

IAA Commission 1 'Space Physical Sciences' Meeting
Sunday, 11 October 2009 am 08:30
Academy Day at 60-th IAC, DAEJEON, Korea
Room: 101

Minutes of the meeting

Meeting Attendance:

Nickolay Smirnov (secretary), Stamatios Krimigis, Bernard Foing, Claudio Maccone, Stephan Ulamec, David Kendall, Seth Shostak, Wen Rui Hu, Ralph McNutt, Konstantin Elkin, Valery Korepanov, Boris Zagreev, Mohamed Laoucet Ayari, Gerhard Schwehm, H.Paul Shuch.

Agenda:

1. Welcome, apologies and adoption of agenda
2. Minutes from 17 March 2009 meeting, see homepage
3. Study Group activities
4. Program for 61th IAC, Prague, Czech Republic, October 2010 see 1st announcement
5. Preview of Commission 1 items at 61th IAC at Prague, Czech Republic, October 2010
6. Next meetings
7. New business

1. Welcome and adoption of agenda

List of attendees was signed. No papers were ready and printed.
The agenda was adopted.

2. Report on and Minutes of the meeting in Paris on 17 March 2009

Nickolay Smirnov reported on meeting in Paris. The minutes were approved.

3. Study Group activities

3.1 Ongoing studies:

3.1.1. **Study Group 1.3** Title of Study: **Search for Extraterrestrial Intelligence (SETI)** Chair: Seth Shostak, Co-Chair: Paul Shuch, Co-Chair: Claudio Maccone, Secretary: Carol Oliver

Claudio Maccone, and Seth Shostak reported on the state of the group's activities

3.1.2. **Study Group 1.4** Title of the study: **The Next Steps for Human Space Exploration: What are the Alternatives?** Study group chair: Ernst Messerschmid. Ernst Messerschmid was not present at the meeting, but a session was organized within the framework of the Congress.

3.1.3. **Study Group 1.5. Particle Radiation Hazards en route to and at Mars** Chair: Susan McKenna-Lawlor.

The report submitted by Susan McKenna-Lawlor was delivered to the audience by the Commission 1 secretary Nickolay Smirnov.

1. Introduction

We now have eleven delivered chapters for the IAA book on "Particle radiation hazards en route to and at Mars". The titles/authors of these chapters are given below (Section 2). The lead authors of each chapter were requested to suggest the names of suitable referees. All of them seemed to be very pleased by this request and they complied appropriately.

Two further chapters are scheduled to arrive at the end of the month (Section 3). A further two chapters are still hoped for, but the situation with regard to them is presently uncertain (Section 4).

2. Chapters already available

2.1. A Science Case for the Human Exploration of Mars and the Moon

by Jean-Claude Worms.

2.2. Particle radiation en route to, in orbit about and at the surface of Mars,

by S. McKenna-Lawlor, D. Heynderickx, P. Nieminen, G. Santin, B. Foing, P. Concalves, Ana Keating., P. Truscott, F. Lei, S. Barabash, Y. Futaana, K. Kecskemeti, M. Dryer, G. Fry and W. Murtagh.

2.3 Assessment of how solar related particle disturbances can affect the

Martian environment, by O. E. Malandraki, D. Lario, S. McKenna-Lawlor, Y. Futaana, M. Yamauchi and A. Aran.

2.4 MGS measurements of solar storms and their effects by D. A. Brain, G. T. Delory, R. J. Lillis, D. Ulusen, D. Mitchell and J. Luhmann.

2.5 Consequences of the radiation hazard en route to/at Mars for spacecraft

design and component selection by E. Daly, D. Heynderickx, P. Nieminen, M. Poizat, A. Keating and L. Desorgher.

2.6 Strategies for mitigation based on increased knowledge of the particle radiation hazard en route to/at Mars for spacecraft systems and for

astronauts/cosmonauts by T. P. Armstrong, J. Feynman, H. Garrett, S. Gabriel, and J. Luhmann.

2.7 Convection-diffusion and drift modulations of galactic cosmic rays in respect to the radiation hazard en route to and at Mars by Lev I. Dorman.

2.8 Forecasting of total radiation fluence from SEP events en route to and at Mars by L. Dorman.

2.9 The Mars Energetic Radiation Environment Models by P. Goncalves, A.

Keating, S. Valente, P. Truscott, F. Lei, L. Desorgher, D. Heynderickx, N. Crosby, H. de Witt, G. Degreef, P. Nieminen and G. Santin.

