December 1999

Cosmonotes

Décembre 1999

The Newsletter of the Canadian Alumni of the International Space University

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

President's Message

What a year.

When I realised who I was going to get to work with on the CAISU Board in 1999 I was pretty excited. The "Dream Team" that we put together was an amazing group of people and it was a great experience to work with them. Thanks to Matt, Caroline, Sebastien, Cory, Denis, Rob, Chantal, Jonathan, and Brian for an amazing year.

We had big plans for the year and we delivered way past our expectations. We were able to meet regularly (using modern communications technology, of course) even though we are busy people, and all geographically challenged! We secured the highest CAISU budget ever this year and we took on some amazing new projects. The CAISU web page was redesigned, and the members contact list was totally re-done to contain the most recent information from virtually all our members. A huge job considering that our typical CAISU member does not stay in one place for long. And this is the second issue of Cosmonotes going out this year, also a big job.

We held a few social events in Toronto and Montréal, and we supported the send-off of the 1999 SSP team Canada in Cambridge, Ontario, as well as the alumni weekend. And after the summer session, the 1999 class took on the responsibility of spreading the word to prospective students with the very successful Road Show activity.

The biggest event this year was, of course, our involvement with the Space Generation Forum, which was part of the 3rd United Nations Conference for the Peaceful Uses of Outer Space (UNISPACE III). The articles on SGF in this issue will give you a taste of what it was like, but I can tell you that, for me, it was one of the highlights of my life so far. Something I will not soon forget. So many amazing people coming together from everywhere to put on an amazing event. To everyone who participated in SGF, congratulations, and thank you to the Canadian Space Agency Space Awareness Program and to CFISU for helping make Canadians once again shine on the international space scene.

Please join me in welcoming our newest alumni, the SSP 1999 students, fresh from their 10 weeks at the Suranaree University of Technology in Nakhon Ratchasima, Thailand:

- Eric Choi
- Gordon Coutts
- Alwin Cunje
- Thierry Fontaine
- Angelina Guzzo
- Eric Lanoix
- Douglas McKay
- Morla Milne
- Ethel Poiré
- Nishi Rawat
- Josée Robert
- Aynharan Sinnarajah
- William Stewart
- Nicholas Svensson
- Laurence Vigeant-Langlois

Welcome also to our current MSS5 (1999-2000) Millenium class:

- Kamran Bahrami
- Simon Kruijen
- Rocco Locantore
- Valéry Tessier

We held a great CAISU Annual General Meeting at the end of November at CSA, followed by a nice evening at the home of CAISU co-founder Stéphane Lessard. Lots of people turned up. We discussed many new initiatives that CAISU might get involved with in the near future. At the AGM, we also elected the 2000 CAISU Board of Directors (see Matt's column). I look forward to working with this new team (a mix of old and new!), but I would like to sincerely thank the out-going BOD members who made the year what it was: Denis, Cory, Caroline, and Matt. The new people have big shoes to fill!

I've said this before, and I will say it again. CAISU can be whatever we want it to be. I cannot think of a more amazing (and humbling!) group to be involved with. Look out for some new, bold initiatives to come out of the next CAISU Board of Directors.

Alain Berinstain (SSP 91, MSS1)
1999 CAISU President

Letter from the Editor

I present to you the last issue of the Cosmonotes this millenium! As you can see from the header above, CAISU is already Y2K compliant but, just in case, we're mailing before the new year begins…

This December edition includes articles describing CAISU's various activities over the past several months, including several articles from the SSP 99 summer session in Thailand, the newest MSS5 class, and the amazing Space Generation Forum at Unispace III in Vienna. Also included are articles from alumni on the Surrey Space Center, ADAM, the Mars Society and the Mars Polar Lander Descent, the Canadian Center for Microgravity Research, the Mars Lander, space education, and various alumni regional gatherings. In this issue, I have also started what, I hope, will become a Cosmonotes feature in further editions. I have requested that two of our alumni, Alain Poirier (SSP 89) and Matt Wuhr (SSP 96), write profiles of themselves. I am constantly fascinated by the various paths taken by persons in reaching specific positions within aerospace companies, and so I asked them to describe their position within their company, what they do, and maybe how they happened to get there!

I didn't think the previous issue could be surpassed, but this issue of Cosmonotes has reached 24 pages! Many thanks to all alumni who made submissions or contributed to this edition of the Cosmonotes. This newsletter is indeed YOUR newsletter and cannot exist without alumni involvement. I hope you enjoy this issue of Cosmonotes, and wish you all Happy Holidays!

B.O.D. 2000

by Matt Wuhr (SSP 96, CAISU Secretary)

It's a pleasure to announce to you that we have elected a full 9 members to the CAISU Board of Directors 2000. Just prior to the beginning of the Annual General Meeting, we had received 4 nominations. The enthusiasm at the AGM generated another 7 nominations. An election was held, selecting 9 candidates for next year's BOD. It was felt best to just elect a BOD and to allow them to sort themselves into their respective positions at the upcoming transitional meeting.

Following a brief verbal presentation by each of the nominees present, and the reading of submissions on behalf of those who couldn't be with us, a ballot vote was held (26 ballots cast, including proxies). Each ballot allowed voting for up to 9 names (but fewer were permissible). The voting difference between elected and non-elected was a mere 4 votes. Here is the new Board (in alphabetical order):

Alain Berinstain (SSP 91, MSS 1)
Sebastien Drouin (Staff 94, 95, 96, 99)
Jonathan Knaul (SSP 98)
Chantal Lamontagne (SSP 95, 96)
Brian Rishikof (SSP 90, 91)
Josée Robert (SSP 99)
Rob Tarzwell (SSP 98)
Isabelle Tremblay (SSP 98, 99)
Rachel Zimmerman (MSS 3)

Many thanks to these, and to Eric Choi (SSP 99) and Claude Rousseau (MSS 4) for allowing their names to stand for election. As an alumni group, we were VERY fortunate to have 11 such candidates. Each candidate is very strong indeed, and we would have been blessed no matter which way the vote went. You may recognize 6 names as returning members from the 1999 BOD.

As a parting word, the minutes (to be issued in the near future) will briefly cover the level of exciting possibilities that face CAISU in the next couple of years. Involvement in any of these activities is not limited to the BOD members. Rather, in some cases, it will even be preferable if a non-BOD member takes the lead. So there are possibilities for participation for any and all interested. The new BOD will introduce these activities as they mature.

Call for Candidates:

Alumni Representative on the ISU Board of Trustees

by Alain Berinstain (SSP 90, MSS1, CAISU President)

Since 1994, there has been a seat on the ISU Board of Trustees for an alumni representative, and the position has been rotated through the world alumni organisations. Canada was first in 1994. It is now Canada's turn again to select a CAISU member to fill this important role.

The ISU Board of Trustees is the highest administrative board of ISU; the president of ISU reports to the Board of Trustees. Among other things, the BOT is responsible for strategic decisions, staffing the highest positions within the ISU administration, ensuring the financial well-being of ISU, and dealing with major issues that face the institution from time to time. There are representatives from government, industry, and academia on the BOT, and the alumni rep is a full, equal member.

The individual who fills this position represents the views of the alumni, but must always act IN THE BEST INTEREST OF ISU, not necessarily in the best interest of the alumni (although they rarely conflict). All board members (no matter who they represent) are bound by this. As a member of the Board, you are personally partially responsible for the actions and consequences of the entire organisation. This cannot be taken lightly.

In addition, this should not be seen as an opportunity to "push alumni issues". In my opinion, that's not what the alumni position is for. Of course, sitting on the Board gives the individual access to people at ISU and, if carefully done, items on the alumni agenda can also be addressed, but it should not be seen as the main purpose of the position.

Mark Matossian is the current alumni rep. His last BOT meeting will be held in February. We would like to have our candidate selected by then so there can be a one meeting overlap with the two reps present. The successful candidate must be available to attend several meetings a year and be ready to communicate the status of his/her activities to all alumni of ISU. The time needed to fulfill these responsibilities properly is not negligeable. We will do everything we can to find a way to cover the costs associated with the travel to the meetings.

In 1994, I had the privilege of holding this position. I'd be happy to answer any questions anyone has. If you are interested in being considered for this position, please send your name and a paragraph or two on why you would like to do this to caisubod@conveyor.com BY JANUARY 15, 2000. Elections will be held in January by electronic means.

Profile: ALAIN POIRIER (SSP 89), Canadian Space Agency

Profile: ALAIN POIRIER (SSP 89)
Canadian Space Agency

I was born a few months before Sputnik made its famous beep-beep heard from orbit; and I was a teenager when humanity walked on the Moon. I consider myself part of the first space-age generation, i.e., born as humanity made that historical step into space. However, I understood the real significance of the space age only recently.

My fascination for space came later in my career. At first, I was captivated by science as it unveiled the laws of nature, by pure knowledge as if it was a treasure to be found. The history of sciences, and more specifically the biography of famous philosophers and scientists such as Aristotle, Ptolemy, Newton, Rutherford, Einstein and others, made me undertake studies in physics; I completed a Ph.D. (1982) at McGill University in Modern Optics and Solid States Physics. During my studies, I experienced the thrill of innovation and discovery. I also

realized that without resources (knowledge, time, people, and money) and a good dose of management, one rapidly exhausts the spectrum of possibilities. After my Ph.D., I joined a small and growing high tech company, MPB Technologies, that provided me with the freedom and resources that I needed to innovate and have fun. That is when the first opportunity to conceive, design and manufacture my first space qualified system materialized, i.e., a Get-Away-Special Payload to be launched in the Shuttle cargo bay. That was in 1984 (the year of the first Canadian astronaut in space, Marc Garneau), when my proposal to design and manufacture a multi-purpose furnace for crystal growth experiments as part of the Space Station User Development Program (SSUDP) was accepted. All of a sudden, my work took on a new dimension. It was no longer the thrill of creating (a new gadget or system), but the moving feeling that somehow I would participate in the space adventure, being part of something much, much bigger.

Everything is a matter of perspective, as this well known tale exemplifies: In an old village, a stranger comes across a group of workers busy cutting large stones. The stranger asks the closest worker "What are you doing? "; the worker answered "I am cutting a stone, can't you see?". Still puzzled, the stranger asks another worker that looked wiser, and asks "What are you doing?"; the second worker answered "I am building a cathedral". These days, working on the International Space Station (ISS) feels very much as if we were building a cathedral. Each contribution to the space program, however small, is equivalent to assembling the building blocks of a new civilization, one that is expanding beyond its cradle, the Earth, into space. We are privileged to be at the right place and the right time to make it happen.

The challenges of space programs and the complexity of mastering the resources to realize those ambitions very rapidly defined the limit of my managerial capabilities. Technical and scientific knowledge was certainly not enough for me to succeed in the space endeavor, I had to also become a better manager. Two options lay in front of me: to acquire experience and some grey hair, or to undertake a Master of Business Administration (M.B.A.). Actually, I did both, as I worked full time and took the MBA part-time over 5 years. I graduated in 1989, and attended the ISU Summer session that year, ten years ago. Since then, as my wife was pregnant during the ISU Summer session, I am marking ISU time by the age of my daughter Alexandra.

The year 1989 was a critical year for Canada in space. The Canadian Space Agency (CSA) was created and Canada became a partner in the International Space Station. My involvement in both the SSUDP and the newly created STEAR (Strategic TEchnologies for Automation and Robotics) program, both part of the space station program, together with my participation at ISU, raised my profile with the senior management at the CSA. I pursued my career with different companies, e.g., Oerlikon Aerospace and SNC-Lavalin, specifically working on space programs (Space Station and RADARSAT) until 1993.

The Canadian Space Agency was created in 1989 (the CSA Act), but the current facility in St-Hubert was opened only in 1993. I was amongst the very first "employees" to move into that superb building in late August 1993. Spar Aerospace in those years was the Canadian prime contractor. As I did not work for Spar or any company that was part of the main contractor team, I was limited to second tier type work or small payload related projects. The Canadian space adventure is orchestrated by the CSA. My ambition was to participate in a bigger way in that great adventure. As many government employees had to move from Ottawa to St-Hubert, many decided not to come. It created an opportunity for people like myself. Using my connections, and being known by key senior managers at the CSA, I was able to join the CSA under the Interchange Canada Program, on "loan" from industry.

My first duty at the CSA was to manage the STEAR program, a program aimed at developing the next generation robotics technology to evolve the Mobile Servicing System, Canada's contribution to the International Space Station (see figure 1). One year later, as opportunities were created, I became director, Strategic Development, for the Space Station program. In August 1995, I was honored and privileged to become the director general, Space Station Program. In 1996, I became director general, Space Systems, which includes responsibilities for the Canadian contribution to the International Space Station, the RADARSAT-2 program (see figure 2), and also the main engineering and management functions required to deliver medium and large space projects, i.e., project management, systems engineering, operations engineering, safety and product assurance, and configuration management. Those responsibilities involve a yearly budget of approx. $200M with close to 200 persons in my team (I write those numbers not to boast, but simply to highlight the scope and level of complexity of the tasks). My formal training in management and years of experience provided me with

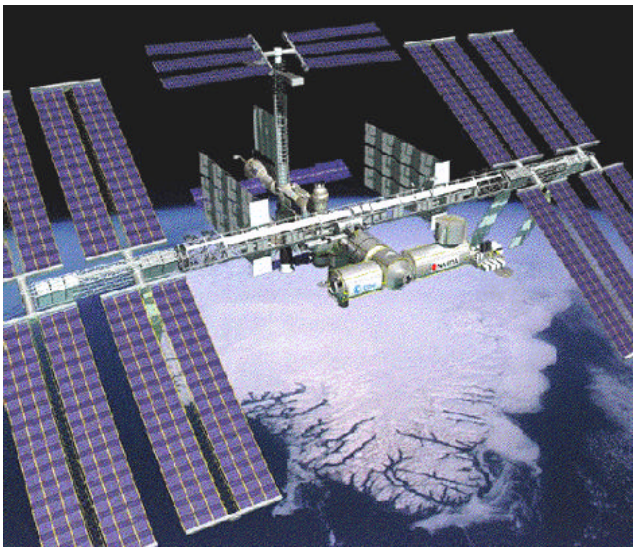

Figure 1 International Space Station

Figure 2 Rasarsat-2

the right mix of skills and knowledge to tackle this challenge.

