SNC Commercial ISS Programs Overview

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John Curry/SNC Senior Director, Dream Chaser Program Director
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Dream Chaser Space Vehicle

- Only runway-landing Orbital Space Vehicle
- Crewed or uncrewed 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 > 700 mile cross-range capability
- Designed to launch on a variety of launch vehicles
- Proposed both for the NASA’s Commercial Crew Program and Cargo Resupply Services 2 (CRS2) Program
Dream Chaser Development History

• **1983-95**: NASA Langley development of HL-20 (based on BOR-4)

• **2005-10**: SpaceDev (later SNC) modified HL-20 into Dream Chaser spacecraft

• **2010-14**: SNC awarded 4 NASA contracts to develop a crew vehicle. Performed first flight test of the Engineering Test Article (ETA) at Edwards AFB, Oct 2013

• **2014-15**: SNC modified Dream Chaser spacecraft into a cargo system for NASA’s CRS2 program

• **2016-17**: SNC wins CRS2 Contract, performs second ETA flight test at Edwards AFB, Nov 2017 NASA awards SNC its first mission under the task order contract for launch in 2020/2021

• **2018**: Dream Chaser Cargo System (DCCS) passes its Critical Design Review (CDR) with NASA in October, and is cleared to begin production, Passes NASA Cargo Demonstration Milestone

• **2019**: SNC begins Dream Chaser #1 (DC-1) and Cargo Module Assembly Integration & Test (AI&T), SNC SAA with NASA Commercial Crew Program (CCP) for crewed mission design continues to 2022
Dream Chaser Flight Test Vehicle at Edwards AFB (2017)
Approach and Landing Flight Video
• CRS2 Contract ($14B total for 3 providers) in place for minimum 6 Cargo Missions to ISS thru 2024
• First CRS2 Mission Order ATP’d for 2021 launch
• SNC successfully completed final integrated system CDR Oct 2018
• Development jointly funded by NASA and SNC

Only Vehicle that provides Delivery, Disposal and Return on Every Flight
Spacecraft Summary
Dream Chaser Cargo System Features

Uncrewed Dream Chaser (UDC) Spaceplane

Pressurized Cargo Delivery and Return

Cargo Module (CM)

Pressurized and Unpressurized Cargo Delivery and Disposal

Pressurized/Unpressurized Upmass: 5,500 kg
Pressurized Return: 1,850 kg
Pressurized Disposal: 3,477 kg
Unpressurized Disposal: 1,500 kg

Safe and Flexible: Gentle reentry, lands at ANY major runway, non-toxic propulsion

Responsive: Immediate post-land access to full payload

Affordable: Highly reusable (15x), broad commercial services

Flexible: Cargo Disposal + return, stows in 5m launch fairings

Mature: Leverages 40+ years of Shuttle/X-plane experience
Dream Chaser Progress
Range of Dream Chaser Missions

Free Flying, Science, Remote Sensing & Technology Test

On-Orbit Robotic Deployment, Servicing, Assembly & Repair

NASA Commercial Cargo Services

CRS2 Cargo Missions
- Guaranteed 6 Missions to ISS 2019-2024.

CRS3 for ISS Extension or Commercialization of LEO
- Another 12-18 missions to 2030

Additional missions for ESA, UN, Interagency, and Commercial customers

Crewed Missions

 Exploration Support
The SNC Gateway is a flexible, modular architecture designed to support crewed or autonomous operations in cis-lunar space.

- Our solution can be assembled using SLS and/or commercial launches and features three unique platforms.
- The building block approach provides for incremental build up and test, and evolution of in-design elements and subsystems.
- The modular architecture supports buildup, test and deployment of the Deep Space Transport (DST) through reuse of elements.
- We minimize development costs by extensive re-use of CRS2 components and subsystem technology, and AEPS technologies.
- Our full-scale ground prototype will confirm the proof-of-concept, demonstrate interfaces between core technology elements and create a “walk through” experience that fosters program adoption by government seniors.

The Gateway is envisioned to prove critical technologies for a human-tended, cis-lunar outpost for future lunar and deep space exploration.
SNC Elements Provide Maximum Flexibility for Gateway Buildup

- Four elements of SNC architecture continue to meet lunar Gateway needs
- Preserves extensibility to long duration Mars class mission
- Provides both launch and on-orbit operation flexibility
COOL DREAM CHASER VIDEO LINKS

HTTPS://VIMEO.COM/254581500  -  DREAM CHASER FLIGHT TEST ALT-2 (GREAT DAY TO FLY)

HTTPS://VIMEO.COM/327799680  -  DREAM CHASER COLOR CHANGE

HTTPS://VIMEO.COM/315964682  -  SNC VORTEX ENGINE

HTTPS://VIMEO.COM/324400568  -  SNC GATEWAY ARCHITECTURE OVERVIEW

HTTPS://VIMEO.COM/328034447  -  GATEWAY TIME LAPSE WITH EXPLANATION

HTTPS://VIMEO.COM/327831491  -  SPACE TECHNOLOGIES SYSTEM 2018 ACHIEVEMENTS

HTTPS://VIMEO.COM/321877007  -  SNC CARGO MODULE TIME LAPSE

HTTPS://VIMEO.COM/320333152  -  SNC MILESTONE 5 TESTING
Questions?

www.sncorp.com