



Progress report on IAA Study Group 3.9 “Private Human Access to Space”

Proposer(s): H. Rauck – G. Brachet **Chair:** Ch. Bonnal
Primary IAA Commission Preference: Commission 3
Secondary IAA Commission Interests: Commission 5

Overall Goal:

Identify and quantify the key topics associated to Manned Private Access to Space for both Orbital and Sub-orbital missions.

Key words:

- Technical aspects
- Legal and regulatory aspects, safety aspects
- Financial aspects, market analyses, associated business plans
- Motivations of potential customers
- Physiological and Psychological requirements, ergonomic constraints

Expected outcome of the study:

IAA Position Paper giving the keys to the topic and potentially including recommendations. Subdivision of the study into key chapters, with one “book captain” per chapter ; 7 or 8 members per chapter covering a wide range of origins (countries, agencies, industrials, searchers, operators...)

Time line:

Initially: 3 years following the initial proposal (March 2007)

Revised timeline:

- | | | |
|---|---|---------------------------|
| 1 st IAA symposium on Private Human Access to Space (Arcachon) | ⇒ | 28-30 May 2008 |
| Publication of the full CD with all the papers, most of the presentations, pictures, ... Distribution to all participants | ⇒ | End of September 2008 |
| Report during IAC Glasgow | ⇒ | October 2008 |
| Publication in Acta Astronautica of the 15-20 best papers out of the 68 presented in Arcachon | | |
| Process just started, following problems of understanding of the editing constraints. | | |
| Coordination with potential reviewers on-going | | |
| Special issue of Acta to be formalized. | | |
| Co-editors: Dr. Gerzer and Ch. Bonnal | | |
| Tentative date was March 2009, | ⇒ | Revised to September 2009 |
| Drafting of the Position Paper | ⇒ | Daejeon, October 2009 |
| Re-work within the SG3.9 working group | ⇒ | IPC, Paris March 2010 |
| Draft release for Peer Review within IAA | ⇒ | IPC, Paris March 2010 |
| Final publication | ⇒ | IAC, October 2010. |

IAA Position Paper on Private Human Access to Space
Tentative table of contents, sub-chapters, length and chapter responsables:

1. Introduction:
 - a. context, history,
 - b. general overview,
 - c. IAA action description

(4 pages – Bonnal)
2. Societal motivations :
 - a. New transportation culture, Space age
 - b. Effects on society
 - c. Outreach

(6 pages – Peeters, Eymar)
3. Market analysis
 - a. Current analyses and forecast
 - b. Phased approach to public access to space

(6 pages – Salt)
4. Medical, Physiological and Ergonomics
 - a. Risk factors for the crew and passengers
 - b. Medical selection, dedicated ground infrastructures
 - c. Habitability requirements, flight suits
 - d. Applicable and similar experiences

(7 pages – Gerzer, Antuñano, Winisdoerffer)
5. Legal, Insurance and Regulatory aspects
 - a. General legal frame
 - b. Risks and Insurances
 - c. Regime and Users status
 - d. Specific national regimes

(11 pages – Couston, Crowther, Masson-Zwaan (TBC), Clerc (TBC))
6. Technical aspects:
 - a. Potential solutions, variants at system level, shape, number of passengers, single or dual stages
 - b. Main sub-systems, aerodynamics, propulsion, thermal protections, TRL
 - c. Growth potential: P2P, hypersonic passenger travels

(12 pages – Calabro, Bultel, Bernard-Lépine (TBC))
7. Ground Infrastructures
 - a. Space tourism and Grand public
 - b. Spaceports : criteria, proposals

(8 pages – Droneau, Webber)
8. Reliability, Safety, Risk
 - a. Reliability requirements
 - Safety requirements

(4 pages – Romero (TBC))
9. Conclusions:
 - a. Key hurdles to overcome
 - b. Recommendations, role of Agencies

(4 pages – Bonnal)

Grand total : 62 pages (for comparison : Space Debris = 64 pages)

Key members of the study group:

Dr. Melchor J. ANTUÑANO, Director, Civil Aerospace Medical Institute, FAA

Max CALABRO The Inner Arch, former head of propulsion department
in Astrium Space Transportation, IAA

Pr. Mireille COUSTON University of Lyon 3, Head of Space Laws Center

Pr. Richard CROWTHER Rutherford Appleton Laboratory

Philippe DRONEAU, Deputy Director, Toulouse Cité de l'Espace

Patrick EYMAR, N4E, former head of future projects at Astrium ST

Prof. Dr. Med. Rupert GERZER, Head, Institute of Aerospace Medicine
German Aerospace Center DLR

Walter PEETERS, Dean of ISU, International Space University

Manola ROMERO, ONERA, IAA

Dave SALT, Vega Group, European Space Agency

Garrett SMITH, Airbus, Chairman of the 3AF Space Tourism Commission

Derek WEBBER, Spaceport Associates

Francis WINISDOERFER, Airbus, Professor at Strate College

“Recall of invitation” recently sent: two enthusiastic answers so far.

Additional members are welcome, but may lead to problems of coherence and homogeneity (lack of efficiency; depends on the definition of a Working Group !)

Not much work so far (with the exceptions of Pr. Couston and Dave Salt) despite clear marks of interest.

Probable lack of motivation, time, and/or understanding of the rationale for the IAA Position Paper (Status? Proposals? To whom? Are they expecting it?...)

↳ Official appointment from IAA would greatly help!

Next symposia:

Current activity on the subject at world level is very low:

- No news at all from Space Ship 2: good progress at White Knight 2 level, due to synergies, but nothing on the “passenger” side; potential problems with propulsion
- Astrium SpacePlane TBN is frozen
- No news at all from Goddard – New Shepard – Blue Origin (Jeff Bezos)
- No significant progress on Rocketplane XP development
- Hardly any news from X-Cor since Arcachon
- VSH is frozen
- Space Dev Dreamchaser Benson heritage ?
- Progress on ISAS side ?
- Orbospace Infinity re-scoped for sub-systems
- Numerous concepts apparently stuck nowhere: Armadillo, Da Vinci, Masten, Starchaser, Interorbital Systems Neptune,
- ...

↳ Considering the general lack of activity at world level on this subject, and despite the strong support of Avantage Aquitaine (thanks!), the 2nd IAA Symposium on Private Human Access to Space is postponed to May – July 2011

→ Location and local organizer to be discussed, but same as 2008 seems a good idea.