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The Southern Hemisphere Space Studies Program: The next 5 years

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**Abstract**

Since 2011, the Southern Hemisphere Space Studies Program (SHSSP) has been held seven times in Adelaide, Australia. The last program, which ran from January 15 to February 16, 2018, reached a new attendance high, enrolling 50 participants from over 15 countries around the world. Attendees were engaged by over 45 international experts, whose backgrounds encompassed the entire spectrum of disciplines relevant to space exploration, industry and technology. The participants had a broad range of experiences, being represented by undergraduate students all the way to professionals employed in national space agencies, and entrepreneurs. This provided an exciting mix of motivations and abilities, which clearly epitomised the purpose of the program: to expose highly achieving students in training as well as accomplished professionals to a proxy of the multidisciplinary and multifaceted environment typical of space enterprises. The international, intercultural, and interdisciplinary philosophy of the program was reflected in a diversity of lectures, hands-on workshops, public events and team exercises and, for the first time, the construction and launch of 12 model rockets. Two capstone projects, involving participants, faculty and consulting experts, were synthesised in papers entitled ‘Disaster Management, Space-based Solutions for Developing Nations’ and ‘Space Ready, The Launchpad for Emerging Agencies’. The 2018 program was highly successful, and the five week live-in program, complemented by one optional week of intensive English as second language program carried out before the commencement of the SHSSP, is now an established educational offering of the International Space University - University of South Australia (UniSA) consortium. With the stability of a new agreement securing the program for the next 5 years, we are looking at more strategic improvements to the program structure and embedding it further within the Australian Space and academic communities.

**Keywords:** (ISU, UniSA, Education, Space Program, Adelaide)

**1. Introduction**

In 2010 the International Space University (ISU) and the University of South Australia (UniSA) formed a consortium to launch a new space education program in the Southern Hemisphere. Designed as an intensive, five week, live-in experience, the program is held in January and February each year. The program is open to participants from all disciplines, ages and nations, incorporating the international, intercultural, and interdisciplinary educational philosophy for which ISU is renowned.

As in other ISU programs, participants benefit from the shared experience of an international, interactive working environment shared with other professionals, graduate researchers and an international faculty. The SH-SSP is open to university students who have completed 2 years of an accredited university degree (full time), to graduates as well as professionals. Program graduates become part of the international network of

ISU alumni, faculty members and visiting lecturers, now numbering more than 4,000.

In 2017, at the 68<sup>th</sup> IAC in Adelaide, the original agreement to the partnership was extended for a further 5 years and providing some medium term stability. In this paper we look at the strategic planned evolution of the program over that time frame.

**2. Program history**

ISU has been conducting international space education since 1988, with an expanding set of program offerings. It started with a two months Space Studies Program (SSP), which is held in different locations around the world in the northern hemisphere summer months of July and August. In 1995 a one year Master of Space Studies program was launched at the new ISU central campus in Strasbourg, France. Today the ISU program offerings include the annual Space Studies Program, the one year Master of Space Studies, a two year MSc in Space Studies and Thesis, and an annual

Executive Space Course in Strasbourg. To date the ISU network comprises more than 4,000 alumni, and demand for its programs continues to grow.

The University of South Australia is one of Australia's largest universities with over 30,000 students and campuses in Adelaide, regional South Australia, and a number of locations in Asia. It has a long standing collaborative relationship with ISU dating back to the early 1990s. Its flagship Institute of Telecommunications Research (ITR) is internationally renowned as a leader in satellite telecommunications research. The ITR was a leading member of the consortium that designed, built and operated the Australian experimental satellite, Fedsat1, launched in 2002. In addition, members of the ITR have been directly involved in the QB50 program. UniSA also has research and teaching expertise in remote sensing, geomatics, space and planetary science, including collaborations with NASA and ESA mission science teams.

The SSP has been offered 30 times around the world (the last time in Delft, Netherlands), including twice in the southern hemisphere (in Valparaiso, Chile in 2000 and Adelaide, Australia in 2004). It is the goal of ISU to meet the space education needs of the entire world, and therefore a means to address this imbalance was sought by establishing the SH-SSP, specifically aimed at encouraging participation during the southern hemisphere summer months.

The space industry has changed significantly since the founding of ISU in 1988. New applications and technologies have developed, and the costs and benefits of space access have changed markedly. Many southern and developing nations are now placing increasing emphasis on the practical benefits of space, and are creating new space programs, cooperative initiatives, and agencies. These include not only the major players such as China, India and Brazil, but also Australia, Chile, Malaysia, Nigeria, Mexico, South Africa and others. These nations are looking for space education opportunities that match their level of development and capability, are cost effective, and compatible with their academic schedules. The SH-SSP aims to address these needs.

Given the collaboration between ISU and UniSA that resulted in the very successful 9 week ISU Space Studies Program held in Adelaide in 2004 and the close working relationship that was established, the two universities joined forces to submit a competitive bid for grant funding from the Australian Space Research Program in 2010 to develop a 5-week, intensive, live-in space educational program focused on the needs of the southern hemisphere nations, to be initially held in Australia. This

proposal received an award of A\$475,658 for the period 2011 to 2013, and the first session of the program was offered in January-February, 2011 at UniSA's Mawson Lakes Campus, Adelaide, Australia.

The reputation of the program is such that it is now possible to hold the program annually without government financial support. Furthermore, its continued relevance is such that over the years the program has attracted sponsorship from national and international bodies. Demand has increased steadily and in 2018 saw a record 50 international participants take the program.

