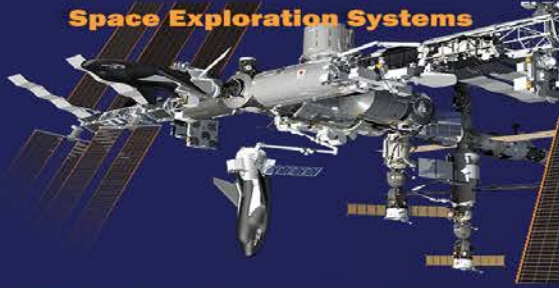
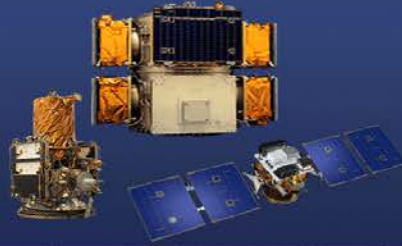


Space Exploration Systems



Spacecraft Systems



Propulsion Systems



Space Technologies



**Sierra Nevada Corporation Space Systems
SPACE 2016
14 March 2016**

Sierra Nevada Corporation's Space Systems



A Proven Pedigree with Extensive Capabilities

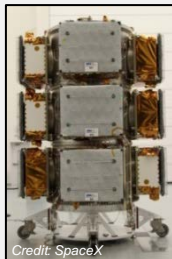
- **26 Years** of Space Flight Heritage
- **430+** Space Missions Supported
- **4,000 Products** Delivered with On-Orbit
- **Launching ~Every 3 Weeks**
- **70+ Successful NASA Missions** and Supplier to Flagship Space Programs
- **Space Relationships** in over 20 countries
- **Certified** to all three industry quality and safety standards
- **Trusted provider** of engine technology and advanced space science habitats



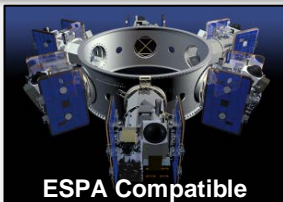
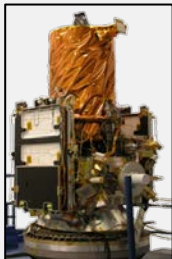
Spacecraft Systems



Constellation Mission Design and Satellite Production



Earth Observation



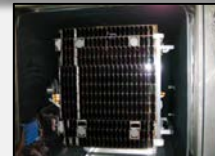
Space Technologies



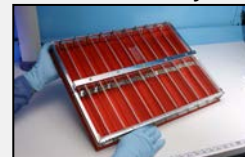
Pointing & Motion Control



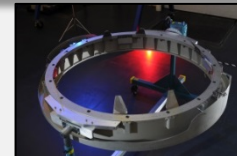
Adapters & Separation Systems



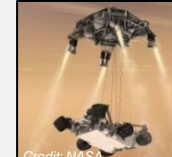
Electrical Power Systems



Thermal Control



Berthing & Docking



Electro-Mechanical

Space Exploration Systems

Dream Chaser® Space Utility Vehicle
For Low Earth Orbit Missions

NASA Commercial Cargo Services



Crewed Missions



Free Flying, Science, Remote Sensing & Technology Test



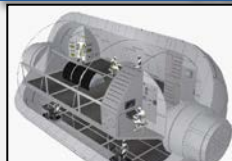
On-Orbit Robotic Deployment, Servicing, Assembly & Repair



