The European Astro–political Landscape and the rôle of the European Astronomical Society

Thierry J.–L. Courvoisier and EAS Council

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1 Introduction

The European Astronomical Society (EAS) was founded in 1990 as an association to contribute and promote the advancement of astronomy in Europe. In particular it is meant to deal with astronomical matters at a European level. It is a society of individual members, professional astronomers, who elect a council to represent them. The society has a privileged relationship with the national societies of astronomers in European countries, which fulfill similar rôles as the EAS, but predominantly at a national level.

The European Astronomical Society is the only organisation in which all European astronomers can be members, independent of their field of research or country of work or origin. The society offers therefore a forum for discussion on all aspects of astronomical development in Europe and it is also the organisation which can represent the interests of the astronomers in discussions of Europe–wide developments. The EAS council has been reflecting on the rôle the society should have on the European scene and is determined to act to strengthen the links among its members, with the national societies and between the astronomical community and the European authorities.

There is wide–spread recognition that Europe needs more coordinated planning for large science facilities than has been the case over the past decades. This effort is to include national planning efforts, those of ESO and ESA related to astronomical research, as well as a number of planning efforts underway at EU level, often under the auspices of the European Union. We review in section 2 the fields covered and in section 3 some of the on–going planning efforts in these fields. We spell out our aims in section 4 and present in section 5 how the European Astronomical Society can help to provide an overall view of these planning exercises and how it can make the voice of the astronomers heard in a European context. In this last section we also review the actions that the society has been and will be taking in the near future to enhance the coherence of the astronomical community on an EU–wide basis.

2 The Field

Astrophysics deals with a wide variety of themes from the physics of the Earth–Sun connection to the physics of cosmic objects, be they planets and their moons, stars, galaxies or more extreme objects like neutron stars and black holes, to the description of the largest structures and cosmology. All these objects are observed using tools that range from *in situ* measurements in the solar system to observations of electro–magnetic waves from the radio regime to TeV energies and to the detection of particles like cosmic rays and soon neutrinos. It is hoped that gravitational waves will also become part of the astronomical tool kit in the coming years. Furthermore concepts like astro–chemistry and astro–biology have become current and cover new ways of approaching astronomical objects and knowledge. Modern astronomy (or equivalently astrophysics) is thus a very multi–disciplinary domain of investigations, an aspect that the EAS intends to fully integrate in its activities.

There are a number of subjects that border astronomy and should be considered when contemplating the astronomical landscape, without necessarily being always associated with it. One example is the search for dark matter particles in ground–based laboratories or the particle physics experiments that reproduce conditions thought to exist in the cores of neutron stars or at early times in the Universe.

Another domain that is closely related to astronomy but whose border with astrophysics is more fuzzy is the "geology" of solar system bodies and the study of their atmospheres. This is an object of study *per se* and features in relation with the study of exoplanets.

3 The Actors

With such a wide field of study it is not surprising that the number and variety of the actors are truly astronomical. We deal with national organisations, and often several per country from Portugal to Russia and from Finland to Greece. We also deal with inter-governmental organisations like ESO and the space science programme of ESA. The scene is also now inhabited by a number of organisations and structures stemming from one part or another of the European Union.

The rôles of these organisations are often overlapping. They are sometimes in competition and some fund others in various schemes. Some are parts of national governments, while others represent users or contributors at various levels. The geographical area of influence of these organisations ranges from a national area to Western Europe or the NIS states. Only one organisation has a pan–European scale, and that is the European Astronomical Society (EAS).

3.1 National Organisations

In general the national actors on the astro–political scene are the ministry (or regional authorities) that funds positions and basic infrastructure in the universities and research centers. These entities then often define themselves the priorities they give to different activities such as teaching and

research. There is then often a grant giving organisation that funds individual research projects proposed by researchers. Together these structures shape the root infrastructure available nationally to astronomical research.

Additional national actors are those services that fund and represent national interests in the ESA and ESO intergovernmental organisations, or contribute to national bi– or multi–lateral space science and exploration efforts in large countries. These services seldom all come from the same governmental entity.

