1st Annual Report

OPTICON

Optical Infrared Co-ordination Network for Astronomy

Integrating Activity

implemented as

Integrated Infrastructure Initiative

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There may be some rounding anomalies when comparing costs on Forms C and the Summary Financial Report. Any rounding errors were corrected by department B4 at the European Commission.

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1. Progress report

1.1 Summary of the activities and major achievements

OPTICON year-one activity has involved initiation of six major JRA projects, six complex and multi-component networking activities, and an access programme which includes every 2-4m telescope worldwide with even partial European ownership, as well as several more specialist facilities, with all these activities spread across 47 full OPTICON partners, and involving some 70 labs and organisations. Thanks to considerable good-will, hard work, and the enthusiasm of the participants for this ambitious project, all activities are underway.

The networking activities are focussed on strengthening the astronomical community in Europe, integrating newer communities and young scientists into technologies and opportunities with considerable future development potential and developing the science and technical cases to justify those future technologies, infrastructures and research potential. Very considerable progress has been made in developing the European leadership of the next major optical-infrared infrastructure, the Extremely Large Telescope, with an attractively produced Executive Summary widely available. Technical site testing work has started, and more technical work is under development involving hundreds of scientists from across Europe. More specialist facilities and projects, from future developments in interferometric imaging and technology, through space-born ultraviolet science, to future software requirements, are all coming under detailed analysis. A specific and important network is developing a detailed roadmap for future key technologies, establishing a planning basis for the future of astronomy, and identifying those activities which are likely to evolve into JRA activities under FP7. Substantial progress has been made in activities involving strengthening the community, with in particular the first forum where the directors of all 22 of Europe's optical-infrared telescopes can meet, to optimise their future planning and developments, and share expertise and experience. This forum provides regular oversight of the hugely successful Access programme, which has involved provision already of over 310 nights of telescope use, delivered to 334 users from 23 different countries.

OPTICON JRA activities are grouped into six projects,. These range from the very large, multi-faceted and extremely ambitious JRA1, which addresses all aspects of the future development of the real-time adaptive optics wavefront control systems which are the critical requirement for the next stages of development in astronomy, to the highly specialised JRAs which focus on a specific yet critical requirement. For example JRA 2 is developing the next generation of CCD-based fast wavefront sensors which are critical for all adaptive optics, interferometry and high time resolution astrophysics. This JRA2 has made notable progress, in already having in place a very major contract with the world's leading supplier (a European company) to develop and characterise the next generation of these systems. JRA1 has initiated all aspects of its work, and is proving extremely active and effective in its development programmes. A very considerable number of technical reports in the scientific literature resulting from this work have already been produced. This JRA has already produced patented results, which are currently being developed further under license to industry.

JRA3 is extending the work of JRA2 to redder sensitivities, and to devices with more general applicability in astronomy applications. This work is well underway, with three complementary technologies, and associated electronic control systems, under detailed evaluation and test. JRA4 is another ambitious project, developing, in partnership with an associated network activity, the European skill base in interferometric astronomy. Europe is currently developing the largest and most sophisticated interferometric optical/infrared facility on Earth, the VLT Interferometer, at ESO's Paranal observatory. Interferometry is an extremely powerful technique, yet remains in the domain of specialist users. This JRA (and network) are working to develop new generations of instruments and software to ensure the considerable scientific potential of this methodology is available as a common and widely-used research tool. They are working towards a major open meeting in early 2005. JRA5 concentrates on the interface between the telescope, collecting photons, and the detector, recording them. In between vast sophistication is required to ensure the right photons are delivered in the right format to the correct detector. These `smart focal plane' systems are being developed to ensure that future large telescopes can indeed deliver their scientific potential: they will also be invaluable to improve the scientific productivity of the present generation of major infrastructures. This involves some especially interesting work at an SME in the Czech Republic. JRA6 is developing a new class of optical/infrared dispersive devices, Volume Phase Holographic Gratings. These VPHGs are significantly more efficient than standard gratings currently in use. They are a development in which Europe is establishing a clear global lead: this JRA involves both research groups in Italy and an SME in Belgium. Progress is spectacular, and has led already to patented results.

1.2 NA1: Management Activity

The primary management activity has involved initiation of six major JRA projects, six complex and multi-activity networking activities, and an access programme which includes every 2-4m telescope worldwide with even partial European ownership, as well as several more specialist facilities, with all these activities spread across 47 full OPTICON partners, and involving some 70 labs and organisations. A non-trivial effort was required to absorb the impact of the arrival of first funding somewhat later than initial plans. Nonetheless, all is well underway, and going well.

Four formal management meetings were held, two of the OPTICON board, the overarching management body, and two of the smaller executive committee. These are detailed in the table below, with links to the minutes of these meetings. The project office, distributed between contractors nos. 1 and 2, provided support for these meetings, produced and circulated minutes, etc.

The project office carried out calculations of the amounts due as part of the 1st pre-financing and then undertook the actual transfers of the funds to the contractors via its supporting financial officers.

The project had significant representation at the Berlin 2004 Conference on Future Large Facilities. Many presentations relevant to OPTICON's goals were made at this meeting by several contractors. The management team attended to present OPTICON activities, distribute literature and have informal meetings. The Scientific Co-ordinator spoke at a press conference called during the meeting.

Presentations on the overall OPTICON programme and on the trans-national access programme were made at the Joint European National Astronomy Meeting in Granada, Spain. These presentations (and accompanying written material distributed at the meeting and published in the proceedings) set out the goals and activities of OPTICON to a wide audience and new participants were invited to join many of the established OPTICON networks. Special efforts were made to promote the trans-national access programme.

The Scientific Co-ordinator had many discussions with commission representatives over contract amendments and clarifications.

The Project Scientist participated in meetings of N3.1, N3.2, N3.5, N6.1, N6.3 JRA-4 and (via video-conf) JRA3. He was in teleconference and e-mail contact with the leaders of N3.3, N3.6, N4, N5 and all JRA1-6 PI's. In the main, the management role at these meetings was to present the whole OPTICON project to the working groups so they could see how individual activities fitted into the overall project and to answer questions on how the project was to be managed and financed.

The Project Scientist consulted widely with the OPTICON consortium on the draft format for this annual report presented by the EU and fed those comments back to the Commission team. Many of these comments were accepted and a better template for the report was the beneficial outcome. The Project Scientist attended the RI Co-ordinators meeting, Brussels Nov12 (the Co-ordinator was unavailable due to a prior international commitment).

The project office completely revised the original OPTICON web site, with special emphasis on meeting international standards on accessibility. All OPTICON pages conform to a common standard. A series of paper handouts, plus low cost items carrying the OPTICON logo (pens, badges etc), have been produced and widely distributed to raise awareness of the project. Articles on progress with the project have appeared regularly in the newsletter of the European Astronomical Society.

The Project Scientist and Scientific Coordinator were in frequent contact with their counterparts in RadioNet to share information and discuss common issues.

Participant number[1]	1a	2b	
Participant short name[2]	UCAM - IoA	PPARC - UKATC	**Total**
Person-months[3]	13 (9)	10	**25**

The Project Office made special efforts to clarify with all concerned what information would be required and who was responsible for each action needed to produce the report. Templates were prepared and circulated in late December.

[1] Lead participant first

[2] Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

[3] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

Date	Title/subject of meeting	Location	Number of attendees	Website address
1 - 2 April 2004	1st Board meeting	Ghent	40	http://www.astro-opticon.org/meetings.html
2 April 2004	1st Executive Committee meeting	Ghent	17 (includes observer)	http://www.astro-opticon.org/meetings.html
21 September 2004	2nd Executive Committee meeting	Leiden	8 +1 by teleconf	http://www.astro-opticon.org/meetings.html
11 - 12 October 2004	2nd Board meeting	Grenoble	28	http://www.astro-opticon.org/meetings.html

There has been no general meeting of the entire consortium. It is too large, and its activities too diverse, to make such a meeting productive.

No specific consortium management problems have been encountered

1.3 NETWORKING ACTIVITIES (other than Management)

1.3.1 NA2: Coordination and Integration of ENO facilities

1.3.1.1 Contractors:

Participant number[4]	7	2c, 2d	24	
Participant short name[5]	IAC	PPARC – WHT, INT	IGAM	**Total**
Person-months[6]	46 (2)	3 (3)	4 (3)	**53 (8)**

The following contractors participated in these activities but are not charging staff effort to the project:

Participant number[7]	27	8f	25	43	17	20a	22	13	1b
Participant short name[8]	IOA-KUL	INAF - TNG	THEMIS	IFAE	KIS	RSAS	Utrecht Univ	NOTSA - NOT	UCAM - CAV
Person-months[9]	0	0	0	0	0	0	0	0	0

[4] Lead participant first

[5] Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

[6] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

[7] Lead participant first

[8] Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

[9] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

Other participants[10]:

- ✓ Laboratoire Universitaire d'Astrophysique de Nice (LUAN), France
- ✓ Jodrell Bank Observatory, United Kingdom

1.3.1.2 Summary of Objectives and progress made:

WP1.: Co-ordination of scientific communities at ENO:

- ***WP1.1.: Dissemination of good practices:*** Directors with facilities at ENO have met twice during 2004 under the NA2 together with the European Northern Observatory Network (some of the participants at NA2 are members of this ENO network). The first meeting was held in Copenhagen (Denmark, 4th June 2004) and the second one in Tenerife (Canary Islands, Spain, 28th October 2004). The different activities and work-packages carried out under NA2 are reviewed in detail during these meetings, making recommendations to optimise their results.

  Apart from that, some specific activities have been carried out under the framework of these meetings. A 4M€ proposal to improve bandwidth and reliability of all of the communications links from each of the installations to the national and international networks has been submitted at the end of June to the Spanish national authorities. Final evaluation and results are expected by February 2005.

- ***WP1.2.: Laser Traffic Control System (LTCS) for ORM:*** The kick-off meeting of this sub-work package was held in July. The main rules for the Laser beacon deployment at the ORM were presented and approved at the CCI meeting (Copenhagen, June 04).

  Suitability of adopting (parts of) the LTCS developed by the Keck Observatory on Hawaii is being investigated. Apart from this assessment, work currently focuses on pinpointing the exact geographical coordinates of the telescopes, which is essential input to any LTCS implementation. Documented telescope coordinates are being compared to, and cross-checked with, accurate GPS measurements and satellite imagery.

WP2.: Site Characterisation of the Canary Islands' Observatories: A report on night-time seeing measurements with DIMMS has been produced. Annual reports on measurements of extinction and dust as well as on discussion forums for site-selection has been produced. In this regard, the ATST Science Working Group (SWG) has organized a meeting at the end of October to review the report delivered by the Site Survey Working Group.

A database powered website of meteorological data has already been developed by the IAC. First contacts have also been made to coordinate all ORM and OT weather stations (October 2004). The main objective is to know the status of different meteorological databases and to study the technical feasibility of a joint database powered website.

The tender for DIMMA (Automatic) took place in June 2004 and was subcontracted to INERZA, S.A. in September 2004, for the amount of 139.000,00 EUR. The DIMMA is under construction and it is expected to have it operative by 2006. The main part of the funds requested to subcontract this development has been provided entirely by the IAC.

[10] No resources have been made available on the basis of prior agreements. Their participation is related to the attendance of meetings. No costs or resources are identified in Annex I of the contract for their participation

Systematic day-time seeing measurements using a DIMM at Teide Observatory (OT) are expected by March 2005, once the ATST (Advanced Technology Solar Telescope) campaign at ORM has finished and the corresponding instrumentation has been acquired.

Some contributions were provided to the SPIE meetings in June (Glasgow) and in September (Canary Islands).

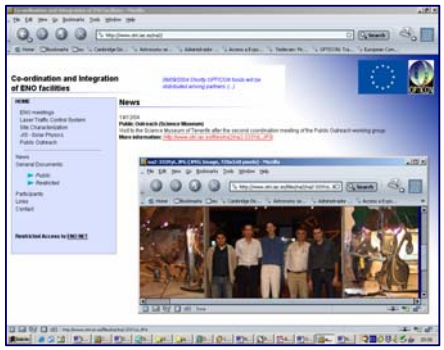
WP3.: Joint Information System and Transfer of Knowledge:

- ***WP3.1.: Development of a Joint Information System for Solar Physics (JIS):*** The kick-off meeting was held in Tenerife (19th March) and detailed planning for different activities was agreed. In April, by means of the JOSO (Joint Organization for Solar Observations) Secretariat and the Board of the JAD (Joint Astrophysics Division of the European Physical Society –EPS- and the European Astronomical Society –EAS), a general message was sent to all national communities involved with Solar Physics, informing them of the JIS initiative. A teleconference took place in May with the main objective of coordinating actions between JIS and EGSO (European Grid of Solar Observations). The First Draft Proposal related to the development of the JIS was issued by July 23rd. A technician was recruited for the development of the JIS' database in November 2004, in order to assure that the interface met all requirements and versatility on time.

- ***WP3.2.: Co-ordinated actions on transfer of knowledge and public outreach:*** Two coordination meetings were held during 2004, the first one in La Palma (29th September) and the second one in Tenerife (14th December). The IAC is leading this working group for the organization and implementation of joint actions on public outreach. During 2004, some of these actions were implemented through conferences, open doors, stands, etc (described in more detail later), as well as dissemination of individual results arising from the facilities installed at ORM and OT. Two visits to the ORM have been organized during 2004, in August and November respectively. A stand promoting both observatories (ORM & OT) was presented by the IAC in JENAM 2004 (Joint European and National Astronomical Meeting, 13-17 September), where handouts about the coordination and integration of the facilities installed at both observatories were distributed. Likewise a dossier describing the facilities and joint website are being developed.

1.3.1.3. Achievements and their impact resulting from this activity during the reporting period

The management of the whole Networking Activity (NA2) has been supported by the development of a joint website where progress made, schedules and documents are registered. A restricted access area for each working group has been set up, making possible the exchange of information and the uploading of new documents related to their workpackage.



NA2 website: www.otri.iac.es/na2/

The management of the different working groups is monitored through this platform, where the chair is carrying out a regular update of minutes from the coordination meetings, current news, gallery of images and information about the forthcoming events of interest for the NA2.

WP1. Co-ordination of scientific communities at ENO:

WP1.1 Dissemination of good practices

A proposal for communication infrastructure between both observatories and the IAC HQ (Communication Network Developments at ENO) was presented last June. This proposal was submitted to the Spanish National Government and, if successfully approved, it will cover 70% of the cost for this new infrastructure, which is estimated to be around 4 M€, including IAC infrastructure.

WP1.2: A co-ordinated Laser Traffic Control System (LTCS) for the ORM

The successful implementation of the LTCS relies on good collaboration between the telescopes at the observatory site. Therefore a kick-off meeting was held at which all partners were informed of the plans for laser deployment at the William Herschel Telescope. The potential impact on other telescopes was discussed, in particular with respect to the intelligent IT system, the LTCS, that would be designed to prevent negative impact of laser light affecting any other telescope. Many technical issues resulted from this that will be taken into account in the design and implementation phase

Roque de los Muchachos Observatory (ORM): Dashed lines represent the telescopes projecting lasers

of the project.

At the highest level, a proposal was put forward to the International Scientific Committee that oversees the operation of the observatory for the deployment of a laser system. A set of ground rules was endorsed. Moreover, a detailed theoretical model for Rayleigh scatter from the laser was completed that will serve as essential input to the project.

Activities on WP1.2 ramped up with the recruitment of a dedicated person in October 2004, once the OPTICON funding had been secured. First, contact was established with the Keck Observatory at Hawaii, where experience with a similar system exists. Potentially much can be learned from the Keck implementation. Second, work focussed on the determination of the exact position of all participating telescopes, using GPS measurements, existing geodetic measurements, and satellite imagery. This will be an activity that will take a few months to complete. Third, the overall system requirements will be assessed before construction and implementation can take place.

WP2. Site Characterization at the Canary Islands' Observatories:

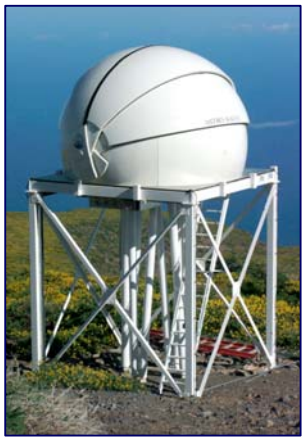
WP2.1: Co-ordination of night-time seeing measurements with DIMMs

Continuous site-testing campaigns have been carried out at the Degollada del Hoyo Verde, ORM, for seeing and meteorological characterization, starting in March 2002.

Statistical seeing results indicate very good optical conditions showing a high homogeneity between different sites at the observatory over several years.

The spot saturation has been undertaken as a parameter involved in the seeing calculation (The influence of spot saturation on DIMM seeing measurements, Varela, Vernin & Muñoz-Tuñón, Proc. of SPIE on Extremely Large Telescopes, Bäckaskog, Sweden, Vol. 5382, 656, 2004 http://www.iac.es/project/sitesting/site.html on Bibliography). In the same way, we conclude that the opposite effect, i.e. the loss of intensity of the spots, has also to be implemented as a control parameter in future automatic DIMMs.

Night time seeing data and statistics are now also available from the project web page http://www.iac.es/project/sitesting/site.html under "Statistics and Data". To the best of our knowledge, this is the first dynamical seeing and meteorological database available at an observing site.



DIMMA will be protected by a clam-shell dome.

Assembly of elements to be linked in the DIMMA.

The tender for DIMMA was assigned to INERZA, S.A. in September 2004 from among 4 applications. The DIMMA is under construction and will be delivered in a 1.5 year (expected for 2006). Most of the funds needed to carry out this development were compromised through a subcontract (139000€). This subcontract has been entirely covered by the IAC (no OPTICON funds are requested for this). OPTICON funds will be used for consumables, trips, durable equipment, etc. Although the IAC will have the DIMMA property rights, this milestone and corresponding deliverable expected by 2006 will be an achievement of the OPTICON project.

WP2.3 Joint actions for meteorology, dust, extinction and Sky Background

Joint Actions for Meteorology have been started in this summer. The IAC meteo web page will be the central link for a common web page. In order to coordinate all ORM and OT weather stations' data we have initiated the first contacts in order to know the status of different meteorological databases and the feasibility of their being implemented in a common database, accessible on the web.

In October 2004 the working group has tested its recently acquired CASELLA Automatic Weather Station (AWS) which will be installed at a possible site to host a future ELT (close to the heliports). New AWS software creates html files directly for networking data. This software will be implemented in the Degollada del Hoyo Verde meteorological station in order to have on line weather conditions at both sites.


AWS at ORM

The permissions and budgets for installing this new AWS have been approved (expected for early 2005).

With regard to the measurement of extinction and dust, Atmospheric extinction provided by the CAMC and aerosol index provided by the NASA-TOMS has been compared (refs. SPIE conferences), as well as the aerosol index provided by TOMS/Earth Probe from 1996 to 2004, at the Canaries Observatories' sectors with the atmospheric extinction coefficient provided by the CAMC Telescope.

The results have recently been published in the Ground-based Telescopes SPIE Conference Proceedings (Comparison between atmospheric extinction coefficient and TOMS aerosol index at the Canaries Observatories, Varela, Fuensalida, Muñoz-Tuñón, Rodriguez-Espinosa and Cuevas, Vol. 5489, 245, 2004) and in Remote Sensing SPIE Conference Proceedings (No correlation between atmospheric extinction coefficient and TOMS aerosol index at the Canaries Observatories, Varela, Fuensalida, Muñoz-Tuñón, Rodriguez-Espinosa and Cuevas, 2004) see http://www.iac.es/project/sitesting/site.html on Bibliography.

An astronomical calibration of the semi-quantitative aerosol index given by NIMBUS7 has been derived, in good agreement with daytime calibrations available in the literature from AERONET measurements, or from Sun photometry over sites affected by Saharan dust. The results have been presented at the SPIE meeting in Glasgow, 2004 (Correlation between TOMS aerosol index and the astronomical extinction, Siher, Ortolani, Sarazin & Benkhaldoun, Vol. 5489, 138, 2004).


Portable dust meter

Dust measurements in situ have been regularly collected with a portable dust meter, in the range 0.3 - 5.0 micron. The data from the last three years have been reduced. An analysis of the results has been presented during 2004 at the SPIE meeting of Glasgow, June 2004 (Three Years Of Dust Monitoring at Galileo Telescope, Ghedina, Pedani Guerra, Zitelli and Porcedu, Vol. 5489, 227).

WP2.4 Joint actions for Measurement of turbulence and wind vertical profiles (SCIDAR, GSM & DIMM)

We have been observing at the Observatorio del Roque de los Muchachos (ORM) since February 2004 with a monthly one-week SCIDAR campaigns. We already have one year of SCIDAR measurements at the ORM and a few nights of simultaneous SCIDAR turbulence profiles at the ORM and the Observatorio del Teide (OT).

First results on the statistical behaviour (over a period of six months) of turbulence profiles at the ORM were presented at the SPIE meeting "Remote Sensing" held on Gran Canaria (Spain) and the paper contribution is already published (Statistics of atmospheric parameters for the Observatorio del Roque de los Muchachos by Fuensalida, García-Lorenzo, Castro, Chueca, Delgado, Gónzalez-Rodríguez, Hoegemann, Reyes, Verde, & Vernin, 2004, Proc SPIE, 5572, 1). This is the first statistical study of the turbulence behaviour over a long period for any astronomical site in the world. We have found that most of the turbulence is concentrated close to the observatory level (2400m), with no more than two turbulent layers at higher altitudes. The temporal evolution during six consecutive months indicates that the turbulence is concentrated at lower altitude layers during winter. Large isoplanatic angles are also reached in winter compared to the values in spring.

We have developed new software to remove the dome seeing contribution from the observed turbulence profiles based on the mathematical properties of the parity of functions. We are also developing new software to derive the wind vertical profiles from SCIDAR observations based on wavelet analysis of the cross-correlation of a series of scintillation patterns derived from SCIDAR measurements.

The NOAA Climate Diagnostic archive have been used to obtained tropospheric wind data of different astronomical sites (La Palma (ORM), Mauna Kea, La Silla, Paranal, and San Pedro Martin) and compared their wind vertical profiles (wind speed at the different altitudes and temporal behaviour) with special attention to winds at the 200 mbars pressure level. The preliminary results were presented on the SPIE conferences "Remote sensing" (Climate diagnostic archives: an approach to ELT site selection by Garcia-Lorenzo, Fuensalida, Mendizabal, Muñoz-Tuñón, & Varela, 2004, Proc SPIE, 5572, 68) and "Astronomical Telescopes and Instrumentation" (Climatological databases as a tool for the ELT site selection by Garcia-Lorenzo, Fuensalida, Mendizabal, Muñoz-Tuñón, & Varela, Proc SPIE, 5489, 130). A paper on this subject entitled "Astronomical Site Ranking based on Tropospheric Wind Statistics" (García-Lorenzo, Fuensalida, Muñoz-Tuñón, & Mendizabal) has been recently published at the MNRAS (MNRAS, 2004, 691). The statistical results derived in these papers indicates that, based on the winds at the 200 mbars parameter, the ORM is the most suitable site for adaptive optics of the five in the study.

WP2.5 Distribution and discussion of results and participation at the scientific forums

The Site Testing group has attended two International SPIE Conferences during the summer 2004:

1º Astronomical Telescopes and Instrumentation, Scottish Exhibition and Convention Centre Glasgow, Scotland United Kingdom, June 2004:

At this Symposium we have presented 6 contributions related to the most recent works performed by the IAC's Sky Quality Group and the High Spatial Resolution team, on the site "Characterization of the Canaries Observatories" project. The use of the climate data archive and satellite data for site testing is discussed against in situ measurements. We approach the need for using both measurements -in situ and remote- in the process of site selection for a future Extremely Large Telescope and for applying high-resolution techniques. The parameters analyzed were the tropospheric winds (and their atmospheric turbulence relationship) and the aerosol distribution in the maritime mixing layer and in the medium-upper free troposphere, and its contribution on the astronomical observations.

2º Remote Sensing. Optics in Atmospheric Propagation and Adaptive Systems VII. Maspalomas, Gran Canaria, September 2004:

In the 9 contributions presented at this Symposium the site testing results and techniques developed in the last decade at the Canaries Observatories were summarized.

An annual report on discussion forums for site-selection has been delivered.

The working group proposed a new analysis of parameters related to the astronomical site characterization (clouds, dust, etc.) and the prospects on the detection by spectrographs onboard satellites.

WP3. Joint Information System and Transfer of Knowledge:

WP3.1 Development of a Joint Information System (JIS) on European Solar Physics Facilities

General issues concerning the database were discussed during a kick-off meeting at Tenerife. In an international conference on solar physics the JIS was presented and people were asked for further inputs. It was decided that the location of the server could be the Kanzelhöhe observatory at Treffen, Austria, and the responsible person for carrying out the programming work should be one who is already familiar with respective programs and solar physicists. In this context the Joint Organization for solar observers (JOSO) serves as a medium to spread the information and collect input.

JIS: 1st version.

First version of the JIS has already developed, including the login-page. All pages are secured with a username and a password stored in a separate database.

Visitors have access to thematic sections such as a 'map' page, where all institutes/observatories are distributed by country. This database powered website has also different levels of access. In the event of delicate data and information that must be available for restricted access, the JIS architecture will provide the safety device to the designated persons. As a consequence, all the servers of JIS have appropriate support and security politics in order to guarantee the functionality of JIS.

WP3.2: Co-ordinated actions on transfer of knowledge and public outreach.

The set of activities organised during 2004 under the framework of this workpackage has obtained a very high impact and positive results towards a higher level of integration and co-ordination of ENO facilities. Among the activities carried out during 2004, the following ones can be emphasized here:

- Visits to the Roque de Los Muchachos observatory (ORM): Open Doors Days in August 2004 and an astrobiology-oriented visit in November 2004.
- A stand promoting both observatories presented in JENAM 2004 (September). Granada.
- Promotional material: Design of joint brochures of the facilities presented at the ORM and the Teide Observatory (OT) as well as a design of permanent panels to be installed at both observatories. Collaboration in the European Science & Technology Week 2004 celebrated in La Palma (Canary Islands) with poster contributions and science communication talks.
- Development of the first draft of the joint Website on public outreach.

Astrobiology-oriented visit. November 2004.

Public Outreach Website. First design.

The regular update of the Website will be focussed on public outreach news, including new observing programmes carried out at both observatories, each facilities' highlights, forthcoming events about science communication as well as OPTICON highlights.

The Public Outreach Website will be available in Spanish and English. The whole development of this website will be subcontracted but the compilation of contents will be done by the working group.

These activities have produced a positive impact not only for the general public as final users, but also for the Telescope facilities installed at ENO where the synergy set up by the working group is allowing to widely publicize their scientific results.

1.3.1.4 Deviations from the work planned in the last detailed implementation plan.

The spent related to the NA2 activity is behind schedule due to legal restrictions affecting the management of external funds. The IAC is not allowed to make certain kinds of expenses, e.g. acquiring major durable equipment or recruitment of new staff, when too large an amount of funding is involved, unless those necessary funds are available in our accounts. In fact, the main part of the durable equipment (around 120 k€) related to the Site Testing and other activities, as originally planned, could not be acquired for this reason. Most of these expenses, originally planned and necessary for the activities are being incurred during early 2005 given that funds were released in October 2004. Although such expenses have not been approached in 2004 with the resulting delay, the actual coordination level among the different working groups will allow this lost time to be made up during 2005, according to the revised detailed implementation plan.

Deviations associated with specific workpackages:

WP1. Co-ordination of scientific communities at ENO

WP1.2: A co-ordinated Laser Traffic Control System (LTCS) for the ORM

Although due to late release of the OPTICON funds some delay in the programme has been inevitable, we feel confident that delivery of the LTCS will remain on track, and that implementation of the system will be within the cost and time envelope.

WP2. Site Characterization at the Canary Islands' Observatories:

WP2.1: Co-ordination of night-time seeing measurements with DIMMs

As has been highlighted in the previous section, most of the activities initially planned in this workpackage have been carried out during 2004, except the campaigns using a Generalized Seeing Monitor (GSM) at the ORM, given that it was impossible to bring this instrument from Nice University (GSM's owner). The deliverable corresponding to these campaign will depend on the availability of this instrument during 2005

WP2.2 Co-ordination of day-time seeing measurements at Teide Observatory (OT)

Once again, the late release of the OPTICON funds has prevented the two milestones planned for this first year of the contract being reached (systematic measurements using SDIMM and as well as scintillitation measurements). With the ATST campaign at ORM already finished, it is expected that by March 2005 the observing team will start work at OT with a similar instrumentation to the one used at ORM.

WP2.3 Joint actions for meteorology, dust, extinction and Sky Background

The installation of the Automatic Weather Station (AWS) depends on the time required to pass the administrative proceedings. It is expected that this milestone will be achieved by the first four months of 2005.

Although the ''*annual report on stations already existing*'' has still not been achieved, considerable progress has been made during 2004, starting with the first proposals to develop a joint meteo-website. Some of the institutions involved in this METEO and WEB network (NOT, ING, TNG, Mercator) are providing information about their stations, and a first report by the middle of 2005 is expected.

WP3. Joint Information System and Transfer of Knowledge:

WP3.1 Development of a Joint Information System (JIS) on European Solar Physics Facilities

To accomplish the main goal of JIS (to establish an information system for the whole European community in solar physics) it was decided to subcontract a company to develop such an interface to technical requirements and specifications as agreed by partners. Although an offer from a Spanish company with technical specification of how to achieve that was received, it was realized that the draft proposal only very vaguely described how the company thinks that such a system could be established. Two problems were found with the proposal issued by this company: 1) This proposal did not offer enough documentation or technical specifications as to guarantee requirements for the solar community would be met; 2) productive discussions with this company would be very difficult since this company had no major links or relationship with the solar community or with research institutions.

For both reasons, it was agreed to carry out this development by ourselves by recruiting a technician with good skills in programming similar interfaces, some background in solar physics, and under the direct supervision of the working group.

Therefore the amount of funding for this subcontract (14000 Euros), as initially planned, was not spent.

The deliverable D1: Draft proposal for design and contents of Central Site is now scheduled for February 2005 and considerable progress have been made in next ones (D2, D3,D4 & D5).

In May 2005 a special workshop will be held on JIS and final proposals for minor changes can be made there. Thus JIS should become an optimized and extremely valuable tool to the solar physics community.

WP3.2: Co-ordinated actions on transfer of knowledge and public outreach.

Although most of the actions already started in this workpackage (see previous section) could be achieved in the next few months, the implementation plan related to the Public Outreach is behind schedule mainly due to the delay in the releasing of OPTICON funds among participants as well as to the setbacks when establishing the composition of the working group for this activity during last summer.

This deviation of the implementation plan will be overcome during 2005, where the coordination level will be fully effective. To guarantee this main goal, the working group has developed an internal implementation plan that will boost joint actions focussed in the achievement of the Deliverables and Milestones initially planed and agreed.

Milestone ‘’M1 Open-door day at ORM’’ has been already achieved in last August, and complemented by an Astrobiology oriented-visit carried out in November coinciding with the 2004 European Science and Technology week.

1.3.1.5. Milestones and Deliverables achieved:

Name of deliverable/milestone	Activity (NAx; JRAy)	Work-package /Task	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
D1. Updated Progress report and revised roadmap	NA2	WP1.1 Dissemination of good practices.	IAC	12	11
M1: Regular ENO meetings	NA2	WP1.1 Dissemination of good practices.	IAC, IOA-KUL, INAF, THEMIS, IFAE, UCAM, Jodrell Bank.	6	6
M1: Regular ENO meetings	NA2	WP1.1 Dissemination of good practices.	IAC, IOA-KUL, INAF, THEMIS, IFAE, UCAM, Jodrell Bank.	12	10
M1: Kick-off meeting for the co-ordinated laser control system	NA2	WP1.2: A co-ordinated Laser Traffic Control System (LTCS) for the ORM	PPARC, IAC, IOA-KUL, IFAE, NOTSA, INAF	6	7
D1. Report: Systematic measurements of seeing & meteorology	NA2	WP2.1: Co-ordination of night-time seeing measurements with DIMMs	IAC, INAF, PPARC, NOTSA	13	12
M1 Automate monitor DA/IAC	NA2	WP2.1: Co-ordination of night-time seeing measurements with DIMMs	IAC	3>>	9>>
D1 Annual report on measurements of extinction and dust	NA2	WP2.3 Joint actions for meteorology, dust, extinction and Sky Background	IAC, INAF	12	12
D1. Report on techniques to get wind profiles	NA2	WP2.4 Joint actions for Measurement of turbulence and wind vertical profiles (SCIDAR, GSM & DIMM)	IAC	12	12
D1. Annual report on discussion forums for site-selection	NA2	WP2.5 Distribution and discussion of results and participation in the scientific forums	IAC	6	6
M1: Kick-off meeting: Joint Information System - JIS	NA2	WP.3.1 Development of a Joint Information System (JIS) on European Solar Physics Facilities.	IGAM, IAC, KIS	1	3
M1: Open-doors days at OT and ORM	NA2	WP3.2: Co-ordinated actions on transfer of knowledge and public outreach.	IAC, PPARC, INAF, IOA-KUL, IFAE	8	8

1.3.1.6. Meetings and Workshops table

WP1.1 Dissemination of good practices

Name of Meeting	Date and Location	Web address
First ENO meeting	Copenhagen, 4th June 2004	http://www.otri.iac.es/na2/
Second ENO meeting	Tenerife, 28th October 2004	http://www.otri.iac.es/na2/

Description:
Directors with facilities at ENO have organized the first meeting under the NA2 together with the IV ENO Board meeting.

This meeting has been focused on the establishment of special working groups to discuss very specific and common issues affecting subsets of astronomical community (communications, etc), reviewing the status and activities carried out since the last meeting in The Hague (June 2003), as well as to make recommendations on the activities to be carried out under NA2.

Directors with facilities at ENO have organized the second meeting under the NA2 together with the V ENO Board meeting.

The future perspectives of the ENO network were the main issue of discussion, reviewing the status and activities carried out since the last meeting in Copenhagen (June 2004).

WP1.2 A co-ordinated Laser Traffic Control System (LTCS) for the ORM

Name of Meeting 1	**Activity (NAx; JRAy)**	**Date and Location**
Kick-off meeting	NA2	La Palma, 4th July 2004

Description:
This was the formal kick-off meeting to initiate the discussion for the development of a laser traffic control system that will minimize the adverse impact of the use of laser beacons for adaptive optics on other telescopes at the Roque de los Muchachos Observatory.

First technical specifications:

- It was noted that the field of view for avoidance of beam collisions agreed as a starting point by the CCI would be one degree, but as implemented with the Hawaii system this could be fine tuned to accommodate the actual fields of view of the instruments on each telescopes, which would generally be smaller
- It was remarked that the priority rules should allow for beam switching (dithered) observations.
- Moving targets could cause erroneous assessment of whether beam collisions would take place. The Hawaii LTCS would only allow for sidereal tracking rates. However, typical non-sidereal tracking rates are small compared to the typical field of view, and if necessary a larger safety margin in the field-of-view could be set to accommodate moving targets.

A new technician was recruited in October leading the development and implementation of the LTCS. Work will focus initially on the definition of the project (hardware and software), assessment of the Hawaii software system, and determination of the exact position of the various telescopes.

WP2 Site Characterisation of the Canaries Observatories

Name of Meeting	Date and Location	Web address
SUCOSIP Meeting	Copenhagen, 4th June 2004	http://www.otri.iac.es/na2/ http://www.iac.es/gabinete/cci/index.html
Astronomical Telescopes and Instrumentation 2004. [SPIE]	June 21-25th , 2004, Glasgow	http://spie.org/Conferences/programs/04/as/
Remote Sensing, [SPIE]	September 13- 16th , 2004, Canary Islands	http://spie.org/Conferences/programs/04/ers/
Science Working Group (SWG) meeting	13-15 October, 2004 Tucson, USA	http://www.otri.iac.es/na2/
Fourth National meeting of amateur meteorology	May 4-9th , 2004, Canary Islands	http://www.meteored.com/ram/numero20/tablon.asp
SUCOSIP Meeting	Tenerife, 28th October 2004	http://www.otri.iac.es/na2/ http://www.iac.es/gabinete/cci/index.html
Name of Workshop	Date and Location	Web address
Workshop on Automatic weather station and other applications	October 5th, 2004, Canary Islands	NA

Description:

Progress report were presented and discussed for each of the Working groups:
WP2.1: Co-ordination of night-time seeing measurements with DIMMs
WP2.2: Co-ordination of day-time seeing measurements at Teide Observatory (OT)
WP2.3: Joint actions for meteorology, dust, extinction and Sky Background
WP2.4: Joint actions for Measurement of turbulence and wind vertical profiles (SCIDAR, GSM & DIMM)
WP2.5: Distribution and discussion of results and participation at the scientific forums

The working plan established for the next months included technical/scientific issues such as:
• Meteo WEB, • Dust and satellites, • SCIDAR and Slodar and DIMM automatic plans.

Four contributions related to the recent work carried out by the Sky Quality group and the IAC High Resolution group was presented in this conference.

The discussion was focussed in the use of climatology and satellite data files for astronomical prospecting by comparison with measurements in situ. Likewise, it was pointed out the importance of having *in situ* and *remote* measurements with a view to the selection of an ELT site as well as the development of high resolution techniques.

Nine contributions about astronomical prospecting at the Canaries Observatories during the last decade and the most recent achievements were presented in the Remote Sensing conference. Among these achievements, the seeing measurements with DIMM and the DIMMA projects, the turbulence profiles with the Cute-Scidar at the ORM and the development of techniques related to the adaptive optics were highlighted.

The Science Working Group (SWG) expresses gratitude to the Site Survey Working Group (SSWG) for their outstanding effort in the site testing process. The SWG has reviewed the report provided by the SSWG and has come to the following conclusions and recommendations:

The ATST site survey effort has identified three excellent sites for solar observing: Mees Solar Observatory at Haleakala, Big Bear Solar Observatory (BBSO) at Big Bear Lake, and Roque de los Muchachos observatory at La Palma.

These sites emerged from an initial list of 72 potential candidate sites of which the 6 most promising sites were selected for detailed testing and further narrowed to the three most suitable sites for ATST.

The site survey effort has produced the data needed to make an informed ATST site recommendation.

The SWG recommends that the ATST be located at Haleakala.
The SWG finds that La Palma and BBSO are viable alternative sites. In the event the ATST cannot be constructed at Haleakala, the SWG should be consulted in the selection of the alternate site.

Meeting no. 5 organized by the Canarian Network of Meteorology (ACANMET) and METEORED was focussed in meteorology in the Canary Islands. Experts of regional and national level discussed about the relevant aspects concerning the meteorology, including the Astroclimatic Site Characterization carried out at both observatories (OT &ORM) by the OPTICON Site Testing working group.

Likewise, this forum hosted the recent advances in the field of the satellite communications related to the meteorology.

Members of Site Testing group initiated first contacts with the National Institute of Meteorology with the aim of establishing coordinated actions in dust & pollution campaigns.

The CASELLA Group provides innovative environmental products and includes the supply of environmental monitoring instrumentation, such as Automatic Weather Stations.

The WP2 workshop was focused on the configuration of the Automatic Weather Station (AWS) after an environmental product range review.

WP3.1 Development of a Joint Information System (JIS) on European Solar Physics Facilities

Name of Meeting	Date and Location	Web address
Kick-off meeting	March 19th, 2004, Tenerife.	http://www.otri.iac.es/na2/
Coordination meeting in Tenerife	June 11th, 2004, Tenerife	http://www.otri.iac.es/na2/
7th Hvar Astrophysical Colloquium	September, from 18th to 25th , 2004. Croatia	http://www.geof.hr/oh/meetings/

Description:
During this first meeting a schedule for different activities was agreed. The result of the OPTICON board meeting regarding the preparation of the contract was also commented on. The meeting focussed in the way of compile relevant information amongst European institutions (overall grouped catalogue) as well as the identification of common needs to be addressed by the JIS (draft design proposals and contents, Site design, etc.).

The coordination meeting at the IAC was to discuss the process to identify research groups, activities, information, etc., as well as to study the possibility of having a core group testing the tool. Likewise, technical and scientific specifications have been agreed with a view to the first draft proposal related to the development of the JIS. The first draft proposal was provided by a software company specializing in this kind of tools one month later and it is under discussion.

The Colloquium addressed topics related to Solar Rotation, Methods of Treatment, Variability During the Cycle, Space Weather and the Sun and Climate Variations among others. This colloquium was a great opportunity to present the JIS project to the solar community.

It was pointed out that JIS will not duplicate the EGSO Project ((European Grid of Solar Observations)), the JIS database should contain all relevant data and information on the institutes and persons. Both initiatives were identified as absolutely "complementary" and therefore common actions will be undertaken. In particular, experience acquired by EGSO on specialized software tools has been offered for the development of the JIS initiative.

WP 3.2 Co-ordinated actions on transfer of knowledge and public outreach

Name of Meeting	Date and Location	Web address
Coordination meeting	La Palma, 29th September, 2004	http://www.otri.iac.es/na2/
Coordination meeting	Tenerife, 14th December, 2004	http://www.otri.iac.es/na2/

Description:
The following main topics have been addressed during this coordination meeting:

- Telescope/Observatory outreach joint panels and open-doors. The Open Doors Day at the ORM supported by the ''Public Outreach activity '' on August, the 15th is the first activity carried out by this working group. General public visited the Observatories and saw how the telescopes are used by astronomers, obtaining explanations on the site. Likewise the IAC has participated as an exhibitor in JENAM 2004, focusing its stand in the promotion of the European Northern Observatory (ENO) and publicizing its results.

A detailed working plan has been produced for:

- Bulletins, press releases and other multimedia material
- Updating of ENO web pages (including information and results from the activities of this whole I3 project).
- Explanatory units and displays for public events related to exceptional astronomical phenomena (1-2/year).
- Collection of talks and material on research programmes at ENO facilities
- Stands and other explanatory elements for co-ordinated major events (like participation in exhibitions organised by the European Commission).

This second coordination meeting was held in La Laguna to assess the progress made in this workpackage during 2004 and to establish the implementation plan for 2005.

The milestone achieved during 2004 has been the M1: Open-door day at ORM last August, complemented by an Astrobiology oriented-visit carried out in November under the 2004 European Science and Technology week.

Most of the actions already started could be achieved in the next few months, such as the production of a dossier with brochures of each facility, development of a Joint Website and the installation of permanent panels at both observatories.

Among actions to be carried out during 2005, the Open-door days, the exhibition of educational material and the participation of the Public Outreach working group in international events on science communications will have special relevance.

1.3.2 NA3: Structuring European Astronomy

Participant number	2	2b	
Participant short name	PPARC	UKATC	**Total**
Person-months	7.0	3.3	10.3

Considerable efforts have been put into these activities by many contractors and other persons, however, only two individuals are charging effort to the project.

WP1: ELT

The planned appointment of a project scientist for the ELT science case development (Dr Isobel Hook) has been confirmed and her ELT activities are funded ~50% by OPTICON and ~50% by PPARC. A meeting with our US colleagues was held in Berlin in mid-May, just prior to the large "Berlin 2004" conference on future facilities. The goal of the joint EU/US meeting was to discuss science that could be carried out with extremely large telescopes of sizes from 30m diameter (as for the US GSMT) to 100m (as for the European "OWL" telescope concept). 10 representatives from the OPTICON ELT science working group attended and 10 from the GSMT SWG. There was broad consensus on the main science that would be achievable with either telescope. Several areas for further study (such as creating simulated observations) were identified.

Several presentations were made by members of the OPTICON Science Working Group (SWG) at the Berlin 2004 conference (Hook, Bremer, Lehnert) and written papers were prepared for the proceedings. Hook also gave a presentation at the SPIE meeting in Glasgow (June 2004) on ELT science on behalf of the OPTICON SWG, and prepared a 12-page written version of the paper. Also an ELT presentation supported by OPTICON was made (by Zinnecker) at the recent bio-astronomy conference in Iceland.

A web site has been created for the OPTICON ELT Science WG,

(http://www-astro.physics.ox.ac.uk/%7Eimh/ELT/) where details of the meetings and draft science cases can be found. In addition, a brochure giving an overview of the ELT science case has been prepared for publicity purposes.

The chair of this activity (Dr Hook) continues close interaction with the European ELT Design Study team (involving attendance at meetings within Europe). Plans for the OPTICON ELT activity were presented to the OPTICON board at their meeting in Ghent on 1st-2nd April.

A major workshop on developing the ELT science case was held in Florence on 8-10 November. The meeting consisted of presentations and discussions on various science topics by members of the Science WG. These provide the basis for a European ELT science case and for a requirements document which is now being written. 54 people attended (8 full-funded plus 8 part-funded by OPTICON). Very lively discussions were held at the meeting, particularly on the details of simulated observations of Exo-planets. This highlighted the need for more effort on simulations, in order to bring them to a consistent level of detail.

WP1, milestone M2 was considered unnecessary since effective consultation and preparation for the ELT workshop proved possible by electronic means.

WP2: Network for UV Astronomy (NUVA)

The Network for UltraViolet Astronomy has been successfully established. Its objectives are to:

- Formulate and operate a UV astronomy Network
- Plan and execute a road mapping activity
- Carry out exploratory analysis to define scientific requirements for the future and critical assessment of the publicly available information in various archives.

Colleagues from the EU countries France, Finland, Germany, Italy, The Netherlands, Spain, UK as well as from Russia, U.S.A. and Israel have joined the network.

A preparatory workshop on UV astronomy was held from the 21st-24th of September in Madrid. 24 astronomers attended the meeting to define and prepare a science case for UV astronomy. The attendees worked together for a week to integrate a science case for UV astronomy ranging from the formation of the Solar System to Fundamental Physics and Cosmology. Several working groups have been established by specialties: Solar System, Cool Stars, Formation of planetary systems (from ISM to planets), Massive Stars, Interacting binaries, White Dwarfs, Galaxy formation and evolution, AGNs and QSOs, Intergalactic Medium and Cosmology and Instrumentation. A preliminary science case for each of these fields has been drafted**.** More than 40 astronomers have offered to collaborate in the further elaboration of the case. The final draft of the science case will be published as a special issue devoted to UV astronomy in Astrophysics and Space Science.

NUVA has been presented in several scientific meetings during this year: Exploring the Cosmic Frontier (Berlin, May 2004), Cool Stars, Stellar Systems and the Sun XIII (Hamburg, July 2004) and JENAM 2004 (September 2004).

A web page, able to channel the community interaction, has been launched (http://www.ucm.es/info/nuva/mipag.php?id_llamador=0) – the major initial inputs came after the Madrid meeting (September 2004).

A letter has been sent to ESA from NUVA in answer to the call for letters for the "Cosmic Vision 2015" pointing out the relevance of UV astronomy for the progress of astrophysics.

The work proceeds as scheduled originally.

WP3: High Time Resolution Astrophysics (HTRA)

No expenses have been reported in 2004, since most of the communication related to WP3 has taken place by e-mail and direct contacts in conjunction with activities in JRA3.

The division of participants into working groups has taken place (milestone M1), as follows:

WG1 L3-CCDs: This working group was tasked with documenting short-term astronomical applicability and the projected technological development of L3 CCDs. The Chairman was Craig MacKay (UACM-IoA) and the member laboratories were participant nos. 1a (UCAM-IoA), 37 (LSW), 4a (ESO), 39 (USFD), 40 (Warwick), 13 (NOTSA).

WG2 photon counting PN sensor: This working group was tasked with evaluating potential areas of applicability of photon counting CCDs based on PN sensor technology. The Chairman was Kanbach (MPE) and the member laboratories were participant nos. 11e (MPE), 11d (MPA), 4a (ESO-INS) and an external advisory member, the silicon laboratory of the MPE.

WG3 APD: The working group was tasked with the critical evaluation of the application opportunities for APD technology in astronomy. Chairman: Spruit (MPA). Member laboratories: 11e (MPE), 28 (NUIG), 11d (MPA)

The internal reports produced by these working groups over the next 18 months will provide technical and scientific input for the planned international conference, and the final deliverable of N3.3, the white book on HTRA (D1).

Tests of detectors suitable for HTRA have been done in conjunction with JRA3. The main result has been a reassessment of best estimates of the relative merits and areas of applicability of the different technologies (level-3 CCDs, PN-sensors, APD detectors). The rapid rate of change of current technology in L3 and PN-sensors has caused some uncertainty, which has had an impact on the schedule for the next main milestone of the work package. The main product of the WP3 collaboration, a report on the state of the art in technology and applications for HTRA, is still planned to be completed on schedule.

