Presentation of Robert O. Piland, Deputy Director of Science and Applications, Science and Applications Directorate

Since we have been in the space business, a majority of our efforts have necessarily been directed toward developing spacecraft and associated operations. However, throughout this period we have looked forward to the time when we could exploit these capabilities; both for basic scientific investigations and for applications.

Even in Mercury, the last mission or so, we had a few simple, but very meaningful experiments.

The Gemini spacecraft was not designed with a predetermined and basic capability to carry experiments. Nevertheless, as secondary objectives, we were able to carry quite a few experiments, some of the results of which I will show you today.

In Apollo, from the very beginning there was a science program intended for Apollo and a defined capability built into the spacecraft to support the scientific activities. In the Apollo Applications program we hope to exploit this capability to an even greater extent.

In talking about the uses of space flight for scientific purposes, I recall a publication that was issued shortly after our space program started, which I think very worthwhile in putting science and space in perspective. It noted that the satellite, being high above the Earth, offers us three things: One, it permits you to look "down" and see the Earth as you have never seen it before; in other words, you can stand back and get a big look at it. Another thing you can do is to sample the environment in which you are located, which we had never been able to do before. Thirdly, you can look "out" at the stars and not be hindered by the atmosphere which blankets the Earth.

Obviously, those three advantages are equally available to us in either the unmanned or manned satellites.

I would like to comment about three additional items that our manned spacecraft program gives us. One, we have our crews; and our crews have visual capability; they have selective capability; and they have the ability to improvise. They also have the ability to do certain functions which could be automated, but which are much simpler when done by the crew.

A second advantage is that manned spacecraft are inherently relatively large; and, therefore, without significant penalty you can afford to carry a substantial amount of scientific equipment. I will point this out with Gemini, specifically. The third thing is that a manned spacecraft clearly is designed and built to reenter. This is very important to many scientific investigations since it gives us the ability to bring back samples. This, of course, includes lunar samples, but there are many items which we want to expose to space environment, and then return them to Earth to study them in detail. Many of the experiments we want to do involve the use of film. Photography is a very