MISSILE PRODUCTS CORPORATION (A)

In October, the Director for Research and Engineering in the Office of the Secretary of Defense had disapproved the Navy recommendations to proceed to engineering development and acquisition of the SURTAC missile system with the Missile Products Corporation (MPC), a subsidiary of the Matrix Development Corporation, as principal development agent. They did not object to the selection of MPC, but felt that the Navy had not accomplished all the objectives of system definition. They clearly wanted MPC to work on an advance development hardware feasibility contract. It was also clear that the advance development effort would be funded at a reduced level, representing a stretch-out of the SURTAC system development. A contract was negotiated late the next year, directing MPC to fabricate the agreed upon subsystems and to perform feasibility tests demonstrating the necessary operational capabilities.

The SURTAC system was an advanced surface-to-surface tactical missile for multi-purpose use in limited war, which had grown out of the development of an earlier missile designed for use against enemy ships and selected ground targets. The new SURTAC system was based on a state of the art advance in a homing device to guide the missile, after launching it from the ship or small craft which located the target. The original required operational capability was amended to include attack on sophisticated radar systems and to apply the SURTAC to interdiction-type targets, such as trucks, tanks and supply trains.

Sam Roberts, project manager for the missile guidance subsystem, was very concerned about the MPC organizational traditions. As a result of his discussions of the project with the SURTAC program manager, Stan Jones, and the general manager of MPC, Dick Nolan, it was agreed that a significant amount of reorientation of traditional MPC project operations was

necessary to attain the goals of the project. Nolan felt that the SURTAC missile guidance project should serve as a model for refining the lead engineer concept at MPC (see Exhibit I for a partial organization chart of MPC). Sam Roberts decided that he should set up a reporting structure for the SURTAC guidance project consisting of lead engineers from the functional organization and project engineers from the project office thus, hopefully providing a balance in the power between the two of them to facilitate optimal decision making.

From the conversations in the past few months with the Navy, three guidance subsystems in the SURTAC missile and one guidance subsystem for the ship or other platform would require feasibility demonstration tests (a partial end-item tree for the SURTAC system is presented in Exhibit II). The critical subsystems for the missile guidance project are the intercept computer, the sensor, and the electronic counter-measures (ECM) and mode selection logic. The critical guidance subsystem for the ship is the signal receiving subsystem.

Based on his analysis of the project, Sam Roberts made his choice of lead engineers. Three of the six design departments would play a major role in the feasibility demonstration. They were: the system engineering department, the digital department, and the signal processing department. Roberts decided that he would draw his lead engineers from these sections and from the technical staff. He designated Gene Mack, one of the department managers in the signal processing department, as the lead engineer for the ship signal receiving subsystem. Gene had previous experience as a design engineer, lead engineer and section manager. It appeared to Roberts that Gene had the technical scope plus a talent for organizing and controlling any program. He would interface with Pete Johnson as the project engineer for shipboard equipment in the program office. Pete Johnson was also the chief engineer on the SURTAC guidance project.

Roberts permitted Gene to select three of his section managers to be lead engineers for the antenna, receiver, and processor subsystems of the signal receiving system. They were:

1. Carl Willey, the junior man, in charge of the antenna. This was his first job as a lead engineer since joining MPC five years ago as a new BSEE. His experience had all been related to antenna design and development.

2. John Haskins, the receiver lead engineer. This was his third LE assignment within a year. Haskins, a former major in the Air Force, had spent most of his ten-year military career as an electronic countermeasure (ECM) specialist before joining MPC six years ago.

3. Bill Jenkins, the processor LE, had only recently joined MPC but had over ten years experience in the electronics industry as a design engineer and as a development lab manager with a small New England R&D corporation.

Sam Roberts felt that these appointments took care of the signal receiving subsystem that was an integral part of the shipboard equipment, but that he also needed a lead engineer for each key missile guidance subsystem (three in all). In making the choice for the lead engineers, Roberts felt the need for the flexibility to modify the subsystems as more data came in from the design groups and as Navy thinking progressed.

