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THE IAU ASTRONOMY FOR DEVELOPMENT PROGRAMME

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Abstract. Astronomy is a unique tool for international development because it combines cutting-edge technology with fundamental science and has deep cultural roots. The International Astronomical Union regards furthering the exploitation of astronomy for sustainable global development as an important part of its mission.

To realize these aspirations the IAU has developed an ambitious strategic plan for the period 2010 – 2020. This plan, "Astronomy for the developing world: Building from IYA 2009", endorsed by the IAU General Assembly in 2009, envisages a substantial increase in IAU educational and development activities during the next decade.

This article will discuss the content of the plan, the processes that led to its creation and adoption and the setting up of the IAU Global Office of Astronomy for Development at the SAAO in Cape Town, South Africa. We shall also describe the activities envisaged in the plan and argue that such a program is important for its own sake and necessary to generate funding for the next generation of astronomical research facilities.

1. Introduction – Astronomy for International Development

> *"It is important to maintain a basic science competence in 'flagship' sciences such as physics and astronomy for cultural reasons. Not to offer them would be to take a negative view of our future – the view that we are a second-class nation, chained forever to the treadmill of feeding and clothing ourselves".* – South African Department of Science and Technology, White paper on Science & Technology Policy (1996)

1.1. BACKGROUND

The IAU has long regarded fostering astronomy in developing countries as an important part of its mission. During the past two decades the IAU has conducted a range of educational and outreach activities under the auspices of its Commissions 46 and 55. These activities were directed mainly towards stimulating astronomy at university level. The success of the International Year of Astronomy (IYA 2009) and the increase in the scope and size of astronomy outreach activities inspired a review IAU activities and the development of a new strategic plan for the next decade. As IAU Vice President for Development and Education, I was privileged to be author of this plan and responsible for its implementation.

In this article, I shall first describe the outline the unique aspects of astronomy as a tool for furthering education and capacity building throughout the world. After commenting on the present global state of the astronomical research and education and I shall describe some activities that have been carried out by the IAU in recent years. I shall then outline the processes that led to the development of the new strategy, discuss the content of the Plan and the present state of its implementation, including the setting-up of a small office to coordinate the activities at the South African Astronomical Observatory (SAAO) in Cape Town, South Africa.

1.2. UNIQUENESS OF ASTRONOMY FOR HUMAN CAPACITY BUILDING

As illustrated in Fig. 1, the front cover of the IAU Decadal Strategic Plan, astronomy provides an inspirational and unique gateway to technology science and culture, three fundamental characteristics of developed nations.

- Astronomy is an important driver for the development of *advanced technology*, such as the most sensitive detectors of light and radio waves and the fastest computers. The need to study the faintest objects possible requires sophisticated electronics and extreme-precision adaptive optics as well as state-of-the-art engineering and innovative software algorithms. Astronomy has played an important role in the development of space technology that has opened up the Universe for study across the whole electromagnetic spectrum and driven developments in miniaturization. Modern optical and radio telescopes are among the most advanced machines ever built and are outstanding educational vehicles for becoming familiar with the latest complex technology.
- The Universe provides an inexpensive laboratory for *scientific studies* of extreme conditions that are inaccessible on Earth. Stars and galaxies are environments that have produced the chemical elements around us and formed organic molecules, the building blocks of life. During the