2.10 Design of active magnetic shielding systems to protect a space crew against

cosmic rays and solar particle radiation by P. Goncalves, A. Keating, S. Valente, P. Truscott, F. Lei, L. Desorgher, D. Heynderickx, N. Crosby, H. de Witt, G. Degreef, P. Nieminen and G. Santin.

2.11 Assessing Radiation Hazards for the Exploration of Mars, by S. B.

Guetersloh, M. Van Baalen, C. Zeitlin and B. Gersey

3. Chapters almost ready

A further two chapters (see below) are expected shortly.

3.1. Radiation dosage and radiation hazards pertaining to cosmonauts/ astronauts en route to/at Mars” by Vlaidslav Petrov

An e-mail received from Prof. Petrov on 22 September informed me that this chapter (43 pages in Russian) is under translation into English (at that time 60% was completed). The final title of this chapter was not indicated. The one I provide above is the originally conceived title.

3.2. Particle radiation to be expected at the surface and within the subsurface of Mars based on modelling by G. deAngelis.

This author called on October 2 to say that his chapter will not be ready for submission until the end of the month. This is partly due to the illness of his mother and partly to a career move from Italy to Germany (DLR)

4. Unresolved

(1) In view of the general opinion during the Spring Meeting in Paris that reference data concerning normal and critical dosage for humans should be covered

by the book, I consulted with G. Horneck and she recommended that the appropriate person to write a chapter on hazardous dosage to humans is Guenther Reitz. I spoke with him before the end of the Spring Meeting and he indicated that, in principle, he could provide this. However, thus far no text has appeared, although I have written to him several times. If any further news arrives before the Meeting in Korea I will forward it.

Stephan Ulamec earlier provided a short chapter with the title “Estimate of the particle radiation to be expected at the surface of Mars based on measured data”. In view of the lack of relevant surface measurements it was later considered, while also having regard to discussions during the Spring Meeting of the Committee in Paris, that the emphasis of this text might usefully be shifted to “Human survivability on long duration missions” and perhaps merged with the hoped for Chapter by Guenther Reitz.

(2) At the Paris meeting it was also foreseen that B. Foing and Wu Ji would cooperate on producing a chapter providing recommendations for future long duration manned missions. This has not yet been delivered but I heard some time ago from Dr. Foing that it would be provided.

3.1.4. **Study Group 1.6.** Title of the study: **Protected Antipode Circle on Lunar Farside** Chair: Claudio Maccone.

Claudio Maccone reported on the ongoing studies and of the associated paper published in *Acta Astronautica* on this topic.

3.2 New study groups and leads

David Kendall reported on the joint study group on International Cooperation on Space Weather. He emphasized that Dan Barker and Gerhard Haerendel were definitely supporting the joint study group.

Proposal form is available at:

<http://iaaweb.org/iaa/Scientific%20Activity/Commissions/sg59.pdf>

The Commission supported the study group creation.

4. Program for 61th IAC, Prague, Czech Republic, October 2010 see 1st announcement

Proposals for Highlight Lectures/Plenary events

Tom Krimigis suggested to increase the influence of Commission 1 in forming and discussion of plenary events for the 61st IAC. The topics of major interest and the latest advances of Space physical science should be covered.

Nickolay Smirnov informed of the mechanisms and procedure for plenary events selection.

The Commission 1 decided to submit and discuss the plenary events for Prague by December 2009. One of possible options could be plenary on SETI.

5. Preview of Commission 1 items at 61th IAC at Prague, Czech Republic, October 2010

The following Symposia are relevant: A1 Space life Science. A.2 – Microgravity Science and processes. A.3 – Space exploration. A.5 – Human exploration of the Moon and Mars.

6. Next meetings

Next Commission meetings were planned for IAA, Paris March 2010, COSPAR July 2010, and 61-st IAC, Prague, October 2010

7. Any Other Business

Mohamed Laoucet Ayari suggested a new study group “Lunar reflectors for First Moon light timing...”.

The Commission 1 secretary suggested to submit the proposal following the existing form for launching a new study group, and to make a detailed presentation during the next Commission meeting in Paris, March 2010.