My position reports directly to the President of the Canadian Space Agency, Mr. W. Mac Evans. Moreover, being the project leader responsible for Space Station, I sit on the top level ISS management board, together with representatives from the US (NASA), Russia (RSA), Europe (ESA) and Japan (NASDA, STA). Every six months since May 1997, I support Mac Evans at Heads of Agency meetings dedicated to ISS. It is quite fascinating to participate in the history of the space station at the highest level, to see it unfold and, to a limited extent, influence its course. ISS is the largest civil international scientific program ever undertaken. The management challenge is enormous, but it is fundamental that the Partners (15 countries) learn to work together in an efficient and effective manner. I truly believe that space exploration and its colonization will only happen by working together over very long periods of time. ISS is the first test of this new paradigm and it is no longer just a dream, it has become reality since November 1998 with the launch of Zarya.

ISS is a major step for humanity, it marks the beginning of a sustained exploration of space. Humanity will go beyond low earth orbit, back to the moon to stay and soon to Mars. The rationale and the reasons for doing it will be different from those behind the Apollo missions, the Shuttle program and the MIR space station. That is what every space program is struggling with; we have to understand better why space is important, to redefine its purpose and relevance to our civilization. In particular, we must justify and rationalize the human presence in space. I believe it will take another decade or so for that to happen, and then we will unlock the full potential and fascination of space exploration.

The graduates of ISU possess a unique inclination towards space and a desire to participate actively, as a group, in the space adventure in an international framework. ISU is establishing the basis of this new paradigm that will enable space exploration on a global, multinational basis. Indeed, I feel privileged to live in these pioneering years. I am confident that the next twenty years will be even more fascinating as the space adventure breaks its moorings to aim for the stars.

Profile: MATHIAS WUHR (SSP 96), Telesat Canada, Ottawa

At Telesat, engineers could work in any of various groups: ground antennas, software development, data processing & archiving, payload frequency co-ordination, telecommunication research, future planning & requirements, product assurance, flight dynamics, or satellite systems. I work in the latter division.

Telesat itself doesn't build satellites, we operate them. And thus far, the only ones have been geostationary satellites. Telesat sends out "Requests For Proposals" based on what they need in a satellite, and then entertain bids from all the major communication satellite manufacturers. In the space systems division, most of the engineers are involved in analyzing the proposed designs and then, when a successful candidate is chosen, monitoring and testing the fabrication of the spacecraft.

The division is also heavily involved in consulting and offering pre-launch program management for other satellite operators that do not have the experience that Telesat has acquired over the years. In any given month, the Ottawa-area headquarters could be host to guests from Hughes, Lockheed Martin, Space Systems/Loral, Matra Marconi, Aerospatiale, Boeing's launch vehicles' division, Arianespace, Khrunichev, the people we consult for, etc. It often seems that telecons are happening all the time in the various meeting rooms. Some of the Telesat personnel are on long-term assignment to field offices at Hughes, SS/Loral, Lockheed Martin, or wherever the need. Some engineers travel with the satellites during shipping, and some monitor launch site activity. The ground antennas group is even able to offer extensive transfer orbit coverage thanks to a Telesat antenna station in Australia and relationships with antenna people in England and Israel. Telesat is in a favoured position with many firms and is always exercising discretion so that one company's secrets don't leak to another.

A smaller portion of the satellite systems division is involved in the day-to-day operations of the satellites. This is my group. We are like the family doctors to the satellites that have been launched and are under Telesat control. The other satellite engineers are more subsystem specialized, but in my group we have to be more system and operations oriented. For example, we are more interested in what can be done with the satellite (and how) than we are with why things were designed the way they were (though we can still appreciate good design technique). We need to focus on the supporting operational documentation, rather than the results from integration & test. (But of course, there is no hard and fast rule in any of this...people do cross boundaries in their various specialties.)

Me in particular...well, I'm the junior of two (sometimes three) engineers who are preparing for the day-to-day operations of NIMIQ (Telesat's newest direct broadcast satellite, built by Lockheed Martin). It's the newest member of the Telesat family, but not for long. Next year will see the launch

of Anik F1, built by Hughes. Shortly after that will be Anik F2 & F3 (but we don't yet know who will be making those). The export control regulations out of the U.S. have been making things rather difficult recently (even for us in Canada), but this is supposedly about to change. My role is not too technical (I've really only played with the occasional simple equation in my two and a half years here). It's more involved with managing an abundance of information, and understanding things from a big picture point of view. There has been some travel, to date, to the San Francisco / San Jose area of California, but now that the satellite is launched, I'm permanently based in Ottawa as a NIMIQ engineer ("anemic" engineer?? hmmmm....), with no further travel on the horizon. On my trips out to California, I had the great pleasure of meeting about 5 of the alumni from my class of SSP 96.

Message from CFISU

Following a highly successful SSP 99, CFISU is once again gearing up for our first class of the new millennium. Once again, we hope to sponsor around 10 students for ISU 00, to be held at Universidad Tecnica Federico Santa Maria, in Valparaiso, Chile.

The deadline for applications is fast-approaching, so if you know anyone who is interested, remind them to get their application in. The CFISU Student Selection Committee will meet at the end of January to select the lucky winners.

On another note, the CFISU Board has given approval in principle to transferring the foundation's administrative activities to the Canadian Aeronautics and Space Institute (CASI). We feel this will help to bring more resources to promoting CFISU and ISU, and will also help establish a closer link between our alumni and CASI, which is Canada's leading society for space professionals. (If any of you are not currently members of CASI, I urge you to join).

Finally, I wish you all a happy, healthy and prosperous New Year!

Rod Tennyson
President CFISU

Web Activities

by Sebastien Drouin (Staff 94, 95, 96, 99, CAISU Ontario Director)

As the new CAISU Web master, I was handed off the CAISU web site as well as CFISU's in September of '98. All I can say is that Adam Mizera had done an extra cool job of revamping the site at that time. What I did since then is to polish it up, and maintain it. In the past year, some of you may have noticed the added links to the SGF and a coverage of the SSP in Thailand. As I was the Info Resource Coordinator at the SSP this summer I was able to build a small site with the picture of our new members, the class of '99. Just recently the roadshow had its dedicated page, as well as the Annual General Meeting agenda.

This year almost saw a new way to do elections for the Board of Directors: the Web Elections. Nominations were posted on the internet as well as a secure site for posting the votes of every Canadian alumni. Unfortunately, because of last minute details seen in the By-Laws, we had to cancel that. It is my hope to rectify this for next year as we will be able to get more votes to elect the 2001 BOD.

Other things novel to the site is the addition of the AGM minutes from last year and this year. Also were added the minutes of the BOD from last year and this year's will be included after each meeting to make sure people know what's happening with the association. One more issue is the Cosmonotes. We have gathered some of the old issues (when Vivian was the 'editor') and the last one from Chantal. Those will be available on the web very soon.

For a long time CFISU had a web site with really back dated information so that was updated as well. Stay tuned for a major face lift in the first quarter of 2000 for both sites! Moreover, the long time association with the Internet Conveyor Ltd. is ending soon. For that matter, both sites are being transferred to the ISU web server in Strasbourg. The end result will be transparent to users since we will retain the same domain names (DNS) but they will simply be pointing at ISU instead. Thanks to John Criswick and the Internet Conveyor.

There is also a project from Alain Poirier that will most likely be put somehow on the web in the coming year regarding a new perspective on space exploration, space awareness and its history in general. So make sure to come visit us and drop your comments and suggestions to caisu-web@conveyor.com.

CAISU AGM - Nov 27th

by Chantal Lamontagne (SSP 95, CAISU Membership Director)

A very successful CAISU Annual General Meeting was held at the Canadian Space Agency on November 27th. 26 CAISU members were present, with another 11 guests, including two SSP 2000 applicants!

The assembly was welcomed by our President, Alain Berinstain (SSP 91, MSS1), who followed with the CAISU annual report, outlining our activities of the past year. The election process was described, with nominations open all day (please see BOD 2000 article elsewhere in this issue for elections results".

A presentation was then made by Marie Juneau on behalf of the Canadian Aeronautics and Space Institute (CASI) to discuss their proposal to have CASI take over CFISU administrative functions from the Impact Group. A closed session followed while the membership discussed how this would impact CAISU as an independent association.

Half-hour presentations were made on the MSS4 Team Project (the Commercialization of International Space Station), the SSP 99 and Roadshow activities, and the SSP 99 design projects (South East Asia Disaster Management System, Human Exploration Away from Earth). The process and activities of the Unispace III/Space Generation Forum were presented, stressing Canadian involvement at this UN event, followed by a presentation by ADAM, the Association for the Development of Aerospace Medicine. Alain Poirier (SSP 89) then gave a phenomenal,

wide-sweeping and inspirational presentation on a Historical Perspective on the Quest for the Human Exploration of Space. The assembly bombarded Alain with questions, and there seems to be great enthusiasm for CAISU to take on this project in the near future.

Other business discussed included the Canadian Space Foundation, the ISU Board of Trustee position, and a possible future SSP in Canada. Please see the AGM minutes for more details on the discussions involved.

During lunch, generously sponsored by the Canadian Space Agency, the members present were treated to an impromptu tour of CSA, with various CAISU members spontaneously demonstrating their knowledge as we proceeded through the complex! Once the election results were tabulated, the meeting was finally adjourned (a tad late) and we were graciously hosted by Stéphane Lessard (SSP 88) and family for an evening dinner and social a-la-ISU.

The enthusiasm and ideas generated at the AGM were fantastic, and prove that CAISU, as an organization, is vibrant and alive, with the capacity to do anything. We thank all CAISU members for having attended the 1999 AGM and look forward to meeting more of you next year!

Membership News

by Chantal Lamontagne (SSP 95, CAISU Membership Director)

Thanks to a fresh SSP 99 class with 15 Canadians, and the current millenium edition of the MSS with 4 Canadians, our membership now stands at 156 Canadian alumni (140 SSP, 18 MSS, 2 having done both programs), with an additional 6 alumni living in Canada having represented other countries at ISU.

It is the nature of ISU alumni to remain mobile and, as our numbers keep growing, it becomes increasingly difficult to keep everyone in contact with CAISU. If you are moving or have new contact information, please let us know so we can then update your entry in the Contacts List! Please contact the Membership Director at:

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

with any changes or to request a copy of the Contacts List between publications.

Lost in Space Alumni

A few alumni still remain "lost in space", with no current contact information.

Kathy McCuaig (SSP '89)
Jesko Von Windheim (SSP '89)
Céline Lévesque (SSP '91)
René Landry, Jr. (SSP '94)
Peter Lee (MSS2)

If you have any information on the whereabouts of these alumni, please contact the Membership Director, Chantal, at clamont@utias.utoronto.ca so we can quickly get them back in touch with the rest of CAISU.

TOGA x 2

In mid-May, a group of Toronto area alumni met for what we are now calling TOGAs (TOronto Gathering of Alumni, not the Greek togas, though those were optional). Pizza and snacks ruled the day as we welcomed students bound for Thailand and prepared them for their sleepness summer at ISU. We were also regaled late into the night with stories (and pictures!) from Louis-Paul Bédard (MSS4) and Roland Seurig (SSP 91 GER) who both described their experiences of working in Japan.

The Toronto group felt that more of these such TOGAs were needed, and vowed to meet once again before Christmas, to get the scoop from the summer session students, and to reminisce just a bit more. The next TOGA, on December 17th, was just in time for the holidays! We all met at the Old Spaghetti Factory for some good food and to find out who Santa thinks has been Naughty or Nice! TOGA's next goal? To convince Chantal to try Sushi…

QAIG

The Quebec Area ISU Alumni Gathering (QAIG) in Montreal on June 5th was a great success. More than 50 people showed up!!! It was unfortunate that Alain Berinstain was unable to sing but we still had lots of entertainment. We even had a surprise phone call from Paulo Alfonso of Portugal. Thank you to everyone for attending, and a special and very important thank you goes out to Louise and Alain Poirier and their two daughters for hosting the party. They did an excellent job. We had tons of food, a beautiful house and backyard/pool, and outstanding hosts.

Kingston Area Gathering – KAGA 1!

by Sebastien Drouin (Staff 94, 95, 96, 99, CAISU Ontario Director)

They all drove down on that rainy day from Ottawa, Montreal, and Kingston and were welcome to my humble house, December 4th, 1999. A good bunch of alumni and friends were present to celebrate the year that has passed and the upcoming year with a 'Hats Off to the New Year' Theme (all showed up with interesting hats…)!

Everyone arrived around four in the afternoon and we all started to cook. Fortunately the kitchen was large enough to accommodate about 10 people all cooking different dishes for the 'potluck' dinner. We had Thai Chicken with rice and Papaya spicy salad, all kinds of hors-d'oeuvres, vegetable and dip, homemade salsa and shrimps. We also had fancy Rhum flambé crêpes with maple syrup, cheesecake, tropical fruits and more and more! Needless to say everyone was full at the end! It was open bar all night with cool music, pictures of wedding, SSP '99, and very interesting chats as we are all familiar with. We went to bed at around 03:30 hrs and everyone has space to crash somewhere. The house was full of people! The next morning we had eggs, bacon, crêpe, toast, everything! A long table with everyone sitting made for a perfect atmosphere to sip coffee, talk more and then say bye until the next

time! Here were the people that showed up:

Ron Dicke (93), Pat Sullivan (93) and Janic, Bill Stewart (99) and Heather, Thierry Fontaine (99) and Josephina, Ratan Bhardwaj (97) and his girlfriend, Angelina Guzzo (99), Rachel Zimmerman (MSS 3), Gordon Coutts (99), Morla Milne (99), Eric Lanoix (99) Josée Robert (99), Jameel Janjua (Staff 99) and Pierre Chouinard (Staff 99).

