January 2017

ZOOM in on america

A Monthly Publication of the U.S. Consulate Krakow

Volume XIII. Issue 145

TWENTY SECONDS AND COUNTING

AT CAPE CANAVERAL

Photo: NASA or National Aeronautics and Space Administration

In this issue: Kennedy Space Center

Zoom in on America

Kennedy Space Center

An hour drive east of Orlando, Florida there is a 34-mile long and roughly six-mile wide area, covering 219 square miles that is visited, on average, by 1.5 million visitors per year. It is called the Kennedy Space Center, but more than tourism it can boast a primary role in the progress of space exploration, a launch pad for Earth's future voyage to space, for which a countdown has already begun.

As the countdown to the take-off of a rocket or spacecraft begins, you wait expectantly for the enormous puff of smoke that will nearly envelop the craft as it lifts up into the sky. In these moments of anticipation, you feel that seconds pass more slowly than usual. Albert Einstein seems to wink at you with an enigmatic smile: "Do you understand the relativity of time?"

In the early 1960s, when a venue that would make a good launching spot for space bound rockets and spacecraft was sought out, Merritt Island in Florida seemed like just the right place. It was close to Cape Canaveral where an Air Force Station had been established since 1949. The 60's were a time when the space race between the United States and the Soviet Union was in full swing. President John F. Kennedy made it a goal that American astronauts perform a crewed lunar landing and return to Earth; he wanted it to happen before 1970.

This is how the Space Center (later renamed in honor of President Kennedy,) and the Apollo program started. Even though the Apollo 1 mission ended in a tragedy when a crew of three astronauts was killed in a fire at a pre-start test, the mission was carried on with errors corrected and consecutive missions confirmed so that the first manned Apollo flight would be a success.

Finally a day came for Apollo 11 to launch at Launch Pad 39A with the aid of Saturn-V AS. It was July 16, 1969, 9:32

In this February 23, 1962 photo, astronaut John Glenn, left, and President John F. Kennedy, center, inspect the Friendship 7 Mercury capsule which Glenn rode in orbit. At right is Vice President Lyndon B. Johnson. Kennedy presented the Distinguished Service Medal to Glenn at Cape Canaveral, Florida (AP Photo)

a.m. and one of the most important countdowns in the history of the Kennedy Center was heard:

"Neil Armstrong just reported back: 'It's been a real smooth countdown'. We've passed the 50-second mark. Power transfer is complete - we're on internal power with the launch vehicle at this time. 40 seconds away from the Apollo 11 lift-off. All the second stage tanks now pressurized. 35 seconds and counting. We are still Go with Apollo 11. 30 seconds and counting. Astronauts report, 'It feels good'. T minus 25 seconds.
PAO: Twenty seconds and counting. T minus 15 seconds, guidance is internal. Twelve, 11, 10, 9, ignition sequence starts..."

Listen to the whole recording of the countdown on the NASA page (CLICK here).

Each and every launch is a unique experience to watch, but perhaps the most thrilling were those take offs during the NASA Space Shuttle Era (1981 - 2011) when space shuttles Columbia, Challenger, Discovery, Atlantis and Endeavour carried people into orbit, launched, recovered and repaired satellites, conducted cutting-edge research and built the largest structure in space: the International Space Station. A space shuttle - "the first reusable spacecraft that launches like a rocket, maneuvers in Earth orbit like a spacecraft and lands like an airplane" - brought us closer to space journeys with new exploratory possibilities, tested technologies, and thus new solutions to problems. In all, there were 135 missions performed by space shuttles. Unfortunately, two manned missions ended in tragedies: in 1986 Challenger was lost just seconds after liftoff and in 2003 Columbia went into flames 16 minutes before its expected landing. Fourteen astronauts lost their lives. Each and every one of the 135 missions brought some new answers and discoveries that help today's workers master new designs to improve safety, thus contributing to the development of space technology. In turn, these developments set and accomplish ever more challenging goals in space exploration.

