National Aeronautics and Space Administration

The Launch Pad

NASA Shared Services Center

October - December 2010

This One's for the Girls

Recording artist Mary J. Blige recently teamed up with NASA astronaut Leland Melvin to record public service announcements encouraging young women to pursue their interests in science, math, technology and engineering. This is great news to us at the NSSC, because although we already have numerous extraordinary females on our staff - there are opportunities for more to join. Working with the NSSC opens doors to many exciting opportunities. Whether you decide to join our top-notch finance team or our innovative IT community, we'd be happy to have you here. Check out the current opportunities available for students interested in working with NASA: http://nasajobs.nasa.gov/studentopps/employment/programs.htm

Above: Kristine "Kris" Hunstad, works in Information Technology Division as a Developer

Someone we think you should meet

Christopher J. Cassidy
(Commander, USN)
NASA Astronaut

Experience:

- Ten years as a member of the U.S. Navy SEAL Team
- Selected by NASA in May 2004
- February 2006 - completed Astronaut Candidate Training
- Mission Specialist on the crew of STS-127, International Space Station Assembly Mission 2J/A, Endeavour (July 15-31, 2009)
- Performed three spacewalks for a total of 18 hours and five minutes of extravehicular activity (EVA)
- Mission was accomplished in 248 orbits of the Earth, travelling 6,547,853 miles in 15 days
- See more astronauts: http://www.jsc.nasa.gov/Bios

About our Sun – Ten facts:

Above: Students of Parkland Magnet School in Rockville, Md. trace sunspots using Sun spotters.

1. The Sun is a star
2. The Sun is the closest star to Earth
3. The Earth orbits around the Sun
4. The Sun is way bigger than the Earth – In fact its radius is 109 times bigger than the radius of the Earth
5. The Sun's average surface temperature is 10,292° F; Compare that to the Earth's average temperature, which is 68° F
6. The Sun is 93 million miles away from the Earth
7. The Sun is 4.5 billion years old
8. The Sun has layers, but unlike the Earth, the Sun is entirely gaseous; there is no solid surface
9. The Sun rotates on its axis approximately once every 26 days
10. The Sun changes – scientists observe these changes by watching the sunspots.

See more Sun: http://www.nasa.gov/vision/universe/solarsystem/sun_for_kids_main.html

What is the Kepler Mission?

The Kepler Mission is a NASA Discovery Program for detecting potentially life-supporting planets around other stars. All of the extra solar planets detected so far by other projects are giant planets, mostly the size of Jupiter and larger.

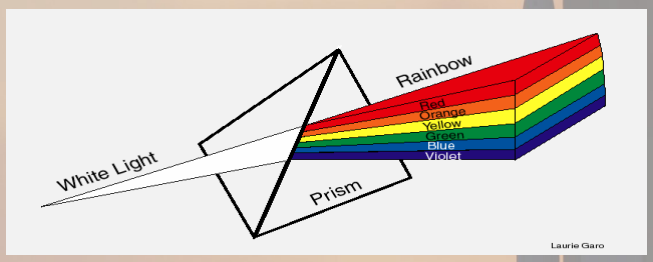
Kepler is poised to find planets 30 to 600 times less massive than Jupiter by a method known as the transit method of planet finding.

When we see a planet pass in front of its parent star, it blocks a small fraction of the light from that star. When that happens, we say that the planet is transiting the star. If we see repeated transits at regular times, we have discovered a planet! From the change in brightness, we can tell the planet size. From the time between transits, we can tell the size of the planet's orbit and estimate the planet's temperature. These qualities determine possibilities for life on the planet.

The Kepler satellite has a 0.95-meter diameter telescope that is a photometer having a field of view a bit over 10 degrees square (an area of sky the size of about two open hands). It is designed to continuously and simultaneously monitor the brightness of 100,000 stars - brighter than 14th magnitude - in the constellations Cygnus & Lyrae.

