



Subject: Policy for the Handling of Mortality Related to NASA Human Spaceflight Operations

Responsible Office: Office of the Chief Health & Medical Officer

1. POLICY

a. NASA strives to make spaceflight as safe as possible by meeting safety objectives, mitigating technical risk, and conducting independent assessments of mission threats and mishaps. b. It is NASA's policy to:

- (1) Establish and implement necessary processes and agreements with internal and external stakeholders to conduct medical investigations, handling of remains, and chain of custody for NASA spaceflight-related mortality mishaps or incidents resulting in the death of a crewmember at a launch or landing site, in space, on a spacecraft, or other planetary body during a NASA spaceflight activity or mission.

Note 1: This policy complements NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping, which outlines requirements for mishap readiness and response. The intent of this policy is to further delineate responsibilities regarding medical readiness and response.

Note 2: NPR 1800.1, NASA Occupational Health Procedural Requirements, details occupational medicine responsibilities including support of official civil service foreign travel unrelated to spaceflight (e.g., official civil servant and NASA astronaut overseas travel).

- (2) Enable human spaceflight by consulting with other federal agencies (e.g., Federal Aviation Administration (FAA), Department of Defense (DoD), Defense Health Agency (DHA)/United States Armed Forces Medical Examiner System (AFME/AFMES), National Transportation Safety Board (NTSB)) to ensure mishap plans related to medical investigations, handling of remains, and chain of custody are in place for NASA missions or NASA astronauts operating on non-NASA property.

- (3) Endeavor to assist commercial providers and international partners, if asked, generally on a reimbursable basis and as permissible under the law, when a non-NASA mission spaceflight-related mortality mishap occurs on NASA federal property including the U.S. segments of the ISS or other NASA spacecraft.

2. APPLICABILITY

- a. This NASA Interim Directive (NID) is applicable to NASA Headquarters and NASA Centers, including Component Facilities.
- b. This directive is applicable to other contractors and parties to cooperative agreements or other agreements only to the extent specified in the contracts, cooperative agreements, or other agreements.
- c. This NID is applicable to commercial provider facilities where NASA Astronauts conduct spaceflight-related training and mission activities to the extent specified in their contracts.

d. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term “shall.” The term “may” denotes a discretionary privilege or permission, “can” denotes statements of possibility or capability, “should” denotes a good practice and is recommended, but not required, “will” denotes expected outcome, and “are/is” denotes descriptive material.

d. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

3. AUTHORITY

- a. Inspectors General, 5 U.S.C. §402
- b. Health Services Programs, 5 U.S.C. § 7901.
- c. The National Aeronautics and Space Act, 51 U.S.C. § 20113 (a).
- d. Recovery and Disposition Authority, 51 U.S.C. § 20147.
- e. Designation of Agency Safety and Health Officials, 29 CFR § 1960.6.
- f. NPD 1000.3, The NASA Organization.

4. APPLICABLE DOCUMENTS AND FORMS

- a. Definitions, 51 U.S. Code § 50902.
- b. To Research, Evaluate, Assess, and Treat (TREAT) Astronauts Act, 14 CFR pt. 1241.
- c. Recording and Reporting Occupational Injuries and Illnesses, 29 CFR pt. 1904.
- d. NPR 1800.1, NASA Occupational Health Program Procedures.
- e. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping.
- f. NID 8715.129, Biological Planetary Protection for Human Missions to Mars.
- g. NASA-SP-2020-5006891, Spaceflight Mishap Investigation Flight Surgeon Handbook.
- h. Principles Regarding Processes and Criteria for Selection, Assignment, Training, and Certification of ISS (Expedition and Visiting) Crewmembers. Multilateral Crew Operations Panel (MCOP), Revision G. August, 2013.

5. RESPONSIBILITY

a. The NASA Chief Health and Medical Officer (CHMO) shall:

(1) Act as the Occupational Safety and Health Administration (OSHA) Designated Agency Safety and Health Officer (DASHO) and as the Agency Medical Authority of record for fatal spaceflight-related mortality mishaps during NASA missions. The CHMO may delegate this authority as appropriate. The CHMO coordinates with:

(a) Appropriate investigators and medical examiners and reports the death of a NASA Astronaut or other Agency personnel as the DASHO in accordance with 29 CFR pt. 1904, Recording and Reporting Occupational Injuries and Illnesses.

(b) Foreign medical authorities, the U.S. Department of State, and/or DoD, and the NASA Office of International and Interagency Relations (OIIR) when responding to spaceflight-related mortality mishaps on foreign soil.

