

Proposal for an AIAA Space Architecture Technical Committee (SATC)

Prepared by

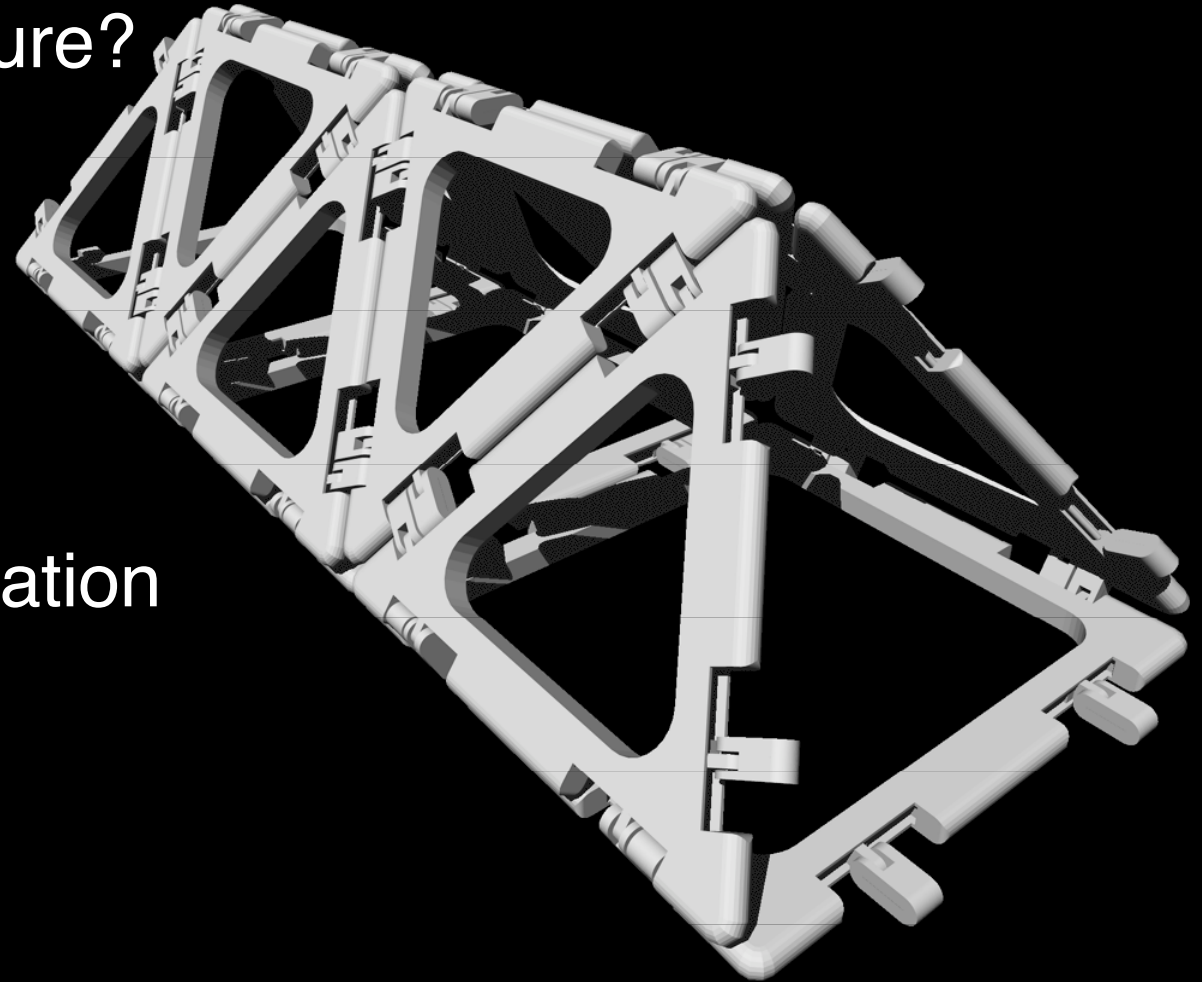
Dr. A. Scott Howe : Vice-chair for Space Architecture, Design Engineering Technical Committee

