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STANDARD**

NASA-STD 8709.22

National Aeronautics and Space Administration
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**SAFETY AND MISSION ASSURANCE
ACRONYMS, ABBREVIATIONS, AND
DEFINITIONS**

Measurement System Identification:
None

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FOREWORD

This NASA-STD is approved for use by NASA Headquarters and NASA Centers, including Component Facilities. This NASA-STD may be applied on contracts per contractual documentation as a reference or training publication.

Comments and questions concerning the contents of this publication should be referred to the National Aeronautics and Space Administration, Director, Safety and Assurance Requirements Division, Office of Safety and Mission Assurance, Washington, DC 20546.

Requests for information, corrections, or additions to this NASA-STD shall be submitted via "Feedback" in the NASA Technical Standards System at <http://standards.nasa.gov> or to the National Aeronautics and Space Administration, Director, Safety and Assurance Requirements Division, Office of Safety and Mission Assurance, Washington, DC 20546.


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Approval Date

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Safety and Mission Assurance Terms and Definitions

1 SCOPE

1.1 Purpose

This standard defines uniform safety, reliability, maintainability, and quality assurance (SRM&QA) and risk management terms to support effective communication within NASA and with its contractors. The definitions in this standard are the official NASA SRM&QA community definitions for commonly used terms. The terms and definitions contained within this standard support the interpretation and use of documentation associated with NASA's SRM&QA activities.

1.2 Applicability

This standard is applicable to NASA Headquarters, NASA Centers, including Component Facilities, and to NASA contractors to the extent it is applied on the contract.

This standard may be cited in contract, program, and other Agency documents as a supporting document for technical requirements or as a reference for guidance.

2 REFERENCE DOCUMENTS

2.1 General

2.1.1 The documents listed in this section were used as source material to obtain the abbreviations, acronyms, and definitions provided in this standard and are referenced within this document. (Note: Not all terms and definitions from all of the referenced documents are included in this NASA-STD, some that were determined to be of limited use outside of a specific discipline were not included in this first issuance of this NASA-STD.)

2.1.2 The latest issuances of cited documents shall be used unless otherwise indicated. The reference documents are accessible via the NASA Online Directives Information System (NODIS) at <http://nodis3.gsfc.nasa.gov/> or the NASA Technical Standards System at <http://standards.nasa.gov>, or directly from the Standards Developing Organizations (SDOs) or other document distributors.

2.2 Government Documents

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NM 7120-81, NASA Space Flight Program and Project Management Requirements.

NPD 8700.1, NASA Policy for Safety and Mission Success.

NPD 8700.3, Safety and Mission Assurance (SMA) Policy for NASA Spacecraft Instruments and Launch Services.

NPD 8730.5, NASA Quality Assurance Program Policy.

NPD 8831.1, Maintenance of Institutional and Program Facilities and Related Equipment.

NPR 7120.5, NASA Space Flight Program and Project Management Requirements

NPR 7120.8, NASA Research and Technology Program and Project Management Requirements.

NPR 7123.1, NASA Systems Engineering Processes and Requirements.

NPR 7150.2, NASA Software Engineering Requirements.

NPR 8000.4, Agency Risk Management Procedural Requirements.

NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping.

NPR 8705.2, Human Rating Requirements for Space Systems.

NPR 8705.4, Risk Classifications for NASA Payloads.

NPR 8705.5, Probabilistic Risk Assessment (PRA) Procedures for NASA Programs and Projects.

NPR 8705.6, Safety and Mission Assurance Audits, Reviews, and Assessments.

NPR 8715.1, NASA Occupational Safety and Health Programs.

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NPR 8715.3, NASA General Safety Program Requirements.

NPR 8715.5, Range Safety Program.

NPR 8715.6, NASA Procedural Requirements for Limiting Orbital Debris.

NPR 8715.7, Expendable Launch Vehicle (ELV) Payload Safety Program.

NPR 8735.1, Procedures for Exchanging Parts, Materials, and Safety Problem Data Utilizing the Government-Industry Data Exchange Program and NASA Advisories.

NPR 8735.2, Management of Government Quality Assurance Functions for NASA Contracts.

NPR 8820.2, Facility Project Requirements.

NSS-1740.14, Guidelines and Assessment Procedures for Limiting Orbital Debris.

NASA STD 0005, NASA Configuration Management (CM) Standard.

NASA STD 5001, Structural Design and Test Factors of Safety for Spaceflight Hardware.

NASA-STD 8709.2, NASA SMA Roles and Responsibilities for ELV Services.

NASA-STD 8719.7, Facilities Systems Safety Guidebook.

NASA-STD 8719.9, Standard for Lifting Devices and Equipment.

NASA-STD 8719.10, Standard for Underwater Facility and Non-Open Water Operations.

NASA-STD 8719.11, Safety Standard for Fire Protection.

NASA-STD 8719.12, Safety Standard for Explosives, Propellants, and Pyrotechnics.

NASA-STD 8719.13, Software Safety Standard.

NASA-STD 8719.14, Process for Limiting Orbital Debris.

NASA-STD 8719.17, NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (PV/S).

NASA-STD 8729.1, Planning, Developing and Managing an Effective Reliability and Maintainability (R&M) Program.

NASA-STD 8739.8, Software Assurance Standard.

2.3 Non-Government Documents

None

3 ABBREVIATIONS, ACRONYMS, AND TERM DEFINITIONS

3.1 Abbreviations and Acronyms. The abbreviations and acronyms listed in this section are found in SMA directives and standards.

Acronym	Term
°C	degree Celsius
°F	degree Fahrenheit
A&E	Architect and Engineering
A-50	Aerazine-50 (UDMH)
A _a	Achieved Availability
AA	NASA Associate Administrator
AC	Alternating Current
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AFB	Air Force Base
AFFF	Aqueous Film Forming Foam
AFOOSH	Air Force Occupational Safety and Health
AFSPCMAN	Air Force Space Command Manual
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AGS	Above Ground Sites
AHJ	Authority Having Jurisdiction
A _i	Inherent Availability
AIAA	American Institute of Aeronautics and Astronautics
AIS	Abbreviated Injury Scale
ALARA	As Low as Reasonably Achievable
ALERT	Acute Launch Emergency Reliability Tip
AMD	Aircraft Management Division
ANSI	American National Standards Institute
A _o	Operational Availability
AO	Announcement of Opportunity
AOA	Annual Operating Agreement
	Analysis of Alternatives [NPR 7120.5]
API	American Petroleum Institute
ARC	NASA Ames Research Center
ARFF	Aircraft Rescue and Fire-fighting
ASAP	Aerospace Safety Advisory Panel
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers

Acronym	Term
ASTM	American Society for Testing and Materials
ATD	Advanced Technology Development
BAIR	Breathing Air
BIT	Built-in-Test
BP	Best Practice
BRS	Baseline Requirements Set
BWR	Boiling Water Reactor
CA	Collision Avoidance
CAAS	Contract Administration and Audit Service
CAD	Computer Aided Design
CADS	Cartridge Actuated Devices
CAM	Collision Avoidance Maneuver
CAP	Corrective Action Plan
CARA	Collision Avoidance Risk Assessment
CAS	Contract Administration Services Chemical Abstract
CASE	Computer Aided Software Engineering
CCB	Change Control Board
CD	Center Director
CDR	Critical Design Review
CDRL	Contract Deliverables Requirements List
CEV	Crew Exploration Vehicle
CFR	Code of Federal Regulations
CG	Compatibility Group
CGA	Compressed Gas Association
CHMO	Chief Health and Medical Officer
CI	Configuration Item
CIES	Community Information Exchange System
CIL	Critical Items List
cm	Centimeter
CM	Configuration Management
CMAA	Crane Manufacturers Association of America, Inc.
CMM®	Capability Maturity Model
CMMI®	Capability Maturity Model Integration
CMM-SW	Capability Maturity Model - Software
CMO	Contract Management Office Configuration Management Organization
CMOR	Canadian Meteor Orbit Radar
CMS	Contingency Management System
CNC	Critical Noncompliance
CNG	Compressed Natural Gas
CO	Contracting Officer
CoF	Construction of Facilities

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Acronym	Term
CoFR	Certification of Flight Readiness
COLA	Collision Avoidance Collision on Launch Assessment
COPUOS	Committee on the Peaceful Uses of Outer Space
COPV	Composite Overwrapped Pressure Vessel
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off the Shelf Commercial Orbital Transportation Services
CQA	Contract Quality Assurance
CRF	Critical Radiant Flux
CRM	Continuous Risk Management
CSO	Chief SMA Officer
CTE	Coefficient of Thermal Expansion
CVCM	Collected Volatile Condensable Material
CVD	Chemical Vapor Deposition
CW	Continuous Wave
DAS	Debris Assessment Software
DASHO	Designated Agency Safety and Health Official
DC	Direct Current
DCMA	Defense Contract Management Agency
DCR	Design Certification Review
DDESB	Department of Defense Explosives Safety Board
DFRC	NASA Dryden Flight Research Center
DIL	Deliverable Items List
DIP	Dual-In-Line Package
DNT	Dinitrotoluene
DoD	Department of Defense
DOE	Department of Energy
DOL	Department of Labor
DOT	Department of Transportation
DSC	Differential Scanning Calorimetry
DTA	Differential Thermal Analysis
DVA	Divinylacetylene
EAR	Export Administration Regulations
EAV	Experimental Aerospace Vehicle Experimental Aeronautical Vehicle
EBW	Exploding Bridge Wire
E _c	Expectation of Casualty
ECM	Earth Covered Magazine
ED	Executive Director
EED	Electro-Explosive Device
EEE	Electrical, Electronic, and Electromechanical
EELP	Explosives, Energetic Liquids, and Pyrotechnics

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Acronym	Term
EH&S	Environmental Health and Safety
EID	Electrically Initiated Device
EIDS	Extremely Insensitive Detonating Substance
ELCG	Energetic Liquid Compatibility Group
ELV	Expendable Launch Vehicle
EM	Engineering Memorandum
EME	Electromagnetic Energy Electromagnetic Environment
EMR	Electromagnetic Radiation
EMS	Emergency Medical Service
EO	Executive Order
EOD	Explosives Ordnance Disposal
EOM	End of Mission
EOMP	End of Mission Plan
EOS	Earth Observing System
EPA	Environmental Protection Agency
EPS	Engineering Performance Specification
ERB	Engineering Review Board
ERP	Effective Radiated Power
ERPG	Emergency Response Planning Guidelines
ES	Exposed Site
ESA	European Space Agency
ESD	Electrostatic Discharge Event Sequence Diagram
ESMD	Exploration Systems Mission Directorate
ESO	Explosive Safety Officer
ESQD	Explosive Safety Quantity Distance
ESSP	Earth System Science Pathfinder
ETA	Event Tree Analysis
ETBA	Energy Trace Barrier Analysis
EVA	Extravehicular Activity
EVM	Earned Value Management
FAA	Federal Aviation Administration
FACI	First Article Configuration Inspection
FAE	Fuel-Air Explosive
FAR	Federal Acquisition Regulation
FCA	Functional Configuration Audit
FDC	Fire Department Connection
FDIR	Fault Detection, Isolation, and Recovery
FED-STD	Federal Standard
FEEA	Federal Employees Education and Assistance Fund
FEH	Facilities Engineering Handbook
FEMA	Federal Emergency Management Agency

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Acronym	Term
FHA	Facility Hazard Analysis Fault Hazard Analysis
FM	Factory Mutual (Data Sheets)
FMEA	Failure Modes and Effects Analysis
FMEA/CIL	Failure Modes and Effects Analysis/Critical Items List
FMECA	Failure Modes, Effects, and Criticality Analysis
FOD	Foreign Object Debris
FOM	Facility Operations Manager
FRACAS	Failure Reporting and Corrective Action System
FRI	Facility Risk Indicator
FRR	Flight Readiness Review
FS	Factor of Safety
FSAR	Final Safety Analysis Report
FSI	Flame Spread Index
FSMP	Facility Safety Management Plan
ft	foot
FTA	Fault Tree Analysis
FTS	Flight Termination System
gal	gallon
GAO	Government Accountability Office
GAS	Get Away Special
GB	Guidebook
GCQA/GSI	Government Contract Quality Assurance/Government Source Inspection
GEIA	Government Electronics and Information Association
GEO	Geosynchronous Earth Orbit
GFE	Government Furnished Equipment
GFP	Government Furnished Property
GHz	Gigahertz
GIDEP	Government-Industry Data Exchange Program
GMID	Government Mandatory Inspection Document
GMIP	Government Mandatory Inspection Point
GOES	Geostationary Operational Environmental Satellite
GOTS	Government Off-the-Shelf
GOV	Government Owned Vehicle
GOWG	Ground Operations Working Group
gpm	gallons per minute
GPMC	Governing Program Management Council
GRC	NASA John H. Glenn Research Center
GSA	General Services Administration
GSE	Ground Support Equipment Ground Servicing Equipment Government Supplied Equipment
GSFC	NASA Goddard Space Flight Center

Acronym	Term
GTO	Geosynchronous Transfer Orbit
HAD	Heat Actuated Device
HALT	Highly Accelerated Life Testing
HAN	Hydroxyl ammonium nitrate
HASC	Hazard Analysis Sub Committee
HASS	Highly Accelerated Stress Screening
HATI	Hazard Analysis Tracking Index
HAZOP	Hazard and Operability Study Hazardous Operation
HE	High Explosive
HEA	Human-Error Analysis
HEO	High Earth Orbit
HFD	Hazardous Fragment Distance
HLTR	Hazard List Tracking Record
HOP	Hazardous Operating Procedure Hazardous Operating Permit
HOWI	NASA Headquarters Office Work Instruction
HPM	High Performance Magazine
HQ	Headquarters
HQR	Handling Qualities Rating
HR	Hazard Report
HRA	Human Reliability Analysis
HRCP	Human-Rating Certification Package
HRR	Human Rating Requirements
HRV	Hazard Resolution Verification
HSPD	Homeland Security Presidential Directive
HVAC	Heating, Ventilating, and Air Conditioning
IA	Independent Assessment
IADC	Inter-Agency Space Debris Coordination Committee
IAEA	International Atomic Energy Agency
IAOP	Inter-Center Aircraft Operations Panel
IATA	International Air Transport Association
IAW	In Accordance With
IBD	Inhabited Building Distance
IBR	Integrated Baseline Review
ICA	Independent Cost Analysis
ICAO	International Civil Aviation Organization
ICE	Independent Cost Estimate
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFO	Institutional/ Facility/Operational
IFSTA	International Fire Service Training Association
IGSCC	Intergranular Stress Corrosion Cracking

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Acronym	Term
IHE	Insensitive High Explosives
ILD	Intraline Distance
IMD	Intermagazine Distance
IMO	International Maritime Organization
INSRP	Interagency Nuclear Safety Review Panel
IPAO	Independent Program Assessment Office
IPR	Independent Peer Review
IRFNA	Inhibited Red Fuming Nitric Acid
IRIS	Incident Reporting Information System
IRT	Interim Response Team
ISI	Inservice Inspection
ISO	International Organization for Standardization
ISS	International Space Station
IST	Initial System Test
ITA	Independent Technical Authority
ITAR	International Traffic in Arms Regulations
IV&V	Independent Verification and Validation
JIMO	Jupiter Icy Moons Orbiter
JP-10	High Density hydrocarbon fuel (composed solely of exotetrahydrodi (cyclopentadiene))
JPD	Johnson Policy Directive
JPL	Jet Propulsion Laboratory
JPR	Johnson Procedural Requirements
JSC	NASA Johnson Space Center
JWST	James Webb Space Telescope
KDP	Key Decision Point
kg	kilogram
KHB	Kennedy Handbook
kHz	kilohertz
KM	Knowledge Management
km	kilometer
km/hr	kilometer/hour
kPa	kilopascal
KSC	NASA John F. Kennedy Space Center
kV	kilovolts
kVA	kilovoltampere
L	liter
l/min	liters per minute
LADEE	Lunar Atmosphere and Dust Environmental Explorer
LAIR	Liquid Air
LaRC	NASA Langley Research Center

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Acronym	Term
LCC	Launch Commit Criteria Launch Control Center Life-Cycle Cost
LDE	Lead Discipline Engineer Lifting Devices and Equipment
LDEC	Lifting Devices and Equipment Committee
LDEM	Lifting Devices and Equipment Manager
LED	Light Emitting Diode
LEO	Low Earth Orbit
LH ₂	Liquid Hydrogen
LLIS	Lessons Learned Information System
LNG	Liquefied Natural Gas
LOD	Letter of Delegation (Quality Assurance)
LOTO	Lock-out/Tag-out
LOX	Liquid Oxygen
LP	Liquid Petroleum
LRU	Line Replaceable Unit
LSPM	Launch Services Program Manager
LSRR	Launch Site Readiness Review
MAF	NASA Michaud Assembly Facility
MAWP	Maximum Allowable Working Pressure
maxTTR	Maximum Time to Repair
MCE	Maximum Credible Event
MCR	Mission Concept Review
MDAA	Mission Directorate Associate Administrator
MDMT	Minimum Design Metal Temperature
MDPMC	Mission Directorate Program Management Council
MDR	Mission Definition Review
MDT	Mean Downtime
ME	Meteoroid Environment
MELV	Medium (Class) Expendable Launch Vehicle
MEM	Meteoroid Engineering Model
MEO	Medium Earth Orbit Meteoroid Environment Office
MER	Mars Exploration Rover
MF	Multiplying Factor
MHE	Materials Handling Equipment
MI	Mishap Investigator
MIB	Mishap Investigation Board
MIDEX	Medium Class Explorer
MIL-STD	Military Standard
min	minutes
MIT	Mishap Investigation Team

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Acronym	Term
MLE	Maximum Likelihood Estimation
MM	Micro-Meteoroid
MmaxCT	Maximum Corrective Maintenance Time
MMH	Monomethylhydrazine
MMOD	Micro-Meteoroid Orbital Debris
MOA	Memorandum of Agreement
MON	Mixed Oxides Of Nitrogen
MOTS	Modified Off-The-Shelf
MOU	Memorandum of Understanding
mph	mile/hour
MRB	Material Review Board
MRO	Mars Reconnaissance Orbiter
MRR	Mission Readiness Review
MSDS	Material Safety Data Sheet
MSFC	Marshall Space Flight Center
MSO	Mission Support Office
MSPSP	Missile System Prelaunch Safety Package
MTBF	Mean Time Between Failures
MTTF	Mean Time To Failure
MTTR	Mean Time To Repair Mean Time To Restore
MVA	Vinylacetylene
MWR	Morale, Welfare, Recreation
NAARS	NASA Aviation Anomaly Reporting System
NAICS	North American Industrial Classification System
NAR	Non-Advocate Review
NASA	National Aeronautics and Space Administration
NASA SP	NASA Special Publication
NASA TM	NASA Technical Memorandum
NASA-STD	NASA Standard
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors
NBIC	National Board Inspection Code
NBL	Neutral Buoyancy Laboratory
NCASPG	NASA Contract Administration Services and Audit Policy Group
NCS	National Consensus Codes and Standards
NDE	Nondestructive Evaluation
NDT	Nondestructive Testing
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NEQ	Net Explosive Quantity
NEQA	NASA Engineering and Quality Audit
NESC	NASA Engineering and Safety Center

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Acronym	Term
NEW	Net Explosive Weight
NEWQD	Net Explosive Weight for Quantity Distance
NFAF	NASA Family Assistance Fund
NFC	National Fire Code
NFESC	Naval Facilities Engineering Service Center
NFPA	National Fire Protection Association
NFS	NASA Federal Acquisition Regulation Supplement
NFSAM	Nuclear Flight Safety Assurance Manager
NHBK	NASA Handbook
NHPP	Non-Homogeneous Poisson Process
NIMS	National Incident Management System
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NITROX	Nitrogen Oxygen
NM	NASA Memorandum
NMO	NASA Management Office
NODIS	NASA Online Directives Information System
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NPS	Nominal Pipe Size
NPSL	NASA Parts Selection List
NSC	NASA Safety Center
NSC AAO	NASA Safety Center Audits and Assessments Office
NSI	NASA Standard Initiator
NSN	National Stock Number
NSRS	NASA Safety Reporting System
NSS	NASA Safety Standard
NSTC	NASA Safety Training Center
NSTS	National Space Transportation System
NTIS	National Technical Information Service
NTO	Nitrogen Tetroxide
NTSB	National Transportation Safety Board
O&SHA	Operating and Support Hazard Analysis
OCE	Office of the Chief Engineer
OCHMO	Office of the Chief Health and Medical Officer
OD	Orbital Debris
ODA	Orbital Debris Assessment
ODAR	Orbital Debris Assessment Report
ODPO	NASA Orbital Debris Program Office
OE	Objective Evidence
OEM	Original Equipment Manufacturer
OEP	Operations and Engineering Panel

Acronym	Term
OER	Office of External Relations
OHO	Office of Headquarters Operations
OIG	Office of Inspector General
OJT	On-the-Job Training
OMB	Office of Management and Budget
OMI	Operations and Maintenance Instruction
ONR	Office of Naval Research
OPA	Office of Public Affairs
OPF	Orbiter Processing Facility
OPR	Office of Primary Responsibility
Ops	Operations
OPS	Office of Protective Services
ORI	Operational Readiness Inspection
ORR	Operational Readiness Review
OS	Operating System
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OSMA	Office of Safety and Mission Assurance
OSPP	Office of Security and Program Protection
OSTP	Office of Science and Technology Policy
OTS	Off-the-Shelf
pA	picoampere
PA&R	Program Assessment and Review
PADS	Propellant Actuated Devices
PAO	Public Affairs Office
PAR	Preflight Acceptance Review
PBAN	Polybutadiene acrylonitrile
PBMA-KMS	Process Based Mission Assurance - Knowledge Management System
P_c	Probability of Casualty
PCA	Program Commitment Agreement Physical Configuration Audit
PCE	Program/Project Chief Engineer
PCSA	Power Crane and Shovel Association
PD/NSC	Presidential Directive/National Security Council
PDD	Program Description Document
PDF	Probability Density Function
PDR	Preliminary Design Review
PEL	Permissible Exposure Limit
PEP	Performance Evaluation Profile
PER	Preliminary Engineering Report
PES	Potential Explosive Site
PETN	Pentaerythritol tetranitrate
PHA	Preliminary Hazard Analysis

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Acronym	Term
PHL	Preliminary Hazard List
PI	Principal Investigator
PIV	Post Indicator Valve
PL	Public Law
PM	Program Manager Project Manager Performance Measure
PMC	Program Management Council
POC	Point of Contact
POL	Petroleum, Oil, Lubricant
POV	Privately Owned Vehicle
PPE	Personal Protective Equipment
PPM	Parts Per Million
PPO	Planetary Protection Officer
PQA	Procurement Quality Assurance
PQASP	Program/Project Quality Assurance Surveillance Plan
PR	Performance Requirement Problem Report
PRA	Probabilistic Risk Assessment
PRACA	Problem Reporting and Corrective Action
PRB	Problem Review Board
PRD	Pressure Relief Device
PRF	Pulse Repetition Frequency
PRP	Personnel Reliability Program
PRT	Platinum Resistance Thermometer
PSAR	Preliminary Safety Analysis Report
PSI	Pounds per Square Inch
PSIA	Pounds per Square Inch Actual
PSIG	Pounds per Square Inch Gauge
PSM	Pressure Systems Manager Procurement Strategy Meeting
PSM	Process Safety Management
PSP	Program/Project Surveillance Plan
PSRP	Payload Safety Review Panel
PSV	Pressure Safety Valve
PSWG	Payload Safety Working Group
PTR	Public Traffic Route
PVS	Pressure Vessels and Pressurized Systems
PWA	Printed Wiring Assembly
PWB	Printed Wiring Board
PWP	Plasticized White Phosphorus
QA	Quality Assurance
QAAR	Quality Audit, Assessment, and Review

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Acronym	Term
QASAR	Quality and Safety Achievement Recognition
QASP	Quality Assurance Surveillance Plan
QC	Quality Control
QD	Quantity Distance
QPL	Qualified Products List
R&M	Reliability and Maintainability
RAC	Risk Acceptance Code Risk Assessment Code
RADCC	Radiological Control Center
RAM	Reliability, Availability, Maintainability
RBD	Reliability Block Diagram
RCC	Range Commanders Council
RCM	Reliability Centered Maintenance
RDX	Cyclotrimethulenetrinitramine (1,3,5-trinitroperhydro-1,3,5-triatine (cyclonite)
REDAA	Requirements Flow Down and SMA Engineering Design Audits and Assessments
RF	Radio Frequency
RFP	Request for Proposals
RH	Relative Humidity
RIDM	Risk-Informed Decision Making
RLV	Reusable Launch Vehicle
RM	Risk Management
RMP	Risk Management Plan
RMS	Root Mean Square
RP-1	Rocket propellant (rocket-grade propellant – kerosene)
RP-2	Rocket propellant (processed RP1 kerosene)
RPSF	Rotation, Processing, and Surge Facility
RSM	Range Safety Manual
RSO	Range Safety Officer
RSRMP	Range Safety Risk Management Plan
S&A	Safe And Arm
SA	Software Assurance
SAARIS	Surveys, Audits, Assessments, and Reviews Information System
SAE	Society of Automotive Engineers International Software Assurance Engineer
SAM	Software Assurance Manager
SAR	Safety Assessment Report, Safety Analysis Report
SARD	Safety and Assurance Requirements Division
SAS	Safety Analysis Summary
SBU	Sensitive but Unclassified
SCBA	Self-Contained Breathing Apparatus
SCD	Source Control Drawing

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Acronym	Term
SCG	Storage Compatibility Group
SCUBA	Self-Contained Underwater Breathing Apparatus
SDI	Smoke Development Index
SDO	Standards Developing Organizations
SDR	System Definition Review
SEB	Source Evaluation Board
SEI	Software Engineering Institute
SELV	Small (Class) Expendable Launch Vehicles
SEMP	Systems Engineering Management Plan
SEPP	Systems Effectiveness Program Plan
SER	Safety Evaluation Report
SFP	Single Failure Point
sfu	Solar Flux Unit
SHA	System Hazard Analysis
SHE	Safety, Health, and Environment
SIR	System Integration Review
SMA	Safety and Mission Assurance
SMARTS	Safety and Mission Assurance Requirements Tracking System
SME	Subject Matter Experts
SMEX	Small Explorer
SMO	Systems Management Office
SMSR	Safety and Mission Success Review
SOMD	Space Operations Mission Directorate
SOP	Standard Operating Procedure
SOW	Statement of Work
S-P	Severity-Probability
SPECSINTACT	Specifications Kept Intact
SPF	Single Point Failure
SQA	Software Quality Assurance
SR&QA	Safety, Reliability, and Quality Assurance
SRB	Solid Rocket Booster
SRM	Solid Rocket Motors
SRM&QA	Safety, Reliability, Maintainability, and Quality Assurance
SRR	Systems Requirements Review
SSAE	SMA Software Assurance Engineer
SSC	NASA Stennis Space Center
SSDS	Surface Supplied Diving System
SSE	System Safety Engineer
SSHA	Sub System Hazard Analysis
SSN	Space Surveillance Network
SSO	Semi-Synchronous Orbit Sun Synchronous Orbit
SSP	Space Shuttle Program

Acronym	Term
SSPP	System Safety Program Plan
SSTP	System Safety Technical Plan
START	NASA Standards and Technical Assistance Resource Tool
STD	Standard
STE	Special Test Equipment
STSC	Scientific and Technical Subcommittee
SW	Software
T&E	Test and Evaluation
TA	Technical Authority
TBD	To Be Determined
TEA	Triethyl aluminum (aka: TEAL)
TEB	Triethoxy butane
TFE	Tetrafluoroethylene
THF	Tetrahydrofuran
TIM	Technical Interchange Meeting
TML	Total Mass Loss
TNT	Trinitrotoluene
TPA	Thickened Pyrophoric Agent
TRR	Test Readiness Review
TRRB	Test Readiness Review Board
U.S.C.	United States Code
UAS	Unmanned Aerial System
UAV	Uninhabited Aerial Vehicle
UBC	Uniform Building Code
UDMH	Unsymmetrical Dimethylhydrazine
UFAS	Uniform Federal Accessibility Standard
UFC	Uniform Fire Code
UL	Underwriters Laboratories Incorporated
UMC	Uniform Mechanical Code
UML	Unified Modeling Language
UNO	United Nations Organization
USAF	United States Air Force
USAR	Updated Safety Analysis Report
USG	United States Government
USSTRATCOM	United States Strategic Command
UV	Ultraviolet
V&V	Verification and Validation
VAFB	Vandenberg Air Force Base
VCS	Voluntary Consensus Standard
VPP	Voluntary Protection Program
WBS	Work Breakdown Structure
WFF	NASA Wallops Flight Facility

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Acronym	Term
WP	White Phosphorus
WSSH	White Sands Space Harbor
WSTF	NASA White Sands Test Facility

3.2 Definitions

Notes on the definitions contained in this section:

- 1) *Definitions with a defining document listed in the below table were previously approved for use in the current version of that document.*
- 2) *When two or more defining documents are listed, the document listed first is the primary source of the definition.*
- 3) *Definitions which are listed with numbers preceding each definition for that term are separate uses/definitions of the term and, as a result, have separate definitions and defining documents. If no defining document is listed, the definition has not been baselined in a previously published document.*
- 4) *If a parenthetical with curly brackets “{ }” follows the name of a term, then that definition is specific to the listed discipline, function, or context within NASA. If no parenthetical is used, the definition applies across NASA. Round brackets “()” indicate abbreviations of the term or other amplifying information.*

Term	Definition	Defining Document and Paragraph
Abort {Human Space Flight}	The forced early return of the crew to Earth when failures or the existence of uncontrolled catastrophic hazards prevent continuation of the mission profile and a return to Earth is required for crew survival. The crew is safely returned to Earth in the space system nominally used for entry and landing/touchdown. (Also referred to as ‘Mission Abort.’)	NPR 8705.2B, Appendix A
Aboveground Magazine	Any building or structure, except for an operating building, used for the storage of explosives. Aboveground magazines are all types of above grade (not earthcovered) magazines or storage pads. This includes storage in trucks, trailers, railcars, or cargo aircraft.	NASA-STD-8719.12
Accelerated Life Testing	A testing strategy whereby units are tested at stress or temperature levels higher than use stress or temperature in order to facilitate failures in a timely manner. The results of these tests are then analyzed in such a manner so that a profile of the failure behavior of the products at the use stresses or temperatures can be determined based on the behavior of the products at the accelerated stresses.	
Acceptance	Agreement by the appropriate NASA Management Official to the change in the level of risk to programs, hardware and personnel and taking the responsibility for the potential outcome of any increase in risk.	NASA-STD 8709.20

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Term	Definition	Defining Document and Paragraph
Acceptance Test	A test conducted under specified conditions, using delivered or deliverable items, in order to determine the item's compliance with specified requirements. (Includes acceptance of first production units.)	
Accessibility	A feature of hardware design layout and installation for ease and rapidity of admission (to perform visual inspection and maintenance) without introduction of fault or failure to the accessed hardware.	NASA-STD 8729.1
Accident	[1] A severe perturbation to a mission or program, usually occurring in the form of a sequence of events, that can cause safety adverse consequences, in the form of death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.	[1] NPR 8715.3C, Appendix B
	[2] An unplanned event or series of events that results in death, injury, occupational illness, or damage to or loss of equipment, property, or damage to the environment; a mishap. [Note: NASA-STD 8719.13B also uses the IEEE 1228 definition]	[2] NASA-STD 8719.13B
Accident Prevention	Methods and procedures used to eliminate the causes that could lead to an accident.	NPR 8715.3C, Appendix B
Acquirer {software}	The entity or individual who specifies the requirements and accepts the resulting software products. The acquirer is usually NASA or an organization within the Agency but can also refer to the Prime contractor – subcontractor relationship as well.	NASA-STD 8739.8
Adequate	When referring to fire protection or life safety, the safeguards necessary to provide facilities and their occupants with protection against all known or recognized hazards.	NASA-STD 8719.11A
Adjudication	The process that encompasses the process of review, concurrence, and approval of a request for relief from an Agency-wide SMA requirement. The process includes the approval or disapproval of the request by the Chief, Safety and Mission Assurance (or delegated approval authority) and acceptance or rejection of the change in risk and acceptance of the new risk level by the appropriate NASA management official. A request is adjudicated when all steps in the process are complete.	NASA-STD 8709.20
Aggregate Risk	The cumulative risk associated with a given performance measure, accounting for all significant risk contributors. For example, the total probability of loss of mission is an aggregate risk quantified as the probability of the union of all scenarios leading to loss of mission.	NPR 8000.4A Appendix A

