820-MPCP-2019-01

BALLOON PROGRAM OFFICE (BPO)

MISHAP PREPAREDNESS AND CONTINGENCY PLAN (MPCP)

Effective Date
July 2019

Expiration Date
July 2024

820/NASA Balloon Program Office

National Aeronautics and Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

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CHANGE HISTORY LOG		
REVISION	**EFFECTIVE DATE**	**DESCRIPTION OF CHANGES**
-	July 2019	Complete revision of the BPO MPCP, including annex templates for each campaign location and attachments. This cancels 820-2016-PLAN-02 revision A and all previous versions.

Appending Annexes will not require change or revision of this plan		
Annex # (Project #)	**Effective Date**	**Mission/Project**

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1 INTRODUCTION

This document provides general mishap response information to be utilized in concert with the relevant Mishap Preparedness and Contingency Plan (MPCP) for the NASA Balloon Program Office (BPO), Columbia Scientific Balloon Facility (CSBF), Balloon Research and Development Lab (BRDL), Wallops Arc-Second Pointer (WASP) Integration, and BPO campaigns. The following sections incorporate general NASA guidelines, procedures and documentation that shall be used by the Mission Management Team (MMT), the Interim Response Team (IRT), and Investigating Authority (IA). Notable sections of NPR 8621.1 "*NASA Procedures and Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping*," GPR 8621.4 "*Goddard Space Flight Center (GSFC) Mishap Preparedness and Contingency Plan*," and 803-GS-PLN-INST-01 "*Wallops Flight Facility (WFF) Institutional Mishap Preparedness and Contingency Plan*" are referenced herein; however, personnel should refer to all governing documentation.

In this plan, all mandatory actions (*i.e.*, requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denotes discretionary privilege or permission; "should" denotes a good practice and is recommended, but not required; "will" denotes expected outcome; and "are" or "is" denotes descriptive material.

1.1 Purpose of Plan

In accordance with NPR 8621.1, this is the NASA BPO plan for responding to mishaps and close calls with respect to CSBF, which is located in Palestine, Texas, BRDL at WFF, WASP integration at WFF, and BPO balloon payload integration, launch, and mission operations associated with campaigns. The purpose of this document is to establish the initial response process for the immediate gathering of essential facts and information in response to balloon mission mishaps or close calls. A mishap or close call, as applicable to this plan, generally involves injury to personnel (including the public), unplanned off-range impact of the launch vehicle or payload, damage to non-flight assets (including private property), or an incident that is highly visible to the public. Mishaps or close calls shall be immediately reported to the BPO Chief who will then make notifications per this MPCP and in accordance with NPR 8621.1, GPR 8621.4, and Code 800 directives.

1.2 Plan Applicability and Scope

This plan applies to the CSBF, BRDL, WASP Integration, and BPO mishaps and close calls, including Balloon Program ground, flight, and recovery operations during its campaigns. This plan uses the terms mishap and close call compliant with NPR 8621.1. This plan makes a distinction between incidents categorized as a "Mishap" or "Close Call" that requires adherence to NPR 8621.1 and an "Accepted Risk" that will be investigated under 800-PG-8621.0.1. Mishaps and Close Calls are the only class of incidents addressed by this plan. This plan also does not cover any equipment or payloads where the experimenter was responsible for packaging and shipping, including shipping container.

In accordance with the Suborbital and Special Orbital Projects Directorate's Suborbital (SSOPD) Anomaly Investigation and Reporting, 800-PG-8621.0.1, accepted risks as determined by the BPO, and in agreement with its stakeholders, are not considered mishaps or close calls and shall be documented in the mission-specific Portfolio Project Plan Annex.

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Mishaps or close calls occurring at the BRDL, WASP Integration, or CSBF, are by definition, a "NASA Mishap", regardless of the ownership of the property involved. CSBF is a NASA facility. NASA maintains ownership of its equipment regardless of location. Principal Investigators (PIs) and their teams are required to cooperate with BPO and CSBF in response to a mishap or close call and will be briefed on protocols onsite. In the event of a potential or confirmed NASA Balloon mishap or close call occurring during the campaign, the BPO shall execute mishap response and investigation in accordance with NPR 8621.1 and this document.

