

I.A.A. Commission III

PRAGUE MEETING – SEPT 2010 MINUTES

Meeting Date(s) : September 26th, 2010 Page 1/11

Venue : Suite I, Rhine, CORINTHIA HOTEL, PRAGUE

Participants:

1. JOHN C MANKINS	AIMS	Chairman
2. GIUSEPPE REIBALDI	ESA	Vice Chairman
3. S. RAMAKRISHNAN	ISRO	Secretary
4. SHOIDIRO MIHARA	USEF	
5. ALEX IGNATIEV		
6. SERGE FLAMENGAR		
7. MARIA ANTONETTA PERINO	THALESALENIASPACE	
8. WENDELL MENDELL	NASA	
9. GIANCARLO GENTA	POLITO	
10. CHRISTOPHE BONNAL	CNES	
11. ROMAN KEZERASHVILI	NYC TECH	
12. RAO V. KOTESWARA	ISRO	
13. KLAUS SCHILLING		
14. MAX CALABRO	IA FRANCE	
15. HIROBUMI SAITO	JAXA	
16. KOICHI IJICHI	USEF	
17. GREG MATLOFF	NYC TECH USA	
18. JIM GRADY JIM	GEI	
19. JUNICHIRO KAWAGUCHI	JAXA	
20. SUN MOBILIA	GEI	
21. YASUSHI HORIKAWA	JAXA	
22. JEAN MUYLACET		
23. ANDREAS RITTWEGER	ASTRIUM EADS	
24. HORST RAUCK	GMK	
25. WILLIAM SIEGFRIED	BOEING	
26. CHRISTIAN SALLABERGER	MDA CORPN	
27. C.P. STAURINIDIS	ESA	
28. MICHAEL MENKING	ASTRIUM EADS	
29. E.D. ASHFORD		
30. JUNJIRO ONODA	JAXA	
31. KUNINORI UESUGI	JAPAN	
32. SEISHIRO KIBE	JAXA	
33. CLAUDIO BRUNO	UNIROMA	
34. PETER BAINUM	HOWARD	

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- 35. ROBERT A LAINE ORANGE
- 36. HAROLKI TAKEGAHARA
- 37. HIROKI MATSUO

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Objective : Progress Review preparatory to SAC Presentation on Academy Day at IAC, Prague.

AGENDA

1. Introduction & Commission III composition
2. Review of Actions from Paris meeting held in March 2010
3. Status of Study Group reports progress & way forward:
 - # SG 3.1 Advanced Propulsion Perspective – Max Calabro
 - # SG 3.9 Private Human Access to Space – Christophe Bonnal
 - # SG 3.10 Interstellar Precursor Missions – Claudio Bruno
 - # SG 3.11 Solar Energy from Space – John Mankins
 - # SG 3.12 Global Human Exploration of Space – Wendell Mendell
 - # SG 3.13 Space Elevators Concept & Technologies – Peter Swan
4. New SG proposals:
 - Piggy Backing to Planets – Jacques Blamont
5. Symposia status:
 - IAC 2010
 - IAC 2011
6. Report to SAC
7. Any other Business

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Minutes :

Subject/Description	Action	Due Date
<p>Chairman, Commission III welcomed the Members and other participants to the Commission meeting and briefed on the agenda proposed.</p> <p>1. Commission III composition was displayed (Annexure-I) and confirmed.</p> <p>2. Review of Actions from March 2010 meeting: Action items status was presented (Annexure-I)</p> <p>3. Status of study Group reports:</p> <p>#SG 3.1 <u>Advanced Propulsion Perspective</u></p> <p>Comments on draft document received from M/s.Bonnal, Onoda, Claudio Bruno, Hans Hoffmann & Roger Lenard were presented and reviewed (Annexure-I)</p>		

