

**BY ORDER OF THE SECRETARY OF THE
AIR FORCE**

AIR FORCE INSTRUCTION 14-202

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Intelligence

***STANDARDIZATION, EVALUATION, AND
QUALITY ASSURANCE FOR US AIR FORCE
RECONNAISSANCE IMAGING SYSTEMS***

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(SMSgt Dave Hay)
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This instruction implements AFR 14-2, *Intelligence Collection, Production and Application*. It assigns responsibilities for the quality assurance program of imagery sensor support systems. It sets up the quality assurance requirements for continuous photographic laboratories serving RF-4C, U-2R, imagery drone, and imagery related intelligence production organizations.

SUMMARY OF REVISIONS

This revision aligns the instruction with AFR 14-2.

Chapter 1

RESPONSIBILITIES

1.1. HQ USAF designates Ogden Air Logistics Center, Air Force Materiel Command (AFMC), as the USAF Central Calibration Facility (USAF CCF). OO-ALC/TIWL (Precision Measurement Equipment Lab), Hill AFB UT represents the Air Force Photographic Quality Assurance and Image Evaluation Program.

1.2. HQ USAF CCF:

- Demonstrates traceability of diffuse density measurements and exposure in meter-candlesecond (MCS) to the National Bureau of Standards (NBS).
- Calibrates step-tablets for diffuse densitometers.
- Coordinates with the Aerospace Guidance and Meteorology Center (AGMC) on the densitometer calibration program and sensitometer calibration procedures according to AFI 21-113, *Air Force Meteorology and Calibration (AFMETCAL) Program* (formerly AFR 74-2).
- Supports the MAJCOM CCF in resolving densitometer and sensitometer calibration problems.
- Produces a sensitometer calibration package consisting of two rolls of film of the same emulsion. The CCF must expose one roll with a calibrated step-tablet exposure and age the film to reduce latent image effects. The second roll must remain unexposed. The CCF also stores the sensitometer calibration package under controlled conditions at all times, and keeps appropriate records for periodic verification.
- Manages the sensitometer calibration packages and calibrated densitometer step-tablets.
- Analyzes the data returned from the user, determines the exposure made by the sensitometer to be calibrated, and notifies the user and the appropriate MAJCOM/CCF of the exposure value.
- Establishes the Air Force Avionics Laboratory (AFMC) as the USAF Sensor Evaluation Center (USAF SEC).

1.3. HQ USAF Sensor Evaluation Center:

- Performs sensor system performance evaluations for the Sensor System Evaluation Steering Group, which addresses problems organizations and depots can't solve.
- Provides technical assistance to HQ USAF, the sensor System Evaluation Steering Group, and users on Nominal Performance Standards (NPS) matters.
- Develops and coordinates standardized measurement methods for evaluating images used to update NPS.
- Works with user commands, supporting organizations, and staff agencies.

1.4. MAJCOMs:

- Establish a calibration program for sensitometers and densitometers and support users by resolving calibration problems.
- Designate a MAJCOM/CCF and notify HQ USAF/INX and HQ USAF/CCF of the assignment.

- Designate each facility which must requisition USAF/CCF sensitometer and densitometer calibration packages.
- Ensure that all exposures produced by a command standard sensitometer are within established tolerances as determined by exposures from the USAF/CCF standard sensitometer. Only then can a command use its own standard sensitometer to produce secondary calibration packages for its users. *Note: This does not apply to Joint Intelligence Organizations.*
- Monitor the command densitometer and sensitometer calibration programs and supplement procedures as required.
- Ensure calibration sensitometers correlate with the USAF/CCF standard sensitometer exposure and produce sensitometer calibration packages for users not requisitioning packages from USAF/CCF.
- Implement the USAF Sensor System Evaluation Program through the MAJCOM supporting reconnaissance programs and assign responsibilities within the command for imagery evaluation considering facility capability, resources, and mission requirements.

1.5. Users:

- Requisition the calibration densitometer step-tablet from the national stock list at least every 12 months, establish an expiration date of the calibration densitometer step-tablet 12 months from the date of first use, and write the expiration date on the AFTO Form 108, **PME Certification Label**. Use this step-tablet as the facility standard to calibrate working step-tablets.
- Maintain working step-tablets traceable to the facility standard step-tablet. Use expired facility standard step-tablets as working step-tablets if their physical condition is acceptable.
- Certify the diffuse densitometer according to TO 10-1-6-2, using the calibrated step-tablet work standard. If the densitometer fails, calibrate it according to the equipment calibration procedures in the appropriate densitometer technical order (TO).
- Requisition the sensitometer calibration package for the type of sensitometer to be calibrated at least every 12 months.
- Calibrate the facility standard sensitometer according to TO 10-1-6-2, and as supplemented by instructions in the calibration package. Once you calibrate the facility standard sensitometer, use its calibration for all remaining facility sensitometers. Do this every 12 months.
- Produce exposures on control stock film using the facility standard sensitometer during calibration. Use these exposures for later calibrations and certifications.
- Monitor sensitometer calibration according to TO 10-1-6-2 to determine when you need maintenance.

Chapter 2

QUALITY ASSURANCE (QA) PROCEDURES

2.1. QA Program. Each laboratory must establish a QA Program and develop process standards for each sensor and film type. Establish these standards so they are consistent with the manufacturers' specifications, laboratory capability, and DoD requirements.

2.1.1. Establishing a Program to Meet Mission Requirements. No single quality assurance specification covers all reconnaissance programs; however, you must identify criteria for photographic quality to get the most information from a given reconnaissance system. Once you have determined the "quality goal," you must examine the various laboratory activities to find which variables affect the final product quality. Assign control tolerances to each variable to make sure you achieve the overall "quality goal." When you have identified the "quality goal," you can define the operating criteria for each laboratory procedure. From this point, your quality control program makes sure you maintain standards within specified limits.

