

**MPR 7900.2
REVISION A**

**EFFECTIVE DATE: October 10, 2019
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MARSHALL PROCEDURAL REQUIREMENTS

QD01

MSFC AVIATION OPERATIONS

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Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 2 of 27

DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Change/ Revalidation/ Canceled)	Document Revision/ Change	Effective Date	Description
Baseline		9/2/2015	
Change	1	8/1/2017	On 8/1/17, at the request of the OPRs, ownership was changed from AS01 to QD01.
Revision	A	10/10/2019	Major revision expanding MSFC Unmanned Aircraft System (UAS) operations beyond Engineering purpose. Added description of Commercial-Off-the-Shelf UAS missions and differences from Engineering UAS. Clarified agency policies and incorporated NPR 7900.3 updates and latest HQ guidance on UAS and Commercial Aircraft Services. Deleted Appendix E: Sample MRASRB Format since it is no longer necessary.

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 3 of 27

TABLE OF CONTENTS

PREFACE

- P.1 Purpose
- P.2 Applicability
- P.3 Authority
- P.4 Applicable Documents and Forms
- P.5 Measurement/Verification
- P.6 Cancellation

CHAPTER 1. ASSIGNMENT OF AUTHORITY AND RESPONSIBILITIES

- 1.1 MSFC Center Director
- 1.2 MSFC Aviation Operations
- 1.3 MRASRB Chairman
- 1.4 Office of the Chief Information Officer
- 1.5 Senior Engineering UAS Pilot
- 1.6 UAS Pilot
- 1.7 Observer
- 1.8 Ground Control Station Operator

CHAPTER 2. MSFC UAS FLIGHT CREW TRAINING

- 2.1 UAS Flight Crew Training
- 2.2 Pilot Check Flight
- 2.3 Training Frequency

CHAPTER 3. MSFC UAS OPERATION PROCEDURAL REQUIREMENTS

- 3.1 UAS Airworthiness
- 3.2 Flight Request
- 3.3 Flight Planning
- 3.4 Pre-Flight, Flight, and Post-Flight Operations

CHAPTER 4. UAS ACQUISITIONS AND DISPOSITIONS

- 4.1 General
- 4.2 UAS Inventory
- 4.3 UAS Acquisition
- 4.4 UAS Disposition

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 4 of 27

CHAPTER 5. COMMERCIAL AIRCRAFT SERVICES

CHAPTER 6. NON-NASA AIRCRAFT OPERATIONS AT MAF

Appendix A: (Reserved for Definitions)

Appendix B: Acronyms

Appendix C: (Reserved for Verification Matrix)

Appendix D: Records

Appendix E: Sample MSFC UAS Flight Crew Training Requirements

Appendix F: Sample MSFC Engineering UAS Flight Crew Training Plan and Requirements

Appendix G: Sample Pre-Flight and Post-Flight Checks

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 5 of 27

P.1 PURPOSE

- a. To establish requirements, responsibilities, and procedures for aviation operations of Category I (less than or equal to 55 lbs. weight with an airspeed of less than or equal to 70 knots) Unmanned Aircraft Systems (CAT I UAS) and Commercial Aircraft Services (CAS) at Marshall Space Flight Center (MSFC), including Michoud Assembly Facility (MAF) and National Space Science and Technology Center (NSSTC), in alignment with NPD 7900.4, NPR 7900.3, NPR 8715.5, and the Governing Agreements with Redstone Arsenal. CAT I UAS is also called small UAS (sUAS), and will be referred as UAS in this MPR hereafter.
- b. NPR 7900.3 requires each Center’s Flight Operations Office to manage all aviation activities. If a Center has no Flight Operations Office, the Center will receive oversight from another Center’s Flight Operations Office. For UAS operations, MSFC Aviation Operations receives guidance and oversight from Kennedy Space Center (KSC) Flight Operations Office in accordance with the May 2018 Memorandum of Understanding (MOU) between MSFC, KSC and HQ Aircraft Management Division (AMD). For CAS operations, MSFC coordinates with Johnson Space Center (JSC) Flight Operations Office prior to approval of CAS operations.
- c. This MPR addresses only MSFC specific requirements and process that are tailored from NPR 7900.3, and readers should refer to NPR 7900.3 for comprehensive NASA flight operations policies and requirements.
- d. MSFC UAS consists of Engineering UAS (kit assembly) and Commercial-Off-The-Shelf (COTS) UAS. Whenever there are different requirements or procedures between MSFC Engineering UAS and COTS UAS, they are addressed specifically.

