

IAA COMMISSION II

Life Sciences
Coordination Meeting

Sunday, October 3, 2004 9:00 – 12:00

Location: room 9

55 IAC Vancouver, Congress Centre Vancouver

Summary minutes

1. The meeting was chaired by **G. Horneck**, replacing **I. Koslovskaya**, which could not participate in the meeting. When welcoming the participants G. Horneck briefly reported on the activities happened since the last meeting in Paris and outlined the objectives for the present meeting. A list of participants of the meeting is enclosed (Annex I).
2. The **draft agenda** – distributed to participants prior to the meeting – was agreed upon with 3 modifications (Annex II). Copies of the draft minutes from last Commission II meeting in Paris have been handed to participants for comments and amendments prior to the meeting and agreed upon. The final version of these minutes have already send to participants and is also available on the IAA website (<http://www.ianet.org/commissions/>).

3. Scientific Activities Report, last Board of Trustees

R. White informed participants on the results of the last meetings of the Board of Trustees. Concerns have been raised regarding

- the membership of sections (Life Sciences smallest section, Engineers 500, science 300 participants)
- the high average age of academicians and loss of active members due to retirement (loss of mission support)
- urgent need for more younger academy members; more attention for the nomination of younger candidates
- under-representation of specific countries (e.g. South Africa, India, Spain, Italy etc.)

R. White explained in detail the different steps of the 1 year long nomination process. Only the full understanding of the process by each Commission members will facilitate future nominations. Special categories in IAC fees eg. Student fee or one day fee could help attracting young people to IAC and to the academy. Further measures could include joint meetings with ASMA.

Regarding the membership in IAA Commissions R. White encouraged the chairs to review the current set up of members and to replace – if necessary – non participating members by candidates, which will actively contribute to the work of Commission II.

In conclusion asked G. Horneck for proposals of new Commission members to chair, vice-chair or secretary by the end of 2004.

She reported furthermore on the proposals made for the next IAA president as discussed during the last board of trustees meeting.

4. Study Group proposals/activities

4.1 Study Groups

G. Horneck asked the present leader of the study groups for an current status of the work to be able for subsequent reporting to the scientific activities committee.

N. Kanas: Psychology and Culture in Long Duration Space Missions (annex III)

This study group currently has 20 active members and 4 subcommittees. A meeting took place in Moscow. Next meeting are planned for 4. October in Vancouver, during the ASMA meeting in Kansas City, the Humans in Space symposium in Graz and the next IA in Fukuoka. The full report of the study group will be available next year.

R. White: Mathematical Modeling & Physiological Simulation: The Digital Astronaut/Cosmonaut (annex IV)

The study group has started with its work and a first report has been delivered to Commission II. A further meeting has been scheduled during the IAC in Vancouver and the final report is planned for October 2005.

G. Horneck: Biosystems for future extraterrestrial habitats and in terrestrial applications

No written report available. The study group is still in state of formation and is facing problems to get started. Next meetings will take place at the Humans in space symposium in Graz and in August 2005 in Krasnojarsk, Russia. G. Horneck will deliver the envisaged workplan to all IAA Commission II members in due time prior to the next meeting in Paris.

J. Rummel: Astrobiological Studies of Solar Systems

No written report available. This study group was first proposed at the IAC in Bremen 2003, and the work of the group is intended to benefit from studies undertaken by the NASA Astrobiology Institute, the European Astrobiology Network Association, and other Astrobiology organizations and their members. A meeting of the group will take place during the IAC in Vancouver,

L. Young: Artificial Gravity as a Tool in Biology & Medicine (annex V)

Report available. Dr Polaski reported for DrYoung on the current status to the work. A meeting will take place during the IAC in Vancouver and a white paper will be elaborated. The next meeting has been scheduled for the Humans in space symposium in Graz.

4.2 Discussion on new proposals for study groups

- New proposal for a study group has been received from C. Maccone: **SPACE POLICY AND ENVIRONMENTAL PROTECTION OF THE MOON** (annex VI). The commission felt that more information was required before a recommendation could be made. Further discussions are required with chair of Comm. 5
- Prof. M. Antunano suggested a new study group on **Medical and psychological issues for passengers of commercial spaceflight**". A small task group was formed to formulate a proposal.