I thank everyone that showed up and those that could not but wanted to come. As expressed by some of you, I will organize another KAGA sometime in the first quarter of 2000. This time I'll try very hard to get also the people from Toronto! Hopefully it won't be exam time again!

Cheers to all, joyeuses fêtes et une bonne année pour ceux que je ne verrai pas avant les célébrations et pour ceux aussi que je reverrai! All the best!

Canada Day Celebrations at SSP '99 and Canadian Cultural Night

by Morla Milne (SSP 99)

Excited. Nervous. Weighted with luggage. The Canadian ISU students arrived at

orientation to get the lowdown on the summer. We were immediately told we had a list of responsibilities longer than my arm. As Canadian representatives we were required to find a canoe. In Thailand. As Canadian representatives we were expected to find a boatload of Canadian beer. In Thailand. As Canadian students we were supposed to plan the party of all parties for Canada Day. Okay, that was the easy part.

I'm all for responsibility but admit it, it's a lot easier to get Canadian beer in Cleveland. The Canadians brainstormed ideas about where to get the required elements to celebrate our culture in the manner it deserves. Do we buy the beer here and transport it around the world? What are the liquor restrictions in Thailand? We could picture it now: "I'm sorry, Canadian, you aren't allowed to go to ISU because you can't bring 25 cases of beer into our country!" Think of the shame.

I decided to contact the Canadian consulate; they are usually a font of information. I also thought, if anyone is going to have a canoe in Thailand, it will be a Canadian.

They couldn't help on the canoe front but they did offer some beer support. A driver carrying a case of Labatt's met us in Bangkok airport. It wasn't enough for all of the SSP students but we figured we could use it as prizes and get everyone drunk on local brew. This concept worked out very well but more on that later. The consulate also told us that there were no canoe-like boats available in Thailand. Disaster. Before we even leave Canada we are failing our ISU ancestors. After a careful search of the Cambridge area we struck gold: canoe-in-a-box. It was inflatable but, I hasten to add, a real canoe.

While the beer and canoe were being organized, another crack team of Canadians including Ethel Poiré, Nishi Rawat, Alwin Cunje and Angelina Guzzo began combing

the stores of Cambridge for anything with a maple leaf. The timing was perfect: the week before July 1. We got stickers, tattoos, flags, posters, facepaint and jello - thirty packages of it.

This particular idea was inspired. We would fill the canoe with red jello and have jello wrestling: Canadians vs The World. At first, I think the SSP thought the Canadians were a bit cliquey because we were always calling "Canadians come to the corner for a meeting!" The plans for Canada Day progressed.

On July 1, Eric Lanoix cooked French Canadian crêpes, courtesy of his mom's recipe, for the whole SSP. All the Cannuckleheads provided maple syrup. The dining room was decked in Canadian flags, each table boasted a flag and every person got a Canadian pin carefully pinned by Josée Robert. We out patrioticked the Americans.

That evening the beer flowed freely and no one was allowed to come into the party without getting a Canada tattoo or a Canadian symbol painted on them somewhere. People cheered loudly as the Canadians portaged the canoe into the party room.

Nick Svensson, of COM DEV, played Alex Trebek in a toque. There was a grueling session of Canadiana, everything from space to entertainment trivia. Spain won the day and received stylish Canadian t-shirts to sport around campus.

Then came the feature event: Wrestling. We had decided not to use the jello to wrestle in, so as not to offend anyone else's culture. We had planned to serve it as a snack during the party but the kitchen staff had put it in the freezer to gel it more quickly and it had frozen. We had to sacrifice the 45 litres of jello!

In any event, the canoe proved to be unstable enough to make it dangerous. There was much scuffling as the opponents tried to get past one another to break the balloon tied to the end of the canoe.

Canadians Eric Choi and Thierry Fontaine threw themselves into the fray

and there were Brits, Yanks, Auzzies and French fighting for national honour! The bouts were evenly split between the World and Canada. The audience went wild.

At one point, the party was so intense that the ceiling caved in. The party room was a building specially built for ISU and completed just days before we arrived. There was torrential rain that night and water had been collecting in air conditioning ducting. During a rockin' song the water reached critical mass and the ceiling in one corner of the room caved. Water rushed to the floor, giving a nice slippery skim to dance on, which is exactly what everyone kept doing. It was a good thing we had the canoe.

The party lasted late into the night as everyone danced to Bryan Adams, The Tragically Hip and Sarah McLachlan.

You know it's a good gathering when the party is so intense the roof falls in and when the turnout to lecture the next morning is sparse. Chris Sallaberger's business lecture echoed in the lecture hall that was barely half filled.

The Canada Day celebration was an excellent event; we set a high standard for all other national parties during ISU.

Culture Night Postscript

Just a few days later Canada shared more of their culture, along with other countries, at the first cultural night. We gave a music and slide show giving an impression of the breadth and depth of Canada. The show was put together with the time and effort of all the Canadians, especially Laurence Vigeant-Langlois spearheading music with Aynharan Sinnarajah. Bill Stewart and Gordon Coutts hosted the evening as Bob and Doug MacKenzie. (That's MacKenzie not Doug McKay, although he was there too, supporting the effort).

For the final part of the presentation we had the audience play Canadian roulette. Four beers were passed out to various people. One of them had been shaken vigorously. The four lucky contestants held the beers close to their heads and pulled the tabs. One of the Thai students, and a number of people sitting near him, was doused with beer.

For the party afterward we offered maple taffy and a massive chocolate cake as Canadian cuisine.

I think the best offering of Canadian culture, though, was the Canadians themselves and it didn't happen on just one night. At many times throughout the SSP it was the Canadians who pitched in when something needed to be done, who made an extra effort to include everyone in what was going on. We were the largest delegation at the SSP but we were rarely found in a gaggle but rather spread throughout the events, activities and studies. Exactly as it should be.

1999 Design Projects

Out of the Cradle: An International Strategy for Human Exploration Away from Earth

by Eric Choi (SSP 99) and Eric Lanoix (SSP 99)

Three decades after Apollo 11, none of the world's space agencies have an approved program to send humans beyond low-Earth orbit (LEO). NASA has tentative plans for human expeditions to Mars, but is currently bogged down in the construction of the International Space Station (ISS). The Russian Aviation and Space Agency retains the ambitions for Mars of its Soviet predecessor, but is hamstrung by the country's political and economic crises. The European Space Agency and the National Space Development Agency of Japan have proposed robotic missions to the Moon and Mars, but have no definite plans for human expeditions. Finally, the smaller space agencies of nations like Canada, India, and Brazil have no plans of their own but may be willing to participate in initiatives led by the major agencies.

At the 1999 ISU Summer Session, 41 students from thirteen countries worked together to devise a new strategy for human space exploration. The result was a report entitled *Out of the Cradle: An International Strategy for Human Exploration Away from Earth*, in which a global coordinated strategy for human spaceflight was developed and a detailed design study of one precursor mission was carried out. This strategy calls for a series of focused robotic missions followed by a permanent human presence as soon as possible. The Moon, near-Earth objects (NEOs), and Mars are considered not as discrete destinations but as steps towards the development of a robust infrastructure that addresses the scientific, technological, legal, economic, and social aspects of human exploration away from Earth.

LEO is considered the foundation of the strategy. Here, ISS would play a niche role in areas such as technology demonstration, scientific research, and commercialization. Inflatable structures that may be used as low-cost habitats on lunar and Martian bases were recommended for testing aboard the Space Shuttle with a sub-scale "Testhab" prototype. An internationally coordinated commercialization plan was also endorsed as a means of encouraging and assisting companies in utilizing ISS. This would be a step towards convincing industry to invest further in human space activities.

The first step of the strategy beyond LEO consists of expanding human presence in the inner Solar System. This would first be carried out by a series of robotic missions that would characterize extraterrestrial resources in order to prepare for eventual human missions. Humans and robots would explore together in a concurrent partnership. Once the Moon has been adequately surveyed by the precursors, astronauts would at last return to the lunar surface. At the same time, precursors would continue to be sent to NEOs and Mars. These robotic missions would then be followed by human exploration of these bodies.

The second step of the strategy focuses on the systematic utilization of the extraterrestrial resources surveyed in the previous phase. On the Moon, resources may be extracted from the regolith or polar ice. Multiple bases on the Moon could then be constructed. Activities at these bases would include resource utilization, astronomy, life sciences, and perhaps tourism. NEOs

would also be exploited for their mineral and possible water resources. Mars also has resources similar to that on the Moon and NEOs, as well as an atmosphere that may be used to produce propellant and water.

Finally, thanks to the resources at their disposal, human settlers in the inner Solar System would eventually become self-sufficient. These autonomous settlements would form the basis of a "space society". Such a society would help ensure the survival of humanity in two ways. First, it would be able to alter the trajectory of any NEOs on a collision course with Earth. Second, the fact that humanity has spread out among many worlds would ensure that no single catastrophe, NEOs or otherwise, could wipe out civilization.

To facilitate the initial planning of the strategy, it was recommended that the functions of the existing international lunar and Mars exploration working groups be merged into a new *ad hoc* International Human Exploration Consultative Group (IHECG). This group would differ from its predecessors in that it would coordinate not only missions but also areas such as public outreach, education, and commercialization. It would also have an expanded membership that would include representation from industry, private institutions, and developing nations. Once the world's space agencies proceed to the mission hardware phase, a more formal organizing structure may be required. For this stage, the formation of a series of treaty-based consortia, modeled after INTELSAT, were proposed to manage the steps of the strategy.

The report concluded that no "breakthrough" technologies are required to begin human deep space exploration. However, a continued program of technology development would be beneficial. Some of the technologies that should be pursued include reusable and heavy-lift launchers, advanced propulsion and power systems, closed-loop life support systems, *in-situ* resource utilization, and radiation countermeasures.

The current framework of space treaties was found to be adequate for the preliminary steps in human exploration and should be respected. However, this framework must evolve as the strategy progresses and humanity moves into the Solar System. While it has been suitable for space activities to date, some of the current provisions, such as the Registration and Liability conventions, will need to be reconsidered in the future.

While the space budgets of nations like China, India, and Brazil may increase as they work towards G7-level gross domestic products, the spending of the US, Europe, and Japan is expected to remain generally level. Hence, methods of controlling cost will be essential. Coordination through the IHECG and its follow-on consortia would result in cost control through the elimination of duplicated effort. Also, by setting up the project with a corporate-like structure, the program may proceed even if one or more of the "investors" drop out.

Generating and maintaining public support is the most crucial part of the strategy. Public interest in space must be shifted from short-lived feelings to a forward-looking concern for future generations. To achieve this goal, decision-makers, their advisors, the attentive public, and also the general public must be better educated. Fortunately, the envisioned strategy is based on the concept of many focused missions that build on each other. Such a paradigm is beneficial to enhancing public awareness because it keeps space "visible" in the news. Ideally, newsworthy milestones should be accomplished every two to four years because this is the "attention horizon" of governmental and corporate decision-makers.

Towards this end, it would be desirable to conduct missions based primarily on their public awareness value. While possibly controversial to the scientific community, these missions should be acceptable if other returns exist, such as the development of commercial opportunities. This was the rationale behind the robotic precursor mission that was selected for detailed design study: the Lunar Rover Race.

The Lunar Rover Race is modeled after terrestrial events like the *Tour de France*. A lander would carry ten racing rovers and one media rover to the starting point of the Apollo 17 landing site. The proposed track is a closed circuit that would run out to the Luna 21 site and loops back to Apollo 17. It is further defined by twelve checkpoints corresponding to natural geological features. At each stage of the race, the media rover would go ahead to the next checkpoint to broadcast the arrival of the racers. This competition would be open to all, including universities, companies, space agencies, and the military. A team would represent each of the five continents. In addition, there would be five others consisting of the best runners-up. The race would be managed as a private operation, with the funding obtained primarily through commercials, sponsorships, and other non-governmental means.

The *Out of the Cradle* report concluded that the only major obstacle to sending humans beyond LEO is the lack of public and political support. The world space community has to do more to educate governmental and corporate decision-makers, their advisors, and especially the general public on why humans should explore space. But the message must shift from the notion that space is a foreign and hostile environment to be "conquered" to one that views space as a part of humanity's natural habitat. In many respects, we have gone full circle. The title and spirit of the report merely reflect what Konstantin Tsiolkovsky already knew nearly a century ago: "Earth is the cradle of humanity; one cannot live in the cradle forever."

South East Asia Disaster Management System – SEADS

by Laurence Vigeant-Langlois (SSP 99)

In recent years, we have grown to realise to what extent our exploits may impact our fragile environment. Observing our Earth from orbit, Vietnamese cosmonaut Pham Tuan perceived our natural world in its unity and solitude, as both a fragile and powerful entity. "During the eight days I spent in space, I realised that humankind needs height, primarily to better know our long-suffering Earth, to see what cannot be seen close up. Not just to love her beauty, but also to

ensure that we do not bring even the slightest harm to the natural world." Pham Tuan, Soyuz 37, July 1980.

Severe flooding in the Chanthaburi province of Thailand during the past Monsoon season reminded us once more of the influence of natural disasters on this part of the developing world.

If we humans can observe, understand and share information on how nature and human activities mutually influence each other, could we ensure a more harmonious existence for our future generations?

This was part of the questioning process that 47 ISU students from around the globe participated in during SSP 99. In considering pre- and post-disaster management phases, we complemented each other's efforts in searching for effective ways to save lives and reduce property damage.