P.2 APPLICABILITY

- a. This MPR applies to Center personnel, programs, projects, and activities, including contractors and resident agencies to the extent specified in their respective contracts or agreements. (“Contractors,” for purposes of this paragraph, include contractors, grantees, Cooperative Agreement recipients, Space Act Agreement partners, or other agreement parties.)
- b. This MPR does apply to MAF.
- c. This MPR applies the following: all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The terms: “may” or “can” denote discretionary privilege or permission; “should” denotes a good practice and is recommended, but not required; “will” denotes expected outcome; and “are/is” denotes descriptive material.
- d. This MPR applies the following: all document citations are assumed to be the latest version unless otherwise noted.
- e. This MPR applies to Projects, Directorates, and Offices that design, test, manufacture, or operate unmanned aircraft systems as defined by NPR 7900.3.

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 6 of 27

P.3 AUTHORITY

- a. NPD 7900.4, NASA Aircraft Operations Management
- b. NPR 7900.3, Aircraft Operations Management Manual

P.4 APPLICABLE DOCUMENTS AND FORMS

- a. Code of Federal Regulations (CFR) 14 Part 91
- b. NPR 1441.1, NASA Records Management Program Requirements
- c. NPR 8715.5, Range Flight Safety Program
- d. NRRS 1441.1, NASA Records Retention Schedules
- e. Support Agreement W31G3G-08105-0004, between the US Army Garrison – Redstone Arsenal and Marshall Space Flight Center.
- f. Letter of Agreement (LOA), Subject: NASA use of Army Special Use Airspace (Restricted Areas R2104) for UAS Operations
- g. LOA, Subject: Unmanned Aircraft Systems (UAS) Operations within Redstone Army Airfield (KHUA) Class D Airspace
- h. Memorandum of Understanding between MSFC and KSC for small Unmanned Aircraft Systems Flight Operations

P.5 MEASUREMENT/VERIFICATION

None.

P.6 CANCELLATION

MPR 7900.2 Baseline-1, MSFC Category I Unmanned Aircraft Systems (CAT I UAS), dated September 2, 2015

Electronically approved by

Jody Singer
Director

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 7 of 27

CHAPTER 1. ASSIGNMENT OF AUTHORITY AND RESPONSIBILITIES

1.1 MSFC Center Director

1.1.1 Ensures airworthiness and flight safety of MSFC's UAS and CAS.

1.1.2 Maintains a program-independent Aviation Operations within the MSFC Safety & Mission Assurance Directorate to implement and comply with all UAS and CAS applicable requirements in NPR 7900.3.

1.1.3 Designates the Chairman and membership for the Marshall Space Flight Center/Redstone Arsenal Aviation Safety and Review Board (MRASRB) as defined in this document.

1.2 MSFC Aviation Operations

1.2.1 Plans, organizes, directs, and controls MSFC's UAS and CAS acquisitions, operations, maintenance, modifications, dispositions, and safety by implementing all the applicable policies and requirements levied by Federal Aviation Administration (FAA), Garrison-Redstone Army, and Headquarters Aircraft Management Division (HQ AMD), including NPR 7900.3 waiver.

1.2.2 Plans and executes appropriate UAS or CAS operations based on the specific mission types as requested by MSFC organizations, programs, or projects.

1.2.3 Obtains the Certificate of Airworthiness from the MSFC Center Director for COTS UAS and maintains appropriate COTS UAS airworthiness certificates through coordination with KSC Flight Operations.

1.2.4 Maintains required FAA Certificate of Authorizations for Class D airspace through coordination with Redstone Army.

1.2.5 Obtains and maintains required Department of Defense approvals for UAS operations on Redstone Arsenal through coordination with Redstone Army.

