

	EUROPEAN COMMISSION RESEARCH AND INNOVATION DG	Periodic Report
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Project No: 312430

Project Acronym: Opticon

Project Full Name: Optical Infrared Co-ordination Network for
Astronomy

Periodic Report

Period covered: from 01/01/2013 to 31/12/2013

Start date of project: 01/01/2013

Project coordinator name:
Prof. Gerard Gilmore

Version: 1

Date of preparation: 24/03/2014

Date of submission (SESAM): 15/04/2014

Project coordinator organisation name:
THE CHANCELLOR, MASTERS AND SCHOLARS
OF THE UNIVERSITY OF CAMBRIDGE

Periodic Report

PROJECT PERIODIC REPORT

Grant Agreement number:	312430
Project acronym:	Opticon
Project title:	Optical Infrared Co-ordination Network for Astronomy
Funding Scheme:	FP7-CP-CSA-Infra
Date of latest version of Annex I against which the assessment will be made:	27/11/2012
Period number:	1st
Period covered - start date:	01/01/2013
Period covered - end date:	31/12/2013
Name of the scientific representative of the project's coordinator and organisation:	Prof. Gerard Gilmore THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE
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Declaration by the scientific representative of the project coordinator (1)

I, Prof. Gerard Gilmore THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE , as scientific representative of the coordinator of the project Opticon and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

The project has fully achieved its objectives and technical goals for the period.

The attached periodic report represents an accurate description of the work carried out in this project for this reporting period.

The public website is up to date.

To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 6) and if applicable with the certificate on financial statement.

All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 5 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name	Prof. Gerard Gilmore THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE
Date	15/04/2014

This declaration was visaed electronically by Gerard GILMORE (ECAS user name ngilmoge) on 15/04/2014

1. Publishable summary

Summary description of project context and objectives

Project context and objectives

A decade ago planning assumptions for next-generation astronomical infrastructures took for granted that older facilities would be closed in favour of newer facilities. This ‘obsolescence paradigm’ was based on two fundamental errors: first, that older facilities could not be upgraded affordably to retain cutting-edge competitiveness, and secondly, that all progress would come from the new, large facilities. However, optical-infrared telescopes are limited mostly by their instruments and the performance of astronomical detectors has been improved by orders of magnitude over the last two decades. So, “small” facilities can retain cutting-edge capabilities, especially if they are focussed onto specific niche questions or capabilities such as the execution of wide-field spectroscopic surveys to complement imaging surveys from the ground and in space.

In light of this, and catalysed by the actions of activities like ASTRONET and OPTICON, European optical-infrared astronomy is evolving from a heterogeneous collection of national 2-4m telescopes into a rational, coherent European network, with a stable long-term future delivering scientific excellence. Technical and organisational preparations for reaching this goal are already underway. Conducting the planned surveys implies the commitment to operational costs for many hundreds of nights on dedicated telescopes, displacing the other types of science currently conducted there. The logical solution is to provide access for the whole European astronomical community to the common telescope system through a single time allocation process. This requires a major cultural change and cannot happen overnight, so OPTICON is providing continued Trans-National Access to the existing 2-4m telescopes during the transition to their new scientific responsibilities and corresponding new complement of instruments. Notably, a prototype common observing proposal and time allocation procedure system has been developed and is being field tested. This TNA activity requires management of User Fees, operating an International Time Allocation Committee, maintaining a Telescope Director’s Forum and further developing and maintaining the Northstar web-based application system prototyped by OPTICON during the previous contract.

In parallel the decision to construct the European Extremely Large Telescope (E-ELT) while maintaining a suite of smaller telescopes will consolidate European global leadership in optical-infrared astronomy for a decade or more. Large European consortia are being assembled to construct the necessary advanced instruments for all these telescopes while other consortia are embarking on the construction of the first generation of the even larger instruments needed for the E-ELT. Cutting-edge technology must continue to be developed over the next decade to ensure that future instruments are as good as they can be. So OPTICON is co-ordinating the development of essential enabling technologies for the next generation of instruments on the existing system of European telescopes and for the even more advanced second generation instruments that will populate the E-ELT later in the next decade. This involves technology workpackages which develop detectors, which are basic to everything; adaptive optics, which is on the critical path for almost every instrument on large telescopes and for every application from cosmology to exoplanets; new potentially paradigm-changing applications of photonic systems and “smart optics” and innovative dispersive systems, applying capabilities developed in industry to astronomy and in turn delivering industrial spin-offs back to industry and society.