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Term	Definition	Defining Document and Paragraph
Aircraft Mishap	An aircraft mishap is an occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers a fatality or serious injury, or in which the aircraft receives substantial damage.	NPR 8621.1B, Appendix A
Allocation {R&M}	The assignment of reliability (or maintainability) performance requirements to subsystems and elements within a system which will result in meeting the overall reliability (or maintainability) performance requirements for the system if each of these performance requirements is attained.	NASA-STD 8729.1
Anomaly	Hardware or software damage, a departure from established procedures or performance, or a deviation of system, subsystem, and/or hardware or software performance outside certified or approved design/performance specification limits.	
Apogee	The point in the orbit that is the farthest from the center of the Earth. The apogee altitude is the distance of the apogee point above the surface of the Earth.	NASA-STD 8719.14
Appointing Official	The official authorized to appoint the investigating authority for a mishap or close call, to accept the investigation of another authority, to receive endorsements and comments from endorsing officials, and to approve the mishap report.	NPR 8621.1B, Appendix A
Approval	Decision by the SMA TA that the request for relief is within NASA policy and may be implemented after the appropriate NASA Management official accepts the risk.	NASA-STD 8709.20
Approving Authority(ies) {ELV Payload Safety}	The organization(s) (internal and/or external to NASA) having the responsibility to grant approval/concurrence to perform processing and/or launch activities in their respective facilities, including acceptance of any associated risk.	NPR 8715.7, Appendix A
Apsis (Plural Apsides)	The point in the orbit where a satellite is at the lowest altitude (perigee) or at the highest altitude (apogee). The line connecting apogee and perigee is the line of apsides.	NASA-STD 8719.14
Architecture	A structure that shows the elements and their relationship for a set of requirements or a system concept or both.	NASA-STD 8729.1
Argument Of Perigee	The angle between the line extending from the center of the Earth to the ascending node of an orbit and the line extending from the center of the Earth to the perigee point in the orbit measured from the ascending node in the direction of motion of the satellite.	NASA-STD 8719.14

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Term	Definition	Defining Document and Paragraph
Arm {Explosives}	A general term that implies the energizing of electronic and electrical circuitry that, in turn, controls power sources or other components used to initiate explosives. The arming operation completes all steps preparatory to electrical initiation of explosives except the actual fire signal.	NASA-STD 8719.12
Ascending Node	The point in the orbit where a satellite crosses the Earth's equatorial plane in passing from the southern hemisphere to the northern hemisphere.	NASA-STD 8719.14
Assembly	A hardware item composed of any number of parts or subassemblies, joined together to perform a specific function, which can be disassembled without destruction.	NASA-STD 8729.1
Assessment	<p>[1] Review or audit process, using predetermined methods, that evaluates hardware, software, procedures, technical and programmatic documents, and the adequacy of their implementation.</p> <p>[2] An evaluation and analysis of procedures, processes, and practices necessary for effective definition, imposition, implementation, and verification of SMA requirements. Assessment findings are provided to the organization being assessed and to senior Agency management (e.g., Chief, Safety and Mission Assurance; Chief Engineer; Mission Directorate Associate Administrator; Center Director; and Center SMA Director).</p> <p>[3] An evaluation or appraisal of the state of a system, program/project, or a portion of a program/project.</p>	<p>[1] NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A</p> <p>[2]</p> <p>[3] NASA-STD 8729.1</p>
Assessment {Software Assurance}	An objective evaluation of performed processes or products and services against their applicable process descriptions, standards, procedures, and requirements.	NASA-STD 8739.8
Assurance	Providing a measure of increased confidence that applicable requirements, processes, and standards are being fulfilled.	NPR 8715.3C, Appendix B
Audit	<p>[1] Formal review to assess compliance with hardware or software requirements, specifications, baselines, safety standards, procedures, instructions, codes, and contractual and licensing requirements.</p> <p>[2] An onsite in-process verification of compliance with policies, procedures, processes, and requirements. Audits and assessments have the unique responsibility for citing noncompliances, as well as observations, and require a follow-up CAP and corrective action status reports.</p>	<p>[1] NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A</p> <p>[2]</p>

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Term	Definition	Defining Document and Paragraph
Audit {Software Assurance}	An examination of a work product or set of work products performed by a group independent from the developers to assess compliance with specifications, standards, contractual agreements, or other criteria. [Based on IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology]	NASA-STD 8739.8
Audit Review Guide	A guide defining the overall scope, authority, procedures, applicable documents, and administrative and logistic details necessary to conduct an audit, review, or assessment. It also includes a set of detailed questions to be covered during the audit/review/assessment based on requirements from Agency-level SMA documents, industry standards, and NASA Center-specific procedures and requirements.	
Audit, IFO SMA	An independent audit/review of NASA Center compliance with institutional, facility, and operational SMA requirements. This includes Federal, State, or local safety requirements and NASA SMA requirements.	
Audit/Review Report	A document that provides a record of an audit, assessment, or review. This report contains, at a minimum, an Executive Summary and a concise discussion and description of the findings resulting from the audit or review.	
Audit/Review Team	A team comprising subject matter experts from NASA Headquarters, NASA Centers, and, if necessary, non-NASA organizations selected to conduct the NASA NSC-led SMA audits and assessments IFO Safety Audit, REDAA, or QAAR process activities.	
Audit/Review Team Lead	The NASA employee assigned to execute the required audit preparation, audit, and post-audit actions for NASA NSC/AAO-led or Center-led audits, reviews, and assessments conducted in support of SMA audits and assessments IFO Safety Audit, REDAA, or QAAR process, respectively. For NSC/AAO-led audits/reviews/assessments, the employee will be from the Office of Safety and Mission Assurance. For Center-led audits/reviews/assessments, the employee will be from the appropriate Center SMA organization.	
Authority Having Jurisdiction	Refers to the individual(s) at the NASA Centers and Headquarters responsible for implementing the fire safety provisions of NPR 8715.3, "NASA General Safety Program Requirements," and with the authority for "approving/concurring in" associated installations, procedures, and equipment.	NASA-STD 8719.11
Automated	Automatic (as opposed to human) control of a system or operation	NPR 8705.2B, Appendix A
Autonomous {Space Flight}	Ability of a space system to perform operations independent from any Earth-based systems. This includes no communication with, or real-time support from, mission control or other Earth systems	NPR 8705.2B, Appendix A

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Term	Definition	Defining Document and Paragraph
Auxiliary Building	Any building that supplements an operational building, line, or area but is not directly used for the productive activity. Examples of such auxiliary buildings are fan houses, valve houses, and similar units.	NASA-STD 8719.12
Availability	<p>[1] Measure of the percentage of time that an item could be used as intended.</p> <p>[2] The probability that an item will be in an operable and committable state at the start of a mission when the mission is called for at a random time. Availability is generally defined as uptime divided by total time where total time is the sum of uptime and downtime; the specific definitions are provided as Inherent Availability (A_i), Achieved Availability, and Operational Availability (A_o) [defined below]</p>	<p>[1] NPR 8715.3C, Appendix B</p> <p>[2] Modified from NASA-STD 8729.1</p>
Availability, Inherent (A_i)	The probability that an item will operate satisfactorily at a given point in time when used under stated conditions in an ideal support environment. It excludes logistics time, waiting or administrative downtime, and preventive maintenance downtime. It includes corrective maintenance downtime. Inherent availability is generally derived from analysis of an engineering design and is calculated as the mean time between failure (MTBF) divided by the mean time between failure plus the mean time to repair (MTTR). It is based on quantities under control of the designer.	NASA-STD 8729.1
Availability, Achieved	The probability that an item will operate satisfactorily at a given point in time when used under stated conditions in an ideal support environment (i.e., that personnel, tools, spares, etc. are instantaneously available). It excludes logistics time and waiting or administrative downtime. It includes active preventive and corrective maintenance downtime.	NASA-STD 8729.1
Availability, Operational (A_o)	The probability that an item will operate satisfactorily at a given point in time when used in an actual or realistic operating and support environment. It includes logistics time, ready time, and waiting or administrative downtime, and both preventive and corrective maintenance downtime. This value is equal to the mean time between failure (MTBF) divided by the mean time between failure plus the mean downtime (MDT). This measure extends the definition of availability to elements controlled by the logisticians and mission planners such as quantity and proximity of spares to the hardware item.	NASA-STD 8729.1
Barricade	An intervening approved barrier, natural or artificial, of such type, size, and construction as to limit, in a prescribed manner, the effect of an explosion on nearby buildings or exposures.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Barrier	A physical device intervention (e.g., a guardrail) or an administrative intervention that can provide procedural separation in time and space (i.e., lock-out/tag-out procedure) that is used to reduce risk of the undesired outcome to an acceptable level.	NPR 8621.1B, Appendix A
Baseline	[1] An agreed-to set of requirements, designs, or documents that will have changes controlled through a formal approval and monitoring process.	[1] NPR 7123.1A, Appendix A
	[2] A specification or product that has been reviewed formally and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures.	[2] NASA-STD 8719.13B
	[3] <i>noun</i> : Document(s) or databases(s) that record a set of requirements or product solutions that can be changed only by formal, documented procedures. <i>Verb</i> : To formally approve a baseline.	[3] NASA-STD 8729.1
Baseline {Document Context}	Implies the expectation of a finished product, though updates may be needed as circumstances warrant. All approvals required by Center policies and procedures have been obtained.	NM 7120-81, Appendix A
Baseline {Software Quality}	A specification or product that has been reviewed formally and agreed upon, that thereafter serves as the basis for further development, and can be changed only through formal change control procedures.	
Best Practice	A process or procedure that could provide significant benefit to other NASA Centers and/or could address systemic issues.	
Black Box Testing	Testing that ignores the internal mechanism of a system or component and focuses solely on the outputs generated in response to selected inputs and execution conditions. [IEEE 610.12]	NASA-STD 8719.13B
Blast Overpressure	The pressure, exceeding the ambient pressure, manifested in the shock wave of an explosion	NASA-STD 8719.12
Breakout	During proximity operations, the ability to maneuver one or more vehicles to a safe separation distance.	NPR 8705.2B, Appendix A
Breakup	An explosion or disassembly of the spacecraft or launch vehicle which generates orbital debris.	NPR 8715.6A, Appendix A
Buddy System	An arrangement used when risk of injury is high, where personnel work in pairs, with one person in the pair stationed nearby, not directly exposed to the hazard, to serve as an observer to render assistance if needed.	NPR 8715.3C, Appendix B

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Term	Definition	Defining Document and Paragraph
Built-In Test	A test approach using self test hardware or software to test all or part of an equipment item or system. BIT denotes any self-test feature incorporated into a design for the purpose of detecting, diagnosing and isolating failures.	NASA-STD 8729.1
Can	As used in requirements documents, denotes statements of possibility or capability.	
CAP Closure Statement	A final statement made by the appointing official that documents that all corrective actions have been completed and the CAP is closed.	NPR 8621.1B, Appendix A
Capability	Capability refers to the degree to which the process, as defined by the implementing organization, achieves the intent of the Agency-level SMA requirement.	
Casualty	An injury requiring overnight hospitalization or worse, including death. For the purpose of casualty modeling, any injury that, due to its severity, qualifies as a Level-3, 4, 5, or 6 injury per the Abbreviated Injury Scale (AIS), Association for the Advancement of Automotive Medicine, would be counted as a casualty.	NPR 8715.5, Appendix A
Catastrophic	[1] A hazard that could result in a mishap causing fatal injury to personnel, and/or loss of one or more major elements of the flight vehicle or ground facility. A condition that may cause death or permanently disabling injury, major system or facility destruction on the ground, or loss of crew, major systems, or vehicle during the mission. [2] Loss of human life or permanent disability; loss of major system; loss of vehicle; loss of ground facility; severe environmental damage.	[1] NPR 8715.3C, Appendix B [2] NASA-STD 8739.8, Appendix A Table A-1
Catastrophic Event	An event resulting in the death or permanent disability of a crew member or passenger or an event resulting in the unplanned loss/destruction of a major element of the crewed space system during the mission that could potentially result in the death or permanent disability of a crew member or passenger.	NPR 8705.2B, Appendix A
Catastrophic Hazard	Any hazard that, when uncontrolled, results in a catastrophic event.	NPR 8705.2B, Appendix A
Cause	An event or condition that results in an effect. Anything that shapes or influences the outcome.	NPR 8621.1B, Appendix A
Cause, Failure	The events which are the basic reason for failure or which initiate the process by which unexpected circumstances, deterioration, or degradation proceeds to failure.	
Cause, Hazard	Any item that creates or significantly contributes to the existence of a hazard.	NASA-STD 8719.7

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Term	Definition	Defining Document and Paragraph
Center Essential Personnel	Government or contractor personnel who perform functions necessary for continued operations at a NASA Center or other site where NASA has control and responsibility.	NPR 8715.5, Appendix A
Center Essential Personnel {Range}	For a specific range operation, the Center essential personnel include mission essential personnel (i.e., mission essential is a subset of Center essential).	NPR 8715.5, Appendix A
Certificate of Authorization	A Certificate of Authorization constitutes relief by the FAA from specific regulations for the period of time specified on the certificate. For approval purposes, the FAA will issue Certificates of Authorization to an organization in preference to an individual, specify the operations that are permitted by the authorization, define the area, and specify altitudes at which they may be conducted.	NPR 8715.5, Appendix A
Certification {1 Software Safety}, {2 PVS}	[1] The process of formally verifying that a system, software subsystem, or computer program is capable of satisfying its specified requirements in an operational environment for a defined period of time. This includes any requirements for safing the system upon the occurrence of failures with potential safety impacts. [2] The official approval process for ensuring and documenting the integrity of PVS.	[1] NASA-STD 8719.13B [2] NASA-STD 8719.17
Certification of Flight Readiness	This document represents a commitment by each element of the program and program managers (NASA and contractor) certifying that their organizations have satisfactorily completed the requirements needed to assure safe flight.	NPR 8715.5, Appendix A
Certified Personnel	Personnel who have completed required training and whose specified knowledge or proficiency in a skill has been demonstrated and documented.	NASA-STD 8719.10
Chairperson {Mishap}	The individual in charge of a mishap investigation board or mishap investigation team.	NPR 8621.1B, Appendix A
Class A Human Rated Software Systems	Ground and flight systems developed and/or operated by or for NASA that are needed to perform a primary mission objective of human space flight and directly interacts with human space flight systems. Limited to software required to perform “vehicle, crew, or primary mission function,” as defined by software that is: 1. Required to operate the vehicle or space asset (e.g., spacesuit, rover, or outpost), including commanding of the vehicle or asset, or 2. required to sustain a safe, habitable environment for the crew, or 3. required to achieve the primary mission objectives, or 4. directly prepares resources (e.g., data, fuel, power) that are consumed by the above functions. * Includes software involving launch, onorbit, in space, surface operations, and entry, descent, and landing.	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A

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Term	Definition	Defining Document and Paragraph
Class B Non-Human Space Rated Software Systems or Large Scale Aeronautics Vehicles	<p><u>Space Systems</u>*: Flight and ground software that must perform reliably to accomplish primary mission objectives, or major function(s) in Non-Human Space Rated Systems. Limited to software that is:</p> <ol style="list-style-type: none"> 1. Required to operate the vehicle or space asset (e.g., orbiter, lander, probe, flyby spacecraft, rover, launch vehicle, or primary instrument), such as commanding of the vehicle or asset, or 2. Required to achieve the primary mission objectives, or 3. Directly prepares resources (data, fuel, power, etc.) that are consumed by the above functions. <p><u>Airborne Vehicles</u>: Large Scale aeronautic vehicles that are NASA unique in which the software:</p> <ol style="list-style-type: none"> 1. Is integral to the control of an airborne vehicle, or 2. Monitors and controls the cabin environment, or 3. Monitors and controls the vehicle's emergency systems. <p>This definition includes software for vehicles classified as "test", "experimental", or "demonstration" which meets the above definition for Class B software. Also included are systems in a test or demonstration where the software's known and scheduled intended use is to be part of a Class A or B software system.</p> <p>* Includes software involving launch, onorbit, in space, surface operations, and entry, descent, and landing.</p>	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A

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Term	Definition	Defining Document and Paragraph
Class C Mission Support Software or Aeronautic Vehicles, or Major Engineering/Research Facility Software	<p><u>Space Systems:</u></p> <ol style="list-style-type: none"> 1. Flight or ground software that is necessary for the science return from a single (non-primary) instrument, or 2. Flight or ground software that is used to analyze or process mission data, or 3. Other software for which a defect could adversely impact attainment of some secondary mission objectives or cause operational problems, or 4. Software used for the testing of space assets, or 5. Software used to verify system requirements of space assets by analysis, or 6. Software for space flight operations, that is not covered by Class A or B. <p><u>Airborne Vehicles:</u> Systems for non-large scale aeronautic vehicles in which the software:</p> <ol style="list-style-type: none"> 1. Is integral to the control of an airborne vehicle, or 2. Monitors and controls the cabin environment, or 3. Monitors and controls the vehicle's emergency system. <p>Systems on an airborne vehicle (including large scale vehicles) that acquire, store, or transmit the official record copy of flight or test data.</p> <p><u>Major Engineering/Research Facility:</u> Systems that operate a major facility for research, development, test, or evaluation (e.g., facility controls and monitoring, systems that operate facility-owned instruments, apparatus, and data acquisition equipment).</p>	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A

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Term	Definition	Defining Document and Paragraph
Class D Basic Science/Engineering Design and Research and Technology Software	<p><u>Basic Science/Engineering Design:</u></p> <ol style="list-style-type: none"> 1. Ground software that performs secondary science data analysis, or 2. Ground software tools that support engineering development, or 3. Ground software used in testing other Class D software systems, or 4. Ground software tools that support mission planning or formulation, or 5. Ground software that operates a research, development, test, or evaluation laboratory (i.e., not a Major Engineering/Research Facility), or 6. Ground software that provides decision support for non-mission critical situations. <p><u>Airborne Vehicle Systems:</u></p> <ol style="list-style-type: none"> 1. Software whose anomalous behavior would cause or contribute to a failure of system function resulting in a minor failure condition for the airborne vehicle (e.g., the Software Considerations in Airborne System and Equipment Certification, DO-178B, “Class D”), or 2. Software whose anomalous behavior would cause or contribute to a failure of system function with no effect on airborne vehicle operational capability or pilot workload (e.g., the Software Considerations in Airborne System and Equipment Certification, DO-178B, “Class E”), or 3. Ground software tools that perform research associated with airborne vehicles or systems. <p><u>Major Engineering/Research Facility Related:</u> research software that executes in a Major Engineering/Research Facility but is independent of the operation of the facility.</p>	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A
Class E Small Light Weight Design Concept and Research and Technology Software	<ol style="list-style-type: none"> 1. Software developed to explore a design concept or hypothesis, but not used to make decisions for an operational Class A, B, or C system or to-be built Class A, B, or C system, or 2. Software used to perform minor desktop analysis of science or experimental data. 	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A
Class F General Purpose Computing Software {Multi-Center Or Multi-Program/Project}	<p>General purpose computing software used in support of the Agency, multiple Centers, or multiple programs/projects, as described for the General Purpose Infrastructure To-Be Component of the NASA Enterprise Architecture, Volume 5 (To-Be Architecture), and for the following portfolios: voice, wide area network, local area network, video, data Centers, application services, messaging and collaboration, and public Web. A defect in Class F software is likely to affect the productivity of multiple users across several geographic locations and may possibly affect mission objectives or system safety. Mission objectives can be cost, schedule, or technical objectives for any work that the Agency performs.</p>	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A

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Term	Definition	Defining Document and Paragraph
Class G General Purpose Computing Software {Single Center Or Project}	General purpose computing software used in support of a single Center or project, as described for locally deployed portions of the General Purpose Infrastructure To-Be Component of the NASA Enterprise Architecture, Volume 5 (To-Be Architecture) and for the following portfolios: voice, local area network, video, data Centers, application services, messaging and collaboration, and public Web. A defect in Class G software is likely to affect the productivity of multiple users in a single geographic location or workgroup but is unlikely to affect mission objectives or system safety.	NPR 7150.2A, Appendix E and NASA-STD 8739.8, Appendix A
Class H: General Purpose Desktop Software	General purpose desktop software as described for the General Purpose Infrastructure To-Be Component (Desktop Hardware and Software Portfolio) of the NASA Enterprise Architecture, Volume 5 (NASA To-Be Architecture). A defect in Class H software may affect the productivity of a single user or small group of users but generally will not affect mission objectives or system safety. However, a defect in desktop IT security-related software, e.g., anti-virus software, may lead to loss of functionality and productivity across multiple users and systems.	NPR 7150.2E, Appendix E and NASA-STD 8739.8, Appendix A
Close Call	An event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than \$1000), but which possesses a potential to cause a mishap.	NPR 8621.1B, Appendix A
Code PVS	Pressure vessels and pressurized systems that are designed, fabricated, installed, code stamped, and maintained in strict conformance with the requirements of the NCS specified as applicable by the PSM.	NASA-STD 8719.17
Cognizant Center Safety Office	The safety office of the Center that hosts the project or that has been assigned SMA responsibilities for the program.	NPR 8621.1B, Appendix A
Cognizant SMA Authority	SMA authority is the authority assigned by NPD 1000.3, The NASA Organization, to the Chief, Safety and Mission Assurance to determine if the risk of a hazard exceeds the limits where it can be accepted. This authority is not limited solely to hazards related to SMA requirements but to any hazard. Application of this authority is intended to be applied at a level consistent with the application of Technical Authority (that is to the cognizant SMA authority).	NPD 8700.1, para 1.j.(2)
Combustible Material/Fuels	Any material which, when ignited, will sustain burning.	NASA-STD 8719.12
Commendation	Acknowledgement of something the Center does exceptionally well.	NPR 8705.6B, Appendix A
Commercial Launch	A service supplied by the private sector that provides the capability of placing a vehicle and any payload into a suborbital trajectory, Earth orbit, or into outer space.	NPR 8715.5, Appendix A

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Term	Definition	Defining Document and Paragraph
Commercial Off the Shelf (COTS)	Commercial items that require no unique Government modification or maintenance over the life cycle of the product to meet the needs of the procuring agency. A commercial item is one customarily used for non-Governmental purposes that has been or will be sold, leased, or licensed (or offered for sale, lease, or license) in quantity to the general public. An item that includes modifications customarily available in the commercial marketplace or minor modifications made to meet NASA requirements is still a commercial item.	NASA-STD 8719.17A
Commercial-Off-The-Shelf (COTS) Software	Operating systems, libraries, applications, and other software purchased from a commercial vendor. Not customized for a particular project. Access to source code and documentation are often limited.	
Common Cause Failure	Failure of multiple items or systems due to a single event or common failure mode.	NPR 8705.2B, Appendix A
Common Cause Variation	The variation that is “built into” the process. It is expected to be there and does not change from measure to measure. Commonly called random variation or non-assignable cause variation.	
Compatibility	[1] The capability of two or more items to exist or function in the same system or environment without mutual interference.	[1] NASA-STD 8729.1
Compatibility {Explosives, Propellants, and Pyrotechnics}	[2] Chemical property of materials to coexist without adverse reaction for an acceptable period of time. Compatibility in storage exists when storing materials together does not increase the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident. Storage compatibility groups are assigned to provide for segregated storage.	[2] NASA-STD 8719.12
Complex Item	A product that has quality characteristics not wholly visible in the end item, for which contract conformance cannot be determined through inspection, measurement, and/or test of the end item, and for which conformance can only be established progressively through the item’s life by precise measurements, tests, and controls applied. Examples of complex items include assemblies, machinery, equipment, subsystems, systems, and platforms.	NPR 8735.2A, Appendix A
Complex Work	[1] The design, manufacture, fabrication, assembly, testing, integration, operation, maintenance, refurbishment, or repair of complex items.	[1] NPR 8735.2A
	[2] Involves either: a) the design, manufacture, fabrication, assembly, testing, integration, maintenance, or repair of machinery, equipment, subsystems, systems, or platforms; or b) the manufacture/fabrication of parts or assemblies which have quality characteristics not wholly visible in the end item and for which conformance can only be established progressively through precise measurements, tests, and controls applied.	[2] Appendix A NPD 8730.5, Appendix A

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Term	Definition	Defining Document and Paragraph
Compliance Verification	Compliance verification includes: 1) verifying that appropriate technical and process requirements are in place (requirement flow down verification); 2) verifying that documented SMA requirements are in place and capable; and 3) observing work activities and products to verify process implementation and compliance with process and technical requirements (e.g., onsite in-process audits and assessments for verification of work discipline).	
Component	[1] A constituent element of a system or subsystem. [2] An assembly or any combination of parts, subassemblies, assemblies mounted together, such as a transmitter or cryogenic pump. [3] Any part of a complete item whether loaded with explosives (commonly called “live”), inert (not containing explosives), or empty.	[1] NASA-STD 8719.13B [2] NASA-STD 8729.1 [3] NASA-STD 8719.12
Condition	Any as-found state, whether or not resulting from an event, that may have safety, health, quality, security, operational, or environmental implications.	NPR 8621.1B, Appendix A
Configuration Item	An aggregation of hardware, software, or both, that is established and baselined, with any modifications tracked and managed. [Based on IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology] Examples include requirements document, Use Case, or unit of code.	NASA-STD 8739.8
Configuration Management	The identification, control, accounting, and verification of requirements and implementation documentation for formal orderly control of the PVS configuration.	NASA-STD 8719.17A
Configuration Management Organization	The collaborative configuration management effort shared between the Program/Project/Center and the Supplier	NASA-STD 0005
Conjunction Assessment	An analysis done to predict the closest point of approach of two space objects based on their orbital parameters.	NPR 8715.6A, Appendix A

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Term	Definition	Defining Document and Paragraph
Consent to Take Risk	Formal consent to take any human safety risk by the actual risk taker and an appropriate member of his/her supervisory chain.	NPD 8700.1, para 1.j.(3)
	NOTE: There are two elements to the consent to take risk. The first element is that the risk takers themselves volunteer to take the risk. The second element is that the appropriate member of the supervisory chain also consents to the risk-taking. The first element focuses on the willingness of the risk taker to volunteer while the second element provides for a check and balance on the risk taker to alleviate situations where a risk taker might be reluctant to decline taking inappropriate risk.	
Constraints	Boundaries limiting design freedom which can be defined by environmental factors, contractual requirements, internal program/project requirements, or other factors. Environmental factors may include operating temperatures, pressure, levels of dust, etc. Contractual and internal design constraints may include interfaces, reliability, maintainability, human factors, logistics support, physical mass and dimensions, standardization, costs, design and fabrication practices, personnel resource and training.	NASA-STD 8729.1
Contact Operations	An operation in which an operator and an explosive item are both present with no operational shield.	NASA-STD 8719.12
Containment	A range safety technique that precludes hazards (such as vehicle, debris, explosive, or toxic) from reaching the public, the workforce, or property in the event of a vehicle failure or other mishap.	NPR 8715.5, Appendix A
Contingency Management System	A system designed to manage the vehicle throughout the atmospheric flight envelope that provides a controlled response under the full set of circumstances defined by the mission's risk assessment. The system may be comprised of a set of elements within the vehicle, including but not limited to manual control, autonomous control, and recovery capability.	NPR 8715.5, Appendix A
Continuous Risk Management (CRM)	A systematic and iterative process that efficiently identifies, analyzes, plans, tracks, controls, and communicates and documents risks associated with implementation of designs, plans, and processes.	NPR 8000.4A Appendix A

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Term	Definition	Defining Document and Paragraph
Contract	<p>[1] A mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing. In addition to bilateral instruments, contracts include (but are not limited to) awards and notices of awards; job orders or task letters issued under basic ordering agreements; letter contracts; orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; and bilateral contract modifications. Contracts do not include grants and cooperative agreements covered by 31 U.S.C. 6301 et seq. or Space Act agreements covered by 41 U.S.C. 2473.</p> <p>[2] An agreement between two or more parties which is normally written and enforceable by law.</p>	<p>[1] NPR 8735.2A, Appendix A and NM 7120-81, Appendix A</p> <p>[2] NASA-STD 8729.1</p>
Contract Agreement	<p>Terms utilized interchangeably in this standard to indicate an agreement between a Supplier and a Program/Project/Center. This agreement could be between government organizations (e.g., task agreement) or between the Government and a business enterprise or academia (e.g., contract).</p>	NASA-STD 0005
Contracted Software	<p>Software created for a project by a contractor or subcontractor.</p>	NPR 7150.2A, Appendix A
Contracting Officer	<p>A person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings.</p>	NPR 8715.1, para 1.2.1
Contractor	<p>A party under contract to provide a product or service at a specified cost to another party (or parties) to the contract, also known as the customer(s).</p>	NASA-STD 8729.1
Contributing Factor	<p>An event or condition that may have contributed to the occurrence of an undesired outcome but, if eliminated or modified, would not by itself have prevented the occurrence.</p>	NPR 8621.1B, Appendix A
Control Braking Means	<p>A method of controlling speed by removing energy from the moving body or by imparting energy in the opposite direction.</p>	NASA-STD 8719.9
Corrective Action Plan	<p>A document that addresses the proximate and root causes of noncompliance findings and the scope/population of noncompliant items. It includes the correction, replacement, repair, or authorized disposition of noncompliant items/conditions; implementation of preventive measures to eliminate the causes of noncompliance; and validation that implemented preventive measures has effectively eliminated recurrence of noncompliant conditions (recurrence control).</p>	

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Term	Definition	Defining Document and Paragraph
Corrective Actions	Changes to design processes, work instructions, workmanship practices, training, inspections, tests, procedures, specifications, drawings, tools, equipment, facilities, resources, or material that result in preventing, minimizing, or limiting the potential for recurrence of a mishap.	NPR 8621.1B, Appendix A
Cost-Benefit Analysis	A procedure in which the present value of future expenditures associated with the installation and maintenance of a fire safety system or device is related to the economic benefits of the facility or portion thereof that it is designed to protect. The technique is intended to determine the practicality of the installation of fire protection systems and must be limited to those situations where the possibility of loss of human life is low.	NASA-STD 8719.11A
Crane	A machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine.	NASA-STD 8719.9
Cratering Flux	The number of impacts per square meter per year of objects which will leave a crater at least as large as a specified diameter.	NASA-STD 8719.14
Crew	Any human on board the space system during the mission that has been trained to monitor, operate, and control parts of, or the whole space system; same as flight crew.	NPR 8705.2B, Appendix A
Crew/Passenger Survival	Capability and ability to preclude crew/passenger fatality or permanent disability. The ability to keep the crew/passengers alive using such capabilities as abort, escape, safe haven, emergency egress, rescue and emergency medical, in response to an imminent catastrophic condition.	NPR 8705.2B, Appendix A
Crewed Element (of the Space System)	All system elements that are occupied by the crew/passengers during the space mission and provide life support functions for the crew/passengers. The crewed element includes all the subsystems that provide life support functions for the crew/passengers.	NPR 8705.2B, Appendix A
Crewed Space System	The crewed space system consists of all the system elements that are occupied by the crew/passengers during the space mission and provide life support functions for the crew/passengers (i.e., the crewed elements). The crewed space system also includes all elements physically attached to the crewed element during the mission. The crewed space system is part of the larger space system used to conduct the mission.	NPR 8705.2B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Critical	<p>[1] The condition where failure to comply with prescribed contract requirements can potentially result in loss of life, serious personal injury, loss of mission, or loss of a significant mission resource. Common uses of the term include critical work, critical processes, critical attributes, and critical items.</p> <p>[2] A condition that may cause severe injury or occupational illness, or major property damage to facilities, systems, or flight hardware.</p>	<p>[1] NPR 8735.2A, Appendix A</p> <p>[2] NPR 8715.3C, Appendix B</p>
Critical Action	A critical action is defined as any operator action that, if performed in error during operations with zero or one system failures, would result in a catastrophic event or an abort.	NPR 8705.2B, Appendix A
Critical Facilities/ Equipment	Equipment necessary to manufacture, test, or process critical hardware (such as flight hardware). Equipment whose failure could cause injury or death, cause more than \$2,000,000 in damage (see NPR 8621.1B, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping), could cause embarrassment to NASA or a specific Center, or could cause significant schedule impacts to important programs. This does not include typical building systems such as heating, ventilation, and air conditioning, and electrical distribution.	NPD 8831.1E, Attachment A (adapted to incorporate the latest revision of NPR 8621.1B)
Critical Function	Mission capabilities or system functions that, if lost, would result in a catastrophic event or an abort.	NPR 8705.2B, Appendix A
Critical Item List	A list of items which, because of special engineering or logistic considerations, requires an approved specification to establish technical or inventory control at the component level.	NASA-STD 8729.1
Critical Lift	A lift where failure/loss of control could result in loss of life, loss of or damage to flight hardware, or a lift involving special high dollar items, such as spacecraft, one-of-a-kind articles, or major facility components, whose loss would have serious programmatic or institutional impact. Critical lifts also include the lifting of personnel with a crane, lifts where personnel are required to work under a suspended load, and operations with special personnel and equipment safety concerns beyond normal lifting hazards.	NASA-STD 8719.9
Critical Software	Any software component whose behavior or performance could lead to a catastrophic event or abort. This includes the flight software as well as ground-control software.	NPR 8705.2B, Appendix A
Critical Software Command	A command that either removes a safety inhibit or creates a hazardous condition.	NPR 8715.3C, Appendix B