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<p>It was noted that the scope of the study document is revised and limited to 'Chemical Propulsion from Earth to Orbit'</p> <p>The commission concluded that this study report may not qualify as a cosmic study document since it is more in the nature of a survey report on the state of art. Hence, it may be redefined as a technical paper/monograph to be published under ACTA Astronautica Journal of IAA.</p> <p>The document to be revised/ updated taking into account the comments from Members and the above recommendation of Commission-III</p> <p>The Commission Agreed that study is completed and hence SG 3.1 is declared as closed.</p> <p>#SG 3.9 <u>Private Human Access to Space:</u></p> <p>Study Status reviewed; Part-I covering the sub-orbital flights in</p>	Max Calabro	15 th Dec. 2010
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<p>advanced state of readiness. Part-II addressing the orbital flights initiated.</p> <p>2nd International IAA conference on Private Human Access to Space scheduled for 30th May – 1st June at Arcachon, France.</p> <p>The symposium announcement has to be posted in IAA website.</p> <p>#3.10 <u>Inter Stellar Precursor Missions</u></p> <p>Comments on draft report received from M/s. Bonnal, Hans Hoffman, G. Reibaldi and Roger Lenard presented to the Commission (Annexure-I)</p> <p>It was observed that this study report is in good shape. However, the report to be revised with respect to the consistency of technical depth and harmonization of different topics/chapters dealt with. The main body of the report to be more concise and the technical</p>	<p>IAA Secretariat</p>	<p>Closed</p>
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<p>details/mathematical formulations can be shifted to Appendix.</p> <p>Additional feed back from other Commission-III Members to be communicated to Prof. Bruno.</p> <p>Revised Study Report to be ready for review by Commission-III Members.</p> <p># SG 3.11 <u>Solar Energy from Space</u></p> <p>The Study Report is complete and ready for review by Commission Members. The draft report will be mailed to Commission-III Members for feed back. Due on 30th November 2010.</p> <p>Initiation of Peer <u>IAA</u> Review process.</p> <p>Completion of Peer <u>IAA</u> Review process.</p>	<p>Commission-III Members</p> <p>C Bruno</p> <p>John C. Mankins</p>	<p>31st Oct. 2010</p> <p>28th Feb. 2011</p> <p>15th Oct. 2010</p> <p>30th Nov. 2010</p> <p>March 2011</p>
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<p># SG 3.12 <u>Global Human Exploration of Space</u></p> <p>Study Group meeting held in March 2010</p> <p>The objective of study, target audience, scope of the report with respect to already completed studies have been discussed.</p> <p>Study Group report outline under review and writing assignments will be identified.</p> <p>The IAA 50th Anniversary Study Group report on this topic will form part of inputs from this study.</p> <p># SG 3.13 <u>Space Elevators concepts & Technologies</u></p> <p>Study Group proposal (Annexure-II) formally approved by the Academy and work has commenced. Progress to be reported in next Commission Meeting.</p>	<p>W. Mendell</p> <p>P. Swan</p>	<p>March 2011</p>
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4. New SG Proposal

The Commission considered the Proposal (Annexure-III) for a new Study Group on the topic 'Piggy-backing to Planets' originated by Mr. Jacques Blamont.

The Commission concluded that the proposal is too narrow in scope, more in line of a project execution task than a cosmic study.

The Commission recommended the proposal may be revised to address a wider subject, viz. 'Low Cost Planetary Missions using Mini Satellites'.

5. Symposia Status:

IAC-2010 and IAC-2011 sessions related to Commission-III are generally good.

There is a need to review the sessions planned in IAC-2012 to link them with the current Study Groups under Commission-III.

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6. Report to SAC:

The final report presented to SAC on 26th September is given in Annexure-IV.

7. Any other Business:

Reviewed the actions from IAA Commissions plenary meeting held that morning.

Regarding presentations from IAA in UN COPOUS meet, suggested following possibilities:

- Present IAA 50th Anniversary Study Reports (4 topics)
- Present outcome of concluded Study – SG 3.11 report on Space Solar Power.

Regarding special events at IAC-2011 in Cape Town, SA on the theme ‘Space for Africa/Africa in Space’ it was proposed that symposia

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<p>key note talks can be arranged relevant to the theme, for example, IAA SG 3.11 presentation on Space Solar Power can be the keynote for session C 3.1.</p> <p># With reference to Global Space Technology Forum meet at Abu Dhabi, IAA should get involved.</p> <p># Topics for possible stand-alone conferences to be identified.</p> <p># Special sessions/symposia on Anniversaries of early space endeavor events to be identified and proposed.</p> <p># Interface between the new IAA Centres for Conferences and studies respectively and the IAA Commissions to be spelt out.</p>	<p>Members, Commission-III</p> <p>Members, Commission-III</p> <p>IAA Secretariat</p>	<p>15th Dec. 2010</p> <p>15th Dec. 2010</p> <p>15th Dec. 2010</p>
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IAA COMMISSION-III MEETING

PRAGUE, CZECH REPUBLIC

Sunday, 26th September 2010

AGENDA

1. Introduction & Commission III composition
2. Review of Actions from Paris meeting held in March 2010
3. Status of Study Group reports progress & way forward:
 - # SG 3.1 Advanced Propulsion Perspective – Max Calbro
 - # SG 3.9 Private Human Access to Space – Christophe Bonnal
 - # SG 3.10 Interstellar Precursor Missions – Claudio Bruno
 - # SG 3.11 Solar Energy from Space – John Mankins
 - # SG 3.12 Global Human Exploration of Space – Wendell Mendell
 - # SG 3.13 Space Elevators Concept & Technologies – Peter Swan
4. New SG proposals:
 - Piggy Backing to Planets – Jacques Blamont
5. Symposia status:
 - IAC 2011
 - IAC 2012
6. Report to SAC
7. AoB