Families and friends of the astronauts were invited to each launch to watch the lift off of STS missions. Reporters, photographers and other guests arrived at Merritt Island ahead of time. At the Kennedy Center they first had a special pre-briefing that included videos featuring astronauts and their program and the aim of the mission. Then, if the time of the launch was set for the night, they went to their hotels to rest and returned to the Kennedy Center at the set hour, where they were taken to their viewing point by bus. Assessing weather conditions was important to es-

The Apollo 11 crew relaxes during training May 24, 1969 (Photo NASA)

Liftoff of Apollo 11,July 16, 1969 (Photo NASA)

tablishing whether the shuttle could really take off. There are strict regulations concerning conditions that must be met, for example clouds have to be higher than 5,000 feet as the space shuttle has to be able to turn around and land if there is an emergency. And so it happened on this occasion, that the launch was called off and the guests were taken back to the car parks, where they left the traffic clogged Center only to return the next day for a new countdown.

But, however long the wait, to watch the launch from a viewing point in the Center is rewarding. “There is nothing quite like it on Earth,” says the Center’s website. Indeed, if you watch the launch at night, the sky gets suddenly as bright as it is during the day. The noise shakes the ground and reverberates through your body, so that you can yourself feel the power required to send a spacecraft into Earth orbit.

If you are planning on visiting the Kennedy Space Center and would like to watch a launch it’s a good idea to visit the Center’s website for details: There you can also find a video of what a day launch of a rocket looks like.

An extremely important countdown (one that was also briefly halted at T-31 seconds when computer software failed to shut down a fuel valve) was more than a quarter of a century ago when, on April 24, 1990 Discovery shuttle carried Hubble Space Telescope into orbit. A wonder telescope named in honor of a great astronomer Edwin Hubble has realized one of the longest-held dreams of mankind, to “travel back in time.” STS 31 mission was launched on April 24, 1990 at 8:33 a.m. from Pad 39B. On top of all great discoveries of yet unknown galaxies, as well as our own Milky Way galaxy, Hubble telescope found what appears to be the most distant observable object in the universe, whose light traveled 13.2 billion years, about 150 million years longer than the previous record holder. This object is a compact galaxy of blue stars that existed as early as 480 million years after the big bang. (based on NASA page about Hubble Space (CLICK here)

Can you imagine the world without the present communication technologies, which are possible only via satellite, global positioning, a digital data base of the world’s terrain, views of the universe that exceed imagination, and a space station which flies overhead at 8 kilometers per

In this April 25, 1990 photograph provided by NASA, most of the giant Hubble Space Telescope can be seen as it is suspended in space by Discovery's Remote Manipulator System (RMS) following the deployment of part of its solar panels and antennae. This was among the first photos NASA released on April 30 from the five-day STS-31 mission. The Hubble Space Telescope, one of NASA'S crowning glories, marks its 25th anniversary on Friday, April 24, 2015. With more than 1 million observations, including those of the farthest and oldest galaxies ever beholden by humanity, no man-made satellite has touched as many minds or hearts as Hubble. (NASA via AP)

second? Yes, it would be hard. And yet, these are all recent developments that exist because of the decades of space programs.

Finally, let's mention two of the recent and very important countdowns:

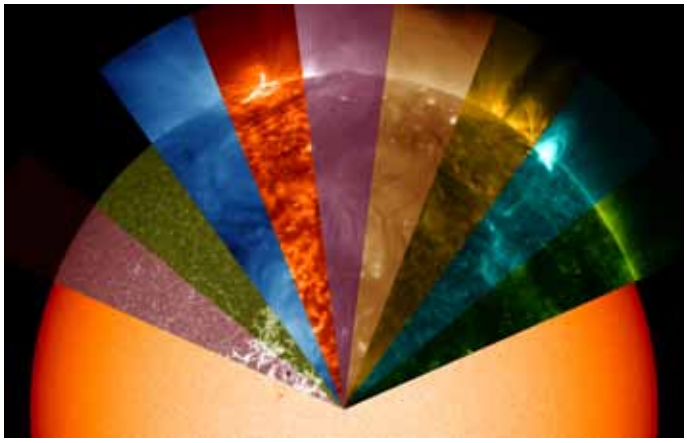
On February 11, 2010 the Solar Dynamics Observatory (SDO) was launched from Space Launch Complex. Visiting NASA page of SDO (CLICK here) you can observe the Sun on 24/7 basis and see amazing HD photographs. SDO lets scientists continue a non-stop observation of the Sun. SDO is the first satellite of NASA's Living with a Star (LWS) program. Such observations are very important even to those of us on earth, since this data is expected to give researchers the information they need to eventually predict solar storms and other solar activity that can affect a spacecraft in orbit, astronauts on the International Space Station and earthbound electronic systems. Space Weather, which affects not only our lives here on Earth, but the Earth itself and everything outside its atmosphere as well as astronauts and satellites out in space and even the other planets, is determined by the sun.

