



Solutions & Services

Circle 13 on reader service card (last page)

Launch success starts on the ground

The success of the Ariane 5 ECA launch on February 12 is a feather in the cap of the entire European space industry, and establishes a new standard in commercial space transportation. For Cegelec, the international technology services group that has been involved in the European space program from the outset, Flight 164 is the culmination of several years of work to adapt ground installations, in particular fluid networks, at the Guiana Space Center.

Ariane 5 ECA offers an enhanced payload capacity of nearly 10 metric tons into geostationary transfer orbit. A major advance over the basic 5G version, in service since 1996, this enables simultaneously launching two communications satellites, thereby significantly reducing launch cost.

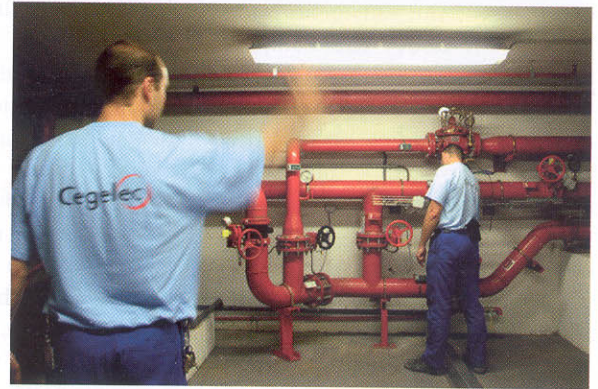
This new capability was achieved thanks to significant modifications to both the launcher (upgraded engines, propellant load) and site infrastructure.

The main cryogenic stage of Ariane 5 ECA features the Vulcain 2, a new version of the cryogenic engine, which required larger liquid oxygen and hydrogen tanks to carry an additional 16 metric tons of propellant. The upper cryogenic stage, the core of the Ariane 5 upgrade package, carries 14 metric tons of liquid oxygen and hydrogen, whereas the storable propellant stage of the basic version is loaded with just under 10 metric tons of liquid propellant (MMH and N₂O₄). In addition, the propellant load in the upper segment of the solid boosters has been increased by almost 2.5 metric tons, an extra 10%.

All of these modifications have significantly impacted the different launch complex fluid networks operated and maintained by Cegelec.

Cegelec's role

In 1999, Cegelec, an integrated international group providing technology services to the public and private sectors, signed a contract with the French space agency CNES encompassing piping and component design, supervision of installation, and performance monitoring for conventional fluid networks. The agency also commissioned Cegelec to design, build and extend operational control networks (communications, display and safety) as part of the associated instrumentation and control systems. Cegelec was additionally charged with coordinating the group of European companies respon-



▲ Modifications for Ariane 5 ECA have significantly impacted the different launch complex fluid networks operated and maintained by Cegelec

sible for installing dedicated facilities for the cryogenic upper stage.

Cegelec participated in the launch table modification program, whereby sections were added to the umbilical mast, together with cryogenic arms for filling the upper cryogenic stage.

In a re-run of its involvement in the instrumentation package for the baseline Ariane 5 program, Cegelec supplied online analyzers for Ariane 5 ECA. This specifically concerned an environmental monitoring system for launch countdown, and a purge monitoring system for the hydrogen and oxygen networks in both the launch zone and the final assembly building.

For command and control systems, Cegelec supplied two additional checkout stands (CCX 1 and CCX 2) on behalf of Alcatel ETCA for the launch zone and the two launch tables. The software used in the main checkout stands (CCO1 and CCO2) also had to be adapted to take account of the new equipment and new functionalities installed as part of the upgrade to ECA launch capability. Cegelec also designed, supplied and commissioned the DSMX, the "last-line" stand-alone personnel and equipment protection system, which interfaces with the existing system.

In addition, Cegelec was responsible for adapting the launcher integration building and final assembly building to receive the new launcher. This work included extending existing fluid systems and installing new electrical equipment for safety, monitoring and communications.

Cegelec has operated locally from its Kourou base since 1968, when the Guiana Space Center was in its infancy, and now has a presence in almost all of the member

Cegelec

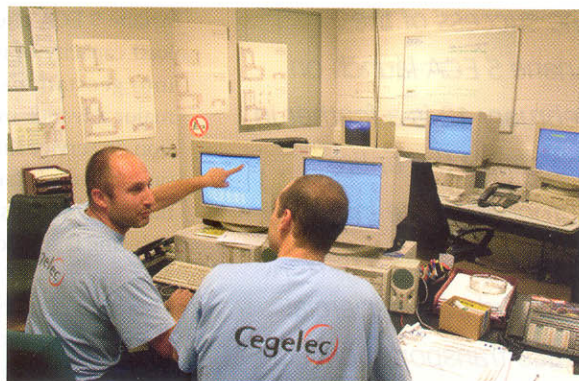
Solutions & Services

countries of the European Space Agency. In 2001, the company brought together its different European subsidiaries within a consortium called Cegelec Space (see NfP No. 52), providing them with a single, streamlined point of contact. Cegelec has contributed to the development of the Guiana Space Center, particularly through its work for the French space agency CNES and Arianespace (ground infrastructure projects, operation and maintenance

Launch success starts on the ground

of ground installations for satellites and launchers). It also provides all-trades design and monitoring services for all modifications and repairs carried out at the base.

For Cegelec and its customers, the success of Flight 164 represents the crowning achievement of the hard-working team of more than 130 technicians based at Kourou, and signals the start of a new era in the European space program.



▲ Cegelec deploys over 130 technicians at the Guiana Space Center