Inside Wallops

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NASA to Explore "Secret Layer" of the Sun

Early next year, NASA astronomers hope to glimpse a secret layer of the sun.

"The transition region" is a place in the sun's atmosphere, about 5000 km above the stellar surface, where magnetic fields overwhelm the pressure of matter and seize control of the sun's gases.

It's where solar flares explode, where coronal mass ejections begin their journey to Earth, where the solar wind is mysteriously accelerated to a million mph. It is, in short, the birthplace of space weather.

Researchers hope it is about to yield its secrets.

"We're going to launch an experimental telescope that can measure vector magnetic fields in the transition region," explains Jonathan Cirtain of the Marshall Space Flight Center (MSFC). Previous studies have measured these fields above and below the transition region—but never inside it. "We hope to be the first."

The name of the telescope is SUMI, short for Solar Ultraviolet Magnetograph Investigation. It was developed by astronomers and engineers at MSFC and is currently scheduled for launch from White Sands Missile Range, N.M., in April 2009.

SUMI works by means of "Zeeman splitting." Dutch physicist Pieter Zeeman discovered the effect in the 19th century. When a glass tube filled with incandescent gas is dipped into a magnetic field, spectral lines emitted by the gas get split into two slightly different colors—the stronger the field, the bigger the splitting. The same thing happens on the sun.

By measuring the gap, astronomers estimate the strength of the sunspot's magnetic field. By measuring the polarization of the split line, astronomers can figure out the direction of the magnetic field. Strength + direction = everything you ever wanted to know about a magnetic field.

This trick has been applied to thousands of sunspots on the solar surface but never to the transition region just a short distance above.

Why not?

"Just bad luck, really," says Cirtain. "Gas in the transition region doesn't produce many strong spectral lines that we can see at visible wavelengths." It does, however, produce lines at UV wavelengths invisible from Earth's surface.

"That's why we have to leave Earth."

A Terrier-Black Brant sounding rocket of the type that will carry SUMI above Earth's atmosphere.

SUMI will be housed in the nosecone of a Terrier-Black Brant sounding rocket on a suborbital flight that takes it to an altitude of 186 miles. "We'll be above more than 99.99% of Earth's atmosphere," says Cirtain.

About 68 seconds into the flight, payload doors will open, giving SUMI a crystal-clear view of the UV sun. "From that moment, we've only got eight minutes to work with. We'll target an active region and start taking data."

SUMI's "vector magnetograph" is tuned to study a pair of spectral lines: one from triply-ionized carbon (CIV) at 155 nanometers and a second from singly-ionized magnesium (MgII) at 280 nanometers.

Cirtain anticipates how it will feel to have his precious instrument hurtling above Earth at 5,000 mph: "Eight minutes of terror." He'll start breathing again when the payload doors close and SUMI begins its descent back to Earth.

Wallops Shorts.....

Balloon Launch

A NASA scientific balloon was launched from Ft. Sumner, N.M., on September 27. The flight was the second qualification test of the new 34.43 million cubic foot balloon design with a fully loaded (8,000 pound) payload. The Spacecraft Technology Center at Texas A&M University flew a camera and control computer system to capture images of stars and near Earth orbiting satellites at an altitude above 100,000 feet as a piggyback instrument.

Debbie Fairbrother, NASA Wallops Flight Facility, Balloon Program Office was the experimenter for the flight that reached a float altitude of 125,000 feet for a total flight time of 27 hours, 39 minutes. All instrument systems functioned normally.

Wallops Celebration Rescheduled

The Wallops Celebration originally scheduled for October 2 has been postponed until Thursday, October 23.

NASA's ARCTAS Mission Support

"I would like to take this opportunity to send our commendations and highest regards for the outstanding performance of the Wallops P3 Aircraft Group during the NASA ARCTAS field mission conducted during the spring and summer of 2008.

An intensive and demanding flight schedule such as the one we had in Cold Lake, Canada, created additional stress on the science and flight crews. Throughout the entire deployment, the performance of the P3 crew was consistent and exceptional. They made every effort to ensure that all the experiments were accommodated and ready for the next flight.

This "can do" effort and attitude was exhibited by the entire crew throughout the field mission from pre-integration to the final download of the experiments and the return of shipments home. This is indicative of teamwork at its best and requires qualified and dedicated personnel who are willing and able to function as a "close knit" group.

I, and the other researchers and technicians from our branch feel very fortunate to have had the opportunity to work with such a professional group. In particular, we would like to recognize the following P3 personnel for their significant contributions in making the P3 ARCTAS deployment such a huge success.

Our thanks to Mike Cropper, John Valliant, Jeff Sigrist, John Doyle, Peter Peyton and Bill McGrory of the NASA Wallops Flight Facility and Todd Brody of AeroUnion for a job well done."

Warren Gore
Chief, Atmospheric Science Branch
Earth Science Division
NASA Ames Research Center

The heavy rain, winds and high tides from last week's N'easter sent the surf crashing over the geo tubes and bulkhead on Wallops Island.

Photos by Rebecca Powell and Betty Flowers

Energy Consumption

The following is a list of buildings on the Main Base and Wallops Island and electric consumption for the period August 21 to September 20 as compared to the same period last year. The percentage indicates either a decrease (-) or increase (+) in consumption.

Building F-160 held on to the lead for the second month in a row. Building N-161 was second in ranking last month and dropped to 5th place this month. Building F-6 moved from 3rd to 2nd place. Remember turn off lights and electrical equipment when not in use.

Overall Rankings

1.	F-160	-28.7 %
2.	F-006	-22.9 %
3.	F-004	-22.5 %
4.	F-019	-20.3 %
5.	N-161	-18.4 %
6.	X-075	-13.7 %
7.	F-001	-12.6 %
8.	D-010	-11.8 %
9.	Z-040	-9.5 %
10.	E-107	-8.8 %
11.	F-005	-7.4 %
12.	E-106	-7.1 %
13.	N-159	-6.9 %
14.	A-001	-5.8 %
15.	AEGIS	-3.1 %
16.	F-007	-3.0 %
17.	F-010	-2.3 %
18.	N-162	-2.0 %
19.	E-002	+1.3 %
20.	E-134	+1.9 %
21.	X-015	+2.0 %
22.	E-104	+2.8 %
23.	E-105	+3.0 %
24.	F-002	+8.2 %
25.	D-008	+10.4 %
26.	V-024	+11.0 %
27.	B-129	+11.2 %
28.	F-016	+19.2 %
29.	W-020	+30.2 %
30.	D-001	+49.5 %
31.	F-003	+54.7 %
32.	E-007	+97.5 %
33.	M-015	+110.2 %
34.	B-031	+144.8 %
35.	M-020	+245.7 %

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