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Term	Definition	Defining Document and Paragraph
Critical System (or Subsystem)	A (sub)system is assessed as critical if loss of overall (sub)system function, or improper performance of a (sub)system function, could result in a catastrophic event or abort.	NPR 8705.2B, Appendix A
Critical Temperature	Temperature above which the self-heating of an explosive causes a runaway reaction. It is dependent on mass, geometry, and thermal boundary conditions.	NASA-STD 8719.12
Critical Weld	A weld whose failure could result in injury to personnel or damage to property or flight hardware by dropping or losing control of the load.	NASA-STD 8719.9
Critical Work	Any hardware task that, if performed incorrectly or in violation of prescribed requirements, could result in loss of human life, serious injury, loss of mission, or loss of a significant mission resource (e.g., Government test or launch facility).	NPD 8730.5, Attachment A
Criticality (of a failure)	A measure of the severity of a failure in relation to mission performance, hazards to material or personnel, and maintenance cost. Programs/projects typically establish their own criticality definitions and classifications.	NASA-STD 8729.1
Customer	[1] The NASA program, project, facility, or other entity that acquires software developed by another organization.	[1] NASA-STD 8719.13B
	[2] The recipient of a product or service provided by a supplier or contractor.	[2] NASA-STD 8729.1
Danger Zone	That area around a test site where personnel could be in physical jeopardy due to overpressure, fragments, or firebrands released during an explosive test.	NASA-STD 8719.12
Debris Flux	The number of impacts per square meter per year expected on a randomly oriented planar surface of an orbiting space structure.	NASA-STD 8719.14
Debris Flux To Limiting Size	The number of impacts per square meter per year of debris objects of a specified diameter or larger.	NASA-STD 8719.14
Debris Hazard	A hazard resulting from any solid particle thrown by an explosion or other strong energetic reaction. For aboveground explosions, debris refers to secondary fragments.	NASA-STD 8719.12
Decision Authority	The Agency's responsible individual who authorizes the transition of a program/project to the next life-cycle phase.	NM 7120-81, Appendix A
Decomposition	The process of breaking a system or component up into constituent parts. For requirements, the top-level requirements will be general, and lower-level (decomposed) requirements will be specific.	NASA-STD 8719.13B

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Term	Definition	Defining Document and Paragraph
Decompression Diving	An operation which requires halts or “stops” at specific depths (or pressures greater than 14.7 absolute pounds per square inch actual (psia)) for specified lengths of time in order to eliminate dissolved inert gases from body tissues.	NASA-STD 8719.10
Decompression Sickness	An illness caused by the formation of inert gas bubbles in body tissues as the result of a transition to an environment with a lower ambient pressure.	NASA-STD 8719.10
Decompression Table	A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.	NASA-STD 8719.10
Defect	A condition of any hardware in which one or more characteristics do not conform to the specified requirements.	
Deflagration	A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and be accelerated without input of heat from another source; a surface phenomenon with the reaction proceeding towards the unreacted material along the surface at subsonic velocity. The effect of a true deflagration under confinement is an explosion. Confinement of the reaction increases pressure, rate of reaction, and temperature and may cause transition into a detonation.	NASA-STD 8719.12
Degradation	A gradual impairment in ability to perform one or more functions.	NASA-STD 8729.1
Delegated Agency	An organization providing Contract Administration Services (CAS) quality assurance support to NASA on designated contracts. Delegated agencies that provide NASA CAS support include the Defense Contract Management Agency (DCMA) and the Office of Naval Research (ONR).	NPR 8735.2A, Appendix A
Deliberation	In the context of this NPR[NPR 8000.4A], the formal or informal process for communication and collective consideration, by stakeholders designated in the Risk Management Plan, of all pertinent information, especially risk information, in order to support the decision maker.	NPR 8000.4A, Appendix A
Deliverable Software	Deliverable software developed and produced either as a contract end item or included as part of a deliverable end item (firmware/embedded software). It includes commercially available, reusable, or Government-furnished software, whether modified or unmodified, designated as part of a deliverable end item.	NPR 8735.2A, Appendix C 17.1.a
Deluge System	A quick-acting detection and water delivery system providing for a high volume of quenching water to cover hazardous points of an operation or areas where accidental ignition may be likely to occur.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Derived Requirements	Arise from constraints, consideration of issues implied but not explicitly stated in the high-level direction provided by NASA Headquarters and Center institutional requirements, factors introduced by the selected architecture, and the design. These requirements are finalized through requirements analysis as part of the overall systems engineering process and become part of the program/project requirements baseline. They are established by and are the responsibility of the Programmatic Authority.	NM 7120-81, Appendix A
Derrick	An apparatus with a mast or member held at the head by guys or braces, with or without a boom and that uses a hoisting mechanism and operating ropes for lifting or lowering a load.	NASA-STD 8719.9
Design Constraints	Boundaries limiting design freedom which can be defined by environmental factors, contractual requirements, internal program/project requirements, or other factors. Environmental factors may include operating temperatures, pressure, levels of dust, etc. Contractual and internal design constraints may include interfaces, reliability, maintainability, human factors, logistics support, physical mass and dimensions, standardization, costs, design and fabrication practices, personnel resource and training.	NASA-STD 8729.1
Design Factor	A numeric term that is broadly used. It is usually expressed as a ratio of the ultimate stress, or yield stress, to the capacity of a component, or to the service load, or its rated capacity. It is also used or includes factors in calculations to quantify variations found in the properties of materials, manufacturing tolerances, operating conditions, and design assumptions.	NASA-STD 8719.9
Design for Minimum Risk	A design process or characteristic thereof such that deliberate effort is expended to maximize crew survival and minimize the risk of loss of mission, property, or life. Hazards not controlled by failure tolerance should be controlled by specified margins of safety, factors of safety, material properties, or any other properties inherent to the design of the part, component, subassembly, or assembly.	
Design Load	The value used by the manufacturer as the maximum load around which the device or equipment is designed and built based on specified design factors and limits. This is also the load referred to as the "Manufacturer's Rated Load."	NASA-STD 8719.9
Design Safety Factor	See Design Factor.	NASA-STD 8719.9

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Term	Definition	Defining Document and Paragraph
Design Specification	Generic designation for a specification which describes functional and physical requirements for an article, usually at the component level of assembly or higher. In its initial form, the design specification is a statement of functional requirements with only general coverage of physical and test requirements. In many programs/projects the end item specifications supplant design specifications for the contract end-items; for articles not designated contractually as end-items, design specifications provide the basis for technical and engineering management control.	NASA-STD 8729.1
Designated Agency Safety and Health Official	The individual who is responsible for the management of the safety and health program within an agency, and is so designated or appointed by the head of the agency pursuant to 29 CFR 1960.6 and the provisions of E.O. 12196. The NASA DASHO is the Chief Health and Medical Officer.	NPR 8715.1, para 1.2.2
Designated Person	Any person who has been selected or assigned (in writing) by the responsible NASA organizational element or the using contractor as being qualified to perform specific duties. A licensed operator may serve as a designated person for the equipment he/she is licensed to operate.	NASA-STD 8719.9
Detonation	A violent chemical reaction within a chemical compound or mechanical mixture evolving heat and pressure that proceeds through the reacted material toward the unreacted material at a supersonic velocity. The result of the chemical reaction is exertion of extremely high pressure on the surrounding medium forming a propagating shock wave which is originally of supersonic velocity. A detonation, when the material is located on or near the surface of the ground, is normally characterized by a crater.	NASA-STD 8719.12
Deviation	<p>[1] The concepts previously covered by the term deviation are now encompassed by the terms exception and waiver. The term deviation may continue to be used in ongoing programs/projects but is proposed that it not be used in new programs/projects.</p> <p>[2] A variance that authorizes departure from a particular safety requirement that does not strictly apply or where the intent of the requirement is being met through alternate means that provide an equivalent level of safety.</p> <p>[3] A documented authorization releasing a program or project from meeting a requirement before the requirement is put under configuration control at the level the requirement will be implemented.</p>	<p>[1] NASA-STD 0005</p> <p>[2] NPR 8715.5, Appendix A</p> <p>[3] NASA-STD 8709.20</p>
Diagnostics	Tools, procedures, or software coding used to either identify and troubleshoot system faults or to verify the integrity of a system.	NASA-STD 8729.1

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Term	Definition	Defining Document and Paragraph
Direct Cost Of Mishap Or Close Call {For The Purpose Of Mishap Classification}	The sum of the costs (the greater value of actual or fair market value) of damaged property, destroyed property, or mission failure, actual cost of repair or replacement, labor (actual value of replacement or repair hours for internal and external/contracted labor), cost of the lost commodity (e.g., the cost of the fluid that was lost from a ruptured pressure vessel), as well as resultant costs such as environmental decontamination, property cleanup, and restoration, or the estimate of these costs.	NPR 8621.1B, Appendix A
Disability, Permanent	A non-fatal occupational injury or illness resulting in permanent impairment through loss of, or compromised use of, a critical part of the body, to include major limbs (e.g., arm, leg), critical sensory organs (e.g., eye), critical life-supporting organs (e.g., heart, lungs, brain), and/or body parts controlling major motor functions (e.g., spine, neck). Therefore, permanent disability includes a non-fatal injury or occupational illness that permanently incapacitates a person to the extent that he or she cannot be rehabilitated to achieve gainful employment in their trained occupation and results in a medical discharge from duties or civilian equivalent.	NPR 8705.2B, Appendix A
Disability, Permanent Partial	Any injury or occupational illness that does not result in a fatality or permanent total disability, but, in the opinion of competent medical authority, results in permanent impairment through loss of use of any part of the body, with the following exceptions: loss of teeth, loss of fingernails or toenails, loss of tip of fingers or tip of toe without bone involvement, inguinal hernia (if it is repaired), disfigurements, or sprains or strains that do not cause permanent limitation of motion.	NPR 8621.1B, Appendix A
Disability, Permanent Total	Any nonfatal injury or occupational illness that, in the opinion of competent medical authority, permanently and totally incapacitates a person to the extent that he or she cannot follow any gainful occupation and results in a medical discharge or civilian equivalent.	NPR 8621.1B, Appendix A
Discrepancy	(See "Nonconformance")	
Disposal	An end-of-mission process for moving a spacecraft (if necessary) to an orbit considered acceptable for orbital debris limitation.	NASA-STD 8719.14
Diver	Personnel exposed to hyperbaric conditions through either underwater immersion or pressurization in a chamber.	NASA-STD 8719.10
Diving	Activities involving exposures to hyperbaric conditions through either immersion or pressurization in a chamber.	NASA-STD 8719.10
Diving Mode	Type of diving activity requiring specific equipment, procedures, and techniques (Self-Contained Underwater Breathing Apparatus (SCUBA), surface-supplied breathing gas and suited subjects).	NASA-STD 8719.10

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Term	Definition	Defining Document and Paragraph
Dominant Root Cause	Along a chain of events leading to a mishap, the first causal action or failure to act that could have been controlled systemically either by policy/practice/procedure or individual adherence to policy/practice/procedure.	NPR 8715.3C, Appendix B
DOT Service	Those uses of PVS covered by the regulations contained in 49 CFR 100 – 185, Pipeline and Hazardous Materials Safety Administration.	NASA-STD 8719.17A
Downtime	The total time a system is in a non-operable state. Total downtime is typically from supply, access, diagnosis, maintenance, replacement or repair, and verification/alignment.	NASA-STD 8729.1
Dry Run	Rehearsal of a process without the presence of the associated hazard. The level of dry run activities is dependent upon effect of change to the hazard level of the process.	NASA-STD 8719.12
Drying	Removal of volatiles from ingredients or mixtures.	NASA-STD 8719.12
Dummy Load	A test load, to simulate the real load; typically a test weight.	NASA-STD 8719.9
Dunnage	Inert (though possibly flammable) material associated with the packaging, containerization, blocking and bracing, ventilation, stability of shipping, stacking and storage configuration.	NASA-STD 8719.12
Earth Ascent Abort	An abort performed during Earth ascent, where the crewed spacecraft is separated from the launch vehicle without the capability to achieve a safe stable orbit. The crew is safely returned to Earth in a portion of the spacecraft nominally used for entry and landing/touchdown.	NPR 8705.2B, Appendix A
Earth Covered Magazine	An aboveground, earth-covered structure intended for the storage of explosives, pyrotechnics, propellant, or UN Class 1 hazardous materials that meets soil cover depth and slope requirements of NASA-STD 8719.12.	NASA-STD 8719.12
Earth Electrode Subsystem	A component of a lightning protection system that transfers the current of a lightning flash to the earth. The earth electrode system (e.g., ground rods, counterpoise, buried metal plates, or Ufer grounds) is connected to down conductors and is in direct contact with the earth.	NASA-STD 8719.12
Eccentricity	The apogee altitude minus perigee altitude of an orbit divided by twice the semi major axis. Eccentricity is zero for circular orbits and less than one for all elliptical orbits.	NASA-STD 8719.14
Eddy Current Brake (control braking means)	A method of controlling or reducing speed by means of an electrical induction load brake.	NASA-STD 8719.9

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Effect, Hazard	The potential detrimental consequences of the hazard	NASA-STD 8719.7
Egress	A continuous and unobstructed way of travel from any point in a building or structure to a public way. It consists of three separate and distinct parts (a) the exit access, (b) the exit, and (c) the exit discharge. A means of egress comprises the vertical and horizontal ways of travel and includes intervening room spaces, doorways, hallways, corridors, passageways, ramps, stairs, lobbies, horizontal exits, courts, and sidewalks.	NASA-STD 8719.11
Electrical Bonding	Electrical connection between two conductive objects intended to prevent development of an electrical potential between them.	NASA-STD 8719.12
Electro-Explosive Device	A device containing some reaction mixture (explosive or pyrotechnic) that is electrically initiated. The output of the initiation is heat, shock, or mechanical action. See also Low-Energy EED.	NASA-STD 8719.12
Electrostatic Discharge	This is an arcing of electric charge across a gap between two points not in contact or through a nonconductor when the voltage exceeds the dielectric breakdown voltage of the nonconductor. All static electricity hazards are initiated by this sudden energy release or discharge mechanism.	NASA-STD 8719.12
Electrostatic Energy	Storage of electric charge accumulated on almost any item regardless of size or properties. Its accumulation can result in an uncontrolled/unplanned discharge. A conductor will only store electrostatic energy if it is ungrounded	NASA-STD 8719.12
ELV Payload Safety Agency Team	An agency group appointed by the Chief, Safety and Mission Assurance that performs as an element of the NASA OSMA and provides guidance to the NASA Chief, Safety and Mission Assurance, the NASA ELV Payload Safety Manager, and NASA ELV payload projects. The Agency Team works with the Payload Safety Working Group to resolve any safety concerns associated with a project. The Agency Team also works to ensure that NASA ELV payload safety policy and requirements are adequate and consistently implemented throughout the Agency.	NPR 8715.7, Appendix A
ELV Payload Safety Manager	A position appointed by the Chief, Safety and Mission Assurance that leads the ELV Payload Safety Program, ensuring Agency policy, requirements, and processes are developed, maintained, and implemented to safeguard people and resources from hazards associated with payload to launch vehicle integration, multiple payloads, and payloads and related GSE. This individual also leads the Agency Team.	NPR 8715.7, Appendix A
Emergency	Unintended circumstance bearing clear and present danger to personnel or property which requires an immediate response.	NPR 8715.3C, Appendix B

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Emergency Egress	<p>[1] Capability for a crew to exit the vehicle and leave the hazardous situation or catastrophic event within the specified time. Flight crew emergency egress can be unassisted or assisted by ground personnel.</p> <p>[2] The capability to exit a location and leave a hazardous situation within a specified amount of time.</p>	<p>[1] NPR 8705.2B, Appendix A (older definition in NPR 8715.3C Appendix B)</p> <p>[2]</p>
Emergency Equipment and Systems	A set of components (hardware and/or software) used to mitigate or control hazards, after occurrence, which present an immediate threat to the crew or crewed spacecraft. Examples include fire suppression systems and extinguishers, emergency breathing devices, and crew escape systems.	NPR 8705.2B, Appendix A, NPR 8715.3C, Appendix B
Emergency Medical	<p>[1] The capability to respond to illness or injury in order to prevent fatality or permanent disability. This capability includes either an inherent local capability or the timely transfer to a place or vehicle that can provide a similar or higher level of medical care, or both.</p> <p>[2] The capability to respond to crew illness or injury in order to prevent, or mitigate, crew demise or permanent disability. This includes either an inherent capability on a vehicle, timely transfer to a place or vehicle that can provide a higher level of medical care, or both.</p>	<p>[1] NPR 8715.3C, Appendix B</p> <p>[2] NPR 8705.2B, Appendix A</p>
Emergency Response Planning Guidelines (ERPG) – Level 2	The ERPG – Level 2 is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual’s ability to take protective action.	NPR 8715.5, Appendix A
Emergency Stop (E-Stop)	A manually operated switch or valve to cut off electric power or control fluid power independently of the regular operating controls.	NASA-STD 8719.9
End Item	The final product when assembled or completed and ready for use.	NASA-STD 8729.1
End-Of-Mission	The time of completion of all mission activities, experimental operations, and stand-by status, immediately preceding passivation and disposal of the spacecraft or launch vehicle stage.	NPR 8715.6A, Appendix A
Endorsing Official	The Appointing Official, Chief/OSMA, OCE, AMD, CHMO, Procurement, or other official who reviews the signed mishap report and provides a signed written endorsement, comments (when applicable), and a recommendation as to whether the mishap report shall be approved or rejected.	NPR 8621.1B, Appendix A

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Term	Definition	Defining Document and Paragraph
Energetic Liquid	A liquid, slurry, or gel, consisting of, or containing, an explosive, oxidizer, fuel, or combination of the above, that may undergo, contribute to, or cause rapid exothermic decomposition, deflagration, or detonation.	NASA-STD 8719.12
Energetic Material	A material consisting of, or containing, an explosive, oxidizer, fuel, or combination of the above, that may undergo, contribute to, or cause rapid exothermic decomposition, deflagration, or detonation.	NASA-STD 8719.12
Entry Operation	The sequence of controlled thrust maneuvers or other events that brings a space vehicle or spacecraft from Earth orbit or outer space to Earth. Entry operations do not include suborbital flights.	NPR 8715.5, Appendix A
Environment	The natural and induced conditions experienced by a system including its people, processes, and products during operational use, stand-by, maintenance, transportation, and storage.	NASA-STD 8729.1
Environmental Requirements	The expected worst case impact of the environment on the system or item as well as the allowed impact of the system or items on the environment.	NASA-STD 8729.1
Equivalent/ Equivalency	When referring to fire protection and life safety, the technology, systems, devices, and designs that, while not meeting the letter of code provisions, will provide comparable levels of fire safety. This determination is to be made by the AHJ after a complete analysis of hazardous conditions and required levels of safety.	NASA-STD 8719.11A
Escape {Manned System}	Removal of crew and passengers from the portion of the space system normally used for reentry, due to rapidly deteriorating and hazardous conditions, thus placing them in a safe situation suitable for survivable return or recovery. Escape includes, but is not limited to, those modes that utilize a portion of the original space system for the removal (e.g., pods, modules, or fore bodies).	NPR 8705.2B, Appendix A
Escape {Process}	Any problem found after it should have been detected during normal processing. Escapes include problems found during surveillance sampling, inspection (including random), or audit after closeout or test. Also, if an assessment determines that the problem would not have been caught during closeout or test, the problem will be considered a process escape.	
Event	A real-time occurrence describing one discrete action, typically an error, failure, or malfunction. Examples: pipe broke, power lost, lightning struck, and person opened valve.	NPR 8621.1B, Appendix A

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Term	Definition	Defining Document and Paragraph
Event and Causal Factor Tree	A graphic representation of the mishap or close call that shows the event (accident) at the top of the tree, depicts the logical sequence of events, illustrates all causal factor(s) (including condition[s] and failed barrier[s]) necessary and sufficient for the mishap or close call occurrence, and depicts the root cause(s) at the bottom of the tree.	NPR 8621.1B, Appendix A
Ex Officio	An individual authorized to participate in all investigation proceedings and tasked to assure that the investigation is conducted in conformance with NASA policy and this NPR [NPR 8621.1B].	NPR 8621.1B, Appendix A
Exception	<p>[1] A written authorization granting permanent relief from a specific, non-applicable requirement.</p> <p>[2] An authorization for permanent relief from a specific requirement and may be requested at any time during the life cycle of a program/project.</p>	<p>[1] NASA-STD-0005 and NPR 8705.2B, Appendix A</p> <p>[2] Older definition in NPR 8715.3C, Appendix B</p>
Excluded PVS	A PVS that is not required to meet the certification (or recertification) requirements of NPD 8710.5, Policy for Pressure Vessels and Pressurized Systems, and need not be included in the PVS configuration management system. Excluded PVS are subject to all applicable laws, regulations, safety requirements, NASA requirements, and appropriate NCS and must be maintained in accordance with applicable NCS.	NASA-STD 8719.17
Existing PVS	PVS is considered to be “Existing PVS” if installed no later than 6 months from the date of original issue of this document (Requirement).	NASA-STD 8719.17
Expectation of Casualty (E_c)	The average number of casualties expected per an event, such as vehicle flight, if a large number of events could be carried out under identical circumstances.	NPR 8715.5, Appendix A
Expendable Launch Vehicle	A vehicle that, once launched, is not reused and typically is not retrieved.	NPR 8715.5, Appendix A
Experimental Aerospace Vehicle (EAV)	Defined by 42 U.S.C. S 2458c, Section 309 of the National Aeronautics and Space Act of 1958, as amended. Section 309(d)(3) defines an EAV as: “an object intended to be flown in, or launched into, orbital or suborbital flight for the purpose of demonstrating technologies necessary for a reusable launch vehicle, developed under an agreement between the Administration and a developer.”	NPR 8715.3C, para 10.1.2 & NPR 8715.5, Appendix A
Explosive Debris	Solid propellant fragments or other pieces of a launch or entry vehicle or payload that result from breakup of the vehicle during flight and that explode upon impact with the Earth’s surface or on their own and cause overpressure.	NPR 8715.5, Appendix A

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Term	Definition	Defining Document and Paragraph
Explosive Donor	An explosion from a small device or explosive mass that may cause an adjacent explosive item or larger mass to react in such a manner as to yield measurable blast overpressure.	NASA-STD 8719.12
Explosive Wastes	Explosive materials or devices that are no longer useable or that are no longer wanted or needed and have no intended use (see 40 CFR 261).	NASA-STD 8719.12
Explosive	Term “explosive” or “explosives” includes any chemical compound or mechanical mixture that, when subjected to heat, impact, friction, detonation, or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases that exert pressures in the surrounding medium. The term applies to materials that either detonate or deflagrate.	NASA-STD 8719.12
Explosives Area	A restricted area specifically designated and set aside from other portions of an installation for the manufacturing, processing, storing, and handling of explosives.	NASA-STD 8719.12
Explosives Safety Officer	A trained and experienced person is designated as the ESO at each NASA Center to manage the Installation Explosives, Propellants, and Pyrotechnic Safety Program.	NASA-STD 8719.12
Exposed Explosives	Explosives that are open to the atmosphere (such as unpackaged bulk explosives or disassembled or open components) and that are susceptible to initiation directly by static or mechanical spark, or create (or accidentally create) explosive dust, or give off vapors, fumes, or gases in explosive concentrations. This also includes exudation and explosives exposed from damaged items such as gun powder or rocket motors.	NASA-STD 8719.12
Exposed Site	A location exposed to the potential hazardous effects (blast, fragments, debris, and heat flux) from an explosion at a potential explosion site (PES). The distance to a PES and the level of protection required for an ES determine the quantity of explosives permitted in a PES.	NASA-STD 8719.12
Facility	Buildings, structures, and other real property improvements including utilities and collateral equipment.	NASA-STD 8719.11A
Facility Hazard Analysis (FHA)	The FHA is a preliminary hazard analysis performed during the planning and decision phases of a facility design and acquisition program. It may later be updated to become the OHA.	NPR 8715.3C, Appendix B
Factor of Safety {Safety Factor}	[1] Ratio of the design condition to the maximum operating conditions specified during design (see also Safety Margin and Margin of Safety). [2] The material design factor of safety on structural failure and is equal to the lesser of the material strength divided by the material stress under anticipated loading or the actual buckling load divided by the anticipated buckling load.	[1] NPR 8715.3C, Appendix B [2] NASA-STD 8719.17A

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Term	Definition	Defining Document and Paragraph
Fail-Safe	Ability to sustain a failure and retain the capability to safely terminate or control the operation.	NPR 8715.3C, Appendix B
Failure	<p>[1] Inability of a system, subsystem, component, or part to perform its required function within specified limits.</p> <p>[2] Non-performance or incorrect performance of an intended function of a product. A failure is often the manifestation of one or more faults.</p>	<p>[1] NPR 8715.3C, Appendix B, NPR 8705.2B, Appendix A</p> <p>[2] NASA-STD 8719.13B, and a variation in NASA-STD 8729.1</p>
Failure Analysis	The conduct of evaluations and analyses to determine the specific cause of system (including elements of hardware, software, and human performance) and/or component failure.	Variation in NASA-STD 8729.1
Failure Distribution	A mathematical model that describes the probability of failures occurring over time. Also known as the probability density function (pdf), this function is integrated to obtain the probability that the failure time takes a value in a given time interval. This function is the basis for other important reliability functions, including the reliability function, the failure rate function and the mean life.	
Failure Effect	The consequence(s) a failure mode has on the operation, function, or status of an item, the subsystem, interfacing subsystem, mission, or crew/vehicle/element.	
Failure Mechanism	The process (e.g., physical, chemical, electrical, thermal) of degradation or the chain of events which results in a particular failure mode.	NASA-STD 8729.1
Failure Mode	<p>[1] Particular way in which a failure can occur, independent of the reason for failure.</p> <p>[2] The characteristic manner in which a failure occurs, independent of the reason for failure; the condition or state which is the end result of a particular failure mechanism; the consequence of the failure mechanism through which the failure occurs, e.g., short, open, fracture, excessive wear.</p>	<p>[1] NPR 8715.3C, Appendix B</p> <p>[2] NASA-STD 8729.1</p>
Failure Mode and Effects Analysis (FMEA) {Facilities}	Analysis used to determine what parts fail, why they usually fail, and what effect the failure has on the systems in total. An element of reliability-centered maintenance.	NPD 8831.1E, Attachment A and NPR 8820.2F, Appendix A

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Term	Definition	Defining Document and Paragraph
Failure Mode and Effects Analysis (FMEA)	<p>[1] A bottoms up systematic, inductive, methodical analysis performed to identify and document all identifiable failure modes at a prescribed level and to specify the resultant effect of the modes of failure. It is usually performed to identify critical single failure points in hardware. In relation to formal hazard analyses, FMEA is a subsidiary analysis.</p> <p>[2] A bottom-up systematic, inductive, methodical analysis performed to identify and document all identifiable failure modes at a prescribed level and to specify the resultant effect of the modes of failure.</p> <p>[3] Analysis of a system and the working interrelationships of its elements to determine ways in which failures can occur (failure modes) and the effects of each potential failure on the system element in which it occurs, on other system elements, and on the mission.</p>	<p>[1] NPR 8715.3C, Appendix B and additional definition in NASA-STD 8719.9</p> <p>[2] NASA-STD 8719.13B</p> <p>[3] NASA-STD 8729.1</p>
Failure Mode Effects and Criticality Analysis (FMECA)	Analysis of a system and the working interrelationships of its elements to determine ways in which failures can occur (failure modes) and the effects of each potential failure on the system element in which it occurs, on other system elements, and on the mission, and the study of the relative mission significance or criticality of all potential failure modes.	NASA-STD 8729.1
Failure Rate	The frequency or number of occurrences of a repeating event per unit time with which an engineered system or component fails.	
Failure Tolerance	The ability to sustain a certain number of failures and still retain capability.	NPR 8705.2B, Appendix A (older definition in NPR 8715.3C, Appendix B)
False Alarm	An indicated fault where no fault or failure exists.	NASA-STD 8729.1
Faraday Cage	A grounded conductive shell (usually of wire screen) completely surrounding a piece of equipment or an area of a facility in order to shield the interior from external electric fields and/or vice versa.	NASA-STD 8719.12
Faraday Cap	A cap applied to the connector end of an Electroexplosive Device (EED), e.g., an NSI, to provide an electromagnetic energy (EME) shield to prevent inadvertent firing from radio frequency (RF) sources. Some, but not all, Faraday caps also short out the bridgewire.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Fault	<p>[1] An undesired system state and/or the immediate cause of failure (e.g., maladjustment, misalignment, defect, or other). The definition of the term “fault” envelopes the word “failure,” since faults include other undesired events such as software anomalies and operational anomalies.</p> <p>[2] An inherent defect in a product which may or may not ever manifest, such as a bug in software code.</p>	<p>[1] NPR 8705.2B, Appendix A</p> <p>[2] NASA-STD 8719.13B</p>
Fault Detection	The ability to discover faults; the process of determining that a fault has occurred.	NASA-STD 8719.13B
Fault Isolation	The process of determining the location or source of a fault.	NASA-STD 8719.13B; also in NASA-STD 8729.1
Fault Recovery	A process of overcoming a fault without permanent reconfiguration.	NASA-STD 8719.13B
Fault Tree	A schematic representation resembling an inverted tree that depicts possible sequential events (failures) that may proceed from discrete credible failures to a single undesired final event (failure). A fault tree is created retrogressively from the final event by deductive logic.	NPR 8715.3C, Appendix B
Fault Tree Analysis (FTA)	<p>[1] An analysis that begins with the definition or identification of an undesired event (failure). The fault tree is a symbolic logic diagram showing the cause-effect relationship between a top undesired event (failure) and one or more contributing causes. It is a type of logic tree that is developed by deductive logic from a top undesired event to all sub-events that must occur to cause it.</p> <p>[2] An analytical technique, whereby an undesired system state is specified and the system is then analyzed in the context of its environment and operation to find all credible ways in which the undesired event can occur.</p> <p>[3] A deductive system reliability tool which provides both qualitative and quantitative measures of the probability of failure. It estimates the probability that a top level event will occur, systematically identifies all possible causes leading to the top event, and documents the analytic process to provide a baseline for future studies of alternative designs.</p>	<p>[1] NPR 8715.3C, Appendix B</p> <p>[2] NASA-STD 8719.13 for software</p> <p>[3] NASA-STD 8729.1</p>

