A Quarter Century of 3Is Space Education:

25 Years of the International Space University

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1. History of ISU

- In 1985, Peter Diamandis, Todd Hawley and Robert D Richards created the *Space Generation Foundation.*

- Among the ideas that came from the SGF was that of ‘an international space university’ (another was the SGAC)

- The ISU concept was supported by such people as UR Rao, Harrison Schmitt, Gerard O’Neill and Arthur C Clarke.

- The ISU concept was presented at the 1986 AAS meeting where it found considerable support.
As a result, in April 1987, a three-day Founding Conference was held at MIT.

ISU was established as a non-profit educational organization in Massachusetts, USA.

In 1988, with the support of the major space agencies, the first ISU Summer Session Program (SSP, now Space Studies Program) took place at MIT.
1.1 ISU Educational Philosophy

ISU programs are designed around three themes that are key to success in meeting the present and future challenges of international space cooperation:

**Interdisciplinary** - a broad knowledge base and understanding of the complex interactions of the various space and space-related disciplines, which enable the professional to manage competently all aspects of a project, be they scientific, engineering, regulatory, policy-related or economic.

**International** - a comprehensive understanding of the international space sector and teamwork in international ventures, essential for approaching the utilization of space from a global perspective.
Intercultural - improved intercultural sensitivity towards the different objectives of, and approaches to, problem solving pursued by colleagues, counterparts and competitors throughout the world.

ISU students, faculty and visiting lecturers are drawn from a broad range of backgrounds, providing a rich environment in which to implement this ‘3Is’ educational philosophy
ISU programs are based around eight main disciplines:

- 3Is Space (3IS)
- Space Engineering (ENG)
- Space Sciences (SCI)
- Human Performance in Space (HPS)
- Space Applications (APP)
- Space Management and Business (MGB)
- Space Policy Economics and Law (PEL)
- Space Humanities (HUM)
2. ISU Organisation

- ISU has:
  - Chancellor
  - Board of Advisors
  - Board of Trustees
  - President supported by Executive, including the Dean
  - Academic Council
    - Responsible for ensuring the academic quality of ISU's teaching and research activities.
ISU’s programs are delivered by ISU’s global faculty and College of Teachers.

These are:

- Eight ‘Resident Faculty’ based at the central campus in Strasbourg.
- Approximately 70 other ISU faculty around the world, plus adjunct and associate faculty.
- A wide range of visiting lecturers.
3. ISU Development and Achievements

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>1987</td>
<td>ISU Founding Conference and Incorporation in USA</td>
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<td>1988</td>
<td><em>Summer Session Program (SSP)</em> launched at MIT</td>
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<tr>
<td>1994</td>
<td>ISU Central Campus Central Campus established in Strasbourg</td>
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<tr>
<td>1995</td>
<td><em>MSc in Space Studies (MSS)</em> launched.</td>
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<tr>
<td>1996</td>
<td><em>ISU Symposium</em> launched.</td>
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<td>1998</td>
<td><em>Permanent Observer</em> status granted with UN COPUOS</td>
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<tr>
<td>2002</td>
<td>ISU Central Campus building opened in Strasbourg</td>
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<tr>
<td>Date</td>
<td>Milestone</td>
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<td>2003</td>
<td><em>Executive Space Course (ESC)</em> launched.</td>
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<td>2004</td>
<td>Official accreditation awarded by the French Ministry of Education</td>
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<td>2004</td>
<td><em>MSc in Space Management (MSM)</em> launched.</td>
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<td>2009</td>
<td><em>Space Executive MBA (EMBA)</em> launched.</td>
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<td>2010</td>
<td>ISU awarded Sir Arthur Clarke Award for International Achievement</td>
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<td>2011</td>
<td><em>Southern Hemisphere Summer Space Program (SHSSP)</em> launched.</td>
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<td>2012</td>
<td>ISU 25th Anniversary ISU awarded Biennial Herbert Curien Award</td>
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The 3500+ ISU alumni come from over 100 countries
4. ISU Programs and Activities

- Over the last 25 years, ISU has continually developed its programs and activities.