Some large international projects, like the search for astronomical neutrinos (ANTARES) or that for gravitational waves (VIRGO) are run and funded through different channels stemming from further governmental actions.

The national scenes also include professional societies, in our field of interest these are mainly astronomical societies, but also sections of national physical, or even chemical societies. These play a variety of rôles in shaping the national priorities across the borders of the administrations attached to different ministries or departments. They produce or contribute to "national roadmaps" that express the interests and priorities of their respective research communities. They often define their subject matter boundaries in ways that differ across geographical borders.

3.2 Inter–Government Organisations

ESA (standing here in short for its scientific programme and the scientific aspects of its exploration programme) and ESO are two organisations that were shaped after the model of CERN, a model in which a number of governments decided to unite their efforts to develop and operate facilities that are clearly beyond their individual reach. Although there is a large overlap, the members of ESA and ESO are not identical, nor is any of them the same as the membership of the European Union. In addition, different ministries and services fund and represent many of the countries in both organisations.

ESA and ESO have their, different, planning cycles. ESO has recently decided to invest large efforts in the development of a 40–m class telescope, while ESA is in a vast exercise of thinking about ideas for future space science missions. It has produced the "Cosmic Vision" document, written under the coordination of ESA's advisory structure with inputs from the whole community including "ideas" generated as a response to a general call. Of the 150 such ideas, there is hope that one or two missions may be realised before 2020, albeit at the possible cost of eliminating one mission of the existing programme and/or a significant part of the operations of existing missions.

Both organisations have a strong link with their user communities through a number of committees on which astrophysicists fill several rôles, *ad personam* or as representatives of governments or national bodies. The final programmatic decisions are, however, taken by delegates of the national administrations rather than by the scientists.

3.3 EU Bodies

Building on the Lisbon European Council in 2000 the European Union (EU) has created a number of structures relevant for astrophysics research, within the concept of the European Research Area (ERA). The ERA concept combines a European 'internal market' for research, where researchers, technology, and knowledge should freely circulate with European–level coordination of national and regional research activities and programmes and with initiatives implemented and funded at a European level. Several networks (ERA–Nets) based on this concept have activities in the astrophysics domain. There are essentially three levels of ERA–Nets:

1. those run by professional astronomers like OPTICON, RadioNet, EuroPlaNet, and ILIAS,
2. ERA–Nets run by national funding agencies (ASTRONET),
3. and those run by governments (ESFRI).

In addition the EU has founded the European Research Council (ERC), an independent Council of distinguished scientists set up to fund investigator–driven frontier research in all scientific disciplines. The ERC is the EU body responsible for bottom–up research funding.

All these structures have some degree of a planning rôle and all are trying to gain influence on the European scene either in general terms or to gain support for their specific projects and research activities. Through this set of structures, the EU is gaining a significant impact with a minimal funding effort.

3.3.1 OPTICON

The objectives of OPTICON (`http://www.astro-opticon.org`) state that "OPTICON brings together all the international and national organisations which fund, operate and develop Europe's major optical and infrared infrastructures, together with several world class facilities for solar astronomy located in the Canarian Observatories."

Work towards this generic aim is organised through a number of Networks and Joint Research Activities (each of these concepts correspond to EU funding structures). OPTICON provides on the one hand access to a number of facilities for users outside their "natural" areas and on the other sponsors a number of programs to develop designs and technologies that will be of prime importance for future large telescopes. OPTICON also aims at improving the coordination between astronomical facilities.

3.3.2 RadioNet

RadioNet (`http://www.radionet-eu.org`) "is an Integrated Infrastructure Initiative (I3) that pulled together all Europe's leading astronomy facilities to produce a focused, coherent and integrated project that will significantly enhance the quality and quantity of science performed by

European astronomers." In some sense RadioNet provides to radio astronomy a number of services similar to what OPTICON provides to optical and infrared astronomy. Specifically it makes access to radio telescopes easier and funds a number of technologies that will be essential for future large projects. It also has a number of coordinating activities.