Dr. Theodore W. Hall : Chair, Aerospace Architecture Subcommittee, DETC

Brent Sherwood : Vice-chair, Aerospace Architecture Subcommittee, DETC

SATC Proposal Structure

- What is Space Architecture?
- Need for SATC
- AIAA SA background
- Proposed SATC charter
- Proposed SATC organization
- TC support / concerns
- Recommendation

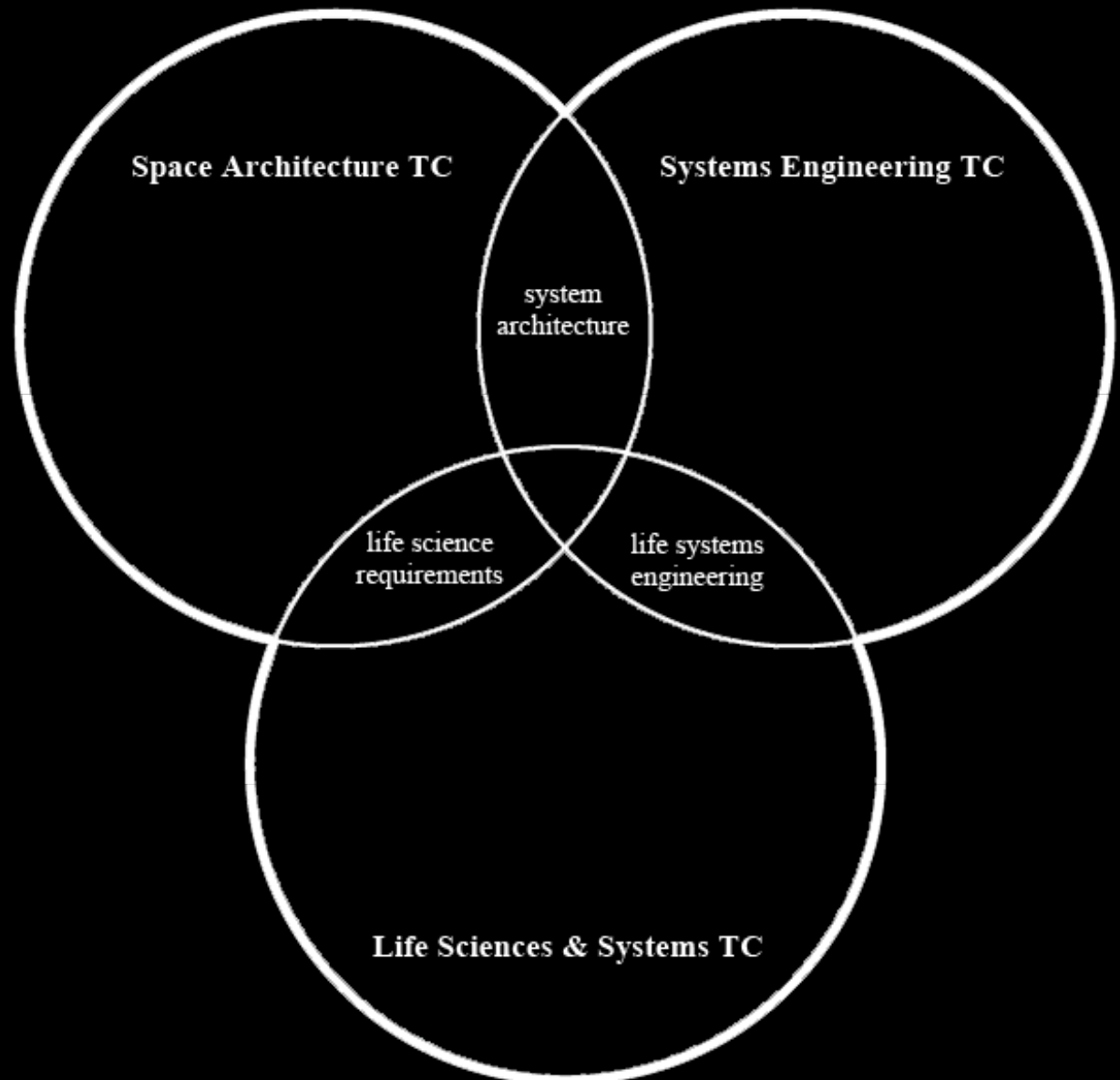


What is Space Architecture?

