IAA Study Group Status Report #3

Responsible Commission:
Commission 2

Study Number and Title:
2.12-Effectiveness of Countermeasures

Short Study Description (repeat from Study Group Proposal):
To collect and summarize evidence of the effectiveness of physiological countermeasures for the protection of human health in space and present a state of the art and needed forward work for future manned deep space exploration missions.

Progress in past six months (Meeting list)

1. **Meeting no. 3: April 7, 2014 – 7:00-8:00 am (US CST) telecon:** Documents from Milestone 1 and 2 (a list of physiologic countermeasures currently used and a method to score or evaluate the effectiveness of countermeasures) were discussed and revised.

2. **Meeting no. 4: April 29, 2014 – 7:00-8:00 am (US CST) Telecon:** Milestone 1, 2a and 2b were further revised and discussed.

3. **Informal face-to-face Meeting: May 12, 2014 5:30 pm San Diego, CA:** No decisions made.

4. **Meeting no. 5: May 27, 2014 – 7:00-8:00 am (US CST):** Milestones 1, 2a and 2b were further discussed, but no major changes were made. Milestone 3 (evaluation of countermeasures being tested in a research setting in space) was prepared for the next meeting and milestone 4 (evaluation of countermeasures tested in ground analogs) was prepared and discussed based on inputs from Dr. Cromwell, who had supplied a list of references.

5. **Forward Work:** A face-to-face meeting is planned for the 6th International Congress of Medicine in Space and Extreme Environments (ICMS) in Berlin, Germany September 16, 2014, and another meeting (telecon) at the end of October 2014. After the October telecom, the 6 first milestones are expected to be completed before the end of 2014 and milestones 1-10 before mid-2015. A draft of the Study Group report will be presented at the Humans in Space (HIS) meeting in mid-2015.
6. **Updated list of milestones:**

   **Milestone 1,**
   February 2014:
   Establish a list of physiological countermeasures used in manned spaceflight programs divided up into short (<30 days) and long (>30 days) duration flights (A joint U. S./Russian publication in 5 volumes entitled “Space Biology and Medicine” edited by Nicogossian, Mohler, Gazenko and Grigoriev will be the basis of this work).

   **Milestone 2,**
   February 2014:
   Establish a method to score or evaluate the effectiveness of countermeasures based on previous U. S and Russian experience (2a) and score/evaluate previously used countermeasures based on milestone 1 (2b).

   **Milestone 3,**
   May, 2014:
   Describe and evaluate countermeasures that have been tested during ground analog conditions, and which are not operational yet but have shown potentials for future use.

   **Milestone 4,**
   September 2014:
   Describe and evaluate countermeasures that have been tested in a research setting in space, and which are not operational yet but have shown potentials for application.

   **Milestone 5,**
   November, 2014:
   Based on milestones 1 - 4, recommend the most efficient integrated countermeasure suite for investigation in space before the end of ISS.

   **Milestone 6,**
   January 2015:
   Establish a vision for future integrated human countermeasure suites during deep space exploration missions related to the most likely mission scenarios (e. g., divided into missions with or without planetary surface investigations and shorter or longer than 6 months and combinations thereof).

   **Milestone 7,**
   March 2015:
   Describe the expected gaps of knowledge regarding countermeasure development from the end of ISS to the initiation of future deep space exploration missions
Milestone 8,
June 2015:
Discuss and describe the usefulness of artificial gravity for future deep space exploration missions and describe the advantages and disadvantages, and how use of artificial gravity during future exploration missions will influence the utilization of ISS.

Presentation of draft report on Effectiveness of Countermeasures for HIS audience,
July 2015:
Discussion and afterwards implementation of comments for improvement of report.

Milestone 9,
October 2015:
Revision of report based on HIS and other inputs.

Milestone 10,
December, 2015:
Final report.

Presentation to IAA,
Spring 2016.

