Spacefaring Logistics Infrastructure Fact Sheet

1. System name: Aerospaceplane (Gen 1.5)
2. Infrastructure phase deployed: 1
3. Function: Provide transport to low Earth orbit (LEO) for SBSP assembly components and related cargo; provide transport for passengers.
4. 2007 Technology Readiness Level: 5-9; requires improved orbiter thermal protection system and increased engine life.
5. Description:
   - Fully-reusable, two-stage booster-orbiter system.
   - Vertical takeoff / horizontal landing; rocket-propelled.
   - Cargo carried internally in orbiter.
   - Orbiter is able to land with cargo.
   - System operates unmanned.
   - Similar to Gen 1 Aerospaceplane; new orbiter optimized for SBSP component delivery.
6. Technical notes:
   - This is a block update to the Generation 1 aerospaceplane.
   - The booster is updated to: reduce weight; add increased-life engines; and, incorporate design changes and technologies to reduce recurring costs and increase time between system and subsystem inspections.
   - The orbiter is redesigned to: reduce weight; add increased-life engines; incorporate design changes and technologies to reduce recurring costs and increase time between system and subsystem inspections; and, change the payload carriage from external to internal. The orbiter is optimized to carry SBSP components.
   - The gross weight of the system will be comparable to that of the Generation 1 aerospaceplane.
   - After the safety of the system has been demonstrated, a passenger transport module would be carried in the payload bay or a separate version of the orbiter produced with an integrated passenger compartment.
7. Technical data (targets):
   - Gross weight: ~3 M lb
   - Booster empty weight (booster): ~225,000 lb
   - Orbiter empty weight (w/o payload or passenger module): ~80,000 lb
   - Staging velocity: ~10,000 fps
   - Booster T/W: 1.35

   - Orbiter T/W: 1.27
   - Booster length/diameter: ~140 ft/~23 ft
   - Orbiter length/diameter: ~120 ft/~16 ft
   - Net payload (270 nm @ 28.5°): ~30,000-50,000 lb
   - Payload fraction: ~1-1.7% (270 nm @ 28.5°)
   - Booster/orbiter propellants: LOX/kerosene
   - Booster no. of engines: 4
   - Orbiter no. of engines: 4
   - Booster /orbiter nominal maximum engine thrust setting: 92%
   - Cargo size: 15 ft diameter x 30 ft length; average component density at 30,000 lb weight is approximately 6 lb per cubic ft
   - Turn-around time per system (IOC): 1 week following orbiter landing
   - Turn-around time per system (FOC): 3 days following orbiter landing
   - Vehicle life: 2,000 missions (excluding engines)
   - Main engine life: ~100 missions
   - Thermal protection system: ~250 missions

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