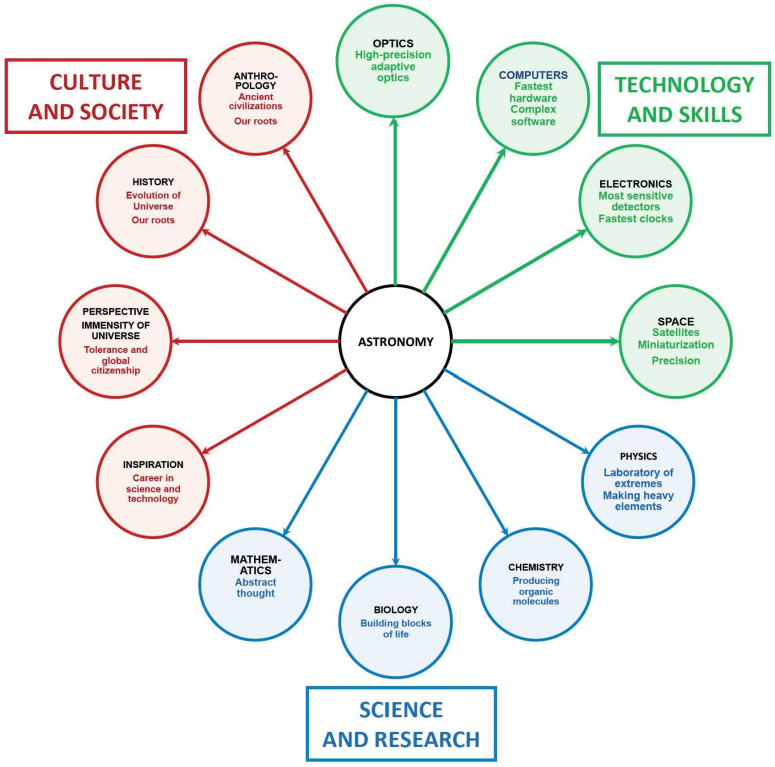

Figure 1. Schematic reproduction of cover of the IAU Strategic Plan, illustrating that astronomy is a unique tool for capacity building.

last century astronomical studies have led to new discoveries in physics, chemistry and biology and to the creation of the new sciences of astrophysics, astrochemistry and astrobiology. Because of its mathematical basis, astronomy is also an excellent tool for teaching mathematics. Access to several of the most sophisticated astronomical facilities and data archives are open to all. Hence astronomy enables scientists in every country to become involved in forefront scientific research at very little cost.

- Astronomy also contributes substantially to modern *culture* and is relevant to several topical issues of present-day society.
  - Astronomers are the ultimate historians. Large telescopes are "time machines" that routinely provide pictures and other information about of the observable Universe close to its "birth", 13.7 billion years ago. Unravelling the history of the Universe has been a

crowning achievement of humankind during the last half-century.

- One of the most important societal functions of modern astronomy is as a tool for education in the broadest sense. Because it is one of the most approachable of sciences, and one that consistently fascinates young people, astronomy is an excellent vehicle for introducing science and technology to children. The accessibility of the sky, the beauty of cosmic objects and the immensity of the Universe are inspirational and provide a perspective that encourages internationalism and tolerance. The excitement of astronomy has stimulated large numbers of young people to choose a career in science and technology, thereby contributing to the "knowledge economy" of many countries.

1.3. FROM THE CRADLE TO THE GRAVE

These various characteristics make astronomy an important tool for education and capacity building at all levels "from the cradle to the grave".

- *Primary education* (ages 4-10).
  The early formative years are crucial in the development of the human value system. At these ages children can readily appreciate and enjoy the beauty of astronomical objects and can learn to develop a 'feeling' for the vastness of the Universe. The sky and the Universe can excite young children and stimulate their imaginations. Exposure to inspirational astronomical themes can help broaden the minds and stimulate a world-view. Furthermore, astronomy is an excellent and exciting introduction to the scientific method and the concept that nature can be interrogated by rational means.
- *Secondary education* (ages 11-18).
  Astronomy is an outstanding medium for stimulating the interest of secondary school students in science and technology. The Universe and space travel are fascinating subjects in their own right. These topics can be integrated into physics, chemistry, biology and mathematics teaching and provide a link with technology and engineering studies. Recently, educational networks of telescopes have been developed that enable school children throughout the world to do astronomical observations by means of the Internet and introduce children to exciting scientific research.
- *Tertiary/University education and research training.*
  The link with astronomy is a frequent reason for young people to choose to study the physical sciences at University and the study of astronomy provides an excellent preparation for many careers in technology and management. Astronomy deals with material, which is much denser and

much sparser than anything that can be produced on Earth. Analysing phenomena under the extreme conditions that are present in astrophysical objects develops problem-solving abilities. Furthermore, modern astronomical research is often carried out in international collaborative teams, which by necessity develops managerial and people skills.

- *Research capabilities and infrastructures.*
  Much modern astronomical research requires facilities that are too expensive even for individual developed countries to build and operate. The realization of such facilities has frequently necessitated large international collaborations. Nevertheless, many of the largest astronomical telescopes and satellites and their archival treasures can be used by astronomers throughout the world, no matter where they are based, providing an easy and relatively inexpensive entry for developing countries into inspirational and visible world-class international research.
- *Public outreach.*
  Astronomy is the most approachable of all sciences for the general public. Compare the relative attention that astronomy receives in the newspapers and other media of most countries with that devoted to most other sciences. Everybody can gaze at the sky and appreciate its beauty. The evocative images produced by modern telescopes fascinate, whereas stories about exotic cosmic objects and the evolution and origin of our Universe can inspire, entertain and stretch the imagination. Information about the state of the Universe in the distant past has deep implications about the roots and future of our species. Astronomy provides an ideal introduction for teenagers to the creative excitement of the exact sciences and frequently stimulates students to embark on a scientific career. The adventure of astronomy is a popular ingredient of adult education program

