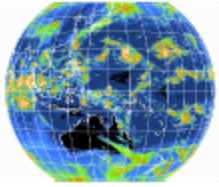


Space Education in Australia – The Secondary and Tertiary Experience

Dr. Salah Sukkarieh
University of Sydney, Australia





Focus of this presentation

Space Education in Australia – The Secondary and Tertiary Experience

- **Secondary Schools**
 - An outline of the structure of our secondary schooling system,
 - Examples of some of the activities happening to encourage space science.
- **Tertiary Institutes**
 - The transition to tertiary institutes,
 - An example course structure in space systems design,
 - Examples of space science activities including research.
- **Summary**



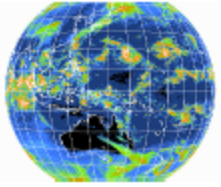
Schooling across the country

Space Education in Australia – The Secondary and Tertiary Experience



	VIC	NSW	ACT	TAS	NT	SA	WA	QLD
Year 12	Year 12	Year 12	Year 12	Year 12	Year 12	Year 12	Year 12	Year 12
Year 11	Year 11	Year 11	Year 11	Year 11	Year 11	Year 11	Year 11	Year 11
Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10	Year 10
Year 9	Year 9	Year 9	Year 9	Year 9	Year 9	Year 9	Year 9	Year 9
Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8	Year 8
Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7	Year 7
Year 6	Year 6	Year 6	Year 6	Year 6	Year 6	Year 6	Year 6	Year 6
Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5	Year 5
Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4	Year 4
Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3	Year 3
Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2	Year 2
Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1	Year 1
Prep	Prep	Prep	Prep	Prep	Prep	Prep	Prep	Prep
Prep	Prep	Prep	Prep	Prep	Prep	Prep	Prep	Prep

Higher School Years
 Secondary
 Primary
 Preparatory



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AISS

Space Education in Australia – The Secondary and Tertiary Experience



Australian International Space School

A five-day residential program for high school students in Year 11.
Woomera, South Australia



South Australian Space School

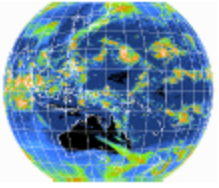
A three-day residential program for high school students in Year 10.



Interested in a career in
space science and
technology?

www.spaceschool.com



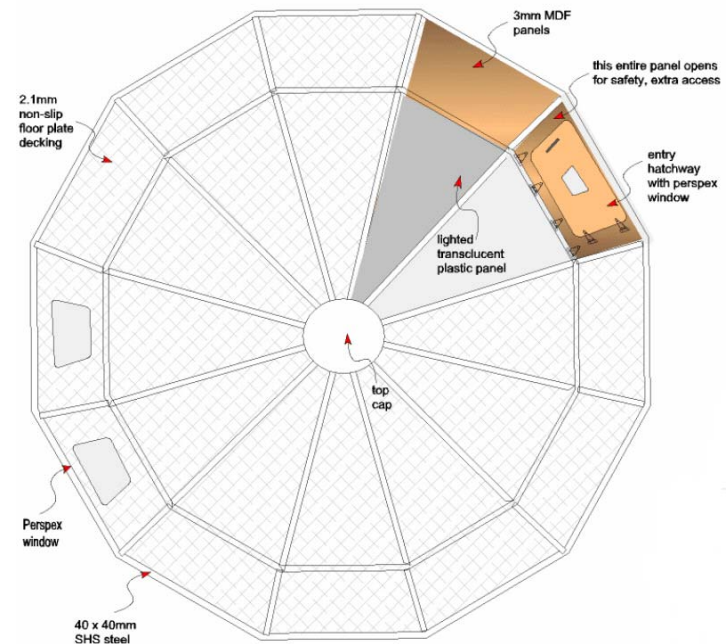


Robotic Telescope

Space Education in Australia – The Secondary and Tertiary Experience



- Collaboration between Trinity College, Murdoch University & the Mars Society
- Linking astronomy and space science in the school curriculum to practical implementation.





