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Cosmonotes

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The Newsletter of the Canadian Alumni of the International Space University

Le Bulletin des Anciens Etudiants Canadiens de l'Université Internationale de l'Espace

HAPPY HOLIDAYS!!!

Here is the December 2000 edition of your CAISU newsletter, Cosmonotes, again packed with many fascinating articles from alumni and friends. This issue of Cosmonotes was slightly delayed to include an article on the November 30th launch of STS-97 with Canadian Astronaut Marc Garneau on board, a launch that many CAISU members were present in Florida to view thanks to an invitation from the Canadian Space Agency! Thank you to Audrey Robinson-Seurig (SSP 91) for writing me the launch article on a tight deadline while in the midst of her move to Germany!

Recent CAISU activities also include our Annual General Meeting, our yearly Roadshow, the CSA merchandising project, and the CAISU Day Conference Workshop held in conjunction with the CASI Astronautics Conference in Ottawa at the beginning of November. Although a preliminary conference report was ready for publication, it was decided to wait until the full, detailed final report on the CAISU Day Conference Workshop was completed to present it to our members. The final report will be mailed out to CAISU members and conference participants in the new year.

You will also find in this issue articles on the MSS5 Team Project, the 2 SSP 2000 Design Projects, the ISU Chile-Kourou Space Center Tour, many alumni updates, a message from CFISU President Rod Tennyson, a final report on the Mars Society Convention, an update on ADAM events, Membership News and alumni gatherings in Ottawa and Toronto, a report on the 1st Annual ISU*USA Alumni Congress, an article on Enhancing Youth Participation in Space Activities, another on the Space Generation Advisory Council, an article reminiscing on an Aerospace Medicine Elective at KSC, and an article from the busy, busy, busy MSS6. Another opinion piece is included in this issue, this time on The Dreams our Star Stuff is Made of – thank you to Eric Choi (SSP 99) for polling the alumni and writing a delightful article from all responses received.

Thank you to all alumni who volunteered to write articles for Cosmonotes! It is thanks to the constant willingness of alumni to contribute that this newsletter keeps getting better (and thicker!) with each issue.

As this is the last issue of the year 2000, on behalf of the 1999-2000 CAISU Board of Directors, I would like to wish everyone un Joyeux Noël et une Bonne Année!!!

Chantal Lamontagne SSP 95
2000 CAISU Membership Director
Editor, Cosmonotes

CAISU Members See Spectacular Space Shuttle Launch

by Audrey Robinson-Seurig (SSP 91)

About 20 CAISU members and their guests gathered at NASA's Kennedy Space Center (KSC) and Cocoa Beach in Florida recently to experience the Space Shuttle launch of the STS-97 mission which features Canadian Space Agency astronaut Marc Garneau.

STS-97 Mission

During this 11-day mission, the Space Shuttle orbiter Endeavour will initially rendez-vous and dock with the inhabited International Space Station (ISS), which is traveling about 200 miles above the Earth at more than 17,000 miles per hour. Commander Brent W. Jett, Jr. (CDR, USN) and Pilot Michael J. Bloomfield (Lt. Col., USAF) will be responsible for catching the Station, docking with it and then departing from it. While the Shuttle is docked to the Station, three spacewalks will be conducted to deliver, assemble, and activate the U.S. electrical power system on board the ISS. The electrical power system, which is built into a 47-foot integrated truss structure known as P6, consists of solar arrays, radiators for cooling, batteries for solar energy storage, and electronics. P6 is the first section of a system that ultimately will deliver 60 times more power to the ISS research facilities than was possible on Mir.

Mission Specialist Marc Garneau (Ph.D.) will attach P6 to the evolving ISS using the Shuttle's Canadian-built robotic arm in coordination with spacewalking Mission Specialists Joseph R. "Joe" Tanner and Carlos I. Noriega (Lt. Col., USMC) who will make the final connections. The spacewalkers will then prepare P6 for the subsequent deployments of the large solar arrays and radiator, which are important steps in the activation of the electrical power system. The 120-foot solar arrays will provide a five-fold increase in power, which is needed for the first ISS crews to live and work in the U.S. segment of the Station. Later in the mission, the Space Shuttle astronauts will be the first to visit the three Station crew members, astronaut Bill Shepherd and Russian cosmonauts Yuri Gidzenko and Sergei Krikalev, who have resided on the Station since November 2, 2000.

Launch Day Events

On the morning of November 30, 2000, CAISU members took a five-hour cruise on the Canadian Navy vessel HMCS Glace Bay for a sea-side view of the Space Shuttle on launch pad 39-B, which was five miles away at closest approach.

Later in the afternoon at the Hilton Cocoa Beach Oceanfront, we joined about 300 guests at an outdoor Pre-Launch Reception to honour Marc Garneau and to celebrate the STS-97 launch. Television sets placed around the oceanfront deck and a video

projection on the outer wall of the hotel displayed the latest updates from NASA Select TV, including the astronauts donning their flightsuit helmets and walking to the bus that transports them to the launch pad. The vivid pink-orange sunset overhead at the reception matched the NASA Select TV broadcast of the heavenly backdrop behind the Space Shuttle waiting on the launch pad. Near the end of the reception, Marc Garneau's wife Pamela (née Soame) shared her insight about the launch and mission, and a pre-recorded videotaped message from Marc Garneau was presented.

During his third Space Shuttle flight, Garneau will operate the Shuttle's robotic arm to help deploy the first section of the giant solar arrays that will provide power for the orbiting International Space Station (ISS). As Canada's first astronaut, Garneau previously logged over 437 hours in space aboard STS-41G (Challenger) in 1984 and STS-77 (Endeavour) in 1996. After his initial flight, he served as spacecraft communicator (CAPCOM) in Mission Control during Shuttle flights. A native of Quebec City, Canada, Garneau earned a B.S. degree in engineering physics from the Royal Military College of Kingston and a Ph.D. in electrical engineering from the Imperial College of Science and Technology in London, England. He also attended the Canadian Forces Command and Staff College of Toronto.

...3...2...1...Lift-Off!

While CAISU members participated in the Launch Day activities, the launch preparations continued. The countdown proceeded until a small set-back occurred just before the external fuel tank was loaded. Technicians noticed a loose bracket on the side of an access arm on the launch gantry. Workers used a crane to remove the bracket from a water pipe, and the fueling was initiated. Furthermore, four hours before Endeavour's scheduled launch, a small grass fire ignited inside the enclosure of the spacecraft's launch pad. The fire did not jeopardize the Shuttle and was extinguished by a single fire truck. Controllers also had a slight range problem that was quickly resolved.

Following the Pre-Launch Reception, the guests boarded buses that transported them to the different viewing sites. CAISU members watched the launch from a site along the causeway that was about five miles from the launch pad. The cloudless evening sky was illuminated by a myriad of stars and planets. We listened to the audio broadcast of NASA Select as the countdown continued. At the scheduled time of 22:06 p.m., the Shuttle soared upward from the launch pad on a blazing pillar of orange fire. After the Shuttle was visibly well off the ground, we heard the delayed thunderous roar of the powerful rockets. Shortly after the launch, a flash of light outlined a concentric arc around the Shuttle. This event looked like a "shooting star," or meteor, piercing the atmosphere. However, from its location and timing, it could have been a solid rocket booster re-entering the atmosphere after it burned out and separated from the external tank about two minutes following the launch. Because of the clear nighttime conditions, it was possible to watch the Space Shuttle ascend and accelerate away from us until it appeared to shrink into a star-sized pinpoint of light that finally disappeared at the horizon. According to Canadian astronaut Bob Thirsk, who attended the CAISU post-launch party, the Shuttle was visible for seven minutes before it reached the horizon. He usually sees the Shuttle after launch for only four minutes until it vanishes from sight. For more information about this Space Shuttle launch and mission, see the website http://www.ksc.nasa.gov/.

More Fun in Florida

Before and after the Space Shuttle launch, CAISU members participated in a variety of activities in warm and sunny Florida. Some of us toured Kennedy Space Center and saw exhibits and shows at the KSC Visitor Center, such as the "Astronaut Encounter" with six-time Space Shuttle astronaut Story Musgrave. Watching the latest STS-97 updates on NASA Select TV, including the meticulously slow but successful docking of the Space Shuttle orbiter and the ISS, was a popular pastime. Relaxing on the beach and playing sports, such as beach volleyball and swimming, were other favourite activities. At KSC, some CAISU members observed wildlife, ranging from alligators and turtles to eagles with a 1,000-pound nest. Other CAISU members visited wildlife at Disney's Animal Kingdom in Orlando.

Uplifting Music

On the way to the Space Shuttle launch, several CAISU members entertained us on the slow bus ride with songs involving various feats of physical and verbal dexterity. To close this article, I would like to share the lyrics from my song entitled "A Vision of Tomorrow: Go, Shuttle, Go!", which I composed for a contest that involved writing a theme song for the "Teacher in Space" Space Shuttle mission. The contest was sponsored by Jim Rowley, a teacher from my high school who was one of the "Teacher in Space" finalists from Ohio. The selected "Teacher in Space" astronaut Christa McAuliffe flew on the tragic Challenger mission (STS-51L) that was launched on January 28, 1986 (which happens to be my birthday). The destroyed Challenger orbiter was replaced by Endeavour, which carried Marc Garneau back into orbit on November 30, 2000. I would like to dedicate this transcription of the lyrics to all astronauts past, present, and future.

"A Vision of Tomorrow: Go, Shuttle, Go!"

Lyrics and Music by Audrey A. Robinson-Seurig © 1985

The Shuttle has left the launch pad now.
It is ready to launch our dreams
From Earth's laboratories to outer space
Where we'll find out what they mean.

Space – it's not so far away.
A rocket thrust, and now we're on our way
To explore the universe surrounding us.

Go, Shuttle, go!
Fly up into orbit,
Go, Shuttle, go!
Glide around in space,
Go, Shuttle, go!
Way up there in orbit,
Go, Shuttle, go!

Go, Shuttle, go!

The Shuttle is a useful tool
For conducting experiments out in space.
We will be cruising above the atmosphere,
As we help the human race.

It's not so bad out there in zero-g.
Just come along and you can learn and see
Discoveries we're making now out here in space.

Go, Shuttle, go!
Fly up into orbit,
Go, Shuttle, go!
Glide around in space,
Go, Shuttle, go!
Stay up there in orbit,
Go, Shuttle, go!
Go, Shuttle, go!

A vision of tomorrow
Is the forecast of today.
We will experience the future
As the Shuttle leads the way,
As the Shuttle leads the way!

Go, Shuttle, go!

(CAISU members who were present for the launch include: Josée Adamson (SSP 99), Alain Berinstain (SSP 91, MSS1), Frédéric Bourgault (SSP 2000), Denis Bourque (SSP 92), Eric Choi (SSP 99), Liara Covert (SSP 2000), Sebastien Drouin (Staff 94), Katia Dyrda (SSP 2000), Simone Garneau (MSS4), Johanne Heald (SSP 96), Tony Hong (SSP 95), Jonathan Knaul (SSP 98), Judith Lapierre (SSP 95), Kamiel Rezkallah (SSP 90), Michele Shemie (SSP 94), Roland Seurig (SSP 91) and Audrey Robinson-Seurig (SSP 91), Marc Simmons (SSP 89), Deana Smith (MSS3), Dany St-Pierre (SSP 91, MSS1), Elaine Tan (SSP 2000), Laurence Vigeant-Langlois (SSP 99) and Rachel Zimmerman (MSS3). CFISU President Rod Tennyson was also present for the launch.)

STS-97 Photos Online!

Photos of the launch were unavailable at the time this issue of the Cosmonotes went to press. Please make sure to visit the CAISU website www.caisu.ca to see the many photos taken by CAISU members present at the launch of STS-97.

THANK YOU CSA!

by Chantal Lamontagne (SSP 95, CAISU Membership Director)

On behalf of all CAISU members, the 1999-2000 CAISU Board of Directors wishes to sincerely thank the Canadian Space Agency and all those that were involved, in part or in whole, for the opportunity for our CAISU members to be guests in Florida to view the Space Shuttle Endeavour launch of Mission STS-97 with Canadian Astronaut Marc Garneau on board.

Many, many people were involved in this "endeavour" (no pun intended!), either organising for CAISU members to receive invitations and be present for the launch, coordinating logistics before the launch, at St-Hubert and at KSC, organising the launch day's activities, and making sure everything flowed smoothly for everyone participating. The anticipation, the sights, and the sounds of the shuttle Endeavour launching were very moving experiences for many present, and all CAISU members deeply appreciate the efforts made on their behalf for this event by the following persons at the Canadian Space Agency:

Steering Committee:
- Mr. Mac Evans
- Ms. Jacqueline Bannister
- Mr. Alain Poirier
- Mr. Michel Vachon

Working Group:
- Ms. Anna Kapiniari
- Ms. Joanne Blais
- Mr. Stéphane Desjardins

Guest Ops at KSC:
- Ms. Kerry Dunseath
- Ms. Fabienne Lévesque
- Ms. Chantal Nobert
- Ms. Hélène Tremblay
- Mr. Denis Bourque
- Mr. Serge Garon
- Ms. Paulette Charbonneau
- Mr. Michel Giroux
- Mr. Barry Wetter
- Mr. Bob Thirsk
- Mr. Bjarni Tryggvason

Guess Ops support from St-Hubert:
- Ms. Cherryl-Ann Horrocks

Each of the persons listed above will receive a copy of this Christmas issue of the CAISU Cosmonotes as only a very small token of our appreciation and thanks for giving our CAISU members a truly wonderful and memorable Christmas present.

All Canadians are looking forward to the launch of the SSRMS, part of Canada's contribution to the International Space Station, on mission STS-100 in April 2001, with Astronaut Chris Hadfield on board scheduled to become the very first Canadian to perform an EVA when he installs the new arm on the station.

Can ISU Be Done in One Day?

A Report on the CAISU Day 2000 Conference Workshop

by Brian Rishikof (SSP 90, CAISU Vice President)

Can ISU be done in one day? This was the question on our minds as we started a little experiment at the bi-annual CAISU day activity held in conjunction with the CASI Astro2000 conference. The date was November 6, 2000, and the venue was the Crowne Plaza Hotel in downtown Ottawa. We assembled a formidable team to provide an unparalleled "mini ISU" experience to some talented and motivated young people at the university level and in the beginning of their careers as professionals. We organised the event to emphasise the fact that Space *is* more than just rocket-science, and chose a theme related to Mars Missions and the issues and criteria for a crew selection.

The program included almost all the ingredients that make up an ISU session: Introductions; a series of multi-disciplinary lectures; a high-profile, special-guest plenary lecture; a design project; and a social event. "In one day?!" you gasp! Yup! All that and a nearly endless stream of traditional last minute announcements, too!

But how many people would show up? We knew we'd have 6 high-powered speakers, a battery of 16 volunteers

and a handful of CASI organisers. Now all we needed were some participants. Even after much promotion on the various ISU e-mail lists, distribution of hundreds of posters and flyers, presentations as part of the CAISU road-show, countless phone calls and other e-mails, and the creation of a spectacular web-site (if we do say so ourselves – www.caisu.ca/astro2000), we still weren't sure of the numbers. This question was answered at around 8:30 am when registration had ended, and activities had begun. Over 85 space enthusiasts registered, and nearly all of them new to the ISU community. Now we were coasting. Things would go off without a hitch, wouldn't they?

Seasoned ISU veterans provided the content for the morning lectures, and they did not disappoint. John Connolly (from the exploration office at NASA's Johnson Space Center) spoke on Mars Mission Architectures; Dr. David Kendall (CSA Space Science Program Manager) introduced the Mars Mission topics related to the Physical Sciences; Dr. Doug Hamilton (Space flight surgeon from NASA JSC) provided an entertaining look at the physiological Life Science issues of long term space flight in and out of the gravity field; Dr. Judith Lapierre (Université de Quebec a Hull) authoritatively discussed the psychological factors of the Life Sciences for long term missions; Dr. Alain Poirier (CSA Director General of Space Systems) gave an insightful overview of the Business & Marketing factors that influence all large space projects; and Dr. Lucy Stojak (ISU SSP Director) showed once again that in the end, politics always wins. The entire lecture group was then assembled as a panel for a dynamic question and answer session that was unfortunately much too short.

