

Meeting of IAA Commission 1 on 'Space Physical Sciences'

23 March, 2015, (Monday 14:00-16:00)

IAA Head Quarters,

Paris, France

Agenda

The agenda of the meeting is contained in *Appendix 1*

This agenda was adopted and the minutes of the meeting are as follows:

1. Welcome

The Chairman of Commission-1, Prof. J. N. Goswami, welcomed Commission-1 executives, members of Commission 1 and study group representatives.

Commission executives included: The Commission Chair: J. N. Goswami (India), The immediate Past Commission Chair: G. Vane (USA), Commission Secretary: S. McKenna-Lawlor (Ireland).

Commission Members; G. Schwehm (Germany); S. Ulamec (Germany); Cl. Macone (Italy); A. Viviani (Italy) and T. Krimigis, (USA).

IAA member B. Foing was present in the deliberations. Dr. R. Lopez who was scheduled to be elected an Associate Member of the Academy, attended as an Observer.

Prof. Y. Yatskiv (Ukraine) represented a report on Study Group 1.9.

Prof. B. Weimin (China) attended the discussion and presentation of his new study group proposal (Section 5).

2. Self Introduction

All of those present introduced themselves and described their scientific areas of interest. Breaking news concerning the Rosetta Lander Philae on the surface of comet 67P/Churyumov Gerasimenko was provided by G. Schwehm, S. Ulamec and S. McKenna-Lawlor.

3. Minutes of the Toronto Meeting

The minutes of the Toronto Meeting (including a small addition made earlier by the Academy) were presented by SMcKL and accepted without change. (*Appendix 2*).

4. Study Group Activities

There are currently 6 active study groups under the aegis of Commission 1 (1.6, 1.8, 1.9, 1.10, 1.12 and 1.13.

SG 1.6 Protected antipode Circle on the Lunar Farside. Presentation by Cl. Macone.

The most recent version of this study proposes the creation of PAC (Protected Antipode Circle), an area on the lunar far-side, centred at the antipode and spanning an angle of 30° in longitude, latitude and all radial directions from the antipode. In view of its unique features PAC is proposed in the study to be officially recognized by the UN as an International Protected Area where 'no radio communication by humans will take place now and in the future for the benefit of all humankind'. New initiatives in progress within the study were also outlined.

Prof. Goswami commented that UN recognition of such a site as a "Protected Area" through IAA effort is unlikely based on experience thus far. He also noted that, *before Study 1.6 could be considered closed, the Study Group final report should be published by IAA.*

It was then recommended that the present study be considered closed and that new activities described as ongoing in the presentation may be proposed for a follow up Cosmic Study.

SG 1.8 Global Satellite System for Monitoring and Forecasting the Earth's seismic activity

Prof. Degtyarev, General Director of the Yuzhnoye Design Office, Ukraine submitted a Preliminary 48 page *Report Draft* on Study 1.8 to Commission 1. He also made a presentation on the results obtained. These included an account of the basic principles that are determined to be necessary for the creation and operation of a satellite system for seismic activity monitoring and forecasting, together with schemes for studies of specific observational parameters.

This study group activity may be considered complete and the report provided will be submitted to the Academy.

SG 1.9 Satellite Remote Sensing of aerosols in the Earth's atmosphere

No report on SG 1.9 was received from the study group leader Dr. Y. Yatskiv and no representative of the group was present.

SG 1.10. Terrestrial Analogue Comparison of Terrestrial and Planetary Geology.

The study group leader Prof. M. Coradini forwarded a report on this study to Commission 1 (***Appendix 3***). It was noted therein that one of the main goals is to investigate existing laboratory and university capacities and solicit interest in the topic from developing and emerging countries with interest in space sciences and exploration. A particular focus involves offering affordable access for space exploration personnel in Latin America and Africa to using the IAA network.

Progress made within the last six months was deemed by the Commission to be satisfactory.

SG 1.12. Virtual Exploration (Telepresence Exploration).

The study group leader, again Prof. M. Coradini, forwarded a report on this study to the Commission (*Appendix 4*).

It is noted therein that virtual reality applications primarily comprise visual experiences. A further virtual reality technique (Tele-robotic) is described which would allow, for instance, a robotic arm controlled by an operator on Earth wearing a special robotic data glove to perform tasks such as : picking up rock samples on the Moon or on a near earth object (NEO); performing operations in a lunar lava tube. The concept of “Telepresence” is also proposed to be introduced to enlarge the scope of this study.

Progress within this study group was deemed by Commission 1 to be satisfactory.

SG 1.13 Planetary Science Enabled by the New Generation of Cube-Sats and Miniaturized Scientific Instruments.

G. Vane presented progress made in this study and also provided a written report (*Appendix 5*).

The focus of this study group is on planetary science activities that are presently realizable using Cube-sats and miniaturized scientific instruments. Detailed outlines of the science, instrument, spacecraft, and mission design sections of this study are already available.

The status and progress of SG-13 were deemed to be satisfactory by the Commission. The Commission also noted that an earlier debate as to whether this study should be carried out in Commission IV rather than in Commission 1 had resulted in retaining this study group in Commission 1.

5. Proposal for a new study group

A proposal for a new study group entitled “*Integrated Precursor Distinguish in Multi-Geophysical Fields around Global Earthquake Events with Magnitude larger than 7 in Recent 10 Years*” was received by the Chairman of Commission 1 from Prof. Bao Weimin of the IAA Studies Centre in China.

Since the Academy advised that it is necessary for new studies to be endorsed by a relevant Commission before they are considered for acceptance within the Academy, Prof. Weimin was invited by the Chair to present his study proposal (*Appendix 6*) to **Commission 1**.

The presentation was made in the presence of Prof. Weimin by a member of his study group. Comments and suggestions were put forward by several Commission members and the presenter indicated that these will now be taken into account. The Commission in principle considered the proposal to be suitable for consideration by the Chair of ‘Study Group Activities’ who will take the final decision as to its acceptance.

6. The 11th IAA Conference on Low Cost Planetary Missions. It was reported by G. Vane that the next (11th) LCPM Conference will be held in the ‘Einstein Saal’ at the Archenhold Sternwartin Berlin, Germany from 9-11 June 2015 (hosted by the DLR). Tilman Spohn and G.Vane will act as co-chairmen during this event. The heads of at least five major space agency

planetary programs have committed to be present in Session 1 with another such acceptance pending. Further details are contained in *Appendix 7*.

7. The Second IAA Symposium on Spacecraft Safety.

SMcKL reported on a communication to Commission 1 from Prof. N. Smirnov concerning his organization of a second IAA Symposium on Spacecraft Safety, to be held in St. Petersburg, Russia (29 June - 2 July 2015).

The proposed sessions are:

1. Fire safety of Space vehicles.
2. Protection of Space structures from space debris collisions and micrometeoroids.
3. Safety at launch place and during takeoff.
4. Propulsion systems.
5. Radiation hazards and safety.
6. Supercomputer predictive modeling for ensuring Space program safety.

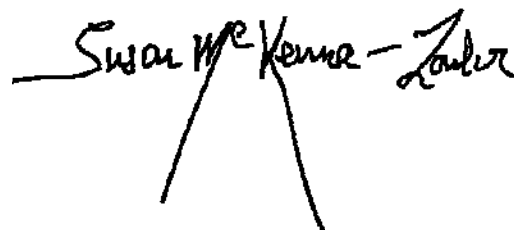
Session Chairs from Commission 1 will include N. Smirnov (topic 2) and Susan McKenna-Lawlor (topic 5). Plans are in place to publish (refereed) contributions to the Symposium in a Special Issue of Acta Astronautica.

