

# Kennedy Space Center

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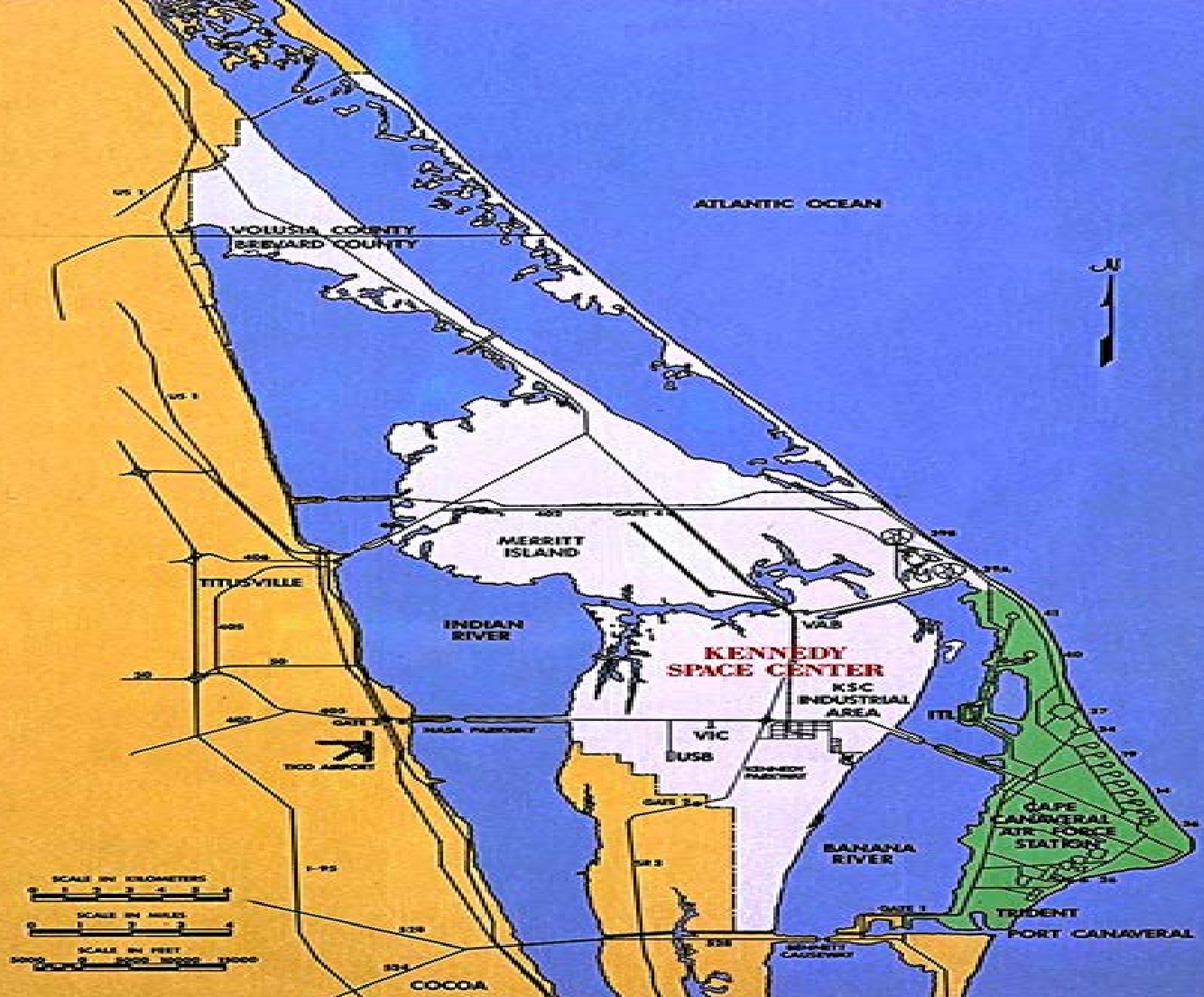
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## Space Shuttle and Orion: NASA's Human Space Exploration!