To detect an Earth-size planet, the photometer must be able to sense a drop in brightness of only 1/100 of a percent. This is akin to sensing the drop in brightness of a car's headlight when a fruit fly moves in front of it! The photometer must be space based to obtain this precision. Kepler was launched in March 2009. For more information, see: http://kepler.nasa.gov

Above: Photometer being lowered onto spacecraft



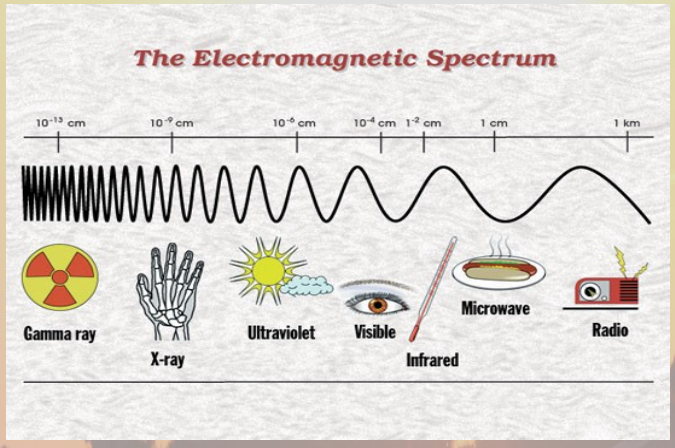
What is the EM Spectrum?

The electromagnetic (EM) spectrum is more familiar to you than you might think. The microwave used to heat your food and the cell phones you use are part of the EM spectrum. The light that our eyes can see is also part of the EM spectrum. This visible part of the EM spectrum consists of the colors that we see in a rainbow - from reds and oranges, through blues and purples.

As white light travels through a prism, the waves of light are refracted. Each color of light has a slightly different wavelength, and the longer wavelengths (red) bend at a lesser angle than the shorter wavelengths (blue). The result is the separation of the wavelengths by color, forming a rainbow. Conversely, a second prism could combine all the wavelengths back into white light.

EM waves are similar to ocean waves in that both are energy waves — they transmit energy. EM waves are produced by the vibration of charged particles and have electrical and magnetic properties. But unlike ocean waves that require water, EM waves travel through the vacuum of space at the constant speed of light.

Have you ever ridden a wave in the ocean? Ocean waves travel on the surface of the water. You can see them, and you can feel them. As you swim through the water, you can even make your own waves. Have you ever seen a flag on a windy day? The wind creates waves in the flag. Both the waves in the flag and the ocean waves are waves that you can see. There are other kinds of waves. We cannot see these waves, but we experience them every day. These waves are called EM waves.



Sound is also a type of wave that we cannot see. Like ocean waves, sound waves need something to travel through like waves through the ocean or through a flag. Sound can travel through air because air is made of molecules. These molecules carry the sound waves by bumping into each other, like dominoes knocking each other over. Sound can travel through anything made of molecules - even water! There is no sound in space because there are no molecules there to transmit the sound waves.

EM waves are different from sound waves because they do not need molecules to travel. This means that EM waves can travel through air and solid materials - but they can also travel through empty space. This is why astronauts on spacewalks use radios to communicate. Radio waves are one kind of EM wave. Electricity can be static, like what holds a balloon to the wall or makes your hair stand on end. Magnetism can also be static like a refrigerator magnet. But when they change or move together, they make waves - EM waves! For more information, see: http://science.hq.nasa.gov/kids/imagers/ems/index.html

Conquering the Next Frontier (of paperwork!)

