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AIR FORCE READING ABILITIES TEST: UTILIZATION  
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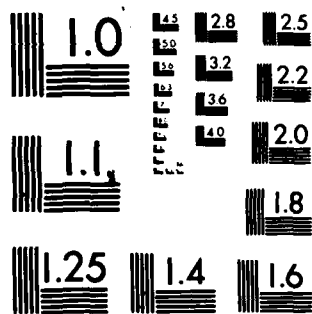
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**AIR FORCE**



AD A138986

**HUMAN RESOURCES**

**AIR FORCE READING ABILITIES TEST:  
UTILIZATION ASSESSMENT**

By

**Stephen E. Ricner**

**APPLICATIONS AND LIAISON OFFICE  
Brooks Air Force Base, Texas 78235**

March 1984  
Final Report

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This report has been reviewed and is approved for publication.

**ALFRED A. BOYD, JR., Colonel, USAF**  
Commander

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By

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**APPLICATIONS AND LIAISON OFFICE  
Brooks Air Force Base, Texas 78235**

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Reviewed by

**Alfred N. Giovine, Jr., Lt Colonel, USAF  
Deputy Director  
Applications and Liaison Office**

Submitted for publication by

**William C. DeBoe, Colonel, USAF  
Director, Applications and Liaison Office**

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides a utilization assessment of the Air Force Reading Abilities Test (AFRAT). The AFRAT was developed to standardize the evaluation of the reading ability of Air Force personnel and to replace the various commercial reading tests previously used. Agencies having functional responsibilities for programs related to the AFRAT were contacted concerning its utilization. The Air Force has implemented the AFRAT as its primary operational reading test. Forms 81A and 81B of the test were implemented in March 1982 to support many formal training programs and on-the-job training. In October 1982, it was designated as the operational test to screen enlistees in Basic Military Training for inadequate reading ability. On 12 January 1983, AFRAT Form 827 was implemented in Officer Training School to identify officer trainees who needed to improve their reading ability.		

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## EXECUTIVE SUMMARY

### Objective

The objective of this report is to provide a utilization assessment of the Air Force Reading Abilities Test (AFRAT).

### Requirements

Request for Personnel Research (RPR) 76-25, "Development, Validation, and Standardization of a Reading Ability Test for Air Force Personnel" established the requirement for development of AFRAT. The agencies establishing the requirement were the Headquarters United States Air Force, the Air Force Manpower and Personnel Center, and the Air Training Command.

The objective of the research and development (R&D) to support RPR 76-25 was to develop, norm, and validate a standardized diagnostic Air Force reading comprehension test in two parallel forms.

### Products

The major products were three forms of the AFRAT—Form 81A, Form 81B, and Form 82X. In addition to the AFRAT, three Air Force Human Resources Laboratory (AFHRL) technical reports (TRs) documented the R&D: AFHRL-TR-78-82, *Prediction of Reading Grade Levels of Service Applicants from Armed Services Vocational Aptitude Battery (ASVAB)*; AFHRL-TR-80-11, *Reading Grade Levels of Air Force Civilian Personnel*; and AFHRL-TR-82-26, *Reading Abilities Tests: Development and Norming for Air Force Use*.

### Specifics

AFHRL received RPR 76-25 in July 1976. The requirement was submitted as a result of prior R&D on job-related reading requirements by the AFHRL Technical Training (now Training Systems) Division and discussions at the Air Force Reading Literacy Conference in May 1975.

Active R&D support of RPR 76-25 by the AFHRL Manpower and Personnel Division began in April 1977. The initial effort resulted in the development of an experimental form of AFRAT, called AFRAT Form X (now Form 82X), with a reading grade level (RGL) range of 6 to 17. AFRAT Forms 81A and 81B were subsequently developed to ensure that lower-reading-ability individuals could be accurately measured. These forms measure vocabulary and comprehension reading ability from the 4th to the 12th RGL.

Norming studies conducted by AFHRL used Air Force and Army trainees to equate the AFRAT to three commonly used commercial reading tests. It was also equated to the ASVAB General-Technical composite. Raw-score-to-RGL conversion tables have been generated for AFRAT subtest and total scores. A preliminary analysis indicated that it would be a valid predictor of technical training performance.

On 22 September 1982, RPR 76-25 was completed.

### Product Implementation

AFHRL recommended that the AFRAT, Forms 81A and 81B, replace commercial reading tests that had been used in screening enlistees for inadequate reading ability. Agencies having responsibilities for programs related to the AFRAT were contacted concerning its utilization.