- Space Architecture is the architectural design of living and working environments in space-related facilities, habitats, and vehicles
- Space Architects hold professional degrees from accredited universities
- Space Architecture seeks to define the built culture and environment of space-faring civilization
- Space Architecture group is currently organized under Design Engineering TC
 - ◆ “Aerospace Architecture Subcommittee” (ASASC)

Need for Space Architecture

- Support safety, habitability, human reliability, and crew productivity in extreme and unforgiving environments
- Architects have the experience and training to offer unique approaches to system integration
- Architects are becoming valuable team members in the industry



Space Architecture History

- NASA Ames Research Center, Space Human Factors Office (1980s)
- NASA Ames Advanced Projects Group (1990s)
- Aerospace Architecture Sessions (ICES, etc)
- AIAA Space Architecture Working Group (1996)
- Aerospace Architecture Subcommittee (2000)
- Conferences and Symposia (2000s)
- Proposed Space Architecture TC (2008)



Space Architecture Conferences

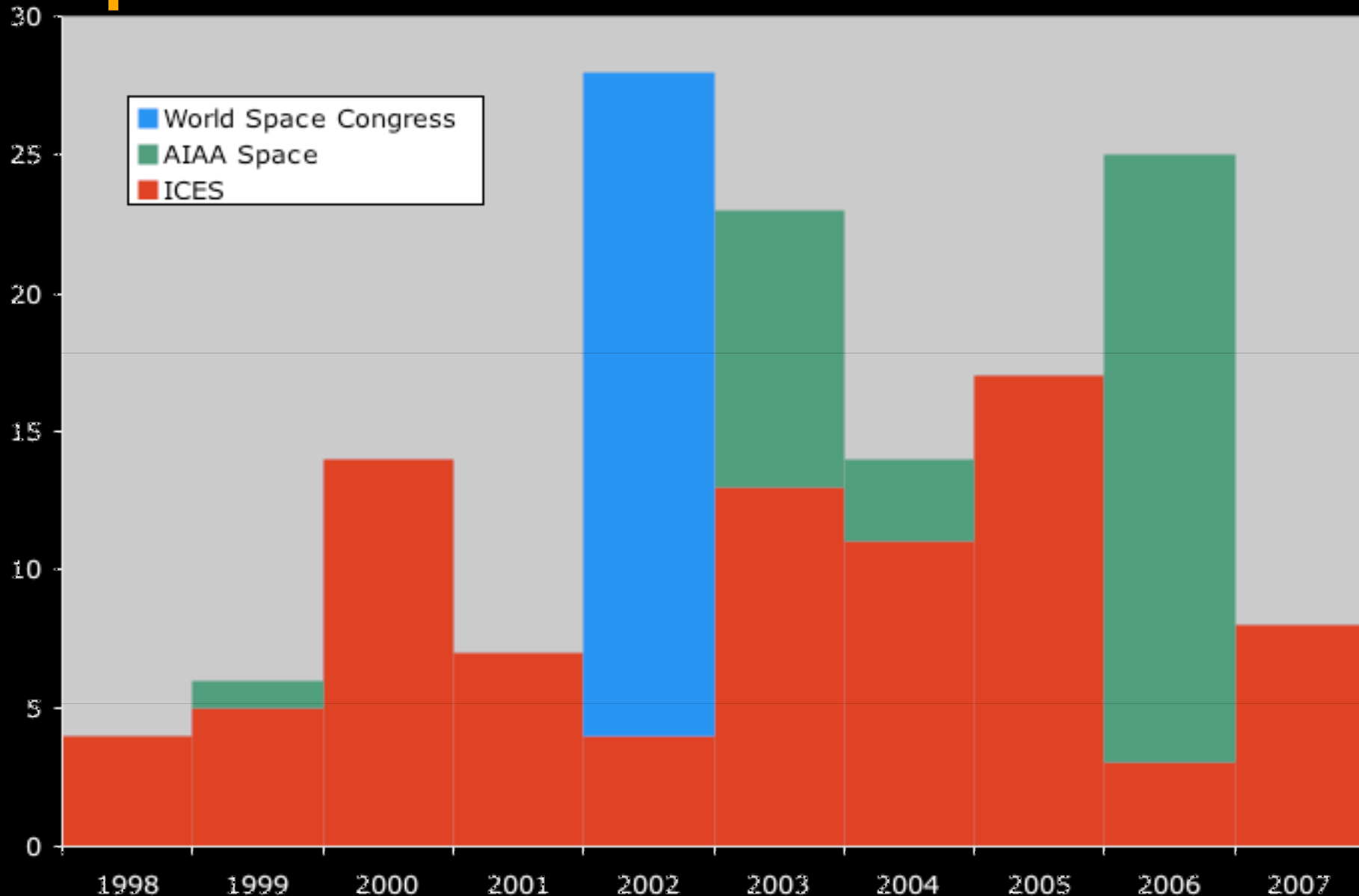
- SAE ICES: International Conference of Environmental Systems (space architecture)
- AIAA Space (human factors & aerospace architecture)
- AIAA Space Architecture Symposium
- IAF International Astronautical Congress
- Others under consideration:
 - ◆ Habitation Conference
 - ◆ ASCE Earth & Space
 - ◆ STAIF



