

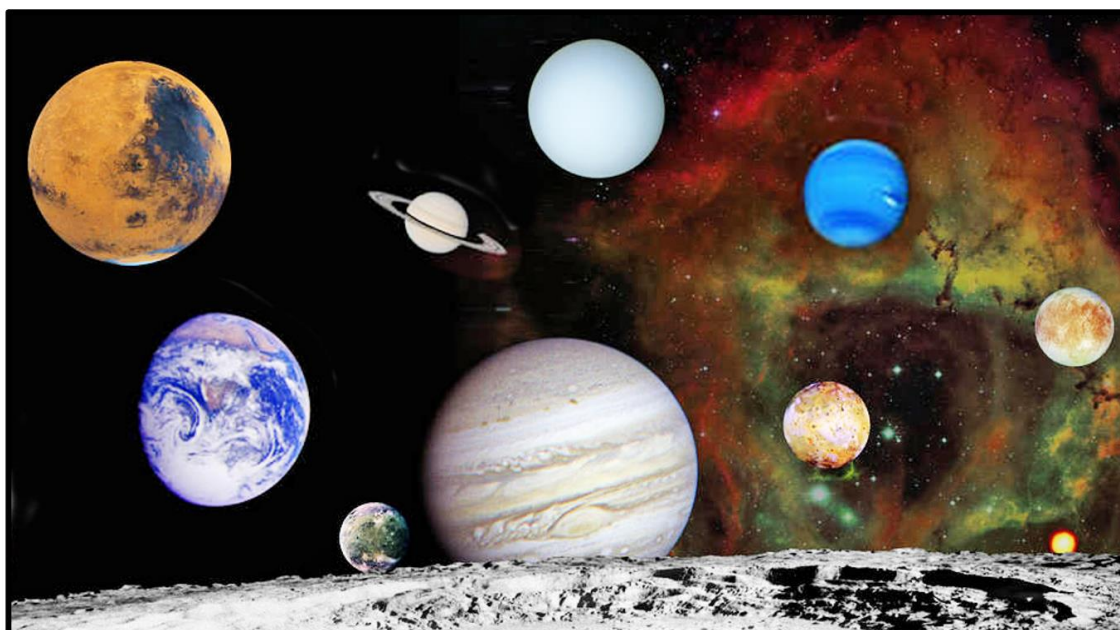
TRANSISTOR MUSEUM™

"THE FIRST TRANSISTORS IN SPACE"

PRESERVING HISTORIC 1950S/60S/70s TRANSISTORS
USED IN EARLY SPACECRAFT AND MISSILES

LEARN HOW THE FIRST GERMANIUM AND SILICON TRANSISTORS POWERED THE EARLIEST SPACECRAFT AND MISSILES

Invented at Bell Labs in 1947 and announced publicly in June 1948, transistor technology was destined to become a fundamental enabling component of early space flight. The key performance characteristics of transistors, including very low power consumption, rugged use, light weight and long service life were very well matched with space flight requirements and supported the rapid development of spacecraft and missile technologies throughout the 1950s-1970s. An historic example of this remarkable pairing of technologies was the successful launch in January 1958 of the first U.S. satellite, Explorer 1, which used only transistor electronics (no vacuum tubes) and performed beyond expectations by measuring radiation levels and returning the resultant scientific data that was the basis for the discovery of the Van Allen radiation belt. The Transistor Museum is pleased to open this new section highlighting the historic contributions of transistor technology to early spacecraft and missiles. We will soon be expanding this section, so please check back often.



FIRST TRANSISTORS IN SPACE

Scroll through the pages below for a quick view of our new Transistor Museum Section. Use the links provided for detailed information on each historic transistor, spacecraft and missile.

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EXPLORER 1 SATELLITE SILICON TRANSISTOR TI TYPE "2N335"

TRANSISTOR MUSEUM PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

First U.S. Satellite: Successfully launched on January 31, 1958, this satellite was a welcome success for the U.S. space program, which had experienced a major setback with the earlier Vanguard launch explosion. Explorer 1 data led to the discovery of the Van Allen radiation belt.