After this ambitious and auspicious series, we were still on time and it was off to lunch for a very special presentation by CSA Astronaut, Bjarni Tryggvason of STS-85 fame. He mesmerised the audience with insight and anecdotes on what crew training is like for the Space Shuttle and the International Space Station, and how these may or may not apply to a Mars Mission. This was the perfect motivator for the group as they embarked on the next part of the day – albeit an hour or so behind schedule, which is also true to the ISU tradition.

The second half of the program was dedicated to the group design project. This project involved all of the conference participants and while the objective was that the experience be more important than the outcome, the final results far outdid the organisers' expectations.

The aim of the project was to consider all of the aspects of a Mars mission crew selection. This included not only an analysis of who should be the ones to go on the first human mission to Mars, but also such things as the logistics and finances involved in a selection process; the legalities of such a process; and even the moral and ethical implications of who is picked to go. To achieve this, the 88 conference attendees were divided into the following 8 departments, each of which was moderated by a CAISU member: Space Physical Sciences (Alain Berinstain, SSP '91, MSS 1); Space Life Science (Dr. Bob Tarzwell, SSP '98 and Judith Lapierre, SSP '95, '96); Crew Flight Operations and Training (Deana Smith, MSS 3; Marius Ochisor SSP '00); Space and Society (Morla Milne, SSP '99, '00); Space Legal, Policy, and Finance (Alain Poirier, SSP '89); Space Engineering (Johanne Heald, SSP '96); Space Robotics and Remote Sensing (Marcus Dejmek, SSP '97, '98); and Space Architecture and Mission Design (Josée Adamson, SSP '99). In addition, there were roving consultants/experts who included Rachel Zimmerman (MSS 3), Lucy Stojak (several SSP's), David Kendall (several SSP's), Jonathan Knaul (SSP '98), John Connolly (several SSP's), Larry Reeves (MSS 2), and Brian Rishikof (SSP '90 and several others).

The departments of Physical Sciences, Life Sciences, and Crew Ops and Training considered the question of "who", in terms of skills, knowledge, and expertise would make up the crew. The three groups addressed what science humans would want to do during the voyage there, on the surface, and during the return voyage from Mars. Then they asked the question of what kinds of individuals would best fulfill these roles. Space Engineering and Robotics asked the question of what requirements would need to be filled on the first mission, and thus who would be best suited to make those requirements become reality. The Space Legal, Policy, and Finance department did an analysis of such aspects as who would pay for the selection process, what nationalities would make up the crew, etc. The Space and Society group focused on the ethical and moral issues surrounding the first crew selection to go to Mars – for example, what are the implications of selecting a crew made up only of couples? What mix of religions and cultures should be included in the crew make-up? Lastly, the Space Architecture and Mission Design department acted as the control group. Their task was to settle on the maximum number of people that could go to Mars given the current level of world technology and finances.

At 2:45 pm, the participants reassembled and Jonathan Knaul and John Connolly introduced the project. At 3:00 pm we were underway. By following an established process of brainstorming ideas, department members were able to pick a list of items that would be most essential to focus on during the first human Mars mission (i.e. for Physical sciences, one of these items was the search for water). From there they were able to consolidate their ideas to establish what type of individuals were required to satisfy the mission, or in the case of the Space and Society department; determining what is the expected final impact of who is chosen for this mission.

At 7:00 pm, with only one break of 15 minutes, and a slight diversion as 40 gourmet pizzas were consumed, since getting started at 2:45 pm, the groups were ready to make a presentation on their findings to the plenary. Each group had 5 minutes maximum to present. At that time, a two-page report detailing their results was handed in from each department. By 8:00 pm, all of the presentations were complete and the reports had been submitted. At this time, the Integration department formed, made up of a

spokesperson from each of the original departments. The Integration group met for one hour during which they discussed their final results with the objective of finalising their proposed composition for the first crew to Mars. John Connolly, Johanne Heald, and Jonathan Knaul moderated the team. The professional and efficient nature in which the Integration group members handled themselves was impressive. It was very inspiring when at the completion of the Integration meeting, John Connolly noted to the participants that there were several ideas discussed and conclusions made that were novel and would prove very useful within the Exploration Office at the NASA Johnson Space Center.

While the Integration group was meeting, the remainder of the conference participants watched a retrospective slide show of the day made possible by the magic of digital imagery and our roving photographer, Larry Reeves. They also retrieved additional souvenirs in the form of posters and remaining hand-out material before heading upstairs to the Penthouse floor of the hotel for a social mixer with the CASI registrants. The mixer included a poster session of the ISU design projects from both the MSS and SSP for the last two years. Some truly exquisite posters were prepared and have been laminated and retained by CAISU. Special thanks go to the volunteers who prepared them and who came out to present their results. After this final event, the last of the participants meandered out at around 10:00 pm. Whew!

The overall goal of the conference workshop was to give the participants a true taste of the ISU experience – the powerful feeling that comes from the intense participation in a meaningful educational endeavour, where the boundaries have been lifted and anything is possible. With 88 participants who had never met before and just one day (O.K., so it was a really long day), we believe we achieved that goal.

Huge thanks go to everyone who helped make this day possible: To the core organising committee for their tireless efforts in putting together an awesome program; to the lecturers and special guest who devoted their time, energy and expertise to our enterprise; to the moderators who were critical in directing the afternoon project; to the volunteers who showed up to handle all the big "little things" on the day of the conference; to our Ottawa hosts who put us up in beds, on couches and on floors; to our Saturday night pre-conference party hosts; to the CSA, NASA, ESA, NASDA and ISU for their generous support of volunteers and for contributions to the goody-bag that all participants received; to CASI and our CASI contacts, and of course, to CFISU. A list of individual contributors follows in alphabetical order (though there are surely some not listed – please remember and thank them too!): Josée Adamson, Alain Berinstain, John Connolly, Mark Dejmek, Sebastien Drouin, Doug Hamilton, Johanne Heald, Marie Juneau, David Kendall, Jonathan Knaul, Chantal Lamontagne. Judith (and Stéphane) Lapierre, Morla Milne, Marius Ochisor, Marty Pecaric, Alain Poirier, Larry Reeves, Brian Rishikof, Deana Smith, Lucy Stojak, Rob Tarzwell, Isabelle Tremblay, Bjarni Tryggvason, Matt Wuhr, Rachel Zimmerman.

CAISU: A Caterpillar in its Cocoon

CAISU and the Kalson Group gain exclusive rights to using the CSA logo for promotional purpose

by Alain Berinstain (SSP 91, MSS1, CAISU President)

As you probably know, CAISU gets it annual operating budget from CFISU. Part of the money is spent on ISU promotion (like the Road Show put on at the end of each summer), and fulfills the role of making sure there is a good large pool of new applicants every year. When we have special projects like the Space Generation Forum or special conferences, we sometimes need to go to other sources of funds. But we have to be careful; we do not want to go to the same sponsors as those that CFISU relies on for creating their SSP scholarships every year that have made us such a strong community.

CAISU is ready to grow into something more, into more of a professional society as opposed to an alumni association. We needed to find that source of funding that would allow us to evolve but not impede CFISU with its way of fundraising.

At the 1999 CAISU Annual General Meeting in St-Hubert, we got the go-ahead from our membership to follow up on a new initiative for fundraising. CSA released a Request for Proposals (RFP), looking for a private enterprise to acquire exclusive rights to using the CSA logo for CSA promotional purposes (like CSA caps, shirts, keychains, etc.) The CSA logo is property of the Crown and cannot be used without the permission of the Government. Using it for commercial profit has been totally prohibited.

CAISU formed an alliance with the Kalson Group of Mississauga, Ontario to submit a proposal in response to the CSA RFP. Kalson is successful in the business of making garments for corporate promotion and already owns the rights for the RCMP logo.

Our proposal was selected as the top proposal. At the time of writing of this article (November 20th on a plane from Frankfurt to Toronto!), the contract with CSA is still being negotiated, but signature is imminent.

CAISU's role in this arrangement is mainly to create and maintain the website through which orders can be placed. Orders are sent directly to Kalson and are shipped from Kalson. We expect website orders to get popular, and Sebastien Drouin has put a lot of work into it. Please go check it out at space-boutique.com.

However, the plan is for much more than website sales and Kalson has great plans for merchandising (note that CSA gets no money for this – their philosophy is that the more money we make, the greater visibility they get). There will be wholesale sales to museum shops, airport shops, and any other suitable places. CAISU, with its knowledge of the space sector and

potential markets, will play a key role in defining new markets.

The first line of items is related specifically to Marc Garneau's flight on STS-97. There will also be more generic CSA items available soon, and Chris Hadfield's STS-100 mission is just around the corner. We can add any number of optional items to the agreement, upon CSA approval, and CSA is very open-minded in these matters (astronaut teddy bears, plastic-molded models of the SSRMS in McDonald's Happy Meals, and other great ideas are all in the works).

The revenue available for CAISU is almost unlimited, but is expected to start at $10000-$20000 for the first year and will increase steadily after that. What this does is open the door to many new possibilities we have been dreaming of for CAISU in the past.

This has taken a lot of volunteer hours and we clearly will spend the first revenues on contracting out the web maintenance as soon as we can afford it. We then can start thinking about hiring a CAISU administrator. If we are to grow, we need to be able to offload the CAISU Board from the ever-increasing administrative overhead associated with running the association.

Longer term plans include creating an MSS scholarship program. CFISU has done a wonderful job at maintaining our strong presence at the SSP by making sure that Canadians accepted by CFISU to the SSP receive a full scholarship. No such program exists for the MSS and this needs to change. CAISU is committed to becoming the association that will set this up in Canada. This merchandising project and other projects will enable CAISU to realise this goal.

The plans don't stop there! Your current Board has a lot of vision. It is clear that CAISU has an ever-growing influence on the space sector in Canada. With a membership like ours, we can do even greater things. CAISU, we believe, is now starting its metamorphosis into a professional society as opposed to an alumni association. Our by-laws (available on our web site www.caisu.ca) allow for CAISU to grow to much more. For example, did you know that CAISU has 4 membership classes and we only really use one of them? CAISU could become an association that all kinds of space enthusiasts may want to be linked to.

This is an exciting time to be a member of CAISU. Let us know if you'd like to become more involved in this project or in others.

Annual General Meeting

by Rachel Zimmerman (MSS3, CAISU Secretary)

24 CAISU members attended the Annual General Meeting held in Ottawa on November 4th at the DND Lorne Building (thank you Mike Mckay for arranging the room for us!). Members flew in from as far away as Paris, Colorado, Los Angeles, Houston, Washington D.C., and New Brunswick to attend the meeting and the CAISU conference that followed. Many CAISUers stayed with Judith Lapierre, whose hospitality went above and beyond anyone's expectations. Thanks, Judith!

The election of the new Board of Directors for 2001 was a resounding vote of confidence for the 2000 BOD, as all seven candidates who ran for re-election were chosen. The two vacant positions on the Board were filled by Johanne Heald and Katia Dyrda. Welcome to the new Board members, and many thanks to Brian Rishikof and Sebastien Drouin who served us well in 2000. The 2001 BOD consists of Alain Berinstain, Jonathan Knaul, Isabelle Tremblay, Rachel Zimmerman, Josée Adamson, Chantal Lamontagne, Rob Tarzwell, Johanne Heald, and Katia Dyrda. It is yet to be decided what position each Board member will hold.

CAISU has found volunteers to fill the roles of Project Managers for four new endeavours: the Space History project (Thierry Fontaine), the CSA Merchandising project (Alain Berinstain), Web Developer (Morla Milne), and Canadian SSP 2004 Bid project (Valéry Tessier). These Project Managers will become chairs of subcommittees to further develop each of these projects, and CAISU is actively looking at forming teams around them. If anyone is interested in joining these committees, please contact each project manager individually.

A special thanks to Sebastien Drouin for bringing the CSA Merchandising website online this year. Be sure to visit www.space-boutique.com to see what's for sale. The current online features are Marc Garneau STS-97 items such as t-shirts, hats, mission patches, pins, etc. CAISU gets royalties on all items purchased via the Space Boutique website, so be sure to tell your friends about the site!

(The minutes from the AGM will soon become available on the CAISU website, www.caisu.ca.)

À propos de l'édition 2000 de la tournée de promotion de CAISU

by Isabelle Tremblay (SSP 98, CAISU Treasurer)

Parmi les objectifs de notre association, la dissémination d'information à la communauté canadienne à propos des affaires de l'ISU, ainsi que l'appui à l'avancement de l'éducation et de la recherche dans le domaine de l'espace, sont prioritaires.

En vue de contribuer à cette mission, CAISU organise annuellement une tournée de promotion, qui consiste en une série de présentations ayant lieu un peu partout à travers le Canada. Nos membres, et en particulier les plus récents diplômés des programmes d'été et de maîtrise de l'ISU, participent activement à cet événement. La série de présentations, qui débute chaque année après le SSP, vise à populariser les sessions d'études offertes par l'ISU et à solliciter des candidatures canadiennes pour les programmes de l'ISU à venir.

La tournée de promotion de CAISU est aujourd'hui une tradition bien ancrée dans notre association. Avant leur départ pour le programme d'été de l'ISU, les futurs membres de CAISU participent à un briefing, durant lequel on les informe entre autres d'une part essentielle de leur mission en tant que

représentants canadiens à l'ISU: ils doivent à leur retour partager l'expérience exceptionnelle qu'ils auront vécue avec leur communauté locale. La tournée annuelle est en fait une occasion hors pair pour les nouveaux diplômés d'étendre davantage le réseau de contacts établi à l'ISU et de le mettre à contribution ! Il s'agit également d'un véhicule unique qui permet aux nouveaux diplômés de devenir des membres actifs de CAISU et de s'impliquer de près dans les activités de l'organisation.

En tant que coordonnatrice de l'édition 2000 de la tournée de promotion, j'ai eu le privilège de travailler avec une équipe formidable, constituée des diplômés de la session d'été 2000 (SSP 2000) et de la 5e classe du programme de maîtrise (MSS 5).

La contribution des diplômés du MSS était sollicitée pour la première fois cette année: une expérience à renouveler l'an prochain! En fait, un des objectifs à court terme de CAISU est d'appuyer et de promouvoir davantage le programme de maîtrise de l'ISU et de mieux encadrer les étudiants qui y prennent part. Il est donc crucial que les diplômés du MSS partagent leur expérience en tant qu'étudiants à Strasbourg, et que la communauté canadienne soit davantage mise au fait de toute la gamme d'activités éducatives offertes par l'ISU.

Je tiens enfin à souligner le travail superbe de Katia Dyrda (SSP 00) qui a réalisé le matériel de présentation en format PowerPoint, et de Valéry Tessier (MSS 5) qui en a effectué la traduction. Je souhaite également remercier tous les organisateurs et présentateurs, dont le nom figure dans le tableau récapitulatif ci-dessous.

L'audience moyenne pour chaque présentation est estimée à 50 personnes. L'expérience démontre qu'au moins 3 personnes sur les 50 rempliront un dossier de mise en candidature pour le programme de session d'été, et par le fait même pour l'une des bourses offertes par CFISU. Des résultats probants!