1.2.6 Coordinates COTS UAS flight crew check flight through KSC Flight Operations.

1.2.7 Oversees training for both COTS UAS and Engineering UAS flight crew.

1.3 MRASRB Chairman

1.3.1 Conducts airworthiness reviews for Engineering UAS as described in NPR 7900.3 Chapter 2 and Chapter 5.5.

1.3.2 Requests the Certificate of Airworthiness from the MSFC Center Director for Engineering UAS in accordance with NPR 7900.3.

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 8 of 27

1.3.3 Ensures flight safety of Engineering UAS per HQ AMD issued NPR 7900.3 Waiver and LOA, Subject: NASA Use of Army Special Use Airspace (Restricted Areas 2104) for UAS Operations.

1.3.4 Keeps minutes for all MRASRB meetings and appropriately retains them in accordance with this MPR and Agency policy.

1.3.5 Designates the Senior Engineering UAS Pilot.

1.4 Office of the Chief Information Officer

1.4.1 Assists MSFC Aviation Operations to develop and maintain the IT System Security Plan (SSP) for MSFC UAS.

1.4.2 Reviews appropriate section(s) of NASA Form (NF) 1707 relating to UAS and provide concurrence.

1.5 Senior Engineering UAS Pilot

1.5.1 Establishes Engineering UAS flight crew training and proficiency requirements in accordance with NPR 7900.3 and this MPR.

1.5.2 Assures the training and qualification of Engineering UAS flight crew and provides the records to MSFC Aviation Operations.

1.6 UAS Pilot

1.6.1 See Chapter 5 of NPR 7900.3 for definition and responsibilities.

1.7 Observer

1.7.1 See Chapter 5 of NPR 7900.3 for definition and responsibilities.

1.8 Ground Control Station Operator

1.8.1 See Chapter 5 of NPR 7900.3 for definition and responsibilities.

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 9 of 27

CHAPTER 2. MSFC UAS FLIGHT CREW TRAINING

UAS flight crew for a typical UAS mission consists of a pilot, observer(s), and ground control station operator (Engineering UAS only).

2.1 UAS Flight Crew Training

2.1.1 The Senior Engineering UAS Pilot shall define training requirements (Appendix F shows an example) for Engineering UAS flight crew.

2.1.2 MSFC Aviation Operations shall define training requirements (Appendix E shows an example) for COTS UAS flight crew.

2.1.3 Engineering UAS flight crew shall meet both the training requirements established by MSFC Aviation Operations and the training requirements established by the Senior Engineering UAS Pilot.

2.1.4 UAS flight crew needs to verify with MSFC Aviation Operations and/or Senior Engineering UAS Pilot for the latest training requirements.

2.1.5 MSFC Aviation Operations shall oversee training for both COTS UAS and Engineering UAS flight crew

2.2 Pilot Check Flight

2.2.1 UAS flight crew shall not schedule a check flight with KSC Flight Operations without MSFC Aviation Operations' approval.

2.2.2 MSFC Aviation Operations shall verify that UAS flight crew has met all the required trainings and requirements prior to giving approval to schedule a check flight.

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 10 of 27

2.3 Training Frequency

2.3.1 UAS flight crew training requirements shall be renewed in accordance with Table 2-1.

Requirement	Renew
FAA Third-Class Medical Exam	Annually
Vision Exam	Annually
Required Readings	Annually
Mission Operations Control Center (MOCC) Restricted Airspace Training	Annually
Crew Resource Management (CRM) Training	Every 2 year
FAA Part 107 Remote Pilot Certificate for sUAS	Every 2 year
Pilot Check Flight	Annually
Pilot Proficiency Flight	At least 3 times within every 3-month interval after the Pilot Check Flight

Table 2-1

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 11 of 27

CHAPTER 3. MSFC UAS OPERATION PROCEDURAL REQUIREMENTS

MSFC UAS performs two different mission types: COTS UAS for institutional needs (i.e. aerial imaging for events, hardware transportation activities, and facilities inspections) and Engineering UAS for technology and research needs.

