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
Summary

- 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)

**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.
Lessons learned

- 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.
International cooperation…

…is the way forward
Thank you for your attention