Commission III Composition

- John C. Mankins (USA), Chairman
- Giuseppe Reibaldi (It), Deputy Chairman
- S. Ramakrishnan (In), Secretary
- Christophe Bonnal (F), Member
- Hans E. W. Hoffmann (D), Member
- Wendell Mendell (USA), Member
- Claudio Bruno (It), Member
- Junjiro Onoda (J), Member
- Roger Lenard (USA), Member
- Christian Sallaberger (Ca), Member
- Tetsuo Yasaka (J), Past Chair

Review of Actions from March 2010 meeting

➤ SG 3.1 DRAFT DOCUMENT ON 'CHEMICAL PROPULSION FROM EARTH TO ORBIT' (MAX CALABRO) TO BE SENT TO COMN.III MEMBERS AND FEEDBACK SOUGHT

➤ SG 3.10 DRAFT REPORT ON 'INTERSTELLAR PRECURSOR MISSIONS' (CALUDIO BRUNO) TO BE SENT TO COMMN III MEMBERS & FEED BACK SOUGHT

❖ COMMENTS RECEIVED FROM:

- C. BONNAL (CNES)
- ONODA (JAXA)
- CLAUDIO BRUNO
- HANS HOFFMANN
- ROGER LENARD

❖ COMMENTS RECEIVED FROM:

- C. BONNAL
- HANS HOFFMANN
- ROGER LENARD
- G. REIBALDI

➤ SG. 3.9 DRAFT REPORT ON
'PRIVATE HUMAN ACCESS
TO SPACE' (C. BONNAL)
PART-I TO BE PRESENTED
& PROPOSAL FOR PART-II
(ORBITAL FLIGHTS) STUDY
PLAN

➤ TO BE PRESENTED

➤ SG. 3.11 FINAL DRAFT
REPORT ON 'SOLAR
ENERGY FROM SPACE' (J.
MANKINS) TO BE READY
FOR REVIEW/DECISION ON
PEER REVIEW

➤ TO BE PRESENTED

3. STUDY GROUP PROGRESS

SG-3.1 ADVANCED PROPULSION PERSPECTIVE

COMMENTS FROM BONNAL C.

- COVERS CORRECTLY ALL CHEMICAL PROPULSION DOMAIN
- RECOMMENDATIONS CHAPTER TO BE STRENGTHENED
- GENERAL ROAD MAP AS EXECUTIVE SUMMARY IS TO BE REVIEWED IN COMMISSION
- IT IS STILL A DRAFT – CAN BE IMPROVED

SG – 3.1 ADVANCED PROPULSION PERSPECTIVE – MAX CALABRO

ONODA (JAXA)

- GENERAL REMARK ON HYBRID PROPULSION CHARACTERISTICS & TECHNICAL CHALLENGES TO BE ADDED
- JAPANESE DEVELOPMENTS IN HYBRID ROCKET TO BE INCLUDED
- SOME UPDATES ON H-II VEHICLE PROPULSION PARAMETERS

SG-3.1 ADVANCED PROPULSION PERSPECTIVE -

CLAUDIO BRUNO

- REFERENCES FOR ALL TABLES & FIGURES
- USE I_{sp} INSTEAD I_{sv}
- NO MENTION OF LRE USING H_2O_2
- MIX OF DIFFERENT TOPICS – IMPROVE FOCUS
- STATEMENTS ON FUTURE IMPROVEMENTS – NOT CLEAR
- DOCUMENT SKEWED TOWARDS SP/SRM
- LOOKS AT THE EXISTING SCENARIO - TSTO USING AB MISSING

SG-3.1 ADVANCED PROPULSION PERSPECTIVE -

HANS HOFFMANN

- REPORT INCOMPLETE WITHOUT MENTION OF FALCON LAUNCHER /MERLIN ENGINE ETC.
- SHOULD INCLUDE CONTRIBUTIONS FROM AMERICAN /CHINESE /RUSSIAN AGENCIES

ROGER LENARD

- REVIEW INTRODUCTION/FIRST CHAPTER
- REWRITE THE SECTION ON AUTOMOTIVE & AIRCRAFT TURBOJETS
- FUTURE OF HYBRID PROPULSION MISSING
- GOOD REVIEW OVERALL

