

Lockheed Martin Physicist Honored With 2011 American Geophysical Union John Adam Fleming Medal

PALO ALTO, Calif., Dec. 8, 2011 [/PRNewswire/](#) -- Dr. Alan M. Title, physicist at the Lockheed Martin (NYSE: LMT) Space Systems Advanced Technology Center (ATC) in Palo Alto, was honored last evening with the 2011 John Adam Fleming Medal, at a ceremony at the 2011 Fall Meeting of the American Geophysical Union (AGU) in San Francisco. The Fleming Medal is awarded not more than once annually to an individual "for original research and technical leadership in geomagnetism, atmospheric electricity, aeronomy, space physics, and related sciences."

Established in 1960, the Fleming Medal is named in honor of John Adam Fleming, who made important contributions to the establishment of magnetic standards and measurements. Fleming served as AGU officer in a number of positions, including: secretary of the Terrestrial Magnetism and Atmospheric Electricity section (1920–1929), Union General Secretary (1925–1947), and honorary president (1947–1956). John Adam Fleming was associated with the science of geomagnetism throughout his career, and with the American Geophysical Union from its founding until his death.

As a scientist, Alan Title studies the Sun. His primary research interest is the generation, distribution, and effects of the solar magnetic field throughout the Sun's interior and outer atmosphere. Using spectral imaging techniques we now can map both horizontal and vertical flows in the solar interior and surface. Flow maps have shown among other things how the solar interior rotates as a function of radius. This profile is essential for any understanding of interior magnetic field generation – dynamo action. Magnetic fields can be measured in the photosphere and inferred in the interior and outer atmosphere. Using these techniques it has been discovered that magnetic field emerges everywhere on the solar surface at a rate sufficient to completely replace the fields outside of active regions in less than a day, and even active region fields are replaced in at most a few weeks. The detailed mechanisms by which magnetic energy is released is currently the focus of his research. At present, he has 169 articles in refereed journals. Building on accumulated knowledge, through observation and experimentation, he asks new questions of the Sun and formulates hypotheses on how it might work.

As an engineer, Alan Title designs, develops, builds, and flies new instruments that will gather the data necessary to test those hypotheses. He led the development of tunable bandpass filters for space-based solar observations, a version of which is currently operating on the JAXA/ISAS Hinode spacecraft. He also invented a tunable variation of the Michelson Interferometer that has been employed on the SOHO spacecraft, the Solar Dynamics Observatory (SDO), the Global Oscillations Network Group of the National Solar Observatory as well as other ground-based systems.

Extraordinarily dedicated to advancing public awareness of science, Dr. Title has supported activities at the Tech Museum, Chabot Observatory, Boston Museum of Science, the National Air and Space Museum, and the Hayden Planetarium. In addition, his educational outreach funding has supported a yearly summer program for Stanford undergraduates, and the Stanford Hass Center activities that develop science programs for K-12 classrooms. And for two decades, promising students from the Palo Alto High School District have come to work in his laboratory.

Dr. Title has been with the company since 1971. He is currently the Principal Investigator for NASA's next solar mission called the Interface Region Imaging Spectrograph (IRIS), which will launch in late 2012. Both the instrument and spacecraft are under construction at the ATC. Title was the Principal Investigator responsible for the Atmospheric Imaging Assembly on NASA's Solar Dynamics Observatory (SDO) launched in 2010, and is a Co-Investigator for another instrument on SDO, the Helioseismic Magnetic Imager. He was also the Principal Investigator for NASA's solar telescope on the Transition Region and Coronal Explorer (TRACE) mission, launched in 1998, and the Focal Plane Package on the JAXA/ISAS Hinode mission launched in 2006. Additionally, Title serves as a Co-Investigator responsible for the Michelson-Doppler Imager (MDI) science instrument on the NASA-European Space Agency Solar and Heliospheric Observatory (SOHO), launched in 1995. All of these instruments were built under Alan Title's direction at the ATC.

Dr. Title was born in Los Angeles and went to local schools and attended UCLA as an undergraduate. After graduating with a degree in mathematics he attended Columbia University in New York City for a year, then

transferred to the California Institute of Technology and graduated in 1966 with a PhD in physics. Upon graduation he was a National Research Fellow at the Smithsonian Astrophysical Observatory in Cambridge, Mass. After a year he became a Research Fellow at Harvard University where he was responsible for the development of the optical solar telescopes on Skylab. At Harvard, Dr. Title met his wife to be, Dr. Ruth Peterson.

Dr. Title joined Lockheed in 1971 to take over the direction of its Solar Observatory. Except for six months in 1989 where he was a visiting Professor at the Max Planck Institute for Astrophysics in Garching, Germany and six months in 1993 where he was a visiting Professor at Tokyo University, Japan, he has remained at Lockheed Martin as leader of the solar group. In 1994, Professor Phillip Scherer of Stanford and Dr. Title formed the Stanford-Lockheed Institute for Space Research.

The Solar and Astrophysics Laboratory at the ATC conducts basic research into understanding and predicting space weather and the behavior of our Sun, including its impacts on Earth and climate. It has a 48-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 of NASA's Transition Region and Coronal Explorer, the Focal Plane Package on the Japanese Hinode satellite, the Solar X-ray Imagers on GOES-N, -O and -P, the Extreme Ultraviolet Imager instruments on NASA's twin STEREO spacecraft, and the Helioseismic and Magnetic Imager and the Atmospheric Imaging Assembly on NASA's Solar Dynamics Observatory. The ATC is currently building both the science instrument and spacecraft for NASA's Interface Region Imaging Spectrograph (IRIS), a Small Explorer Mission scheduled for launch in late 2012.

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 126,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation's 2010 sales from continuing operations were \$45.8 billion.

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