



CENTRE NATIONAL D'ÉTUDES SPATIALES



ATV#1 “Jules Verne” Control Centre

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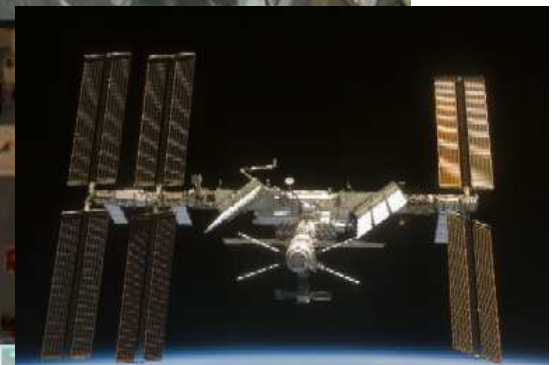
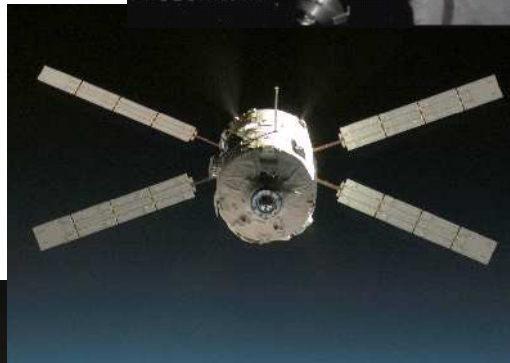
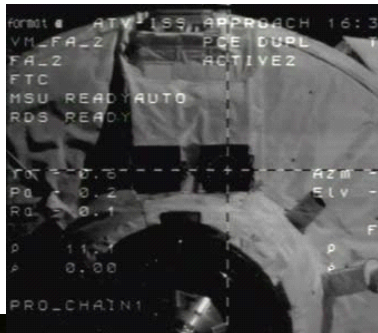
The ATV Control Centre development and the ATV Jules Verne operations were conducted by CNES Toulouse Space Centre, under contracts with the European Space Agency (ESA).

Pictures from space: credit: NASA and NASA TV

- **European ISS Operations Concept**
- **The ATV “Jules Verne” mission**
- **The ATV operations teams**
- **The challenges of the ATV-CC operations**
- **The lessons learned**

- **The European Space Agency (ESA) is in charge of the development and management of the European participation to the International Space Station.**
- **Columbus laboratory and the Automated Transfer Vehicle (ATV) are the 2 major elements of this participation.**
- **ISS operations concept is based on a decentralised architecture within which, each international partner is responsible of the operations of its own elements.**
This concept has been kept for the European participation to ISS:
 - ♦ **The scientific Users Operations Centres are distributed amongst most of the European countries.**
 - ♦ **The Automated Transfer Vehicle (ATV) is operated on behalf of ESA by the Toulouse Space Centre of the French Centre National d'Etudes Spatiales (CNES).**
 - ♦ **The European Laboratory Columbus is, in a similar way, operated from the German Space Operations Centre of the Deutsches Zentrum für Luft- und Raumfahrt located in Oberpfaffenhofen (DLR-GSOC).**





The ATV operations are supported by a number of teams:

ATV-CC – Toulouse, France

- Flight Control Team (FCT) – CNES (26 positions)
- Operations Management Team (OMT) – ESA (3 positions)
- Engineering Support Team (EST) (26 positions)
- ESA and ATV industrial team

Around 130 engineers involved in operations

- The ISS Mission Control Centre – Moscow, in Russia
- The ISS Mission Control Centre – Houston, in the USA
- The ISS Crew – International Space Station
- The Guyana Space Centre – Kourou, in French Guyana
- The Columbus Control Centre – Oberpfaffenhofen, in Germany
- The ARTEMIS (ESA relay satellite) team – REDU, in Belgium