Habituellement, la tournée de promotion a lieu durant l'automne et s'arrête avant le mois de décembre (ce qui correspond aussi à la date limite de l'AUCC pour la présentation des mises en candidatures pour le SSP). À la différence des années précédentes, nous souhaitons maintenant tenir des

Location and audience	Presenters	Date
Canadian Remote Sensing Society (CCRS), Ottawa, Ontario, Applications Division Section Meeting, Professionals	Shannon Ross, SSP 00	September 28
CCRS, Management Meeting, Professionals	Shannon Ross, SSP 00	October 5
CCRS, General presentation, Professionals	Shannon Ross, SSP 00	October 18
École Polytechnique de Montréal, Students	Martin Gascon, SSP 00 Isabelle Tremblay, SSP 98	October 19
Canadian Space Agency (CSA), Saint-Hubert, Québec, Professionals	Marius Ochisor, SSP 00 Isabelle Tremblay, SSP 98	October 24
University of Ottawa, Faculty of Medicine Students	Katia Dyrda, SSP 00	October 24
University of Ottawa, General presentation, Students	Katia Dyrda, SSP 00	October 26
McMaster University, Hamilton, Ontario, Students	Farheen Dossa, SSP 00 Elaine Tan, SSP 00	October 27
McGill University, Montréal, Québec, Students	Carol Chahine, SSP 00 Rémi Duquette, SSP 00	November 1
York University, Toronto, Ontario, Students	Soeren Peik, SSP 98	November 1
Université Laval, Québec, Québec, Students	Laura Sie, SSP 00	November 6
CASI - Ottawa branch, CASI members and general public	Shannon Ross, SSP 00	November 14
Dalhousie University, Halifax, Nova Scotia, Students	Liara Covert, SSP 00	November 14
University of New Brunswick, Frederiction, New Brunswick, Students	Liara Covert, SSP 00	November 16
University of Toronto, Students	Barry Cayen, SSP 00	November 22
University of New Brunswick, Saint John, New Brunswick, Students	Liara Covert, SSP 00	November 23
Carleton University, Ottawa, Ontario, Students	Morla Milne, SSP 99	TBD
Queen's University, Kingston, Ontario, Students	Josée R. Adamson, SSP 99	TBD
École de technologie supérieure, Montréal, Québec, Students	Simon Kruijen, MSS 5	January 2001 – TBC

présentations sur une base continue, durant toute l'année. Avec l'objectif de mieux répartir nos efforts de promotion à travers tout le Canada, et de rehausser la participation aux programmes de l'ISU, en particulier dans l'Ouest, CAISU requiert une plus grande implication de ses membres. Nous avons besoins de vous, membres de CAISU, en tant que présentateurs!

Pour faciliter votre travail, le matériel de présentation, la documentation sur l'ISU et les affiches publicitaires sont disponibles sur notre site web: www.caisu.ca. Un fonds est disponible pour couvrir, par exemple, les coûts de réservation de salle ou de reproduction de la documentation. En échange de quelques heures de votre temps, vous pourrez contribuer de manière exceptionnelle à la mission de CAISU! Pour vous impliquer, écrivez-moi à l'adresse courriel suivante: isabelle.tremblay@space.gc.ca.

Aussi, vos commentaires, suggestions, ou contributions concernant la tournée de promotion sont sollicités. Veuillez les faire parvenir à l'adresse courriel suivante: bod@caisu.ca.

The Dreams Our Star Stuff is Made Of

by Eric Choi (SSP 99)

I'm sure we all remember the little essay about "Why I Wish to Attend ISU" that we had to write for our SSP or MSS applications. Recently, I got to thinking about the bigger related question: What is it that makes us want to get into this crazy space business in the first place? So, I set forth and asked my fellow alumni. The responses I got were sometimes funny, occasionally profound...and always very, very inspiring.

"For as long as I can remember, I have always been interested in space," says Catherine Laurin (Staff SSP 97). "I just always had this feeling that space had something more to offer, something very challenging that I had to explore, that I had to find out more about. And I know now that I am not alone."

Indeed, she is most certainly not.

Many alums were influenced as very young children. "One of my first bedtime stories was called 'The Bears Who Stayed Indoors', which was about a bunch of teddy bears who plan an imaginary trip to the Moon when it's too rainy to go outside and play," recalls Rachel Zimmerman (MSS3). "I always wanted to work at NASA when I grew up, before the Canadian Space Agency even existed."

Like Rachel, Michele Shemie (SSP 94) was also inspired at an early age. "I knew almost forever that I would be doing something in science when I grew up. But my earliest distinct memory was when I was 9-years-old, and some people came to my school to give us a science demonstration. They mixed two clear liquids and they turned purple. My heart was sold from then on". Michele's interest focused on space during her graduate studies. "My research needed the use of microgravity. I was studying dust combustion, which necessitates zero-g for controlled experiments. That gave me the 'using space for the benefit of mankind' bug."

A school event was also what launched Johanne Heald (SSP 96) on her space odyssey. "When I was 8-years-old, I had to write one of those 'What I Want to be When I Grow Up' paragraphs for my Grade 3 teacher. I was determined to break out of the nurse/teacher/soccer player mould of the rest of my classmates. During a 'library period' I wandered into the Science section...and I started looking at the books about Astronomy. One had pictures of the Orion Nebula in it – so beautiful. The book, whose title and author I never noted, implied that astronomers looked at nebulae all the time. I decided to be an astronomer. I wrote a lovely paragraph on the subject, and took it home for parental inspection. My dad – and I'm not kidding, I still remember this! – took me aside after reading it, and explained to me that there were very few jobs for astronomers these days. And I thought, okay, if I can't look at the stars all the time, at least I'd like to see them once. So I told my father I'd be an astronaut instead!"

Alums often cite their early school years as being a very impressionable time for steering them towards the field of space. "My initial interest in space dates back to when I was in Grade 2," recalls Rachel Zimmerman. "My teacher was telling us about the planets in our Solar System, and I remember being fascinated with Venus. My uncle had worked on the guidance system for the Apollo Moon landings, but I was too young to understand the significance of that achievement until I was much older."

Of course, there's nothing like a trip to the Kennedy Space Center to fire the imagination, as Rachel can attest. "My parents took me to KSC when I was pretty young - eight or ten, I guess. That made a big impression on me. I remember the Shuttle's external tank from back in the days when it was painted white."

Movies and TV shows, particularly those in the "sci-fi" genre, influenced the academic and career choices of many alums. It would seem that many of these programs really are, to borrow a phrase from SF writer Thomas M. Disch, the dreams our star stuff is made of.

"I was always interested in space, being 'forced' to watch *Doctor Who*, *Star Trek*, and *Hitchhiker's Guide to the Galaxy* – I never did get that fish in the ear back then – when I was a kid," recalls Chantal Lamontagne (SSP 95). "My dad and uncle were heavy into sci-fi; dad studied engineering physics, and uncle studied physics and had made us stare through his telescope for years. So, I kind of grew up with it. My Dad also worked in Churchill, on the Black Brant rocket program."

Louis-Paul Bédard (MSS3) saw *2010* when he was 14. "That day, I decided I wanted to become an astronaut and go to Jupiter. I never made it either as an astronaut or to Jupiter, but I am now working for the space program."

Catherine Laurin's path to space was also blazed in part by the silver screen. "I would say I really became aware of my interest in space when I was around 10- or 12-years-old. I remember watching the movie *SpaceCamp* for the first time and thinking that space was

really something." Catherine eventually had the privilege of attending the real thing. "I definitively knew I wanted to become involved in that field after I came back from the SpaceCamp in Huntsville, Alabama, when I was 15-years-old. I totally loved everything we did during that very special week My parents even told me afterwards that 'j'ai vécu sur un nuage' for a couple of weeks after. At that point I decided that I wanted to study either space sciences or aerospace engineering. I did not exactly know what was the difference between the two, but I knew there was the word space in both and that was what I wanted to learn more about."

Johanne Heald also attended SpaceCamp when she was 16. "I discovered that I was really good at problem solving and leadership. They gave me the Right Stuff Award, which went to the person 'most likely to succeed' from the session. That confirmed it for me, I guess. Not only was it something that I wanted to do, it was something I was good at as well."

For many, the real-life space program was inspiration in and of itself. Several alums cited the first human Moon landing as the catalyst for their ambitions. "It happened at age four, when I saw the crew of Apollo 11 walk on the Moon," says Gilles Primeau (SSP 94). According to Alain Poirier (SSP 89), "I was impressed by the reality of space travel when Neil Armstrong walked on the Moon. I watched that with my father live when I was 13-years-old."

Canada's exploits in space have also infected many alums with the "space bug". "It happened when I watched the launch of Marc Garneau on TV live," says Éric Lanoix (SSP 99). Chantal Lamontagne's academic career was also influenced by Canada's first astronaut. "In my first year of high school in Ottawa, two Grade 13 students from my school had an experiment that Marc Garneau was to perform on the Shuttle during his first flight in 1984. The excitement of the launch, and the colour photos they all got back, pretty much clinched it, along with hearing all about the Canadarm. When it came time to choose my university program, I read in our local *Ottawa Citizen* newspaper that a new program at Carleton University was being created and had just started enrolling students: aerospace engineering, at the time the only full undergrad aero program in Canada. So I applied, I think shocking the heck out of my Dad, and went into engineering. Haven't left since!"

Rachel Zimmerman also recalls being inspired by Canada's astronauts. "My Dad took me and my little brother to meet Marc Garneau and Roberta Bondar when they came to London, Ontario. I couldn't have been more than 11-years-old or so. I met Steve Maclean in 1985 when he was a guest speaker at the Canada-Wide Science Fair. Who would have guessed that in 1999 I would be working on his Space Vision System? Astronauts are still my heroes."

In perhaps the greatest tribute to ISU, Troy McConaghy (SSP 98) credits his participation in the program with helping to focus his career goals. "I've always had a fascination with outer space, but I grew up on a Saskatchewan farm and the prospect of having a career involved with space seemed remote. I studied physics and applied mathematics at the University of Saskatchewan, but not because I saw that as getting me involved with space. It wasn't until I went to ISU that I discovered all the career opportunities that exist."

And me? One of my earliest recollections is of building a Voyager 1 model out of Lego when I was six, cutting pictures of Jupiter out of *Time* and imagining that my little plastic probe had taken them. The exploration of space has always inspired me, and I have dedicated my life, my academic education, and my career towards that goal. I know now that I am not alone.

"Ships and sails proper for the heavenly air should be fashioned," wrote Johannes Kepler in a letter to Galileo Galilei in 1609. "Then there will also be people, who do not shrink from the dreary vastness of space." *We* are those people, carried aloft on sails not of cloth or rocket fuel, but on the noble wings of our hopes and dreams.

Message from Professor Rod Tennyson, President, CFISU

Judging from the volume of calls we're receiving from prospective students, interest is high in SSP 2001. Much of this no doubt due to the excellent work of CAISU in promoting ISU and CFISU, especially at the "Mini-ISU Day" held in conjunction with the CASI astronautics conference. Congratulations to the organizers for a terrific job!

The transition of CFISU administration from The Impact Group to CASI is proceeding apace, and should be complete this winter. Inquiries about CFISU should now be directed to Marie Juneau at CASI (mjuneau@casi.ca, (613) 234-0191).

I am pleased to announce that CFISU and CAISU have been recipients of a generous donation from alumnus John Criswick (SSP 91). John's donation will be used to send students to SSP 2001 in Bremen and to help with the operation of CAISU. John is characteristically modest about his donation, but I want to assure him of our gratitude and recognition. THANK YOU JOHN!

I look forward to meeting as many of our alumni as possible this summer during the annual send-off dinner for scholarship recipients. Due to the later-than-usual scheduling of the Bremen program (14 July - 15 September) we expect to host the SSP 2001 students the evening of Thursday 12 July. Please mark this date in your calendars.

Finally, as this piece is being written Marc Garneau is making his last space mission to the Space Station Alpha. The success of Marc's mission serves to highlight his own accomplishments and those of the hundreds (thousands?) of people - many of them ISU alumni - behind the scenes who are supporting the mission. Congratulations to Marc and everyone working on STS-97!

Prof. Rod Tennyson
President, CFISU
rod.tennyson@utoronto.ca

The MSS 2000 Design Project

Autonomous Lunar Transport Vehicle A L T V

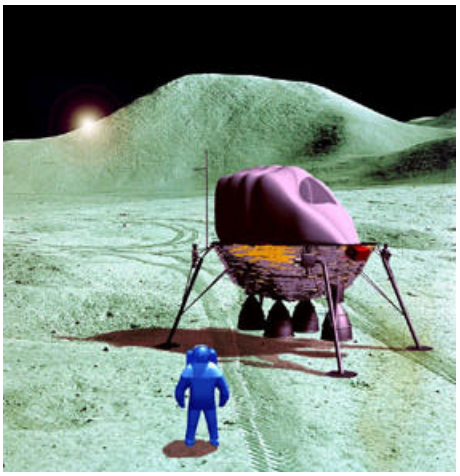
Providing a Link for Scientific Research

by Simon Kruijen (MSS 2000)

The design project undertaken was defined within the scope of Space Transportation for the Twenty-First Century. After an extensive literature survey and series of brain storming sessions, the year 2000 class of the Master of Space Studies program at the International Space University chose to focus on lunar transportation as the topic to be examined. This project involved a detailed preliminary design of what the International Space University - Master of Space Studies 2000 team has named the Autonomous Lunar Transport Vehicle (ALTV). It is a vision of the future. A pre-phase A study of the Autonomous Lunar Transport Vehicle was performed, and is summarized in this article.

The Mission Statement

"To design a crewed transportation system operating between points on the surface of the Moon to support scientific missions."



Artists view of the ALTV on the Moon

Mission Overview

By the 21st century, humans will establish a permanent presence on the Moon. This presence will spawn the need for vehicles to support this new infrastructure.

In this design project, an Autonomous Lunar Transport Vehicle that will operate between two bases in the year 2040 was considered. One base, located in Shackleton crater near the Lunar South pole, conducts geological research and lunar resource utilization. The second base, established in Tsiolkovsky crater on the far side, performs astronomical observations. The primary mission of the ALTV is to reliably and rapidly transport crew or cargo of 550 kg between these two bases, 2123 km apart. Given the long transit time of ground vehicles, a rocket-propelled ballistic hopper was selected. The vehicle was designed to support a payload of up to two crew, two cargo units, or combinations thereof.

The resulting ALTV uses a unified propellant system with the non-toxic and storable propellants H_2O_2 and RP-1. Passengers or cargo are contained in unpressurized units mounted on rails for easy loading, unloading, and mass balancing. The short half-hour transit times, combined with prepared landing sites supported by each base, reduce the thermal and power requirements on the vehicle. Radar ranging, an inertial measuring unit, and a microwave guidance system facilitate accurate and autonomous flight and landing.

The total life cycle cost of the vehicle is estimated at US $ 6.4 B (FY 2000). Given the challenging requirements and conservative use of technology, these costs are modest and indicate the overall feasibility of the system. Technological improvements in the next forty years can only improve this concept.

Overview of the ALTV

- Vehicle can transfer up to 550 kg of payload travailing a distance of approximately 2100 km in 35 minutes
- Standardized, modular interfaces for different payload configurations
- Configurations: 2 crew, 1 crew + 1 cargo container, 2 cargo containers, or empty
- Crew seat designed for excess shock absorption

- Four throttleable main engines with maximum thrust of 45 kN each
- Fuel: RP-1, oxidizer: hydrogen peroxide (H_2O_2)
- Two main engines sufficient for completing the mission
- Dry mass estimated 1150 kg for entire propulsion system

- Passive thermal control system
- Multi-layer insulation
- Mass estimate 5 kg

- Lithium-ion cells
- 28 Volts DC provided by power distribution unit
- 913 W peak power
- Mass estimate 33 kg

- Development costs of US $ 1.7 B (FY 2000)
- First unit production cost US $ 78 M (FY 2000)

- Production cost for 3 units US $ 200 M (FY 2000)
- Operation cost of US $ 1.5 B (FY 2000) per year

- 900 MHz communication frequency
- Data rate 144 kbps
- RF power for vehicle 10 W
- Mass estimate 21 kg

- Flight computer –autonomous flight control (unpiloted system)
- Black box to store all flight data
- Mass estimate 20 kg

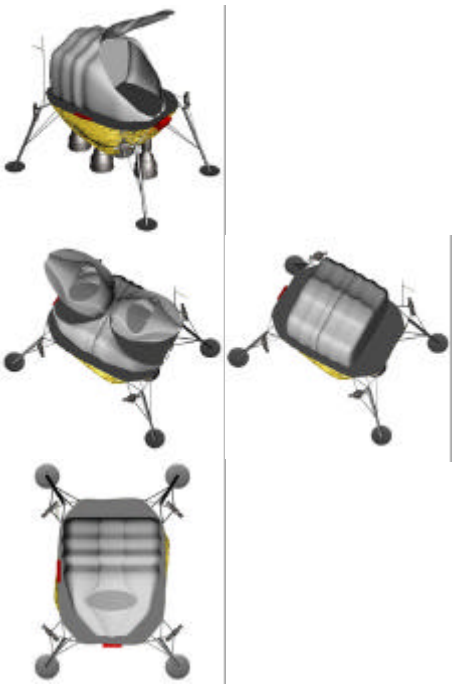
- Navigational accuracy arriving at base of 1 m
- Inertial measurement unit
- Radar altimeter, star imager
- Microwave landing system
- Mass estimate 13 kg

- Truss structure to support loads
- Tanks arranged symmetrically
- Captive rails used to install modular payload
- Mass estimate 320 kg

- Compliant with international space law and United Nations' treaties
- Vehicle designed to safeguard the life and health of persons on the Moon
- Environmentally friendly vehicle
- Warranty for defective vehicle or parts
- Patented design

- Dry mass of 2105 kg
- Wet Mass of 7630 kg
- Height of 4.8 m
- Width of 4.6 m
- Length of 6.4 m

- Reliability of 99.9 % for 50 flights
- Survivability goal of 99.99 % for each flight
- Operation time around 6 hours
- Pressurized payload handling area
- Remote pad location from base, requiring transporter and propellant transfer vehicle



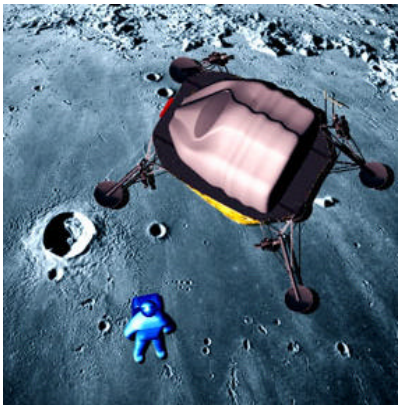
Different configurations of the ALTV

Conclusion of the project

This pre-phase A study has shown the ALTV to be a technically feasible mode of lunar transportation for the Twenty-First Century. The ALTV is feasible, assuming that the projected elements of lunar settlement, technology advancements, intergovernmental cooperation, and positive public interest are all in place by 2040.

