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Organization Procedure No. GRC-P7600.002

Revision H

## 7610/7620/7660 Organizational Procedure

# AERO Facility Engineering

**Approved by:**

**Chief, Research Testing Division/7600**

This document identified the correct steps to accomplish this process. I acknowledge that by my signature, I am the document owner for purposes of it's maintenance and update.

**NASA - Glenn Research Center  
Cleveland, OH 44135**

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<b>Glenn Research Center Organization Procedure</b>	<b>Title: AERO Facility Engineering</b>	
	<b>Document No.: GRC-P7600.002</b>	<b>Rev.: H</b>

**Document Owner: 7610/Aviation Environments Test Engineering Branch  
7620/Aeropower & Propulsion Test Engineering Branch  
7660/Electronic & Special Systems Branch**  
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### Change Record

<b>Rev.</b>	<b>Effective Date</b>	<b>Description</b>
Basic	04/09/1999	Initial Issue
A	06/21/1999	Response to audit see change request form for details, FCR1999-1039
B	04/25/2000	Correct records list, FCR2000-1189
C	08/24/2000	See FCR2000- 1224 for changes
D	03/23/2001	General Revisions, FCR2001-1312
E	05/18/2001	Annual Review FCR2001-1328
F	06/21/2002	Annual Review FCR2002-1495
G	11/04/2003	Document Number Changed from 7500.023 to 7600.002 General numbering and reference changes related to directorate re-organization and document re-numbering. FCR2003-1654
H	02/12/2004	Minor changes due to reorganization FCR2004-1685

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## 1.0 INTRODUCTION

### 1.1 PURPOSE

This document describes the steps required by the Research Testing Division's Aero Test Engineering Branches (7610, 7620, 7660) to provide Aero Facility Engineering Services. These services ensure Product Assurance is addressed for all aero facilities.

### 1.2 Scope

This procedure pertains to all aero test facilities and discusses how facility maintenance, upgrades and/or modifications are performed by the engineers in the Aero test engineering branches.

## 2.0 REFERENCES

### 2.1 Applicable Documents

<b>Document Number</b>	<b>Document Title</b>
GRC-P2.10.1	Hardware Product Assurance
GRC-P2.6.3	Implementation - Hardware Development
GRC-P3.4	Facilities Management
GRC-P3.9	Acquisition Process
GRC-P7780/7790.001	7780/7790 Task Completion Process
GRC-P7600.001	Research Facility Management
GRC-P7300.005	Engineering and Design
GRC-P7600.003	Aero Test Engineering
GRC-W7600.007	Test Engineering Non-Conformance ID and Reporting System

### 2.2 Records and Forms

SOW and Resultant Study  
NASA C-29 Facility Change Request  
Non-Conformity Memo to Facility Management  
NASA C-709 Work Request

### 2.3 Definitions

<b>7610</b>	Aviation Environments Test Engineering Branch
<b>7620</b>	Aeropower & Propulsion Test Engineering Branch
<b>7660</b>	Electronic & Special Systems Branch
<b>Aero Test Facilities</b>	10X10 Foot Supersonic Wind Tunnel, 1X1 Foot Supersonic Wind Tunnel, 8X6 Foot Supersonic Wind Tunnel, 9X15 Foot Low Speed Wind Tunnel, Aero Acoustic Propulsion Lab (AAPL), Engine Components Research Lab (ECRL), Engine Research Building (ERB)

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**CoF** complex, Icing Research Tunnel (IRT), Propulsion System Lab (PSL)  
Construction of Facilities A congressional appropriation which provides contractual services for the repair, rehabilitation, and modification of existing facilities; the construction of new facilities; the acquisition of related collateral equipment; equipment; environmental compliance and restoration activities; the design of facilities projects; and advanced planning related to future facility needs.

**Field Engineering** The assemblage and fulfilling of technical requirements, specifications, analysis and engineering drawings, which define hardware or part of a hardware system, which can include electronic systems. The process is less formal than the Implementation Hardware Development process (CLP GRC-P2.6.3) or Engineering and Design (GRC-P7300.005) process but is used when there are time constraints, available test engineering resources and/or simplicity of design. It can encompass electrical and mechanical engineering.  
All Field Engineering is the responsibility of the Aero Test Engineering Team, which follows formal guidelines where they exist and good design practices if no guidelines can be found. They do an informal (non-documented) evaluation of any hazards and/or risks associated with the field change, if deemed necessary, by the engineer, the work is reviewed by a third party, and obtains the necessary safety and management approval.

**In House Fabrication** In House Fabrications are activities performed by Glenn organizations as a result of *Field Engineering*. Typically these consist of minor test article and/or facility repairs, including model fabrications, machining operations, or instrumentation fabrications or other tasks described from a *field engineering* activity as described above. All in house fabrications are reviewed to ensure they meet functionality requirements (electrically, mechanically, and structurally)

**IST** Integrated System Test (IST) This is the final test done after a major rehabilitation project. An IST assures all systems required in the facility function together as intended.

**SOW** Statement of Work (SOW). This document is used for contractual projects like studies, out side fabrication, or contract installations. It describes all the tasks to be accomplished, milestones, and deliverables

**Study** Studies are done when long-term improvements are required or many engineering solutions exist and/or a best approach needs to be defined.

**RTD Work Management System (7i) aka Task Request** “7i” is an electronic task request (TR) system RTD uses to accomplish work.

**WR** Work Request (NASA C –709) is a request to various organizations other than TID to accomplish work. Such as the Print Shop, Photo Lab, or the Work Control Office in Branch 7320.