Figure 3-1 depicts the procedural flow of MSFC UAS Operation planning and execution:

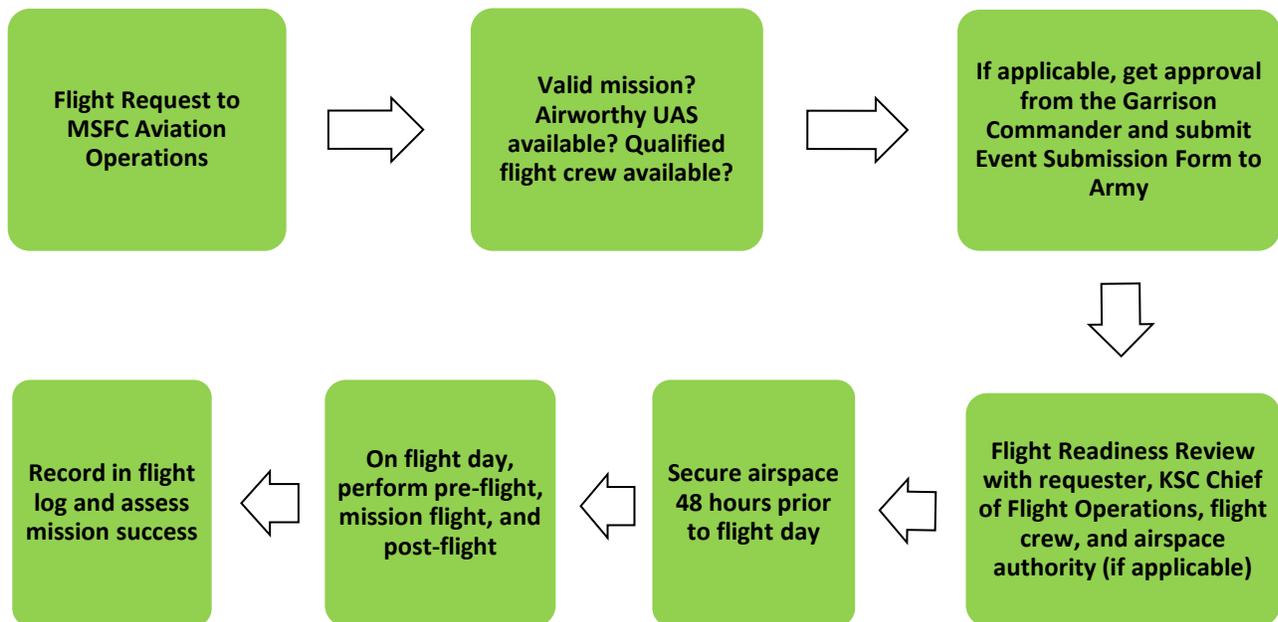


Figure 3-1

3.1 UAS Airworthiness

3.1.1 For COTS UAS, MSFC utilizes KSC Airworthiness and Flight Safety Review Board (AFSRB) process for airworthiness approval. KSC Flight Operations will provide guidance in flight planning and safety in accordance with the MOU between MSFC and KSC for UAS flight operations.

3.1.2 For Engineering UAS, the airworthiness shall be managed by the MRASRB.

3.2 Flight Request

Any MSFC organization/program/project needing UAS or CAS support shall submit a flight request to MSFC Aviation Operations and/or a Service Request (SR) through the NASA Integrated Service Management (NISM) in Explornet. For UAS missions within Redstone Arsenal, the Redstone Army requires minimum two weeks of coordination in advance of planned flight date.

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 12 of 27

3.3 Flight Planning

3.3.1 Mission Definition: Once a flight request is received, MSFC Aviation Operations plans flight operation by defining mission requirements with the requester. Depending on the mission type, MSFC Aviation Operations either coordinates with COTS UAS or Engineering UAS flight crew to plan the requested flight operation.

3.3.2 Airspace Coordination: For UAS missions within Redstone Arsenal, MSFC Aviation Operations either coordinates with the Army Airfield for Class D airspace or MOCC for Restricted airspace. For Class G airspace outside of Redstone Arsenal, MSFC operates COTS UAS in accordance with NASA agency COA with FAA.

3.3.3 Army required coordination: If applicable, Redstone Arsenal Event Form and a letter to Garrison Commander for approval should be submitted at a minimum of two weeks in advance of planned UAS operation. The requesting organization shall prepare the letter to Garrison Commander on NASA letterhead and forwards it to MSFC Aviation Operations for submission.