The ALTV design philosophy of simple, safe, reliable, repetitive transportation results in vehicle with a maximum payload capacity of 550 kg and a wet mass of about 7600 kg. The ALTV is capable of accomplishing it's mission to transport crew or cargo safely and reliably over a distance of 2123 km. in the rapid time of 35 minutes using a ballistic trajectory with a total ?v of 3.1 km/s. The vehicle is designed to operate for 150 flights over a three year period with periodic scheduled and preventative maintenance. The lunar infrastructure to support the vehicle includes a payload integration area, a hangar and a landing pad at each base, together with additional navigation and communications assets.

The MSS 2000 group hopes that the demonstrated feasibility of this innovative ALTV design will serve to inspire those taking part in lunar development and research over the coming decades. The authors believe that the LunarTech ALTV, its descendants or derivatives, have the potential to make a useful contribution to Space Transportation in the 21st Century, replacing man's small steps with giant ballistic leaps.



Artists view of the ALTV on the Moon

If you want to find more about this exciting project please contact the Master of Space Studies 2000 students at: mss5@isu.isunet.edu. You might also want to visit the MSS 2000 Team Project web page to find an online versions of the executive summary at: http://tp2000.isunet.edu:8000/. The web page contains also more detailed contact information and features downloadable documents concerning the Autonomous Lunar Transport Vehicle.

Space Tourism:

Your Ticket to Ride!

by Barry Cayen (SSP 2000) and Katia Dyrda (SSP 2000)

"The beauty of the cosmos continually inspires wonder and curiosity. Throughout history, space has provided humanity with both practical benefits and fertile grounds for the imagination… Together with future generations, we will be the next explorers to unravel the mysteries of the universe." - The United Nations

Driven by the innate desire for adventure, travel, fun as well as the financial gains that can be made by satisfying this desire, space tourism will become a reality. For such an industry to be viable, advancements in engineering must be made, and, issues regarding law & policy, medicine and business & management must be considered closely. However, ultimately the satisfaction of the clients will be the key to success.

Client Activities

Currently, options for the space tourist enthusiast are to visit a cosmonaut-training centre or a "space camp" to experience a neutral buoyancy lab or a centrifuge. Also available for purchase are parabolic flights and rides on Russian military jets. The future of space tourism will initially involve suborbital flights. As technology improves, it will become financially viable to progress to low earth orbit (LEO) experiences. Activities envisioned include athletics, science experiments and especially viewing the earth. Surveys of those interested in space travel have identified that the duration of a LEO trip should last between 2 and 5 days.

Engineering

Currently, the only two manned launch vehicles in operation are the U.S. Space Shuttle and the Russian Soyuz rocket. Presently, liquid rocket propellant systems have the best combination of performance and versatility.

Near-future options for a sub-orbital experience include a manned balloon which can bring tourists to 50km of altitude and a vehicle such as the proposed Pathfinder, a rocket plane entered for the XPrize that is designed to deliver a capsule capable of carrying 3 passengers into LEO.

For LEO tourism, choices need to be made regarding whether tourists will remain in the launch vehicle for the duration of their experience or be shuttled to a permanently orbiting facility. The latter option will require a larger initial investment, but will be more economically viable as the number of customers accumulates. Other engineering decisions that need to be made include Two Stages to Orbit versus Single Stage to Orbit vehicles, air breathing versus rocket engines and vertical versus horizontal takeoff and landing. The high-inclination orbit required to see the home countries of many of the clients must be weighed against the increased radiation exposure from the South Atlantic Anomaly. Space debris, the level of vehicle autonomy, technological reliability, maintenance, ground support and environmental concerns are issues that need to be explored.

In the far future, the major limitation to interstellar space travel will be the attainable velocity. For this to be overcome, advancements in physics are needed to realize such theories as ramjets, nuclear propulsion, plasma propulsion, solar and laser sails, electromagnetic mass drivers or harnessing antimatter energy.

Business & Management

Although tourism is the world's leading economic contributor and adventure tourism is growing rapidly, few companies (such as Space Adventures) are currently planning sub-orbital flights. The barrier is the large initial investment required for the research and development (R & D) of a reusable launch vehicle. Market surveys suggest that ticket prices below $50,000 are necessary for a sustainable space tourism industry. Based on current technology however, the price for a sub-orbital space trip is more likely to be $550,000. It is recommended that space adventure companies initially target young, wealthy adventure-seekers and corporations who are looking to offer incentives to their employees.

Since R & D for space-tourism technologies is too long-term a venture for the private sector, co-investment by governments are needed to spark a surge in privately-run space tourism development.

The Medical Perspective

Tourist selection processes must be less stringent than those for current astronauts. The presence of active disease states and the inability to perform emergency egress procedures will likely be criteria for exclusion. Clients should be given basic first aid training and psycho-social training for issues such as claustrophobia, appropriate hygiene and teamwork skills. Life support systems and habitable volume specifications will be directly related to the duration of the space experience. Space motion sickness (SMS) will likely be the largest barrier to client enjoyment. The development of medications and ground training to limit such effects are needed. Countermeasures against orthostatic intolerance will be necessary before the return to earth. Although minimal loss of muscle and bone will be experienced during 5 days of 0-G exposure, daily exercise is recommended. A medically-trained in-flight staff member, an emergency escape vehicle and medical ground support will all be necessary for a

space experience lasting longer than a few hours.

Policy & Law

Governments must establish the appropriate technological, regulatory and financial environment in order to encourage private companies to invest in space tourism. Certification and licensing of spacecraft will be necessary in order to limit the liability of the host country for damages as outlined by current conventions. The adaptation of aviation, environmental and criminal laws to space are necessary. The derogation of the Non-appropriation Principle of Outer Space needs to be considered.

From Dream to Reality…

The gap between the current cost of launches and the costs needed to make space tourism a self-sustaining market must be closed. Government co-investment with private industry will help overcome the barriers to the development of new, cheaper technologies. When ticket prices decrease, customer demand will increase, sustaining the industry. As reliable as the phenomenon of technological advancement, so will the dream of space tourism become a reality.

Canadian students who participated in this design project included Barry Cayen, Fahreen Dossa, Katia Dyrda, Arif Janjua, Raffi Kuyumjian and Elaine Tan.

ENSO: A Global Challenge and Keys to a Solution

by Rémi Duquette (SSP 2000)

ENSO: A Complex Phenomenon

El Niño and the Southern Oscillation (ENSO) is an interaction between the atmosphere and the ocean that occurs every two to seven years, and lasting one to four years. The Southern Oscillation refers to a change in atmospheric pressure between the eastern and western halves of the equatorial Pacific Ocean. That variation is closely related to El Niño and La Niña climatological events.

The ENSO phenomenon is not a recent climatic development. Studies of coral reefs have proven that it has been a persistent event recurring for thousands of years. In 1567, fishermen off the coast of Peru first identified the phenomenon when they recognized the appearance of unusually warm water in the Pacific Ocean. Because these warm water events tended to appear near Christmas, sailors named the phenomenon El Niño, which signifies the Christ child in Spanish culture. La Niña means “little girl” in Spanish. The media coined the term during the 1988-89 event that occurred during winter in the southern hemisphere and followed the 1987-88 El Niño event. La Niña is characterized by unusually cold ocean temperatures along the Pacific equator.

Normal climatic conditions in the Pacific Ocean are characterized by strong trade winds. The east to west direction of the winds along the equator is produced by the interaction between a low-pressure system in the western Pacific and a high-pressure system in the eastern Pacific. Colder waters are typical along the Pacific coast of South America while warmer waters are typical along the western equatorial Pacific. The cold, nutrient-rich waters along the Pacific coast of South America have abundant marine life. In these normal conditions, the Pacific coast of South America is relatively dry.

El Niño is a disruption of the ocean-atmospheric system in the tropical Pacific. It results in significant consequences in weather systems around the world, including increased rainfall across the western coast of South America (causing destructive flooding), drought in the west Pacific, and devastating brush fires in Australia. El Niño is characterized by diminished (or even reversed) trade winds. During El Niño events, the winds at the equator blow from west to east in the Pacific. These winds travel along the surface of the ocean and bring warm surface water, heated by the tropical sun, to the western coasts of North and South America. Rainfall follows the warm water eastward and results in flooding in Peru and drought in Indonesia and Australia. A key indicator of El Niño is unusually warm ocean temperature along the Pacific coast of South America. Equatorial interval waves may accompany an El Niño onset, providing another indicator. Typically, El Niño warming starts late in the boreal spring, reaches a peak at the end of the year, concludes by the following summer.

ENSO-related changes in ocean temperatures also affect the atmosphere, resulting in climatic changes that are experienced throughout much of the world — not simply within the tropical Pacific region. Hot, humid air over the ocean fuels tropical thunderstorms. As the temperature of the air increases, the thunderstorms become more powerful. As the Pacific's warmest water spreads eastward, powerful thunderstorms move with it. These thunderstorms pump warm air and humidity more than 15 kilometers into the atmosphere. El Niño essentially changes the position of jet stream winds, resulting in unusual weather patterns around the world.

Cyclical warming and cooling patterns in the eastern and central Pacific produce a distinctive signature in the form of changing sea-level atmospheric pressures. That change can be measured by comparing pressure in Australia and Tahiti. Those measurements are used to generate an index number. A positive index number correlates with La Niña (or ocean cooling); a negative index number correlates with El Niño (or ocean warming).

Effects of ENSO

During ENSO-related events, populations in nations on the Pacific coast of South America are subjected to floods, droughts, storms, and mudslides. Population growth, poor infrastructure, political instability, and the location of communities in hazard-prone areas are a few factors that exacerbate the impacts of ENSO. Furthermore, hazard mitigation for poor populations has not been a high priority on the policy agenda of most countries. The result is that comparable ENSO

events are potentially more destructive today than they were a century ago.

ENSO has significant impact on Colombia, Ecuador, Peru, and Chile. Several benchmarks are used to indicate the magnitude of the adverse effects of ENSO events, including: the number of lives lost; the number of persons displaced; the value of economic damages; and percentage of Gross National Product (GNP) lost. For example, during the 1997-1998 El Niño event: 22 Chileans lost their lives to ENSO-induced floods; approximately 650 people in Colombia, Ecuador, Peru, and Chile were killed due to ENSO-related effects (e.g. mudslides, floods, and storms); approximately 70,000 families were forced to flee their homes; economic damages exceeded US$5.8 billion; and the estimated percentage of El Niño-related GNP losses was 0.15% for Chile, 1.19% for Peru, 11.41% for Ecuador, and 0.57% for Colombia.

On the Pacific coast of South America, ENSO has significant impacts in three broad sectors — physical infrastructure, industry, and public health. There are significant discrepancies within available information regarding the effects of previous ENSO events. Those differences are largely dependent on how long after the event the statistics were compiled and who published the data (government vs. non-government organizations).

The effects of ENSO on agriculture are strongly felt because that sector constitutes a significant portion of the overall GNP of Chile, Ecuador, Peru, and Colombia. For example, the 1997-1998 El Niño event was responsible for over US$113 million of losses to Chilean fisheries and approximately US$1.5 billion of losses to Ecuadorian farmers. Throughout South America, heavy rains, landslides, and floods damaged existing roads and bridges, severely disabling transportation networks. In Colombia, ENSO was responsible for US$315 million of damages to transport, energy, and water resource infrastructure. The ENSO phenomenon's impact on public health has been shocking. ENSO is blamed for a sharp rise in infectious diseases and the appearance of new illnesses. The World Health Organization (WHO) has reported "quantitative leaps" in the incidence of malaria around the world, coincident with extreme weather events associated with El Niño. Following the latest El Niño, hundreds of cases of malaria were reported in northern coastal regions of Peru and an outbreak of cholera took place in northern Chile.

In view of these impacts, a substantial investment in mitigation is easily justified. However, mitigation efforts require a great deal of cooperation among institutions, governments, local authorities, and the public. Following the 1982-83 El Niño event, governments began appreciating the necessity of preparing for upcoming ENSO events. The main obstacle is that it is difficult to produce localized country predictions because ENSO conditions are constantly changing. For example, in 1997-98, Peru distributed approximately US$300 million to the northern region of that country (the hardest hit during the 1982-83 event) to prepare for ENSO — however, the northern region of Peru was not hard hit by that El Niño event. Therefore, it is clear that the effectiveness of ENSO preventive measures depends on the reliability of prediction systems and on the ability of regional, national, and international initiatives to meet the needs of the people via inter-sector coordination measures.

Benefits of Technology

State of the art technologies are used in industrialized (and to some extent in developing) countries to monitor and predict weather dynamics and to mitigate the effects of climatic hazards. These technologies have been separated for purposes of this report into modeling tools, forecasting applications, and data gathering systems.

Modeling

Analysis of the ENSO phenomenon is complex due to the many natural factors involved, which are difficult to observe, measure, and predict. Current research is geared towards a better understanding of the physical processes, better predictions, and improved hazard mitigation tools. Recent advances in data acquisition and distribution techniques can help to achieve these goals, but only if ways are found to apply them more effectively in vulnerable countries.

To predict climatic behavior, oceanic, and atmospheric models are used. The prediction system utilizes an integrated assembly of models, data management, and procedures used to produce the prediction. However, predictions are still imperfect. One problem is the uneven distribution of critical data such as sea surface temperature, sub-surface temperature, and wind velocities. Better data gathering devices, a denser network of them, and more consistent use of existing satellite systems could improve that situation.

Different organizations are able to produce relatively reliable global forecasts for time periods of approximately one year. The diversity of forecasts and sources, though, makes it difficult to ensure a reliable channel that transmits the information to the end user. In addition, the forecasts need to be transmitted to the local level with a higher degree of accuracy to be usable by local planning authorities. That local data is also needed for other technological applications used to mitigate the effects of climatologic hazards.

Applications

To mitigate the impact of climatic hazards on people and property, early warning and expert systems have been developed. Early warning systems are used to produce short-term alerts regarding incoming hazards. They provide a means for warning the public and for allocating resources to minimize damages. One such application is to detect the propagation of equatorial waves in the Pacific Ocean as a signature of El Niño development.

Expert systems provide advice and recommendations regarding what long term measures should be adopted to combat ENSO. These systems can be used within the agriculture sector to make recommendations concerning

crop management planning and within the fisheries sector to provide predictions relating to the distribution of specific fish species.

Geographic Information Systems (GIS), including satellite images, are used to provide data inputs for both early warning and expert systems. They can be used in infectious disease outbreak risk systems and fire prevention systems.

Data Gathering

Providing sufficient data to the prediction models, early warning systems, and expert systems is a critical issue. The data must be obtained frequently, precisely, and with sufficient resolution and coverage. Space assets play a crucial role in that process. Current satellites (managed primarily by NOAA, NASA, ESA, NASDA, ISAO, and CNES) operate to gather physical data of the environment. However, that data is often difficult to access. Moreover, critical information is sometimes sold at high prices that make it too costly for some developing countries to purchase.