WP4: Astrophysical Virtual Observatory (AVO)

This was the third and last year of the Astrophysical Virtual Observatory (AVO) project. The second AVO science demonstration (AVO First Science) was held on January 27 - 28 at ESO, concurrent with a meeting of the AVO Science Working Group (SWG) (full details available at http://www.euro-vo.org/twiki/bin/view/Avo/SwgMeeting04). Two science cases were demonstrated: an extragalactic one on *Obscured (Type 2) Quasars* and a Galactic one on *Classification of Young Stellar Objects*. The demonstration was a great success and resulted in the publication of the first significant VO refereed paper (*Discovery of optically faint obscured quasars with Virtual Observatory tools*, Padovani, Allen, Rosati & Walton, 2004, Astronomy & Astrophysics, 424, 545). The acceptance of the paper was accompanied by joint ESO/ESA/ASTROGRID/CDS press releases on May 28, details of which can be found at http://www.euro-vo.org/pub/articles/AVO1stSciencePressRelease.html. The press release was extremely well received and found its way on a large number (> 30) of internet Web pages, including those of Nature, Science, and New Scientist. The demonstration dealt with a variety of astronomical data at X-ray, infrared, optical, and radio wavelengths, both from space-based and ground-based observatories. It showed the capability of the AVO to do real science, access spectroscopic data, data cubes, and visualization, use new International Virtual Observatory Alliance standards, implement new tools, developed based on the science and SWG requirements, access photometric tools, access any VO-compliant data collection and archive, in particular the ESA ISO and XMM-Newton and ESO archives. The last AVO demonstration was on January 25 – 26 2005 at ESAC, Madrid. That will mark the end of the AVO project and the beginning of its successor, the EURO-VO.

WP5 : Key Technologies Network

Effort is claimed for the Key Technologies Network only by PPARC in their role as the Key Technologies Network administrator. Travel costs were claimed by some of the participants for attending meetings.

Network Overview

The principal objectives of the Key Technology Network (KTN) are to identify technology needs, look for opportunities which technology developments in other sectors provide for astronomy, encourage European collaborative technology development projects, and provide a form for discussing potential routes for further development.

A core team of 13 has been established to lead these activities (see table below), and an associate team of 26 people to assist activities has been identified. The core team was selected to have expertise in all of the major astronomy technology areas, supported where necessary by the associate team.

A first meeting was held in Glasgow in June 04 during which the membership of the KTN was finalised and an activity plan for the KTN was determined.

A second meeting was held in Grenoble in October 04 during which the scope of the Key Technology Network were clarified.

- The focus of the KTN activities will be *enabling* technologies
- The KTN will support the development of facilities (telescopes) as well as instruments
- The core activity of the KTN will be in the wavelength region 300 nm to 35 μm.
- The KTN will support a balanced portfolio of low risk and high risk technology developments
- The KTN should support the integration of telescope and instrument test facilities

An initial technology roadmap for astronomy was compiled based upon three potential ELT instruments.

- A high contrast, small field imaging instrument for planet finding.
- A multi-object, multi-imaging, diffraction limited patrol field instrument for Virgo stars
- A multi-object, 5*diffraction limited, integral field spectroscopy instrument for high Z galaxies.

Preliminary conclusions in relation to detectors, adaptive optics, cryogenics and general instrument aspects have been posted on the TWIKI open web-site. The roadmap itself will be generated using Strateva software and posted on the web.

This roadmap has been used to guide the KTN plan for workshops to be held during 2005 to be led by core team members. This will include workshops:

- at ESO on the facilities that will be required to support technology development
- on NIR IR detector arrays
- on deformable mirrors
- on the optical components supply chain

Key Technologies Work Package (WP5) Core Team Members:

Participant	Organisation	Core Associate	Meeting 1 - Glasgow	Meeting 2 - Grenoble
Colin Cunningham	UKATC	Yes	Yes	Yes
Callum Norrie	UKATC	No	Yes	Yes
John Davies	UKATC	No	No	Yes
Alan Bridger	UKATC	Yes	Yes	Yes
Stefan Wagner	LSW/Heidelberg	Yes	Yes	No
Bernhard Brandl	Leiden University	Yes	Yes	Yes
Carlos Martin	IAC	Yes	Yes	Yes
Fillipo Zerbi	Brera Obs, Milan	Yes	Yes	Yes
Gavin Dalton	RAL/Oxford Univ	Yes	Yes	Yes
Norbert Hubin	ESO	Yes	Yes	Yes
Guy Monnet	ESO	No	No	Yes
Philippe Feautrier	LAOG, Grenoble	Yes	Yes	Yes
Pierre Kern	LAOG, Grenoble	Yes	No	Yes
Alain Chelli	LAOG, Grenoble	Yes	No	Yes
Goran Olofsson	Stockholm University	Yes	No	Yes
Martin Roth	AIP	Yes	No	No

WP6: Future Software

Contractors:
Although the Working Group has been very active, all work have been done on a volunteer basis and no effort has been charged to OPTICON. The following contractors have all contributed effort to this work package: ESO, PPARC, ESA, RDS, NOVA, INSU/CNRS.

Summary of Objectives and progress made:
The Network was started in the spring of 2004 by the creation of a Web based collaboration site (based on TWiki) at the URL:
<http://archive.eso.org/opticon/twiki/bin/view/Main>
on which ideas and proposals could be exchanged. To keep all participants informed on progress, monthly phone meetings were held (minutes on the Twiki). The vision and scope were first discussed and posted. A agreement was reached in June 2004. The major topics, outlined by the scope, were then considered. To better focus on high-level requirements, typical user scenarios for usage of a future astronomical software environment were defined.

The work done in the NA3.6 was presented in a poster at ADASS 2004 where a Bird-of-Feather (ie a group discussion between people with similar interests) session also was devoted to this topic.

Based on these user scenarios, the discussions on both requirements and architectural concepts were started. Detailed proposals were made before the first face-to-face meeting in December 2004 where general agreement was reached. This meeting was delayed until December 2004 to ensure that topics discussed during the meeting were properly prepared. The main issues for this first meeting were: a) user scenarios, b) top-level requirements for a future software environment, and c) the architectural concept.

Contacts with other projects (e.g. ESO/SAMPO, NRAO, ALMA, STScI, NORO, VO, GRID) were established to ensure wide coordination of the efforts to define a future software environment.

All major groups working on astronomical data analysis have joined the Network activities which therefore presents an important forum for discussions. A consensus on the architectural concept for a future software environment seems to be within reach.

The milestone M1 was achieved by definition of the Scope for the WP6 Working Group as posted on the URL:
<http://archive.eso.org/opticon/twiki/bin/view/Main/ScopeOfNetwork>

Milestones And Deliverables Achieved During The Reporting Period

Activity	Deliverable/ Milestone No	Deliverable/Milestone Name	Work-package /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
NA3	M1	ELT Science Web site	WP1	PPARC	6	1
NA3	M2	Science Team Leader Meeting	WP1	PPARC	9	Cancelled
NA3	M3	ELT Science case meeting	WP1	PPARC	15	11
NA3	M1	Establish UV Net Members	WP2	PPARC	3	3
NA3	M2	Meeting on Future of UV Astronomy	WP2	PPARC	15	9
NA3	M3	1st draft of Roadmap	WP2	PPARC	18	Not due yet
NA3	M1	Establish Working Groups	WP3	MPG	3	3
NA3	M2	First Working Group meetings	WP3	MPG	6	3
NA3	M3	Circulate 1st draft reports	WP3	MPG	18	Now Month 24
NA3	M4	Announce Conference	WP3	MPG	9	21
NA3	M5	Hold Conference	WP3	MPG	18	30
NA3	M1a M1b	Interoperability Meetings	WP4	ESO	6 -	5 9
NA3	M3	DCA Meeting, Paris	WP4	ESO	12	12
NA3	M1	Set up core Working Group	WP5.1	UKATC	1	3
NA3	M2	Plan road map	WP5.1	UKATC	3	6
NA3	M1	Set up initial web page	WP5.2	UK ATC	3	4
NA3	M2	Set up WIKI or equivalent	WP5.2	UK ATC	12	4
NA3	M1	Establish working group and schedule	WP6	ESO	6	6
NA3	M2	Draft High level Requirements	WP6		12	Now due month 18
NA3	M3	Draft interface and design recommendations	WP6		18	Was duplicate M2. Now redefined as M3 and due month 30
NA3	D1	Report on recommendations	WP6		12	Was M3, redefined as deliverable, due month 48

Note to table. Due to an inconsistency between the 5 year and 1st 18 month plan for N3.6, some milestones and deliverables have been redefined as noted here.

Major Meetings And Workshops Organised During The Reporting Period

Date	Title/subject of meeting /workshop	Location	No. of attendees	Website address
8 - 10/11/04	WP1 OPTICON ELT Science meeting	Florence, Italy	54	http://www-astro.physics.ox.ac.uk/~imh/ELT/
21– 24/09/04	WP2 NUVA Meeting	Madrid	28	http://www.ucm.es/info/nuva/mipag.php?id_llamador=0
27 – 28/1/04	WP4 AVO Science Working Group	Garching	21	http://www.ivoa.net/twiki/bin/view/IVOA/IvoaExecMeetingFM9
Dec 2004	WP4 Data Centre Alliance	Paris	~10	In progress
25 – 26/1/05	WP4 AVO Demo	ESAC, Madrid	60	http://www.euro-vo.org/twiki/bin/view/Avo/AvoDemo2005
24 – 28/5/04	WP4 Interoperability Meeting	Boston, USA	74	http://www.ivoa.net/twiki/bin/view/IVOA/InterOpMay2004
27 – 29/9/04	WP4 Interoperability Meeting	Pune, India	85	http://www.ivoa.net/twiki/bin/view/IVOA/InterOpSep2004
23/6/04	WP5 Core Group Meeting	Glasgow	10	https://ssl.roe.ac.uk/twiki/bin/view/Optikeytec/WebHome
13/10/04	WP5 Core Group Meeting and Roadmapping Workshop	Grenoble	14	https://ssl.roe.ac.uk/twiki/bin/view/Optikeytec/WebHome
17/05/04	WP5 Joint meeting with GSMT SWG	Berlin, Germany	20 (10 from OPTICON SWG)	http://www-astro.physics.ox.ac.uk/~imh/ELT/

1.3.3 NA4: Mechanisms for synergy in space-ground coordination

The Network has worked on two of the initial goals whose objectives have been clarified as follows. No effort has been charged to the project:

WP1: Organisation of a network to coordinate the scientific exploitation of major European astronomical infrastructures

The list of major new astronomical infrastructures which started operations recently or which are approved and are in study or building phase has been completed. Groups using these facilities are expected to release reduced data quickly to the overall astronomical community and to develop general use methods and algorithms for data analysis. Thus the question of matching the US support for optimal scientific exploitation of these facilities is just as critical as for space astronomical missions.

The objectives of the network is to analyze this situation, propose mechanisms for the support of scientific activities to groups in Europe carrying large programmes on large ground and space infrastructures. This support should thus reinforce the competitiveness of the astronomical community in Europe with respect to its international competition. The network will be organized with one representative per major facility (space or ground based) which is in either its exploitation or the development phase. For planetary science a specialized I3 exists which will work on similar questions. The N4 network will coordinate with them to consider a common proposal covering both astronomy and planetology.

A group of representatives of these facilities will discuss different mechanisms of the scientific exploitation of these facilities and will discuss ways and means to maximize the scientific return. Examples may be:

i) new mechanisms to support the large scientific projects
ii) mechanisms to distribute the know how of the most knowledgeable groups (instrument builders, leaders of key type projects) to the general user community.

WP2: Organisation of a coordination network of laboratory test facilities for astronomical instrumentation

The aims of this WP are to identify the needs not covered by the present European infrastructures and to propose solutions to the following issues:

- what type of test facilities are better suited to be within research institutes or in European development agencies or in industry
- what test facilities do not exist yet but are clearly needed in the future
- how can duplication of sophisticated facilities for which the demand does not justify more than one in Europe be avoided
- how can reciprocal access to the unique support of these facilities; study mechanism for dual support (from national and European sources) be arranged
- how can access to these facilities be given to countries which only recently became involved in the development of astronomical instrumentations for large European infrastructures and do not have any such test facilities.

An original WP1 objective was concerned with the set up of Elite fellowships in astronomy. In view of the plans to create such fellowships on a pluri-disciplinary basis this goal has been dropped.

The coordinators have identified representatives of each large astronomical European infrastructures (space or ground based) and of the research laboratory test facilities plus representatives of the main two European astronomical development agencies ESA and ESO who are ready to work on the refined goals listed above.

WP1 Space astronomical infrastructures

- XMM - Martin Turner, mjlt@star.le.ac.uk – Mike Watson : mgw@star.le.ac.uk / Space Research Centre, Leicester :
- Integral - Thierry Courvoisier - ISDC Geneva : Thierry.Courvoisier@obs.unige.ch
- Herschell -M. Griffin, Dept Phys. & Astro, Univ de Cardiff : GriffinMJ@Cardiff.ac.uk
- Planck - JL Puget - IAS Jean-Loup Puget@ias.u-psud.fr
- Gaia - C. Turon - Obs de Meudon : catherine.turon@obspm.fr
- JWST - Mark Mc Caughrean, Astrophys.Institute Postdam : mjm@aip.de
- Ground based astronomical infrastuctures
- VLT /VLTI - B. Leibundgut, ESO, Garching : bleibund@eso.org – Wolfram Freudling : wfreudli@eso.org
- ALMA -T. Wilson, ESO, Garching : twilson@eso.org

WP2 Test facilities

- RAL: R.Crowther : R.Crowther@rl.ac.uk – R. Harrison : R.A.Harrison@rl.ac.uk
- CSL: C. Jamar : cjamar@ulg.ac.be
- PANTER: H. Brauninger : hb@mpe.mpg.de
- SRON Utrecht: Piet de Korte : P.A.J.de.Korte@sron.nl
- SRON Groningen: T. de Graauw : thijsdg@sron.rug.nl - Wolfang Wild : W.Wild@sron.rug.nl
- IAS-SAp Orsay: J.L. Puget : jean-loup.puget@ias.u-psud.fr - P.O. Lagage : lagage@cea.fr
- LAM: Olivier Le Fevre : Olivier.LeFevre@oamp.fr
- ESO: A. Morwood : amoor@eso.org
- ESA(SCI-A): Anthony Peacock – apeacock@esa.int

Meetings of these two groups were organised, but the dates originally considered appeared incompatible with other commitments of the participants. New dates are being arranged in early 2005.

Coordination with the European Space Science Committee which is working on related issues and making a study on the funding of space research is ensured by one of the coordinators (J.L. Puget) who chairs the Physical Science Panel within the ESF committee.

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1.3.4 NA5: Interferometry forum

Although the group has been very active, no staff effort has been charged to the project, only travel and material costs. Significant contributions were made by contractors 12 NOVA, 6 INSU, 21b ULg and 34 NCU/UMK.

A handout has been produced on the network activities, and a paper, by Bakker et al, in the JENAM2004 proceedings appeared on the activities of the network.

The European Interferometry Web-site has been developed. This contains the most up to date information about the European Interferometry Initiative (EII) activities and the Network Activities (www.strw.leidenuniv.nl/~eurinterf).

WP4 European (Fizeau) exchange visitors program

The announcement of the Fizeau Exchange Visitors Program has been widely distributed through mailing lists, web-pages (http://www.strw.leidenuniv.nl/~eurinterf), and direct mailing. A poster with the announcement has been designed and is in press. This will further broaden the reach of the announcement.

On 15 March (call 2004A) and 15 September (call 2004B) 2004 two application rounds for the Fizeau Exchange Visitors Program were closed. The applications were reviewed by the Network Board and suitable candidates were identified. This has resulted in two series of exchange visits (Table N5.1).

Applicants name		Home country	Host country	Host city
First	**Last**			
2004A				
Daniela	Korcakova	Czech Republic	France	Grasse
Erez	Ribak	Israel	Italy	Torino
2004B				
Krzysztof	Goździewski	Poland	Netherlands	Leiden
Laszlo	Mosoni	Hungary	Germany	Heidelberg

Table: N5.1: participants of Fizeau Exchange Visitors Programme in 2004.

WP2 Strategic Coordination

Three working groups have been established. One of the "Interferometric scientific council", one on "Radiative transfer", one on "Stellar atmospheres". Each of these working groups have convened at least once during the first 12 months of the project.

Scientific council

The "scientific council" met for the first time on 24 September 2004 in Heidelberg. One representative for each participating country and the two international organisations (ESO and ESA) were nominated and all nominated candidates formally accepted their membership (Table N5.2). Through a formal election process a president and deputy-president were elected. Minutes of the meeting have been compiled and distributed.

Country	Member	Status
Austria	Josef Hron	
Belgium	Jean Surdej	
Switzerland	Didier Queloz	
Czech Republic	Pavel Koubsky	
Germany	Thomas Henning	President
Spain	Carlos Eiroa	
France	Christian Perrier	
United Kingdom	David Buscher	
Hungary	Lajos Balazs	
Italy	Mario Gai	
Israel	Erez Ribak	
Netherlands	Eric J. Bakker	Deputy-president
Poland	Andrzej Niedzielski	
Portugal	Paulo Garcia	
ESO	Guy Monnet	
ESA	Malcolm Fridlund	Observer

Table: N5.2: participants of working group "EII scientific council".

The "radiative transfer" and "stellar atmosphere" working group met for the first time (together) on 15 and 16 December 2004 at Nice. 8 people participated and plans were made to structure the interaction within the working group and elaborate on a working plan. Members of this working group are listed in Table N5.3.

Participant	Home country	Home city
Romain Petrov	France	Nice
France Allard	France	Lyon
Renaud Foy	France	Lyon
Frederic Thevenin	France	Nice
Thomas Beckert	Germany	Bonn
Jo Bruls	Germany	Freiburg
Armando Domiciano	Germany	Bonn
SebastianWolf	Germany	Heidelberg

Table: N5.3: participants of working group "Radiative transfer" and "Stellar atmospheres".

WP3 Developing the vision for a next-generation interferometric facility

A study group meeting took place on 23 to 26 August 2004 in Liège to discuss the science case of a next generation interferometric facility. In total, some 40 participants were actively involved during the Liège Workshop. The workshop consisted of general presentations summarizing the different science cases driving the performance requirements (angular resolution(s), number of baselines, magnitude range(s), etc.) of future interferometric facilities and very lively discussions. Contributed talks and posters were part of the programme. The main science topics discussed during the Liège workshop were:

- Science cases for ELTs, including a discussion comparing the scientific merits of ELTs versus those of a next generation interferometer, cf. an Optical Large Array (P. Dierickx)
- Basic and future concepts of interferometers, including future technologies, image reconstruction techniques (P. Riaud)
- Circumstellar material (S. Wolf)
- Exoplanets and high dynamic range objects (J. Schneider)

- Active Galactic Nuclei (A. Marconi)
- Extragalactic astrophysics (cf. supernovae, GRBs, …) (D. Fraix-Burnet)
- Stellar activity (asteroseismology, …) (F.X. Schmider)
- Stellar imaging (O. von der Luehe)
- Binary and multiple stars (F. Verbunt)
- Fundamental stellar parameters (mass, etc.) (M. Wittkowski)
- General conclusions (P. Léna)

Conference proceedings, including a final and detailed report summarizing the main conclusions of this workshop are in press.

A web-site is maintained for the workshop:
http://www.strw.leidenuniv.nl/~eurinterf/Activities/OPTICON-NA/

Milestones and Deliverables

Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
M1	List of members of selection committee	WP1	NOVA	1	1
M2	Annual call for applications	WP1	NCU	1	3&9
M3	Collate list of applicants	WP1	NCU	2	4&10
M4	Selection of exchange visitors	WP1	NCU	4	4&10
D1	Report from participants	WP1	NCU	12	12
M1	List of members of working group committee	WP2	INSU	1	1
M2	Call for topics of working groups	WP2	INSU	1	1
M3	List of topics proposed for working groups	WP2	INSU	4	4
M1	List of members of study group committee	WP3	ULg	1	1
M2	Call for topics of study groups	WP3	ULg	1	1
M3	List of topics proposed for study groups	WP3	ULg	4	4

Table N5.5: milestones and deliverables for interferometry forum in first 12 months

Milestone WP1.M2, WP1.M3, and WP1.M4 occur twice in the year 2004 since applications for the Fizeau Exchange Visitors Programme were accepted every 6 months.

Meetings and workshops

	Date	Title/subject of meeting /workshop	Location	Nr of attendees	Website address
1	7+8/01/04	Kick-off meeting	Nice	39	
1	http://eii-jra4.ujf-grenoble.fr/				
2	6/05/04	Network board teleconference no 01	Tele-conference	5	
3	16/06/04	Network board teleconference no 02	Tele-conference	4	
4	20/07/04	Network board teleconference no 03	Tele-conference	4	
5	23-26/08/04	Science Case for Next Generation Optical/Infrared Interferometric Facilities (the post VLTI era)	Liège	40	http://www.astro.ulg.ac.be/colloques/2004/meeting2/index.html
6	23/09/04	Working Group "Scientific Council"	Heidelberg	20	http://www.strw.leidenuniv.nl/~eurinterf/Management/Minutes/meeting_sc_01_heidelberg/Minutes_EII_SC01_24september2004_v3.pdf
7	26/10/04	Network board teleconference no 04	Tele-conference	4	
8	7/12/04	Network board teleconference no 05	Tele-conference	4	
9	14+15/12/04	Working group "Radiative transfer"	Nice	8	
10	14+15/12/04	Working group "Atmospheric models"	Nice	8	

1.3.5 NA6: OPTICON Telescope Network

Participant number	7	
Participant short name	IAC	**Total**
Person-months	24 (20)	24 (20)

WP1 : Telescope Directors Forum

Although this group has been very active, no staff effort has been charged to the project. The group is chaired by the Project Scientist who time is accounted to management effort. The telescope director's time, mostly preparation for, travel to and participation in the directors forum, is not charged to OPTICON but to their national programmes.

The first year's programme has seen the start-up of activities and integration of new telescopes into the access programme process. This has essentially been a merging of the OPTICON and ENO FP5 projects related to medium sized telescopes.

This group first met in January 2004 under the auspices of the FP5 programme (where it is so reported) for a comprehensive discussion of its aims. This was the final meeting of the FP5 medium telescope working group and marked its transition into the expanded OPTICON telescope director's forum. This meeting introduced the directors of several new facilities, especially solar telescopes. There was an overview of the access programme and description of activities to be undertaken by the access office. A mission statement was written and criteria for OPTICON funded Trans-national access developed. There was also consideration of instrument sharing, multi telescope (i.e. whole earth) proposals and enhancement activities.

In May Chairperson John Davies attended a meeting called by the US astronomy organisation NOAO in Virginia on the subject of the 'System of US telescopes'. A brief overview of the OPTICON programme was given. Many similarities between the issues facing the US system and the European situation of medium sized telescopes were apparent at this meeting.

A splinter group meeting was held in Paris to discuss the prospects for those 4 metre telescopes the network which had been restructuring in recent years, e.g. ING and CAHA. There was a general discussion on how to proceed in developing a rationalisation plan for European 4 metre telescopes.

A second full meeting of the telescope directors took place on November 16 and 17, 2004 to review the access programme. There was detailed consideration of user fee payment modalities and on how to prioritise this heavily oversubscribed programme. This meeting also considered the how to implement the recommendations of the proposal referees that the Liverpool Telescope and Aristarchos telescope should be integrated into the access programme after a peer review of their readiness. A special panel was established to accomplish this. Specific actions were agreed to focus support on new users and those with no similar national infrastructures.

WP2: Operation of the Trans-National Access Office

The Trans-national Access Office was set up at the Instituto de Astrofisica de Canarias (IAC) at the beginning of January, to perform the tasks defined by the Telescope Directors' Forum in support of the OPTICON Access Programme, and in order to provide full assistance to the Telescope Operators in the fulfilment of their obligations.

Apart from the activities entrusted to this Office, and carried out effectively during this first year of the Programme, the following specific actions can be outlined here:

- Promotion of the Access Programme to the European astronomical community (universities, research institutions, observatories and other RTD organisations from EU Member States and Associated States), by means of a general advertisement (March and October 2004). A special effort was made to inform researchers from Central and Eastern Europe.

- Implementation of a very user-friendly and dynamic homepage, http://www.otri.iac.es/opticon/ offering detailed information about this Opportunity for Access: full information about the telescopes offered under the contract; information on how to apply for access; scientific, technical and logistical support; criteria of eligibility, on-line application forms for travel and subsistence support, forms for reporting, questionnaires, deadlines, etc. This website includes a restricted area for users, telescope operators and the staff of the Access Office, for a complete management of the Programme (i.e. on-line statistics can be obtained in real time, etc.)

- Oral and poster presentations during the Joint European and National Astronomical Meeting – JENAM 2004 (Spain, September 13-18). Preliminary results about the first year of this contract were also shown. Handouts were made available during the whole conference, together with the poster summarising the programme.

- Preparation of progress reports for the Executive Committee and the Telescope Directors' Forum providing updated information of the running of the Access Programme and detailed statistics about the type and characteristics of observing runs supported.

- Attendance and presentations during the meetings of the OPTICON Board and the Telescope Directors Forum. Progress reports of the Access Programme activity were made available for these meetings and assessment of the proper running of the Access Programme was given to the telescope directors.

See the report about the Access Programme for further details about this WP.

Milestone for this WP, as defined by the contract, have been achieved. A preliminary report to be provided to the Telescope Directors' Forum was issued in April 2004, and updated in September and November, to include details on those observing runs carried out late 2004:

A human effort of 24 person-months were devoted to operate the Access Office. However, only 20 person-months are requested to the European Commission as additional cost, since the remaining 4 person-months have been provided by IAC staff (not charged to the project).

WP3: Enhancement

There was a successful activity held at ESO/ST-ECF this July, based on exploiting archival data (ground and space) rather than actual new observing.There were 20 participants from all over Europe at this event. The network provided travel support only for the experienced participants. The importance of archival data widely recognised by all participants/contributors, so this type of school will continue in parallel with activities directly at telescopes. This event was a direct outcome of the efforts of the OPTICON enhancement group.A related FP6 Marie Curie proposal for observing schools ranked A, was accepted and is entering the negotiation phase. Continued complementarity between MC and OPTICON funding will therefore be essential.

Future activities were discussed briefly during the Paris meeting in August, and will be discussed further during a WG meeting in spring 2005 It is envisaged to plan an activity around specifics of space research experiments, if the MC funding follows. The activity spending has started slowly because of the unavailability of the OPTICON funds but will speed-up rapidly with the up-coming enhancement programmes. Accordingly WP3 M1 and M2 have been delayed by approximately 9 months.

Milestones and Deliverables

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
M1	Confirm membership & Terms of Reference	WP1	PPARC	1	1
M2	1st Directors Forum	WP1	PPARC	9	11
M3	Promote Network and Access Programme at JENAM meeting.	WP2	PPARC, IAC	8	8
M1	1st Report to Directors forum	WP2	IAC	9	4 (preliminary report) 9 (1st update) 11 (2nd update)

Milestone M2 was rescheduled early in the year in order to have more information to hand on the status of the access programme when the meeting took place.

Meetings and workshops

Date	Title/subject of meeting /workshop	Location	No of attendees	Website address
12 August 2004	Splinter meeting on 4m	Paris, France	5	
17-18 Nov 2004	Telescope Directors Forum meeting	Observatoire de Haut Provence, France	20 + 1 by teleconf	http://www.astro-opticon.org/meetings.html

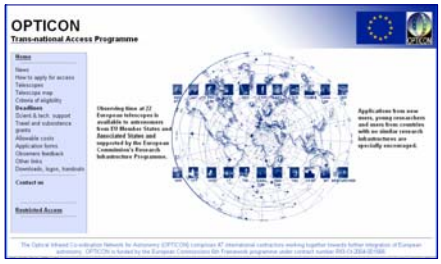
1.4 TRANSNATIONAL ACCESS ACTIVITIES

1.4.1 OPTICON Trans-national Access Programme

1.4.1.1 Description of the publicity concerning the new opportunities for access

The Trans-national Access Programme has been widely publicised among the international scientific community. Several measures have been taken to ensure appropriate dissemination of this new opportunity for Access under the auspices of this EC contract.

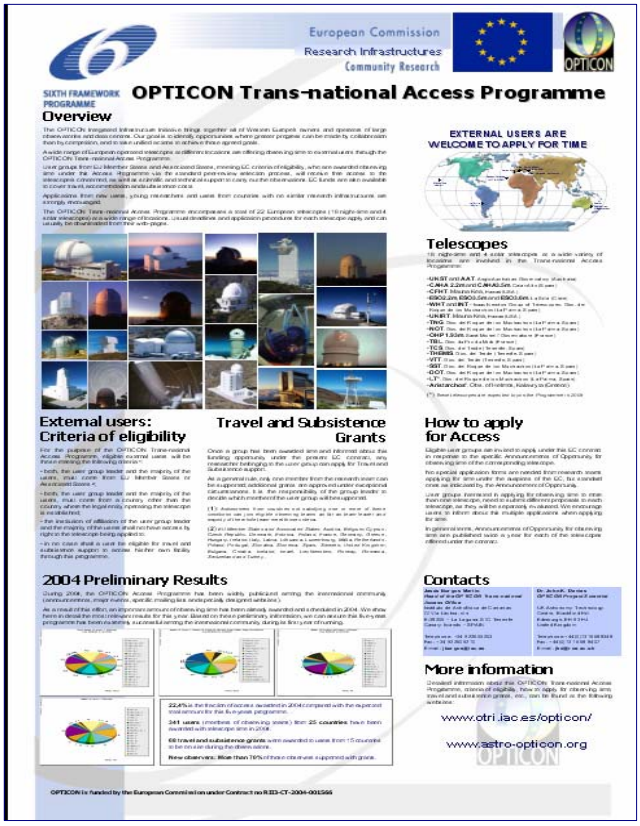
The main source of publicity of the OPTICON Integrated Infrastructure Initiative can be found at the general web site http://www.astro-opticon.org/ . This website includes some information about the Access Programme and a direct link to a very user-friendly and dynamic homepage, http://www.otri.iac.es/opticon/. This homepage, developed by the Trans-national Access Office (located at the IAC) and launched mid March 2004, offers detailed information about this Opportunity for Access: full information about the telescopes offered under the contract; information on how to apply for access; scientific, technical and logistical support; criteria of eligibility, on-line application forms for travel and subsistence support, forms for reporting, questionnaires, deadlines, etc.



Apart from the detailed information available there, this website (database powered) allows the monitoring of the activity (it uses the same platform for users, telescope managers and the Access Office), production of statistics and reports on-line, as well as the management of the whole programme, maintaining records of all observing runs awarded under the contract, useful information on telescopes under the programme, time allocation committees, etc. Users, telescope operators and manager of the programme all interact over the same utility, avoiding duplications and mistakes. Moreover, since most of the relevant information at the public site (deadlines, observing periods, telescope information, etc) is directly provided by the database, this information is always kept updated.

Likewise, information about the access programme can be found on the corresponding web sites of each of the 22 participating telescopes. Each observing campaign is widely advertised there. Announcements of Opportunity are normally published twice a year via the Internet as well as via extensive distribution to the international astronomical community.

The Trans-national Access Office has sent also by post (March and October 2004) a general advertisement of the programme to more than 500 entities (universities, research institutions, observatories and other RTD organisations from EU Member States and Associated States). This announcement included a summary of the scope of the Programme and information on how to participate in it. A special effort was made to inform researchers from Central and Eastern Europe.



Further efforts in advertising this Programme were made at the Joint European and National Astronomical Meeting – JENAM 2004 (Spain, September 13-18). An oral presentation about the Access Programme and about how to apply for time was offered. Preliminary results about the first year of this contract were also shown (some figures and statistics are provided at the end of this section). Handouts were made available during the whole conference and a poster summarising the Programme was exhibited.

1.4.1.2 Description of the selection procedure

Observing time is awarded following standard selection procedures at each telescope or group of telescopes, which are based on scientific merit and feasibility.

Since 22 medium-sized telescopes are offered under the contract, and they are operated by different legal entities / countries, so specific criteria of eligibility differ from one telescope to another. The procedure to apply for telescope time under this EC contract is to do it in response to the different Announcements of Opportunity for observing time at each telescope. Once the deadline for submission of proposals has been closed, Time Allocation Committees (TACs)[11], composed of experts of international reputation, evaluate the proposals received and approve a ranked list for distributing the observing time available among the highest ranking proposals.

The prime consideration of these TACs in making awards is scientific merit and technical feasibility, taking into account the interests of the astronomical community as well as scientific output from previous time awards. Teams compete on the basis of equal opportunity. However, new users, young researchers and users from countries with no similar research infrastructures are especially encouraged to apply for observing time.

Following EC guidelines, criteria of eligibility of the astronomers who want to benefit from this access programme are mainly based on the country of origin of the user group (as defined below), and the ownership of the telescope for which observing time is applied to (or country of the entity/ies responsible for its operation). These criteria apply separately to each telescope.

[11] See Annex 2: Selection Panel members list.

To be eligible to benefit from access to a particular telescope under the contract, a user group[12] must satisfy the following conditions:

- both the user group leader and the majority of the users must come from Member States or Associated States;

- both the user group leader and the majority of the users must come from a country other than the country(ies) where the legal entity(ies) operating the infrastructure is(are) established;

In order to prioritize applications from actual external users (specially new users), i.e., users not having access by right to these telescopes because of any formal agreement signed between their institutions and the telescope operator, two other additional criteria were considered when awarding time under the EC contract:

- the institution of affiliation of the user group leader and the majority of the users shall not have access by right to the facility being applied to.

- in no case shall a user be eligible for travel and subsistence support to access his/her own facility through this programme.

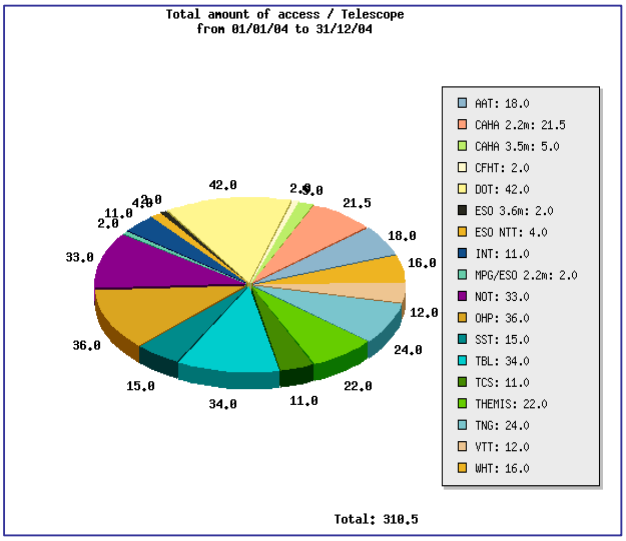
User groups meeting EC criteria of eligibility, and awarded telescope time by these TACs, are informed by the Trans-national Access Office (located at Instituto de Astrofísica de Canarias, Spain) about this funding opportunity. They receive full information about how to apply for travel and subsistence grants, how to get scientific and technical support to carry out their observations, application forms, etc. Application forms and reports can be completed on-line.

1.4.1.3 Trans-national Access activity

Amount of Access delivered:

21,52 % of the total amount of access to be provided under this five-year contract has been already delivered in 2004. This equals 310,5 days/nights.

The Dutch Open Telescope (DOT), the OHP 1.93m Telescope (Observatoire de Haute Provence) and the Telescope Bernard Lyot 2.03m, are those telescopes which have delivered the most observing time during this year (42, 36 and 34 days/nights respectively).
All telescopes offering time under the contract in 2004 have received a

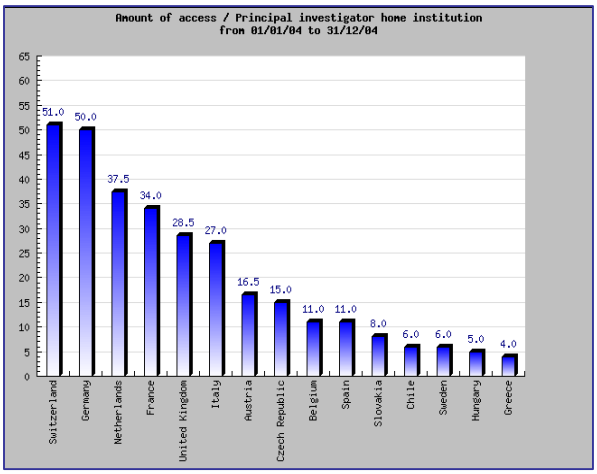


[12] **User:** means a researcher within a user group, including the user group leader. **User group:** means a research team of one or more researchers given access to the infrastructure under the project. Each user group is led by a user group leader.

significant number of applications and most of them have contributed to reach this total amount of 313,5 days/nights awarded.

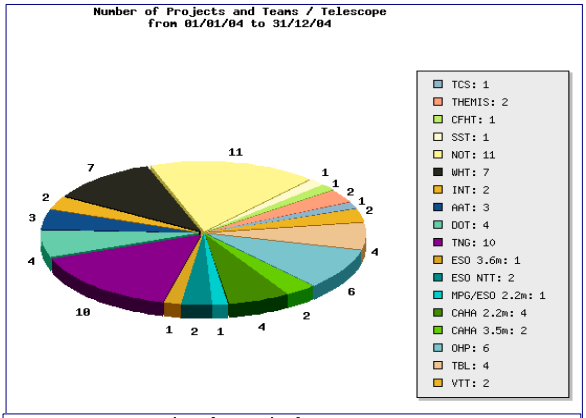
User groups and projects awarded with time:

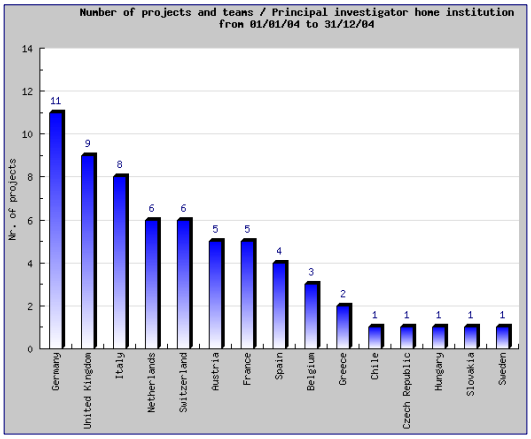
We provide here detailed information about the number of days/nights offered under the contract per country of origin of the group leader.
It should be noted that those 6,0 observing nights awarded to the user group leaded by an astronomer working in Chile is because this astronomer works for the European Southern Observatory (International Organisation, eligible under EC conditions).

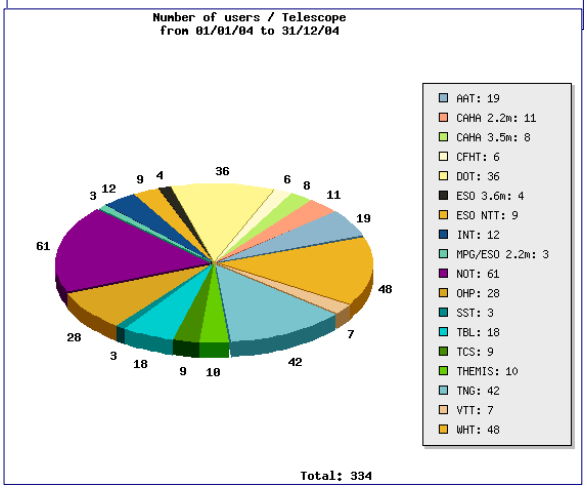


64 user-projects have been awarded time in 2004. 11 of this user-projects have been carried out at the Nordic Optical Telescope (NOT), 10 at the Telescopio Nazionale Galileo (TNG) and 7 at the William Herschel Telescope (WHT).

More detailed information about these user-projects can be found in Annex 3 of this report.

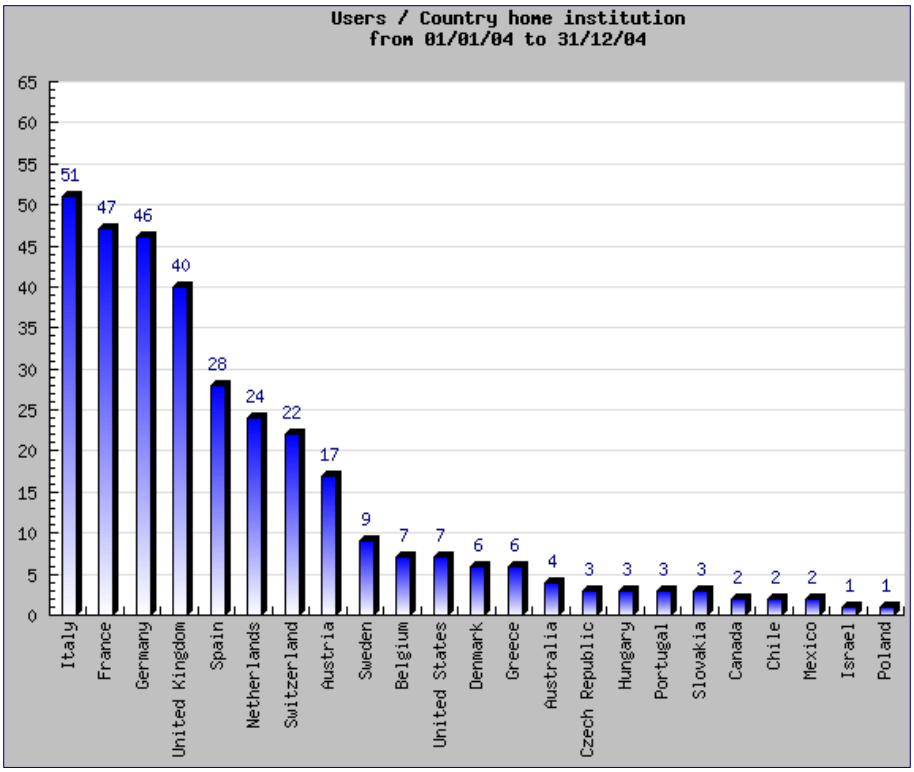






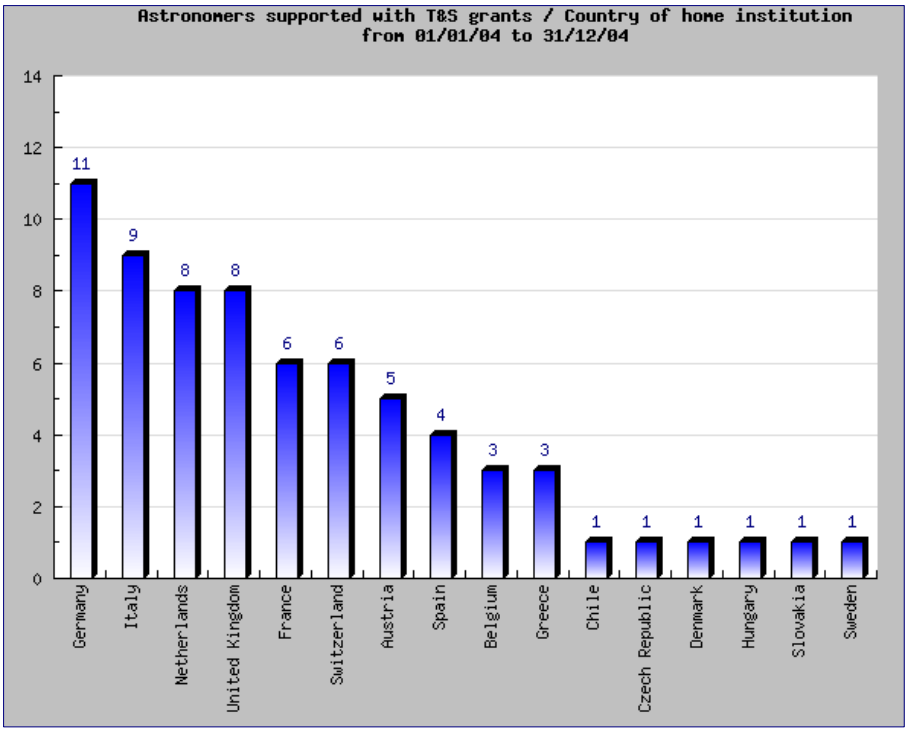
Statistics on users awarded telescope time:

334 users from 23 different countries have benefited from this Access Programme during this period (members of the user groups). 45 % of these users were awarded observing time at three telescopes: the Nordic Optical Telescope, 2.5m (NOT), WHT and TNG.
Italy, France, Germany and UK were those EU countries involving more users. (*see next figure*)

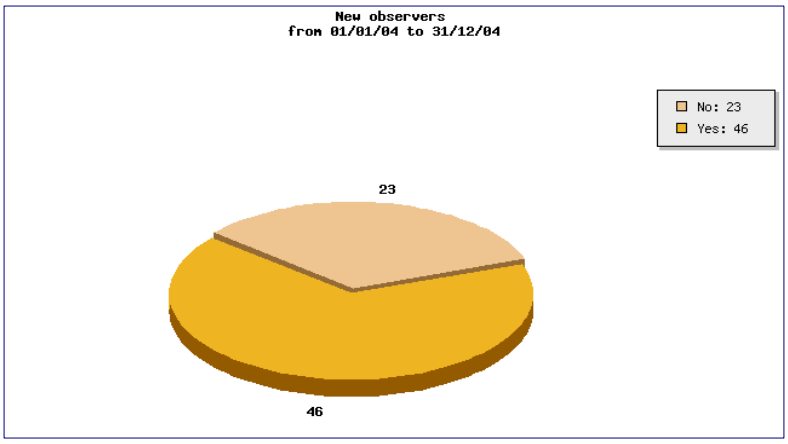


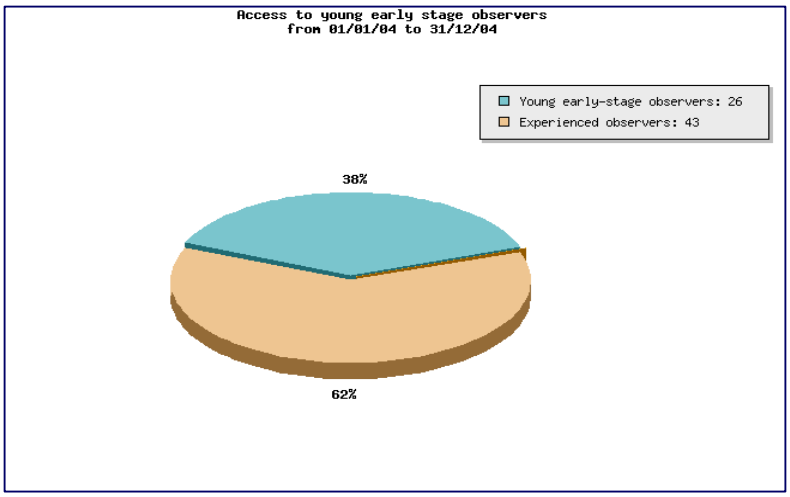
Travel and subsistence grants:
69 of these 334 users have been granted for Travel and Subsistence (T&S) support when visiting the facility to carry out the observations (basically one observer per project, apart from those special cases in which two grants were needed and awarded). See Annex 4.

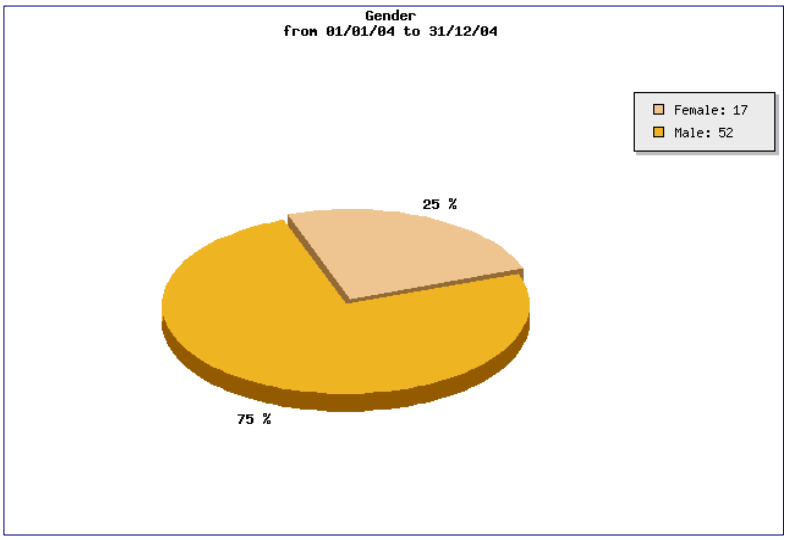
Following charts offer more information about these travel and subsistence grants:



More than 66% of these visiting astronomers were new observers, and 37 % were young-early stage researchers[13]. The gender ratio among users with T&S grants is 25% female and 75% male







[13] **Young-early stage researchers** are those users supported with T&S grants that have less than four years of research experience.

