

The International Year of Astronomy 2009 — An opportunity too good to miss

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Abstract

The International Astronomical Union (IAU) started the International Year of Astronomy 2009 (IYA2009) project in 2006. This paper presents a snapshot of the current status of the project, and re-iterates the IYA2009 vision, goals, objectives and deliverables. Part of the paper will deal with some important IYA evaluation parameters as well as the global strategy for the future.

Vision and goals of the International Year of Astronomy 2009

Vision

The vision of the IYA2009 is 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. Everyone should realise the impact of astronomy and basic sciences on our daily lives, and understand better how scientific knowledge can contribute to a more equitable and peaceful society.

IYA2009 activities will take place at the global and regional levels, and especially at the national and local levels. National Nodes have been formed in each country to prepare activities for 2009. These nodes will establish collaborations between professional and amateur astronomers, science centres, educators and science communicators in preparing activities for 2009. More than 90 nations are already involved, with well over 140 expected. To help coordinate this huge global programme, and to provide an important resource for the participating countries, the IAU has established a central Secretariat and an IYA2009 website as the principal IYA2009 resource for public, professionals and media alike.



Figure 1 – The IYA2009 Logo

¹ www.astronomy2009.org

Goals and objectives

Goals To:	Objectives ² To:	Evaluation estimator
<p>1. <i>Increase scientific awareness</i> among the general public through the communication of scientific results in astronomy and related fields, as well as the process of research and critical thinking that leads to these results.</p>	<ul style="list-style-type: none"> • Make astronomical breakthroughs more visible in the daily lives of billions of people through all available means of communication (TV/radio documentaries, newspapers, web pages, exhibitions, stamps, blogs, web portals, advertising campaigns etc). • Facilitate individual astronomical observing opportunities. 	<ul style="list-style-type: none"> • The number of people “touched”: • Number of press clippings and readership. • Number of people visiting national, regional and global web pages (webstats). • Number of activities. • Number of new products etc.
<p>2. <i>Promote widespread access to the universal knowledge of fundamental science</i> through the excitement of astronomy and sky-observing experiences.</p>	<ul style="list-style-type: none"> • Enable as many laypeople as possible, especially children, to look at the sky through a telescope and gain a basic understanding of the Universe. 	<ul style="list-style-type: none"> • Number of laypeople, especially young people and children, viewing the Universe through a telescope at street astronomy events, star parties, professional observatory webcasts etc. • Number of “cheap” new telescope kits produced, assembled and distributed.
<p>3. <i>Empower astronomical communities in developing countries</i> through the initiation and stimulation of international collaborations.</p>	<ul style="list-style-type: none"> • Involve astronomical communities of the developing nations in the Year, thereby providing examples of how outreach and education is carried out in different parts of the world. 	<ul style="list-style-type: none"> • Number of participating developing nations as measured by the establishment of IYA National Nodes. • Number of new international partnerships and joint programs formed. • Number of people reached by new initiatives.
<p>4. <i>Support and improve formal and informal science education</i> in schools as well as through science centres, planetariums and museums.</p>	<ul style="list-style-type: none"> • Develop formal and informal educational material and distribute all over the world. • Conduct focused training of event leaders and presenters. 	<ul style="list-style-type: none"> • Number of participating teachers and schools. • Number of educational materials distributed. • Number of new event leaders and presenters trained.

² The fulfilment of these objectives will be achieved through national, regional and global activities, see <http://www.astronomy2009.org>