The Kennedy Space Center Visitor Complex offers public tours of the center and Cape Canaveral Air Force Sta-

NASA's Solar Dynamics Observatory, SDO, launched aboard a United Launch Alliance Atlas V from Space Launch Complex-41 at 10:23 a.m. EST on Thursday, February 11, 2010. SDO is the first satellite of NASA's Living with a Star (LWS) program. Photo: Pat Corkery/United Launch Alliance

tion. The Complex attracts visitors from all over the world with displays of aircraft, IMAX theaters, and most of all the Shuttle Launch Experience. There is United States Astronaut Hall of Fame, and Apollo/Saturn V Center.

CLICK HERE TO LISTEN TO THE ARTICLE



Above: This still image was taken from a new NASA movie of the sun based on data from NASA's Solar Dynamics Observatory, showing the wide range of wavelengths – invisible to the naked eye – that the telescope can view. Image: NASA

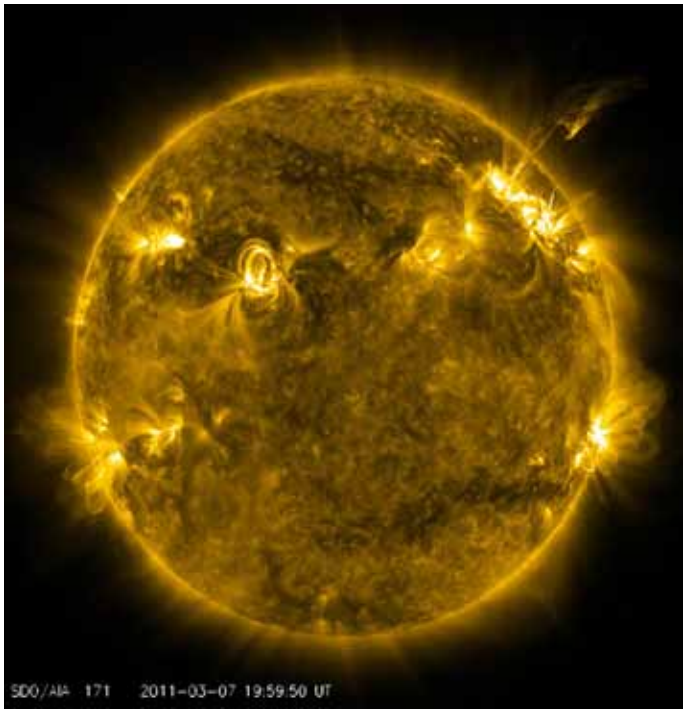
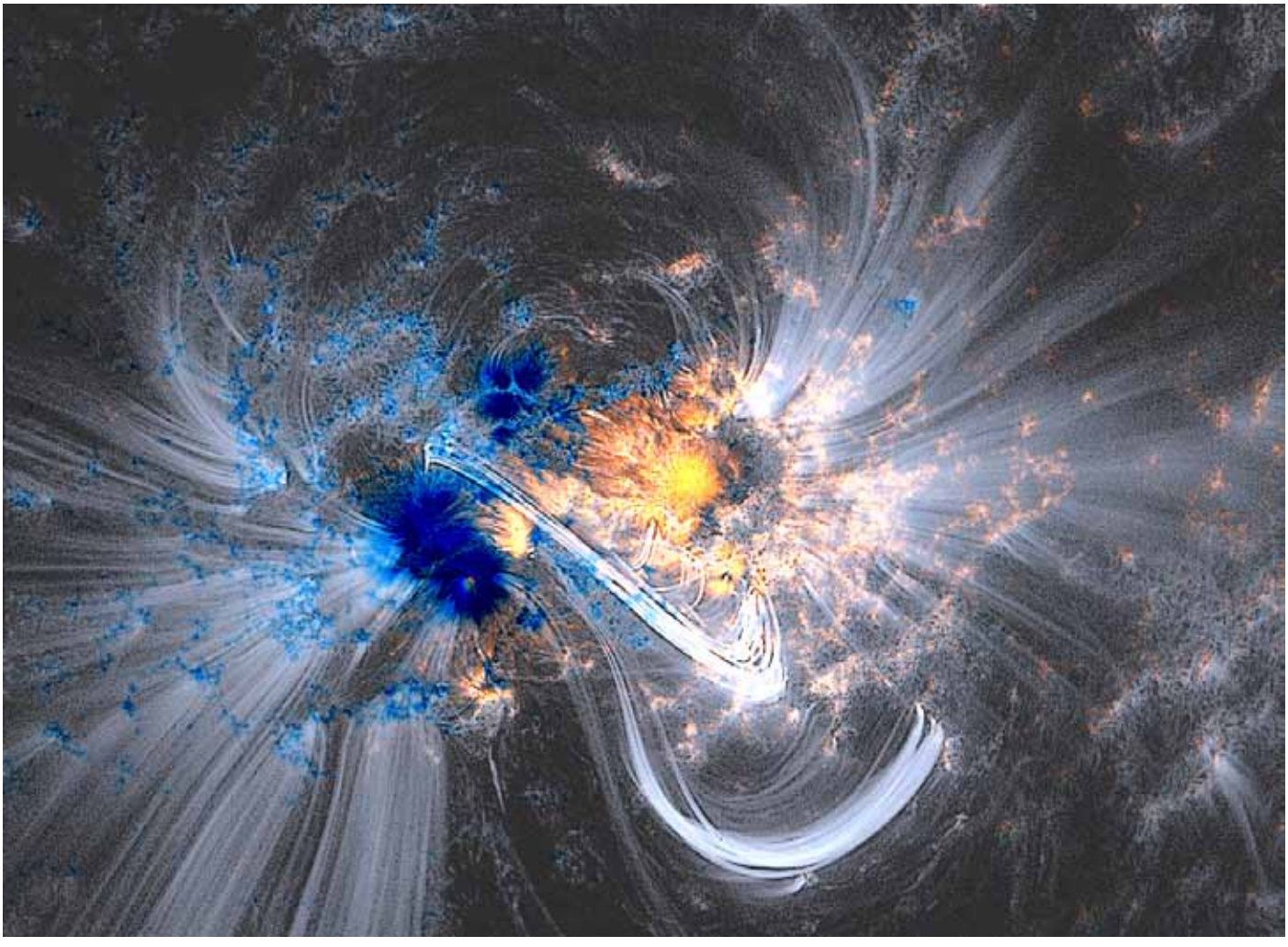


