

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.

Anglo-Australian Telescope - AAT (Warrick Couch)

By 2015/16, the AAT will offer:

- (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"x18" field of view and selectable spatial resolution of either 0.7" or 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.

Calar Alto Observatory - CAHA (David Barrado)

David Barrado left the directorship in the summer. He was replaced by Jose Maria Quintana. Since then the precise direction of the observatory remains under discussion. The follow section is unchanged since December.

The German MPG and the Spanish CSIC have already signed the agreement for the continuation of the operations of the Calar Alto observatory for the period 2014-2018. The goal is to reduce costs by decreasing the suite of instruments, and focusing on the 3.5m telescope. In fact, from a broad perspective, we are following the recommendations outlined in the ETSRC report.

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 2014. 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 over this five year period, 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, we have recently commissioned an optical échelle spectrograph (CAFE) and we expect to commission a wide-field (30x30 arcmin) camera (PANIC) in 2013. Together with CAFOS (optical imaging, low-res spectroscopy, polarimetry), they will be the work-horses of this telescope, but we expect to operate the telescope in a more cost-effective way.

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)

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 2014. SITELLE will operate from ~0.4-1.0 μm and provide spectral-imaging across its 11x11 arcmin field of view at resolutions up to $R \sim 10,000$. After SITELLE is commissioned, CFHT will release the instrument for science operations, probably in 2014B. 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 exoplanets in the habitable zones of their low-mass host stars. Finally, a range of new filters will be added to MegaCam in 2014, 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, ground 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)

The OHP 1.93m telescope will continue to exploit the recent improvement of SOPHIE spectrograph which reaches a radial velocity precision of $\sim 2\text{m/s}$, exoplanets and asteroseismology studies will remain the main fields and specialities of the telescope. Additional improvements are foreseen to reach the 1 m/s precision.

A study for a new low resolution spectrograph has been completed and a funding proposal has been submitted to the national French Research Agency (ANR). If funded, it will be installed at the 1.93m Cassegrain focus in parallel with SOPHIE spectrograph for Targets of Opportunity.

We plan to use one "Cassegrain Bonnette" auxiliary output to setup a visible imaging channel equipped with a FLI CCD camera. This will allow transiting exoplanets observations alternatively with RV observations, switching duration between the two observation modes would last 15 to 30 minutes maximum

The OHP 1.93m telescope will continue to provide access to visitor instruments at the Cassegrain focus; e.g. MYOSOTIS, a multi-object high speed photometer for studies of transneptunian objects. This focus will also remain available for prototyping and tests of new instruments.

For the time horizon beyond 5 years, mostly large and long-term programs 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.

Isaac Newton Group - ING = WHT+INT (Marc Balcells) (No Changes since December)

ING has devised a 10 year strategy that has received broad support from the three funding agencies in Spain, the Netherlands and the UK. In the UK, the STFC Council supported all components of the proposed ING strategy, authorised the signature of an extension of the current tripartite agreement until March 2015, and directed the Executive to negotiate a new agreement that would give the UK continued access to the WHT after 2015. The main line of the ING strategy is the provision of a next-generation optical spectroscopy survey facility for the WHT, that will respond to the widespread need, recognised by many and in particular in the ASTRONET strategy

documents, for wide-field high-multiplex spectroscopy. This instrument is WEAVE, now being designed and built by a consortium by the three partner countries. The consortium is open to non-ING partners, and France is in fact participating in design work for WEAVE. PDR is expected in 2013 and first light in 2017.

While WEAVE is being constructed, the WHT will continue to offer access to the northern sky to the partners, using its full instrumentation set; it will maintain the visitor instrument programme; will continue to offer telescope time for the development and prototyping of technologies needed for the E-ELT, and will retain its resident student programme. Pending approval of the funding agencies, the ING will introduce long-term programmes on the WHT and INT, offered through a common TAC. Through the visitor instrument programme we will host PAUCam, a wide-field CCD mosaic for the WHT prime focus featuring narrow-band filters for precision photometric redshifts. PAUCam will be available to the community.

Once WEAVE arrives, WEAVE legacy surveys will take a large fraction of the telescope time. We envision that time will be retained for PI work allocated by the national TACs. Precisely how much time will remain available to other instruments and other programmes remains to be decided. WEAVE legacy surveys will take 5 or more years. The current plan therefore extends out to roughly 2022.

Liverpool Telescope - LT (Chris Davis)

The Liverpool Telescope (LT) will continue to specialize in time domain astrophysics. Robotic control allows for the scheduling of monitoring observations on timescales from minutes to years. The ability to update the schedule during the night will continue to provide the ability to respond rapidly and automatically to Targets of Opportunity. The instrument complement will consist of:

- * IO - A dual beam camera with a 10x10 arcmin optical (u'->z'band) detector plus a 6x6 arcmin near IR (YJH) detector capable of simultaneous imaging (near-IR arm is currently under development).
- * THOR - A rapid readout (<10 msec) optical lucky imaging camera.
- * FRODOSpec - A dual beam optical medium resolution (R=2500 or 5000) spectrograph
- * SPRAT - A high efficiency, low resolution (R=500) optical spectrograph (under development)
- * RISE - a fast-readout camera designed specifically for planetary 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)

The NOT intends to offer the optical and NIR imager/spectrographs ALFOSC and NOTCam through 2016, plus the fibre-fed high-resolution spectrograph FIES, which will be upgraded for spectropolarimetry and improved RV performance. From 2017, 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. Coordinating instrumentation and operations with the TNG is being developed, and an exchange of observing time with the TNG has been initiated as of semester 2013B.

Telescope Bernard Lyot - TBL (Philippe Mathias)

The future instrumentation at will exploit a spectropolarimetry "niche". 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 & OHP, what is foreseen for TBL is in the short term an improvement of the NARVAL spectropolarimeter, mainly with the aim of increasing the limiting magnitude (presently around 12) by about 2 units, together with an increase of the spectral stability (presently about 15m/s) by a factor of about 3. This is the DEEP-NARVAL project, expected for 2015.

In the mid-term we hope that a copy of SPIRou at the CFHT, foreseen for 2015, can be adapted for the TBL. This is the SPIP instrument (NARVAL in the near-IR: 0.9-2.6micron, R~50,000). This new instrument is not expected at TBL before 2017. The transition to regional funding in ~2015 (most likely 2016) makes longer-term planning somewhat uncertain at this time.

Telescopio Nazionale Galileo - TNG (Emilio Molinari)

The TNG continues its way along specialised offer, and the integration of the NIR fibre spectrograph Giano is taking place.

The set of instrumentation now includes:

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

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)

The TCS is in the process of optimising operational costs, and its continuity for the mid-term will be discussed. Until then, the TCS will maintain its two main instruments: CAIN-3, an infrared camera, and FastCam, a lucky imaging optical instrument. Besides this, a new instrument, Wide FastCam, is being finished. WFC is a spin-off of FastCam for wide field observations. In addition, a 4k x 4k optical CCD is being tested and will be probably installed at the TCS during some periods. Finally, a project to make the telescope remotely controlled is under way.