



Appendice A6

Relazioni dei Visiting Committees - Estratti

1. PREMESSA

Al fine di valutare l'attività scientifica delle proprie Strutture di ricerca, l'INAF ha istituito nell'ottobre del 2007 dieci "Visiting Committees" internazionali, ciascuno composto di 3 o 4 scienziati di rilevanza internazionale, appartenenti tutti, con una sola eccezione, ad Università ed Istituti di ricerca esteri. Le visite sono avvenute tra il novembre del 2007 ed il gennaio del 2008, ed hanno avuto per oggetto i progetti scientifici e tecnologici svolti presso le Strutture, il tasso di produttività scientifica, il livello di finanziamento sia interno ad INAF che su fondi esterni, l'amministrazione e organizzazione interna delle Strutture, e i problemi del personale, con particolare riguardo al personale di ricerca precario. Ai fini della valutazione, i "Visiting Committees" si sono giovati di estesa documentazione predisposta dai Direttori delle Strutture, di presentazioni scientifiche fatte dal personale di ricerca durante la loro visita, e di colloqui privati con le varie componenti del personale delle Strutture. Al termine delle loro visite, ciascun "Visiting Committee" ha prodotto un rapporto e ha formulato specifiche raccomandazioni. I rapporti dei "Visiting Committees" sono attualmente all'esame della dirigenza INAF e saranno sottoposti a breve al Consiglio Scientifico, al fine di ottimizzare il funzionamento dell'Ente e l'allocazione delle risorse finanziarie e umane. Nel seguito, sono riportati estratti dei rapporti dei "Visiting Committees", con particolare riferimento alle raccomandazioni di carattere più generale e alla valutazione delle attività scientifiche e tecnologiche dei gruppi di ricerca presso le varie Strutture.

2. FINANZIAMENTI

Recommendation: Realizing that such an inappropriate allocation of funds to Institutes which undoubtedly score amongst the very top of Italian Astronomy is a consequence of an inadequate funding of INAF as a whole, the VC strongly encourages INAF to negotiate with the Italian Authorities a substantially higher allocation of research funds to INAF as a whole, to a level that is at least vaguely comparable to that of the other large European Countries. This is seen by the VC to be essential for Italian Astronomy to remain visible on the international scene. *(from VC Report on IASF-MI and OA-Brera)*

The VC is seriously concerned that, unless the funding situations is rapidly and dramatically improved, the meager amount of research money currently available will soon prevent AOPD from maintaining its current level. The current status of good health of science at AOPD is largely based on past investments. The future, if the current funding situation remains unchanged, will certainly be much less glamorous. Simply stated, the science staff cannot maintain a leading position in, or even keep pace with, modern research, which is very competitive and dynamic, and requires rapid response in terms of project financing on a short time scale, with the current level of funding. *(from VC Report OA-Padova)*

Astronomy is rapidly becoming a “big science” in terms of the size and cost of even what are considered small projects. To remain competitive, research groups must have access to adequate financial support for personnel (typically, graduate student, postdocs or specific technical personnel), computing, laboratory equipment, infrastructure, and technical staff, travels and publications. Vital scientific activities, such as maintaining contacts and collaborations, attending international scientific events (workshops, symposia, conferences, etc.), hiring of young associates, acquisition of vital hardware, are literally being strangled at AOTS by the current level of funding. The VC believes that AOTS is very likely to undergo a rapid decline of its current scientific and technological level, even of its capability to operate as an effective research institution in the next few years, if the funding situation is not improved. *(from VC Report on OA-Trieste)*

One fundamental issue brought to the attention of the VC is the level of funding for Basic Research the Observatory has received in recent years from INAF. During the past year, of the funding directly received from INAF, only about 20% was granted for basic research, while the remaining funds were for general expenses and maintenance of the Observatory. This Basic Research allocation represented only about 10% of all the research expenses at the Observatory during 2007. So far, the science personnel has succeeded to partially offset this very low funding level by securing independent research grants and contracts (which last year made about 90% of all basic research expenses). However, the VC notes that this modus operandi is highly unstable, and if continued would suffocate important lines of research. In addition, the VC notes that to increase the level of scientific productivity of the OAC a much higher level of funding for Basic Research is mandatory. *(from the VC Report on OA-Capodimonte)*

From the programmatic point of view, the VC notes that with the “local research” funds amounting to a small fraction of all the money spent by the AOTS staff, INAF is essentially forcing the Observatory to abdicate the implementation of INAF's scientific and technological strategies and pursue instead those of the funding agencies where the staff can get money from, and these strategies might or might not agree with those of INAF. *(from VC Report on OA-Trieste)*

