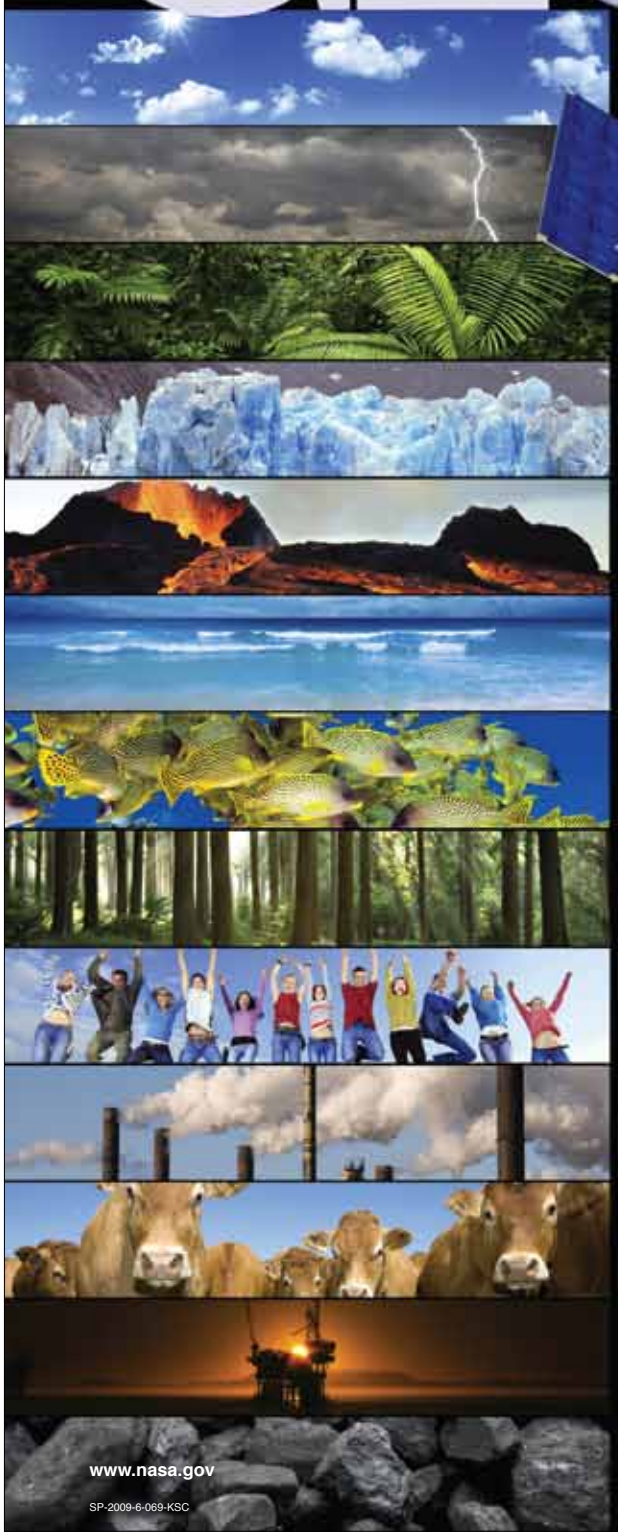
National Aeronautics and Space Administration

Launch Services Program presents...

GLORY



NASA's Glory mission is the first of its kind dedicated to improving our understanding of human and solar effects on climate. The mission will be launched to a low-Earth orbit on a Taurus XL launch vehicle from Vandenberg Air Force Base in California. Glory will carry instruments designed to measure total solar irradiance and aerosol particles in the Earth's atmosphere, and their relative impacts on Earth's energy balance.

Glory will:

- Continue and improve upon the 31-year satellite record of total solar irradiance, a record that is used in climate models to help determine climate sensitivity to changes in the sun's radiation.
- Help determine the properties and distribution of aerosol particles across Earth's atmosphere, enabling climatologists to evaluate the degree to which different aerosols absorb and reflect solar radiation and influence clouds.
- Provide a new understanding of how and why the sun's radiation varies, and how this variation affects Earth's climate.
- Reveal new information about the global distribution of black carbon, produced by both human activities and natural processes, that's known to absorb radiation strongly and thus have a warming influence on climate.
- Provide improved capability to distinguish aerosol types from space - an important capacity that has been a challenge for previous sensors.
- Record information continuously, providing scientists with a new and different source of data that provides the capability to evaluate the sizes of water cloud droplets and the shape and size of ice cloud particles more accurately than before.
- Be the sixth spacecraft to join a fleet of Earth-observing satellites known as the Afternoon Constellation, or "A-Train," which together offer a more cohesive and detailed picture of our Earth system.
- Improve the accuracy of global and regional climate predictions as society seeks to respond and adapt to a changing climate system.