3.3.4 MSFC Aviation Operations shall prepare the Redstone Arsenal Event Form and submit the Form with the letter to Garrison Commander for approval. For UAS pilot proficiency and training flights within the Restricted airspace, the Army does not require the Redstone Arsenal Event Form or the letter to Commander. MSFC Aviation Operations can utilize/schedule Restricted airspace through direct coordination with MOCC.

3.3.5 Flight Readiness Review (FRR): MSFC Aviation Operations will conduct an FRR as described in NPR 7900.3, Chapter 3.12. Prior to FRR, MSFC Aviation Operations shall verify that the selected UAS has a valid Certificate of Airworthiness and that the selected flight crew are qualified. Pilot proficiency and training flights are not considered missions, so FRR is not applicable.

3.3.6 Flight Brief: If FRR is completed more than a week before flight operation date, MSFC Aviation Operations will send a reminder email to the FRR members a few days before UAS operation date.

3.3.7 Flight Plan: MSFC Engineering UAS pilot shall submit Flight Plan on the day of flight to the MRASRB Chairman and MSFC Aviation Operations. This allows flexibility to utilize a pool of many Engineering UAS and pilots while documenting real-time changes as needed. For COTS UAS missions, KSC requests MSFC to submit UAS Flight Planning Form to KSC Flight Operations during the mission planning phase.

3.4 Pre-flight, Flight, and Post-flight Operations

UAS flight crew will execute the planned UAS operations in a safe and effective manner.

3.4.1 UAS flight crew shall perform pre-flight checks and adhering to the weather condition constraints as outlined in the FRR package prior to committing to flight operation. A sample pre-

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 13 of 27

flight checks list is shown in Appendix G.

3.4.2 If applicable, UAS flight crew shall communicate with appropriate airspace authority to confirm airspace clearance prior to operation. For UAS operations within Redstone Arsenal Restricted airspace and Class D airspace:

3.4.2.1 UAS flight crew will use assigned radio to communicate with the appropriate airspace authority.

3.4.2.2 UAS flight crew will provide cell phone numbers to the airspace authority as backup for communication.

3.4.3 If applicable, UAS flight crew shall inform airspace authority on the mission completion and confirm the airspace release after flight operation is done.

3.4.4 UAS flight crew shall perform post-flight checks as described in the FRR package. A sample post-flight checks list is shown in Appendix G.

3.4.5 UAS flight crew shall inform MSFC Aviation Operations on the mission completion and record the operation as required in the flight log and send it to MSFC Aviation Operations.

3.4.6 UAS flight crew shall record the operation in the After Action Review (AAR) and send it to MSFC Aviation Operations. AAR is used as lessons learned for each UAS flight operation.

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 14 of 27

CHAPTER 4. UAS ACQUISITIONS AND DISPOSITIONS

4.1 General

MSFC seeks to use UAS that can support multiple mission requirements and operate its UAS resources in an effective and efficient manner. In accordance with NASA policy, the following MSFC process and requirements for UAS accountability are communicated yearly as a reminder with all MSFC organizations and UAS end users.

4.2 UAS Inventory

MSFC Aviation Operations shall perform UAS inventory with MSFC Property Management Office and UAS owning organizations at least once per year. The purposes of inventory are to ensure that all UAS are maintained adequately and identify unneeded or damaged UAS for appropriate dispositions.

4.3 UAS Acquisition

All UAS procurements shall be pre-coordinated with MSFC Aviation Operations and approved by the MSFC Center Director. Purchasing UAS above the agency asset capitalization requires HQ AMD approval in addition to MSFC Center Director approval.

4.3.1 To purchase UAS below the Agency asset capitalization threshold, the requesting organization shall provide a procurement approval request letter and NF 1707 to MSFC Aviation Operations to include:

4.3.1.1 As a minimum, the procurement approval request letter shall provide a business case justification for UAS, intended mission description, UAS cost, and rationales for choosing a particular model. If the requesting organization already has a UAS, then the letter will disclose the number of existing UAS and reasons as to why additional UAS is necessary.

