control, design, and development associated with other environments than air and space travel, with travel under the seas, on their surface, and on the ground.

We have found repeatedly that a significant proportion of the technological advances we have generated in meeting our own program needs, turn out to have a current or potential application to the activities of some other Federal agency. We have tried to capitalize on this R. & D. fact of life by making real efforts to make this technology known to other Federal agencies and to industry and the academic community as well. We are are working to disseminate all of our technology to all segments of the economy. However, we feel that it is easier for the people who understand the technology to infer its possible use for other purposes, than it is for managers in other programs to search the entire range of technology to find things that may be of use.

In many cases NASA, therefore, has taken the initiative in approaching other agencies where we have felt that some facet of our emerging technology might be of value to them. In other cases, agencies have approached us about making use of some NASA capability. From these kinds of contacts, we have over the years developed a number of different types of working relationships which can be tailored to meet many kinds of national needs. I would like briefly to illustrate some of these relationships for this subcommittee.

Perhaps our most important relationships with another agency are the long standing associations we have maintained with the Department of Defense in which NASA and its predecessor, the NACA, conducted research on military aircrafts of all kinds. We have conducted research ranging from preliminary design to operational trouble shooting on virtually every significant military aircraft developed in this country since the 1920's.

In addition to work on and with military aircraft, NASA has exercised an important role in civil aviation. In some cases military departments have come to us with specific problems of design, structures, materials, or operating problems. In other instances our research has produced a technological advance which we recognize can be applied to a military plane, DOD has furnished NASA with aircraft for test and evaluation programs and we do the research. NASA benefits in this relationship because we learn about the latest aircraft development and extrapolate that knowledge into more advanced research. NACA and NASA research results have been applied in almost every aircraft that is flying.

In these areas NASA has worked with DOD on the F–111, the C5A, various vertical and short takeoff landing aircraft, et cetera. The development of high-performance gyros for space flight has been applied in navigation platforms for aircraft such as the C141 and the C5A. Some of the most important gas turbine engine research results and design concepts and solutions for operating problems on gas turbine engines grew out of the test and analysis work done at the Lewis Research Center in the late 1940's through the 1950's. As an example, the real understanding of compressor and turbine operation in such engines over the range of speeds and altitudes and over the range of engine acceleration and with disturbance of inlet air conditions came from that testing. Interestingly enough, in research on SST problems