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Term	Definition	Defining Document and Paragraph
Federal Occupational Safety and Health Administration (OSHA) Official	An investigator, evaluator, or compliance officer employed by, assigned to, or under contract to OSHA.	NPR 8715.1, para 1.2.3
Final Acceptance	The act of an authorized representative of the Government by which the Government, for itself or as an agent of another, assumes ownership of existing identified supplies tendered or approves specific services rendered as partial or complete performance of the contract.	NPR 8735.2A, Appendix A
Final Mishap Investigation Report	The signed mishap investigation report with the endorsements and comments attached.	NPR 8621.1B, Appendix A
Final Product Acceptance	Defined in 48 CFR Subpart 7.5 as an inherently Governmental function that may only be performed by NASA or other Federal agency personnel.	NPR 8735.2A, para 4.4.2.a
Final Product Acceptance, Denoted By Signature Approval	An inherently Governmental function and may only be performed by Federal Government employees. Support contractors may, however, recommend acceptance of a product or service or act as a liaison for a Material Review Board (MRB) or other similar function.	NPR 8735.2A, para 1.1.3 note and para 6.3.2 note
Finding	[1] A conclusion, positive or negative, based on facts established during the investigation by the investigating authority (i.e., cause, contributing factor, and observation).	[1] NPR 8621.1B, Appendix A
	[2] A conclusion of importance based on facts established during SMA audits, reviews, and assessments. There are seven categories of findings for SMA audits, reviews, and assessments: Catastrophic Noncompliance, Critical Noncompliance, Major Noncompliance, Noncompliance, Minor Noncompliance, Observation, Commendation, and Best Practice	[2]
Fire Hazard Area	A location in which the primary but not necessarily the only hazard is that of fire including explosions of gas or vapor and air mixtures.	NASA-STD 8719.12
Fire Load	(see "Fuel Load")	
Fire Partition	A physical barrier to prevent the horizontal spread of fire between areas within buildings, constructed of materials sufficient to achieve a 1- or 2-hour fire-resistance rating as determined by NFPA 251.	NASA-STD 8719.11A
Fire Retardant	A treatment or surface covering applied to combustible materials or structures to retard ignition or fire spread.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Fire Wall	[1] A physical barrier to prevent the horizontal spread of fire between buildings, constructed of materials sufficient to achieve at least a 3 or 4 hour fire resistance rating as determined by NFPA 251.	[1] NASA-STD 8719.11A
	[2] A wall of fire-resistive construction designed to prevent the spread of fire from one side to the other. A fire wall may also be termed a "fire division wall."	[2] NASA-STD 8719.12
Firebrand	A projected burning or hot fragment whose thermal energy has the potential for transfer to a receptor.	NASA-STD 8719.12
Fire-Resistive	[1] A broad range of structural systems capable of withstanding maximum intensity and duration of fire without failure. Common fire-resistive components include masonry load bearing walls, reinforced concrete or protected steel columns, and poured or pre-cast concrete floors and roofs.	[1] NASA-STD 8719.11A
	[2] A term used to indicate the ability of structures or materials to resist a fire to which they might be subjected without themselves becoming weakened to the point of failure.	[2] NASA-STD 8719.12
Firing Pad	Prepared site where explosive items are fired for test data acquisition.	NASA-STD 8719.12
Firing Site	Controlled access area where test firing of explosives is conducted.	NASA-STD 8719.12
Firmware	The combination of a hardware device and computer instructions and/or computer data that reside as read-only software on the hardware device.	NASA-STD 8719.13B
First Aid	Refer to OSHA definition in 29 CFR 1904.7.	NPR 8621.1B, Appendix A
First Responder	An individual who in the early stages of an incident is responsible for the protection and preservation of life, property, evidence, and the environment, including emergency response providers as defined in section 2 of the Homeland Security Act of 2002 (6 U.S.C. 101), as well as emergency management, public health, clinical care, public works, and other skilled support personnel (such as equipment operators) that provide immediate support services during prevention, response, and recovery operations.	NPR 8621.1B, Appendix A

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Term	Definition	Defining Document and Paragraph
Flammable Liquid	<p>[1] A liquid having a flash point below 100 °F (37.9 °C) and having a vapor pressure not exceeding 40 pounds per square inch (absolute (275.79 kilopascal) at 100°F (37.9° C)) or a combustible liquid heated to, or above, its flash point.</p> <p>[2] Any liquid having a flash point below 38C (10F) and a vapor pressure not exceeding 280 kpa (41 psia) at 37.8C (100F). This is the definition as applied in this manual; it includes some materials defined as combustible liquids by the Department of Transportation (DOT).</p>	<p>[1] NASA-STD 8719.11A</p> <p>[2] NASA-STD 8719.12</p>
Flash Point	The lowest temperature at which a liquid produces a sufficient concentration of vapor above it so that it forms an ignitable mixture with air (and therefore the lowest temperature at which a flame will propagate through the vapor of a combustible material to the liquid surface)	NASA-STD 8719.12
Flight	Launch or entry of an orbital or suborbital space vehicle/spacecraft or operation of an aeronautical vehicle. For the purposes of this NPR [NPR 8715.5], “flight” does not include on-orbit operations.	NPR 8715.5, Appendix A
Flight Crew {Space flight}	Any human on board the space system during the mission that has been trained to monitor, operate, and control the space system; same as crew.	NPR 8705.2B, Appendix A
Flight Crew {Aeronautical}	Any human on board the aircraft during the mission that has been trained to monitor, operate, and control the aircraft system; same as crew.	
Flight Hardware	<p>[1] Any hardware that is flown on or is a part of an aircraft, experimental flight vehicle, satellite, lighter than air vehicle, unoccupied aerial vehicle, or space transportation system.</p> <p>[2] Hardware designed and fabricated for ultimate use in a vehicle intended to fly.</p>	<p>[1] NPR 8621.1B, Appendix A</p> <p>[2] NPR 8715.7, Appendix A and NPR 8715.3C, Appendix B</p>
Flight PVS	An assembly of components under pressure, including vessels, piping, valves, relief devices, pumps, expansion joints, gages, etc., that are fabricated in accordance with program requirements specifically for use in aircraft or spacecraft.	NASA-STD 8719.17
Flight Software	Any software that is flown on or is a part of an aircraft, experimental flight vehicle, satellite, lighter than air vehicle, unoccupied aerial vehicle, or space transportation system.	NPR 8621.1B, Appendix A

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Term	Definition	Defining Document and Paragraph
Flight Termination System (FTS)	A type of range safety system designed, tested, and incorporated into vehicles that provides for the independent and deliberate termination of an errant/erratic vehicle's flight.	NPR 8715.5, Appendix A
Flux {Meteoroid}	The number of particles passing through a unit area in a given time. Flux is normally expressed in units of number per square meter per year. For risk calculations, meteoroids are simplified to be spherical with a density distribution. While this is a gross assumption, it provides an accurate representation of the meteoroid environment for use in engineering assessments.	NPR 8715.3C, para 11.2.a
Flying	Refers to exposure to hypobaric conditions through operations in aircraft or hypobaric chambers. For aircraft operations, the cabin altitude, not the aircraft altitude, shall be applicable to this standard. The nominal cabin altitude of an aircraft operated by a major air carrier is less than 10,000 feet.	NASA-STD 8719.10
Fragmentation	Breaking up of the confining material of a chemical compound or mechanical mixture when an explosion takes place. Fragments may be complete items, subassemblies, pieces thereof, or pieces of equipment or buildings containing the items.	NASA-STD 8719.12
FTS Command System	All components needed to send a flight termination command signal to an onboard vehicle flight termination system. An FTS command system starts with flight termination activation switches and ends at each command-transmitting antenna. It includes all intermediate equipment linkages, software, and auxiliary transmitters that ensure a command signal will reach the onboard vehicle flight termination system during flight.	NPR 8715.5, Appendix A
Fuel Load	Also known as Fire Load. Expected maximum quantity of combustible material in a given fire area. In normal facilities, the combustible structural elements and the combustible contents contained within that area. Fuel/fire load is usually expressed as weight of combustible material per square foot of area.	NASA-STD 8719.11A
Functional Configuration Audit (FCA)	An audit conducted to verify that the development of a configuration item has been completed satisfactorily, that the item has achieved the performance and functional characteristics specified in the functional or allocated configuration identification, and that its operational and support documents are complete and satisfactory.	NASA-STD 8739.8
Functional Redundancy	A situation where a dissimilar device provides safety backup rather than relying on multiple identical devices.	NPR 8715.3C, Appendix B

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Term	Definition	Defining Document and Paragraph
Functional Requirements	Functional requirements define what the system or subsystem must do to fulfill its mission, including timing and performance requirements. All requirements that will be expressed in the system, rather than in the process to create the system, are functional requirements.	NASA-STD 8719.13B
Geosynchronous Earth Orbit (GEO)	A circular GEO with 0° inclination is a geostationary orbit about the Earth; i.e., the nadir point is fixed on the Earth's surface. The normal altitude of a circular GEO is 35,786 km and the inclination is normally +/- 15 degrees latitude.	NASA-STD 8719.14
Geosynchronous Orbit	An orbit with a period equal to the sidereal day.	NASA-STD 8719.14
Geosynchronous Transfer Orbit (GTO)	A highly eccentric orbit with perigee normally within or near the LEO region altitude and apogee near or above GEO altitude.	NASA-STD 8719.14
Government-Industry Data Exchange Program (GIDEP)	A cooperative information-sharing program between the U.S. and Canadian governments and industry participants. The goal of GIDEP is to ensure that only reliable and conforming parts are in use on all Government programs and operations. GIDEP members share technical information essential to the research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment.	NPR 8735.1B, Appendix A
GIDEP Agency Action Notice	A GIDEP document for redistributing problem information issued by a Government Agency to GIDEP participants.	NPR 8735.1B, Appendix A
GIDEP Alert	GIDEP document for reporting a problem with parts, components, materials, specifications, software, facilities, manufacturing processes, or test equipment that can cause a functional failure.	NPR 8735.1B, Appendix A
GIDEP Problem Advisory	A GIDEP document for reporting a problem with parts, components, materials, manufacturing processes, specifications, software, facilities, or test equipment that has an unknown or low probability of causing problems for other users.	NPR 8735.1B, Appendix A
GIDEP Safe-Alert	A GIDEP document for reporting a nonconforming item, product, or situation that creates a safety hazard for personnel or equipment.	NPR 8735.1B, Appendix A
Glueware	Software created to connect the off-the-shelf software/reused software with the rest of the system. It may take the form of "adapters" that modify interfaces or add missing functionality, "firewalls" that isolate the off-the-shelf software, or "wrappers" that check inputs and outputs to the off-the-shelf software and may modify to prevent failures.	NPR 7150.2A, Appendix A

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Term	Definition	Defining Document and Paragraph
Governing Program Management Council	Forums composed of NASA and/or Center Senior Management that assess program and project planning and implementation and provide oversight and direction as appropriate.	NASA-STD 8729.1
Government Contract Quality Assurance	Quality assurance functions performed by, or for, the Government at the contract location to determine whether a contractor has fulfilled the contract obligations pertaining to contract quality. Safety, reliability, and maintainability functions are also included within the scope of this term.	NPR 8735.2A, Appendix A
Government Mandatory Inspection Point (GMIP)	A specific step, sequence, or time in a product's life when a NASA-mandated product assurance action (e.g., product examination, process witnessing, record review) must be performed by NASA, a delegated Government agency, or by a NASA quality assurance support contractor.	NPR 8735.2A, Appendix A
Government Off-The-Shelf (GOTS) Software	This refers to Government-created software, usually from another project. The software was not created by the current developers (see software reuse). Usually, source code is included and documentation, including test and analysis results, is available. That is, the government is responsible for the GOTS software to be incorporated into another system.	NPR 7150.2A, Appendix A
Government-Furnished Property	Property owned by the Government and provided to a contractor for use in performance of a contract.	NPR 8820.2F, Appendix A
Ground Support Equipment	Ground-based equipment used to store, transport, handle, test, check out, service, and control aircraft, launch vehicles, spacecraft, or payloads.	NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A 7
Ground Support Equipment {Facilities}	Nonflight equipment, implements, and devices required for handling, servicing, inspecting, testing, maintaining, aligning, adjusting, checking, repairing, and overhauling an operational end item or a subsystem or component thereof. This may include equipment required to support another item of ground support equipment as defined herein.	NPR 8820.2F, Appendix A
Ground-Based PVS	Ground-based PVS: All PVS, including PVS based on barges, ships, or other transport vehicles, not specifically excluded in paragraph 4.2 of this Standard. Flight PVS used for their intended purpose aboard active air or space craft, even though on the ground, are not included in this definition, but flight PVS converted to ground use are included.	NASA-STD 8719.17A

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Term	Definition	Defining Document and Paragraph
Grounding	Practice of providing an electrical path from one or more conductive objects to ground. Note: The words “bonded” and “grounded” mean either that a bond or ground as defined has been deliberately applied, or that an electrically conductive path having a resistance adequately low for the intended purpose (usually 10 ⁶ ohms or less) is inherently present by the nature of the installation.	NASA-STD 8719.12
Hard-time	Process under which an item must be removed from service at or before a previously specified time.	NASA-STD 8729.1
Hardware	Items made of a material substance but excluding computer software and technical documentation.	NASA-STD 8729.1
Hazard	<p>[1] A state or a set of conditions, internal or external to a system, that has the potential to cause harm.</p> <p>[2] A state or condition that could potentially lead to an undesirable consequence (i.e., casualty or property damage).</p> <p>[3] Existing or potential condition that can result in, or contribute to, a mishap or accident.</p> <p>[4] Any real or potential condition that can cause injury or death to personnel, or damage to or loss of equipment or property.</p>	<p>[1] NPR 8715.3C, Appendix B, NPR 8715.7, Appendix A, and NPR 8705.2B, Appendix A</p> <p>[2] NPR 8715.5, Appendix A</p> <p>[3] NASA-STD 8719.13B</p> <p>[4] NASA-STD 8719.7, NASA-STD 8719.9</p>
Hazard Analysis	<p>[1] Identification and evaluation of existing and potential hazards and the recommended mitigation for the hazard sources found.</p> <p>[2] The process of identifying hazards and their potential causal factors.</p>	<p>[1] NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A 9</p> <p>[2] NPR 8705.2B, Appendix A</p>

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Term	Definition	Defining Document and Paragraph
Hazard Control	<p>[1] Means of reducing the risk of exposure to a hazard.</p> <p>[2] Means of reducing the risk of exposure to a hazard. This includes design or operational features used to reduce the likelihood of occurrence of a hazardous effect or the severity of the hazard.</p>	<p>[1] NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A</p> <p>[2] NASA-STD 8719.13B</p>
Hazard Mitigation	Any action that reduces or eliminates the risk from hazards.	NASA-STD 8719.13B
Hazard, Accepted Risk	A hazard that has not been counteracted by hazard reduction controls but has been formally certified as acceptable by safety and program management.	
Hazard, Controlled	A hazard for which the likelihood of occurrence or consequence severity has been reduced to an acceptable level by implementing an appropriate hazard reduction precedence sequence to comply with program requirements.	
Hazard, Eliminated	A hazard that has been eliminated by completely removing the hazard causal factors.	
Hazard, Serious Workplace	A condition, practice, method, operation, or process that has a substantial probability that death or serious physical harm could result and the employer did not know of its existence or did not exercise reasonable diligence to control the hazard.	49 CFR 105.5 (paraphrase), NPR 8621.1
Hazardous Fragment	A hazardous fragment is one having an impact energy of 58 ft-lb or greater.	NASA-STD 8719.12
Hazardous Material	<p>[1] Defined by law as “a substance or materials in a quantity and form which may pose an unreasonable risk to health and safety or property when transported in commerce” (49 U.S.C S 5102, Transportation of Hazardous Materials; Definitions). The Secretary of Transportation has developed a list of materials that are hazardous which may be found in 49 CFR Part 172.101. Typical hazardous materials are those that may be highly reactive, poisonous, explosive, flammable, combustible, corrosive, radioactive, produce contamination or pollution of the environment, or cause adverse health effects or unsafe conditions.</p> <p>[2] Any compound, mixture, element, or assemblage of material that, because of its inherent characteristics, is dangerous to manufacture, process, store, or handle.</p>	<p>[1] NPR 8715.3C, para 3.7.3 and NPR 8715.7, Appendix A</p> <p>[2] NASA-STD 8719.12</p>

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Hazardous Operation Safety Certification	Certification required for personnel who perform those tasks that potentially have an immediate danger to the individual (death/injury) if not done correctly, could create a danger to other individuals in the immediate area (death or injury), and present a danger to the environment.	NPR 8715.3C, Appendix B
Hazardous Operation/Work Activity	[1] Any operation or other work activity that, without implementation of proper mitigations, has a high potential to result in loss of life, serious injury to personnel or public, or damage to property due to the material or equipment involved or the nature of the operation/activity itself. [2] Any operation involving material or equipment that has a high potential to result in loss of life, serious injury to personnel, or damage to systems, equipment, or facilities.	[1] NPR 8715.3C, Appendix B [2] NPR 8715.7, Appendix A
High Density Traffic	Traffic routes having 10,000 or more car and/or rail passengers per day, or 2,000 or more ship passengers per day.	NASA-STD 8719.12
High Earth Orbit (HEO)	An orbit with a mean altitude greater than 2000 km or, equivalently, an orbit with a period greater than 127 minutes.	NASA-STD 8719.14
High Explosive	An explosive in which the transformation from its original composition and form, once initiated, proceeds with virtually instantaneous and continuous speed through the total mass, accompanied by rapid evolution of a large volume of gas and heat, causing very high pressure and widespread shattering effect.	NASA-STD 8719.12
High Explosive Equivalent	Amount of a standard explosive that, when detonated, will produce a blast effect comparable to that which results at the same distances from the detonation or explosion of a given amount of the material for which performance is being evaluated. It usually is expressed as a percentage of the total net weight of all reactive materials contained in the item or system. For the purpose of these standards, TNT is used for comparison.	NASA-STD 8719.12
High Performance Magazine	An earth-bermed, 2-story magazine with internal nonpropagation walls designed to reduce the maximum credible event (MCE).	NASA-STD 8719.12
High Visibility {Mishaps Or Close Calls}	Those particular mishaps or close calls, regardless of the amount of property damage or personnel injury, that the Administrator, Chief/OSMA, CD, ED/OHO, or the Center SMA director judges to possess a high degree of programmatic impact or public, media, or political interest including, but not limited to, mishaps and close calls that impact flight hardware, flight software, or completion of critical mission milestones.	NPR 8621.1B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Hoist	A machinery unit device used for lifting and lowering a load.	NASA-STD 8719.9
Hoist Supported Personnel Lifting Device	Lifting equipment such as a platform, bucket, or cage supported by hoist(s) that is designed, built, tested, maintained, inspected, and certified as having sufficient reliability for safely lifting and lowering personnel.	NASA-STD 8719.9
Holding Brake	A brake that automatically prevents motion when power is off.	NASA-STD 8719.9
Holding Yard	A holding area for rail cars, trucks, or trailers used for temporary storage of vehicles containing explosives and other dangerous materials prior to shipment or transfer to a more permanent storage area.	NASA-STD 8719.12
Hot Work (Thermal)	Any operation requiring the use of a flame-producing device, an electrically heated tool, or a mechanical tool that can produce sparks, heat explosives, contaminate explosives, thereby providing an initiation stimulus.	NASA-STD 8719.12
Hull Loss	An aircraft damaged to the extent that it is not economically feasible to repair it. This includes aircraft that are destroyed and aircraft that are missing.	NPR 8621.1B, Appendix A
Human Capital: Certification of People	Formal documentation that an individual has reached the prescribed skill or knowledge level based on completion of required training, demonstration of proficiency, or other specified requirements.	
Human Error	Either an action that is not intended or desired by the human or a failure on the part of the human to perform a prescribed action within specified limits of accuracy, sequence, or time that fails to produce the expected result and has led or has the potential to lead to an unwanted consequence.	NPR 8705.2B, Appendix A
Human Error Analysis (HEA)	A systematic approach to evaluate human actions, identify potential human error, model human performance, and qualitatively characterize how human error affects a system. HEA provides an evaluation of human actions and error in an effort to generate system improvements that reduce the frequency of error and minimize the negative effects on the system. HEA is the first step in Human Risk Assessment and is often referred to as qualitative Human Risk Assessment.	NPR 8705.2B, Appendix A
Human Error Risk Assessment	A process that identifies risks to designs, equipment, procedures, and tasks as a result of human error.	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Human Factors	<p>[1] A body of scientific facts about human characteristics, capabilities, and behavior. The term includes, but is not limited to, principles and applications in the areas of human engineering, personnel selection, training, life support, job performance aids, and human performance evaluation.</p> <p>[2] A body of information about human abilities, human limitations, and other human characteristics from a physical and psychological perspective that are relevant to the design, operations, and maintenance of complex systems.</p>	[2] NASA-STD 8729.1
Human Factors Engineering	<p>[1] The application of knowledge about human capabilities and limitations to system, equipment, job, or environment design and development to achieve efficient, effective, comfortable, and safe performance with minimum cost, manpower, skill, and training. Human engineering assures that the system, equipment design, required human tasks, and work environment are compatible with the sensory, perceptual, mental, and physical attributes of the personnel who will operate, maintain, control, and support it.</p> <p>[2] The application of human factors information to the design of tools, machines, systems, tasks, jobs, and environments for safe, comfortable, and effective human use.</p>	[2] NASA-STD 8729.1
Human Factors Mishap Investigator	An investigator with expertise in human factors engineering and mishap causation who has the primary responsibility to assist in the collection and analysis of data, determine how human factors caused or contributed to the mishap or close call, evaluate relevant human error and determine its root cause(s), and generate recommendations that eliminate or reduce the occurrence of the error or minimize the negative effects of the error to prevent the recurrence of the mishap.	NPR 8621.1B, Appendix A
Human Factors Task Analysis	An analysis and listing of all the things people will do in a system, procedure, or operation with details on: (a) information requirements; (b) evaluations and decisions that must be made; (c) task times; (d) operator actions; and (e) environmental conditions.	NASA-STD 8729.1
Human Health Management and Care	The set of activities, procedures, and systems that provide (1) environmental monitoring and human health assessment; (2) health maintenance and countermeasures; and (3) medical intervention for the diagnosis and treatment of injury and illness.	NPR 8705.2B, Appendix A
Human Performance	The physical and mental activity required of the crew and other participants to accomplish mission goals. This includes the interaction with equipment, computers, procedures, training material, the environment, and other humans.	NPR 8705.2B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Human Rating	<p>[1] The certification that a system has been developed and is capable of being operated in a manner appropriate for use by human crews at minimal risk. Human-rated certification includes: (1) human safety; (2) human performance (both nominal and degraded states of operation); and (3) human health management and care as applicable.</p> <p>[2] Incorporation of enhanced environmental support, reliability, and safety features into the design and operation of an underwater facility essential to ensure the preservation of life throughout a human-testing mission.</p>	[2] NASA-STD 8719.10
Human Testing (Training)	Underwater facility operations using SCUBA, pressure suit, or surface-supplied breathing gas for life support during test (training) activities.	NASA-STD 8719.10
Human-Rated Space System	A human-rated system accommodates human needs, effectively utilizes human capabilities, controls hazards with sufficient certainty to be considered safe for human operations, and provides the capability to safely recover from emergency situations.	NPR 8705.2B, Appendix A
Human-Rating Certification	<p>[1] Human-Rating Certification is the documented authorization granted by the NASA Associate Administrator that allows the program manager to operate the space system within its prescribed parameters for its defined reference missions. Human-Rating Certification is obtained prior to the first crewed flight (for flight vehicles) or operational use (for other systems).</p> <p>[2] The comprehensive evaluation of the technical and non-technical features of a system and other safeguards, made as a part of and in support of the accreditation process, to establish the extent to which a particular design and implementation meets a set of specified requirements.</p>	[1] NPR 8705.2B, Appendix A
Human-Rating Process	The process steps used to achieve a human-rated space system. These steps include human safety risk identification, reduction, control, visibility, and program management acceptance criteria. Acceptable methods to assess the risk to human safety include qualitative and/or quantitative methods such as hazards analysis, fault tree analysis, human error analysis, probabilistic risk assessment, and failure modes and effects analysis.	NPR 8705.2B, Appendix A
Human-System Integration	The process of integrating human operations into the system design through analysis, testing, and modeling of human performance, interface controls/displays, and human-automation interaction to improve safety, efficiency, and mission success.	NPR 8705.2B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Hydra-set	Trade name for a closed circuit hydraulically operated instrument installed between hook and payload that allows precise control of lifting operations and provides an indication of the applied load. It will be used in the general sense in this standard as a means of identifying precision load positioning devices.	NASA-STD 8719.9
Hyperbaric Chamber	A large chamber in which the oxygen pressure is above normal for atmosphere; used in the treatment of decompression sickness, breathing disorders, or carbon monoxide poisoning.	NASA-STD 8719.10
Hyperbaric Exposure	Exposure to atmospheric pressure conditions in excess of surface pressure (e.g., SCUBA diving, chamber operations, etc.)	NASA-STD 8719.10
Hypergolic	Self-igniting upon contact of fuel and oxidizer, without a spark or external aid.	NASA-STD 8719.12
Idle Lifting Device	Lifting device that has no projected use for the next 12 months.	NASA-STD 8719.9
Imminent Danger	[1] Any conduct or operations in any workplace which are such that a danger exists which would reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through normal procedures. [2] Condition or practice that could be reasonably expected to cause death or serious physical harm immediately or in the near term. These are classified as Risk Assessment Code (RAC) 1 using the typical NASA risk assessment matrix.	[1] NPR 8715.1, para 1.2.4 [2] NPR 8715.3C, Appendix B
Importance Measure	A measure of the relative contribution of an event or component's contribution to the overall system's reliability. The importance measure of a component is equivalent to the first partial derivative of the component reliability with respect to the system reliability.	
Incident	An occurrence of a mishap or close call.	NPR 8621.1B, Appendix A
Inclination	The angle an orbital plane makes with the Earth's equatorial plane.	NASA-STD 8719.14
Independent Assessment	A customer-driven evaluation of program/project activities and the ability of the program/project to achieve mission success. May include selected SRM&QA functional areas, program/project-specific technical areas, management issues, or all of the above.	

