

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems Technologies (5)

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TECHNOLOGIES MATURATION PROGRAM H-X RESULTS

Abstract

To take up the new challenges imposed by the next re-ignitable cryogenic upper stage for A5 mid-life evolution ME or future launchers, AIR LIQUIDE has proposed to mature thermal and functional technologies for cryogenic tanks under a CNES technological program H-X. Indeed, the non-usual coasting phases in orbit up to 6 hours or even more, the thermal control of cryogenic propellant storage (LH2 and LOX) implies to use innovative thermal and functional technologies to limit the vaporized propellant losses and to ensure engine re-ignition.

Elementary and medium scale maturations have been performed from 2007 to 2009 in the frame of HXT (Technology development and testing at component and subsystem level in order to reach a TRL up to 4). To continue the maturation plan up to TRL 6, the most promising technologies matured in the frame of HXT were tested on a large scale ground demonstrator HXG in beginning 2011. This demonstrator, based on 2 elongated Ariane ECA RLOX tanks separated by a common bulkhead part, has allowed testing technologies in representative environment on ground and in altitude simulation with vacuum and solar fluxes simulation.

This paper will address the main results obtained during this technology maturation program H-X.