Water Rocket Competition

Space Education in Australia – The Secondary and Tertiary Experience





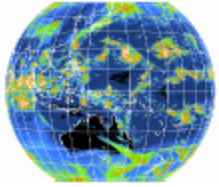
Victorian Space Science Education Centre (VSSEC)

Space Education in Australia – The Secondary and Tertiary Experience



- AU\$6.4 million dedicated Space Science Education Center
- Scenario programs
 - Mission to Mars
 - Mission to the ISS
- Full day programs
 - Robotics
 - Space Science
 - Geology and astrobiology

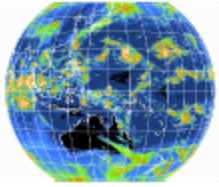




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Universities which teach Space Degrees

Space Education in Australia – The Secondary and Tertiary Experience

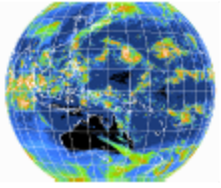
- 41 universities
- No university teaches a straight Space degree.
- NSW
 - UNSW (B. of Aerospace Engineering), USyD (Adjunct degrees with B. of Aero, Mechanical and Mechatronics).
- Vic
 - LaTrobe (B. of Space Science), Monash (B. of Aerospace), RMIT (B. of Aerospace).
- Queensland
 - Queensland (B. of Engineering (Space))
- South Australia
 - Adelaide (B. of Science (Space Science), B. of Engineering (Aerospace))
- Western Australia
 - None
- Northern Territory and Australian Capital Territory
 - None
- Approximately 20-30 students graduate each year in Australia with some level of Space qualification.
- This is despite the fact that Australia has no space program, no dedicated space government group, and a very small space industry.



Focus of this presentation

Space Education in Australia – The Secondary and Tertiary Experience

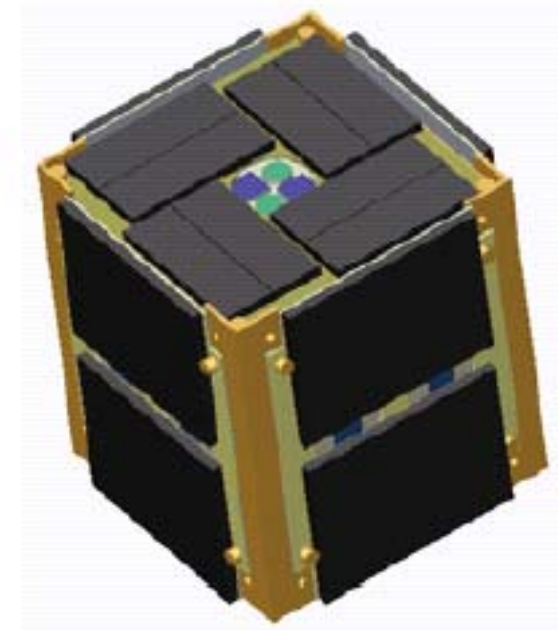
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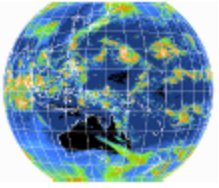


University of Sydney – Space System Design

Space Education in Australia – The Secondary and Tertiary Experience

- Objective is to:
 - Develop technical and practical skills in space systems design and systems engineering.
 - Developing a value system which encourages the ethical and social responsibilities of space.
- Students build and test a complete prototype space system comprising of ground station, communication and pico-satellite system.





University of Sydney – Space System Design

Space Education in Australia – The Secondary and Tertiary Experience

- The pico-satellite design follows that of the CubeSat standards (Calpoly, Stanford). This provides a cost effective means of developing local knowledge of space systems.