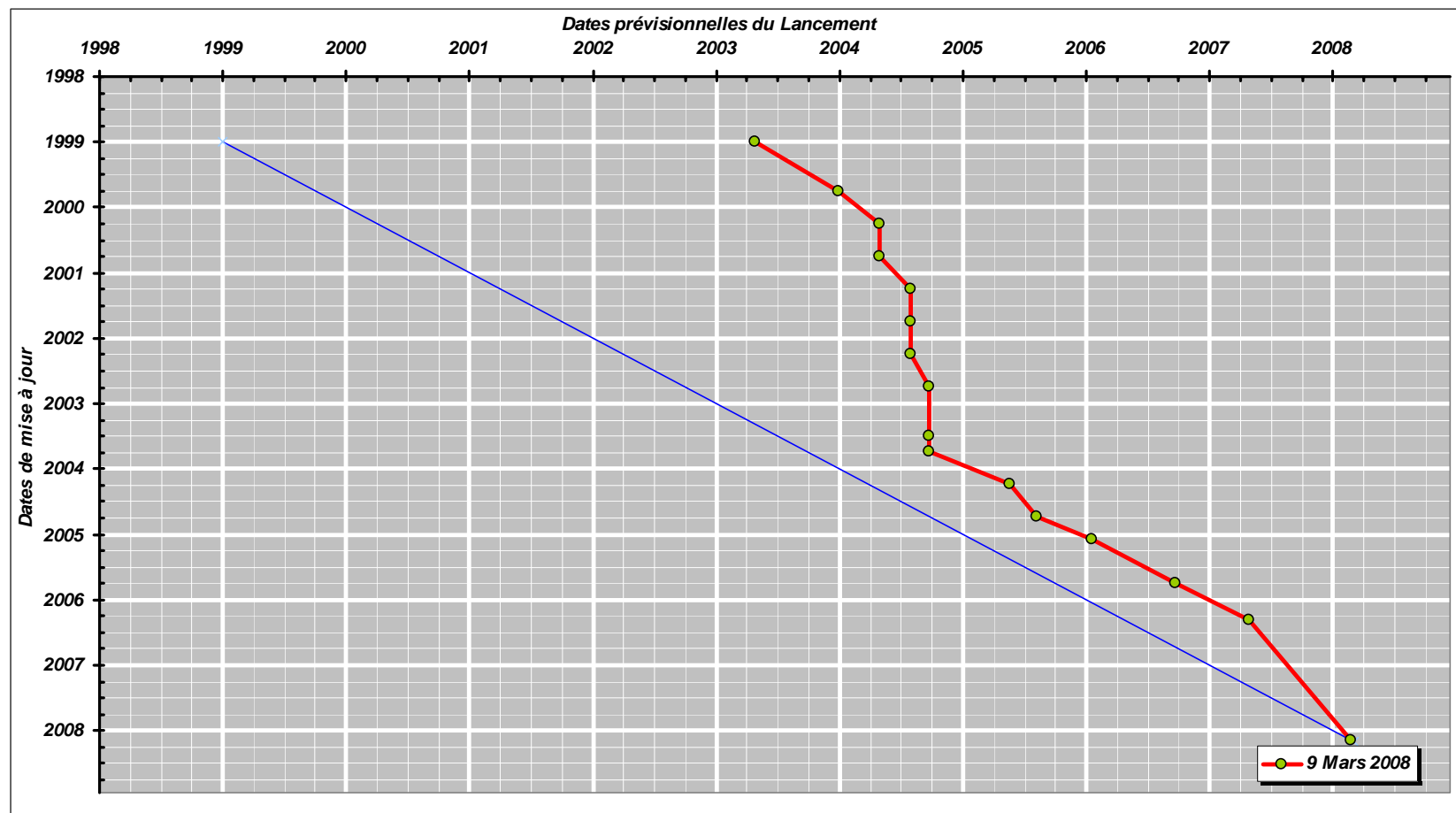
- **A première for Europe,
and the first automatic rendezvous with optical navigation system
ever performed.**

- **An evolving mission:**
 - ♦ from a 4 months mission to be launched in 2003,

to

 - ♦ the launch on March 9, 2008,
 - ♦ with a parking phase, taking into account Shuttle STS-123, lately
introduced (only 2 months before launch),
 - ♦ and during the mission itself, an attached phase extended and
a re-entry strategy modified to be phased with ISS, leading to a 7 months
mission.

- A permanent schedule shift, which was not a help to gain partners' confidence:



- **Jules Verne fulfilled all its mission objectives and no mission event was delayed because of an ATV-CC anomaly or of an operator error.**

- **To prepare the recurrent ATV operations:**
 - ◆ **all the mission has been analysed, recommendations have been made:**
 - the ATV-CC has been modified,
 - the operational process scrutinized and adapted, in particular for routine operations,
 - ◆ **the ATV-CC knowledge was captured and formalised in a training academy,**
- **But, the ATV will not evolve as wished, due to the impacts on its qualification.**

