

Report

# Aiding astronomy in developing nations: Japanese ODA

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## Abstract

In order to promote education and research in developing nations, the Government of Japan has been providing developing nations with high-grade equipment under the framework of the Official Development Assistance (ODA) cooperation programme since 1982. Under this successful cooperation programme, 24 astronomical instruments have been donated to 19 developing nations up to the end of the Japanese fiscal year 2003. The instruments donated included university-level reflecting telescopes, as well as modern planetaria used for educational purposes, together with various accessories. This paper reports on a continuation of the previous ODA donations and the subsequent follow-up programmes provided with the assistance of the Japan International Cooperation Agency (JICA) and the cooperation with the Programme on Space Applications of the United Nations Office for Outer Space Affairs (OOSA). It also describes how aid applications should be pursued.

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## 1. Need for astronomical equipment in developing nations

The number of science students in developing nations is rapidly increasing. In addition, a good number of them attend Ph.D. courses at universities or science institutes in order to further pursue higher education. Many of these science students are aware of the fact that the present age is often called the “space age” and have therefore become very interested in the subject of space and the universe.

Similarly, the number of highly educated professionals in astronomy is also steadily increasing in developing nations; however, most developing nations unfortunately do not have the adequate astronomical equipment so urgently needed for education and research purposes that such professionals could use. One example of the need to support cooperation programmes providing adequate astronomical equipment to developing nations is that old-fashioned refracting telescopes are still used in a good number of them. There is still a great lack of modern high-grade reflecting telescopes of higher quality and better resolution that could be used to better observe astronomical phenomena. (See Fig. 1 for examples of where these have been successfully installed; and Fig. 2 for an example of a reflecting telescope in use.)

A similar situation is also encountered with planetaria and their related equipment. Planetaria are important

and necessary tools for a good education in astronomy [1]. Nevertheless, only a limited number of developing nations have planetaria, usually of the old type and located only in their capital cities. By contrast, industrialized nations have built a considerable number of planetaria to be used for space education not only in their capital cities, but also in towns, schools and other places. For example, there are some 500 planetaria in the USA and 360 in Japan.

Therefore, in order not only to promote and support space education and university high-level research, but also to raise global awareness of the need for adequate astronomical equipment in developing nations, financial assistance from industrialized nations is most important and welcome in the field of astronomy.

## 2. Japanese ODA for astronomy

In 1986, the Japanese Government made its first donation through the ODA programme in the form of a planetarium for Burma.

Japanese ODA consists of three types of aid: general grant aid, for a large national project; cultural grant aid, mainly for educational and research equipment; and grassroots aid, mainly for urgent situations such as when sudden disasters take place.

Of the three different aid types, the most suitable one that applies to supplying adequate astronomical equipment to developing nations is cultural grant aid [2];

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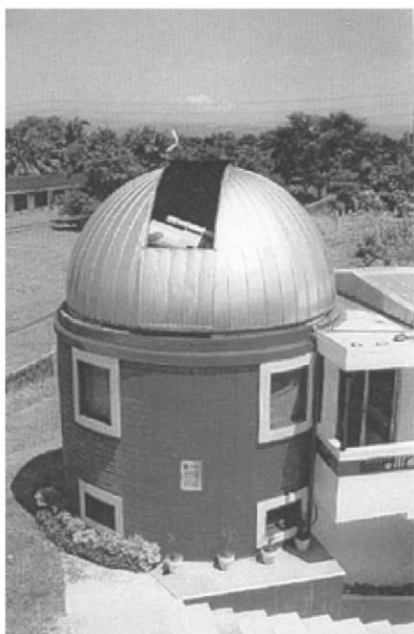
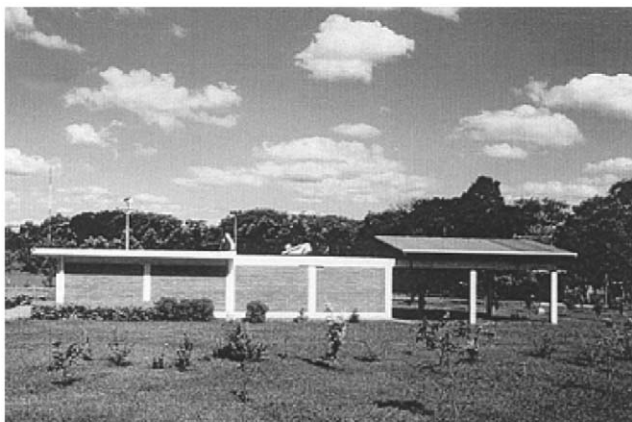


Fig. 1. Examples of housing or buildings to accommodate 45-cm reflectors. Top: Sliding-roof type, National University of Asunción, Republic of Paraguay [7]. Bottom: Dome-type, Philippine Atmospheric Geophysical and Astronomical Service Administration, The Philippines [8].

however, this type of aid is not exclusively used for purposes involving activities or projects related to astronomy. As a consequence, applications for astronomical research equipment must compete with applications from researchers in other fields from a particular country that may be seeking financial support from the Government of Japan.