Our approach was to analyse current technological and organisational infrastructures, identify shortcomings and provide recommendations for improving the overall disaster management system. We learned about the importance of the close relationship between disaster management and the economic and social development in the area.

The challenges we faced included establishing links between our group and the local organisations to gain a better understanding of the relevant issues and attempt to have an impact with the regional organisations.

A conference on disaster management is planned for the upcoming summer and will be led by our venerable project co-chair, Vern Singhroy of the Canada Centre for Remote Sensing.

MISSION: ISU Takes Over The World

(a.k.a. CAISU Roadshow 2000)

by Angelina Guzzo (SSP 99) and Bill Stewart (SSP 99)

The Roadshow was organized again this year to get new students informed and enthused about ISU. The approach to this year's Roadshow was to minimize travel by asking ISU alumni to make presentations in their local region. Although everyone was extremely busy at the time, the ISU spirit prevailed and we had the participation of many of the SSP 99 students and alumni from past years. Presentations were made at McGill University, l'Ecole Polytechnique, at the University of British Columbia, at the University of Toronto, at Queen's University, at the Royal Military College, at Dalhousie University, at the University of Ottawa, at Carleton University, at McMaster University, at the University of Waterloo and at the Canadian Space Agency. The presentations were a great success with plenty of good questions from prospective students. Many students also stayed after to ask more questions. The audience really enjoyed the photos in the presentation that showed the "extracurricular activities" we participated in while visiting Thailand.

More than 200 applications were distributed throughout Roadshow 2000. French and english versions of the Roadshow presentation are available for download at the CAISU web site, www.caisu.ca. In addition, an electronic version (MS Word) of the ISU application form is available on the CAISU web site, courtesy of Isabelle Tremblay (SSP 98). We would like to extend our thanks and appreciation to all the people that contributed to the success of this year's Roadshow.

Réflexions Thai

par Thierry Fontaine (SSP 99)

Voici des chroniques Thailandaises écrites par Thierry Fontaine et envoyées à ses amis pendant son séjour comme étudiant à la session d'été 1999.

Pensée profonde

C'est bon de savoir que même si la session d'été est orientée au cube sur l'espace et aussi - c'est vrai - sur l'étude appronfondie des problèmes de navigation et contrôle lors de la prise excessive de liquide houblonneux :), on aborde aussi des sujets très serieux voire préocuppants. Oui, je veux parler de la superpopulation, du rechauffement de la planète, de l'effet de serre, de la croissante demande en énergie, de la déforestation, de l'augmentation du niveau de la mer, de la désertification, de l'épuisement des réserves fossiles, de l'amincissement de la couche d'ozone… La question est: "Où est-ce que le vaisseau spatial Terre s'en va?" Sans régler le problème, ça vaut la peine d'y penser. Qu'est-ce qu'on peut faire pour que les générations futures aient du bon temps sur la Terre et ne soient pas trop en maudit contre nous? Si vous avez des idées ou des commentaires, envoyez-moi ça et ne soyez pas gênés.

Nourriture Thai

1er aout. Je suis officiellement tanné du riz! Loi de moi, rizzerias, ou sont

les pizzerias! Ici il y a du riz partout, tout le temps, matin, midi, soir et même pour la collation en cas du petit creux. Du pain et des patates, mon rêve… Je veux aussi dire que les Thailandais n'ont pas à rougir et que les Mexicains n'ont qu'à bien se tenir ;-) Oui, parce que pour ce qui est d'épicer la bouffe, ici c'est grave. Les petits piments rouges et minces sont particulièrement dévastateurs.

Expédition dans la jungle

Journée dans la jungle: Je dois vous raconter l'excursion que j'ai fait dans la jungle il y a pas trop longtemps avec un groupe de français. On est parti une dizaine pour aller marcher avec un guide dans un parc National. Une balade de 8km sur 4 heures (vitesse moyenne 2 km/h) avec comme but de rejoindre la cascade d'Haeo Suwat. La j-u-n-g-l-e, WOW, c'est dense, humide, boueux, les arbres font 20 metres de haut, il y a des lézards, des grenouilles (mais elles ne sont pas vertes), des araignées, des oiseaux, des tigres (on en a pas vu mais rien ne dit qu'aucun ne nous a vus!), des éléphants (traces spottées par le guide), des singes… Très cool donc pour le trekking. Mais, mais, mais, faut partir équipe, c'est à dire avec de l'eau et surtout des guêtres. On n'avait pas marché une demie-heure que je me penche et je regarde mes souliers et c'est quoi ça

ces maudites affaires-là. Des sangsues! Ouach, le pire c'est qu'elle n'étaient pas dans l'eau comme toute bonne sangsue normalement constituée, mais dans le sentier, prêtes à mordre l'innocent touriste. Tout le monde s'en est pris sur les chevilles, même le guide, à travers les bas (chaussettes)! Alors, le conseil c'est vaut mieux porter des guêtres (longues et épaisses chaussettes par-dessus les pantalons). Si quelqu'un est prêt à s'associer pour partir une business de bottes en cuir de sangsues, je suis partant.

MSS5 Underway!

The Millenium edition of the Master of Space Studies program is well underway. On September 1st 1999, 38 students gathered for the MSS5 opening ceremony. Our ambassadors at MSS5 this year represent Argentina, Australia, Canada, China, France, Germany, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Russia, Spain, Sri Lanka, Sweden, Tunisia, the United Kingdom, and the United States of America. To find out more about what the MSS5 students are doing, please visit their webpage: http://mss.isunet.edu/~mss5web

MSS 5 Team Canada

by Rocco Locantore (MSS5 1999-2000)

First, a warm welcome to all from Strasbourg! We, the Canadian contingent of the 1999 – 2000 MSS program at ISU, would like to introduce ourselves to the ever-growing Canadian ISU family. We are:

Kamran BAHRAMI, graduated with a degree in Mechanical Engineering (B.A.Sc., '97) from the University of Toronto in Toronto, ON. Work experience at AlliedSignal Aerospace Canada and Pratt & Whitney Canada.

Simon KRUIJEN, graduated with a degree in Mechanical Engineering (B. Ing., '99) from École de Technologie Supérieure in Montreal, QC. Work experience at Pratt & Whitney Canada.

Rocco LOCANTORE, graduated with a degree in Aerospace Engineering (B. Eng., '98) from Ryerson Polytechnic University in Toronto, ON.

Valéry TESSIER, graduated with a degree in Architecture from Laval University (B. Arch., '98) in Quebec City, QC. Work experience in architecture, urban planning, and landscape architecture at Les Architectes Deschamps – Paradis, QC and Urbio S.A., Republic of Panama.

We are proud to be the newest members of the ISU family, and as such we do not hesitate to fully integrate ourselves in the ISU experience. Without a doubt, Team Canada plays an integral part of MSS 5 and we are only too happy to share our culture and experiences as Canadians to the rest of the class. As everyone knows, ISU was founded upon the educational philosophy of the 3 "I"s: Interdisciplinary, International and Intercultural. Not surprisingly, Team Canada almost completely embodies this visionary philosophy. While Kamran, Rocco, and Simon are all engineers in the aerospace field, each bring a similar but not identical outlook to the MSS program. Valéry, being an architect, truly validates the interdisciplinary aspect of the 3 "I"s. And regarding the international and intercultural aspects of the 3 "I"s? Well, we have got that in spades! Kamran is of Iranian heritage, Simon of Austrian/Dutch heritage, Rocco of Italian heritage, and Valery of long-time French-Canadian heritage. So among ourselves, we have our own distinctive cultural backgrounds and as all being proud Canadians are proof that the ISU educational philosophy can work. With a tolerant attitude, and open mind, and a little effort, the ISU family can realise what Canada has known and enjoyed for decades: a tolerant multicultural society that sees differences not as a weakness but as a strength, and that together we can reach the stars!

MSS 5 So Far

The 1999 – 2000 MSS class is made up of 38 students from 19 countries. One student completed Module 1 but unfortunately cannot complete the program with the MSS 5 class. She is eager to join the MSS 6 class in 2000 – 2001 to complete the remaining four modules and will give next year's class invaluable insight to ISU. Two students attended SSP 99 in Thailand and joined the MSS 5 class at the beginning of Module 2. With them, they bring much experience to our class. Just a couple of weeks to the end of Module 2, this year's MSS class has not been without its share of exciting experiences.

By far the most interesting trip so far was the ISU class trip to the 50th IAF Congress, which this year was held in Amsterdam, The Netherlands. The main goals of the trip were: to gain experience in attending such a professional conference; gather information and broaden one's knowledge of the space industry; and to meet and converse with persons in the space industry to gain their personal insights and experiences related to ISU schooling and future employment opportunities. The MSS 5 students were enthusiastic in attending technical sessions related to their field of interest/education/experience, along with the informative agency and company booths. In our short time there, the MSS students had the pleasure of attending two social functions where many contacts were made regarding Professional Placement and future employment opportunities. In particular, Team Canada received warm receptions from many persons at IAF; Canada plays a small but important role in the space sector, and Team Canada is eager to carry the torch. At the IAF Congress the MSS students showed great pride for ISU and by displaying genuine enthusiasm to all, the reputation of ISU enjoyed a well-deserved boost. The students even did their part in attracting prospective ISU candidates. This was accomplished with ease since at the Congress was present a huge contingent of ESA Outreach students, perfect candidates for ISU, with whom some ISU students made contact. As a result, the ISU booth enjoyed a surge in interest from potential ISU candidates. Even though the schedule was very full with IAF related functions, a number of students made time to take in some of the sights of beautiful Amsterdam; these sights included the Van Gogh Museum and the Red Light District. As a closing remark, IAF 99 was a tremendous success for ISU and the

MSS students, and an immensely enjoyable experience was had by all.

Since one of the main tenets of ISU is to introduce the students to space industry and organisations, ISU arranged a class trip to the European Space Operations Centre (ESOC) in Darmstadt, Germany. ESOC is the control centre for European space missions and much was to be learned. The students were able to speak with a number of ESOC employees, some of whom are ISU alumni. Afterwards the faculty and students enjoyed dinner at a traditional German restaurant, which was celebrating the keg opening of the annual Christmas beer. A good time was enjoyed by all, especially after a few (or more) pints of beer.

Canadian students at MSS5 (left to right): Simon Kruijen, Kamran Bahrami, Valéry Tessier and Rocco Locantore

One of the drawbacks of the current MSS lecture series is that it is much too focused on the European aspect of space. While European space activities are of great significance and importance to the study of space, when other aspects are neglected it compromises the educational experience. A more balanced approach to the global space field is needed when the guest lecturers are being selected. At this time there seems to be a minimal emphasis on the North American sector, even though it is the largest of the sectors. What needs to be re-evaluated is the balance of the lecture schedule. Though logistically it may be difficult, the situation should be improved upon. ISU prides itself on the three "I"s; let's make sure the International aspect is balanced some more. Many of the students at the ISU will be working in the North American space sector. Having a good perspective on the European sector will be a definite asset, but not at the expense of learning about the other regional space programs. For Team Canada, exposure to not only the Canadian space industry, but to the US space industry is of great importance and should not be neglected. The non-North American ISU students would also benefit from exposure to more Canadian and US space activity exposure. The beauty of ISU is that the student will be able to adapt to the different space sectors by having an understanding of them. If the home sector is ignored then what sort of frame of reference is that person left with? This situation existed during MSS-4. It is time that the message is delivered to the ISU administration that some students are dissatisfied with this level of imbalanced education.

Back on a positive note, we believe that it is the duty of the ISU community to strive to improve ISU. Canada played an important role in the founding of ISU, offering support during the development of the university, and Canada continues to play an important role. In 1990 York University in Toronto, ON had the pleasure of hosting the Summer Session. Team Canada believes that the SSP should return to Canada. Two obvious candidate cities are Montréal and Vancouver. Montréal would be well qualified as a host city, given that it is the centre of the Canadian aerospace and space industries. Also, Montréal would display French Canadian culture and thus educate people regarding Canada's unique cultural mix. While Vancouver is not known for its space industry (neither is Strasbourg for that matter), it would be an excellent candidate city for SSP because it would show how important a role multiculturalism plays in Canadian society; Canada is a shining example of many cultures living together in harmony. This is of much importance to the ISU philosophy. As well, Canada's strong ties to other Pacific Rim countries would be evident. The space programs of Japan, China, and India cannot be ignored and Vancouver would show that if co-operation could exist between East and West in other industries, it can occur in the space sector as well.

Recently the ISU community received the unfortunate news that the ISU administration has decided that Scott Madry's services will no longer be required for future MSS and SSP programs. The present MSS class has expressed considerable regret at this decision and is very much concerned. We consider ourselves fortunate to have had Scott as one of our instructors, even if only for a short time. It is our sincere hope that the MSS 5 class is not the last class to have benefited from Scott's space industry knowledge, experience, and love of life.

In conclusion, Team Canada is proud to be at ISU and it is our hope that we carry on the great Canadian tradition at ISU. We are all enjoying ourselves

immensely, not only from the educational experience, but from the cultural experiences as well. It is our hope that Canada continues to strongly support the ISU and ensure through an expanded scholarship program that many more Canadians have the opportunity to live the ISU life and become part of this wonderful family. GO TEAM CANADA, EH!

