

PROFESSOR OF
AERONAUTICS AND ASTRONAUTICS
DIRECTOR
INTERNATIONAL CENTER FOR AIR TRANSPORTATION

ROOM 33-303
77 MASSACHUSETTS AVENUE
CAMBRIDGE, MASSACHUSETTS 02139
(617) 253-2271 FAX (617) 253-4196
E-MAIL: rjhans@mit.edu

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The Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Ms. Blakey:

At your request during the September 2004 the Research, Engineering and Development Advisory Committee (REDAC) meeting, the Subcommittee on Human Factors over the past year, has reviewed the FAA plans and activities related to the skills training and needs of the next generation controller workforce in anticipation of the upcoming retirement replacement needs.

The committee commends the development of the *Plan for the Future: The FAA's 10-Year Strategy for the Air Traffic Control Workforce* but is concerned about implementation. The committee has significant concerns with the speed and efficiency of current training practice to meet the system wide and facility specific demands over the next 5 years. Concern is based on the 2-5 year time to train to CPC and the cost/time for position transfer-training to facility specific operations. A large portion of the training time is on-the-job training. This process is of uncertain efficiency and requires significant controller resources.

The committee sees an opportunity to improve effectiveness and efficiency of the recruitment, selection and training process (at all stages: Collegiate Training Initiative, Academy, and on the job training). Specific observations and recommendations include:

Leadership

Observation: Currently there are many activities associated with implementing *A Plan for the Future: The FAA's 10-Year Strategy for the Air Traffic Control Workforce*, but there is no focal point for leading the various efforts from an integrated human-systems perspective.

Recommendation: The FAA should immediately designate an individual to be responsible and accountable for all the interdependent activities associated with the implementation of the "Plan for the Future." That individual should have executive

and budgetary authority for implementing the plan. This authority should include all efforts regarding recruiting, selection, staffing, and training. It should also include coordinating the CTI schools, the Academy, OJT for terminal and en route. The individual should be accountable for evaluating workforce initiatives, for both the present requirement and for future NAS operational developments.

Training Process Enhancements

Observation: There are a number of initiatives proposed in the “Plan for the Future” focused on achieving gains in efficiencies and effectiveness in the training process with associated reductions in training time and costs. Much less emphasis has been placed on developing the right training program.

Recommendations: The FAA should immediately convene a workgroup and independent lean process review team to, in the near term, assure the response needed to meet immediate needs and, in the far term, develop the training program for the future. Conduct a complete review of the current academy training program and facility training programs, and the age 56 exceptional controller process. Consider new training approaches, eg concurrent Radar and Associate Training. Review options on centralized versus decentralized training.

Identify requirements and venues for training of advanced controller tools. Support assessments regarding the use of simulation throughout the training process. Training must be a requirements-driven and performance-based process. Training must focus on determined knowledge, skills and abilities to reach CPC. The FAA should accelerate current efforts in staffing standards model and functional requirements development

ATCS Performance Measures & Training Effectiveness

Observation: The assessment of Academy training and OJT effectiveness are hindered by a lack of metrics to ensure performance competencies, prioritize efforts to address training and remediation, and track controller development. Training seems largely time-based as opposed to performance and results based.

Recommendation: The FAA should immediately and consistently develop and implement performance-based metrics and standards for CTI, Academy, facility airspace, and OJT training entry/exit criteria to assess controller competencies. The FAA should seek to standardize, to the extent possible, scenario characteristics for training and exploit advanced simulation technology to converge on a common set of controller skills. The FAA should combine the use of objective measures of skill with behaviorally anchored rating scales to ensure effective use of training exit criteria. The FAA should examine best practice and lessons learned in training for air transport operations and investigate their application to controller performance.

Use of Simulation

Observation: Simulation technology is not properly exploited in ATCS training. The subcommittee observes an over-reliance on labor intensive full fidelity simulation to mimic the “real world” as opposed to simulation fidelity selected to match training value. Also there is no basis for what should be trained at varying levels of simulator fidelity and an ineffective use of CBT and part-task simulation, which could increase training effectiveness at a lower cost

Recommendation:

In the next six months develop a set of technology requirements to support performance-based training objectives, identify and map skills to training technologies (CBT, part-task simulators, full fidelity simulation) to training objectives. It should also, address scenario and airspace specific development issues, evaluate MITRE (R-SAT) simulation training approach (and others) to be systematically matched with training outcomes for effective training delivery and investigate the use of simulators to provide early practice and testing.

Standardization of Procedures

Observation: A large portion of training at the facility is dedicated to learning local procedures and memorizing detail which is an artifact of prior technology limits. This is compounded by differences in local practices for use of common ATCS tools such as URET.

Recommendation: Immediately determine how to improve, staffing flexibility, OJT and Academy effectiveness through: Identification of general techniques and consolidation that standardizes procedures and training across facilities such as control techniques for certain operational flows. Facilities at risk of personnel shortfall should be targeted for early implementation. Focus on procedure simplification and support for controller rapid indoctrination in local techniques including enhanced processes for reducing training effort and off-loading sector-specific requirements to perceptual and decision support tool. In this process the agency should anticipate the impact of future initiatives in procedure and equipment to enhance procedural standardization. In the next year, determine how standardized procedures could be improved for use of ATCS tools

CTI - Academy Alignment

Observation: Collegiate Training Initiative (CTI) programs are seen as one way of expanding the FAA training capability. In order to exploit that possible expansion, the CTI programs need to be better aligned with Academy and FAA requirements.

Recommendation: Immediately, give the CTI schools clear guidance to allow their graduates advance in Academy training. Immediately establish minimum requirements for CTI graduates to enter Academy training as well as requirements for

advanced Academy placement. Streamline the transition between CTI and Academy and support currency training during transition
Develop a program of feedback to the CTI schools using Academy statistics to improve CTI curricula including use of training technologies.

Use of Team Training

Observation: Use of team training is not addressed in *A Plan for the Future: The FAA's 10-Year Strategy for the Air Traffic Control Workforce*. Part of this strategy should be ensuring safety management and a reporting culture by indoctrinating controllers early on the value of teamwork.

Recommendation: In the next six months, implement an approach for leveraging the use of team training, whether in the form of team based collaborative learning, Air Traffic Teamwork Enhancement (ATTE), Crew Resource Management (CRM), or some other approach. Principles should be introduced at the Academy, and practiced in OJT.

Please contact myself or Dr. Kevin Corker if you would like to discuss these observations and recommendations or if the REDAC can be of further assistance.

Sincerely,

R. John Hansman
Co-Chair, FAA Research, Engineering and Development Advisory Committee
Professor of Aeronautics and Astronautics
Director, MIT International Center for Air Transportation