- (c) Foreign space agencies in reporting the death of their agency astronaut during NASA missions.
- (d) Internal NASA offices and appropriate stakeholders in accordance with NPR 8621.1, paragraph 2.2, including but not limited to, the Office of the NASA Administrator, Office of Safety and Mission Assurance (OSMA), and NASA Mishap Program Executive.
- (e) External entities as appropriate (e.g., commercial providers, FAA) in reporting the death of a non-NASA crewmember as a part of a spaceflight-related mortality mishap when such mishap occurs on NASA federal property, including NASA space vehicles, during NASA missions, or when engaged with a NASA vehicle or spacecraft, such as the ISS.

Note: NASA medical investigation procedures and flight surgeon responsibilities are documented in NASA-SP-2020-5006891, Spaceflight Mishap Investigation Flight Surgeon Handbook.

- (2) Act as a liaison to and consult with other federal agencies (e.g., Federal Bureau of Investigation (FBI), FAA, DoD, and NTSB) when requested.
- (3) Notify the NASA Office of Inspector General of information potentially related to criminal activity or other wrongdoing in connection with a spaceflight-related mortality mishap. Any personnel may make the notification.

b. The Office of the Chief Health and Medical Officer (OCHMO) shall:

- (1) In order to implement this policy, develop and maintain Memoranda of Understanding (MOU) or other agreements with appropriate offices of other federal agencies (e.g., DHA/AFMES/AFME, FAA) and appropriate national accreditation and/or credentialing organizations and universities with expertise in the forensic sciences regarding the conveyance, autopsy, forensic pathological examination, toxicology, analysis and preparation (e.g., embalming and cremation) of deceased crewmembers due to a NASA spaceflight-related mortality mishap.

Note: The AFME will be the prime medical examiner for missions involving NASA astronauts.

- (2) As directed, provide support and information to any relevant Presidential Commissions, Congressional Commissions or Congress.
- (3) Develop and maintain an MOU with the NTSB that allows NASA to lend consulting expertise to the NTSB on space physiology, forensics, spaceflight life support, spaceflight human factors, and other areas of interest should such expertise be needed or requested in the performance of their duties in a private human spaceflight mishap investigation.
- (4) Coordinate with AFMES regarding forensic pathology sample return (e.g., blood, aqueous and vitreous humor, hair, tissue) that may be required for adequate determination of cause of death.
- (5) Enable information, lessons learned, and best practices sharing to educate and assist international agencies, NTSB, FAA, and state and local personnel on spaceflight physiology, pathology, and hazards related to human spaceflight including their specific impact on remains or forensic investigation.
- (6) Coordinate with the NASA Planetary Protection Officer (PPO) regarding planetary protection requirements if the remains are not recoverable or it is deemed appropriate to inter the remains (as opposed to returning them) on a planetary body or in space. Ensure that any sample return from remains from an extraplanetary body are in accordance with containment requirements set forth by the NASA PPO. The NASA PPO will act as a liaison with other agencies, countries, or entities regarding the planetary protection requirements.

Note: The current OSMA policy, NID 8715.129, Biological Planetary Protection for Human Missions to Mars, is being expanded to include all human missions.

- (7) Coordinate with the NASA Mishap Program Executive regarding mishap investigations or lessons learned that may be important to disseminate to other programs, agencies, or partners.
- (8) Assign NASA flight surgeons, as appropriate, to mishap investigation or response teams.
- (9) As Health and Medical Technical Authority (HMTA), develop and maintain technical standards and requirements related to spaceflight-related mortalities.
- (10) As delegated to the JSC Medical Contingency Group in the Health and Human Performance Directorate, work with the KSC Chief Medical Officer (CMO) to establish and maintain requirements for the handling of remains both on orbit and on NASA federal property in the event of a mishap or death related to human spaceflight.
- (11) As delegated to the JSC CMO, assign a Flight Surgeon who will act as the principal liaison on medical affairs to the family of deceased NASA astronauts and assist international agency flight surgeons in their support to crewmember families.
- (12) As delegated to JSC Behavioral Health and Performance personnel, provide support services to the family of deceased astronauts and assist international agency flight surgeons in their support to crewmember families.
- (13) For foreign crewmembers involved in NASA spaceflight-related mortality mishaps or incidents, and with OIR assistance as required:
 - (a) Aid the medical officers from the international agency or country.
 - (b) Facilitate discussions and arrangements pertaining to implementation of the death investigation and autopsy as appropriate between international agency(ies) and the appropriate local coroner or medical examiner, AFME, host nation medical examiner, or local law enforcement for the purposes of scene forensics, body recovery, or remains repatriation to the foreign person's country.
 - (c) Aid in the facilitation of additional resources as required (e.g., Critical Incident Stress Debriefing).
 - (d) Use government temporary mortuary storage, remains containment units for transport, or other assets to assure the chain of custody and appropriate transport of crewmember remains until they may be remanded to the local medical examiner, AFME, or host nation medical examiner, and returned to the crewmember's country.