# UNIQUE LOCATION



- 140,000 square acres within Merritt Island National Wildlife Refuge and Canaveral National Seashore
- 6,800 currently acres used for NASA-related activities
- Over 15 variety of endangered species
- Unique balance between technology and nature

# HISTORY OF ROCKETRY



Robert Goddard (pictured)  
becomes first to successfully  
use liquid fuel to power a  
rocket (1926)

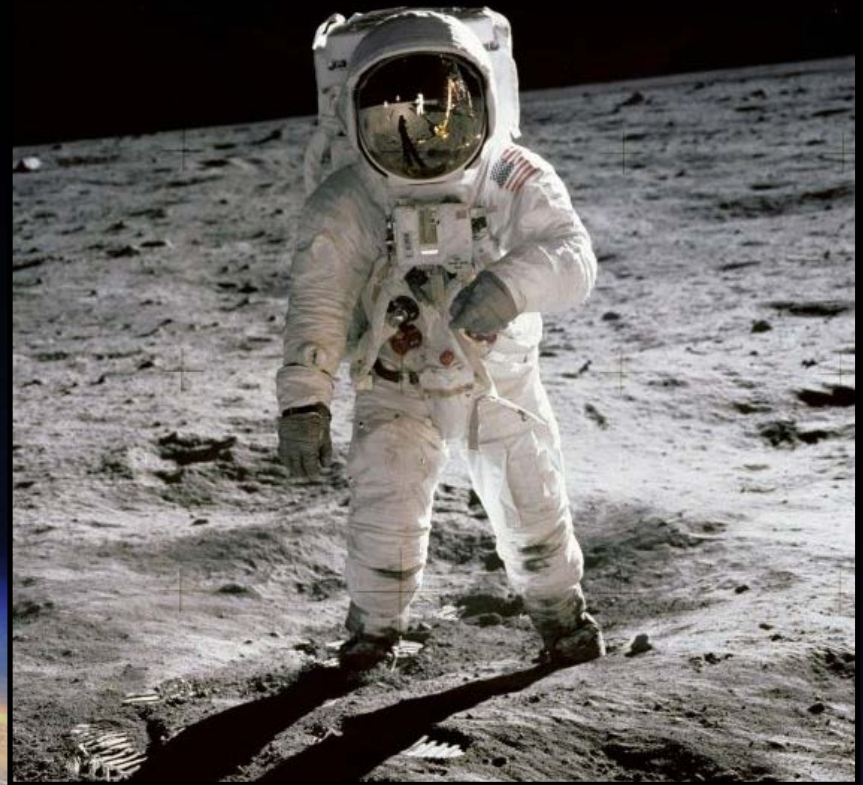




# HISTORY OF ROCKETRY



- Alan Sheppard (pictured) becomes the first American in space (1961)
- Neil Armstrong is the first man to step foot on the moon (1969)



# HISTORY OF ROCKETRY



John W. Young and Robert L. Crippen

- The Space Shuttle becomes the first reusable space flight vehicle (1981)
- Rockets continue to be a mainstay in the space program



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## Space Shuttle Era

- Enterprise, OV-101 (1977, never flew)  
displayed at Intrepid Sea, Air & Space Museum in New York City
- Columbia, OV-102 (2003, 28<sup>th</sup> mission)
- Challenger, OV-099 (1986, 10<sup>th</sup> mission)
- Discovery, OV-103 (39 missions)  
displayed at Smithsonian's National Air and Space Museum Steven F. Udvar-Hazy Center in Virginia
- Endeavour, OV-105 (25 missions)  
displayed at California Science Center in Los Angeles
- Atlantis, OV-104 (33 missions)  
displayed at Kennedy Space Center Visitor Complex in Florida







Servicing Hubble Space Telescope  
1997, 1999, 2002 and 2009



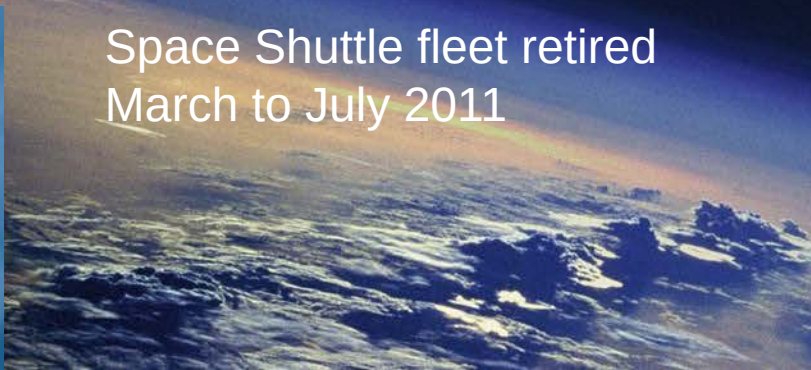


The shuttle carried satellites to orbit; transported parts, cargo and crew to build the International Space Station; and helped NASA learn about living and working in space

Space shuttle was designed to travel low Earth orbit!