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Independent Verification and Validation (IV&V)	Verification and validation performed by an organization that is technically, managerially, and financially independent. IV&V, as a part of software assurance, plays a role in the overall NASA software risk mitigation strategy applied throughout the life cycle, to improve the safety and quality of software.	NASA-STD 8739.8, NASA-STD 8719.13B, and older definition in NPR 8715.3C, Appendix B
Inert (As Applicable to Explosives)	Containing no explosives or chemical agents. Material show no exothermic decomposition when tested by DSC or DTA. Moreover, the inert material shall show no incompatibility with energetic material with which it may be combined when tested by recognized compatibility tests. Inert material does not alter the onset of exotherm of the DSC or DTA trace of the energetic material nor increase the rate of decomposition or gas evolution of the energetic material.	NASA-STD 8719.12
Inert Area	Any area other than an explosives area within an establishment.	NASA-STD 8719.12
Inert Components	Parts of a device that do not contain explosives or chemical agents.	NASA-STD 8719.12
Informal Review	A review of a program/project, task, or work unit not designated as formal by a cognizant convening authority per the formal review criteria.	NASA-STD 8729.1
Information Technology	Any equipment, or interconnected system(s) of subsystem(s) of equipment, that is used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the Agency.	NM 7120-81, Appendix A
Inhabited Building Distance (IBD)	Minimum allowable distance between an inhabited building and an explosive facility. IBDs are used between explosives facilities and administrative areas, operating lines with dissimilar hazards, explosive locations and other exposures, and explosive facilities and installation boundaries, and define the restricted zone into which non-essential personnel may not enter.	NASA-STD 8719.12
Inhabited Buildings	A building or structure other than operating buildings, magazines, and auxiliary buildings occupied in whole or in part by human beings, or where people are accustomed to assemble, both within and outside of Government establishments. Land outside the boundaries or local restrictive easement estate of NASA establishments is considered as inhabited buildings (Requirement).	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Inheritance Review	A review to verify that inherited hardware, or an inherited hardware design, is adequate to satisfy the requirements of the inheriting program/project.	NASA-STD 8729.1
Inherited Hardware	Hardware built for a previous program/project to be used in an appropriate application by the inheritor.	NASA-STD 8729.1
Inhibit	Design feature that prevents operation of a function.	NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A
In-house Program/Project	A program/project that is implemented within the customer organization rather than by a system or integration contractor.	NASA-STD 8729.1
Insight	Surveillance mode requiring the monitoring of customer-identified metrics and contracted milestones. Insight is a continuum that can range from low intensity, such as reviewing quarterly reports, to high intensity, such as performing surveys and review.	NPR 8715.5, Appendix A, NPR 8735.2, NPR 7150.2A, Appendix A, and NASA-STD 8739.8
Inspection, Health/Safety	A comprehensive survey of all or part of a workplace by qualified personnel in order to detect safety and/or health hazards. Inspections are normally performed during the regular work hours of the Agency, except as special circumstances may require. Inspections do not include routine workplace surveillance of occupational health conditions.	NPR 8715.1, para 1.2.5
Inspection, Test	Product examination, process witnessing, record review, verification, or confirmation as defined herein.	NPR 8735.2A, Appendix C 9.4.a
Institutional Requirements	Requirements that focus on how NASA does business that are independent of the particular program or project. There are five types: engineering, program/project management, safety and mission assurance, health and medical and Mission Support Office functional requirements.	NM 7120-81, Appendix A
Institutional Risk	Risks to infrastructure, information technology, resources, personnel, assets, processes, occupational safety, environmental management, or security that affect capabilities and resources necessary for mission success, including institutional flexibility to respond to changing mission needs and compliance with external requirements (e.g., Environmental Protection Agency or Occupational Safety and Health Administration regulations).	NPR 8000.4A Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Integrated Baseline Review	A joint assessment by the offeror/contractor and the Government to verify the technical content and the realism of the related performance budgets, resources, and schedules. It should provide a mutual understanding of the inherent risks in offerors'/contractors' performance plans and the underlying management control systems, and it should formulate a plan to handle these risks.	NM 7120-81, Appendix A
Interchange Yard	A location set aside for exchange of rail cars or trailers between a common carrier and NASA.	NASA-STD 8719.12
Interface	The boundary, often conceptual, between two or more functions, systems, or items, or between a system and a facility, at which interface requirements are set.	NASA-STD 8729.1
Interim Response Team	A team that arrives at the mishap scene immediately after an incident; secures the scene; documents the scene using photography, video, sketches, and debris mapping; identifies witnesses; collects written witness statements and contact information; preserves evidence; impounds evidence (at the scene and other NASA locations as needed); collects debris; implements the chain-of-custody process for the personal effects of the injured and deceased; notifies the NASA Public Affairs Officer about casualties, damages, and any potential hazards to the public and NASA personnel; advises the supervisor if drug testing should be initiated; and provides all information and evidence to the investigating authority. The team is considered "interim" because it operates as a short-term response team and concludes its mishap-response activities when the official NASA-appointed investigating authority arrives to the scene and takes control.	NPR 8621.1B, Appendix A
Interlock	Hardware or software function that prevents succeeding operations when specific conditions are satisfied.	NPR 8715.3C, Appendix B
Intermediate Cause	An event or condition that existed before the proximate cause, directly resulted in its occurrence and, if eliminated or modified, would have prevented the proximate cause from occurring.	NPR 8621.1B, Appendix A
Intraline Distance (ILD)	The minimum distance permitted between any two buildings within one operating line. ILDs are also used for separating certain specified areas, buildings, magazines, aircraft, and other locations even though actual line operations are not involved. ILD separation is expected to protect explosive materials in buildings from propagation detonation due to blast effects, but not against the possibility of propagation detonation due to fragments. Buildings separated by ILDs will probably suffer substantial structural damage.	NASA-STD 8719.12
Intraline Operations	Process accomplished within one operating line.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Investigating Authority	The individual mishap investigator, mishap investigation team, or mishap investigation board authorized to conduct an investigation for NASA. This includes the mishap investigation board chairperson, voting members, and ex officio but does not include the advisors and consultants.	NPR 8621.1B, Appendix A
Is	In requirements documents, the verb “is” or verbs without emphatic auxiliaries are used in descriptive material.	NASA-STD 0005
Item	Any product including processes and facilities.	NASA-STD 8729.1
Jack	A mechanism with a base and load point designed for controlled linear movement.	NASA-STD 8719.9
Jansky	A unit of electromagnetic power density equal to 10^{-26} watts/m ² /Hz.	NASA-STD 8719.14
Key Decision Point	The event at which the Decision Authority determines the readiness of a program/project to progress to the next phase of the life cycle (or to the next KDP).	NPR 7123.1A, Appendix A, NM 7120-81, Appendix A, and used in NPR 8715.7, Appendix A
K-Factor	K is a constant that is used to determine separation distance by the formula $d = KW^{1/3}$, where W is the weight in pounds. The formula can be used to determine required distances between potential explosive sites (PESs) and exposed sites (Ess). This will normally appear as the letter “K” followed by a number, for example “K8,” or “K30.”	NASA-STD 8719.12
Knowledge Management	Knowledge management is getting the right information to the right people at the right time and helping people create knowledge and share and act upon information in ways that will measurably improve the performance of NASA and its partners.	NPR 8000.4A Appendix A
Laboratory Operations	Any operation in a laboratory where the total quantity of explosives in the room does not exceed 500 grams.	NASA-STD 8719.12
Landing	The final phase or region of flight to Earth/Lunar surface consisting of transition from descent, to an approach, touchdown, and coming to rest.	NPR 8705.2B, Appendix A
Landing Site	The location on which a vehicle impacts, lands, or is captured.	NPR 8715.5, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Laser Clearinghouse	A function within the United States Strategic Command/Space Control Center that maintains the laser facility database, receives laser facility emission requests, determines waiver status, sends approval/denial/restrictions to the laser facilities, and processes accidental illumination information.	NPR 8705.5, Appendix A
Launch	To place a vehicle and any payload from Earth in a suborbital trajectory, in Earth orbit, or in outer space.	NPR 8715.5, Appendix A
Launch Service	A NASA-procured and –managed launch service encompassing ground processing, flight operations, tracking, and disposal of used launch assets in the Earth’s orbit or upon reentering the Earth’s atmosphere. Spacecraft and/or instrument events include design/development, ground processing, science operations, data processing, tracking, and disposal in the Earth’s orbit or upon reentering the Earth’s atmosphere.	NPD 8700.3B, para 1.b
Launch Site	The location from which a launch takes place. This includes land, air, or a sea-based position.	NPR 8715.5, Appendix A
Launch Vehicle	Any space transportation mode, including expendable launch vehicles (ELVs), reusable launch vehicles (RLVs), and the Space Shuttle.	NASA-STD 8719.14
Launch Vehicle Services	The management and implementation of activities required to place the spacecraft directly into its operational environment, or on a trajectory towards its intended target. This element includes launch vehicle, launch vehicle integration, launch operations, any other associated launch services (frequently includes an upper-stage propulsion system), and associated ground support equipment. This element does not include the integration and test with the other project systems.	NM 7120-81, Appendix G.5.08
Legacy/ Heritage	Software products (architecture, code, requirements) written specifically for one project and then, without prior planning during its initial development, found to be useful on other projects.	NPR 7150.2A, Appendix A
Lessons Learned	The written description of knowledge or understanding that is gained by experience, whether positive (such as a successful test or mission), or negative (such as a mishap or failure).	NPR 8621.1B, Appendix A
License	Formal documented permission from the ESO to operate a Licensed Explosive Location.	NASA-STD 8719.12
Licensed Explosive Locations	Locally licensed locations within NASA’s control where explosives are used or stored for use (used for armories, ejection systems, gun clubs, and similar applications). Licensed Explosive Locations may include Division 1.1, 1.2, or 1.3 explosives only within the limitations of paragraph 4.25.9.1.12.10 of NASA-STD 8719.12.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Licensed Operator	Any person who has successfully completed the examination for crane, hoist, or heavy equipment operator and has been authorized to operate such equipment. (NOTE: This term includes certified and/or authorized operator.)	NASA-STD 8719.9
Life Cycle	The totality of a program or project extending from formulation through implementation encompassing the elements of design, development, verification, production, operation, maintenance, support and disposal.	NPR 8705.2B, Appendix A
Life Cycle, Project	Steady progression of a project from its beginning to its completion and decommissioning. A set of steps or phases through which a project advances. This includes formulation/conception through sign-off and delivery to the customer and may include operations, maintenance and retirement depending on how the project is defined. The operations and maintenance phases through retirement may be a separate project life cycle and as such still needs to address the requirements in this Standard.	NASA-STD 8719.13B
Life-Cycle Cost (LCC)	<p>[1] The total of the direct, indirect, recurring, nonrecurring, and other related expenses incurred, or estimated to be incurred, in the design, development, verification, production, operation, maintenance, support, and disposal of a project. The LCC of a project or system can also be defined as the total cost of ownership over the project or systems' life cycle from formulation through implementation. It includes all design, development, deployment, operation and maintenance, and disposal costs.</p> <p>[2] The total cost of acquisition, operation, maintenance, and support of an item throughout its useful life, and including the cost of disposal.</p>	<p>[1] NM 7120-81, Appendix A</p> <p>[2] NASA-STD 8729.1</p>
Lifting Devices and Equipment	Devices such as overhead and gantry cranes (including top running monorail, underhung, and jib cranes), mobile cranes, derricks, hoists, winches, special hoist supported personnel lifting devices, hydra-sets, load measuring devices, hooks, slings and rigging, mobile aerial platforms, powered industrial trucks, and jacks used for lifting and lowering.	NASA-STD 8719.9
Lifting Devices and Equipment Manager	Person responsible for overall management of the installation lifting devices and equipment program, coordinating with appropriate personnel at their installation on lifting issues and providing their installation's position on lifting devices and equipment safety issues.	NASA-STD 8719.9
Likelihood	A measure of the possibility that a scenario will occur that also accounts for the timeframe in which the events represented in the scenario can occur.	NPR 8000.4A Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Line of Apsides	The line connecting the apogee and perigee points in an orbit. This line passes through the center of the Earth.	NASA-STD 8719.14
Line of Nodes	The line formed by the intersection of the orbit plane with the Earth's equatorial plane. This line passes through the center of the Earth. The ascending node is the point where a satellite crosses the equator from the southern hemisphere to the northern hemisphere.	NASA-STD 8719.14
Linear Fiber Sling	A sling where load bearing fibers are bundled in a linear fashion.	NASA-STD 8719.9
Link Analysis	A method for arranging the physical layout of instrument panels, control panels, workstations, or work areas to meet specific objectives; e.g., increased accessibility. An assessment of the connection between (a) a person and a machine or part of a machine, (b) two persons, or (c) two parts of a machine.	NASA-STD 8729.1
Liquid Propellant	Liquid substances (fuels, oxidizers, or monopropellants) used for propulsion or operation of rockets and other related devices.	NASA-STD 8719.12
Listed Or Approved	When referring to a material or device used in conjunction with fire protection, a product that has been tested by a recognized and independent research laboratory (e.g., Underwriters Laboratories and Factory Mutual), in accordance with generally accepted and standardized test methods and verified that it will perform adequately and dependably under adverse conditions.	NASA-STD 8719.11A
Load	The total load, including the sling or structural sling, below the hoisting device hook, being raised or moved.	NASA-STD 8719.9
Load Limit	The maximum expected external load or combination of loads, which a structure may experience during the performance of specified missions in specified environment. When statistical estimate is applicable, the load not expected to be exceeded with 99% probability at 90% confidence.	
Load Measuring Device	A measuring device below the hook that is part of the load path for lifting operations.	NASA-STD 8719.9
Loading Docks	Facilities at ground level or elevated structures designed and installed for transferring explosives and components to or from automotive vehicles or railway cars.	NASA-STD 8719.12
Local Public	Refers to the population in the vicinity of a site for a NASA operation but not directly associated with the operation.	NPR 8715.3C, para 2.3.4.b note 7
Logistics	The discipline dealing with the support related activities of the procurement, maintenance, and transportation of equipment, supplies, facilities, and personnel.	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Logistics Support	The management and technical process by which all elements of logistics are planned, acquired, tested, and deployed in a timely and adequate manner.	NASA-STD 8729.1
Logistics Support Cost	The cost of providing all support considerations necessary to assure the effective and economical support of systems for their life cycle.	NASA-STD 8729.1
Loosely Coupled Program/Project	Programs/Projects that are not a part of Tightly Coupled Programs. (See NASA Memo 7120-81, paragraph 2.1.4, which updated NPR 7120.5D, for further definitions on program/project types.)	NASA-STD 8709.20
Loss Of Crew	Any incident which results in death or permanent disability to a crew member or passenger.	
Loss Of Mission	Inability to accomplish enough of the mission objectives such that a repeat mission must be flown	
Lost Time Injury/Illness	A nonfatal traumatic injury that causes any loss of time from work beyond the day or shift it occurred; or a nonfatal nontraumatic illness/disease that causes disability at any time.	NPR 8621.1B, Appendix A
Low Earth Orbit (LEO)	An orbit with a mean altitude less than or equal to 2000 km, or equivalently, an orbit with a period less than or equal to 127 minutes.	NASA-STD 8719.14
Low Traffic Density	Traffic routes having less than 400 cars and/or rail passengers per day or less than 80 ship passengers per day.	NASA-STD 8719.12
Magazine	A structure designed or specifically designated for the storage of explosives.	NASA-STD 8719.12
Magazine Distance	Minimum distance permitted between any two storage magazines. The distance required is determined by the type(s) of magazine and also the type and quantity of explosives stored therein.	NASA-STD 8719.12
Maintainability	A measure of the ease and rapidity with which a system or equipment can be restored to operational status following a failure. It is characteristic of equipment design and installation, personnel availability in the required skill levels, adequacy of maintenance procedures and test equipment, and the physical environment under which maintenance is performed.	NASA-STD 8729.1
Maintainability Engineering	The set of tasks and deterministic and probabilistic methods performed during the lifecycle of a system which aim at evaluating and improving system maintainability.	
Maintainability Prediction	A forecast of the maintainability of a system or system element.	NASA-STD 8729.1
Maintainability, Demonstrated	Maintainability which has been measured by the use of objective evidence gathered under specified conditions.	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Maintainability, Predicted	Maintainability which is expected at some future time, postulated on analysis, past experience, and tests.	NASA-STD 8729.1
Maintenance	All actions necessary for retaining an item in, or restoring it to, a specified condition.	(NASA-STD 8729.1)
Maintenance Analysis	The process of identifying required maintenance functions by analysis of the design, and to determine the most effective means to accomplish those functions.	NASA-STD 8729.1
Maintenance Concept	A description of the planned general scheme for maintenance and support of an item in the operational environment. The maintenance concept provides the basis for design, layout, and packaging of the system and its test equipment and establishes the scope of maintenance responsibility for each level of maintenance category and the personnel resources required to maintain the system.	NASA-STD 8729.1
Maintenance Manpower Cost	The cost of the labor (as opposed to material) to retain an item in, or restore it to a specified condition.	NASA-STD 8729.1
Maintenance, Corrective	All unscheduled maintenance actions, performed as a result of system/product failure, to restore the system to a specified condition.	NASA-STD 8729.1
Maintenance, Facilities	The recurring day-to-day work required to preserve real properties (land, buildings, structures, utility systems, collateral equipment, and other permanent improvements) in such a condition that they may be used for their designated purpose over an intended service life. It includes the cost of labor, materials, and parts. Maintenance minimizes or corrects wear and tear, forestalling major repairs.	NPD 8831.1E, Attachment A
Maintenance, Organizational	Maintenance performed by the using organization. Includes routine inspection, servicing, minor repairs and adjustments.	NASA-STD 8729.1
Maintenance, Preventive	All maintenance actions performed to retain an item in a specified condition, including periodic inspection, detection, condition monitoring, calibration, and critical item replacement to prevent incipient failures.	NASA-STD 8729.1
Maintenance, Scheduled	A form of preventive maintenance.	NASA-STD 8729.1
Maintenance, Unscheduled	Corrective maintenance.	NASA-STD 8729.1
Mandatory SMA Standard	A standard (NASA owned/developed or otherwise) that is directed to be used by a requirement in an NPD, NPR, or other mandatory SMA standard.	NASA-STD 8709.20

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Manual Control	The crew's ability to bypass automation in order to exert direct control over a space system or operation. For control of a spacecraft's flight path, manual control is the ability for the crew to effect any flight path within the capability of the flight control system. Similarly, for control of a spacecraft's attitude, manual control is the ability for the crew to effect any attitude within the capability of the flight/attitude control system.	NPR 8705.2B, Appendix A
Margin	The allowances carried in budget, projected schedules, and technical performance parameters (e.g., weight, power, or memory) to account for uncertainties and risks. Margins are allocated in the formulation process, based on assessments of risks, and are typically consumed as the program/project proceeds through the life cycle.	NM 7120-81, Appendix A
Margin Of Safety	Deviation of the actual (operating) factor of safety from the specified factor of safety. Can be expressed as a magnitude or percentage relative to the specified factor of safety.	NPR 8715.3C, Appendix B
Mass Detonation/Explosion	Virtually instantaneous explosion of a mass of explosives when only a small portion is subjected to fire, severe concussion or impact, the impulse of an initiating agent, or to the effect of a considerable discharge of energy from an outside stimulus. Also refers to the instantaneous propagation of an explosion between multiple explosives items such that blast overpressure effects are combined into a single enhanced blast wave.	NASA-STD 8719.12
Material Review Board	A board having the authority to make dispositions of the non-conforming articles and for responsibility for ensuring the implementation of corrective action to preclude recurrence. As a minimum, its membership normally includes one representative whose primary responsibility is engineering and one with primary responsibility for product quality. Possible dispositions include: Rework, Repair, Use-as-is, and Scrap.	
Maximum Corrective Maintenance Time	The maximum time required to complete a specified percentage of all maintenance action. Also (from MILSTD-471), "That value (of maintenance downtime) below which a specified percent of all maintenance (actions) can be expected to be completed. Unless otherwise specified, this value is taken at the 95 th percentile point of the distribution of downtimes."	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Maximum Credible Event (MCE)	In hazards evaluation, the MCE from a hypothesized accidental explosion, fire, or agent release is the worst single event that is likely to occur from a given quantity and disposition of explosives, chemical agents, or reactive material. The event must be realistic with a reasonable probability of occurrence considering the explosion propagation, burning rate characteristics, and physical protection given to the items involved. The MCE evaluation on this basis may then be used as a basis for effects calculations and casualty prediction.	NASA-STD 8719.12
Maximum Time to Repair (maxTTR)	A measure of that time below which a specified percentage of all corrective maintenance tasks must be completed. When stated as a requirement, the max TTR should be stated for organizational and direct support levels of maintenance. Max TTR is used as an “on-system” maintainability parameter; it is not used for the off-system repair or replaced components.	NASA-STD 8729.1
May	As used in requirements documents, denotes discretionary privilege or permission.	
Mean Downtime	The combination of all times involved in restoring an equipment to operation. Mean downtime includes Active Corrective Maintenance, Logistics Downtime, and Administrative Downtime.	NASA-STD 8729.1
Mean Life	A reliability measure that represents the expected value of the failure times for a failure distribution, also known as the average or central life value. While this represents a useful representative value of a distribution of failure times, it is often over-used as the sole reliability metric.	
Means of Egress	A means of egress is a continuous and unobstructed way of travel from any point in a building or structure to a public way. A means of egress comprises the vertical and horizontal travel and includes intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, escalators, horizontal exits, courts, and yards.	NASA-STD 8719.11A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Mean-Time-Between-Failures (MTBF)	<p>[1] A basic measure of reliability for repairable systems, MTBF is the mean number of life units during which all parts of the system perform within their specified limits, during a particular measurement interval, under stated conditions. – The mean of the distributions of the time interval between failures.</p> <p>[2] In the case of repairable systems, MTBF stands for mean time between failures. This average time excludes the time spent waiting for repair, being repaired, being re-qualified, and other downing events such as inspections and preventive maintenances and so on; it is intended to measure only the time a system is available and operating. Whereas, in the case of non-repairable systems, MTBF stands for mean time before failure and is represented by the mean life value for a failure distribution of non-repairable units.</p>	[1] NASA-STD 8729.1
Mean-Time-To-Failure (MTTF)	The mean life value for a failure distribution of non-repairable units.	
Mean-Time-To-Repair (MTTR)	<p>[1] A basic measure of the capability to actively repair a device or system, MTTR is a design quantity representing the onsite repair time only, without consideration for acquisition of spare parts and other logistics-related functions not considered part of active repair. MTTR is the mean of the distributions of the time intervals needed to repair an item. This is often computed as the accumulation of active repair times divided by the total number of malfunctions during a time interval.</p> <p>[2] The mean life value for a distribution of repair times (see Maintainability).</p>	NASA-STD 8729.1
Measure of Effectiveness	A measure by which a stakeholder's expectations will be judged in assessing satisfaction with products or systems produced and delivered in accordance with the associated technical effort. The MOE is deemed to be critical to not only the acceptability of the product by the stakeholder but also critical to operational/mission usage. An MOE is typically qualitative in nature or not able to be used directly as a "design-to" requirement.	NPR 7123.1A, Appendix A
Measure of Performance	A quantitative measure that, when met by the design solution, will help ensure that an MOE for a product or system will be satisfied. These MOPs are given special attention during design to ensure that the MOEs to which they are associated are met. There are generally two or more measures of performance for each MOE.	NPR 7123.1A, Appendix A
Medium Traffic Density	Traffic routes having 400 or more, but less than 10,000, car and/or rail passengers per day or 80 or more, but less than 2,000, ship passengers per day.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Memorandum of Agreement	A written agreement between two or more parties that defines the roles and responsibilities of each party with respect to the collaborative efforts of a particular program/project. A MOA is sometimes called a Memorandum of Understanding (MOU).	NASA-STD 8719.13B
Meteoroid Environment	The sporadic meteoroid environment consists of a diffuse background of meteoroids of cometary and asteroidal origin and represents a continuous risk to spacecraft throughout the year. This constant flux must be mitigated by an appropriate spacecraft design, which can lead to significant engineering challenges.	NPR 8715.3C, para 11.2.b
Meteoroids	Naturally occurring particulates associated with solar system formation or evolution processes. Meteoroid material is often associated with asteroid breakup or material released from comets.	NASA-STD 8719.14 and NPR 8715.3C, para 11.1.2
Metric	A measure used to indicate progress or achievement.	NASA-STD 8729.1
Milestone	Any significant event in the program/project life cycle or in the associated reliability or maintainability program which is used as a control point for measurement of progress and effectiveness or for planning or redirecting future effort.	NASA-STD 8729.1
Mishap Investigation Board (MIB)	<p>A NASA-sponsored board that:</p> <ol style="list-style-type: none"> a. Is appointed for a Type A mishap, Type B mishap, high-visibility mishap, or high-visibility close call. b. Requires concurrence from the Chief/OSMA and the Chief Engineer on membership. c. Consists of an odd number of Federal employees (including the chairperson) where the majority of the members are independent from the operation or activity in which the mishap occurred. d. Has a minimum of five voting members for Type A mishaps and three voting members for Type B mishaps. e. Includes a safety officer and a human factors mishap investigator. For all Type A mishaps involving injury, illness, or fatality, also includes an occupational health physician (or flight surgeon for aircraft-related mishaps) as a member. f. Is tasked to investigate the mishap or close call and generate the mishap report per the requirements specified in this NPR [NPR 8621.1]. 	NPR 8621.1B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Mishap Investigation Team (MIT)	<p>A NASA-sponsored team that:</p> <ul style="list-style-type: none"> a. Is appointed by the CD or ED/OHO, or designee, for a Type C mishap, Type D mishap, or close call. b. Does not require concurrence from the Chief/OSMA or the Chief Engineer on team membership. c. Consists of an odd number of Federal employees (including the chairperson) where the majority of the members are independent from the operation or activity in which the mishap occurred. (The actual number of members is chosen at the discretion of the appointing official.) d. Includes a safety officer and a human factors mishap investigator as members. e. Is tasked to investigate the mishap or close call and generate the mishap report per the requirements specified in this NPR [NPR 8621.1]. 	NPR 8621.1B, Appendix A
Mishap Investigator (MI)	A Federal employee who has expertise and experience in mishap or close call investigation; has knowledge of human error analysis in mishaps; serves as the sole investigator for a Type C mishap, Type D mishap, or close call; and is tasked to investigate the mishap or close call and generate the mishap report per this NPR [NPR 8621.1].	NPR 8621.1B, Appendix A
Mishap Preparedness and Contingency Plans	Pre-approved documents outlining timely organizational activities and responsibilities that must be accomplished in response to emergency, catastrophic, or potential (but not likely) events encompassing injuries, loss of life, property damage, or mission failure.	NPR 8621.1B, Appendix A
Mishap, Executive Summary	A very top-level summary of the circumstances of a mishap that includes who, what, when, where, and why, including a description of the proximate cause(s) and root cause(s).	NPR 8621.1B, Appendix A
Mishap, Final OSHA Summary	A report (OSHA 301 Form: Injury and Illness Incident Report, or an equivalent form) provided in accordance with 29 CFR 1960.70 by NASA to the Office of Federal Agency Programs for each mishap involving an OSHA recordable incident.	NPR 8621.1B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Mishap, NASA	<p>An unplanned event that results in at least one of the following:</p> <ul style="list-style-type: none"> a. Injury to non-NASA personnel, caused by NASA operations. b. Damage to public or private property (including foreign property), caused by NASA operations or NASA-funded development or research projects. c. Occupational injury or occupational illness to NASA personnel. d. NASA mission failure before the scheduled completion of the planned primary mission. e. Destruction of, or damage to, NASA property except for a malfunction or failure of component parts that are normally subject to fair wear and tear and have a fixed useful life that is less than the fixed useful life of the complete system or unit of equipment, provided that the following are true: 1) there was adequate preventative maintenance; and 2) the malfunction or failure was the only damage and the sole action is to replace or repair that component. 	NPR 8621.1B, Appendix A, paraphrased in NPR 8715.3C, para 2.3.1 note 1, and abbreviated in NPR 8715.5, Appendix A
Mishap, NASA Contractor, Grantee or Close Call	Any mishap or close call that a NASA contractor/grantee is required to report or investigate due to the provisions of its contract.	NPR 8621.1B, Appendix A
Mishap, Recommendation	An action developed by the investigating authority to correct the cause or a deficiency identified during the investigation.	NPR 8621.1B, Appendix A
Mishap, Type A	(See Type A Mishap”)	
Mishap, Type B	(See Type B Mishap”)	
Mishap, Type C	(See Type C Mishap”)	
Mishap, Type D	(See Type D Mishap”)	
Mission Assurance	Providing increased confidence that applicable requirements, processes, and standards for the mission are being fulfilled.	NPR 8715.3C, Appendix B
Mission Critical	[1] Item or function that must retain its operational capability to assure no mission failure (i.e., for mission success).	[1] NPR 8715.3C, Appendix B, NPR 7150.2A, Appendix A, NASA-STD 8719.13B
	[2] An item or function, the failure of which may result in the inability to retain operational capability for mission continuation if a corrective action is not successfully performed.	[2] NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Mission Essential Personnel	Government or contractor personnel who are directly involved in ensuring the safety and success of the range operations associated with a mission. For the purposes of range safety, mission essential personnel do not include any crew on board the vehicle.	NPR 8715.5, Appendix A
Mission Failure	A mishap of whatever intrinsic severity that prevents the achievement of the mission's minimum success criteria or minimum mission objectives as described in the mission operations report or equivalent document. Note: A mission failure applies only to a NASA program's mission, and not a test or ongoing institutional operation. If a program accomplishes all minimum success criteria but not "full mission objectives," it is not a mission failure (even though in some cases it may appropriately be classified and investigated as a close call).	NPR 8621.1B, Appendix A
Mission Operations	All activities executed by the spacecraft; includes design mission, primary mission, secondary mission, extended mission, and disposal.	NASA-STD 8719.14
Mission Profile	A time phased description of the events and environments an item experiences from initiation to completion of a specified mission, to include the criteria of mission success or critical failures. Mission Profiles are used in establishing general performance requirements and are essential to evaluate R&M performance. They should include functional and environmental profiles that define the boundaries of the R&M performance envelope, provide the timelines typical of operations within the envelope, and identify all constraints where appropriate.	NASA-STD 8729.1
Mission Success	Meeting all mission objectives and requirements for performance and safety.	NPR 8715.3C, Appendix B
Mission Success Activities	Those activities performed in line and under the control of the program or project that are necessary to ensure that the program or project will achieve its objectives.	
Mobile Aerial Platform	A mobile device that has an adjustable position platform, supported from ground level by a structure.	NASA-STD 8719.9
Modified Off-The-Shelf (MOTS) Software	When COTS, legacy/heritage software is reused, or heritage software is changed, the product is considered "modified." The changes can include all or part of the software products and may involve additions, deletions, and specific alterations. An argument can be made that any alterations to the code and/or design of an off-the-shelf software component constitutes "modification," but the common usage allows for some percentage of change before the off-the-shelf software is declared to be MOTS software. This may include the changes to the application shell and/or glueware to add or protect against certain features and not to the off-the-shelf software system code directly.	NPR 7150.2A, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Nadcap	An aerospace industry third party accreditation program which conducts supplier audits and provides accreditation/certification that a supplier is competent to furnish a specified product, process, or service. Nadcap program requirements, including the criteria, terms, and governance structure for Nadcap accreditation, are provided in SAE AS7003. Details regarding Nadcap accreditation services, a list of processes for which NADCAP provides supplier accreditation, and Nadcap auditing attributes can be found at http://www.pri-network.org/NADCAP/ .	NPR 8735.2A, Appendix A
NASA Advisory	A NASA document for exchanging significant parts, materials, and safety problems or concerns among NASA activities.	NPR 8735.1B, Appendix A
NASA Employees	Federal civil servants employed and paid by NASA, or on detail from other Federal agencies.	NPR 8715.1, para 1.2.6
NASA Human Spaceflight Missions	Terminology used to distinguish human spaceflight missions that require human-rated systems per this NPR [NPR 8705.2B]. Any human spaceflight mission where NASA retains the mission decision authority and the responsibility for crew safety is considered a NASA mission.	NPR 8705.2B, Appendix A
NASA Launch	A launch conducted by or for NASA, where NASA is so substantially involved that it effectively directs or controls the activity. (Also see Commercial Launch.)	NPR 8715.5, Appendix A
NASA Operation	Any activity or process that is under NASA direct control or includes major NASA involvement.	NPR 8621.1B, Appendix A and NASA-STD 8719.9
National Airspace System	The common network of U.S. airspace controlled by the FAA including air navigation facilities, equipment and services, airports or landing areas, aeronautical charts, information and services, rules, regulations, and procedures, technical information, and manpower and material. Also included are system components shared jointly with the military.	NPR 8715.5, Appendix A
Net Explosive Weight (NEW)	The total quantity, expressed in pounds, of explosive material or pyrotechnics in an item.	NASA-STD 8719.12
Net Explosive Weight for Quantity Distance (NEWQD).	The total quantity, expressed in pounds, of high explosive equivalency in each item to be used when applying quantity-distance criteria. The NEWQD is equal to the NEW unless hazard classification testing has shown that a lower weight is appropriate for Quantity Distance (QD) purposes. If the NEWQD is less than the NEW, the reason is usually that propellant or other substances do not contribute as much to the blast effects as the same amount of high explosives would.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Neutral Buoyancy Facility	A facility housing a pool, tank, or vessel containing liquid and used for research or training in a simulated weightless environment.	NASA-STD 8719.10
NITROX	A breathing gas with an oxygen content greater than that of air (19.5-23.5% oxygen), balance nitrogen, and trace gases.	NASA-STD 8719.10
Non-Advocate Review (NAR)	The analysis of a proposed program or project by a (non-advocate) team composed of management, technical, and resources experts (personnel) from outside the advocacy chain of the proposed program or project. It provides Agency management with an independent assessment of the readiness of the program/project to proceed into implementation.	NM 7120-81, Appendix A
Non-Code PVS	Any pressure vessel that is not stamped with the appropriate symbol and documented as complying with the original applicable or legally mandated construction Code or any pressure piping system that does not meet the requirements of the appropriate fabrication code (e.g., ASME Section VIII, B31.1, B31.3), including PVS that were fabricated from non-Code materials by non-Code processes or organizations.	
Noncombustible	<p>[1] Structures in which the structure itself (exclusive of trim, interior finish, and contents) is noncombustible but not fire-resistive. Common forms include exposed steel beams and columns, and masonry or metal walls.</p> <p>[2] Not combustible. Will not ignite and burn if not continuously subjected to flame from another source.</p>	<p>[1] NASA-STD 8719.11A</p> <p>[2] NASA-STD 8719.12</p>
Noncomplex Work	Includes manufacture of “build to print” piece parts or performance of a discrete manufacturing/test operation such as plating, heat treating, non-destructive testing, or laboratory testing for chemical composition or mechanical properties.	NPD 8730.5, Attachment A
Noncompliance	<p>[1] A failure to comply with an Agency-level requirement, a Center-level implementing requirement, a program/project SMA plan, or a contract SMA requirement or related Federal, State, or local safety requirements.</p> <p>[2] An unsatisfied requirement.</p>	[2] NPR 8715.7, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Noncompliance (Catastrophic)	Failure to comply with a Federal, State, or local OSHA law and/or Agency/Center SMA requirement that requires immediate operational shutdown, where the catastrophic condition presents a substantial likelihood that either death, permanent disabling injury, or substantial imminent endangerment to health, loss of high value assets/mission, or the environment may occur, which requires immediate remedial/corrective action prior to the restart of any operations.	
Noncompliance (Critical)	Failure to comply with a Federal, State, or local OSHA law and/or Agency/Center SMA requirement that could result in: 1) Severe or partially disabling injury/illness; 2) damage to high value asset; and/or 3) impairment of mission success that may require immediate remedial or corrective action, but does not require immediate operational shutdown since the risks of harm can be eliminated within a reasonable amount of time by using unscheduled staffing procedures.	
Noncompliance (Major)	A deficiency that could have a direct, first-order adverse effect on the quality of a product or service. Major noncompliances may include, for example, a complete absence or breakdown of a required quality system (a systemic issue). A series of minor noncompliances may indicate a systemic issue.	
Noncompliance (Minor)	A deficiency that could have an indirect, lower order adverse effect on the quality of a product or service or on the ability to meet requirements for a product or service. Minor noncompliances may include, for example, isolated instances of failure to comply with a quality system requirement or failures to comply that would affect quality only if another system failed as well.	
Nonconformance	The state or situation of not fulfilling a requirement.	NPR 8735.1B, Appendix A
Noncritical Lift	A lift involving routine lifting operations governed by standard industry rules and practices except as supplemented with unique NASA testing, operations, maintenance, inspection, and personnel licensing requirements contained in this standard.	NASA-STD 8719.9
Nondestructive Evaluation (NDE)	Test and inspection methods used to determine the integrity of materials or equipment that do not involve destruction of the test object. Examples are ultrasonic, magnetic particle, eddy current, x-ray, and dye penetrant. Used interchangeably with “nondestructive testing (NDT)”.	
Nondestructive Examination	The application of technical methods to examine materials or components in ways that do not impair future usefulness and serviceability in order to detect, locate, measure, and evaluate flaws; to assess integrity, properties, and composition; and to measure geometrical characteristics.	NASA-STD 8719.17A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Nondestructive Testing (NDT)	The development and application of technical methods to examine materials or components in ways that do not impair future usefulness and serviceability in order to detect, locate, measure, and evaluate flaws; to assess integrity, properties, and composition; and to measure geometrical characteristics.	NASA-STD 8719.9
Nondestructive Testing, Volumetric	Test and inspection methods used to examine the interior of equipment/materials; e.g., ultrasonic and radiographic.	NASA-STD 8719.9
Non-essential Personnel	Personnel not essential to, or involved with, the immediate operation presenting the energetic materials hazard.	NASA-STD 8719.12
Non-mass Explosion	Partial explosion of a mass of explosives when only a small portion is subjected to fire, severe concussion or impact, the impulse of an initiating agent, or to the effect of a considerable discharge of energy from an outside stimulus. Also refers to sequential propagation of explosions of multiple items with time delays such that blast overpressure effects do not combine from each individual explosion.	NASA-STD 8719.12
Normal Maintenance	Work performed on explosive devices to prevent deterioration and to correct minor defects not requiring renovation or major modification operations.	NASA-STD 8719.12
NTSB Serious Injury	Any injury resulting from an aircraft mishap in which any one or more of the following apply: a. Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received. b. Results in a fracture of any bone (except simple fractures of fingers, toes, or nose). c. Causes severe hemorrhages or nerve, muscle, or tendon damage. d. Involves any internal organ. e. Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.	NPR 8621.1B, Appendix A
Objective Evidence	Data or information that verifies or supports the existence of a finding. It may be obtained through observation, measurement, test, or other means and is not influenced by prejudice, emotion, or bias. Objective evidence must be sufficient, competent, relevant, and useful.	
Observation	See “Observation {Audit}” and “Observation {Mishap}”	
Observation {Audit}	A condition that does not violate requirements, but has the potential to affect safety and/or mission success: this may also include opportunities for improvement.	

