cies "will encourage, to the maximum extent feasible, a domestic commercial launch industry," by contracting directly with the private sector rather than with NASA.

Last week's announcement also noted that the President will establish a National Microgravity Research Board to stimulate research in the "microgravity environment," which in this context essentially means in earth orbit, such as aboard a space station. The board is to include representatives from the Departments of Commerce, Transportation, Energy and Defense, as well as the National Institutes of Health and the National Science Foundation.

In addition, government space activities will use commercially available goods and services wherever possible, as well as avoiding any actions that may "preclude or deter commercial space sector activities." Questions of patent rights, for example, have been a sore point for years.

The administration's ambitious plans for the future, however, are likely to require more than just off-the-shelf technology. The plan is now to start NASA on a program called Project Pathfinder to develop technologies needed for "expanding human presence and activity beyond earth orbit," as well as for unmanned missions. The project is envisioned as focusing on four major areas: Besides exploration (the kind of mission) and operations (making it work), it includes "humans-in-space" (such as the biological, physiological, psychological and other needs of people on a three-year round trip to Mars, given that not even any Soviet cosmonaut has spent as long as a year in space), and "transfer vehicles" (a variety of space tugs and other craft for such tasks as moving from low to higher orbits, important, for example, in building a space station).

A major factor in plans for the U.S. space station has been the administration's goal of securing international cooperation, primarily from Europe, Canada and Japan. Late last week, the European Space Agency announced initial agreement with NASA on the text of a memorandum of understanding covering Europe's participation, which is to consist of a laboratory module attached to the station, another that is an unattached "free-flyer" positioned nearby, and an unmanned platform that would be stationed in a pole-crossing orbit rather than in the near-equatorial orbit of the station itself. Canada's contribution, a "mobile servicing center" equipped with a remotely controlled arm similar to the one Canada provided for the shuttle, is a step farther along in the agreement process. Another laboratory module, with its own remote arm as well as an external storage pallet, is to be provided by Japan, though the actual agreement texts are not yet final. — *J. Eberhart*

UV radiation decreasing over U.S.?

Long-term measurements of ultraviolet (UV) radiation from the sun are not living up to scientific expectations, according to researchers who have been monitoring this radiation at eight U.S. airports. Between 1974 and 1985, they report, the amount of UV radiation appears to have decreased. However, some scientists familiar with the instruments used in this project are questioning the accuracy of the findings.

Atmospheric scientists have anticipated an increase in the UV radiation reaching the earth's surface because of recent observations that the global ozone layer has thinned since the late 1970s (SN: 1/9/88, p.20). Stratospheric ozone protects life on earth by absorbing dangerous UV radiation, and scientists have estimated that for every 1 percent drop in ozone, there should be a 2 percent increase in the amount of UV radiation reaching the earth's surface.

"That's the confusing part about this finding. The UV should be increasing," says Gerald Cotton of the National Oceanic and Atmospheric Administration's Air Resources Laboratory in Silver Spring, Md. Cotton worked with Joseph Scotto and Thomas Fears of the National Cancer Institute and Frederick Urbach and Daniel Berger at Temple University in Philadelphia. The researchers published their results in the Feb. 12 SCIENCE.

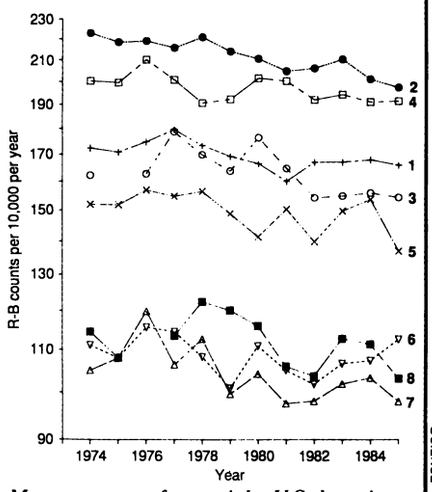
The experiment relied on Robertson-Berger meters that were stationed along the edge of the contiguous United States at cities of various altitudes. These instruments detect radiation wavelengths ranging from 280 to 330 nanometers.

Previous studies have shown that a wavelength in the neighborhood of 297 nm is most effective for producing sunburn in typical Caucasian skin, and the same range of wavelengths is known to cause changes in DNA that can lead to skin cancer.

Over the 12-year period, the researchers found a 2 to 7 percent drop in the amount of UV radiation reaching the ground. According to Cotton, these are the longest records for UV radiation measured at the ground.

This decrease does not necessarily call into question the observed loss in stratospheric ozone, says Cotton. Within the earth's troposphere — the layer directly below the stratosphere — there are many factors that absorb UV radiation, such as clouds, air pollution and even debris from volcanic eruptions.

Studies have shown that the United States has become more cloudy in recent years. In addition, volcanic eruptions, like El Chichón in 1982, send fine particles into the atmosphere, where they can remain for years.



Measurements from eight U.S. locations show a clear decrease in the amount of ultraviolet radiation hitting the earth. The stations are labeled: (1) Tallahassee, Fla.; (2) El Paso, Tex.; (3) Fort Worth, Tex.; (4) Albuquerque, N.M.; (5) Oakland, Calif.; (6) Philadelphia; (7) Minneapolis; and (8) Bismarck, N.D. Strength of radiation generally increases with lower latitudes and higher altitudes.

"Maybe there's something going on in the troposphere that's more important than we expected," says Cotton.

However, he adds, "I'm not ruling out that there might be something going on with the instruments, too." Cotton notes that there has been some controversy over the reliability of measurements taken with the Robertson-Berger meter.

According to physicist Jon Geist, the meters are not accurate enough to monitor the small, long-term trends in UV radiation. Moreover, the instruments tend to lose accuracy over time and need to recalibrated, a process that can often introduce error. Geist and his colleagues at the National Bureau of Standards in Gaithersburg, Md., have analyzed the design of the Robertson-Berger meter in an attempt to improve the machine.

"I seriously question whether this instrument is capable of providing data that are meaningful at this level of accuracy," says Geist. "I don't think you can tell a 10 percent change over 10 years."

Berger, who worked on the study and designed the meter used during the project, acknowledges that there were "major problems" with the machines. But he believes that the meters were accurate enough for this study.

"I think," he says, "that the long-term variations are probably correct."

— *R. Monastersky*