In addition to space assets, data is gathered by airborne, oceanographic, and terrestrial systems. Integration of the data provided by these systems would be impossible without the help of space assets. A clear example is the data obtained from the thousands of drifting and moored buoys distributed throughout the ocean. Those buoys collect sub-surface data and transmit it to orbiting satellites that relay the information to ground stations and collection centers.

Airborne systems are useful to obtain necessary data that current satellite technology does not provide accurately. Balloons and dropsondes are used to obtain vertical data profiles in the atmosphere, crucial in atmospheric models.

Our study has shown that there are no critical gaps in space assets for ENSO. However, there is inadequate integration of that data with existing ground-based systems. This does not imply that additional or more advanced satellites are not needed. Instead, it suggests that currently there is inefficient usage of available systems and data. Coordination among institutions is needed to increase the availability and use of ENSO-related information. Continued investments should be made in early warning and expert systems to improve mitigation of climatic impacts within vulnerable populations and economic sectors.

ENSO – The Next Episode

The private sector of Chile recognizes the importance of remote sensing technology to increase the efficiency of different economic sectors. Consequently, consulting companies that offer GIS systems have been developed. The most active sector is fisheries, which relies heavily on remote sensing. However, applications of long-term weather forecasts are still lacking in agriculture, hydroelectricity, and other sectors of the economy.

In the academic arena, a number of organizations in Chilean universities are working with ENSO projects but there are few people dedicated exclusively to that area of research. There appears to be a lack of curricular plans in oceanographic and atmospheric sciences and these are not well integrated into courses on society, economy, technology, and political science.

Overall, we observe a general lack of coordination among the institutions that are studying or could study ENSO and the decision makers who could use long and medium term weather prediction, such as the state ministries and economic sectors of the country.

The next ENSO episode will occur within the next three to four years. Developing countries of South America need to take action to avoid the disastrous impacts felt during the 1997 El Niño event. The continued exchange of expertise and data between developed and developing countries is a vital ingredient for designing an effective ENSO mitigation framework. Therefore, it is hoped that the north and south, the developed and developing, can merge their effort and learn from each other to mitigate the suffering caused by the ENSO phenomenon.

Canadian students who participated in this design project were Frédéric Bourgault, Carol Chahine, Liara Covert, Rémi Duquette, Martin Gascon, Marius Ochisor, Laura Sie, and Shannon Ross; Noemi Nagy (SSP 93) was their hard-working TA.

Greetings from the Rainy City of Strasbourg!

by David Phillips (MSS6)

The MSS6 Canadians have been recently lobbying for an updated copy of the MSS promotional material, containing a warning about the perpetual "liquid in a gravity well" experiments that the Strasbourgeois seem to enjoy so much. We're hoping that the experiment continues through the next few months, so that the Canadians can observe the "frozen flakes" component of the experiment. With the Christmas Market and all the lights being set up downtown, the addition of "white condensate" will add to the ambiance greatly.

Needless to say, we're trying our hardest to be active observers of this great climate experiment, as well as the local environment. I had to add the word "trying", because the forces that be are doing their hardest to keep us from our observations. Group projects (three at a time), many lectures, with many amazing lecturers, as well as many nights participating in cross-cultural beer tasting experiments with the Irish (Times, that is), seem to be adding up to quite a busy schedule. Fortunately, we are managing to greet those challenges aptly, and have even excelled at the Wednesday night trivia quiz that we're forced to take (this week marks the second ISU victory this fall). Oh, and of course we're all learning about remote sensing, telecommunications, aerospace medicine, law, 70's soap operas, satellite design, teamworking, and all those other things that makes ISU so valuable.

Actually, as a Canadian contingent, we really could use the help of the rest of the Canadian alumni; tomorrow night is an intercultural night, in which we Canucks get to spread the word about

the glory of being Canadian. However, defining Canadians is not an easy task. We've come up with: Beer, Donuts, the Great White North and the Great Outdoors, Moose, Beavers, Touques, Eh?, Sorry, Canoes and Poutine as some defining features of our heritage. Any other suggestions would be greatly appreciated. Thank goodness that Sleeman's is sold in Strasbourg, otherwise we might be entirely at a loss for finding true Canadiana to share with the rest of the class.

Unfortunately, I can't continue telling you about all the wonders that we're experiencing daily, although I'm sure you'll hear about them in future updates and through contacting us directly. We're all starving for the latest Leafs' score, and we're curious about the result of the election (not to mention happy that it won't be as long and as sordid as the American affair). Instead, we're all working madly on the team project and finding placements for February, though we have plenty of time to be jealous of those going to the Garneau launch.

With that said, we wish you all well, and look forward to hearing all about the upcoming plans CAISU has in store.

Au revoir!

The MSS6 Canucks

Reminiscing about my Aerospace Medicine Elective at Kennedy Space Center

by Angelina Guzzo (SSP 99)

I am currently in my fourth year of medical school at McGill and had the fortunate experience of being sponsored by the Canadian Space Agency to pursue an Aerospace Medicine Elective at the Kennedy Space Center (KSC) during October and November, 2000.

Arriving at Cocoa Beach on the Saturday before my elective started allowed me two days to explore the community which had so much of its own history wrapped into the US space program. I lived a block from the beach and was amazed when I was able to go for a run along the beach on Sunday morning and have a clear view of the Atlas launch pads directly in front of me. The sense of awe on that day was the prelude to a very fascinating two months. On the Monday morning of my first day, I drove on the KSC causeway and saw the signs labeled “3 days to launch.” This was to be the first shuttle launch that I would see and I was anticipating it with excitement. As we were given an orientation to KSC on the first day by the flight nurses, Ivonne Garcia and Cathy DiBiase, I was introduced to Dr. Norm Fields, a microbiologist, who was planning to do some water sampling from the orbiter that night at 2 AM. He kindly invited Mike Speckhart, another medical student, and myself to join him. We met Norm at the microbiology lab at 1 AM. We got into the van, drove to the launch pad, dressed up in our bunny suits and took the elevator 175 feet up and entered the White Room. What a great surprise when we were invited to crawl around the orbiter and sit in the Commander and Pilot’s seats as some of the check outs were being performed! Once the water was collected we went back to the microbiology lab where Norm plated the water samples.

The STS-92 launch was scheduled to go on October 5, but after several scrubs, it finally launched on October 11 with its crew of seven. During that time Mike and I got started on our research projects supervised by Dr. Phil Scarpa. The choice of research projects at Kennedy Space Center was very open. I was interested in working on telemedicine and Mike was interested in working on a differential diagnostic program. We decided to collaborate on a project to devise an autonomous telemedicine system that would diagnose and recommend treatments for illnesses and injuries that could affect an astronaut during a mission with the eventual goal of using the program during long duration missions. We identified what is currently available, its limitations and what technology would be required in the future before such a system would be possible.

The launch had been delayed by several days due to structural problems and bad weather conditions. On October 10, the first attempt at a launch was finally scheduled. The crew is placed in quarantine in the crew quarters as part of the NASA health stabilization program to minimize illness during their mission. The crew quarters are in the O&C building where I worked so at 4 PM on October 10 I was able to see the crew walkout. Later that evening I joined the triage team that is put in place as part of the KSC emergency medical plan. At the triage site we were informed that the launch had been scrubbed. However the STS-92 mission finally occurred on October 11. As part of the triage team, we were deployed to a triage site from where we witnessed the launch. It was spectacular. The STS-92 mission went very well but the landing was delayed by up to three days secondary to bad weather conditions making it impossible for a landing at KSC. Space shuttle Discovery finally landed at Edward’s Air Force base. The orbiter had to be transported back to KSC on top of the NASA 747; this was a rare opportunity to witness because it was last done 22 missions prior to STS-92. The 747 and the orbiter then rolled into the mate-demate facility for separation in preparation for Discovery’s transport to the orbital processing facility.

After the completion of the STS-92 mission, preparations were being made for STS-97. The rollout of the space shuttle Endeavour from the Vehicle Assembly building to launch pad 39B started at 7 AM. I was in awe as I watched the crawler proceed out of the building with its 18 million pound load. I had many opportunities to take photos because the crawler moves at 1 mile per hour and takes about 6 hours to get to the launch pad. That evening I drove to the launch pad to view the orbiter before the arm was rolled in place. About one week later the crew of STS-97 arrived at KSC for a mock trial of launch day. In the morning we were permitted to watch the suit up of the astronauts. This was special for me because I was able to see Marc Garneau.

Pilot Lina!

Blast off of STS-92

Discovery landing at KSC after transport on top of a NASA 747

747 and the orbiter rolling into the mate-demate facility

Rollout of shace shuttle Endeavour for STS-97

Endeavour on launch pad 39B

Suit up of STS-97 astronauts, including Canadian Marc Garneau

Astronaut Lina!

The elective also included many interesting lectures such as space physics and decompression sickness by Dr. Art Arnold, as well as many interesting tours of the launch pad, vehicle assembly building, orbital processing facility and the launch control complex. KSC is situated on a wild life reserve so it was never a surprise to see unique varieties of birds and marine life.

One of the primary goals of my elective was to learn about Aerospace Medicine and in particular about being a flight surgeon. The most important aspect I learned is that a career in Aerospace Medicine is diverse and challenging. The field is still very new and provides many unique opportunities not available in other areas of medicine. For example, another project I worked on was to help design a neck collar for the astronauts to be used if any cervical spine injuries are suspected while in their space suits. This allowed me to collaborate with the biomedical engineers and the prototype design office. I also participated in a film directed by Nidal El Rimawi, a Canadian born flight surgeon, who is currently working at KSC. His film entitled "Guardians of the Gateway" depicts the role of the medical team at KSC. I acted as one of the astronauts in a scene in which we had to escape from the launch pad in one of the baskets and run to the bunker to await transport in the M113. This was a very exciting elective which I hope I conveyed in writing this article. Unfortunately I had to leave five days before the launch of STS-97 and missed the opportunity to see the launch and catch up with many of my ISU friends. I am looking forward to hearing about your experience while at KSC! Any questions about this article can be directed to guzzo01@med.mcgill.ca

Mars Society Convention in Toronto

by Audrey Robinson-Seurig (SSP 91)

Approximately 700 space enthusiasts attended the Third International Mars Society Convention at Ryerson University in Toronto on August 10-13, 2000. Throughout the exciting four-day event, various scientific, social, and technical aspects of Mars exploration and settlement were presented and discussed.

Convention Summary

The Convention highlighted the latest reports about the Mars Society's first major project, the Flashline Mars Arctic Research Station. During the Summer of 2000, the Flashline Mars Arctic Research Station was assembled on Devon Island in the Canadian Arctic. The first "shakedown" simulation of a human Mars mission was completed at the research base shortly before the Convention. Convention attendees viewed pictures of the construction of the research base as well as coverage of the "shakedown" simulation.

Twelve plenary addresses were delivered, including presentations by astronauts John Grunsfeld and Scott Horowitz. Plenary debates addressed issues such as "Martian Meteorites and Evidence for Life on Mars." The conference also featured the premiere of an excellent movie about the Mars Society by filmmaker Sam Burbank. At the Saturday night banquet, Karen Lindsey sang "The Pioneers of Mars," her winning entry into the Mars Society's Rouget de Lisle contest for a Martian anthem, which she composed with her beloved collaborator, the late Lloyd Landa. ("The Pioneers of Mars," along with the other top ten entries of the Rouget de Lisle contest, can be downloaded in MP3 format from the Mars Society website at http://www.marssociety.org.)

During the Convention, over 130 talks were given, including some by ISU alumni. Roland Seurig gave a talk about the International Mars Mission design project from the 1991 ISU Summer Session Program. Dr. Judith Lapierre presented her research findings from her isolation chamber experience in Moscow, which repesents a model for studying the social ecology of long-term space flights. Dr. Chris Sallaberger presented "A Canadian Contribution to Mars Exploration" and demonstrated prototype robotic spaceflight hardware from MD Robotics in Brampton, Ontario. Eric Choi delivered a survey of terraforming in science fiction.

After the free public panel discussion about the next steps for Mars exploration, about 20 ISU alumni, Mars Society members, United Nations Space Generation Forum attendees, and their friends gathered at a nearby restaurant for a late-night meal and socializing.

Many Convention attendees and some members of the general public visited the ISU educational outreach display in the exhibits and vendors area. Funded by CAISU and ISU, the display featured

ISU posters, CAISU T-shirts, an ISU core curriculum textbook, order forms for the ISU design projects, issues of Cosmonotes, and the new ISU program brochures. CAISU members Jonathan Knaul, Sebastian Drouin, Eric Choi, Roland Seurig, Audrey Robinson-Seurig, and Judith Lapierre helped to set up and staff the table. Alain Berinstain and Brian Rishikof provided assistance in locating funding. As the Liaison between the Mars Society Toronto chapter and ISU, Audrey Robinson-Seurig coordinated the effort to establish this ISU educational outreach display.

The conference was closed Sunday afternoon with a short speech by Mars Society president Dr. Robert Zubrin. After citing Tsiolkovsky's quote that "the Earth is the cradle of mankind," Zubrin compared the Solar System to the schoolyard, and the universe to the wide world of adult life. According to Zubrin, we are living at the dawn of human history, and 1,000 years from now, numerous new branches of human civilization will be circling stars in this region of the galaxy. The people of these civilizations will have knowledge and technologies that would seem as remarkable to us as ours would to someone living 1,000 years ago. "Yet however far they go," he said, "they will always remember their first day of school, which occurred this summer, on Devon Island." In response to Zubrin's remarks, the audience applauded fervently.

Future Directions for the Mars Society

In a meeting held during the Convention, the Mars Society Steering Committee voted its support to expand the Devon Island effort into a global program of Mars analog operations research. Up to three new research stations would be planned for diverse locations worldwide, such as the American Southwest, the Australian Outback, and Iceland. These additional stations would allow a greater quantity and variety of Mars operations field research to be conducted throughout the year. They would also involve a much larger number of Mars Society members and broaden the extent of public awareness about the Society. Furthermore, the Steering Committee decided that the Society should begin steps toward the funding of actual Mars missions. As its initial effort in this direction, the Steering Committee decided to seek ways to help fund a microscope to be carried to the surface of Mars by the Beagle 2 spacecraft in 2003.

The Mars Society will hold the Fourth International Mars Society Convention at Stanford University in Stanford, California, on August 23-26, 2001.

For more information about the Mars Society and the Flashline Mars Arctic Research Station, please refer to my earlier articles in Cosmonotes or see the Mars Society website http://www.marssociety.org.

ISU Chile-Kourou (French Guyana) Space Centre Tour

by Liara Covert (SSP 2000)

On September 2nd, 2000, a group of 15 enthusiastic ISU SSP 2000 students, 3 teaching Assistants and some faculty, as well as 6 Chilean guests, set out from Santiago, Chile for the tropical paradise of Cayenne, French Guyana to discover the ESA-CNES-Arianespace Launch Centre. Liara Covet, Martin Gascon, Morla Milne, and Elaine Tan formed the Canadian contingent. The travel itself was somewhat of an adventure, because it required stops in Sao Paolo and then an overnight in Belem, Brazil, before the last leg of the journey to Cayenne was undertaken. An overland bus was then caught for Kourou, and gave participants memorable initial impressions of the landscape. Other participants joined this group in Cayenne for the Land portion of the trip only. The total group was 33 people. Arianespace, ISU the ESA-CNES Centre Spatial Guyanais (CSG), and some private donations sponsored the educational trip for some of the ISU students. The American company Space Adventures, as well as Guyane Espace Voyages and ISU Alumnus Juan deDalmau, put together a fantastic itinerary for the 4 day stay.

