



News Release

United States Air Force

HEADQUARTERS SPACE DIVISION (AFSC) OFFICE OF PUBLIC AFFAIRS LOS ANGELES AFS
PO BOX 92960, WORLDWAY POSTAL CENTER, LOS ANGELES, CA 90009 (213) 643-0254 AV 833-0254

Release Nr 87-007
April 16, 1987

MILITARY NAVIGATION SYSTEM OPENS BROAD HORIZONS FOR CIVILIAN USERS

By 1st Lt. [REDACTED]

LOS ANGELES AIR FORCE STATION, Calif. -- In Detroit, Cadillac is investigating the design of one. The Japanese are interested in developing one. And Mercedes Benz is scheduled to sell its first one in 1991.

What are each of these top car builders working on? Navigation equipment that will tell car occupants exactly -- to 100 meters (110 yards) -- where they are, how to get to where they're going, and, even, how to get around road construction or accidents.

That equipment will receive signals from the Navstar Global Positioning System, a military space-based navigation and positioning system being developed by a joint program office at Space Division, Los Angeles Air Force Station.

Navstar GPS will consist of 21 satellites, launched from the space shuttle and the Delta II, a new medium launch vehicle being developed for the Air Force by McDonnell Douglas Astronautics Division. Launching is scheduled to begin in October 1988.

-more-

Although its primary purpose is to provide worldwide three-dimensional navigation and time to military forces, Navstar GPS is already being used by the civilian world -- ranging from underwater mapping in Norway to highway design surveying in Texas.

"Navstar GPS is a system developed by the military," noted Lt. Col. Ernst Willert, NATO deputy program manager in Space Division's Joint Program Office, "but the initial impact will be much greater for the civilians than the military. Civilians will be the first to use it -- something that doesn't usually happen in the military world."

Incredibly, Navstar GPS is not scheduled to be operational until the early 1990s, so most military operations with Navstar GPS will only be partially useful until then.

Currently, seven test satellites orbit the earth, providing partial coverage. This coverage is enough to convince those using the system that Navstar GPS is already impacting the world in many different fields, not just navigation.

Geodesists Mike Ellett of the Defense Mapping Agency and Dr. Franz Lohmar of West Germany's Federal Armed Forces have found many advantages in using Navstar GPS for surveying and, ultimately, map-making. Their speciality, geodesy, is the study of the shape and size of the earth.

"Geodetic surveying has been around for about 180 years," began Mr. Ellett, acting deputy program manager for the Defense Mapping Agency in the Joint Program Office. "Navstar GPS is a tool that everyone in the world can use -- one single reference basis for collecting all geodetic data and making maps."

The biggest problem with conventional surveying methods is the need for

NAVSTAR-3/3/3

line of sight between the points being surveyed, Dr. Lohmar continued. "Without that need, the work can be done faster and even better than before."

Better, Mr. Ellett estimated, may be accuracies in the low centimeters over hundreds of kilometers. A recent "GPS Shootout" in San Francisco between four companies developing receiver sets had the winner measuring the more than 30-meter line exactly, second place was off by one millimeter, and third place missed by seven millimeters.

Accurate measurements from Navstar GPS will aid in highway building, dam construction, mining and water management. In an area like Holland where minor changes in the sea level can affect the dikes and public safety, Navstar GPS may provide a better understanding of the local settling of the lands protected by the dikes.

The Texas Department of Highways and Public Transportation has been on the Navstar GPS geodetic bandwagon since 1982, mainly for highway design surveys and mapping the largest state in the U.S. mainland.

According to Roger Merrell, director of Automated Surveys and Electronic Systems in the Texas highway department, Texas manages a growing \$1.6 billion highway budget.

"We were looking for a way to reduce costs," he explained. One method was to cut down surveying costs associated with mapping operations by some 30 to 50 percent.

In 1981, Mr. Merrell said Texas' highway department looked into using the Navstar GPS satellite system for upgrading its photogrammetric survey process. The process combines aerial photography with ground surveying to produce highly accurate maps.

The ground portion of photogrammetry requires surveying four or five

Although its primary purpose is to provide worldwide three-dimensional navigation and time to military forces, Navstar GPS is already being used by the civilian world -- ranging from underwater mapping in Norway to highway design surveying in Texas.

"Navstar GPS is a system developed by the military," noted Lt. Col. Ernst Willert, NATO deputy program manager in Space Division's Joint Program Office, "but the initial impact will be much greater for the civilians than the military. Civilians will be the first to use it -- something that doesn't usually happen in the military world."

Incredibly, Navstar GPS is not scheduled to be operational until the early 1990s, so most military operations with Navstar GPS will only be partially useful until then.

Currently, seven test satellites orbit the earth, providing partial coverage. This coverage is enough to convince those using the system that Navstar GPS is already impacting the world in many different fields, not just navigation.

Geodesists Mike Ellett of the Defense Mapping Agency and Dr. Franz Lohmar of West Germany's Federal Armed Forces have found many advantages in using Navstar GPS for surveying and, ultimately, map-making. Their speciality, geodesy, is the study of the shape and size of the earth.

"Geodetic surveying has been around for about 180 years," began Mr. Ellett, acting deputy program manager for the Defense Mapping Agency in the Joint Program Office. "Navstar GPS is a tool that everyone in the world can use -- one single reference basis for collecting all geodetic data and making maps."

The biggest problem with conventional surveying methods is the need for

points every photographed mile -- about 1,000 miles every year.

The navigation system was tested in 1982 with excellent results. What used to take four or five people two weeks to accomplish, now takes three people with Navstar GPS receivers a single day -- at least a six to one manpower reduction, stated Mr. Merrell.

"The cost benefits are there even without the full Navstar GPS constellation," he added.

Another surveying option of the Air Force's Navstar GPS is in oil exploration.

"Germany is using Navstar GPS for oil drilling on a regular basis," said Jan Peter Tjardts, a German representative on the NATO GPS Steering Committee. "The accuracy of current systems isn't as effective. GPS is the ideal replacement for all other systems inaccuracies."

Norway is interested in Navstar GPS in its waters for more than just oil exploration. According to Norwegian Naval Capt. Moritz Askildt, the Norwegian Hydrographic Service is involved in ocean mapping along Norway's long peninsula coast line.

Surveying to make very accurate maps has a direct benefit for everyone who drives and uses maps, from car owners to truck drivers. When many geodetically-measured points on a precise map are digitized and stored on a computer disk or cartridge, they can be used in vehicles by anyone who has a Navstar GPS receiver on the dashboard.

From the top of Mount Everest to the bottom of Death Valley, the surveying ability of Navstar GPS is one of potentially hundreds and thousands of civilian uses.

The results of the uses will be -- or already are -- time, lives and money: a military program that is paying off for civilians worldwide.