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APOGEE

THE CANADIAN SPACE PROGRAM NEWSBULLETIN

Canada/Europe Sign Space Co-operation Agreement

A 10-year co-operation agreement between Canada and the European Space Agency (ESA) was signed May 31 in Montreal. Canada's Minister of Industry, Science and Technology, Harvie Andre, and the Director-General of ESA, Professor Reimar Lüst, signed the document. Dr. Larkin Kerwin, president of the Canadian Space Agency, presided over the signing ceremony.

Canada is the only non-European nation to have a close co-operation agreement with ESA, an inter-governmental organization of 13 member states created to carry out space research and space technology applications for peaceful purposes.

Canada has been linked with ESA since the mid-70s, when it had observer status. Since 1979, Canada has been a "closely co-operating" state under the provisions of two five-year agreements.

Canada and ESA have several important common interests, including remote sensing and communications. A recent example of this co-operation is Canada's participation in ESA's *Olympus* satellite program, which produced the largest hybrid satellite to be used for civil communications in the western world.

This new agreement is expected to strengthen Canada's status as a co-operating state by providing a long-term framework for the future.

The close relationship between Canada and ESA reinforces Canada's political and economic relationship with the European Community and strengthens long-term international competitiveness.

Photo: Dr. Larkin Kerwin, Agency President and Professor Reimar Lüst, Director-General of the European Space Agency, at the signing of a 10-year co-operation agreement between Canada and ESA.

Government of Canada Gouvernement du Canada

Canada

Space Agency Progress Report

Welcome to the second issue of *APOGEE*. I would like to take the opportunity to provide an up-date on the progress we have made in establishing our new Canadian Space Agency.

Bill C-16, an Act to establish the Canadian Space Agency, was introduced in Parliament on May 17, 1989. On June 1, Parliamentarians began debating the Bill and completed second reading stage just before summer recess. Once Parliament resumes, the Bill will proceed to the review committee stage prior to being reintroduced to the House for third reading.

In mid-August, an Agency executive office was established in Montreal at 1981 McGill College Avenue (Tel: (514) 496-4000). The office will function as the interim executive office until temporary corporate headquarters are established in early 1990 in the greater Montreal area.

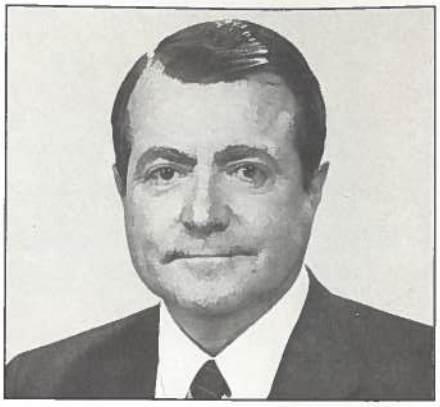
My colleagues are working hard to define the requirements for our permanent headquarters in St-Hubert, which we hope to have open within three years.

Within the Agency, we currently have an outstanding group of employees, with expertise and experience which is an asset to the Space Program and the country.

Our programs are in excellent shape and we have taken several new initiatives in recent months. With the signing of the ESA co-operative agreement and the launch of *Olympus*, we have solidified our relationship with the European Space Agency. The Space Station project is progressing well, with a successful preliminary design review completed this spring. We are looking forward to space shuttle flights by two Canadian astronauts and the acceleration of the RADARSAT satellite program. In addition, we are involved in several international space science projects.

With the support of its employees, the Canadian Space Agency is committed to maintaining Canada's place in space.

Larkin Kerwin, C.C.
President
Canadian Space Agency



New Executive Vice-President

Laurent Bergeron is the Canadian Space Agency's new Executive Vice-President. Bergeron has had a long and illustrious career in the private sector and in public service. Most recently, he was President of the Defense Group at Canadair Ltd. For almost 10 years, Bergeron served as President and Chief Executive Officer of Canadian Arsenals Ltd., a Crown corporation which manufactured defence products for the Canadian Armed Forces. Canadian Arsenals was privatized in 1986, and Bergeron served as President of its successor, SNC Defence Products Ltd, and Executive Vice-President of the SNC Group.

APOGEE

Apogee is the term applied to the highest point above the Earth in the orbit of the Moon or an artificial satellite.

