THEORBIT
2014 / 1st
the Space Architecture community newsletter

- SA Poll of the Orbit: answer the question here -

News and Announcement

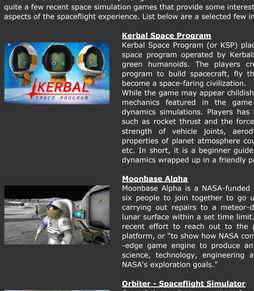
[SATC]: SATC Annual Report 2013 is now available.
[SATC]: Result of the SATC Election.
[SATC]: Changes to SATC subcommittees
[AIAA SPACE]: 14 Jul: Deadline for SPACE 2014 manuscript submission.
[AIAA SPACE]: 4-7 Aug: SPACE 2014 at Manchester Grand Hyatt, San Diego, California, USA.
[IAC]: 2 Mar: Deadline extended for the 65th IAC abstract submission.
[IAC]: 10 Sep: Deadline for the 65th IAC manuscript submission.
[IAC]: 29 Sep -3 Oct: the 65th IAC at Metro Toronto Convention Centre, Toronto, Ontario, Canada.

Mailing list Highlights:
International SunSat Design Competition.
Thoughts on human being not made for space.

Events of Interest:
Latest MDRS "Crew 135" carried out research on reliability & redundancy of space analog habitat systems.

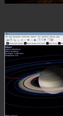
Event Summary : Thresholds of Space

An exhibition called "Thresholds of Space" (Na Hranici Vesmiru in Czech) was held at the Gallery of the National Library of Technology, Prague, Czech Republic, from 7th November to 20th December 2013. It was the first retrospective exhibition of projects by SATC member David Nixon, with 42 projects from the beginning of the 1980s up to the present. The exhibition also included space architecture projects David did with the late Jan Kaplicky, with whom David established the influential architectural practice Future Systems.
The exhibition, along with its associated lectures, radio interviews and a 55-minute question-and-answer TV show were all very well received. There are also ongoing discussions trying to bring the exhibition to London in the foreseeable future.

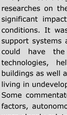

Exhibition design: Benedikt Markel architects. Photo credits: Benedikt Markel architects, Milan Mikulášek.

The Orbit's Pick of Space Sims For Space Architects

While there are no current computer games that are fit to be called a "space architecture sims", there are quite a few recent space simulation games that provide some interesting and fairly realistic perspectives on aspects of the spaceflight experience. List below are a selected few in no particular order:



Kerbal Space Program
Kerbal Space Program (or KSP) places the player in control of a nascent space program operated by Kerbals, a cute-looking alien race of small green humanoids. The players create and manage their own space program to build spacecraft, fly them, and try to help the Kerbals to become a space-faring civilization.
While the game may appear childish on the surface, the physics of orbital mechanics featured in the game are based on realistic Newtonian dynamics simulations. Players has to take into account realistic factors such as rocket thrust and the force-generating locations on the vehicle, strength of vehicle joints, aerodynamic forces and even how the properties of planet atmosphere could affect the aerobraking behaviours etc. In short, it is a beginner guide to orbital mechanics and spaceflight dynamics wrapped up in a friendly package of a computer game.



Moonbase Alpha
Moonbase Alpha is a NASA-funded multiplayer game which allows up to six people to join together to go up against a hypothetical scenario of carrying out repairs to a meteor-damaged international station on the lunar surface within a set time limit. The game represents part of NASA's recent effort to reach out to the public through non-traditional media platform, or "to show how NASA content could be combined with a cutting -edge game engine to produce an experience that inspires interest in science, technology, engineering and math—skills critical to achieving NASA's exploration goals."

Orbiter – Spaceflight Simulator
One of the earlier generation of space flight simulator that has been in development and continually upgraded since its origins in the early noughties. Orbiter is a real-time 3D space flight simulator that allows you to experience manned and unmanned space flight missions from the pilot's perspective. Take control from launch to orbital insertion, rendezvous with space stations, deploy and recapture satellites, and re-enter and land on a planetary surface. You can even execute missions to the moon or other planets. Orbiter accurately models the physics of spaceflight, which makes it possible to either recreate historic missions, or use it as a sandbox for futuristic spacecraft concepts.