A more detailed account of this Symposium is contained in *Appendix 8*.

8. Any Other Business

Study Group 1.11: In view of lack of progress in assembling a study group team as proposed originally, and also lack of response from the prospective study group leader, the **Commission decided that this study should be cancelled and that this decision should be reflected in the IAA website.**

A discussion aimed at strengthening study group activities through the making of direct contact with individual members by a commission representative requesting the submission of new study group proposals, was initiated. An e-mail list of members should be provided to each Commission to support this process. The discussion, however, was curtailed due to lack of time. The Commission Chair indicated that he would mention this proposed action at a meeting of SAC and the topic will also again be tabled at the Commission I meeting in Jerusalem.

A handwritten signature in black ink that reads "Susan McKenna-Lawlor". The signature is written in a cursive, somewhat stylized font. The first name "Susan" is written in a larger, more prominent script, while "McKenna-Lawlor" follows in a similar but slightly smaller script. The signature is positioned above a horizontal line.

Susan McKenna-Lawlor (Secretary, Commission 1)

Appendix-1

Meeting of IAA Commission 1 on 'Space Physical Sciences'

23 March, 2015, (Monday) 14.00-1600,

IAA Head Quarters, 6 rue Galilee, 75116 Paris, France

1. Welcome: (Prof. J. Goswami, Chair)

2. Adoption of the Agenda

3. Self-introduction

(i) Commission-1 Members; (ii) All other attendees

4. Minutes of the Toronto Meeting (Prof. S. McKenna-Lawlor, Sec.)

5. Study Group Activities: (Status, Progress Report)

5 (a): Status of Study Group 1.6;

Protected antipode circle on Lunar farside (Cl. Maccone) [Completed]

Presentation (5-6 mins.) Cl. Maccone

5 (b): Status of Study Group 1.8;

Global Satellite System for monitoring and forecasting of the Earth seismic activity (A. Degtyarev)

Presentation (5-6 mins.) O. Ventskovsky

5 (c): Status of Study Group 1.9;

Satellite remote sensing of Aerosols in the Earth atmosphere (Y. Yatskiv)

Presentation (5-6 mins.) O. Ventskovsky

5 (d): Status of Study Group 1.10;

Terrestrial Analogue – comparison of Terrestrial & Planetary Geology

(M. Coradini). Overview of the study group status provided.

5 (e) Status of Study Group 1.12;

Virtual reality: Virtual exploration of Planets (M. Coradini).

Overview of the study group status provided.

5 (f) Status of Study Group 1.14;

Promoting Global Space knowledge & expertise for Developing countries
(M. Othman)

Presentation (5-6 mins.) Y. Horikawa

6. New Proposal

The Secretary was informed of a proposal entitled "Integrated Precursor Distinguish in Multi-Geophysical Fields around Global Earthquake Events with Magnitude larger than 7 in Recent 10 Years (Group Leader Bao Weimin, China; Co. Group - Leader Dr J. M. Contant, France). This has been forwarded by the Chair to the Sec. General.

A presentation of this proposal will be made to Commission 1 by Prof. Bao Weimin.

7 LCPM - 11

Overview of the upcoming Meeting (G. Vane)

8 Second IAA Symposium on Space Flight Safety

An Announcement concerning the second IAA Symposium on Space Flight Safety has been received from Prof. N. Smirnov (Presented SMcKLawlor)

9. Any Other Business

(i) Discussion of Study Group 1.11

(ii) E-mail list of Commission 1 members

(iii) Protocol for requesting Commission 1 members to provide new Study Group proposals.

Appendix-2

Meeting of IAA Commission 1 on 'Space Physical Sciences'

27 September, 2014, (Saturday) 13.00-1600, Metro Toronto Convention Centre,

Toronto, Canada

Agenda

The agenda of the meeting is contained in *Appendix 1*

Minutes

This agenda was adopted and the minutes of the meeting are as follows

1. Welcome:

The Chairman of Commission-1, J. N. Goswami, welcomed Commission-1 officials and other members of Commission-1.

2. Self-Introduction of Commission 1 members and all attendees - All

Present at the meeting were: [Commission Chair: J. N. Goswami, India), Commission Secretary: S. McKenna-Lawlor, Ireland). Commission Members; T. Krimigis, (USA); G. Schwehm (Germany); R. McNutt (USA); A. Viviani (Italy); M. Othman (Malaysia).

All of these persons introduced themselves and described their scientific areas of current interest. Ventskovsky Oleg (Russia) & Yasushi Horikawa (Japan) also attended during part of the meeting.

Breaking news presented during this period included;

- An account by T. Krimigis of the successful entry into Mars orbit on 21 September, 2014 of NASA's *Mars Atmosphere and Volatile Evolution* (MAVEN) spacecraft. MAVEN is the first spacecraft dedicated to exploring the tenuous upper atmosphere of Mars.
- An account by J. N. Goswami of the successful entry into Mars orbit on 24 September of India's *Mars Orbiter Mission* (MOM) spacecraft. It was noted that the Prime Minister of India (Narendra Modi) attended the launch of MOM on 5 November 2013 and received the first photographs obtained at Mars on the same day (one of these, a spectacular image of a richly cratered part of the Martian surface, was presented to the commission)
- An account by G. Schwehm of the current status of ESA's Rosetta Mission to comet 67P/ **Cheryumov**-Gerasimenko and of ongoing preparations for the deployment of a Lander (Philae) to the surface of the comet on 12 November, 2014.

- S. McKenna-Lawlor reported that the mission critical *Electrical Support System/ESS* which will send commands from Rosetta to the 10 experiments aboard Philae on the cometary surface, and also handle the data streams forwarded to the Lander from the individual experiments, was built by her group in Ireland.

3. Minutes from the Paris Meeting: S. McKenna-Lawlor (S.McKL)

The Minutes of the previous meeting of Commission I which was held in Paris, France at Academy Head Quarters on 17 March, 2014, were presented by S. McKL (copy attached, **Appendix-2**). The members discussed the many points contained in these minutes, several of which were tabled in the Agenda as individual items. The gist of these discussions is provided below under the relevant agenda items. The minutes were adopted without change.

4. Study Group Activities: finalized studies; publication of results (S.McKL)

Study Group: 1.5

It was reported by SMcKL that a camera ready version of SG 1.5 “*The energetic particle radiation hazard en route to and at Mars*” was submitted to the Academy shortly after the Spring Meeting. Several issues of style were then raised, which entail inter alia, as a condition of publication: changing all of the references to numbers; providing a list of acronyms and providing an Executive Summary. These changes are currently being made and publication will take place immediately after the requested changes have been implemented. An account of the book is scheduled for presentation by SMcKL on Academy Day (28 September, 2014) at the Metro Toronto Convention Centre.

5. Study Group activities: status, progress reports (Study group Chairs/members)

J. N. Goswami reported that the Academy had contacted the leaders of all the study groups under the jurisdiction of Commission-1, requesting a formal report on the status/membership of the study with, if possible, an oral presentation at Toronto to the Commission. Progress reports were received from ALL and presentations were made by several study group leaders/members to Commission 1.