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Federal/Provincial RADARSAT agreements signed

The Minister of Industry, Science and Technology Canada, Harvie Andre, signed Memoranda of Understanding with nine provincial partners September 13 on participation in the Canadian-led international RADARSAT earth observation satellite project.

The Canadian government committed $330 million in funding to the project. According to one agreement, the provinces of Quebec, Ontario, Saskatchewan and British Columbia will contribute $52.9 million towards industrial work performed by companies in these provinces. These four provinces will be closely involved with the federal government in the management of the project and will also be users of RADARSAT data. The second agreement, signed with Nova Scotia, New Brunswick, Prince Edward Island, Manitoba and Alberta commits these provinces to pre-pay for RADARSAT data in return for participation in planning the distribution of RADARSAT data nationally.

From almost 800 kilometres above the Earth, the RADARSAT satellite will circle the globe from pole to pole, scanning the entire surface with its radar in swaths up to 500 kilometres wide, providing high-resolution images of lands and oceans.

RADARSAT will provide valuable economic and scientific information on ice conditions, crops, forests and geological formations. The satellite's ability to collect data through darkness and cloud will be particularly useful in penetrating the almost constant cloud cover of the equatorial rain forests and Canada's coastal regions. The satellite will also be used for global environmental monitoring and surveillance of natural disasters including floods, drought, forest fires and other such phenomena.

A Memorandum of Understanding outlining the responsibilities and cost-sharing arrangements of international partners to this project has been negotiated with the United States National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration of the United States Department of Commerce.

Space Scan

Remote Sensing

Agreements on GIS and Remote Sensing

In July, the federal government and the government of the Northwest Territories signed agreements to jointly develop Geographic Information Systems (GIS) capability for the Northwest Territories (N.W.T.) and conduct a series of satellite remote sensing experiments.

GIS technologies collect, store, manipulate and apply geographic information, some of which is obtained from remote sensing satellites. GIS capability thereby enhances natural resource development and management.

The satellite remote sensing experiments in the Radar Data Development Program (RDDP) of Energy Mines and Resources will demonstrate the usefulness of synthetic aperture radar (SAR) for classification of wildlife habits, interpretation of land features and definition of local structural geology.

SAR is a powerful microwave observation instrument which provides more predictable data than the American *Landsat* and the French *SPOT* satellites, because of its ability to see through cloud cover and in darkness. SAR technology will be used on Canada's RADARSAT earth observation satellite to be launched in 1994.

The co-operative venture between N.W.T. and the federal government is one in a series of similar agreements to be signed between the federal government and several provinces.

IGARSS '89

The 1989 International Geoscience and Remote Sensing Symposium (IGARSS '89) took place July 10-14 at the University of British Columbia, Vancouver, B.C.

The symposium, entitled "Quantitative Remote Sensing: An Economic Tool for the Nineties", surveyed a wide range of applications for remote sensing, emphasizing its capability to provide economically valuable information.

Representatives of both the Energy Mines and Resources' Canada Centre for Remote Sensing and the Canadian Centre for Mapping were involved in chairing sessions at the meeting.

Space Station

STEAR Commits $750,000 to B.C. Industry

The Space Station Program's Strategic Technologies for Automation and Robotics (STEAR) branch will commit approximately $750,000 for contracts to British Columbia industry.

Under the Economic Regional Development Sub-Agreement on Science and Technology with British Columbia, the B.C. Advanced Systems Institute will issue six contracts with the allotted money.

The contracts will combine automation and robotics applications for space with those for natural resource development in B.C.

The STEAR Program helps Canadian industry develop advanced technologies for use in the development of the Mobile Servicing System, Canada's contribution to the Space Station, with the objective of creating terrestrial spin-offs and long-term industrial benefits.

Space Vision Systems Competition

The Strategic Technologies for Automation and Robotics (STEAR) branch of the Space Station Program has issued a challenge to hi-tech companies to submit research and development proposals to enhance space vision systems. The competition includes any ideas to improve existing technology for detecting, recognizing and tracking objects in space.

STEAR will fund six feasibility studies for up to $125,000 each. The selection of these six will be made by October, and funding is expected to be in place by the end of the year.