Photo Credit: "Explorer 1 in Orbit", Image credit: Bob Trembley, simulated in Kerbal Space Program. Hosted at Vatican Observatory.

[Explorer 1 Satellite](#)



POLARIS MISSILE GERMANIUM TRANSISTOR TYPE "R212"

HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

This iconic photograph was taken on Nov 16, 1963 and shows President John Kennedy, on the deck of the USS Observation Island, observing the firing of a Polaris missile from the nuclear submarine, USS Andrew Jackson. Kennedy later stated: "It is still remarkable to me that a missile can be successfully and accurately fired from beneath the sea."

Photo Credit: U.S. government printing office.

[Polaris Missile](#)

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VANGUARD SATELLITE GERMANIUM TRANSISTOR WECO TYPE "GF45011"

HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

Vanguard: Shown at upper right of the stamp art image is the Vanguard satellite, launched in 1958 and still in orbit after 60 years. This historic satellite played a key role in establishing U.S. success in the space race.

Photo Credit: U.S. stamp first issue 1999. Series entitled "1950-1959 - America in the 20th Century - U.S. Launches Satellites"

[Vanguard Satellite](#)



OSCAR 1 SATELLITE SILICON TRANSISTOR TYPE "2N1491/2/3"

TRANSISTOR MUSEUM PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

OSCAR 1 SATELLITE - Launched in December 1961, OSCAR 1 was the world's first non-governmental satellite. Built by a group of California based amateur radio operators for only 63 dollars, OSCAR 1 operated for 22 days.

Photo Credit: Smithsonian Air and Space Museum. Project Oscar donated the Oscar 1 spacecraft model shown at left to the Smithsonian in 1963.

[Oscar 1 Satellite](#)

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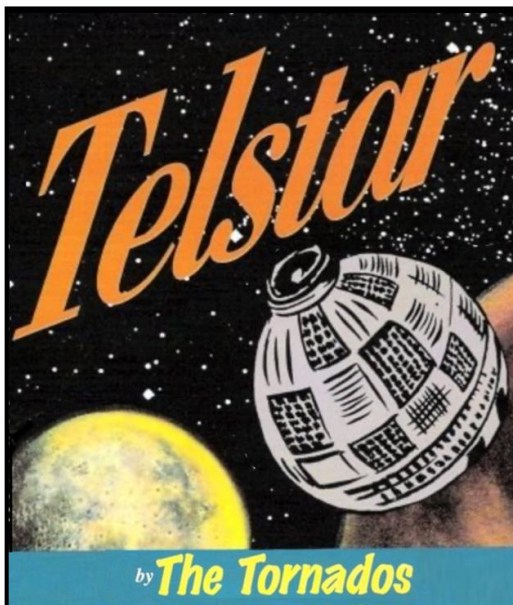
TITAN MISSILE SILICON TRANSISTOR WECO TYPE "2N560"

TRANSISTOR MUSEUM PRESERVATION COLLECTION

Titan Missile: The first successful test of Titan took place in January of 1960 and the first Titans became operational, based out of Lowry AFB in Denver, Colorado in April 1962. Over the next two decades improved missiles Titan II and Titan III were developed and hundreds were deployed.

Photo Credit: 1961 oil painting by Thomas L. Berger - "USAF Titan 1 Missile Atomic Warhead Rocket Launch in Denver Colorado".

[Titan Missile](#)



TELSTAR SATELLITE GERMANIUM TRANSISTOR WECO TYPE "2N559"

HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

First Communications Satellite: Telstar, one of the best remembered 1960s space-race milestones, was launched on July 10, 1962 and was soon relaying TV programs, phone calls, and fax/photo data across the Atlantic.