On the first day, the group enjoyed a complete bus and on-foot tour of the Spaceport facilities. Upon arrival, a surprise group photo was taken with Pierre Moswa, Director of CSG, in front of a life-size Ariane 5 model. The tour that followed included the Jupiter Mission Control Centre, a presentation of the European space adventure in the French Amazon, the Ariane 4 & 5 launch pads and Ariane 4 preparation building. A traditional Creole lunch in the local outdoor café, "Chez Lourdy" was a refreshing break in the middle of informative presentations by on-Spaceportsite officials, the visits to the space museum and other local buildings. A welcome reception and dinner gave everyone in the Kourou tour the opportunity to get better acquainted. Later of course, some of us took time to enjoy more local surroundings…

On the second day, local history was the initial focus. The tour group took a shuttle boat to discover the well-known Salvation Islands located 7 miles north of the town of Kourou. These people enjoyed a guided tour of Royal Island, where they had the chance to explore and learn about the penal ruins of the transportation camp, the Guard house, key room, kitchen, church, hospital, cemetery, and life of hangmen and slaves. Highlights included experiences by those of us who decided to see first-hand what solitary confinement was like, tasting coconuts we opened on jagged rocks, and also those of us who took in complimentary island scenery through walking tours and swimming in wild, transparent water after lunch. Everyone had to evacuate the island by mid-afternoon because of the night scheduled, Ariane 4 launch. Thus, we had time to get back to the mainland and be transported to our VIP viewing site at AGAMI. Spectacular experience! Lots of pictures were taken and the event was also partially video-taped by members of the group.

On the third day, discovering the French Guyana Amazon became an all-consuming experience.

After a morning of diverse activities, we headed to Roura for lunch in the company of local birds, and an

afternoon adventure touring the Gabriel River. Picture it: our group split up to fill two long, dugout canoes. We took off down a winding river where we passed a few native villages, and admired the underside of 2 historical bridges. Some of us were fortunate to sight wildlife high in the branches of the overhanging jungle. Others among us concentrated more on trying to decipher the kinds of vegetation surrounding us. One memorable point was slowing down to see an army of thousands of ants climb a river bank carrying pieces of leaves above their heads in a very orderly fashion. Another highlight was when the barefoot captain of one of the canoes walked unexpectedly up along the gunnels of one side with a machete. He hopped off, scurried into the jungle and came back with a large chip of local rosewood for us to smell and discover. As it happened, we turned around before we arrived at the crocodile swamp. Instead, we headed briefly toward Roura and Cayenne, before stopping in convoy mid-river to experience a local tradition.

On the fourth day, before late afternoon departure, the majority of the group headed into Cayenne to visit the fruits and spices market. Local talent was demonstrating how to make traditional crafts and some of us picked up samples for souvenirs. A few of us stayed back to take in a last glimpse of the Guyanais Spaceport. We re-grouped for the luncheon by the ocean outside Cayenne. Not only was the food delicious, but the meal was extra special because of the disguised carnival dancers who arrived to add some flare and excitement.

For those trip participants who headed back to Santiago, there was a 10 hour layover in Sao Paolo. Flavio de Azevedo Correa Jr. (an ISU alumnus) kindly arranged a tour of the Brazilian Space Agency facilities. Key events included the chance to have a tour of INEP to learn about what kinds of environmental applications space technology currently has in Brazil to help protect rainforests, and also the opportunity to have had a tour of the key satellite testing center.

Participants all enjoyed this organized tour very much and would look forward to the ISU-Kourou trip possibly becoming a tradition! A special thanks should go to Juan deDalmau for making it happen for the first time!

Enhancing Youth Participation in Space Activities

by Mark Dejmek (SSP 97)

This past September 11-14th, a small group of international youth space activists gathered in a familiar local in Graz, Austria called the Hotel Academia. They were assembled for two reasons: (a) to participate in a United Nations conference on "enhancing the participation of youth in space activities", and (b) to develop the statutes of a United Nations youth space organization whose objective would be to implement the recommendations developed at the Space Generation Forum (SGF) last summer.

Even before arriving, some of us caught up with each other in the first class cabin on the flight to Graz. It seems that for all the effort in placing resources where they are most needed, the UN inconspicuously provides specific individuals [ahem, with legal backgrounds] different class airline tickets. -) On a very positive note, these same individuals were compelled to purchase the first round of drinks once any social festivity began. Prior to buckling down for work, our first intercultural event was a randomly selected but wonderful introduction to the experience of holy matrimony "a la Ostereich". It seems that when an Austrian woman gets married, a group of friends take her out into the streets and have her complete a list of tasks outlined in a personally handcrafted sketchbook. On this particular night, the lucky young woman was required to: drink a list of different alcoholic beverages (not too different from an ISU culture night), dance on the bar of various local social establishments (ok. Still ISU in many ways), cut slices off of various pieces of outer clothing from male strangers (maybe stretching the ISU "personal space" bubble here), and finally pasting various slices of men's inner clothing garments (i.e. the next thing I knew, my briefs were shredded!) in her sketchbook as proof of her accomplishments. We also learned that the groom is traditionally contacted via cellular phone to provide updates as to the bride's success throughout the evening! Our Austrian ISU hosts were even short on words when asked to describe the full complement of activities. After the harassment ended on our helpless group of 21st century men (ok. ok. There *was* one who tried to convince the bride-to-be to run away with him.), I'm sure I heard someone blabber in the early morning hours: "then again, this is what happens when ISU neuron-cells get together".

Work began the next day (day before the conference). We broke out into two sessions to tackle the responsibilities, objectives, structure, and international voting protocol of an eventual UN youth space organization. A working document was circulated prior to arrival to get the international community thinking about these issues. The scope of our debate included: the benefits of non-governmental status, United Nations status, the strength of the world's youth passionate about space, how to best avoid becoming a UN bureaucracy, whether this last point can be avoided, what structure would best suite our needs, what the exact objectives and goals of the organization would be, who would be responsible for what, whether a list of specific SGF recommendations to be implemented should be drawn up, and whether the organization would even be responsible for implementing these recommendations! Apart from this maze of issues, I had my own questions to answer. I reflected back to a conversation that I had two days before with a fellow CAISU member in which we passionately debated the usefulness of the UN Committee on the Peaceful Uses of Outer Space (COPUOS). Furthermore, we ended the evening with the question "Are you sure that this youth organization won't be competing for national and international funds with ISU?"

By the end of the first day, we persevered through the first hurdle of

issues and were reasonably pleased with the draft stitched together. We knew that subsequent nights would be even longer and would include more debates encompassing: why an international organization couldn't define and be responsible for voting procedures within a specific country, what the name of the organization would be and the rationale behind selecting that name, revisiting the age issue, and whether we needed to adhere to consensus decision making procedures when they are currently stated but not particularly adhered to at many UN offices. Admittedly, this last issue is a hindrance to making [quick] decisions within any [international] body - something that must be dealt with if we want the body to be an effective "action oriented" organization. However, after a few emotional sessions that went early into every morning, many positive remarks and daily successes, clarifying many interdisciplinary details, and with the guidance and "neutral statements" made by the Director of the Space Applications Office at the Office of Outer Space Affairs (OOSA) in Vienna, the organization's Guidelines were successfully agreed upon and passed over to our OOSA representative with flying colours. It was understood that the result of this exercise would bring permanent status to an organization that is currently formed by an interim council.

As for the conference, opening ceremonies were held on Monday morning with statements made by representatives of the TU of Graz, the Austrian Federal Ministry for Foreign Affairs, the Ministry for Transport, Innovation, and Technology, the UN, ESA, and many other important organizations, including a presentation by the President of ISU.

The first day was dedicated to Education and Outreach, with various speakers presenting their activities. These included: "Education Project and Outreach Activities of ESA", "Space Activism and Public Education" from the National Space Society, and "Education and Outreach Activities of the European Schools Portal to Earth Observation". The afternoon topics included: "Space Technology and Research Students" which is SPACEHAB's STARS program, the Argentinian case for "Education and Dissemination Activities in Remote Sensing towards the Community", the Kenyan presentation on "Education of Young People - an Investment in the Future", and LunarSat's presentation on "Stimulating interest amongst the younger generations". The day was concluded with a panel speaker session in which a noteworthy and encouraging comment from our Kenyan speaker highlighted that space technology may indeed be integrated into Africa and African culture because it has already been integrated successfully for many youth, albeit on a very local scale. The first day ended with a reception hosted by the mayor of Graz at the Schlossberg. Those of you who were at SGF will recall this location as the place where a CAISU member stood up and proclaimed the five recommendations integrated into the Vienna Declaration. This time, the SGF Executive Director was pleased to be back at the same location and in his concluding remarks noted that after one year away "we have returned home, where we belong".

The second day's theme revolved around developing a career in space. Again many organizations were reported on, representatives of which outlined opportunities for youth around the globe. These included: "Possibilities for a Career in Space" from our Argentinian ISU alum, "Admatis - Advanced Materials in Space", "Possibilities in Africa to involve young people in space" from our Kenyan representative, "Getting Involved in Space" from a Chinese space science researcher, a modest presentation on "Experiences in starting up a Space Company" by the President of AeroAstro, and an overview of the "UN Program on Space Applications" by the program's own Director. As there was time allotted for conference participant presentations, many of us were invited to present various activities. These included: teaching and conducting workshops on space history and astronomy through Southern Africa, overview of the Teach and Track program at ESA, an introduction to ACMAD - using radio receivers to provide time-critical information to rural areas in Africa on climate and the environmental impact on sustainable development, the Young Lunar Explorers and the Lunar Explorers Society, the Turkish Space Research Working Group, and the push for an Antarctic ISU Summer Session. A presentation on CAISU and our activities was also conducted. We received many exciting questions regarding collaboration with Kalson and concluded with an open invitation to attend the 2000 CAISU conference.

The morning of the last full day of the conference was spent reporting on the work pursued over the past year by the members of the interim Youth Space Advisory Council. The afternoon was spent in workshops, developing ideas that would guide the working groups over the next year. The group breakdown was as follows: Outreach, Public Awareness, and Space Education; Policy, Law, and Commercialization; Science, Technology, and Environment; Sustainable Development and Meeting Human Needs; Philosophy, Ethics, Religion, and Humanities; and International Co-operation and Peace-keeping. Having attended the Global Space Education Curriculum workshop, I can report that the current status of Global Education recommendation is receiving much attention, due in particular to the encompassing scope of the developed implementation strategy. It was noted that the work and established programs of many international space education speakers fitted nicely into the developed framework. The international space education and awareness community is slowly realizing the value of the implementation strategy developed at SGF. The only drawback is that the group is horribly understaffed on all levels. We would like to use this opportunity to call on your help even though we are doing the best we can with what we have. The afternoon in this group ended with a quick reply form compiling the first elements of the Global Space Information Index. The evening social activity was a guided city-tour (from the TU Graz to the Rathaus) and ended with another guided tour through the Puntigam

Brewery followed by dinner right around the corner - the exact location where one of our CAISU members inadvertently broke a children's helicopter ride last summer. Let it be noted that the ride was removed and not replaced since! A live Austrian accordionist and much dancing and merriment complemented the evening.

The final morning of the Conference was dedicated to closing ceremonies and remarks. After presenting the newly formed "United Nations Program on Space Applications Space Generation Advisory Council", the developed UNSGAC statutes were ceremoniously signed by the interim council and OOSA with much fanfare and symbolism. An SGF-inspired closing slide show was presented and the day ended by a declaration from the Office of Outer Space Affairs that the call for nominations for State Representatives from each UN State was now open.

By the time you read this article, a UNSGAC State Representative for Canada will have been elected. Whoever this person is, s/he can not be expected to successfully achieve every responsibility they'll be requested to take on by working alone. Our challenge as members of this group of highly motivated space enthusiasts will be to mobilize the rest of Canadians and our associated established space organizations to help the Canadian State Rep. implement the SGF recommendations. Let us maintain the momentum established by CAISU (as part of the international community) and lead this effort in Canada.

I would not be able to conclude this article without a few words about the conference's Austrian space artist Christian "Motor" Polanšek. It is unclear how the UN missed this talented, energetic and articulate person for the conference last summer. Nevertheless, Motor's space artwork was presented everywhere we went, at the pleasure of most (if not all) attendees. It was interesting to watch the way he handled the group. After hearing that many of us were extremely interested in possibly purchasing his work, a price list appeared and was (of course) out of line with the standard student budget. He appeared on the second and third days of the conference, noted the "warm and unselfish" character of the attendees (words to this effect), returned with a binder complete with over 100 original space art sketches made on A4 paper, and donated one to every participant, speaker, and organizer! This lead many of us to express our sincere gratitude and, after speaking to him and establishing his views on space, convinced him to apply to ISU as a student! Those of you who will be in Bremen will have to keep an eye out for him.

As always, it is difficult to report on the details that many of you may want to know more about. Don't hesitate to contact us if you would like an update or clarification regarding any aspect of the 2000 UN Graz conference. In the meantime, stay tuned for the first issue of the UNSGAC newsletter, to be appearing soon. In it, you should find a relatively compete list of international space activities. There are so many youth space-related events that occurred over the past two months that it is a serious job just to keep track of it all. Finally, as this year's Graz conference was the first in a series of three conferences on the enhancement of youth participation in space activities organized by the UN, those of you who wanted to attend his year but couldn't will be undoubtedly pleased to know that Graz will be waiting for your next September. Best wishes to each and every one of you for a wonderful end to the fall term, and a very healthy and safe holiday season (whatever your religion). A la prochaine!

Space Generation Advisory Council

by Jessy Cowan

(Canadian SGF Delegate)

History and Recent Developments

The Space Youth Advisory Council was a product of the Space Generation Forum held in July '99 in Vienna. It's mandate is one that I hope many people are by now familiar with; to "create within the framework of the Committee on the Peaceful Uses of Outer Space, of a consultative mechanism to facilitate the continued participation of young people from all over the world, especially young people from developing countries and young women, in cooperative space-related activities."

Over the past year, our framework from which to accomplish this mandate has really been coming together. This September in Graz, Austria, a large portion of the interim council was fortunate to be able to meet. We held numerous (and lengthy!) face to face meetings both with one another and also with members of the Office of Outer Space Affairs (OOSA) and the Programme on Space Applications (PSA). The PSA is a subcommittee of OOSA which aids in the implementation of decisions made by the Committee on the Peaceful Uses of Outer Space (COPUOS) and OOSA, related to the uses of space technology for economic and social development.

A proposal was put forward to the council in Graz that we be formally adopted by the UN PSA and become an advisory council to them directly. The relationship between the council and the PSA is a very natural one, as the council's activities are largely related to earth-based applications of space and space technology. The proposal was accepted, and the "YAC" became formally renamed as the *United Nations Programme on Space Applications Space Generation Advisory Council*, UN PSA SGAC, or just SGAC for short! We were able to walk away from Graz with a strengthened bond to the UN and I think a more focused idea of our objectives as a council.

SGAC's Activities

The goals and activities of the SGAC differ from those of a club in many ways. The SGAC aims to facilitate space-related activities and disseminate space-related information globally, as well as to organize large-scale cross cultural events. By creating points of contact in each state as well as regional representatives who oversee specific areas (such as North America) we hope to obtain a

comprehensive picture of global youth space activities and aim to serve those activities as an umbrella organization.

As the SGAC begins to grow roots around the world, we are initiating several programs in order to realize our vision. As an ongoing activity, the SGAC will hold web-based discussion forums on a number of topics such as Meeting Basic Needs Ethically, International Cooperation and Peacekeeping, and several others. These discussion forums will be moderated by experts in the respective fields, and will culminate in a yearly report of ideas, suggestions and action. This will help SGAC to become an influential member of the space community.

Currently, the council's efforts are focused on a number of education and outreach initiatives. Two Canadians, Liara Covert (SSP 2000) and Mark Dejmek (SSP 97), are heading efforts to make an international Space Education Information Index, a comprehensive survey of global space education to be used as a reference and point of contact, as well as the identification of key components for successful space education.

The SGAC is also building a partnership with an education and outreach program called "Under African Skies" in which students from developed countries will travel to developing countries and teach space education from a predetermined curriculum. This is a great demonstration of what we hope to accomplish, as well as a way of getting out into the field and making a difference. We hope to be sending the first students to Africa by next summer.

SGAC and Canada

Canada will benefit from the SGAC by being exposed to enhanced opportunity for communication with the youth space community on both a national and an international level. The vision is that this will increase efficiency and allow us to take a more direct path towards our goals of space exploration and development. Canadians are encouraged to get involved by keeping your national point of contact (that's me) up to speed with space-related activities, particularly those that affect youth, as well as making contributions to the online discussions (currently located at http://www.unsyac.org/discussion.html). With SGAC providing a more visible front for Canadian youth interested in space, we hope that it will encourage industry and academia to enter into partnerships with the council in order to provide scholarships, internships, and other space-related experiences for our youth.

For more information on how to get involved with the SGAC, please contact myself, Jessy Cowan, at 9jkc@qlink.queensu.ca. As the Regional Representative for North America, and acting point of contact for Canada, I would be interested to hear from you with ideas, suggestions, questions, and updates.

