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TSF Instrumentation Calibration Plan

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APPROVAL SIGNATURES		Date
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REVISION HISTORY			
REV	Description of Change	Author	Effective Date
-	Initial Release	J. Balboni	11/05/98
A	Major update	J. Balboni	2/8/99
B	"may" changed to "shall" between paragraphs 6.5.5 and 6.5.6. Corrected page numbering and footer.	J. Hartman	3/25/99
C	Revised Quality Records Index	J. Balboni	1/25/00
D	Added usage investigation and documentation for out-of-tolerance IM&TE	J.J. Mach	6/27/02
E	Major update to align procedure with new Directorate, Center governing document, calibration services provider / contract, and findings from AMS Internal Assessment.	J.J. Mach	5/12/05
F	Updated to cite and comply with updated higher level documents	J.J. Mach	4/30/09
G	Updated to resolve compliance issues with implementing APR 8730.1 rev.2, including control of instruments that are due for calibration or not calibrated	J.J. Mach	10/6/10



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H	Updated section 5.2 and 5.3, to reflect changes regarding review and verification of Calibration notifications.	S.Eddlemon	12/31/2015
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REFERENCE DOCUMENTS

Document Number	Document Title
APR 8730.1	Metrology / Calibration
APR 8735.1	Control of Nonconforming Products and Services
APR 8735.2	Deviation/Waiver Process
ASF-05-001	Work Instruction for the TSF Calibration System
A029-9701-XM2	ASF Branch Operations Manual

1 Purpose

This document describes the process by which the Thermo-Physics Facilities Branch, Code TSF, implements APR 8730.1, "Metrology/Calibration" and defines the responsibilities and requirements for periodic calibration of IM&TE used in branch facilities for data product and safety-critical measurements.

2 Scope

This procedure applies to all TSF civil servant and contractor personnel who use or calibrate IM&TE that contributes to branch safety, mission success, and the quality of products delivered by the branch pursuant to a formal customer agreement.

3 Definitions

- | | | |
|-----|---------------------------------|--|
| 3.1 | Calibration Recall | System used to remind IM&TE Users of upcoming calibration expiration dates. |
| 3.2 | Critical Instrument Master List | List of a facility's product-critical test instruments containing: operating range, allowable uncertainty, location, and equipment identification. |
| 3.3 | Critical Measurement | A measurement that is used to generate customer product (i.e., data) or is essential for safety or mission success. |
| 3.4 | IM&TE | Inspection, Measuring, and Test Equipment |
| 3.5 | IM&TE Custodian | Personnel with an administrative role over the calibration of IM&TE in a particular facility. (May also be an IM&TE User) |

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- 3.6 IM&TE User On-site personnel directly responsible for the care and use of particular IM&TE.
- 3.7 NIST National Institute of Standards and Technology.
- 3.8 NIST-traceable Capable of being traced via a chain of calibrations to the standards maintained by NIST.
- 3.9 Non-Conformance Report Form (ARC 758) used for the tracking and disposition of non-conformances to an established procedure or agreement (e.g. impact of an out-of-tolerance instrument on a customer test).
- 3.10 Out-of-Tolerance Investigative Report Form (ARC 828) used for logging the use of IM&TE on critical measurements during the period between the previous and most recent calibration where it was found out of tolerance and then determining whether the IM&TE could have had a negative impact on the critical measurement.
- 3.11 Primary Calibration Supplier The Calibration Supplier that provides the majority of calibration services for the TSF branch.
- 3.12 Test Instrument Any sensing device, (gauge, thermocouple, voltmeter, transducer, etc.) used to acquire test data. Typically, test data is considered a Critical Measurement.
- 3.13 Working Standard (also: Transfer Standard) Instrument used to calibrate or certify IM&TE within tolerance. Such a standard shall have measurement accuracy greater than that of the instrument being calibrated.

4 Flowchart

No flowchart is necessary.

5 Responsibilities

In addition to the responsibilities listed in APR 8730.1, the following apply:

- 5.1 IM&TE User shall:
 - 5.1.1 Submit IM&TE for calibration at the required periodic intervals.
 - 5.1.2 Handle, use, and store IM&TE to maintain accuracy and fitness for use.

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5.1.2.1 Track use of IM&TE that perform critical measurements to facilitate investigation of out-of-tolerance instrument use.