1.4.1.4 Scientific output of the users at the facilities.

Observing runs supported under the OPTICON access programme started in April 2004, so is still too early to report on this aspect. Users awarded time are requested to inform to the Trans-national Access Office about any scientific output obtained from the access provided under this Programme as well as to acknowledge EU funding in their publications.

During 2005 the Access Office is carrying out special efforts to obtain this information from awarded users in the future.

See Annex 5.

1.4.1.5 User meetings

No user meetings during the whole contract are expected to be organised.

1.5 JOINT RESEARCH ACTIVITIES

1.5.1 JRA1: Adaptive Optics

The Total human effort deployed during this reporting period for JRA1 is summarized in the following table:

Participant number[14]	4	6	8b	11a	12	19	31	35	
Participant short name[15]	ESO	INSU/CNRS	INAF-Arcetri	MPIA	NOVA	GRANT ECAN	ONERA	Univ Durham	**Total**
Person-months[16]	37.47	24.30	5.02	105 (59.7)	9.27	1.25	12.49	16 (8.5)	**210.8**

WP 1: Coordination of JRA1

The kick-off meeting of this JRA1 was coordinated by ESO in March 2004 at ESO Garching. A JRA1 web page has been created by ESO to disseminate the information and reports produced by this JRA (http://www.eso.org/projects/aot/jra1/). Some documents are password protected. A tool to monitor the FTE and hardware expenditure has been developed by ESO. General meeting 1 was organised by ESO in September 2004 at LAOG in Grenoble. Regular teleconferences between the principal work package managers have been organised. Strong interaction between JRA1 and JRA2 has been coordinated by ESO for the development of the Adaptive Optics CCD detector, specified in the frame of JRA1 and developed in the frame of JRA2.

WP 2: System design

WP2.1: XAO system Study

ESO has launched two feasibility and conceptual design studies of the VLT XAO system aiming at planet finding. Specifications for these studies have been prepared by ESO. INSU-CNRS, MPIA and NOVA have developed the two VLT XAO conceptual design studies which have been completed and were reviewed in December 2004. Top level requirements of the XAO key components have been prepared: Real Time Computer, deformable mirror, visible wavefront sensor and detectors. **These correspond to deliverable M1 of WP2.2: see CD-ROM** in folder **JRA1/WP2.2/INSU-CNRS, JRA1/WP2.2/MPIA, JRA1/WP2.2/ESO.** Twelve papers related to this WP have been published.

[1] "*Wavefront sensing through spatial filters: the case for coronographic, high-contrast AO systems*"; Feldt M.; Costa, J. B.; Stumpf M.; Schmid H. M.; Berton A.; Hippler S.; Stuik R.; Lima J.; Proceedings of the SPIE, Volume 5490, pp. 1146-1154 (2004).

[2] "*Simulations of exoplanets detection obtained with a high-contrast imaging instrument: CHEOPS*"; Berton A.; Gratton R. G.; Feldt M.; Desidera S.; Masciadri E.; Turatto M.; Claudi R. U.; Piotto G.; Pernechele C.; Antichi J. ; Proceedings of the SPIE, Volume 5490, pp. 672-682 (2004).

14 Lead participant first

15 Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

16 AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

[3] "*Simulations versus observations obtained with simultaneous differential imaging*"; Berton A.; Kellner S.; Feldt M.; Masciadri E.; Lenzen R.; Brandner W.; Hartung M.; Gratton R. G.; Proceedings of the SPIE, Volume 5490, pp. 661-671 (2004)

[4] "*Optimizing wavefront sensing for extreme AO*"; Koehler R.; Hippler S.; Feldt M.; Gratton R.; Gisler D.; Stuik R.; Lima J.; Proceedings of the SPIE, Volume 5490, pp. 586-592 (2004).

[5] "*Scintillation effects on a high-contrast imaging instrument for direct detection of exoplanets*"; Masciadri E.; Feldt M.; Hippler S.; Proceedings of the SPIE, Volume 5490, pp. 483-494 (2004)

[6] "*CHEOPS NIR IFS: exploring stars neighborhood spectroscopically*"
Claudi R. U.; Turatto M; Gratton R.; Antichi J.; Buson S.; Pernechele C.; Desidera S.; Baruffolo A.; Lima J.; Alcalà J.; Cascone E.; Piotto G.; Ortolani S.; Schmid H. M.; Feldt M.; Neuhauser R.; Waters R.; Berton A.; Bagnara P.; Proceedings of the SPIE, Volume 5492, pp. 1351-1361 (2004)

[7] "*The science case of the CHEOPS planet finder for VLT*"; Gratton R.; Feldt M.; Schmid H. M.; Brandner W.; Hippler S.; Neuhauser R.; Quirrenbach A.; Desidera S.; Turatto M.; Stam D. M.; Proceedings of the SPIE, Volume 5492, pp. 1010-1021 (2004)

[8] "*CHEOPS/ZIMPOL: a VLT instrument study for the polarimetric search of scattered light from extrasolar planets*" Gisler D.; Schmid H. M.; Thalmann C.; Povel H. P.; Stenflo J. O.; Joos F.; Feldt M.; Lenzen R.; Tinbergen J.; Gratton R.; Stuik R.; Stam D. M.; Brandner W.; Hippler S.; Turatto M.; Neuhauser, R.; Dominik C.; Hatzes A.; Henning T.; Lima J.; Quirrenbach A.; Waters, L. B. F. M.; Wuchterl G.; Zinnecker H.; Proceedings of the SPIE, Volume 5492, pp. 463-474 (2004)

[9] "*High Contrast Imaging from the Ground: VLT/Planet Finder*"; Mouillet, D.; Lagrange, A. M.; Beuzit, J.-L.; Moutou, C.; Saisse, M.; Ferrari, M.; Fusco, T.; Boccaletti, A.; Extrasolar Planets: Today and Tomorrow, ASP Conference Proceedings, Vol. 321

[10] *"Modelling and analysis of XAO systems. Application to VLT-Planet Finder "*, R. Conan, T. Fusco, G. Rousset, D. Mouillet, J.-L Beuzit, in *Proceedings of the SPIE, Volume 5490, pp. 602-608 (2004).*

[11] "*High Contrast Imaging from the Ground: VLT/Planet Finder*"; Mouillet, D.; Lagrange, A. M.; Beuzit, J.-L.; Moutou, C.; Saisse, M.; Ferrari, M.; Fusco, T.; Boccaletti, A.;
Extrasolar Planets: Today and Tomorrow, ASP Conference Proceedings, Vol. 321, held 30 June - 4 July 2003, Institut D'Astrophysique de Paris, France

[12] "*The Planet Finder project for the VLT*"; Beuzit, J.-L.; Mouillet, D.; Moutou, C.; Fusco, T.; Longmore, A.; Saisse, M.; Ferrari, M.; Udry, S.; Rousset, G.; Conan, R.; Menard, F.; Lagrange, A.-M.; Segransan, D.; Rabou, P.; Dohlen, K.; et al.; SF2A-2004: Semaine de l'Astrophysique Francaise, meeting held in Paris, France (2004)

WP2.2: GLAO System Study

ESO and NOVA (for the first study only) have developed two complete conceptual design studies of a Laser Guide Star (LGS) Ground Layer Adaptive Optics (GLAO) system for the VLT. The first LGS-GLAO concept now called GALACSI will provide correction for a 3D visible spectrograph (MUSE) over a Field of View of 1'. NOVA has mainly contributed to the interface definition between the Adaptive Optics system and the MUSE, the scientific top level requirements and the technical specifications. NOVA has also conducted sky coverage laser rayleigh scattering simulations. In addition, NOVA has proposed a concept of an adaptive secondary simulator (ASSIST) which could be used to perform the testing of the GALACSI AO system in the laboratory.

The second LGS-GLAO will provide correction for a Near IR imager over a 8' FOV HAWK-I. Both conceptual design reviews have been conducted in 2004. **This corresponds to deliverable M1 of WP2.2: see CD-ROM JRA1/WP2.2/GALACSI and JRA1/WP2.2/HAWK-I**

The feasibility study of the NGS multi-object system based on the FALCON concept has been pursued by INSU-CNRS in Paris as planned: See CD-ROM, **JRA1/WP2.2/INSU-Paris**. A PhD thesis has been completed in November on this subject.

Six papers describing the result of this WP have been written [1-6]

[1] "*Wide-field adaptive optics for deep-field spectroscopy in the visible*", Le Louarn, M.; Hubin, N, MNRAS, 349,1009-1018,2004

[2] "*Adaptive optics for second-generation VLT instruments*", M. Le Louarn, N. Hubin, and R. Arsenault, Proceedings of SPIE -- Volume 5490, Advancements in Adaptive Optics, Domenico Bonaccini Calia, B. L. Ellerbroek, R. Ragazzoni, Editors, October 2004, pp. 248-259

[3] "*Ground layer AO correction for the VLT MUSE project*"; Hubin N.; Le Louarn M.; Conzelmann R.; Delabre B.; Fedrigo E.; Stuik R.; Proceedings of the SPIE, Volume 5490, pp. 846-857 (2004).

[4] "*The second-generation VLT instrument MUSE: science drivers and instrument design*" Bacon R. et al.; Proceedings of the SPIE, Volume 5492, pp. 1145-1149 (2004)

[5] "*MUSE optomechanical design and performance*"; Henault F.; Bacon R.; Dekker H.; Delabre B.; Djidel S.; Dubois J. P.; Hubin N.; Lantz B. ; Lau W.; Le Louarn M.; Lewis I. J.; Lizon J.L.; Lynn J.; Pasquini L.; Reiss R.; Roth M.; Proceedings of the SPIE, Volume 5492, pp. 909-920 (2004).

[6] "Generalized Sky Coverage for Adaptive Optics and Interferometry"; Stuik R., Lelouarn M., Quirrenbach A.; Proceedings of the SPIE, Volume 5490, pp. 331-337 (2004).

WP2.3: Multi-Object WFS for GTC

The work carried out so far at GRANTECAN has involved analysis and simulation of curvature sensing using multiple reference sources. A code has been written to perform polychromatic Fresnel propagation. This is used to obtain intensity maps corresponding to different planes in a collimated beam with multiple sources in the field. An algorithm to recover the phase from two intensity maps has been developed. This approach has so far been tested for the case of having a single turbulent phase screen at the pupil (r0=20 cm at 0.5 μm). The phase has been reconstructed from the intensity measurements at two planes with five point sources distributed over a field of diameter ~20 arcseconds. One paper related to this WP has been written [1]

[1] "*Preliminary design and plans for the GTC adaptive optics system*"; Devaney N.; Bello D.; Femenia B.; Castro J.; Villegas L., Alejandro R.; Fuensalida J.; Proceedings of the SPIE, Volume 5490, pp. 913-923 (2004)

WP2.4: Multiple FOV System with NGS

MPIA and INAF-Arcetri have developed the opto-mechanical design of a Multiple Field of View Adaptive Optics Wavefront Sensor prototype to be tested on the Adaptive Optics System of LINC-NIRVANA, a Fizeau Interferometer for the Large Binocular Telescope (LBT). In addition, sky coverage and performance simulations of this wave front sensor have been performed. The performance analyses have been gathered in an analysis document and have been published at the Glasgow SPIE conference last summer [1]. The Ground Layer wavefront sensor design is described in a dedicated report. **These two reports corresponds to deliverable M1 of WP 2.4 see CD-ROM in folder JRA1/WP 2.4.** The first opto-mechanical parts both for the Ground Layer Wavefront sensor and for LINC-NIRVANA have been received in 2004. Exhaustive tests have been done on the 349 actuator deformable mirror from Xinetics and results were published in the SPIE conference proceedings [2].

[1] "*Sky coverage for layer oriented MCAO: a detailed analytical and numerical study*", C. Arcidiacono, E. Diolaiti, R. Ragazzoni, J. Farinato, E. Vernet.; Proceedings of the SPIE, Volume 5490, pp. 563-573 (2004)

[2] "*LINC-NIRVANA: the single arm MCAO experiment*", S. E. Egner, W. Gaessler, T. M. Herbst, R. Ragazzoni, D. R. Andersen, H. Baumeister, P. Bizenberger, H. Boehnhardt, S. Ligori, H. Rix, R. Soci, R. Rohloff, R. Weiss, W. Xu, C. Arcidiacono, J. Farinato, E. Diolaiti, P. Salinari, E. Vernet-Viard, A. Eckart, T. Bertram, C. Straubmeier. Proceedings of the SPIE, Volume 5490, pp. 924-933 (2004)

WP 3: ENABLING TECHNOLOGY FOR 2nd GENERATION/ELT AO SYSTEM

WP3.1: 2nd Generation RTC Platform

The Real Time Computer (RTC) top level requirements from the Extreme Adaptive Optics (XAO), Ground Layer Adaptive Optics (GLAO) systems have been produced by INSU-MPIA and ESO respectively in the frame of the WP 2.1 and 2.2. In addition, RTC requirements for the high order wavefront sensor experiment (WP3.8) have been collected. From these top level requirements, ESO has produced a Real Time Computer platform "white paper". This document identifies the key issues and components while providing a generic concept. Emphasis has been given to using industry standards to reduce the long term costs and improve reliability and maintainability. Moreover the selected technologies will provide a satisfactory road-map for the next 5 years in order to fulfil even the more challenging requirements.

Based on this document a market survey has been conducted by ESO to identify the key technologies (multi-CPU power PC boards, switched fabric real time communication interface, serial FPDP low latency high speed communication interface, etc.). Durham proposed an auxiliary technology which has been integrated into the RTC platform concept to improve some aspect of the processing (FPGA boards). For this purpose both ESO and Durham have (or are going to) set up Non Disclosure Agreements with key players in the industry in order to have access to the respective technological road-map. ESO has procured four computational boards and several communication interfaces (both types) as well as auxiliary hardware (crates, Local Control Unit etc.) and the required software. Durham has also started the procurement for the FPGA card, auxiliary hardware (crates, Local Control Unit etc.) and the required software.

Using the selected technologies ESO has produced conceptual design documents (see CDROM **JRA1/WP3.1**) for each of the previously mentioned AO applications. Those concepts have been based on estimates on the real performance of the hardware since the hardware was not yet fully available or not properly installed. At the time of this writing a benchmarking of the procured hardware is progressing with the aim at validating the conceptual design. In parallel, software module prototypes have been developed to test concepts like parallel computation and distributed objects. Moreover we have defined a key interface of the system (output device), see CDROM **JRA1/WP3.1**). Durham has also produced a conceptual design of the FPGA application (see CD-ROM **JRA1/WP3.1**).

A few months delay is expected for this WP3.1 and its corresponding milestones because of the postponement of the Real Time Software Engineer recruitment due to the late OPTICON contract signature. One paper describing the result of this WP has been written [1].

[1] "*The ESO adaptive optics real-time computer platform: a step toward the future*"; Fedrigo E.; Donaldson R.; Soenke C.; Hubin N.; Proceedings of the SPIE, Volume 5490, pp. 1393-1401 (2004)

WP3.2: ***Optimal Control Methods for MCAO Systems***

ESO and ONERA developed a detailed work plan and specification for the study of Optimal Control Methods for MCAO Systems. Following extended discussion within JRA1 about critical aspects of future Multi Conjugate Adaptive Optics system, the issue of high performance wavefront sensors has been identified and a corresponding detailed study has been added to the project plan of JRA1- WP 3.2. The new work plan provided in the **CD-ROM JRA1/WP3.2** includes this new activity. The start of WP3.2 has been delayed (~ 6 months) due to the late signature of the OPTICON contract and due to a redefinition of the work plan after the kick-off meeting. Therefore the planned deliverable **M1 for WP 3.2** is also delayed and will be included in the next period report.

As planned, an end-to-end simulation tool has been developed by ONERA to study MCAO star oriented systems with the implementation of several control laws: integrator, optimized modal gain integrator, and Kalman control. The Kalman based control has been tested in MCAO with simplified WFS and DM models. It has also been validated with realistic WFS and DM models but only in a classical AO configuration. The detailed study of the Kalman approach in classical AO has been presented in a conference article [1]. It has been shown that this optimal control approach brings significant gains in performance with respect to more standard control, particularly in the presence of vibrations.

An experimental validation of the optimal control approach developed above has started based on the AO bench BOA available at ONERA. This pioneering experimental work will then help the specification and implementation of the future ESO MCAO demonstrator optimal control. The bench is a regular AO bench with one WFS and one DM in the pupil. It is now available with a double source, a new bare-CCD Shack-Hartmann WFS and a rotating turbulent screen at a variable altitude. All the elements of the system have been calibrated (WFS, DM, etc.). The optimal control consists of the optimization of the off-axis performance using the on-axis WFS data. The first tests in static mode have been performed at ONERA. The regular on-axis correction has been compared to an off-axis static Kalman-like regularized correction which uses the knowledge of the altitude and strength of the turbulent screen. A systematic gain brought by the off-axis optimization has been demonstrated. The code mentioned above is now used to compare the experimental results and the simulation. In the meantime a new Real Time Computer has been developed by Shakti-Ware to test the Kalman approach in dynamic mode. The first results are very encouraging. Complementary static measurements and the first dynamic tests should be performed in the coming months.

In the field of high performance wavefront sensor for MCAO, ONERA has defined a three fold strategy to tackle this very complex problem:

- Development of new sky coverage estimation for MCAO **(CDROM JRA1/WP3.2)**
- Comparison of already known wavefront sensor devices
- Comparison of the MCAO wavefront sensing strategies (star and layer oriented approaches)

A theoretical basis for each topic has been established and simulation tools have been developed, experimental validations have been performed on specific points concerning the Wavefront Sensor (WFS) devices. All these studies have led to two [2] & [3] papers in refereed-review journals (plus one in preparation [4]) as well as 3 papers in

international conferences [5-7].

[1] "*Kalman Filter based control loop for Adaptive Optics*", C. Petit, F., F. Quiros-Pacheco, J.-M. Conan, C. Kulcsar, H.-F. Raynaud, T. Fusco and G. Rousset, *Advancement in Adaptive Optics*, **5490**, D. Bonaccini, B. Ellerbroek, R. Ragazzoni eds, SPIE conf. 2004

[2] *"Improvement of Shack-Hartmann wavefront sensor measurement for Extreme Adaptive Optics"*, M. Nicolle, T. Fusco, G. Rousset and V. Michau, Optics Letters, 29(23), 2004

[3] *"Closed-loop experimental validation of filtered Shack-Hartmann"*, T. Fusco, C. Petit, G. Rousset, J.-M. Conan and J.-L. Beuzit, Optics Letters, submitted

[4] *"Improvement of sky coverage estimation for MCAO system"*, A. Blanc, T. Fusco, V. Michau, G. Rousset, M. Nicolle, J.-L Beuzit and N. Hubin, to be submitted to A&A.

[5] "*Study of sky coverage for multi-conjugate adaptive optics"*, A. Blanc, T. Fusco, G. Rousset, V. Michau, J.-L. Beuzit and N. Hubin, in *Scientifics highlights 2004*, F. Combes, D. Barret, T. Contini, F. Meynadier and L. Pagani eds.., EDP Science

[6] *"Analysis of wavefront sensing concept for ground layer adaptive optics"*, M. Nicolle, T. Fusco, V. Michau, G. Rousset, A. Blanc and J.-L. Beuzit, in *Scientifics highlights 2004*, F. Combes, D. Barret, T. Contini, F. Meynadier and L. Pagani eds., EDP Science

[7] *"Ground Layer Adaptive Optics : Analysis of the wavefront sensing issue"*, M. Nicolle, T. Fusco, V. Michau, G. Rousset, A. Blanc and J.-L. Beuzit, Proceedings of the SPIE, Volume 5490, pp. 858-869 (2004)

WP3.3: 2nd Generation Piezo DM

The top level requirements for the 2nd Generation Piezo Deformable Mirror (DM) have been defined by INSU-CNRS, MPIA and ESO in the context of the two XAO feasibility studies described in WP2.1.

From these top level requirements, ESO has prepared the detailed technical specifications of the 1370 actuator Deformable Mirror and has issued an international call for tender (CfT) in August (significantly later than originally planned). This delay is mainly due to the late signature of the OPTICON contract and the fact ESO is not allowed to commit for such a cost (~1 M€), without the corresponding contract signed. Therefore this whole activity has suffered a delay of about 9 months.

Following the CfT, two proposals have been received and evaluated. A recommendation has been submitted to the ESO Finance Committee for approval in November and contract negotiations are proceeding at the time of this writing with CILAS (France).

Specification document is provided in the **CD-ROM/WP3.3**.

WP3.4: 2nd Generation Piezo DM drive Electronic

The Deformable Mirror drive electronic development is planned to start when the Deformable Mirror has been identified and when the DM electronic interfaces has been known. Due to the delay of the DM development mentioned above, the DM drive

electronics specifications have not been finalised yet. A draft version is provided in the CD-ROM **JRA1/WP3.4 for information**.

WP3.5: VLT Adaptive Secondary

During this first period, **ESO** in collaboration with **INAF** has prepared the detailed technical specification and statement of work **(CD-ROM JRA1/WP3.5/ESO**) for the development of the VLT Adaptive Secondary. Two different approaches are being investigated: an upgrade of the present VLT secondary mirror unit or a complete replacement of this unit. The contract (s) for the feasibility and conceptual design study part of this development was signed with Microgate (Italy) in July 04 (slightly behind schedule due to the late OPTICON contract signature). Microgate has delivered a straw man design report including review of the critical interfaces and corresponding design review has taken place (**CR-ROM JRA1/WP3.5/INAF JRA1/WP3.5/Microgate, JRA1/WP3.5/ESO).** INAF has produced the preliminary evaluation of the performances of the VLT adaptive secondary for this straw man design phase. No major show stopper has been identified although minor discrepancies are being addressed by the appropriate actions. Next progress reviews for this feasibility study are contractually planned for March and July 05 (final report corresponding to **M1 of WP 3.5**).

In parallel ESO has given a contract to L'Institut d'Automatisation Industriel (Switzerland) for the study of specific issues related to the implementation, calibration and testing of such system on a large telescope [2]. Three topics have been identified and studied: on-sky calibration, test facility design, influence function optimisation. Report has been delivered on the first topic **(CD-ROM JRA1/WP3.5/IAI**). Two papers related to this WP have been written [1-2]

[1] "*Towards an Adaptive Secondary for the VLT?*"; Arsenault, R.; Hubin, N.; Le Louarn, M.; Monnet, G.; Sarazin, M ; The ESO Messenger, No.115, p. 11-14 (March 2004)

[2] "*Determining the interaction matrix using starlight*"; Wildi F. P.; Brusa G.; Proceedings of the SPIE, Volume 5490, pp. 164-173 (2004)

WP3.6 Manufacturing and Demonstration of a large convex glass shell

The manufacturing and demonstration of a large convex glass shell is strongly linked to the design activity of the VLT adaptive secondary activity (WP 3.5). The late start of the WP3.5 due to the late signature of the OPTICON contract has consequently delayed WP3.6 as well.

The writing of the manufacturing technical specification for the thin glass shell have been the result of a collaborative work between ESO, INAF, Microgate/ADS, INSU-LAM. A draft specification document has been issued in October 2004 for internal review (**CD-ROM JRA1/3.6**). A call for tender based on these specifications will be issued 1Q 05.

In parallel, INSU-LAM has studied a new manufacturing process based an innovative 'Active Optic' manufacturing technique that will reduce the cost and complexity of thin shell production. This approach is also pursued in the framework of a PhD on *Active Optics Techniques applied to Large Size and Complex Optics Manufacturing*. The results of this study will be summarised in a report to be delivered Q1-2005 (**M1 of WP 3.6**).

If the active Optics manufacturing technique provides the expected gain in the manufacturing process and the expected specifications, it would significantly reduce the

cost of the production of the required thin shell.

WP3.7 2k Actuator & low order Micro-Deformable Mirrors (MDM) R&D

INSU-LAOG has prepared the draft technical specifications of the 2k Micro-Deformable Mirror (MDM) (**CR-ROM JRA1/WP 3.7**). These specifications are being reviewed by an internal committee to make sure the developed MDM will fulfill the needs of future Adaptive Optics systems. Because of the very limited Adaptive Optics knowledge of the MEMS manufacturer and the difficulty for the JRA1 partner to evaluate the actual MEMs technological limitations and cost drivers, it was recently decided to issue a request for information (**CR-ROM JRA1/WP 3.7**) to have the opportunity to release and collect information to and from the suppliers before issuing the call for tender initially planned.

The late signature of the OPTICON contract did not allow us to issue the request for information/ call for tender as originally planned in July 04 and is now planed for March 2005. A consulting company specialized in the MEMS market is now helping INSU-LAOG to speed-up the selection of potential subcontractors.

INSU-LAOG has started the development of the drive electronics for the MEMS deformable mirror. Three different concept demonstrators have been built and tested, and a conceptual design has been prepared .

INSU-LAOG has developed a ~60 actuator magnetic deformable mirror prototype and preliminary tests of this MDM looks promising. It has a very large stroke (>50um), a good optical quality (<6nm RMS) and a low manufacturing cost (<15kE). It can be used in other fields than astronomy, such as ophthalmology or laser control. A test report has been issued and two pictures of this magnetic deformable mirror prototype is provided (**CR-ROM JRA1/WP 3.7**). This prototype and its test report are the **deliverable M4 of WP 3.7** ahead of plan by 18months (expected date To+30). The proposed technology has been patented (French patent number #0452342) and is currently being licensed to a private company (Imagine Eyes) for all non-astrophysical applications. A start-up is also being created to address astrophysical application, with the help of FLORALIS (a private firm funded by the Grenoble University for this kind of purpose). One paper describing the result of this WP has been written.

[1] "*System level simulation of micro-mirrors for adaptive optics*"; Charton J.; Hubert Z.; Stadler E.; Schartz W.; Beuzit J.L.; Proceedings of the SPIE, Volume 4842, pp. 207-218 (2003)

WP3.8 High Order wavefront sensor experimental study

A theoretical study has been performed by ONERA comparing the Shack Hartmann and the pyramid wavefront sensors for high order adaptive optics. The corresponding report has been produced ahead of plan. This report is the deliverable **M1 of WP 3.8** and is included in the **CD-ROM JRA1/WP 3.8/ONERA**. The top level requirement of the High Order Wavefront Sensor (HOWFS) experiment has been produced by ESO in collaboration with INAF-Arcetri and Durham and is also included in the **CD-ROM in JRA1/WP 3.8**. ESO has started the design of the HOWFS bench, INAF-Arcetri has started the design of the Pyramid WFS and Durham has started the design of the Shack Hartmann WFS. ESO has ordered the long lead hardware parts like the 1k actuator Micro Deformable Mirror to Boston Micromachine and the CCD camera for the shack Hartmann WFS to ANDOR. In parallel a survey of possible coronagraphs to be implemented on the HOWFS bench has been pursued by ESO and INSU-LAOG and will allow us to extend the capability of this bench to the demonstration of high contrast imaging important for the continuation of the work planned in WP 2.1. Several papers [1-6] have been produced describing the results obtained in this work package.

[1] "*End-to-end model for XAO simulation. Application to Planet Finder"*, T. Fusco, G. Rousset, R. Conan, M. Nicolle, C. Petit and J.-L. Beuzit, in *Scientifics highlights 2004*, F. Combes, D. Barret, T. Contini, F. Meynadier and L. Pagani eds., EDP Science

[2] *"Optimisation of Shack-Hartmann-based wavefront sensor for XAO system "*, T. Fusco, M. Nicolle, G. Rousset, V. Michau and J.-L Beuzit, in *Proceedings of the SPIE, Volume 5490, pp. 1155-1166 (2004)*

[3] *"Simulations of extreme AO: a comparison between Shack-Hartmann and pyramid-based systems"* C.Verinaud; M. Le Louarn; V.Korkiakoski; J.Braud, Proc. SPIE 5490 pp. 1177-1188 (2004).

[4] *"On the nature of the measurements provided by a pyramid wave-front sensor",* C.Verinaud, Optics Communications, Volume 233, Issue 1-3, p. 27-38.

[5], "Adaptive optics for high contrast imaging: Pyramid Sensor vs. spatially filtered Shack-Hartmann sensor"', C.Verinaud, M. Le Louarn, V. Korkiakoski, M. Carbillet accepted for publication in MNRAS letters.

[6] "Combining spatially filtered Shack-Hartmann wavefront sensing and coronography in closed loop AO simulations" V.Korkiakoski; M.Le Louarn; C.Verinaud; Proc. SPIE 5490, pp. 695-704 (2004).

The following table summarised the Milestones and deliverables achieved during the 2004 reporting period:

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
M1	Kick-off meeting	**1**	ESO	6	3
M2	JRA1 General Meeting 1	**1**	ESO	9	9
M1	Two Feasibility design studies of the VLT XAO system aiming at Planet Finding	**2.1**	INSU-LAOG MPIA ESO	12	12
M1	Complete conceptual design study of an LGS GLAO system for the VLT: Two studies delivered instead of one	**2.2**	ESO NOVA	12	3 & 11
M1	Complete design of a multi-object wavefront sensor prototype for the LBT	**2.4**	INAF-Arcetri MPIA	18	12
M1	Complete conceptual design of the new Real Time system	**3.1**	ESO – INS	12	Delayed ~12 mo
M1	Complete theoretical study of the optimal control for MCAO systems	**3.2**	ONERA	12	Delayed ~6 mo
M1	Complete feasibility study of a ~1m glass shell for an adaptive secondary	**3.6**	INSU/CNRS	12	Delayed ~6 mo

M5	Delivery of a 60 actuator magnetic micro deformable mirror prototype and testing	**3.7**	INSU-LAOG	30	12
M1	Complete theoretical study of a high order wavefront sensor	**3.8**	ONERA	18	12

The table below summarises the major JRA1 meetings:

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
March 1st & 2nd 04'	JRA1 Kick-off meeting	ESO Garching	30	http://www.eso.org/projects/aot/jra1/
March 15th &16th	Conceptual design review of the VLT MUSE GLAO system	ESO	20	http://www.eso.org/rojects/aot/jra1/
Sept. 16th & 17th 04'	JRA1 general meeting 1	INSU-LAOG Grenoble	30	http://www.eso.org/projects/aot/jra1/
Nov 18th	Conceptual design review of the HAWK-I GLAO system	ESO	20	http://www.eso.org/projects/aot/jra1/
Dec 16th	Conceptual design review of the VLT XAO system 1	ESO	30	http://www.eso.org/projects/aot/jra1/
Dec 17th	Conceptual design review of the VLT XAO system 2	ESO	30	http://www.eso.org/projects/aot/jra1/

1.5.2 JRA2: Fast detectors for AO

Human effort

Participant number[17]	40	4	7	31	
Participant short name[18]	INSU/CNRS	ESO-INS	IAC	ONERA	**Total**
Person-months[19]	26.72	3.86	0.64 (0)	0	**31.22**

Progress report

The main activities of the JRA2 during the reporting period were:

- Re-definition of the JRA2 organisation and of the exact participation of the partners. Introduction of IAC as a new partner. IAC will be responsible for the detector tests (WP5) instead of LAM which is now responsible for the controller manufacturing (WP3).ESO-INS is now responsible for the detector specification and sub-contract (WP2).

- Iterative discussions between the science group, those responsible for the detector specifications and some detector manufacturers around the world.

- Call for tender sent by August 2004 to the main detector manufacturers.

- Controller preliminary design achieved. Key components tested with L3CCD chips.

WP1: management (INSU/CNRS)

In addition to the global management of the activity, several meetings were organised (see hereafter) allowing good monitoring of JRA2.

The main difficulty encountered by the management came from the late delivery of the funding and the late signature of the OPTICON contract. This had a strong impact on the activity of the other workpackages. The overall activity was delayed by about 6 months.

WP2: science group discussions and detector procurement (ESO)

In close collaboration with the science group, detector specifications were collected by analyzing the requirements of future instruments for XAO, GLAO-LGS, and GLAO-AO-NGS. A requirements document (Deliverable D1) was written and these requirements circulated to all member of JRA2 and to the PIs of future instruments for comment. The requirements were presented and discussed at several JRA2 OPTICON meetings. Simulations were formed to determine the tradeoffs between critical requirements of quantum efficiency (QE), read noise, and excess noise.

On 27 August 2004, a Call for Tenders (CfT) for the development and supply of 256x256 pixel, very low noise (1e- or less), fast readout (1.2kframes/s) CCD detectors that meet the requirements was sent to all known vendors. The CfT was issued by ESO on behalf of JRA2 and ESO's standard rules and regulations on conduct of the CfT and evaluation of responses were followed. Among them was the one from E2V. E2V is a well-known worldwide detector

[17] Lead participant first

[18] Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

[19] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

supplier. E2V had several ESO contracts for CCD detector development both for Adaptive Optics applications (NAOS CCD) and for scientific focal plane instruments. ESO had very good experiences with E2V in the past. Quality in-house production facilities and staff, good management and ability to deliver are the strong points of E2V. E2V proposed to develop a 256x256 Adaptive Optics detector based on the already demonstrated L3 vision technology, but extended from 1 to 4 outputs. The proposed device is conservative and thus there is a high probability of delivery of a device on-time that meets the proposed specifications. As standard, E2V proposed an attractive compact Peltier Cooler package. The technical and managerial proposal as well as the test plan were well elaborated and comply with most of the OPTICON minimum requirements of the Call for Tenders. In addition to this low risk device, E2V proposed to develop in parallel higher risk variants with eight outputs and deep depletion. Going to eight outputs decreases the output pixel rate and improves the feasibility of developing a controller. Deep depletion improves the "red" response.

E2V was the best technically acceptable bidder, for the design, development and supply of Peltier cooled 256 x 256 low noise fast readout CCD detectors for Adaptive Optics. In addition, the proposal from E2V was the cheapest and the lowest risk to get the final product in time. A contract is currently being negotiated between E2V and ESO for the supply of 4 science grade devices at a cost of €1,385,000. The option of saving €270,000 by OPTICON providing test equipment will be taken up which will reduce costs to €1,115,000. This equipment will be developed and built by work packages, WP3 and WP4.

To conclude, the deliverable D1 and the milestone M1 was achieved.

Milestones M2 and M3 of this work-package are delayed by 2 months and will be achieved in 20 months. This is due to the late signature of the contract. This will delay the overall activity of the JRA in the future.

WP3: controller

This year was dedicated on training with high speed CCD techniques which are not common in astronomy and are not usually consistent with low noise techniques. A particular effort has been carried out to evaluate the L3 vision technology from E2V, even though the final subcontractor was not known at the beginning of the project. It was foreseen that other possible contractors would employ a more classical technology that is already well known. At the end of 2004, since the winning subcontractor was known (E2V), efforts were concentrated on the definition of the final controller. Participants of this WP had strong interactions with WP2 (chip definition) in order to drive the constraints and raise the possible issues with some chip designs. The milestones M1 and M2 of this work-package were achieved.

WP4: cryogenic system

The activity of this work-package is delayed because it is strongly linked to the technology of the chosen detector. This activity will start in the first 6 months of 2005, shortly after the detector fabrication KO meeting that is scheduled by February 2005 at the E2V factory. This should not have an impact on the overall schedule of the activity because this work package is not on the critical path.

WP5: detector test

The contribution of the IAC to the JRA2 has been mostly devoted to:
- Attending the JRA2 meetings.
- First contact and familiarization with the JRA2 initial structure, institutions and personnel involved.
- Contribution to the discussions regarding the scientific requirements of the detector to be produced by JRA1.

- Task re-definition for the next period and assignment of responsibilities according to the involvement of the participant institutions.
- Preliminary definition of the detector tests to be performed to validate the JRA2 detector as a responsibility of the WP5 assigned to the IAC.

The list of tests will be revised and developed in the next 18 months. The instrumentation, facilities, planning and personnel required for the execution of such tests will also be defined in detail.

To conclude this progress report, the JRA2 should successfully produce an AO detector that will be of considerable interest for the astronomical community. The activity will be delayed because of the late signature of the OPTICON contract which delayed the call for tender procedure at ESO. At least 6 months of delay is foreseen. No action can be taken to correct such deviation because the detector fabrication schedule is already tight. Moreover, the specified detector during the call for tender is a technical development that is more challenging than what was expected at the signature of the contract.

Milestones and Deliverables

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
M1	Science group discussions	WP2	ESO	6	6
M2	Detector specifications to the manufacturer	WP2	ESO	6	6
M1	Controller conceptual design	WP3	INSU/CNRS	6	6
M2	Controller design review	WP3	INSU/CNRS	6	12

Major meetings and workshops

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
9/3/2004	Kick-off meeting of the JRA2	Grenoble	12	http://www-laog.obs.ujf-grenoble.fr/JRA2 link "kick-off meeting"
1/10/2004	Meeting 1 / General meeting for the JRA2	Marseille	11	http://www-laog.obs.ujf-grenoble.fr/JRA2 link "Meeting 1"

1.5.3 JRA3: Fast Readout High Performance Optical Detectors

A. Contractors:

Participant number	1	2	4	11d	11e	13	28	37	39	40	
Participant short name	UCAM	PPARC	ESO	MPG MPA	MPG MPE	NOTSA	NUIG	LSW	USFD	War	**Total**
Person-months	9 (1)	0	0	1 (0)	13 (6)	1 (0)	6 (0)	8 (0)	2 (0)	1 (0)	**41 (7)**

JRA3 started comparing characteristics of the three major detector schemes currently envisioned to enable astrophysics with very high readout. Note that throughout this report we refer to Electron Multiplying CCDs (EMCCDs) rather than Low-Light-Level CCDs (L3CCDs), as the former is the generic name for the technology whereas the latter is a proprietary name (owned by E2V).

EMCCDs were studied for different characteristics by several contractors (LSW, UCAM, MPG, USFD) and found to be deficient with respect to performance characteristics of currently available devices as quoted by industry. Several tests were explored to understand the reasons of these deficiencies, leading to modifications of the strategies towards exploiting EMCCDs.

The architecture of PN Sensors were explored, aiming at schemes that would reduce the effective read-out per pixel for fast applications. Several designs have been investigated by contractor MPG.MPE. A first layout of a testbench for HTRA instrumentation was developed by contractor LSW.

Progress was slower than anticipated due to the delayed funding of the project and restructuring of the administrative status of the coordinating contractor LSW.

WP1: Management
Kick-off meeting of JRA and two subtasks involving several partners were initiated. Discussions with JRA2 on common procurement of EMCCD and exchange of information on PN Sensors revealed that the requirements for the EMCCDs would make a common call for tender unattractive. A redefinition of the interface with networking activity on HTRA was approved. JRA3 started comparing characteristics of the three major detector schemes currently envisioned to enable astrophysics with very high readout. It was felt that the relevance for fast, high performance detectors for future large telescopes beyond AO applications would require additional effort toward long-term planning beyond the work programme anticipated originally. A working group was established. Delays in funding caused M2, M3 and M4 to be moved backwards in time.

WP2: EMCCD developments
EMCCDs were studied for different characteristics by several contractors (LSW, UCAM, MPG, USFD) and found to be deficient with respect to performance characteristics of currently available devices as quoted by industry. While this will slow down progress with respect to optimistic estimates, it is well within the general timeline of the project and underlines the need for further development of EMCCDs as fast, high-performance detectors. It was possible to carry out the initial tests required for D1 (of WP2) with cameras and chips on loan, rather than purchasing test equipment (M1), as was foreseen in the contract. M1 (procurement of EMCCDs) was hence delayed with respect to the original schedule.

Towards the end of the reporting period, work began on the specification of the functional and performance requirements for EMCCD's for HTRA applications, based on modelling of EMCCD's. In conjunction with this, initial approaches were made to the two manufacturers of these devices - E2V and Texas Instruments (TI). A third supplier, Andor Technology, was also approached, as they have exclusive rights to a spectroscopic format EMCCD manufactured by E2V, which they package in a commercial camera for lab-based spectroscopy.

WP3: PN-sensor development

The Architecture of PN Sensors were explored aiming at schemes that would reduce the effective read-out per pixel for fast applications. Several designs have been investigated by contractor MPG (subnode MPE and its semiconductor lab).

The planning and time lines as foreseen in the contract was based on an existing concept for a HTR detector using PN-sensor (deep depletion layer) technology. Intensive discussion between the JRA3 partners of the likely application environment of this technology in astronomy has taken place in the first half of 2004. Evaluation of this discussion, in particular in comparison with the competing technology of Electron Multiplying EM-CCDs produced two main conclusions:

1) PN technology has the same intrinsic potential of individual photon counting sensitivity, but a far better sensitivity in the near IR (efficiency about 70% at 1 micron). The decision was made to focus on exploiting this advantage of the technology.
2) Existing readout designs for PN sensors are unsuitable for realistic astronomical photon counting.

   Following these conclusions, the semiconductor laboratory at MPE (HLL) spent half a year on a new chip design study. Target of the study was a PN sensor with photon counting performance exceeding that of EMCCDs in conventional thin-depletion microelectronics, and IR sensitivity to 1100 nm. Based on this design study the HLL has produced a draft development plan with cost estimates.

The design study has identified the need for more significant development of the on-chip amplification and readout processes than originally thought. As a result, the initial development effort will also be closer to the semiconductor technology level. The goal remains the production of a prototype satisfying the astronomical high time resolution requirements, by the end of the OPTICON contract period.

Completion of the preliminary design study mentioned above took longer than expected. Though it was still completed in time to meet deliverable D1, this has delayed the possible date for tender of a subcontract.

The changes proposed in the development plan are required in order to accommodate the results of the preliminary design study. The proposed new timeline includes tentative milestones and deliverables for the period from OPTICON contract month 30 till end of the contract.

WP4: APD array development

Following consideration of the HTRA science drivers for APD development, the conceptual design study was carried out in 2004 and led to the choice of an APD fibre array as an interim solution, to provide photometry only, and as a development tool. This short term solution will be followed by development of an IC APD array with the possible use of re-imaging optics and a lenslet array for efficient light collection.

Further simulation of APD Geiger mode operation and hardware simulation of an active quench circuit was successful during this period. The developments, in particular with the active quench circuit simulation, has led to the possibility of reducing, if not eliminating the crosstalk between pixel elements of an IC APD array. A prototype circuit board of an active quench circuit was developed and constructed.

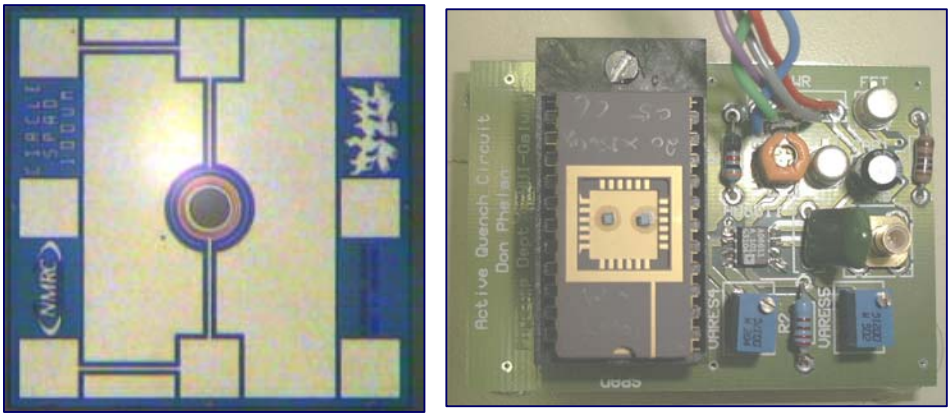


Figure 4.1. On the left is a picture of an Avalanche Photodiode developed by the National Microelectronics Research Centre. On the right is a picture of an active quench circuit developed by NUI, Galway to enable the APDs to operate in Geiger mode.

Successful testing of the active quenching circuit with a TEC controller design also took place during this period. The TEC allows the package temperature to be controlled within +/-1.0 degrees Celsius. On going work carried out by the NMRC and UCC has led to design and process improvements of the APD devices. Also an anti-reflection coating has been applied to the APD devices. Preliminary work by NUI, Galway has also started on the characterisation of the APD devices.

WP5: Controller Development

The activities under this work package includes modifying the SDSU3 controller used by the UltraCam system (Sheffield, Dr Vik Dhillon, and used widely within the astronomical community). The design and manufacture of this high-voltage clock driver board has already been largely completed by the UK ATC (Edinburgh) and the SDSU3 controller can now operate EMCCDs successfully. This aspect of controller development is critical to WP2, milestone M2 reported under the WP2 section. An image of this board integrated into an SDSU3 controller, and working is shown below.

Figure 5.1. The SDSU3 controller box fitted with the new EMCCD driver board designed by the ATC (Edinburgh)

The work at Cambridge is targeted at designing and testing a high-speed controller system capable of operating at speeds in excess of 16 MHz, and with a target speed of 35 MHz, and the capacity to drive many CCDs in parallel. This work is now well advanced with a system design that is now working with E2V EMCCDs mounted within a liquid nitrogen cooled vacuum dewar. The system uses a TigerSharc DSP that allows waveform generation with a time resolution of 3 nsecs (320 MHz), and with low jitter levels. It will soon be upgraded to allow a finer time resolution control by using a Kodak sequencer that will allow about 0.12 nsec resolution.

The CCD drive/signal processing parts of the controller are implemented on two high-density surface mount, multi-layer PCBs. They use the latest high speed precision signal processing devices now used by the digital camera industry. The net effect is extremely stable operation under a wide variety of conditions.

Another aspect of our plans for controller development was to examine the opportunities for using a common controller platform for EMCCDs, APDs and for PN-sensors. After some effort to look at this we concluded that the unique potential of each modality would have been substantially compromised by trying to force an artificial level of commonality. We concluded that the optimal level for achieving this highly desirable commonality was at the level where each detector passes its data stream to an intelligent pre-processing system which each needs. The data rates that are likely to be produced by these detector systems are very great, much above what can be passed through any standard computer bus and so such pre-processing is essential. This work is covered in the report on WP6. Work on D2 is well ahead but will slip to end-2005 because of delays in funding availability.

WP6: Common Software Development

This JRA is concerned with high-time resolution imaging. The new detector systems under development by our JRA3 team are capable of producing data rates well in excess of anything that conventional computer busses are able to manage. Although each instrument is very different at the lowest levels it is important that each system can feed its data into a common pre-processor that can allow an intelligent reduction of the data volume before it is passed to the host computer as science data. In some cases this may simply involve extracting limited areas of interest, while in others it may require that a relatively sophisticated analysis of the images is undertaken with, for example, real-time feed-back to the user about atmospheric conditions. In other instances quality assessment must be carried out dynamically, in real time to allow decisions as to subsequent processing.

We decided that this activity is best managed by hiring an experienced software engineer in Cambridge to carry out this work. Funding delays have meant that it was only possible to get this person in place in late November 2004, so there has been little progress within 2004. Nevertheless a good start has been made in evaluating DSP array processor boards with an emphasis on commercially available boards with substantial processing power as well on the availability of sophisticated programming tools that are essential if more than pure specialists are to be able to work with these systems in future.

An example of such a board is shown below (Figure 6.1)

This board (from Bittware Inc, US) gives 14.4 Gflops of processing power integrated with a front-end high-performance FPGA (Xilinx Virtex-3 Pro) to manage DSP co-ordination.

Essential parts of this activity have been transferred from partner NOTSA to UCam. As a result of funding delays, our new software engineer has been recruited late. It would be premature to hold M1 and 2 until our new software engineer has had a chance to review what hardware and software solutions are likely to be suitable in a general sense. As a result both milestones will be delayed.

WP7: Cooled Camera Head Development

There is already a great deal of experience amongst astronomers with cryogenic systems and cooled camera head structures. This means that the work to be carried out under this heading is relatively slight. Nevertheless some excellent progress has been made.

One of the standard dewars used by astronomers has already been modified at the UK ATC (Edinburgh) with Sheffield involvement to accept one of the EMCCDs, and a picture is shown below.