2. Why a New Strategic Plan?

"Education is a human right with immense power to transform. On its foundation rest the cornerstones of freedom, democracy and sustainable human development." – Kofi Annan

2.1. PREVIOUS ACTIVITIES BY THE IAU COMMISSIONS

Prior to 2009 the IAU education and development activities focused on universities, research and outreach. These were carried out through two commissions of its members. Commission 46 is concerned with "Astronomy Education and Development" and Commission 55 is devoted to "Communicating Astronomy with the Public". Within Commission 46 four "Pro-

gram Groups" were involved with furthering astronomy in the developing countries. These program groups were the "World Wide Development of Astronomy (WWDA)", "Teaching for Astronomy Development (TAD)", the "International Schools for Young Astronomers (ISYA)" and "Exchange of Astronomers". The main activities carried out by the program groups were visits by astronomers to developing countries and organising schools for young astronomers. The coordination and implementation of all the activities were carried out on a purely voluntary basis. This was a limitation on the size and scales of the programmes. The advent of IYA2009 changed this dramatically.

2.2. IYA2009: THE INTERNATIONAL YEAR OF ASTRONOMY

The UN-proclaimed IAU-UNESCO International Year of Astronomy 2009 (IYA2009)[1], initiated by the Executive Committee was the largest science education and public outreach event ever and reached hundreds of millions of people in 148 countries. IYA2009 was a global effort to "help the citizens of the world rediscover their place in the Universe through the day- and night-time sky, and thereby engage a personal sense of wonder and discovery." Reports from the IYA2009 network (148 countries, 40 international organisations and 28 global projects) show that at least 815 million people worldwide were reached by IYA2009 activities. Star parties, public talks, exhibits, school programmes, books, citizen-scientist programmes, sciencearts events, IYA2009 documentaries and parades.

Astronomy is a special discipline for science outreach in that it has hundreds of thousands of amateur practitioners throughout the world. Collaboration between the professional and amateur astronomers was one of several factors that were responsible for the huge success and large outreach of IYA2009. Other factors included (i) the bottom-up and inclusive nature of the activities and (ii) a small office that provided professional coordination for the activities of volunteers. These will be important aspects of future IAU educational and development programmes.

2.3. ROAD TO THE IAU ASTRONOMY FOR DEVELOPMENT PLAN

The advent of IYA2009 was an opportune time to review the educational strategy of the IAU and develop a long-term plan for the post-IYA era.

There are several reasons why such a decadal plan was needed. First, technology is changing. The widespread access to the Internet and the future availability of remotely operated telescopes for education are two of many new opportunities that can be exploited. Secondly, several new

[1] http://www.astronomy2009.org/news/updates/1108/

astronomy-based programs have been instigated for education at the primary and secondary levels. We realised that coordination and focusing of the various IAU and non-IAU programs can produce a program that as a whole is greater than the sum of its parts. Thirdly, to augment efforts in this area a substantial amount of additional funding is needed. An ambitious and well-founded strategic plan is a prerequisite for any attempt to solicit additional funding.

In late 2007 the IAU Executive Committee therefore embarked on an exercise designed to produce a plan for ratification at the 2009 IAU General Assembly. First, we obtained input from a wide range of experts and stakeholders. An informal "brainstorming" meeting was held in Paris from 28-30 January 2008 to provide input to the Plan. Participants included representatives of IAU Commission 46 and its Program Groups, of non-IAU global astronomy education programmes, including the Japanese Tripod, ODA programme, the IYA Cornerstone 11/ Africa Plan, the Las Cumbres Observatory telescope network, Global Hands on Universe and Universe Awareness. In addition, several members of the IAU Executive Committee were present. As a result of this meeting the first draft of a plan was written. During the next year, this Strategic Plan went through several additional drafts, with input obtained from stakeholders such as the United Nations Office for Outer Space Affairs (UNOOSA), the Committee on Space Research (COSPAR) and the International Union of Radio Science (URSI). Finally, the IAU Press Office, with the help of the ESO Education and Public Outreach Department, produced an illustrated version of the Plan for distribution.

The IAU Strategic Plan was approved by the IAU Executive Committee on 7 April 2009 and endorsed by two resolutions at the IAU General Assembly at Rio de Janeiro on 13 August 2009.

3. Digression – State of World Astronomy Development

> *"Fanatic ethnic, religious or national identifications are difficult to support when we see our planet as a fragile, blue crescent fading to become an inconspicuous point of light against the bastion and citadel of the stars."* – Carl Sagan

Before discussing the content of the new IAU Strategic Plan it is instructive to survey the state of astronomy research and general education around the world, i.e. the theatre in which the plan must operate.