5. Programme Committee activities

5.1 Vancouver 2004 Congress Status

- Technical Sessions: will be performed as scheduled
- Plenary Events: none organized by Commission II

5.2 Fukuoka 2005 Congress Planning

- **Symposia Selections :**

Symposium of G Space Life Sciences: **The mission to Mars starts on Earth**

Coordinators: **I. Kozlovskaya and R.J. White**

- o **G1 Gravity: Effects on Human Physiology**
Chairs: I. Kozlovskaya and V.S. Schneider
- o **G2 Going to Mars: Development of Medical Operational Systems to Ensure Human Health**
Chairs: A. I. Grigoriev and J. Davies
- o **G3 Mathematical Models, Physiology and Spaceflight**
Chairs: R.J. White and M. Kushmerick
- o **G4 Analog Models for Microgravity**
Chairs: M. Heer and Y. Kazuyoshi
- o **G5 Psychosocial Issues during Long Duration Space Missions**
Chairs: N. Kanas and G.M. Sandal
- o **G6 Habitats, Life support and Extravehicular Activity**
Chairs: G. Fogleman and R. Gerzer
- o **G7 Robotics and Human Missions to Mars and beyond: Challenges in Astrobiology and Planetary Protection**
Chairs: J.D. Rummel and G. Horneck

- **Plenary events:**

Several proposals have been discussed, e.g. on psychology issues on exploratory missions, going to Mars: human activities and search for life, new findings in human physiology, medical spin offs: daily life applications from spaceflight achievements, living and working on the moon, robotics vs. humans in space activities, Preparing for Mars: Psychology and Culture in Space. A proposal will be prepared.

5.3 Humans in Space Symposium: Planning

- May 22-26, 2005 in Graz
- Main organizer: Prof. H. Hinghofer-Szalkay, University of Graz
- IAA representatives: I. Kozlovskaya, G. Horneck, R. White
- Theme: **Benefits of human presence in space**
- Topics: * Living and working on the International Space Station
* Future of human spaceflight: Exploratory missions
* Access to space for the general public
- Cosponsorship: COSPAR, NASA, ESA, Austrian Ministry bm:bwk, Styrian government, City of Graz
- Structure: Opening Ceremony, IAA address
3 Keynote Lectures
4 Plenaries
18-24 Parallel sessions

5.4 Programme discussion for the 57th IAC in Valencia, Spain

The date has not been fixed. G. Horneck reminded the leaders of the study groups to make proposals for symposiums and sessions by the end of 2004 (topics on bone and muscle should be included in the proposals).

6. Next meeting and work between meetings

The next meeting of Commission II will take place in the week of 20 to 23 March 2005 in Paris. Draft agenda will be send to all Commission II members in advance to the meeting.

7. Any other business

No topic mentioned.

K. Kreuzberg

Annex I

IAA COMMISSION II

Life Sciences Coordination Meeting

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List of participants

	Name	Christian name	Affiliation	E-Mail address
1	Antunano	Melchor	US FAA	Melchor.J.Antunano@FAA.gov
2	Skoog	A. Ingemar		ake.ingemar.skoog@t-online.de
3	Scott	Manatt		smanatt@Aol.com
4	McBarron	James	US	MCBARRON@Wans.net
5	Kanas	Nick	Univ. California San Francisco	nick21@itsa.ucsf.edu
6	Boles	Vincent C.	U,S.U.	vincent.c.boles@aero.org
7	Yajima	Kaz	The Aerospace Corp Nihon-U	yajima-k@sano-c.ac.jp
8	Hinghofer	Helmut	University Graz	helmut.hinghofer@neduni-graz.
9	Fuller	Charles	Univ. California Davis	cafuller@ucdavis.edu
10	Graef	Peter	DLR	peter.graef@dlr.de
11	Gerzer	Rupert	DLR	Rupert.gerzer@dlr.de
12	Katuntser	Vladimir	IMBP	Katunster@imbp.ru
13	White	Ronald	USRA	white@dsls.usra.edu
14	McPhee	Jancy	NASA-JSC/USRA	jancy.c.mcphee1@jsc.nasa.gov
15	Paloski	William	NASA-JSC	William.paloski@nasa.gov
16	Gitelson	Iosef	Russ.Acad. of Sci.	root@gitelson.ibp.krasnoyarsk.1
17	Horneck	Gerda	DLR	gerda.horneck@dlr.de
18	Kreuzberg	Karlheinz	ESA	karlheinz.kreuzberg@ESA.int
19	Young	Laurance	US (MIT)	lry@mit.edu

Annex II

IAA COMMISSION II

Life Sciences
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Sunday, October 3, 2004 9:00 – 12:00

