

Space Architecture Technical Committee, Annual F2F Meeting, 2018

Logistics

17 Sep 2018, Orlando, 1230-1400, Coral Spring 1

Attending in person

Brent Sherwood, JPL (Chair)
Keith Crisman, FIT
Craig Day, AIAA (Director, Product Development)
Ondrej Doule, FIT
Brand Griffin, Genesis Engineering Solutions
Ron Kohl, AIAA (Deputy Director, SMG; Member, Standards Steering Committee)
Luke Roberson, NASA KSC
Ann-Marlene Rueude, Swiss Polytechnic Inst
Matt Simon, NASA LaRC
Fred Slane, Engineering Systems Inc.
Sam Wald, Nanoracks
Mark Whorton, AIAA (Director, SMG)

Attending online

Olga Bannova, Univ Houston SICSA (departed at 1300)
Bill Hart, JPL
Barbara Imhof, Liquifer Systems Group (joined at 1315)

Overview

Through AIAA, SATC is the world's only professional association for the field of Space Architecture. Each year, the period from July-October is SATC's busiest time for direct interaction: all three of the SA sessions we organize; preparation of our annual summary article; and visible presence at the AIAA annual meeting, including public announcement of our best-paper awards and our mandatory face-to-face TC meeting. We had good turnout at the F2F meeting. It appears that compared to the average, our TC, albeit small and geographically distributed, contributes solidly to AIAA's technical networking vision: we produce important papers, host a reliable presence at multiple conferences, engage in multiple relevant activities, and support the goals of our parent organization, SMG (Space and Missiles Group).

Topics

- SATC in context of AIAA
- SATC conference roundup
- SATC initiatives

- Year-end AIAA summary article
- Open mike: whither the SATC
- Appendix: report from the SMG meeting

SATC in context of AIAA

1. Renovation of Space Forum event

By arrangement, Mark Whorton, Director of SMG, led a discussion of AIAA's forward vision for the Space Forum. Mark arose from the aerospace sciences side, and was 20 years at MSFC. Prior to his SMG role, he had been chair of the GNC TC, Director of Region 2, and chair of the Space Forum.

Following the governance model transition undertaken in 2017-18, AIAA is developing a new events model. The Space Forum needs revitalization: attendance has declined, and many TCs don't convene here despite it being the institute's comprehensive annual meeting.

AIAA has hired an outside firm (360 Live Media) to help develop a marketing strategy to establish a broader 'footprint' in the 'aerospace ecosystem', building out from its technical foundation to include entrepreneurs, investors, media, and thought leaders.

AIAA is the Local Organizing Committee for next fall's World Space Congress (the 70th IAC, in Washington DC, celebrating the 50th anniversary of Apollo 11). Therefore, AIAA will not hold a 2019 Space Forum next September. This allows two years to shape the renovated annual event that will start in 2020. The time, location, and name of the new event are all TBD; a plan will be presented to the AIAA Board in Jan 2019, but will likely be designed for a centrally-located, fixed city (e.g., Las Vegas), because "that's what the competitors do."

As a stopgap for 2019 only, SMG is adding a Space track to the AIAA Propulsion and Energy Conference, 19-22 August, in Indianapolis.

SATC actions: 1) Matt and Sam have organized the call for SA topics at the P&E conference; 2) we expect the 70th IAC in Washington to be a major convening event for space architects...speaking slots are likely to be highly competitive and the call will open in Nov.

From Q&A:

With respect to timing and nature of the 2020+ event: Matt noted that end of the FY is a tough time to expect government employees to secure travel funds; most likely the timing will be driven by avoiding competitor events. Whorton stated that AIAA does not see IAC as a competitor; Brent rejoined that from the practical standpoint of travel allocation, it is anyway. Ondrej suggested that making the conference fully virtual would differentiate it from other newspace events; AIAA will make the event F2F.

