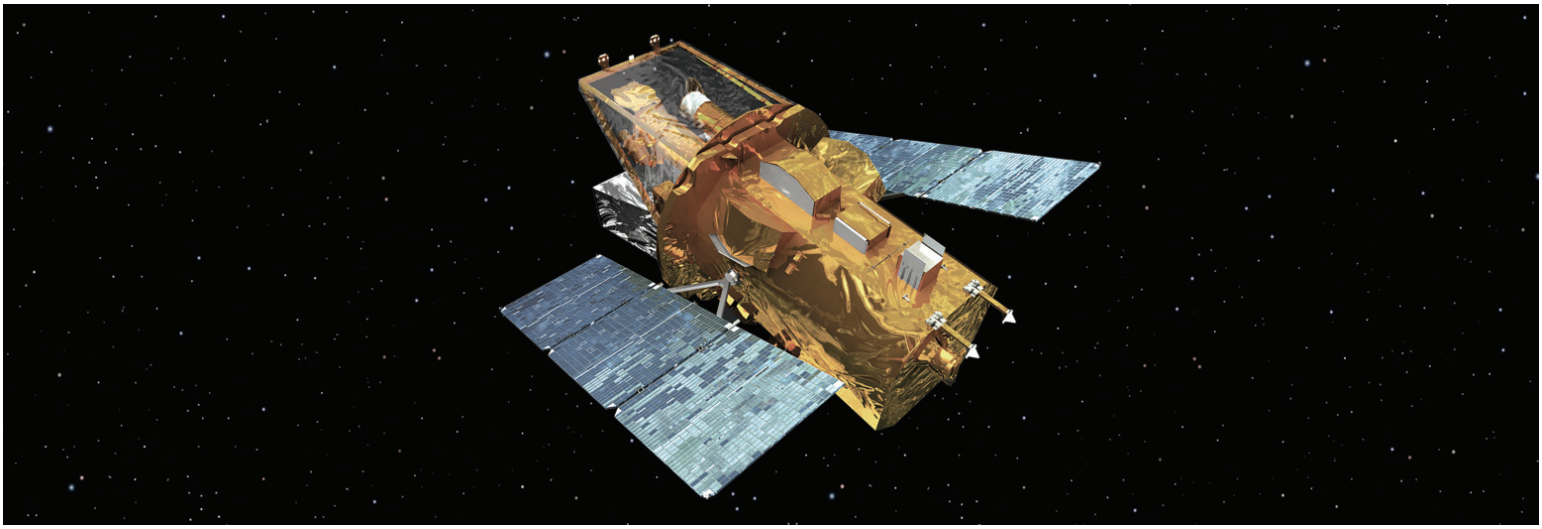
Swift

Space-based Gamma-Ray Observatory

FACT SHEET



Mission Description

Swift is a NASA Mid-size Explorer (MIDEX) orbiting observatory that detects Gamma-Ray Burst (GRB) events and "swiftly" slews itself (within tens of seconds) to focus directly on the event with multi-spectral instruments that provide accurate burst location and other key data for an international science team.

Swift carries three customer-furnished instruments: The Burst Alert Telescope (BAT), the X-Ray Telescope, (XRT), and the Ultra Violet Optical Telescope (UVOT).

When a GRB is detected and located, the coordinates are downlinked via TDRSS to enable concurrent observation using ground-based and other space-based assets.

Within the first 16 months of its 2-year mission Swift precisely located more GRBs than those of all previous missions combined. At the completion of the scheduled mission in December 2006, the Swift spacecraft bus had provided a net mission availability of 99.2 percent and the mission was extended. Swift continues to provide data with a bus net mission availability of greater than 96 percent.

The Swift Mission Operations Center is located at the Penn State University Department of Astronomy and Astrophysics.

Spacecraft

Orbital ATK designed and manufactured the fully-redundant Swift spacecraft bus for NASA, and served in a leadership role at the Goddard Space Flight Center (GSFC) during instrument integration, environmental testing, launch, early orbit check-out, and initial mission operations. Orbital ATK continues to provide sustaining engineering support to the mission.

FACTS AT A GLANCE

- Launched November 20, 2004 on a Delta 7320-10 from Cape Canaveral Air Force Station, Florida.
- 600 x 600 km @ 20.6° inclination, Low Earth Orbit mission.
- Observatory automatically slews to point at gamma ray source within seconds of the onset of the Gamma Ray Burst (GRB).
- Swift successfully completed its two year mission in December 2006 and continues to provide on-orbit GRB data.
- Three payload telescopes: Burst Alert, X-Ray, and UV Optical.
- Simple, easily integrated design based on Orbital ATK's flight-proven LEOStar™-3 modular spacecraft architecture that reduces assembly and test time.