All of this effort will, however, be fruitless unless there exists a growing community of bright people ready and able to use these facilities. To develop these minds, especially amongst communities who

have lacked state of the art facilities for a number of years. OPTICON is nurturing and optimising a set of activities to promote European synergy in astronomy education and to revitalise once active communities through conferences and exchange visits. In keeping with modern trends in robotic telescopes OPTICON is also coordinating a distributed telescope network to respond to transient-source event alerts, notably from the ESA space mission Gaia which was launched last Christmas, and to facilitate other forms of time-domain astronomy, including asteroseismology. We are also providing long-term foresight (roadmaps) and prototyping of emerging technologies which can be derived from, or spun out to, industry. Finally, OPTICON is assisting the community to facilitate the integration of the specialised techniques of optical interferometry into the mainstream.

Description of work performed and main results

Work performed since the beginning of the project and the main results achieved so far.

All the planned activities have started save for the telescope directors' forum which has not yet had a face to face meeting.

Considerable progress has already been made by workpackage 3 in the area of astrophotonics which, in this contract, is aimed at developing technologies to revolutionise the development of infrared spectroscopic techniques for existing and future instruments. Science requirements have been drafted and the first in a series of multi-core fibres and laser inscribed photonic couplers have been manufactured. Some on sky testing has already taken place at the 4m William Herschel Telescope in the Canary Islands in collaboration with the team developing Adaptive Optics as part of workpackage 1. Some of this work was featured on UK television in a local news item. In another area of developing new tools for spectroscopy, workpackage 6 has designed and fabricated some Volume Phase Holographic Gratings which have also been deployed on a telescope, in this case the AFOSC instrument at the Asiago telescope in Italy. Such devices are expected to be several times more efficient than traditional ruled diffraction gratings. Special test facilities have been developed in order to evaluate these devices

Our workpackage 4 on image reconstruction in optical interferometry is rather different from the other JRA packages since its deliverables are software rather than hardware. Its objective is to develop a series of tools which will make it easier for specialists in the highly technical and demanding subject of long baseline optical interferometry to work more closely together, and to induct the more general astronomical community into this esoteric subject. A draft of the unified image reconstruction document has been produced and we expect to deliver the final version by the early spring of 2014. This will provide a general formalism suitable to describe all the interferometric image reconstruction algorithms considered in the project. Such an approach is useful because the proposed formalism will serve as a common basis to unify not only the inputs and outputs of the algorithms but also the underlying prior assumptions and help to identify common tools that could be shared by image reconstruction methods. These tasks are critical for the targeted end users as they will alleviate the porting of the algorithms to different platforms.

The project remains committed to the TNA process which it developed over an earlier contract and which ran successfully from 2010-2012. This brings together a number of nights from a variety of telescopes and allocates them all, strictly on the basis of scientific merit, across the suite of telescopes. The ranking is done via an international panel which includes at least one member from a community which does not provide a telescope to the network and is thus quite independent. There have been two rounds of calls for the Trans National Access in 2013 which has attracted a healthy level of over-subscription while maintaining scientific quality. Two further calls will be held in 2014. Several networking activities have already taken place, with a technology driven workshop on active

mirrors occurring as early as February 2013. Taking place in the summer was the first meeting of a new time domain astronomy network which aims, inter-alia, to co-ordinate robotic and fast response telescopes in support of the ESA Gaia space astronomy mission. This has already paid dividends with a test campaign in 2013 resulting in some immediate scientific results. Plans for a conference on high-time resolution astrophysics in the E-ELT era are already advanced and this meeting will take place in the summer of 2014.

