

# **International Academy of Astronautics**

## **Commission 5**

### **Report on Meeting**

**IAA Headquarters, Paris  
Tuesday 22 March 2011**

#### **1/ Attendance**

There were 15 participants in attendance, including 8 members of the Commission (Appendix 1).

Sergio Camacho, Chairman  
Max Grimard, Co-Chairman  
Corinne Jorgenson, Secretary

Jena Robinson (representing Kai-Uwe Schrogl, Past Chairman), Bernhard Schmidt-Tedd, Kazuto Suzuki, MYS Prasad, Oleg Ventkovsky, Ray Williamson, Mathias Spude, Geir Hovmork, Anatoly Karpov, Sergey Teselkin, Sridhara Murthi, Ciro Arevalo

#### **2/ Adoption of the agenda**

The agenda, which had been distributed before the meeting, was adopted.

#### **3/ Adoption of the Minutes of Commission V Meeting in Prague, September 26, 2010**

The minutes, which had been distributed before the meeting and are available in IAA website were adopted.

#### **4/ Inputs from Scientific Activities Vice-President**

M. Grimard informed the participants about a note which has been sent by the Vice-President, Scientific Activities (VP SAC) to Commission 5 two days before this meeting. The note contained proposals regarding two topics to be discussed by IAA Commissions.

The first topic was about Commission Evolution (Appendix 1), and was answering an initiative taken by Commission 6 Chair, P. Swan, and endorsed by the other Commissions Co-chairs, to send a letter to IAA Management, with recommendations to improve the efficiency of the activities of the Commissions (see Appendix 2). Regarding the issues addressed in Appendix 1, members of Commission 5 had the following views.

Regarding the decision-making inside each Commission, Commission 5 will strongly recommend to use electronic means (e-mails) for formal votes by the Members.

Commission 5 welcomes the proposal to enlarge the network of people associated to a Commission, through the proposed status of "International Expert to an Academy Commission", and agrees with the spirit of the proposed rules for nomination and role of these experts, pending

final language to be prepared by the IAA Secretariat for approval by the Commissions, SAC and Board of Trustees.

The second topic presented by VP SAC was about the follow-on of the IAA Heads of Space Agencies Summit held in Washington on 17 November, 2010. Commissions were asked to discuss the priorities to be given by each of them to the various recommendations of the Summit Declaration (see Appendix 3), for proposed concrete actions by the Academy.

The Summit Declaration was reviewed and discussed by participants at the meeting, and the following priorities have been proposed for possible action by Commission 5 as they are in its domain of interest:

#### Human Space Flight :

- . Perform a study to analyze the gaps between the recommendations contained in the Summit Declaration and on-going Exploration plans in space countries.
- . Focus on Public engagement to support a sustainable Human Exploration Program (recommendation 1.7), Invite new and emerging space faring nations to cooperate in Human Spaceflight activities (recommendation 1.8), with a strong link with education and the youth. Such a topic should also involve Commission 6.

#### Robotic Exploration :

- . Examine legal and policy aspects linked to the implementation of complex missions with multiple flight elements (recommendation 2.4), and making available opportunities for international collaboration in missions with shared instrument payloads (recommendation 2.3)

#### Climate change :

- . Policies regarding access to data, to information, and of data processing and distribution are transversal to recommendations 3.1 to 3.4 and are a topic of interest to Commission 5
- . Interoperability and common standards are also a transversal issue, with some legal and political aspects

#### Disaster Management :

- . Same topics as for Climate Change, i.e. data policies and interoperability, are relevant for recommendations made under the area of Disaster Management
- . Higher focus on space telecommunications use after a disaster should be also addressed (as in promoting adherence to the Tampere Convention).

## **5/ Commission V Symposia**

### **5.1 Results of IAC 2010**

Attendance of Symposium E3 was good. There were a few no-shows, and the status of the papers uploaded in the IAF website is the following :\_19 over 23 planned for Session E3.1–New Developments in National and International Space Policies and Programs, 6 over 6 planned for Session E3.2–Policy and Economics Aspects of Space Weather, 10 over 13 planned for Session E3.3–The Space Economy in Figures, “ 3 over 7 planned for Session E3.4–Protecting the Environment of Celestial Bodies, 1 over 5 Session E3.5–25<sup>th</sup> IAA/IISL Scientific-Legal Roundtable : The new age of small satellite missions.

