Mid-Range Strategies for the Telescopes in the OPTICON Network

A brief informal summary by the telescope directors, originally
October 6, 2012, updated November 2013 and October 2014.

Anglo-Australian Telescope - AAT (Warrick Couch) (Updated October 2104)

Between now and 2019, the AAT will offer the following instruments:

(1) The AAOmega spectrograph with resolution up to 10,000, fed by either the 2dF top-end with 392 optical fibres, or the KOALA integral field unit with a 28" x 18" (27” x 54”) selectable field-of-view and spatial resolution of 0.7” (1.25”);

(2) The HERMES spectrograph with R=28,000 or 50,000 in 4 simultaneous ~25nm bands, fed by the 2dF top-end with 392 optical fibres;

(3) The SAMI instrument, delivering IFU spectroscopy with 13 "hexabundles" of 61 lightly-fused fibres giving a 15” field-of-view at 1.6” sampling, configurable over a 1 degree field of view;

(4) The IRIS2 near-infrared imager and R=2400 spectrograph;

(5) The UCLES optical échelle spectrograph with an image-slicing fibre feed.

Up to 50% of AAT time is expected to be devoted to the *Galactic Archaeology with HERMES* survey (GALAH; see *http://www.aao.gov.au/AAO/HERMES/GALAH/Home.html*) and other large surveys.

It is anticipated that the AAO’s support of the OPTICON TNA program will continue unchanged, with 10 nights of AAT time made available per semester. All these nights will be offered in classical observing mode, but with the following options in terms of where the observers conduct their observations: (i)at Siding Spring Observatory, (ii)remotely from AAO Headquarters at North Ryde in Sydney, and possible (iii)remotely from their home institution or a recognised node in their country.

Sometime around 2019, two new instruments will be commissioned on the AAT:

(1) HECTOR, a 50-200 60-element IFUs configurable over a 2-3 degree field of view feeding a spectrograph working at R=4000 from 400nm to 900nm.

(2) VELOCE, an fibre fed R=60-80k cross dispersed spectrograph over the 370nm to 950nm wavelength range to replace UCLES.

It is also foreseen that IRIS2, SAMI, UCLES, and potentially AAOmega will be decommissioned on this timescale.

Calar Alto Observatory - CAHA (Jesús Aceituno) (updated October 2014)

Last March, Jose Maria Quintana resigned as director of the observatory. Currently a new director is being searched for to start before the end of the year. Until then, the acting director is the deputy director Jesus Aceituno.

The German MPG and the Spanish CSIC signed the agreement for the continuation of the operations of the Calar Alto observatory for the period 2014-2018. The goal is to focus on the 3.5m and Carmenes, but also on the 2.2m telescope which will be operated in a more cost-effective way.

The 3.5m telescope will be primarily devoted to the exploitation of an optical and near-IR échelle spectrograph (Carmenes), which will have first light in the end of 2015. It has been developed by a Spanish-German consortium in close collaboration with the observatory. The consortium will be granted a minimum of 600 nights in the period 2016-2018, with the goal of searching for Earth-like planets around cool stars. This science is protected, but the instrument will be offered to other teams for other projects. We expect that other instruments, specifically PMAS (IFU) and perhaps TWIN (low-res spectroscopy), will be operated and offered to the wider community.

Regarding the 2.2m telescope, the optical échelle spectrograph (CAFE) is in fully operational mode and we have just started to commission a wide-field (30x30 arcmin) camera (PANIC) in October 2014. Together with CAFOS (optical imaging, low-res spectroscopy, polarimetry), they will be the work-horses of this telescope. There is the possibility to access to the telescope and its instrumentation for long period of time by purchasing observing time for those groups who don't belong to CSIC-MPG.

The 1.23m telescope continues being offered to be operated remotely. Interested research teams may buy observing time.

Beyond 2018, it is likely that Calar Alto will become a fully project-oriented observatory, with very few teams obtaining most of the observing time, and driving the operation of the telescopes.

Canada-France-Hawaii Telescope - CFHT (Doug Simons) (updated Oct2014)

Only the French share of CFHT time (42.5%) is open to the OPTICON TNA program in an amount that is decided each semester. CFHT anticipates the arrival of SITELLE, an optical imaging FTS, in early 2015. SITELLE will operate from ~0.4-1.0 um and provide spectral-imaging across its 11x11arcmin field of view at resolutions up to R~10,000. After SITELLE is commissioned, CFHT will release the instrument for science operations, probably in 2015B. CFHT will provide the same range of Phase 1, Phase 2, data pipeline, and user support for SITELLE that is provided for the other instruments offered (WIRCAM, MegaCam, Espadons, and AOB). In addition, development of SPIRou, a near-infrared fiber-fed cross dispersed high resolution spectrometer optimized for spectro-polarimetric and radial velocity measurements, is on-going with delivery anticipated in several years. The principal science objectives of SPIRou include mapping the magnetic environments of young, embedded stars, and detecting significant numbers of terrestrial class exo-planets in the habitable zones of their low-mass host stars. Finally, 10 new filters will be added to MegaCam and available in 2015A, as well as controller upgrades to increase the instrument's readout speed and observing efficiency.