Study Group 1.6

The topic “*Protected antipode circle on Lunar Farside*”(C. Macone) was discussed by Commission-1 and it was recommended that, before the related Study Group could be considered closed, a (refereed) paper on the outcome should be published in Acta Astronautica. *The Academy should communicate this requirement to C. Macone.*

It was not foreseen that the Academy would formally pursue the issue, raised in the study, of seeking radio protection from man-made interference for the Daedalus Crater on the lunar farside from the UN Committee on the Peaceful Uses of Outer Space/COPUOS.

Study Group 1.8 & 1.9

Presentations were made on progress thus far by the Two Study Groups:

1.8 Global Satellite System for monitoring and forecasting of the Earth seismic activity

1.9 Satellite remote sensing of aerosols in the Earth atmosphere

Significant progress has been made in both studies and outlines of further work were also presented. However, the Committee voiced its concern about *lack of participation from any scientist/technical persons from outside the host country* and suggested possible countries where people may be interested in joining in these study groups.

Study Group 1.10/3.19:

The topic “*Feasibility Study of Astronaut Standardized Career Dose Limits in LEO and the outlook for BLEO*” was approved by the Board of Trustees in February, 2013 as a Cosmic Study and assigned jointly to Commissions III and I of the Academy under the designation SG 3.19/1.10. In March 2013 the Human Space Flight Co-ordinating Group/HSFCG recommended that the study be extended to consider also “the biological responses of humans to the impingement of high energy particle radiation” and this extension was duly implemented. Reports on this study have thus far been made to Commission III by the Study Chair S.McKL.

On 18 September, 2014, SMcKL was informed by the Academy that this study could only be carried out under the aegis of one commission and should therefore be, henceforth, titled SG 3.19. She informed the Chair of Commission 1 of this change lest he wished to discuss the change with the Academy but this was not the case.

Study Group 1.11

In view of lack of progress in assembling a study group team as proposed originally and also lack of response from the study group leader, ***this study may be withdrawn*** if no input is received from the study group leader ([R. Ramachandran](#)) about the constitution of an international study team and the provision of a schedule of activities to meet a set timeline for completing the study.

Study Group 1.13

A study on “*Small satellites for extremely low cost planetary missions*” was initially proposed as a Commission-1 study in view of its focus on the planetary science that is enabled by the new generation of Cube-Sats and Cube-Sat-compatible scientific instruments. It was later argued that

a Commission- IV study focussed on spacecraft technology and engineering aspects would be a more appropriate environment for the implementation of this work (which would in this circumstance be carried out under the title Study Group 4.16). Related discussions are still in progress.

Study Group 1.14

The activities of this study group on “*Promoting Global Space Knowledge and Expertise for Developing Countries*” were presented. Informal discussions on the nature of the database and the method for acquiring data were held at the Beijing IAC (September 2013) and at the UNCOPUOS Scientific and Technical Subcommittee meeting (February 2014 in Vienna). The “Database” is to be founded on IAA membership and an agreement on where the database of experts would be located was reached. The study group would like the IAA Secretariat to agree to maintain the database on the IAA website.

Proposal for new Study Groups. (J. Gowami)

It was stated by the Chair that, in view of the several active study groups currently being handled by Commission 1, no further studies were being solicited at this time. However, during a meeting of all the study group Chairs later in the day, the IAA President urged all the Commissions to solicit further proposals for study. Thus, the Commission-1 Chair will send an invitation to all Commission-1 members to submit new study proposals for consideration by the IAA.

6. Academy Day Program (Moscow) Summary

G. Vane (past Chair of Commission-1) in collaboration with Lev Zelenyi, prepared the Moscow IAA-COSPAR Academy Day program that covered a wide spectrum of topics. The programme was attended by close to one hundred academy members and the event received very favourable comments. The program (provided by G. Vane) is attached (**Appendix 3**).

8. Report on First IAA Symposium on “Space Flight Safety” N Smirnov

An IAA Symposium on SPACE FLIGHT SAFETY, was held in Saint Petersburg from 28-31 July, just prior to the COSPAR meeting in Moscow (2-10 August). An account of this event, prepared by N. Smirnov, who was unable to come to Toronto, is contained in **Appendix-4**.

SMcKL who was responsible for a Session on ‘*Radiation Hazards and Safety*’ reported that her session was very well attended with “standing room only” during her keynote address on “Recommendations to mitigate against human health risks incurred due to energetic particle irradiation Beyond Low Earth Orbit /BLEO”. A successful session on “Fire safety of Space vehicles” was chaired by G. Jomaas, from the Technical University of Denmark, Lyngby, Denmark. Other sessions were chaired by Russian experts. Preparations to publish the papers presented at this Symposium in a special (refereed) issue of Acta Astronautica are in train.

9. Report on Fifth IAA Symposium on “Search for Life Signatures (C. Macone).

The fifth IAA Symposium on ‘*Search for Life Signatures*’ was held at the UNESCO Building in Paris from 20-21, March 2014. The goal (see the Paris Minutes of 2014) was to discuss the strategies of both Passive and Active SETI with communities that would include experts involved in the search for: terrestrial type exo-planets and the recognition of probable bio-signatures (as well as other related disciplines) in order to enhance the possibility of SETI signal detection success. An account of this meeting was provided by C. Macone.

10. 12th. Low-Cost Planetary Mission (LCPM-11)– Conference update;

The next LCPM-11 is scheduled for *9-11 June in Berlin Germany*. Conference organizers are trying to hold the meeting in the “Einstein Saal” at the Archenhold Sternwarte in Berlin.

Primary Organizers are: Tilman Spohn (Berlin) and Gregg Vane (JPL)

A proposed (tentative) agenda includes the following themes:

Session 1: Agency Programs and Plans for Future Low-Cost Planetary Missions

Session 2: Latest Science Results from On-Going Missions

Session 3: Missions Currently Under Development for Launch in the Near Future

Session 4: Science Instruments Enabling the Next Generation of Low-Cost Planetary Exploration

Session 5: Advanced Concepts for the Next Generation of Low-Cost Missions

Session 6 : Low Cost Launchers

11. Any Other Items

The Chair opened a discussion on “other items”.

He then commended the many items of special relevance to Commission 1 scheduled to be presented during the 65th IAC.

He thanked those present for their attendance and contributions to the deliberations and closed the meeting.

Minutes prepared by

Susan McKenna-Lawlor; Secy. & Jitendra N. Goswami, Chair

Commission-1; Space Physical Sciences

Appendix-1

IAA Commission 1 'Space Physical Sciences' Meeting
27 September, 2014, (Saturday) 13h00-16h00
Metro Toronto Convention Center
Toronto, Canada

Agenda

1. Welcome – J. Goswami
2. Self-introduction of Commission 1 members and all attendees – All
3. Minutes from Paris meeting – Susan McKenna-Lawlor.
4. Study Group activities: finalized studies, publication of results -
Susan McKenna-Lawlor
5. Study Group activities: status, progress reports – Study group
Chairs/members.
6. Proposals for new Study Groups - J. Goswami
7. Academy Day Programme (Moscow): A Summary – Gregg Vane
8. Report on First IAA Symposium on “Space Flight Safety” –
Nickolay Smirnov.
9. Report on Fifth IAA Symposium on “Search for Life Signatures” –
Claudio Maccone
10. 12th Low-Cost Planetary Mission -- Conference update
11. Any other item

Appendix-2

Meeting of IAA Commission 1 on ‘Space Physical Sciences’

17 March 2014, (Monday) 13h30-16h00, 6 rue Galilee (Metro Boissière)

IAA Headquarters

Paris, France

Agenda

The agenda is contained in Appendix 1

Minutes

This agenda was adopted and the minutes of the meeting are as follows

1. Welcome:

The Chairman of Commission-1, J. N. Goswami, welcomed Commission-1 officials and other members of Commission-1 that were present and requested that everyone would participate in the deliberations of the meeting.