3. SCIENZA

Both the IASF and the OAB conduct first rank research which establishes them as key nodes of European Astronomy. Several individuals and research groups at both Institutions have, evaluated on absolute international standards, outstanding records in terms of scientific achievements, number of publications and citations, and leadership of major international programs and collaborations including leadership of large/key programs on highly competitive facilities like the Hubble Space Telescope, the Chandra X-ray Observatory, the Spitzer Space Telescope, and the ESO VLT. The current excellence in productivity and quality of research is accomplished with abysmally limited funds compared with all other European Institutions that perform at a similar standard (e.g., about a fifth of the research budgets of the MPE-Garching and the ETH-Zurich, once these are scaled to a similar number of scientific staff

members). The VC finds the current outstanding performance of the INAF-Milan Institutes commendable, but not sustainable. Major fundamental developments that are foreseen in Astronomy for the next decades can only be achieved with efforts shared by large international consortia. Long-term international competitiveness in Astronomy requires access to adequate resources, to participate as partners or leaders in major international initiatives. *(from VC Report on IASF-MI and OA-Brera)*

The VC unanimously agrees that the scientific production of AOPD is very good, despite the severe under funding. The scientific staff is well engaged in national and international high-visibility projects and/or collaborations and the range of science interests covers a broad spectrum, including cutting-edge science, and fully covers INAF strategic plans. Their scientific production, as evaluated using standard bibliographic metrics and success rate with grants and proposals, generally has high impact and is competitive on a global scale. The VC also found that the quality of the science production is consistently high across all categories of staff. *(from VC Report on OA-Padova)*

The VC noted that some projects conducted at AOTS reach levels of excellence, and noted leadership in very high profile international projects. Some of the staff, especially some working in extragalactic astronomy, are among the world experts in their fields, and, in general, the VC found that all AOTS researchers are very active and receive very good recognition. Also, the quality of the science production is consistently high across all categories of staff, from junior to senior ones. *(from VC Report on OA-Trieste)*

The Osservatorio Astronomico di Bologna (OABo) is performing well under trying circumstances. The two main research groups are among the best in Italy, based on objective criteria such as publication rate, citation rate, and grants awarded. Some members of these groups are recognized as international leaders both by reputation and by their proven success in obtaining time (including PI leadership of large/keyprograms) on highly competitive facilities like the Hubble Space Telescope, the Chandra X-ray Observatory, the Spitzer Space Telescope, and ESO's VLT. We identify as both timely and promising OABo's lead role in the Giano IR spectrograph, calibration lead for the GAIA mission, and their new technology contributions to the Large Binocular Telescope and the adaptive optics system for the Extremely Large Telescope. *(from the VC Report of OA-Bologna)*

We were impressed by the high quality of the scientific and technical staffs of both institutes. In spite of the staffing and budget problems, the productivity of both IRA and the OAC has been very high. Members of the IRA and OAC scientific staff are international leaders in several important branches of astrophysics and have been invited to give many reviews. The engineering staffs at both institutes are innovative and enthusiastic and are participating in several cutting edge technological developments. We note that whereas there is a severe lack of junior staff researchers at Bologna, there is a lack of senior staff scientists at Cagliari. *(from VC Report on IRA and OA-Cagliari)*

The Galaxies and Cosmology Group at Arcetri aims to understand the big picture in extragalactic astronomy, in particular the coherence between the local and the

distant universe. The group thus tackles a broad range of subjects, including e.g., structure and dynamics of local and distant galaxies, stellar populations and star formation history, black holes and active galactic nuclei, population III stars and Supernovae as cosmological probes. The group has the highest international visibility and has succeeded in making front-line contributions in several research areas over the past decade. It is impressive that such a relatively small group of scientists can have such impact. The group is nationally and internationally well connected and leads or participates in a large variety of excellent projects. *(from VC Report on Arcetri)*

The research in the star formation group at Arcetri is of the highest standards and is highly recognized internationally. The group covers a wide range of topics, from the coldest low-mass pre-stellar cores to the highest mass young stars, and from the smallest scales in protoplanetary disks and jets to the largest scale of clusters and associations. The group combines state-of-the-art observations at optical, infrared and millimeter wavelengths with a healthy dose of in-depth modeling and basic theory of star formation. The research at millimeter wavelengths is heavily intertwined with astrochemistry, an area in which Arcetri has a world-leading reputation. *(from VC Report on Arcetri)*

The Visiting Committee was very impressed by the high over-all level, by international standards, of the research achievements of all three of the research structures we have been asked to review...

We were in the whole favourably impressed by the scope and quality of research conducted at OA-RM. Much of it is commensurate with the prevailing standards in the field, and some of it is truly world-class. The fields in which OA-RM is engaged are all interesting, active, and will remain so for the predictable future, reflecting the overall scientific taste of the OA-RM research staff...