## 5.2 Status of Symposium E3 for IAC 2011 Cape Town

A large number of abstracts has been uploaded, which will make the selection difficult : 20 for E3.1, 16 for E3.2, 17 for E3.3, 9 for E3.4. The Joint Session E3.5 with IISL will be a roundtable with 5 invited papers on the topic “Space debris remediation”

## 5.3 Proposal for 2012 Symposium in Napoli

Taking into account both the discussion about Space Summit follow-on, and potential topics discussed at Prague, the following structure has been agreed by the members of Commission 5 that were at the meeting:

E3.1 International and National space plans and policies sustaining critical infrastructures

E3.2 Data policies in support of climate change mitigation and disaster management

E3.3 Space Economy : Valuing the uses (as proposed by the IAF Space economy technical committee)

E3.4 Space weather follow-up

Chairs and rapporteur positions will be discussed during IPC meeting on Wednesday, 23 March and the following weeks. Volunteers for Co-chairs and Rapporteurs should contact the Symposium co-chairs, S. Camacho and M. Grimard.

E3.5/E7.6, 26th IAA/IISL Scientific-Legal Roundtable: “Scientific-technical and legal issues in optical communications via satellites” (by invitation only)

## 5.2 Other IAA commission V Symposia

No discussion on this point, due to time constraint.

## **6/ Status of Commission V Study Groups**

### S5.5 Space Debris Environment Remediation (Klinkrad, Johnson)

No formal status report from the co-chairs. Study looks on track.

### S5.6 Protecting the Environment of Celestial Bodies (Hofmann, Rettberg)

Status report is provided in Appendix 4. The study has been concluded in February 2010 and submitted for peer review, but has suffered delays for the printing since that time. In particular, changes have been asked on the content by the Board of Trustees: this demonstrates that the Peer Review process managed by Commission 5 should have been more rigorous, to prevent such an additional iteration.

### S5.8 Space Systems as Critical Infrastructures (Piso)

No news for this study group which has not really started. The membership is not completed. Following a suggestion from the meeting participants, a last attempt will be made by the Commission 5 leadership, to ask for a new volunteer who would be interested to lead this study by joining or replacing Mr. M. Piso. If this search is unsuccessful, the Study Group will be proposed for cancellation during the meeting of Commission 5 in October 2011.

S5.9 International Cooperation on Space Weather (Baker, Balogh, Paxton)

No formal status report. The target for publication is October 2012.

S5.10 Orbital Debris Removal: Policy, Legal, Political and Economic Considerations (Hobe, Williamson)

The study has been approved by the SAC and is recorded on the IAA web site, but the appointments of the Study Group have not been made. Commission 5 Chair will ask the SAC and IAA Secretariat to solve the issue. Meetings are planned in Cape Town to start the work.

**7/ Acta Astronautica**

No time to discuss this point.

With K.U. Schrogl being at the end of his mandate, Commission 5 needs a new volunteer among the Members to manage the liaison with Acta Astronautica.

**9/ Date of next meeting**

The next Commission V meeting will be held at the IAC2011 in Cape Town, during the Academy Day on **October 2, 2011; in the morning.**

**10/ AOB**

A report has been provided by the IAA/IISL Liaison Committee and is given in Appendix 5.

Being no other business the meeting adjourned.

## Appendix 1

Paris, March 14, 2011

### Discussion Paper On Commission Evolution

#### 1- Excerpt of the IAA Bylaws (Reminder)

**4.1.1** The Board may establish, amend or annul rules for the conduct of the affairs of the Academy and transact any business...

**4.1.2** The Board shall fix the place of the headquarters of the Academy and adopt its seal. The Board shall develop guidelines for cooperation between the Academy and other national and international organizations in astronautics and related fields... All meetings or symposia, which are to be co-sponsored by other organizations, shall be subject to approval by the Board.

**4.1.3** Seven Members from each of the four Sections...shall be Trustees of the Academy.... In consultation with the Vice President for Scientific Activities and in cooperation with the Chairpersons of the other Sections and of the Academy Commissions, as relevant, these Trustees shall develop program plans for each of their Sections. Such program plans shall be subject to approval by the Board.

**4.2.1** The President, as the Chief Executive Officer, shall serve as Chairperson of the Board. The President shall direct and supervise the general business, publications, scientific programs, finances and other activities of the Academy.... The President appoints members of Standing Committees, all Academy Commissions, Program Committees and Study Groups and their Chairpersons and other officers as appropriate...in consultation with the respective Vice President or Section Chairperson and with the approval of the Board as required.

**4.2.3** The Vice President for Scientific Activities shall advise the President and the Board on policy matters pertaining to the scientific purposes of the Academy. This Vice President shall prepare a plan of scientific activities, in accordance with the recommendations of the Academy Commissions and approval of the Board. This Vice President is charged with the direction of scientific activities, including Academy Commissions, Program Committees, and Study Groups, scientific meetings, and conferences, and shall be the Chairperson of the Scientific Activities Committee of the Academy.

