A satellite in orbit mastering physics

This is the story of two satellites, a common destination and two very different missions. Here on Earth, one lunar orbiter is preparing to begin its journey to the moon. Meanwhile, 235,000 miles into space, others falling from orbit ends his mission in a heap on the surface of the moon. This week, NASA will launch its Lunar Reconnaissance Orbiter (LRO) at Cape Canaveral, Florida. Currently strapped to the top of the Atlas V rocket at the Kennedy Space Center, this $579 million opening salvo of the space agency Vision for Space Exploration, a series of missions originally designed to return Americans to the moon and then eventually take them further into space. John Keller, deputy mission scientist at LRO, says the goal of the project is to determine whether it is safe and whether resources, such as water, exist to implement a plan to colonize the moon. The Kaguya Orbiter, launched by the Japan Space Agency (JAXA) in late 2007, had purely scientific purposes. The agency intended to respond to some of the remaining unsolved mysteries of the moon, not to mention the first map of the moon using the latest digital imaging technology. LRO is not a scientific mission, Jim Garvin, chief scientist at the Goddard Space Center and one of the founding fathers of LRO, told Popular Mechanics. It has high scientific value, but it was conceived to provide engineering parameters for our eventual manned return to the moon. Although orbiters have several similar instruments - both, for example, boast high-resolution cameras and laser altimeters to provide unprecedented, richly detailed topographical models of the lunar surface - the mission's unique targets mean that even seemingly comparable devices actually differ significantly. The scientific community expects huge data sets to come from each of these missions, Keller said. But while Kayuga's data will be extremely useful for NASA, Garvin adds: What we need to know is the terrain on a civilian scale; Temperatures that they don't display; hydrogen is like a resource, a few miles of scale; image on the scale of a rock that will break the lander's leg. When you start putting all these things together, it's for what you want in a common scientific mission. To find safe landing sites, find potential resources, characterize the radiation environment and demonstrate new technologies. LIFESPAN 21 months (September 2007 to June 2009) 1 to 4 years (1 year of research goal, with the possibility of an extended mission lasting 3 years)CAPABILITIES Lunar radiation: Charged particle spectrometer on Kaguya collected data on high-energy particles as they filled the moon, so that scientists could predict radiation from Rays. Magnetic Anomalies: Located at the end of the 12-meter mast, the Lunar Magnetometer Magnetometer measurements in different directions, strength and intensity of the moon's magnetic fields, providing data to obtain the most detailed maps of the moon's magnetic anomalies. Gravitational fields: Measurements of interference in signals sent between Kaguya, a pair of subsputs (Usuda and Okina), and radiotabins on Earth provided data on the moon's gravity and created the first complete maps covering all of the moon's gravitational make-up. Lunar History: Lunar Radar Sounder, a device emitting low-frequency (5 MHz) radio pulses to the moon, has been used to analyze stratification beneath the surface, thus providing data for a better understanding of the moon's tectonic past. HDTV: Kaguya used a high-definition television camera to shoot the first ever HD video of the lunar surface, as well as capture the full sunrise of the Earth as it orbits the moon. Topography: A set of imaging equipment, Terrain Camera (TC) and Multi Band Imager (MI), swept across the surface in a continuous push of broom fashion. TC consisted of two single-dimensional telescopes and captured black-and-white images with an unprecedented resolution of 10 m/pixel. At the same time, a laser altimeter attached to the orbiter sent a permanent laser pulse to the surface. By the time of reflection between the surface and the orbiter, the altimeter collected the exact data used to create the first ever global, accurate and accurate topographical map of the moon. Radiation measurement: Two devices will measure the moon's volatile radiation environment. Like kagui's charged particle spectrometer, the Lunar Explorer Neutron Detector (LEND) will measure the flow of neutrons produced by a flurry of cosmic rays that constantly shower the lunar surface. But the LRO goes even further with the Space Beam Telescope for Radiation Exposure (CRaTER). It will not only detect incoming solar particles as they pass the orbiter, but also carry a layer of tissue equivalent plastic specifically designed to simulate human tissue and measure the biological effects of particle bombardment. Search for ice: LRO has several tools designed to determine whether water, in the form of ice, exists on the moon. Diviner, a radiometer, will create the first global study of lunar surface temperature, detecting cold traps where ice can exist. According to Garvin, this will tell us where the super cold places are, and how cold they really are. No other mission does that, but it's a really fundamental question. A new technological display called the Mini RF, a small antenna attached to the LRO, will send radio waves to the moon's poles, signals that return, will then be analyzed to determine whether ice is trapped in deep, unresented pole craters. The Lyman-Alpha Cartography Project (LAMP) will measure the faint reflection of light created by stars and hydrogen atoms in space to determine the composition of the unlit areas of the moon. Search for landing sites: while Kaguya Kaguya's cameras The altimeter has created topographical models exceptional, never-before-seen clarity and detail, NASA is committed to improving them. Its lunar