For initial mishap classification, the total value of the specific balloon mission is defined as approximate replacement value of the payload, and any property damage resulting from the mishap. Balloon Program mission expendables (*e.g.*, balloon and helium), along with the associated pro rata campaign costs, are funded as part of the program's mission model and are not considered in calculating the mishap value for a particular balloon mission.

The Balloon Program conducts operations at the launch site and remotely through mission support and recovery operations. As such, a Balloon Program Mishap or Close Call can occur at the launch site or offsite along the path of the balloon trajectory and impact recovery site. Regardless of the geographic location or host site, NASA will conduct an investigation of NASA Balloon Program incidents.

Each campaign shall have a campaign specific MPCP that will, for each mission, describe the science mission, assign a mission value, and describe what constitutes mission failure. The campaign specific MPCP documents are annexes to this plan; therefore, all requirements put forth in this plan are applicable.

During a campaign, three categories of incidents can occur, those due to accepted risks, those due to mishaps, and those due to close calls, each of which is defined in the following sections. For purposes of this plan:

- Ground covers all events during payload preparation through balloon release from the spool, and post-flight recovery.
- Flight covers the events beginning with balloon release from the spool, payload release, ascent, flight, termination, descent, and landing.

1.3 Relationship to WFF's Institutional Mishap Preparedness and Contingency Plan

Although this MPCP provides the framework for mishap or close call responses, it is not a substitute for the WFF Institutional Mishap Preparedness and Contingency Plan, which provides guidance related to the response, reporting and corrective actions of mishaps and close calls occurring at WFF and remote locations having WFF assets.

1.4 Terms

1.4.1 NASA Mishaps and Close Calls

The severity of the personnel injury and the direct cost of the mishap or close call (property damage or mission failure) determine the classification level of the mishap or close call (see table below). This

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category of incident shall be reported and investigated under the authority of NPR 8621.1, GPR 8621.4, and 803-GS-PLN-INST-01.

Table 1: NASA Mishap and Close Call Classifications

Classification Level	Property Damage	Injury
Type A Mishap	Total direct cost of mission failure and property damage of $2,000,000 or more, Or Crewed aircraft hull loss, Or Unexpected aircraft departure from controlled flight for all aircraft except when departure from controlled flight has been pre-briefed (e.g., upset recovery training, high AOA envelope testing, aerobatics, or OCF for training) or mitigated through the flight test process inherent at each Center.	Occupational injury or illness resulting in A fatality, Or A permanent total disability.
Type B Mishap	Total direct cost of mission failure and property damage of at least $500,000, but less than $2,000,000.	Occupational injury or illness resulting in A permanent partial disability, Or Hospitalization for inpatient care of three or more people within 30 workdays of the mishap. ***Note*** *Hospitalization does not include any hospital stay intended only for medical testing, diagnosis, or observation to determine nature or extent of injury or illness.*
Type C Mishap	Total direct cost of mission failure and property damage of at least $50,000, but less than $500,000	Nonfatal OSHA-recordable occupational injury or illness resulting in days away from work, or restricted duty, or transfer to another job beyond the day or shift on which it occurred. Or Hospitalization for inpatient care of one or two people within 30 workdays of the mishap.
Type D Mishap	Total direct cost of mission failure and property damage equal to or greater than $20,000 but less than $50,000.	Any nonfatal OSHA recordable occupational injury or illness that does not meet the definition of a Type C mishap.
Close Call	An event in which there is no equipment or property damage, or minor equipment property damage of less than $20,000, but which possesses a potential to cause a mishap.	No injury or only minor injury requiring first aid, but which possesses a potential to cause a mishap.

1.4.2 Accepted Risks

In accordance with baseline programmatic implementation and in agreement with program stakeholders, incidents considered accepted risks shall include but are not limited to:

- Launch abort;
- Failure to meet mission or science minimum success requirements;
- Failure of the balloon during the launch, ascent, or float phases;

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- Failure of support equipment or instrumentation;
- Failure of science equipment or instrumentation;
- Recoverable damage to support or science equipment prior to or during the launch process;
- Unrecoverable damage or loss of support or science equipment due to mission operations, including flight termination and landing, environmental, provided no safety constraints were violated.

Accepted risks associated with the BPO campaigns are documented in the mission-specific Portfolio Project Plan Annexes to ensure that the risk is understood and agreed to by the program, such that no further specific mitigating action is required. Mission specific variances in accepted risks shall be formally documented and agreed upon by the BPO Chief and PI or other stakeholders, as needed. It is the prerogative of the BPO Chief in consultation with SSOPD management and WFF Safety Office to determine whether an accepted risk should be elevated to a close call or mishap.