Descent of the Mars Polar Lander

by Audrey Robinson-Seurig (SSP 91 USA) and Roland Seurig (SSP 91 GER)

On Friday, December 3, 1999, the Mars Polar Lander, which was the third spacecraft provided by Lockheed Martin for the Mars Surveyor program, was scheduled to deploy two microprobes and to land softly on the Martian surface near the Southern ice cap. The purpose of this mission was to search for water in the permafrost layer. Two members of the Toronto Chapter of The Mars Society, Darlene Lim and Roland Seurig (SSP '91), were invited to provide commentary on CTV Newsnet during the descent of the Mars Polar Lander. A graduate student in geology at the University of Toronto, Darlene fielded questions related to the geology of Mars. Based on several years of experience as an engineer in the aerospace industry, Roland answered technical questions about the spacecraft. As the spacecraft approached its target, Darlene and Roland conveyed their enthusiasm for the mission. When it appeared that no radio signals were being received from the Lander within the initially expected timeframe, they expressed their disappointment that contact was not promptly established, but suggested that the NASA engineers would continue to try to contact the spacecraft over the weekend. No radio transmissions were received from the Mars Polar Lander as of Wednesday, December 8, 1999. Possible sources of spacecraft failure include inadequate separation of the cruising stage from the Lander (which would also result in not releasing the two Deep Space 2 microprobes), improper deployment of the parachute, incorrect positioning of the X-band antenna (because the gyroscopic positioning system malfunctioned), and insufficient hydrazine fuel flow for the powered descent engines due to partially cold-soaked fuel lines. The Lander could also have landed in a small crater, disappeared into Martian "quicksand," or hit a boulder and fallen over. For up-to-date information about the Mars Polar Lander mission, please see the following two websites: http://missions.marssociety.org and http://mars.jpl.nasa.gov/msp98

CM0RE

A CANADIAN CENTRE FOR MICROGRAVITY RESEARCH

by Kamiel S. Rezkallah (SSP 90)

Near weightlessness environments (or microgravity) can be simulated on ground for limited periods of time using ground-based facilities such as drop towers and drop tubes, aircraft flying parabolic trajectories, and sounding rockets. In a drop shaft, an experiment is packaged in a capsule that is carefully designed to minimize air resistance during the free fall (or drop). The package (or "payload") is released from ground level to drop distances that, in most cases, do not exceed 145 meters. The present range of drop distances range from 13 meters up to 490 meters, providing a free-fall time ranging from a fraction of a second to 10 seconds. Ground-based facilities are used to provide new knowledge on the behavior of substances, fluids, materials and alloys during weightlessness, as well as to explore the commercial value of some of the products produced in such buoyancy-free environment.

The International Space Station (ISS) represents tremendous opportunities for scientific exploration, technological advancement in areas of strategic importance to Canada and commercial application to increase the wealth and welfare of Canada. In order for the Canadian scientific and industrial research communities to be able to fully exploit such opportunities, it is important that sustainable teaching, research and training facilities exist to assist with the process and to ensure a good return on Canada's investment in space. Such facilities will educate and train young Canadians in areas related to space utilization for R&D activities and space commercialization. It will also ensure that the Canadian scientific and user communities are positioned to get a good return on the investment made in the largest space program in Canadian history (over $1.2 billion will be invested in the Canadian Space Station Program).

The business case for a facility which creates a near-weightlessness environment is based on two factors: (1) a growing global demand for quick and cheap access to a weightless environment in which to conduct research, and (2) an existing mining shaft which can be converted into a drop tower. Commercialization and research in space tends to be complex, expensive, and time consuming. Therefore, it is generally desirable that one undertakes a space project only after much knowledge and experience has been gained through ground based testing. A drop shaft provides opportunities to Canadian scientists to conduct research in a ground facility prior to sending their experiments into space. Thus, a drop shaft will serve as a precursor to the ISS during assembly and also after completion.

It is estimated that over $400 million is spent annually worldwide on microgravity-related research and commercialization efforts. This is expected to increase significantly when the ISS becomes fully operational in the year 2004. In Canada, there is a growing demand for a microgravity facility that serves the needs of the scientific and industrial sectors with easy access for education and training purposes. Such a facility will ensure

that Canada continues to be competitive in the growing areas of space research, utilization, and technology commercialization.

Recently, the International Space Station Commercialization Office within the Canadian Space Agency (CSA) has published a Canadian perspective on the topic of ISS commercialization (A. Eddy and Poirier, A, Commercializing the International Space Station: A Canadian Perspective, paper presented at the ISS Commercialization Workshop, CSA, January 1999). Earlier this year, several workshops were conducted across Canada to solicit the views and needs of the user community. Some of the above mentioned needs were voiced by the industrial sectors across Canada. Clearly, long term planning for effective utilization of the ISS requires a sustainable infrastructure that educates and trains engineers, scientists, educators and young Canadians to fully exploit the opportunities that will become available in the Space Station era.

It is envisaged that a new centre will be created on, or near, the campus of the University of Saskatchewan that will focus on microgravity research and education activities and will include facilities that can provide conditions of microgravity. The proposed centre will ensure a sustainable program in education and training in areas related to the effective utilization of the space environment as a platform for research. Identified opportunities include the construction of a drop tower facility on the grounds of the University and/or the conversion of an abandoned mine in Patience Lake (16 km east of Saskatoon) to a microgravity drop shaft facility where it is predicted that up to 12 seconds of microgravity conditions can be achieved. This will be the longest drop shaft facility in the world, and could serve the needs of scientists previously not served by the existing drop shafts/drop towers. While microgravity duration of 5-7 seconds serves the needs of researchers in the combustion area, a 12 second facility serves a wider area of research including fluid behavior and materials science.

The proposed centre offers several advantages to the microgravity research community, including: an economical precursor facility to conduct ground testing prior to flight; a first point access to microgravity facilities; an opportunity for effective participation from academia, industry and government research labs in space-based research and commercialization activities; enhanced public awareness of space-based research and commercial opportunities; an on-going research facility to educate young Canadians in the Space Station era; and a training centre for Canadian users in areas such as quality control of space-based systems, commercial use of space; and new sensors and instrument development and testing.

The traditional users of space-based R&D are those who have historically undertaken microgravity, materials and life science research in low earth orbit. These users include materials science researchers, protein crystal growth researchers, fluid physics and combustion science researchers, local industries, educational and R&D establishments, and international space agencies and R&D facilities.

Material science is of interest to large and small companies who are involved in terrestrial application of new materials. The ability to mix new alloys of immiscible substances, new forms of glasses and ceramics with high purity, and the lack of sedimentation provide unique opportunities in this field. Protein crystal growth in microgravity is of great interest to the biotechnology community as a means to reduce the time scale of new product development through better understanding of protein structures. The microgravity environment provides for high purity separation and refining of cells and proteins, which in turn creates opportunities for new drugs and pharmaceutical products.

Fluid physics and combustion science are of interest to a variety of users including oil and gas companies, bio-reactor manufacturers, agriculture and food products, power plants and heat transfer equipment. Fluid physics research at microgravity provides for better understanding of transport phenomena that are otherwise masked by gravitational effects.

Research into how fossil fuels behave during combustion and extraction processes has benefited from the weightlessness of the space environment. Dust sedimentation and aerosol dynamics were also studied at microgravity, as well as capillary flows in plant roots and other narrow flow channels. Advanced thermal transport systems using two-phase flow fluids have introduced new concepts of thermal management systems which will be used in future spacecraft and earth observation satellites.

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Space Education

by Rachel Zimmerman (MSS3 1997-98)

The following articles are isu-talk and SGF list excerpts from Rachel Zimmerman (MSS4, SGF 99, ADAM), dealing with space education efforts.

Montreal Children's Hospital

In Montreal on Saturday, December 11, a group of people from SGF, ADAM, ISU, and other space-related organizations will be getting together to volunteer at the Montreal Children's Hospital. We'll be teaching the children there about space. The age range will be rather large, so we're preparing activities that will be appropriate for many different age levels.

Some of the ideas we've come up with so far are: space arts and crafts; making a solar system mobile, or making rockets out of construction paper, cardboard tubes, etc. Colouring books about space, if I can find any. Space story time - reading: reading children's books about space – many children's libraries have a good selection of brightly illustrated space books. Space story time - storytelling: making up adventure stories about the

children as astronauts, and letting them choose which planets to visit. Let them participate in the story when possible. Space question and answer sessions: good for all ages - offer to answer space-related questions on a wide range of topics, including rockets, satellites, astronauts, planets, stars, the moon, microgravity, etc. If the children are shy, be prepared to talk about something to get them started. If they don't have questions for you, ask questions to them...

The balloon rocket experiment I usually do for grade ones and twos might get the kids at the hospital too excited, so I'll take the supplies with me, but only use them if the setting looks suitable.

The group of us who are going will try to dress appropriately for the occasion: space t-shirts, starry capes, or anything else we can find. :-) If any of you have other suggestions for the kinds of things we could teach or activities we could do with the kids, please let me know.

I'm hoping to do similar activities in children's libraries, schools, youth organizations, etc. in 2000, time permitting. A permanent invitation is offered to any of you who would like to participate.

Scouts in Space

A few weeks ago, Ken Murphy (SGF 99, SSP 2000-hopefully) told me that he was interested in helping the Boy Scouts in New York City earn their space merit badges, and this sounds like a great idea to me. I'm proposing that we expand this idea to the global level. The Boy Scouts and Girl Guides/ Girl Scouts have branches in many countries around the world. For some countries, the "curriculum" for the space badges has already been established, so it should be pretty easy for us to get a list of the requirements to help the kids earn their badges.

If we come in as young, enthusiastic guest lecturers, the Scouts/Guides will get a sense that space isn't just for older people, or smarter people, or wealthier people, or people from other countries, but that _everyone_ can learn about space. For countries whose guiding or scouting programs don't have a space merit badge yet, we could champion the cause of creating a space badge. (I think the Girl Guides of Canada have a science badge, an engineering badge, and an astronomy badge, but no space badge, whereas the American Boy Scouts and Girl Scouts each have a space badge. The requirements are different for the Boy Scouts and the Girls Scouts.)

On a local level, we could each help the Boy Scouts and Girl Guides / Girl Scouts earn their space badges, thus spreading space knowledge outside of the classroom. If each of us is a guest speaker for some of the local groups, we will eventually impact a large number of youth, especially if they go home and tell their families and friends about what they've learned. Most guiding and scouting groups meet in the evenings, so it won't conflict with work or school hours. This project could be co-ordinated locally, with each of us reporting back to the group as a whole, stating how many children attended the session, and describing how the event goes, how enthusiastic the children are, what kinds of interesting questions they ask, etc. We can motivate each other to participate in this project, and summarize our reports in a document to the UN Office of Outer Space Affairs or UNCOPUOUS to show how YAC (the UN space Youth Advisory Council), SGFers, and ISUers have impacted global space education and outreach.

The Guiding movement is active in approximately 150 countries and the Scouting movement is active in over 200 countries. (For more information on countries with Girl Guide or Girl Scout movements, please go to http://www.wagggsworld.org/ and to find out more about the World Scouting Movement, please go to http://www.wosm.org/) I would love to see space education activities reach every corner of the world. We have SGFers now in over 60 countries and ISU alumni all over the world, and this approach has the potential to have great impact on a global scale.

If you are interested in pursuing this project, either at the organizational level or the individual level, please contact me at

rachel.zimmerman@space.gc.ca
or Ken Murphy at
murphydyne@myway.com

Together, we truly can change the world!

REPORT: Canadian SGF Delegates: The Inside Scoop

from your Canadian Delegates: Catherine Casgrain (SSP 89), Carol Chahine, Liara Covert, Jessy Cowan, Mark Dejmek (SSP 97), Marlène Grenon (SSP 98), Joshua Izenberg (SSP 97), David Racine, Danny St-Pierre (SSP 92, MSS1), and Rachel Zimmerman (MSS3)

As many of us have realized, it is always difficult to succinctly summarize one whole year (or even ten intense weeks) of ISU for a subsequent CAISU article. This holds true also for the SGF experience and your delegates were up to the challenge. (Ok, ok. It was requested that a report be submitted!) As others have generally described the SGF elsewhere, we have chosen to keep the scope of this article down to the details, results, and other experiences of our U.N. contribution.

After the hooplah of the UNISPACE III Opening Ceremony, SGF Opening Speeches and Live Mir downlink, High Level Academic Panel presentation, the Tele-conference with UK-SEDS and the Vienna Bus tour, your Canuck SGF Delegates settled down to study the challenge we arrived for: to propose meaningful recommendations worthy of contribution to the UNISPACE III report from the I. I. I. (I^3 – you all know what these pillars are) Space Generation. To achieve this goal, we were each invited to choose one of three Parallel Session Plenaries (PSP) in which to contribute: Education and Society/Human Mind, International and Cooperation, and Science and Technology. In each session, we had to select one of five sub-themes into which we would break out and brainstorm in. These brainstorming sessions were invigorating and provided an I^3 mix of emotion, knowledge, ethics, and of course, ideas. Each session had it's own flavour based on which moderator was navigating the session. (All moderators were ISU-alums.) Finally,

each day had its own theme to consider. Day 1 – Individual: Space Benefits to Human Lives; day 2 – Humanity: Global Strategies for Space Applications; and day 3 – Cosmos: Space Science and Exploration.

At the end of each of the first three days, we reconvened into our PSP, where three recommendations from each sub-theme group were to be presented. The delegates from that PSP were then invited to vote on the top five recommendations. This process produced 45 recommendations and, in addition to three "wild-card" additions, the SGF Plenary was invited to vote on the top ten. This was held on Friday of the first week. Immediately prior to the vote, a Senior Advisor feedback session was held. Some delegates viewed this as an attempt to skew the SGF Delegate vote. It turned out that six of our ten recommendations were those chosen by the Senior Advisors. The outcome, from a total of 148 voting delegates, was as follows (votes in parentheses):

Recommendation
Education without Frontiers: A Global Space Education Curriculum (65)
International Space Authority (65)
International Center for Space Medicine (61)
U.N. Youth Space Advisory Council (55)
Priority Access to Mobile Satcom Network for disaster emergency relief (54)
International Space Chamber of Commerce (48)
Action Plan for meeting the world's basic needs through technology (48)
Planetary Defense/Protection (47)
SGF Follow Up (43)
Nobel Space Prize (40)

Many other unique ideas for recommendation were proposed and worthy of implementation study but simply didn't fall within the top ten list. For example, the nearest/next two recommendations received 30 votes each and were: Eradication of Land Mines Using Space Technology and Development of an Accessible Global Space Archive. After the vote, many delegates did concede that apart from selecting their top 5 or 6 recommendations, it was difficult to choose their last 4 or 5.