Space Architecture Session Titles

- Paradigms for AeroSpace Architecture
- Human Dimension in AeroSpace Architecture
- AeroSpace Architecture Construction
- Innovative Design Concepts
- AeroSpace Architecture as a Discipline
- Space Architecture in the Constellation Systems
- Gravity Regime Architecture and Construction
- Living in Space -- Aesthetics and Habitability
- Ground Systems and Terrestrial Applications
- Infra-Free Architecture
- Lunar and Planetary Surface Systems and Construction
- Space Human Factors
- International Space Architecture
- Student Projects Panel

Papers in ASASC Sessions



Space Architecture Resource Webpage

- Provides forum for online interaction
- Comprehensive publication database
- Author and design resources and tools
- Activity schedule



spacearchitect.org

Proposed SATC Charter

- Architectural design in space
- Earth to space analogues
- Habitability and safety in extreme environments

“This charter defines Space Architecture broadly to encompass architectural design of living and working environments in space-related facilities, habitats, and vehicles. These environments include, but are not limited to: space vehicles, stations, habitats and lunar and planetary bases; and earth-based control, experiment, launch, logistics, payload, simulation and test facilities. Earth analogs to space applications may include Antarctic, airborne, desert, high altitude, underground, undersea environments and closed ecological systems. Designing these forms of architecture presents a particular challenge: to ensure and support safety, habitability, human reliability, and crew productivity in the context of extreme and unforgiving environments.”

Proposed SATC Goals

- Initiate Research
 - ◆ Collaboration
 - ◆ Technology development
- Design Projects
 - ◆ System integration
 - ◆ Technology transfer
- Establish Standards
- Organize Symposia
 - ◆ Technical papers
 - ◆ Peer review
- Increase Resources
 - ◆ Webpage
 - ◆ Lectures & publications
- Improve Education
 - ◆ Curriculum & training
 - ◆ Qualification
- Inform Public
 - ◆ Generate interest
- Bridge Professional Societies
 - ◆ AIA, SAE, AIJ, etc

Proposed SATC Organization

- TC Leadership
- Oeuvre Subcommittee
 - ◆ collect, organize, maintain an online library of our members' output, including papers, designs, executed projects, and press coverage
- Professional Practice Subcommittee
 - ◆ lead the discussion, benchmarking, and documentation of definitions, scope, standards, expectations for space architecture
- Affiliations Subcommittee
 - ◆ coordinate development of professional interfaces with AIA, RIBA, AIAA, ASCE, IAA, SICSA, et al.
- Outreach Subcommittee
 - ◆ organize jury reviews for schools, awards and recognition, press releases, responses to incoming requests for information, etc.
- Symposium Chairs
 - ◆ case-by-case leadership of session organization, including abstract approval, paper peer review, chairship / rapporteurship