Human Spaceflight & Exploration Support



Orbital Technologies Corp. (ORBITEC)*



Automated Science & Payload Systems
Bio-Products & Bio-Production Systems

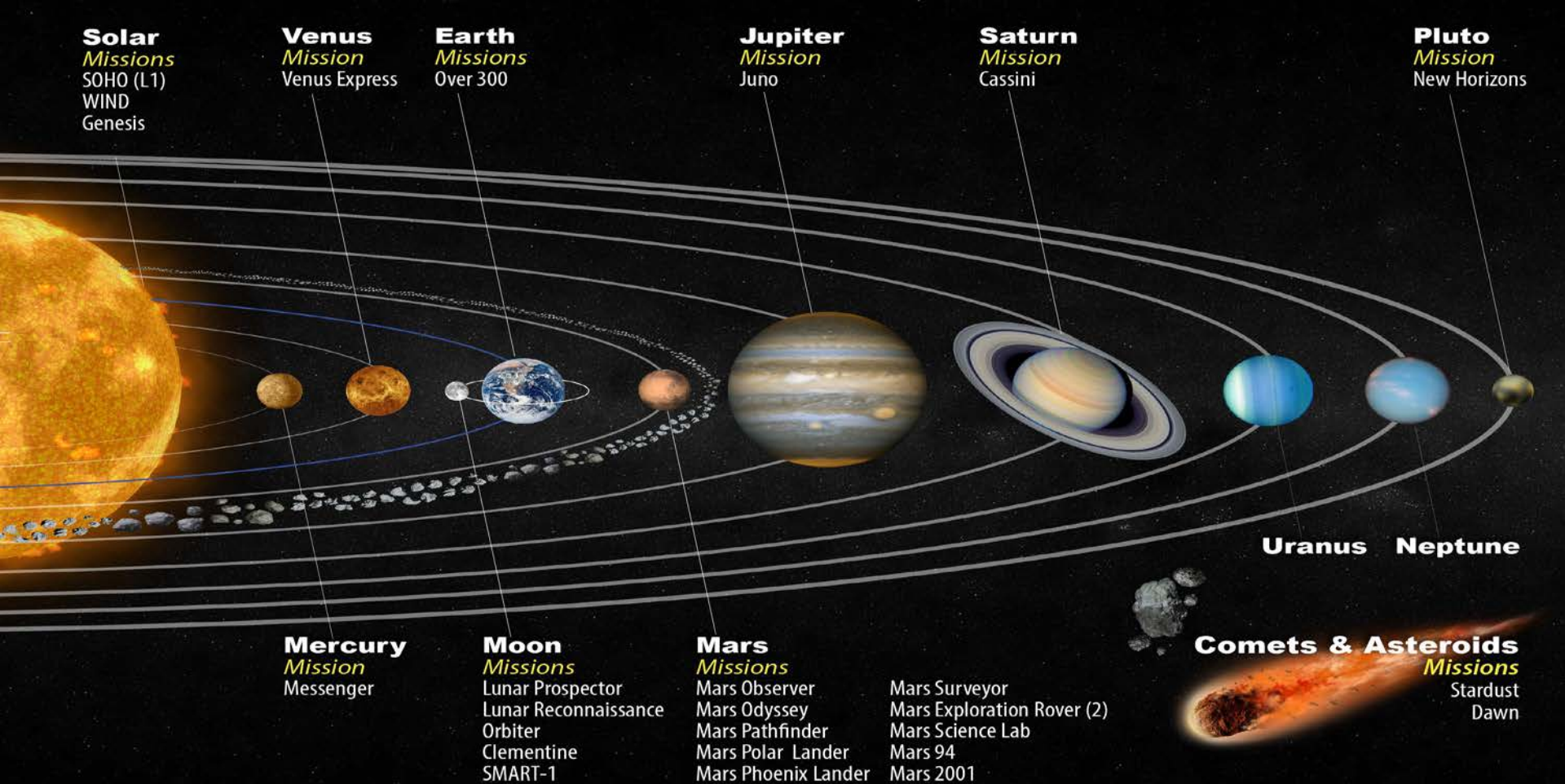


Environmental Control, Life Support, & Thermal Systems

High Efficiency Fire Suppression Systems



Orbital & Suborbital-RCS Engines, Boost & Upper Stage Engines



Sierra Nevada Corporation's Presence in Space

Over 4,000 devices flown on over 400 missions!

©2016 Sierra Nevada Corporation



Compatible with a Range of Propellants

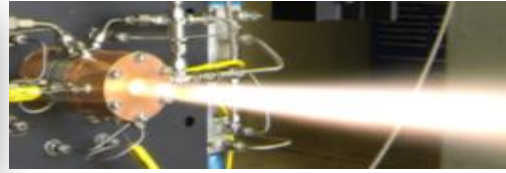
We Customize to the Mission



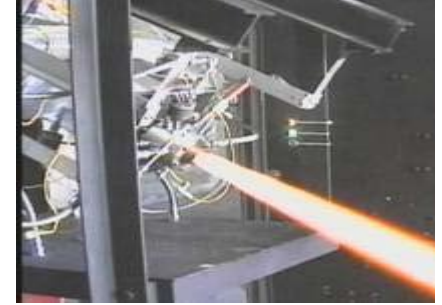
GOX/GH₂



GOX/GCH₄



N₂O/Propane



LOX/GH₂



LOX/RP-1



N₂O/Propane



VEGGIE/VEG-01 First Flight



In recognition for your superior effort on the VEGGIE/VEG-01 Team,
this article was flown aboard SpaceX-4 to ISS from
September 21, 2014 through October 25, 2014.