Space Shuttle fleet retired  
March to July 2011



# Orion



The Orion design divides critical functions among multiple modules to maximize the performance of the integrated spacecraft design

## Crew Module

- Provide safe habitat from launch through landing and recovery
- Conduct reentry and landing as a stand alone module

## Launch Abort System

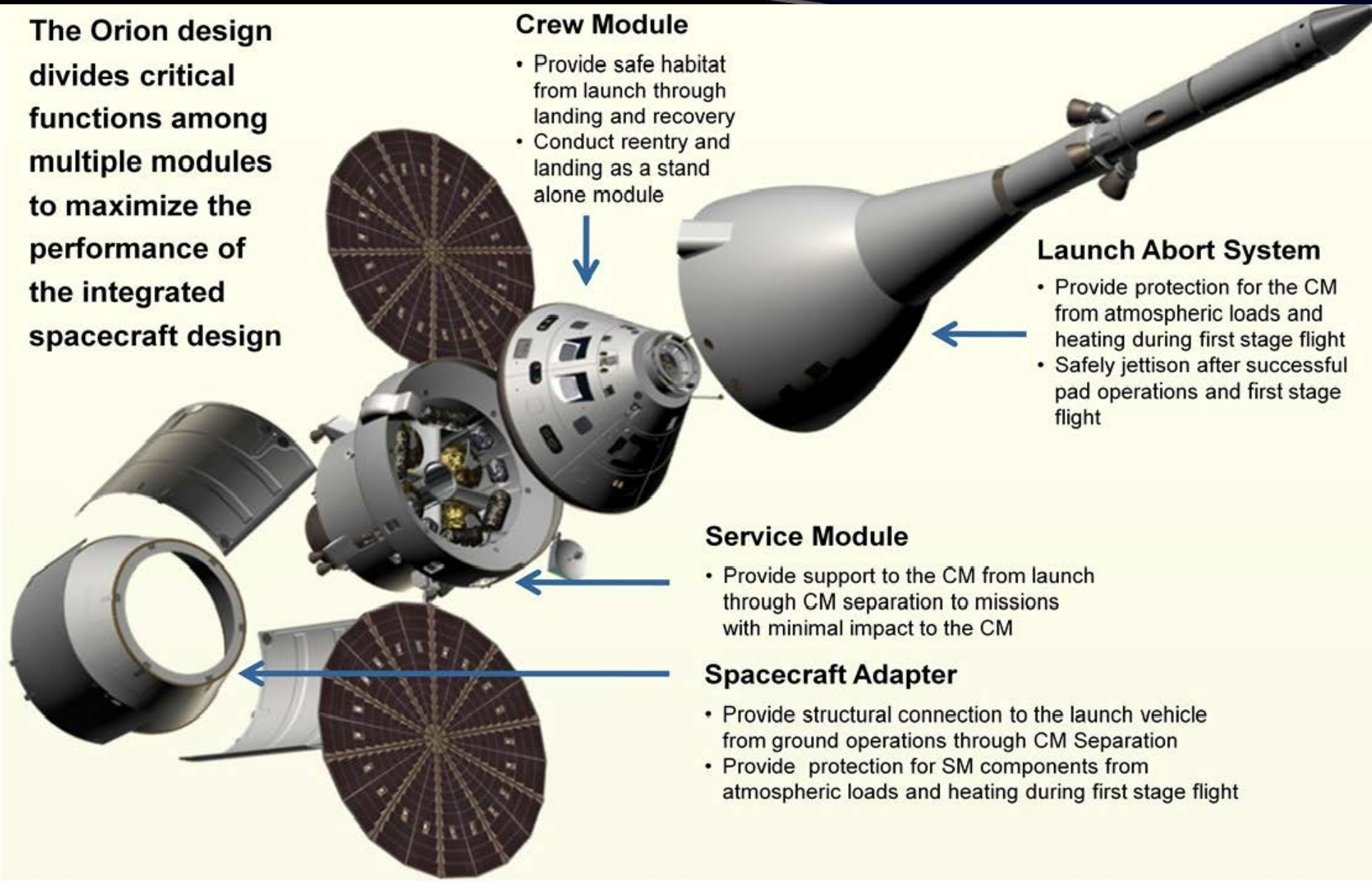
- Provide protection for the CM from atmospheric loads and heating during first stage flight
- Safely jettison after successful pad operations and first stage flight

## Service Module

- Provide support to the CM from launch through CM separation to missions with minimal impact to the CM

