PREFACE

Project BOSPORUS is the product of an interdisciplinary subject having the specific title "Special Studies in Systems Engineering", which was offered under the general direction of Professor William W. Seifert of M.I.T.'s School of Engineering in the Spring of 1968. The term "Systems Engineering" has a wide variety of connotations depending upon who is using it and what his specific purposes are. We can define our use of the term by quoting from the Preface of the report on Project ROMULUS, which was carried on a year earlier.

> "For our purposes, then, systems engineering is no more than the judicious juxtaposition of ideas and the simultaneous, parallel consideration and interaction of these ideas toward a common goal."

The specific problem addressed in Project BOSPORUS was identified in the problem statement circulated to prospective enrollees prior to the beginning of the term. The content of that statement is as follows:

DESIGN OF AIRPORT AND SEAPORT FACILITIES FOR BOSTON

A number of agencies are currently examining a variety of problems associated with the Boston Harbor region. The Harbor is a potentially beautiful and valuable resource which still remains substantially underdeveloped. Shipping activity in the port has been declining steadily, while traffic growth at Logan Airport will outstrip facilities before many years. No one has yet undertaken a sufficiently comprehensive study of the region, analyzing optimal locations for sea and air traffic terminals and coordinated development of remaining areas.

Numerous possibilities for redevelopment of the waterfront, the port facilities, and the Harbor Islands have been discussed by public and private agencies and in the press. It is proposed that the class appraise the potential demand which the New England Region might generate for ocean shipping if a suitable modern port were developed and study where such a port might be located, if a demand for it exists. Included with this may be some investigation of proposals for redevelopment of existing dock areas in East Boston.

A joint and related study should be made of the present projections of air traffic growth, both passenger and air cargo. It has been predicted that a new airport facility will be needed for Boston by the year 1975. The specific requirements imposed on the new site if it is to handle the SST and Jumbo size aircraft must be

investigated. Runway and terminal requirements and noise factors, air space utilization and possible conflicts in air traffic control with existing airports all need to be considered in selecting the new site and in developing a comprehensive airport plan.

One of the interesting possibilities is the integration of the seaport and airport in such a manner that they can jointly use some of the same ground transportation systems and terminal and storage facilities. The feasibility of such a combined facility shall be investigated in depth, with a final report on the advantages and disadvantages of such a combination. This is to be compared to alternative locations for either the seaport or the airport.

While the specific topics to be included depend on the interests and backgrounds of the student participants, the following list is illustrative (but not exhaustive) of the kinds of topics that might be involved.

- Possibility of a Second Airport
  - Traffic Requirements
  - Location Possibilities
  - Design Concepts and Potential
- Seaport Development
  - Potential Demand
  - Location
  - Quality Characteristics
  - Possible Design Integration with Airport
- Redesign of Harbor Area
  - New Uses for Areas Possibly Vacated by Removal of Sea and Air Terminals
  - Ocean and Coastal Engineering Aspects of Proposed Changes
  - Integration of Multiple Uses
- Ground Transport
  - Access to Harbor Facilities

- Special Innovations for Terminal Access
- Improved Freight Handling
- Effect on Current Boston Traffic Patterns

Political and Social Consequences

- New Neighborhoods
- Changes in Political Divisions
- Jurisdictional Clarification

Financial Support

- Finance Plans -- Public and Private
- Benefit Assessment
- Anticipated Revenues

Management of Planning and Implementation

- Enabling Legislation
- Political Structures
- Publicity and Public Acceptance

This subject is designed for graduate students and selected seniors from throughout the Schools of Engineering, Architecture and Planning, and Humanities and Social Science, and Management. Guest lecturers from industry, government, and universities will develop some of the fundamental issues relating to the project.

The students themselves will be responsible for the internal organization of the subject, including leadership, as well as design teams and subgroups to concentrate on specific aspects of the problem, while the faculty and staff will be available as consultants. Some groups, for instance, would develop the requirements for port, airport, housing and recreational facilities, others the technical aspects of facilities construction and others yet the political and organizational procedures involved in such an undertaking. As in previous years, the students will be responsible for producing an integrated plan and making a public presentation thereof at the end of the academic year. This presentation, along with a publishable

report, are the culmination of the semester's efforts.

The make-up of the group which carried on this study is shown in Table P.1.

Participating Student	Departmental Affiliation	Year
Leonid Afanasieff	Naval Architecture	G
Anthony J. Aliberti	Mechanical Engineering	4
Ernest W. Ascherman	Mechanical Engineering	G
David R. Berry	Mechanical Engineering	4
James E. Bodamer	Mechanical Engineering	G
Ronald P. Burd	Mechanical Engineering	4
David F. Cahn	Mechanical Engineering	4
Joshua D. Coran	Mechanical Engineering	4
Cheryl A. Cretin	Mechanical Engineering	4
Gene E. Fax	Naval Architecture	G
Paul A. Forbes	Mechanical Engineering	4
Paul M. Goldberg	Sloan School of Management	G
Brooks Hilliard	Mechanical Engineering	4
David Hoover	Sloan School of Management	G
Jeffrey S. Horowitz	Mechanical Engineering	G
Mohammad A. Jan	City and Regional Planning	G
James E. Just	Electrical Engineering	4
Joseph Kleinmann	Mechanical Engineering	4
Aaron Lehmann	Naval Architecture	G
Robert S. MacDonald	Mechanical Engineering	4
Frank A. March	Naval Architecture	G
Jerome E. Milch	Political Science	G
Edward H.E. Nabbe	Naval Architecture	G
Raul Nino-Guerrero	City and Regional Planning	G
William E. Onorato	Political Science	4
Thomas R. Rice	Mechanical Engineering	G
Ronald B. Rosenfeld	Mathematics	3
Robert H. Sturges, Jr.	Mechanical Engineering	4
Paul Sullivan	Harvard Law School	G
William B. Zimmerman	Mechanical Engineering	4

Table P.1 Enrollment in "Special Studies in Systems Engineering"

The students were encouraged to assume the greatest possible

responsibility for the actual development of this project. None the less, a large group of faculty made themselves available to provide advice and consultation. Those who participated most actively are listed in Table P.2.

Faculty Member	Departmental Affiliation
Professor D.M.B. Baumann	Mechanical Engineering
Dr. S.M. Breuning	Project TRANSPORT, Coordinator
Professor J. Clarkeson	Civil Engineering
Professor F.C. Colcord, Jr.	Political Science
Professor R.H. Cross, III	Civil Engineering
Professor R.L. deNeufville	Civil Engineering
Professor E.G. Frankel	Naval Architecture and Marine Engineering
Mr. P.B. Herr	City and Regional Planning
Mr. S.M. Jacks	Sloan School of Management
Mr. A. Kettaneh	Project TRANSPORT
Professor W.W. Seifert	Electrical Engineering, Professor in Charge
Professor R.W. Simpson	Aeronautics and Astronautics

Table P.2 Faculty

The students are, of course, the ones who deserve credit for the actual ideas presented in this report. Special note should be given to David Cahn, who served as over-all student project manager, and to Anthony Aliberti, who drafted portions of this report. Finally, major credit for the fact that his report was finally brought into publishable form is due to Kathryn Corones, who drafted some sections from fragmentary student notes, edited the entire manuscript, prepared the index, and even typed the copy from which the final report was reproduced. Without her quiet but effective prodding and personal efforts, this document would never have been completed.

June, 1970 William W. Seifert