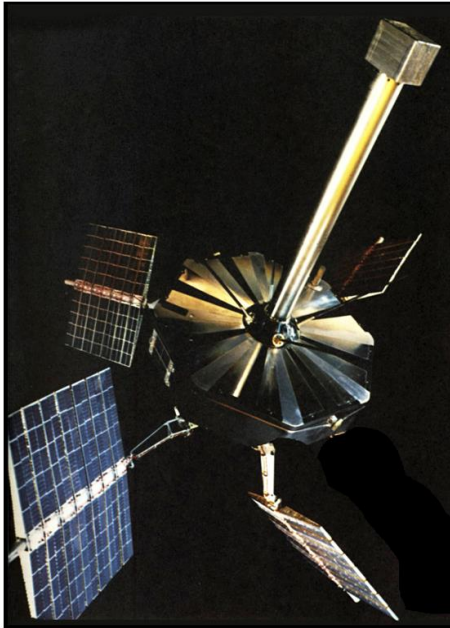
Photo Credit: Album cover of best-selling 1962 song "Telstar" - the success of the satellite had a big impact on popular culture.

[Telstar Satellite](#)

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EXPLORER 12 SATELLITE SILICON TRANSISTOR FAIRCHILD TYPE "2N1131/32"

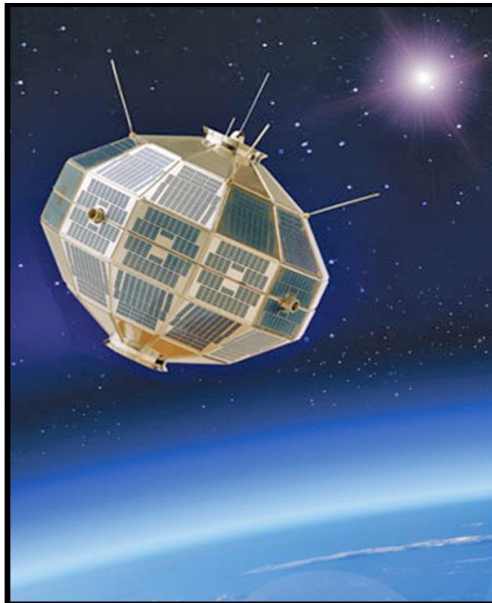
HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

The "Windmill Satellite": The Explorer 12 was launched on August 12, 1961. It was a solar-cell powered, spin-stabilized spacecraft instrumented to measure cosmic-ray and trapped particles, solar wind protons, and magnetospheric and interplanetary magnetic fields. Transmissions ceased on December 6, 1961.

Photo Credit: NASA

[Explorer 12 Satellite](#)



ALOUETTE SATELLITE SILICON TRANSISTOR TYPE "2N2501"

HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

Alouette: With the September 29, 1962 launch of the Alouette I scientific satellite, Canada became the first nation, after Russia and America, to design and build its own artificial Earth satellite. Alouette II was launched in 1965 and both missions were highly successful.

Photo Credit: National Research Council Canada
Artist conception of Alouette in earth orbit.

[Alouette Satellite](#)

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PIONEER 10 SPACECRAFT SILICON TRANSISTOR TYPE "2N930"

HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

A True Pioneer - The highly successful Pioneer 10, launched on March 2, 1972, was the first deep space mission intended to fly by Jupiter and then continue a trajectory past the outer planets and into interstellar space. Last contact with Earth was on January 22, 2003.

Photo Credit: NASA. Artist conception of Pioneer 10 fly-by of Jupiter in December 1973.

[Pioneer 10 Spacecraft](#)



NIKE ZEUS MISSILE SILICON TRANSISTOR WECO TYPE "2N1072"

HISTORIC TRANSISTOR PRESERVATION COLLECTION

HISTORIC PHOTO ARCHIVE

Nike Zeus "Anti-Missile" Missile: Developed in the mid-late 1950s, Nike Zeus was the first missile developed in the U.S. to defend against intercontinental ballistic missiles (ICBM). This timeframe coincided with the availability of the first high performance WECO silicon transistors.

Photo Credit: Copyright © 2013 by Sven Stork. Photo taken at the NPS Golden Gate Park restored Nike Base SF-88 in the Marin Headlands.

[Nike Zeus Missile](#)