After one year's activity, STEAR will choose from these studies and fund three up to $1 million per project to advance their concepts to working prototypes.

Communications

Olympus: a New Generation of High-powered Satellites

Europe's *Olympus* satellite was launched July 11 from Kourou, French Guiana aboard an *Ariane 3* rocket.

Canada has been a major contributor to the *Olympus* program since its inception by the European Space Agency in 1980. Spar Aerospace Ltd constructed the satellite's solar arrays. Final assembly, integration and testing of *Olympus* was performed at the Space Agency's David Florida Laboratory.

Olympus is a joint venture which involves Canada, Austria, Belgium, Denmark, Italy, the Netherlands, Spain and the United Kingdom.

Olympus, formerly known as *L-SAT*, is the largest hybrid satellite used for civil communications launched in the western world.

Users share the satellite for different purposes and thereby allow for a reduction of overcrowding in the geostationary arc. It is powered entirely by silicon solar-energy cells located on 13-metre arrays on the north and south sides of the satellite.

Dr. Colin Franklin, former acting Assistant Deputy Minister, Space, at Communications Canada and Dr. Rolf Mamen, Director of the Space Agency's David Florida Laboratory, discuss launch procedures with Charles Bigot, Director-General of Arianespace.

Olympus also provides a two-channel high-power TV broadcast payload for direct-to-home transmission, a four-channel payload for specialized or business services covering the entire European zone, a payload to be used primarily for pilot projects in video-conferencing and communications systems, and a beacon which will be used to gather data for designers of future satellites.

Canadian scientists plan to utilize *Olympus* to conduct experiments in the

(See **Communications**, page 4)

Space Scan

Communications (from page 3)
extremely high frequency band with an eye to new applications for satellite services. Higher frequency bands allow satellite signals to be beamed to smaller, more economical earth stations on customer premises, which are now being developed in Canada.

DFL Tests Anik E1 and E2

Anik E2 has arrived at the Canadian Space Agency's David Florida Laboratory (DFL) for environmental testing.

Radio frequency testing is also set to begin on Anik E1, which arrived at DFL May 17.

During the next year the satellites will be subjected to a series of environmental tests including vibration, thermal vacuum testing and mass properties measurements. Vibration and thermal vacuum testing on Anik E1 are expected to begin this fall.

The prime contractor on the project is Spar Aerospace Ltd. Anik E1 and Anik E2 will be owned and operated by Telesat Canada. Delivery of the satellites to Telesat is expected in mid-to late-1990.

Sea Link Provides Marine MSAT Service

Communications Canada and Sea Link Ltd. signed an agreement July 7 which will allow two Newfoundland companies to enter a new era in communications — Sea Link, as a marine common carrier, and Ultimateast as a developer of satellite user technology.

Under the agreement, the department and Sea Link will carry out field trials using a two-way fleet messaging, dispatch and control service via Inmarsat's *Marecs B2* satellite. This data service will stimulate market demand for services provided by MSAT, a Canadian satellite scheduled for launch in 1994.

The department will also issue a contract to Ultimateast to augment its existing marine products to include the MSAT standard. Sea Link will use these products to provide improved, specialized features and services to its customers.

It is expected that the equipment will provide service to customers using a leased channel on an available satellite before the MSAT launch.

MSAT will offer advanced mobile communications which can provide a range of improved services, including fisheries resource management and access to reports on weather and sea conditions.

The satellite, designed to provide communications and information services to mobile and remote users, will be owned and operated by Telesat Mobile Inc.

Space Science

Reduced-gravity Aircraft Program Solicits Proposals

The Canadian Space Agency has launched an ongoing program to support research and development involving the microgravity conditions of space.

In collaboration, the National Aeronautical Establishment of the NRC has modified a T-33 aircraft two-seater military jet trainer for use in low-gravity studies and a call for proposals for experimental use of the aircraft has been issued.

The aircraft is now operational and can provide opportunities to perform low-gravity experiments of short duration and to test equipment under development for microgravity flights.

As well, the Agency rents NASA's KC-135, an aircraft better suited to larger experiments, every March and October.

