REPORT OF WORKING GROUP 3

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The workshop session opened with a general discussion that identified the major areas of system needs. The discussion then turned to means by which these needs could be addressed. Finally, the group identified program areas in which research is needed.

NEEDS OF THE FUTURE TERMINAL ATC SYSTEM

The group identified the major needs of the system, which focused on four major areas:

- 1. <u>Need for better data</u>. It was generally agreed that better data is needed in virtually every program category to evaluate the performance of today's system. Types of data that are needed include:
 - a. Delay data. The NAPRS system is inadequate for monitoring purposes. The FAA, airlines, and airports should be collecting this data.
 - b. Wake turbulence. Better data is needed on the wakes generated by each type of aircraft.
 - c. Runway data. Data is needed on runway occupancy times, approach and departure intervals, etc.

This data would be useful to determine whether or not an airport is at capacity and more facilities or slot restrictions are justified. Better data would also allow more standardization, eliminating a lot of subjectivity in the system (for example, the EPS). Care should be taken in the collection of the data to ensure there is no bias or subjectivity in it.

- 2. <u>Flow Control and Metering</u>. The group questioned whether it is the available runway capacity or the in-trail restrictions generated by departure flow metering that are actually limiting system capacity. On the other hand, flow metering that allows the system to operate at maximum capacity was perceived to be very beneficial. Departure flow metering programs in Los Angeles, San Francisco, and Washington, in particular, were seen to provide great benefits. In conjunction with better data on the achievable in-trail separations at the departure fix, these programs would be very effective. Metering and spacing is also needed for arrivals.
- 3. <u>Wake Turbulence Separations</u>. This area seemed to have the highest priority of any area identified by the working group. Support for wake turbulence research has not been expressed strongly enough recently; as a result, funding has been reduced. This trend should be

reversed; any progress achieved would have a big payoff. There should be a multi-program effort, including:

a. Wake sensors/detectors, both in the cockpit and remote sensors for the controller

b. Better data on atmospheric/wind conditions and associated effects on wakes

c. Wind shear detection

Data should be detailed by aircraft type. The current system of classification (the 300,000 pound limit) is inadequate; an individual aircraft's actual weight should be considered.

4. <u>Difficulties in Implementation</u>. The group agreed that implementing concepts that increase system capacity has always been a problem. There are programs that have been proposed for 30 years yet have not come to fruition. There seem to be bureaucratic obstacles that prevent things from getting done. The system cannot use the current technology; how is future technology ever going to be implemented?

ADDRESSING THE NEEDS

The discussion then turned to what needs to be done to overcome the obstacles. The following ideas were proposed:

1. <u>Better Publication of Research.</u> Research in air traffic control needs to be published and circulated in peer-review journals. Guidelines are needed on what research should be done; groups such as this one should identify those guidelines. A centralized library should be established for this kind of research.

It was also pointed out that a lot of conferences on air traffic control are on policy, not research. More attention should be devoted to conferences on the very "high-tech" aspects of air traffic control research that is being conducted.

- 2. <u>Overcome the Implementation Problems</u>. The "it won't work" attitude must be overcome. It is important to recognize that there will be disagreement on the merits of a particular program; these disagreements must not be allowed to stop the program. This does not mean they should be ignored; but instead of discontinuing the program, the problem should be faced head-on. A single person or interest group should not be allowed to overrule a project.
- 3. <u>Solve the Man-Machine Problem</u>. A lot of the subjectivity in the system results from the fact that our ATC system is not a good match with the high technology in the airplane. The ATC system, oriented primarily around the controller, must interface better with the aircraft and airport technology.
- 4. <u>Obtain Continuing Support for Programs</u>. Continuing support of R&D efforts is necessary to avoid having programs reduced in priority.

A watchdog group must be formed to provide this support. It would provide continuity and an "institutional memory." These types of groups have been shown to have great effectiveness.

AREAS OF RESEARCH

The following areas of research that FAA should pursue were suggested; the order of priority is approximate, based on the number of people identifying it and the relative importance they assigned to it.

- 1. Wake vortex
- 2. Separation standard reductions, including those that could result from aircraft avionics/electronic capabilities
- 3. Reduction in system variabilities (e.g., computer-aided final approach spacing)
- Segregation of aircraft by performance capabilities (e.g., helicopters/fixed wing, VTOL/STOL/CTOL)
- 5. Reduction in runway occupancy time
- 6. Safety programs (such as TCAS and doppler weather radar)
- 7. Flow control
- 8. Closing the IFR/VFR gap (e.g., "electronic VFR")
- 9. Delay accounting system
- 10. Review of programs vs. priorities (based on system-wide benefits) to redirect research from site-specific to more general programs
- 11. New facilities (runways)

Participants

The members of Working Group 3 were:

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