

IAA SG 3.19 Study Group Status Report

1.Responsible Commission

Commission III

2. Study Number and Title

SG3.19; Feasibility Study of Astronaut Standardized Career Dose Limits in LEO and the outlook for BLEO; the Biological Responses of Humans to Energetic Particle Radiation under Microgravity Conditions

3. Short Study Description

The preliminary results of this study, which take into account the health hazards and difficulties accruing to long duration human journeys in deep space (to the Moon and Mars) beyond the shielding provided by the geomagnetic field, provide the basis for making recommendations regarding the mitigation of these problems, The recommendations in turn enable progress to be made toward implementing deep space exploration within a framework of multidisciplinary international cooperation.

4.Progress in past six months

A paper for Acta Astronautica reviewing 'The performance and reliability of spacecraft in the near Earth environment due to Space Weather' is under development.

The study was deemed to be finished by Commission III at its Spring Meeting in 2018 and it was reported by its Chair Dr. Lenard at the SAC that a spin-off book entitled

**Feasibility Study of Astronaut Standardized Career
Dose Limits in LEO and the outlook for BLEO**

was in preparation, the complete text of which will be submitted for refereeing to the Board of Trustees with a view to its ultimately being accepted to go forward for publication.

A design for the proposed book cover was already submitted to, and approved by, the Paris Office of the Academy

Book format

The format of the book follows Academy style and the layout is as follows:

Copyright page; Title Page. About the Editor. Table of Content. Possibly a foreword by the Sec. General. A Preface -- (in all approximately 10 pages with Roman Numerals.

An Executive Summary, followed by 10 Chapters and five Appendices individually prepared by one or more study group members including the Study Lead, who also acts as general editor. Each chapter has its own set of references.

Chapter Titles

Chapter 1. Biological responses of the human body to high energy particle radiation

Chapter 2. The radiation hazard in interplanetary space.

Chapter 3. Radiation protection for humans in LEO and the outlook for BLEO

Chapter 4. Overview of health hazards posed by ionizing radiation to human space crews and newly developing methodologies to investigate them.

Chapter 5. Astronaut Career Dose Limits and Radiation Hormesis

Chapter 6. Radiation exposure and shielding effects on the lunar surface.

Chapter 7. The energetic particle environment in the lunar crater Daedalus under solar maximum and solar minimum conditions

Chapter 8. Radiation protection for humans on manned Moon missions – the Chinese perspective.

Chapter 9. RAD measurements of particle radiation at Mars.

Chapter 10. Current limitations in predicting health risks in BLEO and associated recommendations.

Appendices

Appendix 1. Members of the SG 3.19 Team.

Appendix 2 Contributors to Chapters.

Appendix 3 Radiation dose quantities and units.

Appendix 4. Acronyms and Abbreviations.

Appendix 5. Short account of the Academy.

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

We did not use the Website at all as information is passed to members by e-mail/telecon.

6. Issues requiring resolution?

None. The study was successfully completed.

7. Product Deliveries

Our deliveries during the study were always on time. The book will be forwarded to the Academy Trustees for refereeing as soon as all the chapters are ready and edited.

Name of Person providing Study Group Status Report (Group Chair)

The study group chair (Acad. Susan McKenna-Lawlor):

A handwritten signature in blue ink that reads "Susan McKenna-Lawlor". The signature is written in a cursive style with a long horizontal line extending to the left and a long vertical line extending downwards from the end.

Status Report Date

30 September 2018