3.1. RESEARCH

An overview of the state of astronomy development was given by Hearnshaw (2007), who classified countries into various groups, using the GDP as a classification parameter. Here I shall use updated data supplied by Hearnshaw (2008) and adopt a slightly modified classification scheme, based purely on the state of astronomy in the countries. For the purposes of discussing world astronomical development, it is convenient to divide countries into the following groups:

Group 1A. "Developed astronomy research countries A".
These are IAU member states with > 4 IAU members per million population, indicative of a thriving astronomy research community.

Group 1B. "Developed astronomy research countries B".
These are IAU member states that participate in or host front-line astronomy research facilities, but that have less than 4 members per million population.

Group 2. "Emerging astronomy research countries".
These are IAU member states with between 0.5 and 4 IAU members per million population that do not participate in front-line astronomy research facilities. They are targets for stimulating growth of their astronomical research.

Group 3. "Developing astronomy research countries".
These are countries that do not adhere to the IAU, but have at least one individual IAU member, indicative of limited involvement in astronomical research. They are targets for stimulating growth of their astronomical research.

Group 4. "Potential developing astronomy research countries".
These are countries with well-developed tertiary education that neither adhere to the IAU nor contain individual IAU members. They are targets for stimulating the establishment of astronomy-oriented research groups.

Group 5. "Underdeveloped astronomy countries."
These are countries that do not adhere to the IAU or contain individual IAU members whose tertiary education is only weakly developed. They are targets for stimulating the dissemination of astronomy education within their schools.

A summary of the present state of astronomical development in 152 countries as a function of their region is given in Figs. 2. For each region the number of countries and the number of inhabitants that fall into each of the above classifications are shown.

About two thirds of the world's population inhabits Group 1 countries that are developed in astronomical research. However, many of the "developed" astronomy countries in Group 1B have large populations and within

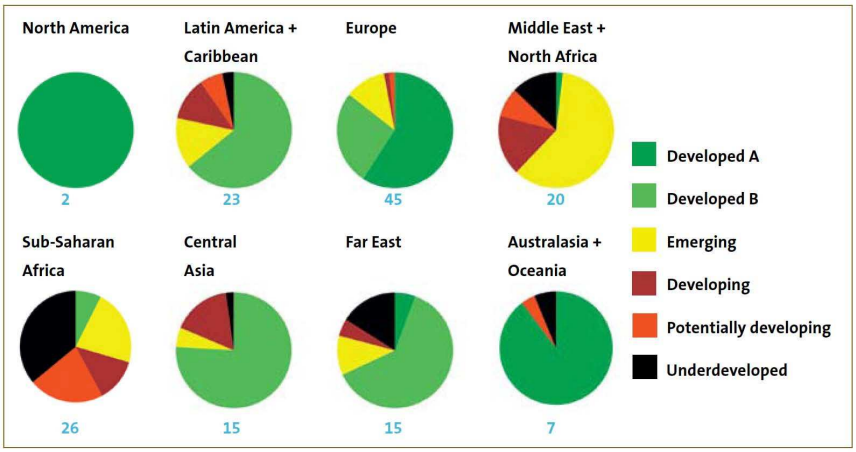

Figure 2. Astronomy research development by region. Populations in millions that inhabit countries at various stages of development in different regions of the world. The plots were compiled on the basis of data from Hearnshaw (2008, private communication). The numbers of countries included in each region are indicated in blue. A number of conclusions follow from these statistics.

these countries there are often substantial regional variations in the degree of astronomy development.

There is considerable disparity from region to region. The region that has the largest populations in the least developed astronomical groups is Sub-Saharan Africa.

As to be expected, there is a strong correlation between astronomical development and gross domestic product (GDP), with poorer countries generally being less developed in astronomy.

3.2. EDUCATION

The state of the educational infrastructure must be an important factor in determining the detailed strategy for astronomy development, particularly in the areas of school education and public outreach. The global distribution of educational index is illustrated in Fig. 3.

Since not all UN member states chose provide the necessary statistics, the data is not complete. Nevertheless, they provide a useful basis for planning future initiatives for programs directed at stimulating astronomy in primary and secondary and tertiary education.

Countries can be divided into three broad categories based on their Education Index: high, medium, and low. As is the case with astronomy research development, Sub-Saharan Africa has the largest number of least developed countries as measured by their educational index.