5.1.3 On the monthly receipt of an internal or external calibration recall notice for IM&TE not calibrated in place, separate IM&TE that is not yet calibrated, overdue, or coming due for calibration to a clearly-marked storage location (i.e., "Detention Center") in their work area to prevent their use on critical measurements prior to their being sent for calibration.

5.2 IM&TE Custodian shall:

5.2.1 Prior to initial use, submit IM&TE for calibration and entry into Calibration Recall, if required.

5.2.1.1 Enter new IM&TE data to relevant Instrumentation databases and Recall and Critical Instrument lists.

5.2.2 Maintain a current Critical Instrument Master List for the facilities for which they are the Custodian.

5.2.3 Maintain the Calibration Recall information to keep the list up to date, including matters such as revising calibration intervals, tolerances, and allocation to the correct IM&TE User and facility.

5.2.3.1 Review Monthly, Calibration Reports and Recall notices. Notify Users of any equipment "Coming Due".

5.2.3.2 Maintain an internal Calibration Recall list and provide monthly notification to IM&TE Users for any items in your custody not already recalled by a Calibration Supplier.

5.2.4 Ensure the calibration of IM&TE is performed by a QS-approved Calibration Supplier or according to approved branch work instructions.

5.2.5 File Calibration, Nonconformance, and Out-of-Tolerance Use Investigation reports and forms. Maintain access to on-line records.

5.2.6 Maintain calibration of branch working standards, as required.

5.2.7 Remove the item from Calibration Recall when IM&TE will no longer be used for critical measurements and does not require regular calibration.

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- 5.2.7.1 Clearly tag (e.g., stickers or securely mounted tags showing "Indication Only," "No Calibration Required," or "Calibrate Before Use") IM&TE removed from recall.

Best Practice: Where practical, IM&TE not recalled shall be stored separately from calibrated IM&TE to avoid accidental use.

5.3 Responsible manager shall:

- 5.3.1 Ensure that all customer-supplied instrumentation and interfaces with Code TSF equipment are defined.

- 5.3.1.1 Ensure that customer instrumentation requirements are clearly identified and conveyed to IM&TE Users implementing the measurement for the customer.

Best Practice: Accuracy baselines may be established by a facility and agreed to, or deviations requested, by the customer.

- 5.3.2 Establish "Detention Center" storage locations in their facility where IM&TE in need of calibration can be stored until they are sent for calibration.

- 5.3.3 Verify on a Quarterly basis, Equipment Custodians/Users are following step 5.2.3.1 (monthly review and notification).

6 Procedure

External and User Calibration:

In addition to the procedure found in APR 8730.1, the following procedure applies:

- 6.1 When IM&TE require calibration, the IM&TE User shall:

- 6.1.1 Submit IM&TE to (or initiate on-site calibration through) the QS-approved Primary Calibration Supplier for Code TSF, using the procedure defined in ASF-05-001 "Work Instruction for the TSF Calibration System."

OR:

- 6.1.2 Initiate on- or off-site calibration of the IM&TE by a Code QS-approved, third-party calibration contractor on the list of approved suppliers maintained by Code QS.

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6.1.2.1 If a new calibration supplier is required for IM&TE (i.e. original equipment manufacturer), the IM&TE Custodian shall contact QS to have the supplier approved and added to the list.

OR:

6.1.3 Initiate on-site user-calibration of IM&TE following Code QS-approved work instructions using calibrated, NIST-traceable, working standards.

6.1.3.1 The ARC 827 Form shall be used to record the data and results from the user-calibration.

6.1.3.2 Ambient temperature and humidity at the site where the calibration is being performed shall be recorded on the ARC 827 Form and verified to be acceptable for the IM&TE and all working standards.

6.1.3.3 If no NIST-traceable standard exists, then identify and explain the basis for calibration (i.e. standard) on the ARC 827 report.

6.2 If the Calibration Supplier (or third-party calibration contractor) determines that the instrument is calibrated or adjusted within tolerance, the IM&TE User shall:

6.2.1 Provide the Calibration Report to the IM&TE Custodian for retention, if provided with a hardcopy report.

6.3 If the IM&TE User determines that the user-calibrated instrument is calibrated and adjusted within calibration tolerance, the IM&TE User shall:

6.3.1 Affix a "Calibrated by User" label to the instrument and fill in the initials of who performed the calibration and the next calibration due date.