The relatively small institute OA-TE has focussed most of its resources and manpower to form a strong team in stellar astrophysics. The research had developed over the last few years into truly world-class science. The field is interesting, active, with good prospects for the future...

We underline the impressive achievements and international reputation of IFSI-RM and congratulate the staff on its evident success, wide portfolio of instruments and collaborations. *(from the VC Report on OA-Roma, OA-Teramo and IFSI-Roma)*

The VC has found that most science groups are active in their respective fields, have achieved many accomplishments, and some have achieved leading positions (more than once) in international projects...

In particular, the Cosmic Dust and Space Technologies groups together are scientifically very strong and a great asset of the OAC. They have a proven record of accomplishments in obtaining external independent funding, in competing for space experiment projects, and in achieving highly significant science/technical results. The Cosmic Dust Laboratory, in particular, is a valuable and unique asset for Italian astronomy, and is strategically well-placed, given the nature of the upcoming ESA and NASA space missions (mostly geared toward the IR, and, thus, the dust-emitting wavelength regime, or towards solar system exploration). *(from The VC Report on OA-Capodimonte)*.

The VC was impressed by the high quality of the research activities of OAPA, the synergy between the different research projects, their scientific output, as evidenced by their publication rate, and their many national and international scientific collaborations. The institute is involved in a number of important space-based missions, mostly in the area of X-rays (Chandra, XMM) and OAPA staff are successful at getting observing time on these highly competitive (on an international level) space missions. OAPA is also active in the development of instrumentation for both space-based and ground-based instrumentation on large telescopes; it operates the X-ray Astronomy Calibration and Testing Facility (XACT) with a 35 m X-ray beam line that has been (and is) used to calibrate instruments for major international X-ray observatories. The prospects for future development in their main research areas are high.

The entry of GRID computing by OAPA is timely as there is large interest in this on an international level. OAPA makes excellent use of this facility and the strong collaboration with Catania on their GRID computing efforts (the COMETA collaboration) can make Sicily a major player in this exciting new area of research. *(from the VC Report on OA-Palermo)*

4. TECNOLOGIA

We were impressed by the technological developments that we saw during our visit to Medicina and the technological projects that we heard are being pursued at Firenze and Sardinia. The quality of the technological staff is high and we commend their enthusiasm. *(from VC Report on IRA and OA-Cagliari)*

The VC was impressed by the technological and instrumentation projects currently ongoing at AOPD. Highlights include highly competitive work on adaptive optics, contributions at various level to high-visibility international projects in extragalactic, galactic and planetary astronomy, such as PLANK, AMICA, SYMBIOSYS, FCU, WSO, WFI, GAIA, EPICS, SPHERE, BepiColombo and NIRVANA (in no specific order). While the VC was impressed by the overall high quality of the contributions made inside AOPD in a number of high technology projects undertaken by the staff, for example the work in adaptive optics and large-telescope instrumentation, it is also very preoccupied that the current level of funding is insufficient to even operate the existing laboratories, complete AOPD's contractual obligations in the various projects, and maintain the expertise at the Observatory. *(from VC Report on OA-Padova)*

As with science, the VC was impressed by the overall high quality of the contributions made inside AOTS in technology projects. Particularly impressive, because of their scope and of the meticulous project management, for example, are the Planck data analysis and the large-telescope control systems. However, the VC is very preoccupied for the future of these activities, since the current level of funding is insufficient to even operate the existing laboratories, complete AOTS's contractual obligations in the various projects, and maintain the existing expertise at the Observatory. There is no money to prevent obsolescence, for instance. The existing infrastructure will soon be rendered obsolete unless funds are given to continue

upgrade them. The VC believes that AOTS will not be able to maintain its current level of productivity and technological expertise with the current funding profile. It certainly will be impossible for them to expand and initiate, let alone lead, new, high-profile projects. *(from VC Report on OA-Trieste)*

The role of the LBT – Adaptive Optics group has changed from its early involvement in mechanical engineering aspects of the LBT to more advanced developments aimed at exploiting its high resolution imaging capabilities. This group has an international reputation based mainly on its pioneering development of deformable mirrors and other elements of AO systems such as the Pyramid Wavefront Sensor. A spin-off deformable mirror is already working on the MMT and two are due to be delivered by Arcetri (together with the Microgate company) to the LBT telescope in the next couple of years. Arcetri/Microgate are also developing a system for the ESO VLT and have won ESO study contracts for both deformable mirrors and edge sensors for the E-ELT. This development, which allows for efficient implementation of Adaptive optics, leading to vastly improved equivalent image quality/resolution, could revolutionize ground Wavefront Sensor. A spin-off deformable mirror is already working on the MMT and two are due to be delivered by Arcetri (together with the Microgate company) to the LBT telescope in the next couple of years. Arcetri/Microgate are also developing a system for the ESO VLT and have won ESO study contracts for both deformable mirrors and edge sensors for the E-ELT. This development, which allows for efficient implementation of Adaptive optics, leading to vastly improved equivalent image quality/resolution, could revolutionize ground based astronomical observational capabilities and be necessary for conceiving larger telescopes of the ELT generation. *(from VC Report on Arcetri)*

