

Paris, June 19, 2007

Air Liquide on board the International Space Station

press release



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Air Liquide and space

In Sassenage (France), **Advanced Technology Division (DTA)** possesses unique know-how in developing on-board cryogenic equipment for orbital systems (MELFI), space simulation chambers and ground launch pads.

Cryospace, set up in Les Mureaux (France), was founded in 1988 between Air Liquide (55%) and Astrium Space Transportation (45%). It develops and manufactures the cryogenic tanks for the European Ariane 5 launcher.

In Kourou (French Guiana), **Air Liquide Spatial Guyane** produces and provides propelling fluids, on-site assistance and launch services.

The International Space Station (ISS)

Build and assembled in joint collaboration between 16 countries including France, the USA, Russia, Japan and Brazil, the ISS is orbiting the Earth at an altitude of around 386km. The first element was launched in 1998, and the ISS should be complete by the end of 2010.

MELFI (Minus Eighty Degrees Laboratory Freezer for the ISS) is a **cryo-refrigerator** for use on board the **International Space Station (ISS)** for freezing and storing **biological samples** and other research specimens at temperatures as low as **-95°C**, before they are brought back to Earth.

On behalf of the **European Space Agency**, **Air Liquide designed and manufactured a unique turbo machine for production of cold**, which constitutes the active cooling part of MELFI. Since July 2006, when it was commissioned on board the ISS, astronauts have used this cold producing system intensively; the rotating speed of the turbo machine can reach 90,000 rpm, and it has already been in flawless service for over 8,000 hours.

Experts from the Advanced Technology Division of Air Liquide took up the challenge to adapt industrial equipment to manned space flights conditions. **Thanks to this achievement and the reliability and performance of the system, NASA decided to extend the orbital lifetime of MELFI by five years.** It was initially planned for two years.

It is envisaged that Air Liquide will also provide special equipment for the internal purification of the cryo-refrigerator. To remove even the minutest trace of humidity, the astronauts will have to vacuum the system each year and refill it with nitrogen stored on board the ISS. Air Liquide will provide them with a system to purify this gas and ensure all the pumping and filling operations.

François Darchis, Senior Vice-President, responsible for R&D, Technologies, Engineering and Construction, declared: ***"With this new success on board the ISS, Air Liquide confirms its long term commitment to space-related activities by providing its high level of technology and innovation, a key growth driver for the Group."***

Air Liquide takes part in the International Paris Air Show in Le Bourget (France), June 18 to 24, 2007, where the Group will show the MELFI turbo machine. In 2007, the Advanced Technologies Division of Air Liquide celebrates 20 years of designing and manufacturing on-board gas production systems, thus contributing to safety in air transportation. Today, the Group totals 15 major aeronautical programmes, eight of which currently being developed, obtained over the five past years.

With nearly **37,000 employees** in **72 countries**, Air Liquide is a **world leader** in industrial and medical gases and related services. The Group offers **innovative solutions** based on constantly enhanced technologies and produces **air gases (oxygen, nitrogen, argon, rare gases...)** and **many other gases including hydrogen**. The Group contributes to the manufacturing of **many everyday products**: bubbles in sparkling beverages, protective atmosphere for packed foods, oxygen for hospitals and homecare patients, ultra-pure gases for the semiconductor industry, hydrogen to desulfurize fuels...

Air Liquide is committed to **sustainable development** and helps to **protect life**. Founded in 1902, Air Liquide has successfully developed a long-term relationship with its shareholders built on **trust** and **transparency** and guided by the principles of **corporate governance**. Since the publication of its first consolidated financial statements in 1971, Air Liquide has posted **strong and steady earnings growth**. Sales in 2006 totaled **10,949 million euros**, with sales outside France accounting for almost 80%. Air Liquide is listed on the Paris stock exchange and is a component of the CAC 40 and Eurostoxx 50 indices (ISIN code FR 0000120073).