The Air Force has implemented the AFRAT as the operational reading test used Air Force-wide. Forms 81A and 81B of the test were implemented in March 1982 to support many formal training programs and on-the-job training. In October 1982, these two forms were implemented in Basic Military Training. In January 1983, AFRAT Form 82X was implemented in Officer Training School. The use of AFRAT as a DoD-wide reading test is being considered through the Joint Services Selection and Classification Working Group.

#### **Payoff**

With the implementation of AFRAT, a single reading test, rather than 12 different commercial reading tests, is used by the Air Force to assess reading skills and to identify reading deficiencies. The AFRAT provides a means of effectively screening and identifying Air Force personnel for reading remediation at all stages of an individual's Air Force career. No longer does the Air Force have to incur high testing-material costs nor to base career decisions on RGL norms of unknown appropriateness for military personnel. Also, the standardization of test scores is no longer the problem it was before AFRAT implementation.



TABLE OF CONTENTS

	Page
I. Introduction and R&D History . . . . .	5
II. Development Costs . . . . .	6
III. Utilization . . . . .	6
Agencies Contacted . . . . .	7
Product Implementation . . . . .	7
IV. Payoff . . . . .	8
V. Conclusions . . . . .	9
References . . . . .	9

LIST OF TABLES

Table	Page
1 R&D Work Units Supporting AFRAT Development . . . . .	6

## AIR FORCE READING ABILITIES TEST: UTILIZATION ASSESSMENT

### I. INTRODUCTION AND R&D HISTORY

In late 1975, three separate Requests for Personnel Research (RPRs) in the reading/literacy area were submitted as a result of prior research and development (R&D) on job-related reading requirements by the Air Force Human Resources Laboratory (AFHRL) Technical Training Division. The RPRs were, in part, the result of discussions at the Air Force Reading Literacy Conference held at the Pentagon in May 1975.

1. RPR 75-32, *Development, Validation, and Standardization of a Reading Ability Test.*
2. RPR 75-34, *Development of Comparison Tables for Selected Reading Tests for Air Force Personnel.*
3. RPR 75-38, *Reading Capabilities of Air Force Student Personnel.*

AFHRL felt that the three RPRs, all related to literacy measurement for Air Force personnel, might best be handled in the context of a single RPR and recommended merging them. Acting on this recommendation, the requirement agencies, Headquarters United States Air Force, Air Force Manpower and Personnel Center, and the Air Training Command withdrew the RPRs, developed a consolidated requirement, and submitted RPR 76-25, *Development, Validation, and Standardization of a Reading Ability Test for Air Force Personnel*, in July 1976.

The objective of the R&D to support RPR 76-25 was to develop, norm, and validate a standardized diagnostic Air Force reading comprehension test in two parallel forms. Active support by AFHRL began in April 1977 with in-house work unit 77191225. Contract work unit 77191229 followed in August 1978. The initial effort under these work units resulted in the development of an experimental form of AFRAT, called AFRAT Form X, with a reading grade level (RGL) range of 6 to 17. To ensure that lower-reading-ability individuals could be accurately measured, in-house work unit 77191808 was subsequently initiated to develop AFRAT Forms 81A and 81B. The following goals were pursued in that development:

1. Vocabulary and comprehension sections, as found in the Tests of Adult Basic Education (TABE) and other commercial reading tests used by the Air Force, were to be designed.
2. Comprehension passages were to be written with expository prose.
3. Comprehension questions were to cover factual matter unlikely to be answered correctly based solely on prior knowledge.
4. Vocabulary words that showed a likelihood of being encountered in an Air Force work environment were to be selected. Esoteric adverbs and adjectives were to be avoided to keep the test from being overly academic in nature.
5. The test was to be as reliable as possible, but to require less than an hour of testing time.

As developed, AFRAT measures reading abilities from the 4th to the 12th RGL. Each parallel form separately measures vocabulary and reading comprehension through the use of 45 vocabulary items in a synonym format and 40 comprehension items consisting of one or several paragraphs followed by one or more questions. The comprehension items require either paraphrasing or making inferences from the passages. All items are multiple choice with four alternatives. The total test time limit is 50 minutes. A separate RGL conversion table has been constructed for each part of the test. AFRAT norming studies were conducted by AFHRL in which Air Force and Army trainees were used to equate the AFRAT to the TABE, the Adult Basic Learning Examination, and Gates-MacGinitie reading tests. The AFRAT has also been equated to the Armed Services Vocational Aptitude Battery (ASVAB) General-Technical composite.

