Sierra Nevada Corporation- Access to Space: Dream Chaser and Inflatable Habitat

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20 November 2019
SNC AND SPACE EXPLORATION

ISS Primary Platform for Human Habitation

Dream Chaser for Cargo and Crew Transportation

Gateway Logistics Services

Free Flying Dream Chaser for Science

New Commercial LEO Platform(s)

NASA Gateway

Reusable Lunar Lander

In-Situ Resource Utilization

Dream Chaser for Low g payload return to Runway

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Space Exploration Systems

Crewed and Uncrewed Dream Chaser Space Vehicle

- Cargo Services to ISS
- Science
- Servicing
- Observation
- Exploration Support

Space Transportation & Space Missions

Commercial LEO and Deep Space Missions

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Dream Chaser Vehicle

• Only runway-landing Space Vehicle actively in development
• Crewed or un-crewed transportation to and from Low Earth Orbit (LEO)
• Non-toxic propulsion for launch abort, orbital translations, attitude control, deorbit
• < 1.5g re-entry profile and >1,500 km cross-range capability
• Designed to launch on a variety of launch vehicles
• Can land at any runway that supports a B737 or A320 aircraft.
• Basic runway landing
  Nominal 3,000 meter
  >1,000 nmi cross-range capability
• Tri-landing gear configuration:
  Two main landing gear with wheels
  One nose landing gear with a nose skid
Cargo Configuration for NASA CRS2 Program
Cargo Up to Space Station, Disposal and Rapid Cargo/Science Return
Free Flyer Configuration

Key features
- 30 – 90 days LEO orbits
- 5500 kg upmass, 1750 kg downmass
- Late access prior to launch
- Low g reentry and soft runway landing for return
- Fast access upon return

Payload & rideshare accommodations
- Pressurized internal 35+ mid-deck locker (MDL) equivalents
  - 2 ft³
  - 33 kg, 75 W average power per
- Unpressurized external and deployment (ESPA, Cubesats)
  - 3 locations, > 7 m³ total & 450 W
- Conformal passive

Utilities service
- Deployment
- Power- > 6 kW total across payloads
- Thermal management- > 10 kW rejection from payloads
- Communications- X / Ka, 51 / 200 minutes per day, command & 1 Gb downlink per payload per day
Designed for Science Missions

- Selection of:
  - Launch Vehicle
  - Desired Landing Site
  - Orbit and Inclination
  - Mission Duration
  - Standard or Customized Hardware
  - Crewed, Uncrewed, or Tele-operational
- Frequent Flight and Re-Flight Opportunities
- Expedited and Cooperative Payload Integration
- Flexible Operating Requirements and Environments
- IP Control
Free Flyer CONOPS

- Up to 35 powered payloads operating in orbit
- Deploy unpressurized payloads at beginning or end of mission

Integration & Launch using Compatible Launch Vehicle

Return Payload Unloading

Return to any runway, 3000m length x 45m width
Dream Chaser Orbital Vehicle Integration

Pressurized Vessel arrived last month to the SNC Louisville-Taylor facility in Colorado

Integration has already started
Flights schedule

**CRS2 first flight -> 2021**

**Free Flyer**
Orbital Space Mission in support of the SDGs
- Responses to Landing Site CFI due by April 2020
- AO -> Stay Tuned
- Mission Execution -> 2024
LIFE Inflatable Module

Credit: Sierra Nevada Corporation
**LIFE Element**

- Inflatable soft goods structure with rigid core
  - Internal attachment on both rigid structure and soft goods
  - Provides excellent radiation protection and secondary radiation shelter
  - Flexible to launch on 5-meter commercial LV or SLS

- Inflatable design provides ample space for all planned Gateway activities including:
  - On-board experimentation
  - Crewed and Autonomous Operations
  - Dedicated and independent work stations for lunar surface ops

- Single habitat supports functions needed for crewed missions
  - Pressurized volume of ~300 m³
  - Allows for 4 crew habitation

- Supports crewed missions
  - LEO Destination
  - Lunar Orbit
  - Designed to support 1100 day Mars class missions
LIFE Inflatable Module Hallway and Work Stations
LIFE Inflatable Module Sleeping Quarter
Thank you
Questions?

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