Roberts felt that the three subsystems pertaining to the missile should be broken out into five subsystems: (1) intercept computer, (2) sensor antenna, (3) sensor receiver, (4) sensor processor, and (5) ECM and mode logic. He then selected five individuals to be lead engineers for the various elements of the missile hardware. Each of these people would report directly to Dick Miller, the project engineer in the program office, who was in charge of the guidance portion of the SURTAC missile. The lead engineers were:

1. Herb Olson, a section manager in the digital department who would be the lead engineer

for the intercept computer. Herb was young and relatively new to MPC but was technically sophisticated in regard to digital concepts.

2. Bob Taylor would be the lead engineer for the ECM and mode selection subsystem. Bob was a section manager in the systems engineering department. Roberts felt that Bob would have to lean heavily on the digital and signal processing departments for most of his work. In the past, he had demonstrated both a skill and an interest in managing technical projects and had worked well with the department engineers.

3. Ed Smith, who was one of the technical staff consultants, would be the lead engineer for the sensor antenna. Ed was considered to be one of the outstanding authorities on antennas in the country. He had recently returned from a year's teaching at Stevens Institute of Technology and was currently available for a 100% effort.

4. Scott Harple, a section manager in the signal processing department, was to be lead engineer for the sensor receiver. Scott had a lot of experience and had been with MPC for almost ten years, working on a variety of systems. Almost all the sensor receiver work would be performed in the signal processing department. No other projects were scheduled for his department during the projected six months.

5. Finally, Dan Long, who was also a technical staff consultant, would be LE for the sensor processor. This would not take 100% of his time and he had worked with both analytical and experimental groups easily.

The final reporting structure of the SURTAC lead engineers and MPC program office is depicted in Exhibit III.

QUESTIONS

1.What do you think about Sam Roberts' overall decisions on the choices of lead engineers?

What about departmental involvement at this point? What do you think about the respective candidates?

2. What do you think about the task analysis of the overall project? Do you agree with the task breakouts? What conflicts do you foresee based on Roberts' overall decisions?

