

Sabre hybrid rocket-jet engine

BAE Systems has bought a 20% stake in a company developing a radical engine that could propel aircraft into space. The *Sabre* hybrid rocket/jet engine is designed to launch satellites at a fraction of current costs

SKYLON SPACEPLANE

SOMA: Orbital manoeuvring engines

Ceramic aeroshell

Canards: Provide extra stability

Twin Sabre engines: Hydrogen mixed with oxygen scooped from atmosphere. As air density falls, engines switch to full rocket mode using onboard liquid oxygen

Liquid oxygen tanks

Auxiliary propellant

SOMA propellant

Liquid hydrogen tank

Payload bay
Can carry satellites or 40 passengers

Liquid hydrogen tank

Length: 83 metres **Top speed:** Mach 5.5 in atmosphere, Mach 25 in orbit

Fuel use: 80 percent less than standard rocket **Launches:** 200 per vehicle

SABRE (Synergistic Air-Breathing Rocket Engine)

Bypass burners
Excess hydrogen burned off

Compressor
Air compressed before mixing

Precoolers: Fine pipework extracts heat and drops air to -140°C in 0.01 seconds

Hot air

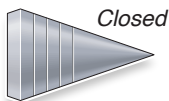
Rocket engine nozzles

Combustion chamber: Fuel mixture burned

Air intake cone
Closes when in conventional rocket mode



Open



Closed