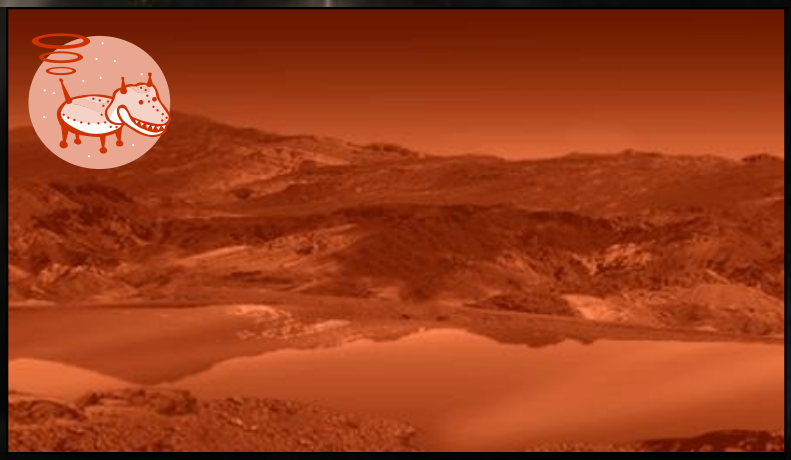
By Susie Satellite

Howdy space cadets! Today finds me behind the locked doors that keep NASA's documents safe and sound in the home of the NSSC's Document Imaging team. What an overwhelming variety of perfectly-inked perfection presides in this chamber. There are forms that allow an astronaut to see a doctor when she's sick, forms that allow a scientist to retire to his dream home in the country, and even bills NASA must pay to keep the shuttles flying. Within these four walls, some of NASA's most important paperwork is handled. Over 1,000,000 pages are processed by this small team of well-trained technicians each year! Using state-of-the-art equipment, they feed documents, stacked like pancakes, into a scanner that gobbles each page, one at a time, and takes a crystal-clear image of each one with its tiny camera. Within moments, the picture is transferred to a computer screen where it is labeled and sent somewhere down the halls of the NSSC. The paperwork never ends! Mail trucks bring documents that the experts at the NSSC must sort, scan and deliver to the right department. When they need help, sometimes the best scientists and engineers at NASA have to fax a request to this very room. The NSSC team is also capable of receiving documents directly from the internet. In many cases, NASA avoids ever having to print a single document. Fewer pieces of paper to print means less money is needed to conduct business. These savings can be spent on fuel for the shuttle, telescope repairs, and maybe a new treadmill for the astronauts on board the space station. The Document Imaging team is highly-trained on sophisticated software as well all business rules and procedures. Remember kids— a successful NASA requires many talents! If you want to help, the important thing is to study and be passionate about what you do.

Suzie Satellite is constantly visiting the NSSC and is always eager to report on the exciting things she sees. She reminds you that you can build your own NASA scientist and mission at: http://www.jpl.nasa.gov/education/uildMissionGame.cfm

The View from Titan

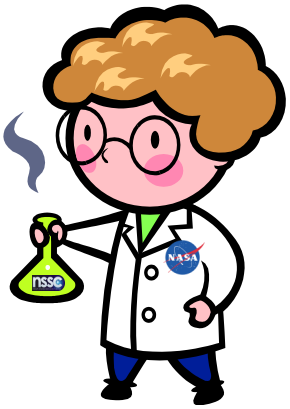
By Sirius



Titan is the biggest of the 53 known moons orbiting Saturn. It is a cold world enclosed by a thick, hazy atmosphere impenetrable by telescopes and cameras. Titan is the second largest moon in our solar system. It's bigger than our own moon and even the planet Mercury. The temperature at Titan's surface is about -178°C (-289°F). Titan is of great interest to scientists because it is the only moon in the Solar System known to have clouds and a mysterious, thick, planet-like atmosphere. Because of the extremely cold temperatures typical of celestial bodies that are that far away from the Sun, the structure of Titan's chemical atmosphere is in a state of deep freeze. It is this chemical composition that interests scientists a great deal because Titan's atmosphere might consist of compounds similar to those present in the primordial days of the Earth's atmosphere. Titan's thick cloudy atmosphere is mostly nitrogen, like Earth's, but may contain much higher percentages of "smog-like" chemicals such as methane and ethane. The smog may be so thick that it actually rains "gasoline-like" liquids. The organic nature of some of the chemicals found in Titan's atmosphere might indicate that this fascinating moon could harbor some form of life.

Learn more about Titan: http://solarsystem.nasa.gov/planets/profile.cfm?Object=Titan
Cassini-Huygens: http://solarsystem.nasa.gov/missions/profile.cfm?MCode=Cassini

Sirius, the robotic dog, travels to exciting places in our Solar System. He frequently sends reports back to the NSSC in exchange for treats and a scratch behind the ear.



It's not just Rocket Science

We're famous for space exploration, but you don't have to leave earth to make use of some our greatest NASA inventions. Some of our discoveries probably impact your daily life and maybe even your favorite sport. Let's take a look at some of the ways NASA scientists have impacted the sport of auto racing.

CLEANER CARS

Space flight research on how and why things burn has helped scientists' efforts to find other fuels, like hydrogen, for engines and furnaces. The research has already begun to show up in improved jet engines, and could soon mean cleaner-burning cars.

HEAT-RESISTANT PAINT

Inorganic paint protects the hot parts of automobiles like exhaust systems, firewalls, brake drums and engine manifolds. The paint was developed from NASA technology.