Information requests or proposals should be directed to:

Dr. G. Atkinson
Canadian Space Agency
c/o National Research Council
Room 1029, 100 Sussex Drive
Ottawa K1A 0R6
Tel: (613) 990-0788

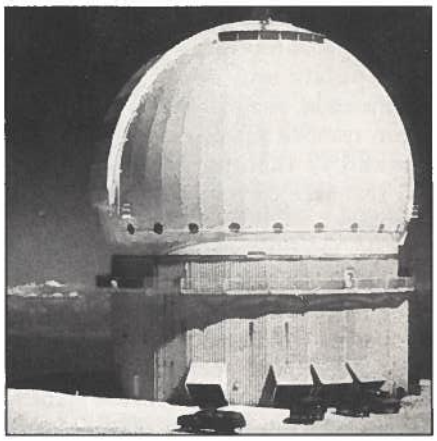
Satellite Celebrates 20th Birthday

ISIS 1, a Canadian research satellite devoted to ionospheric studies, recently marked its 20th year in space.

Launched January 30, 1969, *ISIS 1* is more powerful than its predecessors, *Alouette 1* and *2*, thereby allowing scientists to conduct more detailed research.

The satellite is still operative and continues to influence advances in the Canadian space program. Space physics data from the *ISIS 1* form the basis for more than 100 academic articles.

Both *ISIS 1* and *ISIS 2*, launched two years later, have been operated since March 1984 by Japan's Communication Research Laboratory. *ISIS 2* is still used to gather weekly ionospheric information in Antarctica.



The Canada-France-Hawaii telescope at the summit of Mauna Kea, Hawaii.

Anniversary Celebration for International Telescope

The Canadian Astronomical Society (CAS) honoured the 10th anniversary of the Canada-France-Hawaii telescope at its annual meeting in Montreal June 27-29.

CAS dedicated June 27 as "Canada-France-Hawaii Telescope Day" and invited those associated with the telescope to present papers about the telescope's history and research results obtained from study of the solar system and beyond.

The Canada-France-Hawaii telescope was built by an international partnership of Canada's National Research Council, France's Centre National de la Recherche Scientifique and the University of Hawaii. It was the first large telescope to be placed at the summit of Mauna Kea in Hawaii, considered by many to be the finest site on Earth for observing the universe.

The clarity and uniformity of the atmosphere above the location, and the quality of the telescope have contributed to significant advances in the study of quasars, black holes and other areas of research.

Space Scan

Astronaut Program

IML-1 and Canex-2 Flights Changed

The first International Microgravity Laboratory (IML-1) mission, originally scheduled for a Space Shuttle Flight in February, 1991, has been rescheduled to fly aboard *Columbia* in December, 1990.

On the IML-1 flight, Canada will have six space physiology experiments, which are primarily concerned with the way humans adapt to the weightless environment of spaceflight.

Canadian astronauts Dr. Roberta Bondar and Dr. Ken Money are payload specialist candidates for the international mission.

The launch date for Canada's Canex-2 experiments has also been changed. Previously scheduled for early 1992, they will be on board *Discovery* during Space Shuttle Mission STS-49, now scheduled for September 30, 1991.

Dr. Steve MacLean, the designated payload specialist for the Canex-2 mission, will perform a number of experiments for Canadian investigators relating to space technology, space science, materials processing and life sciences, including the testing of the Canadian Space Agency/NRC Space Vision System (SVS) technology.

The schedule changes, and the fact that the two flights are now closer together puts pressure on the Canadian Space Agency and the astronauts to prepare more quickly for the flights.

Canadian IML-1 Experiments

In May, Canadian payload specialist candidates Bondar and Money, along with payload specialist candidates Dr. Ulf Merbold (ESA) and Dr. Roger Crouch (NASA) had meetings at three Canadian universities with investigators who have designed experiments for the International Microgravity Laboratory (IML-1) Space Shuttle Flight.

The astronauts met first with Dr. Peter C. Wing and Dr. Donald E. Brooks at the University of British Columbia.

Wing's experiments are designed to assess back pain in astronauts, which researchers suspect may be related to the elongation of astronauts' spines that occurs in space in the absence of gravity.

Brooks' experiments will investigate phase partitioning, a unique way of separating different kinds of molecules out of complex mixtures of substances. On earth, gravity-induced fluid flow makes it difficult to separate substances with maximum purity.

