

**Task 2: Evaluation of ATCS Biographical Data and Interview Selection Procedures (Broach)**

**Program Manager:** Edmundo A. Sierra, Jr., Scientific and Technical Advisor for Human Factors, AJP-612, (202) 267-7867, edmundo.sierra@faa.gov

**Task Customers/Sponsors:**

Jay Aul, Manager, AHR ATO Support Team, Human Resources Management, AHR-4, (202) 267-9862

Margaret Eggleston, Controller and Technical Operations Hiring Team, AJG-B14, (202) 493-4066

**Performing Organization:** NAS Human Factors Safety Research Laboratory, AAM-520 Dana Broach, AAM-520, (405) 954-4839, dana.broach@faa.gov

**University/Contract Performing Organization:**

Michelle Dean, Ph.D., San Diego State University, San Diego, CA (619) 594-6839, michelle.dean@sdsu.edu

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**Anticipated End Date:** 9/30/2010

**Requirements Statement**

*Operational Shortfall or Knowledge Gap*

Current personnel selection procedures for the Air Traffic Control Specialist (FG-2152) occupation in the Terminal and En Route & Oceanic service domains of the FAA Air Traffic Organization (AJT and AJE, respectively) consist of (a) an on-line application, (b) a short on-line biographical data (“biodata”) questionnaire embedded in the on-line application process, (c) the computer-administered Air Traffic Selection and Training (AT-SAT) test battery, (d) the Centralized Selection Panel (CSP), (e) a structured interview conducted by a manager of an ATC field facility, (f) a tentative offer letter, (g) a post-offer, pre-employment medical examination in accordance with FAA orders and policies, (h) a drug test as required by law, and (i) a pre-employment security investigation and adjudication of suitability for employment in the federal civil service as required by law. A final offer letter for a position at a specific facility is made to selected applicants by Human Resources Management (AHR).

The process begins with completion of the on-line application managed by Human Resources Management (AHR). Applicants who meet specific criteria in the on-line application are referred to take the AT-SAT battery. A score of 70 or above is required to qualify. Some, but not all, qualified applicants are then referred by the CSP to the interview stage of the controller selection process. The interview is managed by ATO. Interviews are generally conducted at the facility nearest the candidate’s address of record, which is not necessarily the gaining facility. Upon completion of the interview, AHR extends tentative offers to candidates based on ATO’s recommendations, for a position at a specific air traffic control facility. The medical examination, security investigation, and drug test are conducted post-offer in accordance with current statutes, regulations, and policies. Final offers are extended by AHR to successful candidates at the ATO’s direction upon completion of those pre-employment examinations.

There are four operational shortfalls in this process of interest to the ATO. First, scores obtained by applicants on the prototype on-line biodata questionnaire (the CAMI Life Experiences Questionnaire, or CLEQ) were highly skewed and compressed at the high end of the scale, resulting in little differentiation among candidates. The skewed scores also suggested that applicants were easily able to “read” the biodata questionnaire and respond in a socially or organizationally desirable manner, which might or might not have been an accurate reflection of the candidate. Second, the ATO has no basis at present for placement of applicants by option or facility level. Third, the evaluation of applicant responses in the structured interview by interviewing managers has not been reviewed for coherency and degree of support provided for the recommendation given (not recommended, marginal, or recommended). Fourth, the ATO has no information on how the accredited interviewers perceive the reliability, validity, and utility of the pre-employment interview. If the interview is seen as having little reliability, validity or utility, then it is at risk for becoming a *pro forma* step as interviewers simply go through the motions. This happened with the interview used in the recovery of the ATCS workforce following the 1981 PATCO strike.