A preliminary analysis by AFHRL using AFRAT Form X indicated that it would be a valid predictor of technical training performance. The median correlation (validity) with technical training grades in 19 Air Force specialty groups was .40.

A more complete validation study involving AFRAT Forms 81A and 81B is continuing under work unit 77191819. The continuing development and validation of reading tests for operational use with enlisted and officer personnel will also take place under this new work unit. Full development and validation should be completed by September 1985.

## II. DEVELOPMENT COSTS

The requirement for the development of AFRAT, RPR 76-25, was closed out on 22 September 1982. Data from the Job Order Cost Accounting System (JOCAS) indicated that the total cost of the effort was \$349,540. However, some of the resources consumed in response to RPR 76-25 have aided programs involving the ASVAB and the Air Force Officer Qualifying Test. For example, in 1980 a Paragraph Comprehension (PC) subtest was added to ASVAB. Most of the 90 PC items in ASVAB 8, 9, and 10 came from the pool of items initially developed for possible use in AFRAT. AFRAT R&D was conducted by the AFHRL Manpower and Personnel Division. A summary of applicable information related to the R&D work units that supported RPR 76-25 is shown in Table 1.

Table 1. R&D Work Units Supporting AFRAT Development

Work Unit	Completed	Requirement	Products	Contractor	Total \$ Obligated JOCAS Actual
77191808	Sep 82 <sup>a</sup>	RPR 76-25 <sup>b</sup>	AFRAT, Parallel Forms 81A and 81B AFHRL-TR-82-26 (Mathews and Roach)	AFHRL In-House	93,095
77191225	Oct 80	RPR 76-25	"Experimental" AFRAT Form X (now called AFRAT Form 82X) AFHRL-TR-78-82 (Mathews, Valentine, and Sellman) AFHRL-TR-80-11 (Massey and Mathews)	AFHRL In-House	193,725
77191229	Aug 79	RPR 76-25	AFRAT Item Development 553 Items (281 Items of Word Usage, 155 Reading Passages, and 117 Reading Paragraphs)	Educational Development Corporation	62,720
				Total	\$349,540

<sup>a</sup>Work Unit 77191808 was cancelled 29 September 1982 - continuing work under Work Unit 77191808 was merged into Work Unit 77191819.

<sup>b</sup>RPR 76-25 was closed out as having been completed on 22 September 1982.

## III. UTILIZATION

AFHRL recommended that the AFRAT, Forms 81A and 81B, replace the commercial reading tests in screening enlistees for marginal or inadequate reading ability. Agencies having functional responsibilities for programs or policies related to areas of potential AFRAT impact were contacted in late October 1982 for discussions of utilization of this test. A consolidation of their views on AFRAT implementation is included. Footnotes are used to attribute utilization statements to specific user agencies.

## **Agencies Contacted**

### *Requirement Agencies:*

AFMPC/MPCYP – Air Force Manpower and Personnel Center, Assistant for Personnel Plans, Programs, and Analysis, Research and Measurement Division; Office of primary responsibility (OPR) for the Air Force Military Personnel Testing Program.

HQ USAF/MPPE – Headquarters Air Force, Directorate of Personnel Programs, Education Programs Division.

ATC/XPTT – Air Training Command, Deputy Chief of Staff for Plans, Training Systems Directorate, Training Research and Technology Division.

### *Additional User Agencies:*

HQ USAF/MPPTS – Headquarters Air Force, Directorate of Personnel Programs, Training Programs Division, Systems/Specialist Branch; OPR, Air Force On-The-Job Training (OJT) Program.

HQ USAF/MPXOA – Headquarters Air Force, Directorate of Personnel Plans, Policy Division, Accessions and Reenlistment Branch.

ATC/TTX – Air Training Command, Deputy Chief of Staff for Technical Training, Assistant for Plans, Analysis, and Data Systems.

ATC/DPAE – Air Training Command, Deputy Chief of Staff for Personnel, Personnel Programs Directorate, Education and OJT Division.

BMTS/MT – Air Training Command, Basic Military Training School, Operations Division.

OTS/MT – Air Training Command, Officer Training School, Deputy Commander for Military Training.