At the University of Calgary, Dr. Howard G. Parsons and Dr. Jane E. Thirsk familiarized the astronauts with an experiment to measure human energy expenditure in spaceflight. The results will help in the design of appropriate dietary and fitness programs for astronauts as they prepare to spend longer periods in space.

The astronauts also worked with Dr. Douglas G.D. Watt at McGill University. Watt is studying the Space Adaptation Syndrome, which encompasses a range of human responses to the weightlessness of space.

The four astronauts will visit 13 countries to work with investigators supplying the many sets of experiments to be conducted on the IML-1 mission.

Preparing Researchers for Space Station

The User Development Program (UDP) is preparing Canadian industry and researchers to make use of the Space Station's microgravity environment.

UDP was established in 1986 as part of the Space Station Program to fund Canadian research requiring microgravity. The Program identifies areas of research with commercial potential, assists in developing concepts for hardware to be used on the Space Station, and allows researchers to experiment in microgravity on aircraft and rockets.

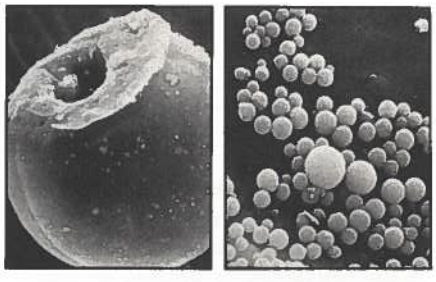
The Program has been allocated $75 million to the year 1997. Since 1986, $11 million worth of research and study contracts have been awarded.

Long periods of microgravity make it easier for researchers to modify and improve the properties of materials. In space, the absence of natural convection in fluids allows more effective control of temperature and concentration gradients.

The absence of buoyancy and sedimentation in microgravity allows researchers to regulate particle distribution within fluids precisely. In microgravity it is also possible to produce alloys that cannot be produced on earth.

Companies are able to use the microgravity of space to produce purer drugs and crystals, stronger plastics and composites, and perfect ceramic spheres. Alloys, glasses, glassy-metals, semi-conductors, biotechnology, radiation biology, space adaptation, fluid physics, and laser applications are among other areas of interest to industry and researchers.

UDP offers flight opportunities on NASA's KC-135, the National Research Council's T-33 Microgravity aircraft, and flights on rockets and the Space Shuttle, to allow experiments in microgravity while the Space Station is being built. Microgravity aircraft achieve weightlessness for short periods by flying in a parabolic arc.



A tiny ceramic microsphere grown in near-zero gravity (left). The same product formed in normal gravity (right) is much smaller.

Under the international Space Station agreement, Canadian scientists will be allocated three per cent of all Space Station resources, including space, power, crew time, and data downlink time.

The creation of new products and services on the Space Station is expected to generate substantial scientific, industrial and economic spinoffs for Canada.

Space International

Meetings with the Soviets

Meetings of the Canadian and Soviet scientific communities took place in early September in order to negotiate co-operative space research agreements. Projects discussed ranged from magnetospheric studies to radiation dosimetry.

Canada has been involved in co-operative ventures with the Soviets in the past, having negotiated an agreement with the Space Research Institute of the U.S.S.R. Academy of Sciences (IKI) to put a Canadian ultra-violet auroral imager (UVAI) on the Soviets' Auroral Probe when it is launched in 1991.

A contract has been awarded to Canadian industry to build the UVAI imager. Testing of the engineering model is scheduled for October 1989 when a delegation of Soviet scientists visits Canada. The final flight model is to be delivered in October 1990.

The Auroral Probe is one of two main satellites in the larger Interball project. Each of the two satellites will fly in different orbits and release a smaller satellite. The Interball project is an excellent example of international partnership, with machinery on board the satellites from 10 different countries and participation in the project from 12 countries and the European Space Agency.

UN Outer Space Committee Meets

At a June meeting, the United Nations Committee on the Peaceful Uses of Outer Space proposed that the UN endorse International Space Year, planned for 1992.

The Committee also discussed the use of nuclear power sources in outer space, space debris, and spin-off benefits of space technology.