2. Self-Introduction:

All the officials of Commission-1 were present [i.e. J. N. Goswami (Chair, India), N. Smirnov (Vice-Chair, Russia), G. Vane (immediate past Chair, USA), S. McKenna-Lawlor (Secy., Ireland)], Other Commission-I members present were: T. Krimigis, (USA); G. Schwehm (Germany); R. McNutt (USA); M. Nakamura (Japan); A. Viviani (Italy); S. Schindler (Germany); R. Ramachandran (India); C. Maccone (Italy).

All of these persons introduced themselves and described their scientific areas of current interest.

3 Minutes of Beijing Meeting

A brief account of the discussion that took place at the Beijing meeting in September 2013 was presented by the Commission Chair. He noted that only **four** Commission members (including the Chairman and Secretary.) were present and that two other Academy members joined in the deliberations. The full minutes of the meeting were presented by the Secretary and approved by those present.

4 Study Group Activities (finalized studies, publication of Results)

S McKenna-Lawlor reported that her book arising from Study Group 1.5 on “*The energetic particle radiation hazard en route to and at Mars*” had been fully completed and submitted to the Academy in 2013 for approval for publication. No information was available as to when publication would take place. An action was taken by J. N. Goswami and G. Vane to raise the question of publication status with Jean-Michel Contant and the SAC later in the day. *It was subsequently learned from G. Vane that the book has been fully approved for publication and that congratulations were forwarded to SMcKL.*

5 Study Group Activities (Status, progress reports)

An in-depth discussion on the current status of the approved study reports (SG1.5, 1.6, 1.8, 1.9, 1.10, 1.11, 1.12 and 1.14) followed and the committee made the following observations during these discussions with back-up recommendations.

Observations:

- (i) *The Study Group report SG 1.5, on “Particle radiation hazards en route to and at Mars” is now awaiting BOT approval, prior to publication.*
- (ii) *The current status of two Study Groups proposals (SG-1.6 & SG-1.11) were presented by the proposers of these studies (C. Maccone and R. Ramachandran). The absence of corresponding reports on the current status of the other study groups (as had been requested to be provided before the meeting by both the IAA office and the Chairman of Commission-1), was deemed to be a cause for worry.*
- (iii) *The separation of Commission-1 Study Group 1.13 from Commission-4 Study Group 4.16 (“Small satellites for extremely low cost planetary missions”) was discussed. Study Group 1.13 was initially proposed as a Commission-1 study with the focus on the planetary science that is enabled by the new generation of Cube-Sats and Cube-Sat-compatible scientific instruments. It was felt that a Commission-4 study focussed on spacecraft technology and engineering aspects would be more appropriate for Study Group 4.16. In subsequent discussions at the SAC and later, it was decided by IAA leadership to restore Study Group 1.13 to Commission 1 as originally proposed.*
- (iv) *A clear statement regarding publication policy with regard to study reports from an IAA perspective needs to be put in place - in particular for study SG 1.5.*
- (v) *Congratulations were offered to C. Maccone on the successful completion of the study he had led on the topic “Protected antipode circle on the Lunar far side”.*

Recommendations:

- (i) *The IAA office should be requested to send out a further request for a status report from each of the individual leaders of Study Groups 1.8, 1.9, 1.10, 1.12 and 1.14 since, for the Spring Meeting, they have neither submitted a report on the progress of their studies nor updated earlier information concerning study group membership.*
- (ii) *The IAA should issue guidelines concerning the time frame within which particular Study Group activities should be completed following the approval of a particular study group, as well as formulate the steps to be taken (including discontinuation) if there is an unreasonable delay in meeting the allocated milestones.*
- (iii) *The study group SG 1.5 book, on “Particle radiation hazards en route to and at Mars”, should be published at an early date (unanimous declaration).*
- (iv) *An IAA publication policy for study group reports should be formulated which takes into account both current day expertise and the availability of modern methods of dissemination of information via the media, which techniques are now supplemental to printed documentation. The policy thus formulated should be circulated to all Commission Chairs and conveyed to Study Group Leaders and Members at the time of acceptance of a study proposal.*

6. Proposals for new Study Groups

The Chairman recommended that, in view of its already approved SEVEN study groups, Commission-1 should await the formal publication policy of the IAA before proposing any further study groups.

7. COSPAR (Moscow) Academy Day Technical Programme

G. Vane (past Chair of Commission-1) is organizing, in collaboration with Lev Zelenyi, the Moscow IAA COSPAR Academy Day program. He presented to Commission 1 the preliminary program (Appendix 2) and noted that all of the invited speakers listed had already confirmed their attendance. Other items may yet be added to this program.

8. 11th. IAA Conference on Low Cost Planetary Missions

It was confirmed by G. Vane that the next (11th) LCPM Conference will be hosted by the DLR in Berlin, Germany, from 9-11 June 2015. *Tilman Spohn* and Gregg Vane will act as co-chairmen. As previously reported at Beijing, *the International Planetary Probe Workshop (IPPW)* plans to hold its 2015 IPPW meeting at DLR in Koln, Germany during the following week, 15-19 June 2015, to avoid conflicting dates. Gregg and Tilman plan to meet in Washington in May, 2014, to put together a draft international program committee and top-level agenda for LCPM-11.

9 Fifth IAA Symposium on Search for Life Signatures

The fifth IAA Symposium on 'Search for Life Signatures' was scheduled to be held at the UNESCO Building in Paris from 20-21, March 2014. C. Macone, in his capacity of Conference Organizer, provided Commission 1 with an historical account of SETI. Since 1960 radio telescopes have been employed to detect extraterrestrial signals near 1420 MHz (the emission line of neutral hydrogen) while optical searches have been pursued since 1990 (Passive SETI). In recent years signals had been deliberately transmitted into space to enhance the probability of contacting distant technological civilizations (Active SETI)

The goals of the Paris Symposium in 2014, against a background of the discovery since 1995 of, in excess of, 2000 extra-solar planets, is to discuss the strategies of both Passive and Active SETI with communities that will include experts: in the search for terrestrial type exoplanets; in the recognition of bio-signatures; and in other related disciplines in order to enhance the possibility of SETI signal detection success.

10 First IAA Symposium on Space Flight Safety

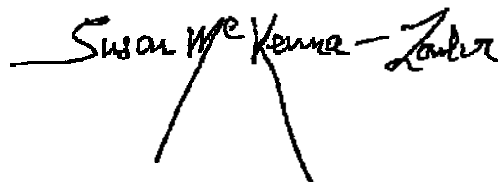
N. Smirnov reported that an IAA Conference on SPACE FLIGHT SAFETY, will be held in Saint Petersburg this Summer from 28-31 July, just prior to the COSPAR meeting in Moscow (2-10 August). The conference program is contained in Appendix 3. The Commission 1 Secretary will take responsibility for Topic 4.

Prof. Smirnov provided information on how to reach the venue on the Gulf of Finland and noted that the recommended hotel has on show two remarkable portraits.