1.5 Authority Document

Document Number	Title
NPR 8621.1	NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping

1.6 Applicable Documents

Document Number	Title
GPR 8621.4	GSFC Mishap Preparedness and Contingency Plan
803-GS-PLN-INST-01	Institutional Mishap Preparedness and Contingency Plan for Wallops Flight Facility
800-PG-8621.0.1	Suborbital Research Program Anomaly Investigation and Reporting
820-PG-8621.1.1	Investigation and Reporting Procedures for Balloon Program Mishaps, Failures, and Anomalies
NNG15WA53C	NASA Balloon Operations Contract
820-MPCP-FORM-2019-01	BPO MPCP Attachments
820-MPCP-NOTFICATION-2019-01	BPO MPCP Notification Contact List Attachment
820-MPCP-Antarctica-XXXX-XX	BPO Antarctica Campaign MPCP Annex
820-MPCP-Australia- XXXX-XX	BPO Australia Campaign MPCP Annex
820-MPCP-Ft.Sumner- XXXX-XX	BPO Fort Sumner Campaign MPCP Annex
820-MPCP-NewZealand- XXXX-XX	BPO New Zealand Campaign MPCP Annex
820-MPCP-Palestine- XXXX-XX	BPO Palestine Campaign MPCP Annex
820-MPCP-Sweden- XXXX-XX	BPO Sweden Campaign MPCP Annex

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1.7 Reference Documents

Document Number	Title
803-GS-RAR-BPO-Balloons-01	Balloon Risk Analysis Report for Balloon Launch Vehicles
803-RS-BDA-BPO-01	Balloon Impact Dispersion Analysis for Balloon Program Office Conventional Zero pressure and Sure Pressure Balloon Missions
820-FORM-2013-1	BPO MM Launch Procedure
Hand Launch SOP	Balloon Risk Analysis and Standard Operating Procedure for Hand Launch Balloon Missions
GSFC-STD-8009	Wallops Flight Facility Range Safety Manual
EL-100-10-H	Long-Duration Ballooning Support for Science Groups
	NASA Scientific Balloon Program Programmatic Environmental Assessment from September 2010

1.8 Generic Description of Scientific Balloon Campaign

The scientific balloon program uses helium-filled low linear density polyethylene balloons of large volume, typically between about 1.2 and 18.3 million cubic meters (4 – 60 million cubic feet). The balloons are launched from various sites around the world by crews of the CSBF based in Palestine, Texas. They float in the stratosphere for periods ranging from less than a day to over 100 days, following trajectories imposed by the wind at the float altitude. On radio command, the flights are terminated over an appropriate location, and the instruments parachute to the ground and are recovered for possible future flight.

Conventional balloon flights are those with flight durations ranging from a few hours to a few days, use direct line of sight telemetry for commands and data, and their payloads are recovered typically within several hundred miles of the launch site. Conventional missions are currently supported for launches from Fort Sumner, New Mexico; Palestine, Texas; McMurdo, Antarctica; Wanaka, New Zealand; Alice Springs, Australia; and Kiruna, Sweden (Esrange).

Long Duration Balloon (LDB) flights normally traverse between continents or circumnavigate one of the poles, and may last as long as four weeks. Ultra-Long-Duration Balloon (ULDB) flights normally traverse between continents or circumnavigate one of the poles, and may last longer than 100 days. LDB flights rely on satellite-based electronic systems for commands and data, and their payloads are recovered typically several hundred miles or more from the launch site. LDB missions are currently supported for launches from McMurdo, Antarctica; Wanaka, New Zealand; Alice Springs, Australia; and Kiruna, Sweden.

Zero-Pressure (ZP) balloons have been used for both conventional and LDB flights. Zero-pressure means they are vented near the bottom to the outside, so the balloon pressure is in equilibrium with the atmospheric pressure at that point (zero differential pressure). Only a small fraction of the balloon's volume is filled with helium on the ground, since the helium expands as the balloon rises. Excess helium flows out the vents as the balloon reaches its fully inflated float altitude. After floating during a day, at night there is a cooling of the helium and consequent shrinking of the balloon volume, which causes the balloon to sink to a lower altitude. To reduce the altitude variation, at sunset ballast is

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dropped; however, the number of sunsets a balloon can survive and the extent to which the diurnal altitude variation can be reduced is limited by the amount of ballast that can be carried.