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Observation {Mishap}	A factor, event, or circumstance identified during the investigation that did not contribute to the mishap or close call, but, if left uncorrected, has the potential to cause a mishap or increase the severity of a mishap; or a factor, event, or circumstance that is positive and should be noted.	NPR 8621.1B, Appendix A
Occupational Safety and Health Administration (OSHA)	The Federal agency which promulgates and enforces workplace safety regulations and guidance.	NPR 8715.3C, Appendix B
Occupied Facility	A building or facility occupied by persons on a regular basis and not used for sleeping purposes.	NASA-STD 8719.11A
Off-The-Shelf Software	[1] Software not developed in-house or by a contractor for the specific project now underway. The software is general purpose or developed for a different purpose from the current project.	[1] NPR 7150.2A, Appendix A
	[2] Ready-made software used "as-is" within a system.	[2] NASA-STD 8719.13B
On Call	Able to be physically present in a facility test area, within a specified period of time, in response to the first call for assistance.	NASA-STD 8719.10
On Station	Located at the proper assigned duty station.	NASA-STD 8719.10
Open Plan	When referring to office space, it denotes large floor areas (greater than 3,000 square feet [279 square meters]) characterized by the lack of fixed, ceiling-high partitions and conventional doorways. Individual workstations are identified by the arrangement of desks, chairs, files, bookcases, and movable partitions. The hazard from a fire safety standpoint is due to the ill-defined nature of means of egress and the lack of a significant physical barrier against the spread of smoke and fire, thus magnifying potential loss.	NASA-STD 8719.11A
Operability	As applied to a system, subsystem, component, or device is the capability of performing its specified function(s) including the capability of performing its related support function(s).	NPR 8715.3C, Appendix B
Operating Building	Any structure, except a magazine, in which operations pertaining to manufacturing, processing, or handling explosives are performed.	NASA-STD 8719.12
Operating Line	Group of buildings used to perform the consecutive steps in the loading, assembling, modification, normal maintenance, renovation, or salvaging of an item or in the manufacture of an explosive or explosive device.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Operational Availability (A _o)	The probability that an item will operate satisfactorily at a given point in time when used in an actual or realistic operating and support environment. It includes logistics time, ready time, and waiting or administrative downtime, and both preventive and corrective maintenance downtime.	
Operational Concept	A description of how the system will be operated during the life-cycle phases to meet stakeholder expectations. It describes the system characteristics from an operational perspective, and helps facilitate an understanding of the system goals. See NASA/SP-2007-6105.	
Operational Or Working Load	A value representing the weight of the load actually being handled plus the weight of the attaching equipment (slings, Hydra-set, spreader bars, etc.).	NASA-STD 8719.9
Operational Readiness	The ability of a system to respond and perform its mission upon demand.	NASA-STD 8729.1
Operational Readiness Inspection	Formal program review conducted by independent management teams to evaluate all facets of neutral buoyancy facility management and operations support for the safety program and compliance with existing safety rules and regulations including this standard.	NASA-STD 8719.10
Operational Safety	That portion of the total NASA safety program dealing with safety of personnel and equipment during launch vehicle ground processing, normal industrial and laboratory operations, use of facilities, special high hazard tests and operations, aviation operations, use and handling of hazardous materials and chemicals from a safety viewpoint.	NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A
Operational Shield	A barrier constructed to protect personnel, material, or equipment from the effects of a possible fire or explosion occurring at a particular operation.	NASA-STD 8719.12
Operational Test	A test to determine if the equipment (limit switches, emergency stop controls, brakes, etc.) is functioning properly.	NASA-STD 8719.9
Operator	[1] Any human interacting with the crewed space system during the mission.	[1] NPR 8705.2B, Appendix A
	[2] A person assigned to perform a specific, generally continuing function on a production, maintenance, renovation, or disposal line or operation. Typically, the functions are performed at workstations or areas defined in a Standard Operating Procedure (SOP).	[2] NASA-STD 8719.12
Operator Work Station	A specific location within a line or production area where an operator is assigned on a continuing basis to perform operations described in the relevant SOP.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Orbit Dwell Time	The total time spent by an orbiting object below an altitude of 2000 km during its orbital lifetime. If the debris is in an orbit with apogee altitude below 2000 km, the orbit dwell time equals the orbital lifetime. The orbit dwell time for each object can be obtained directly using DAS and the orbital information collected for the evaluation of Requirement 4.3-1.	NASA-STD 8719.14, para 4.3.4.2
Orbital Debris	<p>[1] Any object placed in space by humans that remains in orbit and no longer serves any useful function. Objects range from spacecraft to spent launch vehicle stages to components and also include materials, trash, refuse, fragments, and other objects which are overtly or inadvertently cast off or generated.</p> <p>[2] Artificial objects, including derelict spacecraft and spent launch vehicle orbital stages, left in orbit which no longer serve a useful purpose. In this document, only debris of diameter 1 mm and larger is considered. If liquids are to be released, they should explicitly be shown to be compliant with all mitigation requirements.</p>	<p>[1] NPR 8715.6A, Appendix A</p> <p>[2] NASA-STD 8719.14</p>
Orbital Lifetime	The length of time an object remains in orbit. Objects in LEO or passing through LEO lose energy as they pass through the Earth's upper atmosphere, eventually getting low enough in altitude that the atmosphere removes them from orbit.	NASA-STD 8719.14
Orbital Stage	A part of the launch vehicle left in a parking, transfer, or final orbit during or after payload insertion; includes liquid propellant systems, solid rocket motors, and any propulsive unit jettisoned from a spacecraft.	NASA-STD 8719.14
Ordnance Storage Area	A designated area of explosive-containing facilities set aside for the exclusive storage or "warehousing" of explosives.	NASA-STD 8719.12
Organizational Factor	Any operational or management structural entity that exerts control over the system at any stage in its life cycle, including, but not limited to, the system's concept development, design, fabrication, test, maintenance, operation, and disposal. Examples: resource management (budget, staff, training); policy (content, implementation, verification); and management decisions.	NPR 8621.1B, Appendix A
Organizational Unit	An organization, such as a program, project, Center, Mission Directorate, or Mission Support Office that is responsible for carrying out a particular activity.	NPR 8000.4A Appendix A
OSMA Policy/ Requirements Website	Website where OSMA documents can be accessed: http://www.hq.nasa.gov/office/codeq/doctree/index.htm	NASA-STD 8709.20

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Override	To take precedence over system control functions.	NPR 8705.2B, Appendix A
Oversight	Surveillance mode that is in line with the supplier's processes. The customer retains and exercises the right to concur or nonconcur with the supplier's decisions. Nonconcurrency must be resolved before the supplier can proceed. Oversight is a continuum that can range from low intensity, such as customer concurrence in reviews (e.g., PDR, CDR), to high intensity oversight, in which the customer has day-to-day involvement in the supplier's decision-making process (e.g., hardware/software inspections).	NPR 8715.5, Appendix A, NPR 8735.2, and NASA-STD 8739.8
Oversight/ Insight	The transition in NASA from a strict compliance-oriented style of management to one which empowers line managers, supervisors, and employees to develop better solutions and processes.	NPR 8715.3C, Appendix B
Part	One piece, or two or more pieces joined together, which cannot be disassembled without destruction or loss of design use	NASA-STD 8729.1
Partitioning	Separation, physically and/or logically, of safety-critical functions from other functionality.	NASA-STD 8719.13B
Passenger	Any human on board the space system while in flight that has no responsibility to perform any mission task for that system. Often referred to as "Space Flight Participant."	NPR 8705.2B, Appendix A
Passenger Railroad	Any steam, diesel, electric, or other railroad that carries passengers for hire.	NASA-STD 8719.12
Passivation	[1] The process of removing all forms of stored energy from spacecraft, launch vehicle stages, and propulsion units. Passivation includes, but is not limited to, the depletion of all residual propellants, pressurants, electrical storage devices, and forms of kinetic energy to a level where the remaining internal stored energy is insufficient to cause breakup/disassembly. Some sealed batteries and heat pipes need not be depressurized if their potential for explosion is extremely low. [2] The process of removing stored energy from a space structure at EOM which could result in an explosion or deflagration of the space structure to preclude generation of new orbital debris after End of Mission. This includes removing energy in the form of electrical, pressure, mechanical, or chemical.	[1] NPR 8715.6A, Appendix A [2] NASA-STD 8719.14

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Payload	<p>[1] Any airborne or space equipment or material that is not an integral part of the carrier vehicle (i.e., not part of the carrier aircraft, balloon, sounding rocket, expendable or recoverable launch vehicle). Included are items such as free-flying automated spacecraft, Space Shuttle payloads, Space Station payloads, Expendable Launch Vehicle payloads, flight hardware and instruments designed to conduct experiments, and payload support equipment.</p> <p>[2] The object(s) within a payload fairing carried or delivered by a vehicle to a desired location or orbit.</p>	<p>[1] NPR 8705.4, P.2.5.a</p> <p>[2] NPR 8715.5, Appendix A</p>
Payload {Lift}	The actual object, below the sling or structural sling, being raised or moved.	NASA-STD 8719.9
Payload Safety Introduction Briefing	The first meeting of a payload project's PSWG where the Payload Organization briefs the payload to the safety community. This meeting is also referred to as the Concept Briefing with respect to AFSPCMAN 91-710, Range Safety User Requirements.	NPR 8715.7, Appendix A
Payload Safety Working Group	A working group formed for each NASA ELV payload with a primary purpose to ensure (1) a project's compliance with applicable safety requirements and (2) that the safety risk is identified, understood, and adequately controlled.	NPR 8715.7, Appendix A
Payload, NASA	Any payload for which NASA has design, development, test, or operations responsibility.	NPR 8705.4, P.2.5.b
Peer Review	<p>[1] A review of a software work product, following defined procedures, by peers of the producers of the product for the purpose of identifying defects and improvements. [SEI-CMM Software Engineering Institute Capability Maturity Model®].</p> <p>[2] Independent evaluation by internal or external subject matter experts who do not have a vested interest in the work product under review. Peer reviews can be planned, focused reviews conducted on selected work products by the producer's peers to identify defects and issues prior to that work product moving into a milestone review or approval cycle.</p>	<p>[1] NASA-STD 8739.8</p> <p>[2] NPR 7123.1A, Appendix A</p>
Penetration Debris Flux	The number of impacts per square meter per year that will penetrate a surface of specified orientation with specified materials and structural characteristics.	NASA-STD 8719.14
Performance	A measure of how well a system or item functions in the expected environments.	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Performance Measure	A metric used to measure the extent to which a system, process, or activity fulfills its intended objectives. Note: Performance measures should in general relate to observable quantities. For example, engine performance parameters, cost metrics, and schedule are observable quantities. Although safety performance measures can be observed in principle, many of them have to be modeled. Partly because of this, in ranking decision alternatives, one may use a risk metric (e.g., probability of loss of crew) as a surrogate for a performance measure.	NPR 8000.4A Appendix A
Performance Requirement	The value of a performance measure to be achieved by an organizational unit's work that has been agreed-upon to satisfy the needs of the next higher organizational level.	NPR 8000.4A Appendix A
Performance-Based Contracting	The method of contracting which entails structuring all aspects of an acquisition process around the purpose of work to be performed as opposed to how the work is to be performed. It emphasizes objective, measurable performance requirements and quality standards in developing statements of work, selecting contractors, determining contract incentives, and performance of contract administration.	NASA-STD 8729.1
Perigee	The point in the orbit that is nearest to the center of the Earth. The perigee altitude is the distance of the perigee point above the surface of the Earth.	NASA-STD 8719.14
Periodic Load Test	A load test performed at predetermined intervals with load greater than or equal to the rated load, but less than the proof load.	NASA-STD 8719.9
Personnel Barrier	A device designed to limit or prevent personnel access to a building or an area during hazardous operations.	NASA-STD 8719.12
Personnel Certification	A means to assure an individual is qualified to perform a designated task.	NASA-STD 8719.9
Personnel Lift	For the purposes of this document, a working platform that will lift, lower, sustain, and transport people.	NASA-STD 8719.9
Physical Configuration Audit (PCA)	An audit conducted to verify that one or more configuration items, as built, conform to the technical documentation that defines it. [Based on IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology]	NASA-STD 8739.8
Platform Hoist	A dedicated hoist whose only purpose is to raise and lower a platform not carrying personnel.	NASA-STD 8719.9
Postmission Disposal	The orbit/location where a spacecraft/launch vehicle is left after passivation at EOM.	NASA-STD 8719.14

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Potential Explosive Site (PES)	Location of a quantity of explosives that will create a blast fragment, thermal, or debris hazard in the event of an accidental explosion of its contents. Quantity limits for ammunition and explosives at a PES are determined by the distance to an ES.	NASA-STD 8719.12
Precursor	An occurrence of one or more events that have significant failure or risk implications.	NPR 8715.3C, Appendix B
Preliminary Hazard Analysis	A gross study of the initial system concepts. It is used to identify all of the energy sources that constitute inherent hazards. The energy sources are examined for possible accidents in every mode of system operation. The analysis is also used to identify methods of protection against all of the accident possibilities.	NASA-STD 8719.13B
Pressure Relief Device	A device designed to open without intervention by an operator and relieve excess pressure so as to protect the pressure vessel/system (PVS) on which it is installed from damage due to that pressure.	NASA-STD 8719.17A
Pressure Safety Valve	A pressure relief device designed to actuate on inlet static pressure and to reclose after normal conditions have been restored. [Note: this definition is that of ASME PTC 25-2001.]	NASA-STD 8719.17A
Pressure Suit System	The hardware which encompasses all or part of the human body and operates at pressures different than the surrounding environment. The pressure suit system includes both the anthropometric pressure barrier and any integrated support systems providing life support regulation (e.g., suit pressure controllers).	NASA-STD 8719.10
Pressure System/ Pressure Vessel	Any vessel used for the storage or handling of a gas or fluid under positive pressure. A pressure system is an assembly of components under pressure e.g., vessels, piping, valves, relief devices, pumps, expansion joints, gauges.	
Pressure Systems Manager	The person responsible for implementation of NPD 8710.5, Policy for Pressure Vessels and Pressurized Systems, and NASA-STD 8719.17A at a NASA facility.	NASA-STD 8719.17A
Pressure Vessel	Any vessel used for the storage or handling of a fluid under positive pressure. A pressure system is an assembly of components under pressure; e.g., vessels, piping, valves, relief devices, pumps, expansion joints, gages.	NPR 8715.3C, Appendix B
Preventive Action	Action to preclude or minimize the likelihood of the occurrence or recurrence of a nonconformance.	

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Probabilistic Risk Assessment (PRA)	<p>[1] A PRA is a structured, logical analysis methodology that is used for identifying and assessing risks in a variety of applications including complex technological systems. In general, a PRA provides a modeling framework that interfaces with or includes the various disciplines used to conduct health, safety, and mission assurance analyses including hazard analysis, failure mode and effects analysis, and reliability analysis. A PRA draws upon the relevant collection of qualitative and quantitative information and models that are developed as part of design and assurance activities.</p> <p>[2] A PRA is a comprehensive, structured, and logical analysis method aimed at identifying and assessing risks in complex technological systems for the purpose of cost-effectively improving their safety and performance in the face of uncertainties. PRA assesses risk metrics and associated uncertainties relating to likelihood and severity of events adverse to safety or mission.</p>	<p>[1] NPR 8705.5A, para. 1.1.1</p> <p>[2] NPR 8715.3C, Appendix B</p>
Probability of Casualty (Pc)	<p>A measure of individual risk. Pc is the probability that an individual at a specific location would be a casualty per an event, such as vehicle flight, if a large number of events could be carried out under identical circumstances. For example, if an individual would be a casualty once per one million identical launches, the Pc for such a launch would be $1 \leq 10^{-6}$.</p>	NPR 8715.5, Appendix A
Probability of Impact	<p>The probability that one or more pieces of debris from a vehicle will impact a given location or object (e.g., aircraft, ships).</p>	NPR 8715.5, Appendix A
Problem/ Failure Management	<p>A formalized process to document, resolve, verify, correct, review and archive problems and failures incurred during the development of functional hardware or software.</p>	NASA-STD 8729.1
Procedure	<p>A documented description of a sequence of actions to be taken to perform a given task.</p>	NASA-STD 8729.1
Process	<p>A set of activities used to convert inputs into desired outputs to generate expected outcomes and satisfy a purpose.</p>	NPR 7123.1A, Appendix A
Process Assurance	<p>Activities to assure that all processes involved with the project adhere to plans and comply with the contract and/or any memorandum of agreement/understanding</p>	NASA-STD 8739.8
Process Failure Modes and Effects Analysis (PFMEA)	<p>An analysis of an operation/process to identify the kinds of errors humans could make in carrying out the task. A method to deduce the consequences for process failure and the probabilities of those consequences occurring.</p>	NASA-STD 8729.1

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Term	Definition	Defining Document and Paragraph
Process Witnessing	Physical observation of a contractor test or work process to ensure that the process is being correctly performed in accordance with prescribed procedures and contract requirements.	NPR 8735.2A, Appendix A
Process, Critical	A process which changes the chemical/physical properties of a material, or a specific process for manufacture, fabrication, assembly, checkout, test, inspection, or installation; which, if improperly performed, could have a significant adverse performance effect on hardware. A non-material process (i.e., crew training, food preparation, software processes) that if not properly performed would have a significant adverse affect on crew safety or mission success.	
Process, software	A set of interrelated activities, which transform inputs into outputs. [ISO/IEC 12207, Software life cycle processes]	NASA-STD 8739.8
Product	A result of a physical, analytical, or other process which is intended for use. What is delivered to the customer (e.g., hardware, software, test reports, data), as well as the processes (e.g., system engineering, design, test, logistics) which make the product possible.	NASA-STD 8729.1
Product Assurance	Activities to assure that all required plans are documented, and that the plans, software products, and related documentation adhere to plans and comply with the contract and/or any memorandum of agreement/understanding.	NASA-STD 8739.8
Product Examination	Physical inspection, measurement, or test to ensure product conformity to prescribed technical/contract requirements.	NPR 8735.2A, Appendix A and Appendix C 9.4.b
Program/Project Surveillance Plan (PSP)	Documentation of the overall approach used by the program/project for the maintenance of government insight of contractor performance on the program/project.	NASA-STD 8729.1
Program/Project Quality Assurance Surveillance Plan (PQASP)	A consolidated set of detailed instructions for the performance of Government contract quality assurance actions related to a specific program/project. Examples of PQASP contents include lists of contractor documents, data, and records to be reviewed; products and product attributes to be examined; processes and process attributes to be witnessed; quality system elements/attributes to be evaluated; sampling plans; and requirements related to quality data analysis, nonconformance reporting and corrective action tracking/resolution, and final product acceptance.	NPR 8735.2A, Appendix A
Proof Load	Specific load or weight applied in performance of a proof load test and is greater than the rated load.	NASA-STD 8719.9

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Term	Definition	Defining Document and Paragraph
Proof Load Test	A load test performed prior to first use, after major modification of the load path or at other prescribed times. This test verifies material strength, construction, and workmanship and uses a load greater than the rated load. Proof load test, as used in this standard, is equivalent to the OSHA rated load test.	NASA-STD 8719.9
Propagation	Communication of an explosion (detonation or deflagration) from one potential explosion site to another by fire, fragment, or blast (shock wave) where the interval between explosions is long enough to limit the total overpressure at any given time to that which each explosion produces independently.	NASA-STD 8719.12
Propellant Liquid	Substances in fluid form (including cryogenics) used for propulsion or operating power for missiles, rockets, and other related devices. For the purpose of this standard, liquid fuels and oxidizers are considered propellants even when stored and handled separately.	NASA-STD 8719.12
Propellant Solid	Explosives compositions used for propelling projectiles and rockets and to generate gases for powering auxiliary devices.	NASA-STD 8719.12
Property Damage	Damage to any type of government or civilian property, including, but not limited to, flight hardware, flight software, facilities, ground support equipment, and test equipment.	NPR 8621.1B, Appendix A
Protected Non-combustible	Noncombustible structures enclosed with partitions having a minimum of 1 hour fire-resistance rating.	NASA-STD 8719.11A
Provider {software}	The entities or individuals that design, develop, implement, test, operate, and maintain the software products. A provider may be a contractor, a university, a separate organization within NASA, or within the same organization as the acquirer. The term “provider” is equivalent to “supplier” in ISO/IEC 12207, Software life cycle processes.	NASA-STD 8739.8
Proximate Cause	The event(s) that occurred, including any condition(s) that existed immediately before the undesired outcome, directly resulted in its occurrence and, if eliminated or modified, would have prevented the undesired outcome. Also known as the direct cause(s).	NPR 8621.1B, Appendix A
Proximity Operations	Two or more vehicles operating in space near enough to each other so as to have the potential to affect each other. This includes rendezvous and docking (including hatch opening), undocking, and separation (including hatch closing).	NPR 8705.2B, Appendix A
Pyrophoric	A chemical that will ignite spontaneously in air at a temperature of 130°F (54.4°C) or below.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Public	[1] All humans not participating in the spaceflight activity who could be potentially affected by the function or malfunction of the space system.	[1] NPR 8705.2B, Appendix A
	[2] For the purposes of range safety risk management, all people who are not Center Essential Personnel. Public includes visitors and personnel inside and outside NASA-controlled property who are not Center Essential and who may be on land, on waterborne vessels, or in aircraft.	[2] NPR 8715.5, Appendix A
Public Highway	Any street, road, or highway not under NASA custody used by the general public for any type of vehicular travel.	NASA-STD 8719.12
Public Traffic Route Distance	Distance to be maintained between a PES and any public street, road, or highway, navigable stream, or passenger railroad (includes roads on NASA Field Installations that are open to non-essential personnel or the public for thoroughfare).	NASA-STD 8719.12
Purchaser	In a contractual relationship, the recipient of a product or service provided by a supplier.	NASA-STD 8729.1
Pyrotechnic Device	All devices and assemblies containing or actuated by propellants or explosives, with the exception of large rocket motors. Pyrotechnic devices include items such as initiators, ignitors, detonators, safe-and-arm devices, booster cartridges, pressure cartridges, separation bolts and nuts, pin pullers, linear separation systems, shaped charges, explosive guillotines, pyrovalves, detonation transfer assemblies (mild detonating fuse, confined detonating cord, confined detonating fuse, shielded mild detonating cord, etc.), thru-bulkhead initiators, mortars, thrusters, explosive circuit □nscrewed□rs, and other similar items	NASA-STD 8719.12
Pyrotechnic Material	Explosive or chemical ingredients, including powdered metals, used in the manufacture of pyrotechnic devices.	NASA-STD 8719.12
Qualification Test {Design Approval}	A test conducted under specified conditions, by, or on behalf of the government, using items representative of the production configuration in order to determine compliance with item design requirements as a basis for production approval.	
Qualified Personnel	Personnel that have received the necessary training and have demonstrated presubscribed, documented, proficiency in a particular activity or task.	
Quality	The composite of material attributes including performance features and characteristics of a product or service to satisfy a given need.	NPR 8715.3C, Appendix B

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Quality Assurance (QA)	A planned and systematic pattern of all actions necessary to provide adequate confidence that adequate technical requirements are established; products and services conform to established technical requirements; and satisfactory performance is achieved.	
Quality Assurance Letter of Delegation (LOD)	Documented instructions from NASA to a Federal Agency detailing quality assurance support responsibility and services required in support of a designated contract.	NPR 8735.2A, Appendix A
Quality Assurance Support Contractor	A non-Government entity on contract with NASA and independent of the contractor providing supplies or services that is tasked to perform specified quality assurance surveillance functions (e.g., GMIPs).	NPR 8735.2A, Appendix A
Quality Audit, Assessment, and Review Process	An independent evaluation of a program's or project's QA activities, functions, and compliance with Agency QA requirements.	
Quality Engineering	The branch of engineering which deals with the principles and practice of product and service quality assurance and control.	
Quality, Appraisal Costs	The costs associated with measuring, evaluating or auditing products or services to assure conformance to quality standards and performance requirements. Examples include costs associated with incoming and source inspection/test of purchased materials, in-process and final inspection/test, product audits, process audits, and calibration of measuring and test equipment.	
Quality, Cost of	The sum of the Prevention Costs, Appraisal Costs, and Failure Costs. Total cost of quality represents the difference between the actual cost of a product or service, and what the reduced cost would be if there was no possibility of substandard service, failure of products, or defects in their manufacture.	
Quality, Failure Costs	The costs resulting from products or services not conforming to requirements or customer/user needs. Failure costs may be internal or external and include items such as cost of scrap, rework, re-inspection, and material review, and costs associated with corrective action implementation.	
Quality, Prevention Costs	The costs of all activities specifically designed to prevent noncompliant products or services. Examples include costs of quality planning, supplier capability, process capability evaluations, quality education and training.	

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Quantity Distance (QD)	Quantity of explosives material and distance separation relationships which provide defined types of protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate QD tables.	NASA-STD 8719.12
Radiological Control Center (RADCC)	A temporary information clearinghouse established on an as-needed basis to coordinate actions that could be required for mitigation, response, and recovery of an incident involving the launching of nuclear material.	NPR 8715.3C, Appendix B
Range	A permanent or temporary area or volume of land, sea, or airspace within or over which orbital, suborbital, or atmospheric vehicles are tested or flown. This includes the operation of launch vehicles from a launch site to the point where orbit is achieved or final landing or impact of suborbital vehicle components. This also includes the entry of space vehicles from the point that the commit to deorbit is initiated to the point of intact vehicle impact or landing or the impact of all associated debris. This includes range operations with aeronautical vehicles from takeoff to landing.	NPR 8715.5, Appendix A
Range Operations	The flight of a launch or entry vehicle or experimental aeronautical vehicle including any payload, at, to, or from a range, launch site, or landing site. Range operations utilize specific infrastructure as well as trained and certified human interfaces to monitor, command, and control the range safety elements associated with programs. Range operations do not include the flight of conventional piloted aircraft unless specific aspects of the operation require range safety involvement to protect the public, workforce, and property. Range operations do not include on orbit operations of vehicles after orbit is achieved or prior to initiation of entry.	NPR 8715.5, Appendix A
Range Operator	A range operator is either a NASA, DoD, commercial, or foreign agency official responsible for providing the ground, sea, air, or space-based assets required to support range operations.	NPR 8715.5, Appendix A

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Term	Definition	Defining Document and Paragraph
Range Safety	<p>[1] Application of safety policies, principles, and techniques to protect the public, workforce, and property from hazards associated with range operations.</p> <p>[2] Application of safety policies, principles, and techniques to ensure the control and containment of flight vehicles to preclude an impact of the vehicle or its pieces outside of predetermined boundaries from an abort which could endanger life or cause property damage. Where the launch range has jurisdiction, prelaunch preparation is included as a safety responsibility. Additionally, the term “Range Safety” is informally used to refer to the organization responsible for implementing/enforcing range safety requirements (e.g., USAF 30th or 45th Space Wings’ Safety Offices and the Wallops Flight Facility Safety Office).</p>	<p>[1] NPR 8715.5, Appendix A</p> <p>[2] NPR 8715.7, Appendix A and NPR 8715.3C, Appendix B</p>
Range Safety Officer (RSO)	A person responsible for safety during a range operation. An RSO has the authority to hold or abort the operation, or take a risk mitigation action, which includes terminating the vehicle. RSO is synonymous with the term Mission Flight Control Officer used at some DoD ranges.	NPR 8715.5, Appendix A
Range Safety Organization	An organization that is independent of any vehicle program, oversees the implementation of range safety requirements, and may provide range safety-related services and operational support to vehicle programs.	NPR 8715.5, Appendix A
Range Safety Program	A program implemented to manage risk to the public, workforce, and property during range operations.	NPR 8715.5, Appendix A
Range Safety System(s)	A system (including any subsystem) whose performance is factored into the range safety analysis and relied upon during flight to mitigate hazards. These systems include range safety displays, range clearance capability, radar, optic tracking systems, telemetry, tracking display systems (including instantaneous impact predictors), contingency management systems, flight termination systems, and command and control capability for flight termination systems.	NPR 8715.5, Appendix A
Range User	A range user is considered a NASA (or NASA contractor) developed flight test or launch and/or entry vehicle program that conducts range operations on a range.	NPR 8715.5, Appendix A
Rated Load Or Safe Working Load Or Rated Capacity	An assigned weight that is the maximum load the device or equipment shall operationally handle and maintain. This value is marked on the device indicating maximum working capacity. This is also the load referred to as “safe working load” or “working load limit.” If the device has never been downrated or uprated, this also is the “manufacturer’s rated load.”	NASA-STD 8719.9