With respect to peer review of AIAA conference papers (Brent). AIAA "can't fix that," and is "moving in the opposite direction" to use conferences as a wide net that feeds archival-quality papers toward the AIAA journals.

SATC action: If one of the editors of JSR (Journal of Spacecraft and Rockets) joined SATC, we could build a closer relationship to exercise this conference-to-journal pathway, as we already do from IAC-to-Acta Astronautica.

2. Integrating the AIAA space community

By arrangement, Ron Kohl, a Deputy Director of SMG and former Chair of the Space Colonization TC, led a discussion on his efforts to improve integration of the AIAA space community. TCs “don’t have a good track record working together” but ought to do so. SATC working with SCTC is an exception, but mostly occurs by virtue of personal relationships rather than organizational intent. Ron’s primary idea is to assemble a topics database about space-related services and capabilities, to map topics of interest to multiple TCs and identify overlaps. His plan is under review by SMG; he will contact TC chairs directly, and there is no action at this time.

3. Year-end summary article

The year-end issue of Aerospace America includes articles by the TCs providing a roundup of progress and events in their respective domains. This year Ted Hall took the lead, supported by Barbara Imhof and Maria João Durão to produce our article. It focuses on three topics: 1) the lunar Gateway, for which the six NextSTEP companies are developing habitat concepts on contract to NASA; 2) the Eden ISS greenhouse, which is now operational in Antarctica; and 3) a tribute/obituary for space architect Constance Adams.

Conference roundup

Brent led a discussion summarizing the Space Architecture statistics and footprint at the July 2018 ICES in Albuquerque (organized by François Levy, Georgi Petrov, Sandra Häuplik-Muesberger, and Don Barker); the then-present 2018 Space Forum in Orlando (organized by Matt Simon and Sam Wald); and the then-upcoming 69th IAC in Bremen (organized by Olga Bannova, Brent Sherwood, and Barbara Imhof), which included the Space Architecture Symposium Bremen (organized by Christina Ciardullo and Barbara Imhof). For details, see the summaries of those events, at <https://www.SpaceArchitect.org>.

SATC initiatives

1. Habitability Standard

NASA standards are neither public nor commercial, and are therefore not considered industrial standards for broad use. However, the emergence of non-agency space architecture flight projects may mean that it is timely to begin development of an industry standard. Our TC is encouraged by AIAA Executive Director Dan Dumbacher to reach out to industry to fill this gap.

Ondrej Doule leads the SATC initiative, supported by Fred Slane; they led the discussion.

ISO 16157:2018, *Technomedical Requirements for Space Vehicle Human Habitation*, published in July 2018 after four years of development, provides a structure. But a 1st-level standard is missing: an ontology for human space flight, with a focus on occupant safety (FAA’s core interest). ITAR needs to be incorporated because suborbital flights are inherently international.

From Q&A:

Brand, pointing to the Ramsey-Sleeper precedent from terrestrial architecture, noted that developing a detailed standard will be a tough job going forward.

Matt noted that the NASA-STD-3001 v2 is in review now, anticipated to be released in 1-2 months.

Ron Kohl offered: 1) interaction with the AIAA Standards Steering Committee, to help migrate NASA standards into the AIAA world; and 2) himself as a non-TC reviewer.

SATC action: Ondrej will distribute a short draft (~ 6 pp) imminently. He will reach out to specific reviewers; and anticipates completion of this 1st-level standard by the end of 2018.

2. Gateway Gravity Testbed, Gateway Utilization RFI Submittal

Earlier in 2018, NASA solicited ideas for utilizing Gateway. SATC collaborated with JPL to submit a response called Gateway Gravity Testbed, describing a range of ways the planned Gateway flight elements could be integrated into a first and only testbed for human-scale artificial gravity. Members Scott Howe, Brent Sherwood, and Ted Hall led this submittal. The purpose was to ensure that AG was present in the conversation about Gateway – no other developmental project proposes to demonstrate AG.