Max-Planck Gesellschaft 2.2m (Roland Gredel)

The LaSilla 2.2m telescope has been transferred to a national telescope as of Oct 1, 2013, so I can see some increased demand there (few southern telescopes, FEROS very efficient, grond let's see, WFI full moon size imager). I can make more time available if there is the demand, probably I could reduce the price per night as well There are presently no plans for new instrumentation.

Haute-Provence Observatory - OHP (Auguste Le van Suu)(Updated October 2014)

The OHP 1.93m telescope will continue to exploit the recent improvement of SOPHIE spectrograph which reaches now a radial velocity precision less than 2m/s, exoplanets and asteroseismology studies will remain the main fields and specialities of the telescope and science "niches" for large programs with RV. Additional improvements on the spectrograph setup are already planned to reach the 1 m/s precision(calibration, thermal controls, CCD change).
In parallel we have started hardware setup modifications on the telescope in order to get a safe remote control operating mode, the gain will be a very better efficiency for the spectrograph (science) versus telescope motion delay ratio.
A study and design for a new low resolution spectrograph has been completed and a funding proposal has been submitted to the French State-Region contract 2015-2020 . If funded, it will be installed at the 1.93m Cassegrain focus in parallel with SOPHIE spectrograph for Targets of

Opportunity. This spectrograph can be switched on from SOPHIE mode, in a very short delay. This feature makes the system well adapted to transient sky observation with a fast response to alerts and a wide range of spectral resolution.
The current T193 observation mode planned to operate 362 nights/year, makes the system very reactive to astronomical events and alerts observations with two different spectrographs.
The T193 telescope and SOPHIE spectrograph system have been confirmed by the French community to operate up to 2025 and beyond.
The OHP 1.93m telescope will continue to provide access to visitor instruments at the Cassegrain focal plane; e.g. MYOSOTIS, a multi-object high speed photometer for studies of transneptunian objects, or GHASP a scanning Fabry-Perot and photon counting system. This focal plane will be also available for prototyping and tests of new instruments.
For the time horizon beyond 5 years, mostly large and long-term programs with T193+SOPHIE for exoplanet studies are planned in synergy with space missions like GAIA, CHEOPS and TESS.This will dramatically increase the value of the RV database started in the early 90's with the ELODIE spectrograph continued with SOPHIE database.

Isaac Newton Group - ING = WHT+INT (Marc Balcells) (Updated Oct 2014)

A new ING tripartite operation agreement is expected to be in place in early 2015. We are building WEAVE, a next-generation optical spectroscopy survey facility for the WHT, which will respond to the widespread need for wide-field high-multiplex spectroscopy for follow-up of space missions (Gaia) and ground-based surveys (LOFAR; VISTA). WEAVE FDR is scheduled for January 2015, and commissioning is planned for late 2017.

During WEAVE construction (until 2017) ING will continue operating the WHT and INT in classical observing mode. We will maintain diversity of instrumentation, but plan to discontinue the AO cluster (NAOMI, OASIS, INGRID, OSCA) and WHT PFIP imaging. The WHT instrument set will comprise:

- ISIS, 2-arm long-slit optical spectrograph, R=600 – 12600; imaging polarimetry, spectropolarimetry; fast spectroscopy; image slicer.
- LIRIS: NIR imaging and long-slit spectroscopy, R=1000 – 3000; multi-object spectroscopy, spectropolarimetry; imaging polarimetry.
- ACAM: imaging and long-slit spectroscopy, R=400, permanently mounted on Cass cluster.
- AF2: PF wide-field (40 arcmin) multi-fibre spectroscopy, multiplex 150 fibres; R = 100 – 9500. AF2 has been refurbished to serve as a test-bed precursor to WEAVE.
- We will retain the visitor instrument programme. Some of the visitor instruments are offered to non-team members through normal TAC process. An upcoming visitor instrument is PAUCam, a wide-field CCD mosaic for the WHT prime focus featuring narrow-band filters for precision photometric redshifts. PAUCam will be made available to the community.
- We will continue to make telescope time available for testing of technologies for future giant telescopes.

For the INT, in Sep 2014 ING has issued a call for letters of intent to provide new instrumentation or telescope upgrades in exchange for telescope time. While this process follows its course, we will continue to offer:

- WFC: CCD mosaic wide-field imager (33’.8 FOV), wide set of broad- and narrow-band filters.

- IDS: long-slit CCD spectroscopy, R = 700 – 10,000.
- Demand for INT in training programmes is increasing, and we will continue to provide access for such programmes.

Once WEAVE arrives, WEAVE legacy surveys will take nominally 70% of the telescope time. The remaining 30% time will be retained for PI work allocated by the national TACs. The provision of community fibres during WEAVE surveys is being considered. WEAVE legacy surveys will take 5 or more years. The current plan therefore extends out to roughly 2022.