This is when some of us realized the power of "presentation". The Senior Advisors gave the impression that their selection was based on the "short" title of the recommendation only, without looking into the draft documents for the goals and actions supporting the idea. Some of us realized that if we had "packaged" our recommendations by only proposing a different short title, the outcome would have been different.

The first week was also enjoyable in that we were able to watch the endless ISU debate on "process versus product" at fine work. The organizers and moderators had prepared SGF for this and charted ahead accordingly. For example, the U.N. YSAC recommendation wasn't getting the support it needed to be proposed even at the sub-theme brainstorming level due to its inability to answer the proposed steering question. As a result, the proposal was put to vote in that session as an additional topic, aside from those selected through regular channels.

Another interesting learning experience was the definition of "consensus" – an important consideration when working at the United Nations. During delegate deliberations and proposals forwarded by the organizers, it was always difficult to achieve consensus regarding most debated and contested ideas thrown around. This sounds familiar from each of our own ISU Design Project experiences, except that there, a vote would be taken and "too bad" for those who were in the minority – we move on. At the UN, instead of meaning "everyone is in agreement" with the recommendation (implying that everyone votes "yes"), consensus is actually defined as "those who care to propose it vote yes, and everyone else doesn't have any real disagreement" with the proposal (and so nobody votes "no"). This arguably slight difference was evident when the delegates had to vote for a top ten list of recommendations and then found themselves disheartened with the outcome. No one then voted "no" when the organizers came to ask for consensus later on. Compare the similarity of this experience to the river of those flowing from the classic U.N. decisions presented in tomorrow morning's news.

At one of the UNISPACE III technical forums, an SGF delegate was selected to represent the youth perspective at the EURISY round table discussion on incorporating remote sensing into the European secondary school curriculum. Rachel Zimmerman sat on the international panel of distinguished UNISPACE III delegates and provided suggestions for developing a multi-national space education program. Wubbo Ockels, a European astronaut, commended Rachel on her idea of asking ISU and SGF alumni to tour Europe as guest lecturers on space-related subjects, spreading both knowledge and enthusiasm for space while giving the ISU/SGF alumni a chance to travel in Europe. Rachel hopes to develop this idea further in the coming months.

Finally, because NASA's Administrator was retained domestically due to cries for agency spending cuts and therefore didn't speak to the SGF Plenary, a Canadian-led letter was signed by Delegates and shipped to the U.S. Delegation. The letter outlined our regret but included our ten recommendations and invitations for implementation.

The second week was just as condensed as the first. The delegates were invited to choose one of the top ten recommendations and work on identifying an implementation plan that would be put to use post-SGF. In parallel, lobbying for which of the ten recommendations would be proposed for the Vienna Declaration (as we understand it, *the* UNISPACE III binding document) began immediately on the Monday. Some groups decided to go directly to the UNISPACE III Technical Forums to pitch their recommendations. The Canadian SGF Delegation (not just delegates) worked on the wording of five recommendations, culminating in an evening/dinner meeting with [some] members of the Canadian UNISPACE III Delegation (actual CAISU members – big smile). This process was also

suggested because SGF needed a supporting country from whose microphone to present their recommendations to the U.N. Vienna Declaration Committee (Committee One). As it turns out, SGF was fortunate enough to have presented their recommendations from the Canadian Delegation's platform. A press conference was organized for the Tuesday morning of the second week, at which SGF presented their top ten recommendations.

On occasion throughout the SGF Plenary and PSP deliberations, various Canadian UNISPACE III Delegates would drop by and tune in. The head of the Canadian Delegation must have listened intently: our CSA President addressed the SGF at the beginning of the second week, challenging us to think outside the box that his generation established, challenge the givens, and to maintain enthusiasm. He received a standing ovation, which incidentally was also presented to our very own CAISU President after addressing the Plenary prior to departing for Thailand.

Over the next two days, the SGF delegates were invited to visit Graz (Austria's City of Space) and had a shagadelically good time. However, five SGF Delegates stayed back and worked with the organizers to lobby Committee One for inclusion of as many recommendations as possible. (Recall consensus exercise previously mentioned!) The joyous news came after dinner on Wednesday night when Canadian SGF organizers announced that five of the ten recommendations were accepted for publication into the Vienna Declaration. The celebrations overflowed into Graz's clubbing district with delegates and organizers overtaking a local bar and cheering "We got Five – we'll Change the World!"

Having returned to Vienna, Friday was spent attending closing ceremony activities. It was only at this time that the printed SGF Report surprisingly contained an additional, poorly formulated recommendation from the Mars working group, in addition to publicizing contact information for an advocacy group. Our SGF Chairperson was quick to attempt to rectify the situation and went to teach the Canadians that "politics" does indeed percolate through many organizations/events, even those with the best I^3 intentions.

That evening, basically all the Canadian delegates went out to celebrate our last evening in Vienna when we ran into a completely unexpected event. Upon attempting to enter the Sansibar on the Danube, three Africans and our Kenyan colleague were refused entry based what seemed to be solely on skin colour. Some Canadian delegates were already inside dancing and only realized afterwards that there were no black-coloured individuals in the club. Upon requesting clarification, the club's employees confirmed our gravest concerns: discrimination based on colour (and origin, and culture!) were their reasons for refusing entry. Those delegates that were present began brainstorming as to what to do and began chanting "Sha na na na, Sha na na na, hey hey hey, Good Bye" in irony. Negotiations continued throughout the next day (departure day) and a heated debate ensued regarding the contents of the letter to be sent, including careful consideration of the facts of the event and everyone's intentions, emotions, and concerns. Finally, a letter was sent to the President of the Republic of Austria requesting an inquiry. This has since become the unofficial sixth accepted SGF recommendation.

There were so many other stories, backroom negotiations, personal and group discussions, and long hours due to working within the I^3 community that we should report on but don't have the space to do so. Of course, there was also the culture, art, and history of Vienna. We invite you to contact us for any additional information you may like. The Canadian Delegates wish to sincerely thank the 1999 CAISU Board of Directors for their hard work at funding our participation at the SGF and in pursuing many long hours in organizing the event. Without their support, the SGF outcome simply wouldn't have been the same.

A la prochaine,

Your Canadian U.N. SGF Delegation.

Post Scriptum (please address CAISU SGF Organizers for additional results):

The SGF report and recommendations have since been presented in many nations and at many conferences. In August 1999, The White House invited leaders of space industry and government to a briefing regarding the events and outcomes of the UNISPACE III Conference. The purpose of the briefing was to inform key decision makers on issues that may impact US space policy and industry. The SGF received the largest portion of presentation time as compared to other presenters (such as NASA, NOAA, and the State Department) and a list of organizations represented at the briefing included Rand, Boeing, Iridium, OSC, Arianespace, US DoT and DoC, AIAA, NSS, AAS, SFF, and ProSpace.

The European Space Agency's Committee on Space Education indicated similar "ideas" from the SGF Education recommendation and are currently studying the SGF implementation tasks.

ADAM, the Association for the Development of Aerospace Medicine, has since been established and the group has been active in promoting space medicine, developing its membership list, and sprouting chapters across Canada.

At the end of November 1999, the Canadian Space Agency unveiled a new Space Science Prize, named after a Canadian Nobel Laureate.

The Girl Guides received a tour of CSA, a Space Education and Awareness Initiative.

A first reply from the office of The President of the Republic of Austria was received within six days of shipping the letter outlining the discrimination incident. The President's Office indicated that the Ministry of the Interior in addition to the city of Vienna Mayor's Office would be conducting an inquiry into the event. In October 1999, we received the report from the Ministry of the Interior. Their findings included pursuing the owners of the establishment, who apologized for the

event but nevertheless justified their actions due to the intoxicated nature of our non-alcoholic Kenyan colleague. … The story continues…

Space Generation Forum Adds Recommendations to UNISPACE III Vienna Declaration

by Jonathan Knaul (SSP 98) and Rachel Zimmerman (MSS3)

When most young professionals ask their employers for two weeks of vacation time at the end of July, it is usually for a relaxing break from work. But for the 18- to 35-year-olds who participated in the Space Generation Forum (SGF) this summer, their trip to Europe was far from relaxing. One hundred and seventy delegates from over 60 countries travelled to Vienna, Austria, to attend the SGF. These SGF delegates, including ten Canadians, met in brainstorming sessions and workshops to devise realistic implementation plans which will help pave a peaceful road for humanity's use of outer space.

Approximately once every 15 years the United Nations General Assembly (UNGA) convenes a world space conference in Vienna on the exploration and peaceful uses of outer space. The first of these international gatherings took place in 1967 in light of the race to the Moon, and the second such conference followed in 1982. The theme of the third conference, entitled UNISPACE III, was "Space Benefits for Humanity in the Twenty-first Century" and it was held in July, 1999. This year, for the first time, the UN invited the youth of the world to convene a parallel conference in which students and young professionals could fully express their creative visions for the future of space in an international and intercultural environment. The responsibility of organizing this youth conference was given to the alumni of the International Space University (ISU). Thus, the Space Generation Forum was born. This was very fitting, since the idea of forming the ISU itself was born at the UNISPACE '82 conference.

One of the principal goals of the main UNISPACE III conference was to generate recommendations that outline the peaceful, future uses of space. The higher goal of the SGF was to generate recommendations that were different from those of the main UNISPACE conference - a lofty goal given that UNISPACE had already published their draft report before the conference, and the draft report contained just about every peaceful space recommendation that one could think of. The final UNISPACE report was to include a document called the Vienna Declaration, a two-page executive summary of the UNISPACE recommendations. This document would list the proposed goals for the future of space exploration and applications for the benefit of humanity. The UN published a lengthy final report covering all the results of the conference, and it has vowed to ensure that actions will be taken to fulfill the recommendations contained in the Vienna Declaration. The main challenge to the SGF participants was to devise ambitious yet feasible space-related program concepts and convince the UN to incorporate these youth recommendations into the Vienna Declaration, where their implementation would be assured.

At the beginning of the Space Generation Forum, the conference organizers outlined the goals for the coming week. They told the eager, young delegates that they would be working very hard as a team to come up with the best ideas they could, and that they would be lucky if one or two of the SGF recommendations would be accepted for inclusion in the Vienna Declaration. After many energetic discussions and even more sleepless nights (work was done around the clock in order to meet the UN's deadline) 49 ideas, complete with implementation plans, were agreed upon by the SGF delegation.

From the 49 recommendations, a top ten list of recommendations was voted upon and submitted to the UN. These ideas included a space education program, a satellite-based disaster management system, an international space chamber of commerce, an international space medicine institute, and a global space prize to recognize outstanding achievements leading toward the peaceful uses of outer space. The SGF also recommended that a Youth Advisory Council (YAC) be established, to work in conjunction with the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS). This council would provide the youth of the world with a channel through which they could add their input to future decisions regarding the utilization of space. Remarkably, five of the ten SGF recommendations were accepted for inclusion in the Vienna Declaration. The excitement in the room as the announcement was made was exhilarating and unforgettable. It was as if we had just landed the first humans on Mars.

There was even more to the SGF than just changing the world - as if that weren't enough. The opening ceremonies included a live audio link to the MIR space station, and a personal video address from the famed author, Sir Arthur C. Clarke. A typical day for the delegates began with breakfast at 7:00 am, followed by a subway ride to the UN buildings. Daily conference proceedings began with a plenary session during which invited speakers included such dignitaries as Mac Evans, President of the Canadian Space Agency, and Yash Pal, the head of the UNISPACE '82 conference. Brainstorming sessions commenced after the plenaries and continued through lunch and into the late afternoon. Most delegates returned to their hotel by early evening, and adhoc groups would meet until the early hours of the morning constructing implementation plans for their recommendations. An average night's sleep was estimated at between 3 - 4 hours for the entire two weeks. "There were only two weeks together", said delegate Bojan Pecnik of Croatia, "we had to spend as much time together as possible!" During the few free hours the delegates had in their busy schedules, they experienced an IMAX presentation of "Destiny in Space," hosted by three cosmonauts and astronauts, they met with the Mayor of Vienna, and then even had a chance to experience some micro-gravity rides in glider aircraft.

The legacy of the SGF extends far beyond the field of space, because the Space Generation Forum has become more than just a two-week-long conference in Vienna. The participants in the SGF have made a commitment to continue development of the ideas generated at the conference, and are continuing to work together, from far and abroad, to insure the proper implementation of their recommendations. Local projects on space medicine and space education have already begun, with online networking in place to allow those with experience in the field to share their expertise with others. The newly-formed Youth Advisory Council is now part of the UN space office. YAC has begun its activities, and will be co-ordinating the implementation groups to ensure that recommendations are followed up with action.

The SGF has set a precedent in international understanding, cooperation, and teamwork in the field of space, our "final frontier." The SGF delegates came from many different backgrounds to achieve a common goal based on a mutual interest in the future of space exploration and applications rather than on national political agendas. Although the SGF delegates came from over 60 countries, including South Korea, Morocco, India, Australia, Pakistan, and North Korea, they were able to put aside their national differences and work together peacefully as colleagues - and as friends. The SGF was a bonding experience, and the friendships formed in Vienna will last a lifetime.

It seems somehow fitting that the SGF was held 30 years after Neil Armstrong and Buzz Aldrin first set foot on the Moon. The plaque they left there stated, “Here men from the planet earth first set foot upon the Moon. July 1969, A. D. We came in peace for all mankind”. The SGF delegates could summarize their two weeks in Vienna with a similar quotation: “We came in peace for all humankind.”

Please visit the SGF website, http://space-generation.org, for more information.

A Nice Story

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

Hello friends,

I have a nice story to tell, I just thought I'd share it with you...

