Vanguard 1 facts

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Vanguard 1, the first Solar-Powered Satellite [and the Oldest Human-Made Object Still in Orbit] was Launched on March 17, 1958

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Our editors will review what you"ve submitted and determine whether to revise the article.

NSSDCA/COSPAR ID: 1958-002B

Vanguard 1 (1958 Beta 2) was a small Earth-orbiting satellite designed to test the launch capabilities of a three-stage launch vehicle and the effects of the environment on a satellite and its systems in Earth orbit. It also was used to obtain geodetic measurements through orbit analysis. It was the second satellite launched by the U.S., the first successful satellite of the Vanguard series, and the first satellite to use solar cell power. It is the oldest satellite still orbiting the Earth.

A cylindrical separation device kept the sphere attached to the third stage prior to deployment. At deployment a strap holding the satellite in place released and three leaf springs separated the satellite from the cylinder and third stage at a relative velocity of about 0.3 m/s.

Vanguard was the designation used for both the launch vehicle and the satellite. The first stage of the three-stage Vanguard Test vehicle was powered by a GE X-405 28,000 pound (~125,000 N) thrust liquid rocket engine, propelled by 7200 kg of kerosene (RP-1) and liquid oxygen, with helium pressurant. It also held 152 kg of hydrogen peroxide. It was finless, 13.4 m (44 ft.) tall, 1.14 m (45 in.) in diameter, and had a launch mass of approximately 8090 kg (17,800 lbs. wt.).

The second stage was a 5.8 m (19 ft.) high, 0.8 m (31.5 in.) diameter Aerojet-General AJ-10 liquid engine burning 1520 kg (3350 lbs) Unsymmetrical Dimethylhydrazine (UDMH) and White Inhibited Fuming Nitric Acid (WIFNA) with a helium pressurant tank. It produced a thrust of 7340 pounds (~32,600 N) and had a launch mass of approximately 1990 kg (4390 lbs. wt.). This stage contained the complete guidance and control system.

A solid-propellant rocket with 2350 pounds (~ 10,400 N) of thrust (for 30 seconds burn time) was developed by the Grand Central Rocket Co. to satisfy third-stage requirements. The stage was 1.5 m (60 in.) high, 0.8 m (31.5 in.) in diameter, and had a launch mass of 194 kg (428 lbs.). The thin (0.076 cm, 0.03 in.) steel casing for the third stage had a hemispherical forward dome with a shaft at the center to support the satellite and an aft dome fairing into a steel exit nozzle.

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The total height of the vehicle with the satellite fairing was about 21.9 meters (72 feet). The payload capacity was 11.3 kg (25 lbs.) to a 555 km (345 mi.) Earth orbit. A nominal launch would have the first stage firing for 144 seconds, bringing the rocket to an altitude of 58 km (36 mi), followed by the second stage burn of 120 seconds to 480 km (300 mi), whereupon the third stage would bring the satellite to orbit. This was the same launch vehicle configuration, with minor modifications, as used for Vanguard TV-3 and all succeeding Vanguard flights up to and including Vanguard SLV-6.

Launch Date: 1958-03-17Launch Vehicle: VanguardLaunch Site: Cape Canaveral, United StatesMass: 1.46 kg

Questions and comments about this spacecraft can be directed to: Dr. David R. Williams