Update on ADAM Events

by Angelina Guzzo (SSP 99)

ADAM, the Association for the Development of Aerospace Medicine, got in full swing with the start of a new academic year. Although two of its founding members, Marlène Grenon and Rachel Zimmerman, are sadly missed after their move to other cities, we have been working hard to continue their legacy. Our first event of the season was a members talk given by myself on September 25 entitled The Search for Extraterrestrial Intelligence: Why haven't we found life in the universe. With my molecular biology background and knowledge from SSP 99, I had lots of fun researching the topic. The next event on October 19 was a space careers panel discussion made up entirely of ISU folks including Alain Berinstain (SSP 91, MSS1), Bill Stewart (SSP 99), Isabelle Tremblay (SSP 98, 99), Michele Shemie (SSP 94), Rémi Duquette (SSP 00) and Thierry Fontaine (SSP 99). This was an exciting event in which the audience could ask our panel questions about their jobs. All of these people selflessly volunteered their evening to help us out. On November 23, ADAM's own Carol Chahine (SSP 00) with Martin Gascon (SSP 00) and Rémi Duquette (SSP 00) gave a talk about their design project entitled El Nino and the Southern Oscillations: it is a global challenge and keys to a solution. The audiovisual effects were outstanding and attest to the hard work of the last winter session. ADAM's profile was increased when our president, Keegan Boyd, gave a presentation at the CASI conference on November 8 about our space education program. In November, ADAM members again volunteered at the Montréal Children's Hospital to teach sick children about space. This has always been a wonderful event that benefits the children and the volunteers. We are planning to expand our space education program this year with more trips to the hospital and to also start teaching to kids in the classroom. One of our big events in January will be a talk by ISU's Dr. Judith Lapierre (SSP 95) about her isolation experiments in Russia. ADAM events are open to the public and we welcome you to attend all of them. For more information, visit our website at www.ssmu.mcgill.ca/adam or contact me at guzzo01@med.mcgill.ca.

Report on the First Annual ISU*USA Alumni Congress

by Leslie Bermann (SSP 97 USA, ISU*USA President)

The United States Alumni Association of the International Space University (ISU*USA) is pleased to report that our First Annual Alumni Congress was a stellar success, with approximately 30 alumni from four countries, including five Canadians participating in the week's events.

*ISU*USA*

ISU*USA--the alumni association of US-based ISU alumni, faculty and staff--reorganized itself this year. ISU*USA represents alumni who are American citizens as well as those of any nationality living in the US, including Canadians (of course!). Alumni not covered by another regional group and faculty and staff are also welcome to join. By organizing various activities and educational opportunities and by promoting professional and personal

From left to right: George Tahu (SSP 94, USA), Daryle Lademan (SSP 93, USA), Sunita Bali (MSS2, USA), James Brice (SSP 89, USA), Leslie Bermann (SSP 97, USA), Eric Choi (SSP 99, CAN)

networks, ISU*USA is dedicated to providing alumni and the broader ISU community an environment that nurtures ideas, connections, and the realization of our shared visions for the future of space and humanity.

Alumni Congress Summary

The Alumni Congress was conducted in Washington, DC, October 24-28, 2000 and consisted of many activities. Specifically, it included a first-ever Meeting of Members, a professional development seminar, an alumni lunch with Lockheed Martin, an alumni discussion with ISU President Karl Doetsch, and numerous social and networking events.

Meeting of Members

The first ISU*USA Meeting of Members was the central event of the Congress, and was modelled after the successful CAISU AGM. The ISU*USA Board of Directors outlined its accomplishments in 2000, chief among them being the creation of a website (www.isu-usa.org) and an e-mail list, the organization of the Congress, and the recruitment of class representatives and regional coordinators. The Board also described the activities it would like to undertake in 2001, which includes organizing other professional development activities, incorporating the Association so that donations to it will be tax deductible, adapting the innovative and successful CAISU Road Show concept to the US, preparing for SSP2002 in Pasadena, increasing alumni involvement, and strengthening ties with CAISU and other alumni organizations. Alumni who participated provided invaluable comments and feedback that will help guide the Board of Directors next year.

Professional Development

The Professional Development Seminar on grant writing was another highlight of the week. This seminar was attended by twenty alumni, including Canadians Deanna Smith (MSS3), Liara Covert (SSP 00), and Eric Choi (SSP 99). Attendees developed their abilities to write effective grant proposals under the tutelage of noted professional trainer David Bauer. Unanimously, the alumni who attended remarked on how grateful they were to have been able to participate in such a productive developmental opportunity.

Alumni Networking Lunch with Lockheed Martin

The Alumni Lunch with Lockheed Martin was a great success as well. Approximately 25 alumni participated. After brief welcoming remarks from myself and ISU President Dr. Karl Doetsch, Mr. Jay Honeycutt, the President of Lockheed Martin Space Operations in Houston, provided the keynote address. Demonstrating Lockheed Martin's strong support for ISU and its alumni, he announced that his company will be sending two students to the Summer Session in Bremen next year and that it has also recently commissioned a study with ISU on privatization.

Discussion with President Doetsch

ISU President Doetsch met with alumni and provided a status report on the permanent campus building in Strasbourg, SSP 2000 in Valparaiso, the new MSS6 class, and other topics. There was an active question and answer session that focused on how alumni can get more involved, the alumni database currently under development in Strasbourg, and the concept of dynamic consulting research projects that would utilize the talented and growing ISU network.

Social Networking

Finally, what would an ISU event be without parties? There were many social functions held throughout the week that gave alumni a chance to mingle informally. A reception hosted by Peggy Finarelli, Vice-President of ISU North American Operations, provided a relaxed atmosphere in which alumni could expand their networks. President Doetsch and several representatives from ISU Strasbourg and the ISU Board of Trustees were in attendance.

An informal dinner at the infamous Brickskeller in the Dupont Circle neighbourhood of Washington, DC gave alumni an opportunity to sample and rate over 800 different beers from around the world. Crown Lager and Lucifer were two of the favourites.

George Tahu (SSP 94, USA) hosted a Halloween Party–a raucous homage to the SSP space masquerade, with lots of dancing, laughter, good food and drink. Among the attendees were the Space Cowboy, the Real Cowboy (at least he had a gun!), the Human-Turned-Alien and his Accomplice, Ms. Ming The Merciless from Flash Gordon, the Moon-Faced Disco Ball, Stud Bloke, the Cutest Alien This Side of Bethesda, a Sartorial Space Devil, a Dallas Cowboy Cheerleader, the Scream Guy, Heidi, a Scotsman Turned Darth Maul and His Wench, Alien Candy Man, NASA in a Sling, a Magic 8 Ball, Amazon and Dot-Com, and other various and sundry life forms.

Daryle "Into Thin Air" Lademan (SSP 93, USA) led about 20 daring alumni, friends, and family on a three-hour ?ISU Adventure Hike? through some of the beautiful, rugged terrain of the Billy Goat Trail along the Potomac River. The hikers were blessed with near-perfect Mid-Atlantic fall weather, with bright blue skies, colourful foliage, and light breezes. Only once did rain threaten, and only two hikers (who shall remain nameless to protect the identity of the guilty, but rest assured that neither was Canadian) suggested retreating to a local pub! Fortunately, the gray clouds dissipated as quickly as they had appeared and the hikers enthusiastically completed the entire journey before engaging in any extracurricular activities involving a drinking establishment. Every participant should be congratulated for keeping up with Jim "Hypersonic Hiker" Brice (SSP 89, USA), particularly Doug Messier (SSP 91, USA), who made the entire journey while dutifully documenting it on video. The only quasi-serious mishap occurred when Otis Marechaux's (SSP 90, Canada) footwear suffered a catastrophic failure at the beginning of the hike. Undeterred, Otis completed the hike with speed and grace, proving himself a true red and white Canadian outdoorsman, eh!

The brave hikers then joined up with about 30 others at a relaxed barbecue lunch/dinner/late night snack hosted by Gabriele and Ralf Huber (SSP 93, Germany) in their Virginia home. We feasted on authentic German beer, sausages, pretzels, sauerkraut, bread, snacks, and of course, Black Forest cake. It was the perfect way to wrap-up an extremely busy, fun-filled and productive week!

Canadian Highlights

Canadian alumni were involved in all aspects of the ISU*USA Alumni Congress, and were instrumental players on the Congress Organizing Committee. Moreover, several Canadians travelled to DC and actively participated in the various events. We were also fortunate that newly minted Canadian alumnus Arif Janjua agreed to make a presentation on the SSP 2000 Space Tourism design project to the Board of Directors of the National Space Society. While he may be "newly minted", he adroitly demonstrated an even exchange rate and impressed the NSS!

Thank Yous

The First Annual ISU*USA Alumni Congress would not have been such a resounding success without the support of our many sponsors: Lockheed Martin, Futron Corporation, Honeywell Technology Solutions Inc., George Washington University, the X-Prize Foundation, Paragon Space Development Corporation, the ISU North American Office, the Huber Family, and the generous donations of alumni. Special thanks also go to Peggy Finarelli, the Vice-President of ISU North American Operations, for her invaluable and unflagging support, assistance, and ideas.

Next year's Congress will surely be as fun and valuable to participants as this one, and it is our hope that many more Canadians will be able to attend. In the meantime, we are inviting our great neighbours to the north to work (and play, of course) closely with us in 2001 and beyond in realizing our mutual goals. We look forward to sharing and implementing the enthusiastic and exciting ideas for closer relations between CAISU and ISU*USA.

Membership News

by Chantal Lamontagne (SSP 95, CAISU Membership Director)

An Auf Wiedersehen dinner at Frankie Tomatto's in Markham was held on November 24th for departing CAISU members Audrey Robinson-Seurig (SSP 91 USA) and Roland Seurig (SSP 91 GER) who are relocating to Munich, Germany (with a stop to view the STS-97 launch in Florida). In leaving the country, we lose one CAISU member in Roland, but gain a permanent member in Audrey, who just this past August received her Canadian citizenship. Congratulations Audrey!!! And good luck to both you and Roland in Germany (see their update at the end of the newsletter).

Martin Gascon (SSP 00) romancing one of the local alpacas in Chile.

Wesley Oke (Staff SSP 00) treated to blood pudding as the highest form of appreciation by Francois Becker

New Alumni-to-be!

Please join me in welcoming into the CAISU family new members-to-be from the current MSS6 (2000-2001) class:

- Nasreen Dhanji
- Sandra Janosik
- Leila Kheradpir
- David Phillips
- Timothy Radcliffe

They are currently enjoying the crazy MSS programme schedule, but have had the time to introduce themselves to the CAISU community with short biographies to the CAISU email distribution list, which are included in this issue under their personal updates. Please also see David Phillips' article on behalf of his classmates (Greetings from the rainy city of Strasbourg) in this issue.

Moving?

Please contact me, the Membership Director, at the following address for any changes to your address (either home or work/office), telephone numbers, fax numbers, or emails…

Chantal Lamontagne
UTIAS, 4925 Dufferin Street
Downsview, Ontario
Canada, M3H 5T6
Tel: (416) 667-7701
Fax: (416) 667-7799
Email: clamont@utias.utoronto.ca

New Contact Info!!

Our group email distribution list has changed, to better reflect our needs, and to stem the influx of spam emails. If you have any questions, or need to reach anyone on the CAISU Board of Directors, please email caisu-bod@egroups.com. If you wish to reach every alumni currently on our email distribution list, please direct your email to caisu-alumni@egroups.com.

Lost in Space Alumni

Every effort is made to keep the CAISU address database up to date, but several alumni still remain "lost in space", with no current contact information. Someone finally spotted Céline Lévesque (SSP 91) in Ottawa, and so I am now down to THE FINAL THREE missing alumni!!!

Kathy McCuaig (SSP 89)
Bill Unger (SSP 88)
Jesko Von Windheim (SSP 89)

If you have any information on the whereabouts of these alumni, please let me know as soon as possible at clamont@utias.utoronto.ca so we can quickly get them back in touch with the rest of CAISU.

CAISU Contacts List

The CAISU Contacts List is mailed out yearly to all CAISU members. If you did not receive your copy in the last issue of Cosmonotes, or wish an updated copy before the next yearly mailing, please let me know and an electronic copy will be distributed to you. Again, please respect the privacy of our members by not distributing the list to outside agencies.

If there were mistakes in your entry, or if you have changes or more information to pass along, please let me know so that I can modify your database entry.

Paper or Electronic?

Votes are still being taken online at the CAISU website, www.caisu.ca, whether you want to receive either the Cosmonotes or the Contacts List via electronic or paper medium for the next issues. Please note that votes can always be changed, and that this is also another way to get your address changes to me, or to contact the Board with comments or suggestions.

Alumni Gatherings

Alumni across the country have been busy gathering and exchanging ISU memories. We are happy to publicize upcoming gatherings if given enough notice, and to include in Cosmonotes cub scout reportings of any alumni gatherings.

Toronto CAISU Christmas Party

by Chantal Lamontagne (SSP 95, CAISU Membership Director)

A group of alumni gathered on December 9th for the annual CAISU Christmas party for the Toronto area. Noemi Nagy (SSP 93) played the perfect hostess, serving up tons and tons of food and drink, including a delicious homemade Hungarian gulash from a secret family recipe! Of course, Chilean wine was very prominent to celebrate the successful completion of the first "winter session" of the SSP. Those attending included a few of Noemi's roommates (who were *trying* to study but were coaxed out for food), Kahram Bahrami (MSS5) and girlfriend, Ratan Bhardwaj (SSP 97), Angelina Guzzo (SSP 99), Chantal Lamontagne (SSP 95) and husband Harold Seaborn, Christine Marton (SSP 91), Doug McKay (SSP 99), Yifang Ban (SSP 94) and husband Jonas Spaak (SSP 95 Sweden) and their 2 year old daughter Ellen (SSP 2022?) who was quite shy at meeting all the new grown-ups but was all sparkles when Tigger, Pooh, Piglet, Eeyore and Rabbit came out to play (you had to be there...).

The conversation throughout the evening kept jumping back and forth from engineering to space to medicine

as half the people present had a medical background, with three present also having a Hungarian background!! We also got regaled with stories and photos from the SSP 2000 summer session in Valparaiso, Chile, thanks to Noemi, who was very proud to show off her student's ENSO design project multimedia presentation. We also got to see a comparison of Peter Diamandis and Albert Einstein made by the other DP (space tourism) this summer.

Before the evening ended and we all went our separate ways (parking on the street expired at midnight without a permit!), we all got to sample some of Jonas' Swedish glög, a hot red wine and spice drink that really, really packed a punch! For those who are interested in reproducing this drink but can't find the original recipe, Jonas assures us that the mix of spices can be found at your local Swedish Ikea!

The JAGA – Judith`s Area Gathering of Alumni

Nov 4th, 2000

by Jonathan Knaul (SSP 98, CAISU Québec Director)

Thank you first of all to Judith Lapierre (SSP 95) and her husband, Stéphane, for hosting an outstanding party and weekend stay at their home in Gatineau, Ontario.

The 4th of November was the day of the CAISU Annual General Meeting, held this year in Ottawa at the Lorne Building. That night we saw the first ever "JAGA" event. Hosted at the exquisite Château Judith & Stéphane (I am not kidding, it is a stunning home. Stéphane, an owner/manager of two contracting firms, built the house himself and it is quite something.), there were a total of 17 guests.

Stéphane and Judith prepared a lovely sit down supper. I think we were at the table for at least three hours – the stories and jokes were endless! We had people there from as far away as Houston (Brian Rishikof – every SSP since '90, I think), Colorado (Johanne Heald - SSP 96, 98), St. John (Liara Covert - SSP 00), and Mark Dejmek - SSP 97, 98 from Paris, who was in full-form. The only thing missing was a phone call from Paulo Alfonso (SSP 98) from Lisbon. Stories, jokes, and spontaneous performances by Josée Adamson (SSP 99) added a particular flare to the evening that left many of us in stitches.

When we finally did manage to peel ourselves away from the table, the party retired to Stéphane's garage. Please do not get me wrong, this is not just any garage – this is a SPA. The most prominent feature in the "garage" is the 10 person whirlpool. The walls are all finished and decorated, the floors are tiled, there is a large TV in the ceiling corner opposite the whirlpool, two other ceiling corners are fitted with stereo speakers, and one entire wall is comprised of a very large bay window that looks out into the forest. This was indeed the place to be on the 4th of Nov.