- They are dedicated to the development of future and current space professionals from all nations seeking advancement in space-related fields.

- ISU offers two kinds of programs:
  - Annual programs
  - Short on-demand programs
    - Professional Development Programs
4.1. ISU Annual Programs

- Three graduate programs:
  - MSc in Space Studies (MSS)
  - MSc in Space Management (MSM)
  - Space Executive MBA (EMBA)

- Space Studies Program (SSP)
- Southern Hemisphere Summer Space Studies Program (SHS-SP)
- Executive Space Course (ESC)
- Annual Symposium
4.1.1 MSc in Space Studies/Management

- The MSS and MSS are for individuals seeking professional development or further academic study in the space field.
- 12-month programs include a 3-month professional internship
The MSS and MSM are built from 6 modules:
- 3 classroom-based (M1-ITS, M2-ISS, M3-SS)
- 2 project-based (M4-TPR, M5-IPR)
- 1 internship-based (M6-INT)
MSc13 Student Background

MSc13 academic background

- Engineering: 49%
- Physical Sciences: 14%
- Life Sciences: 7%
- Information technology: 5%
- Humanities: 5%
- Space applications: 7%
- Policy and Law: 2%
- Business and Management: 11%

MSc13 previous degree

- Bachelor: 74%
- Master: 24%
- PhD: 2%

Geographical zone:

- Europe: 53%
- Asia: 21%
- Africa: 3%
- North America: 18%
- South America: 3%
- Oceania: 2%
MSC13: 57 students from 26 countries
2013 - MARS-X: Human exploration of Mars from orbit
- Arctic: Resources for Arctic navigation
4.1.2 EMBA

- Created on request of the space industry and, in particular, space operators.

- Provides middle-management and high-potential professionals with deeper knowledge in financial and economic principles guiding the space sector.

- Classical MBA has been combined with space-related business curriculum.

- 18-month program delivered in 2-week modules around the globe.
4.1.3 SSP

- 9-week program for graduate students and professionals of all disciplines.
- Each year in a different location

Curriculum:

- Core Lectures on fundamental concepts across all subjects
- Theme days presenting keys/issues of space with 3I approach,
- Hands-on workshops providing practical applications
- Department activities on ISU subjects: in-depth lectures/workshops, professional visits, and individual research projects
- 3I Team Project
ISU SSP Host Sites 1988 - 2014

Europe
- 1989 Strasbourg (France)
- 1991 Toulouse (France)
- 1994 Barcelona (Spain)
- 1995 Stockholm (Sweden)
- 1996 Vienna (Austria)
- 2001 Bremen (Germany)
- 2003 Strasbourg (France)
- 2006 Strasbourg (France)
- 2008 Barcelona (Spain)
- 2010 Strasbourg (France)
- 2011 Graz (Austria)
- 2013 Strasbourg (France)

Asia
- 1992 Kitakyushu (Japan)
- 1999 Nakhon Ratchasima (Thailand)
- 2007 Beijing (China)

North America
- 1988 Boston (USA)
- 1990 Toronto (Canada)
- 1993 Huntsville (USA)
- 1997 Houston (USA)
- 1998 Cleveland (USA)
- 2002 Pomona (USA)
- 2005 Vancouver (Canada)
- 2009 San Francisco (Canada)
- 2012 Florida (USA)
- 2014 Montreal (Canada)

South America
- 2000 Valparaiso (Chile)
- 2013 Sao Jose dos Campos (Brazil)

Australia
- 2004 Adelaide (Australia)
5-week program for senior undergraduates, graduates and professionals.

Focuses on space applications, space policy and space services while providing rounded coverage of other ISU subjects.