Notes:
• Presentations on progress will be delivered to IAA at their regular meetings.
• Each milestone will be discussed and approved at IAA study group telecons closely related to the dates of milestones, and for each telecon the secretary is responsible for presentation of a draft section of the report for discussion and comments.
• In between milestones and telecons/meetings, email exchanges between IAA study group members on content of report will be conducted as the basic working tool coordinated by the secretary.

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

Study Plan and Schedule: See above.

Membership:

Patrik Sundblad (ESA)
Jörn Rittweger (DLR)
Chiaki Mukai (JAXA)
Sh. Chen (China)
Natalie Hirsch (CSA)  
Perry Johnson-Green (CSA)  
Valerie Gil (CSA)  
Hiroshi Ohshima (JAXA)  
Nora Petersen (ESA)  
Oliver Angerer (ESA)  
Judith Hayes (NASA)  
William H. Paloski (NASA)  
Elena Fomina (IBMP)  
Elena Tomilovskaya (IBMP)  
Jon Scott (ESA-EAC)  
Lena Norrbrand (Swedish Aerospace Physiology Centre)  
Ronita Cromwell (USRA-NASA)

Next Meeting:

2. Telecon, end of October 2014.

Forward Work:

Completion of milestones 1-6 before end of 2014 and preparation of milestones 1-10 before mid-2015. A draft of the Study Group report will be presented at the Humans in Space (HIS) meeting in mid-2015.

Issues requiring resolution? (recommend approach):

None

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

All deliveries are on schedule except for the revisions indicated above.

Study Team Member Changes? (List any Study Team Members that you wish to discontinue, and provide names plus contact coordinates of any Members you wish to add on the second page of this Study Update form.) Note: Complete contact information including email, tel. and fax must be provided for all additions. Only Members with complete contact information will be listed and receive formal appointment letters from the IAA Secretariat.)

The following new members have been added to the group: (See Appendix 1 for complete contact information)
1. Jon Scott (ESA-European Astronaut Centre) was added on April 29, 2014, substituting for Simon Evetts.
2. Lena Norrbrand (Swedish Aerospace Physiology Centre) was added on May 27, 2014, suggested by Patrik Sundblad.
3. Ronita Cromwell (USRA-NASA) was added on May 27, 2014 suggested by Peter Norsk.

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

Study update:
  Peter Norsk, Secretary (USRA/NASA)

Chairs:
  John Charles (NASA)
  Inessa Kozlovskaya (IBMP)

Status Report Date:

08/13/14

Study Team Membership Changes:

See above

Effective Date:
08/13/14
APPENDIX 1.

IAA study group 2.12 - Effectiveness of Countermeasures

List of participants, May 2014.

Chairs: John B. Charles
NASA/Johnson Space Center

Inessa Kozlovskaya
IBMP

Secretary: Peter Norsk
NASA/Johnson Space Center

Other Members: Oliver Angerer
Human Exploration Science Coordinator
ESA/ESTEC, HSO-USH

Sh. Chen

Elena Fomina
IBMP

Valerie Gil (CSA alternate)
Astronauts, Life Science and Space Medicine
Space Exploration
Canadian Space Agency

Judith Hayes
NASA/Johnson Space Center

Natalie Hirsch
Astronauts, Life Science and Space Medicine
Space Exploration
Canadian Space Agency

Perry Johnson-Green (CSA alternate)
Astronauts, Life Science and Space Medicine
Space Exploration
Canadian Space Agency
Chiaki Mukai
Center for Applied Space Medicine
JAXA

Hiroshi Ohshima
Space Biomedical Research Office
JAXA

William H. Paloski
NASA/Johnson Space Center

Nora Petersen
Crew Medical Support Office (HSO-UM)
European Astronaut Centre

Jörn Rittweger
Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
German Aerospace Center, Institute of Aerospace Medicine

Patrik Sundblad
Human Research Coordinator at ESA

Elena Tomilovskaya
IBMP

Jonathan Scott
Crew Medical Support Office (HSO-UM)
European Astronaut Centre

Lena Norrbrand
KTH Royal Institute of Technology
Swedish Aerospace Physiology Centre

Ronita L. Cromwell
NASA/Johnson Space Center