PREFACE
Joseph D. Blatt

The early pioneers, in the development of our airspace system, recognized that air transportation, if it is to compete successfully with other modes of transportation, if it is to attract its fair share of the travel market, would have to be accepted by the potential system users as being at least as safe as the competing modes. Research and development programs therefore stressed aviation safety. No compromise with safety would be tolerated. In the development of procedures, standards, facilities and subsystems safety was given the highest priority. The success of the developers is today evident -- some say too evident. Today air transportation is not only an accepted mode of transportation, but is accommodating a significant percentage of our interstate and international transportation market. In the transcontinental and in the intercontinental passenger transportation markets it has become the accepted mode.

Success has been accompanied by sociological, environmental and operational problems. Capacity, and the delays created by the lack of capacity, have become today's primary concerns. How to increase system capacity without in any way degrading system safety is the challenge faced by today's system developers.

It is the purpose of this circular to highlight the more significant issues the developers must face in their quest to resolve the capacity problem. This circular in no way even attempts to answer all the problems inherent in these issues. It merely attempts to highlight the importance of the airport, airspace and system capacity problem, to discuss the significant issues in sufficient depth to provide the reader with some fundamental understanding of the issues and hopefully to stimulate research toward the solution of the capacity problem.

INTRODUCTION AND SUMMARY
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In the first quarter of 1980, the Transportation Research Board Committee on Airfield and Airspace Capacity and Delay, A3A14, decided to address the problems and potential actions that might be taken to improve capacity and decrease delay. The chairman of the committee Joseph Blatt put the following questions to the committee at large:

- In order of priority, what are the ten most serious problems the nation has with respect to airfield and airspace capacity and delay?
- What recommended actions should be taken with respect to these problems?

The committee, approximately twenty in number, by individual member, sent in responses which were then compiled through two rounds of questionnaires. Ultimately, ten categories of problems/action areas were defined and ranked on a scale of ten to one, with "ten" representing the most significant, "nine" the next most significant, and so forth. These ten areas are listed below in their statement as problems; the same areas defined the actions, with some minor language changes:

A. Improper match of demand to system capacity

B. Inadequate number and operational use of runways

C. Inefficient flow control, spacing and management

D. Inadequate computer/communications technology usage

E. Funding, planning and institutional problems

F. Noise and its effects/consequences

G. Wake vortex and its effects/consequences

H. Inadequate overall airport/terminal configurations and facilities

I. Insufficient analysis/evaluation/information

J. Inefficient airport access/egress/processing

The composite results of the committee's ratings are shown in the bar chart of Figure 1 and the tabulation of Table 1. The figure shows the demand/capacity match, number and use of runways and funding, planning and institutional processes as the three highest priority areas, in that order, with respect to both "problems" and "actions". The table shows the numerical average rating and estimates of the standard deviation in the ratings for all ten areas. The latter provides some insight into the degree of agreement or disagreement in the ratings, noting the greatest deviation for "analysis/evaluation/information" and the smallest deviation for "airport/terminal facilities".

A summary commentary for each of the ten areas is provided below.

- Improper Match of Demand to System Capacity
  - First priority problem and action area
  - Demand on system over time and space must be smoothed to more efficiently utilize existing capacity
  - Possible better use of reliever airports, separate runways, scheduling, quotas, slot assignments, peak/off-peak pricing, etc.
  - A non-technology based "solution"
- Inadequate Number and Operational Use of Runways
  - Second priority problem and action area
  - More innovative use of existing runways (e.g., occupancy time, high speed turnoffs, etc.)
  - Reduce parallel spacing requirements
- Funding, Planning and Institutional Problems
  - Third priority problem and action area
  - Relatively high variance; difference of opinion
  - Lack of funds and institutional will/management/coordination to plan for and implement improvements