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Draft Agenda

1. Welcome/ Introduction
2. Review of minutes from last Commission II meeting in Paris
3. Scientific Activities Report, last Board of Trustees meeting
 - report by R. White on IAA commission business
4. Study Group proposals/activities
 - 4.1 General overview
 - 4.2 Status/Progress report from Study Groups chairmen
 - 4.3 Discussion on new proposals
 - report by M. Antuna
 - report by C. Maccone
5. Programme Committee activities
 - 5.1 General
 - 5.2 Status for Vancouver 2004 (if necessary)
 - 5.3 Status of preparations for the 56th IAC 2005 in Fukuoka, Japan
 - 5.4 Status of preparations for the 2005 Humans in Space Symposium
 - 5.5 Programme discussion for the 57th IAC in Valencia, Spain
6. Next meeting and work between meetings
7. Any other business

Annex III

Yearly Report: IAA Study Group on “Psychology and Culture in Long Duration Space Missions (S 2.4)”

Nick Kanas, M.D.
September 30, 2004

Members of our study group communicated via e-mail throughout the year and met in person during the IAC in Bremen (September-October 2003), the 40th Anniversary of the IBMP in Moscow (November 2003), and the AsMA Annual Meeting in Anchorage (May 2004).

During the course of the year, we organized our group into four main subcommittees: Cognition and Complex Performance Skills (Dietrich Manzey, Chair); Personality, Coping, and Adaptive Behavior (Gro Sandal, Chair); Social, Interpersonal, and Group Functioning (Vadim Gushin, Chair); and Mental Health and Psychopathology (Nick Kanas, Chair). Each subcommittee worked on a draft manuscript of their area (largely through e-mail communication), which ultimately will be combined for our “white paper”. To date, I have received two drafts (from Dr. Sandal and Dr. Kanas), and the other two are in process.

The study group sponsored a section for the Space Life Sciences Symposium at the IAC in Vancouver entitled: “Psychology and Culture in Long Duration Space Missions” (G.5). A total of 18 papers were accepted for presentation, 9 on the afternoon of October 4, 2004, and 9 on the morning of October 5, 2004.

During the upcoming year, we plan to meet during the IAC in Vancouver (October 2004), the AsMA Annual Meeting in Kansas City (May 2005), the Humans in Space Conference in Graz (May 2005), and the IAC in Fukuoka (October 2005). We hope to draft our “white paper”, with all four of the subcommittee areas integrated into one document. We also plan to sponsor another psychology section during the IAC in Fukuoka.

Nick Kanas, M.D.

**STATUS REPORT
IAA STUDY GROUP 2.1**

**Mathematical Modeling & Physiological Simulation: The Digital
Astronaut/Cosmonaut
October 3, 2004**

The first meeting of the Study Group will be held on Tuesday, October 5, 2004 during the Vancouver IAC meeting (1500 – 1700, Gov. Gen. B). The agenda for the meeting is as follows:

- 1300 Welcome & Introductions
 The IAA and its Study Groups
 Study Group 2.1: Mathematical Modeling & Physiological Simulation: The Digital Astronaut/Cosmonaut
 Background: The Digital Human
 NASA's New Project: The Digital Astronaut
 The Task at Hand: Development of a Report
 Outline
 Schedule
 Contributions
 Integration
 Review
- 1500 Adjourn

The proposed outline to be discussed for the Study Group Report is as follows:

- I. Introduction
 The Medical, Biomedical and Psychosocial Risks of Human Space Flight
 Special Challenges of the Future – Voyages of Exploration
 The Role of Modeling & Simulation – The Digital Astronaut/Cosmonaut
- II. Background
 Historical Review – Modeling & Simulation in Support of Human Space Flight
- III. Current Developments in Computationally-Related Biomedicine
 Structure, Function and Data Integration
 Systems Biology and Physiological Modeling
 The Role of High Performance Computing
 The Grand Challenge: The Digital Human
- IV. The Digital Astronaut/Cosmonaut
 What is it?
 Issues:
 - Foundational (unified ontology, modeling methods, computational methods, community training, ...)
 - Structural Integration (whole body, organs, tissues, ...)
 - Functional Integration (coupled physiological subsystems)
 - Data Integration (representation, archiving, utilization, standardization, ...)
 Dealing with the Issues – Restricting the General Approach
 The Role of International Cooperation and Coordination

V. Benefits for the Space Community & General Earth Benefits

Engineers & Managers – Improved reliability & understanding of human systems

Physicians – Improved access to data & capability of realistically testing therapies prior to use in space

Space Research Community – Enables multidisciplinary team research to be more effective

General Health Care Benefits (training, remote care, ...)

The proposed schedule to complete the report is:

Report Outline	October 2004
Individual Contributions	Due: January 7, 2005
Integrated Report Draft	March 2005
First Review	May 2005
Second Draft	July 2005
Second Review	September 2005
Final Report	October 2005

Future meeting opportunities will be the final topic of discussion.