Liverpool Telescope - LT (Chris Davis)(updated October 14)

The Liverpool Telescope (LT) will continue to specialize in time domain astrophysics, medium and long-term monitoring, transit observations, and rapid response to Targets of Opportunity. Robotic control, automated flexible scheduling, and the user's ability to update the schedule manually or automatically during the night allows for rapid reaction to sudden triggers and outbursts, and for the scheduling of monitoring observations on timescales of minutes to years.

The instrument complement will consist of:

* IO:O - The LT's workhorse optical imaging camera with a 10x10 arcmin field of view and a range of broad and narrow-band filters (u'->z'band)
* IO:I - A near-IR imager with a 6x6 arcmin field-of-view and a small number of broad-band filters (currently under development).
* FRODOSpec - A dual beam, medium resolution (R=2500 or 5000), fibre-fed optical spectrograph.
* SPRAT - A high throughput, low resolution (R=500), long-slit optical spectrograph.
* RISE - A very stable, fast-readout camera designed specifically for planetary and stellar transit work.
* RINGO3 - A three beam optical imaging polarimeter.

In addition, a scientific and technical case for a larger successor facility is being developed. From the early 2020s LT-2 will provide rapid spectroscopic follow-up of transients triggered by LSST and other facilities (possibly including LT).

Nordic Optical Telescope - NOT (Thomas Augusteijn)(updated October 2014)

The NOT intends to offer the optical and NIR imager/spectrographs ALFOSC and NOTCam through 2017, plus the fibre-fed high-resolution spectrograph FIES, which will be upgraded for spectropolarimetry and improved RV performance. More detailed information on the currently available instrument suit can be found at http://www.not.iac.es/instruments/instruments.html

From the start of 2018, it is planned to replace ALFOSC and NOTCam by a combined optical/NIR imager and spectrograph, patterned after the X-shooter at VLT and optimised for transient sources. This “NOT Transient Explorer” (NTE) will then be the only instrument at the main focus, operated in parallel with FIES.

The NOT is continuing to develop its capabilities for remote and

automatic observations. The NOT is also regularly used for observing courses, which includes remote operations of the telescope. Coordinating instrumentation and operations with the TNG is being developed, and an exchange of observing time with the TNG has been in place since semester 2013B.

Telescope Bernard Lyot - TBL (Remi Cabernac) (Updated October 2014)

Remote access is already possible for the science instrument, TBL team is working on remote control of the telescope. Full service observing is expected to be continue in the coming years (the number of nights offered will ultimately depend on the level of operation funds, TBD at this time).

The future instrumentation at TBL will exploit a dual niche, spectropolarimetry and velocimetry. Presently, the only focal instrument at TBL is Narval, an adapted copy of ESPADONS at the CFHT. Following discussions within the French community headed by the Scientific Boards of TBL, what is foreseen for TBL is in the short term an improvement of the NARVAL spectropolarimeter, mainly with the aim of increasing the spectral stability (presently about 15m/s) by a factor of about 3. This is the Neo-Narval project. The aim of Neo-Narval is to probe evolved stars and the latest stages of planetary systems. Presently, the funds for Neo-Narval is secured and phased for 2015 and 2017.

In the mid-term, we hope that a copy of SPIRou at the CFHT, foreseen now for 2016-17, can be adapted for the TBL. This is the SPIP instrument (equivalent to Narval in the near-IR: 0.9-2.6micron, R~50,000). The regional funding return in 2014 (defining priorities for the period 2015-2020) was too scarce to warrant funding of SPIP this time. Hence, The instrument is postponed to the next call (2020+).

Telescopio Nazionale Galileo - TNG (Emilio Molinari) (Updated Oct 2014)

The TNG continues its way along specialised offer, the set of instrumentation now includes:

* HARPS-N, high resolution, high accuracy spectrograph, mainly devoted to exoplanet RV measurements. R~100000
* DOLORES, imager/low resolution spectrograph for the visible
* NICS, imager/low resolution spectrograph for the near infrared
* GIANO, an infrared high resolution spectrograph R~50000

Italian collaboration with the NOT started with a common time call for proposals and will continue with the collaboration for the construction of the next NOT instrument. A small fraction of time for small projects and technological demonstrators will always be available.

Telescopio Carlos Sanchez - TCS (Alex Oscoz) (Updated October 2014)

The TCS is in the process of being remotely controlled as much as possible via virtual remote desktops or other software such as TeamViewer. This is already possible for TCS with CAIN-3, and can be exported to other facilities with ease.

The set of instrumentations consists of:

- CAIN-3, infrared camera;
- FastCam, lucky imager for the visible;
- Wide FastCam, wide field very fast observations for the visible.

Other aspects being developed include:

Store the images in real time at the IAC HQ thanks to the new impressive bandwidth connecting the observatories and the HQ.

Implement security protocols to prevent a bad use of the software.

The possibility of applying for hours instead of nights and an increase in service and remote observations to improve flexibility (eg monitoring of an object over a long period of time, and researchers do not apply for full nights to make use of 1 hour/night.

The possibility of applying for large programs.

Optimized pipelines available to the community for the most frequently used instruments.