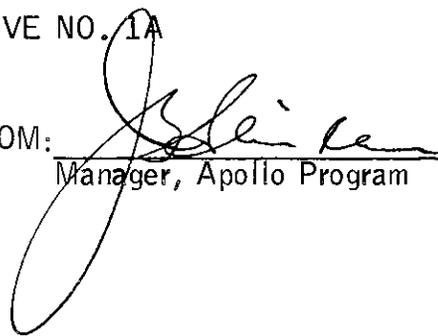


KSC APOLLO PROGRAM DIRECTIVE NO. 1A

TO: See Distribution

FROM: 
Manager, Apollo Program

SUBJECT: KSC Apollo Calibration Policy

REFERENCE: NPC 200-2, NPC 200-3

I. PURPOSE

It is KSC calibration policy to establish uniform calibration measurements of high accuracy that are traceable to national standards for all on-site operations performed by KSC and associated mission and support contractors.

The principal functions and responsibilities of KSC organizations and associated mission and support contractors for on-site calibration activities are outlined and shall be implemented commensurate with contract requirements and organizational needs.

Off-site contractor metrology and calibration activities related to KSC procured hardware are administered by the KSC Quality Engineering and Control Division.

II. SCOPE

The KSC organizations involved in the implementation of this directive are:

Manager, Apollo Program (DA)

Director, Quality Assurance (EA)

Director, Launch Vehicle Operations (JA)

Director, Spacecraft Operations (KA)

Director, Information Systems (PA)

Director, Support Operations (QA)

Director, Installation Support (RA)

Apollo contractor organizations with the standard base support clauses included in their contracts with KSC are governed by the provisions of this directive.

III. AUTHORITIES AND RESPONSIBILITIES

- A. The Manager, Apollo Program is responsible for:
1. Establishing KSC calibration policy in accordance with NASA reliability and quality assurance policy.
 2. Validating and funding for overall KSC calibration facilities, resources and requirements in support of the Apollo Program.
- B. The Director of Technical Support is responsible for:
1. Management of KSC instrument calibration activities which require traceability to national standards; calibrating and repairing instruments at KSC as designated by using organization requirements (see paragraph C.3).
 2. Maintaining and operating KSC reference standards traceable to the National Bureau of Standards (NBS), including all measurement parameters requiring traceability. Serving as the KSC single technical interface with the National Bureau of Standards for equipment requiring NBS certification.
 3. Certifying or calibrating all transfer and/or working standards in use at KSC as designated by the using organization calibration requirements, (see paragraph C.3).
 4. Calibrating portable commercial test equipment, or commercial test equipment contained in GSE, as designated by the using organization requirements (see paragraph C.3).
 5. Calibrating, as required by Launch Operations organizations, test equipments contained in stage or spacecraft GSE which are used as "system standards" for the maintenance, functional testing, adjustment, and calibration of the system or its components. For the purposes of this document "system standard" is defined as follows:

"A system standard is any instrument which is an integral part of a unit of GSE or an integral part of a separate and complete instrumentation system which is used to calibrate or to monitor the accuracy of other instruments mounted in the same or separate systems."

6. Establishing satellite laboratories in the Manned Spacecraft Operations Building, VAB, LC-39 pads, and other highly instrumented areas where large calibration and repair workloads make a local laboratory more economical or expeditious.
7. Providing KSC professional metrology support on measurement problems at state-of-the-art accuracy or stability levels, as designated by using organization requirements (see paragraph C.3).
8. Maintaining an inventory and calibration status file.
9. Establishing and administering a recall system for providing advance notification to all KSC mission and support contractor organizations of equipment recalibration due dates; notifying KSC operational organizations when instruments are not returned for recalibration.
10. Providing a loan pool for the receipt, storage and short-term issue of high usage general test equipment, and other measuring and calibration devices as required by KSC and associated contractors. Unique and costly equipments not falling into the high utilization category will be maintained either in the loan pools or the operational laboratories, whichever is more appropriate. Provisioning of such unique equipments to all potential users would not be feasible. Equipments of this nature will be screened by the operating elements of KSC, including contractors, and returned to the loan pool of the Calibration Branch for deployment.
11. Establishing procedures used for maintenance, adjustment, and repair of all reference standards; and for establishing similar procedures for those standards periodically calibrated by the Calibration Branch.
12. On an emergency basis, calibrating operational type equipment (such as flight hardware and components, transducers, etc.) as requested.