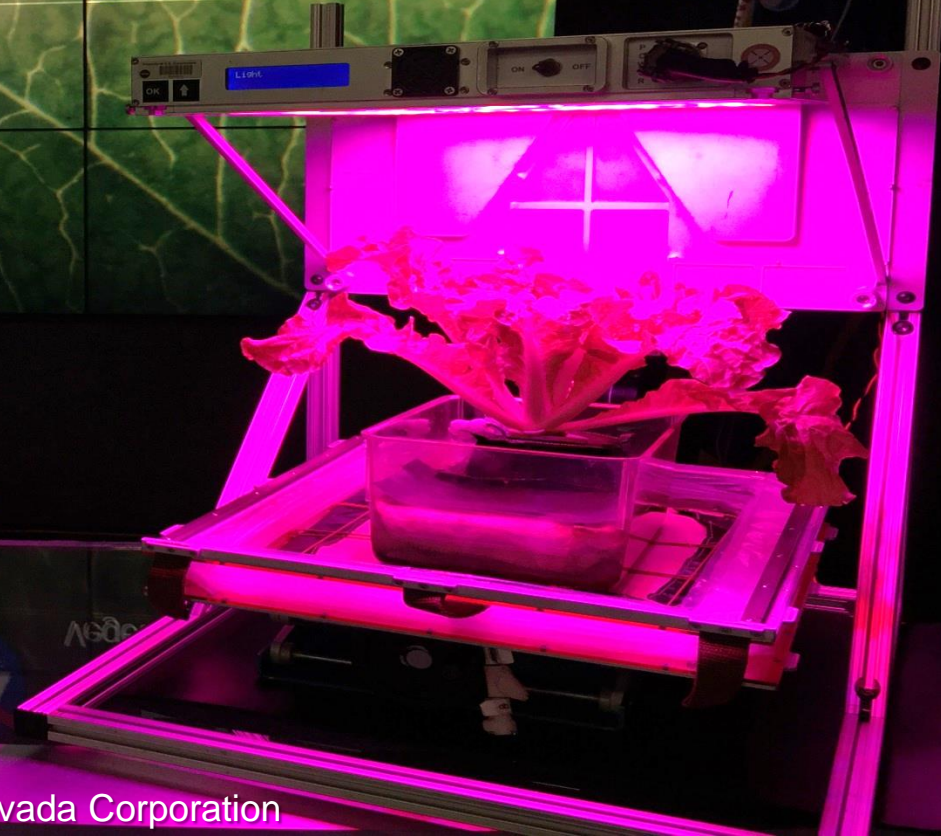
46 of 198

Flight Operations and
Support Award
provided to
ORBITEC, NASA
team and individuals
for the successful
flight support of
VEGGIE as well as
Crew Operations



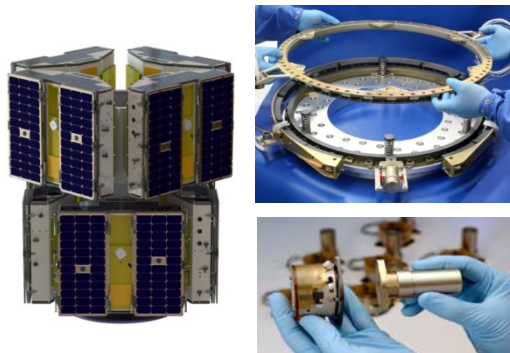
VEGGIE

Vegetable Production System



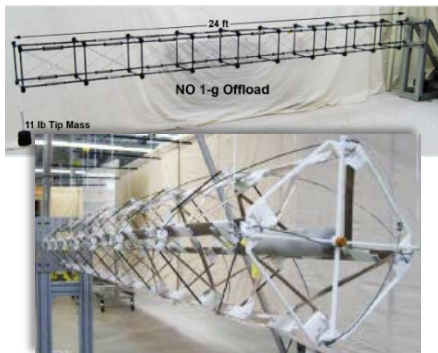
Space Technologies Product Offering

Launch Adapters & Separation Systems



Payload Adapters • Multiple Satellite Dispensers
Clamp-bands • Hold Down & Release Mechanisms