Committee members agreed on five international principles concerning use of nuclear power sources in outer space and are close to consensus on two more. The issue was first raised following the 1978 re-entry of a Soviet nuclear-powered satellite, *Cosmos 954*, which spread radioactive debris across northern Canada. More technical study of space debris was proposed after developing countries expressed concern about the future use of space.

At the meeting, Committee members discussed spin-off benefits of space technology for the first time. The U.S.A. proposed the topic and drew on the experiences of NASA's Technology Utilization Program for its presentation. The U.S.S.R., India, West Germany and the UN Food and Agriculture Organization also reported on spin-off benefits of their space activities.

Canada is represented on the Committee by External Affairs.

Canadian Space Day Held at the Paris Airshow

This year's Paris Airshow saw the federal government and the Aerospace Industries Association of Canada co-sponsor the first Space Day held at the Canadian Pavilion.

Canadian Astronaut Dr. Marc Garneau toured the airshow site and attended a space industry luncheon hosted by Spar Aerospace Ltd. The Canadian Space Agency and Industry, Science and Technology Canada distributed information packages about the Canadian space program and industry to interested trade show attendees.

Several Canadian companies with an involvement in space research and development sponsored exhibits at the pavilion, including Spar, Canadian Astronautics Ltd., Bristol Aerospace, Heroux Inc., Devtek Corporation, Novatronics Inc., Fleet Aerospace Corporation, Leigh Instruments Ltd., and Lavalin Aviation Canada Ltd. The Paris show was one of the most successful ever for the Canadian contingent of 44 aerospace companies and three provincial governments.

Space Net

Call for Papers

Organizers of the Canadian Society for Mechanical Engineering Micro-gravity Sciences Symposium, to be held at the University of Toronto on June 3-9, 1990, have issued a call for papers.

The conference, sponsored by the Canadian Space Agency, will provide a forum for discussion of recent advances and practical problems in Materials Science and Microgravity, with an emphasis on research and development results.

An abstract of 300 words must be submitted by November 17. Authors whose abstracts are accepted will be notified by December 15 and complete papers must be received by January 6, 1990.

Abstracts and correspondence should be directed to:

Dr. M.Z. Saghir
Canadian Space Agency
c/o National Research Council,
100 Sussex Drive,
Ottawa
K1A 0R6
Tel: (613) 990-0808

TVOntario Launches Space Videos

A series of educational video programs with a space theme is being produced by TVOntario with the technical assistance of the Canadian Space Agency.

The first three 12-minute films in the continuing series are available for educational distribution. They will air first on the French language TVOntario network this fall.

The first is entitled *What if?* and deals with the effects of gravity on Earth. *Making gravity disappear* is about achieving weightlessness and the third module is *Making sense of our senses*, an investigation of the human balance system on Earth and in space. Purchasing information is available through TVOntario marketing (Tel: (416) 484-2600).

MGCI Celebrates Second Anniversary

On October 16, 1989, Marc Garneau Collegiate Institute celebrated the second anniversary of its official opening with a student conference. Astronaut Marc Garneau and science journalist Terry Dickinson spoke at the conference. The theme was "Exploring Spaceship Earth".

Space Net

ISU Selects 11 Canadians

Eleven graduate students from Canadian universities attended the prestigious International Space University 1989 Summer Session in Strasbourg, France, June 30-August 31.

The students, chosen for their academic excellence and leadership qualities, are: John C. Bird, PhD, Experimental Space Science (in progress); Alain Poirier, PhD, Materials Science and Lasers, MBA (in progress); Catharine Casgrain, MSc, Materials Processing in Space (Metallurgical Engineering) (in progress); Marc B. Simmons, MSEng; Shane M. Munro, MD (in progress); David N.C. Tse, Honours BEng (in progress); Benoit Dubuc, PhD, Computer Science (in progress); Simon A. Collins, MEng, Aeronautical and Astronautical Engineering (in progress); Katherine E. McCuaig, MD (surgical residency in progress); Robert Parent, MSc, Physics (in progress); Jesko von Windheim, PhD (in progress).

Four Canadian students in the 1988 Summer Session of the International Space University returned as tutors for the 1989 session, at the request of organizers.

Tutors chosen to participate in Summer Sessions were picked from an international list of top-notch scholars, and are regarded as the best of the best.

