* NOVA *

N. 179 - 24 FEBBRAIO 2011

ASSOCIAZIONE ASTROFILI SEGUSINI

STS-133

Stasera, giovedì 24 febbraio 2011, alle 22:53 (ora italiana) è partito da Cape Canaveral lo Space Shuttle Discovery, *per la sua trentanovesima e ultima missione: ha a bordo 6 astronauti (umani, normalmente però sono 7) più un robot antropomorfo,* Robonaut 2, *che diventerà "membro" permanente della Stazione Spaziale.*

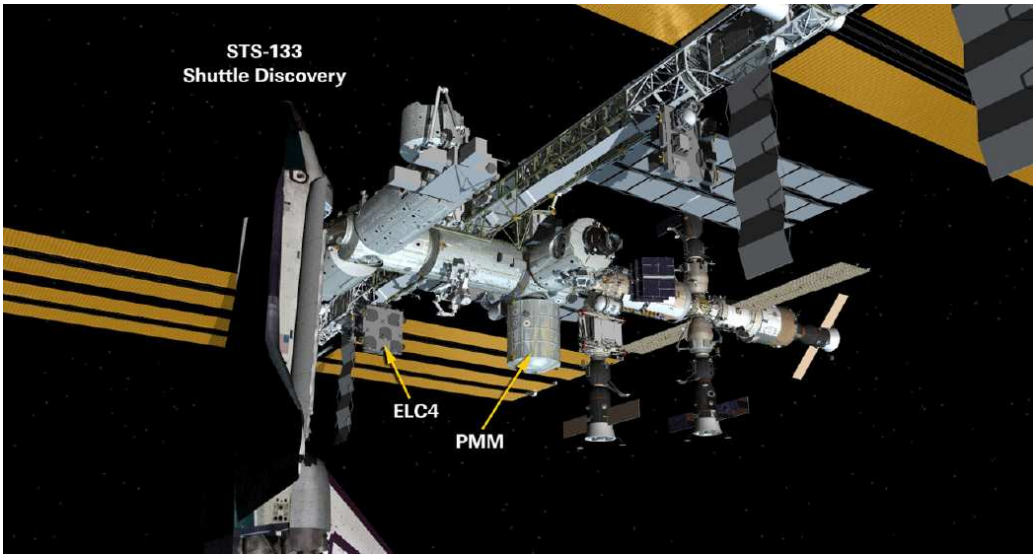
Sulle caratteristiche e le potenzialità di Robonaut 2 *vedi*
http://robonaut.jsc.nasa.gov/default.asp
e anche http://science.nasa.gov/science-news/science-at-nasa/2010/29apr10_r2/

*Nella stiva dello Shuttle ci sono due moduli: l'*ELC4 *(apparati elettrici e di servizio) e il modulo* Leonardo – *progettato e costruito a Torino – che ha già volato sette volte e che opportunamente modificato, e rinominato* Permanent Multipurpose Module *(PMM), sarà permanentemente installato sulla stazione spaziale come modulo aggiunto. Il modulo, lungo circa 6.50 m e largo 4.50 m, è particolarmente silenzioso e sarà possibile al suo interno lavorare ed essere collegati ad Internet.*
*Ricordiamo che Paolo Pognant, ingegnere aerospaziale e nostro vicepresidente, è uno dei progettisti di PMM e ne seguirà il volo dalle console di ALTEC a Torino (*http://www.altecspace.it/Index.htm*)*

Informazioni aggiornate sulla missione STS-133 dal sito della NASA
http://www.nasa.gov/mission_pages/shuttle/main/index.html

Vedi il Press Kit NASA del febbraio 2011, pdf di 106 pagine,in inglese, dedicato alla missione, su
http://www.nasa.gov/pdf/491387main_STS-133%20Press%20Kit.pdf

Nelle ultime due pagine di questa Nova *riportiamo il* STS-133 Mission Summary *tratto da*
http://www.nasa.gov/pdf/514136main_STS133_Fact_Sheet_2-1-11.pdf



La stazione spaziale con i due moduli aggiunti nei prossimi giorni.
Notare oltre allo Shuttle, le due *Soyuz* di salvataggio, in basso a destra (immagine NASA).