**4.6.1** The Scientific Activities Committee shall assist the Vice President for Scientific Activities in the performance of his or her duties relating to the preparation and conduct of the Academy's scientific research and other endeavors, including the management of the Academy Commissions, Program Committees and Study Groups, meetings and conferences, and international communications within the astronautical sciences. The Scientific Activities Committees reviews the work of Program Committees and the reports of Study Groups, and makes recommendations relating to these to the Board of Trustees. This Committee also recommends appointments of Chairpersons and members of Academy Commissions, Program Committees and Study Groups.

#### **4.9 Regional or National Bodies of Members**

(a) Regional or national bodies of Members, be they called associations, branches, offices or otherwise, may be established by Honorary Members, Members and

Corresponding Members of the Academy from a certain region or a country in order to foster the purposes of the Academy, as spelled out in its Statutes, in such regions or countries. Other personalities, who are potential candidates for Academy membership, may also become members of a regional or national body.

**7.1** In order to provide opportunities for initiation of focused activities, to facilitate and observe such activities, enable the exchange of ideas and information among interested members of the Academy and recommend appropriate measures relating to the establishment and activities of Program Committees and Study Groups to the Board of Trustees, six Academy Commissions shall be established, namely: Commission I on Space Physical Sciences; Commission II on Space Life Sciences; Commission III on Space Technology and System Development; Commission IV on Space Systems, Operations and Utilization; Commission V on Space Policy, Law and Economics; Commission VI on Space and Society. The initial general scopes of responsibility of each of the Academy Commissions are shown for information in Appendix 1 of these Bylaws. The scopes may be amended by majority Board decisions in the future.

**7.2** The officers of each Academy Commission shall be a Chairperson, a Vice Chairperson and a Secretary. They shall be appointed by the President upon recommendation of the Vice-President for Scientific Activities for a term of two years. The Vice Chairperson shall succeed the Chairperson at the expiration of his term of office. Each Academy Commission shall be composed of members appointed by the President upon the recommendation of the Vice-President for Scientific Activities. The Chairpersons of the relevant Program Committees and Study Groups shall serve as ex-officio members of the respective Academy Commissions. The Chairperson and Vice-Chairpersons of the Academy Commissions shall be selected from among the Members of the Academy, the Secretary and other members of the Commissions may be either Members or Corresponding Members of the Academy.

**8.1** Subject to approval by the Board, the President may establish Permanent Committees for ensuring liaison and cooperation with other international or national organizations, or for promoting activities in such fields which are of substantial interest to all or several Academy Commissions and require a continuing consideration and development. The Permanent Committees thus established shall closely cooperate with the Vice-President for Scientific Activities and the respective Academy Commissions, Program Committees and Study Groups. A Permanent Committee may be dissolved or transformed by the same procedure which was applied for its establishment, when the reasons of its establishment cease to exist or changed.

## **2- Decision making inside each Commission**

The decision making inside each commission is exclusively made by consensus among the 10 Commission members. If consensus is not reached secret ballot may be adopted as decision making process.

Open meetings of the Commissions to non-IAA members are welcomed for fresh blood capture and newly elected engagements. In any case those meeting cannot be decision making meetings because non-Academician cannot participate to the Academy internal decision making process, due to absence of membership, ignorance of the Academy statutes and Bylaws as well as absence of privileges and duties towards the Academy (see Statutes Para 3. Membership Privileges and Duties.).

Consequently it is proposed to reinforce the power of the 10 Commission members by:

- having a written formal engagement of any Commission nominee to participate,
- having a mandatory commission meeting immediately following the Open Commission meetings or within 3 weeks by formal teleconferences hosted by the Academy,

-having an additional restricted Commission meeting during the year, outside of IAC or Paris spring meetings, either on the occasion of a standalone IAA conference or in a dedicated special meeting.

### **3- Enlarged membership of Commission**

The possibility of creating a new “Associate Member” of an Academy Commission cannot be adopted because of the obvious confusion with the “Corresponding Member” Academician Peer reviewed and elected status. However, it is proposed to consider creating a new “*International Expert to an Academy Commission*” status in order to capture and keep the best talents inside the Commissions momentum. This status would not give access to the decision making process made by the 10 formal commission members.

The Status of “*International Experts to an Academy Commission*” should be given through a strictly controlled process as follows:

-nominees (members or non-members of the Academy) should be proposed through an application form including a detailed CV, a peer review acceptance process, and a formal engagement of each nominee duly signed in order to avoid misconduct or abuse.