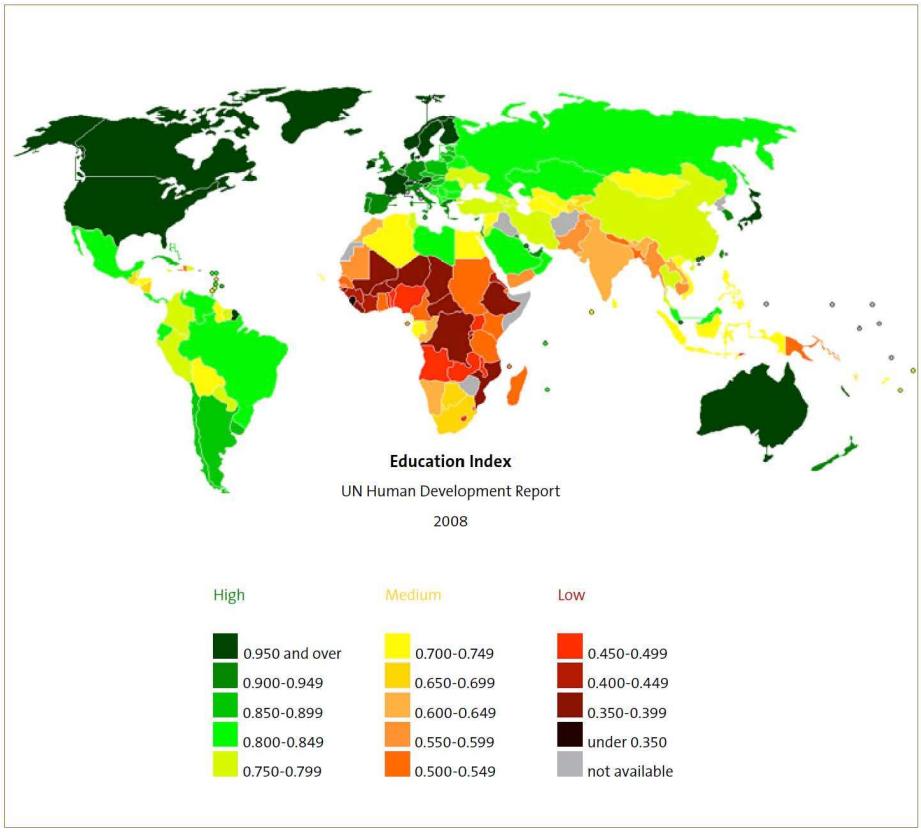

Figure 3. Global distribution of educational index. The educational index is defined by E = 2/3 (L) + 1/3 (C), where L is the literacy rate and C is the combined gross school enrolment ratio. This is taken from the 2007/2008 edition of the UN Human Development Report (2007, ISBN978-0-230-54704-9).

4. Building on the IYA – The IAU Strategic Plan 20102020

"Education is the great engine of personal development. It is through education that the daughter of a peasant can become a doctor, that the son of a mineworker can become the head of the mine, that a child of farm workers can become the President of a great nation." – Nelson Mandela

4.1. THE STRATEGY

The new IAU plan[2] is a bottom-up plan of action for the next decade to use astronomy as a tool for capacity building throughout the world. It contains a vision, goals to be achieved during the next decade, a strategy for achieving these goals and a blueprint for implementation.

The long-term vision of the plan is that eventually all countries should participate at some level in astronomical research and that all children throughout the world will be exposed to knowledge about astronomy and the Universe. Specific goals for the next decade are (i) to raise the level of astronomy development of as many countries as possible by one or more categories (Section 3.1) and (ii) to include aspects of astronomy in the primary and secondary education of as many children as possible.

The "meat" of the plan is a strategy consisting of several components.

- *A strategic phased integrated approach.*
  This includes primary, secondary and tertiary education, research and public science outreach. The strategy will be based on the future potential for astronomy research and education in each country, using objective data, augmented by advice from experts in the region
- *Special attention to Sub-Saharan Africa.*
  Because of its relative underdevelopment, sub-Saharan Africa will receive special attention.
- *Using IYA2009 as a springboard.*
  Several IYA global cornerstones will be continued and supported, after the IYA has finished. Examples of activities that have been adopted by the IAU include the Galileo teacher training program, UNAWE and the Galileoscope. Also, the huge network of IYA contacts that has been built up in IAU member states and other countries is a valuable resource that will be used for future capacity building activities.
- *Enlarging the number of active volunteers.*
  We shall recruit vigorously among our ∼10,000 members and augment the pool of member volunteers by doctoral students, postdoctoral trainees and talented non-member experts on pre-tertiary education and outreach, including amateur astronomers. It is hoped that expatriates will play an important role.
- *Initiation of new activities*, such as semi-popular lectures on inspirational topics at the high school and long-term institute twinning between established astronomy institutes and university departments in less developed countries.
- *Creation of a small Global Office of Astronomy for Development (GOAD).*