3.3.3 EuroPlaNet

The objectives of EuroPlaNet (`http://europlanet.cesr.fr`) are:
1) increase the productivity of planetary projects with European investment, with emphasis on major planetary exploration missions;
2) initiate a long–term integration of the European planetary science community;
3) improve European scientific competitiveness, develop and spread expertise in this research area,
4) improve public understanding of planetary environments.

The objectives are to be met through improving synergies between subfields, developing an integrated information system to provide access to all relevant data sets.

3.3.4 ASTRONET

ASTRONET (`http://www.astronet-eu.org`) is a "group of European funding agencies [coming together] in order to establish a comprehensive long—term planning for the development of European astronomy."

To achieve this goal ASTRONET has set for itself the following concrete objectives:

- producing a Science Vision for European astronomy, benefiting from national reviews when they exist, inspiring others when they don't,
- proposing, as a result, an Infrastructure Roadmap of European astronomy, identifying key technologies that are on the critical path to success,
- proposing targeted coordinated actions between ASTRONET participants, in particular evaluation procedures and specific research programs,
- laying the foundations for a permanent mechanism of cooperation between European research agencies in the field of astronomy and astrophysics.

These objectives will be met by producing an "Infrastructure roadmap" itself based on a document called "Science Vision".

Although ASTRONET is a group of funding agencies, it has set up a way of working that involves the astronomical community by setting up working groups and by inviting the community as a

whole to discuss the draft "Science Vision" document elaborated by the working groups. Further working groups are now working on the "Infrastructure roadmap" which will again be presented to the community for discussion.

3.3.5 ESFRI

The members of this forum are delegates from national ministries of EU member states, the commission and associated countries (those that are not EU members but are taking part in the framework programme). In contrast to OPTICON, RadioNet and EuroPlaNet that have been proposed by members of and are run by the scientific community, ESFRI is a forum of government officials. ESFRI has sought advice from external experts.

ESFRI has been set up with the following scope:

1. to support a coherent and strategy–led approach to policy making on research infrastructures in Europe;
2. to facilitate multilateral initiatives leading to a better use and development of research infrastructures."

The European Strategy Forum on Research Infrastructures (`http://cordis.europa.eu/esfri`) has identified "35 large scale infrastructure projects, at various stages of development, in seven key research areas including Environmental Sciences; Energy; Materials Sciences; Astrophysics, Astronomy, Particle and Nuclear Physics; Biomedical and Life Sciences; Social Sciences and the Humanities; Computation and Data Treatment. The list covers among others projects such as the European Polar Research Icebreaker, high power lasers, biobanks, large optical telescopes, the square kilometre array, high power computing services and the upgrade of the European Social Survey."

In astronomy ESFRI recommends the ELT (large ground based telescope), SKA (square kilometre low frequency radio telescope) and KM3NET (a cubic kilometre neutrino detector).

3.3.6 ApPEC and ASPERA

ApPEC (Astroparticle Physics European Coordination) has initiated work towards the definition of the priorities and possible implementations of astroparticle experiments in Europe. The first stage of this work, the ASPERA (an FP6 ERA network, `http://www.aspera-eu.org`) roadmap stage I, has been issued in 2007. The roadmap describes a number of experiments that can be expected to provide considerable progress based on the results obtained lately in TeV astronomy and other domains and on the existing technologies, or at least on those that can be expected to mature in the coming years. The experiments aim to include dark matter searches, neutrino astronomy and physics, proton decay, TeV gamma ray astronomy, charged particles (cosmic rays) and gravitational waves. This field is in rapid transition from a set of early "experiments" to becoming a rapidly

growing observational tool able to study populations of cosmic objects and thus to become one of the tools of multi–wavelength astrophysics in the study of numerous types of cosmic objects. This is particularly true of TeV astronomy where the next generations of instruments are expected to be real "observatories", serving large communities.

Further steps of the ASPERA process will lead to an implementation plan for a number of facilities.