Note: Additional processes and procedures will be documented and instituted for each international agency/country through appropriate program agreements and medical boards.

c. The OCHMO may:

- (1) Request and pay for an autopsy consistent with 14 CFR pt. 1241, To Research, Evaluate, Assess, and Treat (TREAT) Astronauts Act.
- (2) Coordinate with FBI forensics personnel/field offices as necessary regarding recovery of remains, forensic investigation, and death investigation.
- (3) Allocate funding of research, convene expert panels, or commission reports related to the handling of remains, forensics, or death investigations as appropriate to better inform NASA policies and procedures.

- (4) For spaceflight-related mortality mishaps or incidents resulting in the death of a crewmember during or caused by spaceflight operations, but not during a NASA spaceflight activity or mission on federal property, if requested by the commercial or international partner endeavor to:
- (a) Aid the assigned medical officers and facilitate additional resources as needed (e.g., Critical Incident Stress Debriefing).
 - (b) Facilitate discussions, agreements, and implementation of the death investigation and autopsy between the private entities and the appropriate local coroner or medical examiner, local law enforcement for the purposes of scene forensics and body recovery.
 - (c) As required by exigent circumstances, use government temporary mortuary storage of deceased crewmembers' remains until such time that they may be remanded to the local medical examiner, while ensuring proper chain of custody.

Note: Such activities may be performed on a reimbursable basis as permissible under the law.

6. DELEGATION OF AUTHORITY

None.

7. MEASUREMENT/VERIFICATION

The CHMO measures compliance with this directive by assessing records and by meeting regularly with other federal agencies involved in responding to spaceflight mortality mishaps.

8. CANCELLATION

None.

ATTACHMENT A: Definitions

The following definitions are applicable for the purposes of this document and may differ from those used by other organizations or agencies. More than one term may apply to the same person. As operational concepts, agreements, and terms of reference evolve for current and future spaceflight programs, these definitions will be updated as required. Some official definitions have been adapted to address the current state of human spaceflight activities.

Crewmember. A participant in human spaceflight who is either an international astronaut, NASA astronaut, private astronaut, or spaceflight participant. This generic term is intended to apply to any one of the people assigned or operating together as a mission, expedition, or increment ‘crew.’

Designated Agency Safety and Health Official (DASHO). The person 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, Designation of Agency Safety and Health Officials, and the provisions of Executive Order 12196.

NASA Astronaut. An astronaut employed by or detailed to NASA who is a professional career astronaut, as defined by the ISS Multilateral Crew Operations Panel (MCOP), *Principles Regarding Processes and Criteria for Selection, Assignment, Training, and Certification of ISS (Expedition and Visiting) Crewmembers*, and who is currently eligible for flight assignment.

Spaceflight-Related Mortality Mishap. An unplanned event resulting in the death of a U.S. or foreign crewmember during or caused by NASA spaceflight operations. Such events may occur during any operational mission phase, including pre-flight, inflight, or post-flight.

ATTACHMENT B: Acronyms

AFME	Armed Forces Medical Examiner
AFMES	Armed Forces Medical Examiner System
CHMO	Chief Health and Medical Officer
CMO	Chief Medical Officer (e.g., at a NASA Center)
DASHO	Designated Agency Safety and Health Officer
DHA	Defense Health Agency
DoD	Department of Defense
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
HHPD	Human Health and Performance Directorate
HMTA	Health and Medical Technical Authority
ISS	International Space Station
JSC	Johnson Space Center
KSC	Kennedy Space Center
MCOP	(ISS) Multilateral Crew Operations Panel
MOU	Memorandum of Understanding
NID	NASA Interim Directive
NTSB	National Transportation Safety Board
OCHMO	Office of Chief Health and Medical Officer
OIIR	Office of International and Interagency Relations
OSHA	Occupational Safety and Health Administration
OSMA	Office of Safety and Mission Assurance
PPO	Planetary Protection Officer
U.S.	United States

ATTACHMENT C: References

- a. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, United Nations Resolution 2345 (XXII), December 19, 1967.
- b. Memorandum of Understanding between the Defense Health Agency and the NASA Lyndon B. Johnson Space Center.
- c. Memorandum of Understanding between the National Aerospace and Space Administration (NASA) and the Federal Aviation Administration Regarding Achievement of Mutual Goals in Commercial Space Activities.
- d. The Artemis Accords, Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes, October 12, 2020.

e. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, United Nations Resolution 2222 (XXI), December 19, 1966.