MILITARY SPACE SYSTEMS' TECHNOLOGY PLAN

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I would like to thank the sponsors of this conference for the opportunity to talk to you about the Space Technology Center and the Military Space Systems' technology model and plan. I will speak briefly about where the Space Technology Center fits into the Air Force space business structure and then run quickly through the model to show you how it works.

The Space Technology Center is a relatively new organization, having been in existence just a little more than a year. The Center is a continuation of an Air Force process that brings the Air Force laboratories under the control of specific product divisions. In our case, we are working for Space Division in Los Angeles. Our Commander, Bob Francis, works directly for General McCartney, the Commander of the Space Division, and the Technology Center has a detachment in Los Angeles. We have a Plans Directorate; we have a Technology Directorate that pursues several technology demonstration programs; and our Management Services people keep us all on track.

The Space Technology Center now has control and responsibility for the Geophysics Laboratory, the Weapons Laboratory, and the Rocket Propulsion Laboratory. The Center's mission is to give focus to space technology efforts, to ensure that technology needs are integrated with development efforts, and to plan and execute the non-space-related technology activities of these three laboratories as well. We assess the laboratories in their nonspace activities. We also function as the Space Division Commander's source of technical excellence in the space technology area.

The Plans Directorate is divided into two divisions: Plans and Analysis, the people primarily responsible for the development and evolution of the methodology used in our technology planning, and Development and Applications, a group of technologists who generate technology initiatives. These initiatives are new starts, new technology programs to fill gaps in the technology required to complete specific space missions.

The problem that we face is one that everyone should be familiar with, and that is the extremely long lead time for the development of specific space capabilities. The only consolation is that the Soviets face about the same type of lead time in developing their systems. Small consolation, perhaps, but it still highlights the need for accurate forecasting of technologies. We must ensure that the technology base is available when needed for the development of these specific space systems.

The objective of the technology model is to provide us with a systematic process for joining future technology needs to mission requirements. We stress continuity between space missions and the technology programs we pursue. The

model also acts as a vehicle for communications between the Air Force laboratories and major air commands, operational commands, other government agencies, and NASA. It is also a guide to industry for IR&D. The Technology Center, along with the AIAA, sponsors workshops in which a series of technology panels address all of the technology categories contained within the model. We have recently acquired a NASA field office within the Technology Center; that is staffed by Mr. Wayne Hudson.

We take our guidance from Air Force Headquarters, Space Division, Space Command, and all of the other operational commands that generate requirements and needs for space systems support. Our technical interfaces are with the Space Division program offices, the Air Force laboratories, other DOD agencies, NASA, and industry. All of this goes into the technology model as input, and the output is continually fed back as technology for these systems as we produce our Space Technology Plan. This plan is our technology investment strategy and supports the planning, programming, and budgeting process.

The technology model is divided into six volumes. The first volume is generated primarily by the Plans Office at Space Division. Their input comes from Space Command and the other operational commands. This planning group develops the basic mission requirements, projects needs, and gives priority to missions. From the material they give us, we form a set of preliminary concepts. Since we are talking about operational dates around the turn of the century in many cases, we have to have "strawman" concepts from which we extract technology requirements. These concepts are in volume 2. In volume 3 we project trends in technology so that we might properly assess the technologies of the future. Then in volume 4 we assess and study state-of-the-art technology, the programs that are in force now. In volume 5 we develop a roadmap of how a technology program would continue to develop the technology base required for the specific concepts and missions considered and defined in volumes 1 and 2. Volume 6 will set priorities and present a realistic plan for the development of technologies necessary to support primary space missions as defined in volume 2. These will be our technology investment recommendations.

This analytical product, our prioritized list of technologies, will not be an absolute guide in itself. It will simply be a planning tool for the senior headquarters staff to determine where best to invest their technology dollars. Most likely, other outside considerations will be included, but we feel that the plan is going to be a good starting point and a good yardstick by which to make intelligent decisions.

The technology plan aims to provide in a single document a systematic, logically derived way of investing technology resources. We will look at long-term requirements through our projection of system requirements for turn-of-the-century initial operating capability (IOC) dates for systems. It will provide the rationale and guidance for supporting these programs, thus making the budget process more systematic. The model can be used to support specific requirements for specific technology programs. With the model we also maintain concurrence and synchronization with the Air Force and Systems Command space plans, the Air Force Space Systems' architecture study, and other top-level guidance documentation of that nature.

The technology plan takes the input and runs it through a prioritization process. Then, using a resource review program, we identify the priority technology programs. The plan will tell us something about the availability of the technology base to support certain space missions.

The prioritization methodology is a combination of subjective inputs, a modified Delphi process, some computer modeling, and some analytical work on the different parameters. The plan input is the group of top-level mission requirements that come from Air Force Headquarters guidance. First we develop a set of prioritized missions. We attach importance levels to specific missions and rank them. Then we develop a set of mission requirements that support those particular prioritized missions. These are also computerized; then we sum the priorities of the missions that each of the requirements supports and work them down one more level to the concepts. At this point, we construct these concepts in order to determine what technologies are required to support these specific requirements.

Concepts then go through a review that identifies the mission requirements that each concept supports. At the last level of the plan, which is the technology level, we identify the priorities of the concepts supported by these technology programs to maintain a logical flow throughout this entire scheme, which ultimately links technologies to specific missions. Technologies that support more than one concept, or more than one mission, get appropriate emphasis in the prioritization process.

A major advantage of the model is its ability to incorporate policy changes. If there are changes in the mission rankings, for instance if the space station were to be adopted by the military as a firm requirement, we could alter the mission requirements up front. Another problem we are concerned about is ballistic missile defense. We do not know where to fit that in the model right now because major decisions are yet to be made on the process. But the model process, the model itself, can accommodate these types of change.

Technology breakthroughs are accounted for with the model. We can find potential problem areas in this same process; we can isolate concepts that are affected by technology problems and identify changes in performance and changes in the availability dates of these systems.

The schedule we are working against, the end product, is the publication of volume 6. Earlier volumes are being restudied and a third edition containing new mission requirements is in the process. This project is being developed by Air Staff, Space Command, and Space Division planning staff through the Space Systems architecture study. Volumes 3 and 4 are being updated with support from the laboratories and the AIAA panels. And we are working on the methodology of volume 6.

To conclude, we at the Space Technology Center believe that the model is a very orderly, systematic way of joining technology needs to specific space missions. It supports top-level guidance, the space plan from Air Force and Systems Command. And it is an effective tool for communicating with the Air Staff program element monitors, with the laboratories, and with industry. Volume 6 will be the Air Force Space Technology Center Space Technology Plan. It will be a guide for determining how we invest our technology dollars, and it will give the rationale for supporting programs in the program objective memorandum (POM) process.