13. Developing consolidated KSC annual calibration resources requirements.
- C. Directors for Support Operations, Launch Vehicle Operations, Spacecraft Operations, Information Systems and Installation Support are responsible in their respective organization for:
1. Identifying a specific organizational segment to implement the calibration program.
 2. Managing and administering the respective mission and support contractor calibration activities.
 3. Obtaining, reviewing, validating, and consolidating annual calibration resources requirements from their respective contractors.
 4. Monitoring mission and support contractor compliance with NASA and KSC calibration policy.
 5. Preparing (or assuring) forecasts of equipment requiring calibration by the Calibration Branch.
 6. Assuring Calibration Branch is notified of all surplus or obsolete equipment which no longer requires calibration.
 7. Performing (or assuring their contractors perform) systems calibration.
- D. The contractors identified in paragraph B are responsible for:
1. Identifying a specific organizational segment (or aligning with the cognizant KSC operational organization) to implement calibration activities.
 2. Calibrating in-place instrumentation and operational type equipment such as flight hardware, overall systems checkout equipment and transducers; functional checkout and calibration of flight and GSE pressure switches, relief valves, tape or oscillographic recorders, discriminators, and similar equipment which are not systems standards requiring calibration by the Calibration Branch in accordance with

paragraph B.5 above. Situations will exist where the small quantity of instruments or calibration requirements under consideration will not justify equipping and establishing a contractor calibration effort. Under these circumstances, it would be in the best interests of the Government for the Calibration Branch to perform calibration services. For control purposes, actions of this type should be approved at the affected Directorate level. In-place calibration is defined as that instrumentation which is not removed from racks or panels for calibration.

3. Forecasting and submitting annual calibration resources requirements to the cognizant KSC operational organization.
4. Developing and implementing procedures to assure removal from use (or flagging as suspect) all equipment which is overdue for recalibration, including marking of any data collected from use of such equipment. Provided such equipment is in current use. Procedure will be developed to remove equipment temporarily not in use from the normal recalibration cycle.
5. Establishing and implementing procedures for the control of equipment (inspection, cleaning and test equipment) which is not periodically calibrated by the Calibration Branch, to comply with NPC 200.3 paragraph 3.9, "Control of inspection, Measuring and Test Equipment", NPC 200.2, section 9.0, "Inspection, Measuring and Test Equipment", or equivalent requirements.
6. Establishing and maintaining a list of contractor operated and/or maintained equipment, and quantity of each type, requiring certification or calibration by the Calibration Branch. The contractor shall indicate the time frame for mandatory recalibration of the equipment listed. Where equipment is operated by one contractor and maintained by another, the contractor with the maintenance responsibility will establish and maintain the above list. This list shall be submitted to the cognizant KSC operational organization.
7. Submitting programs and procedures for calibration, maintenance adjustment, repair and mandatory recalibration control of operational equipment to the cognizant operational organization.

8. Preparing a forecast and subsequent quarterly revisions of equipment requiring calibration and submitting it to the cognizant KSC operational organization for transmittal to the Calibration Branch or submitting it directly to the Calibration Branch when so directed by the cognizant KSC operational organization.
 9. Notifying the cognizant KSC operational organization or the Calibration Branch when so designated by the cognizant KSC operational organization of all surplus or obsolete equipment which no longer requires calibration.
- E. The Director, Quality Assurance is responsible for monitoring the implementation of this policy and advising the Manager, Apollo Program of deviations from the policy that cannot readily be resolved with the responsible organizations.

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