Paper ID: 10124
oral

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems (4)

Author: Mr. Mark Hempsell
Reaction Engines Ltd., United Kingdom

PROGRESS ON THE SKYLON AND SABRE DEVELOPMENT PROGRAMME

Abstract

SKYLON is a reusable single stage to orbit spaceplane that can take off from a runway reach low earth orbit with a payload of 15 tonnes and then return to earth for a runway landing. The key technology that enables this is the Synergistic Air-Breathing Rocket Engine (SABRE) which has both air breathing and pure rocket modes. This engines allows SKYLON to fly to over Mach 5 and an altitude of 25 km while air-breathing greatly reducing the burden on the subsequent phase of the launch trajectory which uses the less fuel efficient pure rocket mode,

The SKYLON development programme has concentrated on the SABRE engines and 2011 saw the end of the Phase 2 of the Technology Demonstration Programme. This has centred on the production and testing of a demonstration pre-cooler heat exchanger using modular elements that match those required for the flight engine.

Other engine technology related projects undertaken in Phase 2 were oxygen cooled chambers, the STRICT Expansion Deflection test engine and computer modelling of the active intake.

The SKYLON vehicle development programme has also progressed. The System Requirements Review held in September 2010 confirmed the programme's objectives together with its technical and economic viability. With these requirements established the technical evolution of the D1 configuration continued. The design work on D1 has a broader range and is going into more depth than the previous C1 studies and includes new areas such as the electrical and electronic systems and a detailed examination on the payload interface. This is consistent with the intention that the D1 configuration will be the last system level design revision for the final vehicle.

As with the engine the airframe design work has been supported by a series of technology development programmes mostly centred on the structure and thermal protection system.

The recent progress on both SKYLON and SABRE have kept the development programme on schedule for vehicle commercial operations to start in 2020.