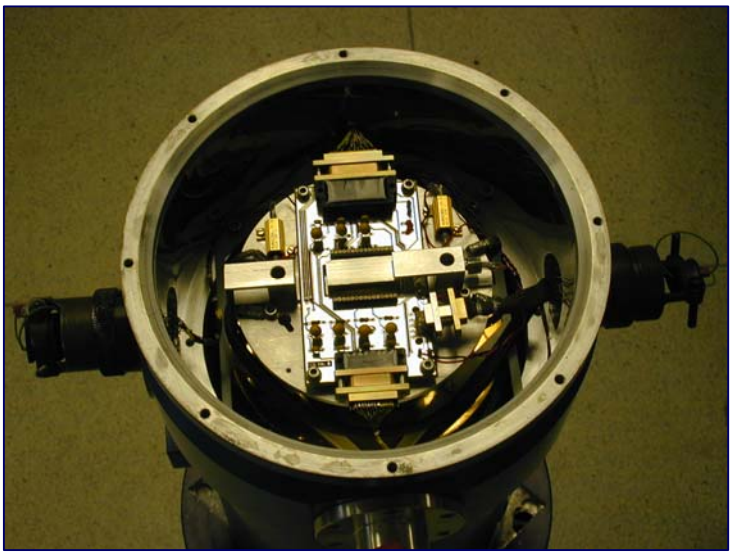


Figure 7.1. The internals of a liquid nitrogen cooled vacuum dewar modified to accept an EMCCD

However, the liquid nitrogen cooled heads traditionally used by astronomers are often very heavy, need regular vacuum pumping and hold nitrogen for a limited time. Cambridge activity has identified a much more compact, light-weight technology that gives essentially pumping-free operation, and excellent hold times (36 hours are not uncommon).

When used with high-speed CCDs such as the EMCCDs there are significant issues with uncontrolled track lengths between driver electronics and the CCD such as are introduced by using cable bundles. We have developed a novel structure whereby the connections pass through the dewar wall in an internal layer of a PCB while the outer layers are gold-plated copper to give an excellent vacuum seal. This board is proving to give highly acceptable performance.

M1 was achieved but resulted in the recognition that Common Camera Heads are not desirable in a general sense. For the specific purposes of JRA3 this aspect will be integrated in WP8. M2 was hence transferred.

WP8: Common Testbed

A first layout of a testbench for HTRA instrumentation was developed by contractor LSW. The time-schedule has been shifted considerably due the delayed funding. While work in some work packages could start with institutional funding such that the delay will be minor, other activities will be delayed by more than 12 months, since expert personnel who were originally foreseen to be recruited in early 2004 got alternative offers and are no longer available for OPTICON. Restructuring of the workpackages is underway to minimize the effect caused by the differential offsets in the different work packages.

Milestones and Deliverables:

Activity (NAx; JRAy)	Deliverable/ Milestone No	Deliverable/milestone name	Work-package /Task	Lead Contractor(s)	Planned (in months)	Achieved (in months)
JRA3	M1	Preliminary Design Review all technologies	WP1	LSW	6	12
JRA3	M1	Preliminary Design Fast Controller	WP5	UCAM, PPARC	6	6
JRA3	M1	Preliminary Design Camera Head	WP7	PPARC	6	6
JRA3	D1	Test Report L3CCD	WP2	LSW, MPE	12	9
	M1	Specification of EMCCD to be procured fixed	WP2	Usfd	3	15
JRA3	M2	CCD chip procurement	WP2	Usfd /UCAM	6	21
JRA3	D1	Design Report pn Sensor	WP3	MPG	12	12
JRA3	M1	Definitions of PN-sensors for HTRA	WP3	MPG	3	Done
JRA3	M2	PNSensor prototype setup and tests	WP3	MPG	9	18,modified
JRA3	M3	Design meeting with testbed/camera head	WP3	MPG	12	Done
JRA3	D1	Preliminary Design report	WP3	MPG	12	done
JRA3	M1	Image dissector technology for APD array chosen	WP4	NUIG	6	Done
JRA3	M2	Design APD Array completed	WP4	NUIG	12	done
JRA3	M1	Preliminary design of fast timing CCD controller	WP5	UCAM	6	done 5
JRA3	M2	Critical design review for PN-sensor	WP5	UCAM	12	moved WP6
JRA3	D2	Delivery of Fast timing controller for L3CCD	WP5	UCAM	12	24
JRA3	M1	Common software design meeting	WP6	UCAM	6	18
JRA3	M2	Software requirements and implementation plan	WP6	UCAM	12	24
JRA3	M1	UCam Preliminary Design of Common Camera Head	WP7	UCAM	6	Done
JRA3	M2	UCam Critical Design Review Common Camera Heads	WP7	UCAM	9	transferred WP8
JRA3	M1	Design of common testbed for medium/large telescopes	WP8	LSW	9	done

List of Meetings

Name of Meeting 1	Activity	Date and Location	Number of Contractor(s) represented	Any participants present external to network	Total no. of Attendees	Web-link/URL
Kick-off meeting	JRA3	14-16/03/04, Garching	7	2 (Project scientist by video, part-time and company PN Sensors (part-time)	14	-

Description/Purpose:
Kick-off of JRA 3. Presentations, discussions and more detailed and updated definitions of all workpackages, discussions about changes wrt to previous plans, revision of time-scales for 2004. Detailed discussion of performance of EMCCDs and PN-CCDs. Detailed discussion of front-end electronics. Comparison of different controller architectures. Detailed presentation of developments in field of PNCCDs - with presentations of external participant (part-time) company PNSensors (6 participants). Revision of trade-of table of EMCCDs and PN sensors. Discussions of Lab-test equipment. Discussion of instrumentation developments for fast detectors. Discussion of possible synergies with JRA2. Discussion of relationship to HTRA Network. Implications of Fast detectors for large telescopes

Name of Meeting 2	Activity (NAx; JRAy)	Date and Location (e.g dd/mm/yy, Paris)	Number of Contractor(s) represented	Any participants present external to network	No. of Attendees	Web-link/URL, if any
Kick-off Testbed design	JRA3	21-25/06/04, Glasgow	5	-	6	-

Description/Purpose:

Discussion of procurement of EMCCD test-devices. Implications for design of testbed devices for different chips. Discussion of EMCCD applications to UltraCam-type instrumentation. Implications for testbed designs that allow tests on the sky. Discussion of future developments in PN-Sensors: PN-Sensors with on-chip amplification (as in EMCCDs): Possible designs, advantages, and difficulties.

Name of Meeting 2	Activity (NAx; JRAy)	Date and Location (e.g dd/mm/yy, Paris)	Number of Contractor(s) represented	Any participants present external to network	No. of Attendees	Web-link/URL, if any
Kick-off EMCCD lab-tests Peltier cooled CCD	JRA3	10/08/04 Heidelberg	2	-	6	-

Description/Purpose:

Discussion of test-procedures of EMCCDs. Comparison of test-procedures for gain and noise Evaluation of testbed setups. Exchange of testprotocols between partners. The meeting agreed on separate matching tests to be conducted on water- and Peltier cooled systems to be conducted in different parts of parameter space with chips provided from industry for these test-purposes. The test include laboratory measurements as well as night-sky applications by both contractual partners involved.

1.5.4 JRA4: Integrating optical interferometry into mainstream astronomy

Participant number[20]	Participant short name[21]	Person-months[22]
6a	INSU/CNRS	76.53*
1b	UCAM/CAV	8.5 (0)
8e	INAF	8
11[a]	MPIA	18.5 (8.5)
11f	MPIfR	6 (0)
12	NOVA	15 (15)
21b	Ulg	0
30	Konkoly Observatory	4 (4)
31	ONERA	4.89 (4.89)
32	CAUP	2.5 (0)
33	TECHNION	2.5 (2.5)
34	NCU/UMK	6 (0)
36	UNIGE	0
38	OO	0
41	UNIVIE	1.2 (0)

* 118.03 including staff from Universities

JRA4 is aimed at studying the second generation of VLTI instruments (WP1.1 & WP1.2) and at producing a software to interpret interferometric observables in terms of astrophysical observables (WP2).

The JRA4 Kick-off meeting was held on 7 and 8 of January 2004 in Nice (France) with 40 participants. Tasks and persons contributing to the architectural design were identified.

[20] Lead participant first

[21] Use the same contractor short names and numbers indicated in the table "list of participants" in Annex I of your contract.

[22] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.

A web page at the address: http://eii-jra4.ujf-grenoble.fr, was organised for JRA4. It contains the description of the work packages, lists of contributors, working group and all the documents produced within JRA4.

The follow-up was done by means of teleconferences about every 2 months between the coodinator of JRA4 and the Work Package leaders. There were 5 such teleconferences in 2004.

The Scientific Council of the Euro-Interferometry Initiative (EII-SC) was settled on 24 of September 2004 in Heidelberg (Germany). The EII-SC is a new working group common to JRA4 and N5 (Chairman: Thomas Henning). It will be in charge of an evaluation of the experimental concepts studied in WP1.1. A detailed description of the progress of work for the year 2004 can be found in the document JRA4-TRE-0000-0001.

WP1.1: Concept to feasibility studies

The first phase of the WP1.1 (Jan04-Jun05) consists of seven parallel concept studies of second generation instruments for the VLTI. An evaluation of these concepts will be done by the Scientific Council of the EII at the end of the common ESO/EII meeting in April 2005. An important activity has been the definition of the evaluation matrix that will be used by the different groups as a template for their final study reports (JRA4-TRE-1100-0001).

Project A1 report: "PRIMA faint object" (INSU/CNRS/LESIA): Due to the current development of PRIMA at ESO, the situation of this project is not yet fully established. After the first proposal which allowed the development of this idea, the group is currently considering a larger contribution to this project. More details will be given in the coming months.

Project B1 "IFSPEC" report, (UL, UNIVIE): The start of the project was in January 2004. Since then progress has been made on the conceptual design and in the science case. First the expected performance of the overall instrument is being addressed and this will be evaluated together with the performance required for the various science goals of this project.

Project B2 "APRESMIDI" report (INSU/CNRS/OCA, MPIA): The progress of the phase A studies concerns the optical layout and the mechanical setup of the extension as well as theoretical analysis of the expected performance in terms of sensitivity and quality of the reconstructed images. The results from the latter were taken into account for the definition of science cases.

Project C1 "VITRUV" report (INSU/CNRS/LAOG, CAUP): The VITRUV pre-study project has progressed in several directions. The definition of science cases has been focused on compact objects. Several configurations for the beam combiner have been studied and evaluated in order to find the best concept. A 4T multiaxial beam combiner has been simulated and an 8T simulator is almost in the construction stage. A simulation of the effects of differential birefringence on interferometric observables has been done. Image reconstruction has been initiated and compared with what can be obtained with current existing instruments.

Project C2 "VIDA" report (INSU/CNRS/OCA): The expected performances of VIDA have been computed from numerical simulations and progress has been made in the definition of science cases. The optical scheme and the focal instrument are under definition. At the same time a test-bench is under development.

Project C3 “Bulk Optic” report (UCAM/CAV): The enumeration of possible concepts, the identification of manufacters for required opto-mechanical components and the study of optics tolerances and input beam trajectories have been initiated.

Project C4: “homothetic mapper for DARWIN”: A demonstrator of a homothetic mapping system has been tested. Based on the results the spectral capability of such beam combiner is also investigated. An optical design of the homothetic mapping beam combiner was completed based on bulk optics.

WP1.2: Cophasing and fringe tracking

The WP1.2 is focused on analysis and optimisation in three areas: current cophasing instrumentation performance, measurement operations and cophasing schemes for future instruments. It is supported by a working group managed by INAF/Torino, taking advantage of the Web resources supported by the Grenoble team (WP2.1).

The INAF/Torino group is working on the VLTI fringe sensors FINITO and PRIMA FSU, and plans tests in the lab and at the VLT on Paranal. The work in progress was focused mainly on the design and analysis activity for the PRIMA FSU and in setup optimisation for FINITO.

The Technion group aims at in-depth practice on interferometric techniques, and multiple beam combination concepts in particular. In the framework of the NA5 Exchange Visitor Programme, E. Ribak (Technion) spent time in Torino for analysis of implementation issues of current instruments and evaluation of future multi-beam instrument concepts.

The LISE team (OHP) is carrying on the analysis and laboratory activity aimed at testing the “dispersed speckle” method.

The Köln group is working on the LINC-NIRVANA Fringe-And-Flexure-Tracker for the LBT.

WP2: Software

This workpackage is aimed at delivering, over a 5 year span, two successive versions of a software package suitable for general use. This software aims at facilitating the use of large modern interferometric facilities such as ESO's VLTI to an end-user who is a non specialist in optical interferometry. Due to the complexity of the task, the work is distributed into 5 parts that develop quite independently a functionality of the whole software.

WP2.1 General Management and User Support (INSU/CNRS/LAOG): A web site: http://eii-jra4.ujf-grenoble.fr, has been set up, with all services needed for communication between JRA4 (WP1 and WP2) groups, documentation, reporting, software repositories, software configuration, etc. We have also provided the setup and continue to maintain the server and the above mentioned services. User support has been started: 2 persons have been scheduled part-time for user support. Template documents have been written for all scheduled kinds of reporting and deliverables. A documentation management plan has been written. Documentation control and delivery is performed on a routine basis. More than a dozen active mail distribution lists enabling inter-group exchange and activity are maintained by WP2.1

WP2.2 Common Software (INSU/CNRS/LAOG): The management plan has been produced. The LAOG group has worked full time on the following subjects: early concepts documentation, studies and writing of base libraries for interprocess communication, error

handling, log and reporting, programming rules. It has completed writing of a preliminary, but functional, version of the corresponding libraries.

WP2.3 Model Fitting (INSU/CNRS/CRAL): The management plan has been written. The main parts of the model fitting program have been defined, a test version has been coded in and design of APIs with WP2.2 has started. Furthermore, a first version of the Applications Programing Intefaces (API) was released in July. It will evolve through the remarks of the whole group and the progress of the operational prototype. A User Requirements Document is underway and will be delivered in the next 6 months.

WP2.4 Astrometry(UL, UNIGE): No work was performed on this task in the reporting period due to the delay in obtaining EU funds.

WP2.5 Image Reconstruction (1/ INSU/CNRS/CRAL & ONERA, 2/ UCAM/CAV, 3/ MPIA & MPIfR, 4/ UGR/IAA): Four groups participate to this work package which aims at providing a set of image reconstruction methods from optical interferometric observables. The first two groups are working on algorithms well suited to VLTI data. The third group works on algorithms dedicated to LBT data. The fourth group is working in an interface with which optical interferometry data will be directly read into the AIPS software package, as a first step for reducing these data with radio software packages. Each group has produced its management plan. Groups 1 and 2 have participated to an international image reconstruction contest organized by Peter Lawson (JPL, USA) within the framework of the International Astronomical Union, in which their respective software were used and compared.

Milestones and Deliverables

Activity	Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
JRA4	D1	List of contributors	WP1.1	MPIA & INSU/CNRS	3	3
JRA4	D1	List of contributors	WP1.2	INAF	3	3
JRA4	D1	List of contributors	WP2.2	INSU/CNRS	18	12
JRA4	D1	List of contributors	WP2.3	INSU/CNRS	18	12

List of Meetings

Date	Title/subject of meeting	Location	Number of attendees	Website address
January 7-8 2004	JRA4 Kick-off meeting	(Nice (France	40	http://eii-jra4.ujf-grenoble.fr
September 24 2004	1st Meeting of the Scientific Council of the Euro-Interometry Initiative	Heidelberg (Germany)	20	http://www.strw.leidenuniv.nl/~eurinterf

1.5.5 JRA5: Smart Focal Planes

Participating Contractors and Effort Deployed

Participant number	**1a**	**2b**	**5**	**6c**	**6d**	**7a**	**8d**
Participant short name	UCAM-IOA	UKATC	CSEM SA	CRAL	LAM	IAC	Padua
Person-months	3 (3)	9.7	8 (4)	13.5	24	4 (0)	2.4

Participant number	**10**	**26**	**35**	**44**	**45**	**47a**	
Participant short name	ASTRON	UNI BREMEN	UNIV DURHAM	Reflex s r o	TNO/TPD	AAT Board	**Total**
Person-months	2.5	0.4 (0)	10(5)	6	0	10	90.5 (12)

Introduction

The Smart Focal Planes JRA has started to make excellent progress. We have developed the technology roadmap which we used to plan the proposed activity, and used this in conjunction with instrument concept workshops to produce outline requirements and specifications for devices and subsystems. All workpackages can show significant advances in their technologies. In particular, in the beam manipulators activity we have developed several working 'starbug' demonstrators, and developed alternative concepts for an ELT instrument based on them. The image slicer activity is also using these ELT instrument concepts to drive specifications for novel devices using conventional and replication manufacture techniques. Work on slit mechanisms, both conventional and MOEMS based, are showing promise, as is work on deployable IR fibre systems.

We have spent just over 50% of the planned expenditure in this period, corresponding to the late start forced on many of our participants by the delay in contract signing. This slow start has not prevented us meeting our contractual milestones. The rate of increase of activity is rising now, and our plan for the next 18 month period projects that we will have caught up from the initial delays.

All our activities are now building towards a technology evaluation review in late summer, which will be used to define our Phase B prototyping programme.

WP 1.0 Management (PPARC)

In addition to individual WP meetings, an overall kick-off meeting was held 16th March and Progress Meeting 1 was held 23rd June. Financial matters for participants post kick-off were resolved. Monthly reports were received from WP managers, and a monthly telecon was held to manage activities. Documents were provided to participants to assist in the management of intellectual property. A restricted web-page was established for JRA5 participants. https://ssl.roe.ac.uk/twiki/bin/viewauth/Smartfp/

WP 1.1 System Design and Systems Engineering

A meeting to update to technology roadmap held was 17th March. A document detailing the science requirements for a SFP instrument was created. An instrument requirements documents for a SFP system was created. A decision was taken as to the principle technology for pick-offs to be examined in Phase A. A workshop was held to determine an optical concept for a SFP system, from which requirements have been derived for technology

development.

It has been determined that mechanical arms will not be able to provide the method of pick-off to meet the science requirements for an ELT multi-object spectrograph. This has focussed activity during the first phase of the project on Starbugs type methods.

The programme is approximately 3 months behind schedule due to the delay in the signing of the contract, but increased activity is planned for the upcoming 6 months in order to bring the project back on schedule.

WP 2.1 Image Slicers (CRAL)

Undertook the first phases of the development of glass slicers which will enable the evaluation of this technology for further development towards ultra-thin slicers for ELTs.

Areas of work undertaken include:

- Preparation of Catadioptric Slicer Test Plan document
- Optical components procurement
- Establishment of optical testbench assembly
- Upgrade of optical testbench
- Update of Slicer Test Plan
- Start Catadioptric Slicer testing

WP 2.1 Image Slicers (Padua)

A study on smart-optics replications by galvanic techniques has begun with two specific meetings (Prague October 14 2004 and Merate December 17 2004) and a teleconference on December 8, 2004. During the Merate meeting two companies (Reflex Prague and MediaLario Lecco) which are both deeply involved in high precision optical components galvanic replication were present.

The major achievements are the following:

- the start of a common programme of verification of the limits intrinsic to galvanic replication for high fidelity reproduction of optical parts with 90 degree edges and very small detail surfaces (0.1 to 1 mm size); this programme will be based on predefined test samples (‘challengers’) to be specifically prepared, measured and then replicated. This programme is directly concerned with the possibility of creating a considerable number (about 50) of image-slicers by replica technique.
- the start of a common programme to understand the behaviour of replica number versus optical quality degradation.
- the start of a common programme to verify the ability of galvanic replication to create small arrays of mirror surfaces, even in a multi step mode ie: first: construction by machining techniques of a reference model; second: creation of a negative replica made by resin; last: replication of the intermediate negative by galvanic deposition.
- the definition of a first tentative activity schedule for the next activity period.

There have been no major deviations from the work planned in the last detailed implementation plan and in the contract

WP 2.1 Image Slicers (Uni Bremen)

Progress towards the objectives of the activity have been delayed due to delayed signature of contract.

WP 2.1 Image Slicers (Univ Durham)

A sub-group of JRA5-contractors interested in image slicer optics has been set up and regular meetings have been organised.

An ELT instrument feasibility study (MOMSI) has been established and goal specifications have been formulated.

A replication work team has been put together and a detailed work plan has been created to investigate the process of electrochemical replication of optical surfaces for image slicer applications. During the coming months the first prototype hardware will be developed. Initial questions to be answered are:

- Is replication of IFU mirror arrays feasible with existing replication techniques?
- What is the effect on optical fill factor when employing replication techniques?
- How many replications are possible before the replication master wear has an effect on the quality of the optical performance?

Significant achievements were:

- The MOMSI study has shown that diffraction-limited slicer mirrors will be much smaller than slicing mirrors currently produced. Current image slicer optics are produced by precision machining methods and would be difficult if not impossible to produce by current machining methods.
- The replication experiments will provide answers to the questions raised above. Test master pieces to investigate the feasibility of using replication techniques have been designed and are currently in manufacture.

For ELT applications the emphasis has clearly moved from machining to replication methods. Resources are now being focussed on developing the replication techniques with parallel investigations involving two of the JRA contractors to try and accelerate the technology development process.

WP 2.1 Image Slicers (Reflex sro)

- Optical replication techniques for slicer production have been explored.
- Feasibility study and experiments with electroplating techniques and electrochemistry have been performed to optimise replication process for slicer production.
- Parameters considered include mandrel material, geometry and size, electrochemical bath volume, composition and temperature, electrode shape and electrical current.
- Special attention was paid to the mandrel surface treatment and composition of a separation layer. The best known surface for electroformed Ni replication from metal surface is with an additional thin NiP layer. However, cost effective technologies and design options for batch production calls for simpler solutions.
- Reflex prepared technically for the working meeting on slicers in Prague.
- Consultations and design work regarding mandrels and challengers for replication tests have been done together with Univ Bremen, INAF Padova and UNIV Durham.

Significant achievements were:

- Design of replicas from an Al mandrel with NiP layer for the challenger.
- Design of replicas from a bare Al mandrel for the challenger.

- Proposal for optimisation and additional tests with non-NiP separation layers
- Continued studies of feasibility of technologies with medium to long-term availability and potential high performance

There have been no major deviations from the work plan with regard to content though the schedule was adjusted.

WP 2.1 Image Slicers (TNO/TPD)

Progress towards the objectives of the activity have been delayed due to delayed signature of the contract.

WP 2.2 Beam Manipulators (AAO)

- Six Starbug prototypes, of three different designs, have been built and tested. The testing was done at room temperature and –20 degrees C.
- The software for closed loop control of the Starbugs has been developed.
- A test dewar has been built for testing the prototypes in a cryogenic environment.
- The work on the optical relay design and instrument concepts has been completed and a report written.
- Some links with industry have been established.

The AAO has made significant progress towards confirming the viability of a Starbugs based Smart Focal Plane. The size of the latest Starbug prototype is suitable for the MOMSI concept.

We have demonstrated, through modelling, that large numbers of Starbugs could efficiently be allocated to targets randomly distributed in the field.

There have been no major deviations from the work planned in the last detailed implementation plan and in the contract

WP 2.2 Beam Manipulators (LAM)

There has been significant participation to the definition at the system level especially during a workshop organized at LAM.

Significant achievements were:

- Participation in the instrument system analysis with ATC
- Analysis of autonomous field pick off devices
- Design a steering device with deformable mirror on top
- A first optical design of a typical instrument was done.

The exploration of innovative field selection concepts was undertaken, including a novel magnetic levitation concept. The development roadmap is under evaluation directed towards the proposition of a first demonstrator.

WP 3.1 Fibre Systems (UCAM-IOA)

Progress made during the reporting period:

1) Design of deployable Near-IR IFUs.
2) Design of plug-plate system for prototype multi-IFU system.
3) Identifying component suppliers for prototype system and obtaining quotes.
4) Procuring coherent guide fibre bundles for prototype system.
5) Manufacturing plug-plate system.

Tests of guide fibre bundles were very successful. Work is progressing in a satisfactory manner with no unforeseen problems. Note: system has not been fully manufactured yet.
There have been no major deviations from the work planned in the last detailed implementation plan and in the contract.

WP 3.2 Reconfigurable Slits and Masks and WP 2.2 Beam Manipulators (CSEM-SA)

Work has been undertaken in four areas.

1. Survey of cryogenic Multi-Object-Spectrograph concepts. The activity also included participation to a dedicated (OPTICON) 2-day workshop on 27-28 Sept on reconfigurable slits. A first technical note was produced.
2. The conceptual groundwork was worked out and described in a technical note. Some material for prototyping was purchased. Survey of field selection (i.e. masking) function in cryogenic multi-object spectrographs.
3. Control concepts of multiple (hundred of actuators) devices such as the ones applied in MOS masks. An assessment of technologies required and implied by the Starbug concept for next generation instruments. A first technical note was produced.
4. A study on the manufacturing of straight bars as used in the cryogenic mechanical slit masks was undertaken. Several alternative manufacturing methods (with respect to current practice and application) were investigated, along with experimental evidence. The work lead to improved process knowledge and will result in a significant cost improvement for these critical elements.

WP 3.2 Reconfigurable Slits and Masks (IAC)

A survey on applications of reconfigurable slit masks and associated mechanisms has been completed for new infrared spectrometers. This survey is planned to be continuously updated as new instruments may appear.

Some efforts have also been dedicated to capture the specific engineering specifications which a reconfigurable system should meet to accomplish the high level scientific requirements of a modern astronomical instrument.

Finally, several areas of risks in the development of such a robotic system have also been identified and their potential impact has been outlined.

A complete set of specifications of a robotic configurable slit mask system exists, from which the design can now proceed. In addition, several topics which can severely hamper the expected performances are now listed, which is an important step towards a correct understanding of the operational loads of such a system.

There have been no major deviations from the work planned in the last detailed implementation plan and in the contract

WP 3.2 Reconfigurable Slits and Masks (ASTRON)

The following work was undertaken in the area of linear slides and actuators for cryogenic temperatures.

- Study of literature of linear slides: completed and report internally released. Several companies provide vacuum compliant translation stages. All are very interested in cryogenic applications and sometimes even in starting tests.
- Overview of suitable materials, surface treatments: completed and report internally released. There are several potentially suitable coatings on the market, and new ones are becoming available regularly. The cryogenic specifications of these coatings are limited and should be tested for friction and wear in cryogenic circumstances.
- Study of literature and existing solutions for commercial 'low cost' actuators, completed and report internally released. Interesting actuators identified for test.
- Test of potential solutions on friction and accuracy started
- Design build and test of a sliding prototype without actuator started
- Test of the most promising actuator(s) not yet started
- Combination of slide bearing prototype and actuator not yet started

No major deviations from the work planned have been experienced or are expected. Minor deviations are some rescheduling of workpackages, mainly an earlier start on motor study and longer period for material testing.

WP 3.3 MOEMS

This task involves the prototyping of a SFP specific MOEMS device in a European lab/industry for preliminary evaluation. A collaboration with University of Neuchatel (Switzerland) has been formed in order to get a first demonstrator of a MOEMS-based slit mask. The micro-mirror approach has been selected and a proper design is under investigation in terms of performances and feasibility. The goal is to design some relevant device, useful for simulating a multi-slit mask.

In terms of modelling, the impact of the use of a "fat" MEMS configuration for NIRSpec has been evaluated in terms of photometry and spectral photometric variation.

Tests are being run on an existing micro-mirror array (TI). The operation of a multi-object spectrograph is being simulated with our multi-object field of view with several sources. By using attenuation filters, the magnitude difference between the studied object and the spoiling source(s) can be eliminated. Contrast measurements are under way considering relative locations and differential intensity of the sources.

Development plan for a cryo test is under way.

Significant achievements were:

- Selection of a laboratory for SFP prototype realization in Europe
- Development of SFP models and impact in MOS performances
- Extensive tests on our characterization bench for SFP operational evaluation

Valuable samples of European prototypes of a MOEMS-based reconfigurable slit masks will be sourced.

There have been no major deviations from the work planned in the last detailed implementation plan and in the contract

Milestones And Deliverables Achieved During The Reporting Period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D1	1st six Monthly Progress report	1	UK ATC	6	7
D1	2nd six monthly Progress report	1	UK ATC	12	12*
M1	Technology Roadmap Workshop	1	UK ATC	2	3
M1	Choose appropriate technology to concentrate effort on – depending on ESO KMOS choice	2.2	UK ATC	3	7
D1	Review of European micro-technology labs/industries capabilities and exploitation of devices from different application sectors	3.3	LAM	9	12

* material in this annual report

Major Meetings And Workshops Organised During The Reporting Period

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
30/01/04	Image Slicer kick-off	Bremen	8	Image Slicer kick-off Minutes
16-17/3/04	JRA Kick-off & Roadmap Update	Edinburgh	10	JRA Kick-off & Roadmap Update Agenda
30/04/04	Beam Manipulators kick-off	Marseille	12	Beam Manipulators kick-off Agenda
23/06/04	Team Meeting	SPIE Glasgow	14	Team Meeting at SPIE Minutes
27-28/09/04	Reconfigurable Slits KO	Edinburgh	12	Reconfigurable Slits KO Presentations
5-7/10/04	Smart MOMSI Workshop	Marseille	10	Smart MOMSI Workshop
14/10/04	Image Slicers PM1	Prague	7	Image Slicers PM1 Minutes
8/12/04	Slicer Specification	Durham	8	Slicer Specification
17/12/04	Slicer Replication	Milano	10	Slicer Replication

1.5.6 JRA6: Volume Phase Holographic Gratings

A. Contractors:

Participant number	4a	7a	8c	21b	23	
Participant short name	ESO - INS	IAC	INAF - Brera	ULg – CSL-AOHL	POLIMI	**Total**
Person-months	8.1	0(0)	7.74	0(0)	8(0)	**23.84**

B. Summary of Objectives and progress made:

The JRA6 was originally organised in 4 main work packages (see Annex I to the contract). In view of the differences which emerged during the study between IR and UV gratings (originally in the same WP 2) we decided to split the research lines and create WP 5 (UV VPHG) under the responsibility of Hans Dekker at ESO.

Currently the JRA is then organized in 5 main work packages (also referred to as *research lines*) which are:

1. Management
2. IR Volume Phase Holographic gratings development
3. Non-traditional VPHG-based configurations
4. Photochromic Polymers based VPHGs
5. UV Volume Phase Holographic gratings development

The planned 18-months activity for each WP is aimed at the production of a laboratory-level prototype and its preliminary tests. This is in order to address the longer second phase of activity aimed to the realisation of science grade prototypes.

During the last reporting period, activity toward the definition of the materials, the techniques and the characteristics of the prototypes has been carried out. Attention has been given to the definition of test protocols to evaluate the characteristics of the prototypes. Towards the end of the last period material procurement and the fabrication phase has started. In agreement with the proposed schedule the first 6 months of the year 2005 (months 12-18 of the project) will be dedicated to the fabrication and characterization of the prototypes.

The following is a brief summary of the activity organised per work package. A more detailed description is given in the Annual Technical report available at the JRA web-site (see following pages).

Information contained in the web-links is not public and the access to the document is password protected. OPTICON Board members have the password and other authorities entitled to access the documents can request the password from the JRA leader.

WP 1 – Management

The activity of this work package concerned mainly the set up and organisation of the interconnection between the work packages. It is notable that each of the contractors in JRA-6 contributes to more than one work package offering specific expertise in every research line. A coordination activity, e.g. making everyone aware of the expertise, infrastructure and facilities available is therefore important for the success of the activity.

The management activity also concerned the link between the JRA and the OPTICON Board and Executive. This has been done via the participation of the JRA leader in the relevant meetings and by assuring the preparation and delivery of the technical documentation in a timely manner.

WP-1 also took care of the setting-up, maintaining and recently upgrading the JRA web-site which is a source of information for the use of the participants, the OPTICON members and the general public.

WP-1 organized the 2 meetings we had in the reporting period (see below) and took care of the collection and dissemination of the information collected at the meetings.

A complete description of the activity can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-005.pdf

The test plan for the prototypes under construction can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-006.pdf

WP 2 – IR VPHGs

The activity of WP 2 in reporting periods concerned a) the definition of the characteristics of the IR prototypes to be fabricated, b) the definition of a standard test plan to evaluate their performance and c) the upgrade, refurbishing and setting up of the test laboratories at IAC.

The definition of the prototype characteristics (substrate material, gelatine thickness, number of lines per millimetre, size, etc.) took into account the test equipment available, e.g. dimensions of the cryogenic test chamber, of the cost of the material, of the characteristics of the holograph top be used and finally of the performance predictions obtained via RCWA (Rigorous Coupled Wave Analysis).

The Characteristics of the prototypes are currently fixed and the substrates have been procured. The exposure will take place at CSL in Liege in the next months and the preliminary test report will be available at the end of the first 18-month period (middle of the next reporting period).

A complete description of the activity can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-005.pdf

The test plan for the prototypes under construction can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-006.pdf

WP 3 – Non Traditional VPHG-based configurations

The research of WP 3 is aimed at procuring technological demonstrators for non-traditional configurations based on VPHGs. The rationale of this is to provide the astronomical community with tested ideas for innovative use of these devices.

The activity in the reporting period has included:

- Study, design and set-up of dedicated laboratory facilities for prototype construction
- Optomechanical study and trade-off study of the configuration proposed as baseline
- Selection of the configuration to be built
- Definition of the performance test plan on such configurations.

In view of the limited budget, effort has been devoted to refurbishing and recovering components and tools available in the Merate Laboratories. For the first set of prototypes existing VPHGs will be used as well as existing opto-mechanical components and equipment.

The selection of the configuration to be explored, i.e. a high resolution spectrograph and a tunable filter, has been a result of the analysis of expected performances, and examination of the available components and cost of procuring them. The possibility of testing such devices on the sky at the robotic telescope REM at la Silla (Chile) has been also considered in the selection process.

A complete description of the activity can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-005.pdf

The test plan for the prototypes under construction can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-006.pdf

WP 4 – Polymer based VPHGs

The goal of WP 4 in the reporting period has been the production and characterisation of suitably designed photochromic materials which should show enhanced modulation of the refractive index (Δn). The materials will be used for the realisation of rewritable VPHGs. The research has been carried out along 3 main lines:

1. Consideration of the state of the art and design of the photochromic materials
2. Production of the targeted photochromic materials and optical and spectroscopic characterisation
3. Processing of photochromic materials in thin films and Δn measurements

As regards point 1) above, starting from the analysis of literature on photochromic materials, diarylethenes have been considered as the basic photochromic structure for the development of new materials showing large modulation of the refractive index. Diarylethenes are characterised by high thermal stability of the coloured form, high sensitivity and fast response. By focussing our attention on the modulation of the refractive index between the two states of these materials, suitable molecular structures have been designed. Specifically, two different strategies have been followed:

- Production of low molecular weight diarylethenes bearing active substituents on 5,5' positions:
- Production of backbone photochromic polymers:

As regards point 2) following specific experimental procedures small quantities of the targeted photochromic materials for the laboratory test were obtained. The materials were fully characterised (using UV-vis, NMR, IR, Raman and GPC for photochromic polymers).

As regards point 1) above, chloroform solutions of low molecular weight photochromic material and PMMA (5.8 % wt. of the active molecule) were spin coated on a fused silica substrate 1 mm thick. A spin coating technique from chloroform solution was used to process backbone photochromic polymer too, but in this case no PMMA support was required. Films obtained were homogeneous, except for two polymers (poly 1 and poly 2, see Deliverable 3001.3) which, consequently, were processed with PMMA as for low molecular weight substances. Moreover, the low solubility of photochromic polyurethanes (poly 6 and poly 7) did not allow the production of good films by processing from solution, both with or without matrix of support.

A complete description of the activity can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-005.pdf

The test plan for the prototypes under construction can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-006.pdf

WP 5 – UV VPHGs

The activity of WP 5 in the reporting period concerned a) the definition of the characteristics of the UV prototype to be fabricated, b) the definition of a standard test plan to evaluate its performance and c) the upgrade, refurbishing and setting of the test laboratories at ESO.

The definition of the prototype characteristics (substrate material, gelatine thickness, number of lines per millimetre, size, etc.) was mainly driven by the goal of testing the device in a working instrument. The idea, subject to availability and positive result of the preliminary testing, is to test the device as cross-disperser for UVES at the VLT. Characteristics of the Holograph, RCWA results and cost compromises have also been taken into account.

The characteristics of the prototype is currently fixed and the substrate has been procured. The exposure will take place at CSL in Liege in the next months and the preliminary test report will be available at the end of the first 18-month period (middle of the next reporting period).

A complete description of the activity can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-005.pdf

The test plan for the prototypes under construction can be found in
http://golem.merate.mi.astro.it/projects/jra6/secure/doc-006.pdf

Milestones and Deliverables achieved

Milestones and deliverable are in agreement with the workplan in the contract. The documents describing the deliverables are available in the JRA6 web-site. The document code is reported in the last column of the following table.

Activity (NAx; JRAy)	Deliverable No	Name of deliverable/milestone	Work-package /Task	Delivered by Contractor (s)	Planned (in months)	Achieved (in months)	Doc #
JRA6	M1	Preliminary Design Meeting	WP1	ALL	4	3	
JRA6	M1	Material, Fabrication and test plan doc	WP2	ALL	6	6	003
JRA6	M2	Manufacturing Report	WP2	ALL	8	8	
JRA6	M1	Preliminary design study report	WP3	ALL	6	6	003
JRA6	M2	Test Plan and test equipment procurement path document	WP2	ALL	12	12	006
JRA6	M2	Industrial ready design report	WP3	ALL	12	12	005
JRA6	M1	Theoretical and Experimental analysis report on the materials to be used	WP4	ALL	4	4	003
JRA6	M2	Production of small quantity of the selected material and analysis	WP4	ALL	12	12	005

Meetings and Workshop Table

Date	Title/subject of meeting	Location	# att.	Website address
17/18-03-04	Kick Off Meeting	Politecnico - Milano	15	Doc-002
05-10-04	Mid Term Review	CSL Liege	8	Doc-004

- Kick off meeting. Purpose: get to know each other, learn about the facilities available in each contractor laboratory, define workplan and milestones and reporting system.

- Mid Term review. Prototypes definition finalized, test plan almost finalized. Definition of the prototype procurement phase and the test plan in order to be compliant and in schedule with the main 18 months deliverables, i.e. one fully tested laboratory prototype per each of the 4 research line of the JRA.

Significant achievements and their impact resulting from this activity during the reporting period

1. A new promising high contrast polymeric compound has been designed and synthesized at Politecnico Laboratories in the framework of WP 4.
2. A dedicated optical laboratory has been set up at Brera Observatory for the assembling and characterization of non traditional VPH-based configurations. (WP 3)
3. Silica substrate for the UV and IR prototypes have been defined and ordered. (WP 2, WP 5)
4. A complete test plan for all prototypes of all research lines has been defined (ALL WPs).

2. List of deliverables

Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
NA2	D1	Updated Progress report and revised roadmap	WP1.1 Dissemination of good practices.	IAC	12	11
NA2	M1	Regular ENO meetings	WP1.1 Dissemination of good practices.	IAC, IOA-KUL, INAF, THEMIS, IFAE, UCAM, Jodrell Bank.	6	6
NA2	M1	Regular ENO meetings	WP1.1 Dissemination of good practices.	IAC, IOA-KUL, INAF, THEMIS, IFAE, UCAM, Jodrell Bank.	12	10
NA2	M1	Kick-off meeting for the co-ordinated laser control system	WP1.2: A co-ordinated Laser Traffic Control System (LTCS) for the ORM	PPARC, IAC, IOA-KUL, IFAE, NOTSA, INAF	6	7
NA2	D1	Report: Systematic measurements of seeing & meteorology	WP2.1: Co-ordination of night-time seeing measurements with DIMMs	IAC, INAF, PPARC, NOTSA	13	12
NA2	M1	Automate monitor DA/IAC	WP2.1: Co-ordination of night-time seeing measurements with DIMMs	IAC	3>>	9>>
NA2	D1	Annual report on measurements of extinction and dust	WP2.3 Joint actions for meteorology, dust, extinction and Sky Background	IAC, INAF	12	12
NA2	D1	Report on techniques to get wind profiles	WP2.4 Joint actions for Measurement of turbulence and wind vertical profiles (SCIDAR, GSM & DIMM)	IAC	12	12
NA2	D1	Annual report on discussion forums for site-selection	WP2.5 Distribution and discussion of results and participation in the scientific forums	IAC	6	6
NA2	M1	Kick-off meeting: Joint Information System - JIS	WP.3.1 Development of a Joint Information System (JIS) on European Solar Physics Facilities.	IGAM, IAC, KIS	1	3
NA2	M1	Open-doors days at OT and ORM	WP3.2: Co-ordinated actions on transfer of knowledge and public outreach.	IAC, PPARC, INAF, IOA-KUL, IFAE	8	8

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Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
NA3	M1	ELT Science Web site	WP1	PPARC	6	1
NA3	M2	Science Team Leader Meeting	WP1	PPARC	9	Cancelled
NA3	M3	ELT Science case meeting	WP1	PPARC	15	11
NA3	M1	Establish UV Net members	WP2	PPARC	3	3
NA3	M2	Meeting on Future of UV Astronomy	WP2	PPARC	15	9
NA3	M3	1st draft of Roadmap	WP2	PPARC	18	Not due yet
NA3	M1	Set up working groups.	WP3	MPG	3	3
NA3	M2	First Working Group meetings	WP3	MPG	6	3
NA3	M3	Circulate 1st draft reports	WP3	MPG	18	Reschedule to M24
NA3	M4	Announce Conference	WP3	MPG	9	NA3
NA3	M5	Hold Conference	WP3	MPG	18	
NA3	M1a M1b	Interoperability Meetings	WP4	ESO	6 -	5 9
NA3	M3	DCA Meeting, Paris	WP4	ESO	12	12
NA3 NA3	M1 M2	Set up core Working Group Plan road map	WP5.1 WP5.1	UKATC UKATC	1 3	3 6
NA3	M1	Set up initial web page	WP5.2	UK ATC	3	4
NA3	M2	Set up WIKI or equivalent	WP5.2	UK ATC	12	4
NA3	M1	Establish Working Group and schedule	WP6	ESO	6	6
NA3 NA3	M2 M3	Draft High level Requirements Draft interface and design recommendations	WP6 WP6		12 18	Now due month 18 Was duplicate M2. Now redefined as M3 and due month 30
NA5	M1	List of members of selection committee	WP1	NOVA	1	1
NA5	M2	Annual call for applications	WP1	NCU	1	3&9
NA5	M3	Collate list of applicants	WP1	NCU	2	4&10
NA5	M4	Selection of exchange visitors	WP1	NCU	4	4&10
NA5	D1	Report from participants	WP1	NCU	12	12
NA5	M1	List of members of working group committee	WP2	INSU	1	1
NA5	M2	Call for topics of working groups	WP2	INSU	1	1

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Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
NA5	M3	List of topics proposed for working groups	WP2	INSU	4	4
NA5	M1	List of members of study group committee	WP3	ULg	1	1
NA5	M2	Call for topics of study groups	WP3	ULg	1	1
NA5	M3	List of topics proposed for study groups	WP3	ULg	4	4
NA6	M1	Confirm membership & Terms of Reference	WP1	PPARC	1	1
NA6	M2	1st Directors Forum	WP1	PPARC	9	11
NA6	M3	Promote Network and Access Programme at JENAM meeting.	WP2	PPARC, IAC	8	8
NA6	M1	1st Report to Directors forum	WP2	IAC	9	4 (preliminary report) 9 (1st update) 11 (2nd update
JRA1	M1	Kick-off meeting	WP1	ESO	6	3
JRA1	M2	JRA1 General Meeting 1	WP1	ESO	9	9
JRA1	M1	Two Feasibility design studies of the VLT XAO system aiming at Planet Finding	WP2.1	INSU-LAOG MPIA ESO	12	12
JRA1	M1	Complete conceptual design study of an LGS GLAO system for the VLT: Two studies delivered instead of one	WP2.2	ESO NOVA	12	3 & 11
JRA1	M1	Complete design of a multi-object wavefront sensor prototype for the LBT	WP2.4	INAF-Arcetri MPIA	18	12
JRA1	M1	Complete conceptual design of the new Real Time system	3.1	ESO – INS	12	Delayed ~12 mo
JRA1	M1	Complete theoretical study of the optimal control for MCAO systems	3.2	ONERA	12	Delayed ~6 mo

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Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
JRA1	M1	Complete feasibility study of a ~1m glass shell for an adaptive secondary	3.6	INSU/CNRS	12	Delayed ~6 mo
JRA1	M5	Delivery of a 60 actuator magnetic micro deformable mirror prototype and testing	WP3.7	INSU-LAOG	30	12
JRA1	M1	Complete theoretical study of a high order wavefront sensor	WP3.8	ONERA	18	12
JRA2	M1	Science group discussions	WP2	ESO	6	6
JRA2	M2	Detector specifications to the manufacturer	WP2	ESO	6	6
JRA2	M1	Controller conceptual design	WP3	INSU/CNRS	6	6
JRA2	M2	Controller design review	WP3	INSU/CNRS	6	12
JRA3	M1	Preliminary Design Review all technologies	WP1	LSW	6	12
JRA3	M1	Preliminary Design Fast Controller	WP5	UCAM, PPARC	6	6
JRA3	M1	Preliminary Design Camera Head	WP7	PPARC	6	6
JRA3 JRA3	D1 M1	Test Report L3CCD Specification of EMCCD to be procured fixed	WP2 WP2	LSW, MPE Usfd	12 3	9 15
JRA3	M2	CCD chip procurement	WP2	Usfd /UCAM	6	21
JRA3	D1	Design Report pn Sensor	WP3	MPG	12	12
JRA3	M1	Definitions of PN-sensors for HTRA	WP3	MPG	3	Done
JRA3 JRA3	M2 M3	PNSensor prototype setup and tests Design meeting with testbed/camera head	WP3 WP3	MPG MPG	9 12	18,modified Done
JRA3	M1	Image dissector technology for APD array chosen	WP4	NUIG	6	Done
JRA3	M2	Design APD Array completed	WP4	NUIG	12	done
JRA3	M1	Preliminary design of fast timing CCD controller	WP5	UCAM	6	done 5
JRA3	M2	Critical design review for PN-sensor	WP5	UCAM	12	moved WP6

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Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
JRA3	D2	Delivery of Fast timing controller for L3CCD	WP5	UCAM	12	24
JRA3	M1	Common software design meeting	WP6	UCAM	6	18
JRA3	M2	Software requirements and implementation plan	WP6	UCAM	12	24
JRA3	M1	UCam Preliminary Design of Common Camera Head	WP7	UCAM	6	Done
JRA3	M2	UCam Critical Design Review Common Camera Heads	WP7	UCAM	9	transferred WP8
JRA3	M1	Design of common testbed for medium/large telescopes	WP8	LSW	9	done
JRA3	M1	Preliminary Design Review all technologies	WP1	LSW	6	12
JRA3	M1	Preliminary Design Fast Controller	WP5	UCAM, PPARC	6	6
JRA4	D1	List of contributors	WP1.1	MPIA & INSU/CNRS	3	3
JRA4	D1	List of contributors	WP1.2	INAF	3	3
JRA4	D1	List of contributors	WP2.2	INSU/CNRS	18	12
JRA4	D1	List of contributors	WP2.3	INSU/CNRS	18	12
JRA5	D1	1st Six Monthly Progress reports	WP1	UK ATC	6	7
JRA5	D1	2nd Six Monthly Progress reports	WP1	UK ATC	12	13
JRA5	M1	Technology Roadmap Workshop	WP1	UK ATC	2	3
JRA5	M1	Choose appropriate technology to concentrate effort on – depending on ESO KMOS choice	WP2.2	UK ATC	3	7
JRA5	D1	Review of European micro-technology labs/industries capabilities and exploitation of devices from different application sectors	WP3.3	LAM	9	12

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Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
JRA6	M1	Preliminary Design Meeting	WP1	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	4	3
JRA6	M2	Manufacturing Report	WP2	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	8	?
JRA6	M1	Material, Fabrication and test plan doc	WP2	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	6	6
JRA6	M1	Preliminary design study report	WP3	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	6	6
JRA6	M1	Theoretical and Experimental analysis report on the materials to be used	WP4	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	6	6
JRA6	M2	Test Plan and test equipment procurement path document	WP2	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	12	12
JRA6	M2	Industrial ready design report	WP3	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	12	12
JRA6	M1	Computation of properties	WP4	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	4	4
JRA6	M2	Production of small quantity of the selected material and analysis	WP4	INAF-Brera; ESO-INS; CSL-AOHL; POLIMI; IAC	12	12

[In addition to being described in the Activity Report, achieved deliverables, if not yet provided to the Commission services, will be gathered in a CD-ROM in ***Annex 7****. When the deliverable is not a report provide any available supporting material that can document it (e.g. photographs of a prototype).]*

3. Use and dissemination of knowledge

NA 1. Management

OPTICON Web site **www.astro-opticon.org**

Handouts, printable from A4 up to poster size, on OPTICON activities downloadable from http://www.astro-opticon.org/download/index.html

Presentation at the JENAM 2004 conference in Granada 13-17 September 2004 and paper in the Proceedings by J.Davies. OPTICON, The Optical Infrared Co-ordination Network for Astronomy.

