Lockheed Martin Solar X-Ray Imager To Be Launched On NOAA GOES-P Spacecraft

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The Solar X-ray Imager (SXI) instrument, designed and built by Lockheed Martin at its Space Systems Advanced Technology Center (ATC) is ready for flight.

Built for the NASA Goddard Space Flight Center (GSFC) in Greenbelt, Md., SXI is awaiting launch - scheduled for March 2 - on the National Oceanic and Atmospheric Administration (NOAA) GOES-P spacecraft from Cape Canaveral Air Force Station, Fla. SXI is one of a suite of instruments that resides on the current generation of Geostationary Operational Environmental Satellites (GOES).

"It is enormously satisfying to have our third SXI instrument ready for launch and we look forward to seeing it operating on-orbit," said George Koerner, SXI program manager at the ATC. "While the other GOES instruments provide near-constant viewing of the Earth, SXI is designed to view the Sun and provide vital information regarding solar activity."

The SXI will be used to aid NOAA and U.S. Air Force personnel in issuing forecasts and alerts of space weather conditions, and in developing a better understanding of Sun-related phenomena that affect the Earth's environment. Turbulent space weather can affect radio communication on Earth, induce currents in electric power grids and long distance pipelines, cause navigational errors in magnetic guidance systems, upset satellite circuitry and expose astronauts to increased radiation.

SXI will observe solar flares, coronal mass ejections, coronal holes and active regions in the X-ray region of the electromagnetic spectrum. These features are the dominant sources of disturbances in space weather that lead to, for example, geomagnetic storms. SXI will also examine flare properties, newly emerging active regions, and X-ray bright points on the Sun. SXI will provide continuous, near real-time observation of the Sun's corona, acquiring a full-disk image every minute. The images cover a 0.7 degree field of view with 0.0014 degree pixels.

The solar disk, as viewed from Earth, is approximately 0.5 degrees in diameter. By recording solar images every minute, NOAA observers will be able to detect and locate the occurrence of solar flares. This is the name given to the explosive releases of vast amounts of magnetic energy in the solar atmosphere. Since scientists are not yet able to predict the occurrence, magnitude or location of solar flares, it is necessary to continually observe the Sun to know when they are happening.

When a flare erupts, it throws out large clouds of ionized, or electrically charged, gas. A small fraction of the cloud is very energetic and can reach the Earth within a few minutes to hours of the flare being observed. These energetic particles pose a hazard to both astronauts and spacecraft.

Coronal mass ejections, which are often associated with flares, take several days to reach the Earth. Fast, powerful ejections give rise to geomagnetic storms, which can disrupt radio transmissions and induce large currents in power transmission lines and oil pipelines. They have resulted in large-scale failures of the North American power grid and greatly increased pipeline erosion. SXI also will monitor coronal holes -- persistent sources of high-speed solar wind. As the Sun rotates every 27 days, these sources spray across the Earth like a lawn sprinkler and cause recurring geomagnetic storms.

NOAA's environmental satellite system is composed of two types of satellites: Geostationary Operational Environmental Satellites (GOES) for national, regional, short-range warning and "now-casting"; and Polar Operational Environmental Satellites (POES) for global, long-term forecasting and environmental monitoring. Lockheed Martin and its heritage companies built all of the POES satellites going back to the very first weather satellite launch on April 1, 1960, and is currently developing the next generation GOES-R satellite system, with a first launch set for 2015. Both GOES and POES are necessary for providing a complete global weather monitoring system. Both also carry search and rescue instruments to relay signals from people in distress.

The ATC has a 47-year-long heritage of spaceborne solar instruments including the Soft X-ray Telescope on the Japanese Yohkoh satellite, the Michelson Doppler Imager on the ESA/NASA Solar

and Heliospheric Observatory, the solar telescope on NASA's Transition Region and Coronal Explorer, the Solar X-ray Imager on the GOES-N and O environmental satellites, the Focal Plane Package on Hinode and an Extreme Ultraviolet Imager on each of the two spacecraft in NASA's Solar Terrestrial Relations Observatory. The laboratory also conducts basic research into understanding and predicting space weather and the behavior of the Sun including its impacts on Earth and climate.

The ATC is the research and development organization of Lockheed Martin Space Systems Company (LMSSC). LMSSC, a major operating unit of Lockheed Martin Corporation, designs and develops, tests, manufactures and operates a full spectrum of advanced-technology systems for national security and military, civil government and commercial customers. Chief products include human space flight systems; a full range of remote sensing, navigation, meteorological and communications satellites and instruments; space observatories and interplanetary spacecraft; laser radar; ballistic missiles; missile defense systems; and nanotechnology research and development.

Headquartered in Bethesda, Md., Lockheed Martin is a global security company that employs about 140,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation reported 2009 sales of $45.2 billion.

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