Under One Sky: The IAU Centenary Symposium
Proceedings IAU Symposium No. 349, 2019
C. Sterken, J. Hearnshaw & D. Valls-Gabaud, eds.

doi:10.1017/S1743921319000127

The IAU in the 21st Century

Robert Williams[1,2]

[1]Space Telescope Science Institute, Baltimore, USA
[2]University of California at Santa Cruz, USA
email: wms@stsci.edu

Abstract. Beginning in year 2000 the IAU undertook a number of initiatives that changed the Union from being primarily an inward-focused organization whose emphasis was the world of professional astronomy, to being more outward looking in engaging with the public. These initiatives included proposing to the United Nations and then leading the *International Year of Astronomy* IYA 2009, and the formulation of a *Strategic Plan* that included creation of the *Office of Astronomy for Development*. Additional programs are being undertaken by the Union that continue to broaden IAU engagement with the public.

Keywords. The IAU in the future, IAU and public outreach, IAU Strategic Plan

1. Introduction

The IAU turns 100 and enters mid-life. It is a mature organization and by most organizational criteria appears to be in good health. It does help that astronomy and astrophysics are in such good repute world-wide. There are obvious reasons for this:

(*a*) Our telescopes and detectors of both electromagnetic and gravitational radiation paint a compelling picture of the universe that is striking and hard to ignore.

(*b*) Public understanding is gaining wide acceptance of the fact that the Earth as a planet, and life itself, may be understood in terms of evolutionary processes that have occurred over æons in different conditions in accordance with natural laws. Significantly, people are coming to appreciate more than in the past that everything out beyond the Earth may represent part of life's roots. Slowly but steadily, science is making inroads against superstition.

During its early years the IAU was largely an inward-looking organization. It was international, but its focus was internal – taking care of astronomy and astronomers: bringing astronomers together, acting as a regulatory body for systems and units that were important to astronomers, e.g. naming conventions, coordinate systems and time. The internal focus of the early IAU was perhaps due to the fact that 20th century astronomy – which as a pure science rather than more applied sciences like chemistry, geophysics or physics – did not have large industries whose livelihoods were tied to advances in astronomy.

2. Evolution of the IAU's focus and mission

The IAU evolved to become more outward looking in the latter half of 20th century when technological advances broadened the scope of astronomy, making it possible to address fundamental scientific questions using newly developed instruments. Telescopes could be launched into space. Bulky, low quantum efficiency photographic plates were replaced by more sensitive electronic detectors that could sample a broad range of

wavelengths. Archiving digital data became easy, and computers made possible the construction of complex hardware and detailed theoretical models. These advances drove up the cost of frontier science to high levels. Forefront astronomy became quite expensive.

Astronomers responded to this situation by mobilizing and setting up national committee structures within their countries whereby they could come together, set priorities, and act in a unified, more effective way. These structures led to the formation of large national and international observatories like ESO, AAO, NOAO, SAAO and NAOJ. These observatories broadened and elevated the research levels in their countries, doing so without direct involvement of the IAU. It was not appropriate for the IAU to intervene in countries that had their own processes for determining priorities. So the IAU kept its focus on the broad organizational needs of the science.

This all changed at the end of the century, in the 1990s, due to one key factor that dramatically changed more than just astronomy – the rapid rise of world-wide communication through the internet. The internet made very easy direct contact between scientists with exchanges of ideas and data even in the presence of continuing political and economic differences, which in previous decades had made communications difficult among scientists in countries whose interests and governments were not aligned. At the same time, the ease with which media could propagate through every part of society had a huge impact in improving education. Science, and astronomy especially, was one of the main beneficiaries. The excitement of astronomical discoveries was grabbing the public's attention throughout the world.