[2] http://iau.org/static/education/strategicplan_091001.pdf

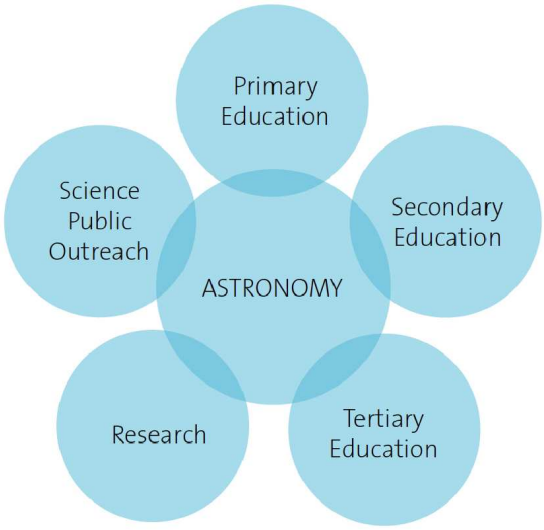

Figure 4. Elements of astronomy development. Fundamental ingredients of development to which astronomy can make a unique contribution. The mix of activities will be tailored to the needs of each country and region.

Mobilizing large number of volunteers and implementing new programs need professional coordination, as was demonstrated during the coordination of IYA2009.

- *Increasing regional involvement.*
  The bottom-up IYA2009 approach will be continued, with a substantial degree of decentralization. This will involve the appointment of regional development coordinators and the designation of regional "institute nodes". It is envisaged that the regional coordinators will coordinate development efforts throughout their geographical region.
- *Exploiting innovative techniques.*
  Where possible we shall explore innovative approaches to education and development, including the internet and new tools, such as archives, robotic telescope networks and the "Astro-bus" a mobile science centre pioneered by La Cité des Sciences in Tunis that contains a planetarium and a small telescope and reaches children and the public in rural Tunisian villages.
- *Evaluation and assessment* will be an essential part of the plan.

4.2. PLANNED ACTIVITIES

The core of the planned strategy is to expand existing IAU activities and initiate several new ones. Planned activities to be carried out under the

auspices of the Strategic Plan (Table 1) include the following:

4.2.1. *Primary and secondary education*

- *Teacher training.*
  Teacher training at primary and secondary levels is a crucial element of national development. During the last few years the IAU has organized teacher-training courses in several countries. It is planned to rationalise and expand these activities during the next decade. Outreach to teachers in the developing world will involve the preparation and translation of materials, the provision of training courses and harnessing global technological resources in the service of primary and secondary education. It is envisaged that the use of expatriates for such activities will be expanded during the implementation of the Plan.
- *Inspiring disadvantaged children (Universe Awareness).*
  The IAU web site[3] uses the beauty and grandeur of the Universe to inspire young children from ages 4 to 10 years, particularly those from an underprivileged background. The perspective given by astronomy is used to broaden children's minds, awaken their imagination, encourage curiosity in science and stimulate global citizenship and tolerance. Although UNAWE was only founded five years ago, it is already active in more than 40 countries and comprises a global network of almost 500 astronomers, teachers and other educators. Besides developing educational material and training teachers, UNAWE enables the exchange of ideas and materials through networking and interdisciplinary workshops. The European Union (EU) has recently granted 1.9 million Euros to support the 6-country EUNAWE project in Germany, Italy, The Netherlands, South Africa, Spain and the UK. In some countries UNAWE has worked closely with the UNESCO network of schools.
- *Global Hands-On Universe (GHOU)* is an educational program that enables secondary school students to investigate the Universe while applying tools and concepts from science, mathematics, and technology. Using the Internet, GHOU participants around the world request observations from an automated telescope or download images from a large image archive, and analyse them with the aid of user-friendly image processing software.

4.2.2. *Tertiary/university education and building research capacity*

- *Capacity-building visits by scientists and engineers.*
  With a view to developing capabilities in astronomy teaching and/or research in countries that have little experience in astronomy visits

[3] `http://www.iau.org/`

TABLE 1. Some of the activities envisaged in the strategic plan

Development Phase	**Activity**
Primary and secondary education	Teacher training
	Universe Awareness
	Global Hands on Universe
Tertiary/university education and research capacity	Capacity-building visits by astronomers and engineers
	National schools for undergraduates
	Regional schools for postgraduates
	Long-term (sustainable) institute twinning
Public outreach	Semi-popular inspirational lectures in astronomy and related technology
	Exploitation of fixed and mobile planetaria

are made by IAU experts to assess the situation and encourage the development of astronomy courses at undergraduate level, or the setting up of small astronomy research groups.