3.4 Other International Organisations

The OECD has also established a forum in which large facilities for research are discussed by national delegates. This body has already met a few times and generated some reports. It provides a forum in which large scientific projects, among which a number of astronomical projects, can be discussed in a world wide framework.

The European Science Foundation (ESF) also takes on a number of reviews for various organisations and authorities and contributes thus to the shaping of the astronomical efforts in Europe.

4 The aim

The European landscape is dominated by national structures, even when they very successfully collaborate in some inter–governmental organisations like ESA and ESO. Indeed, even in these organisations policy is set by national delegates rather than by a truly European body. Sometimes, but certainly not always, the national delegates to European intergovernmental organisations act to foster or preserve national interests and points of view. It also happens, though, that committees and councils choose to develop a truly European policy. This is easiest when there are no competing national interests, be they scientific or industrial. This truly European construction has allowed Europe to take a leading position in optical, mm, and radio astronomy and to develop a remarkable position in space science, in the latter case with a rather modest (in international comparison) budget.

The EU adds a new administrative layer between the national states and the projects or organisations that it funds. This layer acts to collect the outcomes of the national debates and then turns them into a truly European policy, in which national interests should cease to dominate. This should then imply that an important fraction of the funding comes from the EU, which is up to now far from being the case. It must also be noted that up to now at least, the EU is seen in large parts of the scientific community as a top heavy bureaucracy, ill equipped to understand the scientific community and to respond to its, sometimes complex and contradictory statements.

This notwithstanding, the EU has in the past years taken an important if somewhat confusing rôle in the discussions of large scientific projects. This has led to the initiatives described in section 3. One problem at present is that the number of organisations that are on the coordination scene has become large and that they represent many different types of constituencies. Furthermore, none of these organisations or networks represents the entire European astronomical community. The

EAS, which is the society of all professional European astronomers, is therefore thinking about its rôle in this complex landscape, hence the present paper.

A further difficulty is that all planning efforts are meant for different funding bodies and/or structures. Whereas it is most often possible to see who is expected to take advice from the roadmaps and other documents, the advice provided is relevant for a number of actors, not necessarily only those who mandated the exercise in the first place. Funding authorities are therefore confronted with a number of papers, some of which are meant for them, some others simply relevant and not necessarily coordinated among themselves. The bodies at the origin of the harmonisation plans and roadmaps are also diverse in terms of the interests they represent. For the time being none is representing the astronomical community at large, even if some planning efforts have called on the community. ASTRONET is a good example here.

We should aim for a coherent expression of the priorities of the European astronomical community for years ahead. We should also aim at ways to make these views understood by all the funding bodies in Europe.

5 The rôle of the EAS

Only the EAS represents the astronomers and astrophysicists on a pan–European scale. The Council of the society recognises the responsibility that this representation implies and made it a core issue in guiding its thinking for the coming years. We describe here our current activities and those proposed for the near future.

5.1 EU contacts

5.1.1 Relationship with the commission

EAS Council is working towards establishing a regular discussion with the EU commission at the appropriate level. This will be taken care of for the council by the President. A report will be given at each of the general assemblies and published in the EAS Newsletter.

5.1.2 Astronomical planning in Europe

We have seen in section 3 that many organisations in Europe are making plans, producing roadmaps and funding recommendations. Some explicitly use inputs from the community, others less so. Many use EU funds to place contracts to national agencies or other bodies to do part of the work, none is community driven, except for several national roadmaps.

Although all the planning efforts now underway have limitations, they are all valuable as they are based on sometimes considerable efforts and thoughts. These values must be recognised and put

to good use.

EAS council proposes to review the planning material generated up to 2007, be it of national or international origin and to produce a synthesis of the findings. In order to perform this task, EAS council is setting up a committee of senior astronomers, members of the society. The committee is chaired by Prof. M.C.E. Huber and composed of members *ad personam*. The members are selected so as to cover a very broad knowledge base. EAS council will approve the document prior to making it public.