Customers:

NASA Goddard Space Flight Center

Penn State University

Swift

Specifications

Spacecraft

Mass:	1,467 kg (3,234 lb.)
Solar Arrays:	Two gimbaled, three panel, triple-junction GaAs/Ge cells, 2132 W EOL
Orbit:	600 x 600 km @ 20.6° inclination
Stabilization:	3-axis, zero momentum bias
Pointing:	<144 arcsec (pitch & yaw), <150 arcsec (roll) control <2.2 arcsec (pitch & yaw), <45.8 arcsec (roll) knowledge
Data Storage:	32 Gbits
Data Downlink:	STDN/TDRSS, to 2.25 Mbps
Propulsion:	None
Mission Life:	2 year mission; 3 year design; 5 year goal
Current Status:	Operational

Launch

Launch Vehicle:	Delta II 7320-10
Launch Site:	Cape Canaveral Air Force Station, Florida
Date:	November 20, 2004

Instruments

Burst Alert Telescope (BAT)

Initially identifies coordinates of GRBs to <3 arcmin causing the spacecraft to change its attitude (slew) to point the XRT and UVOT towards the GRB source. Covers 10-150 keV; has large coded-aperture; 1.4 steradian field-of-view; 400 W; 318 kg (optics). Developed by NASA GSFC.

X-Ray Telescope (XRT)

X-ray CCD imaging spectrometer that measures position, spectrum, and brightness of GRBs and afterglows from 0.2-10 keV. Has a dynamic range of more than seven orders of magnitude in flux; 51 cm aperture (tube diameter); 30 cm mirror aperture; 3.5 m focal length; 23.6 x 23.6 arcmin FOV; 87 W; 198 kg. Jointly developed by Penn State University, the University of Leicester, and the Brera Observatory.

Ultra Violet Optical Telescope (UVOT)

Covers wavelengths from 170 to 650 nm with dynamic range from mB = 24 to mB = 8; 30 cm aperture; 3.8 m focal length; 17 x 17 arcmin FOV; 125 W. Jointly developed by Penn State University and the Mullard Space Sciences Laboratory.

Data Availability

Swift data is available to the world via the High Energy Astrophysics Science Archive Research Center (HEASARC) in the U.S., the U.K. Swift Science Data Center (UKSSDC) in the U.K., and the Italian Swift Archive Center (ISAC) in Italy. For more information, visit: *http:///heasarc.nasa.gov/docs/swift/sdc/*

Mission Partners

NASA Goddard Space Flight Center

Procuring Agency: provided program and contract management, Principal Investigators, and development of the BAT instrument

Orbital ATK

Designed and manufactured spacecraft, supported payload integration and system test, launch support, and on-orbit engineering

Penn State University

XRT lead and development, UVOT lead, data-processing unit development, and on-orbit mission operations

University of Leicester, U.K.

Developed the XRT focal plane array and operates the UK Swift Data Centre

Mullard Space Science Laboratory, U.K.

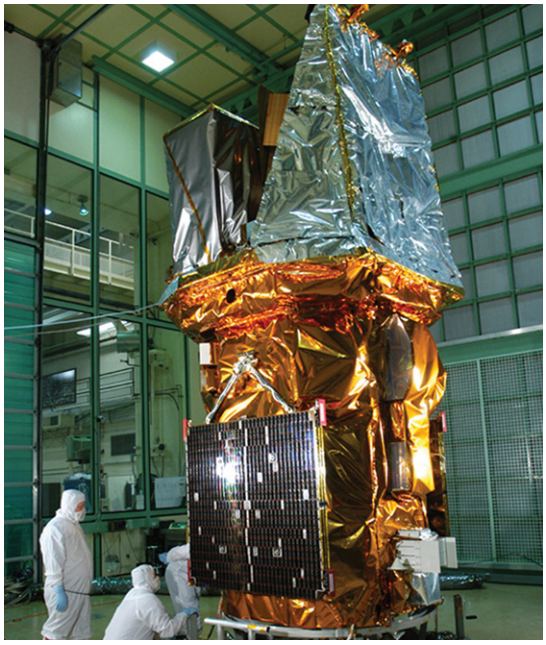
Developed the UVOT telescope module

Osservatorio Astronomico di Brera (OAB), Italy

Provided the optics for the XRT and jointly operates the Italian Swift Data Centre with ASI

Agenzia Spaziale Italiana (ASI), Italy

Provided software for the XRT, provides the Malindi (Kenya) Ground station, and jointly operates the Italian Swift Data Centre with OAB



Swift in final checkout at GSFC. (NASA photo)