Deployable Structures



Jackscrew Linear Boom • K-Truss Boom
Large 3-D Space Structures

Pointing & Motion Control



Gimbals • Actuators • Motors
Twist Capsules • Integrated Pointing
Subsystems
Open/Closed Loop • Drive Electronics

Electrical Power



Solar Arrays • Cell Lay-down • LAPSS testing
SADM • SADE • Battery Cell Shorting
Devices • Integrated Power Subsystems

Docking & Berthing Systems



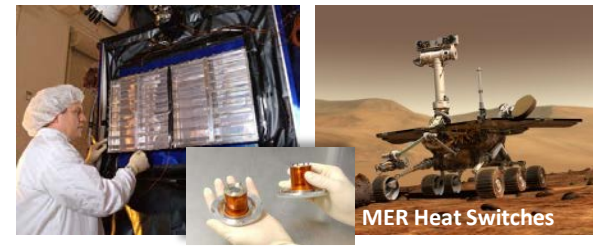
Satellite Docking Systems
Common Berthing Mechanisms

Flight & Thrust Vector Control

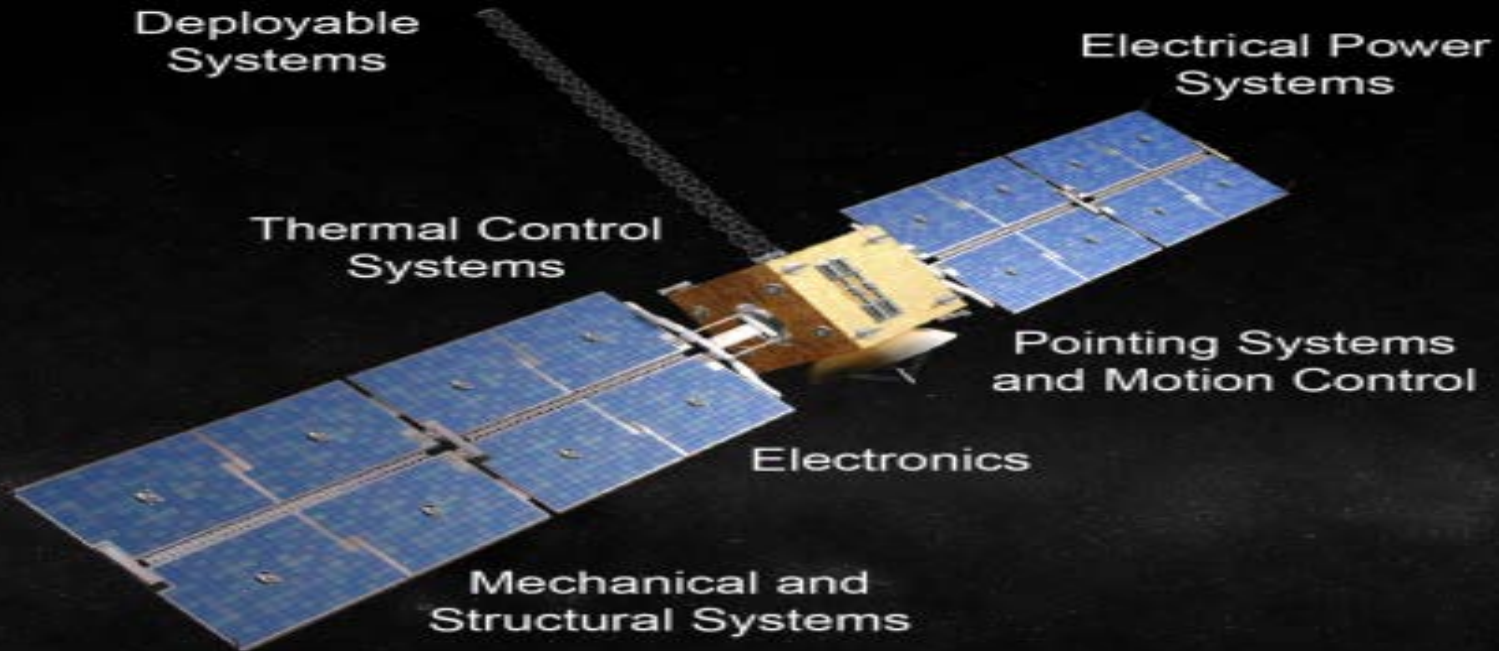


FCAS & TVC Linear Actuators
Electronic Control Units

Thermal Control Devices



Thermal Louvers • Heat Switches

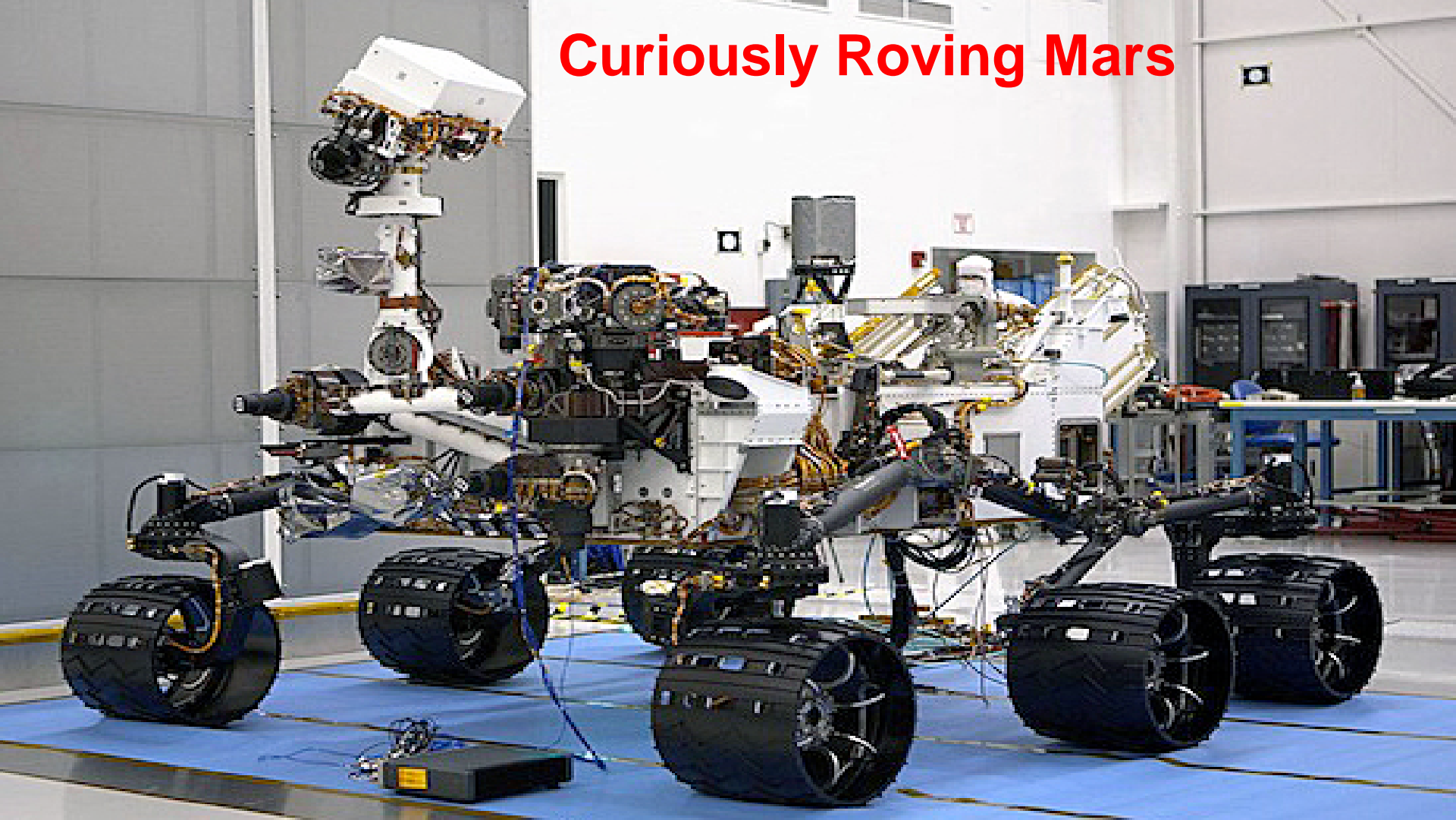


Space Technologies Products

Launch Support
Products and Services

Docking and
Berthing Systems

Curiously Roving Mars



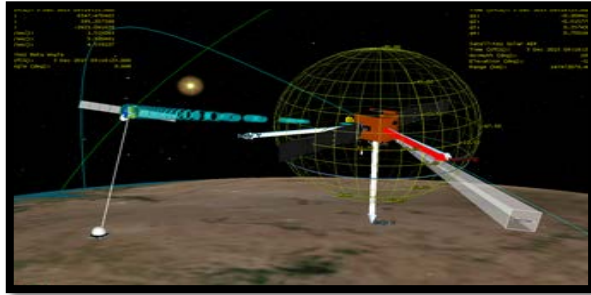


Orbital's Cygnus Vehicle SNC Built Common Berthing Mechanism

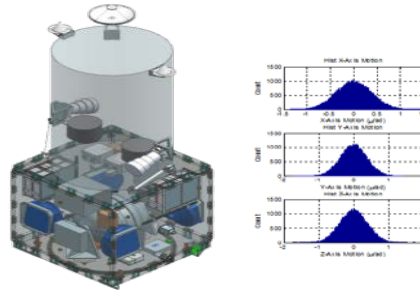




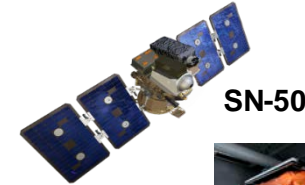