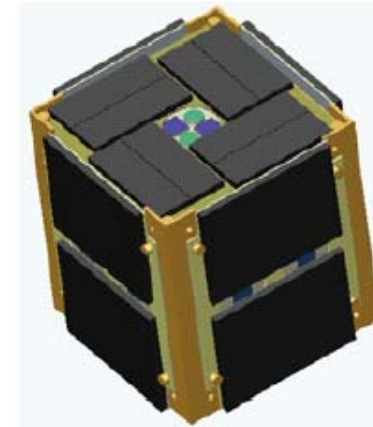


Figure 6.14: Prototype of entire satellite

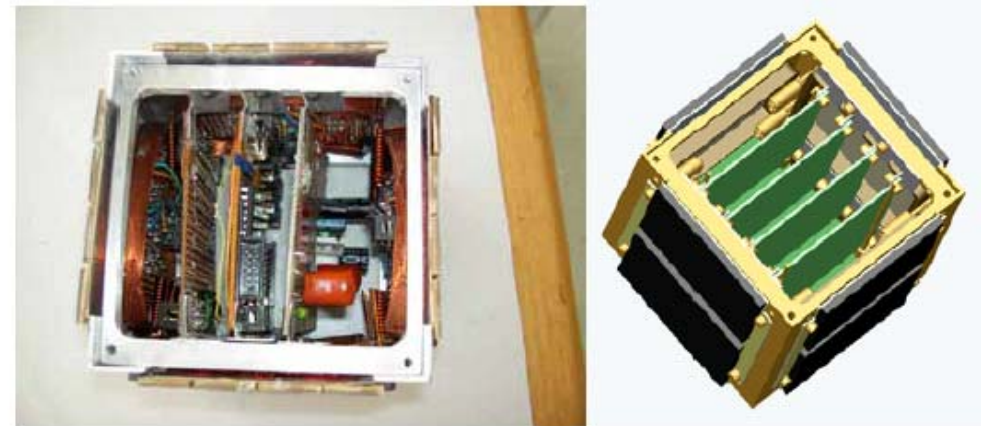
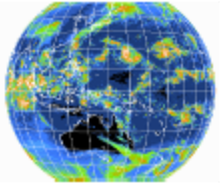


Figure 6.15: Comparison of actual satellite configuration and Solidworks prototype.



University of Sydney – Space System Design

Space Education in Australia – The Secondary and Tertiary Experience

- There are no formal lectures on any satellite subsystem: students choose what they would like to work on and conduct their own learning of that area – PBL.

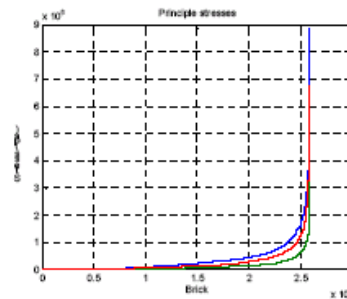
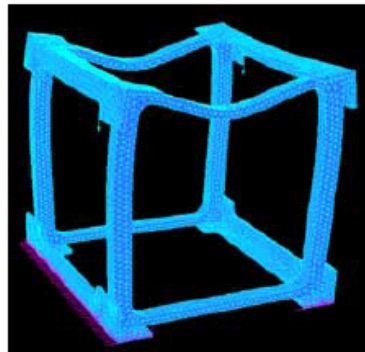
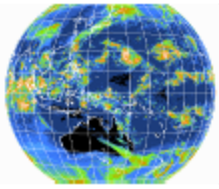


Figure 6.7: Deformed finite-element model showing mesh and principle stress components for 14g loading along the y-axis.