Furthermore, applications for cultural grant aid must be made formally through the Japanese Embassy in the nation concerned, by the submission of an application document (there are no special application forms). In preparing an application document, applicants should present a clear justification of why the equipment is needed and should also include a short history of their educational background related to astronomy and, if



Fig. 2. Sri Lankan astronomer checking and adjusting CCD Camera Spectrograph, plus ST-7 for the reflector, at Arthur C. Clarke Institute [9].

applicable, information on astronomy research in their nations. It is essential to name and describe a responsible institution within the nation where the equipment could be housed. It is also important to provide guarantees from the applicant nation for the provision of the building needed to house the equipment being requested. Finally, the complete application document must be submitted to the Embassy of Japan, through the host institute and the Ministry of Education of the nation concerned, with signatures by the representatives of these respective institutions.

### 3. Equipment donated by the government of Japan from 1986 to 2003

Up to the end of the Japanese fiscal year 2003, 19 nations and their 24 respective institutions had received astronomical equipment from the Japanese Government. They are listed in Table 1. Peru's application for a planetarium has been selected for donation in 2004 and is included in the list.

### 4. Cooperation with the United Nations

The Office for Outer Space Affairs (OOSA) at the United Nations Office Vienna is concerned with the exploration and peaceful uses of outer space, as well as the worldwide development and promotion of basic space science. It has been cooperating with Japan for over 10 years; their joint activities are considered something of a model for cooperation between countries and the United Nations, as was acknowledged in a 2001 UN press release (See Fig. 3). One of OOSA's most important activities is to organize annually a series of workshops dealing with astronomy and basic space

Table 1  
Astronomical equipment donated by Japan

<i>Reflecting telescopes and accessories donated</i>			
Year	Reflector size (cm)	Receiving institutions/location	Country
1987	40	Science Centre	Singapore
1988	45	Bosscha Observatory, Institute of Technology, Bandung	Indonesia
1989	45	Chulalongkorn University, Bangkok	Thailand
1995	45	Arthur C. Clarke Institute for Modern Technologies, near Colombo	Sri Lanka
1999	45	Asunción National University	Paraguay
2000	45	PAGASA, Quezon City, near Manila	The Philippines
2001	45	Cerro Calán Astronomical Observatory, University of Chile	Chile
<i>Planetaria donated</i>			
Year	Planetarium/location	Country	
1986	Pagoda Cultural Centre, Yangon	Myanmar	
1989	Haya Cultural Centre, Amman	Jordan	
1989	Space Science Education Centre, Kuala Lumpur	Malaysia	
1990	Auxiliary projectors for the already-existing planetarium, Manila	The Philippines	
1993	Burdwan University, West Bengal	India	
1993	Auxiliary projectors for the already-existing Planetario de la Ciudad, Buenos Aires	Argentina	
1994	Auxiliary projectors for the already-existing Planetario de la Ciudad, Montevideo	Uruguay	
1998	Ho-Chi Minh Memorial Culture Hall, Vinh City	Viet Nam	
1998	Auxiliary projectors for the already-existing planetarium, Bangkok	Thailand	
1998	Auxiliary projectors for the already-existing planetarium, Colombo	Sri Lanka	
1999	Anna Science Centre, Chennai	India	
2000	City Park, Tashkent	Uzbekistan	
2001	Asunción National University	Paraguay	
2002	Planetario Municipal, Cuenca	Ecuador	
2002	Children Museum, San Pedro Sula	Honduras	
2003	National Costa Rica University, San Jose	Costa Rica	
2004	Laboratorio Central del Instituto Geofísico, Lima	Peru	

science in cooperation with several partners, such as the European Space Agency (ESA) [5].

The latest workshop organized by the Office of Outer Space Affairs, through its Programme on Space Applications, was held in 2002, in Córdoba, Argentina, where almost 100 astronomers participated from all over the world. As an illustration of cooperation, an interesting presentation was made as an example of joint work by F. Doncel (Paraguay), A.E. Troche Boggino<sup>1</sup> (Paraguay) and T. Noguchi (Japan) entitled “CCD photometry of KZ Hya using the 45-cm reflector of Asunción National Observatory” [6]. The reflector was donated by Japanese ODA. The KZ Hya is a peculiar non-radial pulsating variable (9.46–10.26 in V)

with very short period of 0.05911157 days (from the recent unpublished analysis of T. Noguchi).

## 5. Follow-up programmes

In order to follow up on the assistance programmes provided to developing nations in the form of astronomical equipment donations, the Government of Japan continues to advise responsible staff and related institutes in a particular nation that has successfully received the equipment required. In this way, potential candidates can apply to JICA to receive further technical training from Japanese staff members. This is usually done by applying from the relevant institute directly to the available JICA office in the nation. Successful applicants are able to receive the requested financial help from JICA.