*Benefit in Closing the Shortfall or Gap*

The benefits from closing these operational shortfalls and knowledge gaps include 1) making a stronger differentiation between applicants based on their personal experiences with greater validity in predicting future job performance, 2) identifying factors that might be assessed in the pre-employment interview for placement purposes as an interim measure until the Concurrent Validation of AT-SAT for Placement (Co-VATCH) is completed, and 3) providing feedback and guidance to interview program managers to improve the interview. Closing these three shortfalls or gaps in our knowledge will provide data on which to base management decisions about the ATCS selection process to support achievement of Objective 3 (“Make decisions based on reliable data to improve our overall performance and customer satisfaction.”) of the Organizational Excellence goal of the FAA Flight Plan 2009 – 2013. Closing the shortfalls and gap also supports the ATCS hiring initiative to support achievement of Objective 1 (“Make the organization more effective with stronger leadership, increased commitment of individual workers to fulfill organization-wide goals, and a better prepared, better trained, safer, diverse workforce”) of the Organizational Excellence goal of the FAA Flight Plan 2009 – 2013.

*Description of the Desired Product*

Four products are desired. The first product desired is a biographical data collection instrument suitable for computerized administration that contains about 100 or so items scored in such a way as to minimize socially desirable responses. This instrument must have demonstrable incremental validity over scores on the computerized AT-SAT test battery in predicting ATCS job performance and comply with technical guidelines, principles, standards, and accepted professional practices for the development and validation of personnel selection instruments. The second product desired is a content analysis of interviewer remarks from samples of interviews, an assessment of the degree to which interviewer comments justify the interview outcome. The third product is an evaluation of the ATCS interview with recommendations for content and procedural changes if warranted. The fourth product is a set of factors that can be assessed in the pre-employment interview for placement purposes as an interim measure until Co-VATCH is completed.

*Schedule*

Q3 FY10      ATCS Interview evaluation

Q4 FY10	ATCS Interview content analysis
Q4 FY10	Assessment of technical feasibility of criterion-related validation of the biographical data scale and ATCS structured interview

### Research Objective

This research has four objectives. The first objective is to assess the fairness, reliability, validity, and utility of non-cognitive instruments currently used in the FAA air traffic control specialist employment process in accordance with the *Uniform Guidelines on Employee Selection Procedures* (29 CFR §1607) and relevant professional standards, principles, and best practices. The second objective is to develop a biographical data collection instrument resistant to overt faking through socially desirable responding. The third objective is to evaluate the implementation of the ATCS structured interview and make recommendations, if appropriate, for content and procedural changes. The fourth objective is to identify factors that can be assessed in the interview and might be used for placement decisions on an interim basis until Co-VATCH is completed.

### Background

In FY2006, an empirically-keyed biographical data (“biodata”) instrument was developed for referral of air traffic control specialist (ATCS; FG-2152) applicants to second-stage aptitude testing. That prototype biodata instrument, known as the CAMI Life Experiences Questionnaire (v1.0) was developed on the basis of archival data from the CAMI ATCS research database and the validation of the Air Traffic Selection and Training (AT-SAT) test battery. The CLEQ v1.0 was delivered to AHR in mid-FY2006 to be implemented as a component of the Automated Staffing and Application Process (ASAP) for the ATCS occupation. In FY2006, CAMI also sponsored, under a contract with a researcher from San Diego State University (Michelle Dean, Ph.D.), the development of an empirically-keyed, response-option scored biodata instrument on the basis of archival data. Research on response-option scoring suggests that it is a viable strategy for the mitigation of the effects of socially desirable responses on biodata questionnaires. The initial iteration of the proposed biodata instrument, delivered to CAMI in early FY2007, included all items from the CAMI Biographical Questionnaire (BQ) and the Applicant Background Assessment (ABA), resulting in an instrument that was very lengthy and cumbersome to administer. Research in FY2009 on biographical data focused on identifying a practical subset of about 100 items from the empirically-keyed, response-option scored instrument with substantial validity as a predictor of ATCS job performance. The scale was programmed and data collection from new hires began in mid-FY2009 to support a future predictive validation study.

The research team also collaborated with AJA-55 contract staff (NCI, Inc.) in FY2005 and FY2006 to develop a structured interview and evaluation guide for the ATCS occupation. The structured interview (v1.0) was implemented in November, 2006. By August 20, 2008, 4,584 personal interviews had been conducted by ATO ATC field facility managers or their designees at field facilities or at ATO PEPCs. In the fall of 2008, a sample of 395 completed interview records was delivered to CAMI for transcription and analysis. The sample included 85 interviews resulting in adverse recommendations (e.g., “Not recommended” or “Marginal/Hold”) and 310 positive interviews matched, as nearly as possible, on interviewer and facility. The interview records were transcribed for qualitative analysis in FY2009. Development of a content coding

scheme began in FY2009 Q4. Coding began and will be completed in FY2010 Q2. Results will be used to provide recommendations for training of interviewers.