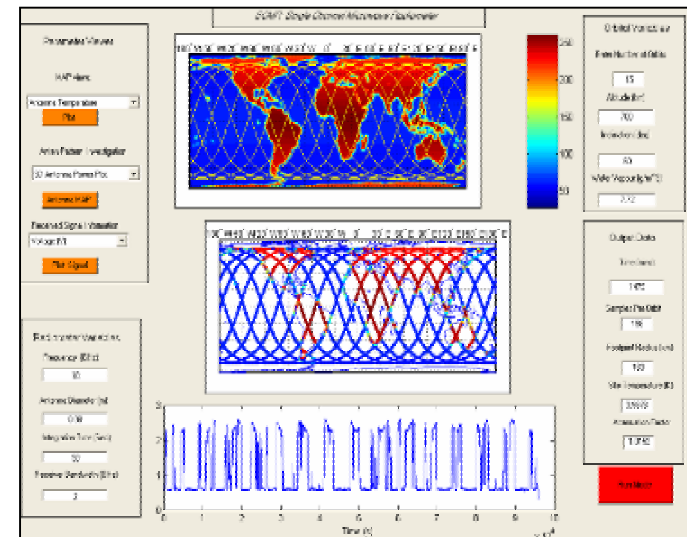
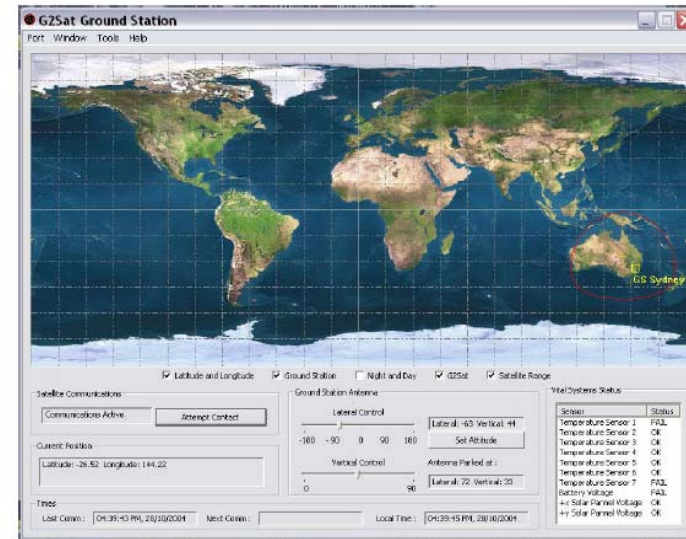
Figure 3.2.3: Testing gamma radiation filtering circuit



University of Sydney – Space System Design

Space Education in Australia – The Secondary and Tertiary Experience

- Students also interact with other students via e-learning in a teaching/learning exercise. WebCT
- Delivers a learning environment which interacts both the technical nature of satellite system design, and the ethical and social role of space systems (generic graduate attributes).
- Currently interaction occurs across the country with industry. Has the potential to be international and to assist developing countries curricula.

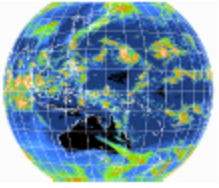




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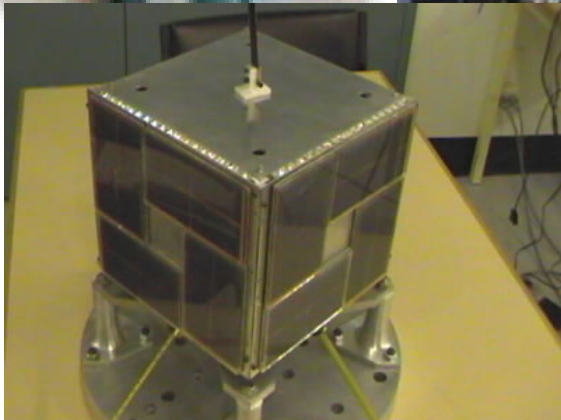