<sup>1</sup>Unfortunately, Professor A.E. Troche Boggino suddenly passed away just 1 month before the workshop took place, after having worked devotedly to establish the first Astronomical Observatory of Paraguay.



**Japan's Contribution to the  
United Nations Programme on Space Applications to  
Promote Astronomy and Basic Space Science in Developing Nations Marks Tenth Year Anniversary**

UNIS/OS/224  
6 February 2001

VIENNA, 6 February (UN Information Service) - Cooperation between Japan and the United Nations in promoting space science programmes in developing countries is marking its tenth year in 2001. Representatives of Japan are expected to receive a special word of praise for the decade long, model-like cooperation during the next session of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) which begins here on 12 February.

Building on the successes of the past ten years, the Government of Japan, in cooperation with the Vienna-based United Nations Office for Outer Space Affairs, is continuing the establishment of Planetaria and astronomical telescope facilities at universities in developing nations. Japan's initiative is facilitated through Japan's Cultural Grant Aid and General Grant Aid Programmes. Cooperation between leading astronomers from the National Astronomical Observatory of Japan, Tokyo, with their peers in developing nations has been a main driving force for establishing Planetaria and astronomical telescope facilities in developing nations around the world.

Planetaria have been donated to Uzbekistan (2000), India (1999), Sri Lanka (1998), Uruguay (1994), and Argentina (1993). Currently negotiations are ongoing between the Governments of Costa Rica and Japan to establish a Planetarium at the Universidad de Costa Rica in San Jose.

Astronomical telescopes and supplementary equipment have also been provided by Japan to the Philippines (2000), Paraguay (1999), and Sri Lanka (1995). The Government of Chile is currently negotiating with the Government of Japan the establishment of an astronomical telescope facility at the Cerro Calán Astronomical Observatory at the University of Chile.

These developments follow up on recommendations made at a series of basic space science workshops organized annually since 1991 under the United Nations Programme on Space Applications, implemented by the Office for Outer Space Affairs in cooperation with the European Space Agency (ESA).

The annual Workshops on Basic Space Science are intended to contribute to the worldwide development of astronomy and space science. Such Workshops have been organized in India (1991) and Sri Lanka (1995) for Asia and the Pacific, in Costa Rica (1992), Honduras (1997), and Colombia (1992) for Latin America and the Caribbean, in Nigeria (1993) and Mauritius (to be held in 2001) for Africa, in Egypt (1994) and Jordan (1999) for Western Asia, and in Germany (1996) and France (2000) for Europe.

Other projects considered during the UN/ESA Workshops on Basic Space Science, include:

- the feasibility of the establishment of a World Space Observatory (WSO/UV);
- the Network of Oriental Robotic Telescopes (NORT);
- the annual publication of a newsletter (African Skies/Cieux Africain) for the astronomical community in Africa; and
- the development of educational material to be used in introducing astronomy into education curricula in developing nations at the university level.

Over the past ten years, astronomers and space scientists from 123 United Nations member States have participated at or contributed to the success of the UN/ESA Workshops on Basic Space Science.

The workshops were conducted as part of the activities of the United Nations Programme on Space Applications, which promotes awareness of advances in space science and technology and their applications, in developing nations. The Programme conducts annually training courses, seminars, conferences, and workshops on space-related issues. It also administers a long-term fellowship programme for in-depth training of specialists in space science and technology, provides technical advisory services on request and is contributing to the establishment and operation of regional Centres for Space Science and Technology Education, affiliated to the United Nations, around the world with the goal of developing indigenous capabilities.<sup>1</sup>

<sup>1</sup>These centres are discussed in [3].

Fig. 3. United Nations Press Release 2001 [4]. (See also Ref. [3].)

In addition, six-month follow-up training courses have been provided to staff making use of the 45-cm reflectors and accessories such as photoelectric, spectroscopic and CCD instruments at the following Public Observatories in Japan, which have available astronomical facilities:

- Bisei Observatory (two staff members from Sri Lanka in 1996 and 1998);

- Nishi-Harima Observatory (one staff member from Paraguay in 2001);
- Gunma Observatory (one staff member from the Philippines in 2002).

As for training for a newly installed planetarium, the techniques and strategies for presenting new planetarium show programmes are also taught during such courses. Also taught are ways of exchanging

information on such programmes, as well as best management and operation techniques. As an example of a successful follow-up programme involving technical cooperation between Japan and Jordan, Jordanian staff who had been locally trained to use a planetarium donated to Jordan by Japanese ODA came to Tokyo to receive such training at several planetarium institutes.

In order to consolidate these training courses, the Government of Japan, through JICA, is able to provide technical assistance by sending Japanese senior engineers or technical professionals to developing nations. For example, one senior engineering astronomer from Bisei Observatory was sent to Sri Lanka to help local staff for a period of 2 months in 2000. Similarly, the former chief engineering astronomer at Subaru Observatory was sent to Paraguay between 2002 and 2003, not only to provide technical help, but also to monitor CCD cameras. The above three cases were also made possible thanks to financial help from the JICA fund.

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