Launch Vehicle: Taurus XL

Launch Location: Vandenberg Air Force Base, CA

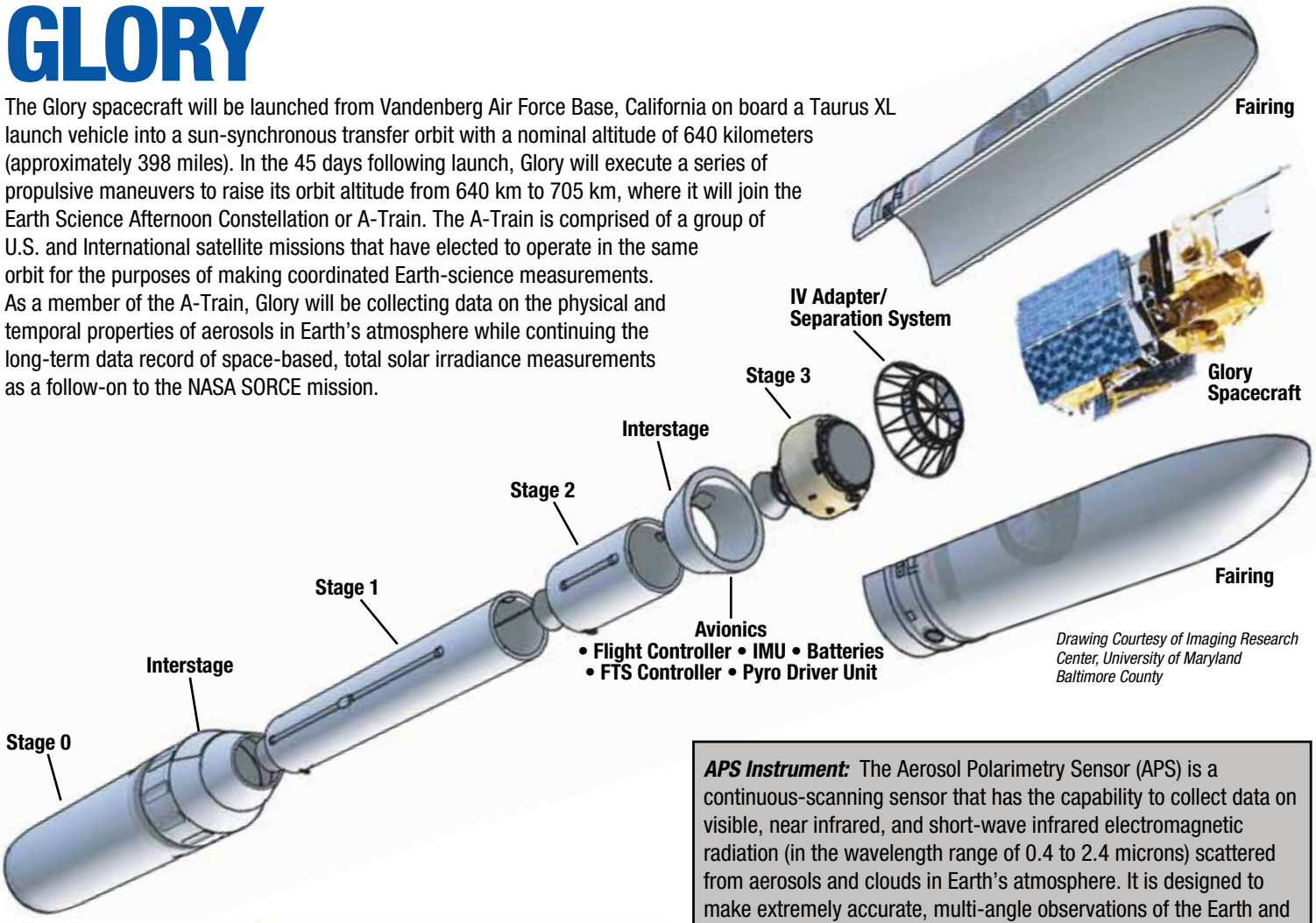
Launch Date: 2011

www.nasa.gov

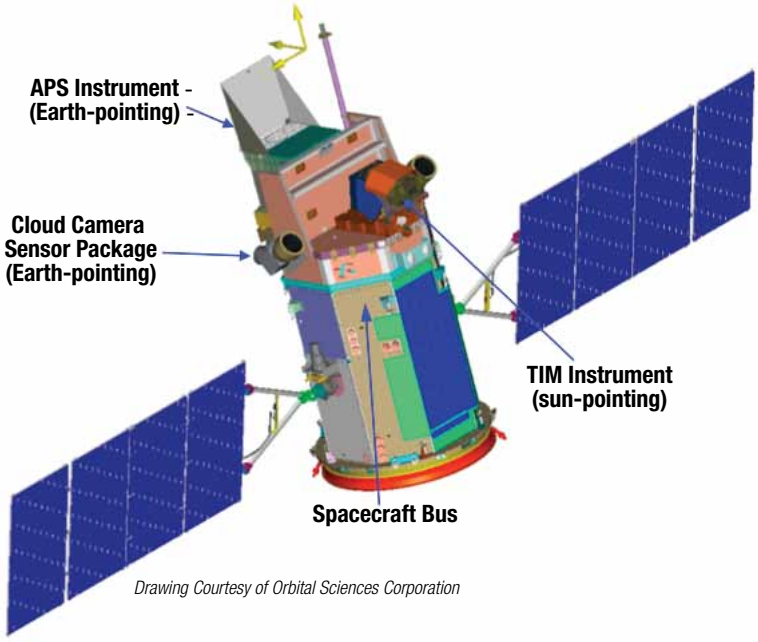
SP-2009-6-069-KSC

GLORY

The Glory spacecraft will be launched from Vandenberg Air Force Base, California on board a Taurus XL launch vehicle into a sun-synchronous transfer orbit with a nominal altitude of 640 kilometers (approximately 398 miles). In the 45 days following launch, Glory will execute a series of propulsive maneuvers to raise its orbit altitude from 640 km to 705 km, where it will join the Earth Science Afternoon Constellation or A-Train. The A-Train is comprised of a group of U.S. and International satellite missions that have elected to operate in the same orbit for the purposes of making coordinated Earth-science measurements. As a member of the A-Train, Glory will be collecting data on the physical and temporal properties of aerosols in Earth's atmosphere while continuing the long-term data record of space-based, total solar irradiance measurements as a follow-on to the NASA SORCE mission.



Drawing Courtesy of Imaging Research Center, University of Maryland Baltimore County



Drawing Courtesy of Orbital Sciences Corporation

APS Instrument: The Aerosol Polarimetry Sensor (APS) is a continuous-scanning sensor that has the capability to collect data on visible, near infrared, and short-wave infrared electromagnetic radiation (in the wavelength range of 0.4 to 2.4 microns) scattered from aerosols and clouds in Earth's atmosphere. It is designed to make extremely accurate, multi-angle observations of the Earth and its atmospheric scene spectral polarization and radiance.

TIM Instrument: The Total Irradiance Monitor (TIM) is an electrical substitution radiometer (ESR) that records total solar irradiance with extreme accuracy and precision. It has four identical radiometers to provide redundancy and to help detect changes in the instrument from exposure to solar radiation. TIM is mounted on a platform that points the instrument toward the Sun independently of the spacecraft.

Cloud Camera Sensor Package: The Cloud Camera Sensor Package is a dual-band (blue and near infrared), visible imager utilizing non-scanning detector arrays that are analogous to star trackers but Earth-viewing. It consists of an optical imaging system that provides continuous cross-track coverage over a field of view centered on the APS along-track footprint.

Spacecraft Bus: The Glory spacecraft bus uses Orbital Science Corporation's LEOStar bus design, with twin articulated deployable solar panels, 3-axis stabilization, and X-band/S-band RF communications capabilities. The structure consists of an octagonal aluminum space frame and a hydrazine propulsion module containing enough fuel for at least 36 months of on-orbit service. The spacecraft bus also provides payload power; command, telemetry, and science data interfaces, including onboard storage of data; and an attitude control subsystem to support instrument pointing requirements.

Spacecraft Definitions Courtesy of Goddard Space Flight Center/Glory Project Office

National Aeronautics and Space Administration

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