

## The Current and Future ST-ECF

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After 15 years in orbit, the Hubble Space Telescope is facing an uncertain future although there is a real possibility of a fifth servicing mission within the next two to three years. ESA and ESO have jointly been pondering the future of the ST-ECF at the ESO headquarters in Garching and this article outlines their conclusions.

The Space Telescope – European Coordinating Facility (ST-ECF) was established by ESA and ESO in 1984 for the purpose of supporting European astronomers in their use of the Hubble Space Telescope (HST). The subsequent history of the group and its evolving role up to 2002 is described in an article in the STScI Newsletter (Fosbury and Albrecht 2002; [http://sco.stsci.edu/newsletter/PDF/2002/summer\\_02.pdf](http://sco.stsci.edu/newsletter/PDF/2002/summer_02.pdf)) and will not be repeated in detail here.

With the HST already in orbit beyond its design lifetime of fifteen years, both ESA and ESO have been giving thought to the functions that the ST-ECF should perform during the remaining active phase of the Hubble project – however long that is – and also to their own requirements for maintaining such a joint group into the post-Hubble era. The purpose of this article is to outline the results of these deliberations and to sketch the anticipated future activities of the group.

### Current tasks

Following a mid-term review in 1996, carried out by Len Culhane, Rolf-Peter Kudritzki and George Miley, the ST-ECF shifted emphasis from user support to direct contributions to the HST project in collaboration and coordination with STScI. It also took on additional tasks and some additional staff at the request of ESA as part of a renewed ESA/NASA Hubble Memorandum of Understanding (MoU). These tasks were to pre-process the plate scans used for the second Guide Star Catalog (GSC II), to improve the calibration of selected post-operational Hubble instruments using instrument modelling techniques, and to pro-

vide a European channel for Hubble-related public outreach. The first of these has been completed, the second is being absorbed within the now primary ST-ECF task of providing high-level science data products for selected current – as well as post-operational – Hubble instruments. The available manpower has, however, been reduced as a result of the current evolution of the ESA/NASA MoU which takes account of ESA's considerable contributions to JWST. The third: European Outreach for Hubble, JWST and some other ESA activities, is continuing as a mainstream ST-ECF activity.

By early 2006 and at the request of ESA, the ST-ECF will have reduced its staff from a maximum of twenty-one back to the original complement of seven ESA-funded and seven ESO-funded personnel with the expectation that this level will be maintained until the decommissioning of the HST spacecraft. When this event will happen is currently very uncertain. If NASA decides to carry out the next servicing mission (SM4) before any catastrophic failure, this could be many years ahead: at least five years after the servicing mission takes place. However, for planning purposes, ESA is using the date of 2010 as the anticipated Hubble End of Life (EoL).

While the HST remains operational – and probably somewhat beyond EoL, the ST-ECF will continue its focus on Hubble-related tasks, principally in the areas of high-quality science-data products and public outreach. Projects currently underway in the instrument science area are predominantly in the area of spectroscopy, notably the provision of high quality, physical-model-based wavelength, charge transfer efficiency calibrations and correction procedures for STIS and the calibrations and procedures for reducing the slitless spectroscopy data from the ACS. The STIS project is a natural follow-on from similar work done for FOS and the ACS work has its heritage in NICMOS and STIS. Descriptions of this work can be found in recent issues of the ST-ECF Newsletter which can be found on-line at the ST-ECF website (<http://www.stecf.org/newsletter/>). The wavelength calibration work has involved extensive laboratory work to characterise the on-board lamps and has resulted in a new set of wave-

lengths for the Pt/Cr-Ne lamp (Sansonetti, C. J. et al. 2004).

If SM4 is carried out successfully within the next two to three years, Hubble will be equipped with two new instruments: a NUV-NIR imager (WFC3) and a high-efficiency UV spectrometer (COS). There is also the realistic possibility that the STIS will be repaired. Such a dramatic increase in HST capabilities would carry serious implications for the ground support at both the STScI and at the ST-ECF.