4.3.1.2 The letter and NF 1707 shall be reviewed by MSFC Aviation Operations and Office of the Chief Information Officer (OCIO) for concurrence prior to submitting them to the MSFC Center Director for approval.

4.3.2 All UAS procurement requests shall include the NF 1707 and MSFC Center Director's approval letter when utilizing a credit card or submitting a purchase requisition to the MSFC Office of Procurement.

4.3.3 After the UAS is acquired, MSFC Property Management Office will issue Equipment Control Number (ECN) for the UAS and create Equipment Master Record (EMR) in Property Plant and Equipment System (PP&E).

4.3.4 The UAS acquired organization shall coordinate with Property Management Office to obtain the ECN and affix the ECN tag on the UAS. If affixing ECN tag on the UAS is impractical, MSFC

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 15 of 27

Supply & Equipment Management Officer (SEMO) authorizes virtual tag issuance.

4.3.5 The UAS acquiring organization shall register the UAS with the FAA, provide the N-number to MSFC Aviation Operations and Property Management Office, and affix the N-Number on the UAS.

4.3.6 The UAS shall not be operated until it has an N-Number.

4.3.7 The UAS acquiring organization shall keep all acquisition records of the UAS in accordance with NPR 1441.1.

4.4 UAS Disposition

If an UAS is no longer needed or unsafe for operation, the owning organization shall notify MSFC Aviation Operations to determine proper disposition. MSFC Aviation Operations will coordinate with HQ AMD to determine if another NASA Center can utilize it. After HQ AMD coordination, MSFC Aviation Operations requests MSFC Property Management Office and the owning organization to either excess or transfer the UAS to another Center.

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 16 of 27

CHAPTER 5. COMMERCIAL AIRCRAFT SERVICES

Requests for CAS as defined by NPR 7900.3 shall be submitted to MSFC Aviation Operations with the appropriate document required by NPR 7900.3. MSFC Aviation Operations reviews the required documents and coordinates with JSC Flight Operations for final approval in accordance with Agency procedures. NPR 7900.3 defines CAS as a “full-service contract agreement through which an executive agency acquires an aircraft and related aviation services (e.g., pilot, crew maintenance) for exclusive use.”

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 17 of 27

CHAPTER 6. NON-NASA AIRCRAFT OPERATIONS AT MAF

Requests for approval of non-NASA aircraft operation at MAF shall be submitted to MSFC Aviation Operations and KSC Flight Operations with the planning documents and safety assessment. In accordance with the agreements between HQ AMD, MSFC, and KSC Flight Operations, KSC Chief of Flight Operations Office is authorized to approve non-NASA helicopter operations at MAF.

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 18 of 27

Appendix A: (Reserved for Definitions)

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 19 of 27

Appendix B: Acronyms

AAR	After Action Review
AFSRB	Airworthiness and Flight Safety Review Board
CAS	Commercial Aircraft Services
CAT I UAS	Category I Unmanned Aircraft Systems
CFR	Code of Federal Regulations
COTS	Commercial-Off-The-Shelf
CRM	Crew Resource Management
ECN	Equipment Control Number
EMR	Equipment Master Record
FAA	Federal Aviation Administration
FRC	Federal Records Center
FRR	Flight Readiness Review
GCS	Ground Control Station
HQ AMD	Headquarters Aircraft Management Division
JSC	Johnson Space Center
KSC	Kennedy Space Center
LOA	Letter of Agreement
MAF	Michoud Assembly Facility
MOCC	Mission Operations Control Center
MOU	Memorandum of Understanding
MRASRB	MSFC/Redstone Arsenal Aviation Safety and Review Board
MSFC	Marshall Space Flight Center
NARA	National Archives and Records Administration
NF	NASA Form
NSSTC	National Space Science and Technology Center
OCIO	Office of the Chief Information Officer
PIC	Pilot in Command
PP&E	Property Plant and Equipment System
RC	Remote Control
SEMO	Supply & Equipment Management Officer
SR	Service Request
SSP	System Security Plan
sUAS	Small Unmanned Aircraft System
UAS	Unmanned Aircraft System
VFR	Visual Flight Rules