You know how my last name is spelled really strange? It's pretty rare, and I have never met anyone with the same last name as me (except my father). Dad died 10 years ago and never really told us much about his family, about its history, and he never really said much to Mom. Dad was an only child, and his parents were deported during WWII in France. He was raised by aunts and uncles, first on his father's side, then on his mother's side. Mom and Dad moved to Canada in 1967 and dad never had much contact with his family once he moved to Canada.

I have always been curious about the family history and once in a while, while surfing on the internet, I would do a search based on my name and sometimes I got a few matches; some in France, and some in Spain, but not many who were easy to get in touch with.

A few months ago I started using an internet chat program called ICQ. To use it, you have to register and it puts your name and related info in a directory. I wanted to check if the info I had submitted was correct, so I did a search on my last name and *two* listings popped up; one was mine and the other was for a Marc Berinstain, and his email address was there.

So I wrote him an email, saying something like "excuse me sir, you'll think I'm crazy, but this is my name, my parents names, my grandparents names, etc... do any of these names look familiar to you?". He wrote back quickly saying that his father and my father were first cousins.

My life has changed a lot since that day. We write a lot to each other via email, we do internet chats, and we even do video conferences over the internet. He (Marc) is about my age, a really cool guy, we have a lot in common (my sister says we look alike - we have the same forehead and we're both hairy). We're growing quite close. Here's the most ironic part: he and his parents live in Strasbourg, and they lived there the whole time I was there for MSS1! Maybe we bumped into each other at Mammouth or at les 3 Brasseurs...

Since these initial emails I have received news from many "new" cousins of mine in France, some of which grew up with my father after his parents were taken away. They have been sending pictures of my father from when dad was young, history of the family, stories that are amazing to hear, so many questions answered about my family history. For so long I thought I was "the last Berinstain" and now, I see that I am part of a very large clan. The whole experience has been very emotional and wonderful.

For all the negative and unimportant things the Internet has created, it also has brought together a family that had lost its connections. We are planning a large reunion for next summer in France.

This millenium has been kind to me; the next will only get better. Be kind to each other.

ADAM

by Marlène Grenon (SSP 98) and Rachel Zimmerman (MSS3)

The Association for the Development of Aerospace Medicine (ADAM) was founded in August 1999 in response to a recommendation that was made at the UNISPACE III Space Generation Forum. The first chapter, created at McGill University, is only the platform for what we hope will become the International ADAM, which we are working on now.

To attain its goal, ADAM formed an executive committee, which is now comprised of Marlène Grenon, President (SSP 98, SGF 99), Carol Chahine, Vice-President (SGF 99), Rachel Zimmerman, External Liaison (MSS 98, SGF 99), Angelina Guzzo, Space Education Coordinator (SSP 99) as well as Scott McFayden, Secretary and Keegan Boyd, Treasurer.

But what exactly is ADAM? ADAM gave itself the following mission

statement: "In the interest of promoting space medicine and its applications for the benefits of humankind, on Earth and in space, we commit to providing an international, intercultural and interdisciplinary approach to the dissemination of knowledge in aerospace medical sciences and to developing state-of-the-art space medicine in support of future space exploration." This goal is presently being implemented trough providing a forum for lectures given by members and guest speakers, by promoting space education for all, by establishing a web-page where discussions on diverse topics will soon be available, and by collaborating with UN YAC (the United Nations space Youth Advisory Council) and other organisations. Also, we hope to organise space medicine conferences with future ADAM chapters once they exist.

Some of our past activities include a lecture given by a panel of guest speakers from CSA on "Space Careers", Dr. Doug Watt on "Introduction to Microgravity and its Effects on Human Physiology", Dr. Vali on "Astrobiology-Mars Rocks" and others.

In January, we will celebrate the millenium with Mr. Mac Evans, President of the Canadian Space Agency, through a lecture given on "The Role of the Future Generation in Space Exploration". The event will take place at McGill University on January 18th, 2000, and all CAISU members are invited to attend this event.

We are also planning to hear Mr. Pat Sullivan on "Decompression Sickness," Rachel Zimmerman on "Medical Applications of Space Technologies," Dr. Judith Lapierre on "Isolation Studies," as well as others, including Dr. Bob Thirsk, Canadian Astronaut and Dr. Gary Gray, Canadian flight surgeon. These guest lectures will be alternated with lectures given by ADAM members.

One special program that is being developed within ADAM is our space education program. Its goal is to promote space awareness including space medicine to students of all ages. The event will take place at the Montreal Children`s Hospital on December 11th, 1999. But once again ADAM is thinking on a global scale and hopes to coordinate activities with other space education programs worldwide, as well as participate in the creation of space books for children.

ADAM is becoming stronger everyday, with new members, new experiences, and new challenges. This could not have happened without the support of some individuals and organisations we wish to thank: Alain Berinstain, President of CAISU, all CAISU executive and members, the Canadian Space Agency, McGill University and its Student's Society (SSMU).

For those interested in ADAM, please visit the web-page at:
http://www.ssmu.mcgill.ca/adam/

or contact the executive (Marlène at greno00@med.mcgill.ca, or Rachel at (rachel.zimmerman@space.gc.ca).

The Mars Society – Toronto Chapter

by Audrey Robinson-Seurig (SSP 91 USA)

The Toronto Chapter of The Mars Society (http://www.marssociety.org/) will be hosting the 3rd Annual Mars Society Conference at Ryerson University in Toronto from August 10-13, 2000. More information about the conference is available at the following website:

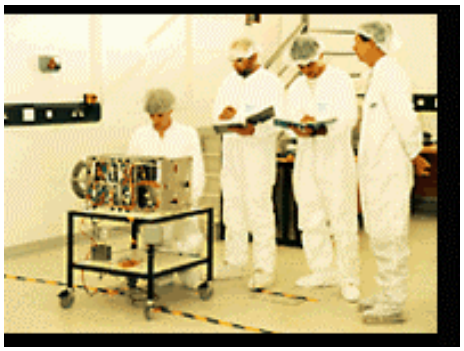
http://chapters.marssociety.org/toronto. The conference dates will coincide with the inauguration of the Mars Arctic Research Station (MARS) in the Canadian Arctic. The Mars Society is working to establish the Mars Arctic Research Station in cooperation with the NASA Haughton-Mars Project (HMP) (for details, please see http://www.marssociety.org/arctic/ and the July 1999 issue of "National Geographic"). Two of the HMP team members, Dr. Charles Cockell and Dr. Patrick McGinnis, attended the ISU Summer Session Program in 1991.

The Surrey Space Centre

by Vaios Lappas (MSS4 1998-99)

In the mid-1980's, the availability of commercial microelectronics stimulated a boom in small satellites by enabling the construction of small, yet sophisticated payload instruments and bus sub-systems. In the late 1980's, state-of-the-art technologies enabled satellites of between 50 kg and 100 kg mass with simple solar-panel configurations to carry multiple small payloads managed by highly-automated on-board computers. These so-called microsatellites have proven suitable for a wide range of commercial and scientific missions ranging from store-and-forward communications, to medium-resolution Earth-observation.

Indeed, over the last two decades, the University of Surrey has pioneered the use of these small, low-cost spacecraft through its "UoSAT" programme of 50 kg microsatellites. Sixteen microsatellites have been constructed to date, each within a 6-18 month period and each at a typical cost of around $2-3 million (USD) at today's prices. Around 60 orbit-years of operational experience in LEO has been gathered, and this has been, and continues to be, used to stimulate new ideas for advanced small satellites.



Driven by the personal computer and personal communications markets, microelectronic systems have advanced considerably in the 1990's:

The semiconductor industry has integrated analogue and digital functions into single integrated circuits (ICs). Application specific ICs (ASICs) and various forms of programmable gate-array logic devices are now widely available, significantly reducing the volume needed to support logic functions. Memory densities have increased exponentially, and micro-controllers are now available which combine many peripheral functions with a central processing unit.

These advances in commercial-off-the-shelf (COTS) electronic technologies now make it feasible to construct even smaller satellites in the 1-10 kg mass range (nanosatellites), with virtually the same functionality as the earlier microsatellites, but at an *order of magnitude* less cost.

This opens up the possibility of designing and building satellites - with real applications in mind - as part of an education and training exercise for prospective spacecraft engineers, at a price which is affordable by individual academic institutions.

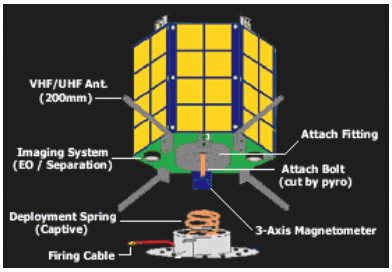
Work began in this area at Surrey in 1995 when the author organised a series of undergraduate student projects examining the feasibility of a "football" sized satellite for Earth imaging. This proved to be a highly successful educational exercise, and resulted in our first prototype nanosatellite concept: a multi-faceted polyhedral satellite, about the size of a soccer ball with a mass less than 10 kg. The students built prototype hardware including an on-board computer based on a Motorola 68HC11; a power system utilising 14V NiCd battery, providing a regulated 5V and 9.5V power supply; and a VHF transmitter. A CMOS video camera payload was also produced, and this was actually incorporated into the *TMSat* microsatellite which was being built at Surrey at the same time.

In 1997, work began on the topic of "Autonomous Space Vehicle Inspection Using Nanosatellites", and, as part of this work, staff and students at the Surrey Space Centre were brought together in a series of coordinated projects to help design a practical, modular, low-cost, multi-mission nanosatellite platform - the Surrey Nanosatellite Applications Programme (SNAP) was born.

Satellite Class	Mass
Medium:	500 - 1000 kg
Mini-Satellites:	100 - 500 kg
Micro-Satellites:	10 - 100 kg
Nano-Satellites:	1 - 10 kg
Pico-Satellites:	0.1 - 1 kg

SNAP, due for launch in March 2000, is currently under hardware design. It will be a 3-axis-stabilized spacecraft using 3 magnetorquers, magnetometer and a Y-axis reaction wheel. It will be a 3 facet structure, each facet having 2 Eurocard boxes to accommodate subsystems and payloads. Other specifications:

Mass: Approx. 8 kg
Solar Panels: GaAs solar cells
Antenna: UHF1/4- Wave diplexed monopole; 2m-band uplink/70 cm-band downlink
OBC: "Buterfly" RISC processor
Batteries: 6 cell 7.5 V NiCd
Payload: 2 CMOS APD video cameras, Orion GPS receiver, Communications payload.



SNAP is built to verify the above technologies as well as to prove a working Nanosatellite bus. In the future, an improved version of SNAP will be able to accomplish missions such as autonomous inspection, formation flying and formation of a distributed satellite system.

The SNAP Nanosatellite bus continues Surrey's commitment to innovative engineering making space accessible at low-cost to the educational and professional community.

The Master of Space Studies Program

by Rachel Zimmerman (MSS3 1997-98)

If 10 weeks at ISU wasn't enough for you, ISU also offers a year-long Master of Space Studies (MSS) program at the Central Campus in Strasbourg, France. The MSS is now in its fifth year, and the alumni from previous years have recently been offering their assistance to the new MSS students to help them get settled in Strasbourg and to answer any of their questions. Since the majority of CAISUers graduated from the SSP, I thought I'd tell you a bit about the MSS.

The MSS consists of six months of lectures and workshops, a three-month internship abroad to work on an individual project, and two months of intensive teamwork to develop a Team Project report with the rest of the class. (The first six weeks of the MSS, consisting of ISU's core lecture series, can be skipped if you've already done the SSP.) Like the SSP, MSS professors and guest lecturers range from Russian rocket scientists to British finance officers and Italian architects, from Thai remote sensing specialists to Canadian space lawyers - not to mention the astronauts and cosmonauts who drop in for special guest appearances from time to time. As a student in MSS-3 in 1997-98, I was one of 33 students from 23 countries. Between us, we had backgrounds in physics, engineering, space policy, economics, marketing, medicine, robotics, telecommunications, remote sensing, and biochemistry. Each student brought something new to the discussions, and we learned as much from each other as we did from the distinguished faculty.

There were five Canadians in MSS-3: Patrick Assouad, Louis-Paul Bédard, Eric Dore, Deana Smith, and me. There were more students in my class from Canada than from any other country –- amazing considering that CFISU does not provide funding for the MSS, and each student had to independently come up with enough money to cover tuition, room and board, travel to and from France, and other living expenses for the year. The MSS was the best year of my life, and it was well worth the time, the effort, and the expense.

Space has been one of my main interests since I was around six years old, and I've been interested in assistive technology since I was eleven. I never thought I would find a way to combine these two very different fields, until I discovered ISU. For my internship as part of my Master of Space Studies degree, I spent three months at the NASA Ames Research Center in northern California,

developing a new program to encourage NASA engineers, scientists, and technicians to build custom assistive technology for disabled people in their community.

Other students in my class worked on projects that were equally interesting. Clarence Johnson, an American space policy expert, did his Professional Placement in Australia, where he combined remote sensing and indigenous knowledge to search for solutions to environmental problems. Louis-Paul Bédard, a Canadian physicist and engineer, went to Japan and helped design the Japanese Experiment Module of the International Space Station. Tsegaye Tadesse, an Ethiopian meteorologist, studied droughts at a university in Nebraska, while Kirsten Busteed, an Australian physicist, flew on the KC-135 to complete her microgravity experiments with the Canadian Space Agency. Kalendher Farook, a Sri Lankan civil engineer, went to Thailand and used GIS to redirect a road through the Himalayan Mountains to prevent erosion damage, and Young-Jin Kim, a Korean satellite telecommunications expert, studied space policy in Washington, DC. Patrick Assouad searched for brown dwarf candidates at the Harvard Smithsonian Center for Astrophysics, Eric worked in Toulouse, France, and Deana worked on ISS berthing mechanisms at NASA's Johnson Space Center in Houston, Texas.