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Real-time Waiver Request	A request for relief that was unforeseen and is needed on a short-term basis to meet an immediate operational need.	NASA-STD 8709.20
Record Review	Review and verification that recorded data properly evidences conformance to contract requirements (e.g., invoked drawings, specifications). Recorded data may document work performance, product attributes, product configuration, product performance, or quality assurance actions performed by the contractor.	NPR 8735.2A, Appendix A
Recovery System	A system that is installed on a flight test, launch, or entry vehicle that may be activated when the vehicle has malfunctioned and cannot be recovered under its own capacity. For example, the system may deploy a parachute, extend landing gear, or move flight control surfaces in the attempt to reduce the impact of the vehicle with the ground. Recovery systems are intended to preserve the vehicle and do not necessarily address range safety concerns.	NPR 8715.5, Appendix A
Redundancy	Use of more than one independent means to accomplish a given function.	NPR 8715.3C, Appendix B
Redundancy (of design)	A design feature which provides a system with more than one function for accomplishing a given task so that more than one function must fail before the system fails to perform the task. Design redundancy requires that a failure in one function does not impair the system's ability to transfer to a second function.	NASA-STD 8729.1
Regression Testing	The selective retesting of a system that has been modified to ensure that any defects have been fixed and that no other previously working functions have failed or ceased to work as expected as a result of the changes.	NASA-STD 8719.13B
Regular Service Lifting Device	Lifting device that is being used one or more times per month.	NASA-STD 8719.9
Reliability	[1] The probability that a system of hardware, software, and human elements will function as intended over a specified period of time under specified environmental conditions.	[1] NPR 8705.2B, Appendix A
	[2] The probability that an item will perform its intended function for a specified interval under stated conditions. The function of an item may be composed of a combination of individual sub-functions to which the top level reliability value can be apportioned.	[2] NASA-STD 8729.1
Reliability {Demonstrated}	Reliability which has been measured by the use of objective evidence gathered under specified conditions.	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Reliability Analysis	An evaluation of reliability of a system or portion thereof. Such analysis usually employs mathematical modeling, directly applicable results of tests on system hardware, estimated reliability figures, and non-statistical engineering estimates to ensure that all known potential sources of unreliability have been evaluated.	NPR 8715.3C, Appendix B
Reliability Assurance	The management and technical integration of the reliability activities essential in maintaining reliability performance, including design, production, and product assurance activities.	NASA-STD 8729.1
Reliability Engineering	The set of tasks and deterministic and probabilistic methods performed during the lifecycle of a system which aim at evaluating and improving system reliability.	
Reliability Growth	The improvement of R&M performance over a period of time due to changes in design, manufacturing, assembly, test, transportation, storage, operations, integration, maintenance, and repair.	
Reliability Prediction	A forecast of the reliability of a system or system element, postulated on analysis, past experience, and tests.	NASA-STD 8729.1
Reliability-Centered Maintenance	[1] A process used to determine the most effective approach to maintenance which involves identifying the actions that, when taken, will reduce the probability of failure and which are the most cost-effective. [2] An on-going process which determines the mix of reactive, preventive, and proactive maintenance practices to provide the required reliability at the minimum cost. It can use diagnostic tools and measurements to assess when a component is near failure and should be replaced. The basic thrust is to eliminate more costly unscheduled maintenance and minimize preventive maintenance.	[1] NPD 8831.1E, Attachment A [2] NASA-STD 8729.1
Relief	A waiver, deviation, or request for determination of non-applicability to modify or eliminate a stated requirement and usually not meet the full intent and letter of the requirement as stated.	NASA-STD 8709.20
Remote Emergency Stop (Remote E-Stop)	An emergency stop remotely located from the regular operator controls.	NASA-STD 8719.9
Renovation	That work performed on devices containing explosives, propellants, or pyrotechnics to restore them to a completely serviceable condition; usually involves the replacement of unserviceable or outmoded parts.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Repair	A procedure that makes a nonconforming item acceptable for use. The purpose of the repair is to reduce the effect of the nonconformance. Repair is distinguished from rework in that characteristics after repair still do not completely conform to the applicable drawings, specifications, or contract requirements.	
Requirement, Derived	A requirement that is not a directed requirement.	NASA-STD 8709.20
Requirement, Designated	This is a requirement which OSMA has identified for special or additional processing with regards to requests for relief.	
Requirement, Directed	[1] An SMA requirement that has been imposed on NASA SMA as a flowdown of a requirement from a level higher to, or outside of OSMA. This includes requirements in standards which are called out as mandatory in the source of other directed requirements. <i>Example: Seatbelt requirements in NPR 8715.3 are directed requirements because Executive Order 13043 requires seatbelt usage by all Federal employees in a duty status.</i>	[1] NASA-STD 8709.20
Requirement, Non-applicable	Not relevant, not capable of being applied (from NASA Memo 7120-81, Appendix A, which updated NPR 7120.5D).	NASA-STD 8709.20
Requirement, Prescribed	A requirement levied on a lower organizational entity by a higher organizational entity. These requirements are distinguished from requirements that are derived at the lower level in order to implement the higher level prescribed requirements.	NASA-STD 0005
Requirement Relief Request	Request for a waiver, deviation, or determination of non-applicability.	NASA-STD 8709.20
Requirements	A set of characteristics or distinguishing features that is obligatory or a necessity. In engineering, requirements are established to meet operational needs and comply with applicable policy and practices.	NASA-STD 8729.1
Requirements Flow Down and SMA Engineering Design Audits and Assessments (REDAA)	An independent audit/review of NASA Center flow down of institutional programmatic support SMA requirements and of NASA program/project flow down and implementation of SMA design requirements.	
Requirements Traceability	The process of mapping originating requirements to implementing requirements. This is completed after a determination of applicable requirements is completed.	NASA-STD 8709.20

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Term	Definition	Defining Document and Paragraph
Rescue	The process of locating the crew, proceeding to their position, providing assistance, and transporting them to a location free from danger.	NPR 8705.2B, Appendix A
Responsible Organization	The organization responsible for the activity, people, or operation/program where a mishap occurs or the lowest level of organization where corrective action shall be implemented.	NPR 8621.1B, Appendix A
Restricted Area	Any area, usually fenced, at an establishment where the entrance and egress of personnel and vehicular traffic are controlled for reasons of safety.	NASA-STD 8719.12
Reusable Launch Vehicle	Experimental or operational space launch vehicle that is intended to be reused (at least in part).	NPR 8715.5, Appendix A
Reusable or Reused Software	Software created for another system that is incorporated into the system under development.	NASA-STD 8719.13B
Review	<p>[1] A process or meeting during which a software product or related documentation is presented to project personnel, customers, managers, software assurance personnel, users or user representatives, or other interested parties for comment or approval. [IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology] Reviews include, but are not limited to, requirements review, design review, code review, test readiness review. Other types may include peer review and formal review.</p> <p>[2] A critical examination of a task or program/project to determine compliance with requirements and objectives.</p> <p>[3] An examination and analysis of documentation to evaluate the feasibility, capability, appropriateness, relevance, and effectiveness of documented processes and procedures for defining, imposing, implementing, and verifying SMA requirements. It is a necessary precursor to an audit or assessment. Review findings are provided to the organization being evaluated and to senior Agency management (e.g., Chief, Safety and Mission Assurance, Chief Engineer, Mission Director, Center Director, Center SMA Director).</p>	<p>[1] NASA-STD 8739.8</p> <p>[2] NASA-STD 8729.1</p>
Rework	A procedure applied to a nonconforming item that completely eliminates the nonconformance and results in a characteristic that conforms completely to the drawings, specifications, or contract requirements.	
Right Ascension of Ascending Node	The angle between the line extending from the center of the Earth to the ascending node of an orbit and the line extending from the center of the Earth to the vernal equinox, measured from the vernal equinox eastward in the Earth's equatorial plane.	NASA-STD 8719.14

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Term	Definition	Defining Document and Paragraph
Risk {Operational}	<p>In the context of mission execution, risk is operationally defined as a set of triplets:</p> <ul style="list-style-type: none"> - The scenario(s) leading to degraded performance with respect to one or more performance measures (e.g., scenarios leading to injury, fatality, destruction of key assets; scenarios leading to exceedance of mass limits; scenarios leading to cost overruns; scenarios leading to schedule slippage). - The likelihood(s) (qualitative or quantitative) of those scenarios. - The consequence(s) (qualitative or quantitative severity of the performance degradation) that would result if those scenarios were to occur. <p>Uncertainties are included in the evaluation of likelihoods and consequences.</p>	NPR 8000.4A Appendix A
Risk {Programmatic}	<p>The combination of (1) the probability (qualitative or quantitative) of experiencing an undesired event, (2) the consequences, impact, or severity that would occur if the undesired event were to occur and (3) the uncertainties associated with the probability and consequences.</p>	NPR 8715.3C, Appendix B, NPR 8715.7, Appendix A 22, and other in and NPR 8705.2B, Appendix A and other definitions in NM 7120-81, Appendix A, NPR 7123.1A, Appendix A, NASA-STD 8719.7, NASA- STD 8719.13B, NASA-STD 8729.1
Risk {Range}	<p>The baseline definition for risk is the combination of (1) the probability (qualitative or quantitative) that a program will experience an undesired event such as cost overrun, schedule slippage, safety mishap, or failure to achieve a needed technological breakthrough; and (2) the consequences, impact, or severity of the undesired event were it to occur. For Range Safety, risk is expressed as casualty expectation, which is a measure that takes into consideration both the probability of occurrence and the consequence of a hazard to a population or installation. Risk is measured in the same units as the consequence, such as number of injuries, fatalities, or dollar loss.</p>	NPR 8715.5, Appendix A
Risk Acceptance	<p>Taking/accepting the responsibility for the potential outcome of a documented increase in risk.</p>	

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Term	Definition	Defining Document and Paragraph
Risk Assessment	An evaluation of a risk item that determines (1) what can go wrong, (2) how likely is it to occur, (3) what the consequences are, and (4) what are the uncertainties associated with the likelihood and consequences.	NM 7120-81, Appendix A and NPR 8705.2B, Appendix A
Risk Assessment {Probabilistic Risk Assessment}	A comprehensive, structured, and logical analysis method aimed at identifying and assessing risks in complex technological systems for the purpose of cost-effectively improving their safety and performance in the face of uncertainties. PRA, and other risk assessment techniques, assesses risk metrics and associated uncertainties relating to likelihood and severity of events adverse to safety or mission.	
Risk Assessment {Safety}	Process of qualitative risk categorization or quantitative risk (safety) estimation, followed by the evaluation of risk significance.	NPR 8715.3C, Appendix B, and NPR 8715.7, Appendix A
Risk Acceptability Criterion	A rule for determining whether a given organizational unit has the authority to decide to accept a risk. Note: This does not mean that all risks satisfying the criterion are accepted, or that a combination of such individual risks is automatically acceptable in the aggregate, but rather that, subject to aggregate risk considerations, the given unit has the authority to decide to accept individual risks satisfying the criterion.	NPR 8000.4A Appendix A
Risk Disposition: Accept	The formal process of justifying and documenting a decision not to mitigate a given risk associated with achieving given objectives or given performance requirements.	NPR 8000.4A Appendix A
Risk Disposition: Close	The determination that a risk is no longer cost-effective to track, because (for example) the associated scenario likelihoods are low (e.g., the underlying condition no longer exists), or the associated consequences are low.	NPR 8000.4A Appendix A
Risk Disposition: Elevate	The process of transferring the decision for the management of an identified source of risk to the risk management structure at a higher organizational level. Note: Some organizational units within NASA use the term “escalate” to mean “elevate.”	NPR 8000.4A Appendix A
Risk Disposition: Mitigate	The modification of a process, system, or activity in order to reduce a risk by reducing its probability, consequence severity, or uncertainty, or by shifting its timeframe.	NPR 8000.4A Appendix A
Risk Disposition: Research	The investigation of a risk in order to acquire sufficient information to support another disposition; i.e., close, watch, mitigate, accept, or elevate.	NPR 8000.4A Appendix A

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Term	Definition	Defining Document and Paragraph
Risk Disposition: Watch	The monitoring of a risk for early warning of a significant change in its probability, consequences, uncertainty, or timeframe.	NPR 8000.4A Appendix A
Risk Management	<p>[1] Risk management includes RIDM and CRM in an integrated framework. This is done in order to foster proactive risk management, to better inform decision making through better use of risk information, and then to more effectively manage implementation risks by focusing the CRM process on the baseline performance requirements emerging from the RIDM process.</p> <p>[2] An organized, systematic decision-making process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risk and establishes mitigation approaches and plans to increase the likelihood of achieving program/project goals.</p>	<p>[1] NPR 8000.4A Appendix A</p> <p>[2] NPR 8735.2, NM 7120-81, Appendix A, NPR 7150.2A, Appendix A NPR 8715.3C, Appendix B, NPR 8715.7 Appendix A</p>
Risk Owner	The “risk owner” is the entity, usually a named individual, designated as the lead for overseeing the implementation of the agreed disposition of that risk.	NPR 8000.4A Appendix A
Risk Reduction	The process of reducing risk by eliminating adverse scenarios, reducing their severity or reducing their likelihoods.	
Risk Review Boards	Formally established groups of people assigned specifically to review risk information. Their output is twofold: (1) to improve the management of risk in the area being reviewed and (2) to serve as an input to decision-making bodies in need of risk information.	NPR 8000.4A Appendix A
Risk, Acceptable	<p>[1] The risk that is understood and agreed to by the program/project, governing PMC, Mission Directorate, and other customer(s) such that no further specific mitigating action is required. (Some mitigating actions might have already occurred.)</p> <p>[2] A level of risk, referred to a specific item, system or activity, that, when evaluated with consideration of its associated uncertainty, satisfies pre-established risk criteria.</p>	<p>[1] NM 7120-81, Appendix A</p> <p>[2] NPR 8715.3C, Appendix B</p>
Risk, Collective	The total combined risk to all individuals exposed to a particular hazard during a specific period of time or event (a specific phase of flight). Unless otherwise noted, collective risk is the mean number of casualties expected (Ec) during an established period or event (e.g., a launch) due to a given hazard.	NPR 8715.5, Appendix A
Risk, Cross-cutting	A risk that is generally applicable to multiple mission execution efforts, with attributes and impacts found in multiple levels of the organization or in multiple organizations within the same level.	NPR 8000.4A Appendix A

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Term	Definition	Defining Document and Paragraph
Risk, Individual	The probability of an individual from a certain group (or subgroup) at a specific location suffering a casualty from exposure to a given event during an established period (e.g., a launch). Individual risk is typically stated as a Probability of Casualty (Pc).	NPR 8715.5, Appendix A
Risk, Range Safety	For Range Safety, risk is expressed as casualty expectation, which is a measure that takes into consideration both the probability of occurrence and the consequence of a hazard to a population or installation. Risk is measured in the same units as the consequence, such as number of injuries, fatalities, or dollar loss.	NPR 8715.5, Appendix A
Risk, Residual	<p>[1] The level of risk that remains after applicable safety-related requirements have been satisfied. In a risk-informed context, such requirements may include measures and provisions intended to reduce risk from above to below an acceptable level.</p> <p>[2] The remaining risk that exists after all mitigation actions have been implemented or exhausted in accordance with the risk management process.</p>	<p>NPR 8715.3C, Appendix B, and additional definitions in NPR 8715.3C, para 2.5.3.1.c note 19, NPR 8705.5, para 1.4.5.5.2</p> <p>[2] NNP 8700.1, para 1.j.(4).</p>
Risk, Residual Profile	A summary of individual safety and/or mission success residual risks associated with the program/project. These individual risks may be associated with technical issues; minority opinions; establishment of requirements; nonconformance with requirements; lack of process/organizational capability; and institutional, facility, or operational risks. It is presented as a severity versus likelihood matrix per the program/project risk management plan.	
Risk-Based Acquisition Management	The integration of risk management into the NASA acquisition process.	NM 7120-81, Appendix A
Risk-Informed Decision Making (RIDM)	<p>A risk-informed decision-making process uses a diverse set of performance measures (some of which are model-based risk metrics) along with other considerations within a deliberative process to inform decision making.</p> <p>Note: A decision-making process relying primarily on a narrow set of model-based risk metrics would be considered “risk-based.”</p>	NPR 8000.4A Appendix A
Rocket	A complete device that derives its thrust from ejection of hot gases generated from propellants carried in the vehicle.	NASA-STD 8719.12

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Term	Definition	Defining Document and Paragraph
Rocket Motor	That portion of the complete rocket or booster that is loaded with solid propellant.	NASA-STD 8719.12
Root Cause	An event or condition that is an organizational factor that existed before the intermediate cause and directly resulted in its occurrence (thus indirectly it caused or contributed to the proximate cause and subsequent undesired outcome) and; if eliminated or modified, would have prevented the intermediate cause from occurring, and the undesired outcome. Typically, multiple root causes contribute to an undesired outcome. One of multiple factors (events, conditions, that are organizational factors) that contributed to or created the proximate cause and subsequent undesired outcome and, if eliminated or modified, would have prevented the undesired outcome. Typically, multiple root causes contribute to an undesired outcome.	NPR 8621.1B, Appendix A
Root Cause Analysis	A structured evaluation method that identifies the root causes for an undesired outcome and the actions adequate to prevent recurrence. Root cause analysis should continue until organizational factors have been identified or until data are exhausted.	NPR 8621.1B, Appendix A
Safe Haven	A functional association of capabilities and environments that is initiated and activated in the event of a potentially life-threatening anomaly and allows human survival until rescue, the event ends, or repair can be affected.	NPR 8705.2B, Appendix A
Safety	<p>[1] In a risk-informed context, safety is an overall condition that provides sufficient assurance that mishaps will not result from the mission execution or program implementation, or, if they occur, their consequences will be mitigated. This assurance is established by means of the satisfaction of a combination of deterministic criteria and risk-informed criteria.</p> <p>Note: This NPR [NPR 8000.4A] uses the term “safety” broadly to include human safety (public and workforce), environmental safety, and asset safety.</p> <p>[2] Freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment.</p>	<p>[1] NPR 8000.4A Appendix A</p> <p>[2] NPR 8715.3C, Appendix B with variations in NPR 8715.3C, para 2.3.4 note 6, NM 7120-81, Appendix A, NPR 8705.2B, Appendix A A.54, NPR 8705.6B, Appendix A, and NPR 8715.7, Appendix A</p>

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Term	Definition	Defining Document and Paragraph
Safety Analysis	<p>[1] Generic term for a family of analyses, which includes but is not limited to, preliminary hazard analysis, system (subsystem) hazard analysis, operating hazard analysis, software hazard analysis, sneak circuit, and others.</p> <p>[2] A document prepared to systematically identify the hazards of a NASA operation; describe and analyze the adequacy of measures taken to eliminate, control, or mitigate identified hazards; and analyze and evaluate potential accidents and their associated risks.</p>	<p>[1] NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A</p> <p>[2] NASA-STD 8719.12</p>
Safety Analysis Report (SAR)	A safety report of considerable detail prepared by or for the program detailing the safety features of a particular system or source.	NPR 8715.3C, Appendix B
Safety Analysis Summary (SAS)	A brief summary of safety considerations for minor sources; a safety report of less detail than the SAR.	NPR 8715.3C, Appendix B
Safety and Health Inspector	A safety and/or occupational health specialist or other trained person authorized to carry out inspections with the equipment and competence to recognize safety and/or health hazards in the workplace.	NPR 8715.1, para 1.2.8
Safety and Mission Assurance	<p>[1] The technical and management efforts of directing and controlling the safety and mission assurance elements of the project. This element includes design, development, review, and verification of practices and procedures and mission success criteria intended to assure that the delivered spacecraft, ground systems, mission operations, and payload(s) meet performance requirements and function for their intended lifetimes. This element excludes mission and product assurance efforts directed at partners and subcontractors other than a review/oversight function, and the direct costs of environmental testing.</p> <p>[2] Refers to the organization, i.e., the offices and people at all NASA Field Installations and Headquarters, who support customers with policy, process, and standards development; oversight and insight; and technology development and transfer, in the disciplines of safety, reliability, maintainability, and quality.</p>	<p>[1] NM 7120-81, Appendix G.5.03</p> <p>[2] NASA-STD 8719.13B</p>
Safety and Mission Assurance Manager	An individual assigned from the Center SMA organization to provide SMA support to a specific program/project and to act as liaison between the program/project and the Center SMA organization.	
Safety and Mission Assurance Requirement Tracking System	NASA data system that contains meta data about Agency-wide SMA requirements (SMARTS can be accessed at: http://smarts.nasa.gov).	NASA-STD 8709.20

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Term	Definition	Defining Document and Paragraph
Safety and Mission Success Review	A review held to prepare Agency safety and engineering management to participate program final readiness reviews preceding flights or launches, including experimental/test launch vehicles, or other reviews determined by the Chief, Safety and Mission Assurance. The SMSR provides the knowledge, visibility, and understanding necessary for senior SMA and Engineering management to either concur or nonconcur in program decisions to proceed.	
Safety Assurance	[1] Providing confidence that acceptable risk for the safety of personnel, equipment, facilities, and the public during and from the performance of operations is being achieved.	[1] NPR 8715.3C, Appendix B
	[2] Ensuring that the requirements, design, implementation, verification and operating procedures for the identified software minimizes or eliminates the potential for hazardous conditions.	[2] NASA-STD 8719.13B
Safety Critical	Term describing any condition, event, operation, process, equipment, or system that could cause or lead to severe injury, major damage, or mission failure if performed or built improperly, or allowed to remain uncorrected.	NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A, with a variation in NASA-STD 8719.10, and NASA-STD 8719.13B
Safety Critical Function	A system, equipment, or facility function or process that, by not performing as intended, causes a safety critical condition or event.	NPR 8715.3C, Appendix B with a variation in NASA-STD 8719.10
Safety Critical Item	A part, assembly, installation equipment, launch equipment, ground support equipment, recovery equipment, or support equipment for an aircraft, launch vehicle, or space vehicle if the part, equipment, or assembly contains a characteristic whose failure, malfunction, or absence could cause a catastrophic or critical failure resulting in the loss of or serious damage to the craft/vehicle, an unacceptable risk of personal injury, or loss of life.	NPR 8735.1B, Appendix A
Safety Data Package	A data submittal that provides a detailed description of hazardous and safety critical flight hardware equipment, systems, components and materials that comprise the payload, includes hazard reports, safety assessments, inhibits, and mitigations. Known as a Missile System Prelaunch Safety Package (MSPSP) with respect to AFSPCMAN 91-710, Range Safety User Requirements.	NPR 8715.7, Appendix A

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Term	Definition	Defining Document and Paragraph
Safety Device	A device that is part of a system, subsystem, or equipment that will reduce or make controllable hazards which cannot be otherwise eliminated through design selection.	NPR 8715.3C, Appendix B
Safety Evaluation Report (SER)	A safety report prepared by the INSRP detailing the INSRP's assessment of the nuclear safety of a particular source or system based upon INSRP's evaluation of the program-supplied SAR and other pertinent data.	NPR 8715.3C, Appendix B
Safety Factor	The ratio of the design ultimate breaking strength of a member, material, structure, or equipment and the maximum working stress or safe permissible load expected during ordinary use.	NASA-STD 5001
Safety Margin	(see "Margin of Safety")	
Safety Oversight	Maintaining functional awareness of program activities on a real-time basis to ensure risk acceptability.	NPR 8715.3C, Appendix B
Safety Program	The implementation of a formal comprehensive set of safety procedures, tasks, and activities to meet safety requirements, goals, and objectives.	NPR 8715.3C, Appendix B, NPR 8715.7, Appendix A
Safety-Critical GMIP	GMIPs performed to ensure compliance with contract requirements that, if violated, can result in loss of life. This includes witness or verification of hardware, manufacture, assembly, integration, test, maintenance, operation, or nonconformance resolution tasks which, if incorrectly accomplished, could result in loss of life.	NPR 8735.2A, Appendix A
Safety-Critical Software	Software is safety-critical if it meets at least one of the following criteria: <ol style="list-style-type: none"> 1. Resides in a safety-critical system (as determined by a hazard analysis) AND at least one of the following: <ol style="list-style-type: none"> a. Causes or contributes to a hazard. b. Provides control or mitigation for hazards. c. Controls safety-critical functions. d. Processes safety-critical commands or data. e. Detects and reports, or takes corrective action, if the system reaches a specific hazardous state. f. Mitigates damage if a hazard occurs. g. Resides on the same system (processor) as safety-critical software. 2. Processes data or analyzes trends that lead directly to safety decisions (e.g., determining when to turn power off to a wind tunnel to prevent system destruction). 3. Provides full or partial verification or validation of safety-critical systems, including hardware or software subsystems. 	NASA-STD 8719.13B

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Term	Definition	Defining Document and Paragraph
Scenario	A sequence of events, such as an account or synopsis of a projected course of action or events.	NPR 8000.4A Appendix A
Scrap	Product that cannot be used, reworked, repaired or reclassified, deeming the product totally unusable.	
SCUBA Testing (Training)	Any underwater activity with a test subject using SCUBA exclusively for life support.	NASA-STD 8719.10
Secure Flight Termination System	An approved U.S. cryptography incorporated into the operations center and vehicle that provides a capability for the secure or authenticated transmissions of a flight termination command or the activation of the FTS.	NPR 8715.5, Appendix A
Semi-major axis	Half the sum of the distances of apogee and perigee from the center of the Earth (or other body) equal to half the length of the major axis of the elliptical orbit.	NASA-STD 8719.14
Semi-Synchronous Orbit (SSO)	An orbit with approximately a 12-hour period. A circular SSO is at an altitude of approximately 20,200 km.	NASA-STD 8719.14
Senior Fire Officer	A fire department's Fire Chief or his/her designee.	NASA-STD 8719.11A
Serious Workplace Hazard	A condition, practice, method, operation, or process that has a substantial probability that death or serious physical harm could result and the employer did not know of its existence or did not exercise reasonable diligence to control the presence of the hazard.	NPR 8621.1B, Appendix A, with a variation in NPR 8715.1, para 1.2.10
Serious	When used with "hazard," "violation," or "condition," denotes there is a substantial probability that death or serious physical harm could result.	NPR 8715.3C, Appendix B
Service Magazine	An auxiliary building used for the intermediate storage of explosives materials not exceeding the minimum amount necessary for safe efficient production.	NASA-STD 8719.12
Serviceable Explosive	Explosive in a condition which allows usage for its intended purpose.	NASA-STD 8719.12
Shall	As used in requirements documents, denotes a mandatory action.	
Should	As used in requirements documents, denotes a good practice and is recommended, but not required.	

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Term	Definition	Defining Document and Paragraph
Shunt	Electrically interconnecting various portions of EED circuitry to prevent the development of an electrical charge differential between the shunted parts.	NASA-STD 8719.12
Side Load	The lateral component of a load applied to the hoist line.	NASA-STD 8719.9
Side Pull	That portion of the hoist pull acting horizontally when the hoist lines are not operating vertically.	NASA-STD 8719.9
Significant Problem	Any problem which is of the highest category of significance by virtue of the problem's impact on personnel safety or mission accomplishment (schedule and objectives).	NPR 8735.1B, Appendix A
Simulated Weightless Environment {underwater operations}	An environment in which gravity effects on a mass are offset by adjusting the buoyancy of objects or persons underwater.	NASA-STD 8719.10
Simulation	The process of conducting experiments with a model (an abstraction or simplification) of an item, within all or part of its operating environment, for the purpose of accessing its behavior under selected conditions or of evaluating various strategies for its operation within the limits imposed by developmental or operational criteria.	NASA-STD 8729.1
Simultaneous Detonation	Detonation of separated quantities of explosives occurring so nearly at the same time that the effect on the surroundings is the same as if the several quantities were not separated and were detonated en masse.	NASA-STD 8719.12
Single Failure Point	An independent element of a system (hardware, software, or human) the failure of which would result in loss of objectives, hardware, or crew.	NPR 8715.3C, Appendix B and NASA-STD 8719.9, similar definition in NASA-STD 8729.1
Single Failure Point Policy	Program/project policy requiring that no success-critical failure points be permitted in a system design.	NASA-STD 8729.1
Single Failure Point, Critical	A single item or element, essential to the safe functioning of a system or subsystem, whose failure in a life or mission essential application would cause serious program or mission delays or be hazardous to personnel.	NPR 8715.3C, Appendix B

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Term	Definition	Defining Document and Paragraph
Single Process Initiative	A program for the elimination of agency-unique processes or systems, imposed on contractor facilities shared by multiple Federal government agencies. All contractor systems and processes are candidates for this initiative where improved efficiency will result.	NASA-STD 8729.1
Sling	A lifting assembly and associated hardware used between the actual object being lifted and hoisting device hook.	NASA-STD 8719.9
Sling, Structural	A rigid or semi-rigid fixture that is used between the actual object being lifted and hoisting device hook. Examples are spreader bars, equalizer bars, and lifting beams.	NASA-STD 8719.9
Slings, Wire Rope	Wire ropes made into forms, with or without fittings, for handling loads and so made as to permit the attachment of an operating rope.	NASA-STD 8719.9
Slurry	A chemical system consisting of suspended solid particles dispersed (not dissolved) in a liquid.	NASA-STD 8719.12
Small Arms Ammunition	Ammunition used in firearms of caliber up to and including caliber .60 and shotguns.	NASA-STD 8719.12
Smoke Removal System	An interconnected system of fans, ducts, dampers, and automatic and manual controls designed to effectively remove smoke and other products of combustion from select facility areas. Its use is primarily intended to compensate for the lack of a readily available means to ventilate buildings during and after structural fires, such as in below-grade or windowless building areas.	NASA-STD 8719.11A
Software	Computer programs, procedures, scripts, rules, and associated documentation and data pertaining to the development and operation of a computer system. Software includes programs and data. This also includes COTS, GOTS, MOTS, reused software, auto generated code, embedded software, firmware, and open source software components.	NPR 7150.2A, Appendix A and NASA-STD 8739.8
Software Acquisition	The process of obtaining software from another organization via a documented agreement; a set of activities that are used to acquire software products from another organization.	NASA-STD 8719.13B
Software Assurance	The planned and systematic set of activities that ensure that software life cycle processes and products conform to requirements, standards, and procedures. [IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology] For NASA this includes the disciplines of Software Quality (functions of Software Quality Engineering, Software Quality Assurance, Software Quality Control), Software Safety, Software Reliability, Software Verification and Validation, and IV&V.	NASA-STD 8739.8, NASA-STD 8719.13B

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Term	Definition	Defining Document and Paragraph
Software Assurance Program Metrics	Metrics related to the activities defined in the Software Assurance Program. Examples include number of reviews/audits planned I. reviews/audits performed, software assurance effort planned vs. software assurance effort actual, and corrective actions opened vs. corrective actions closed.	NASA-STD 8739.8
Software Assurance Record	A record that provides objective evidence of the extent of the fulfillment of the requirements for software quality, safety, reliability, verification and validation, and, when present, IV&V. This includes documentation of the software assurance activities and analyses results.	NASA-STD 8739.8
Software Development Life Cycle	All activities required to analyze, define, develop, test, and deliver a software product. The development life cycle ends when the software becomes operational and is accepted formally for use by the customer and/or operations. Once operational, any changes/upgrades are to be treated as reduced scale software development lifecycles and the main activities (analyze, define, develop, test and deliver) should apply during these maintenance activities.	NASA-STD 8719.13B
Software Element	A portion of a software item that is logically discrete. The software element will depend on context, and can be a subset of the requirements, software design, software source code, or any software entity.	NASA-STD 8719.13B
Software Engineering	The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software: that is, the application of engineering to software (Definition from source document: IEEE 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology.)	NPR 7150.2A, Appendix A
Software Hazard	A hazard caused by incorrect software control of hazardous hardware. The software might be functioning correctly (according to its requirements) or in a failure mode.	NASA-STD 8719.13B
Software Hazard Analysis	Identification and verification of adequate software controls and inhibits; and the identification, analysis, and elimination of discrepancies relating to safety critical command and control functions.	NPR 8715.3C, Appendix B
Software Life Cycle	The period of time that begins when a software product is conceived and ends when the software is no longer available for use. The software life cycle typically includes a concept phase, requirements phase, design phase, implementation phase, test phase, installation and checkout phase, operation and maintenance phase, and sometimes, retirement phase. [From IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology]	NASA-STD 8739.8, NASA-STD 8719.13B

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Term	Definition	Defining Document and Paragraph
Software Patch	A modification made directly to an object program without reassembling or recompiling from the source program. [From IEEE 610.12]	NASA-STD 8719.13B
Software Product Quality	A measure of software that combines the characteristics of low defect rates and high user satisfaction.	NASA-STD 8739.8
Software Quality	The discipline of software quality is a planned and systematic set of activities to ensure quality is built into the software. It consists of software quality assurance, software quality control, and software quality engineering. As an attribute, software quality is (1) the degree to which a system, component, or process meets specified requirements; or (2) the degree to which a system, component, or process meets customer or user needs or expectations. [From IEEE 610.12, IEEE Standard Glossary of Software Engineering Terminology]	NASA-STD 8739.8
Software Quality Assurance	The function of software quality that assures that the standards, processes, and procedures are appropriate for the project and are correctly implemented.	NASA-STD 8739.8
Software Quality Control	The function of software quality that checks that the project follows its standards, processes, and procedures, and that the project produces the required internal and external (deliverable) products.	NASA-STD 8739.8
Software Quality Engineering	The function of software quality that assures that quality is built into the software by performing analyses, trade studies, and investigations on the requirements, design, code, and verification processes and results to assure that reliability, maintainability, and other quality factors are met.	NASA-STD 8739.8
Software Quality Metrics	Metrics are quantitative values that measure the quality of software or the processes used to develop the software, or some attribute of the software related to the quality (e.g., defect density).	NASA-STD 8739.8
Software Reliability	The discipline of software assurance that (1) defines the requirements for software controlled system fault/failure detection, isolation, and recovery; (2) reviews the software development processes and products for software error prevention and/or reduced functionality states; and (3) defines the process for measuring and analyzing defects and defines/derives the reliability and maintainability factors.	NASA-STD 8739.8
Software Reuse	A software product developed for one use but having other uses or one developed specifically to be usable on multiple projects or in multiple roles on one project.	NPR 7150.2A, Appendix A & NASA-GB 8719.13

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Software Safety	<p>[1] The discipline of software assurance that is a systematic approach to identifying, analyzing, tracking, mitigating, and controlling software hazards and hazardous functions (data and commands) to ensure safe operation within a system.</p> <p>[2] The aspects of software engineering and software assurance that provide a systematic approach to identifying, analyzing, and tracking software mitigation and control of hazards and hazardous functions (e.g., data and commands) to ensure safer software operation within a system.</p>	<p>[1] NASA-STD 8739.8</p> <p>[2] NASA-STD 8719.13B</p>
Software Safety Analysis	The application of system safety engineering techniques throughout the software life cycle to ensure that errors that could reduce system safety have been eliminated or controlled to an acceptable level of risk.	NASA-STD 8719.13B
Software Safety Change Analysis	An evaluation of whether a proposed change could invoke a hazardous state, affect a hazard control, increase the likelihood of a hazardous state, adversely affect safety-critical software, or change the safety-criticality of an existing software component. This activity determines the impact of changes made in assumptions, specifications, requirements, design, code, equipment, test plans, environment, user documentation, and training materials.	NASA-STD 8719.13B
Software Safety Plan	A document that details the activities, general relative schedule of needed activities, communication paths and responsibilities for performing software safety activities as part of the systems safety program. This does not have to be a standalone document, but could be included as part of the systems safety plan or, for small projects, an overall assurance plan. While it may be written by either the project/program/facility or by the safety personnel within the Center SMA organization(s), both must sign off on it.	NASA-STD 8719.13B
Solid Propellant	Solid compositions used for propelling projectiles and rockets and to generate gases for powering auxiliary devices.	NASA-STD 8719.12
Sortie	A single takeoff and landing of a flight vehicle.	
Solar flux unit (sfu)	Equal to 10^4 janskys measured at a wavelength of 10.7 cm.	NASA-STD 8719.14
Space	Exceeding 100 km (~62 mi) in altitude and achieving or exceeding Earth orbital velocity.	NASA-STD 8719.14, para 1.2
Space Debris	General class of debris, including both meteoroids and orbital debris.	NASA-STD 8719.14

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Space Flight	A process that begins when the crew has boarded the spacecraft on Earth and the hatch is closed and terminates when the spacecraft has returned to Earth and all of the crew have egressed the spacecraft and are in the care of ground personnel. In the event of a launch abort, space flight continues until all crew have been returned to the care of ground personnel.	
Space Launch Vehicles	Operational or experimental vehicles that are launched into orbital or suborbital flights for the purpose of carrying payloads to and from space or demonstrating technologies to further access to space. These vehicles are either inhabited or uninhabited (i.e., ELV, Space Shuttle or equivalent, EAV) and may travel at speeds ranging from subsonic to hypersonic.	NPR 8715.5, Appendix A
Space Structures	Spacecraft and launch vehicle orbital stages. This includes all components contained within the object such as instruments and fuel.	NASA-STD 8719.14
Space System	The collection of all space-based and ground-based systems (encompassing hardware and software) used to conduct space missions or support activity in space, including, but not limited to, the crewed space system, space-based communication and navigation systems, launch systems, and mission/launch control. Also referred "o as ""system" in the technical requirements.	NPR 8705.2B, Appendix A
Spacecraft	<p>[1] A habitable vehicle or device (including but not limited to orbiters, capsules, modules, landers, transfer vehicles, rovers, EVA suites, and habitats) designed for travel or operation outside Earth's atmosphere.</p> <p>[2] This includes all components contained within a space borne payload such as instruments and fuel.</p>	[2] NASA-STD 8719.14
Spares	Maintenance replacements for parts, components, or assemblies in deployed items of equipment.	NASA-STD 8729.1
Spares Provisioning	The stocking of spare units or components based on the anticipated number of failures for a given mission or length of operation.	
Special Hoist Supported Personnel Lifting Device	Device specifically designed to lift and lower persons via a hoist. These devices include hoist supported platforms where personnel occupy the platform during movement. These devices do not include elevators, lifting personnel with a crane, mobile aerial platforms, or platforms or others items hoisted unoccupied to a position and anchored or restrained to a stationary structure before personnel occupy the platform.	NASA-STD 8719.9
Specification	A description of the essential technical requirements for items (hardware and software), materials, and processes that includes verification criteria for determining whether the requirements are met.	NASA-STD 8729.1.

