

HUMAN SPACEFLIGHT SYMPOSIUM (B3) Commercial Human Spaceflight Programs (2)

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THE DREAM CHASER® PROGRAM'S PATH TO CREWED MISSIONS

Abstract

The Dream Chaser® spacecraft, designed and built by Sierra Nevada Corporation (SNC), is a commercial, reusable, multi-mission space utility vehicle (SUV) capable of uncrewed or crewed missions to low-Earth orbit (LEO) and gentle runway landings throughout the world. While initially designed to transport NASA astronauts to and from the International Space Station (ISS), the Dream Chaser Cargo System variant, selected for the NASA Cargo Resupply 2 (CRS2) contract, was optimized for the transportation of cargo by removing the dedicated crew support hardware. However, the Dream Chaser Space System variant remains a safe and affordable crew transportation option. Maintaining the capability to carry crew is a priority as the design matures and protects the ability to later upgrade the vehicle. This includes additional safety considerations, adherence to human rating requirements, and crewed operational philosophies which play a large part in safe and successful human space flight missions. Infusing these values and processes early not only benefits current cargo missions, but ensures a seamless evolution to crewed missions in the future.

SNC has been working with potential customers to explore several different crewed mission options. These customers have varying interests, but can be generally classified into a few focused mission types: crew rotation to a LEO destination, short duration extravehicular activity (EVA) support flight, medium duration free-flight, and a small crew-tended space station. This core set of mission types allows designers to assess the different capabilities needed to achieve them during the development phase. The goal is to develop a crewed Dream Chaser Space System that has the ability to perform a short duration mission and identify future modifications for a Dream Chaser Cargo Module-derived space station and longer crewed mission durations.

The Dream Chaser spacecraft is a safe, affordable, flexible, evolvable, and reliable (SAFER) crew transportation system and includes unique capabilities that inherently provide superior benefits for crewed missions, including low-g reentry and runway landings. The evolution from the uncrewed Dream Chaser Cargo System to the crewed Dream Chaser Space System will require additional systems, new capabilities, and significant testing that are outlined in this paper on the Dream Chaser path to crew.