STUDY GROUP PROGRESS

➤ 3.10 INTERSTELLAR PRECURSOR MISSIONS – CLAUDIO BRUNO

C. BONNAL

- TOPIC IS ORIGINAL & INTERESTING
- TABLE OF CONTENTS GOOD & LOGICAL
- MANY CHAPTERS YET TO BE FILLED
- CHAPTERS TO BE HOMOGENISED/ HARMONISED IN TERMS OF TECHNICAL DEPTH
- CHAPTER 2.1.1 ALREADY PUBLISHED MATTER (ACTA ASTRONAUTICA)
- IDENTIFY TWO MEMBERS TO HARMONISE THE DOCUMENT WITH EQUAL DEPTH IN ALL CHAPTERS

SG-3.10 INTERSTELLAR PRECURSOR MISSIONS – CLAUDIO BRUNO

HANS HOFFMANN

- REPORT IS GOOD WORK & GOOD CONTRIBUTION TO ACADEMY
- WE CAN PUBLISH IT

ROGER LENARD

- WELL WRITTEN/NOTHING OUT-OF-PLACE
- SECTION BY BRUNO & SIMONE TO BE EXPANDED TO INCORPORATE CONCEPTS THAT CAN BE BUILT WITH CURRENT TECHNOLOGIES
- AREA OF SOLAR SAILS/SOLAR ELECTRIC PROPULSION – LOT OF REPETITION
- REQUIRES HARMONISATION

SG-3.10 INTERSTELLAR PRECURSOR MISSIONS – CLAUDIO BRUNO

GIUSEPPE REIBALDI

- THE STUDY IS FRAGMENTED, A SYSTEM APPROACH IS MISSING
- THE EMPHASIS IS MAINLY IN THE PROPULSION WHILE THERE ARE OTHER TECHNOLOGIES REQUIRED FOR SUCH MISSIONS. A CLEAR SET OF CONCLUSIONS IS MISSING WITH SPECIFIC PROPOSAL INCLUDING OVERLAP WITH EXISTING/PLANNED INTERPLANETARY MISSIONS.
- SESSIONS AND THE STUDY GROUP NEEDS TO BE INTERLINKED SO THAT THE SESSION PROVIDE USEFUL INPUTS FOR THE STUDY AND IT IS ALSO THE FORUM TO DISCUSS THE STATUS OF THE STUDY WITH EMPHASIS ON CONTROVERSIAL AREA.

Proposal for Forming an IAA Study Group

SG 3.13

Title of Study: Assessment of the Technological Feasibility and Challenges of the Space Elevator Concept

Proposer(s): Peter Swan, Ph.D. & David Raitt, Ph.D.

Primary IAA Commission Preference: Commission III

Members of Study Team

Chairs: Peter Swan & David Raitt

Secretary: Cathy Swan

Members: (accepted) Robert Penny, Lubos Perek, Tetsuo Yasaka, Radu Rugescu, Richard J. Tremayne-Smith, Ted Semon, Bryan Laubscher, Michael Laine, Ben Shelef
(Invited) Wiley Larson
(invited) other members of Commission III

Short Description of Scope of Study

Overall Goal:

- (1) Assessment of the Technologies**
 - Ribbon Material
 - Dynamics of Ribbon
 - Base Station Infrastructure
 - Ribbon Rider Motor / Wheels
 - Power to Ribbon Rider (Lasers vs. sun)
 - Ribbon Rider Platform
- (2) Systems Design Issues**
 - Space Debris
 - Deployment
 - Environmental Elements
- (3) Description of Space Elevator Implementation – Dynamics and Control of Long Ribbon, Build-up of 1-meter wide Ribbon, Power Approach, Payload Carrying Capacity, Anchor Design**

Intermediate Goals: (1) Conduct sessions at IAC's (South Africa, Naples) with purpose of presenting technological aspects of the Space Elevator. [direct questions from study group]
(2) Conduct a min-symposium co-sponsored by the Academy and the International Space Elevator Consortium presenting the results of this study. [could be session at IAF at Naples]

Methodology: The initial step is to sponsor sessions inside the IAA D.4.4 Symposium (Symposium on the Far Future: Space Elevators & Tethers). A parallel step is to create a study group, establish goals, objectives and timelines for a Space Elevator cosmic study. Conduct a min-symposium to present the results of the study. The last step would be to produce a report for the Academy that discussed the feasibility of a Space Elevator and identify the potential benefits to humanity.

Time Line: 1st Meeting Oct 10 in Prague – to establish study group and schedule [of course much will be started thru email and telephone calls starting when the study is approved.]