- the SAC could propose **radiation** from the list at any time either for misconduct or for lack of activity,

- the list of “International Experts to an Academy Commission” should be maintained by the Academy Secretariat and accessible on the Academy website or other documents as proof.

- Those experts could be solicited according their specialty for any academy project and would be systematically invited to any open meetings of their Commissions.

If the proposal is adopted by the SAC and the Board, the Academy Bylaws should be amended accordingly to make this new membership effective.

## Appendix 2

### Commission Leads Letter to IAA Management

## Commission Leadership Thoughts November 2010 – After Prague

The International Academy of Astronautics (IAA) was founded in Stockholm on August 16, 1960. Since that time, IAA has brought together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, to explore and discuss cutting-edge issues in space research and technology, and to provide direction and guidance in the non-military uses of space and the ongoing exploration of the solar system. The purposes of the IAA, as stated in the Academy's statutes are:

- to foster the development of astronautics for peaceful purposes,
- to recognize individuals who have distinguished themselves in a branch of science or technology related to astronautics,
- to provide a program through which the membership can contribute to international endeavors and cooperation in the advancement of aerospace science, in cooperation with national science or engineering academies.

We, the commission leadership team, really appreciate the information flow that has been initiated. The “life blood” of the Academy flows through the Academicians who actively participate in each commission: are involved in running each commission, involved in the IAC symposium as chairs and rapporteurs, supporting cosmic studies, and by participating/supporting stand-alone conferences. Each re-organization over the last few years has “enabled” stronger representation and more activity.

CHAIR	Baker D. (USA)	Graef P. (Germany)	Mankins J. (USA)	Ginati A. (Germany)	Camacho S. (Mexico)	Swan P. (USA)
VICE CHAIR	Vane G. (USA)	White R. (USA)	Reibaldi G. (Italy)	Alkalai L. (USA)	Grimard M. (France)	Languedoc G. (Canada)
SECRETARY	Smirnov N. (Russia)	Boese A. (Germany)	Ramakrishnan S. (India)	Balint T. (Hungary)	Jorgenson C. (France)	Bannova O. (Russia)

However, the chairs of the six commissions would like to suggest additional actions that can make the running of the scientific activities smoother.

Here are some questions to be resolved and some suggestions from your experienced leadership team:

**1 - Commission Meeting Length:** we applaud the idea of a three hour commission meeting and a three hour SAC meeting. The time necessary to fulfill our needs is indeed at least three hours. One principal purpose of the commission meetings is to let the membership participate in the conduct of the Academy. Their continued and active discussions in the commission meetings is critical to the health of the Academy.



**Suggestion:** Extend the March 21 Meeting to the full three hours (1330-1600 to 1330-1630).

**2 – New structure for Study Support:** We believe that the support from the new VP of SAC for Studies (with the infrastructure in Beijing) will be important and the studies can be more comprehensive.

**2a –** We believe that the commissions are the key element in each of the Academy study to include:

- Approving the initiation of a study
- Ensuring that the topic is well described and “feasible”
- Supporting with resources
- Provide the initial review for commission approval
- Support the Peer Review Team
- Support the Study team’s incorporation of comments
- Final Approval of Report should come from the Commission after Peer Review
- The SAC and Board approve the final Report (Study)
- Study report will then go to the production facilities for formatting and production.
- The Commission will then review the “proof’s” of the final document to ensure that it still meets the expectations of the study group and Commission.

**2b –** The SAC VP for studies should be the focal point for coordinating all aspects of each study with the commissions enabling a single point of contact to be established for clarity. The commission leadership will gladly support the development of a set of procedures that lead to better study accomplishment. In addition, it is suggested that in ANY correspondence within the Academy, and especially to the Beijing office, the three leaders of the specific sponsoring commission be “cc’ed” by email. This will ensure that no surprises occur when the commissions must report out to the SAC and the Academy Board.

**2c – Three Levels of Study Reports:** to avoid confusion on the content of a study report, the study plan should state the purpose of the study and the expectations of the output. One major worry is that the term Cosmic Study is being placed upon reports that do not have the tremendous scope of the intended reports. To be a cosmic study, all three of the purposes of the Academy should be met:

- to foster the development of astronautics for peaceful purposes,
- to recognize individuals who have distinguished themselves in a branch of science or technology related to astronautics,
- to provide a program through which the membership can contribute to international endeavors and cooperation in the advancement of aerospace science, in cooperation with national science or engineering academies.