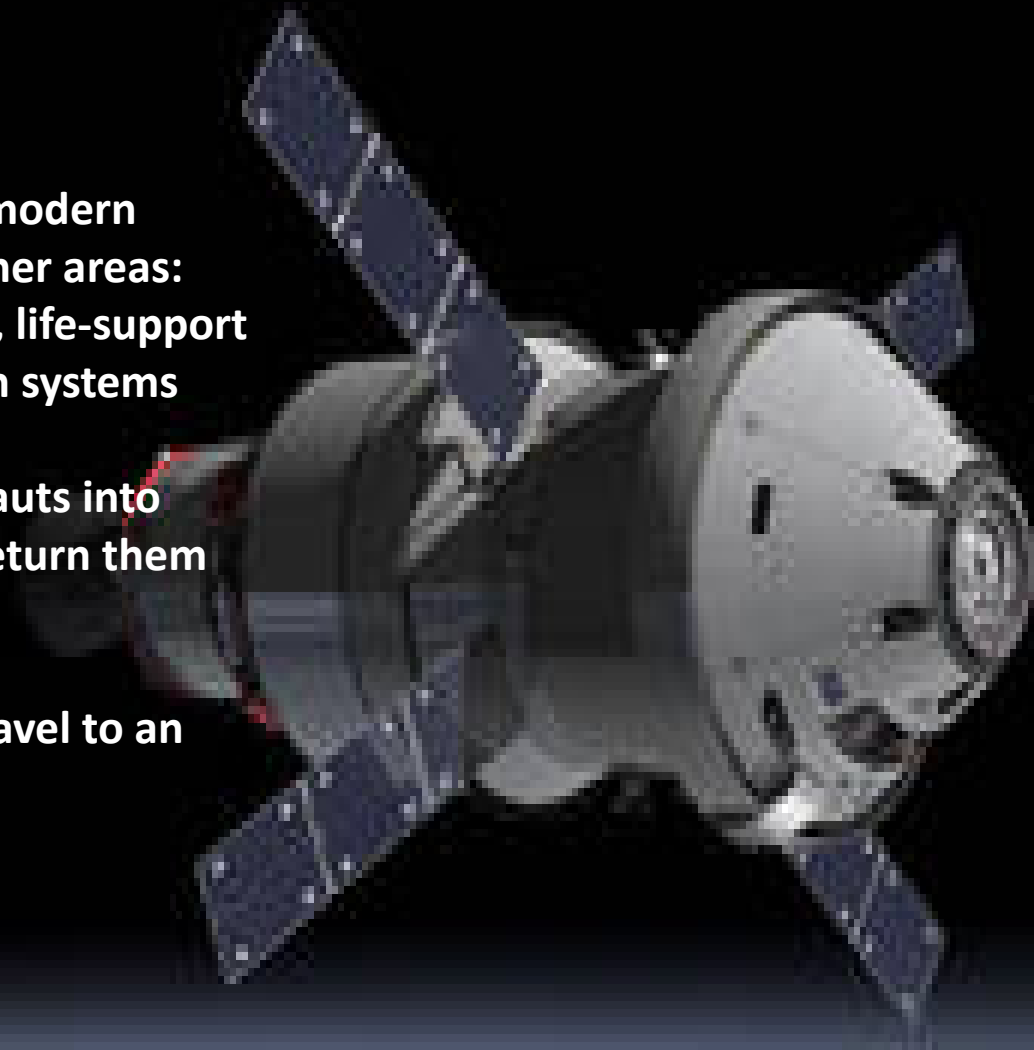
## Spacecraft Adapter

- Provide structural connection to the launch vehicle from ground operations through CM Separation
- Provide protection for SM components from atmospheric loads and heating during first stage flight





- **Orion spacecraft uses modern technology in many other areas: computers, electronics, life-support systems and propulsion systems**
- **Orion will carry astronauts into deep space and then return them home to Earth**
- **Orion will be able to travel to an asteroid or even Mars**



- Orion had its first flight test on Dec. 5, 2014 -- without a crew





# ORION'S FIRST FLIGHT



- Orion spacecraft is similar to NASA's Apollo capsule
- Orion will land in the ocean when it returns with its crew
- The test vehicle splashed down in the Pacific Ocean near California





- Orion, Exploration Mission-1, will last about 25 days (~2018)
- Orion will make a large orbit around the moon
- The spacecraft will go farther into space than people have traveled before



# SHAPING KSC's FUTURE



- Exploration Mission-2 will travel the same path as Exploration Mission-1, but this time with a crew (~2023)
- Orion will carry astronauts to an asteroid
- In the 2030s, NASA's goal is for Orion to carry the first human explorers to Mars, the Red Planet!





# SHAPING KSC's FUTURE



- The EM-2 is to restart manned exploration of the Solar System.



# SHAPING KSC's FUTURE



- KSC will be the launch complex of the future, designed to serve the needs of the world
- KSC will support a variety of private and public customers
- KSC will utilize unique facilities along with a highly skilled workforce to support the space community, which will make accessing space less costly and more routine
- NASA will continue to explore beyond low-Earth orbit, and that effort will continue to launch from KSC



