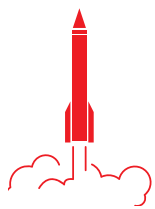


# HARRIS: PARTNERING WITH NASA FOR 60 YEARS

## LEGACY OF SUCCESS



BUILT ON SOLUTIONS FOR MOST MAJOR UNMANNED AND MANNED NASA SPACEFLIGHT PROGRAMS SINCE 1960

## FIRST 2-WAY COMMUNICATIONS

BETWEEN A SATELLITE (ECHO) AND EARTH ENABLED BY HARRIS TECHNOLOGY



## NASA'S TDRS ENABLED

WITH HARRIS UNFURLABLE SATELLITE ANTENNAS AND GROUND SYSTEMS



## TECHNOLOGY FOR APOLLO

INCLUDED TELEMETRY FOR COMMAND AND LUNAR MODULES, AND CAMERA USED BY NEIL ARMSTRONG FOR EXTREME CLOSE-UPS OF LUNAR SOIL



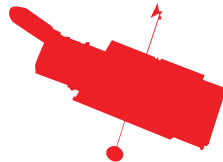
## SHUTTLE MISSIONS



USED HARRIS COMMUNICATIONS TECHNOLOGY ON BOARD EVERY SHUTTLE SPACECRAFT

## HUBBLE TELESCOPE

HAS RELIED ON HARRIS FINE GUIDANCE AND FOCUS CONTROL EQUIPMENT FOR MISSION SUCCESS



## IMAGES OF MARS

TAKEN BY HARRIS IMAGING SENSORS ON THE MARS SOJOURNER ROVER PROVIDED NEW INSIGHTS OF THE RED PLANET



## ON-ORBIT RADIOS

FROM HARRIS ARE USED ON THE INTERNATIONAL SPACE STATION TO ADVANCE COMMUNICATIONS TECHNOLOGIES



## NEXT-GEN IMAGING

SYSTEMS, LIKE THE JAMES WEBB SPACE TELESCOPE, DEPEND UPON HARRIS' SPECIALIZED EXPERTISE



# DELIVERING MISSION SOLUTIONS

TO PUSH THE BOUNDARIES OF HUMAN KNOWLEDGE



Harris' partnership with NASA spans the agency's 60-year history, beginning with miniaturized electronic tracking and pulse code technologies for early spacecraft; continuing through the Mercury, Apollo, Space Shuttle, and International Space Station missions; and contributing to exciting new programs, such as the James Webb Space Telescope and Orion's first crewed flight.

With the company's headquarters and many key operations located on Florida's Space Coast, multiple generations of Harris employees have experienced first-hand the excitement of NASA missions. For many, these missions were the inspiration to pursue careers in advanced technologies.

## COMMUNICATIONS AND TELEMETRY

Harris communications and telemetry technologies have served many key NASA missions. Our antenna system for **Echo**, NASA's earliest communications satellite, enabled the first active, two-way communications between a space satellite and Earth. Our pulse code modulation (PCM) technology for NASA's **Nimbus weather satellites** marked the first use of PCM in an orbiting space vehicle and helped deliver unprecedented long-term forecasts.

Other Harris solutions, including our unfurlable space antennas, ground systems, and ground-based antennas, have played a major role in NASA's **Tracking and Data Relay Satellite System** since the program's beginning. Harris' 5-meter unfurlable space antenna supplied critical communications monitoring connectivity with the Jupiter-orbiting **Galileo** spacecraft. Our fine guidance and focus control equipment has served the **Hubble Space Telescope** throughout its nearly three decades of operation.

Similarly, manned missions have relied on Harris communications and telemetry systems. **Mercury** astronauts used Harris radio technology to communicate with tracking stations. Harris equipment performed flawlessly aboard **Apollo** spacecraft and lunar modules. Apollo missions also relied on a Harris antenna system to help recovery teams locate command modules after splashdown. Harris technology was on board every **Space Shuttle**, either providing direct mission support via onboard computers and electronics, or as part of the spacecraft's payload. The **International Space Station** depends on onboard audio/video distribution technology from Harris and is using our reconfigurable software-defined radio technology to advance communications technology.

## IMAGING AND REMOTE SENSING SYSTEMS

Harris' imaging and remote sensing systems and services for NASA programs have enabled scientists to gain a clearer picture and better understanding of the earth, moon, planets, and larger universe. Our remote sensing technology enabled NASA to deliver many firsts, including the first photos of the earth from the moon and extreme close-ups of the lunar surface taken by **Apollo** astronauts on the moon. Our imaging sensors enabled the **Mars Sojourner Rover** to capture unprecedented images of Mars' surface. Harris' Advanced Baseline Imager is now delivering revolutionary new products for weather forecasting as the primary instrument on the new **Geostationary Operational Environmental Satellites - R Series**, a collaborative NOAA and NASA program.

NASA's **Chandra X-ray Observatory** has captured images of deep space phenomena using an imaging system designed, integrated, and tested by Harris. Harris integrated components to form the optical telescope element of the **James Webb Space Telescope**, and we designed and administered its cryogenic testing. Looking further ahead, we will provide the crucial audio communication system on board the **Orion** spacecraft in support of NASA's first human deep-space exploration mission.



Photo credit: NASA/Chris Gunn

## About Harris Corporation

Harris Corporation is a leading technology innovator, solving customers' toughest mission-critical challenges by providing solutions that connect, inform and protect. Harris supports government and commercial customers around the world. Learn more at [harris.com](http://harris.com).

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