

SpaceShipOne...The First Private Manned Space Program

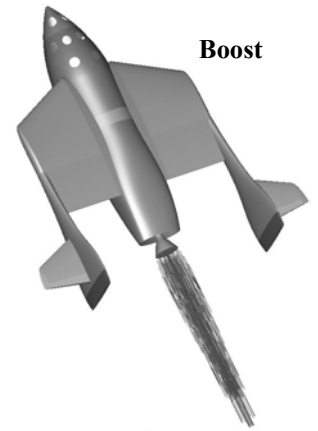
Goal is Affordable Sub-orbital Space Flight

Scaled began designing concepts for sub-orbital manned spacecraft in 1996. In April 2001 an extensive development program began.

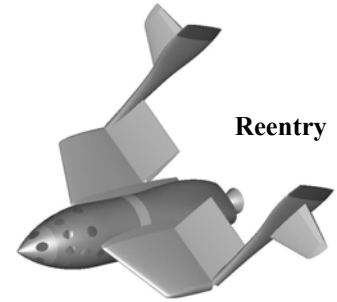
- **White Knight** - An airborne launch aircraft provides safety and performance. Ground-level rocket launches are considered too risky, and a ground-launched ship needs to be twice the weight of one launched at 50kft altitude. The White Knight's cockpit and systems are identical to the spaceship, allowing component flight-qualification testing and realistic pilot training.
- **SpaceShipOne** - A three-place, high-altitude research rocket, designed for sub-orbital flights to 100 km altitude. The unique configuration allows aircraft-like qualities for boost, glide, and landing. The ship converts (pneumatic-actuated 'feather') to a stable, high-drag shape for atmospheric entry. This "Care-Free" configuration allows a 'hands-off' reentry and greatly reduces aero/thermal loads. Designed for a 'shirt-sleeve' environment, the 60" diameter cabin has a space-qualified ECS and dual-pane windows. The ship uses three flight control systems - manual-subsonic, electric-supersonic and cold-gas RCS.

- **Hybrid Rocket Motor** - A new non-toxic liquid-nitrous-oxide / rubber-fuel hybrid propulsion system was developed specifically for SpaceShipOne. Its unique design simplifies mounting and reduces leak paths. The composite nitrous tank and case/throat/nozzle components were developed at Scaled, with Thiokol providing the tank's filament wound over-wrap, and AAE Aerospace supplying the ablative nozzle. Development of the 'rocket science' (fuel, bulkhead, controller, valve, injector, igniter and ground test program) is being competed with two rocket motor developers - eAc (Environmental Aeroscience Corp of Miami) and SpaceDev of San Diego.
- **Mission Control** - A mobile ground station is used to monitor rocket motor tests and all flight tests. Staffed with flight test engineers, it provides real-time T/M data monitoring & recording of flight parameters. The spaceship's avionics displays are duplicated on a Mission Control monitor.
- **Simulator** - A research tool for aerodynamics and avionics, the simulator provides realistic pilot and engineer training. Video monitors at each window provide all-aspect views of boost, black-sky space, reentry, and landing. The simulator has the same avionics as the White Knight & SpaceShipOne.

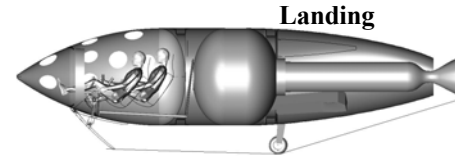
- **Avionics** - A new INS-GPS Nav/Flight Director provides the pilot with the precise guidance information he needs to manually fly SpaceShipOne for boost and reentry. It also provides guidance for approach and landing and vehicle health monitoring. The unit stores flight test data and telemeters data to Mission Control. This system is developed jointly by Scaled Composites and FunTech (Fundamental Technology Systems of Orlando).
- **MONODS** - A mobile tanker is used for servicing liquid Nitrous Oxide to the spaceship and to the TST.
- **TST** - A mobile 'Test Stand Trailer' is used for instrumented, ground-based hot fire testing of the rocket motor. All development firings have used actual spaceship flight components including the nitrous tank and adjacent fuselage structure.



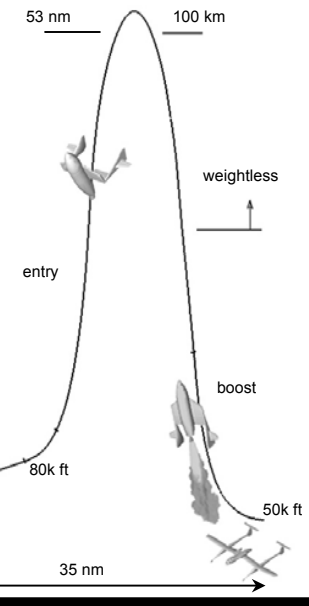
Boost



Reentry



Landing



Thermal and Aero Analysis