The Canadian star performers are Peter Diedrich, Kristiina Valter, Chris Sallaberger, and Erik Viirre.

The Canadian Space Agency sponsored Diedrich and Valter, and provided a travel grant to Viirre. Sallaberger was funded by private industry.

Double Honour for Canada at ISU

Dr. Larkin Kerwin, President of the Canadian Space Agency, delivered the graduation speech at the end of the 1989 International Space University (ISU) Summer Session. The Session took place at the Université Louis Pasteur in Strasbourg, France, from June 30 to August 31. Dr. Kerwin also welcomed students to the 1990 ISU Summer Session to be hosted by Canada's Institute for Space and Terrestrial Science.

The intensive summer course, over 240 hours of lectures and 280 hours of project design work, compresses a full year of study into nine weeks. Participants in the ISU '89 Summer Session worked on two design projects: a Variable Gravity Research Facility (VGRF), and a Lunar Polar Orbiter (LPO), which would search for possible ice, gas or mineral deposits on the moon's poles.

The Space University initiative is a non-profit international graduate program for space development and research. It was founded in 1987 to provide graduate-level students who demonstrate academic excellence and leadership qualities with a multi-disciplinary approach to space science and policy.

Airshow Canada Makes Its Debut

In August the Canadian Space Agency participated in Airshow Canada as part of the federal government presence at the exhibition. Airshow Canada is an aerospace trade show which was held (for the first time) in conjunction with the popular Abbotsford Airshow.

The trade show was supported financially by both the federal and B.C. governments and attracted more than 200 industrial and government exhibitors from 14 nations. The federal government's Space Program was represented by the Space Agency, Department of Communications and Canada Centre for Remote Sensing. Canadian space companies which participated included Canadian Astronautics Ltd., MacDonald Dettwiler Ltd, and Spar Aerospace Ltd.

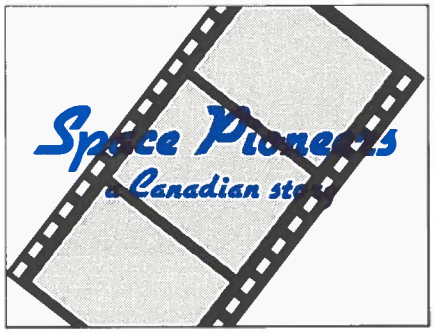
"Looking to 2020", a symposium on the future of aerospace, was held in Vancouver, concurrent with the tradeshow. Canadian astronaut Bjarni Tryggvason spoke about the use of space and near space at a symposium luncheon.

Quebec's Young Astronauts Get Off the Ground

A high school program designed for young space enthusiasts, Programme Jeune Astronautes, begins this September at École Pierre Brosseau in Brossard, Québec.

The program is offered to first-year level students of the secondary school this year and will be expanded annually to be available to all levels.

The course aims for total participation from its students. In addition to a rigorous academic curriculum, the students will participate in discussions with visiting professionals, conduct personal research, attend space camps in the U.S.A., France or the U.S.S.R., view launches and visit aerospace industries.



Space Pioneers Head for Prime Time

Filmmakers Rudy Buttignol and David Sobelman have finalized a contract to show their film *Space Pioneers, a Canadian Story* on CBC prime time television this fall.

The film, which premiered at the Toronto International Festival of Festivals in 1988, is an affectionate and sometimes humourous study of a handful of Canadian scientists and engineers at the dawn of the Space Age.

The documentary focusses on the design and launch of *Alouette 1*, Canada's first satellite. It shows space enthusiasts tracking *Sputnik* and designing a telescope. Some headed south to NASA while others made history by launching *Alouette* — the satellite which helped put Canada in the forefront of space science and technology.

Producer/director Buttignol and writer Sobelman worked on the project for nearly seven years. It was a labour of love for Buttignol, whose childhood was shaped by a fascination with space exploration and travel. The team has made two previous films about the Space Age, *Elements of Flight* and *The Space Experience.*

A study guide for *Space Pioneers* is available from the educational market distributor, McNab Connelly Film in Toronto (Tel: (416) 462-0223). A French-language version of the film is also available.

Completion of *Space Pioneers* was made possible through partial funding from the Canadian Space Program.

