at Lewis, it has been necessary to go back to that work and to extend it to new regimes of flight. Fortunately the capability still exists in the people who did that original work and are still available to carry it out now.

In our manned space flight programs, NASA has made extensive use of DOD research facilities such as those at the Arnold Engineering Development Center at Tullahoma, Tenn., and the Department of the Navy Man Rated Centrifuge at Johnstown, Pa.

The NASA approach to making full utilization of existing national capabilities is further illustrated by the relationships which have evolved with the U.S. Geological Survey. The need for expertise in the geology disciplines was recognized early in the space program and assumed critical importance with the approval of the Apollo program early in 1961. The NASA choice in fulfilling this requirement was to call upon the geological competence already developed by the USGS. The utilization of USGS expertise in direct support of the space program has been evidenced in several forms.

For example, the USGS has detailed outstanding scientists to work directly with NASA during the formative stages of the Apollo program development. The USGS has also detailed specialists to assist in the planning and formulation of an earth resources program. In other instances, USGS scientists have been principal investigators on NASA missions such as Ranger, Surveyor, and Lunar Orbiter. Finally, the USGS is contributing to the planning for detailed exploration of the moon through creation of a Center of Astrogeology located at Flagstaff, Ariz., which works in close association with the NASA Manned Spacecraft Center at Houston, Tex.

Obviously, as part of NASA's role in aeronautics and space, we are also in a position to serve the needs of the Department of Transportation through the technology produced. For example, we are currently funding research in cooperation with the Department of Defense and the Department of Transportation involving the feasibility of a form of grooved aircraft runway which could improve aircraft tire traction under adverse weather conditions. Work in the aircraft landing loads facility at Langley Research Center several years ago, aimed at investigating the performance of aircraft tires on wet or slippery surfaces, produced technical data that proved of value to the study of automobile tires in wet road conditions as well. This led to experiments with grooved runways at our Wallops Station and resulted in an awareness of the hydroplaning problem of automobile tires on wet roads. These experiments combined with data from other countries and other research efforts have led to grooving the sections of this country's highways and have clearly demonstrated the reduction in accidents that result. This work was brought to the attention of the Department of the Army and the Bureau of Public Roads and through these agencies to the tire and automobile industries as well.

Another example of work done in support of the missions of other agencies is the effort getting underway with the National Institutes of Health in computerized image processing. During the conduct of the Ranger, Surveyor, and Mariner projects and based on advanced lunar and planetary video image or picture data. As a result, contrast and detail were brought out far more clearly than was the case through the normal video system. It was found that essentially the