Full Service Satellite Mission Provider



Mission Design



System Design

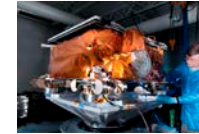


SN-50

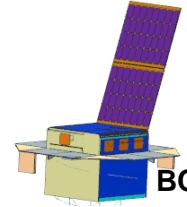


SN-200

SN-100



Make/Buy



BCT-27



Integration & Test



Launch



Operations



OG2 Production Area

SIERRA
NEVADA
CORPORATION
Space Systems



Dream Chaser Space System

snc SIERRA
NEVADA
CORPORATION

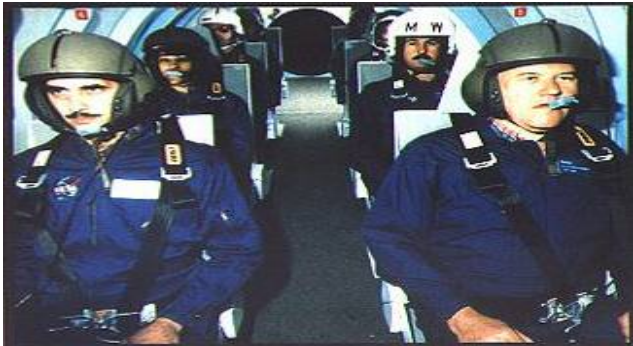


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NASA Chooses Dream Chaser



Eleven Years Ago in 2005...