Space Talk

Officer of the Légion d'honneur

Dr. Larkin Kerwin, president of the Canadian Space Agency, received the highest decoration of the French government by becoming an officer in the Légion d'honneur. The award was presented by Ambassador of France in Canada, François Bujon de l'Estang, at an event celebrating the 200th anniversary of the French Revolution.

VanKoughnett Changes Hats

Dr. Roy VanKoughnett became the new director for the Materials Research Program at the National Research Council June 12.

The Materials Research Program works in tandem with industry to perfect and define applications for plastics, polymers and advanced ceramics.

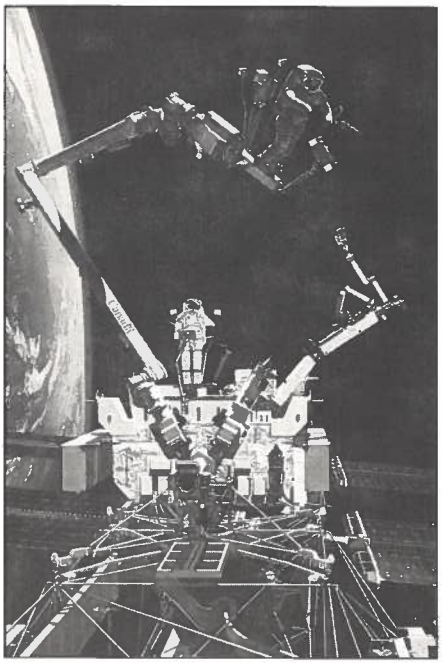
As director of the Space Research Operations Group, VanKoughnett was responsible for the Space Science Program and the Canadian Astronaut Program. Barry Wetter is now acting director of the Space Science Program, while Bruce Aikenhead retains his position as Program Manager of the Canadian Astronaut Program.

Dr. Roy VanKoughnett

Money Awarded Grass Foundation Prize

Canadian astronaut Ken Money has won the 1989 Grass Foundation Neurosciences Lectureship, which is awarded annually for excellence in neurosciences research.

Money's research, in the areas of vestibular function (inner ear balance function and related neural mechanisms), motion/space sickness and the effects of alcohol, is related to International Microgravity Laboratory (IML) experiments.



A new illustration by space artist Paul Fjeld depicts Canada's Mobile Servicing Centre as it would look during an Extra Vehicular Activity assignment at one end of the international Space Station. Pictured are two astronauts repairing a communications structure, while a third astronaut within the station controls the Special Purpose Dextrous Manipulator (SPDM) being used in a support capacity (right).

Fjeld, Canada's foremost space artist, began his professional career as a NASA artist 14 years ago. He has produced numerous large illustrations, many of which have been purchased by the Space Program or Canadian and international aerospace companies. Subjects for his recent illustrations include the MSS (Space Station), RADARSAT, the History of Canada in Space and Anik E.

CSME Award

Dr. David Zimcik, acting group leader in applied mechanics for the Canadian Space Agency, was presented with the George H. Duggan medal by the Canadian Society for Mechanical Engineering (CSME) in May.

The prize is awarded annually by CSME for the best submission to the society's quarterly publication, *CSME Transactions*. Zimcik's article was entitled, "The Application of Composite Materials to Space Structures".

Calendar

October 5, 1989: Fifth Anniversary of the launch of shuttle mission 41-G, Marc Garneau's historic flight aboard *Challenger*.

October 7-14, 1989: International Astronautical Federation Congress, Malaga, Spain (moved from Beijing).

October 18-21, 1989: Science Teaching: Canada's Future, Ottawa, Ontario.

October 25-November 5, 1989: COSPAS/SARSAT joint meeting, technical and operations working groups, London, U.K.

November 8-9, 1989: Canadian Aeronautics and Space Institute Symposium on the Space Station, Ottawa, Ontario.

November 13-16, 1989: Space: Technology, Commerce and Communications Conference and Exposition, Houston, U.S.A.

February 14-18, 1990: Asian Aerospace '90 Conference, Singapore.

March 26-29, 1990: Space Commerce, Montreux, Switzerland.

June 3-9, 1990: Canadian Society for Mechanical Engineering Microgravity Sciences Symposium, Toronto, Ontario.

July - August, 1990: International Space University, Toronto, Ontario.