Australian Space Research Institute

Space Education in Australia – The Secondary and Tertiary Experience



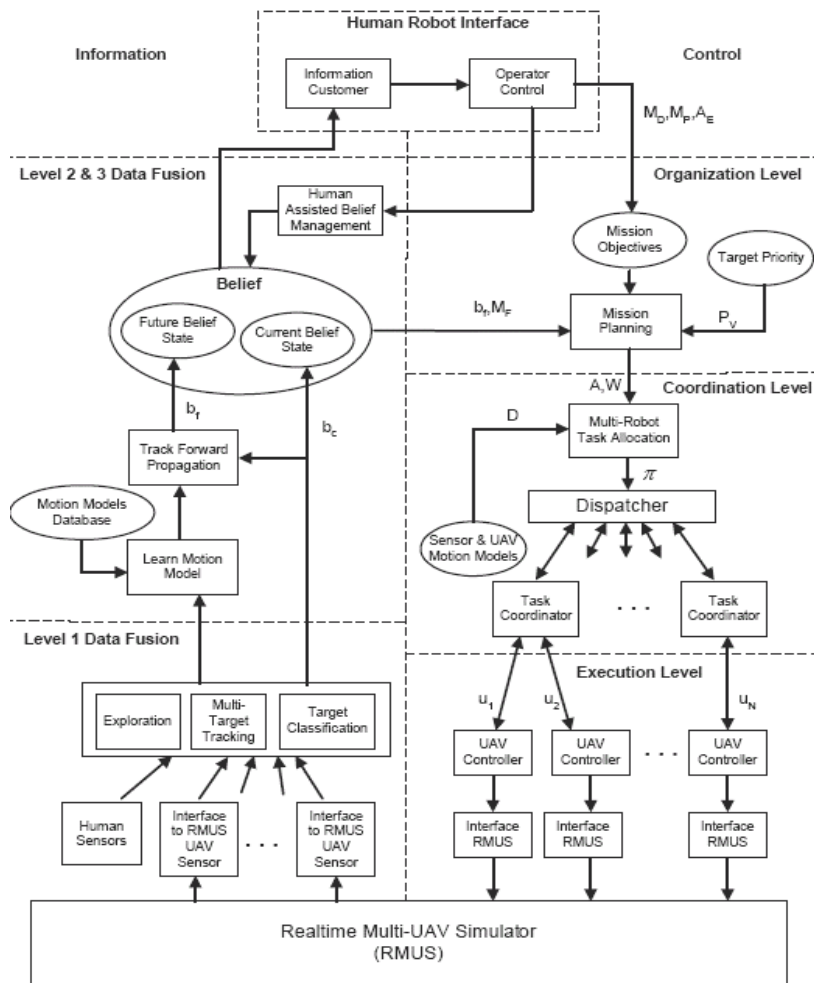
Full scale AUKROC III Mockup at ASRI's Adelaide Facility

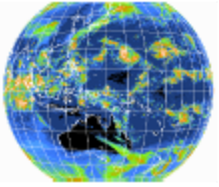




University of Sydney - Postgraduate Research

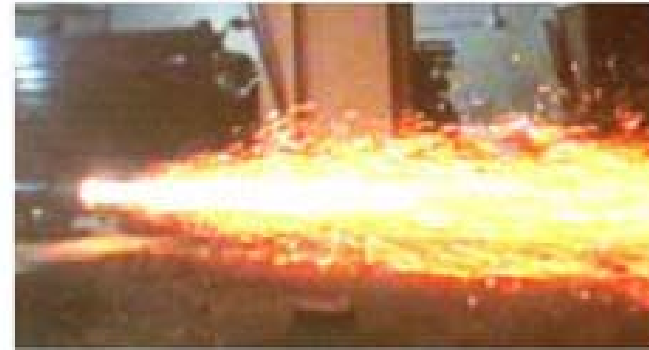
Space Education in Australia – The Secondary and Tertiary Experience





Hybrid Rocket Project – UQ (HyShot)