Proposed SATC Leadership

- Current ASASC officers:
 - ◆ Dr. Theodore W. Hall, chair
 - ◆ Brent Sherwood, vice-chair
- Temporary SATC officers:
 - ◆ Dr. A. Scott Howe, chair (current DETC vice-chair)
 - ◆ Vice-chair TBD (will focus on International member needs)
 - Elected before Space 2007
 - ◆ Secretary / Treasurer TBD
 - Elected before Space 2007
- Subcommittee chairs
 - ◆ Elected on approval of TC



Proposed SATC Participation

- Space architecture AIAA members are the most widespread internationally and maintaining high attendance at ASASC meetings is a challenge.
- SATC is considering a menu of options to maintain member interest and ease the travel burden, including local TC meetings (quorum-based) and teleconferences.
- SATC is also considering adding a continuing education initiative to its membership, based on now-mandatory requirements for the architectural profession.
- A Green Paper on a framework for maintaining SATC membership is circulating to all ASASC members for review and comment.

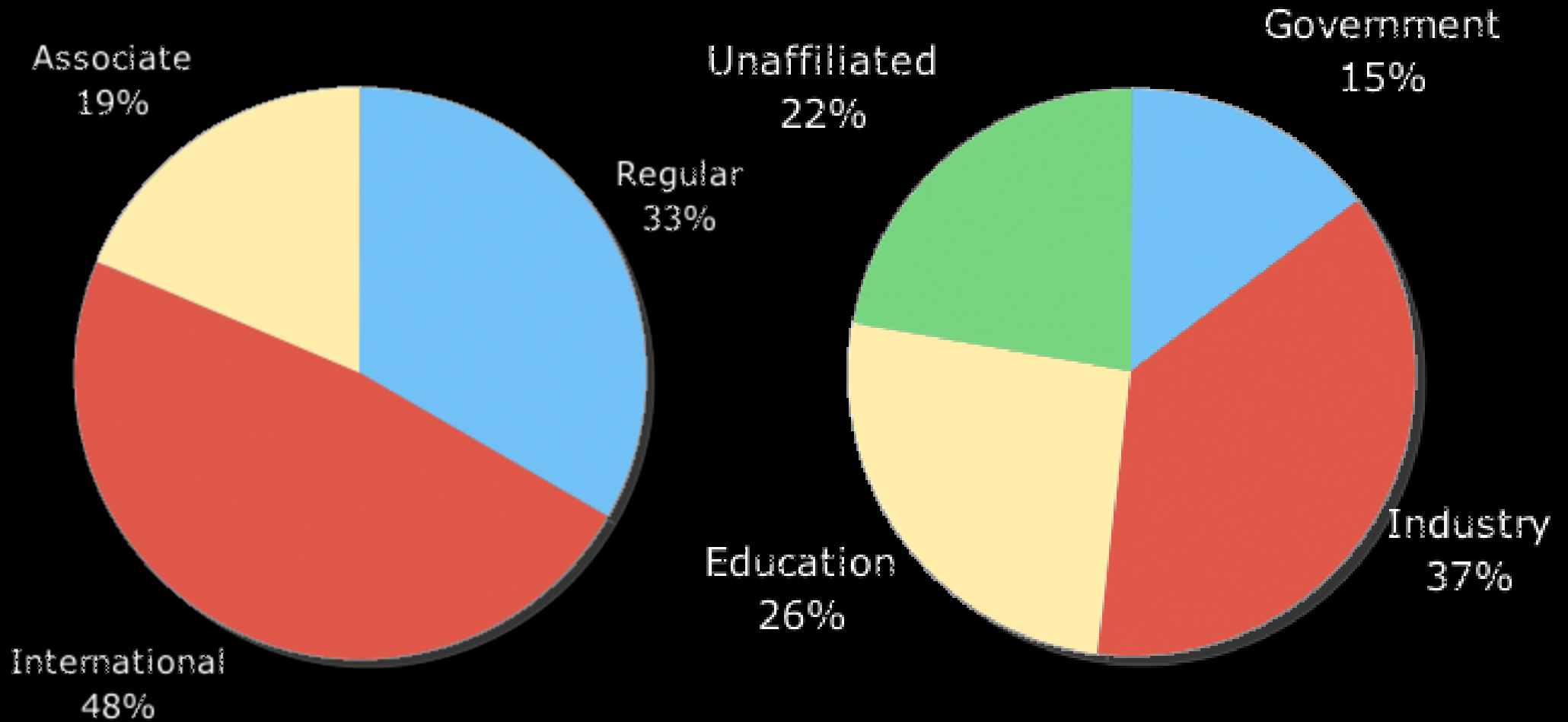
Proposed SATC Liaisons

- AIA (American Institute of Architects)
- AIAA (American Institute of Aeronautics and Astronautics)
 - ◆ Life Sciences & Systems Technical Committee
 - ◆ Space Automation & Robotics Technical Committee
 - ◆ Space Colonization Technical Committee
 - ◆ Systems Engineering Technical Committee
- ASCE (American Society of Civil Engineers)
 - ◆ Committee for Space Architecture
- Habitation Conference
- IAA (International Academy of Astronautics) /
- IAF (International Astronautical Federation) /
- IAC (International Astronautical Congress)
 - ◆ Space Architecture Study Group
- ICES (International Conference on Environmental Systems)
- RIBA (Royal Institute of British Architects)
- UIA (Union Internationale des Architectes)

Current ASASC Roster

- Constance Adams
- Serkan Anilir
- Olga Bannova
- Annette Barnes
- Maijinn Chen
- Marc Cohen
- Silvano Colombano
- Donna Duerk
- Maria João Durão
- Theodore Hall
- A. Scott Howe
- Barbara Imhof
- Jesper Jørgensen
- Päivi Jukola
- Mark Kerr
- Shahzad Khaligh
- Kurt Micheels
- Susmita Mohanty
- David Nixon
- Kenji Nozaki
- Georgi Petrov
- Martina Pinni
- Brent Sherwood
- Claudio Veliz
- Arturo Vittori
- Andreas Vogler
- Kristian von Bengtson
- David Wong

ASASC Makeup



TC Support

- “The Digital Avionics TC does not have an objection to this TC. The responses that I received were very positive towards the formation of a Space Architecture TC” -- Digital Avionics TC