It has been clearly apparent that there are a number of resonances between these Hubble-based instrument projects and the interests of ESO for several VLT instruments. The physical similarities between STIS and UVES have already been exploited in the current UVES pipeline and the similar problems facing CRIRES are currently yielding to similarly effective procedures for the high-quality calibration of this new infrared spectrometer. There has been a recent feasibility study for the application of the slitless spectroscopy procedures developed for ACS to the MXU-mode of the FORS2 spectrometer; work that is described in the article by Kuntschner et al. on page 19 of this issue of *The Messenger*.

The fruits of these HST instrument science labours are ultimately destined for the so-called Hubble Legacy Archive (HLA) which has been conceived to be the repository of the highest-quality, science-ready data products that can be constructed by the combined efforts of the STScI, the Canadian Astronomical Data Centre (CADC) and the ST-ECF. Destined to be fully VO-compliant, the HLA will – together with the published scientific papers based on the data (currently somewhat in excess of 5 000) – be the lasting legacy of this extraordinarily successful scientific endeavour.

The public are overwhelmingly supportive of the HST observatory and, at least in the USA, the word “Hubble” has become synonymous with astronomical telescope. The efforts to make the European public more aware of the project and ESA's role in it are led by the small (2.5 FTE) ST-ECF outreach group who has set up a very efficient and productive infrastructure to increase public awareness – especially

amongst young people. The recent celebration of Hubble's 15th year in orbit has had a very high worldwide visibility with more than half a million copies of the DVD "HUBBLE – 15 years of discovery" being distributed. The web site (<http://www.spacetelescope.org/>) has become one of the most visited science sites in the world.

### Future role

In the post-Hubble era, both ESA and ESO will continue to share common interests and goals. Given their common obligations to astronomy and the very large overlap between the communities they serve, both organisations have expressed a desire to maintain a joint ESA/ESO activity based at the ESO Headquarters in Garching. This group will carry out a range of technical, outreach and coordination tasks of interest and benefit to both parties.

The current plans for such a group, which would evolve from the ST-ECF, have been developed with ESA and ESO over the last year or two. They include a continuation of the high-quality science-data product initiative which necessarily forms the foundation of the VO endeavour. Target projects would come from both ESA and ESO instrument developments. In addition, there are a number of coordination activities between the two organisations that would benefit from a joint group in Garching. The first steps have already been taken with the publication of the ESA/ESO Working Group report on extra-solar planets described in the previous issue of *The Messenger*. This will shortly be followed by a report on the synergies between Herschel and ALMA and then by one on Fundamental Cosmology. These are anticipated to be the beginning of a continuing series of initiatives that map out the joint interests and capabilities of both ESA and ESO to address major scientific problems.

Finally, the continuation of a vigorous public outreach programme is considered to be vital to ensure a continuing interest in the progress of science into the next generation and the future ST-ECF will carry out part of this programme for ESA in close collaboration with ESO.

As a footnote to this description, it should be pointed out that the ST-ECF has been in the past and is currently a substantial contributor to the ESO Astronomy Faculty and the scientific environment. With seven of its staff being Faculty members, it is well represented on Faculty committees and currently holds the (elected) Faculty chairmanship.

### Reference

Sansonetti, C. J., Kerber, F., Reader, J., and Rosa, M. R., "Characterization of the Far-ultraviolet Spectrum of Pt/Cr-Ne Hollow Cathode Lamps as Used on the Space Telescope Imaging Spectrograph on Board the Hubble Space Telescope", 2004, *Astrophysical Journal Supplement Series* 153, 555–579

## PPARC Council at ESO

On October 27, members of the PPARC Council paid a full-day visit to the ESO Headquarters. The Council members were welcomed by ESO's Director General, Dr. Catherine Cesarsky, and in the course of the day received an extensive briefing on key ESO activities including the current science activities at ESO's La Silla Paranal Observatory in Chile, the status of the ALMA project and the OWL project for an extremely large optical/near-IR telescope. Furthermore, ESO's instrumentation programme – arguably the world's most comprehensive and ambitious instrumentation development programme in astronomy – was described as well as industrial relations and technology transfer, and ESO's substantial education and public outreach activities. The Council members also had an opportunity to see the ESO Science Data Archive and the Integration Hall where new instruments are tested prior to being shipped to the observing sites in Chile. During lunch, the participants had a chance to meet UK and Commonwealth staff working at the Headquarters.



Photo: H. H. Heyer, ESO