The training activities have started well with a NEON telescope training school held in La Palma, a dedicated conference on hot topics in astronomy held in Bucharest for the benefit of the surrounding communities and attended by 50 early stage researchers. In the field of interferometry a training school initially planned for 2014 was held in 2013 on the theme of “High angular resolution for stellar astrophysics”. This took place 9-21 September 2013 at Barcelonnette, France. The school had over 70 participants (students and lecturers) and provided an introduction to the technique of long-baseline optical/infrared interferometry and data reduction in stellar astrophysics. Longer and more focussed training in the interferometry area is provided by the Fizeau exchange programme which enables a small number of individuals to make longer visits to expert groups in order to develop their expertise. Selected by a peer review process, four calls for exchanges were issued and funding for 22 exchanges was awarded

Expected final results and potential impacts

The expected final results and their potential impact and use.

At this early stage in the contract it is premature to make statements about outcomes which by their very nature depend on the success of the activities. However the interest shown by new communities in the training programmes, and the Trans National Access activities are encouraging. One community has even asked for OPTICON TNA statistics in order to make a case to its government for greater national spending in the astronomy area.

Website

The OPTICON website can be found at the URL <http://www.astro-opticon.org/>
The page provides quick links to News items, FAQ, Contacts, Consortium members, related FP7 projects etc. It then allows access to themed pages on JRA (WP1-6), TNA (WP7) including the next call and via that page to the proposal submission software, and to networking activities (WP9-14). A meetings link provides information on planned and past events such as workshops, management board meetings and conferences. Meeting minutes, conference programmes, press releases etc can be recovered via this page.

The page is managed by the UKATC as part of its WP8 responsibility and is regularly updated when future events or news items are brought to our attention. It has been designed to conform to W3C standards and makes use of CSS style sheets for visual layout. The use of structured semantic mark-up allows the page to degrade gracefully should a user browser not support Cascading Style Sheets. The design of the site uses a fluid, table-less layout that should expand and contract to suit various browser settings including those on small mobile devices.

Project public website address:

<http://www.astro-opticon.org/>

2. Core of the report

Project objectives, Work progress and achievements, and project management during the

period

The Project Summary Pdf document contains the core of the report.

3. Deliverables and milestones tables

Deliverables (excluding the periodic and final reports)										
Del. no.	Deliverable name	Version	WP no.	Lead beneficiary	Nature	Dissemination level	Delivery date from Annex I (proj month)	Actual / Forecast delivery date	Status	Comments
1	Report on Technical Specifications for the DM developments	0.0	1	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PU	12	31/12/2013	Not submitted	
2	Efficient calibration for complex AO systems: theory, simulation & experimental results test report	0.0	1	OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES	Other	PP	36	31/12/2015	Not submitted	
3	Educational worksheets	0.0	1	UNIVERSIDADE DO PORTO	Other	PU	30	30/06/2015	Not submitted	
4	Adaptive Optics Design and Test Report	0.0	1	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Other	PP	48	31/12/2016	Not submitted	
5	Report on Natural Guide Star Experiments	0.0	1	NATIONAL UNIVERSITY OF IRELAND, GALWAY	Report	PU	48	31/12/2016	Not submitted	
1	NGSD imaging system specification and design document	1.0	2	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PP	12	31/12/2013	Submitted	
2	Natural Guide Star Imaging system design progress report	0.0	2	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PU	30	30/06/2015	Not submitted	
3	Natural Guide Star Imaging system design final report	0.0	2	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PU	48	31/12/2016	Not submitted	
1	Photonics Spectrographic	0.0	3	UNIVERSITY	Report	PP	12	31/12/2013	Not submitted	

