

1. Integration. We have multiple stand alone systems at ARTCC TMU's ATCSCCC and AOC's. Most of the decision support tools (DST's) do not talk to each other, share common data or trajectory models.

The integration of the stove-pipe systems is a major goal of Lockheed Martin research and development activities. Integration of information is a key feature of our Hub Management Demonstration, which the team will see. Some of the ARTCC integration of systems will be accomplished by the FAA's Enroute Modernization Program (ERAM) and Lockheed Martin is engaged in an extremely intense competitive process to win this contract. We would obviously have an interest in industry advice and consultation at the appropriate time. Currently AOCs have very little direct interface with ATC automation. We believe this interface capability should be substantially expanded as the first opportunity to accomplish this presents itself. Lockheed Martin already has technologies that could offer a huge step forward toward the final solution. We would welcome suggestions from the EWG on when this might occur. Clearly ASDI and CDM activities provide some common information, but much is still missing. Weather, for example, is a major source of user specific, diverse information between the stakeholders. Each stakeholder generally utilizes their own weather information sources, and not all sources are in agreement with respect to forecasts, observations, or presentation. Actually, FltWinds/TM is a tool that integrates weather information with flight track and flight intent information to provide an integrated environment for informed decision support.

2. Simulation. With enroute congestion management being at least a five dimensional problem new concept often need proving and testing in a simulation lab environment. This must include AOC 's as a part of that simulation.

There are several aspects of a simulation environment. One, to test new system concepts one needs to have a full system simulation environment. NASA Ames is in the process of building such an environment under VAST. In a different sense, to play "war games" through a mission simulation to test operational scenarios for effectiveness in the NAS operation, involves a more real-time simulation running in an operational environment. In this case, Lockheed Martin is interested in working to develop such simulation tools and in integrating these tools into the operation of NAS.

3. Enroute TFM Database design, accuracy and verification in support of DST's. The ETMS system was built for the times 1980's with 1980's technology. There is a need to examine the benefits of expanding this system or moving on beyond its capabilities.

Some of this analysis should be part of the ERAM program, and in support of developing a more functional system to satisfy traffic flow management requirements, Lockheed Martin has a research and development effort ongoing in traffic flow management. ETMS is clearly outdated and requirements of CDM, for example, were added to ETMS long after the system was in operation. These requirements need to be analyzed,

specified and designed in to the next generation system so that the new system will have the ability to meet the demands placed upon it and the capability for future flexibility and expansion.

4. Defense capabilities. Some of the processes and methods developed for the defense industry are similar to the needs for management of the NAS. Any transferable technology may save large R&D expenditures to address enroute congestion management challenges.

Lockheed Martin is the world's largest defense contractor with heritage in all aspects of defense in all mediums: land, sea, air and space. The Corporation has processes and procedures to assure that the technology developed for one program has the ability to be applied to other programs if applicable. As an example, we have developed technology for tracking air targets for air defense systems. These "trackers" are highly sophisticated and very accurate with respect to a multitude of airborne or surface targets. This tracking technology has been transported to several of the Lockheed Martin civil air traffic control systems. Further, technology associated with military mission planning might be applicable to enroute congestion problems. The answer would require analysis of the problem and analysis of the technology to see if there is a match.