6.3.2 Complete the form ARC 827 "User Calibration Report" and provide it to the IM&TE Custodian for retention.

Out-of-Tolerance Condition:

6.4 If the IM&TE calibration is found to be out-of-tolerance, in addition to procedures in APR 8735.1 and APR 8735.2, the IM&TE User shall:

6.4.1 Determine whether the IM&TE was used for customer product or service or safety or mission critical measurements by conducting a use investigation recorded with the Form ARC 828 "Out-of-Tolerance Investigative Report."

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6.4.1.1 Attach the form to the calibration report for retention.

If the IM&TE is determined to have been out-of-tolerance with respect to customer agreement for products or services, the IM&TE Custodian shall:

6.4.2 Fill out form ARC 758 "Nonconformance Report" and forward one copy each to the Responsible Manager and the IM&TE User.

AND, the IM&TE User shall:

6.4.2.1 Notify the affected customer(s) promptly regarding how the nonconformance has caused the data product or service to depart from the customer's requirements.

If the IM&TE is determined to have had insufficient accuracy for safety or mission critical measurements, IM&TE User shall:

6.4.3 Re-inspect all critical measurements still in use made during the previous calibration period and correct any deficiencies.

The IM&TE Custodian shall:

6.4.4 Arrange for adjustment, repair, or replacement of out-of-tolerance IM&TE, as required.

6.4.4.1 If the IM&TE can be repaired or adjusted to be in tolerance, determine whether or not the calibration interval should be changed.

6.4.4.2 If the IM&TE cannot be repaired or does not function, clearly tag the instrument to identify it as inoperable and not to be used, remove it from the Critical Instrument Master List and Calibration Recall, store it separately from calibrated IM&TE, and follow property disposal procedures.

Urgent Use:

6.5 For temporary, "Urgent Use" cases where IM&TE must be used that functions but cannot be repaired to be within tolerance, the IM&TE Custodian shall:

6.5.1 Fill out a form ARC 762 "Request for Deviation" in order to "use-as-is."

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6.5.2 Obtain approval of ARC 762 "Request for Deviation" from the Responsible Manager. In addition, customer approval of ARC 762 is required if the nonconformance will cause the data product to deviate from the customer's requirements.

The Responsible Manager shall:

6.5.3 Disposition the Nonconformance Report and Request for Deviation.

6.6 For temporary, "Urgent Use," after lapse of the calibration due date, in addition to procedures in APR 8735.1 and APR 8735.2:

IM&TE Custodian shall:

6.6.1 Fill out form ARC 758 "Nonconformance Report" and forward one copy each to the Responsible Manager and the IM&TE User.

IM&TE User shall:

6.6.2 Notify the affected customer(s) promptly of the nonconformance.

6.6.3 Fill out a form ARC 762 "Request for Deviation."

6.6.4 Obtain approval of ARC 762 "Request for Deviation" from the Responsible Manager and from the customer.

The Responsible Manager shall:

6.6.5 Complete disposition of the Nonconformance Report and Request for Deviation as: "use-as-is."

The IM&TE Custodian shall:

6.6.6 Arrange for prompt calibration or replacement of affected IM&TE as required as soon as allowable.

7 Metrics

There are no metrics for this procedure.

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8 Records

Quality records are defined in the TSF Branch Quality Records Matrix. Those related to this document are summarized briefly in the following table:

Quality Records Index		
Record Identification	Retention Period	Custodian
User Calibration Report (ARC 827)	Indefinitely	IM&TE Custodian
Calibration Report (External Calibration Supplier)	Indefinitely	IM&TE Custodian
Out-of-Tolerance Investigative Report (ARC 828)	Indefinitely	IM&TE Custodian
Nonconformance Report (ARC 758)	Indefinitely	Responsible Manager
Request for Deviation (ARC 762)	Indefinitely	Responsible Manager

9 Forms

Forms required for this document:

Form Number	Title
ARC 758	Nonconformance Report
ARC 762	Request for Deviation/Waiver
ARC 827	User Calibration Report
ARC 828	Out-of-Tolerance Investigative Report

Note: The latest versions of all ARC Forms are available from the Ames Electronic Forms System.
<http://server-mpo.arc.nasa.gov/Services/AEFS/AEFHome.tml>