<p>5. <i>Provide a modern image of science and scientists</i> to reinforce the links between science education and science careers, and thereby stimulate a long-term increase in student enrolment in the fields of science and technology, and an appreciation for lifelong learning.</p>	<ul style="list-style-type: none"> • Popular talks by scientists of all ages, genders and races. • Facilitate portraits wherever possible: on TV, in web blogs, • Biographies of scientists that break with the traditional “lab coat view” of scientists, showing the excitement of scientific discovery, the international aspect of scientific collaborations and portraying the social sides of scientists. 	<ul style="list-style-type: none"> • Number of popular talks. • Number of scientist portraits. • Public response questionnaires. • Evidence for penetration of astronomy into popular culture (media, web, TV, radio talk shows...).
<p>6. <i>Facilitate new, and strengthen existing, networks</i> by connecting amateur astronomers, educators, scientists and communication professionals through local, regional, national and international activities.</p>	<ul style="list-style-type: none"> • Connect as many individuals (named “IYA ambassadors”) as well as organisations (amateur and professional) in networks; for instance, by creating of new internal and external electronic communication infrastructures. These networks will become part of the heritage of IYA2009. 	<ul style="list-style-type: none"> • Number of National IYA Nodes. • Number of new networks and partnerships formed.
<p>7. Improve the gender-balanced representation of scientists at all levels and promote greater involvement by underrepresented minorities in scientific and engineering careers.</p>	<ul style="list-style-type: none"> • Provide access to excellent role models and mentors, formally and informally, and publicise them. • Provide information about the female “dual-career” problem and possible solutions. 	<ul style="list-style-type: none"> • Number of active new role models and mentors. • Number of new international partnerships, projects and activities.
<p>8. Facilitate the preservation and protection of the world’s cultural and natural heritage of dark skies in places such as urban oases, national parks and astronomical sites, through the awareness of the importance and preservation of the dark skies and astronomical sites for the natural environment and human heritage.</p>	<ul style="list-style-type: none"> • Involve the dark-sky community in IYA2009. • Collaborate in the implementation of the UNESCO and IAU “Astronomical and World Heritage” initiative. • Lobby organisations, institutions, and local, regional and national governments to approve preservation laws for dark skies and historical astronomical sites. • Put the issues of natural environment and energy preservation on the agenda of decision makers. 	<ul style="list-style-type: none"> • Number of activities and events related with night-sky protection. • Number of countries/cities with laws or guidelines for dark sky preservation. • Areas protected by dark sky laws. • Number of historical astronomical sites identified and protected under the UNESCO’s World Heritage Convention.

The team behind the scenes

IAU

The International Astronomical Union (IAU)³ is the initiator and international leader of IYA2009. The IAU was founded in 1919 with the mission of promoting and safeguarding the science of astronomy through international cooperation. It maintains a small secretariat in Paris. Its individual members are professional astronomers active in research and education in astronomy all over the world. It is a “bottom-up” organisation run by its members for the benefit of astronomy worldwide and maintains friendly relations with organisations that include amateur astronomers in their membership.

Currently the IAU has nearly 10,000 individual members in 87 countries worldwide. In addition to arranging scientific meetings, the IAU promotes astronomical education and research in developing countries through its International Schools for Young Astronomers, Teaching for Astronomy Development, and World Wide Development of Astronomy programmes, and through joint educational activities with UNESCO and other bodies.

The IAU acts as a catalyst and coordinator for IYA2009 at the global level largely, but not exclusively, through the IYA2009 website and Secretariat. The IAU will organise a small number of international events such as the web portal “The Portal to the Universe”, the image exhibition “The Universe from Earth” and the “Galileoscope” project. The IAU will be the primary interface with bodies such as UNESCO and the United Nations.

The next triennial General Assembly of the IAU takes place in Rio de Janeiro in August 2009. Some 2500 astronomers from all over the world will attend. Considerable media attention is always given to the General Assemblies, with regular briefings and news releases provided. Naturally, the programme of the General Assembly will be closely linked to the themes and activities of IYA2009, and this will provide a further opportunity for the Global Sponsors of IYA2009 to promote their activities through displays and speakers at dedicated sessions, particularly those devoted to communication and education.

The IAU/IYA2009 Secretariat

The central hub of the IAU activities for IYA2009 is the Secretariat established by the IAU to coordinate activities during the planning, execution and evaluation of the Year. The Secretariat will liaise continuously with the Single Points of Contact, Task Groups, Global Official Partners, Global Sponsors and Organizational Associates, the media and the general public to ensure the progress of IYA2009 at all levels. A website⁴ has been set up and more than 90 member countries have established national committees and appointed “Single Points of Contact”. The Secretariat and website are the most important coordination and resource centres for all the countries taking part, particularly for those developing countries that lack the national resources to mount major events alone.

³ <http://www.iau.org>

⁴ www.astronomy2009.org

IYA2009 Global Cornerstone Projects

100 Hours of Astronomy

This is a round-the-clock, round-the-globe event, including live webcasts, observing events, public talks, open doors, and other activities connecting the astronomy community around the world. One of the key goals is to allow as many people as possible to look through a telescope, and see what Galileo saw — the four Galilean moons around Jupiter. The 100 Hours of Astronomy might coincide with a “Dark Sky Event” with a controlled reduction of city illumination in a “Wave of Darkness” around the globe to raise awareness that the dark sky is a majestic, but often overlooked, cultural resource for everyone (security and safety issues to be considered).

