ATV-DSD

HPCN TTN Network

Boosting efficiency

Distributed interactive space systems simulation

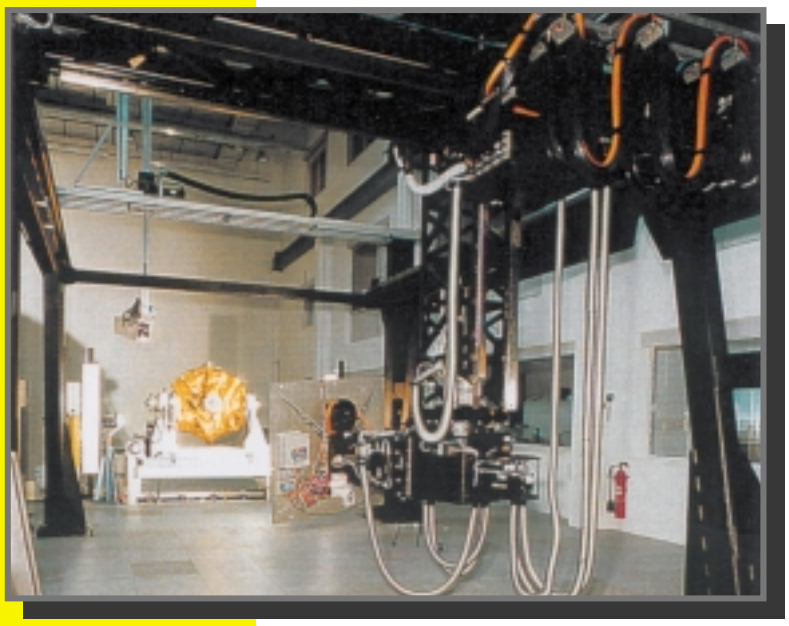
Like all systems, space systems must be tested before operational use. But the nature of their missions makes this unusually demanding - the first flight of a system immediately faces the complete operational environment. There is no possibility of limited “dry-run” testing.

Therefore, space systems contractors rely on Functional Simulation Facilities, which are essentially duplicates of the system in question, with all wiring, hydraulics, servos, and software in place. In projects involving multiple contractors, this can be very expensive, complex and time-consuming.

But there is a solution. HPCN (High Performance Computing and Networking) technology now makes it possible to distribute the simulation effort, allowing several simulators and test facilities to collaborate on joint projects. ATV-DSD is a distributed interactive simulation project that is demonstrating the viability of this concept.

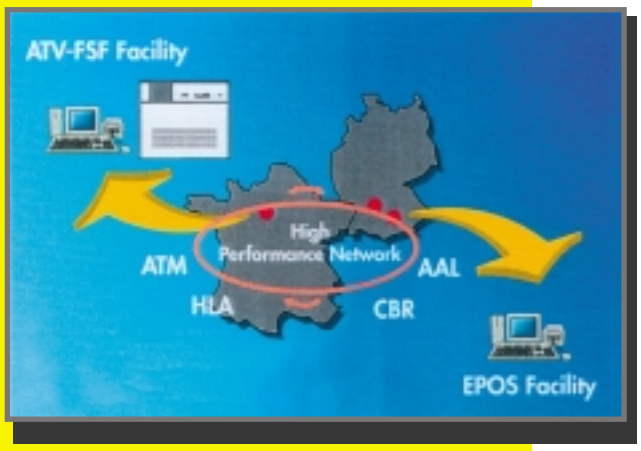
The benefits of distributed simulation are many and substantial:

- Economy through reduction of facility duplication
- Expertise access at remote sites
- Faster validation of complex systems due to more flexible use of simulation facilities
- Faster reaction to contingencies
- More realistic simulations due to easier integration of real components
- Easier cooperation among international partners

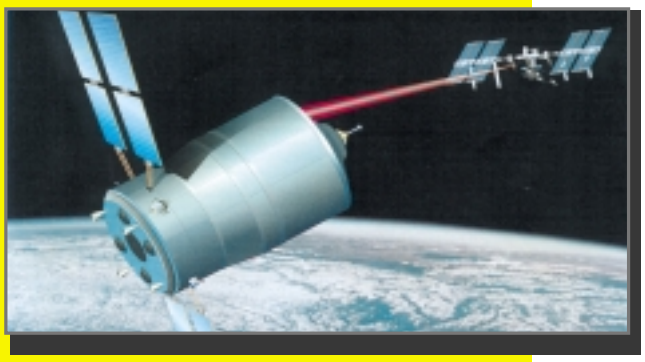


Space system testing must be rigorous and complete

Bringing it together



DSD allows joint testing at remote locations



The ATV will dock with the International Space Station

The ATV - Automated Transfer Vehicle - is a spacecraft that will dock with the future International Space Station to refuel, reboost, resupply and offload waste. DSD - Distributed Simulation Demonstration - is being used to validate the final approach and docking of the ATV. At the same time, ATV-DSD serves as a demonstrator of the technical feasibility and economic advantages of distributed simulation. ATV-DSD is an ESPRIT project within HPCN, and is co-funded by the EC. It involves Aerospatiale in France, the DLR space operations centre in Germany, and RUS (Stuttgart University).

Validation is distributed among facilities in two countries. The dynamic behaviour and relative positioning of the ATV and the space station are simulated at the European Proximity Operations Simulator in Oberpfaffenhofen, Germany, while the optical rendezvous sensor is tested in real time with the other subcomponents in Les Mureaux, France.

By eliminating duplication and maximising system utilisation, Distributed Simulation reduces costs and shortens time to market, at the same time as it enhances testing realism.

High Performance Computing and Networking Programme

The HPCN Programme is an EU initiative to make high-performance computing available for remote collaborations and distributed applications. This is supported by a pan-European network of 21 Technology Transfer Nodes (TTNs). Each TTN acts as a resource centre, providing access to the combined know-how of the entire HPCN TTN Network and contacts to firms and experts engaged in other HPCN projects. Currently some 150 projects are underway.

For more information contact http://www.hpcn-ttn.org or one of the ATV-DSD project partners:

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