17 gennaio 1997: lo Space Shuttle *Discovery* si avvia lentamente,
trasportato su un enorme veicolo cingolato,
alla base di lancio 39A per la missione STS – 82: sette astronauti
si occuperanno della manutenzione del telescopio spaziale *Hubble,*
che era stato messo in orbita il 24 aprile 1990 dallo stesso *Discovery* (Foto NASA).

24 FEBBRAIO 2011: ALCUNE IMMAGINI DEL LANCIO DEL *DISCOVERY*

http://spaceflightnow.com/shuttle/sts133/status.html

NASA Mission Summary

National Aeronautics and Space Administration

Washington, D.C. 20546
(202) 358-1100

STS-133 MISSION SUMMARY — January 2011

SPACE SHUTTLE DISCOVERY

Discovery will deliver to the International Space Station the Permanent Multipurpose Module (PMM), which was converted from the multi-purpose logistics module (MPLM) Leonardo. The PMM will provide additional storage for the station crew, and experiments may be conducted inside it, such as fluid physics, materials science, biology and biotechnology. Discovery also will carry critical spare components and the Express Logistics Carrier 4 (ELC4) to the station. Express, which stands for Expedite the Processing of Experiments to the Space Station, is an external platform that holds large equipment that can only be transported using the unique capability of the shuttle. The STS-133 mission will feature two spacewalks to do maintenance work and install new components. Robonaut 2, or R2, will be the first human-like robot in space when it flies on shuttle Discovery inside the PMM to become a permanent resident of the station.

CREW

Steve Lindsey
Commander (Colonel, USAF, Ret.)
- Veteran: STS-87, STS-95, STS-104, STS-121
- Age: 50, Hometown: Temple City, Calif.
- Married with three children
- Logged 6,500+ hours in 50 different aircraft
- Enjoys camping and mountain/dirt biking

Eric Boe (bo)
Pilot (Colonel, USAF)
- Veteran: STS-126
- Age: 46, Hometown: Atlanta
- Married with two children
- Logged 4,000+ hours in 45 different aircraft
- Enjoys outdoor sports, skiing & scuba diving

Alvin Drew
Mission Specialist-1 (Colonel, USAF)
- Veteran: STS-118
- Age: 48, Born: Washington, DC
- Logged 3,500 hours in 30+ types of aircraft
- Flew 60 combat missions
- Member, Society of Experimental Test Pilots

Steve Bowen (bo-en)
Mission Specialist-2 (Captain, USN)
- Veteran: STS-126, STS-132
- Age: 46, Born: Cohasset, Mass.
- Married with three children
- First submarine officer selected as astronaut
- Logged 27 days in space with five spacewalks

Michael Barratt
Mission Specialist-3 (M.D.)
- Veteran: Expedition 19/20
- Age: 51, Hometown: Camas, Wash.
- Married with five children
- Spent 197 days on the space station
- Performed two spacewalks while on station

Nicole Stott
Mission Specialist-4
- Veteran: Expedition 20/21
- Age: 48, Hometown: Clearwater, Fla.
- Married with one child
- Flew 87 days on station, Expedition 20 & 21
- Performed one spacewalk, 6 hours, 39 minutes

The mission patch is based on sketches from the late artist Robert McCall's final creations from his long and prodigious career. In the foreground, the shuttle Discovery ascends into a dark blue sky above a roiling fiery plume as if it is just beginning a mission. However, only the orbiter, without boosters or an external tank, is shown as it would be at mission's end. This is to signify Discovery's completion of its operational life and the beginning of its new role as a symbol of NASA's and the nation's proud legacy in human spaceflight.