### **3. The Campus**

The SH-SSP has been held each year at the Mawson Lakes campus of the University of South Australia in Adelaide. In addition to UniSA's contribution to the planning and the curriculum, on-site logistical, organizational and IT support is provided by UniSA staff. Program participants are registered as UniSA students, and have full access to campus library, athletic and computing resources. Accommodation is provided for faculty, staff and participants in modern, well-equipped air-conditioned apartments located in Mawson Lakes. Dedicated catering of all meals at facilities on campus and immediately adjacent, social events and public engagements are also provided.

### **4. The Program**

The 5-week program is structured around four components, delivered over 200 hours of activities:

- 40-45 core lectures of one hour each in weeks 1, 2 and 3. These cover all areas of space activities.
- 60 contact hours of workshops, public events, professional visits and field exercises. Together with the core lectures, these constitute the principal educational component of the program.
- 45 contact hours for a group research project.
- 55 hours of independent work for the written exam and the preparation of the group project.

In 2018 the field exercise consisted in 2 stratospheric balloon launches and the launching of 12 model rockets designed and manufactured by the participants (<https://youtu.be/Nw0bkijHr9Q>) [1]

This year, due to the larger group, 2 team projects were produced: 'Disaster Management: Space Based Solutions for Developing Nations' which set out to identify and enhance the use of current and emerging space-based PNT technologies and services in developing nations' disaster management systems [2]; and 'Space Ready: The Launchpad for Emerging

Agencies' which described an international comparison and analysis of space agencies to provide recommendations for the benefit of emerging space states [3]. All previous team projects are available online at: [https://isulibrary.isunet.edu/opac/?lvl=etagere\\_see&id=4](https://isulibrary.isunet.edu/opac/?lvl=etagere_see&id=4)

Articulation of the SH-SSP with UniSA programs is possible: the SH-SSP earns students credit for 9 academic units, equivalent to 25% of 1 year study (full time) in any discipline-relevant degree offered by the university, or 50% credits toward a Graduate Certificate in Space Studies. The Graduate Certificate offers participants the opportunity to focus on individual research and writing based on issues arising from their SH-SSP group research project, or from other topics, such as: space related science and technology, economics, law and policy. Staff from UniSA and ISU Faculty provide expert individual supervision for the projects over a period of one semester following the SH-SSP.

### 5. Participant profile

A total of 268 participants from all over the world completed the program between 2011 and 2018, comprising holders of post-graduate degrees, university graduates, and undergraduates who had completed at least 2 years of their university degree. Approximately 40% of the participants are from Australia, but the program enjoys significant participation from China National Space Administration (CNSA) and in 2017 also from the Indian Space Research Organisation (ISRO). The 50 participants in 2018 were from 15 different countries. Their backgrounds were in: Space Applications: 17%; Engineering: 46%; Science: 18%; Policy, Law and Humanities: 10%; Business and Management: 8%; and IT: 2%. A significant proportion of participants are women, who represented 24% of students.

### 6. The next 5 years

With the partnership agreement extended for another 5 years we have an opportunity to introduce changes to the program in a strategic way to make it more compatible or supportive of other offerings. This coincides with a period of increased interest in the space sector within Australia including the national government commitment to an Australian Space Agency which began operations in July 2018. The SH-SSP has already benefitted from this with 5 full scholarships being offered for the 2018 program by the State Government of South Australia.

Planned changes:

- 1) While the 5 week program has necessarily less programmatic activity than the 9 week ISU

Space Studies Program, an effort is being made to align the curricula more closely to take advantage of both faculty and teaching and learning materials developed for the longer course.

- 2) Currently the SHSSP program can be used as a 50% contribution to the Graduate Certificate in Space Studies offered by UniSA [4]. In previous years this could only be taken with an on-campus component following the main program. In order to increase the opportunities this is now offered on campus or as an online/external with enrolments now possible in February and July.
- 3) The Innovation & Collaboration Centre (ICC) at UniSA have launched Venture Catalyst Space, a six month incubator program to develop and grow innovative or disruptive ideas from entrepreneurs and start-up companies in the space sector to generate accelerator-ready businesses [5]. ISU is a partner with UniSA in this initiative. The SH-SSP program can provide exposure to the SH-SSP curriculum to those taking part in the incubator program and at the same time allowing participants of SHSSP to see how innovation is developed and to meet with budding space entrepreneurs.
- 4) UniSA is also a key player in the SmartSat Collaborative Research Centre funding proposal to the Australian Government. This will potentially provide over AU\$100M in research and development support for development of next generation space technologies aimed at growing the competitiveness of the space industry in those areas where the industry already has niche capabilities. As well as keystone research projects, part of the centre's role will be the support of small to medium enterprises as they try to gain a foothold in a competitive market. Our plan is to make use of the SH-SSP experience in developing appropriate professional development training in aspects of space industry activity.
- 5) With a new space agency and the growth in interest in space in the community and especially among young people, there are opportunities to use the SH-SSP alumni and faculty in creating a critical mass of expertise in some specific disciplines. Making use of many international experts coming to Adelaide for the SH-SSP program gives us the perfect

opportunity to concurrently offer workshops or symposia to the wider community.

## 7. Conclusion

The SH-SSP experiment has demonstrated that the ISU formula for interdisciplinary, intercultural, international (and now intergenerational) space education is equally applicable to the needs of the Global South. Through strong institutional support, a sustainable program has been established, filling a seasonal gap in ISU's offerings. The benefits for both ISU and UniSA have been well recognised. The extension of the ISU - UniSA relationship agreement provides an opportunity to continue and expand this productive educational collaboration beyond the next program and in support of the wider space community locally.

The next Southern Hemisphere Space Studies Program will be held at the Mawson Lakes Campus from January 14 to February 15, 2019.

## References

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