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### 3.0 RESPONSIBILITIES

#### 3.1 Aero Test Engineering Branches 7610, 7620, 7660

In this procedure the Aero Test Engineering Branches are responsible for the detailed planning, engineering, implementation, checkout, and documentation of the maintenance, upgrades, and/or modifications approved through the 7601 Facility Management Process GRC-P7600.001 Research Facilities Management. They also write the memo if any non-conformities are identified.

#### 3.2 Facility Management and Planning Office (FM&PO)

In this procedure the Facility Management and Planning Office provides the strategic and tactical planning and approval process (GRC-P3.4 and GRC-P7600.001) required to secure funds for maintenance, upgrades, and modifications to Glenn's testing facilities. FM&PO then notify the RTD test engineering branches which projects are approved for the up coming Fiscal Year. The Facility Manager keeps all documentation concerning the planning and approval process as well as monitoring the progress of the projects.

#### 3.3 Research Testing Division (RTD)

In this procedure the mechanical, electrical and electronic technicians receive the electronic Task Requests and complete the tasks assigned. They interface with the Aero Test Engineering Branches when questions arise or further explanation is needed that is not indicated on the MP5 Task request.

#### 3.4 7780/Metals Technologies Branch

In this procedure the 7780 branch takes the Field Engineers designs generated by RTD aero test engineers and converts these into hardware. The 7780 branch follows their procedure GRC-P7780/7790.001 7780/7790 Task Completion Process.

#### 3.5 Engineering Development Division (EDD)

In this procedure EDD provides the Design and Analysis for projects identified requiring their expertise. They use Procedure GRC-P2.6.3 Implementation Hardware Development.

### 4.0 PROCEDURE

<b><u>Responsible Person or Organization</u></b>	<b><u>Block No.</u></b>	<b><u>Activity</u></b>
7601	<b>4.1</b>	FM&PO branch follows GRC-P3.4 and uses their Research Facility Management process GRC-P-7600.001 to select maintenance, upgrades and /or, modification tasks for the aero facilities. They also identify funding sources to accomplish these tasks.
Aero test engineering Branches	<b>4.2</b>	The Aero Test Engineering Branches provide technical specifications, requirements, conceptual approaches, and labor and cost estimates for the maintenance, upgrades, and/or modifications to the Aero Testing Facilities being considered by the FM&PO branch in their tactical and strategic plan.

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<b><u>Responsible Person or Organization</u></b>	<b><u>Block No.</u></b>	<b><u>Activity</u></b>
7601	<b>4.3</b>	Once the process is complete the Facility Managers notify the Aero test engineering branches
Aero Test Engineering Branches	<b>4.4</b>	The appropriate Branch is notified
Aero Test Engineering Branches	<b>4.5</b>	Once notified the Aero Test Engineers reevaluate the tasks against the Yearly Facility Implementation Matrix and do the detailed planning required to accomplish the tasks. The Aero Test Engineer decides which categories apply to the project. They coordinate and manage each task. Providing the engineering expertise and guidance needed to complete and verify the success of each of these tasks. The selected projects are implemented through SOW, TR (7i), WR, RTD Field Engineering, and/or Procurement activities. If activity results in less than acceptable product use the criteria listed GRC-W7600.007 (Test Engineering Non-Conformance Identification and Reporting System) to log and report problem.

### Yearly Facility Implementation Matrix

<b>If the ACTIVITY IS</b>	<b>The Implementation Method is</b>
Routine, preventive and/or emergency Maintenance	Initiate either an electronic TR (7i) or paper WR (NASA C-709), Purchase Request, or provide RTD field engineering. Then monitor, check and approve work. This finishes the task. This provides the Product Assurance in GRC-P 2.10.1
Request a Study (Concept/solutions)	Write Statement of Work (SOW) so a study can be performed. The requirement (SOW) and resultant study are the Records
Request for Change (RFC)	Fill out a RFC C – 29 to assure drawings under Configuration Control are changed to reflect work to be accomplished by an electronic TR or paper WR (NASA C-709). The C – 29 is a Record
Design	If project requires Design decide which process to follow CLP (Center Level Procedure) GRC-P-2.6.3 (Implementation Hardware Development), GRC-P7300.005 (Engineering and Design) or RTD Field Engineering.
Fabrication	If project requires Fabrication decide which process to follow 7780/7790 Task Completion Process to obtain EDD fabrication services or use In House Fabrication.
Equipment or System Purchase	Write Purchase Request using Procurement process GRC-P3.9 (Acquisition Process)
Installation and Acceptance	Decide who will install equipment or system. If RTD: Write an electronic TR to get equipment installed and provide checkout oversight to ensure proper operation. This allows product assurance implementation. If non-RTD: Write a WR (NASA C-709) and/or a SOW. For acceptance of hardware contact Organization 7780 Metals Technologies Branch to

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	assure equipment and installation meets requirements.
IST	If this is a large rehabilitation project or major CoF, which effect facility or system operations, then an IST is required. Write requirements and follow GRC-P-7600.003 (Aero Test Engineering Procedure).
Branch Chief and/or Facility Manager Approval	As required on, WR (NASA C-709), Purchase Requests, or SOWs
Non Conformity	A memo detailing the non-conformity and the resolution will be sent to the assigned facility manager for appropriate dissemination if the stated requirements are not met at completion of any of the above activities.

### Facility Engineering

AERO Test Engr.

7601