NA2: Coordination and Integration of ENO facilities

NA2 Web site: **www.otri.iac.es/na2**

WP2. Site Characterization at the Canary Islands' Observatories

WP2.1: Co-ordination of night-tiem seeing measurements with DIMMS

Varela, Vernin & Muñoz-Tuñón, Proc. of SPIE on Extremely Large Telescopes, Bäckaskog, Sweden, Vol. 5382, 656, 2004

Project web page http://www.iac.es/project/sitesting/site.html under "Statistics and Data".

WP2.3: Joint actions for meteorology, dust, extinction and Sky Background

Comparison between atmospheric extinction coefficient and TOMS aerosol index at the Canaries Observatories, Varela, Fuensalida, Muñoz-Tuñón, Rodriguez-Espinosa and Cuevas, Proc SPIE, Vol. 5489, 245, 2004) and in Remote Sensing SPIE Conference Proceedings (No correlation between atmospheric extinction coefficient and TOMS aerosol index at the Canaries Observatories, Varela, Fuensalida, Muñoz-Tuñón, Rodriguez-Espinosa and Cuevas, 2004.

Correlation between TOMS aerosol index and the astronomical extinction, Siher, Ortolani, Sarazin & Benkhaldoun, Proc SPIE, Vol. 5489, 138, 2004.

Three Years Of Dust Monitoring at Galileo Telescope, Ghedina, Pedani Guerra, Zitelli and Porcedu, Proc SPIE, Vol. 5489, 227.

WP2.4 Joint actions for Measurement of turbulence and wind vertical profiles (SCIDAR, GSM & DIMM)

Statistics of atmospheric parameters for the Observatorio del Roque de los Muchachos by Fuensalida, García-Lorenzo, Castro, Chueca, Delgado, Gónzalez-Rodríguez, Hoegemann, Reyes, Verde, & Vernin, 2004, Proc SPIE, 5572, 1.

Climate diagnostic archives: an approach to ELT site selection by Garcia-Lorenzo, Fuensalida, Mendizabal, Muñoz-Tuñón, & Varela, 2004, Proc SPIE, 5572, 68.

Climatological databases as a tool for the ELT site selection by Garcia-Lorenzo, Fuensalida, Mendizabal, Muñoz-Tuñón, & Varela, Proc SPIE, 5489, 130.

"Astronomical Site Ranking based on Tropospheric Wind Statistics" (García-Lorenzo, Fuensalida, Muñoz-Tuñón, & Mendizabal.

NA3: Structuring European Astronomy

WP1: ELT

Presentations at the Exploring the Cosmic Frontier conference (Berlin May 2004) by I. Hook, M. Bremer, M. Lehnert.

Presentation at Meeting of SPIE, Glasgow June 21-25 and paper in the proceedings by I Hook. Proceedings of the SPIE 5489 pp 35-46

ELT presentation, by H. Zinnecker, at bio-astronomy conference in Iceland.

WP2: Network for UV Astronomy (NUVA)

NUVA presentations at Exploring the Cosmic Frontier (Berlin, May 2004), Cool Stars, Stellar Systems and the Sun XIII (Hamburg, July 2004) and JENAM 2004 (September 2004).

http://www.ucm.es/info/nuva/mipag.php?id_llamador=0

WP4: Astrophysical Virtual Observatory (AVO)

Discovery of optically faint obscured quasars with Virtual Observatory tools, Padovani, Allen, Rosati & Walton, 2004, Astronomy & Astrophysics, 424, 545.

ESO/ESA/ASTROGRID/CDS press releases on May 28 2004.

WP6: Future Software

Poster at ADASS 2004 conference 24-27 October 2004 in Pasadena, USA and paper in the proceedings by P Grosbol. Requirements for a future Astronomical Data Environment.

NA5: Interferometry forum

Poster at the JENAM 2004 conference in Madrid 13-17 September 2004 and paper in the Proceedings by E Bakker. European Interferometry Initiative.

Interferometry Web-site - www.strw.leidenuniv.nl/~eurinterf

WP4 European (Fizeau) exchange visitors program
Fizeau Exchange Visitors Program -http://www.strw.leidenuniv.nl/~eurinterf

WP3 Developing the vision for a next-generation interferometric facility

Workshop web-site - http://www.strw.leidenuniv.nl/~eurinterf/Activities/OPTICON-NA/

NA6: OPTICON Telescope Network

WP1 : Telescope Directors Forum

Presentation by J Davies at workshop in Washington on 'The System of US telescopes': Overview of the OPTICON programme.

WP2: Operation of the Trans-National Access Office

Web-site http://www.otri.iac.es/opticon/

Poster presentation and handouts - JENAM 2004 (downloadable)

JRA1: Adaptive Optics

WP 1: Coordination of JRA1

Web-site - http://www.eso.org/projects/aot/jra1/

WP 2: System design

WP2.1: XAO system Study

[1] "*Wavefront sensing through spatial filters: the case for coronographic, high-contrast AO systems*"; Feldt M.; Costa, J. B.; Stumpf M.; Schmid H. M.; Berton A.; Hippler S.; Stuik R.; Lima J.; Proceedings of the SPIE, Volume 5490, pp. 1146-1154 (2004).

[2] "*Simulations of exoplanets detection obtained with a high-contrast imaging instrument: CHEOPS*"; Berton A.; Gratton R. G.; Feldt M.; Desidera S.; Masciadri E.; Turatto M.; Claudi R. U.; Piotto G.; Pernechele C.; Antichi J. ; Proceedings of the SPIE, Volume 5490, pp. 672-682 (2004).

[3] "*Simulations versus observations obtained with simultaneous differential imaging*"; Berton A.; Kellner S.; Feldt M.; Masciadri E.; Lenzen R.; Brandner W.; Hartung M.; Gratton R. G.; Proceedings of the SPIE, Volume 5490, pp. 661-671 (2004)

[4] "*Optimizing wavefront sensing for extreme AO*"; Koehler R.; Hippler S.; Feldt M.; Gratton R.; Gisler D.; Stuik R.; Lima J.; Proceedings of the SPIE, Volume 5490, pp. 586-592 (2004).

[5] "*Scintillation effects on a high-contrast imaging instrument for direct detection of exoplanets*"; Masciadri E.; Feldt M.; Hippler S.; Proceedings of the SPIE, Volume 5490, pp. 483-494 (2004)

[6] "*CHEOPS NIR IFS: exploring stars neighborhood spectroscopically*" Claudi R. U.; Turatto M; Gratton R.; Antichi J.; Buson S.; Pernechele C.; Desidera S.; Baruffolo A.; Lima J.; Alcalà J.; Cascone E.; Piotto G.; Ortolani S.; Schmid H. M.; Feldt M.; Neuhauser R.; Waters R.; Berton A.; Bagnara P.; Proceedings of the SPIE, Volume 5492, pp. 1351-1361 (2004)

[7] "*The science case of the CHEOPS planet finder for VLT*"; Gratton R.; Feldt M.; Schmid H. M.; Brandner W.; Hippler S.; Neuhauser R.; Quirrenbach A.; Desidera S.; Turatto M.; Stam D. M.; Proceedings of the SPIE, Volume 5492, pp. 1010-1021 (2004)

[8] "*CHEOPS/ZIMPOL: a VLT instrument study for the polarimetric search of scattered light from extrasolar planets*" Gisler D.; Schmid H. M.; Thalmann C.; Povel H. P.; Stenflo J. O.; Joos F.; Feldt M.; Lenzen R.; Tinbergen J.; Gratton R.; Stuik R.; Stam D. M.; Brandner W.; Hippler S.; Turatto M.; Neuhauser, R.; Dominik C.; Hatzes A.; Henning T.; Lima J.; Quirrenbach A.; Waters, L. B. F. M.; Wuchterl G.; Zinnecker H.; Proceedings of the SPIE, Volume 5492, pp. 463-474 (2004)

[9] "*High Contrast Imaging from the Ground: VLT/Planet Finder*"; Mouillet, D.; Lagrange, A. M.; Beuzit, J.-L.; Moutou, C.; Saisse, M.; Ferrari, M.; Fusco, T.; Boccaletti, A.; Extrasolar Planets: Today and Tomorrow, ASP Conference Proceedings, Vol. 321

[10] *"Modelling and analysis of XAO systems. Application to VLT-Planet Finder ",* R. Conan, T. Fusco, G. Rousset, D. Mouillet, J.-L Beuzit, in *Proceedings of the SPIE, Volume 5490, pp. 602-608 (2004).*

[11] "*High Contrast Imaging from the Ground: VLT/Planet Finder*"; Mouillet, D.; Lagrange, A. M.; Beuzit, J.-L.; Moutou, C.; Saisse, M.; Ferrari, M.; Fusco, T.; Boccaletti, A.; Extrasolar Planets: Today and Tomorrow, ASP Conference Proceedings, Vol. 321, held 30 June - 4 July 2003, Institut D'Astrophysique de Paris, France

[12] "*The Planet Finder project for the VLT*"; Beuzit, J.-L.; Mouillet, D.; Moutou, C.; Fusco, T.; Longmore, A.; Saisse, M.; Ferrari, M.; Udry, S.; Rousset, G.; Conan, R.; Menard, F.; Lagrange, A.-M.; Segransan, D.; Rabou, P.; Dohlen, K.;; et al.; SF2A-2004: Semaine de l'Astrophysique Francaise, meeting held in Paris, France (2004)

WP2.2: GLAO System Study

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Annexes

ANNEX 1: General Meetings

Full minutes of all OPTICON Board meetings are available at the www site http://www.astro-opticon.org

OPTICON I3 Board Meeting 1

Meeting held at `het Pand', University of Ghent, Ghent, Belgium

April 1+2, 2004

Present:			
R Albrecht	ESA, ST-ECF	A Jorrissen	Belgium
J Andersen	NOTSA	P Kern	Grenoble
E J Bakker	Leiden	J Kuypers	Belgium
P Benvenuti	INAF	S Lilly	SANW
J Bergeron	IAP	O van der Luhe	KIS
W Boland	NOVA	G Monnet	ESO
D Bomans	RDS	F Moreno-Insertis	RA3
S Brierley (minutes)	UK ATC	P Moschopoulous	EC
J Burgos	IAC	B Nordstrom	EAS
A Chelli	Grenoble	A Omont (Chair)	IAP
C Cunningham	UKATC	A Quirrenbach	Leiden
J Davies	UKATC	J Seiradakis	GNCA
H Dejonghe	Belgium	R Sirey	PPARC
M Dennefeld	IAP	C Sterken	Belgium
M Desmeth	Belgium	J Strasser	ESO
P Dierickx	ESO	J Surdej	Univ of Liege
P Feautrier	Grenoble	G Vettolani	INAF
G Gilmore	UCAM	C Waelkens	Belgium
A Gomez de Castro	Madrid	S Wagner	LSW
N Hubin	ESO	F Zerbi	Brera
Absent:			
H-W Rix	MPIA		

1. Welcome

A Omont, Chair of the Board, welcomed the attendees to the first official meeting that marked the beginning of the FP6 contract. He stated that this was an important opportunity for the European Community.
On behalf of the Board, he thanked the EC for their support and the large amount of work done by the proposal and contract writing teams.

FP7 plans were considered, with an appreciation that it is desirable for the considerable experience inside OPTICON of dealing with the astronomical user community and technical communities.

FP7 was the crucial point to discuss in the coming year as the proposals under discussion now were very important for European Astronomy. He also stated that it would be necessary to convince the politicians that the amount of support would need to be increased.

A detailed set of Rules of Procedure were adopted, especially clarifying possible 'Conflicts of Interest': if conflict of interest is declared regarding an item then the Board Member should not be able to vote on that item. In addition, a 'conflict of interest' can be personal as well as institutional so this should be clarified.

G Gilmore informed the Board on other I3 initiatives, specifically ILIAS, an I3 Access programme which is now exclusively concerned with particle physics. All cosmic ray and high-energy astrophysics research was rejected by the EC from the ILIAS proposal, as it had been from OPTICON. This significant community is not represented in any I3 program.

Discussion emphasised the overall goal of the OPTICON FP6 programme – to strengthen the European Astronomical community and develop an ELT. OPTICON provides a way of talking to the EC and thinking towards FP7. This process is already underway, and should become a focus of Board effort over the next 2 years.

Regarding the role of the OPTICON Board, a key question is whether OPTICON is complete or should consider the future inclusion of new members, for example from the high energy or astroparticle communities.

> The purpose of the Board is to set strategic goals and the Executive Committee is where operational issues would be decided. The OPTICON Consortium Agreement delineated the responsibilities of both the OPTICON Board and the Executive Committee and the latter implemented the strategic decisions of the Board.

It was agreed necessary to have a Board Meeting at least once a year

There was further discussion amongst Board members regarding the integration of new members. G Gilmore posed the question that it might be worth setting up a meeting in central Europe to find out what people want for FP7. The Board agreed this would be useful.

There was some discussion on other techniques and initiatives and what should be done. O von der Luhe stated he would like to give a presentation on Solar Physics at one of the next Board meetings.

There was general uneasiness amongst cosmic ray astrophysicists that they were not getting as much support as they should be getting resources provided for particle astrophysics research. There be stronger links between OPTICON and ApPEC.

PROJECT SCIENTIST report
The FP5 contract was completed at the end of February 2004. Regarding the FP6 programme, all 6 JRAs have met and some of the Networks have met or set up twikis to start this process. [http://twiki.org/]

The first N1 FP6 deliverable has been produced – this is the OPTICON website (www.astro-opticon.org).

The OPTICON Project Office is, in reality, a 'distributed network' of people in Edinburgh, Cambridge and La Laguna and that those resources are quite limited.

Formal Approval of JRA and Network leaders

The consortium agreement requires that the Board approves the network and JRA leaders since the presentations from these individuals had not yet been made he proposed that the existing leaders be approved today, with the option to re-visit this issue in the future.

The current list was approved by the Board.

It was discussed how the finer financial details, for example the audits and timesheets are going to be managed. It is a potentially complex issue, as the budget is built up on a work package basis, but the finances are distributed and reported on a national boundary basis: This makes it less easy to manage.

There was considerable discussion on the issue of managing networking funds via either 'national banks' or directly by the institution of the network chairs.

From the discussion, it was clear that myriad cases have to be dealt with and this will make it difficult to manage. As a Board perspective, it has to be made obvious that there is a clear responsibility for the leaders to provide a clear view of how the money is spent and there will have to be some kind of approval, formal or otherwise, on spending this money which is clearly a matter for the Executive Committee.

The majority of the meeting was devoted to detailed presentations of plans and ambitions by all JRA and Network leaders, to ensure maximal cross-information and synergy.

A potentially important issue is that the EC budget is now restricted to exactly 50:50 matched funding. Previously, larger funds were guaranteed by national partners. With this new contract structure, will those additional resources, which are essential to deliver the agreed program, still be assured?
P Moschopoulous clarified that the EC funds 50% of the JRA costs and therefore the audit certificates should only reflect that part of the total project cost such that the EC's 50% contribution is at the budgeted level. He did not address the issue of the imposed change in national guarantees.

An issue arose regarding the definition of `scientific developments' as related to techniques developed during this JRA.
If someone has contributed to the intellectual development of an instrument, by virtue of an early involvement at the basic technology stage, then it must be recognised.

The phrase "scientific development" is not formally defined in the contract in relation to the Intellectual Property Rights, bur arises in the Consortium Agreement.

OUTCOME: The intention of this term is to enable further scientific advances and internal research. As soon as this might lead to commercial work, such as a bid to construct a scientific facility, the licencing arrangements of section 12.3 apply.

Network and Access Activities
this was the only area where OPTICON had an outreach programme. Outreach activities are included within OPTICON and should be a major area in promoting European Astronomy.
N3: Structuring activities raised a special issue, of EC support for research through infrastructures. At present this is impossible. Under FP5 a detailed study had been completed by OPTICON on ways of improving this situation. The study document is available on the OPTICON web page: http://www.astro-opticon.org/fp5/fellowships.html. It will shortly be relinked from the new FP6 pages as the site is further developed.

OPTICON I3 Board Meeting 2

Meeting held at Mercure Hôtel Alpha, Grenoble, France

11 & 12 October 2004

Day One – 11 October 2004

Present:			
R Albrecht	ESA, ST-ECF	N Hubin	ESO
J Andersen	NOTSA	P Kern	Grenoble
E Battaner	Granada	S Lilly	SANW
E J Bakker	Leiden	O van der Luhe	KIS
W Boland	NOVA	G Monnet	ESO
A Chelli	Grenoble	P Moschopoulos	EC
C Cunningham	UK ATC	B Nordstrom	EAS
J Davies	UK ATC	A Omont (Chair)	IAP
M Dennefeld	IAP	R Reboo	IAC
R-J Dettmar	RDS	J Seiradakis	GNCA
P Feautrier	Grenoble	R Sirey	PPARC
G Gilmore	UCAM	A Sosa	IAC
A Gunn	RadioNet	S Wagner	LSW
S Howard (minutes)	UCAM	F Zerbi	Brera

The Chair reiterated how important OPTICON and such technical developments are for European Astronomy and the future implications for FP7.

Approval of and action points from minutes of Meeting One

The minutes were approved.

Action 7 for G Gilmore – arrange a future workshop associated with a Board meeting in Central Europe, to discuss ambitions and requirements for FP7. This is an ongoing issue linked to the Access programme and should be kept for the next Board meeting.

Action 9 for O van der Luhe – prepare a discussion document and lead a discussion on the possible relationship between OPTICON and the Solar Physics community for a future Board meeting. This was deferred to the next meeting.

The chair informed the Board that the new 18-month period starts on 1 January 2005 and that funds should exist by April 2005. G Gilmore explained to the Board members that there is a very important I3 Managers' Meeting in November to discuss the fact the definition of an "annual report" or "audit certificate". There were concerns regarding the audit certificates, from the point of view that with fixed cost models it is impossible to know how much time is spent on what areas, so how could an audit certificate be produced? G Gilmore also pointed out that there were other problems relating to the hiring of staff on multi-year contracts when only single year funding is assured. What is a definition of an audit. G Gilmore explained that it is a statement resulting from an internal check of accounts, confirming that money is being spent correctly. However, he stressed certain problems in that audits are usually conducted per department and not per project.

G Gilmore pointed out that on a positive note, once the audit certificates have been submitted and approved, no more checks will be carried out on that audit certificate period; the exception is ESO, who are audited on a rolling basis and submit certificates as they become available. N Hubin wished the Board to be aware, however, that it is generic in EC law that any contract can be audited up to 3 years afterwards.

G Gilmore stated that the main problems with the required audit certificates were as follows:

- the definition is unclear and different national systems apply;
- they are required soon after the year end and it would not be possible to supply them by this time;
- they can be very costly, although he had requested a contract amendment to provide a full set after year 3 then another after year 5, with the final report.

J Davies presented the project scientist's report, which is available on the web, stating that the Networking is going well.
N3.4 AVO – P Quinn, the Co-ordinator has asked that OPTICON allow a further 10,000 Euros in period 2 for Data Centre Alliance networking until they can obtain suitable funds from the next EU call.

After some discussion, supported by A Omont, J Andersen, O van der Luhe, G Monnet and M Dennefeld, it was decided that there was a moral obligation to continue to support this activity.
All other Networks are progressing satisfactorily. Taking note of the failure of STIS and the delay or cancellation of the installation of COS on the HST, the NUVA network, N3.2, plans to advance its major conference by one year. This will require a rephrasing of its spend profile, but not additional funds. A summary table of Network status was presented and considered satisfactory at this stage.

There was a brief report from all JRAs (with the exception of JRA3, which followed later). These are all available on the website. A complete list of JRA webs (including passwords) was provided at the time and will be circulated again in a separate document.

J Davies outlined some details of the likely procedure for preparing the annual report. Whatever the outcome of the Brussels I3 workshop it is clear that this must be done to a very tight schedule and that any failure to achieve this may have severe cash flow implications. All people responsible for providing information to the project office must do so on the requested timescales and in the requested formats.

A Gunn presented a RadioNet Overview, which is available on the OPTICON website. He emphasised the common interests between OPTICON and RadioNet and the boundaries between the two networks, where co-operation and collaboration are desirable. He stated that RadioNet have considered the possibility of a single astronomy FP7 approach, but this was not considered desirable. There was concern that no astronomy would be funded should the programme fail for any reason and the total amount of money available for astronomy may be reduced by funding limits on single proposals.

Action ***G Gilmore/ J Davies/ RadioNet: to establish a working group to consider issues of overlap and common interest, including training issues, ALMA involvement, reporting and management issues, possibility of a joint astronomy policy towards FP7 and outreach.***

J Seiradakis provided a presentation on the astroparticle network ILIAS. He noted that ILIAS was being established, that it came later than OPTICON and is only now coming into full operation. The Board agreed hat this was very informative and it was appreciated that this presentation was done at short notice. This presentation is available on the web.

The ELT project presentation was given by G Monnet and is available on the web. He stated that this programme is actively being rebalanced to meet financial limits at present.
G Monnet's presentation triggered further discussion of science case development, mentioned in the Co-ordinator's report. M Dennefeld mentioned a forthcoming IAU symposium.

Action ***All: to note IAU Symposium on ELT Science on 14-18 November 2005 in South Africa.***

N.B. The local organiser, Patricia Whitelock, is organising an associated African student workshop from 7-10 November. She would like potential speakers at this symposium to volunteer to lecture at this school.

J Davies reported on the current status of the Access Programme and A Sosa gave a brief overview of current distribution of users and illustrations of the type of report which they are able to produce. These reports are available on the website.

It was noted that the Access Programme is very significantly oversubscribed with peer-reviewed allocated telescope nights. Approximately 28% of the contracted 5-year Access Programme has in principle already been allocated in the calendar year of 2004.

S Lilly stated it would be useful to hear what the EC thought of the socio-economic goals of the Access programme. P Moschopoulos responded that the Access Programme should be easy to monitor and the deliverables are clear. He noted that it was stated in the contract that

preference should be given to new users and young researchers. S Lilly stated that in the case of significant oversubscription, preference should be given to the accession countries. There was some discussion on whether some publicity on the programme had been delivered effectively. Several members emphasised the considerable efforts made by the European Astronomical Society and by the Access office.

O van der Luhe, J Andersen and several other members emphasised that it would be undesirable for OPTICON and the community of users if the Access Programme consumed all its resources early and did not continue throughout the whole of the OPTICON programme, even though this would be contractually and legally possible.

Statistics are not yet available on success rates from different user communities. This issue is to be developed further by the Telescope Directors' Forum at the November meeting.

A Omont emphasised that the Board should provide general guidelines to the Directors' Forum when it develops eligibility criteria. There is an essential need for peer-review, the desirability of uniform spending profile, the importance of integrating new users into the Astronomical Community and the desirability of ensuring preferential support for the highest quality facilities.

S Lilley emphasised that the question for Directors is not to consider who gets access, but who gets OPTICON funding.

R Sirey stressed the desirability of ensuring fees are available to those who would benefit the most.

G Gilmore stated that the spirit of the OPTICON proposal is to emphasise the role of the Access Programme in integrating new member countries into the best astronomical practice. He went on to emphasise the essential need for the OPTICON budget to retain contingency and flexibility at the time of mid-term review. Given this, it is important that the Access Programme should try to spend no more than 80% of its current allocation by contract mid-term.

Following discussion here and later, the following resolution was passed

Resolution of the OPTICON Board concerning Medium Sized Telescopes Access Programme

The OPTICON Board,

taking note of the situation that while about 22% of the total of access units offered were granted in 2004, while at the same time about 28% of the access funds were allocated,

observing the contract between OPTICON and the EU, and

in view of a possible oversubscription in the course of the programme ,

resolves,

1. that scientific merit shall be the prime criterion on which eligible proposals are selected for each telescope,
2. that an observing facility shall not normally exceed the minimum of the access units as stated in the contract.

3. that should for any reason a serious risk appear that, despite the proper publicity, a facility will use less than the budget allocated to it for the whole contract, the remaining funds may be transferred to other activities in the access programme ,
4. that the spending profile shall not exceed 35% of the notional budget by the end of year 2.
5. that the Directors Forum is invited, in order to deal with oversubscription, to propose detailed rules to run the access programme along these guidelines and in particular to suggest additional selection criteria beyond scientific merit.

P Moschopoulos presented the FP7 overview, which included:

- Results of call for DS, CNI, AM;
- Information on next call for TA, I3, CA, AM;
- Towards Research Infrastructures in FP7.

This presentation is available on the website.

P Moschopoulos noted that ELT Design Study was the third most highly rated of all proposals, with AVO as fourth.

In the EC plans for FP7, the current intention is for the EC to develop a list of desirable European scale infrastructures across all subjects. They propose that significant construction costs could be provided by the collaboration with EU structural funds. The roadmap process is likely to involve consultation with ESFRI.

GG introduced the proposal from the Co-ordinator of the NMI3 that all 17 approved I3s collaborate on common issues. These include, in particular, annual reporting issues (as discussed elsewhere in the meeting), input into FP7 discussion and possible contribution as user representatives into the ESFRI working group deliberations.

J Davies summarised his considerable activities on organising OPTICON publicity material for circulation and general use. J Davies also asked for Board members' views on these and other possible actions.
It was agreed that public presentation on OPTICON activities at each JENAM is extremely desirable.
In further discussion, it was agreed that it would be helpful for a brief overview of OPTICON to be available as a glossy brochure.

Action 11 G Gilmore/ J Davies: to produce an overview of OPTICON.

Board Chair: J Andersen was nominated for this post and this was agreed unanimously by the Board.

List of Panel members

Contract ID RII3-CT-2004-001566 **Reporting Period** AR1

Infrastructure Short Name	Family_Name	First_Name	Gende	Nationality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
AAO	Drinkwater	Michael	M	AT	Department of Physics. niversity of Queensland (Senior lecturer in Astrophysics)	Queensland	AT	mjd@physics.uq.edu.au	ATAC2005A (Chair)
AAO	Burton	Michael	M	AT	Dept. of Astrophysics & Optics. School of Physics. University of New South Wales, Australia. (Astronomer)	New South Wales	AT	M.Burton@unsw.edu.au	ATAC2005A
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AAO	Webster	R	M	AT	Univ. Melbourne, Australia (Professor)	Melbourne	AT	rwebster@physics.unimelb.edu.au	ATAC2005A
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CAHA	Heidt	Jochen	M	DE	Landessternwarte Heidelberg-Königstuhl, Germany (Associate Researcher)	Heidelberg-Königstuhl,	DE	J.Heidt@lsw.uni-heidelberg.de	CAHA TAC2005A (Chair)
CAHA	Leibundgut	Bruno	M	CH	The European Southern Observatory, Garching (Head of the Science office)	Garchin	DE	bleibund@eso.org	CAHA TAC2005A
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Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
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CFHT	Rich	Jim	M	GB	CEA, Saclay , France. (Researcher)	Saclay	FR	RICH@hep.saclay.cea.fr	CFHT2005A
DOT	Rutten, Rob	J	M	NL	Sterrekundig Instituut Utrecht. Utrecht University, The Netherlands. (Professor)	Utrech	NL	R.J.Rutten@astro.uu.nl	DOT TAC2005
DOT	von der Luehe	Oskar	M	DE	Kiepenheur Institut fuer Sonnenphysik, Germany. (Director)	Sonnenphysik	DE	ovdluhe@kis.uni-freiburg.de	DOT TAC2005
DOT	Suetterlin	Peter	M	NL	Sterrekundig Instituut Utrecht. Utrecht University, The Netherlands.	Utrech	NL	P.Sueterlin@astro.uu.nl	DOT TAC2005
DOT	Bettonvil	Felix C. M.	M	NL	Sterrekundig Instituut Utrecht. Utrecht University, The Netherlands. (Telescope Operator)	Utrech	NL	F.C.M.Bettonvil@astro.uu.nl	DOT TAC2005

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
DOT	Fleck	Bernhard	M	DK	ESA Solar and Solar-Terrestrial Missions Division. ESTEC, The Netherlands (SOHO Project Scientist)	Noordwijk	NL	bfleck@esa.nascom.nasa.gov	DOT TAC2005
DOT	Scharmer	Goran B.	M	SE	The Institute for Solar Physics. Stockholm Center for Physics, Astronomy, and Biotechnology (FAB). AlbaNova University Center, Sweden. (Director)	Stockholm	SE	scharmer@astro.su.se	DOT TAC2005
La Silla	Maccacaro	Tommaso	M	IT	Osservatorio Astronomico di Brera, Milano, Italy (Senior Astronomer)	Milano	IT	tommaso@brera.mi.astro.it	ESO OPCPeriod 75 (Chair)
La Silla	Ruiz	Maria Teresa	F	OT	Departamento de Astronomía, Universidad de Chile, Santiago de Chile. (Professor)	Santiago de Chile	OT	mtruiz@das.uchile.cl	ESO OPCPeriod 75
La Silla	Moitinho	André	M	PT	Observatorio Astronômico da Faculdade de Ciências da Universidade de Lisboa, Portugal. (Professor)	Lisboa	PT	andre@oal.ul.pt	ESO OPCPeriod 75
La Silla	Tielens	Xander	M	NL	Kapteyn Instituut, Netherlands. (Professor)	Groningen	NL	tielens@astro.rug.nl	ESO OPCPeriod 75
La Silla	Hammer	François	M	FR	Observatoire de Paris-Meudon, DAEC/GEPI, Meudon, France	Meudon	FR	Francois.Hammer@obspm.fr	ESO OPCPeriod 75
La Silla	Groenewegen	Martin	M	BE	Instituut voor Sterrenkunde, Leuven, Belgium. (Senior Staff Member)	Leuven	BE	groen@ster.kuleuven.ac.be	ESO OPCPeriod 75
La Silla	Lehnert	Matt	M	DE	Max-Planck-Institut für extraterrestrische Physik, Garching, Germany. (Junior science staff and postdoc)	Garching	DE	mlehnert@mpe.mpg.de	ESO OPCPeriod 75
La Silla	Wisotzki	Lutz	M	DE	Astrophysikalisches Institut Potsdam, Germany (Researcher)	Postdam	DE	lutz@aip.de	ESO OPCPeriod 75

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
La Silla	Aragón Salamanca	Alfonso	M	ES	School of Physics and Astronomy, University of Nottingham, UK (Reader in Astronomy)	Nottingham	GB	alfonso.aragon@nottingham.ac.uk	ESO OPCPeriod 75
La Silla	Östlin	Göran	M	SE	Stockholm Observatorium, Stockholm , Sweden (Associate Professor)	Stockholm	SE	ostlin@astro.su.se	ESO OPCPeriod 75
La Silla	Knude	Jens	M	DK	Copenhagen University Observatory, Copenhagen , Denmark (Associate professor)	Copenhagen	DK	indus@astro.ku.dk	ESO OPCPeriod 75
La Silla	Grebel	Eva	F	DE	Astronomisches Institut, Universiät Basel, CH (Professor & Director)	Basel	CH	grebel@astro.unibas.ch	ESO OPCPeriod 75
La Silla	Kotilainen	Jari	M	FI	Tuorla Observatory, Finland (Senior Research Fellow)	Turku	FI	Jari.Kotilainen@astro.utu.fi	ESO OPCPeriod 75
La Silla	Perrier	Christian	M	FR	LAOG - Observatoire de Grenoble, Université Joseph Fourier, France (Intrumental Research Group Leader)	Grenoble	FR	christian.perrier@obs.ujf-grenoble.fr	ESO OPCPeriod 75
La Silla	Testi	Leonardo	M	IT	Osservatorio Astrofisico di Arcetri, Firenze, Italy (Associated Astronomer)	Firenze	IT	lt@arcetri.astro.it	ESO OPCPeriod 75
La Silla	Montmerle	Thierry	M	FR	LAOG - Observatoire de Grenoble, Université Joseph Fourier, France	Grenoble	FR	montmerle@obs.ujf-grenoble.fr	ESO OPCPeriod 75
La Silla	Marsh	Tom R.	M	GB	Department of Physics, University of Warwick, UK (Professor, Head of Astrophysics group)	Warwick	GB	christian.perrier@obs.ujf-grenoble.fr	ESO OPCPeriod 75
TCS	Belmonte	J.Antonio	M	ES	Instituto de Astrofisica de Canarias (IAC), Spain.(researcher)	S/C de Tenerife	ES	jab@ll.iac.es	Night Spanish CAT2005A (Chair)
TCS	Anglada	Guillen	M	ES	Instituto de Astrofisica de Andalucía (IAA), Spain. (Head of Department)	Granada	ES	guillem@iaa.es	Night Spanish CAT2005A

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
TCS	Carballo Fidalgo	Ruth	F	ES	Instituto de Física de Cantabria (IFCA), Spain. (Professor)	Santander	ES	carballo@ifca.unican.es	Night Spanish CAT2005A
TCS	Straniero	Oscar	M	IT	Osservatorio Astronomico di Collunaria -Terano (OACT) (Representante CCI, researcher)	Teramo	IT	straniero@astrte.te.astro.it	Night Spanish CAT2005A
TCS	Esteban López	Cesar	M	ES	Instituto de Astrofisica de Canarias (IAC), Spain (researcher)	S/C de Tenerife	ES	cel@ll.iac.es	Night Spanish CAT2005A
TCS	Muñóz-Tuñón	Casiana	F	ES	Instituto de Astrofisica de Canarias (IAC), Spain (Researcher)	S/C de Tenerife	ES	cmt@ll.iac.es	Night Spanish CAT2005A
TCS	Zapatero Osorio	María Rosa	F	ES	Laboratorio de Física Espacial, Madrid, Spain (Researcher)	Madrid	ES	mosorio@gps.caltech.edu	Night Spanish CAT2005A
OHP	Alain Duc	Pierre	M	FR	Service d'Astrophysique (SAp),(CEA-Saclay), France. (Head of Research department CNRS)	Saclay	FR	paduc@cea.fr	OHP/TBL TAC2005A (PNG Chair)
Obs Midi Pyr	Alain Duc	Pierre	M	FR	Service d'Astrophysique (SAp),(CEA-Saclay), France. (Head of Research department CNRS)	Saclay	FR	paduc@cea.fr	OHP/TBL TAC2005A (PNG Chair)
OHP	Pinet	Patrick	M	FR	Observatoire de Midi-Pyrénées (OMP), Toulouse, France. (Head of the department of Planetary and Terrestrial Dynamics)	Toulouse	FR	Patrick.Pinet@cnes.fr	OHP/TBL TAC2005A (PNP Chair)
Obs Midi Pyr	Pinet	Patrick	M	FR	Observatoire de Midi-Pyrénées (OMP), Toulouse, France. (Head of the department of Planetary and Terrestrial Dynamics)	Toulouse	FR	Patrick.Pinet@cnes.fr	OHP/TBL TAC2005A (PNP Chair)
OHP	Lèbre	Agnès	F	FR	GRAAL, Univ. Montpellier, France (Director & Scientist)	Montpellier	FR	lebre@graal.univ-montp2.fr	OHP/TBL TAC2005A (PNPS Chair)
Obs Midi Pyr	Lèbre	Agnès	F	FR	GRAAL, Univ. Montpellier, France (Director & Scientist)	Montpellier	FR	lebre@graal.univ-montp2.fr	OHP/TBL TAC2005A (PNPS Chair)

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
OHP	Boulanger	Francois	M	FR	Institut d'Astrophysique Spatiale (IAS Orsay), Paris, France	Paris	FR	francois.boulanger@ias.u-psud.fr	OHP/TBL TAC2005A (PCMI Chair)
Obs Midi Pyr	Boulanger	Francois	M	FR	Institut d'Astrophysique Spatiale (IAS Orsay), Paris, France	Paris	FR	francois.boulanger@ias.u-psud.fr	OHP/TBL TAC2005A (PCMI Chair)
OHP	Schaerer	Daniel	M	CH	Observatoire de Genève, Switherland (Professor)	Gèneve	CH	daniel.schaerer@obs.unige.ch	OHP/TBL TAC2005A (PNPS)
Obs Midi Pyr	Schaerer	Daniel	M	CH	Observatoire de Genève, Switherland (Professor)	Gèneve	CH	daniel.schaerer@obs.unige.ch	OHP/TBL TAC2005A (PNPS)
OHP	Deleuil	Magali	F	FR	Observatoire de Marseille (OAMP), Marseille, France	Marseille	FR	magali.deleuil@oamp.fr	OHP/TBL TAC2005A (PNPS)
Obs Midi Pyr	Deleuil	Magali	F	FR	Observatoire de Marseille (OAMP), Marseille, France	Marseille	FR	magali.deleuil@oamp.fr	OHP/TBL TAC2005A (PNPS)
OHP	Guilloteau	Stéphane	M	FR	Observatoire de Bordeaux, France. (Researcher)	Bordeaux	FR	guillote@iram.fr	OHP/TBL TAC2005A (PCMI)
Obs Midi Pyr	Guilloteau	Stéphane	M	FR	Observatoire de Bordeaux, France. (Researcher)	Bordeaux	FR	guillote@iram.fr	OHP/TBL TAC2005A (PCMI)
OHP	Combes	Francoise	F	FR	Observatoire de Paris (LERMA), France (Full Astronomer; Professor)	Paris	FR	francoise.combes@obspm.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Combes	Francoise	F	FR	Observatoire de Paris (LERMA), France (Full Astronomer; Professor)	Paris	FR	francoise.combes@obspm.fr	OHP/TBL TAC2005A (PNG)
OHP	Kunth	Daniel	M	FR	l'Institut d'Astrophysique de Paris, France (Faculty Senior Astronomer)	Paris	FR	kunth@iap.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Kunth	Daniel	M	FR	l'Institut d'Astrophysique de Paris, France (Faculty Senior Astronomer)	Paris	FR	kunth@iap.fr	OHP/TBL TAC2005A (PNG)
OHP	Haywood	Misha	M	FR	Observatoire de Paris (GEPI), France. (Researcher)	Paris	FR	misha.haywood@obspm.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Haywood	Misha	M	FR	Observatoire de Paris (GEPI), France. (Researcher)	Paris	FR	misha.haywood@obspm.fr	OHP/TBL TAC2005A (PNG)

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
OHP	Emsellem	Eric	M	FR	Observatoire de Lyon(CRAL), France. (Astronomer)	Lyon	FR	emsellem@obs.univ-lyon1.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Emsellem	Eric	M	FR	Observatoire de Lyon(CRAL), France. (Astronomer)	Lyon	FR	emsellem@obs.univ-lyon1.fr	OHP/TBL TAC2005A (PNG)
OHP	Bosma	Albert	M	NL	Observatoire de Marseille (OAMP), France (Director of Research)	Marseille	FR	Albert.Bosma@oamp.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Bosma	Albert	M	NL	Observatoire de Marseille (OAMP), France (Director of Research)	Marseille	FR	Albert.Bosma@oamp.fr	OHP/TBL TAC2005A (PNG)
OHP	Pello	Roser	F	FR	Observatoire Midi-Pyrénées, Toulouse, France.(Asocciate Astronomer)	Toulouse	FR	roser@obs-mip.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Pello	Roser	F	FR	Observatoire Midi-Pyrénées, Toulouse, France. (Asocciate Astronomer)	Toulouse	FR	roser@obs-mip.fr	OHP/TBL TAC2005A (PNG)
OHP	Balkowski	Chantal	F	FR	Observatoire de Paris(GEPI), France (Astronomer first Class)	Paris	FR	chantal.balkowski@obspm.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Balkowski	Chantal	F	FR	Observatoire de Paris(GEPI), France (Astronomer first Class)	Paris	FR	chantal.balkowski@obspm.fr	OHP/TBL TAC2005A (PNG)
OHP	Dutrey	Anna	F	FR	Observatoire de Bordeaux, France	Bordeaux	FR	Anne.Dutrey@obs.u-bordeaux1.f	OHP/TBL TAC2005A (PNP)
Obs Midi Pyr	Dutrey	Anna	F	FR	Observatoire de Bordeaux, France	Bordeaux	FR	Anne.Dutrey@obs.u-bordeaux1.f	OHP/TBL TAC2005A (PNP)
OHP	Lellouch	Emmanuel	M	FR	Observatoire de Paris (LESIA), France (Astronomer)	Paris	FR	Emmanuel.Lellouch@obspm.fr	OHP/TBL TAC2005A (PNP)
Obs Midi Pyr	Lellouch	Emmanuel	M	FR	Observatoire de Paris (LESIA), France (Astronomer)	Paris	FR	Emmanuel.Lellouch@obspm.fr	OHP/TBL TAC2005A (PNP)
OHP	Pakull	Manfred	M	FR	Observatoire de Strasbourg. Francia. (researcher CNRS)	Strasbourg	FR	pakull@astro.u-strasbg.fr	OHP/TBL TAC2005A (PNPS)

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
Obs Midi Pyr	Pakull	Manfred	M	FR	Observatoire de Strasbourg. Francia. (researcher CNRS)	Strasbourg	FR	pakull@astro.u-strasbg.fr	OHP/TBL TAC2005A (PNPS)
OHP	Rocca	Brigitte	F	FR	l'Institut d'Astrophysique de Paris, France. (Professor)	Paris	FR	rocca@iap.fr	OHP/TBL TAC2005A (PNG)
Obs Midi Pyr	Rocca	Brigitte	F	FR	l'Institut d'Astrophysique de Paris, France. (Professor)	Paris	FR	rocca@iap.fr	OHP/TBL TAC2005A (PNG)
OHP	Soubiran	Caroline	F	FR	OASU, Observatoire de Bordeaux, France (Researcher)	Bordeaux	FR	caroline.soubiran@obs.u-bordeaux1.fr	OHP/TBL TAC2005A (PNPS)
Obs Midi Pyr	Soubiran	Caroline	F	FR	OASU, Observatoire de Bordeaux, France (Researcher)	Bordeaux	FR	caroline.soubiran@obs.u-bordeaux1.fr	OHP/TBL TAC2005A (PNPS)
OHP	Jordan	Laurent	M	FR	LAM / Marseille, France (Astronomer)	Marseille	FR	Laurent.Jorda@oamp.fr	OHP/TBL TAC2005A (PNP)
Obs Midi Pyr	Jordan	Laurent	M	FR	LAM / Marseille, France (Astronomer)	Marseille	FR	Laurent.Jorda@oamp.fr	OHP/TBL TAC2005A (PNP)
OHP	Stee	Philippe	M	FR	OCA, Observatoire de la Côte d´Azur, Nice (Researcher, Head of the PSI TEAM)	Nice	FR	philippe.stee@obs-azur.fr	OHP/TBL TAC2005A (PNPS)
Obs Midi Pyr	Stee	Philippe	M	FR	OCA, Observatoire de la Côte d´Azur, Nice (Researcher, Head of the PSI TEAM)	Nice	FR	philippe.stee@obs-azur.fr	OHP/TBL TAC2005A (PNPS)
NOT	Solheim	Jan Erik	M	NO	Institute of Theoretical Astrophysics. University of Oslo, Norway. (Professor)	Oslo	NO	janerik@phys.uit.no	OPC2005A (Chair)
NOT	Grundahl	Frank	M	DK	Institute of Physics and Astronomy. Aarhus Universitet, Denmark (Assistant Research Professor)	Aarhus	DK	fgj@ifa.au.dk	OPC2005A
NOT	Nilsson	Kari	M	FI	Tuorla Observatory. University of Turku, Finland. (Research Fellow)	Turku	FI	kari.nilsson@astro.utu.fi	OPC2005A
NOT	Sigmundsson	Vilhelm S.	M	IS	Verzlunarskolinn i Reykjavik, Iceland	Reykjavil	IS	mailto:vilhelm@hi.is	OPC2005A

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
NOT	Feltzing	Sofia	F	SE	Lund Observatory, Sweden. (Senior lecturer)	Lund	SE	sofia@astro.lu.se	OPC2005A
AAO	Best	Philip	M	GB	Institute for Astronomy. The University of Edinburgh. Royal Observatory, UK. (Research Fellow)	Edimburg	GB	pnb@roe.ac.uk	PATT AAO2005A (Chair)
AAO	Ryan	Sean	M	AT	The Open University, UK (Senior Lecturer - associated DEAN - Head of the Department)	Milton Keynes	GB	s.g.ryan@open.ac.uk	PATT AAO2005A
AAO	Outram	Philip	M	GB	Univ. Durham, UK. (Postdoc Research Associate)	Durham	GB	Phil.Outram@durham.ac.uk	PATT AAO2005A
AAO	van Loon	Jacco	M	NL	Astrophysics Group. School of Chemistry and Physics. Keele University, UK. (Lecturer)	Keele	GB	jacco@astro.keele.ac.uk	PATT AAO2005A
ING	Oudmaijer	Rene	M	NL	University of Leeds, UK (Senior Lecturer)	Leeds	GB	roud@ast.leeds.ac.uk	PATT ING2005A
ING	Smartt	Stephen	M	GB	University of Cambridge Cambridge) UK. (Lecturer and PPARC Advanced Fellow at Queen´s University Belfast)	Cambridge	GB	sjs@ast.cam.ac.uk	PATT ING2005A
ING	Baker	Joanne	F	GB	University of Oxford, UK. (Research Fellow)	Oxford	GB		PATT ING2005A
ING	Almaini	Omar	M	GB	University Nottingham (Nottingham) , UK (University Lecturer)	Nottinngham	GB	omar.almaini@nottingham.ac.uk	PATT ING2005A
ING	Maxted	Pierre	M	FR	University of Keele, (keele) UK. (Lecturer in Astrophysics)	Keele	GB	pflm@astro.keele.ac.uk	PATT ING2005A
ING	Sansom	Anne	F	GB	University of Central Lancashire, (Central Lancs) UK. (Senior Lecturer)	Central Lancashire	GB	aesansom@uclan.ac.uk	PATT ING2005A

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
SST	Kiselman	Dan	M	SE	Institute for Solar Physics of the Royal Swedish Academy of Sciences, Stockholm, Sweden (Research Associate)	Stockholm	SE	dan@astro.su.se	SST TAC2005 (Chair)
TNG	Oudmaijer	Rene	M	NL	University of Leeds, UK (Senior Lecturer)	Leeds	GB	roud@ast.leeds.ac.uk	PATT ING2005A
TNG	Smartt	Stephen	M	GB	University of Cambridge Cambridge) UK. (Lecturer and PPARC Advanced Fellow at Queen´s University Belfast)	Cambridge	GB	sjs@ast.cam.ac.uk	PATT ING2005A
SST	Rutten	Robert J.	M	NL	Sterrenkundig institutt, Utrecht, Netherlands. (Senior Docent)	Utrech	NL	r.j.rutten@astro.uu.nl	SST TAC2005
TNG	Baker	Joanne	F	GB	University of Oxford, UK. (Research Fellow)	Oxford	GB		PATT ING2005A
TNG	Almaini	Omar	M	GB	University Nottingham (Nottingham) , UK (University Lecturer)	Nottinngham	GB	omar.almaini@nottingham.ac.uk	PATT ING2005A
TNG	Maxted	Pierre	M	FR	University of Keele, (keele) UK. (Lecturer in Astrophysics)	Keele	GB	pflm@astro.keele.ac.uk	PATT ING2005A
TNG	Sansom	Anne	F	GB	University of Central Lancashire, (Central Lancs) UK. (Senior Lecturer)	Central Lancashire	GB	aesansom@uclan.ac.uk	PATT ING2005A
SST	Carlsson	Mats	M	SE	Institute for Theoretical Astrophysics, Oslo, Norway. (Professor)	Oslo	NO	mats.carlsson@astro.uio.no	SST TAC2005
VTT	Schlichenmaier	Rolf	M	DE	Kiepenheuer-Institut für Sonnenphysik (KIS), Freiburg, Germany. (Scientific employee - researcher)	Freiburg	DE	schliche@kis.uni-freiburg.de	VTT TAC2005 (Chair)
VTT	Lagg	Andreas	M	AT	Max-Planck-Institut für Sonnensystemforschung (MPS), Lindau-Katlenburg, Germany (Researcher)	Lindau-Katlenburg	DE	lagg@linmpi.mpg.de	VTT TAC2005

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
VTT	Kneer	Franz	M	DE	Universitätssternwarte Göttingen (USG), Göttingen, Germany. (Professor)	Göttingen	DE	kneer@astro.physik.uni-goettingen.de	VTT TAC2005
VTT	Hofmann	Axel	M	DE	Astrophysikalisches Institut (AIP), Potsdam, Germany. (Researcher)	Postdam	DE	ahofmann@aip.de	VTT TAC2005
TNG	Capellaro	Enrico	M	IT	Osservatorio Astronomico di Napoli, Italy (Astronomer)	Napoli	IT	cappellaro@na.astro.it	TNG TAC2005A (Chair)
TNG	Catalano	Francesco	M	IT	Dippartimento di Fisica e Astronomia dell'Universitha di Catania, Italy. (Associate professor)	Catania	IT		TNG TAC2005A
TNG	Mereghetti	Sandro	M	IT	Istituto di Fisica Cosmica CNR - Milano, Italy (Researcher)	Milano	IT	sandro@mi.iasf.cnr.it	TNG TAC2005A
TNG	Alcala	Juan	M	ES	Osservatorio Astronomico di Napoli, Italy	Napoli	IT	alcala@na.astro.it	TNG TAC2005A
TNG	Poggianti	Bianca	F	IT	Istituto di Fisica Cosmica CNR - Milano, Italy (Researcher)	Milano	IT	poggianti@pd.astro.it	TNG TAC2005A
TNG	Micela	Giuseppina	F	IT	Osservatorio Astronomico di Palermo, Italy 7 (Associatec Researcher)	Palermo	IT	giusi @astropa.unipa.it	TNG TAC2005A
TNG	Cellino	Alberto	M	IT	Osservatorio Astronomico di Torino, Italy (Researcher)	Torino	IT	cellino@to.astro.it	TNG TAC2005A
TNG	Capetti	Alessandro	M	IT	Osservatorio Astronomico di Torino, Italy. (Researcher)	Torino	IT	capetti@to.astro.it	TNG TAC2005A
TNG	Gioia	Isabella	F	IT	Istituto diRadioastronomia C.N.R. - Bologna, Italy (Astronomer)	Bologna	IT	gioia@ira.cnr.it	TNG TAC2005A
TNG	Buson	Lucio	M	IT	Istituto di Fisica Cosmica CNR - Milano, Italy. (Associate astronomer)	Milano	IT	buson@pd.astro.it	TNG TAC2005A
TNG	Brand	Jan	M	NL	Istituto di Radioastronomia C.N.R. - Bologna, Italy. (Researcher)	Bologna	IT	brand@ira.cnr.it	TNG TAC2005A

Infrastructure Short Name	Family_Name	First_Name	Gende	Nation-ality	Home Institution			Email	Additional Information
					Institution Name	Town	Countr		
TNG	Randovich	Mario	M	IT	INAF - Osservatorio Astronomico di Capodimonte (Researcher)	Napoli	IT	radovich@na.astro.it	TNG TAC2005A

List of UserProjects

UserProject Acronym
ALTONINT2004A

Title The dust-to-gas ratio of the intergalactic gas in the M81 group

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives We intend to analyse the color of background galaxies in the M81 group seen through the intergalactic gas, so as to ascertain its dust content and the extinction law of the corresponding grains. This will carry strong implications for the origin of the gas.