Matt reported that NASA received ~300 responses in this RFI cycle, and will publish a Gateway Utilization summary as a result. Barbara noted participation in European brainstorming sessions about Gateway habitat concepts (NASA Gateway cartoons now include discrete hab elements by NASA, ESA, and commercial providers). Brand reported that John Guidi provided a summary of the Colorado workshop (Gateway Science) results in a FISO telecon.

SATC action: Matt committed to learn what can be shared about any follow-on from the RFI, and communicate this to the TC.

3. Weightless Space Habitat Design, Webinar

Brand Griffin will conduct a 90-min online AIAA course on Nov 8, a step-by-step process for designing weightless habitats. He has prepared a dense compendium of facts and issues on all aspects of habitat design, and organized a 60-min presentation for an engineering audience. AIAA has announced the event, with special rates for member and especially for students (sign up at the link below). AIAA will pay SATC \$300 for Brand's effort. https://www.aiaa.org/Step-by-Step-Process-for-Designing-Weightless-Space-Habits/?utm_source=Informz&utm_medium=Email&utm_campaign=DirectTech

Open mike – whither SATC?

Ondrej: how does the dissolution of the Space Forum event affect the TCs? Ron: it doesn't.

Ron: AIAA's former PCs are now called ICs. A new Space Structures TC has formed, and held a first workshop in August. Ron committed to send the report for distribution to the SATC.

Brand: Citing Augustine's Laws, our TC remains outside the mainstream, e.g., not explicitly consulted by NASA as it architects the Gateway. We are paper producers, not a profession. Is there a way to insert ourselves instead of being on the sidelines? Infusion of standards may be one way.

Appendix: Notes from SMG meeting

Held: 17 Sep 2018, Orlando, 1600-1730, Bayhill 19 & 29. Mark Whorton (new SMG Chair), led the meeting.

Attending: Erica Rogers, Ron Kohl, Karen Berry, Karen Barker (Dep Dir. SMG), R. Sebeille (KSC Swampworks), Brian Pomeroy, Craig Day, 360 Live Media, Dan Dumbacher, Brent Sherwood (represented SATC).

TC health. Only half (seven of 14) of the SMG TCs were meeting at Space Forum this year; many meet elsewhere. SMG aims for more consolidation, giving the TCs a reason to meet at the successor event to Space Forum. While TCs engage in diverse activities, there are only three deliverables to SMG each year: the Year-in-Review article in Oct for publication in Dec; the Annual Report due in Jan; and the Roster due at the same time. TC enrollment occurs only once per year (deadline Nov 1). Brent requested more frequent openings; this “needs to be discussed at a higher level.” Brent noted that the TC slate arose organically based on members’ interests and self-organization. If SMG took a top-down, strategic view, what TCs would we need? What are we missing?

Event model. AIAA success hinges on healthy conferences and events. AIAA has retained 360 Live Media to develop a “reimagined space ecosystem experience”. Their business is helping non-profits succeed in a media-saturated world; their clients include the AGU and American Heart Association. All of them use events as a key element of their activity model, to create and then capture demand.

The space community is changing; AIAA aims to expand its core audience by 2x over the next 24 months. The renovated event, to be launched in 2020, will be a “broad ecosystem event to better feature the work of the technical community.” It will be the “strategic and structural keystone for AIAA, making AIAA the premier convener of the new space ecosystem.” Market research is targeting five (as yet not revealed) cohorts according to geographic, demographic, attitudinal, behavioral, and other attributes.

Dan Dumbacher reported that the Board meeting two weeks before Space Forum approved an organization scheme with three overarching themes: 1) transformative flight; 2) aerial mobility and autonomy; 3) building a space economy. “The playbook is now open for SMG and others to define what’s needed going forward.” AIAA promised to engage SMG and its TCs, leading to Jan 2019 Board vote.

SATC action: we will disseminate anything else we learn as it emerges.