Technical Subcommittee and the Legal Subcommittee) have resulted in five legal instruments, all of which have entered into force, as well as four sets of principles adopted by the United Nations General Assembly on the conduct of space activities, including astronomical satellite missions (http://www.seas.columbia.edu/ ah297/un.html):

1. Treaties

The 1966 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ("Outer Space Treaty") provides that space exploration shall be carried out for the benefit of all countries, irrespective of their degree of development. It also seeks to maintain outer space as the province of all mankind, free for exploration and use by all States and not subject to national appropriation. The 1967 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space ("Rescue Agreement") provides for aiding the crews of spacecraft in the vent of accident or emergency landing, and establishes a procedure for returning to a launching authority a space object found beyond the territorial limits of that authority. The 1971 Convention on International Liability for Damage Caused by Space Objects ("liability Convention") provides that the launching State is liable for damage caused by its space objects on the Earth's surface or to aircraft in flight and also to space objects of another State or person or property on board such objects. The 1974 Convention on Registration of Objects Launched into Outer Space ("registration Convention") provides that launching States shall maintain registries of space objects and furnish specified information on each space object launched, for inclusion in a central United Nations Register (maintained by the United Nations Office for Outer Space Affairs). The 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies ("Moon Agreement") elaborates in more specific terms the principles relating to the Moon and other celestial bodies set out in the 1966 Treaty and sets up the basis for the future regulation of exploration and exploitation of natural resources found on such bodies.

2. Principles

The Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (1963). The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting (1982). The Principles Relating to Remote Sensing of the Earth from Outer Space (1986). The Principles Relevant to the Use of Nuclear Power Sources in Outer Space (1992).

3. Space Debris

Space debris are all man-made objects in Earth orbit or reentering the dense layers of the atmosphere that are non-functional with no reasonable expectation of their being able to assume or resume their intended functions or any other functions for which they are or can be authorized, including their fragments and parts. The item on space debris was included into the agenda of the Scientific and Technical Subcommittee at its 1994 session; since 1995 the Subcommittee continued its consideration of this item on a priority basis. Member States and relevant international organizations are currently providing information on practices in minimizing the creation of space debris and the effects of this environment on space systems, including those used for astronomical purposes (`http://www.un.or.at/OOSA_Kiosk/`).

4. Near-Earth Objects

Pursuing an understanding of Earth's interactions with near-Earth objects and adverse environmental impacts on astronomy have become issues of global research. In an effort to provide a scientific basis for future cooperative international research and space exploration, The Explorers Club and the United Nations Office for Outer Space Affairs organized an international conference on near-Earth objects (A. Carusi, T. Gehrels, and S. Isobe in Near-Earth Objects: The United Nations International Conference, Ed. J. Remo, Annals of the New York Academy of Sciences 822 (1997) 632 pp.). The forthcoming United Nations Conference on the Exploration and Peaceful Uses of Outer Space in 1999 at Vienna, Austria, may provide a forum to review such issues in depth.

The views, interpretations, and opinions presented in this paper do not necessarily reflect the position of the United Nations.

18. BILATERAL AGREEMENTS, ZONING, INTERNATIONAL PROTOCOL

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It is clear that conditions of astronomical observations become worse and worse : those are light pollution, radio interference, and space debris. However, causes of these worse astronomical conditions are created to make human life convenient. Therefore, our problems can not be solved straightforward. An way which astronomers have managed to keep good observational conditions is to escape from residential areas to country areas and to mountain areas, and may be in future to back side of the moon. An expansion of cities has produced bright sky glow because of unproper usage of lighting instruments and an increase of necessary radio bands for daily life has produced the higher level of radio noise for astronomical observations. Launching of useful satellites has produced large number of space debris.

In these situations it is hard to keep conditions of astronomical observations in a good shape only by efforts of astronomers. We have to work together with other organizations to develop a channel reaching to the majority of people. For a space debris problem, there are the IAD (Inter-Agency Space Debris coordination) composed of space agencies from many countries such as NASA, ESA, NASDA, ISAS, Russian one, and Chinese one, specialists for space debris at each organization are worry about debris collisions to working satellite near future, but decision makers do not consider it at a severe situation. Astronomers should work with those specialists. For a problem of radio interference, there are COSPAR, ITU, and URSI with which astronomers should work together.

For a problem of light pollution, there is CIE(Commission Internationale de l'Eclairage) with which IAU Commission 50 now jointly sets up a Technical Committee 4-21 under the CIE. To compromise requests by observational astronomers and lighting engineers, an idea of zoning was proposed by Paul Murdin in 1992 and is now included a guide line of CIE TC4-21 "Interference by Light of Astronomical Observations".

To make people realize difficult conditions of astronomical observations, astronomers themselves should produce scientific evidences to show the difficulties. Unfortunately, some certain fractions of astronomers do not show any interest in the problems. We should concentrate our efforts and set up international protocol. For the light pollution, the CIE Division 4 passed a resolution to minimize air glow in October, 1996, the IAU GA passed a resolution to support the CIE one in August, 1997. Then, it is expected that the CIE GA will to pass it in 1999, which will be a starting point to bring it as the ISO standard. When this international protocol will be once set up, all the governments will take different actions to reduce sky glow under the idea of zoning.

Astronomers can directly be against people producing useless light, but it is usually hard work since many people enjoy bright lighting. It is much short way to minimize light pollution that international protocol such as the ISO standard is set up. We can find out a similar way for problems of radio interference and space debris.