The commission chairs suggest that we identify, early in each study, the intended output from the study. We suggest that the outputs of the studies fall into three categories:

**Cosmic Study:** Reflects the broad scope of the Academy, meets all three goals stated above, and ensures that the Academy continues to provide guidance for the global development of space and space activities. These would be published with the

full support of the Academy and deserve distribution around the globe. [as well as being on the Academy website]

**Position Papers:** These papers will usually reflect the position of specific subsets of the academy and could be referred to also as Commission Specific Position Papers. These papers could be monographs or even short chapters in an Acta Astronautica volume. [and placed on the Academy website]

**Conference Proceedings:** The output of our stand-alone, or IAC based, symposia is important to distribute. This should be identified as a set of proceedings that were conducted under the auspices of the Academy and reflect the discussions and information at the congresses. [this could be put on the Academy website]

**3 – Standing Groups:** We would like a clarification of the purpose and structure of the standing groups that have been created and are being created. It would seem to this leadership team that the Commissions should still have the responsibility to oversee the groups, similar to the temporary ones. Each of these permanent committees should fit under a Commission for continuity of purpose and oversight as well as to provide support. It is our understanding that there are two types:

**Permanent Study Groups:** Example is the History group. This one makes sense as it has a constant responsibility to recognize the Academy's history in the making and identify past events of significance. The Group accomplishes this through the History series, we believe, up to volume 48 now.

**Question:** What are the criteria for the creation of this type of group and should there be other permanent study groups?

**Permanent Program Committee:** This one is to be comparable to the Permanent Program Committees inside the IAF that run the symposia/session activities inside the IAC. There are proposals for some permanent program committees inside the Academy [specifically the Small Satellite permanent program committee].

**Some of the questions we have are:**

What are the criteria for creation?

How does one go about this?

When placed inside a Commission, how much oversight is required?

There seems to be confusion between running symposia and running studies; therefore, should one permanent committee conduct studies and running of symposia or stand alone conferences?

**4 – Conference Support:** We applaud the concept of direct support from the Academy to the commissions when they are orchestrating a symposia or conference. The idea of developing an Academy specific software package is excellent as it will enable the "work" to be accomplished more effectively. In addition, the conduct of meetings in Beijing – and supported by Beijing – is excellent. Some of the questions for this line of support are:

What type of facilities will be available?

How does one set up the "schedule" for commitment?

What is included in the support [room, food, transportation inside Beijing]?

**5 – Membership Selection Process:** Active membership inside each commission ensures the ability to conduct symposia as well as cosmic studies. A continuing issue for each commission is the “aging” of the members. As such, we would like to suggest one action and present a general question for better understanding.

The suggestion is that the Academy facilitate the insertion of new members into commission activities. We suggest that after the announcement of new corresponding members, the Academy immediately send this “total list” with the individual backgrounds and email addresses to ALL commissions. Then, each of the commissions may send personal congratulations and an invitation to participate in their activities. We would hope that this initiative to integrate new members inside commission activities could be started immediately with the new members recently announced on the website. A mailing in November would enable the commissions to excite some new members and, perhaps, enable them to be at the March meeting in Paris or a stand-alone symposia elsewhere in the near future. [One question that the commission chairs is asking in the hallways is:

How does the corresponding member election process work?

This is very important to each of the current Academy member. The commissions would like to understand the process of selection so that we may help the Academy with its recruitment. At the present time, once our recommendation for a new member goes into the Academy offices, we, the Academy core members, have No insight into the process, success rate, current membership, and or future needs of the Academy. Please clarify the process from submission of new members until presentation at one of our dinners.

**6 – Refresh the Academy dinner:** Many of the members of the Academy are choosing not to come to the dinners, both in Paris and at the Academy days, and/or leaving early... for many reasons, some personal and some organizational. The suggestion has been made to make the dinner more collegial for more enjoyment of the attendees as well as a vehicle to induct new members. Through discussions with other members of the Academy, it is abundantly clear that changes such as proposed below would enjoy wide and enthusiastic support, and any additional ticket cost would be more than offset by a much more enjoyable evening. This could be achieved through two steps:

**A – ensure recognition of the new members for their memories and as an introduction to the Academy and their peers:**

- prepare a dinner hand-out with the accomplishments, corporate connections (and photos if available) of all the new Corresponding Member and Member inductees [also include e-mail addresses] – this was accomplished in the past
- this hand-out, distributed to each attendee, will offer participants a take-away list of all new CM/Ms for future reference. It will also greatly facilitate contact by Commission executives with the new CM/Ms so they can be invited to join in the activities of the Academy through its Commissions and Study Groups
- inductees can be invited onto the stage in groups; each person in the group can be announced by name and have a diploma presented/photographed individually; and finally the group can be photographed together. Since the handout will contain all the

relevant information on each inductee, there will be no need to announce each person's accomplishments individually. This will result in a much shorter time being spent presenting diplomas

**B** – Only assign seating to the dignitaries and allow the other attendees to sit as desired.

**GOAL:** to significantly shorten the ceremonial parts of the dinner, thereby increasing the amount of time that attendees can spend in conversation and networking.