**STATUS REPORT
IAA STUDY GROUP 2.2**

**Artificial Gravity as a Tool in Biology & Medicine
October 3, 2004**

A new Study Group on the subject of Artificial Gravity (AG) was organized under the chairmanship of Prof. Laurence Young and Prof. Kazuyoshi Yajima, with Dr. William Paloski as executive secretary. Increased attention has been called to AG following the recent U.S. announcement of a Space Exploration Vision involving long-duration flights.

Our international membership has been contacted and the first meeting of the Study Group 2.2 is scheduled for Vancouver on Tuesday, October 5, 2004 from 1300-1500 in the Gov. General Room B. All interested members of the Academy or attendees at the IAF are welcome to attend.

The scope of the Study Group activity and report will cover the key questions which need to be answered to make AG practical as a countermeasure, the facilities and flight opportunities required to answer these questions, and a timeline or schedule to accomplish the research project. Both human and animal experiments, on earth and in space, are to be considered. Both short radius intermittent centrifugation and long radius continuous rotation will be considered.

The starting point for the study will be the questions and recommendations reported at the 1999 Artificial Gravity Workshop held in League City, Texas. Current programs for a Pilot Study and a subsequent international program combining AG with bed rest will be presented at the initial meeting to stimulate discussion. Current plans for AG research will be presented.

A schedule of future meetings, including Graz in 2005, will be determined at the October 2004 Study Group session.

Proposal for Forming an IAA Study Group

Title of Study:

”SPACE POLICY AND ENVIRONMENTAL PROTECTION OF THE MOON”

**Proposer: Claudio MACCONE, Ph. D. – Full Member of the IAA since 2001.
Co-Vice Chair of the IAA SETI Permanent Study Group
Winner of the 1999 IAA Engineering Sciences Book Award**

Primary IAA Commission Preference: Comm. 5: LIFE SCIENCES

Members of Study Team

Chair: Claudio MACCONE (Italy)

Other Members (tentative): Ray A. WILLIAMSON (USA), Vincent C. BOLES (USA), Ronald J. WHITE (USA), Wendell W. MENDELL (USA), William J. O’NEIL (USA), Debra F. LEPORE (USA), Inessa B. KOZLOVSKAYA (Russia), Kazuyoshi YAJIMA (Japan), Vladimir KOPAL (Czech Republic), Joan VERNIKOS (USA), Bernard FOING (ESA - France), Karlheinz KREUZBERG (Germany), Hermann KOELLE (Germany), Rupert GERZER (Germany), and other Members TBD.

Short Description of Scope of Study

Overall Goals: ASCERTAIN THE ENVIRONMENTAL ASPECTS OF THE MOON THAT DESERVE TO BE PROTECTED AND OUTLINE THE FUTURE SPACE POLICY TO DO SO.

Intermediate Goals:

- 1) Determine the environmental consequences of a Moon Base.**
- 2) Consider the legal protection of the central area of the Farside of the Moon as the best location to receive electromagnetic waves “CLEAN” from man-made radio pollution.**
- 3) Outline the “cleanest” and easiest astronomical ways to keep the radio LINK between the Moon (Farside included) and the Earth.**

Methodology: Experts from the most diverse fields (Space Sciences, Space Systems Technologies, International Legal Studies about the Moon, etc.) are requested to contribute to this Cosmic Study of IAA. A coordination with the ILEWG is being sought. Space Agencies like NASA, ESA, RKA, and ISAS are expected to take interest in this IAA Cosmic Study.

Time Line: The Study should be completed in three years after start.

Final Product (Report, Publication, etc.): The Cosmic Study will be published in a BOOK FORM as a supplement to the IAA Journal Acta Astronautica. Every effort will be made to shorten the publishing time.

Target Community: 1) Space Agencies like NASA, ESA, RKA, ISAS and the smaller, national Space Agencies. 2) Astronomers (VLBI and Parallaxes) and Astrophysicists (Radio Images, Cosmology). 3) Humankind as a whole.

Support Needed: 1) Software for Moon Mission Analysis (presumably JPL). 2) Support from International Telecommunications Union (ITU) for frequency selection. 3) Support from the International Astronomical Union (IAU) about parallaxes and VLBI. 5) Support from the International Academy of Astronautics about Space Technologies. 6) Support from the International Institute of Space Law about the Moon International Status. 7) Financial Support from Space Agencies like NASA, ESA, RKA, ISAS and the national space agencies. 8) Possible United Nations Support for SETI-related aspects.

Potential Sponsors:

To be returned to IAA Secretariat Paris fax: 33 1 47 23 82 16 email: sgeneral@iaanet.org

Date: 28 September 2004

Signature: Claudio Maccone

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