

### **Policy and Guidelines for the Use and Care of Animals in Space-borne Research**

[By Dr Pericles Stabekis, Windermere Group, Washington, DC, USA]

A process that began some four years ago led recently to the adoption by COSPAR of a resolution that establishes an international policy and guidelines on animal care and use in space-borne research.

#### **Background**

In late 2003, The International Space Life Sciences Working Group (ISLSWG) recommended that an effort be undertaken to develop an international policy on animal care and use for space-borne research under the aegis of COSPAR. Subsequently, at the 35<sup>th</sup> COSPAR Scientific Assembly (Paris, 2004), a resolution was presented at the business meeting of Commission F recommending that COSPAR develop, maintain and promulgate such a policy. To that end, the resolution proposed the formation of an international working group to develop such draft policy and guidelines. Commission F adopted the resolution, but COSPAR did not commit to adopting a policy and guidelines, agreeing only to the formation of the working group and to its purpose. Deciding whether or not COSPAR would adopt the draft policy and guidelines was deferred to a time frame after the 36<sup>th</sup> Scientific Assembly (Beijing, 2006). As a result, the process to form the international working group and to draft a policy and guidelines was started, while at the same time a special panel session (endorsed by Commission F) was organized and held in Beijing in which the proposed policy and guidelines were presented, discussed, and finalized (F1.3/F2.5). At the end of that session, a resolution was drafted proposing adoption of the policy and guidelines by COSPAR. The resolution was presented at the

business meeting of Commission F when its members requested and were given time to review and comment on the policy and the guidelines. At the conclusion of the allotted time, comments were reviewed and responded to by the primary authors of the document to the satisfaction of the members of the Commission F. Subsequently, the resolution was presented by Commission F to the COSPAR Bureau, which ultimately accepted it following a series of questions and answers pertaining to clarification.

#### **The Process**

The international working group was formed starting with the members of ISLSWG, to which were added representatives of the Russian and Chinese space organizations/agencies. Correspondents included representatives of the latter two countries as well as experts from ESA, CNES, CSA, JAXA and NASA. Three meetings were scheduled and held, each resulting in a draft policy and guidelines that were thoroughly reviewed by both the meeting participants and those who communicated *via* other means. Additionally, other experts affiliated with the organizations represented were consulted and commented on the drafts. Each time the drafts were revised to reflect the consensus of the comments received. After the last meeting and following a post-meeting review of the document, the proposed policy and guidelines document was finalized and presented at the special COSPAR panel session in Beijing.

#### **Rationale for involving COSPAR**

COSPAR is the pre-eminent international organization/forum for every discipline in the field of space research to be disseminated, debated and discussed. It also serves effectively as the authoritative body that maintains and promulgates policy and guidelines for the conduct of space research, consistent with the mandates of international treaties and accepted international scientific and ethical standards. This has certainly been the case with Planetary Protection where, for

over 40 years, COSPAR has developed, maintained and promulgated policy and guidelines that have contributed to the responsible conduct of space exploration by the world's launching nations. In the case of space-borne animal research, COSPAR can similarly contribute to the adherence of all nations involved in such research to common standards of animal care and use. Of course, policy, standards and guidelines for the care and use of animals have long existed for ground-based research. Also, national policy and guidelines have been developed for space-borne animal research. What are lacking, however, are common international policy and guidelines for the care and use of animals in space-borne research. With such standards being absent, nations without their own established guidelines have no authoritative source to consult and are left instead either to their own resources (which may be limited in history and/or expertise) or with the choice of several other national standards to follow. Additionally, with the collaborative aspect of life sciences research, it would be beneficial to have in place a common policy and guidelines. To date, this need has been addressed through bilateral agreements. As more partners become involved, such agreements are extremely complicated to implement.

In order to address the issues concerning the *Policy and Guidelines for the Utilization and Care of Animals Used in Space Research* and follow their progress and evolution, Commission F is planning to propose the creation of a new Panel, internal to COSPAR's own structure. The terms of reference for this Panel are being prepared, and will be written so as to complement and support the work done within individual space agencies, regions and countries. It is intended that this initiative be brought to their attention.

**The resolution, as adopted by COSPAR, was:**

- Noting the critical role of life science research in human space exploration pursuits;

- Noting the central role of animals in biological and physiological research as well as in the development of treatment and prophylaxy;
- Noting the commitment of the international scientific community to the ethical care and use of animals required for research in space;
- Noting the existence of international guidelines, national policies and standards on the care and use of animals in ground-based research, but noting the unique challenge of performing such research in the space environment, and the lack of similar international standards for space-borne research;
- Noting the international aspect of this endeavor, including multi-national collaborations;

Commission F proposes the adoption by COSPAR of the following policy and guidelines for the care and use of animals in space-borne research:

### **COSPAR Policy and Guidelines for the Utilization and Care of Animals Used in Space Research**

In the course of space exploration and utilization, the advancement of biological knowledge and the development of improved means for the protection of the health and well being of both humans and animals may require experimentation on live animals. The COSPAR policy is that all space-based and associated ground-based animal use must be conducted in adherence with the tenet of replacement, reduction and refinement; in compliance with applicable local and national laws and regulations; and consistent with the following principles. This policy also requires that any animal use be described within a protocol approved by a legitimate animal care and use/ethics committee.

- I. Alternatives to the use of animals such as mathematical models, computer simulation, and *in vitro* biological systems should be used wherever possible.