Achievements We have colleted valuable data using the INT-WFC for the nights from 18th to 22nd of March 2004 for all the fields in the M81 group described in the original proposal using the B,V, r and filters.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	2	INT	5

UserProject Acronym
ARNAUVTT2004

Title Study of Sunspot atmospheres

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The magnetic field at the solar surface manifests itself most prominently in the form of sunspots. In spite of significant advances in observations of the sunspot magnetic structure, a completly coherent picture still has not emerged. Considerable advances come from the application of inversion techniques which utilize full Stokes polarimetry to infer the stratification of various physical parameters in the sunspot atmosphere and recover the three-dimensional structure of sunspots.Infrared Fe I lines at 1.56 micron are known to be excellent tools to provide reliable information on the magnetic, thermal and velocity structure of the sunspots.Molecular lines are excellent temperature and pressure indicators, greatly improving the diagnostic of atomic lines.

Achievements Very poor weather conditions during the full run prevented us from getting any observation.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
VTT	1	VTT	5

UserProject Acronym
BALTHDOT2004

Title The Three-dimensional Structure and Dynamics of Sunspots

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The goal was to obtain magnetographic maps and imaging timeseries of sunspots to investigate their magnetic structure in different heights of the solar atmosphere and the dynamics related to these layers.
The task of DOT was to take filtergrams in special lines and nearby continuum.

Achievements Due to bad luck with the weather in November/December, at DOT we obtained data only for one day. Mosaic maps and burst were taken in G-band, Ca II H, H_alpha, continuum at 432 nm and continuum at 635 nm.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
DOT	1	DOT	10

UserProject Acronym
BERDYTHEMIS2004

Title A study of solar magnetic fields with molecular lines: Sunspots and the quiet Sun

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

The magnetic field at the solar surface manifests itself most prominently in the form of sunspots. The main objective of the project is to probe the thermal and magnetic structure of sunspots by means of simultaneous observations and consequent inversions of Stokes profiles of molecular and atomic lines. Since molecular lines are extremely temperature sensitive they can be used to probe the thermal and magnetic structure of the coolest parts of sunspots. This will help to significantly improve the current models of sunspots.

Achievements

We observed several wavelength regions with lines of various molecular and atomic species which form at different heights in the sunspot atmosphere and are strongly magnetically, temperature and pressure sensitive. The main target was a big sunspot with a complex structure of the umbra. It was crossing the solar disk during the observing run. During excellent seeing conditions the observations at THEMIS were coordinated with observations at VTT, Tenerife, and NSST, La Palma. This allowed us to collect polarimetric data on the same sunspots in the visible (THEMIS) and infra-red (VTT) as well as high-resolution imaging in CH and TiO molecular bands. During bad seeing conditions the backup program was carried out. A couple of days were lost due to bad weather. In addition, some time was lost due to technical problems at THEMIS.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
THEMIS	1	THEMIS	12

UserProject Acronym
BIRKMTNG2004A

Title K-band spectroscopy of massive young stellar objects

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives We have obtained high s/n (>100) spectra for 16 target stars and several standards. Data reduction is complete, data analysis is ongoing. We have found several objects with BrG emission and Mg and Fe lines, sugesting that these stars are young objects of early B spectral type. Therefore, together with the existing broad band photometry and known distances to the sources, we will be able to prove that a significant fraction of our ISOSS SFRs have active high-mass star formation. Difficulties: the obtained long slit spectra sometimes suffer from a tilted grism (intrumental effect of NICS). The tracking of the source failed in two cases. A strong aberration of the main mirror had to be corrected at the beginning of the night.
The support of both the telescope and instrument operator was very good.

Achievements We have obtained high s/n (>100) spectra for 16 target stars and several standards. Data reduction is complete, data analysis is ongoing. We have found several objects with BrG emission and Mg and Fe lines, sugesting that these stars are young objects of early B spectral type. Therefore, together with the existing broad band photometry and known distances to the sources, we will be able to prove that a significant fraction of our ISOSS SFRs have active high-mass star formation.Difficulties: the obtained long slit spectra sometimes suffer from a tilted grism (intrumental effect of NICS). The tracking of the source failed in two cases. A strong aberration of the main mirror had to be corrected at the beginning of the night.The support of both the telescope and instrument operator was very good.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	1

UserProject Acronym
BOSCHWHT2004B

Title Radio-halo and cluster mergers: a homegeneous dynamical analysis of a large Northern sample

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The goal of this project is the dynamical analysis of the internal dynamics of radio--halo clusters using optical spectroscopic data. Together with more data at different wavelengths (mainly X-ray and radio) taken from the literature, optical data allow to test (and eventually confirm) the actually accepted scenario explaining the diffuse radio emission in massive clusters as a consequence of the merging of smaller galaxy clusters and groups.

Achievements Our observing run consisted of 1.5 nights at the William Herschel Telescope (WHT) to perform low resolution spettroscopy of galaxies in radio--halo clusters with WYFFOS/AF2. The observers were M. Spolaor and me, the P.I. of the project.
We encountered favourable weather conditions with clear sky and good seeing, often < 1\".
Therefore, we could observe with satisfaction both on the second part of the night of November 21 2004 and on January 13 2004. We only loose about 1.5 hours on January 13 due to technical problems at the WHT.
In total, we took spectroscopy for about 300 galaxies located in the central regions of the Abell radio-halo clusters A796, A610 and A725. From a first preliminary analysis data are good enough to extract the redshift of the observed galaxies and, therefore, to perform the dynamical analysis of their host clusters.
About the activity at the telescope, we enjoied of a very good assistence from the technical and scientific staff of the ING working at the WHT. The support astronomers, in particular, gave us a very precise introduction to the use of the software and computers controlling WYFFOS and we had no problem to perform our observations.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	0,5

UserProject Acronym
BOUDITBL2004A

Title Polarisation of Diffuse Interstellar Bands

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The aim of this project is to detect polarisation of diffuse interstellar bands.

Achievements The primary difficulty of this project is the unknown strength for the (linear) polarisation of the diffuse interstellar bands. The signal is certainly very weak, and might even be non-existent. Therefore, we require observations of very high signal-to-noise (and also sufficient resolving power) linear polaristion spectra to detect very weak features.

We were able to observe for about 50% of the awarded telescope time.

The preliminary data analysis shows no apparent polarisation of DIBs, although we have been able to significantly advance upon previous upper limits.

A detailed presentation of our results is in preparation for publication.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
Obs Midi Pyr	1	TBL	5

UserProject Acronym

CASALCAHA2,2M2004B

Title Magnetic surface activity of young stars in the Taurus Auriga cluster

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

To take a series of nightly spectroscopic and photometric observations of weak-lined and classical T Tauri stars in Taurus Auriga to measure the fractional coverage by cool magnetic regions on the stellar surfaces. We use the well known optical chromospheric indicator, CaII H & K lines to probe the chromospheres. The variation in intensity of the spectral lines as the star rotates will be used to search for any correlation between magnetic activity and brightness. We will combine the optical data taken during this observing run with independent IR data to test the hypothesis that very large fractions of some T Tauri surfaces are covered uniformly with active regions rather than isolated spots.

Achievements

The observing run went smoothly, we observed for 6 nights out of the allocated 9 nights, losing the rest to weather. There was only about 2 hours lost to telescope and or instrument problems. The technical support at the telescope was good. The data reduction is still in the initial stages however I have not encountered any problems with the data so far.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CAHA	2	CAHA 2.2m	9

UserProject Acronym
FASANWHT2004A

Title Star formation and morphological evolution of galaxies in nearbe clusters with WYFFOS

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
In our proposal we plan to continue our campaign to obtain WIFFOS spectra of galaxies in our nearby WINGS cluster sample; which is unique in terms of the detailed, quantitative morphological information that is available for its galaxy populations.The spectra will be used to measure redshifts, line indices and equivalent widths, and thus derive star formation histories and metallicity estimates. This will allow us to explore the evolutionary link between stellar population and morphological properties in high – to low density environments, and thus determine the impact of external factors on galaxy evolution.

Achievements
1. Observing Dates: 19/03/04 - 21/03/04.
Five nights have been already granted by the TNG-TAC to this program in the period AOT6 and three nights in period AOT7. Unfortunately, 50% of the observing time was lost due to both weather (40%) and technical problems (10%) during both observing runs.Bases on our WIFFOS experience in the September run, we have been able to allocate about 60 fibers per configuration on galaxy targets. Thos corresponds to a 50-60% completeness at all magnitudes with respects to the photometric catalog. During the last observing run (19-21 March 2004) we observed all the three nights, we lost only ~ 10% of observing time for technical reasons. We obtained full data for 80% of our targets.
2. Obseving Dates: 25/06/04 - 26/06/04:
Five nights have been already granted by the TNG- T AC to this program in the period AOT6, three nights in period AOT7 and five in this last period. Unfortunately, 50% of the observing time was lost due to both weather (40%) and technical problems (10%) during the AOT6 and AOT7observing runs. In the past March run the observing condition were very good. Based on our WYFFOS experience in the March run, we have been able to allocate about 60 fibers per configuration on galaxy targets. This corresponds to a 50-60% completeness at all magnitudes with respect to the photometric catalogue. During this last observing run (24-25 june 2004) we observed all the two nights in good weather conditions. We obtained full data for 100% of our targets.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	5

UserProject Acronym
FASANWHT2004B

Title Star formation and morphological evolution of galaxies in nearby clusters with WYFFOS

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

This project (WINGS_SPE) represents the spectroscopic follow-up of the Wide-field Imaging Nearby Galaxy-cluster Survey (WINGS; Fasano et al.,ASP Series,268, 2002). The main goal of WINGS+WINGS_SPE is to study a complete sample of 78 X-Ray selected cluster of galaxies in the range of redshift 0.04-0.07, in order to improve our knowledge of the photometric and spectroscopic properties of cluster galaxies in the nearby Universe.
In particular, the specific objetive of this spectroscopic project is to collect data on matallicity, stellar population and redshift of the WINGS cluster galaxies. These data, together with the photometric ones, will provide us with a complete picture of the galaxy population in nearby clusters, to be used as local benchmark for cosmological and evolutionary studies.

Achievements

This project has been granted by TNG-TAC with a total of 24 nights between August-2002 and October-2004 in a total of 6 different periods. However, around half of the observing time was lost to weather conditions (40%) and technical problems (10%). This has reduced the actual outcome of this project to less than half of the expected. The final results comprised 21 clusters with 2 spectroscopic configurations done(one \"bright\" configuration with galaxies brighter than V=20 and on \"faint\" configuration with faintest galaxies), 4 clusters with only one bright configuration and 1 with only faint configuration. The summary of these observations is that we have been able to get full spectroscopy of about half of our initial target sample (that is, 47 clusters that can be observed from La Palma Observatory out of 78 clusters which comprised the complete WINGS_SPE sample). Unfortunately, 50% of the final data that have been gathered were done during regular to bad atmospheric co
nditions.

During this last period of three nights granted by OPTICON the final data set comprised 2 clusters with full spectroscopic data and 2 clusters done only in bright configutation. Besides, we lost about 1/2 of the time (1 full night and half of another one) due to weather conditions. Nevertheless, thanks to a new CCD camera installed in WYFFOS the spectra we got are of better quality and extended to a wider range of wavelength allowing to measure from Halpha to [OIII]3727A.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	3

UserProject Acronym

FELTZINT2004A

Title

A differential study of the metallicity distribution functions in three northern dwarfs spheroidal galaxies

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

The dwarf spheroidal galaxies (dSph), with their seemingly simple structures and dramatically different star formation histories provide laboratories to study the chemical evolution in simple stellar systems.Many recent studies focus on their star formation histories, however, metallicity information is to a large extent lacking. The need for stellar metallicities is that in broad band observations a population of high age and low metallicity can masquerade as a higher metallicity and lower age. We propose to determine reliable metallicities for statistically large samples of stars in dSphs utilising the unique combination offered by the INT WFC fitted with Stromgren filters.

Achievements

The main target of this observing run (this was the second succeful observing run for this project) Ursa Minor was succesfully observed in all four filters. We also obtained good observations of standard stars as well as performing some chop-to-chip observations that will be used to provide zeropoints for the four CCDs for the Stromgren filters.

On the whole the weather was good.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	2	INT	6

UserProject Acronym

FITZSCAHA 2.2M2004B

Title

Detection of the YORP effect in asteroid (54509) 2000PH5
Name of user group leader: Alan Fitzsimmons

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

The thermal YORP-effect may either spin-up or spin-down irregularly shaped asteroids, thereby explaining several puzzling observations of asteroidal rotation. Observation of this effect in main-belt asteroids will take decades or centuries; however for some near-Earth asteroids (NEAs) a much shorter time is required. We have found that linking high precision lightcurves of the fast-spinning NEA (54509) 2000 PH5 over only a couple of years may allow a first precise measurement of this effect.
During July and August 2003 we obtained photometry of 2000 PH5 with a range of telescopes; analysis of these data has already revealed the synodic rotation period to a fractional accuracy of 4E-7. Our objective was to obtain further observations of 2000PH5 in August 2004, to enable us to measure the change in rotation rate over a period of 1 year and thereby measure the YORP effect for the first time.

Achievements

The observations were scheduled as requested. The observations were perfomed excellently in support mode by resident astronomers. At all times the staff at the observatory were very helpful in giving advice and assistence to planning the observations. The data were taken sccessfully and are currently under analysis. Together with another dataset taken in September 2004 on the VLT, we expect that we will achieve our primary goal of measuring the rotation period with the same accuracy as achieved in 2003.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CAHA	2	CAHA 2.2m	0,5

User Project Acronym
FLURITHEMIS2004

Title Diagnostics of weak magnetic fields with differential Hanle effect

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The main objective of this proposal is to study weak, turbulent magnetic fields with the differential Hanle effect. This will deepen the understanding of the structure and evolution of the solar magnetic field and extend the magnetic field regime that is accessible by Zeeman effect observations. We intend to study spatial and temporal variations as well as the depth dependence of weak magnetic fields in the photosphere and the lower chromosphere. The differential approach is based on the comparison of simultaneously observed, comparable lines with different sensitivities to the magnetic field. This eliminates many potential theoretical and instrumental errors. Measurements of very Zeeman sensitive lines complete the picture of the magnetic field distribution.

Achievements
We were able to observe the seven predefined wavelength regions simultaneously, containing photospheric and chromospheric lines with different Hanle sensitivities. In order to study spatial variations we collected data at different locations on the Sun 5 arc sec inside the limb, including the quiet Sun at the north and south poles and more active plage regions close to the equator. To find temporal variations we observed the selected lines at one single location at the north pole over longer time periods on different days.

On a few selected days simultaneous observations were possible with the IRSOL observatory in Locarno, Switzerland.

The available time for observations was reduced by several factors. During two to three days observations were not possible due to bad weather conditions. Various technical problems of the THEMIS telescope reduced the time of data acquisition further.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
THEMIS	1	THEMIS	10

UserProject Acronym
FRÉMAOHP2004B

Title
Interpretation of variability hints for a sample of HIPPARCOS targets located in the lower Cepheid instability strip

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
1. Observation of 38 targets showing hints for radial velocity variability. Detection of short-term (a few hours) and mid-term (a few days) line profile varations.
2. Interpretation of these variability and characterization of the stellar spectra we obtained.

Achievements
During our observing run, there was no problem and the OHP technical team helped me very well to complete the observations.
Due to bad weather conditions, 3.5 nights could be used to complete our objectives. For these reasons the study of the mid-term line profile variations was not possible for most of the targets.
We were able to observe 34 stars from our sample. We already identified several new variable stars (10 stars) among wich 1 has already been identified as a multiperiodic pulsating delta scuti star. All these spectroscopic variable stars are now proposed for a photometric follow-up.
New spectroscopic multiple systems were detected (6 targets). Some of them (3 systems) are also showing line profile variations due to pulsation which make them very interesting objects.
All the targets will now be further analyzed and their spectra will be used to derive their fundamental parameters and chemical composition. A few will be followed on a longer term basis by making photometric observations. Our observation run was therefore a great success and we hope to publish the new data and results before the end of year 2005

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
OHP	1	193 CM OHP	5

UserProject Acronym
GALLEWHT2004B

Title The Globular Cluster system of M31: a radial velocity survey for 86 candidates and the M31 total mass

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives With the oobservation we will:
1. Obtain the radial velocities (confirm the nature of the candidates and study the kinematics of the whole globular cluster system of M31).
2. Obtain and stimate of the metallicity by direct comparison with spectra of M31 clusters of known metallicity and suitable synthetic spectra.
3. Study the mass profile and the total mass of the galaxi.

Achievements The observing run was successfull.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	1,5

UserProject Acronym
GEORGESONTTPERIOD74

Title Identifying the elusive population of high-z dusty type-2 QSOs

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Project objectives (no more than ten lines): This project aims to use near-IR imaging (JK-bands) of optically unidentified (R>23mag) high X-ray--to--optical flux ratio (Iogfx/fopt> 1) hard X-ray selected sources detected in a medium-deep [f(2-8keV)~10e-14cgs] XMM-Newton survey. These sources have X-ray properties suggesting high-z dusty objects and are likely to be associated with the long sought high-z obscured type-2 QSO population: Their X-ray spectra suggest large obscuring columns of gas and dust while the high X-ray--to--optical flux ratios may be attributed to dust obscuring the rest-frame UV part of the spectrum with the hard X-rays remaining relatively unaffected. Type-2 QSOs sources are predicted in large numbers by diffuse X-ray background population synthesis models in stark contrast with recent observational data focusing mainly on the optically brighter sources. The proposed observations will allow us to probe the optically faint (most likely due to dust) X-ray sources to explore their dust properties (e.g. J-K colour) and to constrain the fraction of type-2 QSOs. essential to test and refine existing models on the diffuse X-ray background. This is essential to test and refine exixting models on the diffuse X-ray background.

Achievements
The observations for this project were performed at ESO-NTT using the SoFI detector on 2004 26 and 27 October. The 1st night was photometric and good quality data were obtained while the second night was not photometric. Nevertheless, useful data were obtained even during the second night. We plan to calibrate the non-photometric data using shallower KJ-band observations available. Preliminary on-site reduction of these observations suggests that most of the targeted X-ray sources are detected (8 out of 10) on both the K and the J-bands. More detailed analysis however is required to confirm these results and to perform accurate photometry.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
La Silla	2	ESO 3.5M NTT	2

UserProject Acronym
GONZANOT2004A

Title Ultraluminous Infrared Galaxies from the ELAIS survey

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The objective of the observation was to obtain optical spectroscopy of a sample of ultra luminous infrared sources selected in the mid-IR and with large infrared-to-optical flux ratios. These sources are assumed to belong to a population of highly obscured type 2 AGN and starburst galaxies. With the optical spestroscopy we can distinguish AGN dominated objects from the starburst dominated ones and we are able to determinate the importance of AGN activity to starburst galaxies. Using the mid-IR information we can calculate bolometric luminosities.

Achievements A total of 17 objects from our simple were observed. The fact. that most of these objects are obscures by dust makes the optical spectroscopy challenging. With the NOT we were not able to obtain spectroscopy for the faintest objects in our sample but still we obtained 13 spectroscopic redshifts for objects with r band magnitudes in the range 19 to 20.8. Six of the objects observed were AGNs at z>1 (max redshifts observer z=2.4) Those with high mid-IR-to-optical flux ratios show clear signs of dust obscuration in their optical spectra.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	2

UserProject Acronym
GROOTNOT2004B

Title Spectroscopic Identification of H alfa-emitters from IPHAS

Scientific Field

Main Field	Physics
FP6 Priority or Specific	Astronomy/Astrophysics/Astroparticles

Objectives

The IPHAS survey is currently being carried out at the Isaac Newton Telescope on La Palma. It aims to chart all H-alpha emission line systems in the northern Galactic plane (|b|<5 degrees) down to r\'=19.5. The survey photometry is now making good progress, and the time has come to start planning spectroscopic follow-up. To this end, an intial 1300 bright and clear H-alpha emitters (r\'<18) have been selected, whose spectroscopic identification will be used to plan future large-scale follow-up. In a four-night run on the Nordic Optical Telescope we hope to observe around 250 of the brighter objects in this sample, and as such make a significant contribution to the initial follow-up needed for planning future IPHAS spectroscopy.

Achievements

The telescope worked well and the main limiting factor was the weather, which was rather unfavourable. We nevertheless managed to observe about 75 objects from our target sample of ~250. Quicklook identification largely supports previous results and expectations; most objects in the brighter sample appear to be early-type H-alpha emitters, while a small fraction are cataclysmic binaries. Detailed identification of all objects is underway and the final results will be merged with existing and near-future observations of the larger sample of ~1300 objects, which will then be used as the guide for large-scale spectroscopic follow-up of IPHAS sources.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	4

UserProject Acronym
HAASNOT2004A

Title Establishing the new technique of mid-infrared selection of AGNs

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives Obtain otical spectra of MIR selecte AGN candidates.

Achievements Observing Dates: 09/04/04 - 10/04/04
Fogs & Clouds, 100% humidity during both nights

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	2

UserProject Acronym
HAASNOT2004B

Title Optical spectroscopy of mid-infrared selected AGN candidates

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The objective of this project is to perform follow-up optical spectroscopy of MIR-selected AGN candidates that have been selected on the basis of their MIR and NIR colours with respect to given comparision samples. This project will develop an unbiased selection criterium for AGN on the basis of their isotropic MIR properties.

Achievements Observing Dates: 18/10/04 - 19/10/04
Unfortunately, the weather was very bad during our stay. Thus, nothing could be observed!

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	2

UserProject Acronym
HAASTNG2004B

Title Optical spectroscopy of mid-infrared selected AGN candidates

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Based upon the ISOCAM Parallel Survey at 6.7 microns, in combination with optical and near-infrared colours, we have identified a population of extremely infra-red objects which are supposed to be dusty AGN. If true, this method will provide a powerful selection technique for AGN not effected by dust extinction. As a consequence, the number counts of AGN would have to be revised considerably upwards. After this hypothesis has been confirmed by a spectroscopic pilot study of a brighter subsample, it was the aim of the observing run with DOLORES at TNG to check the faint end of our sample of candidates with most extreme infrared colours.

Achievements
ACHIEVEMENTS: The observing run was successfull. The wheather was very good: all four nights were photometric and the seeing was good during most of the time (<1\" during the first two nights, but >2\" in the last night). Only a small fraction of observing time was lost due to humidity. Both the telescope and the spectrograph worked very well. Minor problems were solved in due time by the staff members. In total, 25 targets could be observed, among them several sources with very faint optical counterparts. A preliminary inspection reveals that all these objects are extragalactic sources, nearly all have strong emission lines. Several objects clearly show broad emission lines typical for classical type 1 AGN. On the other hand, all spectra without strong broad-lined components seem to be heavily reddened. The quick-look inspection thus seems to confirm our AGN search strategy.

DIFFICULTIES: For targets like ours it is not possible to estimate the exposure time (end even the grism to be used) a priori. The best way out is to make a first exposure, based on a \"best guess\", and decide the further proceeding after the inspection of this frame. For that purpose, a quick-look reduction procedure for the spectra (i.e., rough wavelength calibration and relative flux calibration using standard functions) would be very useful. Unfortunately, such a procedure was not available.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	4

UserProject Acronym
HATZIWHT2004B

Title Identificación de contrapartidas ópticas de fuentes de rayos X en M33

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The objective of the project was to use AF2/WYFFOS to obtain spectra for a total of 300 candidate optical counterparts of the X-ray source catalogue in the Local Group Galaxy M33, which we obtained from XMM-Newton observations. The spectral classification wiould then allow us to determine the nature of the X-ray sources (in combination with their X-ray characteristics). The limiting magnitude of the survey was B=22, thus allowing us to detect foreground stars, active galactic nuclei, globular clusters within M33, (unresolved) SNRs and the high mass companions of X-ray binaries.

Achievements We obtained two nights of obesrving time with the WHT. The weather conditions were very poor. Very few useful data were obtained. It is clear that we would need to apply again fopr observing time to achieve the project's goals. However, it is important that the Autofib fields for M33 were all successfully acquired, which confirms that the astrometry of the sources was very good and the configuration files properly prepared.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	2

UserProject Acronym
HENRITBL2004A

Title Long term monitoring of slowly rotating magnetic massive stars.

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The objective was to monitor the magnetic field of four slowly rotating hot starsat several rotational phases. For the magnetic B star beta Cep, with a 12 day rotation period, we searched for any possible deviation from the hithertoassumed pure dipole field and also for possible long-term changes in the field configuration, possibly related to the recent Be phase entered by the star. For another magnetic B star (zeta Cas) we also hoped to constrain the field much better than before. In addition, we selected two A supergiants for which the existence of a magnetic field is supported by numerous circumstantial evidence, but for which no convincing detection exists.

Achievements This program was carried out in service mode. All data have been reduced and analyzed. A total of 51 observations have been taken of beta Cep. A significant decay in the Halpha emission profile, with respect to the previous year, has been found. No significant difference, however, was encountered in the amplitude of the magnetic field modulation. This successful program continues over the subsequent semester. Only 9 new measurements of the field of zeta Cas were obtained, which was insufficient to reach our goal to improve the determination of the amplitude. We were also not successful in finding a magnetic field in the two A supergiants, although significant profile changes in the Halpha occurred. The Opticon support is greatly acknowledged.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
Obs Midi Pyr	1	TBL	15

UserProject Acronym
HIRZBVTT2004

Title Dynamics of small-scale magnetic

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The objective of the proposed observations is a study of the complex interaction between convective motions and magnetic fields, which is present everywhere in the photosphere -from single thin fluxtubes to complex sunspots. Network and facular bright points denote magnetic flux concentrations embedded in a convective environment. Large magnetic concentrations, sunspots and pores, modify velocity fields in the
adjacent photosphere and such motions can also be related with the internal motions in the umbra and penumbra. Light bridges in sunspots and pores might be attributed to convective motions, not completely suppressed by the surrounding magnetic fields.

Achievements
The observations have been carried out by using the "Gottingen" Fabry-Perot Interferometer at the VTT. Time series of two-dimensional spectra of sunspots, pores, and magnetic bright points in both active as
well as network regions have been obtained. These spectra denote scans across various Zeeman active spectral lines in order to achieve information about the (line-of-sight) magnetic field and velocity
components of the observed targets. Particular attention was turned, on
the one hand, to minimize the cadence between subsequent scans in order to study the short period dynamics of the observed magnetic structures. On the other hand, we tried to maximize the spectral accruracy and set the temporal resolution aside. The data obtained in these second observing mode will serve as an input into inversion codes.
The seeing conditions at the observatory have been excellent during at least two days of the observing period and have been acceptable during another two days, i.e. we were able to obtain data of sufficient spatial resolution. The "Gottingen" Fabry-Perot Interferometer and the "KAOS" adatptive optics system worked without serious malfunctions.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
VTT	1	VTT	7

UserProject Acronym
IGLESNOT2004B

Title Optical Follow-up of a sample of very extincted FIR-selected galaxies

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The main goal of the project is the study of the nature of a sample of galaxies selected at far infraerd wavelengths, which show a high dust content but very blue ultraviolet colors. The high image quality of the NOT telescope is perfect to try to disentangle the position of the star forming regions within the main body of the galaxy as well as the dust patches. For this reason we asked for optical imaging and spectroscopy in order to complement our UV and FIR data.

Achievements We had bad weather during at least the first half of the first night and the second half of the second night. In addition, even when clouds were not present in the sky, the atmospheric conditions were not ad hoc for observations. Thus only two galaxies of our sample were imaged in the two night, which unfortunately will not allow us to perform the original proposed program.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	2

UserProject Acronym
ISRAECFHT2004B

Title Have the parent stars of extra-solar planetary systems engulfed planets ?

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The goal of the project was to observe the Li line in a sample of stars with exoplanets. We had to obtain high resolution and high signal-to-noise spectra in order to measure the Li6/Li7 isotopic ratio which is the best indicator of any planetary matter accretion.

Achievements We have been granted 2 nights. Becuse of the high clouds in Hawaii, we were able to observe only 1 night. Several important targets have been observed.
We are happy with the performance of Gecko (high resolution spectrograph). It is stable and MIT1 CCD has a low fringing in the red. This means that the spectrograph is suitable for our work. The data will be reduced, analysed and published within few months.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CFHT	1	CFHT	2

UserProject Acronym
IVANOAAT2004B

Title Infrared Properties of Young Stellar Populations in Low Metallicity Environments

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Our goal is to build a template of near-infrared (H and K bands) spectra of young (5-20 Myr) Magellanic Cloud clusters for modeling of young stellar populations in metal-poor environments. These clusters provide a test case for stellar evolution and stellar atmosphere models in conditions similar to those in which the bulk of the galaxies at high redshift might have formed. The secondary goal is to supplement out near-infrared spectral library (Ivanov et al. 2004, ApJ, 151, 387) with individual metal-poor stars (mainly supergiants) that have no analogs in the Milky Way. Our immediate objective is to obtain integral H and K spectra of ~10 clusters.

Achievements
The observing run was successful - we obtained spectra of 11 objects. The table bellow lists the integration times in H and K bands in min. Unfortunately, two of the nights were almost completely lost due to bad weather (thick clouds). The seeing was ~1-2 arcsec, reaching 5 arcsec at times but the adopted scanning mode allowed to gather useful data.

No	Cluster ID	Int.Time H(min)	K	Age lg(t)	[Fe/H]
1	NGC 2070	64	16	6.3	-0.5
2	NGC 1714	24	45	6.4	-0.4
3	NGC 2004	32	30	6.8	?
4	NGC 2100	32	32	7.0	?
5	NGC 0330	64	64	7.2	-1.4
6	NGC 1847	104	64	7.4	-0.5
7	NGC 1818	64	64	7.4	-0.9
8	NGC 2214	42	64	7.8	-1.2
9	NGC 2136	120	128	8.0	-0.4
10	NGC 1866	64	72	8.4	-1.2
11	NGC 1806	64	64	9.0	-0.2

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
AAO	1	AAT	6

UserProject Acronym
JEFFETNG2004B

Title High-resolution Doppler Imaging of RS CVn SV Cam

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives We propose to use high resolution Doppler Images to map the locations of dark star-spots on the stellar surface of the RS CVn eclipsing binary SV Cam. We have found indirect evidence for dark polar spots in high-precision eclipse-mapping observations from HST, but we need high precision Doppler images to eliminate the possibility that an anomalous limb-darkening law could be responsible. Our aim in this proposal is to determine the characteristic properties of a polar cap, making it then possible to determine the binary system parameters, and to finally measure the overall filling factor of small star-spots on the stellar photosphere.

Achievements Unfortunately due to unfavourable weather conditions it was only possible to take one exposure of a standard star.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	3

UserProject Acronym
KUCERDOT2004

Title Dynamics of the solar photosphere

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The project includes four objectives aimed at studying dynamics of the solar photosphere with some output concerning heating of the chromosphere and coronal loops in the quiet solar atmosphere. The individual objectives follow according the priority:
1. Granular evolution and its penetration into the whole photosphere - comparison of the semi-empirical model of granular evolution with hydrodynamic models.
2. Photospheric shocks - detection of shocks as potential contributors to the coronal heating.
3. 5-min oscillations - origin of the acoustic flux and the relation of 5-min oscillation to granulation.
4. Photospheric magnetic and velocity fields - sources of energy for corona, the question on the Photospheric sources of the coronal heating in the quiet solar atmosphere are addressed.

Achievements
On July 12 the best seeing encountered on VTT in the whole observing period and also seeing on DOT was quite good. This day the two best time series of 1 D - spectra in the whole campaign were obtained. In the moment of the best seeing AO announced observation with the theoretical Fried parameter r0=45cm before correction and 117 cm after correction. These data are also accompanied with observations from DOT imaging the slit vicinity in the G band, the Ca II and blue continuum channel near to the AR10642. The high contrast and long duration of the spectral series are crucial for calculation of more reliable model of granular evolution from spectral line profiles. Another day with very favourable seeing was July 15 when VTT and DOT observed simultaneously (DOT only after 10:00 UT) near to the AR 10646 close to the limb and obtained the best data base with promising signatures of Photospheric shocks. A few reasonable series was obtained with duration from 12 to 30 min. The high scientific value of this observation is underlined with data from TRAC and SOHO/CDS missions available for further tracing of the shocks in cromosphere and corona. Another very good series bearing indications of shocks is from July 14 and it was obtained by VTT near small AR in the limb. Conclusively, observations in every day from July 9 to July 15 brought valuable data which future analyse may improve our knowledge especially about shocks and granulations. Noticeable feature of the campaign was successful co-operation of VTT, DOT TRACE and SOHO/CDS teams, what is a sign of progressive treatment to the solving of the problems in the solar physics. The SOHO/CDS observations were carried out in the framework of JOP 171.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
DOT	1	DOT	8

UserProject Acronym

KUNCAHA 2.2M2004B

Title Spectroscopy of pre-main sequence stars in tre cepheus flare region

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

In order to assess the star forming history of the nearby Cepheus flare giant molecular cloud complex we proposed to obtain medium resolution spectra of its candidate pre-main sequence stars, using the CAFOS instrument installed on the 2.2m telescope of Calar Alto Observatory. The proposed observations allow us to identify the pre-main sequence stars of the region and derive their masses and ages. The results are expected to provide a data set for studying the star forming history and large-scale evolutionary processes of the molecular clouds and will open the possibility for more detailed studies of the target objects.

Achievements

Most of the target objects was succesfully observed during the five nights. During the first night, being not familiar with the measurement control software I encountered some technical difficulties, thus the first night was somewhat less efficient than the others. The weather was good for observations during four and a half nights, some 80 percent of the total allocated observing time. The support astronomer was always ready to help when it was necessary. In all, my observing run was succesful, and the quality of the obtained data is satisfying. The first glance on the data suggest that the aims of my proposal can be completed: a solid sample of the bona fide pre-main sequences stars of the observed star forming region can be established.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CAHA	2	CAHA 2.2m	5

UserProject Acronym
LEONEAAT2004B

Title The oscillating magnetic fields of roAp stars

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives Rapid oscillating Ap stars present photometric and spectroscopic variability with periods between 5 and 20 minutes. Oscillation modes of these stars are not completely undrstood. By means of time-resolved high-resolution spectropolarimetric observations, we intend to define a new strong observational constrain to their modelling.

Achievements Time-resolved high-resolution (R = 100,000) spectropolarimetry has been carried out at the AAT in the range between 450-700 nm for two roAp stars: HD24712 and HD176232. As soon this huge quantity of data (more than 2 Gbytes) will be reduce and analyased, it will certainly possible to better understand the rapid oscillating stars as a class.
I had no problems during the observations, some hours have been lost during the second night because of clouds.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
AAO	1	AAT	2

UserProject Acronym
LODIETNG2004A

Title The stellar and substellar mass function in Collinder 359

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Prior to this observing run, we have obtained deep wide-field optical photometry of the young open cluster Collinder 359. We have extracted a list of cluster candidates. The goal of the observations carried out with the DOLORES spectrograph on the TNG was to obtain low-resolution optical spectroscopy of photometrically-selected cluster member candidates in Collinder 359 to ascertain their membership and probe the contamination Trom one solar mass down to the hydrogen burning limit. Determining the spectral type of the selected objects, searching for Ha and probing the evolution of gravity dependant features, including Nal and KI provide clues concerning masses and membership of these objects

Achievements
- The observations were carried out on 19-21 June 2004. Three nights were allocated for this project entitled "The stellarlsubstellar mass function in Collinder 359". Fifty-five objects spanning I = 13-18 mag over a 42 arcmin by 28 arcmin area in the cluster were observed with low-resolution optical (4500-10500 A) spectroscopy using the LR-R grism on the DOLORES spectrograph mounted on the TNG. We have therefore obtained a complete sequence of cluster candidates spanning 1 to 0.1 M0. We have used a slit of one arcsec throughout the whole observing run. Exposure times were adapted according to the brightness of the objects and range from 5 to 30 minutes.

Spectrophotometric standard stars were observed during the night to calibrate
our spectra in flux. Dome flat fields and bias frames were taken in the afternoon before the begimning of the night to correct for the small and large
scale variations of the detector. Conditions were photometric for about two and a half nights out of three. The seeing conditions were between 1 and 1.5 arcsec during the first two nights and between 1.5 and 2.0 arcsec during the last night. The first half of the second night was lost due to a humidity of
1 OO%.~s a yyh~!e,~ ~tima~ a 1§Jo ti~ lost due10 weather conditions

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	3

UserProject Acronym
MACKANOT2004A

Title High Resolution Spectral Imaging of Nearby AGNs

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives To use an L3CCD camera developed partly using funds from OPTICON in order to undertake Lucky imaging studies on the Nordic optical telescope on la Palma. We nope to take image is of a variety of objects both direct and in spectroscopic mode In order to explore the potential of Lucky imaging for a wide variety of astronomical a significant programmes.

Achievements We were allocated a total of six nights on the telescope. Unfortunately approximately three of these were completely cloudy and the other three suffered from relatively poor observing conditions in that the seeing was seldom better than one arc second and one occasion became as bad as for arc seconds. This meant that we could carry out only very little of our original observing programme to do to Lucky imaging on the telescope. However we did manage to demonstrate that the ability to select images even under conditions of poor seeing made it possible to obtain a substantial improvement in resolution. We would typically able to use 1.5 arc second seeing and produce images with a resolution of between 0.5 and 0.75 arc second resolution. This is a very substantial improvement and of course has a considerable impact on what could be achieved on other telescopes under wide variety of different circumstances.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	4

UserProject Acronym
MARTÍWHT2004B

Title M31 have as many satellites as predicted by Cold Dark Matter theory

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The main objective of this project is to confirm the existence of very low-surface brightness dwarf satellites around M31, selected from the Sloan Digital Sky Survey. These galaxies would be within the lowest galaxies known, and its census is crucial to resolve the \"missing satellite\" crisis of the Cold Dark Matter paradigm.

Achievements We have obtained deep data of the recent discovered satellite And IX, that will be very useful for understanding its stellar population. In addition, we have found a possible new satellite, that could be with surface brightness lower than And IX. This is a wonderful candidate to be the lowest massive galaxy ever detected. However, the majority of the observing run was affected by bad seeing, so the majority of the data are not useful for the project and more observing runs will be necessary to complete our survey of satellites around M31.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	2

UserProject Acronym
MAYOROHP2004B

Title Search for extrasolar planets orbiting solar type stars

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
More than 100 extrasolar planets have been detected by radial velocity monitoring of G and K dwarfs. Distributions of orbital elements are
rich of constrains on planetary formation mechanisms. The ELODIE survey carried out at OHP on the last few years already revealed some 20 planets and 4 low mass companions (M2 sini < 75 Mjup)
The distribution of orbital periods suggest that long periods are more frequent than short ones. Several new planets already have preliminary orbits.

Achievements
This observing run has allowed to continue the ELODIE radial velocity survey. The measurements obtained during this run contribute to complete the radial velocity curves for the long period planets for which the full orbit is still not covered.

No special problems have been encountered.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
OHP	1	193 CM OHP	7

UserProject Acronym

METCACAHA 3.5M2004B

Title Infra-red photometry of the extended Herschel Deep Field

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives To increase our existing Omega Prime H-band imaging of the William Herschel Deep Field by a factor four and
add a further infra-red band (J), by using Omega2000 to cover
an extended 15\'x15\' area (which already has B,R,I and Z
optical imaging and a 75ksec Chandra exposure).
This will enable us to acquire a large sample of ERO
galaxies with which to study E/S0 luminosity and clustering
evolution out to z~1.5 and
to isolate higher redshift samples (using J-H colours).

Achievements Bad weather meant we were only able to observe in the H-band (for one night). None of the J band observations could be made. Data reduction is still underway, but there are problems with reflections of the telescope structure appearing in the dome flat fields, making these useless. Other than that, the data quality looks good. There were some troubles with the telescope software during the run, particularly with the automatic macros for taking multiple darks.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CAHA	1	CAHA 3.5m	3

UserProject Acronym
MITTETNG2004A

Title
The chemical composition of ? Doradus stars as a test for their g-mode mechanism - SERVICING MODE

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The gamma Doradus stars form a new class of pulsators established in 1995. The excited g-type modes should be similar to those expected but not yet found in the Sun. Consequently, gamma Doradus stars are of crucial importance for astero- and helioseismology. However, the excitation mechanism and the role of metallicity in these stars still remains unclear. Up to now metallicity was only determined from photometric data and therefore dependent on calibrations based on normal stars. A much more reliable determination of metallicity can be derived from spectroscopic data. We intend to test the proposed driving mechanism ("convective blocking") by performing a detailed abundance determination in a statistically representative sample of gamma Doradus stars.

Achievements
The following targets have been observed:

#obj	Ra	de
HD224945	00:02:02.62	-02:45:58.22
HD277	00:07:37.48	+53:31:35.55
HD12901	02:06:10.73	-10:16:34.38
HD18995	03:03:28.17	+06:13:36.09
HD19684	03:11:58.87	+46:07:42.97
HD35929	05:27:42.79	-08:19:38.40
HD49015	06:46:40.73	+08:21:47.30
HD62454	07:45:42.30	+39:32:49.00
HD65526	07:59:03.95	-04:19:56.70
HD69715	08:19:31.76	+35:02:44.41
HD70645	08:27:40.09	+67:58:26.79
HD81421	09:25:27.03	-06:24:16.28
HD105458	12:08:26.08	+48:58:06.58
HD106103	12:12:24.90	+27:22:48.32
HD109032	12:31:39.36	+12:07:40.28
HD109838	12:37:33.48	+45:15:13.55
HD126516	14:26:03.09	+00:41:30.26
HD160314	17:39:04.54	+02:03:15.05
HD164615	18:01:33.20	+11:17:08.73
HD167858	18:17:04.84	+01:00:20.64
HD187353	19:49:51.10	-10:43:30.16
HD239276	19:59:25.31	+58:33:19.89
HD201985	21:13:13.70	-04:16:00.23
HD207223	21:47:04.80	+17:11:39.00
HD216108	22:49:28.35	+43:50:36.71
HD218396	23:07:28.72	+21:08:03.30
HD261331	06:39:05.9	+09:41:03.4
HD261446	06:39:28.5	+09:42:04.1

A quick check showed that the required S/N ratio has been achieved.No difficulties were encountered. Software is being developed for an automatic reduction of the spectra.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*

	TNG	1	TNG	1,5

UserProject Acronym
MUNAROHP2004A

Title Jets in symbiotic binaries

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The observation have been succesfully carried out as planned. The whole three nights have been entirely observed without time loss due to bad weather or technical failures. Data analisys is already underway. Support photometric observations from Colorado have been succesfully perfomed too.

Achievements The observation have been succesfully carried out as planned.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
OHP	1	193 CM OHP	3

UserProject Acronym
NEGUETBL2004B

Title A very massive extremely close detached binary

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The aim of this project was obtaining a radial velocity curve in order to derive the orbital and stellar parameters of the close binary BD +56 864. This object had been identified in our previous work as a double-lined spectroscopic binary. The two spectral components have spectral types close to O6V, meaning that they are very massive stars. If we manage to measure the masses of the components of BD +56 864, it is likely to turn out to be the most massive binary in the Galaxy with a good determination of the masses, with the single exception of WR20a. Unlike WR20a, which is an evolved system, their are reasons to believe that BD +56 864 is very young. Moreover, the presence of a strong photometric modulation at 1.2 days shows that it is a very close binary.

Achievements At the start of the first night, the telescope malfunctioned. Due to a mechanical failure, we could not work during that night. On the second night, the weather was poor, but we realised that we were obtaining very few photons from the target. We spent the third night investigating the issue, until we came to the conclusion that the actual efficiency of the system (telescope + instrument) was much lower than advertised on the web page. After some checks on bright standards, we found that the system was 15-25 times less efficent than advertised, meaning that it was absolutely inadequate for the programme.
Making use of the numbers advertised in the observatory web page, we estimated that we could obtain a S/N=70 on our target (V=9.8) in one hour. In practice, we reached a S/N=35 on a V=7.8 star in one hour. Our target produced little more than noise on the detector. The run was completely useless. This was completely unexpected, as we had used similar instruments on 2-m class telescopes on stars of the same brightness before. However, by looking at observations by other teams, this seem to be the usual efficiency of TBL+MUSICOS. We used the last night to observe a few very bright stars of interest.

Installation Use

Infrastructure Short Name	Installation ID	Installation Short Name	Amount of Access Delivered
Obs Midi Pyr	1	TBL	4

UserProject Acronym
NETOPESO3.6MPERIOD73

Title Photometric study of young open clusters

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The project objectives were to study young open clusters within the three filter, intermediate-band, t:1a photometric system. It investigates the flux depression at 520oA, found for ma netic chemica!! eculiar CP objects.

Achievements The first night was dedicated to observe some open clusters photometrically within the Stromgren-system due to problems with our filter set which was mounted at the Grism-wheel. Clouds and problems with the CCD control reduced that night about 2 hours. For the second night the problem with the mounting of our filter-set was able to solve and no more problems occured. The reduction of that data is still in
process, but a first quick-look reduction shows that this observing run will be a substantial progress for our research project.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
La Silla	1	ESO 3.6M	2

UserProject Acronym

PASQUCAHA 2.2M2004B

Title Expanding The boundaries of Cygnus OB2

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

Our project aimed to establish the true extension of one of the bigger OB associations in the Galaxy, and thus to perform the most complete-to-date census of the massive stars in Cygnus OB2. We addressed this by analysing the available JHK photometry of the region as observed by 2MASS and selecting the OB-star candidates on the basis of their JHK colours. JHK colours alone do not allow though an accurate determination of the stellar spectral type, and to be able to distinguish reddened early-type from less reddened late-type stars we performed infrared spectroscopy with MAGIC on the CAHA 2.2m. These observations have been crucial in determining the boundaries between Cygnus OB2 and the field stellar population.