**Respect the Past
As the Key to the Future**

Continuing to Carry the Torch

NASA Space Shuttle
Enterprise
Final Flight



Sierra Nevada
Dream Chaser
First Flight

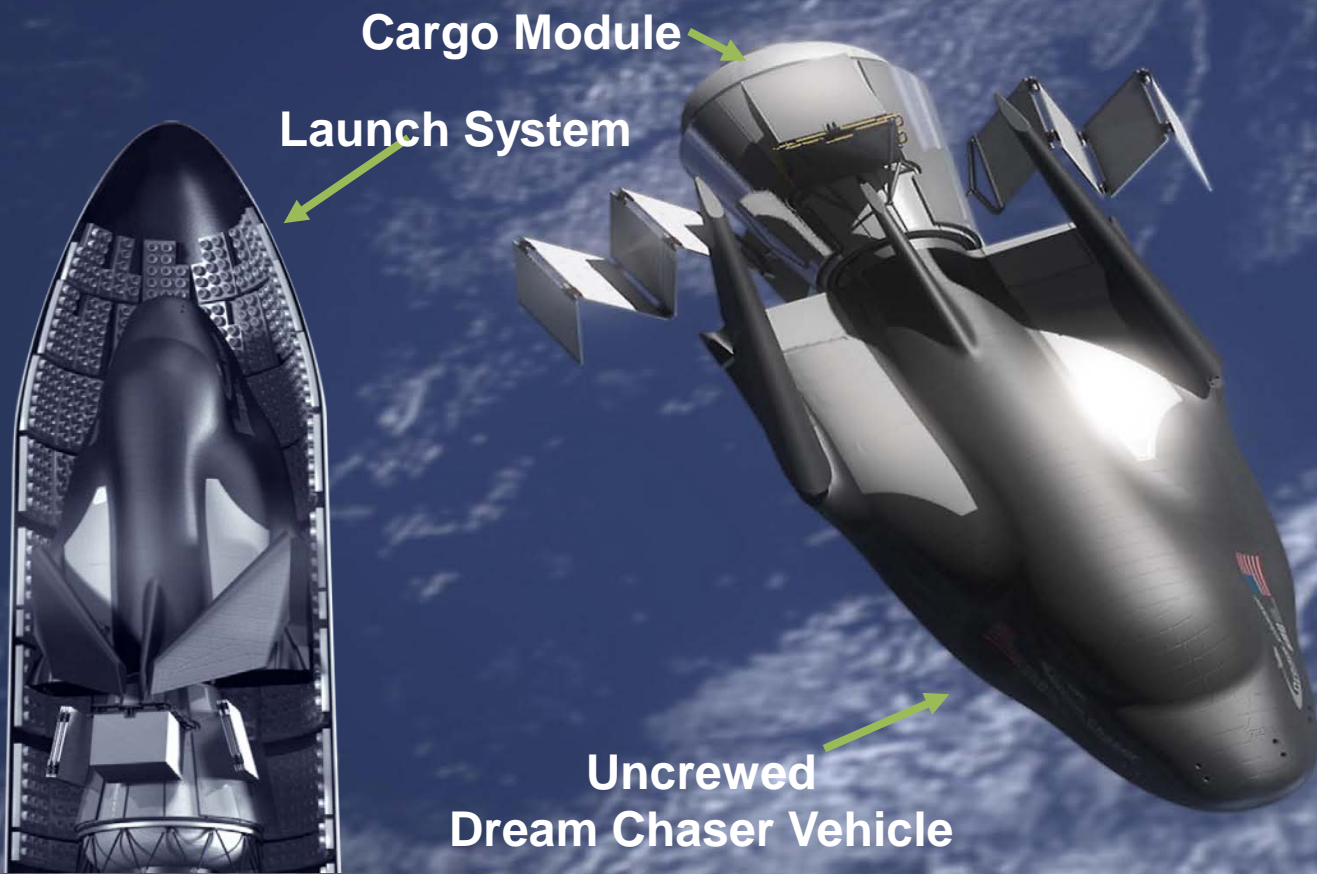


Dream Chaser Flight Test Vehicle



Credit: Sierra Nevada Corporation

Dream Chaser Cargo System (DCCS)



*The Best Cargo Services
Solution in the World*

CRS2 Contract: \$14 Billion; 6
year; Award Jan 2016; 3 Final
Competitors

Capable: Exceeds ALL of
NASA's Cargo Needs

Safe: Gentle reentry, runway
landing, all 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

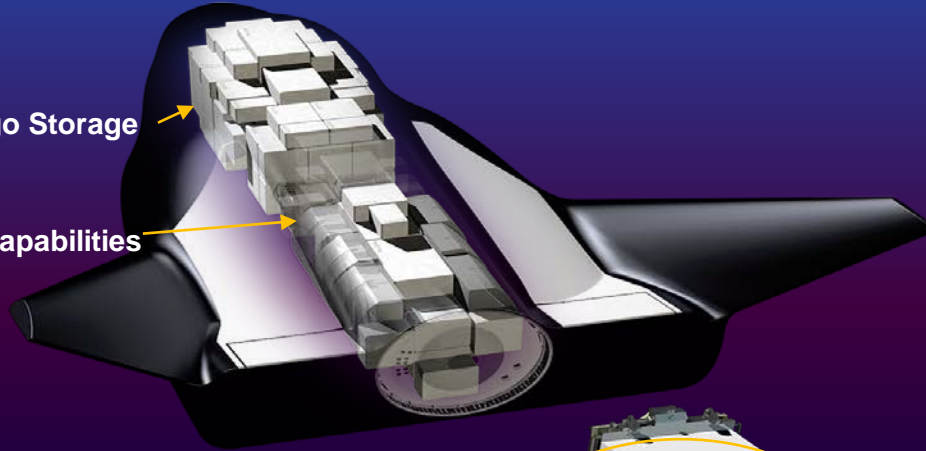
Mature: Leverages 40+ years of
Shuttle/X-plane experience