11 Information on Acta Astronautica Special Issues Policy

N. Smirnov presented an account of his recent discussions with the Editor of Acta Astronautica concerning the policy of the journal regarding Special Issues. The privilege of publishing Special Issues is granted to Conferences and Symposia organized under the auspices of the IAA. The guidelines for arranging IAA meetings are published on the web site of the Academy.

As there were no items in AOB the Chairman thanked those present for their participation and closed the Meeting.

A handwritten signature in black ink that reads "Susan McKenna-Lawlor". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

Susan McKenna-Lawlor; Secy.

Appendix-3

Academy Day

International Academy of Astronautics (IAA) On the occasion of the 40th COSPAR Scientific Assembly *Moscow, Russia, Saturday August 2nd 2014*

Venue: Moscow State University Shukulovsky Building, room S1 04

Chairs: Lev Zeleny, Gregg Vane

- 09h00 Program Presentation, by Lev Zelenyi, and Gregg Vane
- 09h05 Welcome Address, Anatoly Perminov, Vice President, Scientific Programs
- 09h15 IAA Heads of Space Agencies Summits by Jean-Michel Contant, Secretary General
- 09h45 Quantifying Space – Quantitative Models for Space Weather, by Maria Kuznetsova, GSFC, USA
- 10h30 Coffee Break
- 10h45 Remote Sensing of CO₂ and CH₄ in the Earth's Atmosphere: From Missions to Science—
Remote Sensing of Carbon Cycle Science, by Charles Miller, Caltech/JPL
- 11h30 Following the Water in the Solar System – Mars, Europa, Moon, Mercury and beyond, by
Igor Mitrofanov, IKI, Russia
- 12h15 Induction of newly elected Corresponding and Full Members
- 12:30 Lunch (optional-individual payment for each participant at the Moscow State University canteen)
- 13h30 Rosetta: First Results from 67P/ Churyumov–Gerasimenko, by Gerhard Schwehm, ESA
- 14h15 Europa as an Abode for Life: Investigating Habitability with the Europa Clipper Mission
Concept, by Robert Pappalardo, Caltech/JPL, USA
- 15h15 Russia's Space Science Program: Current Activities and Plans for the Coming Decade, by
Lev Zelenyi, IKI, Russia
- 16h00 ROSCOSMOS: The Current Status and Future Plans for Human and Robotic Exploration,
by TBD, ROSCOSMOS, Russia
- 16:45 A brief preview of COSPAR Scientific Event S.4, entitled "Path to Intelligent Life in the Universe,"
by Claudio Maccone, INAF, Italy
- 17h00 Adjourn Plenary Session
- 19h30 IAA Dinner (optional-individual payment for each participant at the Durdin)
- 22h00 End

Appendix-4

*Technical report
On the 1-st IAA Symposium
Space Flight Safety*

The Symposium was held in Saint Petersburg, July 28-31, 2014. Symposium was a great success. The number of registered participants exceeded the expectations and was equal to 50 full paying persons. There were 6 plenary lectures and around 35 oral presentations. The organizing committee will select best presentations for a special issue of Acta Astronautica. There is a Special Issue Space Flight Safety label in a drop down menu in the Elsevier submission system for Acta Astronautica. The submissions should be done in September 2014. Reviewing procedure will be performed in October, in November the papers would be delivered to production office.

Program Chair: Nickolay Smirnov, Prof., Dr.Sc.-Hab., IAA Com.1 Vice Chair, Moscow M.V.Lomonosov State University, Russia

Scientific organizing committee members:

Igor V. Barmin, General Designer, Federal State Enterprize “TsENKI”, Russian Space Agency, Russia

Vladimir Betelin, Academician RAS, Director of Scientific Research Institute for System Studies, Russia

Christophe Bonnal, CNES, Paris, France

Jean Michel Contant, IAA Secretary General, Paris, France

Grunde Jomaas, Technical University of Denmark, Kgs. Lyngby, Denmark

Susan McKenna-Lawlor, Academician, Prof. D.Sc., Sec. IAA Com.1, Ireland

Vyacheslav Nosikov, Adviser to General director “NPO “Technomash”, Russian Space Agency,

Vitalii Panov, Vice-president of Russian Engineering Academy,

Igor Rubtsov, director of scientific Analytic Centre “NPO “Technomash”, Russian Space Agency,

Mikhail Silnikov, Prof., Dr.Sc.-Hab., Director General Scientific and Production Enterprise “Special Materials” Russia

Symposium structure:

– Sessions

1. Fire safety of Space vehicles
2. Protection of Space structures from space debris collisions and micrometeoroids
3. Safety at launch place and during takeoff
4. Radiation hazards and safety
5. Supercomputer predictive modeling for ensuring Space program safety

Each session incorporated plenary lectures and oral presentations.

Accommodation for all participants was provided in Lancaster Court Hotel within a walking distance from the Conference site. The participant kit along with symposium program and badge included Saint Petersburg photo album, Symposium marked shirt and umbrella with a sky star map.

The cultural program included an evening excursion along the rivers and channels of Saint Petersburg and a full-day tour to Peterhof park, fountains and palace.

Symposium Program Chair
Academician Nickolay Smirnov.

Appendix-3: IAA Study Group Status Report

Responsible Commission 1 – Space Physical Sciences

Study Number and Title: 1.10 Terrestrial Analogue Comparison of Terrestrial and Planetary Geology

Short Study Description (repeat from Study Group Proposal):

The cosmic study will investigate the synergy and commonality of studying geology on Earth and on another planet.

Terrestrial analogues are places on Earth that approximate, in some respect, the geological, environmental and putative biological conditions on a particular planetary body, either at the present-day or sometime in the past. Analogue studies are driven by the need to understand processes on Earth in order to interpret and ground truth data sent back from Mars and other planetary bodies by unmanned orbiters and rovers.

Human exploration and testing of Analogue campaigns can assist in the design and validation of technologies and systems to ensure full operability and functionality once deployed at the surface of Mars. Integrated analogue campaigns allow to test exploration strategies and operations planning to maximize the achievement of the mission objectives (e.g. scientific return or production of O₂) and to ensure inter-operability between the different elements of the mission.

One of the main goals is to investigate existing laboratory and university capacities and solicit interest, from developing countries and space emerging countries. A particular focus will be made to offer affordable access to space exploration in Latin America and Africa in using the IAA network.

The cosmic study will engage selected international experts to suggest a global space planetology sciences education and public outreach (EPO) model that: (1) strengthens Latin America's and Africa's future space exploration workforce; and (2) promotes science, technology, engineering, and mathematics (STEM) education and public engagement to communicate the benefits of space for understanding our planet and living in Latin America and Africa; and (3) underlining the importance for involving countries, organizations and individuals who can provide new contributions to the Robotic and Human Exploration endeavor.

A review of on-going study Terrestrial Analogues will be duly taken into account and will represent the starting point of this activity. Interfaces with the Virtual Reality/Telepresence study group (1.12) will also be opened.

Progress in past six months:

Surface processes on Earth & Mars

We are making contacts with geologists in South America where a large number of potentially interesting analogues sites are available. We are establishing synergetic relations with the local academia and we intend to expose them to Mars knowledge.

One of our members (Dave Pieri) has made available his worldwide data base of terrestrial volcanoes and we are putting together a data base of terrestrial/Martian volcanic analogues. Because Mars does not exhibit plate tectonics, volcanic features there tend to manifest most prominently as central vent structures. The opportunity for comparing and contrasting terrestrial analogs with Martian counterparts can help inform such comparisons, especially as we are able to contrast scale, topography, and activity lifetimes, as well as tectonic environments, and the presence or lack of volatiles in the eruption process.