	System (PSS) Specification			OF DURHAM					
2	System Design Document	0.0	3	LEIBNIZ-INSTITUT FUR ASTROPHYSIK POTSDAM (AIP)	Report	PP	30	30/06/2015	Not submitted
3	Photonics OH-Suppression and Coupler Development Report	0.0	3	LEIBNIZ-INSTITUT FUR ASTROPHYSIK POTSDAM (AIP)	Report	PP	48	31/12/2016	Not submitted
4	Photonic Coupler development report	0.0	3	UNIVERSITY OF BATH	Report	PP	48	31/12/2016	Not submitted
5	Networking Report	0.0	3	LEIBNIZ-INSTITUT FUR ASTROPHYSIK POTSDAM (AIP)	Report	PP	48	31/12/2016	Not submitted
1	Unified image reconstruction description and algorithm interface specifications	1.0	4	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Other	PU	12	31/12/2013	Submitted
2	Data reduction tools for Fizeau interferometry	0.0	4	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Other	PU	30	30/06/2015	Not submitted
3	Reconstruction Test Report and data processing 'cookbooks'	0.0	4	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PP	48	31/12/2016	Not submitted
1	Active Freeform Mirror preliminary report	1.0	5	STICHTING ASTRONOMISCH ONDERZOEK IN NEDERLAND	Other	PP	12	31/12/2013	Submitted
2	Actuator and Metrology Design Report	0.0	5	STICHTING ASTRONOMISCH ONDERZOEK IN NEDERLAND	Report	PP	12	31/12/2013	Not submitted
3	Active Freeform System Demonstrator	0.0	5	STICHTING ASTRONOMISCH ONDERZOEK IN NEDERLAND	Demonstrator	PP	48	31/12/2016	Not submitted

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4	Active Freeform Mirror Final Report	0.0	5	STICHTING ASTRONOMIS CH ONDERZO EK IN NEDE RLAND	Report	PU	48	31/12/2016	Not submitted
1	New Materials for Ast ronomical Instruments Tr ade-off Study Repor t	1.0	6	ISTITUTO N AZIONALE DI ASTROFISICA	Report	PU	12	31/12/2013	Submitted
2	Demonstrator Manufact uring Dossier	0.0	6	ISTITUTO N AZIONALE DI ASTROFISICA	Report	PU	30	30/06/2015	Not submitted
3	Demonstrator Final Te st Report	0.0	6	ISTITUTO N AZIONALE DI ASTROFISICA	Report	PU	48	31/12/2016	Not submitted
1	Review of TNA in 2013	1.0	7	SCIENCE AND TECHNOLOGY FACILITIES C OUNCIL	Report	PU	12	31/12/2013	Submitted
2	review of TNA in 2014 -15	0.0	7	SCIENCE AND TECHNOLOGY FACILITIES C OUNCIL	Report	PU	30	30/06/2015	Not submitted
1	Opticon Website Descri ption	1.0	8	SCIENCE AND TECHNOLOGY FACILITIES C OUNCIL	Other	PU	12	31/12/2013	Submitted
2	Period 1 Report to E C	2.0	8	THE CHANCE LLOR, MAST ERS AND SC HOLARS OF THE UNIVER SITY OF CA MBRIDGE	Report	PU	12	31/12/2013	Submitted
3	Period 2 Report to E C	0.0	8	THE CHANCE LLOR, MAST ERS AND SC HOLARS OF THE UNIVER SITY OF CA	Report	PU	30	30/06/2015	Not submitted

				MBRIDGE					
4	Final Report to EC	0.0	8	THE CHANCE LLOR, MAST ERS AND SC HOLARS OF THE UNIVER SITY OF CA MBRIDGE	Report	PU	48	31/12/2016	Not submitted
1	Technology Roadmap and Industry Club Websit e description	1.0	9	SCIENCE AND TECHNOLOGY FACILITIES C OUNCIL	Report	PU	12	31/12/2013	Submitted
2	Report of Industry Sh owcase Event	0.0	9	SCIENCE AND TECHNOLOGY FACILITIES C OUNCIL	Other	PU	30	30/06/2015	Not submitted
3	Innovation Network Fin al Report	0.0	9	SCIENCE AND TECHNOLOGY FACILITIES C OUNCIL	Report	PU	48	31/12/2016	Not submitted
1	Planning Report on ELT Instrumentation Conf er ence	1.0	10	ISTITUTO N AZIONALE DI ASTROFISICA	Report	PU	12	31/12/2013	Submitted
2	E-ELT Science Conferen ce and summer school	0.0	10	ISTITUTO N AZIONALE DI ASTROFISICA	Report	PU	48	31/12/2016	Not submitted
3	report on Data Analys is Methodologies plus Tools for E-ELT and HTRA	0.0	10	ISTITUTO N AZIONALE DI ASTROFISICA	Report	PU	48	31/12/2016	Not submitted
1	Web-based interface a nd software for homog eneous data storage a nd cali bration report	1.0	11	UNIWERSYTET WARSZAWSKI	Other	PP	12	31/12/2013	Submitted
2	Mid-term robotic tele scopes network for tra ns ients and variable s tars follow-up status report	0.0	11	UNIWERSYTET WARSZAWSKI	Other	PU	30	30/06/2015	Not submitted
3	Reports and documenta tion on developed soft wa re and other tools	0.0	11	UNIWERSYTET WARSZAWSKI	Report	PU	48	31/12/2016	Not submitted