Photo of the Sun taken by SDO, NASA

Below: The Atmospheric Imaging Assembly (AIA) instrument on NASA's Solar Dynamics Observatory images the solar atmosphere in multiple wavelengths to link changes in the surface to interior changes. Photo: NASA



ACTIVITY PAGE

JANUARY 2017 TRIVIA QUESTION

Where is Kennedy Space Station?

Send the answer (with your home address) to:
KrakowAIRC@state.gov

The 1st, the 13th and the 14th correct answer will be awarded with a book prize

Deadline: February 10

December 2016 Answer:

Columbia University

The winners are:

Maya from Gliwice and Aga from Czestochowa

CONGRATULATIONS!!!
The prizes will be sent to you by mail.

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YOU HAVE CHOSEN :

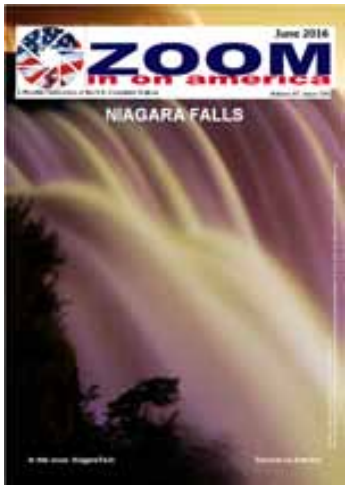
The winning cover of 2016 is:

June 2016

Congratulations to the winners:

Maria, Alicja, Malwina and Pawel

The prizes will be sent to you by mail



Exercise 1 Vocabulary Study:

There are three components that make a space shuttle:

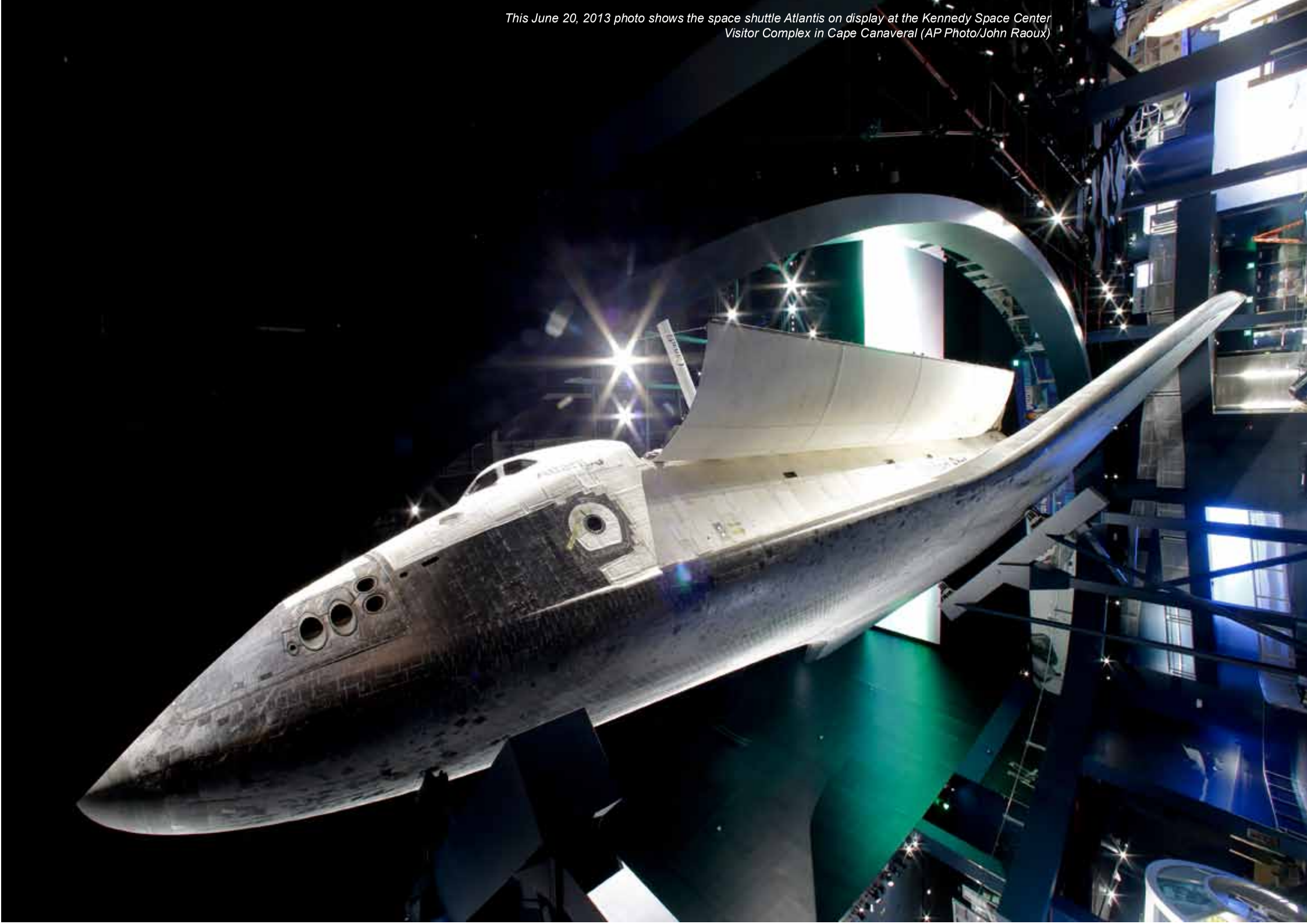
1. the orbiter, 2. two rocket boosters, and 3. the external tank.

Read the definitions a-c and decide which of the words above, they describe:

a. The brains and the heart of the space shuttle, it contains the pressurized crew compartment (which can normally carry up to seven crew members), the huge cargo bay, and the three main engines mounted on its aft end.
b. The “gas tank” that contains the propellants used by the Space Shuttle Main Engines, the only part of the space shuttle that is not reusable and is jettisoned 8.5 minutes into the flight.
c. They operate in parallel with the main engines for the first two minutes of flight to provide the additional thrust needed for the Orbiter to escape the gravitational pull of the Earth. At an altitude of approximately 45 km (24 nautical miles,) they separate from the rest of the shuttle, descend on parachutes, and land in the Atlantic Ocean.

(Based on the NASA website)

The cockpit of of space shuttle Endeavour (AP Photo/John Raoux)



This June 20, 2013 photo shows the space shuttle Atlantis on display at the Kennedy Space Center Visitor Complex in Cape Canaveral (AP Photo/John Raoux)