Work on Fluvial/dendritic deposits on Earth and Mars has progressed thanks to the work of Maurizio Pajola who has made available his database of Martian fluvial resources. Studies of Earth analog terrains relating to a variety of styles of fluvial erosion, mainstream topography, basin shape, and drainage network ramification on Mars have been, and will likely be fruitful. More broadly, such studies address the fluvial transport environment, deltaic depositional environments at channel and valley network outflows, the groundwater environment especially regarding groundwater sapping processes, as well as the interaction between impact (pre-existing and subsequent) features and resulting impact basin Sedimentology

Website Study Information up to date? (Study Group Membership, Study Plan and Schedule):
Please upload the above update as well as verify the presence of the following individuals in the membership list:

Dave Pieri

JPL

Dave.Pieri@jpl.nasa.gov

8183546299

M/S 183-501 \$ 4800 Oak Grove Drive, Pasadena, CA 91109 -USA

Igor Mitrofanov

Institute for Space Research (IKI), Russia

imitrofa@iki.rssi.ru

Issues requiring resolution? (recommend approach):

No issues.

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

Yes. Delivery and Publication by end 2015

Study Team Member Changes:

Please confirm appointment of

Igor Mitrofanov

Institute for Space Research (IKI), Russia

imitrofa@iki.rssi.ru

and

Dave Pieri

JPL

Dave.Pieri@jpl.nasa.gov

8183546299

M/S 183-501 \$ 4800 Oak Grove Drive, Pasadena, CA 91109 -USA

as per previous request

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

Name: Karen McBride

Current email address: kmcbride@igpp.ucla.edu

Tel. +1-310-308-1460

Mailing address:

Institute of Geophysics and Planetary Physics

3845 Slichter Hall

IGPP, UCLA, Box 951567, Los Angeles, CA 90095

Marcello Coradini

JPL MS 180-502 – 4800 Oak Grove Drive, Pasadena CA 91109, USA

Status Report Date: August 24, 2014

Study Team Membership Changes

Effectivity Date: August 24, 2014

Discontinue: None

Add: Mitrofanov –Pieri

Co-Chair: Coradini Marcello

Co-Chair: McBride Karen

Secretary: Hipkin Victoria

Activity:

Study group **Proposal**

Study group status **report**, September 2013

Study group status **report**, March 2014

Membership:

Galante Douglas

Osinski Gordon

Voytek Mary

Appendix-4: IAA Study Group Status Report

Responsible Commission: Commission 1

Study Number and Title: 1.12 Virtual Exploration (Telepresence Exploration)

Short Study Description (repeat from Study Group Proposal):

Virtual Reality (VR) is a computer-simulated environment able to simulate physical presence in remote places real or artificially created. Most current virtual reality applications are primarily visual experiences, displayed either on a computer screen or through special stereoscopic displays, such as special goggles, but may include additional sensory information: sound, tactile information, temperature and so on. Furthermore, virtual reality allows providing virtual presence of users with the concepts of telepresence and telexistence or a virtual artifact (VA).

Another kind of virtual reality technique is the Telerobotic. With a specially designed glove worn by an operator, it is possible to control a robotic arm located at a distant place. This can be applied to tasks such pick up some rock samples on the Moon or on a NEO or operate in a poorly known or hostile environment as a lunar lava tube by a robotic arm controlled by an operator on Earth wearing a special robotic data glove.

When latency time (time gap due to light speed limit and distance) is dramatically reduced [thanks to the establishment of closer control centers], instead of VR exploration we need to speak of **TELEPRESENCE (TP)**. This is indeed the new focus of the study.

We have been carrying out of number of activities these including searching for new and qualified members, organizing public events, making contacts with industries designing and producing specific tools, establishing contacts with ISECG.

New member: Bob Anderson, who is the group supervisor for Geophysics and Planetary Geosciences at JPL to be on our exploration telepresence working group. Maybe you know him. Bob is very enthused about the strategy, and brings to it science operations experience with MSL and MERs, and work on OASIS and the JPL AXEL teleoperated rover concept.

Bergamo Scienza Festival : I am organizing a round table on Telepresence, a public event and I am also gathering European and American companies to support this event with their technologies.

Industries: We got in touch with a US company capable of producing real time 3-D scenes based on laser ranging. This is a tremendous tool to create VR environment and can be used to acquire information in TP.

ISECG: we are in touch with the group chair and we want to establish synergetic interfaces.

The study will have to create connections and interfaces with the **Terrestrial Analogs** study as well as analyzing preliminary investments and studies carried out in the framework of Mars/Moon exploration missions.

Emerging countries with some established know how in space technology will have a great opportunity to participate in design, development and operations of telecommunications assets in space and on the ground. Moreover, familiarization with TLC techniques will have immediate beneficial spin-offs for the improvements of TLC infrastructure in their own countries.

Use of small satellites is also envisaged. To this goal, connections with the **Extremely Low Cost Satellite** study will be made. The group chair is involved in the development of an airborne Mars drone which may become an essential tool for telepresence

Final goal of the study is a recommendation about the constitution of orbital (Mars, Moon and Lagrangian points) low cost satellite network and in-situ assets. We will investigate deep space communication stations technology trends to adapt the existing DSN networks to the new bit rates and telecommanding requirements.

The study will develop investigations to make virtual reality and telepresence as a powerful and cost efficient way to explore planetary surfaces. It will constitute a gate to low cost space exploration for non-space countries or space emerging countries.

Progress in past six months:

Thanks to the input of the new members (Dan Lester and George R. Schimdt) we are refocusing the study from Virtual Reality to Telepresence.

Recent visit to the JPL Virtual Reality Lab has allowed the test of existing technologies. The head of the lab is being invited to join the group.

The following report outline was prepared. Members were invited to select one or more items in the report outline and provide contributions:

What is telepresence (TP)?

What is virtual reality (VR)?

Telepresence vs virtual reality

Telepresence vs human presence

TP/VR vis-à-vis present GES

Telepresence as a safe and affordable tool to explore

Latency: an obstacle to real time exploration?

When is real time exploration needed?

Telepresence from Earth, Lagrangian Points, from on-target-orbit

The Moons of Mars as a base for telepresence w/o latency

Do we need telepresence to explore the Moon?

Do we need telepresence to explore asteroids?

Data flow: a possible bottleneck to telepresence?

The minimum infrastructure to carry out tele-exploration:

-On target assets

-TLC requirements

-In orbit assets

Sensorial experiences in telepresence: feeling the environment without dangerous exposures

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

-Study membership needs updates (see below)

-The report Outline could be added to the web page

Issues requiring resolution? (recommend approach):

No issue

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

Delivery of the report is expected by the end of 2015.

A workshop jointly sponsored by IAA with NRC, NASA and ESA is being envisaged for the spring/summer 2015. Discussions with IAA Secretary General needed.