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Stabilized {spacecraft orientation}	When the spacecraft maintains its orientation along one or more axes.	NASA-STD 8719.14
Stamp/ Signature Warranty	A professional, individual warranty (guarantee) that the operator/inspector personally saw or performed the work (task) literally as stated in the build record.	
Standard (Standing) Operating Procedure (SOP)	A procedure prepared for operation of a facility or performance of a task on a routine basis.	NASA-STD 8719.12
Standards for Occupational Safety and Health	(Or standards adopted by NASA in accordance with NPD 80“0.6, "Technical Sta”dards"). Standards that prescribe conditions and methods necessary to provide a safe and healthful working environment. These standards are either developed internally by NASA or adopted from other sources.	NPR 8715.1, para 1.2.11
Standby Lifting Device	Lifting device that is not in regular service but used occasionally or intermittently as required. Intermittent use is defined as a lifting device which has not been used for a period of one month or more, but less than 6 months.	NASA-STD 8719.9
State OSHA Official	An investigator or compliance officer employed by a state which has an OSHA-approved occupational safety and health plan.	NPR 8715.1, para 1.2.12
Statement of Work	The part of a contract which lists the specific tasks to be performed by the contractor.	NASA-STD 8729.1
Static Dissipative	Having a resistance of 10E6 to 10E12 ohms/square. This range of conductivity helps minimize tribocharging by bleeding off the charge at a safe rate.	NASA-STD 8719.12
Static Electricity	Electrification of materials through physical contact and separation, and various effects that result from the positive and negative charges so formed, particularly where they constitute a fire or explosion hazard.	NASA-STD 8719.12
Static Test Stand	Locations on which liquid propellant engines or solid propellant motors are tested in place.	NASA-STD 8719.12
Storage Compatibility	A relationship between different items of explosives and other dangerous materials whose characteristics are such that a quantity of two or more of the items stored or transported together is no more hazardous than a comparable quantity of any one of the items stored alone.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Storage Magazine	A structure designed or specifically designated for the long-term storage of explosives or ammunition.	NASA-STD 8719.12
Stress Screening	The process of applying mechanical, electrical, or thermal stresses to an equipment item for the purpose of precipitating latent part and workmanship defects to early failure.	NASA-STD 8729.1
Stub	A skeletal or special-purpose implementation of a software module, used to develop or test a module that calls or is otherwise dependent on it. [From IEEE 610.12]	NASA-STD 8719.13B
Subcontracting	An individual, partnership, corporation, or association that contracts with an organization (i.e., the prime contractor) to design, develop, test, verify, and/or manufacture one or more products.	NASA-STD 8719.13B
Substantial Damage	Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage" for the purpose of this part (From 49 CFR Part 830).	NPR 8621.1B, Appendix A
Substantial Dividing Wall	An interior wall designed to prevent simultaneous detonation of quantities of explosives on opposite sides of the wall.	NASA-STD 8719.12
Subsystem	[1] A secondary or subordinate system within a system (such as the crewed space system) that performs a specific function or functions. Examples include electrical power, guidance and navigation, attitude control, telemetry, thermal control, propulsion, structures subsystems. A subsystem may consist of several components (hardware and software) and may include interconnection items such as cables or tubing and the support structure to which they are mounted. [2] A grouping of items satisfying a logical group of functions within a system.	[1] NPR 8705.2B, Appendix A [2] NASA-STD 8729.1
Suited Test	Any underwater activity with a test subject wearing a pressure suit that is designed for use in a vacuum.	NASA-STD 8719.10
Supervisor in Charge of the Establishment (workplace)	The building manager, building operator, facility manager, facility operations manager facility engineering head, or other designated official who normally initiates requests for repairs or maintenance for a particular building, facility, or area within a facility.	NPR 8715.1, para 1.2.13

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Supplier	<p>[1] Any organization which provides a product or service to a <i>customer</i>. By this definition, suppliers may include vendors, subcontractors, contractors, f^{ns}creweroams/projects, and the NASA organization supplying science data to a principal investigator. (In contrast, the classical definition of a supplier is: a subcontractor, at any tier, performing contract services or producing the contract articles for a contractor.)</p> <p>[2] The organization that applies the CM [configuration management] discipline. The supplier may be a contractor, academia, or the Government. The supplier may be the design agency involved in production of a product, or be limited to producing documentation.</p>	<p>[1] NASA-STD 8729.1</p> <p>[2] NASA-STD 0005</p>
Support Diver	The in-water personnel who breathe compressed breathing gas from tanks or surface-supplied hoses assigned to support the suited subject(s), test(s), and/or reconfiguration operations	NASA-STD 8719.10
Support Equipment	Equipment required to maintain systems in effective operating condition in its intended environment, including all equipment required to maintain and operate the system and related software.	NASA-STD 8729.1
Support Software	Non-deliverable software (commercially available or user developed) used for development, fabrication, testing, or acceptance of deliverable software, firmware/embedded software, or hardware. It includes automated manufacturing, test, and inspection/acceptance equipment software, compilers, and software design, test, and inspection tools.	NPR 8735.2A, Appendix C 17.1.b
Surface Nondestructive Testing	Test and inspection methods used to examine the surface of equipment/materials; e.g., magnetic particle and liquid penetrant.	NASA-STD 8719.9
Surface Resistivity	A measure specifying the resistance of a square section along the surface of the material that is usually specified in ohms per square unit.	NASA-STD 8719.12
Surface Supplied Diving	Mode of diving in which breathing gas is supplied from the surface to the diver or suited subject using a flexible hose (umbilical).	NASA-STD 8719.10

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Surveillance	<p>[1] The continuous monitoring and status of an entity and analysis of records to ensure that specified requirements are being met. Note: Surveillance can be performed in an insight, oversight, or a combined mode as determined by NASA using a risk-based decision process.</p> <p>[2] The continual monitoring and verification of status of an entity and analysis of records to ensure that specified requirements are being met. Note: Surveillance can be performed in an insight, oversight, or a combined mode as determined by NASA using a risk-based decision process.</p> <p>[3] The continual monitoring and verification of status of an entity and analysis of records to ensure specified requirements are being met. Surveillance activities may be delegated to other parties on behalf of the customer. It may be 100%, statistically-based sampling, qualitative sampling or the result of discussion with individuals who have first hand knowledge. It also may include the monitoring of contractor supplied metrics, available contractor data, sampling, or surveys.</p>	<p>[1] NPR 8735.2, and NASA-STD 8739.8</p> <p>[2] NPR 8715.5, Appendix A</p> <p>[3] NASA-STD 8729.1</p>
Surveillance Inspection	Visual inspection of explosive stock.	NASA-STD 8719.12
Suspect Car Track	A railway spur track where a car suspected of being in a hazardous condition can be examined prior to unloading of the explosive contents.	NASA-STD 8719.12
System	<p>[1] The combination of elements that function together to produce the capability required to meet a need. The elements include all hardware, software, equipment, facilities, personnel, processes, and procedures needed for this purpose.</p> <p>[2] An integrated aggregation of end items, interfaces, and support functions designed to fulfill a specific mission requirement. A system may include equipment, trained personnel, facilities, data and procedures, and software. For program/project purposes, a system is typically defined as the highest level of hardware organization composed of multiple subsystems. The term is also used to describe a disciplined and consistent approach to accomplish a task, e.g., a failure reporting system.</p>	<p>[1] NM 7120-81, Appendix A and NPR 7123.1A, Appendix A, and NPR 7150.2A, Appendix A</p> <p>[2] NASA-STD 8729.1 Appendix B</p>
System Hazard Analysis	Identification and evaluation of existing and potential hazards and the recommended mitigation for the hazard sources found. [NPR 8715.3] This includes the verification and validation of the safety functions and hazard controls.	NASA-STD 8719.13B

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
System Life Cycle	All activities required to analyze, define, develop, test, deliver, operate, maintain, and retire a system. The software life cycle (and software development life cycle) is incorporated within the system life cycle.	NASA-STD 8719.13B
System Reliability	The reliability of an entire system, as opposed to the reliability of its components. The system reliability is defined by the reliability of the components as well as the way the components are arranged reliability-wise.	
System Safety	Application of engineering and management principles, criteria, and techniques to optimize safety and reduce risks within the constraints of operational effectiveness, time, and cost throughout all phases of the system life cycle.	NPR 8715.3C, Appendix B and NPR 8715.7, Appendix A
System Safety Engineering	The application of engineering and management principles, criteria, and techniques to achieve acceptable mishap risk, within the constraints of operational effectiveness and suitability, time, and cost, throughout all phases of the system life cycle.	NPR 7123.1A, Appendix A
System Safety Manager	A designated management person who, qualified by training and/or experience, is responsible to ensure accomplishment of system safety tasks.	NPR 8715.3C, Appendix B
System Safety Plan	A written plan defining the approach to accomplish the project safety activities, including safety management, identification of safety tasks, roles and responsibilities, and the coordination and communication with project/systems engineers and approving authorities. It is also known as the Systems Safety Technical Plan as defined in NPR 8715.3, and the Systems Safety Program Plan defined in Air Force Space Command Manual 91-710, Range Safety User Requirements Manual, Volume III, Chapter 4.	NPR 8715.7, Appendix A
Systems Engineering	A disciplined approach for the definition, implementation, integration, and operation of a system (product or service). The emphasis is on achieving stakeholder functional, physical, and operational performance requirements in the intended use environments over its planned life within cost and schedule constraints. Systems engineering includes the engineering processes and technical management processes that consider the interface relationships across all elements of the system, other systems, or as a part of a larger system.	NM 7120-81, Appendix A
Tagline	A line used to restrain or control undesirable motion of a suspended load.	NASA-STD 8719.9

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Tailoring	<p>[1] The documentation and approval of the adaptation of the process and approach to complying with requirements underlying the specific program or projects. Tailoring considerations include system size and complexity, level of system definition detail, scenarios and missions, constraints and requirements, technology base, major risk factors, and organizational best practices and strengths. Critical project considerations (e.g., public safety, security, litigation exposures) may preclude tailoring out required process activities, regardless of cost, manpower available, or other considerations. (From Systems Engineering Fundamentals, Defense Acquisition University, January 2001.)</p> <p>[2] The process of assessing the applicability of requirements and evaluating the project's potential implementation in order to generate a set of specific requirements for the project.</p> <p>[3] The process where the authority responsible for a set of range safety requirements (e.g., the Independent Technical Authority for technical requirements) and the range user review each requirement and jointly document whether or not the requirement is applicable and, if it is applicable, whether or not the range user will meet the requirement as written or achieve an equivalent level of safety through an acceptable alternative. Tailoring includes the approval of deviations. Tailoring does not include the approval of waivers, which are addressed by a separate process.</p> <p>[4] To make, alter, or amend for a particular end or purpose. In performance-based contracting, the process by which sections, paragraphs, and sentences of specifications, standards, and other requirements and tasking documents are evaluated to determine the extent to which they are applicable to a specific acquisition contract and then modified to balance performance, cost, schedule, and risk.</p> <p>[5] The process used to refine or modify an applicable requirement by the implementer of the requirement. If the revised requirement meets/exceeds the original requirement, and has no increase in risk from that of the original requirement, then it may be accepted/implemented by appropriate local authority; otherwise a waiver/deviation may be required.</p> <p><i>Note: This definition of "tailoring" is for use within the application of the SMA TA as defined by the Chief, Safety and Mission Assurance.</i></p>	<p>[1] NPR 7123.1A, Appendix A</p> <p>[2] NPR 8715.7, Appendix A</p> <p>[3] NPR 8715.5, Appendix A</p> <p>[4] NASA-STD 8729.1</p> <p>[5] NASA-STD 8709.20</p>
Task	A function to be performed. In contract proposals, a unit of work that is sufficiently well defined so that, within the context of related tasks, readiness criteria, completion criteria, cost and schedule can all be determined.	NASA-STD 8729.1

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Technical Authority	<p>[1] Technical Authorities are part of NASA's system of checks and balances and provide independent oversight of programs and projects in support of safety and mission success through the selection of individuals at delegated levels of authority. These individuals are the Technical Authorities. Technical Authority delegations are formal and traceable to the Administrator. Individuals with Technical Authority are funded independently of a program or project.</p> <p>[2] The individual who specifically maintains technical responsibility over establishment of, changes to, and waivers of requirements in a designated area.</p> <p>Note: There are three Technical Authorities: Engineering, Safety and Mission Assurance, and Health and Medical.</p>	<p>[1] NM 7120-81, Appendix A</p> <p>[2] NPR 8705.2B, Appendix A</p>
Technical Risk	Risk associated with the achievement of a technical goal, criterion, or objective. It applies to undesired consequences related to technical performance, human safety, mission assets, or environment.	NPR 7123.1A, Appendix A
Temporary Holding Area	Designated areas for temporarily parking explosive laden transport trucks/railcars. QD and compatibility requirements apply.	NASA-STD 8719.12
Test	A procedure for critical evaluation; a means of determining the presence, quality, or truth of something; a trial. In engineering, a method of determining performance by exercising or operating a system or item using instrumentation or special test equipment that is not an integral part of the item being tested.	NASA-STD 8729.1
Test Article PVS	A PVS object(s) being tested for the sole purpose of obtaining data (other than integrity data) on the object(s).	NASA-STD 8719.17A
Test Flight	A flight or mission dedicated primarily to test objectives. Flight tests can include scaled test articles, uncrewed flights, and crewed flights.	NPR 8705.2B, Appendix A
Test Plan	Document approved by a Center-designated Test Readiness Review Board that describes the test objectives, test support requirements, test-unique hazards, and the test procedures and acceptable risk alternatives for accomplishing the objectives.	NASA-STD 8719.10
Test Readiness Review Board	A board established by the Center to review, assess, and approve the readiness status of all facility systems, personnel, and documentation for each underwater test or series of tests before the tests begin.	NASA-STD 8719.10
Test Specific PVS	PVS used to perform limited testing of a specific test article. PVS used on a permanent or repeated basis, or built up of components used repeatedly for testing different hardware or configurations are not part of this category.	NASA-STD 8719.17A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Test Team	All personnel assigned to an underwater facility, SCUBA testing, or suited test or training activity in accordance with Paragraphs 4.3 and 5.2 of this standard [NASA-STD 8719.10]	NASA-STD 8719.10
Test, Teardown, and Evaluation	The effort required to disassemble, test, and determine which assemblies, subassemblies, parts, or components failed or malfunctioned and to define the work required to return the failed unit to a condition complying with governing specifications.	
Testability	A design characteristic which permits timely and cost-effective determination of the status (operable, inoperable or degraded) of a system or subsystem with a high level of confidence. Testability attempts to quantify those attributes of system design which facilitate detection and isolation of faults that affect system performance.	NASA-STD 8729.1
Threshold	A level for a performance measure or a risk metric whose exceedance “triggers” management processes to rectify performance shortfalls.	NPR 8000.4A Appendix A
Tightly Coupled Programs	Programs (e.g., Constellation Program) having multiple projects that execute portions of a mission or missions. No single project is capable of implementing a complete mission. Typically, multiple NASA Centers contribute to the program. Individual projects may be managed at different Centers. The program may also include other Agency or international partner contributions. <i>Note: As of August 2010, NASA has four tightly coupled programs: Constellation, International Space Station, Space Shuttle, and Stratospheric Observatory for Infrared Astronomy (SOFIA).</i>	NPR 8709.20
TNT Equivalent	A measure of the blast effects from explosion of a given quantity of material expressed in terms of the weight of TNT that would produce the same blast effects when detonated.	NASA-STD 8719.12
Total Time	Total time is the sum of uptime and downtime.	
Traceability	Ability to trace the history, application or location of an entity by means of recorded identifications. [From ISO 8402, 3.16] For example, requirements traceability as applied to software safety involves identifying safety-critical requirements/functions then tracing them through design, test, acceptance, changes and upgrades, and through retirement.	NASA-STD 8719.13B
Tracing System	A system that enables the traceability, in both the forward and backward directions, of the lineage of a requirement from its first level inception and subsequent refinement to its implementation in a product and the documentation associated with the product.	NASA-STD 8719.13B

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Tradeoff Analysis	An objective comparison, with respect to performance, cost, schedule, risk, and all other reasonable criteria, of all realistic alternative requirements; architectures; baselines; or design, verification, manufacturing, deployment, training, operations, and support approaches.	NASA-STD 8729.1
Transient {explosives, propellants, pyrotechnics}	A person with official business on a production line or operation but who is not routinely assigned to a specific limited location. Typically, transients are roving supervisors, quality assurance, safety personnel, or maintenance personnel. Official visitors are considered transients.	NASA-STD 8719.12
Trend Analysis	The analysis of trends in data. A trend can be any identified direction, tendency, or pattern. Trend analysis generally utilizes statistical analysis to extract the trends and patterns from recorded data. Clustering approaches, discrimination approaches, and pattern-matching approaches can also be used. Examples of trend analysis are time trend analysis, correlation analysis, categorization analysis, regression analysis, and kernel analysis.	
Trouble-shooting	A procedure for localizing and diagnosing equipment malfunctions or anomalies, typically by a systematic examination progressing from higher to lower levels of assembly.	NASA-STD 8729.1
Type A Mishap	A mishap resulting in one or more of the following: (1) an occupational injury or illness resulting in a fatality, a permanent total disability, or the hospitalization for inpatient care of 3 or more people within 30 workdays of the mishap; (2) a total direct cost of mission failure and property damage of \$2 million or more; (3) a crewed aircraft hull loss; (4) an occurrence of an unexpected crewed aircraft departure from controlled flight (except high performance jet/test aircraft such as F-15, F-16, F/A-18, T-38, OV-10, and T-34, when engaged in flight test activities).	NPR 8621.1B, Appendix A
Type B Mishap	A mishap that caused an occupational injury or illness that resulted in a permanent partial disability, the hospitalization for inpatient care of 1-2 people within 30 workdays of the mishap, or a total direct cost of mission failure and property damage of at least \$500,000 but less than \$2,000,000.	NPR 8621.1B, Appendix A
Type C Mishap	A mishap resulting in a nonfatal occupational injury or illness that caused any days away from work, restricted duty, or transfer to another job beyond the day or shift on which it occurred, or a total direct cost of mission failure and property damage of at least \$50,000 but less than \$500,000.	NPR 8621.1B, Appendix A

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Term	Definition	Defining Document and Paragraph
Type D Mishap	A mishap that caused any nonfatal OSHA recordable occupational injury and/or illness that does not meet the definition of a Type C mishap, or a total direct cost of mission failure and property damage of at least \$1,000 but less than \$50,000.	NPR 8621.1B, Appendix A
Uncertainty	An imperfect state of knowledge or a variability resulting from a variety of factors including, but not limited to, lack of knowledge, applicability of information, physical variation, randomness or stochastic behavior, indeterminacy, judgment, and approximation.	NPR 8000.4A Appendix A
Uncontrolled Reentry	The atmospheric reentry of a space structure in which the surviving debris impact cannot be guaranteed to avoid landmasses. Requirement area 4.7 applies to all space structures in Earth orbital area	NASA-STD 8719.14, para 4.7.1
Uncoupled Programs	Programs that are implemented under a broad scientific theme and/or a common program implementation concept, such as providing frequent flight opportunities for cost-capped projects selected through Announcements of Opportunity or NASA Research Announcements. Each such project is independent of the other projects within the program. (e.g., Discovery Program)	NM 7120-81, para 2.1. 4.b
Unexplained Anomaly	An anomaly that cannot be repeated (phantom or ghost) or for which a cause cannot be determined.	
Uninhabited Aerial Vehicle (UAV)	A vehicle that is controlled remotely, or that is autonomous and operates at speeds ranging from subsonic to hypersonic in a manner consistent with a "conventional" aircraft. A UAV may be launched from the ground or dropped from other aerial vehicles, subscale flight test vehicles, or lifting bodies. A UAV may also be referred to using a different name such as Unmanned Air Vehicle, Unmanned Aerial Vehicle, Remotely Piloted Aircraft (RPA), Remotely Operated Aircraft (ROA), or Remotely Piloted Vehicle (RPV). Model aircraft (normally vehicles of less than 55 lbs gross weight flown under manual control within unaided visual contact range) are not considered UAVs.	NPR 8715.5, Appendix A
Unit	An assembly of any combination of parts, subassemblies, and assemblies mounted together, normally capable of independent operation in a variety of situations.	NASA-STD 8729.1
Unserviceable Explosive	Explosive which cannot be used for its intended purpose.	NASA-STD 8719.12
Uptime	The total time a system is in an operable and committed state.	NASA-STD 8729.1
Utilities	Those services such as water, air, steam, sewage, telephone, and electricity necessary to the operation of an establishment.	NASA-STD 8719.12

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Vacuum System	An assembly of components under vacuum, including vessels, piping, valves, relief devices, pumps, expansion joints, gages, and others.	NPR 8715.3C, Appendix B
Validation	<p>[1] Proof that the product accomplishes the intended purpose based on stakeholder expectations. May be determined by a combination of test, analysis, demonstration, and inspection.</p> <p>[2] Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. [ISO/IEC 12207, Software life cycle processes] In other words, validation ensures that “you built the right thing.”</p> <p>[3] Verification that the equipment/system meets the operational needs of the O&M user. It is part of the turnover process from the design agency to the O&M agency.</p> <p>[4] (1) An evaluation technique to support or corroborate safety requirements to ensure necessary functions are complete and traceable; or (2) the process of evaluating software at the end of the software development process to ensure compliance with software requirements.</p> <p>[5] To establish the soundness of, or to corroborate. Validation testing of products is performed to ensure that each reflects an accurate interpretation and execution of requirements and meets a level of functionality and performance that is acceptable to the user or customer.</p>	<p>[1] NM 7120-81, Appendix A, NPR 7123.1A, Appendix A, and NPR 8705.2B, Appendix A</p> <p>[2] NASA-STD 8739.8, NASA-STD 8719.13B (with a variation in NPR 8715.3C, Appendix B)</p> <p>[3] NPR 8820.2F, Appendix A</p> <p>[4] NPR 8715.3C, Appendix B)</p> <p>[5] NASA-STD 8729.1</p>
Valley Break	A broken wire in a wire rope in which the outside wire of a strand breaks in the immediate vicinity of the point where it contacts a wire or wires of an adjacent strand, generally at a point not visible when the wire rope is examined externally. One end of the broken wire is long enough to reach from one valley to the next one and the other end of the broken wire generally cannot be seen.	NASA-STD 8719.9
Variance	<p>[1] An authorization for temporary relief in advance from a specific requirement and is requested during the formulation/planning/design stages of a program/project operation to address expected situations.</p> <p>[2] Documented and approved permission to perform some act contrary to established requirements. Tailoring, deviation, and waiver are types of variance.</p>	<p>[1] NPR 8715.3C, Appendix B</p> <p>[2] NPR 8715.5, Appendix A, NASA-STD 8719.9, NASA-STD 8719.13B</p>

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Verification {Compliance}	Compliance verification includes: 1) verifying that appropriate technical and process requirements are in place (requirement flow-down verification); 2) verifying that documented SMA requirements are in place and capable; and 3) observing work activities and products to verify process implementation and compliance with process and technical requirements (e.g., in-process audits and reviews for verification of work discipline).	
Verification {Product}	Proof of compliance with specifications. Verification may be determined by test, analysis, demonstration, and inspection.	NPR 7123.1A, Appendix A
Verification {Software}	(1) The process of determining whether the products of a given phase of the software development cycle fulfill the requirements established during the previous phase (see also validation); or (2) formal proof of program correctness; or (3) the act of reviewing, inspecting, testing, checking, auditing, or otherwise establishing and documenting whether items, processes, services, or documents conform to specified requirements.	NPR 8715.3C, Appendix B
Verification	<p>[1] Proof of compliance with design solution specifications and descriptive documents. May be determined by a combination of test, analysis, demonstration, and inspection.</p> <p>[2] Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. [ISO/IEC 12207, Software life cycle processes] In other words, verification ensures that “you built it right.”</p> <p>[3] Record review action related to verification of recorded data.</p> <p>[4] The task of determining whether a system or item meets the requirements established for it.</p>	<p>[1] NM 7120-81, Appendix A with variations in NPR 8705.2B, Appendix A</p> <p>[2] NASA-STD 8739.8, NASA-STD 8719.13B</p> <p>[3] NPR 8735.2A, Appendix C 9.4.d</p> <p>[4] NASA-STD 8729.1</p>
Verification Plan	A formal document listing the specific technical process to be used to show compliance with each requirement.	NPR 8705.2B, Appendix A
Vernal Equinox	The direction of the Sun in space when it passes from the southern hemisphere to the northern hemisphere (on March 20 or 21) and appears to cross the Earth’s equator. The vernal equinox is the reference point for measuring angular distance along the Earth’s equatorial plane (right ascension) and one of two angles usually used to locate objects in orbit (the other being declination).	NASA-STD 8719.14

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Waiver	<p>[1] A written authorization to depart from a specific directive requirement</p> <p>[2] A documented authorization releasing a program or project from meeting a requirement after the requirement is put under configuration control at the level the requirement will be implemented.</p> <p>[3] A written authorization granting relief from an applicable requirement and documenting the acceptance of any associated risk. For NASA ELV payload projects, waivers typically are approved for a single mission and have a specific duration. However, a waiver identified early in the design or specification/requirement review(s) may apply throughout the project or to multiple missions that use a common upper stage and/or a common spacecraft bus.</p> <p>[4] A variance that authorizes departure from a specific safety requirement where an increase in risk, due to the fact that the requirement is not satisfied, has been documented and accepted by the appropriate authority.</p> <p>[5] A variance that authorizes departure from a specific safety requirement where a certain level of risk has been documented and accepted.</p>	<p>[1] NPR 1400.1</p> <p>[2] NM 7120-81, Appendix A, NASA-STD 0005 with older definitions in NPR 7123.1A, Appendix A, NPR 8705.2B, Appendix A, NPR 8715.3C, Appendix B, NPR 8715.7, para 1.5.1, and NASA-STD 8719.9</p> <p>[3] NPR 8715.7, Appendix A 33</p> <p>[4] NPR 8715.5, Appendix A</p> <p>[5] NPR 8715.3C, Appendix B, NASA-STD 8719.13B</p>
Waiver, Fleet	<p>A type of waiver which will apply to multiple products/situations that are using the same design or operation which may be outside of a single program/project or Center.</p> <p><i>For example: A waiver applicable to all Delta II 7925 ELVs.</i></p>	NASA-STD 8709.20
Will	Denotes expected outcome.	
Winch	A stationary motor-driven or hand-powered hoisting machine having a drum around which is wound a rope, chain, or web used for lifting and lowering a load (does not apply to winches used for horizontal pulls).	NASA-STD 8719.9
Witness	A person who has information, evidence, or proof about a mishap and provides his/her knowledge of the facts to the investigating authority.	NPR 8621.1B, Appendix A

NASA-STD 8709.22 with Change 1

Term	Definition	Defining Document and Paragraph
Witness Statements	A verbal or written statement from a witness that describes his/her account including a description of the sequence of events, facts, conditions, and/or causes of the mishap.	NPR 8621.1B, Appendix A
Workforce	Government or contractor personnel who are directly involved in a range operation or who work at a range, launch site, or landing site where a NASA range operation takes place. For the purposes of this NPR, "workforce" does not include any crew on board a vehicle during flight.	NPR 8715.5, Appendix A
Working Load	If the device has never been downrated or uprated, this also is the "manufacturer's rated load."	NASA-STD 8719.9