Spaceplane that takes off from airport runway could be ready in 10 years

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Skylon takes off and lands on a normal runway, reducing the launch cost. Image credit: Reaction Engines.

(PhysOrg.com) -- An unpiloted, air-breathing spaceplane that takes off from an airport runway, carries up to 30 passengers, and costs less than one-tenth to launch into space compared to a conventional rocket could be ready to fly in 10 years, according to its developers, Reaction Engines of Oxfordshire, UK. Although the spaceplane is currently in the proof-of-concept phase, the country's new UK Space Agency is hosting a workshop this week to discuss developing the spaceplane commercially. If successful, the spaceplane could be the first single-stage-to-orbit craft to reach orbit.

The spaceplane, called Skylon, is 82 meters long and has a 25-meter wingspan. Like an airplane, the spaceplane takes off and lands horizontally from a typical airport runway. Traveling at speeds of up to

Mach 25, the vehicle could reach altitudes of 460 km (285 miles). It could carry payloads of up to 12 tonnes (twice that of a normal rocket), as well as about 30 passengers.

Skylon has no external rockets, but is propelled by two hybrid air-breathing/rocket engines that burn liquid hydrogen and liquid oxygen. In the first phase, the vehicle combines air from the atmosphere with on-board liquid hydrogen to reach speeds of Mach 5.5. In the second phase, on-board liquid hydrogen and liquid oxygen propel the vehicle to orbital velocities of Mach 25. Before take-off, the spaceplane weighs 275 tonnes, but only 55 tonnes when landing. The weight difference is due to the on-board fuel: at take-off, the vehicle carries about 66 tonnes of liquid hydrogen and 150 tonnes of liquid oxygen. Before re-entering the atmosphere, any unused liquid hydrogen is evaporated and vented overboard, since re-entry is easier for lighter vehicles.

It will cost an estimated $12 billion to develop the spaceplane (about the same amount that it costs to develop an Airbus jet). It would cost an additional $10 million per launch, compared to the approximately $150 million cost of a rocket launch. The company predicts that a trip to orbit for two weeks would cost tourists about $500,000 per seat.

Skylon can reach speeds of up to Mach 25 and altitudes of up to 460 km (285 miles). Image credit: Reaction Engines.

For these reasons, Reaction Engines expects that Skylon could replace the space shuttles that travel to the International Space Station, as well as revolutionize space travel and offer the potential for space-based industry. The company predicts that there is a market for up to 70 reusable Skylon spaceplanes worldwide.

"You can imagine a situation when some of our industrially important but polluting processes are done in space and the finished products are brought back down to Earth," said Richard Varvill, technical director and one of the founders of Reaction Engines.

More information: reactionengines.co.uk
via: The Engineer and Daily Mail

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