## **Product Implementation**

The Air Force has implemented the AFRAT as the operational reading test used Air Force-wide, and incorporated it into Air Force Regulation (AFR) 35-8, Air Force Military Personnel Testing System.<sup>1</sup> It was implemented in the continental United States in March 1982 and overseas a month later.<sup>2</sup> Its use as a DoD-wide (tri-service) reading test is being considered through the Joint Services Selection and Classification Working Group.<sup>3</sup> Inquiries on the Air Force use of AFRAT have come to HQ USAF/MPPE and the AFHRL Applications and Liaison Office (AFHRL/AZ) from the Army (Europe) and to HQ USAF/MPPTS from the Naval Academy. Defense Audit Services, while conducting a study on tri-service reading programs, commented to BMTS/MT on the possibility of AFRAT being established as a DoD-wide reading test.

An entirely new testing program has been implemented with the development of AFRAT. It supports all formal training programs and on-the-job training (OJT). Its use in OJT remedial reading training is documented in AFR 50-23, On-The-Job Training, 30 September 1982, Table 12-1, Duty 4. Additionally, the AFRAT-determined RGL is documented on AF Form 1095, Training Actions Required, in Section 3, Reading/Comprehension Requirements.<sup>4</sup> A sample AF Form 1095 appears as Figure 7-6 in AFR 50-23.

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<sup>1</sup>AFMPC/MPCYP, ATC/XPTT, HQ USAF/MPPTS, and HQ USAF/MPPE.

<sup>2</sup>HQ USAF/MPPE.

<sup>3</sup>AFMPC/MPCYP.

<sup>4</sup>AFMPC/MPCYP, ATC/XPTT, ATC/TTX, ATC/DPAE, HQ USAF/MPPTS, and BMTS/MT.

Through the use of AFRAT, airmen with reading problems can be identified more accurately, thus reducing the costs associated with training failures due to reading problems.<sup>5</sup> Prior to AFRAT, all Air Force trainees were administered the TABE reading test, and the RGL minimum for graduation from Basic Military Training was established as 8.0.<sup>6</sup> The AFRAT was instituted in January 1982 on a test basis with 8,976 airmen tested on the AFRAT and TABE. Based on the test, AFHRL recommended the use of AFRAT and the raising of the criterion RGL to 8.5. The AFHRL recommendation was accepted and on 10 October 1982 an RGL of 8.5, measured by the AFRAT, was implemented as the criterion for airmen to graduate from Basic Military Training. (Note: On 1 March 1983, by ATC/CC direction, the RGL criterion for BMT graduation was raised to 9.0.)<sup>7</sup> With the implementation of AFRAT as the reading test given to each of the approximately 80,000 Air Force trainees per year, the identification of deficient readers has more than doubled--from approximately 100 per month with TABE to almost 250 per month with AFRAT.<sup>8</sup>

The AFRAT is not only used in the Basic Military Training environment; it is also utilized at every Base Education Office through the OJT program. As noted previously, the criterion for Basic Military Training graduation is presently a 9.0 RGL. Each trainee's RGL is measured on the 8th day of training, and is entered on the AF Form 1095 which follows the trainee to the first duty station. An airman who failed to attain scores of at least 9.9 on either the vocabulary or comprehension parts of the AFRAT (reference AFR 50-23, Table 12-1, Duty 4) is retested at the first duty station by the Base Education Office. If the AFRAT retest RGL is still below 9.9, attendance in a remedial reading training program conducted by the Base Education Office is mandatory.<sup>9</sup>

As noted in Section I, early R&D of an Air Force reading test resulted in the development of an "experimental" form (AFRAT Form X) that measured reading ability from the 6th to 17th RGL. The Officer Training School, Deputy Commander for Military Training (OTS/MT), gave permission to implement AFRAT Form X (now identified as AFRAT Form 82X) to Air Force officer trainees in the Officer Training School environment for quick identification of deficient readers for remedial training. Accordingly, AFRAT Form 82X was implemented 12 January 1983 with Officer Training School class 83-09 and replaced the Nelson-Denny Reading Test for the identification of deficient readers. The 13th RGL criterion for graduation from the Officer Training School. However, officer trainees scoring below the 13th RGL on AFRAT Form 82X are encouraged to attend voluntary remedial reading training conducted by the Officer Training School staff.<sup>10</sup>