Super-pressure balloons (SPB) have been used for LBD flights and would be used for ULDB flights. SPB are designed to maintain essentially constant volume – day and night – and thus to float at nearly constant altitude without need for dropping ballast at sunset. These balloons are sealed and designed to withstand slight differential pressure. They are inflated with enough helium to fill the volume at the coldest temperatures, and they have enough strength to hold that helium when sunlight heats it.

A typical campaign has a manifest comprised of hand-launch balloons, ZP balloons, and/or SPB balloons. Each manifest is comprised of one or more science missions each with a Project Portfolio Plan Annex defining its flight profile as a conventional, long-duration, or ultra-long-duration flight.

For each campaign, a specific campaign mishap preparedness and contingency plan annex will be developed and approved. It will describe the campaign's science missions, their objectives, values (cost/price), and defines mission failures. Each mission will also have a Project Portfolio Project Plan Annex that describes the accepted risks. Science hazardous materials and processes are documented in the associated campaign's NASA Ground Safety Plan (GSP) and Flight Safety Plan (FSP).

1.8.1 Science Mission Integration and Testing Description

After a mission has been approved for a campaign, the payload goes through integration and testing at Palestine or the launch site. The payload is assembled and mounted to the certified gondola frame. The gondola may be designed by the science team and certified by CSBF, or be a certified, NASA provided gondola. The payload is then integrated with the CSBF equipment and the ensemble is run through a battery of tests (*e.g.*, vacuum testing). The final test is called a Hang Test that uses the launch vehicle to hang the integrated payload/gondola for testing of all electronics and communication systems and the final weighing of the payload. For Antarctica, New Zealand, Australia, and Sweden, there is a pre-shipment integration and testing at the CSBF facility. Any close call, mishap, or anomaly during integration and testing shall be reported immediately to ensure a timely investigation. Once testing is complete, a mission Flight Readiness Review (FRR) is performed.

1.8.2 Launch Description

Once at the launch site, the Mission Manager (MM) will conduct a series of onsite reviews (tabletops) and lead the Campaign FRR, Wallops Flight Facility (WFF) Approval to Proceed (ATP), Mission FRRs, and Mission ATPs.

The typical balloon vehicle configuration for launch consists of major components as shown in Figure 1. During the launch phase, the mission essential personal allowed in the launch hazard area is limited to two payload handlers, a spool release handler, a launch Crew Chief (CC), an Operational Safety Specialist (OSS), and minimum number of other launch essential personnel per the Range Safety Manual (RSM).

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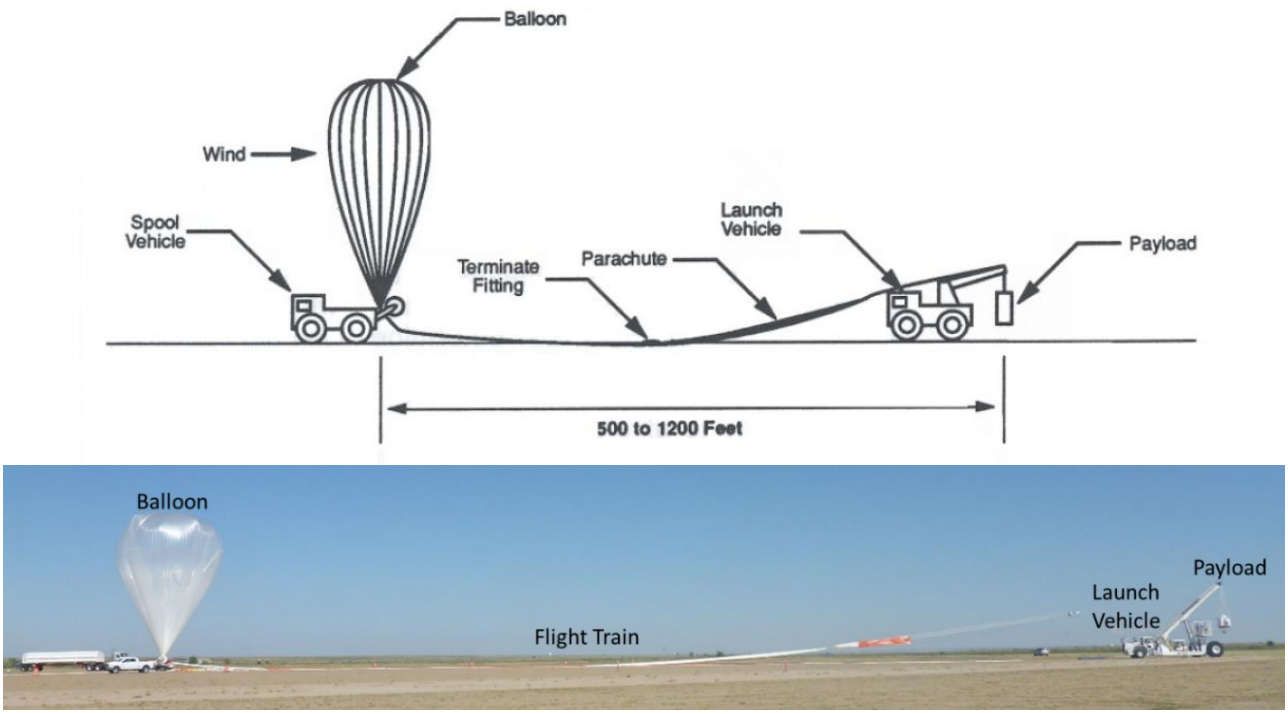