**7. Recognize Positive Participation:** Many of the members of the Academy are choosing to participate within the Commissions without official designation as a Member of the Commission. The current approach limits official recognition to the ten members [currently 11 with past chairman]. It seems to us that the key is active involvement by as many members of the Academy [and non-members] as possible. As such, it is the recommendation of this leadership group that there be a new identification for active participants within each Commission.

**Step One:** The Academy maintain the 10 Membership structure of each commission with appropriate appointments and designations.

**Step Two:** Officially authorize a new title, for Academy members and non-Academy members, of "*Affiliate Members of Commission X.*" This would be handled by each of the Commission Secretaries and would be as follows:

Once a person has shown up for two Commission days in a row (Paris & IAC), they would be recognized by the Commission secretary (in email) as an Affiliate Member of Commission X.

This list will be maintained by the Commission Secretary and updated after each Academy Day. [note: if they do not show up for three meetings in a row, they are deleted] It is a fact that today each secretary keeps a list of active participants. This suggested new title is a formalization of recognition so that the individuals may be acknowledged as contributing to the process of each Commission. We believe it's a good idea, but would like to discuss the details further during the March meeting

## **Appendix 3**

# **IAA Heads of Space Agencies Summit Declaration**

### **IAA Introductory Remarks**

On November 17, 2010, leaders of 30 space agencies from around the world gathered in Washington, D.C. for the International Academy of Astronautics' (IAA) Heads of Space Agencies Summit. In preparation for the Summit, the IAA received inputs from Academicians, other experts and space agency representatives on the subject of enhancing global collaboration in the following four areas: human spaceflight, planetary robotic exploration, climate change and disaster management. Based upon these inputs the IAA sets forth below its findings and recommendations that were welcomed by the heads of space agencies.

## **IAA Summit Declaration**

### **1.0 Human Spaceflight**

Human missions to the surface of Mars are the long-term goal of the space exploration in view of the scientific interest and strategic prospects for humankind. In order to prepare such missions and in line with the Global Exploration Strategy, the IAA recommends the following for space agencies' consideration:

1.1 Continue to support the work of the International Space Exploration Coordination Group, which is formulating plans for global space exploration efforts

1.2 Acknowledge the need of maintaining human space exploration in Low Earth Orbit (LEO) and of extending it in a stepwise approach to those destinations where humans may one day live and work e.g. Moon, Near Earth Objects... building on a carefully planned series of robotic precursor missions

1.3 Recognize the importance of the International Space Station as an integral part of the Exploration initiative and of its utilization for the benefit of all humankind

1.4 Support the development of a common interoperability policy for LEO and beyond including the implementation of common standards and interfaces

1.5 Welcome the development of enabling technologies required to achieve exploration goals, while recognizing the fact that these technologies can also be used in supporting pathways to assist in resolving some of the grand challenges the world is facing, such as energy and environmental issues

1.6 Stress the importance of coordinating research on human factors in preparation for space missions beyond LEO

1.7 Acknowledge the need to define an integrated public engagement plan to support a sustainable Human Exploration Program

1.8 Invite new and emerging space faring nations to cooperate in Human Spaceflight activities in view of the benefits involved and in order to ensure that this becomes a global endeavor.

### **2.0 Planetary Robotic Exploration**

Humanity's understanding about the origin and evolution of our Solar System and our search for signs of life within it have expanded enormously since the dawn of the space age through eyes of ever-more capable robotic explorers. We have reached the stage at which our robotic explorers must be even more sophisticated and capable, and they must operate successfully in a much wider range of environments throughout the solar system if we are to answer the next set of compelling scientific questions, many of which are directed at the age-old question "Did life arise elsewhere outside the Earth?" A program of significantly expanded breadth and depth will be required that is well beyond the means of any given nation to pursue alone. The IAA recommends the following for space agencies' consideration:

2.1 Expand efforts to work together to achieve the next leap in understanding of our Solar System and to pave the way for human exploration

2.2 Focus scientific exploration goals to be mutually supportive, while recognizing the competitive aspect of scientific exploration

2.3 Strive to make available opportunities for international collaboration such as through shared science teams and science instruments, in ways that do not compromise the host agency's primary goals for their individual space missions

2.4 Explore fruitful collaborations in which two or more agencies share significant joint responsibility for missions with multiple flight elements

2.5 Seek ways to apply robotic explorers to further pave the way for expanded human exploration through attainment of critical knowledge of relevant destinations and/or validation of technologies required for human exploration.

