

Spacefaring Logistics Infrastructure Fact Sheet

1. Infrastructure phase: 1

2. Phase description: Establish routine low Earth orbit (LEO) access

3. Capabilities deployed:

- Provide routine and frequent access to and from LEO for passengers and cargo with “aircraft-like” safety and operability
- Provide transport to LEO for heavy and oversize cargo

4. Systems deployed:

- Aerospaceplane (Generation 1): Two-stage-to-orbit (TSTO), fully-reusable, rocket-powered, capable of transporting cargo in an external cargo container and passengers in a small passenger spaceplane. The two-stage system is comprised of the booster and the orbiter.
- Aerospaceplane (Generation 1.5): Block-upgrade to the generation 1 system to improve safety and operability to decrease turn-around time and recurring operational costs.
- Shuttle-derived spacelifter: Updated version of the 1970’s concept of an unmanned, Saturn V-class launch system; capable of transporting large and heavy payloads to LEO as well as multiple Generation 1 aerospaceplane cargo containers.

5. Acquisition concept:

- Focus the Generation 1 aerospaceplane and Shuttle-derived spacelifter on the utilization of currently available technologies (Technology Readiness Level 6-9 on the NASA TRL scale).
- For the aerospaceplane, develop using “aircraft-style” engineering principles, practices, and systems engineering processes to incorporate the essential design and operational features needed to achieve “aircraft-like” safety and operability. This approach is intended to enable the system to achieve an airworthiness certification necessary for the routine transport of passengers.
- For the Shuttle-derived spacelifter, update the 1970’s design for a vertically-stacked launch system to employ reusable fly-back boosters, based on the Generation 1 aerospaceplane’s booster, and new core propellant tanks, based on updated spin-forming manufacturing processes for lower-cost, faster component assembly. Design the core propellant tanks and the associated tank manufacturing

processes to enable these tanks and variants of these tanks to be used on-orbit as unpressurized and pressurized habitat modules.

- Focus the Generation 1.5 aerospaceplane on pre-planned improvements that enable an updated system to be fielded within approximately five years of the start of Generation 1 aerospaceplane operations. The updated version of the orbiter will encompass an internal cargo bay that can be used to transport containerized cargo or a passenger compartment.

6. Aerospaceplane operational concept:

- The aerospaceplanes will be owned by a new Federal Government Corporation functioning as a Spacefaring Logistics Infrastructure Commission.
- Once delivered to the commission, the aerospaceplanes will be leased to private spaceline operators. These operators will “sell” space access for passengers and cargo to federal government agencies as well as to the commission to support in-space infrastructure operations.
- Excess capacity will be sold by the operators on the open market, subject to federal approval. By retaining ownership, the commission can ensure appropriate maintenance of airworthiness and configuration control.
- The aerospaceplanes will be maintained in a Civil Reserve Spacelift Fleet to provide, when determined by the president, the ability to be operated under the control of the Department of Defense (DOD). DOD may also operate the aerospaceplanes on missions requiring direct military operational control. For this purpose, the spaceline operators will provide a designated operational capability using military reserve personnel.

7. Shuttle-derived spacelifter operational concept:

- The spacelifters will be delivered by the manufacturer to a designated operator that, like the current Space Shuttle, is responsible for the mission preparation and payload integration. This responsibility will also include actual launch operations.
- The spacelifter boosters will be maintained by the aerospaceplane spaceline operators and provided to the spacelifter operator for integration.