Study Team Membership

Marcello Coradini Marcello.Coradini@jpl.nasa.gov **Chair**

JPL MS 180-502 - 4800 Oak Grove Drive, Pasadena CA 91109 USA

NEW MEMBER: Bob Anderson, group supervisor for Geophysics and Planetary Geosciences at JPJPL
MS 183-601 - 4800 Oak Grove Drive, Pasadena CA 91109 USA

robert.c.anderson@jpl.nasa.gov

Enrico Flamini Enrico.Flamini@asi.it

ASI - Via del Politecnico snc, 00133 Roma, Italia

Filippo Graziani filippo.graziani@gaussteam.com

GAUSS TEAM Via Poggio Moiano 23, 00199 - Rome – Italy Tel: +39 0697881440

Tomas Komarek tomas.a.komarek@jpl.nasa.gov

JPL MS 321-690 4800 Oak Grove Drive, Pasadena CA 91109 USA

Dan Lester dfi@astro.as.utexas.edu

University of Texas at Austin Department of Astronomy TX, United States

Li Ming liming@spacechina.com

Karen S. McBride space.mcbride@gmail.com

IPPG UCLA 3845 Slichter Hall | 603 CHARLES E. YOUNG DRIVE, EAST | Los Angeles, CA 90095-1567

Denis Moura denis.moura@diplomatie.gouv.fr

Ambassade de France – Piazza Farnese – 00100 Roma

Maurizio Pajola maurizio.pajola@gmail.com

University of Padova

Centre for Studies and Activities for Space “G.Colombo” CISAS Veneto, Italy

Yury Razoumny yury.razoumny@gmail.com

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

Marcello Coradini Group Chair

Status Report Date: March 21, 2015

Study Team Membership Changes

Discontinue:

Add:

Name: **George R. Schmidt**

Current email address: <mailto:george.schmidt@nasa.gov>

Tel.

Fax

Mailing address: **John H. Glenn Research Center**

Lewis Field

Cleveland, Ohio 44135 USA

Name: **Bob Anderson,**

group supervisor for Geophysics and Planetary Geosciences at JPJPL MS 183-601 - 4800 Oak Grove Drive, Pasadena CA 91109 USA

robert.c.anderson@jpl.nasa.gov

Appendix-5
IAA Study Group Status Report
17 March 2015

Responsible Commission: Commission 1

Study Number and Title: Planetary Science Enabled by the New Generation of Cube-Sats and Miniaturized Scientific Instruments, **1.13**

Short Study Description (repeat from Study Group Proposal):

In light of recent advances in science instruments and spacecraft technologies that have emerged in just the past couple of years, Cube-Sats and other very small spacecraft can now be considered for use in planetary exploration, either as adjuncts to larger missions on which they could “catch a ride” to the most remote and challenging destinations in the solar system, or in some cases, as stand-alone missions of their own.

The new generation of Cube-Sats that is emerging is also compatible with capabilities that exist within many universities. This enables students to gain first-hand experience in the design and development of spaceflight hardware, and hence provides an opportunity to further expand the workforce in space sciences and aerospace. If Cube-Sats are launched “piggy back” on larger missions, they also provide a low-cost opportunity for emerging nations to develop and test their capabilities in an endeavor that is currently a very expensive enterprise that requires decades of dedicated capacity building.

In this study we will focus first on the planetary science that can now be considered using these emerging capabilities. The assessment of science opportunities will be anchored in the planetary science priorities of those nations that already have long-term plans and priorities. A key element of the study will be identification of current capabilities and future trends in science instrumentation that are compatible with Cube-Sats and other very small platforms such as micro-rovers, balloon-borne planetary atmosphere probes, etc. A brief survey of emerging capabilities in spacecraft platforms, namely Cube-Sats, miniature rovers, etc, also will be completed in order to, finally, explore example mission concepts where all key elements come together in the pursuit of new scientific knowledge of the solar system.

Progress in past six months:

The team has met several times and has organized into a general team and three sub-teams. Leaders for each sub-team have also been selected. The sub-teams and respective leaders are (1) Science Team led by Dr. Julie Castillo (JPL, USA), (2) Instruments Team led by Dr. Carol Raymond (JPL, USA) and (3) Spacecraft Team led by Dr. Pierre Bousquet (CNES, FR). Each sub-team is assessing (a) what is possible today in the current state-of-the-art, (b) what will most likely be possible in the near-term up to next 5 years and (c) what is likely for the long term. Based upon their assessments, the sub-teams will make observations and recommendations that will be integrated by the general team into a final report.

The boundaries of the study have been discussed and agreed up. They are focused on the range that spans from “Cube-Sat” spacecraft in the mass range ≤ 10 kg corresponding to a 3U to 6U form factor, and up to “Micro-Probes” in the ≤ 25 kg mass range. Our sub-teams and general team will also look at standards to enable international collaboration, at the roles of universities, and at relevant technology trends. For mission implementation, a subdivision into three categories can be envisioned: (1) *in situ* spacecraft (orbiters, landers, rovers, penetrators, etc), (2) deep space probes with no fixed-point final destination (such as probes to conduct *in situ* magnetic field observations), and (3) Earth orbiters with relevance to planetary science (such as asteroid finders or technology demonstrators). Spacecraft in categories (1) and (2) can be free-fliers that make their way alone to their distant destinations in the solar system from, say Geosynchronous transfer orbits to which they might be delivered as a secondary payload on a host launch, and those carried to a distant destination on a “mother spacecraft” bound for that destination as its primary target.

The report outline includes now detailed outlines of the science, instrument and spacecraft and mission design sections.

The team plans to present results at the IAA Low-Cost Planetary Missions Conference (LCPM) in Berlin, June 2015, and has proposed a two “half-day” session event at the 2016 COSPAR Scientific Assembly in Istanbul.

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

Issues requiring resolution? (recommend approach): None

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

.
Complete draft report is expected in June 2015

Study Team Member Changes? No changes

Name of person providing Study Group Status (Study Group Chair or Co-Chair):
Pierre Bousquet and John Baker

Status Report Date:

17 March 2015

Study Team Membership Changes

17 March 2015: No changes since last report

Appendix-6

Proposal for Forming an IAA Study Group (NEW)

Title of Study:

Integrated Precursor Distinguish in Multi-Geophysical Fields around Global Earthquake Events with Magnitude larger than 7 in Recent 10 Years

Proposer(s):

Bao Weimin

Primary IAA Commission Preference: COMMISSION 1 Space Physical Science

Secondary IAA Commission Interests: COMMISSION 4 Space Systems Operations & Utilization

Members of Study Team

Chair(s): Bao Weimin (China), Co-chair(s): Jean-Michel Contant (France), Vladimir Kuznetsov (Russia),

Secretary:

Other Members:

China: Shen Xuhui, Zhang Xuemin, Cao Jinbing, Zhao Zhengyu, Du Jianguo, He Liming

Russia: Sergey Pulnits, Yury Ruzhin

USA: Dimitar Ouzounov

France: Michel Parrot

Japan: Katsumi Hattori

Italy: Roberto Battiston, Valerio Tramutoli

Ukraine:

S. Korea:

India:

Short Description of Scope of Study

Earthquake anomaly distinguishing and determination is one of the most difficulties in the area of natural sciences in the world. Space observation has been showing strong capability to monitor global seismicity and acquires ten's times of case study than ground-based observation. This proposal will mainly focus on the case study of global strong earthquake during last 10 years to draw out the statistical characteristics of space-based precursors, including ionospheric disturbances, geomagnetic and geo-electrical fields, gravity field, infra remote sensing as well as crustal deformation by GNSS and InSAR, making connections among them in temporal and spatial distribution to ensure the reliability of anomaly and improve the distinguishing probability related to earthquakes, and try to make a proposal on global virtual system on earthquake monitoring from space by integrate different satellite resources with multi geophysical and geochemical parameters.