### **3.0 Climate Change**

In close coordination with other systems (ground, sea and airborne), future space systems should support a better monitoring and mitigation of the climate evolution, but also the adaptation to its impacts. The IAA recommends that the space agencies consider the following actions through an increased international cooperation:

3.1 Reinforce the programmatic coordination of the Earth Science programs worldwide, in the frame of institutions such as the Group on Earth Observations (GEO) and the Committee on Earth Observation Satellites (CEOS), with the goal of guaranteeing the continuous long-term availability for all nations of all space dependent Essential Climate Variables, as defined by the Global Climate Observing System (GCOS); and contribute to the elaboration and implementation of GEO Data Sharing Principles acceptable by all parties

3.2 Support the development of technologies, derived sensors, and scientific modeling, to achieve a mapping of Green House Gases (GHG) sources and sinks/drains for international commitments monitoring

3.3 Foster the delivery of reliable, objective and verifiable remote sensing data from space systems for the inventory and monitoring of forests, in support to the decision taken at Copenhagen COP 15, concerning the implementation of a REDD+ (Reduction of Emissions from Deforestation and Forest Degradation) mechanism

3.4 Define interoperability standards to enable the use of space systems for integrated applications aiming at reducing the carbon footprint of systems or activities on ground, sea and in the atmosphere, including transport, land use, agriculture, and energy management

3.5 Foster space technology efforts and demonstration projects, to enable offsetting of space technologies that have a potential for long term development of green systems and/or alternative energies.

### **4.0 Disaster Management**

Having considered the significant role played by space technology in all phases of disaster management and the various initiatives undertaken by the national, regional and international organizations, as well as gaps in the existing observational platforms and early warning/forecasting methods, the IAA recommends the space agencies consider the following:

4.1 Strengthen the existing network of Earth Observation (EO) satellites (optical and radar sensors) through virtual constellations, ensuring their continuity and striving to implement a better coordination of the observation satellites for emergency purposes

4.2 Promote the International Charter on Space and Major Disasters so that many more countries and agencies can participate in it, and encourage EO data to become available at no cost for disaster response

4.3 Improve EO based techniques for disaster response by moving from reactive methods to anticipative methods better meeting both timeliness and precision requirements from disaster management users: improve EO archives globally via strategic datasets

4.4 Facilitate communications' networks through international cooperation in the Data Relay Satellite System (DRSS) for timely availability of data products to stakeholders

4.5 Support GEO Data Sharing Principles to ensure that value-added data products are available from space-based assets at a fair cost to support existing international programs and initiatives on space and relating to disasters

- 4.6 Encourage collaborative research efforts and knowledge integration for developing early warning systems/models; develop EO based disaster alert methods
- 4.7 Increase the ability at local level to exploit satellite-based technologies for disaster management, enhance efforts for capacity building and outreach activities through regular workshops/ trainings/ websites
- 4.8 Strengthen national/regional/international level networking of stakeholders, including government and non-government agencies engaged in disaster mitigation.

### **IAA Closing Remarks**

A consensus widely recognized is that many global challenges to come can better be solved by countries working together. The world is flattening as many newcomers are joining the club of emerging space countries, the major space countries face budgetary challenges and politicians and decision-makers face competing priorities. The result is a need to enlarge the circle of current partners. However space agencies have to balance new aspirations and eventual constraints of programs, budgets and national interests. With a large number of new players, confidence, trust, transparency and best practice sharing will have to be the key points for reducing impediments while promoting a safe and responsible use of space.

The Academy has responded to the need to enlarge this circle by inviting to the Heads of Space Agencies Summit an unprecedented number of space agencies and preparing independent studies to support the discussion. Successful preliminary results occurred as several space agencies have already asked the Academy to serve as catalyst for the next few years with several follow-on studies and meetings all over the world. Partnerships with other existing bodies working on the same subjects will also be welcomed. In order to serve as catalyst, an IAA Summit Advisory Group will ensure follow-on so the Academy can better serve the space community. After 50 years of existence the International Academy of Astronautics is recognized as an elite body that contributes to the advancement of international cooperation. The collaboration continues and the next Heads of Space Agencies Summit is planned for November 2013 in Washington DC, USA.