orbit laser altimeter (LOLA) will provide data mapping relief for the selection of future landing sites. It's not like the ones that flew before, Garvin says. It will actually map things on a spatial scale just a few meters, and 10 cm vertically. This is the scale by which we map the ice sheets on Earth. The LRO camera package consists of a single wide-angle lens with a resolution of 100 m/pixel, as well as a pair of narrow angular sights with a resolution of 50 cm/pixel. Together they will capture extremely detailed views - objects as small as 1 meter will be visible. The cameras on the Japanese mission are being influenced by a scale of as much as 15 meters, 20 meters, not 50 centimeters, Garvin said. We will be able to create integrated maps of landing areas that will provide safety and better design future landing systems. We massively over-designed Apollo because we had to. Now we can be smarter. (Scientists work on a lunar reconnaissance orbiter. Image from NASA) HISTORY - PLUS: WHO owns the Moon?: Analysis from Glenn Reynolds and APOLLO 11: 40 Years Later, Untold Story - MYTHBUSTERS: Jamie and Adam Debunk Lunar Conspiracies - EARLIER: NASA's First Step to Finding Water on the Moon (illustration depicting the Japanese satellite Kayuga. Image from JAXA/Kayuga) This content is created and supported by a third party You may be able to find more information about this and a similar piano.io on the MDA satellite has always been a one-shot deal. Once the satellite enters orbit, it works either until the equipment fails or until it is released from fuel and released into the atmosphere. People have been launching satellites for more than half a century, and we have yet to find an effective way to visit them and prolong their lives. Our space infrastructure is an incredibly fragile thing, says Steve Oldham, president of Space Infrastructure Services (SIS) at McDonald, Detwiler and Associates (MDA). We all depend on it, and yet we have disposable cultures in space. MDA is one of two aerospace companies, the other of which is ViviSat, which had representatives speak at a recent SATCON satellite industry exhibition in New York about new projects to change this, by developing in-orbit refueling and repair services to extend the lifespan of currently operating satellites. The satellites are expected to last 10 to 15 years without mechanical faults, and most have no problems: Equipment is still puffing along the fine when the satellite runs out of fuel, according to ViviSat COO Brian McGuirk. So these technology could continue to work if engineers could find a way to prevent them from falling into the atmosphere. A large number of satellites have been launched from orbit, function well, and function well generates tens of millions of dollars a year in revenue, said Richard DalBello, vice president of legal and regulatory affairs at Intelsat General, the world's largest commercial satellite operator. MDA solution to this problem: Fill 'er up. SIS's satellite service will use video recognition technology and a robotic arm to carefully open the ship's fuel nozzle, insert a hose and replenish fuel (MDA has built a robotic arm that is currently aboard the International Space Station). Oldham says the soldier alone can remain in orbit for about seven years, performing refueling, which will take about two to three weeks each. At the moment, he said, the design of the project's robotic arm includes an instrumental belt that can open about three-quarters of all satellite fuel caps. The ViviSat servicer is called The Vehicle Expansion Mission (MEV). It will carefully dock on satellites and act as a space tug, orbit correction. Because that's what you'd do with a satellite once it's been refueled, the MEV basically performs the same function as a SIS servicer, but without adding fuel. However, the MEV will remain attached to the satellite for much longer than the SIS. It will take one to five years to carefully adjust the course of the satellite. They are both impressive systems, DalBello says. The ability to refuel is a very powerful technology, he says, and his company has just signed a $280 million contract with MDA. However, he said, the towing system has its strengths, for example, for satellites that can no longer control themselves. In situations where you may have a satellite control malfunction, this may be your only solution, he says. In addition to extending the life of satellites, these retainers can also respond to the challenges faced by satellites in orbit. DalBello cites the example of the Intelsat satellite over Africa, which had problems deploying one of its dishes. That multimillion-dollar income hit us, he says. This could be what would require a simple faucet to open the dish. This simple faucet could have been provided by an SIS servicer. While these two support systems will provide unprecedented ability to support satellites, neither of them provides permanent fixes. In the end, the satellites wear out or become obsolete, and at this point will not benefit from additional refueling or course correction. According to DalBello, Intelsat will look to use SIS on satellites that age best and extend their lives by two to four years. It's a small step, but satellite companies are thrilled to be able to service their vehicles, which are likely to start in 2015. We build a satellite, we cross our fingers and we hope for the best and we fully rely on it, says Oldham. We are rely on this network, but oddly enough, we don't put it on, unlike any other network we use. That's about to change. This content is created and supported by a third party, a party, imported to this page to help users provide their email addresses. You may be able to find more information about this and similar content on piano.io piano.io what is the period of a satellite in a geosynchronous orbit mastering physics. a satellite in a circular orbit mastering physics