Sounding Rockets

"We're nere to serve the customer," Gurkin says with a ring of southern hospitality. "If the customer isn't happy, then we're not doing a good job." That customer most often is a university scientist. "We can put the instrument in space where and when it needs to be there."

The average mission, Gurkin continues, costs somewhere around \$200,000 per year, and may include seven or eight flights over a period of years. "That's not a lot of money in space science these days."

All space-science disciplines are included in NASA's sounding rocket program, such as research in high-energy strophysics, galactic tronomy, solar physics and upper atmospheric research. Typically, Gurkin says, researchers look at large, bright, easily tracked objects like the sun and the planets, and their observations do not require long light times.

'On average, there's about six minutes for the experiment to do its thing," Gurkin says. The ast a maximum of 20 minutes. The near-vertical flights with the largest sounding rockets can exceed 800 miles in altitude; however, all of the flights are auborbital.

In general, the rockets range

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from one to four stages, each filled with propellant, depending on the size of the payload and how high they are to be boosted into space. Surplus rocket motors are often used for the program, Gurkin says, which contributes to cost efficiency.

The Smithsonian's Golub egan his research program in 986. To date, his experiment ias flown five times, and he plans one flight a year for the remainder of the current solar cycle, which began in 1986. The solar cycle is a period of about 11 years between "solar minimums" when sunspot activity is lowest.

The payload sent up on each flight is the "Normal Incidence X-ray Telescope," or NIXT, built for Golub's research by engineers at the Smithsonian Astrophysical Observatory and scientists at the IBM Thomas J. Watson Research Center in Yorktown Heights, N.Y. At the heart of the telescope is a special mirror - built by IBM scientist Dr. Eberhard Spiller that allows very high-resolution X-ray images of the sun's corona to be focused on film without contamination by other wavelengths of energy radiated

by the sun. "Basically, our goal is just to see it [the corona] better," Golub says. The most recent launch of the

telescope was during the July 1991 solar eclipse. The path of when the moon completely blocks light coming from the sun - for this eclipse covered Mauna Kea in Hawaii, which also happens to be the site of a major astronomical obscrvatory.

(Continued From Page 2)

Golub and his colleagues took advantage of this coincidence. the first in modern memory. At the very moment totality began in Hawaii, the NIXT was launched in New Mexico. The five-minute rocket flight nearly matched the duration of totality in Hawaii, during which time Golub's experiment recorded the seething corona as seen over the face of the uneclipsed sun.

At the same time, scientists from the University of Hawaii's Institute for Astronomy observed and photographed the corona extending beyond the sun, a phenomenon which can best be seen in visible light from Earth during an eclipse. In the Canary Islands off the coast of Africa - again, at the same moment in time-other researchers looked at the uneclipsed sun in white light to complement Golub's X-ray images of the solar disk.

The observations in multiple wavelengths will help create an improved three-dimensional model of the sun's corona. Such a model will help solar researchers better understand thermal dynamics in the corona as well as magnetic fields and how they are linked to sunspots and solar flares. In addition, the model may help discover what heats this thin atmospheric layer to such high temperatures.

During the most recent launch at White Sands, Golub seemed happy with the success of his

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Smithsonian News Service Photo by William Schulz

This Terrier Black Brant sounding rocket recently carried aloft a telescope to photograph the sun. The telescope was built by IBM and Smithsonian scientists.

mission, at least with what he could tell of real-time images beamed from the telescope to a video screen at the launch site. When the screen went blank, he walked outside to wait for a helicopter that would take him

to recover the telescope and

"What do you think, Leon?" asked an observer there to witness the launch. Golub smiled, hel a cigar in his teeth and gave tl ictory sign.

ASTRO-DES

ARIES Mar. 21 - Apr. 19

Jealousy can wreck a valued relationship. The clock will be against you. You work hard and still cannot

TAURUS Apr. 20 - May 20 Watch out for an everly emotional state in a relation who is close to you. A firm hand is needed.

GEMINI May 21 - June 20 Your imagination can play havoc with you. Broading

CANCER June 21 - July 22 will get you nowhere. Think positively! Frivolity seems to be ulmost this week. Take time and really enjoy yourself. The serious things will be

LEO July 23 - Aug. 22 Your moods vary so much this week that you will not be the easiest person to live with. It's a good time to seek solitude

VIRGO Aug. 23 - Sept. 22 Distractions are many this week. Don't be deterred from your main purpose. Perseverance pays aff.

LIBRA Sept. 23 - Oct. 22 You unbend in your feelings for others, and it is a great improvement towards family relationships.

SCORPIO Oct. 23 - Nov. 21 Relying on one's self is not the only answer. Others are only to eager to assist you.

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Don't try to run the whole show. Not only is it im-

Nov. 22 - Dec. 21 CAPRICORN Dec. 22 - Jan. 19

possible, but it could be hazardous to your health. Your good deeds are mounting and the benefits are

AQUARIUS

shared with older folks. Helping others is in reality helping yourself.

Jan. 20 - Feb. 18

You must place emphasis on the long range plans for you and your family.

PISCES Feb. 19 - Mnr. 20 GTML74

Now is the time to give a great deal of thought to your future. You can succeed if you are willing to make sacrifices.