## **Appendix 4 : IAA Study Group Status Report : SG 5.6**

### **RESPONSIBLE COMMISSION:**

COMMISSION V – SPACE POLICIES, LAW & ECONOMICS

#### **Study Number and Title:**

SG 5.6 “Protecting the Environment of Celestial Bodies (PECB)”

#### **Short Study Description** (repeat from Study Group Proposal):

In the context of increased exploration activities within the Solar System, the study will analyse the effects and threats which those activities pose to celestial bodies and will propose overall guidelines and possible means of regulation for future activities. The Study will be carried out in six steps:

1. Definition of the key questions related to the protection of the environment of celestial bodies.
2. Taking stock of the impact that activities of exploration, scientific research and exploitation generally may have.
3. Identifying fields of influence (such as biology, chemistry, nuclear contamination, space debris, economic exploitation et al.) and evaluating their possible impact respectively.
4. Evaluating the influence on celestial bodies in an interdisciplinary approach, also taking into account legal, political, and economical aspects.
5. Providing proposals for rules of procedure for future activities

### **PROGRESS IN PAST SIX MONTHS:**

- On 21 September 2010 the IAA Commission V handed over the final version of the Study to the IAA Secretary General for submission to the Scientific Activities Committee (SAC) during the IAC2010 in Prague.
- In November 2010 the Study Team was informed by the IAA Secretariat about a delay of the activities regarding the study due to the Heads of Space Agencies Summit.
- In December 2010 the Study Team was informed by the IAA Secretariat that the Board of Trustees has commented that the study does not meet some of the formal standards for an Academy study publication and needed revision.  
At this time the Study had received an ISBN.
- On 31.1. the Study Team submitted a revised version to the IAA Secretariat, reflecting the comments from the IAA Board of Trustees. In turn the Team was informed that it is intended to send the Study to the IAA Studies Center in China after 11 February (end of Chinese New Year celebration) for printing.

#### **Website Study Information up to date?** (Study Group Membership, Study Plan and Schedule):

Yes.

The “Final Draft” version of the study is available under ‘Completed Studies’ on the IAA website.

#### **Issues requiring resolution?** (recommend approach):

The final draft of the Study was submitted to the IAA in February 2010 for peer review, as foreseen in the study planning. Since then, the study has been facing extreme delays in the process of reviewing and towards printing.



**Product Deliveries on Schedule?** (If modified explain rationale):

Yes.

The Study was completed by the Study Team within the specified three-year period, in February 2010.

**Study Team Member Changes?**

No

**Name of person providing Study Group Status** (Study Group Chair or Co-Chair):

Mahulena Hofmann, Petra Rettberg (Study Group Chairs),  
submitted by Marc Haese (Rapporteur) on behalf of the two SG Chairs.

**Status Report Date:** March 18, 2011

**STUDY TEAM MEMBERSHIP CHANGES : N/A**

## Appendix 5

### Short Report for the Commission V Meeting at the Spring Meeting in Paris, March 2011

#### Roundtable 2010:

- In 2010 we celebrated the 25th IAA/IISL Scientific Legal Roundtable
- We were honoured about the presence and the speeches of the IISL President, Tanya Masson-Zwaan, and the Secretary General of the IAA, Jean-Michel Contant
- The topic "The New Age of Small Satellite Missions" met high interest! Up to 60 people listened to the presentations
- From 5 confirmed speakers, 4 did participate and presented their paper
- The session chairs Jane Smith and Rainer Sandau did a good work by introducing topic and speakers as well by inspiring the panel and the audience to do a lively discussion.
- A report is available

#### Roundtable 2011:

- Topic "Space debris remediation".
- Kai-Uwe Schrogl and Wendell Mendell agreed to chair the session, Nicola Rohner-Willsch will be rapporteur.
- Lead speaker will be Heiner Klinkrad
- Further Speakers: Carsten Wiedemann, Germany, Joanne Wheeler, United Kingdom, Catherine Doldirina, Canada and Jana Robinson, Austria.
- The Roundtable will take place on Thursday during the morning session.

#### Roundtable 2012

- Topic "Optical Communication": technical development and regulatory aspects as frequencies, protection from interception during data transmission, economic aspects.
- Pierre Molette and Masahiko Sato agree to be the chairs for 2012.

#### Other:

- The jubilee brochure for the 25<sup>th</sup> roundtable 2010 is still in work. Two articles are still missing.
- An edition of 300 to 500 is foreseen, please send me names for the distribution list.
- The liaison committee homepage is available at: <http://iaaweb.org/content/view/399/557/> thanks to Fabrice Dennemont, IAA office
- The following documents for the website are available at the IAA office (and will be uploaded soon, I assume): Minutes from 2003 to 2010, the actual charter.

With kind regards to the Commission V members,  
Nicola Rohner-Willsch