Figure 1: Balloon Mobile Launch Vehicle Configuration Schematic and Image

A typical balloon hand-launch configuration consists of the major components as shown in Figure 2. During the launch phase, the mission essential personal allowed in the launch hazard area is limited to two payload handlers, a spool release handler, a launch CC, an OSS, and minimum number of other launch essential personnel per the RSM.

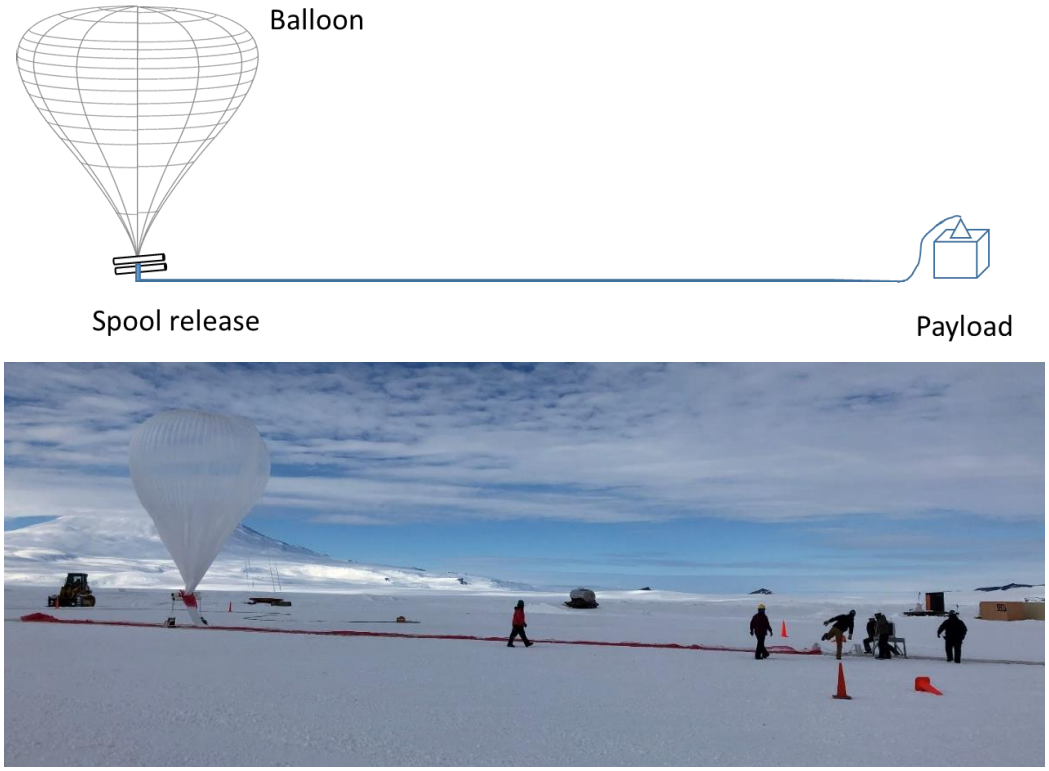

Figure 2: Hand Launch Configuration Schematic and Image

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1.8.3 Post-Flight Recovery Description

Payload recovery will be defined within the Payload Recovery Plan that is associated with the campaign. Depending on the flight type, Conventional, LDB, or ULDB, the recovery may be within hundreds of miles of the launch site or thousands of miles. As per the contract, CSBF is responsible for recovery efforts. After flight is on the ground, team composed of CSBF personnel and, as required, science team members coordinate with local law enforcement for the recovery of the payload and CSBF equipment. For Antarctica only, only the payload and CSBF equipment is recovered.