3. Do Roberts' decisions fit the power balancing purpose for the lead engineer concept?

4. Predict the behavior of the lead engineers in the next phase of the project.

EXHIBIT I

Partial Organization Chart of MPC

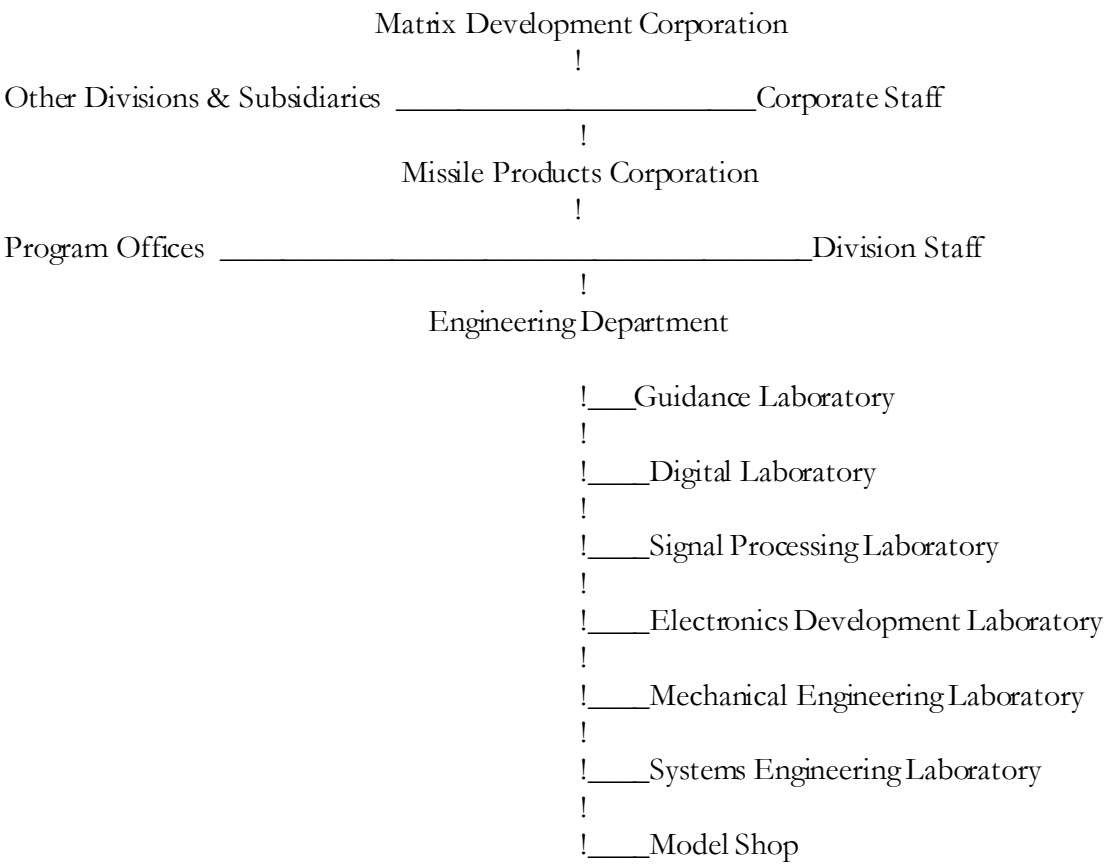
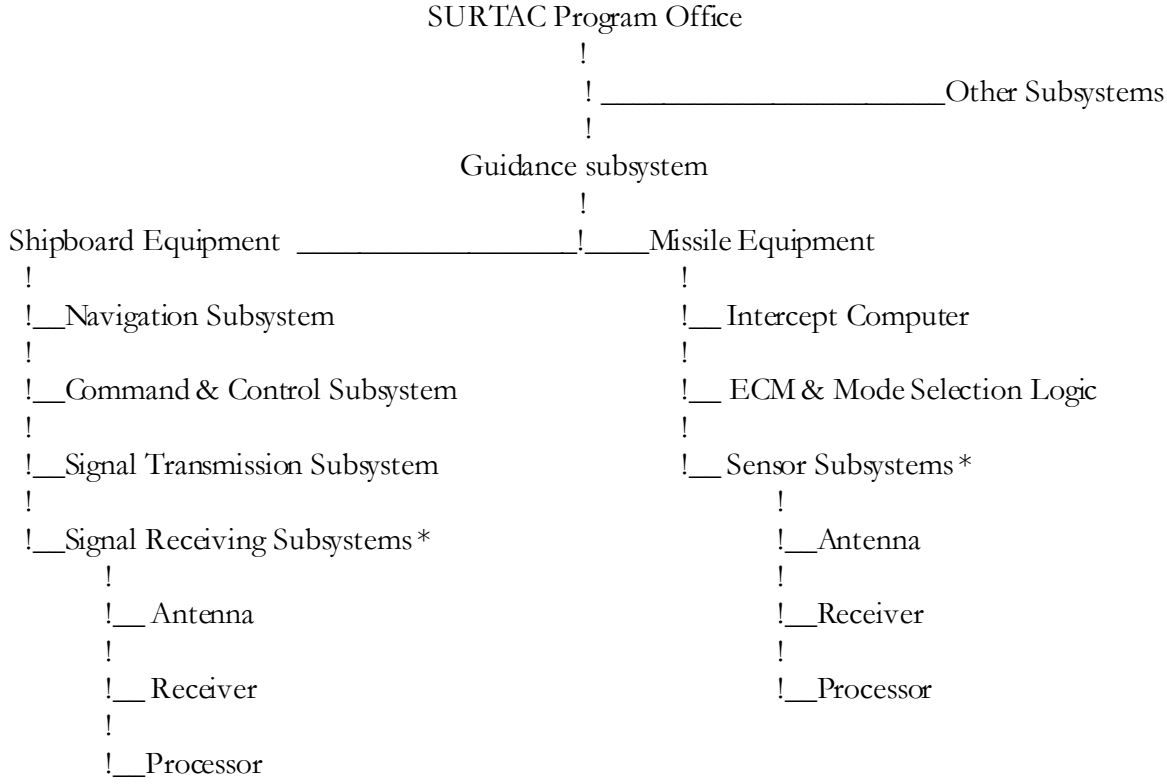


EXHIBIT II

Partial End-Item Breakdown of SURTAC



* Critical Subsystems

EXHIBIT III

Reporting Structure within the SURTAC Guidance Subsystems