ISU's Strasbourg campus provides easy access to other countries, creating an added bonus to the ISU experience: lots of international travel. I lived within walking distance from Germany, and sometimes my MSS friends and I used to take a city bus to Kehl to get ice cream, and walk back home to France in under an hour. I had the opportunity to visit 14 European countries during my year at ISU. Most travelling occurred on weekends and winter break, with other friends from the MSS, including a ski weekend in Switzerland, the IAF conference in Turin, Italy, and an impromptu weekend expedition to Prague. But there were also class trips to Germany and the south of France to visit space agencies and companies. We toured Eumetsat, the European Space Operations Centre, the European Astronaut Centre, and Aerospatiale. I filled ten photo albums with pictures from my year at ISU - that's an average of a roll of film per week!

Canadians at MSS-3 (from left to right): Eric Doré, Judith Lapierre, Louis-Paul Bédard, Ram Jakhu, Rachel Zimmerman, David Kendall, Deana Smith, Patrick Assouad

Almost every student in my class can attribute their current job in space industry, government, or education to the experience they gained at ISU. The solid foundation in a wide range of fields provided us with a well-rounded and flexible base from which to explore our career options, and choose the branch of space most suited to our interests and goals. The Professional Placement gave us job experience, networking contacts in our fields of interest, and the opportunity to try something new. We gained experience in making presentations about our work, and we had on-site mentors as well as ISU faculty advisors to help us edit our 60-page papers.

If ISU had only been a chance to spend time in a new country, travelling and exploring new places, it would have been great. If it were only a chance to meet and work with an international group of people who have a common interest in space, it would have been even better. If ISU were only about the opportunity to network with other young space professionals, it would have been fantastic. If it were only a chance to learn about spacecraft design, life sciences, satellite applications, space policy and law, economics, management, leadership, and teamwork, what more could we ask for? But ISU is much more than any of these individual things. It's a combination of all of them. And that's what makes ISU such a life-changing, unforgettable experience. That also explains why so many ISU students come back and teach at subsequent ISU programs - they don't want to miss out on any of the fun.

SSP 2000 – Chile!

The Millenium Summer Session Program will take place at the Universidad Tecnica Federico Santa Maria in Valparaiso, Chile, between July 1 and September 2, 2000. Once again, the SSP will commence in grand style with Canada Day celebrations on Day 1!!! Of course, Day 1 is also the day when students complain en masse about their ID pictures…some things never change.

SSP 2000 Design Projects

The two design projects for the SSP 2000 are (1) Space Tourism/Low Cost Access to Space and (2) Strategies for Applying Satellite Data to the Management of South American Pacific Coast.

Update on ISU Alumni

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

SSP 1988 Cambridge

Stéphane Lessard (SSP 88) is now Head of International Relations at the Canadian

Space Agency. Thank you Stéphane and family for graciously hosting the evening festivities after the marathon AGM on November 27th.

SSP 1989 Strasbourg

Alain Poirier (SSP 89) Please see Alain's profile article in this issue.

SSP 1990 Toronto

Gary Crocker (SSP 90) has moved to Ottawa, and is now a Ground Systems Engineer in the Data Acquisition Division at the Canada Centre for Remote Sensing.

Michel Pelletier (SSP 90) is now working for Canadair in ville St-Laurent.

SSP 1991 Toulouse

Gary Leung (SSP 91) Gary and his wife Lisa live in Mississauga, Ontario, with their two boys James (4) and Kai (2). After receiving the Ph.D. from the University of Toronto in 1994, Gary spent 5 years at AlliedSignal Aerospace Canada as a systems engineer developing environmental control systems for military aircrafts. In late 1998, Gary joined Hatch Associates Limited where he is currently the Manager of the Production Systems business. Lisa is a FamilyDoctor and practices in the Mississauga area.

Keith McEwen (SSP 91) is now a Business Analyst and Assistant VP at Bank One in Wilmington, Delaware.

Audrey Robinson-Seurig (SSP 91 USA) In November 1999, Audrey received a Master of Applied Science degree in Chemical Engineering and Applied Chemistry from the University of Toronto. For her thesis research, she developed and evaluated a skin tissue replacement for chronic skin wound applications.

Roland Seurig (SSP 91 GER) is now Senior Project Engineer at Allied Signal Canada.

Jean-Christophe Terrillon (SSP 91) I have the immense pleasure of announcing to you all that our daughter Christine Keiko Terrillon-Oono was born at 12:30 p.m. (JST) on Wednesday 14 April at the Kenritsu Nara Hospital in Nara. Christine weighed 3 Kgs at birth, height 49.5 cms. Mother and baby are fine (a few hours after she was born Christine had already found her thumb to suck...she already learns quite fast), and the father experiences the absolutely delightful but also strong shock of fatherhood. Après 3 ans et demi passés à ATR à Kyoto, je pense déménager au nord de Nagoya, près de la ville de Gifu (département de Gifu) pour un emploi en receherche assez lié à ce que j'ai fait à ATR. Le travail devrait commencer en avril prochain, dans un immmense et hypermoderne édifice qui a coûté la bagatelle de 600 million de $ CAN! Il s'agit d'un projet de 11 millions de $ CAN par année étalé sur 5 ans et qui s'appellerait: "Intelligent Human Sensing". Ce n'est pas directement lié à l'espace, tout comme mon travail a ATR, mais je vois des applications à l'avenir telles que des "interfaces humains-machines intelligentes" lors de futures missions pilotées. Je n'ai pas encore les coordonnées exactes à Gifu, je te les ferai parvenir dès que possible, en février sans doute. Je suis très excité pas ce nouveau projet, et tu dois bien te douter que le Japon a plein de fric pour la recherche, ce qui devrait me permettre de "jouer" avec un équipement des plus modernes. Dommage que cela ne soit pas le cas au Canada…

SSP 1992 Kitakyushu

Rob Fowler (SSP 92) I just want everyone at CAISU to know that I've relocated from Toronto to Palo Alto, California to begin a 2 year fellowship in Critical Care Medicine at Stanford University. Please call me (650 213 9891) if you're in the area and/or need a place to stay. I can also be reached at robertdotfowler@hotmail.com

Roanie Levy (SSP 92) got married this summer and went on a wonderful 6 weeks honeymoon through South America. Roanie is also taking a leave from the public service and her legal career to try something completely different. In January 2000, she will be joining the management consulting firm called the Mitchell Madison Group as an Associate in Toronto. She wishes the ISU community the best for the new millennium!

SSP 1993 Huntsville

Nicholas Audet (SSP 93) and his wife just moved in to their new house in Pierrefonds, Quebec, this past July.

Una-May O'Reilly (SSP 93) is now in Boston, MA, working as a research scientist at MIT's Artificial Intelligence Lab. She sends her regards to all her ISU friends, and wishes to announce some very exciting news: on Nov 16, 1999, Glennie Ann O'Reilly LeBaron was born at 7:48 am, weighing 5 lb 7 oz, and Hannah May O'Reilly LeBaron was born at 7:49 am, weighing 5 lb, 15 oz. Congratulations to the proud parents, Mom Una-May and Dad Blake LeBaron, Prof. of Finance and Economics at Brandeis University.

SSP 1994 Barcelona

Louise Cléroux (SSP 94) Hi everybody! I have been working for 2.5 years in robotics doing R&D work and project management for Bombardier Aerospace, Defence Services. Since November 29, I have moved to program management of product development at Bombardier Aerospace, Canadair. I will thus have the chance to participate in the development of the new Canadair aircraft. I am very happy about this change. It will be an opportunity for me to further develop my project/program manager's capabilities.

SSP 1995 Stockholm

Chantal Lamontagne (SSP 95) I spent my summer travelling! First to England for some experimental hypervelocity impact testing, then to Roanoke, Virginia, for a conference, then to Houston, Texas, for more testing through the NASA Johnson Space Center, and then to PEI for a family wedding. Phew! It was certainly a busy summer and, while not involved with business travel, I was planning my own long distance wedding!! In Ottawa on September 18th, I married Harold Seaborn, a liaison engineer at Bombardier deHavilland here in Toronto. Vivian Welch, Tony Hong, Sebastien Drouin and Matt Bullock (all SSP 95) were in attendance to help us celebrate. I am also recently the proud Godmother of my nephew, Benoît, born November 17th to my sister Josée who was gracious enough to be fitted with a bridesmaid's dress while 7 months pregnant at the time! I continue to pursue my PhD studies at the University of Toronto Institute for Aerospace Studies, and also my involvement with CAISU, editing the Cosmonotes and updating the Contacts List as Membership Director. I have the privilege of also having just been reelected to the CAISU 2000 Board of Directors.

Judith Lapierre (SSP 95) is currently participating in a three-month isolation study in Russia.

Fabrice Parmentier Lesage (SSP 95 France) I wish to inform you that as of 1st October 1999, I have been appointed as the Deputy Director of the ISDC (Institut Supérieur de Double Compétence) at the Mulhouse Chamber of Commerce, in addition to my position of Marketing Director at the Purchasing International School.

SSP 1996 Vienna

Kevin Forkheim (SSP 96) I've started up the Canadian Space Medicine Institute (CSMI), which is an institute devoted to the study and research of space medicine and the utilization of space age technologies in the field of medicine. I have done several educational sessions/public interest talks to British Columbia Doctors and the general public on some of the different aspects of space medicine. I'm also involved in a few space research projects. I have also done a lot of public awareness work in the area of Osteoporosis. I was recently the keynote speaker for the Osteoporosis Society of British Columbia's annual Bone China Tea. My research into osteoporosis is continuing and I'm focusing my efforts in the detection and evaluation of osteoporosis. In my spare time, I'm a Radiology resident at the University of British Columbia.

Mathias Wuhr (SSP 96) Please see Matt's Profile article in this issue.

SSP 1997 Houston

Maxime Roy (SSP 97) and **Marleen van Mierlo** (SSP 97, Netherlands). We would like to thank ISU for bringing us, Maxime and Marleen, together. A fact we celebrated on the 25th of June, by GETTING MARRIED! We met during the Summer Session of 1997 and have lived together in Montreal since January 1998. We celebrated our wedding in Holland but will continue our life in Montreal.

SSP 1998 Cleveland

Claude Boullevraye de Passillé (SSP 98) En travail varié, en agence d'architecture au centre-ville de Montréal, projets personnels en architecture, arts visuels et design d'objets; seul et en collaboration.

Jean-François Latreille (Staff 98) Emploi courant: Ingenieur Aerospatial pour la Defense Nationale au 430e Escadron Tactique d'helicopteres a Valcartier.

Thomas Troy McConaghy (SSP 98) I'm currently at the University of Toronto, where (among other things) I've been learning about geometric control theory and general relativity. I'll be visiting my family in Saskatchewan for Christmas. Then I'll be moving to West Lafayette, Indiana, where I'll finish my M.S. in the department of Aeronautics and Astronautics at Purdue University.

SSP 1999 Thailand

Eric Choi (SSP 99) Things have been pretty hectic for me since ISU. In October, I started a new job with AlliedSignal in Greenbelt, MD. There's still some ITAR-related paperwork to go through the State Department, but eventually I'll be working as an orbit/attitude dynamics analyst for Landsat-7 at NASA/Goddard.

Thierry Fontaine (SSP 99) I am an alumni of the exotic SSP 1999 in Thailand. I have studied mechanical/aeronautics engineering at Ecole Polytechnique de Montreal (Poly) and Ecole Polytechnique Feminine in Paris and have obtained my bachelor degree in 1996. Since then I work as an aircraft structural engineer at Bombardier Aerospace in Mirabel airport. I am currently involved in the maintenance program of the CF-18 fighter aircraft fleet. I also pursue (part time, on weeknights... yes) Master's program in Aerospace Engineering at Poly. I should graduate in the year 2000. Besides that, I consider myself a travel and culture lover. I also like to develop Web sites and practice sports like ice hockey, soccer, diving and golf.

Ethel Poiré (SSP 99) is now working for Micro Photonics Inc. in Irvine, California.

MSS-1 1995-96

Alain Berinstain (SSP 91, MSS1, CAISU President) Please see Alain's Message from the President, and his A Nice Story elsewhere in this article.

MSS-4 1998-99

Simone Garneau (MSS4) is now working at the Canadian Space Agency in Ottawa.

Vaios Lappas (MSS4) graduated from Ryerson Polytechnic University in Toronto in 1998. He did his Masters in the International Space University and his placement was conducted in NASA's Goddard Space Flight Centre in the area of Attitude Control of Nanosatellites (Deep Space 5/ST-5). Presently, he is in the Surrey Space Center, in his first year of his PhD in Attitude Techniques for Nanosatellites.

Andrew Ray (MSS4) Since graduating from MSS4 I have moved to Vancouver and taken up a position with MacDonald Dettwiler (MDA) on the Radarsat2 program. The position I took here was a direct result of spending my MSS professional placement in Vancouver working with Radarsat International (RSI) and MDA. That is what led me to decide to work on Radarsat2 and led MDA to decide to hire me. I would like to thank Larry Reeves (MSS2 and Radarsat2 colleague) for his help in the process. I am slowly getting settled in here in Vancouver, and even more slowly acquiring furniture. (After buying a mattress and couch the urgency of getting more furniture was greatly decreased.) I'm enjoying the rainy Vancouver weather combined with 4:00pm sunsets as well as the snowy mountains and oceanfront location.

Claude Rousseau (MSS4) After graduating from the MSS in July 99, I started a new job as Manager, Professional Development Programs and Forum Activities at ISU Central Campus. I am responsible for the marketing and coordination of short programs (courses, seminars, workshops, etc.) offered by ISU.

Next Issue...

Look for more fascinating articles from CAISU in the next issue of the Cosmonotes in early Spring. Until then, the 1999 CAISU Board of Directors hopes that everyone has a happy and safe holiday season.

HAPPY HOLIDAYS!

JOYEUSES FETES!