TIRE RECYCLING

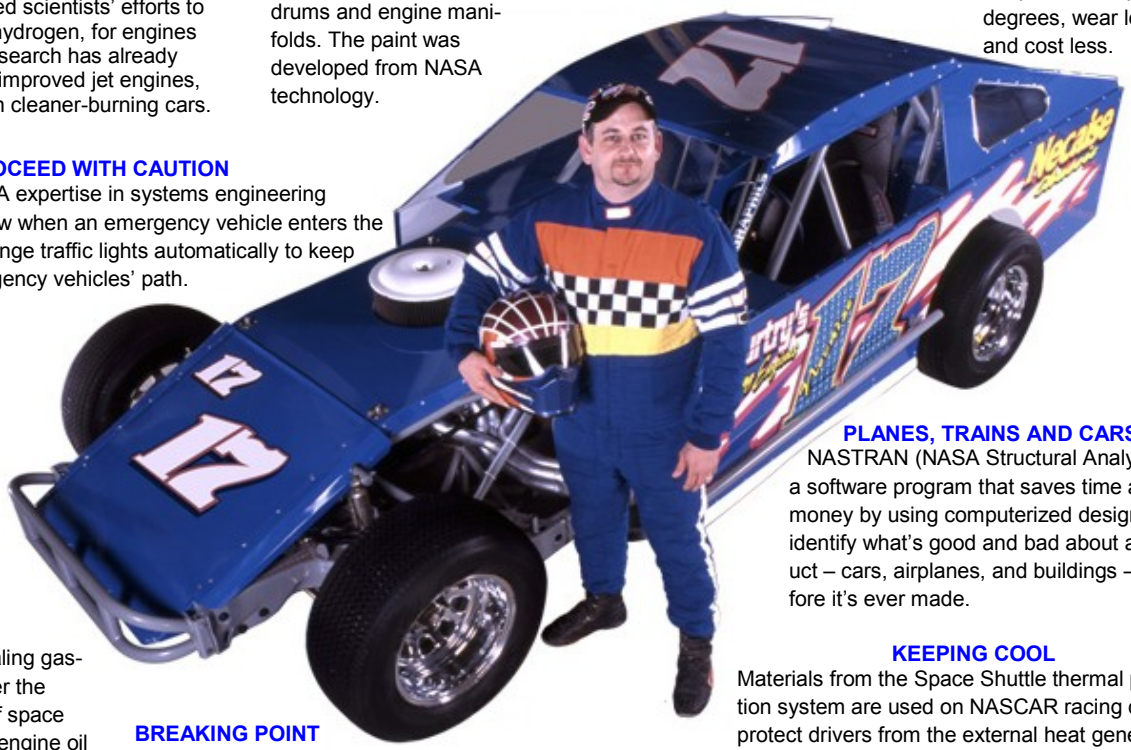
Using a process developed at Stennis Space Center for handling launch vehicle fuels, nearly 5,000 tires per day can be recycled into asphalt road beds, new tires and hoses.

BETTER BRAKES

NASA's search for heat-tolerant space materials led to composite materials for brake linings that stand up under friction temperatures up to 650 degrees, wear longer and cost less.

PROCEED WITH CAUTION

A system using NASA expertise in systems engineering streamlines traffic flow when an emergency vehicle enters the picture. Monitors change traffic lights automatically to keep cars out of the emergency vehicles' path.



GAS GAUGES

A gas leak detection system, developed to monitor the Shuttle's hydrogen propulsion system, is now being used by automakers to build natural gas-powered cars.

PLANES, TRAINS AND CARS

NASTRAN (NASA Structural Analysis) is a software program that saves time and money by using computerized design to identify what's good and bad about a product – cars, airplanes, and buildings – before it's ever made.

OIL– SAVING SEAL

NASA developed sealing gaskets to stand up under the extreme conditions of space flight. They keep car engine oil clean, increasing the life of the vehicle.

BREAKING POINT

A strain gauge had its start on a mobile robot developed for NASA, detecting destructive forces on the robot's frame. The gauge now measures strain on NASCAR and Indy racing car suspension systems.

KEEPING COOL

Materials from the Space Shuttle thermal protection system are used on NASCAR racing cars to protect drivers from the external heat generated by the engine. Without the insulation, it can reach 160 degrees inside NASCAR vehicles.

www.nssc.nasa.gov