Several CAISU people had asked me questions and expressed interest concerning my recent peacekeeping tour flying helicopters in Kosovo. That night we ended the evening with me giving a 30 minute powerpoint presentation that contained about 100 photos that I took during the tour. Thanks to everyone for listening and expressing interest.

Most people headed home around 1:00 am. We did not want to make it too late a night as we had a full day of conference planning to follow on the 5th and then the mini-ISU Day on the 6th. In fact, the party kind of continued for another two nights (Sunday and Monday) because several of us who were organizing/participating-in the conference stayed with Judith and Stéphane. Those who stayed included myself, Dr. Bob Tarzwell (SSP 98), Mark Dejmek, Josée Adamson, Rachel Zimmerman (MSS 3), Liara Covert, and Peter and Heather Jennings (conference participants). Judith and Stéphane were just great hosts – with all that was going on, we really turned their house up-side-down, but they continued to make sure that their guests felt at home.

On Tuesday morning, the 7th, I drove back to Québec City from Ottawa, dropping off Rachel Zimmerman at the Ottawa airport and Mark Dejmek in Montréal on the way. The drive home from Montréal to Québec City was lonely. Wednesday morning found me back at work flying a standard tactical mission, yet my usual environment felt surreal - I found myself experiencing some serious "ISU withdrawal" that took almost a week to pass. The 4th to the 7th was a four day event during which we crammed in everything but "ballroom dancing classes" and a "field trip", had no sleep, got each others' belongings mixed up, had several long meetings, ate only while walking from one place to another, and laughed so hard that for me, my stomach muscles were sore for three days after. What I am trying to say is that I really love these times, and can't wait til we do it again!!! I cannot think of a better way to spend 4 days away from work.

DARE to DREAM !!!

Alumni Photos Needed!

We are looking to update our CAISU website, www.caisu.ca, with class photos and updated bios for all alumni. Also, we'd like to include as many photos of alumni during the SSP and MSS programmes, as well as during alumni gatherings and other CAISU activities. We're always looking to update, so if you have any suggestions, please speak up!

Update on ISU Alumni

Is your name missing from this column? Send in your updates to Chantal at clamont@utias.utoronto.ca

SSP 89 Strasbourg

Frederic Nordlund (SSP 89) is now working at the ESA Washington Office, whose mandate is to cover both US and Canadian activities. He is now getting closer to CAISU activities!

SSP 90 Toronto

Michel Pelletier (SSP 90) J'ai un nouvel emploi chez Amphitech International. Je travaillerai sur la commande, la stabilisation et la detection d'obstacles pour un radar 35GHz embarqué sur hélicoptère.

David Stewart (SSP 90) Dr. David B. Stewart, formerly of the University of Maryland, has been named Executive Vice

President and Chief Technology Officer of a new subsidiary of Applied Research Consultants, Inc. (www.arcorp.net), of Columbia. The new unit, Embedded Research Solutions, LLC (www.EmbeddedZone.com) will provide consulting, contracting, research and training services in embedded systems. Embedded systems have been described as computers-within-applications. They have broad application in transportation, consumer electronics, industrial control, medical equipment, telecommunications, defense systems and other industries. Dr. Stewart has been the Director of the Software Engineering for Real-Time Systems Laboratory and a faculty member in the Department of Electrical and Computer Engineering at the University of Maryland. He was also affiliated with the Institute for Advanced Computer Studies and the Institute for Systems Research. He received the National Science Foundation's prestigious Young Faculty Career Award for his high quality research and teaching programs. He also received the University of Maryland's Celebrating Teachers Award, for being one of the most influential teachers at the university.

SSP 1991 Toulouse

Céline Lévesque (SSP 91) est de retour au pays depuis 1998. Elle est maintenant professeure à l'université d'Ottawa dans la Faculté de droit, Section de droit civil.

Audrey Robinson-Seurig (SSP 91) and **Roland Seurig** (SSP 91) As members of the Toronto Chapter of the Mars Society, Audrey Robinson-Seurig and Roland Seurig assisted in organizing and publicizing the Third International Mars Society Convention in Toronto in August 2000. Audrey also coordinated the effort to establish an ISU educational outreach display at this convention. Roland delivered a talk about the International Mars Mission design project from the 1991 ISU Summer Session Program. (For more information about the Mars Society Convention, please refer to Audrey's article in this issue of Cosmonotes.) In August 2000, Audrey became a Canadian citizen, while retaining her U.S. citizenship. Earlier this year, Roland finished his work at Honeywell/Toronto on the X-33 Single-Stage-To-Orbit electrical power system, which was the last major space program at the company. Since Roland prefers to do development work for space projects, he started to look around for other opportunities in North America and Europe. Eventually, he accepted a job offer from Kayser-Threde in Munich, Germany, as the lead systems engineer for the International Microgravity Plasma Facility. This facility is being developed for flight on the International Space Station in conjunction with the Max Planck Institute for Extraterrestrial Physics in order to study "complex plasma." He started his new job at Kayser-Threde on October 1, 2000. Audrey will look for a job in the Munich area, where several other aerospace companies and institutes are located. She would like to find a position that combines her background in chemical engineering and materials science with her interest in the aerospace field. After moving out of their home in Mississauga, Ontario, in late November 2000, Audrey and Roland enjoyed participating in the CAISU activities surrounding the spectacular STS-97 Space Shuttle launch in Florida. (For more information about the launch, please read Audrey's article in this issue of Cosmonotes.) Audrey and Roland look forward to seeing their CAISU friends at the ISU Alumni Weekend next summer in Bremen, Germany, or sometime in Munich!

SSP 1993 Huntsville

Noemi Nagy (SSP 93) was an excellent hostess at the annual CAISU Christmas party in the Toronto area, and shared her many photos of the SSP in Chile and the Design Project presentations to those present.

SSP 1994 Barcelona

Stephen Cheung (SSP 94) and Debbie Hoffele are proud to announce the arrival of Zachary Wing-Yee Cheung on July 26 in Halifax. His middle name is Chinese for "Always Happy" and he's generally been living up to his name so far! His dad's first reaction, predictably enough, was "Wow, look at those massive cycling quads!" after which he was seen plotting Zachary's training regime to peak for the Tour de France in 2028. Zachary's already taken his first steps into space by racking up the frequent flyer miles visiting his grandparents in Vancouver and Ontario. Zachary sightings can be made at www.zing.com, searching for Member "Stephen_Cheung". In other news, Stephen and Marlène Grenon (SSP 98) have started meetings for ADAM in Halifax and are aiming to build up a strong chapter here in the coming year.

SSP 1995 Stockholm

Sébastien Côté (Staff SSP 95) Depuis SSP 95, Sébastien a terminé un autre bac, en génie électrique, et travaille maintenant à Ottawa dans le même complexe que le David Florida Laboratory dans le domaine des communications et les contre-mesures (jamming). Il est marié depuis l'eté 1999 à une infirmière et ils viennent d'emménager dans leur nouvelle demeure à Kanata.

Chantal Lamontagne (SSP 95) While some CAISU members were in Ottawa for the CAISU AGM and mini-ISU day, I was presenting my doctoral research on high-speed impacts on the composites used in the SSRMS at the Hypervelocity Impact Symposium 2000 in Galveston, Texas. Temperatures of 30C had been recorded on the island of Galveston, on the Gulf of Mexico, the week before my conference, which was a drastic change from the sub-zero temperatures I was enjoying in Toronto at the time! Of course, while I was down there, the weather turned cold, and tornado warnings were issued...but there were still a few warm days for me to enjoy walking on the long sandy beaches collecting seashells at sunset. Being in Texas, home state of George W. Bush, during the US elections was also an experience in itself, as was meeting one of the electoral college voting members for the state. I am slowly recovering from all the huge meals served in Texas, and continue to wait for my new home to be built in Woodbridge, just outside of Toronto. Due to a construction boom in Toronto, all housing has been delayed and our home is now scheduled for a mid-May closing – hopefully we won't be delayed past spring! I continue to be involved with CAISU and have been re-elected for the 2001 Board of Directors. My PhD studies are also gathering steam, and I should be seeing the light at the end of the proverbial tunnel quite soon.

SSP 1996 Vienna

Christopher Paul Barrington-Leigh (SSP 96) is now working at the Space Sciences Laboratory of the University of California.

Li-Te Cheng (SSP 96) has now moved across the border to Boston and started his job as research scientist at Lotus.

SSP 1997 Houston

Caroline Goulet (SSP 97) has recently accepted an Associate Professor position at Creighton University in Omaha, Nebraska.

SSP 1998 Cleveland

Jonathan Knaul (SSP 98) has been re-elected to the CAISU BOD for the upcoming year. Having successfully completed the Canadian Forces test pilot evaluation program this past July, Jonathan will be sent on a one year test pilot course in either the United States or France beginning in July 2001. In the meantime,

Jonathan continues to fly the Bell 412 with 430 Squadron in Valcartier, Quebec. All CAISU members and their spouses have a place to stay in Quebec City anytime, especially if they wish to go skiing.

SSP 1999 Nakhon Ratchasima

Eric Choi (SSP 99) is now working at the Center for Operations: Research and Engineering at Honeywell Technology Solutions Inc. in Columbia, MD. He is also SSP Representative and News Webpage Editor as an At-Large-Representative of ISU*USA. Please see his article “The Dreams our Star Stuff is Made of” in this issue.

Angelina Guzzo (SSP 99) is currently in Toronto finishing an elective at Sunnybrook Hospital. Please see her article on her experiences at KSC, and an update on ADAM, in this issue of Cosmonotes.

Aynharan Sinnarajah (SSP 99) I am in the final year of medical school and in the process of applying for residency. Hence lots of interviews to go to!

SSP 2000 Valparaiso

Carol Chahine (SSP 2000) ISU was probably one of the most energetic, enriching and sleepless summers/winters of my life. A little update on my life since then. I am presently completing my last year in dental school at McGill University. I was recently accepted to the General Practice Residency Program at McGill. I am also doing research in the field of Oral and Maxillofacial Surgery at the Montreal General Hospital. As well, I am keeping busy with the Association for the Development of Aerospace Medicine, ADAM which is in its second year of existence! I miss everyone lots and hope that our paths will cross again soon! A bientôt!

MSS-3 1997-98

Louis-Paul Bédard (MSS3) Je viens de changer d'emploi, mais je reste toujours à l'intérieur de la même compagnie, MacDonald Dettwiler Space and Advanced Robotics. Je travaille maintenant au sein du groupe des opérations (de la Station Spatiale Internationale), à l'Agence Spatiale Canadienne. Malgré que présentement (c'est le début), je m'occupe de tâches relativement diverses, ma position est celle de planificateur de mission. Dans le groupe, nous nous occupons de produire les produits de planification (sous forme de fichiers, que nous livrons à la NASA) pour chaque mission/vol que le Système d'Entretien Mobile (SEM,le système incluant le bras de la station, MSS, en Anglais) effectue, dans le cadre de l'assemblage de la station. Ces produits incluent entre autres (en plus d'une foule d'autres produits) la cinématique, la dynamique et les manipulations d'opération du bras. Nous procurons aussi un certain soutien technique à d'autres groupes.

MSS-4 1998-99

Claude Rousseau (MSS4) Dans le cadre de la Semaine de la Science en France, j'ai eu le paisir de faire une présentation sur la robotique spatiale aux étudiants du lycée-collège André Maurois de Bischwiller, au nord de Strasbourg. Comme vous pouvez le devinez, j'ai eu beaucoup de questions (peut-être à cause de mon accent!) sur la contribution canadienne à la station spatiale internationale. Merci à Chris Sallaberger (ISU 88) et Alain Poirier (ISU89) pour leur précieuse aide. Dans un article du journal local où on rapportait ma conférence, on m'a d'ailleurs présenté comme "chercheur canadien"! J'ai récemment accepté de travailler plus (avec le peu de temps qu'il me reste) avec le Groupe Régional Strasbourg-Alsace de l'AAAF (Association Aéronautique et Astronautique de France) à titre de Secrétaire Général. Notre prochaine activité, le 23 novembre à Mulhouse, portera sur le nouvel avion A-3XX d'Airbus.

MSS-5 1999-2000

Simon Kruijen (MSS5) moved back to Canada in early November. He is now living in Ste-Anne de Bellevue. Please see his article on the MSS5 Team Project, , in this issue.

MSS-6 2000-01

Nasreen Dhanji (MSS6) My background is in Mechanical Engineering. I attended the University of Victoria in B.C. and was enrolled in the coop program. I have had work experience in various industries through coop: automotive, hydro-power generation, mining, pulp and paper and oil and gas. I have also done extensive research in fuel cell development through the Institute of Integrated Energy Systems at UVic. I applied to the MSS program early this year and was thrilled to be accepted into the program. I have always had a passion for space and attending ISU is the perfect opportunity to be exposed to the space sector. I am looking forward to an exciting career in the space sector.

Sandra Janosik (MSS6) Salut from Strasbourg! My name is Sandra Janosik and I come from Ancaster, Ontario (of course, here abroad I just say Toronto, but perhaps now I can afford to be more specific!). I graduated this past April from McMaster University, having finished two concurrent degrees: an Honours English BA and a BSc in Geoscience, specializing in geology. I have spent the summer backpacking around Europe, and doing some geology research on a tiny piece of rock off the west coast of Scotland. I was home just long enough to satisfy my craving for Tim Hortons iced cappuccino before I jetted out to Strasbourg. Even though I will miss my Maple Leafs out here, Strasbourg has enough ice cream places and bike trails to keep me busy! ISU is my way of realizing my dreams to be involved in the future of space activity. Presently I am not decided which direction to focus my interest, but am keen on space science and research. There are so many doors opening with each day, it is difficult to settle down and choose - what an incredible opportunity and experience!

Layla Kheradpir (MSS6) My name is Leila Kheradpir and I was born in Iran and was 'partially' raised in Canada. I graduated from Ryerson Polytechnic University back in 1998 with a degree in Mechanical Engineering. For the past two years I had the opportunity to work for the largest non-ferrous foundry in Canada, Gamma Foundries Ltd., and become more familiar with business and manufacturing environments. I feel ISU will not only provide me with a unique education in space studies but also it will prepare me for the transition into space industry. With the better understanding and appreciation of space that I have already gained from ISU, I wish to be able to contribute to space industry in the future while achieving my career goals. I'm open to your advice and feedback regarding the placement and other academic or career issues. I look forward to meet, write and talk to as many of you as possible!

David Phillips (MSS6) My full name is David Phillips, and I was born and bred in Toronto. I have recently completed my undergraduate degree in the Mechatronics Option at the Department of Mechanical Engineering at the University of Toronto. I'm currently in the process of applying to medical school, and come September 2001, I hope to be well underway towards a career in Aerospace Medicine. My specific field of interest is to develop medical tools and methodologies for use in future manned spaceflight, and adapting space technologies for terrestrial medical applications. I hope that at ISU, I can begin to transition from being an engineer to becoming a research doctor, and I am

looking for a placement and any other experience I can get that will help me in this pursuit. I'm also looking forwards to meeting anybody who can give me advice, or is interested in juggling, biking or anything else ending in "ing". Cheers!

Timothy Radcliffe (MSS6) Hi all. It always intrigues me how people choose to introduce themselves; I'll keep mine short & to the point. Born & bred in Winnipeg, when the Jets left, I left. After graduating from Queen's Commerce, I opted to hit the road & 29 months later find myself here in Strasbourg. During that time, I enjoyed a taste of life on an Israeli kibbutz, telemarking the French Alps, biking the Himalayas, student-life in Beijing, and robbing a Swiss bank. It's a pleasure to be introduced to you all, and I look forward to meeting you in person. Best wishes.

Next Issue...

Look for more fascinating articles from CAISU in the winter issue of the Cosmonotes. It will include the final report on the CAISU mini-isu day conference held in early November, more STS-97 launch stories, information on the MSS6 Professional Placements, and much, much more. On behalf of the 2000 CAISU Board of Directors 2000, I wish you all happy holidays! And a great new millennium!

Chantal Lamontagne SSP 95
2000 CAISU Membership Director
Editor, Cosmonotes

HAPPY HOLIDAYS!

JOYEUSES FÊTES!