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 20 of 27

Appendix C: (Reserved for Verification Matrix)

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 21 of 27

Appendix D: Records

D.1 The following record will be maintained by MSFC Aviation Operations:

DESCRIPTION	RETENTION PERIOD	AUTHORITY
<p>Letter of Agreement: NASA Use of Army Special Use Airspace (Restricted Areas R2104) for Unmanned Aircraft System (UAS) Operations.</p> <p>Letter of Agreement: UAS Operations within Redstone Airfield (KHUA) Class D airspace</p> <p>Certificate of Authorization (COA) by FAA 2018-ESA-968</p> <p>MSFC Engineering UAS and NPR 7900.3 Waiver from HQ Aircraft Management Division (AMD)</p> <p>Memorandum of Understanding between MSFC and KSC for small UAS Flight Operations</p> <p>Department of Defense Exception to Policy for MSFC UAS Operation at Redstone Army</p>	<p>PERMANENT. Retire to Federal Records Center (FRC) 2 Years after completion or expiration transfer to the National Archives 10 years after completion/expiration.</p>	<p>NRRS Schedule 1/7/A</p>
<p>Aircraft (COTS UAS) Crewmember qualifications and performance:</p>	<p>TEMPORARY. Destroy 5 years old after crew member separates from agency.</p>	<p>NRRS Schedule 8/32/A</p>
<p>Aircraft (COTS UAS) Files/Flight Schedules:</p>	<p>TEMPORARY. Destroy 1 year after Flight Season.</p>	<p>NRRS Schedule 7/25/A/3</p>

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 22 of 27

D.2 The following records are maintained by the joint MRASRB:

DESCRIPTION	RETENTION PERIOD	AUTHORITY
Committees, Boards, Councils, Panels, and Conferences: MRASRB Chair Designation memo	PERMANENT. Retire to FRC when 2 years old. Transfer to National Archives and Records Administration (NARA) when 20 years old.	NRRS Schedule 1/14/A
MRASRB meeting minutes and associated airworthiness statement	PERMANENT. Retire to FRC when 2 years old. Transfer to NARA when 20 years old.	NRRS Schedule 1/14/B/1

D.3 The following records are maintained (as specified/applicable in NPR 7900.3, MPR 3410.1, MWI 3410.1, and this MPR) by the MSC Engineering UAS Senior Pilot:

DESCRIPTION	RETENTION PERIOD	AUTHORITY
Aircraft (MSFC Engineering UAS) crewmembers qualifications and performance records: Qualification, Training, and Proficiency of CAT I UAS Pilots and Observers as identified in Appendix F.	TEMPORARY. Destroy or delete 5 years after separation of employee or when no longer needed, whichever comes first.	NRRS Schedule 8/32/A
Aircraft Files/flight schedule:	TEMPORARY. Destroy 1 year after Flight Season.	NRRS Schedule 7/25/A/3

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 23 of 27

Appendix E: Sample MSFC UAS Flight Crew Training Requirements

UAS flight crew shall satisfy below listed requirements. UAS operation proficiency requirements and maintain flight currency (as described in NPR 7900.3) only apply to UAS pilot.

1. FAA Class 3 Medical exam. Observer also needs to have vision correctable to 20/20.
2. Knowledge base:
 - a. SATERN SMA-HQ-WBT-213
 - b. NPR 7900.3 Chapter 5
 - c. MPR 7900.2
 - d. FAA-G-8082-22 Remote Pilot – Small Unmanned Aircraft Systems Study Guide
 - e. 14 CFR Part 107
 - f. 14 CFR 91.17
 - g. 14 CFR 91.19
 - h. KTI-7900_UAS Section 1.5 (only for COTS UAS flight crew)
 - i. Coordination Procedure for MSFC and MOCC
3. MOCC Restricted Airspace training
4. CRM training
5. FAA Part 107 Remote Pilot Certificate for sUAS
6. Check flight

Marshall Procedural Requirements		
QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 24 of 27

Appendix F: Sample MSFC Engineering UAS Flight Crew Training Plan and Requirements

Purpose

MSFC Engineering CAT I UAS operations require Remote Control (RC) Pilots, Ground Control Station (GCS) operators, and Observers. This training and Check Flights shall be completed annually. The training is administered and monitored by the Engineering UAS senior pilot(s) named by Chair of joint MRASRB and MSFC Aviation Operations.