1	Ranked list of proposals from Common Time allocation committee for period 1&2	1.0	12	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	Report	PU	12	31/12/2013	Submitted	
2	Ranked list of proposals from Common Time allocation committee for period 3,4 & 5	0.0	12	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	Report	PU	30	30/06/2015	Not submitted	
3	Ranked list of proposals from Common Time allocation committee for period 6 & 7	0.0	12	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	Report	PU	48	31/12/2016	Not submitted	
1	Report on schools and conferences in 2013	1.0	13	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PU	12	31/12/2013	Submitted	
2	Report on schools and conferences in 2014- 16	0.0	13	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Report	PU	48	31/12/2016	Not submitted	
1	Interferometry Website Description	1.0	14	UNIVERSIDADE DO PORTO	Other	PU	12	31/12/2013	Submitted	
2	Working Group "The future of Interferometry in Europe" report	0.0	14	UNIVERSIDADE DO PORTO	Report	PU	48	31/12/2016	Not submitted	

Milestones

Milestone no.	Milestone name	Work package no	Lead beneficiary	Delivery date from Annex I	Achieved Yes/No	Actual / Forecast achievement date	Comments
2	Review Astrophotonics Science Requirements and Implementation Plan	3.1	UDUR	31/07/2013	No	30/06/2014	Delayed start and availability issues
9	Survey of robotic telescopes for inclusion in network	11	UNIWARSAW	31/12/2013	Yes	30/09/2013	http://tinyurl.com/telescopesforgaia

4. Explanation of the use of the resources

The **explanation on the use of resources** was removed from the scientific periodic reports in SESAM. These details now have to be entered in the cost statement forms in FORCE instead.

5. Transnational Access DataBase

Summary of transnational access provision per installation per reporting period

Particip num	Organisation name	Infrastructure name	Installation num	Installation name	Unit of access	Min. quantity of access to be provided in Annex I	Access provided in RP1	Access provided in RP2	Access provided in RP3	Access provided in RP4	Total access provided	Difference
11	AAO	AAO	1	AAT	Night	56	8.0	0	0	0	8.00	
2	CNRS	CFHT	1	CFHT	Night	12	0	0	0	0		
2	CNRS	OHP	2	OHP193	Night	60	0	0	0	0		
2	CNRS	TBL	3	TBL	Night	32	0	0	0	0		
10	IAC	TCS	1	TCS	Night	16	0	0	0	0		
3	INAF	TNG	1	TNG	Night	16	16.9	0	0	0	16.90	0.90
14	LJMU	LT	1	LT	Hour	320	20	0	0	0	20.00	
4	MaxPlanck	CAHA	1	CAHA3.5m	Night	30	0	0	0	0		
4	MaxPlanck	CAHA	2	CAHA2.2m	Night	24	5	0	0	0	5.00	
4	MaxPlanck	La Silla	1	MPG-2.2	Night	12	0	0	0	0		
12	NOTSA	NOT	1	NOT	Night	80	37.4	0	0	0	37.40	
5	STFC	ING	1	WHT	Night	10	3	0	0	0	3.00	-7.00
5	STFC	ING	2	INT	Night	11	0	0	0	0		

Attachments	TADB_OPTICON_PR1_FP7-2.zip, OPTICON FP7-2 (312430) PERIODIC REPORT ONE.pdf
Grant Agreement number:	312430
Project acronym:	Opticon
Project title:	Optical Infrared Co-ordination Network for Astronomy
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