KAORU MAMIYA: We would like to start the last session for today, the panel discussion session on the topic of “Research in Deep Seas.”

I would like to introduce Professor Noriyuki Nasu, who is professor of the University of Air, and professor emeritus of the University of Tokyo, Japan. He served as the director-general of the Ocean Research Institute of the University of Tokyo and thus contributed to the advancement of oceanography. He is also the chairman of the Council for Ocean Development, an advisory Committee to the Prime Minister, and a Japan representative of UNESCO’s Intergovernmental Oceanographic Commission (IOC). Before we start the panel discussion on deep-sea surveys and research, I would like to introduce the six panelists.

The first is Dr. Craig Dorman. Dr. Dorman is the director of Woods Hole Oceanographic Institution, and his specialty is physical oceanography. Next is Dr. Lucien Laubier. He is director of IFREMER’s International Relations and Cooperation, and his specialty is marine biology. Next to him is Dr. Vyacheslav S. Yastrebov. He is the director of the Shirshov Institute of Oceanology in Russia. Oceanography is his specialty.

Professor Kazuo Kobayashi, is professor at the Ocean Research Institute of the University of Tokyo. Geophysics, especially that of the deep sea bottom is his specialty. Next to him is Professor Isao Karube. Bioelectronics is his specialty, and he is professor at the Finontier Science and Technology Research Center of the University of Tokyo. Finally there is Mr. Hiroyuki Nakato, executive director of JAMSTEC, and naval architecture and instrumentation are his specialties.

This concludes my very brief introduction of the panelists. Another important person I have to introduce to you is Dr. Hiroshi Hotta, director of the Deep-sea Research Department of JAMSTEC, who will serve as the rapporteur of this session.

As a background, I would like to say the following: Global-scale deterioration of the earth’s environment is now a big concern for all of us, and the situation has forced us to realize the urgent need for an adequate understanding of the dynamics of the earth. In this context, the significance of the ocean, covering about 70% of the earth’s surface, and, in particular, that of the deep sea
occupying about 88% of all oceans, is great. Despite their importance, the ocean and the deep sea largely remain a mystery as yet uncovered by man.

This session will discuss how we can achieve a better understanding of this mysterious area. I would like to have comments from each panelist about his interests in the deep sea. I hope we can address those topics shown on the transparency.

The first point to be discussed is how we can proceed on international cooperation in studies of deep sea tectonics, deep sea biology, and material flux in important oceans. The Pacific Ocean is very important as a topic for future cooperation, because one of the most complicated plate motions is found there. And I hope we can discuss how we can cooperate in the next decade in research in the Pacific Ocean. This is the second point. The third is on measures we can take to promote workshops and other forms of interinstitutional cooperation. I hope we can have discussions on those points.

First, I would like to ask Dr. Dorman to make comments on matters related to deep-sea survey and research. Now Dr. Dorman.

CRAIG E. DORMAN: This morning I and several of the other speakers displayed for you much of the technology which we, in the past, have used for deep submergence with manned vehicles. This has dominated our science in the deep sea and has been going on now for more than a quarter of a century. Although much of our future work will continue to be with these manned submersibles, you have also heard earlier today about many of the new technologies which we will be bringing in order to enhance this type of research.

In my talk, however, rather than discuss those additional technologies, I thought I would show you very briefly the locations where the nations with deep submergence vessels have conducted their operations for the last 25 years as marked by these dots. The dots unfortunately do not show you the number of dives, and let me caveat my remarks by noting these are only the dives by the deepest of our vessels, by Nautil, by Alvin, by Mirs and by Shinkai. Some of the other submersibles, particularly those that are capable of diving only in the shallower coastal regions are not represented. But this does represent a general composite of all of the dives that we are aware have been conducted to date.

In spite of the fact that there are no numbers up there again, there have been roughly 3,000 dives made so far. The majority, as you can see, are fairly localized in terms of the areas where those dives have occurred. The vast majority have been along the major international, interocean ridge systems. The Mid-Atlantic Ridge, the East Pacific Rise, and areas off the west coast of the United States, where there are extremely interesting features. There are the straits of Juan de Fuca and further south there are some of the hot vent areas. Certainly there have been a very large number of dives in the Japanese waters of which you heard some details this morning.

As you will see, however, there are vast areas of the ocean in which we have not been, many places which we have not explored. Therefore in spite of the