II. Activities involving vertebrate animals should be designed and performed with due consideration of their relevance to human and animal health, the advancement of knowledge, support of space exploration, or the good of society.

III. Animals selected for use in activities should be of an appropriate species and quality, and the minimum number required to obtain scientifically valid results.

IV. Animals should be treated as sentient and their proper use, including the avoidance or minimization of discomfort, distress, and pain when consistent with sound scientific practices, is an ethical imperative. Unless the contrary is established scientifically or by broad consensus of expert opinion, investigators should consider that procedures that cause discomfort, distress or pain in human beings may cause discomfort, distress or pain in animals.

V. Procedures with animals that may cause more than momentary or slight pain or distress should be performed with appropriate sedation, analgesia or anaesthesia. Surgical or other painful procedures should not be performed on unanaesthetized animals paralysed by chemical agents.

VI. Humane endpoint criteria for activities should be established. Animals that would otherwise suffer severe or chronic pain or distress that cannot be relieved should be euthanised promptly.

VII. The living conditions of animals should be appropriate for their species, sex, strain, and age and contribute to their health and comfort, within space mission constraints.

VIII. The housing, feeding, and care of all animals must be directed by a veterinarian or other scientist trained and experienced in the proper care, handling, and use of the species being maintained and studied. In any case, access to veterinary expertise should be available as required.

IX. Personnel, including space crews, shall be appropriately trained and competent for conducting procedures on animals.

X. Where exceptions are required in relation to these principles, the decisions should not rest with the investigators directly concerned but should be made, with due regard to the above principles, by a legitimate animal care and use/ethics committee or, in the case of anomalous in-flight circumstances/emergencies, an appropriately qualified veterinary expert.

### **Scope**

This policy is applicable to all vertebrate animal use in space. This includes all activities and procedures using vertebrate animals conducted on manned and unmanned space vehicles, and ground-based activities (e.g., controls) that directly support the flight activities. It does not apply to other ground-based activities or procedures that are not in direct support of flight activities (preliminary studies that lead to a flight experiment are not subject to this policy.).

### **Reporting**

COSPAR's Life Science community will consider:

How to maintain contact with each organization or agency involved in space research maintaining and establishing proper measures to ensure the appropriate care and use of all vertebrate animals used in space research activities that are conducted or supported by those organizations or agencies.

The possibility for each organization or agency to submit annually to COSPAR evidence of those measures and reports of the kind listed below:

1. A programme summary document reporting the total number of activities, animals used, species employed, level of invasiveness, and

any animal welfare issues occurring in association with spaceflight missions.

2. Evidence of a review of the merits of each activity by an independent, appropriately qualified body that includes:

- (a) title of activity
- (b) name of principal investigator
- (c) home institution
- (d) date of review
- (e) organization conducting review
- (f) status of review

3. Evidence of an animal welfare and ethical review for each activity by a legitimate animal care and use/ethics committee, including the same information as in #2 (above) and evidence of adherence to the COSPAR policy and guidelines, particularly how the tenet of replacement, reduction and refinement has been addressed.

4. Documentation of plans for the provision of appropriate veterinary oversight for all activities.

5. Assurance that all personnel involved in the use of animals in space are appropriately trained and have demonstrated competence for the activities in which they will be involved.

### Related References

Information on related specific requirements, procedures and guidelines can be found in policy and guideline documents of individual space agencies, regions and countries as well as in international documents that address animal care and use. The COSPAR policy and guidelines are based on the principles contained in those documents and are consistent with the CIOMS (Council for International Organizations of Medical Sciences) *International Guiding Principles for Biomedical Research Involving Animals*.

## Report from the Beijing Assembly

### *The Moon: Recent Results, Science, Future Robotic and Human Exploration (B0.1)*

[Report by Bernard H. Foing]

With the upcoming fleet of lunar missions, and the announcement of new lunar exploration initiatives, the B0.1 session at the 2006 COSPAR Assembly in Beijing, took place on 20 and 21 July, appropriate dates to celebrate the *Apollo 11* Moon landing anniversary. It was timely to cover the various aspects of Man's quest to look beyond the home planet, namely: New views of the Moon: Recent results and science questions (4 talks and 12 poster presentations)  
*SMART-1* technology and science highlights (8 talks & 2 poster presentations)  
Next orbiters: Selene, Chandrayaan-1 (10 talks, 3 posters)  
Chang'E1 (2 talks and 8 posters)  
Lunar reconnaissance (6 talks)  
Future lunar landers, rovers and technologies (4 talks, 5 posters presentations)  
Astronomy from the Moon, radiation, environment, resources (3 talks, 5 posters)  
Future international lunar robotic and human exploration (5 talks, 2 posters)  
International Lunar Exploration Space Agencies Panel (6 talks)  
ILEWG Round Table and Final Discussion

The session was cosponsored by ESA, NASA, JAXA, ISRO, CNSA, ILEWG, IAU, IAF, COSPAR Scientific Commission F and the Panel on Planetary Protection. With 49 invited or contributed talks, and 37 posters (each with a short – 3-minute – oral introduction), the session attracted around 100 participants (even more than the Mars session with which it partly overlapped), providing good opportunities for information exchange and collaboration. The session was coordinated with the follow-up 8th ILEWG International Conference on Exploration and Utilization of the Moon, 23-27 July 2006 that was also held