- *National Schools for undergraduate students.*
  For several years the IAU has had a programme to assist a country or group that has little or no astronomical activity, but which wishes to enhance its astronomy education significantly. Highly successful national training schools in several countries have been given under the auspices of this programme. Funding permitted, it is intended to enhance and intensify these activities.
- *Regional schools for postgraduate students.*
  The IAU International Schools for Young Astronomers (ISYA) has been a highly successful IAU activity for several years. It exposes PhD students from developing regions to the latest cutting-edge science and techniques. Since the inception of ISYA in 1969, 20 ISYAs have been organized in more than 20 countries and have provided education for almost 1000 students. Recent locations include Argentina, Morocco, Mexico, Malaysia and Thailand. Presently these schools are held annually, with partial funding from the Norwegian Academy of Science and Letter During the next decade the ambition of the IAU is to increase the number of such regional schools.
- *Long-term (sustainable) institute twinning.*
  Another new planned activity is a long-term program for "twinning" between developed astronomy institutes and institutes and university

departments where astronomy is less developed. The goal is to provide guidance in setting up astronomy courses and building up an astronomy research capability. The rationale for this program is that such an association can provide needed continuity and focus for sustainable astronomy development.

4.2.3. *Public outreach*

- *Semi-popular inspirational lectures in astronomy and related technologies.*
  An endowed lecturer program will be a major new initiative to promote interest in astronomy and science in developing countries. The goal of such a program is to facilitate excellent and inspiring semi-popular lectures, thereby enhancing worldwide public interest and understanding in astronomy and the Universe. The target audience will be secondary school students, university students and members of the public.
- *Planetaria and small telescopes – Japanese ODA Program.*
  In order to promote education and research in developing nations, the Government of Japan has been providing developing nations with high-grade astronomical equipment under the framework of the Official Development Assistance (ODA) cooperation program since 1984. Instruments donated included university-level reflecting telescopes, as well as modern planetaria used for educational purposes, together with various accessories. By the end of 2007 Japan will have provided 7 telescopes and 20 planetaria to 22 developing nations. In order to ensure effective use of these instruments, the Japanese Government provides follow-up technical training through the Japan International Cooperation Agency (JICA). In return, the recipient countries are expected to provide housing and infrastructure for the instruments. The IAU Strategic Plan envisages working closely with the ODA programme during the next decade to exploit planetaria for science outreach to public in developing countries.

4.3. ORGANISATION OF THE ACTIVITIES.

The Plan foresees a substantial expansion of programmes, and funding, together with a large increase in the number of volunteers. Building on the IYA model, the focus will be on a demand-driven coherent mix of sustainable activities. This will require a more suitable organisational structure that can be provided by the present purely volunteer approach of the IAU Commissions.

To (i) rationalize the activities, (ii) reflect the increasing emphasis on pre-tertiary education and (ii) enable the scale and scope of activities to

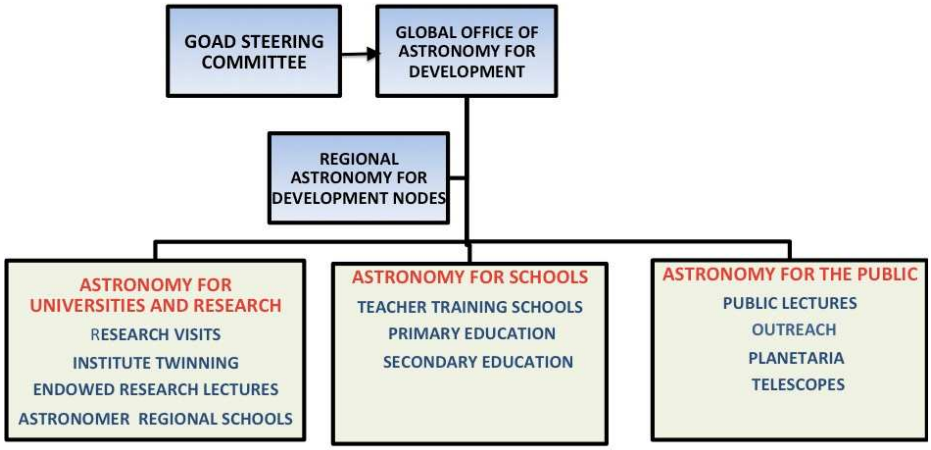

Figure 5. Organogram showing the activity task forces. The IAU Strategic Plan foresees that future astronomy for development activities will be coordinated in these three sector task forces.

be expanded, the Strategic Plan envisages (as shown in Fig. 5) that "three global task forces will be set up to coordinate and carry out activities in the various areas of astronomy development, (i) primary and secondary education, (ii) tertiary/university education and research and (iii) public outreach." According to the SP, the strategy for each of these task forces will be determined by agreement between the task force, the global development office and the regional coordinators, or the relevant institutes or authorities in the developing country. In accordance with the IYA model, the activities will be bottom-up and demand-driven by the regions, with large task forces providing the necessary global expertise.