The Galileoscope

Who doesn't remember the first time they looked at the Moon through a telescope and were amazed by the details of the mountains and craters? The same is true of Jupiter's cloud belts and its fascinating Galilean moons, Saturn's rings and a sparkling star cluster. Observing through a telescope for the first time is a unique experience that shapes our view of the sky and Universe. The IYA2009 programme wants to share this observational and personal experience with as many people as possible across the world and is collaborating with the US IYA2009 National Node to develop a simple, accessible, easy-to-assemble and easy-to-use telescope that can be distributed by the millions. Ideally, every participant in an IYA2009 event should be able to take home one of these little telescopes. This simple telescope enables people to build and observe with a telescope that is similar to Galileo's. Sharing these observations and making people think about their importance is one of the main goals of IYA2009: Promote widespread access to new knowledge and observing experiences. A do-it-yourself Galileoscope could be the key to pursuing an interest in astronomy beyond IYA2009, especially for people who cannot afford to buy a commercial telescope.

We aim to give 10 million people their first look through an astronomical telescope in 2009. This is achievable if, for example, 100,000 amateur observers each show the sky to 100 people. Millions of small telescopes are sold every year, but anecdotal evidence suggests that most are rarely used for astronomy. A worldwide telescope amnesty programme will invite people to bring their little-used telescopes to IYA2009 events, where astronomers will teach people how to use them and offer advice on repairs, improvements, and/or replacements, encouraging more people to stay involved in the hobby. We encourage the organisers of IYA2009 celebrations in all countries to promote similar activities, with a common goal of giving 10 million people worldwide their first look through an astronomical telescope.

Cosmic Diary

This project is not just about astronomy; it is more about being an astronomer. Professional astronomers will blog in text and images about their life, families, friends, hobbies, and interests, as well as their work — their latest research findings and the challenges that face them in their research. The Cosmic Diary aims to put a human face on astronomy. The bloggers represent a vibrant cross-section of female and male working astronomers from around the world. They will write in many different languages and come from five different continents. Outside the observatories, labs and offices, they are musicians, mothers, photographers, athletes, amateur astrono-

mers. At work, they are managers, observers, graduate students, grant proposers, instrument builders and data analysts. Although inspired by the Quantum Diaries made for the International Year of Physics 2005, we believe that the Cosmic Diary has the potential to produce valuable science communication items and enhance public awareness of astronomy and space sciences. At some point during this project, the bloggers will be asked to explain one particular aspect of their work to the public. In a true exercise of science communication with the public, these scientists will be asked to translate the nuts and bolts of their scientific research into more popular language. This will be their challenge. These “explanations” will be highlighted on the web at regular intervals. They will be used to produce a book and a video documentary, both to be released during the IYA2009. The book and documentary will be the legacy of this project.

The Portal to the Universe

The science of astronomy is extremely fast moving, and delivers new results on a daily basis, often in the form of spectacular news, images of forms and shapes not seen anywhere else, enhanced by illustrations and animations. Public astronomy communication has to develop apace with the other players in the mass market for electronic information such as the gaming and entertainment industries. The problem today is not so much the availability of excellent astronomy multimedia resources for use in education, outreach and the like, but rather finding and accessing these materials. Laypeople, press, educators, decision-makers and even the scientists themselves deserve better access to press releases, images, videos and background information. We all need a single point of entry into all the cosmic discoveries that take place on a daily basis — a global one-stop portal for astronomy-related resources. Modern technology (especially RSS feeds and the VAMP — Virtual Astronomy Multimedia Project⁵) has made it possible to tie all the suppliers of such information together with a single, almost self-updating portal. The *Portal to the Universe* will feature a comprehensive directory of observatories, facilities, astronomical societies, amateur astronomy societies, space artists, science communication universities, as well as a news-, image-, event- and video- aggregator and Web 2.0 collaborative tools for astronomy multimedia community interaction such as ranking of the different services according to popularity.

A range of “widgets”, small specialised applications, will be developed to tap live into the existing resources. The start page will feature a selection of these resources. The selection will initially be based on editorial decisions derived from their experience of the behaviour and needs of the target groups, but will gradually move towards a live, community-based selection determined by the real behaviour of the visitors. The visitors may naturally tailor their own *MyPortaltotheUniverse* with the widgets if they wish. In summary, *The Portal to the Universe* will enable innovative access to, and vastly multiply the use of, astronomy multimedia resources — including news, images, videos, events, podcasts and vodcasts.

