



***Assessment of the Technological Feasibility and
Challenges of the Space Elevator Concept
Report for Meeting - 12 March 2012, Paris IAA HQ***

1 – Summary: The meeting went very well, as it achieved its objectives of recording the status of the activities surrounding the Cosmic Study # 3-13.

2 – Attendees: Dr. David Raitt [M], Dr. Peter Swan [M], Dr. John Knapman, Dr. Anna Guerman[CM].

3 – Schedule: The study seems to be on schedule, with a few exceptions; however, effort is being focused on those items. Here is the current schedule agreed upon by the authors:

30 April 2012	Chapters due
15 June	Comments returned
20 August	Final Chapters in draft to editors
25 August	Workshop in Seattle [1/2 day]
15 September	Papers due for IAF session
1 October	Final Cosmic Study mtg in Naples
15 November	Final Cosmic Study to Commission III review
15 January 2013	Comments incorporated in Final Cosmic Study version
15 January	to Peer Review Panel
15 March	comments incorporated into final publishable version
15 March	to SAC and BoT
15 June 2013	to publishers

4 – New Table of Contents: After discussions within Commission III and the study group meeting, the chapters have been re-arranged [chapter authors... do not worry, the content of your chapter has not changed, just its placement – no impact hopefully]. See attachment to this document for final version of ToC.

5 – Terminology: The editors are in the process of developing a series of terms that would be standard across the book for consistency. This will ensure the various chapters are talking the same language. Such items are proposed to be standard: [list to be expanded as we proceed]

Tether [not ribbon] the material stretching from Apex Anchor to base station.

Climber [not rider] to represent the physical “spacecraft” that attaches to the tether. This would consist of subsystem such as structure, electrical [solar arrays, cables, batteries, microprocessors, etc], motor, wheels, payload bay [structure, power & comm’s for customer], communications and then customer payload.

Apex Anchor [not counterweight]

US dollars \$ will be standard.

MKS units will be standard.

6 – Standard Format: As we are approaching the due dates for the chapters, the editorial team will provide a “Word” format document and an example chapter. Dr.



Knapman has agreed to insert his drafted chapter into the format and use the chapter as an example of format for all – font type, numbering approach, references, footnotes, and tables/figures. Dr. Raitt will work with Dr. Knapman and try to have this “model” chapter by 10 April.

6 – Chapter Content: The content of the chapter is left up to the chapter captains and authors; however, for consistency there are two items that have been suggested to the chapter captains in the past and one new addition. If one wishes to see a major study that was presented very well in a book for the IAA, go to the website, go to the studies accomplished part, and download the pdf of “space solar power.” [www.iaaweb.org] the three items to be standardized in each of the chapters should be located towards the end of the chapter and should demonstrate:

TRL level [technology readiness levels by NASA]

Consequence vs. Likelihood matrix [see word page with sample]

Findings and Conclusions

This last item was suggested at the Commission III meeting [our sponsor inside IAA]. The review suggested that our study include a final chapter addressing the technology assessment for each of the space elevator components. To accomplish this, the editors are asking each chapter captain to have the three items listed above inside their chapter. Estimate the TRL of the major aspects of your chapter. Place the major components of the chapter inside a consequence vs. likelihood matrix. And, at the end of each chapter, the findings and conclusions should be outlined. This will enable the editors to summarize the various chapters and to illustrate the actual feasibility of the space elevator concept as of 2013.

7 – Next Meeting [Seattle Aug 25-27]: We have made great progress and a workshop in Seattle [1/2 day, to be scheduled in parallel with the ISEC Space Elevator Conference] will be timely to review ALL chapters together to ensure consistency. The editors invite all authors to attend the meeting for each chapter presentation and observe the other chapters to ensure consistency across the Cosmic Study. The ISEC website should have an update soon with the details of the ½ day workshop. [www.isec.org]

8 – Abstract Submission: I was very pleased with the abstracts submitted for the Naples IAC. During the October Naples IAC, the cosmic study should be in its final stages of editor review with a meeting to resolve any conflicts between concepts or words. The session inside the IAC should be exciting and enjoyable.

9 – Summary: I want to thank all of you who have worked so hard on these items inside the chapters. David, Skip, Pete, Cathy and Ted [the editor team] are really excited about the challenge of “helping” to fit your chapter into this monumental work. It is clear that when our work is finished, the space elevator community will have spoken – We CAN do this in a reasonable time at a reasonable cost and acceptable risk! However, the impact of our work could be no less than “improving the human condition.”

Peter Swan, Ph. D.
Cosmic Study lead Editor



Assessment of the Technological Feasibility and Challenges of the Space Elevator Concept

A Cosmic Study for the International Academy of Astronautics

Editors: Cathy Swan, David Raitt, Skip Penny, Ted Semon,
Peter Swan [contact through Dr-swan@cox.net]

Chapter

- Preface
- Executive Summary
- 1 Introduction
- 2 Systems Infrastructure View

- Part I – Major Elements**

- 3 Tether Material
- 4 Tether Climbers
- 5 Power for the System
- 6 End Station Infrastructure (Base & Apex Anchor)

- Part II – Systems Approach**

- 7 Dynamics of Operation Tether
- 8 Tether Deployment Approaches
- 9 Systems Design for Environment
- 10 Systems Design for Space Debris
- 11 Operations Concept

- Part III – Architectural Considerations**

- 12 Summary of Technological Assessment
- 13 Developmental Roadmaps
- 14 Legal Perspective
- 15 Financial Perspective

- Part IV– Findings and Conclusions**

- 16 Study Findings and Conclusions
- 17 Next Steps

- Appendix (IAA, SE History, acronyms, References)

Sample format for Likelihood Consequence chart