Finally, the *Uniform Guidelines on Employee Selection Procedures* (29 CFR § 1607) require that procedures used to make employment decisions (that is, where progression in the employment process is contingent upon applicant data or performance) be evaluated in terms of fairness, reliability, validity, and utility. However, the technical feasibility of such validity studies depends on (a) sample sizes (particularly for minority and female applicants for fairness studies), (b) variability in scores on the biodata and interview procedures, and (c), for criterion-related validity studies, the availability of appropriate job performance criteria and variability on those criteria (see 29 CFR § 1607.14B(1)). Research in FY2010 will assess the technical feasibility (defined at 29 CFR §1607.14B(1)) of validity studies for the biodata scale and pre-employment interview. Formal studies of biodata and interview fairness, reliability, criterion-related validity, and utility will be conducted if technically feasible in FY2010.

### **Previous Activity on this Task**

Applicant response data for the CLEQ v1.0 were analyzed in December 2007 (Q1 FY08) and the results summarized for AHR and ACR in an internal report and briefing in March, 2008. ATO decided to refer all otherwise qualified applicants for aptitude testing, thereby eliminating the need for the CLEQ. However, AHR retained the CLEQ as a part of the on-line ATCS job application, which will enable a predictive validation study when technically feasible. To continue development of a more robust biodata instrument for future use, the task PI developed and submitted a statement of work for development of an approximately 100-item biodata scale in April 2008. The contract was awarded in September, 2008 with work commencing immediately. The new instrument is known as the CAMI Background Assessment Survey (CBAS). The proposed 80, 100, and 120-item biodata scales were delivered by the contractor in January, 2009. The reliabilities and validities of the 100- and 120-item scales were not significantly greater than the reliability and validity of the 80-item scale. Therefore, that scale was adopted as the CBAS (as a 79-item scale, with one item referring to the old written OPM aptitude test dropped). The scale was then programmed and data collection on new hires began in FY2009.

A semi-structured phone interview of key program and policy managers for the ATCS structured interview and of “high-volume, high-quality” interviewers was conducted in FY2009. An interim report summarizing the results of those discussions was delivered at the end of FY2009. A sample of 395 completed interview records were transcribed as the first step to a content analysis

### **Proposed or Planned Research**

*Subtask 1:* Develop an empirically-keyed, response-option scored ATCS biodata instrument of about 100 (79 actual) items through bootstrap analysis of an archival data set. (Completed)

*Subtask 2:* Conduct two subject matter expert (SME) panels comprised of accredited ATCS interviewers from Terminal Services (AJT) to identify factors that might be assessed in the pre-employment interview and used for placement as an interim measure until Co-VATCH is completed. (Completed)

*Subtask 3:* Conduct semi-structured phone interviews of “high-volume, high-quality” interviewers (N ≈ 50). (Completed)

Develop and administer an on-line survey of all other accredited ATCS interviewers (N≈450) to evaluate their perceptions of the reliability, validity, and utility of the pre-employment ATCS structured interview and evaluation guide.

*Subtask 4:* Transcribe a sample of completed interview records from FY09 (N=395; completed). Develop and apply the content coding scheme to the transcribed interview records. Analyze the patterns of content codes in relation to the within-block (e.g., by factor) evaluations and the overall interview recommendation (e.g., not recommended, marginal, or recommended). Evaluate the degree to which the within-block content and evaluations agree with or justify the overall interview recommendation.

*Subtask 5:* Assess the technical feasibility of criterion-related validation studies for the CBAS and pre-employment ATCS structured interview (annual).

*Subtask 6:* If, and only if, technically feasible in FY10, conduct criterion-related validation studies for CBAS and the ATCS structured interview.