She is an Astronomer

IYA2009 has the aim of contributing to four of the UN Millennium Development Goals, one of which is to “*promote gender equality and empower women*”. Approximately a quarter of professional astronomers are women. The field continues to attract women and benefit from their participation. However, there is a wide geographical diversity, with some countries having none, and others having more than 50% female professional astronomers. Also, the very high level of

⁵ <http://www.virtualastronomy.org>

female dropouts shows that circumstances do not favour female scientists. Gender equality is of a major concern to the whole scientific community regardless of geographic location. The problems and difficulties are different in all regions and continents. IYA2009's "*She is an Astronomer*" programme will offer platforms that address some of these problems. *She is an Astronomer* will contain the following components:

- The *Portal to the Universe* global web portal will provide a collection of links to all the existing regional and national programmes, associations, international organisations, non-governmental organisations, grants and fellowships supporting female scientists.
- Part of the programme will appear in the Cosmic Diary featuring the work and family lives of female researchers.
- The project intends to seek cooperation agreement with prestigious initiatives that are already running, to provide fellowships to female scientists to support their career prospects.
- A Woman Astronomer Ambassador programme will be established to reach girls at school and university level with the messages of the programme.

Dark Skies Awareness

It is now more urgent than ever to encourage the preservation and protection of the world's cultural and natural heritage of dark night skies in places such as urban oases, national parks and astronomical sites, as well as to support UNESCO's goals of preserving historical astronomical sites for posterity. For this Cornerstone Project, the IAU will collaborate with the US National Optical Astronomy Observatory, International Dark-Sky Association and other national and international partners in dark sky and environmental education on several related themes, including worldwide measurements of local dark skies by thousands of citizen-scientists using both unaided eyes and digital sky-quality meters (as in the successful GLOBE at Night programme), star parties, new lighting technologies, arts and storytelling, and health and ecosystems.

IAU/UNESCO Astronomy and World Heritage

UNESCO and the IAU are working together to implement a research and education collaboration as part of UNESCO's Astronomy and World Heritage project. This initiative aims at the recognition and promotion of achievements in science through the nomination of architectural properties, sites or landscape forms related to the observation of the sky through the history of mankind or connected with astronomy in some other way. The proposed lines of action are: identification, safeguarding and promotion of these properties. This programme provides an opportunity to identify properties related to astronomy located around the world, to preserve their memory and save them from progressive deterioration. Support from the international community through IYA2009 is needed to develop this activity, which will allow us to help preserve this sometimes very fragile heritage.

Galileo Teacher Training Programme

There is an almost unfathomable amount of rich and very useful astronomy educational resources available today — mostly in digital form, freely available via the internet. However, experienced educators and communicators have identified a major "missing link": the training of the educators to understand the resources and enable them to use it in their own syllabuses. To sustain the legacy of the International Year of Astronomy 2009, the IAU — in collaboration the National Nodes

and leaders in the field such as the Global Hands-On Universe project, the US National Optical Astronomy Observatory and the Astronomical Society of the Pacific — is embarking on a unique global effort to empower teachers by developing the Galileo Teacher Training Programme. The Galileo Teacher Training Programme's goal is to create a worldwide network of certified Galileo Ambassadors, Master Teachers and Teachers by 2012. The use of workshops and online training tools to teach the topics of robotic optical and radio telescopes, webcams, astronomy exercises, cross-disciplinary resources, image processing, and digital universes (web and desktop planetariums) is included in the programme.

Universe Awareness

Universe Awareness (UNAWA) will be an international outreach activity that aims to inspire young disadvantaged children with the beauty and grandeur of the Universe. UNAWA will broaden children's minds, will awaken their curiosity in science and will stimulate internationalism and tolerance. Games, songs, hands-on activities, cartoons and live internet exchanges are devised in partnership with UNAWA communities throughout the world for children from the age of four onwards. UNAWA will enable the exchange of ideas and materials through networking and interdisciplinary workshops. Universe Awareness is imagination, excitement and fun in the Universe for the very young.

From Earth to the Universe — an exhibit of astronomical images

The fantastic images of the Universe captured by humanity's fleet of ground and space-based telescopes are largely responsible for the magical appeal that astronomy has for lay people. Indeed, popular images of the cosmos can engage the general public not only in the aesthetics of the visual realm, but also in the science of the knowledge and understanding behind them. IYA2009 is an unprecedented opportunity to present astronomy to the global community in a way that has never been done before. The *From Earth to the Universe* project is an exhibition arranged by the IYA2009 that will bring these images to a wider audience in non-traditional venues such as public parks and gardens, art museums, shopping malls and underground stations.