The VC was impressed by the level of mission participation achieved by IASF-RM, which spans the full range from developing flight instrumentation and hardware contributions through Principal Investigators (e.g. Integral/IBIS, SMART-1, Agile) and Co-Investigators (e.g. Cassini, Dawn, Mars & Venus Express), through vigorous exploitation of ongoing missions through their competitive open programmes (e.g. XMM, Chandra, Integral) to significant contributions to the development of future missions (e.g. BepiColumbo, ExoMars, GLAST, XEUS, GRI). The successful delivery and launch of Agile is a prime example of a recent major accomplishment of IASF-RM and its Principal Investigator.

IASF-BO has similarly participated in a number of major ESA and ASI-sponsored national missions, including BeppoSAX, ISO, XMM-Newton, HETE-2, and currently plays important Co-Investigator roles on Agile and Integral, and not least the Principal Investigator role for the Low Frequency Instrument (LFI) on board Planck. The successful design, manufacture and delivery of the LFI represents a considerable investment and major achievement for IASF-BO and Italian space science. IASF-BO staff are also active in exploiting XMM and Integral, and promoting a variety of future space missions including Simbol-X, XEUS and several mission concepts proposed in response to ESA's Cosmic Visions call.

These past achievements combined with healthy levels of on-going and forward looking activities qualify IASF-RM and IASF-BO as two of Italy's leading space laboratories, and established players on the greater European and international space scene. *(from VC Report on IASF-Roma and IASF-Bologna)*

5. PERSONALE

The VC found a major issue in the terms of contract, including the length of appointment and benefits, of fixed-term postdoctoral associates. Many among this staff category are commonly hired on very short appointment (less than one year) and with salary and benefits that are sub-standard on an international scale. Very often, these appointments of very short duration are renewed many times, with the result of keeping young researchers in a continuous state of uncertainty, presumably out of some vague promise that the situation will soon stabilize. *(from VC Report on OA-Padova)*

The VC stresses that the contractual terms of these postdoctoral appointments are so poor that, effectively, the system automatically excludes that competitive researchers can be attracted to come and work in Italian institutions, unless they have some special reasons, other than Astronomy, to do so. The VC is unanimous in sending a strong message and urge AOTS and INAF to discourage this practice and set up a system of postdoctoral appointments of quality standard similar to those in most international institutions. *(from VC Report OA-Trieste)*

In this regard, the VC strongly expresses its opinion that it is simply inadmissible that INAF does not have a very prestigious, high profile postdoctoral fellowship, such as, for example UK's Royal Society Fellowship, or US's Hubble Fellowship. We urge AOPD management and staff to work closely with INAF in trying to create something like, say, the "Galilei's Fellowship", and making it one of the most competitive and sought-after postdoctoral programs in the world, capable to compete on a global scale in attracting the best young researchers to Italy. Such initiative would cost relatively little in absolute terms, but it will give a clear, unequivocal message to the international community about Italy's commitment to astronomy. At the same time it will attract the best and most active young scientists to work in INAF institutions, and, in doing so, help promote international collaborations and enhance the overall cultural and academic level of INAF, including AOPD, and help Italian academics produce and lead the best science. *(from VC Report on OA-Padova)*

Clearly, what is called for is for INAF to institute a sweeping reform of its hiring policies with the aim of presenting young researchers with a clear and transparent career path leading to a permanent position in Italian astronomy. As a minimum, this reform should attempt to reign in the present chaos and impose a degree of homogeneity on the diverse range of finite-term contracts with which beginning researchers can presently be hired. A long term plan for how to address the inevitable generational change in Italian astrophysics through the creation of a suitable and stable source of replacement posts is also urgently needed, and the selection criteria and procedures that should govern the filling of these positions need to be agreed to and made transparent to all concerned. *(from VC Report IASF-Roma and IASF-Bologna)*

Another concern that the VC noted regards the non-staff scientist positions (i.e. postdocs). It appears that there are no clear rules about length and maximum extent of postdoc positions. While some observatories manage to follow the rules that apply

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in the rest of Europe and the US (i.e., 2-3 year length of post-doc employment), in other cases the post-doc relies for support on a succession of very uncertain few-month contracts. This situation causes real concern. This is an area where INAF may work with the Directors, to generate common guidelines. Some amount of Director's discretionary funds may also help in this area, to bridge different grants and ensure synergy among projects. *(from the VC Report on the INAF Institutes in Sicily)*