Take on Mars
Take On Mars allows you to control various simulated robotic rovers and landers, with the ultimate goal of working through numerous science missions in various locations on Mars. While there is a sizable gap in terms of fidelity and reality between the real life Mars rovers and those fictional ones depicted in this simulation, the game does include some fairly interesting scenarios and features that make it worthy for a try to those who are keen to take up a seat as a Mars rover operator.

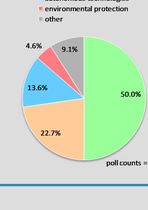
Celestia
Not exactly a space simulation game per se, Celestia is a 3D astronomy program that features real star datasets and realistic modelling of the motions and interactions of celestial bodies and spacecraft etc. It is the modern day equivalence of an armillary sphere (albeit colossally more powerful and user-friendly). The program is capable of making advanced astronomical calculations and orbital modelling, generating some spectacular displays of planets and other celestial bodies, including those that are not possible to attain through planetarium or ground based observations.

If you would like to discuss or comment on any of the news items You can start a discussion thread here.

Poll of the Orbit

2013/4th Poll Results
The poll result suggested that many believed Space Architecture researches on the topics of sustainability could have the most significant impact or benefits by its applications to terrestrial conditions. It was suggested that researches on advanced life support systems as well as energy capture & recycling systems could have the most far reaching impact of all space technologies, help boosting the ecological performance of buildings as well as improving the health and general standard of living in undeveloped or post-disaster regions.
Some commentators also noted of how researches on human-factors, autonomous technologies and environmental protection were closely related to the general idea of sustainability, with the former being focused on specific aspects of how to achieve the latter.
Other mentions include applications of material and structural science, as well as design for extreme environment and compact volumes.
If you would like to discuss or comment on this topic, you can start an email discussion thread here.

Poll: Which research topics on Space Architecture do you think would have the most significant impacts or benefits by its applications to terrestrial conditions?



2014/1st Question:

At present SATC is going through many transitions in terms of structure, leadership and its focus. It also gives a good opportunity to review the direction or emphasis of which the SATC (and subsequently, SpaceArchitect.org) is heading towards in the near future.

What general emphasis would you like to see in the next two-years term of SATC?

- Maintain Status Quo: the current level of supports to the major space conferences and organised events represents the interests of SATC members.

- Do More, Try More: more interdisciplinary outreach and communications with other technical committees, space disciplines as well as conventional architecture communities (e.g. AIA, RIBA, and architecture schools).

- **More Focused:** e.g. focus on near term missions and technologies developed by national space agencies and private industries, or on specific, bold and ambitious projects (such as a new space architecture book or to organise a space architecture design expo) which would help define and promote the space architecture community.

- Other:

Image: Matt McIrvin

Please answer the poll question here.

You can also start a discussion thread on this topic here.

Theme of the Orbit: *Sustain*


NASA "Astrosulture" plant growth unit, during Space Shuttle mission STS-73. Picture: NASA/Marshall Space flight Center

4 articles can be found within the spacearchitect.org publication archive by searching under the keyword: **"sustain*"**.

Bannova, Olga (2012 October). Designing a Sustainable Moon Base: 3D Environment as an Interactive Learning Tool (IAC-12-E1.6.2).

Colombano, Silvano (2003 September). Robosphere: Self-Sustaining Robotic Ecologies as Precursors to Human Planetary Exploration (AIAA 2003-6278).

Kriegh, Michael; Kriegh, Julie (2003 July). Growth, Form and Proportion in Nature: Lessons for Human Habitation in off Planet Environments (SAE 2003-01-2653).

Gormly, Sherwin; Flynn, Michael; Howe, A. Scott (2012). Space Cargo Transport Bags through Membrane Water Treatment Elements to Space Architecture Building Elements: A Total Product Sustainability and Life Cycle Design Optimization Experiment. In, Journal of Green Building (vol. 7, no. 1, p. 71-84).

Schlesinger, Thilini P.; Rodriguez, Branelle R.; Borrego, Melissa A. (2013 July). International Space Station Crew Quarters On-Orbit Performance and Sustaining Activities (AIAA 2013-3515).