Curriculum:

- Core Lectures on fundamental concepts across all subjects
- Hands-on workshops providing practical applications
- 3I ‘White Paper’ Team activity
  - 2011: Developing A Sustainable Space Future for the Global South.
  - 2012: REACH2020; Tele-Reach for the Global South
  - 2013: Paths to Progress: Space and the Southern Hemisphere
4.1.5 Executive Space Course

- One-week program for professionals of diverse backgrounds, including marketing, finance, law, and contracts management.

- Delivers knowledge of space-related subjects that enables participants to communicate more effectively with their technical colleagues.

- Also provides participants with exposure to ISU’s 3I learning environment.
4.1.6 ISU Symposium

- Dedicated to a topic of broad interest to both space industry and space agencies.

- Timed to be part of the MSS/MSM program.

- Students interact with the symposium delegates.
4.2 ISU Research

- **NordicBalSat (FP7)**
  - Nordic+Baltic countries
  - Strengthen relationship between ESA Member and non-member States
  - Co-ordinate space in emerging space countries
  - Completed in 2012
- Self-deployable Habitat for Extreme Environments (FP7)
  - Investigating the integration of architecture and robotics for space applications with the aim of developing a design for a robotically self-deployable habitat.
  - Three year-project. Started Jan 2013.
  - ISU-led, 7 partners (www.shee.eu)
- **Algae/Microbial Food Study (ESA)**
  - Investigating the utilization of algae and other microorganisms for future space missions.
  - Led by Aérial (Technology Resource Centre and Technical Institute for Food Industry)
- **Other research areas:**
  - Human Performance in Space
  - Space Design/Architecture
  - Astrobiology
  - Robotics
  - Microgravity Science
  - Space Commerce and Economics
4.3 ISU Relationships

- NASA
- ESA
- EADS
- The Open University
- CNES
- MAI
- JAXA
- Boeing
- SES ASTRA
- UK Space Agency
- Lockheed Martin
- CASC
- ISU: 25 Years of 3I Space Education

UKSEDS 2013 – Prof Chris Welch - 2013-02-23
5. ISU - What it Means
ArduSat

▪ Four MSc12 students founded *Nanosatisfi* to provide:
  – affordable, open access to space
  – engaging, hands-on education in STEM using nanosatellites.

▪ ArduSat is their pilot satellite for their *Your Experiment in Space* (YES) initiative.

▪ Anyone will be able to:
  – design, write, and run their own space-based experiments, steer the onboard cameras to take pictures on-demand, broadcast messages back to Earth.

▪ Crowdsourced in excess of $100,000.

▪ First launch due in July 2013
LiftPort

- An SSP alumnus set up LiftPort to pursue R&D for space tether systems.

- The first stage is to develop a system capable of climbing a 2-km ribbon.

- Also crowdsourced in excess of $100,000.
ISU means:

People learning together
People working together
People building our future in space.
MSc12 PhotoStory
The UK Space Agency has announced GBP 30,000 in scholarships for ISU’s MSc14 and SSP13 programs.

Scholarships are also available from the European Space Agency.

In order to be eligible, you must apply to ISU for the MSc or the SSP by 15 March 2013 – see www.isunet.edu
6. Adverts

- **Yuri’s Night**
  - 12 April
  - www.yurisnight.net

- **World Space Week**
  - 4-11 October
  - www.worldspaceweek.org
  - www.bis-space.com
IAC 2013 Competition

- The International Astronautical Congress (IAC) is the world’s largest astronauts/space engineering conference.
- At each IAC, there is a student paper competition with two categories UG and PG.
- Selection of the two UK entrants will be carried out by the BIS.
- Deadline Friday 5 April 2013
- Each prize winners will be presented with a cheque for GBP 600 at IAC2013 after the student competition has taken place.
- Entrants must have been no more that 28 on 1 January 2013.

See www.bis-space.com for more details
Any questions?

Web: www.isunet.edu
Twitter: @ISUnet