### **Research Question(s)**

1. What is the optimal, practical length of an empirically-keyed, response-option scored biographical data instrument with substantial incremental validity over the cognitive aptitude test battery?
2. What factors can be assessed in the ATCS pre-employment structured interview that can be used for an informed placement decision in the Terminal option?
3. To what degree are interviewer recommendations justified by the completed interview record?
4. How fair, reliable, valid and useful is the structured interview for selection of candidates into the ATCS occupation from management’s perspective? What changes are recommended?
5. What is the criterion-related validity of CBAS and the ATCS pre-employment structured interview?

### **Technical Approach**

#### **Current Year**

Develop and apply a content coding scheme to the sample of transcribed interviews.

Conduct a content analysis of the 395 transcribed interview records to determine the degree to which the recommendations made are justified by the write-ups and trends in the volume and quality of documentation.

Develop and administer, given access by AJE and AJT, an on-line survey of all other accredited ATCS interviewers (N≈450) to evaluate their perceptions of the reliability, validity, and utility of the pre-employment ATCS structured interview and evaluation guide.

Provide recommendations for training of interviewers.

Assess the technical feasibility of criterion-related validation studies of biodata scores and interview recommendation under the *Uniform Guidelines*.

Complete collection of CBAS data from new hires and analyze psychometric characteristics of the instrument when used to test ATC trainees.

**Out-Years**

Incorporate feedback from accredited interviewers and management stakeholders into the ATCS pre-employment structured interview as appropriate and deliver a new interview template and evaluation guide.

If technically feasible, conduct criterion-oriented concurrent validation study for CBAS and the ATCS pre-employment structured interview.

**Air Traffic Resources Required in FY10**

Yes – (a) All of the approximately 500 accredited ATCS interviewers (for about an hour or less each to complete the on-line survey); and (b) access to ATCS trainees for research data collection and their performance data at the Academy and on PV for assessment of the technical feasibility of criterion-related validation studies for the biographical data instrument and interview. Lack of timely access to these ATO resources will delay or prevent the accomplishment of the research plan.

**Calibration**

N/A

<b>FY10 Milestone Schedule</b>		
Description	Proposed Start Date	Proposed Completion Date
Developed an empirically-keyed, response-option scored ATCS biodata instrument of about 100 items (79 actual) through bootstrap analysis of archival data set (contract awarded FY08 Q4)		FY09 Q2 (Actual)
Conduct a subject matter expert (SME) panel comprised of accredited ATCS interviewers from Terminal Services (AJT) to identify factors that might be assessed in the pre-employment interview and used for placement as an interim measure until Co-VATCH is completed.		FY09 Q1 (Actual)
Conduct semi-structured phone interviews of “high-volume, high-quality” interviewers (N ≈ 50)	FY09 Q2	FY09 Q4 (Actual)

Develop and conduct on-line survey of all other accredited ATCS interviewers (N≈450) to evaluate their perceptions of the reliability, validity, and utility of the pre-employment ATCS structured interview and evaluation guide.	FY09 Q2	FY10 Q3
Transcribe a sample of interview templates (N=395)	FY08 Q1	FY09 Q4 (Actual)
Conduct annual analysis of available data to determine if criterion-related validation studies for the proposed empirically-keyed, response-option scored biographical data instrument and structured interview are feasible as defined by the Uniform Guidelines on Employee Selection Procedures	Annually	
Conduct content analysis of pooled interview records to determine degree to which recommendation is justified by the write-up and trends in documentation	FY09 Q2	FY10 Q4

<b>FY10 Deliverables</b>		
Description	Proposed Completion Date	Actual Completion Date
Annual letter report assessing technical feasibility of criterion-related validation studies of the CLEQ and the ATCS structured interview	FY09 Q4	FY09 Q4
Draft report summarizing results from on-line survey of ATCS interviewers with recommendations	FY10 Q4	
Draft report summarizing results of qualitative (content) analysis of completed interview templates with recommendations	FY10 Q4	
Annual letter report assessing technical feasibility of criterion-related validation studies of the proposed empirically-keyed, response-option scored biographical data instrument and the ATCS structured interview	FY10 Q4	
Supporting materials will be provided at the request of the AJP-61 Program Management. These include power point charts and briefing slides for TCRG meetings, abstracts for reports that don't already include them, quarterly reports, and text for the annual report summarizing the year's activities.	As needed	