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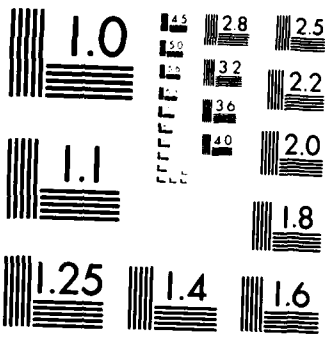

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The purpose of the work reported on in this document was to review and comment on the architecture developed by the CIM/BSP team, to assist in the identification of system needs and the development of a training outline.

...Integration and ...

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TO: Mr. Joseph Baran
Chief, PP&C Division

FROM: Thomas P. Cullinane, Ph.D.

SUBJECT: Final Report to CIM/BSP Team Leader

DATE: July 24, 1984

The April 1984 final report from the Computer Integrated Manufacturing/ Business Systems Planning Team (CIM/BSP) reflects a comprehensive understanding of the importance of undertaking detailed planning activities in the early stages of designing and developing a system. It is clear from the extensiveness of the final report and the findings reported in this document that the CIM/BSP team has recognized the need for an Arsenal wide architecture to ensure that any hardware and software introduced within the fundamental areas of the Arsenal will meet all system integration requirements.

The extensive evaluation of system modeling methodologies, the formal training in the $IDEF_0$ methodology and the several days of learning how to apply $IDEF_0$ appear to have been worth the effort. The $IDEF_0$ methodology has been implemented to develop a model of the "As Is" method of producing a cannon. The results documented in the report indicated that through the utilization of this model the team has been able to:

a. Gain a better understanding of the present system

b. Identify the inputs, outputs, controls and mechanisms associated with each of the system functions and to identify possible duplication of effort within the system.

c. Communicate and analyze elements of the system more effectively

d. Identify needs and to define requirements of the system

e. Establish a "paper testbed" for evaluating the incorporation of changes in the system

The CIM/BSP team has extended some of the basic concepts of function modeling to include an evaluation of information interfaces between functions and an analysis of candidate areas for integration of information. Through this work the CIM/BSP team has created an architecture which supports the top-down planning view of an Integrated Information System. With certain refinements the architecture has been developed to the point where it can serve as a communication tool for the design, development and integration of new information system technologies into the Arsenal's operations control, management control and strategic planning functions.

Through an examination of the newly developed architecture and the creation of some information flow matrices seven major requirements which will lead to an Integrated Information System have been defined. The requirements are:

- o A product definition data base
- o A process definition data base
- o A scheduling and simulation capability
- o Requirement and inventory status reporting
- o Capacity planning procedures
- o Shop loading procedures
- o Shop floor product tracking capability

When these requirements are translated into the framework of the "As Is" architecture for producing a cannon, a "To Be" Integrated Information System will emerge.

The success of the CIM/BSP team in developing and utilizing the "As Is" information system architecture should be viewed as an indicator that the utilization of $IDEF_0$ and the SDM life cycle concepts should be considered for further use on future projects performed at the Watervliet Arsenal. The use of $IDEF_0$ can provide an analyst with a structured approach to understanding problems, identifying needs, and defining systems requirements.

The first step in moving beyond the current level of system modeling will be to have several of the Watervliet designers and engineers trained in the $IDEF_0$ methodology. Subsequent to the $IDEF_0$ training course, a program aimed at refining the existing architecture and further defining and modeling the several areas at Watervliet that still remain to be studied should be undertaken. Every project manager should be required to have sufficient knowledge in the $IDEF_0$ modeling technique to create a model for each project he proposes to management. As a further prerequisite for funding and project approval it should be a requirement that each project be reviewed within the context of the arsenal architecture to be certain that all data flows are recognized and total project integration is achieved.

The CIM/BSP team has developed a baseline architecture and a list of recommendations which will enhance the systems development process at the Watervliet Arsenal. This team has gained extensive experience in modeling and analyzing the function titled "Provide Cannon". Through the advice and guidance of this team the time and resources required to develop comprehensive models of other missions can be optimized. Every effort should be made to utilize the experience gained and the lessons learned by the CIM/BSP team.

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