This new culture presented the IAU with real opportunities. Many IAU members had assumed leadership positions for large projects in their home countries where they learned that a more unified, assertive approach was necessary to obtain government funding and to deal more firmly with industrial partners in contracts. The leadership of the Executive Committee was already accommodating to the internationalization of large science projects, working with the members to push for new ways for the IAU to do business. These efforts took form in two different, significant initiatives. The first was to do what industries were doing: develop a strategic plan that formulated specific goals for the IAU and the ways in which they could be achieved. The second was to grab the attention of the world about the large impact that astronomy has on the way people think and its importance for the peaceful uses of space. These two efforts resulted in the IAU proposal to the United Nations for the International Year of Astronomy 2009, and the formulation of a wide-ranging Strategic Plan that advocated, among other things, increased attention to education and public outreach through the creation of the *Office of Astronomy for Development* with its regional centers, and the *Office for Astronomy Outreach* which engages local communities in astronomical activities.

By every standard these initiatives were very successful, and they were turning points for the Union. Both the IYA and the Strategic Plan required enormous effort and coordination, and their success was the result of the efforts of a number of IAU members. In particular, I must single out Catherine Cesarsky's dedicated leadership of the IYA 2009 as a key to its success, and in the case of the Strategic Plan, George Miley was a driving force behind its formulation and the creation of the *Office of Astronomy for Development*. One of the outcomes of the IYA was the creation of a network of national contacts that served as organizers and gateways for communication with the IAU. This network has been very useful and is still used to coordinate IAU activities among different countries.

One of the central themes of the strategic plan was the deeper engagement of IAU members in the decision making process of the Union. By the Statutes this is carried out in two ways. Budgetary and organizational matters are voted upon by the national members. Scientific matters had long been decided by vote of individual members in attendance at the General Assembly, representing a small fraction of the Union membership. As is well

https://doi.org/10.1017/S1743921319000127 Published online by Cambridge University Press

known, the decision to change the status of the planet Pluto resulted from a relatively close vote involving perhaps 600 members present in Prague.

In the era of web communication there was every reason to believe that a scientific debate can and should take place electronically for important scientific resolutions so that all members could take part and vote. General Secretary Ian Corbett and I felt strongly about this, so the Executive Committee proposed a change to the Statutes that would enable questions of a primarily scientific nature to be decided by electronic vote of the members. This procedure is now in place, and the voting for Division officers is also carried out by e-voting of division members using web-voting.

3. The IAU in the future

With those events and changes now in place it is appropriate to ask: where should we now think of directing new efforts of the IAU in the coming decade? The current Executive Committee is in the process of working with the Divisions to produce a new strategic plan, and various ideas are being discussed during this GA. One new activity that some have proposed would have the Union play a role in the coordination of international projects. The IAU could serve as a gateway for information and a forum for the exchange of ideas and resources. I recall first hearing Ron Ekers advocate this as a useful IAU activity some years ago, and it is now getting our serious attention. Focus Meeting 13 last week considered how we might define IAU participation in the coordination of international projects. It could take on various forms. For example, we could institute a policy that meetings sponsored by the IAU should have a session devoted to proposed and ongoing projects related to the meeting topic. We could host a website where groups publicize the status of projects or their interest in collaborating with partners.

This would require a working group set up by the Executive Committee or a Division, and some funding. Maintaining a website would be necessary, and this could be contracted out – much as Union web work is currently contracted out to external organizations such as ESO. Who would do the work? It would be worthwhile to encourage interested scientists, especially postdocs or graduate students, to work under the direction of a Working Group. It could serve as a way to introduce new talent into the world of forefront research. Significantly, the projects need not be confined to large hardware-intensive projects like ALMA or the SKA, but could involve the development of software tools and statistical methods. The Large Synoptic Survey Telescope, LSST, will identify tens of thousands of transients every night when it begins operation. At the moment there is a large effort being directed at how one classifies and follows up on those transients. Efforts such as this could benefit from increased international participation, which it already does have, in a coordinated way that does not restrict the independence of any groups in the project. Thus, one can imagine a variety of activities that could be enhanced by IAU involvement in international projects.

The IAU will certainly continue its efforts to foster astronomical research around the world and to promote education and outreach. As long as the Union accommodates to the ever changing scientific-technical landscape and captures the best of its features into its culture, it will remain a positive influence in international astronomy.