Dream Chaser Cargo System Features

Pressurized Cargo

Pressurized Cargo Storage

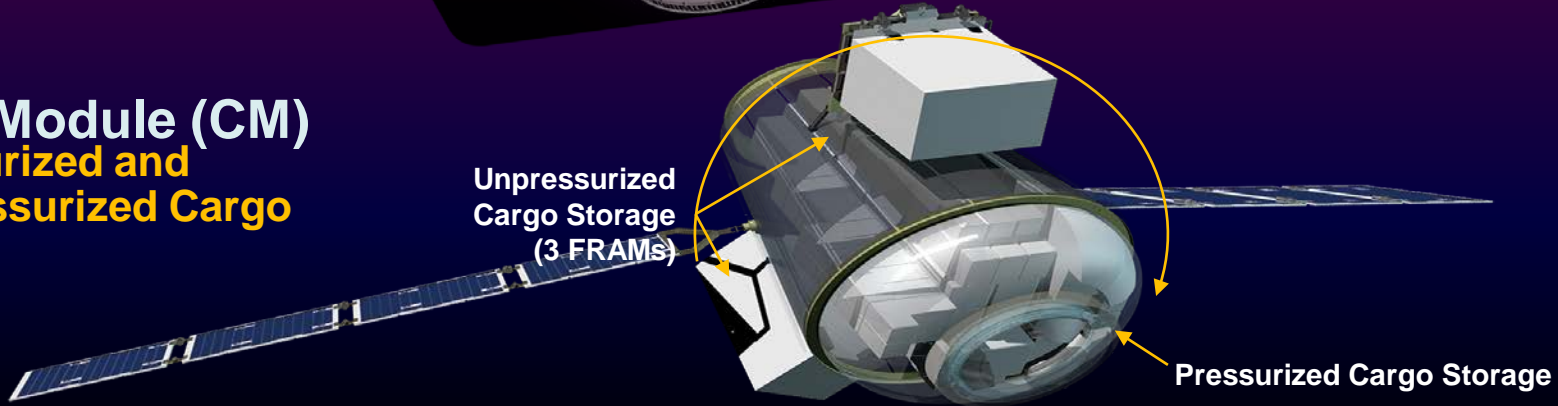
Powered Payload Capabilities



Cargo Module (CM) Pressurized and Unpressurized Cargo

Unpressurized
Cargo Storage
(3 FRAMs)

Pressurized Cargo Storage



Dream Chaser on Launch





esa
COLUMBUS

esa

JAPAN

USA
Cygnus
CRESS



**Free Flying, Science,
Remote Sensing &
Technology Test**

**On-Orbit Robotic
Deployment,
Servicing, Assembly**



**NASA Commercial
Cargo Services**



**Crewed
Missions**



**Exploration
Support**

Dream Chaser Landing Site Studies

- Initiated a program in 2015 for airports or spaceports to be designated a “Preferred Landing Site” for Dream Chaser for commercial missions
 - ◆ Option 1: Compatible Landing Site
 - ◆ Option 2: Approved Landing Site
 - ◆ Option 3: Licensed Landing Site (FAA Part 435 Reentry License)
- Currently working with 6 airports and assume multiple will enter into contracts
 - ◆ Houston Ellington Spaceport
 - ◆ Huntsville Airport (**Workshop in Huntsville w/e 3/28**)
 - ◆ Midland Spaceport
 - ◆ Jacksonville/Cecil Spaceport
 - ◆ Wallops Flight Facility
 - ◆ Prestwick Airport (in running to be U.K. spaceport)
- Strong international interest, but licensing methodology is not clear, and multiple agencies involved (FAA, ICAO, local air traffic control agencies, etc.)



Dream Chaser

Enhanced Platform for Science Missions



Credit: SNC

- **Turn key program offered to Countries with Space Interest**
 - ◆ Offers the benefit and pride of a spaceflight program without the burden of developing the necessary infrastructure
 - ◆ In-country industry, universities, and Govt Labs can design experiments and build payloads
- **Offers the Dream Chaser vehicle and the supporting services for customized missions to low-Earth orbit, including the selection of desired landing site**
 - ◆ Launch, ground and mission support
 - ◆ Landing site selection (in-country option)
- **Benefit's the client's local technology infrastructure and industrial base, such as:**
 - ◆ Government research and development laboratories
 - ◆ Aerospace industry
 - ◆ Universities



Direct Partnerships Signed with International Space Agencies



Agreement Objectives

- Cooperate and partner on the development of technologies, applications and missions for Dream Chaser based space systems that promote the goals of the Agency
- Engage with in-country government laboratories, commercial companies and universities to utilize their technologies where possible

Thank You

snc SIERRA
NEVADA
CORPORATION



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