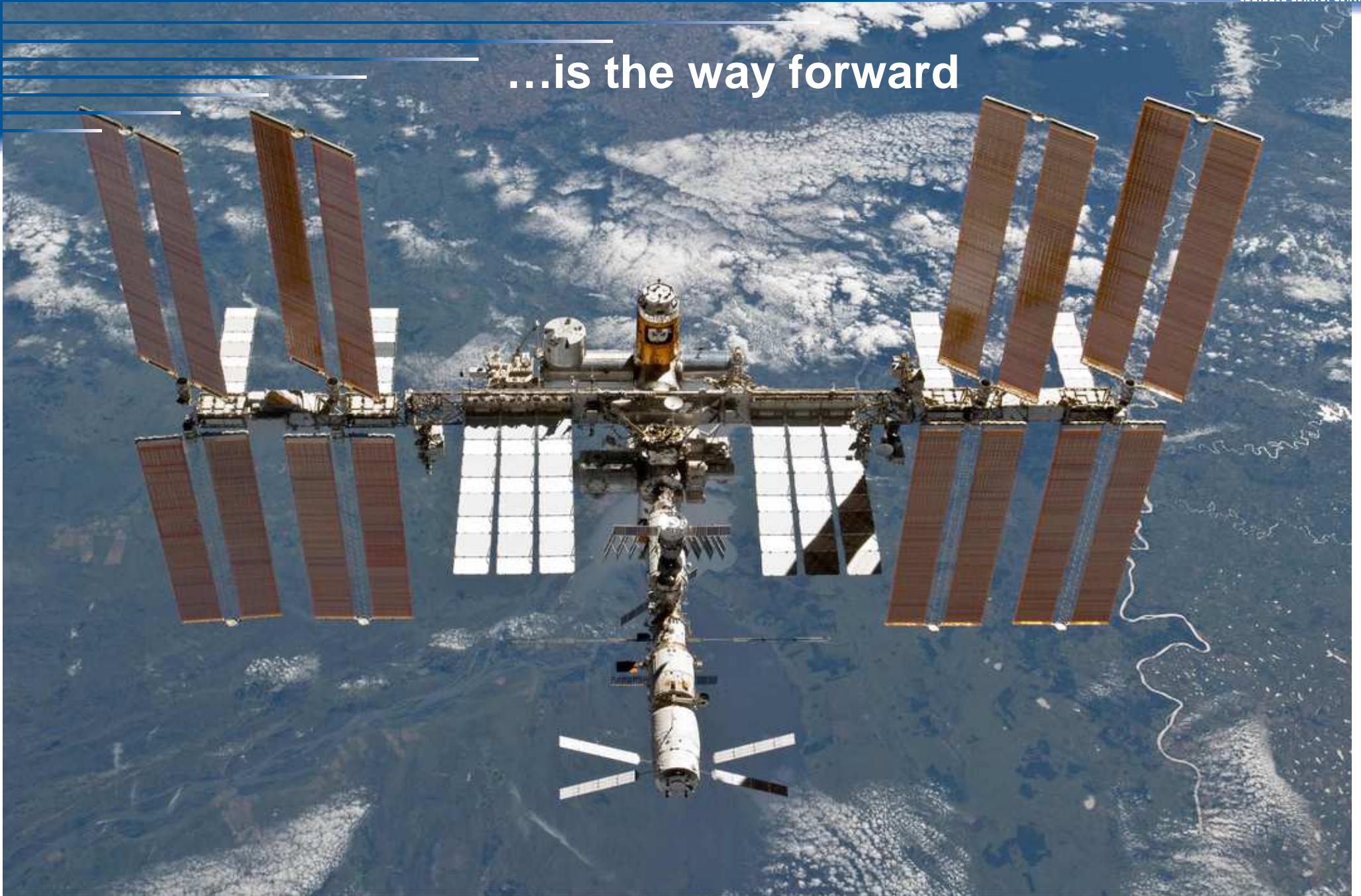
- **Strong links established between ESA and CNES and the ISS partners,**
- **Start of SVTs very early in the program with operational scenarios,**
- **Technical qualification on an independent configuration of each major evolution,**
- **Excellent training of the teams:**
 - ◆ **Simulator running the real vehicle software,**
 - ◆ **Structured training:**
 - Basic training,
 - Qualification with independent Training Instructor,
 - Acceptance of the Operational Qualification jointly by Mission Operations Director (ESA) and Flight Director (CNES),
 - Joint integrated simulations with the partners (incl. crew, even during operations for undocking).
- **Reduction of risks for the first flight: H24 manning with engineers.**

- **ATV-CC key personal involved in the project from the early phases, with a very high expertise associated to a strong motivation (individual and collective challenge).**

 - **Excellent team spirit built during the project allowed to overcome:**
 - ♦ Complexity of the ATV and the ATV-CC,
 - ♦ Operations mishaps,
 - ♦ The very intense operational periods,
 - ♦ The gap between the intensity of the docking success (with public relations impacts) and the need to continue the operations,

 - **The propulsion problem, which took place just after separation from the launcher and was successfully overcome, triggered the change from several teams to a single operational team with complementary fields of expertise...**
- ... this happened to be a major factor of the mission success.**

...is the way forward



S133E010447

Masters Forum – 21 April 2011

A large, artistic background image showing a view of Earth from space. The Earth's horizon is visible at the top, with a bright blue glow. The main body of the image shows a curved, blue and white surface of the Earth, with a bright light source (the sun) creating a lens flare effect in the lower-left corner. The text "Thank you for your attention" is overlaid in white on the right side of the image.

**Thank you for your
attention**