All Candidate Types

The following are training requirement texts for review by all candidate types (i.e. RC Pilots, GCS Operators, and Observers):

1. Review the NPR 7900.3, Chapter 5, and MPR 7900.2.

Candidate's Initial: _____

Completion Date: _____

2. Review SATURN online course SMA-HQ-WBT-213.

Candidate's Initial: _____

Completion Date: _____

3. Review the FAA CFR:
 - a. Section 91.3 "Responsibility and Authority of the Pilot in Command (PIC)"
 - b. Section 91.13 "Careless or Reckless Operation"
 - c. Section 91.17 "Alcohol or Drugs"
 - d. Section 91.111 "Operating Near Other Aircraft"
 - e. Section 91.113 "Right-of-Way Rules: Except water operations."
 - f. Section 91.133 "Restricted and Prohibited Areas"
 - g. Section 91.155 "Basic Visual Flight Rules (VFR) Weather Minimums"

Candidate's Initial: _____

Completion Date: _____

4. Review the FAA "Airspace, Special Use Airspace, and Temporary Flight Restrictions" course notes.

Candidate's Initial: _____

Completion Date: _____

5. Review the Academy of Model Aeronautics "National Model Aircraft Safety Code".

Candidate's Initial: _____

Completion Date: _____

All candidates shall also obtain FAA Class 3 or equivalent medical examination/class clearance required for the candidate's role.

Medical Class: _____

Expiration: _____

Candidate's Signature: _____

Completion Date: _____

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 25 of 27

RC Pilot Additional Requirements

RC Pilots are also required to fulfill the following additional tasks:

1. Practice and train with a small indoor quadcopter, demonstrating his/her capability to:
 - a. Takeoff into controlled flight
 - b. Fly the outlines of a square area
 - c. Hover within a 1' cubed area
 - d. Recover vehicle when orientation control is lost
 - e. Land within a 1' radius circle

Hours Flown: _____

Model Flown: _____

Candidate's Initial: _____

Completion Date: _____

2. Complete a check flight examination consisting of the following minimum tasks:
 - a. Takeoff into controlled flight
 - b. Fly the outlines of a square area
 - c. Hover within an area twice the size of the vehicle
 - d. Recover vehicle when orientation control is lost
 - e. Recover vehicle from an autonomous flight mode
 - f. Land within a circle twice the size of the vehicle

Examiner's Signature: _____

Model Flown: _____

Candidate's Signature: _____

Completion Date: _____

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 26 of 27

Certification of Completion

With completion, initialing, and signing of this NASA Marshall Space Flight Center Engineering UAS Flight Crew Training plan and requirements for the desired role,

(Candidate's printed name): _____ is hereby qualified to perform the role of

Pilot

 Ground Station Operator

 Observer

in operating MSFC Engineering UAS. Compliance of the candidate and candidate's role is reviewed and certified by

Name of Examiner: _____

Signature and Date: _____

Marshall Procedural Requirements QD01		
MSFC Aviation Operations	MPR 7900.2	Revision: A
	Date: October 10, 2019	Page 27 of 27

Appendix G: Sample Pre-Flight and Post-Flight Checks

Pre-Flight:

- Setup vehicle and ground equipment at operation base point.
- Pilot and observer verify their positions for effective communication.
- Check flight log for any notes from previous flight.
- Notify the airspace controlling authority (Army Airfield Tower or MOCC) to confirm scheduled flight and airspace clearance.
- Provide PIC and Observer cell phone number to the airspace controlling authority as backup to radio communication.
- Inspect physical condition of frame and propellers.
- Power up the vehicle and RC equipment.
- Hover vehicle at 5' to 10' altitude to verify operation readiness prior to conducting mission flight.

Post-Flight:

- Power off vehicle.
- Notify the airspace controlling authority on the flight completion.
- Inspect physical condition of frame and propellers.
- Record flight details (hours, flight description, etc.) in flight log.