The council will then communicate this synthesis to the EAS members through the Newsletter and at meetings. It is expected that this information will allow all EAS members to have an informed opinion on the state of astronomy planning in Europe. The EAS will thus serve in this first step as a link between the various committees and bodies that are now doing the planning efforts and the astronomical community at large. The evolution of the synthesis document in the coming years will be addressed by council in due course.

The chairperson is encouraged to involve the community first by seeking opinions using electronic means, and further through direct contacts with external experts where the committee deems necessary. Liaison with the Council will be through one of the vice–presidents.

5.2 Communication between the members

The EAS should not only provide a link between the community and the European planning authorities, it should also foster communication between its members. Even when working in different fields of astrophysics, we share the use of many common facilities. Satellites and observatories are used across all fields and it is collectively that we face the task of developing, operating and maintaining our 'tools'. In order to do this we need to know and understand those colleagues active in areas that can be far removed from our own and to have a good grasp of their ambitions and problems. The EAS provides the framework within which this communication can take place.

5.2.1 EAS meetings

JENAM meetings are common meetings jointly organised by an affiliated society and the EAS. This format has many advantages both regarding the organisational aspects and the opportunity to strengthen the links between a national community and the European society. These meetings are now organised around a number of EAS (or JENAM) symposia on specific subjects, a few of which taking place in parallel, and a number of plenary sessions. This provides a balanced approach between the necessary specialised meetings and the opportunity to meet colleagues working in different fields in a truly multi–disciplinary approach to modern astrophysics.

Council will in future years ensure that this balance remains such that EAS meetings are attractive to the whole community. The Treasurer will provide the necessary long term link between the yearly organisers and Council.

5.2.2 Newsletter

The society has edited almost since the beginning of its existence a Newsletter, providing a physical link between the society and the members. The Newsletter provides information on the Society and its activities, information of use to the community and original material on aspects of its constituency. This latter element is of great importance as it promotes mutual understanding of communities that history has often kept separated for long periods of time. This publication will continue on a bi–annual basis, with issues coming out in December and June under the editorship of Vassilis Charmandaris of the University of Crete. Members are invited to provide comments and articles to the editor and to contribute thus to the liveliness of the journal.

5.2.3 Electronic communication

The EAS has been running a web page providing information to the members on society issues, meetings, but also membership, job opportunities and the like. The web page is maintained at the ISDC, it can be found at: `http://eas.unige.ch`, the e–mail address under which the society's secretary can be reached is `eas@obs.unige.ch`. This service will be continued and, wherever possible enhanced in the coming years. The Secretary is the person in charge of these communications.

5.2.4 The Tycho Brahe prize

The EAS awards yearly the Tycho Brahe prize in recognition for the development or exploitation of European instruments, or major discoveries based largely on such instruments. The prize will be awarded at the JENAM meetings. The winner will give a lecture that will then be published in Astronomy and Astrophysics Reviews.

5.2.5 Other publications

The EAS has a series of publications, the EAS publications series, edited by J.–P. Zahn for the distribution of papers of general interest in astronomy, proceedings and monographs.

The EAS also has special links with Astronomy and Astrophysics Reviews. The publisher grants to EAS members a much reduced subscription rate and will publish the lecture given yearly by the winner of EAS Tycho Brahe price.

5.3 Contacts with and between national societies

Many issues relevant for astronomers in Europe are dealt with within a national framework. Most of the national communities have therefore established astronomical societies in various forms. The EAS will help in the discussions across national boundaries wherever meaningful and will provide a

forum in which contacts can be established and pursued. It also has a register of national societies and their presidents on its web site. The president is in charge of this aspect of the EAS activities.

Meetings of the EAS with its affiliated societies are expected to be the ideal vehicle for these contacts. The first of these meetings took place in January 2008 in Leiden.

5.4 Contacts with sister societies

Astronomy does not operate in a vacuum. Many other scientific fields are organised on the European scene, like the European Physical Society or Euroscience and many others. The EAS, through its President, will seek contacts with these societies in order to discuss areas that straddle different societies like astro–particle physics, in order to find common ground or discuss problems which are shared among communities and ways to address these common issues in a coordinated fashion.