Space Education in Australia – The Secondary and Tertiary Experience

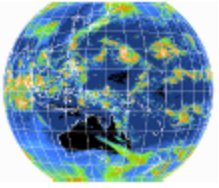




Australian Centre for Astrobiology

Space Education in Australia – The Secondary and Tertiary Experience

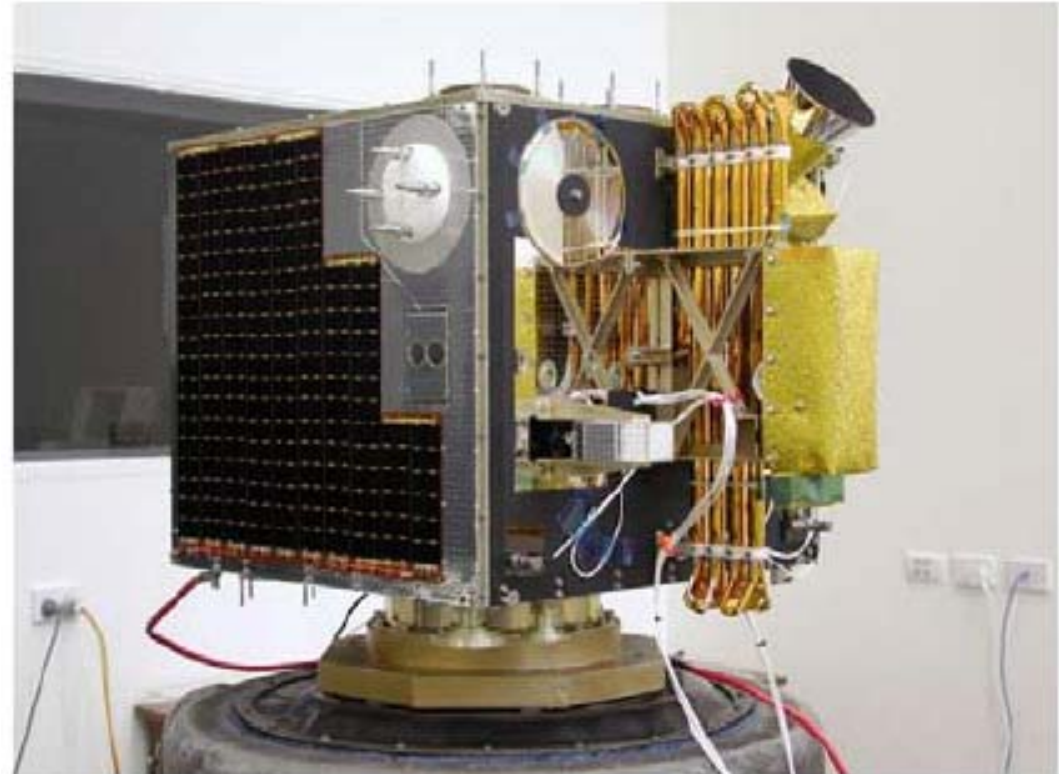
The Australian Centre for Astrobiology is Australia's only concentration of astrobiology research and one of two international Associate Members of the NASA Astrobiology Institute. Its focus is the search for the earliest life on Earth and for possible life, past or present, on Mars. To accomplish this it has six key research areas: ancient hydrothermal systems, modern hydrothermal systems, biomarkers, astronomy, the origin of life and science communication. The latter is also combined with a strong education, media and outreach program intimately entwined with the research of the ACA.



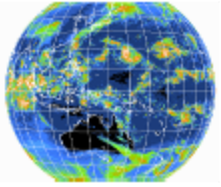
Cooperative Research Centre for Satellite Systems

Space Education in Australia – The Secondary and Tertiary Experience

FedSat (Australia's Federation Satellite)



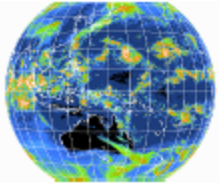
- Approx 60 graduates in space and satellite science and technology



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Summary

- Despite its decentralised nature some of the Australian primary/secondary school curricula have aerospace components within them. In fact the decentralised approach has benefited in this involvement.
- There are extensive space tertiary curricula and research activities in Australia.
 - There are possibilities for educator collaboration and even training within Australia, both in the secondary and tertiary levels.
 - Some have online capabilities for tele-education.
- Two possible areas exist for collaboration with other countries
 - VSSEC
 - Space Systems Design
 - We are committed to help so please let us know.
- Thank you

