

Review of Past Year Activities and Accomplishments

- **ATC/TO Human Factors research program**
 - develops research products and promotes their use for increased aviation system safety and capacity.
- **Key current focal areas include:**
 - Developing methods for measuring and improving controller training and training program efficiency
 - Identifying job competencies and performance metrics
 - Implementing a human error taxonomy to support air traffic and technical operations human factors incident analyses
 - Applying human-in-the-loop simulation, and updating human factors requirements and process standards to support ATO acquisition programs



Review of Past Year Activities and Accomplishments (cont.)

- **Controller training**

- NY TRACON (N90) Training Standards Effectiveness
 - Completed standards development. Begun development of plan for validation of training standards and implementation of training standards.
 - Performed workshops with OJTIs and FLMs on effective on-the-job training techniques that will reduce the cost and time to train air traffic controllers.
 - N90 management requested workshops to be extended to all trainees. Requested the standards training to be increased from 8 hours to 2 days plus a day long 6 month follow up of training
 - Initial data collection on workshop effectiveness assessment has begun
- Air Traffic On the Job Training Instructor (OJTI) Support
 - Developed a handbook for instructors based on the Certified Flight Instructor (CFI) handbook





Review of Past Year Activities and Accomplishments (cont.)

- **Controller training**

- Investigation of Attributes that Predict ATCS Training Success
 - Longitudinal CAMI database supports data-driven decisions for placement, training, and evaluation of developmental ATCSs and training for end-of-course evaluators
- Field Training Success of Air Traffic Controllers
 - Analyzed field training success data
 - Supports selection of interventions to decrease failures in field training

- **Job Competencies and Performance Metrics**

- Job Analysis of Operational Research Analysts (ORAs)
 - Develop competency-based assessments for Risk-Based Decision Making job series
- Standardized Scenarios and Performance Metrics
 - Support assessment of ATC software system performance



Review of Past Year Activities and Accomplishments (cont.)

- **Human Error Taxonomy**

- System Integrity Risk Assessment Process (SI-RAP)
 - Taxonomy of personnel, contextual, equipment, and systemic factors that are considered during incident analyses
- Taxonomy harmonization
 - EUROCONTROL
 - Technical Operations Safety Action Plan (T-SAP)
- Developing aggregates of SI-RAP data
 - to identify prevalent factors
 - to support the development of targeted mitigation strategies



Review of Past Year Activities and Accomplishments (cont.)

- **Human Factors Support to Acquisition Programs**

- Developing and updating human factors standards
(Eddie Sierra – on detail)

HF-STD-001 – Human Factors Design Standard (19 subject areas)

HF-STD-004 – Requirements for a Human Factors Program

HF-STD-003 – Alarms and Alerts in the Technical Operations Environment

HF-STD-006 – Technical Operations Abbreviations Standard

HF-STD-007 – Technical Operations Symbolology Standard

HF-STD-009 – Technical Operations Graphical User Interface Standard

HF-STD-008 – Air Traffic Control Tower Alerts Standard

HF-STD-002 – Baseline Requirements for Color Use in Air Traffic Control Displays

HF-STD-010 – Air Traffic Control Display Color Standard

www.hf.faa.gov/HFPortalNew/standards.aspx#gsc.tab=0



Review of Past Year Activities and Accomplishments (cont.)

- **Human Factors Support to Acquisition Programs (cont.)**
 - Tech Center Human Factors team (ANG-E25) leverages ATC/TO research program funding
 - Conducted Human in The Loop (HITL) Simulations:
 - Unmanned Aircraft Systems (UAS) HITL simulations and the UAS Advisory and Rulemaking Committee planning activities
 - Integrated Arrival-Departure Control Services (IADCS) HITL simulation
 - Weather Technology in the Cockpit HITL simulations
 - Conducted Separation Management HITL simulation to assess conflict probe accuracy requirements
 - Supported Development of User Interface Designs:
 - Traffic Flow Management
 - Terminal Sequencing and Spacing
 - Data Communications



Proposed FY+3 Focal Areas

- **NOTE: Current funding level only provides in-house resources to respond to requirements**
 - Focal Area 1: Strategic Job Analyses
 - Supports ATO Technical Operations and ATO Management Services sponsor needs to have evidence to support changes to recruitment and training methods and criteria
 - Continue development of descriptions of Technical Operations jobs, for current and future job functions, including work performed, competencies required, and tools and equipment needs.



Proposed FY+3 Focal Areas (cont.)

- Focal Area 2: Alignment of Organizational Culture with the Maintenance Operations Concept
 - Provides the Technical Operations (AJW) with tools for aligning organizational culture(s) with the evolving maintenance operations concept, and for measuring the degree to which such alignment has been achieved.
 - Products desired include:
 - A description of the current organizational culture(s)
 - An assessment of alignment with the future maintenance operations concept
 - Recommendations with tools for increasing appropriate alignment, with methods for assessing the degree to which the organizational culture(s) are coming into alignment with the future maintenance operations concept.



Proposed FY+3 Focal Areas (cont.)

- Focal Area 3: Air Traffic Control System Acquisition
 - 3a. Developing an integrated approach to Air Traffic Control system interface design and testing
 - Support the ATO PMO to develop better means to effectively integrate human factors into ATC system user interface design and testing.
 - Evaluate other ATC and engineering organization at NAVSEA, NASA, and AFRL to identify and adopt best practices.
 - 3b. Provide better controller awareness of decision support tool routings
 - Controllers need to be able to visualize lat/long routings generated by decision support tools and predict the aircraft flight path



Proposed FY+3 Focal Areas (cont.)

- Focal Area 3: Air Traffic Control System Acquisition (cont.)
 - 3c. Optimized Presentation of Critical ATC Information
 - Flight data block design is currently the result of the an accretion of separate program requirements.
 - Research is needed to determine the optimally efficient design of flight data block information so that the information may be easily learned and used, and to allow for growth as new systems are implemented.
 - 3d. Suitability Evaluation of Human-System Interface Interaction Methods and Technologies
 - Evaluate potential benefits for use of touch screens with direct manipulation and gesture control technologies to improve controller performance.



Proposed FY+3 Focal Areas (cont.)

- Focal Area 4: Human-Centered Automation
 - Formalize policy and guidance for ATC system acquisition programs related to human-centered automation
 - Update AMS Policy and develop and refine guidance for each of the AMS phases
 - » Provide methods to appropriately address human factors aspects including anticipated human-system performance risks and benefits, and contributions to the safety case
 - » Support decisions and decision rationale for use of ATC automation for particular functions as part of total human-system design and operation



Proposed FY+3 Focal Areas (cont.)

- Focal Area 5: Air Traffic Training Program Efficiency
 - Conduct analyses of longitudinal training and performance data to address questions about:
 - Predictive utility of basic and initial Academy training courses for field qualification training success
 - Relation between Radar Training Facility (RTF) course performance and field qualification success in Tower/TRACON and TRACON only facilities
 - Determine inter-rater reliability (IRR) for training course evaluators (and develop rater training to improve IRR)
 - Collect and analyze questionnaire data from developmentals who recently completed training to identify factors contributing to success and failure, and to develop mitigations