Other potential uses of the AFRAT include one in the reenlistment area. HQ USAF/MPXOA is currently conducting a study of RGL eligibility criteria for all Air Force specialty codes. The study will determine the feasibility of establishing a minimum RGL for reenlistment. If a minimum RGL is ultimately established for reenlistment, then there is expected to be a tremendous increase in personnel taking the AFRAT and, subsequently, attending remedial reading training.<sup>11</sup>

#### IV. PAYOFF

The AFRAT has been implemented in the OJT remedial reading training program through every Base Education Office, in Basic Military Training, and in the Officer Training School. With this implementation of AFRAT, a single reading test, developed specifically for Air Force use, rather than 12 different commercial reading tests, is used by the Air Force to accurately assess reading skills and to identify reading deficiencies. The AFRAT provides a means of effectively screening and identifying Air Force personnel for reading remediation at all stages of an individual's Air Force career. No longer does the Air Force have to incur high testing-material costs nor base career decisions on RGL norms of unknown appropriateness for military personnel. Also, the standardization of test scores is no longer the problem it was before AFRAT implementation.

<sup>5</sup>AFMPC/MPCYP, ATC/XPTT, ATC/DPAE, ATC/TTX, and HQ USAF/MPPTS.

<sup>6</sup>ATC/XPTT and BMTS/MT.

<sup>7</sup>BMTS/MT.

<sup>8</sup>ATC/XPTT and BMTS/MT.

<sup>9</sup>AFMPC/MPCYP, ATC/TTX, ATC/XPTT, ATC/DPAE, HQ USAF/MPPTS, and HQ USAF/MPPE.

<sup>10</sup>OTS/MT.

<sup>11</sup>HQ USAF/MPXOA.

## V. CONCLUSIONS

The AFRAT was developed to standardize the assessment of reading ability of Air Force personnel and to provide a means of effectively screening and identifying Air Force personnel for reading remediation at all stages of an individual's Air Force career. Implemented by the Air Force in March 1982 to support many formal training programs and OJT, in October 1982 in the Basic Military Training environment, and in January 1983 in the Officer Training School, the AFRAT has replaced the TABE, the Nelson-Denny Reading Test, and other commercial reading tests used previously throughout the Air Force.

AFRAT, Forms 81A and 81B, is the operational test used to screen enlistees in Basic Military Training for marginal or inadequate reading ability. It is also used in the Air Force OJT program for assignment of individuals to remedial reading training.

AFRAT Form 82X was implemented 12 January 1983 to identify officer trainees who needed to improve their reading ability.

Further, AFRAT is currently being discussed for use as a DoD-wide, tri-service reading test. The AFRAT is quick to administer, cost-effective (i.e., cost savings through use of Air Force-developed testing materials rather than commercial civilian tests), and has RGL norms developed specifically for military personnel.

AFRAT has been developed at a most opportune time. The Services have increased emphasis on reading skills programs. Attempts are being made to develop and to standardize accurate methods of assessing reading deficiencies because of the increasing reliance on these literacy skills in training and on the job.

Each agency contacted for this R&D Utilization Assessment expressed the view that time will prove the Air Force has a good test in AFRAT. However, to ensure its continuing use as an effective assessment tool and screening device for reading remediation, improvements to the existing test are necessary (e.g., the development of additional versions of the enlisted test for use in reading remediation programs and the preparation of standardized answers to commonly asked questions for the officer test, Form 82X). AFHRL will coordinate the improvements with appropriate implementing agencies. Validation data are also needed. During the AFRAT development process, AFHRL conducted preliminary validity analyses that indicated the AFRAT would be a valid predictor of performance in technical training. Now that AFRAT has been implemented, empirical studies of operational validity are continuing under work unit 77191819. Additionally, this work unit will be the vehicle for further AFHRL development and validation of reading tests for operational use with both enlisted and officer personnel.

## REFERENCES

- Massey, R.H., & Mathews, J.J. *Reading grade levels of Air Force civilian personnel*. AFHRL-TR-80-11, AD-A087 066. Brooks AFB, TX: Manpower and Personnel Division, July 1980.
- Mathews, J.J., & Roach, B.W. *Reading abilities tests: Development and norming for Air Force use*. AFHRL-TR-82-26, AD-A125 913. Brooks AFB, TX: Manpower and Personnel Division, February 1983.
- Mathews, J.J., Valentine, L.D., Jr., & Sellman, W.S. *Prediction of reading grade levels of service applicants from Armed Services Vocational Aptitude Battery (ASVAB)*. AFHRL-TR-78-82, AD-A063 656. Brooks AFB, TX: Personnel Research Division, December 1978.