Achievements

We were able to fully complete the programme in the allocated time, despite nearly two nights lost for bad weather. No telescope/instrument down-time had occurred and the staff support was excellent.
The data are being reduced and their analysis is also on-going.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CAHA	2	CAHA 2.2m	7

UserProject Acronym

PAUNMPG/ESO2.2MPER74

Title A photometric study of chemically peculiar stars in the Magellanic Clouds

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

We intend to detect and study chemical peculiar (CP) stars in the Magellanic Clouds using CCD Delta-a-photometry. This subclass of B to F-type stars with peculiar lines and line strengths revealed other peculiar features, e.g. the existence of a strong global magnetic field with a predominant dipole component located at random with respect to the stellar rotation axis and the center of the star. A plausible diagnostic tool for the investigation of the formation of magnetic peculiar stars from an observational point of view is their statistical identification in a variety of extragalactic environments, implying both different metallicities and different interstellar magnetic field strengths.

Achievements

Since the seeing was not perfect, Delta-a photometry was only performed within one field of SMC.

Further problems beside the weather:

After the arrival at La Silla I have noticed that my stay was stated only for 3 days (Wed-Fri) instead of 5 (Wed-Sun) - so they wanted me to go back right before my observing nights.

The data-backup was never without problems. Every night essential files were missing at the DAT-tape.

Nevertheless we are satisfied with the results of that observing run.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
La Silla	3	ESO 2.2M	2

Contract ID RII3-CT-2004-001566 **Reporting Period** AR1

UserProject Acronym
PIOTTAAT2004A

Title Search for Planetary transits in the metal-rich open cluster NGC6253

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives Detection of extra solar planet transists among stars of the metal rich Galactic open cluster NGC6253.

Achievements Due to the bad weather conditions and instrumental problem, we were able to obrain suitable data only in one out of the ten planned observing nights. This would prevent us to have the planned detection efficiency of extrasolar planets.
Specially, 2 nights were los because of the breaking of th Wide Field Camera.
We used as back-up instrument the IRIS2, which has a 20 time smaller field of view. This furtherly reduced our efficiency. Then, of the remaining 8 night, only 1 was accettable, the other 7 were all very cloudy.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
AAO	1	AAT	10

UserProject Acronym
QUIRRTNG2004A

Title Line bisector variations for K giant stars with possible planetary companions

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Project objectives: The objective of this project is to measure line bisector variations of K giant stars which show periodic radial velocity variations on timescales of 1 to 2 years. The targets have been selected from a sample of 182 K giant stars which we have monitored with a typical radial velocity precision of 5 to 8 m/s over several years. Possible explanations for the observed radial velocity variations include non-radial pulsations, rotational modulation of surface features or orbiting substellar companions. The purpose of the observations is to establish the reason of the observed radial velocity variations: while the shapes of the spectral lines are expected to change in the presence of pulsations as well as starspots, a planetary companion clearly would not affect the shape of the spectral lines.

Achievements
1. Observing Dates: 28/03/2004
Main achievements and difficulties encountered: This is a long-term program since the expected signal occurs on timescales of 1 to 2 years. Only after having acquired multiple high signal-to-noise spectra with high resolution of the same star on timescales comparable to this period one can start to interpret the results. However, unfortunately the weather was bad during this run, and the telescope could not be opened. No data were taken.
2. Observing Dates: 09/05/2004.
This is a long-term program since the expected signal occurs on timescales of 1 to 2 years. Only after having acquired multiple high signal-to-noise spectra with high resolution of the same star on timescales comparable to this period one can start to interpret the results.
The first half of the night the sky was clear but there was a strong wind. This wind caused difficulties to keep the slit in the middle of the star. The seeing was also varying between 0.5\" and 3.0\". This made it difficult to estimate the exposure times to recieve the optimum number of photons for a high SNR. Therefore
some exposure times where estimated too long or too short and some stars had to be observed more than once to obtain the number of photons needed. Furthermore we lost some time due to computercrashes and focussing problems. This took between 30 minutes and one hour of time.
The humidity rose between 23.30 hours and 00.30 hours from 10% to 100% and it started to rain. It kept raining till the end of the night and we could not take any more data.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	2

UserProject Acronym
QUIRRTNG2004B

Title Line bisector variations for K giant stars with possible planetary companions

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The objective of this project is to measure line bisector variations of K giant stars which show periodic radial velocity variations on timescales of 1 to 2 years. The targets have been selected from a sample of 182 K giant stars which we have monitored with a typical radial velocity precision of 5 to 8 m/s over several years. Possible explanations for the observed radial velocity variations include non-radial pulsations, rotational modulation of surface features or orbiting substellar companions. The purpose of the observations is to establish the reason of the observed radial velocity variations: while the shapes of the spectral lines are expected to change in the presence of pulsations as well as starspots, a planetary companion clearly would not affect the shape of the spectral lines.

Achievements
1. Observin Dates: 27/09/2004
The night started with some troubles. After the calibrations in the afternoon there appeared to be a problem with the CCD. The suport astronomer fixed the problem and performed the calibration again. This was before sunset and would not shorten the observation time, but there also appeared to be problems with the azimuthmotors. The technicians had to come up the mountain and it took some time to fix these problems. This was already during the night. It also appeared that a television crew (from the Catalan TV) was visiting the telescope. They looked around in the dome and interviewed all three of us (telescope operator, suport astronomer and me). Due to these activities we started later than expected, but they gave me the whole night in stead of the half night we had originally. After we could start observing we had some problems to get the right exposure times. Therefore we have some saturated images. The second half of the night everything worked perfect and we got a lot of
good observations.

2. Observin Dates. 28/10/2004
Unfortunately the humidity varied between 90% and 100% and we could not observe.

3. Observing Dates. 23/12/2004.
Unfortunately the wheather was very bad. We were covered in clouds all night and as it was freezing the dome was covered with ice. Therefore we where not able to observe.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	1,5

UserProject Acronym
RAUWOHP2004A

Title HD 93521: a cornerstone for asteroseismology of massive stars

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The main objective of this observing campaign was the study of the variations of the 09.5V star HD93521. This object is known to display line-profile variability due to non-radial pulsations with periods of 4 - 6 hours. In addition, HD93521 is a very fast rotator and asa consequence of the resulting gravity darkening, lines from different ions (formed either near the stellar equator or near its poles) should display different levels of variability. Our idea was to monitor HD93521 over 4 nights with an echelle spectrograph in order to investigate the variability over a broad wavelength range and hence over a wide range of ionization stages. The properties of the different pulsation modes and their distribution over the stellar surface should then be compared to the predictions of state of the art theoretical models.

Achievements Unfortunately, the observing campaign was seriously affected by extremely bad weather conditions. Out of a grand total of 30 possible hours of obervation, we could only observe for 12 hours. The first night was completely lost (rain) and during the 3 subsequent nights, we could only observe for 3 " 5 hours per night with a very low transparency (heavy clouds over large parts of the exposures). We nevertheless obtained a total of 18 spectra of HD93521. Because of the poor transparency, their SIN is lower than expected and they will not allow us to study the variations of weaker lines, but they should allow us to investigate the behaviour of the strongest absorption lines (i.e. those of He I formed near the stellar equator and displaying a rather strong variability and the Balmer lines). In addition, we confirmed the existence of a strong short-term variability of the red emission component of the H- alpha line. This emission probably arises in a flattened wind and studying the relationship between its variations and the non-radial pulsations can provide important clues about the interplay between the photospheric and the wind variability. During the last hour of one night, when HD93521 was no longer observable, we obtained a spectrum of HD191612; an Of?p star that shows strong variations between a low and a high emission state on timescales of months or even years. While the star was in its high state during a previous observing campaign in October 2003, we found it now in its low state. This result will help to better constrain the timescale and thus~he origin of the phenomenon.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
OHP	1	193 CM OHP	4

UserProject Acronym
ROGERWHT2004B

Title A complete survey of the Wolf-Rayet contents of M 33

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives We proposed a complete census of the Wolf-Rayet star content of M33 with our dedicated photometric technique. Massive star evolution, and hence the WC/WN ratio, is thought to be metallicity driven, but our recent work on the dwarf galaxy IC10 suggests that metallicity may not be the only important parameter. The combination of the wide field of the WHT PF camera and our dedicated photometric system would allow a complete determination of the Wolf-Rayet content of M33 for the first time, including spectral classification of all Wolf-Rayet stars down to the level of subtypes. Discovery of about 100 new Wolf-Rayet stars, i.e., about 20% of all such stars known in the universe, was expected.

Achievements This was our 3rd oberving run dedicated to this project. Once again it suffered from bad atmospheric conditions, as well as technical problems.
Among the latters I would mention guiding and tracking problems leading to considerable losses of time.
All in all we could not even complete the study of a single of our fields.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
ING	1	WHT	2

UserProject Acronym
ROUDIDOT2004

Title Study the photosphere dynamic around sunspot and filament

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Study of the photosphere dynamic around sunspot and filament The main objective of our program is to study at the same timethe photospheric and chromospheric motions around sunspot and filaments Filaments are one of the most features observed on the Sun. They arelocated in the upper solar atmosphere and are submited of the effectsof the lower layer, the photosphere. On basis of detailed observations,it is wide beleaved that the medium which transferts perturbations intothe corona throught the filament, is a magnetic field. Since theinteraction between photospheric motions and magnetic fields extendinginto the corona plays an important role in the dynamics filaments, itis natural to investigate how material moves below a filament and howcoronal magnetic fields evove when a particular kind of photosphericmotion is imposed at their footpoints.

Achievements
object: JOP 178 Report for OPTICONPeriod: 2004 (SERVICING MODE - 11 days scheduled for October 5-15)First of all , we would like to thank all the DOT team for his professional welcome and technical support. We had the great privilege to use the tomography Dot's mode which allows to study the solar atmosphere from the photosphere to the chromosphere. More particularly, that system allows to get co-spatial synchronous image sequences taken in these wavelengths with identical speckle cameras during as long as eight hours at 20-30 second speckle burst sampling cadence. The field of view covers up to 90 x 70 arcsec at 0.071 arcsec pixel resolution.That observating mode worked very well during the campaign and allows us to get very nice data in the different wavelenghts (quoted below). We obtained very nice sequences with which we can study the flow fields at the bottom of the filament feet. That was the main objective of our program.The observation have been performed on:5/october/2004: good observation conditions. Summary: 2 series of observation of 1h35 and 20min6/october/2004: very good conditions, summary: 1 serie observation of 57 minutes with excellent seeing10/october/2004: good observation condition ,summary: 1 série observation over 1h3015/october/2004: lot of humidity but very good seeing; summary: 1 série observation during 40 minutes SUMMARY of the 4 days of observation: 5 observations series from 20 minutes to 1h35 long. 5 hours of cumulated observation.We appreciated a lot the DOT website which is very well documented and the very nicefacility of the current page allowing to follow in direct the observation. It is a great advantage to have that facility in coordinate campaign.We consider that our DOT observations were very successfull and we hoppe the continuenext year to improve the statistic of our analysis. We plan to request in 2005 at thesame time observations at the DOT and 1M Swedish telescopte too.In order to coordinate our efforts in the analysis of all the data of the JOP 178 2004campaign, we have planned an informal meeting in Meudon the 4 and 5 february 2005 whereall the JOP178 participants well be.During the campaign, we implemented a web site of our jop18 where some of observation examplesare shown for each day. the address is : http://bass2000.bagn.obs-mip.fr/jop178/index.htmlThanks again for the OPTICON support and to the DOT Team.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
DOT	1	DOT	11

UserProject Acronym
SABATTNG2004A

Title Harassed galaxy streams

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
We have carried out deep large area surveys of the Virgo Cluster and the general field in order to investigate their extremely faint (-14 < M_B<-10; central surface brightness > 23 B mag/ sq arcsec) dwarf galaxy population. The number of dwarf compared to giant galaxies detected in these different environments varies enormously: in the Virgo Cluster we have found large numbers of faint galaxies, far fewer than in our survey in the field. It has been proposed that the large dwarf galaxy population is the result of high speed tidal interactions of infalling disc galaxies with the other cluster galaxies. This \'harassment\' picture should result in very faint tidal streams associated with the apparent dwarf galaxy, due to the loss of material from the original infalling galaxy. The project objective is to test this hypothesis

Achievements
We requested deep imaging to try and detect the streams predicted by the harassment mechanism. The main difficulty is that these streams should reveal themselves at extremely faint surface brightness levels, i.e. of about 27-28 B mag/sq arcsec. The investigation that we want to undertake requires therefore very accurate image reduction: the flat fielding procedure is the critical step in order to try and reveal these very low surface brightness structures. In order to do this we have successfully observed several night and morning sky flat fields and we are also intending to use our science images (opportunely observed using the dithering technique) in order to produce a master flat field for each night. The main achievement is thus a successful observing run, within the limits of the weather conditions of the nights (i.e. cirrus at the end of the first night and bad seeing during part of the second night) and few technical problems that the telescope had. The preliminary image reduction done during the observations, however, is not accurate enough to draw one\'s own conclusions.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	2

UserProject Acronym

SAKELCAHA 3.5M2004B

Title The Cluster Galaxy Connection: Interactions Evolution

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

In clusters of galaxies, the interactions of the galaxies with the cluster gas (ICM) might be responsible of their transformation and evolution. Our objective was to perform deep imaging in 5 filters in 1 sq.degree around the binary cluster system A399/401, with the LAICA detector on the CAHA 3.5m telescope. Our X-ray data (XMM) reveals a compression region between the two clusters,as they are approaching each other for the first time. With the LAICA mosaics we aim to: (i) identify the cluster galaxies; (ii) derive of their photometric and structural properties. We then will be able to investigate where, when, how and if the galaxies are transformed due to the galaxy-ICM interactions, using the A399/401 cluster system which appears at early stages of merging.

Achievements

We observed A399/401 in October, during the two nights that we were awarded.

At the beginning of each night we had minor problems with the software, telescope focussing, high humidity (only the first night), and telescope guiding. All these problems were solved easily, and not much observing time was lost. Our target was visible after ~22:00, which meant that the usable night was shorter. The first part of the first night was not photometric, but it became photometric to 5-10% after midnight. Luckily the seeing was better than expected (~1 arcsec), although it has to be checked more accurately. The second night was photometric throughout, but the seeing was a bit worse than the previous night. The length of the night, and the small problems at the beginning of each night meant that we were not left with enough time to observe in all 5 filters. Mosaics were obtained in 4 filters. We have requested a service observation, to observe A399/401 in the missing I-filter.

In summary, the October run was very successful, and we are planning a publication of these data sets as soon as possible.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
CAHA	1	CAHA 3.5m	2

UserProject Acronym
SANZ NOT2004A

Title The young stellar population in a moderately deep X-ray survey

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives We plan to determine the spectral type of all the stars detected in the Rosat North Ecliptic Pole Survey. The moderately deep sensitivity of such survey allows us to study the spatial distribution of stars with age smaller than 1 billion years in the solar neighborhood. The comparison of the spectral distribution of X-ray detected stars with that predicted by galactic stellar models, will permit determining the density of such population and studying the stellar formation rate in the last billion years in the solar neighborhood. Comparison with other X-ray surveys will allow to determine the age distribution of disk population dwarfs.

Achievements All the targets of our list were observed under optimal weather conditions, and no difficulties were found due to the high performance of the installations. The most interesting objects could be observed twice, and a counter-identification was found (an object believed to be a star was found to be a quasar). The analysis of the data is taking place now, and it will be ready in a few weeks. Since we have been able to achieve good spectra for all the objects, the spectral classification will be quite straightforward, and we foresee to accomplish the objectives we planned with these observations.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	2

UserProject Acronym
SCARLTNG2004B

Title Probing galaxy evolution using I-band Tully-Fisher relation at z~0.6 and z~0.4

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

1) reliably determine the Tully--Fisher relation (TFR) in two narrow redshift bins (cenetered at 0.4 and 0.6) in a wavelength range where the continuum is less affected both by dust absorption and star formation,
2) quantitatively study the TFR evolution by comparing the TFR derived at intermediate redshifts with the present day one, and
3) study the evolution of the metallicity--luminosity relation in the rest--frame I-band.
The rest--frame $I-$band Tully--Fisher relation, indeed, provides a relation between stellar mass and dynamical mass of disk galaxies and is therefore invaluable for constraining models of galaxy formation.

Achievements

We were awarded 3 nights at the TNG telescope to obtain J-band images of two fields, with NICS. Unfortunately, due to various reasons the program could not be completed.
First the telescope seemed to be rather fragile in tracking and lost the tracking star several times, which resulted in new pointing operation each time. Together with another technical problem (oil temperature in the azimuth bearing too high), we lost 6.3 hours due to technical problems.

Second, the choice of observing time was too early for our fields. Observing could have started at 20:40, but the 23h field went above 30deg elevation only at 21:30 (telescope cannot point below 25deg), and we lost 50min nights 2 and 3, each. So the total observing time was 9.8 hours, less than half of the time we asked for.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	3

UserProject Acronym
SCHMITCS2004A

Title SYMPA: sismología de planeta gigante

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
SYMPA is a multi site project for Jupiter oscillations measurements. The possible existence of global oscillations on Jupiter was discovered in 1987, with a full disk, non imaging instrument. The "Sismometre Interferentiellmageur a Prismes Accoles", or SYMPA, aims at increasing the frequency resolution and the duty-cycle (by the multi site concept) and the signal-to-noise ratio as well as the angular resolution on the planet surface (SYMPA is an in;1ager): the dedicated instrument, based on the basic principle of an imaging FTS, measures the variation of fringes modulating 4 planet images, and must access to Jupiter eigenmodes of degree up to 20 or so. This mission at the 1.5 m Carlos Sanchez Telescope (TCS) at Izaria was the first use of the second version of the instrument, and thus was part of the first two-site campaign in the frame of SYMPA. 11 nights had been granted to this programme on this telescope (March 19th - March 30th).

Achievements
The SYMPA instrument was first installed at the TCS focus on Monday, March 22nd, 2004, and has been successfully internally tuned and optically aligned on the telescope after two days. From Wednesday, March 24th, the observing team was organized for optimizing observations and calibration measurements. We have obtained calibration files. This first night of real observations (24th) the seeing was excellent at the beginning, and then worsened slowly with the increasing wind along the night. The next day (25th) was still good enough for observations. Unfortunately, on the 26th, the very bad weather period that had been clearly forecasted on the weather maps came in, with cold, snow and winds. No more chance to open the dome occurred for our last 3 nights... Multi site observations permit a duty-cycle up to 16h/day (with two sites). With a duration of 15 days, and better duty cycle, it will be possible to measure each mode with a resolution better than 1~z, i.e. 10-3 in relative precision. The side lobe due to interuptions will be reduced to 25 % of main pick, allowing precise identification of modes. Disgracefully, due to bad weather on almost the total period, only two nights of observations have been successfull. Nervetheless, combined with the good data obtained on Mexico, it will permit to apply some gap-filling algorithms, so the initial goal will be partly fulfilled. Data reduction are under process. Following the obtained quality of data, a supplementary campaign might be necessary next year with the same telescope, and hopefully better weather.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TCS	1	TCS	11

UserProject Acronym
SCHNETBL2004B

Title Magnetic fields in O stars

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The objective of the project was to use the spectropolarimeter at the TBL (Pic du Midi, France) to search for weak magnetic fields in O stars. For this purpuse we planned on following a small sample of carefully selected stars for at least a whole rotational period, which would allow us to search for the rotational variations in the effective line-of-sight field strength. The detection of such fields would enable to explain a wide range of well documented enigmatic phenomena in massive stars.

Achievements
The main difficulty encountered during the observing run was bad weather. Due to snowstorms it was only possible to observe for less than 2 nights out of the scheduled 10 nights. During the time that observations were possible, we obtained observations of our priority 1 targets, but the lack of sufficient time coverage prevents putting strong constraints on the magnetic fields of these targets.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
Obs Midi Pyr	1	TBL	10

UserProject Acronym

SKILLNOT2004B

Title The Distance Scale: A Study of Eclipsing Binaries and Cepheis in IC 1613

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The uncertainty in the extragalactic distance scale is dominated by two systematic effects, the absolute distance to the LMC and the possible effects of metallicity on the luminosities of Cepheids.We are analysing the eclipsing binary and cepheid populations in K1613 in order to derive an independent calibration of the Cepheid P-L seldiarship and to derive the absolute distance to K1613 to ~5%

Achievements In our 4 nights at the NOT we obtained V,B and N photometry on 3 nights (the equivalent to 1 night was lost due to poor weather conditions (seeing)). This data will give near complete light curves of short period cephieds and may several unbrown binaries eclipses.A proposals will be submitted shortly to extend the coverage of the longer period.We met no difficulties. The telescope washed flawlessly, although we lost ~1/4 of our allocation due to poor atmospheric seeing.We would also like to thank optical for prompt of very efficient support.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	3

UserProject Acronym
SNELLTNG2004A

Title The space-density of high redshift FRI radio galaxies (II)

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives We are pursuing a deep optical/radio survey to determine the high redshift space density and cosmological evolution of faint Fanaroff & Riley class I radio galaxies. The TNG observations serve to obtain redshift (distances) for the candidate sample, using the unique capability of the DOLORES multislit spectrograph.

Achievements Main achivements and difficulties encountered: The three nights of observing were conducted in superb weather conditions. No technical problems were encountered, and the observational goals were met by 100% percent. We estimate that for about 50-60% of 35 targets a redshift can be determined (as expected).

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
TNG	1	TNG	3

UserProject Acronym
SOBOTSST2004

Title Dynamics of small-scale magnetic structures

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
Interaction between photospheric convective motions and magnetic field. Observations of magnetic features with different sizes in the solar photosphere -
from G-band bright points up to sunspots. Motions in active regions, sunspots' penumbra and umbra, relations between different magnetic features at the umbra- penumbra and penumbra-photosphere borders. Study of horizontal motions and evolution of granules. The data should be complemented by the 2D spectrometric observations taken at the VTT, Observatorio del Teide, Tenerife, providing Doppler velocities and line-of-sight component of the magnetic field of observed structures.

Achievements
Achievements:
Broad-band high-resolution imaging of the solar photosphere simultaneously in
three wavelength bands: Blue and red continua, and the G-band. In 9 days of 15, assigned for the observing campaign, the seeing was good enough to perform the observations. There was only 1 day with excellent seeing. We obtained:
1. An 8-hour time series of a large sunspot, together with a 50-minutes series for speckle reconstruction. The acquired frames are of a very high quality, promissing
to detect possibly new morphological structures at smallest spatial scales, and their dynamics and evolution.
2. Nine series of frames for speckle reconstruction, two of them lasting 30 minutes, with other sunspots, pores, and active regions with G-band bright points. These data will be suitable to study the evolution of granules, abnormal granulation, and G-band bright points.
3. Five complementary time series of images of sunspots and pores with different.
sizes and evolutionary phases, spanning in time from 1 to 3 hours. Difficulties:
Due to very different seeing conditions at La Palma and Tenerife, it was possible to take only two short observing runs with the two telescopes (88T and VTT)

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
SST	1	SST	15

UserProject Acronym

TORREESONTTPERIOD74

Title Disks in Be/X-ray binaries

Scientific Field

Main Field Physics

FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives

The main goal of this project is to obtain a calibration to properly decouple the interstelar reddening from the cicumstellar reddening in BeX ray binaries. This has been already done for isolated Be stars but not for BeX ray binaries for which the circumstellar reddening was sistematically underestimated. By observing these obejcts at the Magellanic clouds we will be able to compute correctly the distances and, hence, luminosities of these obejects in the Galaxy.

Achievements

In principle the observation was performed as forseen. This is a photometric programme though, and the weather and transparency conditions were certainly not perfect. We are analizing the data and only then we will know to which degree the scientific goals are met. However, it is worth to point out, that during our backup programme time (the project required photometric conditions which were sometimes not met) we performed sepctroscopic observations which have led to the identificacion of the optical counterpart of an INTEGRAL source (see ATEL #370). So, previously to the full analisys of the data we have already an important result.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
La Silla	2	ESO 3.5M NTT	2

UserProject Acronym
UDRYOHP2004A

Title Extrasolar planets orbiting heavy elements rich stars - II

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
The goal of this project is to rapidly detect short-period exoplanets orbiting solar-type stars by biasing the search towards metal-rich stars. The first results on the properties of exoplanet hosts have shown that the latters are in average more metal rich than ``single\'\' stars of the solar neighbourhood, the probability of planet occurrence being over 20% as soon as the metal content of the star becomes twice solar. We plan a rapid screening of about 1000 close-by solar-type stars, not yet observed in other planet-search programmes. The stellar metallicity is rapidly obtained, on site, after 1 observation (in the same time as the star radial velocity), allowing us a real-time follow-up of the interesting candidates (15% of the more metallic stars). A few tens of planets are expected from this survey

Achievements
The programme is planned over 2-3 years. After the first period (semester) of observations (partially founded by OPTICON), about 200 stars have been measured at least once, the more metallic among them having already several measurements. Our expectations for the percentage of metal-rich stars in the sample have been fully confirmed and a first planet with a 6-dyas period has already been detected. We are now scheduling follow-up photometric observations of the candidate to look for a potential planetary transit.

No special difficulties have been encountered during the observations. Contact and support with the Observatoire de Haute-Provence were perfect.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
OHP	1	193 CM OHP	12

UserProject Acronym
VOSSOHP2004B

Title Light curves of new ZZ Ceti stars

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives Obtaining Light curves at condidate ZZ Cetstars thus confirming them as pulsators

Achievements Much observation time was lost to bad weather and some minor problems (Technical) with the telescope. In the remaining useful time, only 6 objects could be observed. 2 objects show signs of variations, which are however not unambiguous because of bad observing conditions (weather). The remaining 4 objects were found to be non-variable.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
OHP	1	193 CM OHP	5

UserProject Acronym
WEIDINOT2004A

Title The NOT legacy: A slice of the z=2 universe

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The objective of the project is to build a catalogue of very faint Lyman-alpha emitting galaxies at a redshift z = 2. The proposal is to image a mosaic of 2 by 2 ALFOSC fields. This will enable us to begin studying the very faint end of the z =2 galaxy luminosity function, and large-scale structures such as filaments and sheets. Following the primary questions such as luminosity function, space-density, morphology and star-formation rate, secondary questions of how these objects are related to other types of high-redshift galaxies may be addressed

Achievements We have succesfully completed the observing run. The astronomical seeing was quite good and very little time was lost due to weather conditions. However, a non-vanishing amount of time was allocated to override programmes. This means that we do not probe the luminosity function all the way down to the limit proposed in our observing proposal. We still need a few nights of observations to complete

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	3

UserProject Acronym
WIEHRDOT2004

Title Two-dimensional seismology of solar prominences

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives Seismology of solar prominences (quiescent) in H-alpha take tim series in total emission (integrated line) at DOT simultaneously with dopler shifts (through soup filter) at SST search for intensity and velocity variations two-dimensionality: periods, spatial and temporal coherence

Achievements After installation, adjustment programming, nice data were obtained on September 13, 14, 15 and 16. No instrumental difficulties were encountered. On Sept 21, excellent weather conditions and thus nicely working AO were used for application of the same program to a sunspot

Installation Use

Infrastructure Short Name	Installation ID	Installation Short Name	Amount of Access Delivered
DOT	1	DOT	13

UserProject Acronym
ZIMANOT2004B

Title Asteroseismology of the evolved δ Scuti star 44 Tau

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives
We carried out a simultaneous spectroscopic/photometric observing campaign for the Delta Scuti star 44 Tau, with the aim to determine a stellar pulsation model on the basis of asteroseismology. To achieve this objective, the detection of a large number of pulsation frequencies combined with an identification of the spherical numbers of a few modes is essential in order to allow for a meaningful comparison of theoretical models with observations. Asteroseismology not only permits the exploration of the invisible stellar interior\'s physical properties, but also its evolutionary status.

Achievements
This campaign was organised as multi-site campaign, utilizing three telescopes located at La Palma, Tautenburg (Germany) and Rozhen (Bulgaria) for spectroscopic observations and the Automated Photometric Telescope (Arizona) of the Univ. Vienna for photometry. The weather permitted observations of 44 Tau during 3 consecutive nights at the NOT (19 hours). During the first 2 hours of the night, when 44 Tau was still too low to be observed, we made measurements of the magnetc active star AR Lac and of RR Lyr (in the frame of the Blazhko Project, see http://www.astro.univie.ac.at/~blazhko/).

At an integration time of 10 minutes, which is 5% of 44 Tau\'s main pulsation period, we were able to achieve a S/N ratio of 100 to 300 at 5300 A. A first brief analysis of the spectra (from NOT and Tautenburg) confirms the low projected rotational velocity of 44 Tau, which is about 7 km/s and makes this a very narrow lined star. Radial velocity measurements taken from Tautenburg in Nov. and Dec. permitted a preliminary detection of 9 significant frequencies of which 4 have been prevoisly detected photometrically.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	4

UserProject Acronym
ZUCKENOT2004B

Title Does M31 have as many satellites as predicted by Cold Dark Matter theory?

Scientific Field
Main Field Physics
FP6 Priority or Specific Astronomy/Astrophysics/Astroparticles

Objectives The number of small satellite galaxies is perhaps the most severe discrepancy between successful CDM cosmological models and observations. Various physical processes, e.g., photoionisation, tidal disruption, etc. have been proposed to alleviate this ``CDM satellite catastrophe\". Many of these processes push the discrepancy to slightly fainter magnitudes (Mv > -9) than present observations reach. With SDSS data we have discovered a new satellite of M31, And IX, with Mv ~ -8, and ~10 more satellite candidates, perhaps as faint as Mv ~ -7, in a regime where these processes can be critically tested. We plan to obtain deep photometry for this new Local Group member and additional photometry to confirm or refute the other faint candidates.

Achievements We obtained g\'r\'i\' images with good seeing of several of the satellite candidates, however weather problems prevented us from completing our planned program. Although the weather on the first night was good, high humidity prevented us from opening the telescope, or forced us to close the telescope, for at least several hours on each of the remaining four nights. In addition, during periods when the humidity was changing rapidly, the seeing was often too poor for the images to be useful.

Installation Use

Infrastructure Short Name	*Installation ID*	*Installation Short Name*	*Amount of Access Delivered*
NOT	1	NOT	5

List of Users

Contract ID RII3-CT-2004-001566 **Reporting Period** AR1

User Project Acronym	Family Name	First Name	Gende	Birth year	Nation ality	Resear. status	User Background			Home Institution				User e-mail	New user	Group leader	Remote user	Num. of visits	Dur. of stay	T and S reimb.
							Sci. Field 1	Sci. Field 2	Sci. Field 3	Type	Name	Town	Country							
ALTONINT2004A	Xilouris	Emmanuel	M	1970	GR	EXP	Physics			RES	Institute of Astronomy & Astrophysics	Athens	GR	xilouris@astro.noa.gr	Y	N	N	1	5	Y
ARNAUVT2004	Arnaud	Jean	M	1945	FR	EXP	Physics			RES	Laboratoire d'Astrophysique de l'Observatoire Midi-Pyrénées	Toulouse	FR	jean.arnaud@ast.obs-mip.fr	Y	Y	N	1	8	Y
BALTHDOT2004	Balthasar	Horst	M	1953	DE	EXP	Physics			RES	Astrophysikalisches Institut Potsdam	Postdam	DE	hbalthasar@aip.de	Y	Y	Y	0	0	N
BERDYTHEMIS2004	Berdyugina	Svetlana V	F	1964	OT	EXP	Physics			UNI	Institute of Astronomy	Zürich	CH	sveta@astro.phys.ethz.ch	N	Y	N	1	13	Y
BIRKMTNG2004A	Birkmann	Stephan	M	1975	DE	PGR	Physics			RES	Max-Planck-Institut für Astronomie	Heidelberg	DE	birkmann@mpia.de	Y	Y	N	1	1	Y
BOSCHWHT2004B	Boschin	Walter	M	1971	IT	PDOC	Physics			UNI	Universita' di Trieste	Triestre	IT	boschin@ts.astro.it	Y	Y	N	1	4	N
BOUDITBL2004A	Cox	Nick	M	1976	NL	PGR	Physics			UNI	Astronomical Institute. University of Amsterdam.	Amsterdam	NL	ncox@science.uva.nl	Y	N	N	1	7	Y
CASALCAHA2,2M2004B	Clarke	Fraser	M	1978	GB	PDOC	Physics			UNI	University of Oxford	Oxford	GB	fclarke@ASTRO.OX.AC.UK	Y	N	N	1	10	Y
FASANWHT2004A	Bettoni	Daniela	F	1954	IT	EXP	Physics			RES	Osservatorio Astronomico di Padova	Padova	IT	bettoni@pd.astro.it	Y	N	N	2	7	Y
FASANWHT2004B	Varela	Jesús	M	1975	ES	EXP	Physics			RES	INAF - Osservatorio Astronomico di Padova	Padova	IT	varela@pd.astro.it	N	N	N	1	5	Y
FELTZINT2004A	Feltzing	Sofia	F	1965	SE	PDOC	Physics			UNI	Lund Observatory. Lund University	Lund	SE	sofia@astro.lu.se	N	Y	N	1	9	Y
FITZSCAHA2.2M2004B	Fitzsimmons	Alan	M	1964	GB	EXP	Physics			UNI	Queen´s University Belfast	Belfast	GB	a.fitzsimmons@qub.ac.uk	Y	Y	Y	0	0	N
FLURITHEMIS2004	Fluri	Dominique	M	1972	CH	EXP	Physics			UNI	Institute of Astronomy (ETH Zürich)	Zurich	CH	fluri@astro.phys.ethz.ch	Y	Y	N	1	12	Y

User Project Acronym	Family Name	First Name	Gende	Birth year	Nation ality	Resear. status	User Background			Home Institution				User e-mail	New user	Group leader	Remote user	Num. of visits	Dur. of stay	T and S reimb.
							Sci. Field 1	Sci. Field 2	Sci. Field 3	Type	Name	Town	Country							
FRÉMAOH P2004B	Frémat	Yves	M	1969	BE	PDOC	Physics			RES	Observatoire Royal de Belgique	Brussels	BE	Yves.Fremat@oma.be	Y	Y	N	1	8	Y
GALLEWH T2004B	Galleti	Silvia	F	1972	IT	UND	Physics			UNI	UniBO & INAF-OAB	Bologna	IT	silvia.galleti2@unibo.it	Y	Y	N	1	4	Y
GEORGE SONTTPE RIOD74	Georgakakis	A	M	1972	GR	PDOC	Physics			UNI	National Observatory of Athens	Athens	GR	age@astro.noa.gr	Y	Y	N	1	7	Y
GONZAN OT2004A	Gonzalez-Solares	Eduardo	M	1973	ES	PDOC	Physics			UNI	Institute of Astronomy, Cambridge University	Cambridge	GB	eglez@ast.cam.ac.uk	N	Y	N	1	3	Y
GROOTN OT2004B	Roelofs	Gijs	M	1979	NL	PGR	Physics			UNI	Radboud University Nijmegen	Nijmegen	NL	gijsroek@astro.ru.nl	Y	N	N	1	8	Y
HAASNOT 2004A	Leipski	Christian	M	1977	DE	PGR	Physics			UNI	Astronomisches Institut, Ruhr-Universität Bochum (AIRUB)	Bochum	DE	leipski@astro.rub.de	Y	N	N	1	7	N
HAASNOT 2004B	Leipski	Christian	M	1977	DE	PGR	Physics			UNI	Astronomisches Institut, Ruhr-Universität Bochum (AIRUB)	Bochum	DE	leipski@astro.rub.de	Y	N	N	1	4	Y
HAASTNG 2004B	Meusinger	Helmut	M	1952	DE	EXP	Physics			RES	Thueringer Landessternwarte Tautenburg	Tautenburg	DE	meus@tls-tautenburg.de	Y	N	N	1	6	Y
HATZIWH T2004B	Antoniou	Valsamo	F	1976	GR	PGR	Physics			UNI	University of Crete	Crete	GR	valliaa@yahoo.com	Y	N	N	1	5	Y
HENRITBL 2004A	Henrichs	Huib. F	F	1958	NL	UND	Physics			UNI	Astronomical Institute. University of Amsterdam	Amsterdam	NL	huib@science.uva.nl	N	Y	Y	0	0	N
HIRZBVTT 2004	Hirzberger	Johann	M	1968	AT	PDOC	Physics			UNI	Institut für Geophysik, Astrophysik und Meteorologie. University of Graz	Graz	AT	jkh@igam.uni-graz.at	Y	Y	N	1	10	Y
HIRZBVTT 2004	Jurcak	Jan	M	1978	CZ	PGR	Physics			RES	Astronomical Institut of the Academy of Sciences of the Czech Republic	Ondrejov	CZ	jurcak@asu.cas.cz	Y	N	N	1	9	Y
HIRZBVTT 2004	Stangl	Stefan	M	1975	AT	PGR	Physics			UNI	Institut für Geophysik, Astrophysik und Meteorologie. University of Graz	Graz	AT	stefan.stangl@uni-graz.at	Y	N	N	1	9	Y

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							Sci. Field 1	Sci. Field 2	Sci. Field 3	Type	Name	Town	Country							
IGLESNO T2004B	Iglesias Páramo	Jorge	M	1968	ES	PDOC	Physics			RES	Laboratoire d'Astrophysique de Marseille	Marseille	FR	jorge.iglesias@oamp.fr	N	Y	N	2	2	Y
ISRAECF HT2004B	Israelian	Garik	M	1963	OT	EXP	Physics			RES	Instituto de Astrofísica de Canarias	S/C de Tenerife	ES	gil@ll.iac.es	Y	Y	N	1	3	Y
IVANOAA T2004B	Ivanov	Valentin D.	M	1967	BG	EXP	Physics			RES	European Southern Observatory	Santiago	OT	vivanov@eso.org	Y	Y	N	1	7	Y
JEFFETN G2004B	Jeffers	S.V	F	1976	IE	PDOC	Physics			RES	Observatoire Midi-Pyrenees	Toulouse	FR	svj1@st-and.ac.uk	Y	Y	N	1	4	Y
KUCERD OT2004	Koza	Julius	M	1970	SK	PDOC	Physics			RES	Astronomical Institute, Slovak Academy of Sciences	Tatranská Lomnica	SK	koza@astro.sk	Y	N	N	1	1	Y
KUNCAHA 2.2M2004 B	Kun	María	F	1949	HU	EXP	Physics			OTH	Konkoly Observatory	Budapest	HU	kun@konkoly.hu	Y	Y	N	1	5	Y
LEONEAA T2004B	Leone	F	M	1961	IT	EXP	Physics			RES	Catania Observatory	Catania	IT	fleone@ct.astro.it	Y	Y	N	1	4	Y
LODIETN G2004A	Lodieu	Nicolas m	M	1977	FR	PGR	Physics			RES	Astrophysikalisches Institut Potsdam	Potsdam	DE	nlodieu@aip.de	Y	Y	N	1	7	Y
MACKAN OT2004A	Mackay	Craig.D	M	1944	GB	EXP	Physics			UNI	Institute of Astronomy, Cambridge University	Cambridge	GB	cdm@ast.cam.ac.uk	N	Y	N	1	9	Y
MARTÍWH T2004B	Martínez Delgado	David	M	1970	ES	PDOC	Physics			PRV	Max-Planck-Institut für Astronomie	Heidelberg	DE	ddelgado@mpia.de	Y	Y	N	1	4	Y
MAYORO HP2004B	Pernier	Bernard	M	1944	CH	TEC	Physics			UNI	Observatoire de Geneve	Geneve	CH	bernard.pernier@obs.unige.ch	N	N	N	1	8	Y
METCACA HA 3.5M2004 B	Metcalfe	Nigel	M	1957	GB	PDOC	Physics			UNI	Durham University	Durham	GB	nigel.metcalfe@durham.ac.uk	N	Y	N	1	4	N
MITTETN G2004A	Weiss	Werner.W	M	1943	AT	EXP	Physics			UNI	University Vienna	Vienna	AT	weiss@jan.astro.univie.ac.at	Y	N	Y	0	0	N
MUNARO HP2004A	Siverio	Alessandro	M	1969	IT	UND	Physics			UNI	University Padova (Dept. of Astronomy)	Vicenza	IT	siviero@pd.astro.it	Y	N	N	1	4	Y
NEGUETB L2004B	Negueruela	Ignacio	M	1970	ES	EXP	Physics			UNI	Universidad de Alicante	Alicante	ES	ignacio@dfists.ua.es	Y	Y	N	1	4	Y
NETOPES O3.6MPE RIOD73	Netopil	Martin	M	1976	AT	PGR	Physics			UNI	Institute for Astronomy - University of Vienna	Vienna	AT	netopil@astro.univie.ac.at	Y	Y	N	1	4	Y

User Project Acronym	Family Name	First Name	Gende	Birth year	Nation ality	Resear. status	User Background			Home Institution				User e-mail	New user	Group leader	Remote user	Num. of visits	Dur. of stay	T and S reimb.
							Sci. Field 1	Sci. Field 2	Sci. Field 3	Type	Name	Town	Country							
PASQUCA HA 2.2M2004 B	Pasquali	Ana	F	1967	IT	EXP	Physics			UNI	ETH Zürich	Zürich	CH	pasquali@phys.ethz.ch	N	Y	N	1	9	Y
PAUNMP G/ESO2.2 MPER74	Netopil	Martin	M	1976	AT	PGR	Physics			UNI	University Vienna	Vienna	AT	netopil@astro.univie.ac.at	N	N	N	1	4	Y
PIOTTAAT 2004A	Bedin	Luigi	M	1973	IT	PDOC	Physics			UNI	Univ. of Padova, Astronomy Dpt	Padova	IT	bedin@pd.astro.it	Y	N	N	1	12	Y
QUIRRTN G2004A	Hekker	Sakia	F	1978	NL	PGR	Physics			UNI	Leiden Observatory	Leiden	NL	saskia@strw.leidenuniv.nl	N	N	N	2	2	Y
QUIRRTN G2004B	Hekker	Sakia	F	1978	NL	PGR	Physics			UNI	Leiden Observatory	Leiden	NL	saskia@strw.leidenuniv.nl	N	N	N	3	3	Y
RAUWOH P2004A	Rauw	Gregor	M	1970	BE	EXP	Physics			UNI	Institut d'Astrophysique et de Geophysique	Liege	BE	rauw@astro.ulg.ac.be	Y	Y	N	1	4	Y
ROGERW HT2004B	Manfroid	Jean	M	1948	BE	EXP	Physics			UNI	Institut d'Astrophysique et de Géophysique	Liege	BE	manfroid@astro.ulg.ac.be	N	N	N	1	3	Y
ROUDIDO T2004	Mein	P	M	1934	FR	EXP	Physics			UNI	Observatoire de Paris - Section de Meudon	Meudon Cedex	FR	Pierre.Mein@obspm.fr	Y	N	Y	0	0	N
SABATTN G2004A	Sabatini	Sabina	F	1973	IT	PDOC	Physics			UNI	University of Wales, Cardiff	Cardiff	GB	s.sabatini@astro.cf.ac.uk	Y	Y	N	1	4	Y
SAKELCA HA 3.5M2004 B	Sakellariou	Irini	F	1969	GR	PDOC	Physics			UNI	University of Birmingham	Birmingham	GB	irini@star.sr.bham.ac.uk	Y	Y	N	1	4	Y
SANZ NOT2004 A	Affer	Laura	F	1969	IT	PGR	Physics			RES	Osservatorio Astronomico di Palermo	Palermo	IT	affer@astropa.unipa.it	Y	N	N	1	3	Y
SCARLTN G2004B	Hippelein	Hans	M	1943	DE	EXP	Physics			RES	Max-Planck-Institut für Astronomie	Heidelberg	DE	hippelie@mpia.de	Y	N	N	1	3	Y
SCHMITC S2004A	Jacob	cédric	M	1973	FR	PGR	Physics			UNI	Laboratoire Universitaire d'Astrophysique de Nice	Nice	FR	Cedric.JACOB@unice.fr	Y	N	N	1	14	Y
SCHNETB L2004B	Schnerr	R.S	M	1977	NL	PGR	Physics			PRV	Astronomical Institute. University of Amsterdam.	Amsterdam	NL	rschnerr@science.uva.nl	N	Y	N	1	12	Y

User Project Acronym	Family Name	First Name	Gende	Birth year	Nation ality	Resear. status	User Background			Home Institution				User e-mail	New user	Group leader	Remote user	Num. of visits	Dur. of stay	T and S reimb.
							Sci. Field 1	Sci. Field 2	Sci. Field 3	Type	Name	Town	Country							
SKILLNOT 2004B	Skillen	Ian	M	1953	GB	EXP	Physics			RES	Isaac Newton Group	S/C de la Palma	ES	wji@ing.iac.es	Y	Y	N	1	4	N
SKILLNOT 2004B	Todd	Ian	M	1980	GB	PGR	Physics			UNI	Queen´s University Belfast	Belfast	GB	i.todd@qub.ac.uk	Y	N	N	1	8	Y
SNELLTN G2004A	Snellen	Ignas A.G	M	1970	NL	EXP	Physics			UNI	Institute for Astronomy, Royal Observatory Edinburgh	Edinburgh	GB	ignas@roe.ac.uk	Y	Y	N	1	4	Y
SOBOTSS T2004	Puschmann	Klaus Gerhard	M	1968	AT	PDOC	Physics			UNI	Universitäts-Sternwarte Göttingen	Göttingen	DE	kgp@uni-sw.gwdg.de	Y	N	N	1	12	Y
TORREES ONTTPER IOD74	Torrejón	J.M	M	1965	ES	EXP	Physics			UNI	Universidad de Alicante	Alicante	ES	jmt@dfists.ua.es	N	Y	N	1	7	Y
UDRYOH P2004A	Da Silva	Ronaldo	M	1975	OT	UND	Physics			UNI	Observatoire de Genève	Sauverny	CH	ronaldo.dasilva@obs.unige.ch	Y	N	N	1	6	N
UDRYOH P2004A	Udry	Stéphane	M	1961	CH	EXP	Physics			UNI	Observatoire de Genève	Sauverny	CH	Stephane.Udry@obs.unige.ch	N	Y	N	1	10	Y
VOSSOHP 2004B	Chevreton	Michel	M	1938	FR	EXP	Physics			UNI	Observatoire de Paris - Section de Meudon	Meudon Cedex	FR	michel.chevreton@obspm.fr	Y	N	N	1	6	Y
VOSSOHP 2004B	Voss	Björn	M	1976	DE	PGR	Physics			UNI	Institut für Theoretische Physik und Astrophysik	Kiel	DE	voss@astrophysik.uni-kiel.de	Y	Y	N	1	7	Y
WEIDINO T2004A	Weidinger	Michael	M	1976	DK	PGR	Physics			UNI	Institute of Physics and Astronomy	Aarhus	DK	michaelw@phys.au.dk	N	Y	N	1	7	N
WIEHRDO T2004	Wiehr	Eberhard	M	1939	DE	EXP	Physics			UNI	Universitäts-Sternwarte Göttingen	Göttingen	DE	ewiehr@uni-sw.gwdg.de	N	Y	N	1	14	Y
ZIMANOT 2004B	Zima	Wolfgang	M	1973	AT	PGR	Physics			UNI	Institute for Astronomy - University of Vienna	Vienna	AT	zima@astro.univie.ac.at	Y	Y	N	1	5	Y
ZUCKENO T2004B	Zucker	Daniel	M	1968	OT	PDOC	Physics			RES	Max-Planck-Institut für Astronomie	Heidelberg	DE	zucker@mpia.de	Y	Y	N	1	6	Y

Observing runs supported under the OPTICON Access Programme started in April 2004, so is still too early to report on this aspect. Awarded users are kindly requested to inform to the Trans-national Access Office about any scientific output obtained from the access provided under this Programme as well as to acknowledge EU funding in their publications.

During 2005 the Access Office is carrying out special efforts to obtain in the future this information from awarded users.

D. DETAILED IMPLEMENTATION PLAN FOR THE NEXT 18 MONTHS

1.1 NA1: Management Activity

During Month 14 the executive committee will meet to review the progress set out in the annual report, consider and revise where necessary the future plans and budgets of all activities.