Make it happen

How can I participate in the International Year of Astronomy?

One of the International Year of Astronomy goals is to enable as many people as possible to experience the excitement of personal discovery that Galileo felt when he spied lunar craters and mountains, the moons of Jupiter, and other cosmic wonders. It is also meant to encourage citizens to think about how new observations force us to reconsider our understanding of the natural world.

If you're a newbie or an astronomy enthusiast...

If you are a beginner and would like to get some advice, the best thing you can do is to contact a local astronomy club, planetarium or science museum. A list of organisations worldwide can be found on the web⁶.

⁶ See for instance <http://skytonight.com/community/organizations> or <http://www.astronomyclubs.com>

If you're an amateur astronomer...

For every professional astronomer, there are at least 20 knowledgeable and engaged amateur astronomers. The IAU is encouraging amateur astronomers to play a major role in the organisation of astronomy outreach activities. As an amateur astronomer, you can join a local astronomy club and plan some cool astronomy outreach activities. Lots of ideas can be “lifted” from the IYA activities pages, and don't be afraid of replicating and adapting them according to your own country's history and culture. Get in touch with science teachers in the local schools and propose some practical activities for the students involving the observation of the sky.

If you're a professional astronomer...

You can do all the above, and contact your country's Single Point of Contact⁷ for advice and new ideas on what can be done in order to promote astronomy in your region. You can coordinate activities together with amateur astronomers, help them to publish your results and contribute to science.

I have an idea for an activity that's not listed in the activities pages. How can I submit it?

If you have a new idea and you are sure it is not listed in the national, regional and global activities, pages, you should contact the Single Point of Contact from your own country and propose your ideas to them.

Conclusion

There are very good reasons for celebrating a global year of astronomy. We live in what may be the most remarkable age of astronomical discovery in history. The IAU hopes and believes that by declaring 2009 the International Year of Astronomy, universities, schools, museums, observatories, societies, and others will be encouraged to increase their efforts to reach out to the public, and especially to young people to enthuse them about astronomy in particular, and about science and technology in general. We believe that IYA2009 has the potential to become one of the largest and most successful global astronomy outreach events in history.

⁷ Look at <http://www.astronomy2009.org> under “National Nodes”.

The International Year of Astronomy 2009 celebrates a crucial moment in the history of science: the first astronomical observations through a telescope, carried out by Galileo Galilei in 1609. The invention of the telescope was the starting point of what turned out to be a sequence of astonishing astronomical discoveries. In this endeavor, mathematics and physics teachers of this association can play a very significant role. In my presentation I describe our plans to be carried out in our country and I also demonstrate some possible practical activities to be carried out by secondary and middle school teachers. Keywords : education; astronomy; activities. Tweet. This is a preview of a remote PDF: <http://www.scielo.org.mx/pdf/eq/v20s1/v20s1a11.pdf>. Silvia Torres Castilleja. • Involve astronomical communities of the developing nations in the Year, thereby providing examples of how outreach and education is carried out in different parts of the world. • Number of participating developing nations as measured by the establishment of National IYA Nodes. • Number of new international partnerships and joint programs formed. • Number of people reached by new initiatives. The International Year of Astronomy 2009 - An opportunity too good to miss (Pedro Russo & Lars Lindberg Christensen). The Future of the International Year of Astronomy 2009 Website (Raquel Yumi Shida, Pedro Russo & Lars Lindberg Christensen). January 1 of 2009 brings with it the International Year of Astronomy, a worldwide celebration commemorating Galileo Galilei's first astronomical observation through a telescope. 135 nations are collaborating to promote astronomy and its contribution to society and culture, with events at regional, national, and global levels, to bring the Universe closer to more people on Earth. Events and activities will take place over the coming 365 days and beyond. How can you participate? Here's a list of several IYA activities events taking place during the next year. If you or a group you are affiliated The International Astronomical Union will be coordinating the International Year of Astronomy in 2009. This initiative is an opportunity for the citizens of Earth to gain a deeper insight into astronomy's role in enriching all human cultures. Moreover, it will serve as a platform for informing the public about the latest astronomy discoveries while emphasizing the essential role of astronomy in science education. In 1609, Galileo Galilei first turned one of his telescopes to the night sky and made astounding discoveries that changed mankind's conception of the world forever: mountains and craters