- “I think it’s a nice idea in general and something which may have an impact for people interested in space. May be some interest for us in the long term for delivery of these systems to orbit” -- Aircraft Design TC
- “I see a weak spot in the AIAA TC structure. Very often the LSSTC is concentrating on the nuts and bolts of keeping things alive, but the function of "keeping things alive with quality of life" is missing. I see the proposed Space Architecture TC being able to fill this void by bringing under it's umbrella the crew human factors in the broadest sense of the word” -- Life Sciences & Systems TC

TC Concerns

- "One concern reaching me has been in regard to the proposed name. 'Space Architecture' may be too broad, as the word 'architecture' is used in many contexts outside your own...Suggest you consider an additional adjective in front of 'architecture' to better distinguish your scope" -- Technical Director, AIAA Space and Missile Group
- "I've visited spacearchitect.org, and have been following the discussion threads. I'm going to soften my vote from 'No' to 'Maybe'. Your subcommittee looks bigger and more active than our entire TC, and there IS some value just in having a large and enthusiastic membership." -- Space Logistics TC
- "We are very sensitive to the word of 'Architecture' since it is one of our main business...Can this new TC be called 'Space Habitation' or 'Human Space Utilization', etc." -- Systems Engineering TC

Conflict Resolution

■ Possible TC overlaps

- ◆ Life Sciences & Systems TC: currently have working relationship, collaborate with paper sessions, liaison work
- ◆ Space Colonization TC: no objection or response received -- we plan to pursue liaison and collaboration
- ◆ Systems Engineering TC: both sides agree to begin liaison and collaboration. SETC takes systems approach, SATC takes quality of living environment approach to design -- should be complementary

■ Possible SATC name change

- ◆ “Space Architecture” term should remain intact, with possible modifier(s)
- ◆ In the US, licensed architects are legally entitled to use the terms “architect”, “architecture”, and “architectural”
- ◆ No other TC has the name “architecture” in their title
- ◆ Only Space Logistics TC and Computer Aided Enterprise Solutions TC include any variation of the word “architecture” in their scopes

Recommendation

- Approve of formation of new Space Architecture Technical Committee (SATC) beginning Jan 2008