During Month 13 and 14 the management team will work with the Network, Access and JRA leaders to complete the 1st annual report to the commission.

During month 19 the executive committee will meet again to monitor progress and prepare any recommendations to the board on future plans

The project office will distribute funds from the second advance when they become available.

The Project Scientist and other members of the management team will constantly monitor progress of the various activities to ensure the planned programme can be delivered.

The project team will continue to make presentations and write articles where appropriate to publicise the activities of the project

Workpackage	**Milestones/ Deliverables**	**Project Month**	**Description**
1	M8	14	Executive meeting. Zurich
1	M9	14	Complete Annual report to EU
1 1	M10 M11	19 19	Executive meeting. Presentations at JENAM meeting
1	M12	21	OPTICON Board meeting. Autumn 05, Italy
1	M13	26	Executive meeting

1.2 NA2. Coordination and Integration of ENO facilities

WP1.: Co-ordination of scientific communities at ENO:

WP1.1.: Dissemination of good practices:
Participants of this work-package will meet three times during the next 18 months to monitor the work-packages and activities under NA2. Other specific activities and working groups will be proposed to promote a better co-ordination of the infrastructures at ENO and to approach common challenges.

A specific new working group may be proposed if the proposal to improve the communication infrastructure between both observatories and the IAC Headquarters is approved. Moreover, international funding opportunities will be identified as well as contacts of interest at European level.

One of the main activities of this working group for the next 12 months will be to guarantee that the NA2 activities initially planned for the first 24 months of the contract will be completely carried out, and any delay due to the reception of the advance payment late 2004 will be overcome.

WP1.2.: Laser Traffic Control System (LTCS) for ORM: A geometrical model of the location of all telescopes at the ORM will be completed. One or more meetings will be held to inform telescope operators on the status of the project and to compile any individual software or hardware specifications. A document on hardware and software requirements will be produced. Next, work will focus on completing the system to receive and send information about the telescope pointing from all telescopes at the ORM.

WP2.: Site Characterisation of the Canary Islands' Observatories:

WP2.1: Co-ordination of night-time seeing measurements with DIMMs

Continuous data comparison of systematic seeing measurements and meteorology will be carried out by the participants; results will be made available and a progress report on these measurements will be delivered. An Automatic Differential Image Motion (DIMM) will be developed by a specialized company at Roque de los Muchachos Observatory (ORM). First tests will be carried out during the upcoming 18 months, as well as intensive campaigns using a Generalized Seeing Monitor (GSM) at the ORM.

WP2.2 Co-ordination of day-time seeing measurements at Teide Observatory (OT)

A solar DIMM will be mounted at Teide Observatory (OT) in order to start systematic measurements and scintillation measurements. A progress report will be delivered by the participants.

WP2.3 Joint actions for meteorology, dust, extinction and Sky Background

The participants will organize a meeting in order to identify the meteorological stations which already exist and will deliver a report of their characteristics, complementarities and the options for exchange of information. An Automatic Weather Station (AWS) will be implemented in the pre-selected potential site for an Extremely Large Telescope (ELT) in order to have on line weather conditions at both sites, once the civil planning permissions have been received. The study of dust pollution monitoring and dust particles will continue being undertaken by the participants.

WP2.4 Joint actions for Measurement of turbulence and wind vertical profiles (SCIDAR, GSM & DIMM)

A co-ordinated measurement of parameters related to atmospheric turbulence (turbulence and wind vertical profiles) will be made. Comparison and calibration of SCIDAR and DIMM measurements. Participants will develop an automatic procedure to derive turbulence profiles from SCIDAR measurements. A progress report will be delivered.

WP2.5 Distribution and discussion of results and participation at the scientific forums

The final design of a common data-base will be fully operative and a meteo-network website will be available (with links to all running programmes). The participation in the discussion forums for site-selection (50m, 100m, ATST) and site characterization will be attended when scheduled and contributions will be prepared. Annual reports will be delivered with all the actions carried out.

WP3.: Joint Information System and Transfer of Knowledge:

WP3.1.: Development of a Joint Information System for Solar Physics (JIS):

This working group will complete the compilation of relevant information amongst European institutions. The first JIS design will be tested among a limited number of institutions. A final version of the tool will be available and fully operative to be announced to the whole solar physics community and presented at appropriate forums/meetings. An open invitation for any interested group belonging to the European solar community to join in and link to the JIS will be circulated. If the European Commission accept our request concerning the change of the type of costs initially allocated for subcontract we, the working group, will carry out appropriate maintenance activities (assistance plus upgrading) for the whole system. A final report of the whole JIS activity will be delivered.

WP3.2.: Co-ordinated actions on transfer of knowledge and public outreach:

Participants in this workpackage will organize two Open-door days at both observatories, one of them mainly focussed in solar physics (at OT), and the other one will cover a wide range of facilities at ORM. Such visits will be complemented by the installation of tents, housing several areas for parallel sessions, exhibitions and workshops. Science communication talks will be prepared and presented at secondary schools in La Palma and Tenerife with the support of volunteers willing to do communication on astronomy. In order to beef up the exhibition elements of astronomy, joint initiatives with relevant entities (airports, museum, etc.) will be proposed and discussed. Permanent panels will be installed at the ORM&OT displaying detailed info about the observatories facilities. Final design of the joint ENO Website will be fully operative and a report on public outreach activities carried out will be delivered.

The working group will identify other networks to coordinate public outreach activities, as well as other complementary funding sources in order to prepare joint proposals focussed on science communication.

Table with breakdown of human effort for next 18 months (person/months)

Laboratory	WP1	WP2	WP3	Total Effort
24. IGAM	0	0	13	13
7. IAC	7	21	4	32
2. PPARC	18	0	0	18
Total effort	25	21	17	63

List of Milestones and Deliverables scheduled (1Jan 05 - 30 Jun 06 / Months: 13th to 30th)

Activity	Work package	Milestones/ Deliverables	Project Months	Description
NA2	WP1.1	D1	24	Updated progress report and revised roadmap
NA2	WP1.1	M1	16, 22,28	Regular ENO meetings
NA2	WP1.1	M2	22	Working Groups meeting
NA2	WP1.2	M2	14	Meetings among telescope operators
NA2	WP1.2	D1	14	Document on hardware specifications
NA2	WP1.2	D2	14	Documented model for ORM geometry
NA2	WP1.2	D3	20	Document on site software requirements
NA2	WP1.2	D4	25	Software implementation at each telescope installation
NA2	WP2.1	D1	24	Report: Systematic measurements of seeing & meteorology
NA2	WP2.1	M1	12>>	Automatice monitor DA/IAC
NA2	WP2.1	D2	18	Report on campaigns carried out at GTC site using GSM
NA2	WP2.2	M1	16>>	Systematic measurements using a DIMM
NA2	WP2.2	M2	16>>	Scintillation measurements
NA2	WP2.2	D1	30	Report on measurements using solar DIMM
NA2	WP2.3	D1	24	Annual report on measurements of extinction and dust
NA2	WP2.3	D2	18, 30	Annual report on stations already existing
NA2	WP2.3	M1	16	Install and run an Automatic Weather Station (1 month)
NA2	WP2.3	D3	24	Feasibility Study - CONCAM and sky monitor
NA2	WP2.4	D1	24	Reports on techniques to get wind profiles
NA2	WP2.5	D1	24	Annual report on discussion forums for site-selection
NA2	WP2.5	D2	22	Network METEO and WEB
NA2	WP3.1	D1	14	Draft proposal for design and contents of Central Site
NA2	WP3.1	D2	18	Final prototype/version of the tool
NA2	WP3.1	D3	22	Report on new institutions interested in JIS
NA2	WP3.1	D4	20	System fully operative
NA2	WP3.1	D5	24	FINAL REPORT: JIS
NA2	WP3.1	M3	16	Workshop
NA2	WP3.1	M4	20	Open Announcement
NA2	WP3.2	M1	20	Open-doors days at OT and ORM
NA2	WP3.2	M2	18	Distribution of new editions
NA2	WP3.2	D1	16	New editions of outreach material
NA2	WP3.2	D2	17	ENO website. Final design operative
NA2	WP3.2	D3	24	Annual report on ENO website and public outreach
NA2	WP3.2	D4	16	Programme of activities for the next event
NA2	WP3.2	D5	18	Exhibition elements and educational material
NA2	WP3.2	D6	24	Major events. Exhibition elements & educational material

1.3 NA3: Structuring European Astronomy

WP1: ELT

The plan for the next 18 months is similar to that originally envisaged. The OPTICON ELT SWG plans to hold one major meeting towards the end of each year (similar to the Florence meeting in November 2004). However in November 2005 the IAU will hold a symposium on ELT Science, in Cape Town South Africa. It is important that European astronomy is well represented at this meeting and we propose to use OPTICON travel funds to support European attendance at this meeting rather than holding our own major meeting within Europe. Smaller meetings of sub-sets of the European SWG may be held within Europe if necessary for the development of the science case and requirements document.

The OPTICON SWG plans to deliver a science case document at the mid-and end points of the project period (i.e. months 30 and 60). Work has begun on this document and a first draft is planned for mid 2005 (around month 18-20).

WP2: Network for UV Astronomy

The situation of UV astronomy has become precarious after the cancellation by NASA of the Shuttle mission to service and upgrade the HST in January 2004 and the failure of STIS in summer 2004.

In addition, the European Space Agency has invited the community to participate in a *Call for Themes for Cosmic Vision 2015-2025,* to assist in developing the future plans of the Cosmic Vision programme of the ESA Directorate of Science.

For these reasons, the NUVA board has agreed to accelerate the original work plan. The draft of the science case (which has been initiated in the Madrid Meeting) will be published before May 2005 and the International Conference on UV astronomy will be advanced from June 2007 to summer 2006. In turn, this requires that the financial support for the organization of this conference (included in the original application) is advanced to the next 18 months.

WP3: High Time Resolution Astrophysics

The international conference needed to produce the main deliverable, a book on HTRA, is now planned for the first half of 2006. A planning meeting for this conference will be held in late 2005.

WP4: Astrophysical Virtual Observatory

The European Virtual Observatory (**EURO-VO**) project is an integrated and coordinated program of work designed to provide the European astronomical community with the data access, research tools and systems, research support, data interoperability standards, data-flow practices and data centre coordination, necessary to enable the exploration of the digital, multi-wavelength universe resident in European and international astronomical and astrophysical data archives. EURO-VO will act as a natural hub for coordination and integration of the new, GRID-enabled, VO research infrastructure that will be essential to the success of future large European community programs in astronomy (e.g. ALMA, OWL, SKA and Planck).

The EURO-VO will consist of three new organizational structures which will meet the objectives of the total work program and which will provide a platform for a long term European VO research infrastructure and capability. These are:

- **The EURO-VO Data Centre Alliance (DCA)**: a collaborative and operational network of European data centres who, by the uptake of new VO technologies and standards, will publish data, metadata and services to the EURO-VO and who will provide a research infrastructure through the adoption and application of GRID-enabled processing and storage facilities.
- **The EURO-VO Facility Centre (VOFC):** an organization that provides the EURO-VO with a centralized registry for resources, standards and certification mechanisms as well as community support for VO technology take-up, VO dissemination and scientific program support using VO technologies and resources.
- **The EURO-VO Technology Centre (VOTC):** a distributed organization that coordinates a set of research and development projects on the advancement of VO technology, systems and tools in response to scientific and community program needs.

Funding has been secured via a successful FP6 proposal to initiate the work of the EURO-VO Technology Centre (VOTECH Project: FP6-2003 Infrastructures-4 011892 http://eurovotech.org/). Proposals in 2003/2004 to initiate the work of the DCA and VOFC aspects of EURO-VO were not successful. Support from OPTICON in 2004/2005 is providing vital funding to initiate DCA and VOFC activities (e.g. initial team meetings) while new proposals are being prepared. The continuation of this support in 2005 is essential since new proposals to FP6 will not result in funding until late 2005 or early 2006.

One highlight for the EURO-VO in 2005 will be an international workshop on VO technologies and standards explicitly designed for data centres and large projects to acquire the knowledge and experience necessary to allow them to become "publishers" in the VO. (see http://www.euro-vo.org). In tutorials and lectures, participants will be instructed in the use of VO analysis tools, libraries and the existing web service infrastructure to build VO compliant services. Participants will be familiarized with new methods of data discovery, data access and data fusion. Funds from OPTICON will support this workshop. The workshop is part of an international strategy adopted by the EURO-VO as part of the International Virtual Observatory Alliance (IVOA, http://www.ivoa.net). The IVOA roadmap highlights 2005 as an important year of transition along the road to an operational international Virtual Observatory. The work of the VO projects will move from technology and standards definition to technology take-up. Data centres and large projects can now employ the emerging VO standards to publish their data products within the VO. Through the uptake of VO standards and technologies and the creation of registries of resources and holdings, a network of VO-compliant data centres and projects will evolve that will constitute the international VO.

WP5: Key Technologies Working Group

Preliminary conclusions in relation to detectors, adaptive optics, cryogenics and general instrument aspects have been posted on the TWIKI open web-site. The roadmap itself will be generated using Strateva software and posted on the web. This has been used to guide the KTN plan for workshops to be held during the next 18 months to be led by Core team members. This will include the following workshops:

- on the facilities that will be required to support technology development
- on NIR IR detector arrays
- on deformable mirrors
- on the optical components supply chain
- industrial forum

The next 18 month will also build on the relationships built with the JRA teams. The KTN will achieve this by:

- Beginning the establishment of a test and facilities database available in JRA participant organisation.
- Encouraging JRA team members to contribute to instrument and systems requirements developed on the Twiki
- Holding yearly meeting of JRA chairs – probably at the OPTICON board meetings
- Encouraging JRAs develop technology roadmaps for their specialist areas to be posted on the TWIKI
- Inviting JRA chairs to the roadmapping workshops

To promote improve interaction with industry, following on a request at the last KTN meeting there will be a preview undertaken of industrial support capabilities , and an industry workshop held, probably at ESO.

WP6: Future Software

Work on the first draft version of high-level requirements will be continued. A face-to-face meeting in June 2005 is planned for the final discussion.
After the general agreement on the architectural concept, high-level design will be started in collaboration with groups interested in prototyping (e.g. SAMPO, NRAO, Starlink). First issues such as parameter model and simple component interfaces will be considered in a meeting associated to ADASS 2005 in Madrid.
As a precursor to Milestone M3 (Draft interface specifications), a new Milestone M3a has been inserted to outline architecture and high-level design of the environment. This will be discussed at a face-to-face meeting in the spring 2006.

List of Milestones and Deliverables scheduled:

Workpackage	Milestones/ Deliverables	Project Month	Description
1	M1	23	ELT science meeting (IAU Symposium)
1	D2	30	Science case document
2	D1	18	Roadmap for UV astronomy in Europe
2	D2	18	UV astronomy website
2	M1	30	International conference on UV astrophysics
3	M4a	21	Planning meeting + announce HTRA conference
3	M4b	30	HTRA conference (was 1st 18mo plan M4)
4	M1	18	Euro-VO Workshop
5.1	M1	18	Circulate Technology Roadmap
5.2	M3	18	Hold Industry Workshop
5.1	D1	24	Progress Report
5.1	D2	30	Technology Report
6	M2	21	Draft requirements
6	M3a (new)	30	Draft architecture

1.4 NA4: Synergy in space-ground coordination

Following the restructuring of this activity the teams set up to accomplish the two newly identified workpackages will meet in Paris on February 24 and 25. At this meeting a more detailed plan for the next 18 months will be developed

1.5 NA5: Interferometry

WP 1: Fizeau exchange visitors programme
Three calls are planned for the exchange programme. Additional efforts will be spend to publicise the planned deadline by the distribution of a poster.
In the following 18 months there are three scheduled deadlines for the FEVP: 15 March (2005A), 15 September (2005B), and 15 March 2006 (2006A).

WP 2: Working groups
At least two meetings of the Scientific Council have already been planned to make critical decisions in the programme of the network and the associated joint research activity.
8 April 2005, Garching, Germany
9 September 2005, Prague, Czech Republic

The Radiative Transfer group and the Stellar Atmospheres working group will come together at least once in 2005, and once in 2006 to discuss progress and enhance the networking activities.

WP 3: Next-generation interferometric infrastructure
After the successful meeting on the science case of a next-generation interferometric facility, in 2005 this sequence will be continued with a focus on the technology roadmap for a next-generation interferometric facility. This meeting will be integrated into the yearly JENAM meeting, which will take place in Liège (Belgium) in July 2005.

Milestones and Deliverables

Work - package	Milestones/ Deliverables	Project Month	Description
1	M2	15	Deadline FEVP 2005A
1	M4	16	List of accepted candidates 2005A
1	M2	21	Deadline FEVP 2005B
1	M4	22	List of accepted candidates 2005B
1	M2	27	Deadline FEVP 2006A
1	M4	28	List of accepted candidates 2006A
2	M4 (new)	16	Working group “Science Council” on instrument selection, Garching
2	D2 (new)	17	Minutes of meeting
2	M5 (new)	21	Working group “Science Council”, Prague
2	D3 (new)	22	Minutes of meeting
2	M6 (new)	18	Working group “Radiative transfer”
2	D4 (new)	19	Report from working group
2	M7 (new)	24	Working group “Stellar atmospheres”
2	D5 (new)	25	Report from working group
3	M4 (new)	13	Establish SOC for study group “Technology Roadmap for Future Interferometric Facilities”
3	M5 (new)	14	Invite speakers for “Technology Roadmap for Future Interferometric Facilities” session at JENAM2005
3	M6 (new)	15	Final agenda for Technology Roadmap for Future Interferometric Facilities session
3	M7 (new)	16	Web-site on Technology Roadmap for Future Interferometric Facilities

3	M8 (new)	19	Session on Technology Roadmap for Future Interferometric Facilities, JENAM2005
3	D2 (new)	22	Report on Technology Roadmap for Future Interferometric Facilities session

1.6 NA6: OPTICON Telescopes network

WP1: Telescope Director's Forum

The telescope directors will have a further meeting in the autumn of 2005 if possible at a location to be determined. This location will be chosen to be co-incident with a major meeting of central European astronomers (for example a national or regional meeting) in order to increase the visibility of OPTICON to these communities.

A sub-committee of the director's forum will convene at appropriate times to review the operation of the newly commissioned Aristarchos and Liverpool telescopes with a view to incorportating them into the trans-national access programme. The schedule of these meeting will depend on progress with these telescopes but the first is expected in the late summer of 2005.

A sub-committee of the directors forum will meet to carry out a review of the operation of the access programme office after the contract has been in force for 18 months. This review will take place between month 6 and 9 of this period, (months 18-21 of the contract) and will report to the next meeting of the directors.

The forum will organise an independent review of the access programme to consider, inter alia, the balance of the user groups being supported and the status of the individual telescopes in the network. This review may take place after this forward look period but will have to be arranged in the next 18 months.

WP2: Operation of the Trans-national Access Office

The Access office will assist in the assessment of the qualifying telescope time awarded and the consequent user fees due to the telescopes.

This office will perform the tasks defined by the Telescope Directors' Forum in support of the access programme (Activity NA6: OPTICON Telescope network). Its plan for the next 18 months also includes the following special activities:

- Special efforts will be made to enhance the participation of new users, young researchers, users from Central and Eastern Europe, and users from countries with no similar research infrastructures. New promotional material will be produced and widely distributed among the international scientific community.

- The different procedures regarding Time Allocation Committees and systems to allocate observing time under the OPTICON contract will be analysed in order to study complementarities and duplications. A document on this analysis will be produced for discussion.

- Scientific output from the access provided under this contract will be closely compiled and monitored. Special measures will be carried out to achieve this objective.

- All applicants (not just successful ones) will receive complete feedback informing

about this programme (reasons for rejection, criteria of eligibility, etc.).

Participants

The Trans-national Access Office will be operated from the Instituto de Astrofisica de Canarias, IAC. The following table shows, in person months, the total effort needed to carry out the running of this Office for the next 18 months.

Laboratory	WP2	Total Effort (person/month)
IAC	36	36

WP3: Enhancement

A plenary meeting of the Enhancement Working Group will take place in spring 2005. It will define the scope of activities in the coming four years, and define specific actions to be undertaken during that period. Beyond the activities already under way, special emphasis is to be given to the needs in instrumentational astronomy (ground or space) and in specific observational techniques like 3D spectroscopy or interferometry.

In support of already existing enhancement activities (like those taking place at astronomical telescopes), the required expertise will be analysed and experts sent to these events (typically 5 to 6 per year). The activity will be monitored in small, yearly interim meetings.

The particular needs of countries in central and eastern Europe will be analysed during specific visits, organised jointly with the local astronomical authorities and the Opticon Telescope Director's forum.

Expected outcomes and deliverables

Work - package	**Milestones/ Deliverables**	**Project Month**	**Description**
1	M2	22	Annual Directors Meeting
1	M3A /B (new)	21	Peer review of Aristarchos and Liverpool Telescopes
1	M4 (new)	21	Review of Access office
1	M5 (new)	22	Plan for mid term review of the Access Programme
2	D1 (new)	21	Among other promotional material an audiovisual of the Programme will be produced and distributed.
2	D2 (new)	21	Document summarising the pros and the cons of a common time selection procedure.
2	D3 (new)	18	Set up a section from our web page with information about publications, press released and participation in conferences.
3	M1 (new)	3	Working Group Meeting

1.7 JRA1: Adaptive Optics

WP 1: Coordination of JRA1

The JRA1 General meeting 2 will be organised in July 8th and 9th 2005. The JRA1 web page will be updated with the documentation produced by the JRA1 partners. Regular teleconferences between the principal work package managers will be held to ensure progress and coordination between the packages. The interim 12 months report will be prepared and will include detailed work plans for the ensuing period.

WP 2: System design

WP2.1: XAO system Study

In the next 18 months, one of the two VLT XAO concepts will be selected by ESO and will be further developed. Remaining design trade-offs will be pursued. The design of the selected VLT XAO system will start.

WP2.2: GLAO System Study

The two GLAO concepts (GALACSI and HAWK-I-AO), the multi Laser Guide Star system and the results of the VLT Adaptive Secondary conceptual design study (WP 3.5) will be merged to a so-called VLT multi LGS GLAO telescope facility. The design of this facility will be performed and will be reviewed (**deliverable D1**). Following the design review a recommendation for the development of this facility will be provided.

NOVA will pursue the design of the Adaptive secondary simulator for GALACSI (ASSIST) and will manage the interfaces between GALACSI and MUSE. NOVA in collaboration with ESO will also develop original control algorithms for GALACSI.

In Parallel, INSU-Paris will continue the feasibility study of the NGS MCAO system based on the FALCON concept (**Milestone M2**)

WP2.3: Multi-Object WFS for GTC

The feasibility study of the wavefront sensor prototype for GTC will be completed and its design will start.

WP2.4: Multiple FOV System with NGS

Within the next 18 month a Call for Tender for the Ground Layer WFS opto-mechanics will be launched and the contract for its manufacturing will be placed by mid 2005 and the delivery is planned 1st quarter 2006. The Mid-High Layer wavefront sensor opto-mechanics is already ordered and parts of it will be received by November 2005 (+T11). INAF-Arcetri and MPIA will start the whole integration.

WP 3: ENABLING TECHNOLOGY FOR 2nd GENERATION/ELT AO SYSTEM

WP3.1: 2nd Generation RTC Platform

In the next 18 months we will complete the overall conceptual design with a comprehensive document encompassing all AO applications in one common design with the already produced concepts obtainable as a specialization of a common architecture. The Durham application will be presented with a separate set of documents but structurally included in the general concept. The various Top level requirements will also be gathered in one document (**milestone M1 of WP 3.1**)

ESO will also complete the benchmarking activities with tests of all the foreseen configurations from all relevant points of view (computational power, communication throughput and latency between CPUs, between boards, between devices). Durham will benchmark the FPGA card.

ESO will move the prototype software a step further from a framework prototype to an application prototype to start verifying the net performance with a limited number of boards at the beginning (one) up to the full set of available boards. Durham will produce a first prototype version of the FPGA application with a temporary interface and later a second prototype with the final interface, together with a test report.

We will continue to procure the remaining hardware.

We will define the interface with the input device, the sensor (work already in progress).

WP3.2: ***Optimal Control Methods for MCAO Systems***

In the next period, the theoretical study of an optimal MCAO control will be completed and the document specified at milestone **M1** will be produced. The implementation of one optimal MCAO control on the Adaptive Optics bench at ONERA will start and two intermediate progress reports will be produced. In parallel the specification of the Optimal MCAO control for the ESO MCAO demonstrator will be prepared.

In parallel the theoretical study of the high performance wavefront sensor for MCAO will be pursued. Numerical simulation for the wavefront sensor key issues to be validated on MAD will be performed. Data obtained from MAD Ground Layer Adaptive Optics mode will be analyzed. The numerical simulations and the MAD GLAO data analysis will be will be summarized in a dedicated report (new deliverable).

WP3.3: 2nd Generation Piezo DM

In the next 18-months the procurement contract will be signed with the selected industrial partner, the design will be conducted and a design review will be organized in Q3 2005. After this design review the manufacturing of the 1370 actuator piezo deformable mirror will start with a progress report in Q1 2006.

WP3.4: 2nd Generation Piezo DM drive Electronic

In the next 18 months, ESO will finalise the technical specifications of the piezo DM drive Electronic based on the piezo DM design information provided in WP 3.3. A Call for Tender will be issued and contract will be signed with the selected supplier. The design of the drive electronics will be developed.

WP3.5: VLT Adaptive Secondary

In the next 18 months, the feasibility and conceptual design report of the VLT Adaptive Secondary will be completed and a design review will be organised in July 2005 (**M1 of WP 3.5).** A full VLT Adaptive Telescope design review will be conducted Q4 2005. If the two design reviews are successful the preliminary design of the VLT Adaptive secondary will be pursued.

WP3.6 Manufacturing and Demonstration of a large convex glass shell

In the next 18 months, the procurement of the Zerodur blank will be launched by ESO. The specification of the thin shell will be finalised. The Call for Tender for the manufacturing of the thin shell will be issued and contract signed with the selected supplier. The report of the active Optics manufacturing process will be delivered (**M1 of WP 3.6**).

After signature of the contract, a manufacturing process and test set-up study report is planned to be prepared.

WP3.7 2k Actuator & low order Micro-Deformable Mirrors (MDM) R&D

In the next 18 months, the 2k MDM contract will be signed, and a preliminary design review will be conducted in October 2005. Preliminary contacts with MEMS manufacturers tell us that recent technological progress should help us to get a first prototype in 2007 as planned. On the other hand, the quick progress made on the magnetic prototype will also allow us to put more manpower and money on the MEMS prototype. The delivery of the 2nd generation magnetic mirror prototype is still planned in October 2005.

WP3.8 High Order wavefront sensor experimental study

In the next 18 months, ESO will complete the design and will prepare the corresponding report (**milestone M2**). The procurement of the remaining hardware will be done and the setup of the bench will be performed by ESO. In parallel INAF-Arcetri will build the pyramid WFS and Durham will build the Shack Hartmann WFS. The drive electronic of the Boston Micro-machine deformable mirror will potentially be provided by INSU-LAOG.

Deliverables and Milestones:

Workpackage	Milestones/ Deliverables	Project Month	Description
1	M1	19	JRA1 General Meeting 2
1	M2	28	JRA1 General Meeting 3
2.2	M2	24	Complete NGS MCAO feasibility study based on FALCON concept
2.2	D1	27	Final design of the VLT multi-LGS GLAO facility
2.4	M1	21	Feasibility study of the GTC wavefront sensor prototype
3.1	M1	18	Complete conceptual design of the new Real Time Computer platform for the 2nd generation of AO system
3.1	M2	30	Complete development of the Real Time Computer Platform and performance testing
3.2	M1	18	Complete theoretical study of the optimal control for MCAO systems
3.2	M2	27	Implementation of the optimal control methods developed above on a simplified laboratory system and performance evaluation.
3.3	D1	21	Design report of a 1370 actuator piezo stack deformable mirror.
3.4	M1	30	Complete design of fast drive control electronics for the piezo stack deformable mirror developed above.
3.5	M1	20	VLT Adaptive secondary conceptual design report
3.6	M1	18	Complete feasibility study of a ~1m glass thin shell for an adaptive secondary
3.7	M1	19	Specifications of a 2k actuator micro deformable mirror prototype; contract signature
3.7	M2	24	Preliminary design of a 2k actuator micro deformable mirror prototype
3.7	M3	30	Delivery of a MDM control electronic prototype
3.8	M2	18	Complete design of a high order wavefront sensor test bench

1.8 JRA2: Fast Optical Detectors for AO

As already mentioned, the activity is delayed because of the late signature of the OPTICON contract and an under-estimation of the time to complete the detector call for tender and sign the contract with the manufacturer.

A delay of 6 months is expected for the total duration of the JRA2.

The following subcontract modification is necessary for the execution of JRA2. The final cost of this subcontract will be known when the final contract between ESO and E2V is signed (beginning of 2005). ESO will cover the extra-cost of this subcontract in addition to the expected OPTICON contribution.

WP	Description of the subcontracted item	Estimated cost (€)
2	Contract for detector construction to specification	1115000
	Expected Opticon contribution	700000
	ESO contribution	415000
	TOTAL	1115000

In the next 18 months period, the following activities are planned:

- WP1: management

Two general meetings are planned during this period, one will be held at IAC in the first 6 months of year 2005. The JRA2 will also be represented at the next OPTICON board meeting in 2005.

- WP2: detector procurement

The work plan for the next 18 months will involve monitoring the progress of the design, development and supply of the detector. Kick-off of the detector manufacturing (To) is expected to be end of February 2005. The detector development schedule is shown in **Table 1**. Two meetings with E2V are proposed; one at kick-off and one for the critical design review.

Table 1: Detector development milestones

Milestones	**Date (months)**
Finalize contract and kick-off (To)	To
Detector Design Review Test Equipment Design Review	To + 5
Delivery of Electrical sample for Controller Development OPTICON provides preliminary Test Equipment User's Manual	To + 12
OPTICON delivers Test Equipment	To + 15
Delivery of 4 Mechanical samples	To + 16
Delivery of 4 Electrical grades	To + 18
Delivery of 4 Engineering grades	To + 19
Delivery of 4 Science grades	To + 20
Development Phase Complete - Close Off meeting and return of ESO supplied Test Equipment	To + 21

- WP3: controller

The controller is now in the design phase. Selection of the main components has been done leading to the more detailed concept. Simulations of the digital concept are underway. Preliminary analog simulations based on early data of the chips are also underway. The controller should be finished by end of 2005 (best effort basis) and be shipped to E2V in order to be used for the detector tests at the factory. In addition to the fact that this solution will save funding, we will have the huge advantage of using the same controller at the E2V factory and during the detector tests by the OPTICON partners. This will guarantee that the measured performances will be the same in both cases.

- WP4: cryogenic system

The task of this work-package is simplified by the fact that the detector will be likely cooled by a 2-stage Peltier package provided by the manufacturer E2V. This solution will be more robust for the future. An overall package of the detector and its Peltier cooler still has to be integrated with the controller. Since the electrical cables between the controller and the detector have to be very short in this application (a few cm), the cryogenic system will be designed taking into account all the mechanical interfaces of the controller and the detector, in order to have a very compact design including all the sub-components. Inputs from instruments like the ESO Planet Finder will also be taken into account, because this kind of instruments is foreseen to use the results of the JRA2 activity in the very near future. Although this work-package has not yet started, this has no impact on the overall schedule because this task will take less time than the other ones. This work-package will have strong interactions with the WP2 and WP3. This task can start only after having enough information from the detector manufacturing: mechanical interfaces have to be provided by E2V. This can be done only after the contract signature with the manufacturer.

- WP5: detector test

Although this work-package has not formally started, the detector test activity is now being discussed inside the JRA2. From the beginning, IAC has been involved in the JRA2 discussions and the detector test plan will be discussed at the next JRA2 general meeting.

Milestones and Deliverables:

Work package	**Milestones/ Deliverables**	**Project Month**	**Description**
2	M3	18	Concept design review to agree the specification.
2	M4	18	Detailed design review of the detector.
3	M3A	30	Delivery of detector controller.
3	M3B	30	Complete controller test.
3	D1	30	Controller acceptance report.
4	M1	18	Complete cryogenic system design
4	M2	30	Cryogenic system acceptance.

1.9 JRA3: Fast detectors for astronomy

Delayed funding required individual developments to go ahead using internal funds which were available in different amounts for the various subactivities. This caused considerable phase-delay of the different workpackages (and within workpackages involving different teams). In order to ensure progress the latter was considered acceptable. WP1 will be involved with phasing-up different activities during year 2.

WP2: EMCCD developments

The functional and performance requirements will be completed at the start of the period, and will be used as the basis to select which of the above chips to procure for both imaging and spectroscopic HTRA applications. It is proposed that science and engineering-grade devices will be purchased from each of the two manufacturers in order to allow their chips to be characterised and optimised alongside each other. In this way, issues such as the level of clock-induced charge inherent to each device, which will be a critical parameter for HTRA applications, can be assessed. In view of progress in year 1, changes and additions to the list of milestones are foreseen.

WP3: PN Sensor developments

The updated implementation plans for OPTICON contract months 13 through 30 comprise implementation of the chip development plan. This will involve a subcontract as described above, for production of a V-1 chip. Project management at MPE in will be needed in connection with the subcontract. The role of this management effort is to ensure that at all stages of development and testing opportunities within the pn sensor technology are identified and exploited to maximize the performance for application in high time resolution astronomy. This will involve the work of 1 full time employee.

Changes in the implementation plan are required in order to accommodate the results of the preliminary design study. The proposed new timeline includes milestones and deliverables for the period from OPTICON contract month 30 till end of the contract, assuming successfull subcontracting. Based on the following plan.

		2004					2005						2006				
1.	Avalanche strategies																
2.	Simulations																
3.	Definition of test plan																
4.	Test implants & analysis V-0																
5.	Technology concept																
6.	Design & layout																
7.	Fabrication of V-1																

further milestones are foreseen for the remainder of the contract period:

M6	42	tests of V-1 finished
M7	42	design of V-2 finished, production start
M8	54	PCB V-2 development completed
M9	60	data analysis and tests of V-2 completed
D2	36	V-1 sensor chip
D3	42	test report of V-1
D4	54	V-2 sensor chip
D5	60	test report on V-2

WP4 : APD array development

The tasks for the next 18 months will continue with the development of a fibre APD array and the development of an IC APD array. Work is continuing within the National Microelectronics Research Centre (Tyndall Institute) and University of Cork on the development of APD devices.

With regards to the fibre APD array, initial tasks will concentrate on further testing of the active quench circuit with the thermo electric cooler. The active quench circuit together with the APDs will then be fully characterised. Design of the fibre bundles and attachment to the APDs will be followed by the construction of a test module. The project will then focus on the design, characterisation of an IC APD array and relevant circuitry, together with a laboratory test. Modifications and additions to the list of milestones are required:

WP5: Controller Development

The high-speed controller development will proceed at Cambridge, though probably at a reduced rate over the following 18 months, building on the work already carried out, and allowing the controller to make the transition from working prototype to a fully tested and characterized system. In addition, the UK ATC/Sheffield collaboration will redesign, manufacture and test a second and final version of the high-voltage clock driver board for the SDSU3 controller.

WP6: Common Software Development

The design and development described above will be the core of our common software development activity over the next 18 months. We also plan to transfer a significant part of the allocation to NOTSA under this heading so that this work can be most efficiently managed in Cambridge. It would be premature to hold M6.1 until the new software engineer has had a chance to review what hardware and software solutions are likely to be suitable in a general sense. As a result all milestones will be delayed by about 9 months.

WP7: Cooled Camera Head Development

We will continue with the testing and refinement of the new way of limiting track lengths for high speed controllers as described above during the next 18 month period. In particular we need to look more carefully at the heat dissipated by these devices when operated at high speed. This will complicate the thermal control of these devices in general use, and probably require that they are continually clocked out.

WP8: Common Instrument Testbed

The preliminary design of a common instrument testbed (M1) will be reiterated based on the progress in Work-packages 2,3,4,5, and 7.

WP1: Management
Milestones and Deliverables:

WP	Milestone/ deliverable	Project Month	Description
1	M2	14	Preliminary design concepts for all hardware
1	M3	18	Preliminary design concepts for all software
1	M4	21	Preliminary design concepts for all interfaces sw/hw
2	M1	15	Specification of EMCCD to be procured fixed
2	M2	21	CCD chip procurement
2	M4	24	Integration of EMCCD camera
2	M5	27	Laboratory characterisation of EMCCDs
2	M6	33	On-sky characterisation of EMCCDs
3	M2	18	Subcontract placement
3	M3	24	Technology concept for V-1 production run
3	M4	30	V-1 production start
3	M5	36	V-1 finished
4	M1	12	Image dissector technology for APD array chosen
4	M2	21	APD fibre array
4	M3	30	IC APD array
4	D1	30	AIT APD
5	M3	18	Interface with higher level common software defined
5	D1	12	Delivery of Fast timing controller for L3CCD
5	D2	24	Delivery of fast timing PN sensor.
6	M1	15	Common software design meeting
6	M2	21	Software requirements and implementation plan review
8	M2	18	Design meeting of common instrument testbed.

1.10 JRA4: Integrating optical interferometry into mainstream astronomy

The implementation plan for the next 18 months will be performed according to the milestones and deliverables listed below. Management will continue on the same basis. An important milestone for all work packages is the ESO/EII common workshop that will be held in Garching in April 2005.

WP1.1: At the end of the ESO/EII workshop the EII Scientific Council will make an evaluation of WP1.1 concept reports. Just after this phase, up to 3 projects will be selected for feasibility studies.

WP1.2: Two new deliverables: 1st and 2nd Progress Reports on CFT, have been added.

WP2: Will provide as planned the User Requirements and the Software Design Description.

Milestones and Deliverables:

Work Package	Milestone/Deliverable	Project Month	Description
All	M1	16	ESO/JRA4 common workshop
1.1	D2	16	Instrument Concept Reports
1.1	D3	16	List of contributors to feasibility studies
1.1	M2	30	Feasibility Studies Review
1.1	D4	30	Instrument Feasibility Reports
1.2	D2	18	1st Progress Report on CFT (new deliverable)
1.2	D3	30	2nd Progress Report on CFT (new deliverable)
2.2 + 2.3	M2	24	Final Design Review
2.2 +2.3	D2	24	Software Design Description
2.4	D1	18	List of contributors
2.4 + 2.5	M2	30	Final Design Review
2.4 + 2.5	D2	30	Software Design Description

1.11 JRA5: Smart Focal Planes

Phase A

WP 1.0 Management, systems design and systems engineering

Continue to ensure the JRA meets its goals, within financial and time constraints. Enable clear communications between teams and to the OPTICON management team. Facilitate an open process for deciding which technologies to progress.

Fix requirements and specifications to provide realistic and measurable goals for technology studies. Develop and evaluate concepts for future instruments using Smart Focal Planes. Evaluate technology requirements and challenges which are common to many of the Smart Focal Plane devices, such as metrology, cryogenic mechanism reliability, position sensing and actuation.

WP 2.1 Image slicers:

The special requirements for image slicers on ELT instruments such as MOMSI are their size and their number. Diffraction limited sampling requires very small components while keeping the fill factor of the slicing mirror up and the numbers of IFUs desired to utilize the whole FOV of an ELT is between several tens and one hundred. This work package will progress until the end of June 05 through 4 subpackages. These are: the replication of slicers from aluminium mandrels, the replication of slicers from glass mandrels, the fabrication of slicers with ultra-thin slices (<0.5 mm), and the design of a miniature replicable IFU. A trade-off study will then be undertaken to determine which technology to take forward to prototyping in WP 6.1.

WP 2.2 Small Field Sampling Devices (Beam manipulation)

The objective of this work-package is to evaluate theoretically and experimentally candidate technology for cryogenic field sampling with greater than 100 fields in the focal plane. This work package has 4 sub-packages, the field sampling transport mechanism, the the field sampling payload, relay optics and metrology. The principle approaches will continue to be examined until the end of June 04 for the field transport mechanism. They are the free-roving robotic system, termed ‘Starbug’, the use of pick-and-place robotic arms, and the use of magnetic levitation free-roving transports. Miniature mechanisms for payloads will continue to be studied to include mirror tilt mechanisms, lens focus mechanisms and miniature adaptive mirrors. Relay optics will be examined to ensure appropriate path length compensation. Metrology requirements for all systems will be addressed.

WP 3.1 Fibre Systems:

This work package will continue with activities begun in the first 12 months of the contract. The study of new ways to manufacture high quality fibre-based IFUs for the wavelength range 0.35 - 2.5 microns will be completed. Recommendations shall be made as to the technologies require for further miniaturisation of fibre IFUs as this has been identified as important during initial system studies. Infrared fibre core material suitable for cryogenic application will be identified and the limitations/opportunities that this presents for future NIR instruments described.

WP 3.2 Reconfigurable Slits and Masks:

The subworkpackage on linear sliders will continue with tests of potential solutions on friction and accuracy, the design build and test of a sliding prototype without actuator, tests of the most promising actuators, and the combination of the slide bearing prototype with the actuator.

There will be work on the definition of a technical requirements for a next generation Multi-object spectrograph based on ELT(WFSPEC) along with those proposed for current 10m class telescopes. This will involve an expansion of the definition of the scientific goals and systems specifications, but will focus on alternative concepts such as transposing the appropriate areas of the focal plane to the slit mechanism.

WP 3.3 MOEMs :

The development of a model of a Multi-object Spectrograph equipped with a MOEMS-based slit mask will continue in order to include all parameters taken into account in our characterization bench. Comparison between the operational tests and our model will permit the optimisation of our prototypes design, as well as understanding the possible performances of such a MOS instrument. Evaluation on the impact for an ELT instrument is also foreseen. Along with a detailed design of a MOEMS-based slit mask prototype, a cryo-test plan will be completed as well as the requirements for a test facility to be undertaken in Phase B.

Phase B

WP 4.0 Trade off Study

Evaluate the technologies against the science and functional requirements. Carry out risk analysis and cost estimates. Choose technologies to prototype. Identify requirements for future developments of other technologies.
Review technology options to agree most productive technologies to progress in Phase B.

WP 5.0 Management and Systems Engineering

Continuation of Phase A, with specific emphasis on roadmapping. Continuation of evaluation of risks and challenges in the provision of enabling technologies, including identifying routes for further development, culminating in a report which details the way forward to multi-object and multiple field spectroscopy with Extremely Large Telescopes and current facilities.

WP 6.1 Prototype IFU

Replication experiments being conducted in aluminium will be concluded with metrology of the test mandrel under one-off and multiple use conditions, as well as the replication of a stand-along pupil mirror. These tests will phased ahead of similar tests for glass mandrels. A survey will be undertaken on the capability of optical fabrication of 0.3 mm thick glass slices. An IFU will be designed and fabricated using the technology deemed most appropriate as a result of the replication studies.

WP 6.2 Sparse field selection transport prototype

Following on from the trade-off study a preferred, and possibly a secondary, option for sparse field selection will be chosen for prototyping. If the autonomous 'star-bugs' concept is selected as the primary option then the sub-packages of work will include The Command and Control System for Star-bugs, Wireless Control, Low Temperature Operation and Testing, Metrology for Submicron Positioning and Microstepping.

WP 6.3 Sparse field selection optical payload and relay optics prototypes

This work package will result in the development of prototypes of the optical elements, supports and actuator control mechanisms required for the optical chain between field selection and the IFU. The challenge for the field selection optics is to be very small to enable maximum clustering of the selected fields, but the optic must be controllable very precisely to maintain a diffraction limited image at the IFU over a long period. Control of the optic during observation may be required to compensate for variable atmospheric dispersion. Adaptive optics may be taken to prototype stage dependent upon phase A studies.

WP 6.4 MOS technology prototype (MOEMS/Reconfigurable Slits/Fibres)

Following on from the MOS systems studies and technology developments undertaken during Phase A, the trade-off study will determine the level of further activity in Phase B in relation to Fibres and Reconfigurable Slits. MOEMs will be taken forward, and a first demonstrator of a MOEMs based slit mask will be realized. This will be based on a micro-mirror rather than a micro-shutter approach. Simulate of the operation of a multi-object spectrograph will be undertaken, taking into account several parameters, in particular relative location and differential intensity of the sources. Optimization should enable most of an instrument's requirement to be achieved during this phase.

Milestones and Deliverables:

Work package	Deliverables Milestones	Project Month	Description
1	D1	18	Six monthly progress reports
1	D2	15	Smart Focal Planes instrument concepts & requirements document
1	D3	20	Phase A report, including Roadmap
2.1	D1	17	Report on image slicer technology and manufacturing
2.1	M1	17	Smooth image slicer optics test pieces made
2.1	M2	17	Transmissive devices test pieces made
2.2	D1	21	Report on beam manipulator technologies and manufacturing
2.2	M2	15	Pre-Prototype pick-off mechanism made
2.2	M3	18	Prototypes of key beam steering elements made
3.1	D1	14	Report on new ways to manufacture fibre-based IFUs for the wavelength range 0.35 - 2.5 microns
3.1	D2	17	Report on fibre materials and fibre IFUs for multi-object applications
3.2	D1	15	Report on concepts, technology and materials for Cryo mechanisms for actuators and linear slides
3.2	D2	15	Report on slit configuration technologies and manufacturing
3.3	D2	15	Development plan for Cryogenic MOEMS test facility
4	D1	20	Report on Trade-offs and recommendations for Phase B
5	D1	24	Six monthly progress reports
5	D2	30	Phase B report
6.1	D1	22	Design of replicable small IFU
6.1	M1a (new)	30	Prototype of replicable small IFU
6.2	D1a (new)	22	Design of scalable field selection device
6.2	M1b (new)	30	Prototype of scalable field selection device
6.3	D1b (new)	24	Design of beam manipulator (possibly a path length compensator)
6.3	M1c (new)	30	Prototype of beam manipulator (possibly a path length compensator)
6.4	D1c (new)	20	MOEMs prototype development plan

1.12 JRA6: Volume Phase Holographic Gratings

During the activity carried out in the last reporting period no need has emerged for major changes in the work package's activity nor in the distribution of milestones and deliverables. The plan for the activity in the next 18 months will then follow the overall plan presented in annex I of the contract. An extract of the milestones and deliverable list from Contract Annex I and the timeline for their achievement are reported in the following 2 tables:

The most important milestones of the next period, coinciding with the final milestone of the first 18 months detailed plan, is the analysis report of the first set of prototypes. Common to each WP this milestone represents a critical milestone for the future development of the activity. The activity following M1 has been planned assuming positive results from the first round of prototype manufacturing. Re-directing the research of some of the WP could arise around the end of the next reporting period, i.e. half way into the present 18-months plan.

WP1 will continue the activity of coordination, liason with OPTICON management and collection and dissemination of the results. At least 2 plenary meetings are foreseen in the next 18 months to compare results and decide future steps in the activity. The link with the Key Technologies Working Group (NA3.5) is also expected to be strengthened in this period in order to better focus the JRA activity with the overall aims of the OPTICON programme.

Three major milestones are defined in the research activity of WP2 and WP5. The prototype manufacturing and testing (M3), prototype analysis report (M4) and science grade device preliminary specification document (M5). These milestones and the corresponding deliverables are expected to be achieved in the original timescale (reported below).

The activity of WP2 is also organized in three milestones, although different from those of WP2 and WP5. These are: M3 prototype manufacturing and test report, M4 review of prototype critical points, M5 construction plan for the science grade prototype. These milestones and the corresponding deliverables are also expected to be achieved in the original timescale (reported below).

Due to its peculiarity WP4 will follow a different path characterized by only 2 milestones: M3 prototype manufacturing and test report, M4 review of prototype critical points.

Milestones and Deliverables:

Workpackage	Milestones/ Deliverables	Project Month	Description
2	M3	18	Prototype Manufacturing Dossier and test report
2	M4	24	Prototype Analysis report document
2	M5	30	Science Grade device specification document
3	M3	18	Prototype Manufacturing Dossier and test report
3	M4	24	Review of Prototype Critical Points
3	M5	30	Definition of construction plan and materials trade off analysis
4	M3	18	Prototype Manufacturing Dossier and test report
4	M4	30	Review of Prototype Critical Points
5	M3	18	Prototype Manufacturing Dossier and test report
5	M4	24	Prototype Manufacturing Dossier and test report
5	M5	30	Science Grade device specification document