Overall Goal:

Developing and exploring the new way for earthquake monitoring and prediction, as well as the reliability analysis on anomalies in multi geophysical and geochemical parameters around same

earthquakes. Advancing the establishment of the global virtual satellite constellation on earthquake monitoring, including electromagnetic, meteorological, infrared RS and hyper spectral satellites etc.

Intermediate Goals:

1. Identification the characteristics of seismic precursors including ionospheric perturbations, infra Remote Sensing, InSAR & GNSS and hyper spectral anomalies based on the satellite observations.
2. Build the time linewith different anomalies around all the earthquakes and suggest an international workflow based on satellite constellation.
3. Develop the coupling model to connect multigeophysical and geochemical precursors before typical events.

Methodology:

Setup an international study group, draft a detailed schedule of the study.

Agreement on a study report outline.

Assigning individual responsibility for the study report.

Assigning editor to coordinate individual parts and compile a coherent study report.

Work to be conducted through on-line collaboration and study group meetings held in the course of annual International Astronautical Congresses and the IAA Spring meetings.

Time Line:

Draft outline of report: September of 2015

Review outline of report and make assignments: autumn of 2016

First draft of report: middle of 2017

Final report: end of 2017

Final Product(Report,Publication,etc.):

Publishable reportto be distributed to the Space international community

At least 3 papers published in international Journals.

Target Community:

International space community, geophysical community and earthquake science community, related universities

Support Needed:

Communication of workshop opportunities

Potential Sponsors:

CNSA?CASC?CEA?

To be returned to the IAA Secretary General Paris by fax: 33 1 47 23 82 16 or by Email: sgeneral@iaamail.org

Appendix-7

***11TH IAA Low Cost Planetary Missions
Conference, LCPM-11***

Status Update
Presented at Commission 1 Meeting
Paris, France
23 March 2015

Gregg Vane
Tilman Spohn

- Conference dates: 9-11 June 2015
- Conference Venue: Einstein Hall, Berlin, German
- Conference Host: DLR
- Abstract submission deadline: 16 March 2015
- Over 90 abstracts received to date! More coming in!
- ***Deadline for Early Registration: 4 April 2015***
- Conference will consist of 6 sessions in series
- Heads of five major space agency planetary programs (ESA, NASA, JAXA, Russia, China) have committed to present in Session 1. One other is pending (ISRO).
- Emphasis on “cube-sats and small-sats” to build on the successful introduction of this topic at LCPM-10 in Pasadena in 2013
- See following pages for screen shot of the LCPM-11 Home Page

First Announcement and call for papers

Second IAA Symposium “Space Flight Safety”

1. Organizer: Scientific and Production Enterprise “Special Materials”
2. Sponsoring organization: “Technomash”, Russian Space Agency
3. Conference site and dates: Saint Petersburg, June 29 - July 3, 2015 (period for “white nights”)
4. Local organizing committee: Mikhail Silnikov, Director General Scientific and Production Enterprise “Special Materials” (Chair), Andrew Mikhaylin (Organizational Department), Mikhail Chernyshov, St. Petersburg State Polytechnical University Head of Department
5. Scientific organizing committee
Igor V. Barmin, General Designer, Federal State Enterprise “TsENKI”, Russian Space Agency, Russia
Vladimir Betelin, Academician RAS, Director of Scientific Research Institute for System Studies, Russia
Jean Michel Contant, IAA Secretary General
Grunde Jomaas, Technical University of Denmark, Kgs. Lyngby, Denmark
Jaye Koo, Professor, Korea Aerospace University, Seoul, Korea
Susan McKenna-Lawlor, Academician, Prof. D.Sc., Sec. IAA Com.1, Ireland
Vyacheslav Nosikov, Adviser to General director “NPO “Technomash”, Russian Space Agency,
Vitalii Panov, Vice-president of Russian Engineering Academy,
Igor Rubtsov, director of scientific Analytic Centre “NPO “Technomash”, Russian Space Agency,
Mikhail Silnikov, Prof., Dr.Sc.-Hab., Director General Scientific and Production Enterprise “Special Materials” Russia
Program Chair: Nickolay Smirnov, Prof., Dr.Sc.-Hab., IAA Com.1 Vice Chair, Moscow
M.V.Lomonosov State University, Russia
6. Symposium structure:
 - Theme of the symposium
Space Flight Safety
 - Topics
 1. Fire safety of Space vehicles
 2. Protection of Space structures from space debris collisions and micrometeoroids
 3. Safety at launch place and during takeoff
 4. Propulsion systems
 5. Radiation hazards and safety
 6. Supercomputer predictive modeling for ensuring Space program safety
 - Sessions
 1. Fire safety of Space vehicles
 2. Protection of Space structures from space debris collisions and micrometeoroids
 3. Safety at launch place and during takeoff
 4. Propulsion systems
 5. Radiation hazards and safety
 6. Supercomputer predictive modeling for ensuring Space program safety
 - Session chairs
Session 1 - Grunde Jomaas, Technical University of Denmark, Kgs. Lyngby, Denmark

Session 2 - Nickolay Smirnov, Moscow M.V.Lomonosov State University, Russia

Session 3 - Igor V. Barmin, General Designer, Federal State Enterprise "TsENKI", Russian Space Agency, Russia

Session 4 - Jaye Koo, Professor, Korea Aerospace University, Seoul, Korea

Session 5 - Susan McKenna-Lawlor, Academician, Prof. D.Sc., Sec. IAA Com.1, Ireland

Session 6 - Vladimir Betelin, Academician RAS, Director of Scientific Research Institute for System Studies, Russia

7. Publication plans for the required special issue of Acta Astronautica

Authors of best papers presented at the Conference, will be invited to submit their contributions to Acta Astronautica for a standard review procedure.

8. Registration fees:

Members of IAA 200 Euros

Non-members 250 Euros

Students 100 Euros

Accompanying persons: free one accompanying person, additional accompanying persons – 100 Euros per person

Early bird registration provides 10% discount of all registration fees.

– items included in the registration fee

Admission to all sessions

Participant badge and kit

Booklets,

Book of abstracts,

Excursion to field test site,

Refreshments and Coffee breaks

9. Banquet and transportation to/from airport, as well as other optional tours are paid separately.

10. Hotels

Hotels will be within walking distance, prices ranging from 70 to 180 Euros depending on room category.

11. Schedule of symposium preparation:

– 1st and 2nd announcement

1st announcement February 15, 2015

2nd announcement and preliminary Program May 15, 2015

– period and method of registration and hotel booking

Registration May 1 – June 29, Early bird May 1 – June 1, 2015.

– Abstract handling:

Submission via e-mail deadline April, 30, 2015

Information of Acceptance – May 15, 2015

Full length paper submission – June 15, 2015

– Program drafting and finalization: May 15, 2015

– Visa handling Since April 1, 2015

Abstract numbering: IAA-SFS-2015-0XX

12. Accessibility:

- Payment: Registration fee should be paid to IAA, Hotel deposit to Local organizing Committee.
- Traveling to the symposium: Pulkovo Airport in Saint Petersburg has good connections with all major capitals of the World. Those preferring to take a flight to/from Moscow (accounting for COSPAR meeting) can use fast train SAPSAN transportation between Moscow and Saint Petersburg. Travelling time 4 hours (650 km), prices from 70 Euros one way.

All questions relevant to registration, abstract submission should be addressed directly to Local Organizational department head Andrew Mikhaylin mikhaylin@npo-sm.ru

Symposium web site: <http://sfs-2015.ru/>

The information is present on the IAA site as well