Space Shuttle Discovery

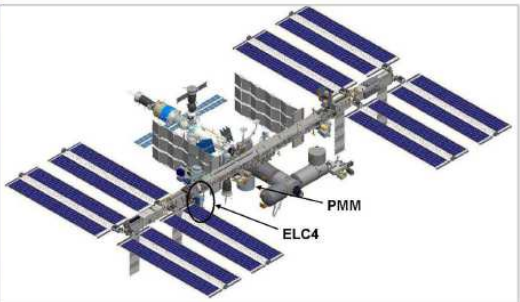
Discovery flew its maiden voyage on Aug. 30, 1984, on the STS-41D mission. Later missions included NASA's return to flight after the loss of Challenger (September 1988) and Columbia (July 2005), launch of the Hubble Space Telescope in April 1990, the final Shuttle/Mir docking mission in June 1998 and Senator John Glenn's shuttle flight in October 1998. When Discovery retires in 2011, it will have flown in space 39 times, more than any other shuttle. Discovery was named after one of the ships British explorer James Cook used in the 1770s during voyages in the South Pacific.

SPACEWALKS Each spacewalk will last approximately six hours. Bowen will wear a suit with solid red stripes and Drew an unmarked, or pure white suit.

- On flight day 5, Drew and Bowen will install a power extension cable between the Unity and Tranquility nodes to provide a contingency power source. The spacewalkers will move a failed ammonia pump module that was replaced in August 2010 from an attachment bracket to a stowage platform adjacent to the Quest airlock. Drew and Bowen will install hardware under a camera on the truss that will tilt the camera to provide clearance for a spare part to be installed on a future mission. They next will replace a guide for the rail cart system used for moving cargo along the truss. The guides were removed when the astronauts were performing work on the station's starboard Solar Alpha Rotary Joint, which rotates the solar arrays to track the sun.
- On flight day 7, Drew will remove thermal insulation from a platform while Bowen swaps out an attachment bracket on the Columbus module. Bowen then will install a camera assembly on the Dextre robot and remove insulation from Dextre's electronics platform. Drew will install a light on a cargo cart and repair some dislodged thermal insulation from a valve on the truss then remove other insulation from Tranquility. The final task will be to "fill" a special bottle with space for a Japanese education payload. The bottle will be part of a museum exhibit for public viewing.

Leonardo in Payload Bay

R2



PMM Installation Location

FACTS AND FIGURES

- NASA selected Bowen to replace mission specialist Tim Kopra, who was injured in a bicycle accident. Bowen will perform two spacewalks on this mission. He is the first U.S. astronaut to fly on back-to-back missions. He was a mission specialist on STS-132, which flew in May 2010.
- Two more flights to the station are planned after STS-133 before the shuttles are retired in 2011. STS-133 is the 133rd shuttle mission and the 35th shuttle flight to the station.
- ELC4 will carry several spare parts, a heat rejection system radiator, flight support equipment and a mechanical system support component for a cargo carrier attached to the truss.
- To convert Leonardo into the PMM, several modifications were made: hardware not required for long-duration use was removed to reduce weight and allow more storage area; the module's interior was modified to make panels easier to open and close; and the outside of the module was armored with a micrometeroid mattress, which lies underneath the metallic shield.
    - The PMM will be attached to the Earth-facing side of the Unity node on flight day 6.
- For the first time, the public helped choose the astronauts' wakeup songs. The two that received the most votes will be played during the mission. Traditionally, friends and family of the crews select songs. For more information, visit: https://songcontest.nasa.gov.
- Discovery will fly a test navigation system for Space Exploration Technologies, or SpaceX. The DragonEye's Laser Imaging Detection and Ranging (LIDAR) system will help guide the Dragon spacecraft as it approaches the space station.
- Stott will post updates about her mission on her Twitter account, @Astro_Nicole.
- R2's current primary job is to demonstrate how dexterous robots behave in space. With upgrades, it could one day help spacewalkers make repairs or perform scientific work.
    - When R2 is unpacked, it will be operated inside the Destiny laboratory for testing, but over time both its territory and its applications could expand.
    - R2, a collaboration between NASA and General Motors, is composed primarily of aluminum with steel and nonmetallics. It weighs 330 pounds and is 3 feet, 4 inches from waist to head.
    - With the help of its supporting team, R2 is posting updates on its Twitter account, @AstroRobonaut, and will be documenting its work aboard the station.

http://www.nasa.gov/mission_pages/shuttle/main/index.html