

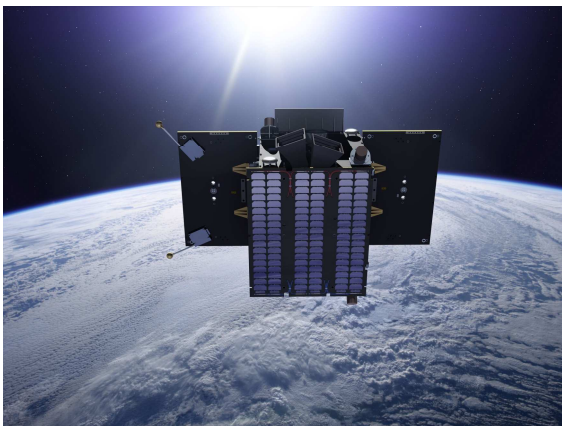


Launch of the PROBA-2 satellite: another success for NGC Aerospace

On November 2nd, 2009 at 1:50 am Greenwich mean time (7:50 pm on November 1st in Sherbrooke), the PROBA-2 satellite began its two-year space journey to accomplish its dual mission of scientific discovery and technology demonstration. Launched from the Plesetsk Cosmodrome in Russia, the 130 kg satellite was successfully placed on its sun-synchronous orbit at an altitude of 700 km. PROBA-2, which is the size of a large television and consumes the energy equivalent to a 60 Watt bulb, has four scientific experiments on board (two in the field of space weather and two for sun observation) as well as 17 technological innovations that will be validated in orbit.

Involved in the project since 2004, Sherbrooke-based NGC Aerospace participated in the design and implementation of PROBA-2 by providing the software that controls the attitude and orbit of the satellite in accordance with the requirements of the scientific mission. Thus, it is the computer software designed by NGC which orients the spacecraft so its cameras and scientific instruments can acquire their data with the accuracy and the stability required by the mission scientists. In addition, thanks to its participation in the project, NGC will have the opportunity to validate in orbit, in the context of a real space mission, up to six different technological innovations, ranging from the measurement of the satellite temperature to determine its position above the ground to using the Earth's magnetic field to orient the spacecraft in the desired direction.

PROBA-2 is the second satellite in a series of mini-satellites mandated by the European Space Agency (ESA), PROBA-1 having been launched on October 22, 2001. Dedicated to Earth observation and the analysis of climate changes, PROBA-1 is still successfully operating after eight years in orbit even though its original mission foresaw a two-year lifetime. With PROBA-1, NGC Aerospace made a quantum leap in aerospace technology by integrating for the first time *intelligence* and autonomy in the operation of Earth observation satellites, thereby increasing the reliability and the efficiency of the satellites while reducing their operating costs. PROBA-2 possesses an enhanced version of the innovative PROBA-1 algorithms, adapted to the constraints of a scientific mission.



Photos ESA

The PROBA satellites are part of the ESA technology demonstration program. The objective of this program, funded by the ESA member countries and Canada, is to validate in the operational conditions of a space mission the new technologies that will eventually be used on future missions. Due to the high risk associated with new technology, in-orbit validation is the final step in the development process of technological innovations. One of the technological innovations developed by NGC Aerospace for PROBA-2 was financially supported by the Canadian Space Agency.

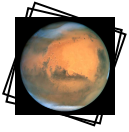
Contact:

Jean de Lafontaine, President
NGC Aerospace Ltd
Telephone: +1 (819) 348-9483
Sherbrooke, Quebec J1J 2C3

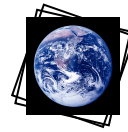
Links:

<http://www.esa.int/Proba>
http://esamultimedia.esa.int/docs/Proba/Proba-2_Factsheet_French_7oct.pdf





NGC Aéronautique Ltée
NGC Aerospace Ltd



THE COMPANY

NGC Aerospace Ltd is a dynamic, high-tech Canadian SME offering analysis, simulation and design services for the guidance, navigation and control (GNC) of planetary exploration vehicles and terrestrial satellites. The company is recognised for its expertise in the cost-effective design and validation of flight software. It is also well known for its development of high-quality GNC systems and software that increase the autonomy, performance, reliability and safety of intelligent vehicles while, at the same time, reducing their operational costs.

EXPERTISE

NGC's field of expertise includes:

- ✦ **GNC Flight Software & Simulators**
- ✦ **Mission Analysis**
- ✦ **Reliable and Efficient Software**
- ✦ **GNC System Trade-Off & Selection**
- ✦ **Efficient & Automated Software Validation Tools**

CLIENTS AND PARTNERS

NGC's main clients are the international space agencies as well as many North American and European aerospace companies. NGC aims to play a key role in major European missions, such as Mars Sample Return, Near-Earth Object missions, formation flight, scientific and Earth observation missions, where the analysis, design and implementation of reliable and efficient GNC flight software and simulators are a critical feature. NGC's extensive experience, dynamism and top-quality software make it an ideal partner for large hardware and system-design prime contractors.

SOFTWARE PRODUCTS

The **ACNS** software (*Attitude Control and Navigation System*) developed by NGC enables the autonomous navigation, guidance and control of Earth observation satellites. The ACNS software was validated in orbit on the European Space Agency's (ESA) autonomous satellite PROBA-1 launched in October 2001. This satellite was initially launched for a two-year mission, yet due to an extension of its successful mission, it is still in operation today. The second generation of the ACNS software will fly on the PROBA-2 satellite to be launched in 2007.

The **APLS** software (*Autonomous Planetary Landing System*), developed by NGC for ESA and the Canadian Space Agency (CSA), makes it possible for a space probe to recognize and avoid obstacles on the surface of a celestial body and to safely land on a secure site. APLS is composed of a simulator of the planetary environment (including scene generation), spacecraft dynamics and GNC equipment (APL_{sim}TM) and of the autonomous on-board GNC software (APL_{obs}TM) for hazard avoidance and precision landing. The current version of APLS allows the simulation and analysis of autonomous planetary landing on planets with or without an atmosphere (Mars, the Moon, Mercury). It is currently used in the design of the Mars Sample Return mission.

The **ORV** software (*Orbital RendezVous software*), developed for ESA by NGC in coordination with its European partners, simulates autonomous rendezvous around Mars between an active chaser and a passive target. This software allows the chaser to accurately track the target despite undesired flexible dynamics of the solar panels and parametric uncertainties of the spacecraft.

JEAN DE LAFONTAINE, PRESIDENT AND FOUNDER OF NGC AEROSPACE LTD.

Jean de Lafontaine was born in Sherbrooke. He graduated with a Baccalaureate degree in Engineering Physics from the Royal Military College (Kingston, Canada) in 1978 and went on to obtain his Masters and Ph.D. degrees, in Aerospace Engineering, from the University of Toronto. From 1982 to 1986, Jean was employed by the Canadian Government and worked on the development of a Canadian remote-sensing satellite. From 1986 to 1996, Jean worked as a system engineer for the European Space Agency at its research centre in Noordwijk in the Netherlands and for the Japanese Space Agency at the NASDA Tsukuba Space Centre near Tokyo. Upon his return to Canada in 1996, Jean became a professor of Mechanical Engineering at the École de Technologie Supérieure and continued in 1999 at the Université de Sherbrooke as a professor of Electrical and Computer Engineering. In 2001, Jean launched NGC Aerospace Ltd specialising in guidance, navigation and control software design and simulation services for the aerospace industry. Since then, Jean and his team of highly qualified personnel have managed a number of innovative R&D projects with various Canadian and European space agencies and companies.