5. Status of the IAU Strategic Plan

> *"Human history becomes more and more a race between education and catastrophe."* – H.G. Wells

5.1. THE GLOBAL OAD

The Strategic Plan covers a ten-year period and will be implemented gradually, in accordance with the available funding and (wo)man power. The first crucial step is to set up of a small Global Office of Astronomy for

Figure 6. The South African Astronomical Observatory, the institute that was selected to host the IAU Office of Astronomy for Development (OAD). This office will coordinate IAU capacity building activities globally and begun operations in March 2011. (Credit: South African Astronomical Observatory)

Development to coordinate the activities. IAU funds alone were insufficient to support such an office and a substantial amount of external funding was needed. In late 2009 the IAU instigated a call for proposals to host this office. Forty letters of intent were received followed by 20 full proposals. In May 2010, the IAU Executive Committee selected the South African Astronomical Observatory (Fig. 6) to host the GOAD. The successful proposal is co-funded by the South African Department of Science and Technology through the National Research Foundation. On 30 July 2010 the President of the South African National Research Foundation, Albert van Jaarsveld and the General Secretary of the IAU, Ian Corbett, signed an agreement to initiate the Global OAD. The Office will be overseen by a 6-member Steering Committee, with equal representation by IAU and NRF nominees.

After a competitive global recruiting process, Kevin Govender was appointed as first Director of the Global OAD from 1 March 2011. The IAU Global Office of Astronomy for Development was inaugurated by Naledi Pandor, the South African Minister for Science and Technology on 16 April 2011.

5.2. TRANSITION TO IMPLEMENTATION – THE FIRST YEAR

Now that the Global OAD has been set up, we are ready to begin the transition to implementing the Strategic Plan. Our goal will be to have the basis of the new organizational structure up and running by the Beijing General Assembly of the IAU in August 2012. The first year will be a learning experience and will be approached pragmatically. Among the initial tasks that will receive attention by the Global OAD are:

- *Increasing the number of volunteers.*
  Recruitment will occur both within the IAU and amongst interested postdocs and other non-IAU members (e.g. teachers) with relevant expertise, who could contribute usefully to the implementation of the Plan. Expatriates volunteers will be given special attention.
- *Securing external contributions to the SP.*
  There is considerable interest in the Plan globally and we shall investigate whether external organisations would be willing to contribute to implementing the plan in a useful way.
- *Setting up the activity task forces.*
  We expect to begin setting up the sector task forces during the first year. The structure and organization of these task forces will depend on the number of volunteers available.
- *Establishing regional nodes.*
  Following a workshop at the Global OAD, we envisage that an Announcement of Opportunities for regional nodes will be distributed.
- *Fund raising.*
  During 2011, the GOAD would investigate possible sources of funding and prepare for an active fund-raising campaign.

6. Final Remarks

> *"But there was another reason why astronomy was so prominent in ancient and medieval science. It was useful in a way that the physics and biology of the time were not."* – Steven Weinberg, Missions of Astronomy, New York Review of Books, October 22 2009

The IAU Strategic Plan for Development is an ambitious blueprint for using astronomy as a tool for capacity building. No scientific union has ever before attempted to implement an educational programme on such a scale. An obvious question that arises is why should the professional astronomical community become involved in such a venture? My answer is to cite reasons of morality and of expediency. Facilities needed to carry out frontier astronomical research become more expensive every year. The willingness of society to fund these magnificent machines sets an ultimate

limit of what can be achieved. The decision of whether or not to construct a billion-dollar astronomical research facility is inevitably a political one. By devoting a tiny fraction of astronomical resources to global development and education, we enhance the image of astronomy as a whole and make politicians more receptive to research proposals. Mobilizing astronomy in the service of global development is a cost-effective strategy for researchers. By mobilizing large numbers of talented and creative scientists, engineers and teachers in the service of society globally, the IAU Plan will be a cost effective spinoff of one of the most profound adventures of our civilization the exploration of the Universe.

From the earliest times astronomy has had a profound effect on human development and has been of enormous benefit to society. The IAU Strategic Plan will continue this role of astronomy as a practical discipline in the present age. Hence our slogan for the IAU decadal plan is "Exploring our Universe for the Benefit of Humankind".

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References

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