March 11 in Paris – to discuss progress, identify action items, finalize South Africa and Naples papers to support study group

3rd Meeting: Oct 11 in South Africa – to discuss presentation during IAF and finalize some portions of the report.

4th Meeting: Mar 12 in Paris – summarize conclusions and recommendations in the report and draft final aspects of Academy product.

5th Meeting: Oct 12 in Naples – produce the Academy report for commission review and have a session focused on the report in co-sponsorship of the International Space Elevator Consortium

6th Meeting: Paris 2013– produce the Academy report- for peer review

Final Product :

Academy Publication entitled: Assessment of the Technological Feasibility and Challenges of the Space Elevator Concept

Target Community and Expected Effects: Those organizations wishing to have inexpensive access to space: Mars/Moon program, Life in space believers, geosynchronous satellite owners (communications, solar power satellites, etc.), planetary defense organizations, commercial satellite builders, space tourism companies, and governments.

Support Needed: Minimal at the present time: Title a session in Prague, South Africa and Naples: Vision of the Far Future – Space Elevators and Space Tethers – the last two structured to support study group.

Potential Sponsors: space agencies, Mars/Moon programs, planetary defense organizations, commercial space organizations, future human habitats and world governments.

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

Date: 22 March 2010

Signature: signed Peter Swan

No Signature required if document authenticated.

Initial Phase

***Application received: Created study group – March 2010
Chairing Session in Prague on Space Elevators and Space Tethers
focused toward the cosmic step.***

Commission Approved:

SAC Approved:

Web Site Section opened:

Members Appointed:

Final Phase

Peer Review by Commission Completed:

Recommended by the Commission:

Final Report Received:

SAC Approved:

BOT Accepted:

Publisher Selected:

Study Published:

Proposal for Forming an IAA Study Group

Title of Study: PIGGY BACKING TO PLANETS

Proposer(s): Jacques BLAMONT
(Must be member(s) of the Academy M or CM)

Primary IAA Commission Preference:

(From Commission 1 to Commission 6)

Commissions: 1 Space Physical Sciences, 2 Space Life Sciences, 3 Space Technology & Systems Development, 4 Space Systems Operations & Utilization, 5 Space Policy, Law & Economics, 6 Space and Society: Culture and Education

Secondary IAA Commission Interests:

(From Commission 1 to Commission 6)

Members of Study Team

Chair(s): Jacques BLAMONT
(Must be member(s) of the Academy, M or CM) TBD (INDIA)

Secretary:

Other Members:
(Open to members and non- members of the Academy)

DEGTYAREV Alexander (UKRAIN), LOPOTA (RUSSIA), TBD (KELDYSH INST.,RUSSIA), TBD (JAPAN^o, J.Y. LEGALL (FRANCE), D. MC CLEESE (USA, JPL), G. VANE (USA, JPL), S.ATREYA (USA, Univ. MICHIGAN), TBD (GERMANY)

Short Description of Scope of Study

Overall Goal: ESTABLISH LIMITS CONSTRAINTS AND ADVANTAGES OF THE USE OF COMMERCIAL LAUNCHES TO GTO FOR PLANETARY MISSIONS
(Expected scientific or practical benefit of the study group's efforts)

Intermediate Goals: UPDATE PRELIMINARY STUDIES (1996...) OF TRAJECTORIES AND MASSES FOR CONDITIONS IN THE 2010'S.

Methodology:

(Email works, workshops, stand alone conferences, interim publications, etc.)

NEW SESSION AT THE 9TH IAA LPCM-LOWCOST PLANETARY MISSIONS
ARTICLE IN ACTA ASTRONAUTICA

Time Line: ONE YEAR

(Cannot exceed three years)

Final Product (Report, Publication, etc.):

SEE ABOVE

Target Community:

PLANETOLOGY AND SPACE OPERATIONS COMMUNITY AND LAUNCH INDUSTRY

Support Needed:

Potential Sponsors:

SPACE AGENCIES, SPACECRAFT AND LAUNCHERS INDUSTRY

To be returned to the IAA Secretary General Paris

*by fax: 33 1 47 23 82 16 or
by email: sgeneral@iaamail.org*

Date: JULY 31TH 2010

(No Signature required if document authenticated).

Follow-up Section for IAA use only

Initial Phase

Application received:

Commission Approved:

SAC Approved:

Web Site Section opened:

Members Formally Appointed by IAA:

Final Phase

Peer Review by Commission Completed:

Recommended by the Commission:

Final Report Received:

SAC Approved:

BOT Accepted:

Publisher Selected:

Study Published: