ASTRONAUT BJARNI TRYGGVASON



Canadian Space Agency, 2008, Image Gallery: Bjarni Tryggvason. Retrieved March 2, 2008, from http://www.space.gc.ca/asc/app/gallery/results2.asp?session=&image_id=astronaut

Figure F-1 Astronaut Bjarni Tryggvason

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ASTRONAUT BJARNI TRYGGVASON

Bjarni Tryggvason is an airline transport rated pilot with more than 4 500 hours of flight experience and 1 800 hours as a flight instructor. He is active in aerobatic flight including time on the Tutor jet trainer with the Canadian Forces. He enjoys jogging, skiing and general fitness. He has two children.

MISSIONS

STS-85

Mission: Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere-Shuttle Pallet Satellite-2 (CRISTA-SPAS-02).

Space Shuttle: *Discovery*.

Launched: August 7, 1997, 10:41:00 a.m. EDT.

Landed: August 19, 1997, 7:07:59 a.m. EDT.

Mission Duration: 12 days.

Orbit Altitude: 150 nautical miles.

STS-85 carried a complement of payloads in the cargo bay that focused on Mission to Planet Earth objectives as well as preparations for ISS assembly:

- the Japanese Manipulator Flight Development (MFD),
- the Technology Applications and Science-01 (TAS-1),
- the International Extreme Ultraviolet Hitchhiker-02 (IEH-02), and
- CRISTA-SPAS-02.

This was the second flight of CRISTA-SPAS payload. CRISTA-SPAS-02 represented the fourth mission in a cooperative venture between the German Space Agency (DARA) and NASA. The payload included three telescopes and four spectrometers, deployed on flight day one, to gather data about earth's middle atmosphere. After more than 200 hours of free flight, CRISTA-SPAS-02 was retrieved on August 16. The three CRISTA telescopes collected 38 full atmospheric profiles of the middle atmosphere. A total of 22 sounding rockets and 40 balloons were launched to provide correlating data.

A complementary instrument, the Middle Atmosphere High Resolution Spectrograph Investigation (MAHRSI), provided additional data. This new information from STS-85 combined with that from the first CRISTA-SPAS flight (STS-66 in1994) was used to yield new insight into the distribution of ozone in earth's atmosphere. Once science operations were complete, CRISTA-SPAS was used in a simulation exercise to prepare for the first ISS assembly flight, STS-88.

TAS-1 was a Hitchhiker payload carrying eight experiments designed to demonstrate faster, better and cheaper avionics and processes. All these experiments were completed successfully:

- Solar Constant Experiment (SOLCON),
- Infrared Spectral Imaging Radiometer (ISIR),
- Shuttle Laster Altimeter (SLA),
- Critical Viscosity of Xenon (CVX),
- Space Experiment Module (SEM),
- Two Phase Flow (TPF),

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- Cryogenic Flight Experiment (CFE), and
- Stand Alone Acceleration Measurement Device and the Wide Band Stand Alone Acceleration Measurement Device (SAAMD/WBSAAMD).

MFD was designed to evaluate use of the Small Fine Arm that will be part of the future Japanese Experiment Module's Remote Manipulator System on ISS. Despite some glitches, MFD completed a series of exercises by the crew on orbit as well as operators on ground. Two unrelated Japanese experiments, Two-Phase Fluid Loop Experiment (TPFLEX) and Evaluation of Space Environment and Effects on Materials (ESEM), were mounted near the Small Fine Arm in the payload bay.

IEH-02 was flying a second time and consisted of four experiments–all with the common objective of investigating solar extreme ultraviolet (EUV) flux and EUV emissions of the Jupiter/Io plasma torus system:

- Solar Extreme Ultraviolet Hitchhiker-2 (SEH),
- Ultraviolet Spectrography Telescope for Astronomical Research (UVSTAR),
- Distribution and Automation Technology Advancement - Colorado Hitchhiker and Student Experiment of Solar Radiation (DATA-CHASER), and
- Shuttle Glow Experiment-5 and -6.

Payloads inside the cabin included:

- Protein Crystal Growth - Single locker Thermal Enclosure System (PCG-STES),
- Midcourse Space Experiment (MSX),
- Shuttle Ionospheric Modification with Pulsed Local Exhaust (SIMPLEX),
- Southwest Ultraviolet Imaging System (SWUIS), used to observe the Hale-Bopp comet,
- two Get Away Special (GAS) payloads,
- Biological Research in Canisters-10 (BRIC-10), one in a series of flights,
- Solid Surface Combustion Experiment (SSCE), and
- Bioreactor Demonstration System-3 (BDS-3), a cell-biology research payload that had flown previously. On this flight, BDS was used for growing colon cancer cells to a larger size than can be achieved on earth.

The crew also worked with the Orbiter Space Vision System (OSVS), which will be used during ISS assembly. OSVS features series of dots, strategically placed on various payload and vehicle structures, which permit precise alignment and pointing capability.

PLACE AND DATE OF BIRTH

Born September 21, 1945, in Reykjavik, Iceland.

EDUCATION

Bjarni Tryggvason's education includes:

- Primary school in N.S. and B.C.,
- High school in Richmond, B.C.,
- BASc in Engineering Physics from the University of British Columbia, and
- completed postgraduate work in engineering with specialization in applied mathematics and fluid dynamics at the University of Western Ontario.

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PROFESSIONAL EXPERIENCE

Bjarni Tryggvason was a meteorologist with the cloud physics group at the Meteorlogic Service Canada (formerly the Atmospheric Environment Service) in Toronto in 1972 and 1973. After that, he served as a research associate in industrial aerodynamics at the Boundary Layer Wind Tunnel Laboratory at the University of Western Ontario from 1974 to 1979.

Tryggvason was a guest research associate at Kyoto University, in Kyoto, Japan, in 1979 and at James Cook University of North Queensland, in Townsville, Australia in 1980. He was a lecturer in Applied Mathematics at the University of Western Ontario from 1980 to 1982.

From 1982 to 1984, Tryggvason was a research officer at the Low Speed Aerodynamics Laboratory at the National Research Council of Canada (NRC) and was a lecturer at the University of Ottawa and at Carleton University from 1982 to 1992.

Selected as one of the original six Canadian astronauts in December 1983, Tryggvason trained as a backup payload specialist for the CANEX-2 set of experiments, which flew on Mission STS-52 in October 1992. He was also the project engineer for the Space Vision System Target Spacecraft, which was deployed during that mission.

Tryggvason also served as the principal investigator for the following projects:

- development of the Large Motion Isolation Mount (LMIM), which flew numerous times on NASA KC-135 and DC-9 aircraft,
- Microgravity vibration Isolation Mount (MIM), which operated on the Russian space station, Mir, from April 1996 until January 1998 to support several Canadian and US experiments in material science and fluid physics, and
- the MIM-2 which flew on STS-85 in August 1997.

He was the originator and technical director during the early development phase of the Microgravity Vibration Isolation Subsystem (MVIS), which the CSA developed for the European Space Agency Fluid Science Laboratory for the ISS.

On August 7, 1997, Tryggvason flew as a payload specialist aboard Space Shuttle *Discovery* on Mission STS-85. His primary role was to test MIM-2 and perform fluid science experiments designed to examine sensitivity to spacecraft vibrations, in order to develop a better understanding of the need for systems such as the MIM on the ISS and to study the effect vibrations have on the many experiments performed on the ISS.

In August 1998, Tryggvason was invited to take part in NASA mission specialist training held at the Johnson Space Center in Houston, Texas. His class underwent two years of physical and academic training and was the first group of astronauts to be trained as both mission specialists for the space shuttle and as potential crewmembers for the ISS.

Following completion of mission specialist training, Tryggvason's NASA duties included serving as a crew representative for the Shuttle Avionics Integration Laboratory (SAIL), which is used to test shuttle flight software prior to onboard use. He also supported integrated simulations on the ISS Training Facility at the Johnson Space Center in Houston, Texas, and served as a CSA representative on the NASA Microgravity Measurement Working Group and on the ISS Microgravity Analytic Integration Team.

From mid 2001 to 2003, Tryggvason worked in the private sector while on leave from the CSA. He returned to work at the CSA in 2004. He has held the position of visiting professor at the University of Western Ontario. He has written more than 50 published papers and holds three patents.

SPECIAL HONOURS

Bjarni Tryggvason's special honours include:

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- recipient of the Canadian Space Agency Innovators Award,
- recipient of the Order of the Falcon from Iceland,
- recipient of the NASA Space Flight Medal, and
- recipient of the Doctorate of Philosophy (honoris causa) degrees, from:
    - University of Iceland, and
    - University of Western Ontario.

AFFILIATIONS

Bjarni Tryggvason’s affiliations include the Canadian Aeronautics and Space Institute.

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