2.1.2. Producing Consistently High-Quality Products. If you control variability, you assure the reliability of the laboratory's products. Laboratory management makes sure that the laboratory system operates within repeatable limits and in a prescribed manner. Quality control applies to all laboratory activities, including the performance of the operators and maintenance personnel, which affect image quality.

2.1.3. Controlling Laboratory Quality Assurance. Use the following steps to control your laboratory quality assurance program:

- **Identify Variables.**
- **Use Instruments Properly.** Whether these devices are simple or complex, you must know their repeatability and accuracy. You must calibrate them periodically against a standard.
- **Collect and Present Data.** You must collect quality assurance data and record it accurately and uniformly. Present the data on AF Form 1600, **Sensitometry Worksheet**; AF Form 1602, **Original Negative Evaluation**; AF Form 1603, **Mission Densitometric Readout Data**; AF Form 1604, **Titling Checklist**; and AF Form 1605, **Equipment Certification**. Laboratories with immersion processors, prototype equipment, or specialized items, such as computer interface printers, are authorized use of locally produced forms for those specific items not covered by existing Air Force forms.
- **Analyze and Integrate Data.** Begin analyzing data by examining control charts for abnormal deviations from the mean. When deviations indicate a trend, you must analyze all variables before making any changes. Conduct an analysis of variance to consider interaction between variables before making any decisions.

2.2. Calibrating and Certifying Standards. All imagery production laboratories must maintain at least minimum standards for certifying and calibrating equipment, and evaluating imagery, statistics, and exposure monitoring systems. See TO 10-1-6-2 for definitive guidance on this requirement. Perform:

- Equipment calibration in all laboratory categories as specified in the appropriate TO. Calibrate sensitometers and densitometers every 12 months.

- Certification, standardization, and quality assurance procedures at least as often as specified in the appropriate TO.

2.3. Sensor System Evaluation Program. The sensor system evaluation program determines the performance of specific imaging systems. The Air Force then compares actual system performance against expected standards. The program considers variables such as the aircraft, camera, film processing, and environmental conditions. It measures the quality of the imagery interpreter's product. Evaluation ranges from limited visual inspection to in-depth study and documentation requiring sophisticated instrumentation. The sensor system evaluation program identifies probable system degradation causes and ensures the Air Force takes corrective action.

2.3.1. Evaluating Sensor Performance. Ogden ALC, Hill AFB, UT verifies repaired/updated sensors meet NPS's. They also evaluate modified or prototype sensors against established standards to calculate their expected gain to the operational users. Depot maintenance level testing to the NPS must be performed on:

- New imaging sensors in the acquisition cycle.
- Existing imaging sensors in a planned recycling basis.
- Existing imaging sensors sent to the depot for maintenance and overhaul.

2.3.2. Defining the Sensor System Evaluation Steering Group. ACC/INXY (Air Combat Command/Intelligence Systems Branch) chairs the group and all commands with reconnaissance responsibilities must appoint a group member. The group determines priorities, approves specific NPS formats, and coordinates command interface required in the sensor system evaluation program. It also recommends specific functions and responsibilities for user commands, supporting organizations, and staff activities.

2.4. Environmental Standards for Photo Processing Laboratories. The quality of a laboratory's control system must be as high as the quality of the photographs it expects to produce. Laboratories must inspect film, analyze it, process prints, and title photographs in the cleanest possible working conditions. Use specific assignment and production requirements to determine the degree of cleanliness a facility requires. Each MAJCOM must set up minimum environmental standards for USAF imagery processing and imagery evaluation facilities based on the mission of each facility.

2.5. Forms Prescribed:

- 2.5.1. AF Form 1600, **Sensitometry Worksheet.**
- 2.5.2. AF Form 1601, **Spray Processor Temperature and Pressure Log.**
- 2.5.3. AF Form 1602, **Original Negative Evaluation.**
- 2.5.4. AF Form 1603, **Mission Desitometric Readout Data.**
- 2.5.5. AF Form 1604, **Titling Checklist.**
- 2.5.6. AF Form 1605, **Equipment Certification.**
- 2.5.7. AF Form 3643, **Digital Map Request.**
- 2.5.8. AF Form 3645, **PIDP Submission Form.**

2.5.9. AF Form 3646, **DBRITE Low Altitude Alerting System (LAAS) Data Submission Forms.**

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Attachment 1

GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS

References

NOTE:

If you use this instruction, you are responsible for verifying the currency of the cited documents.

AFPD 14-2, *Intelligence Collection, Production, and Application*

AFI 21-113, *Air Force Meteorology and Calibration (AFMETCAL)*(formerly AFR 74-2)

TO 10-1-6-2

TO 33K-1-100

Abbreviations and Acronyms

AFB—Air Force Base

AFMC—Air Force Materiel Command

AGMC—Aerospace Guidance and Meteorology Center

CCF—Central Calibration Facility

MAJCOM—Major Command

NBS—National Bureau of Standards

NPS—Nominal Performance Standards

SEC—Sensor Evaluation Center

TO—Technical Order

USAF—United States Air Force

Terms

Nominal Performance Standards (NPS)—NPS is the key element in the sensor system evaluation program. It specifies a sensor system's operational performance under a given set of conditions in terms of image quality. The NPS includes a sensor system description, expected values of imagery quality, and references to appropriate documents. It provides a common technical evaluation baseline for Air Force organizations. NPS can be set up around operational systems, controlled flight tests or static laboratory tests, and will vary for each set of conditions. Sensor system NPS specifies support organization and depot level functions.