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Oldest Satellite in Orbit Turns Fifty

The first solar powered satellite

Fifty years ago, on this very day, the United States Navy launched the fourth artificial satellite into space, Vanguard 1, the first satellite into Earth's orbit to be powered by sunlight. Its mission was to test the capabilities of a three-staged vehicle and the effects of the space environment on artificial satellites and the systems they were using at that time. As of 2007, Vanguard 1 became the oldest satellite, and spacecraft for that matter, into an orbit around the Earth. Although it will probably orbit the Earth for another 200 years, communications with the satellite have been lost some time ago. Practically, Vanguard 1 became a space junk after the loss of radio signal in 1964. It was allegedly supposed to stay into a stable orbit around the Earth until 2000, however, soon after orbit insertion engineers discovered that the orbit was already decaying due to the action of solar radiation pressure and atmospheric drag, and was estimated that its actual lifetime was only 240 years. Vanguard 1 consists of an aluminum sphere 15 centimeters in diameter, weighing 1.47 kilograms. Inside the sphere two radio transmitters lie, one of them being powered with the help of a mercury battery while the other, through a solar panel array with six cells. Both transmitters had as primary purpose the tracking of data. Besides other sub-systems, Vanguard 1 also carried two thermistors that monitored the efficiency of the heat shield the satellite was equipped with. It executes an orbit around the Earth in about 134.2 minutes and had an eccentricity of 34.25 degrees in the day of the launch. Radio signals from the two transmitters, emitting in the 108 and 108.3 Mhz, showed the asymmetry between the north and the south pole of the Earth and the electron concentrations between the satellite and the Earth receptors. After 6 years of continuous service, the solar panels of the spacecraft were no longer able to provide with the required energy to power the radio transmitter. After a few days, the signal began to gradually weaken until all transmissions stopped. Additionally, Vanguard 1's shape enabled it to make detailed observations on the upper layers of the Earth's atmosphere and the drag it exerted on any spacecraft orbiting in that specific area of space. Today, the United States Navy Research Laboratory celebrates five decades since the satellite was launched.