1.8.4 Special Procedures for each campaign

1.8.4.1 Hazardous Materials and Operations

a. The MM will retain applicable hazardous procedures, NASA GSP, FSP, and review the Payload Recovery Plan.
b. The CSBF CC will retain a master Safety Data Sheet (SDS) book.
c. The following landing and recovery procedures take into account the possibility that the balloon gondola-payload will sustain damage upon ground impact and therefore serves as the procedures to identify and handle hardware debris, including hazardous materials.

- Gondola Recovery Procedure
- CSBF Recovery Procedure

d. Mission Recovery Procedures shall be reviewed and released for use in time to support the specific mission's FRR.

1.8.4.2 Unexploded Ordnance and Hazardous System Disposal

All ordnance contained on balloon systems are considered 1.4S (1 Amp / 1 Watt / No Fire) and are to be shielded and shorted and in SAFE mode as integrated in the system (refer to firing circuit diagram in 803-GS-RAR-BPO-BALLOONS-01.

a. In the case of active aborted launch, in accordance with the campaign's mishap preparedness and contingency plan, the Incident Commander (IC) will notify local authorities if the balloon leaves the controlled area. After the first responders are on scene, the IC, in coordination with the OSS, will determine if the recovery site is safe for entry and will direct CSBF to perform destructive or non-destructive operations to safe, destroy, or neutralize any/all hazardous systems. The IC/OSS may also direct personnel to leave unexpended ordnance in state for removal. The IC and OSS will advise CSBF crew as to how this shall be accomplished based upon the geometry of the debris.

b. In the case of a nominal termination or controlled abort, in accordance with recovery procedures, essential personnel will likely be the first responders on scene. The IC, in coordination with the OSS, will determine if the recovery site is safe for entry. If necessary, the IC/OSS will direct CSBF to perform destructive or non-destructive operations to safe, destroy, or neutralize any/all hazardous systems. The OSS may also direct personnel to leave unexpended ordnance in state for removal.

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c. In the case of an off-nominal termination, in accordance with CSBF termination and recovery documentation, essential personnel may not be the first responders on the scene but will be activated and enroute. CSBF will contact local authorities to advise personnel of hazardous systems and instruct how best to proceed.

1.9 Coordination of Investigation with Local Authorities

For mishaps or close calls that occur at the BRDL, WASP Integration, or CSBF, NASA will have primacy of investigation unless directed otherwise. Other organizations may elect to conduct a parallel investigation. NASA will coordinate with other agencies on the mishap to determine if they wish to exercise their own investigation, as required. In the event of a potential or confirmed NASA Balloon mishap or close call occurring during the campaign, the BPO shall execute mishap response and investigation in accordance with NPR 8621.1 and this document. Campaign specifics for coordination with other organizations will be documented in the campaign MPCP.

2 ROLES AND RESPONSIBILITIES FOR BPO MISHAPS, CLOSE CALLS, AND ACCEPTED RISKS

In accordance with NPR 8621.1 and GPR 8621.4, NASA Mishap Reporting and Investigating Policy, the BPO is responsible for ensuring that the MPCP is in place to respond to mishaps and close calls. The BPO Chief is responsible for timely reporting of Balloon Program contingencies, including mishaps, anomalies, and close calls to NASA center and headquarters management. There are three types of investigating authorities: Mishap Investigation Board (MIB), Mishap Investigation Team (MIT), and Mishap Investigator (MI). The appointing official will determine the type of investigation authority.

2.1 The WFF/SSOPD Director shall:

a. Notify the GSFC Center Director (CD) and the GSFC Deputy CD.

2.2 The WFF Safety Office Chief shall:

a. Notify the Mishap Investigation Program Manager, HQ/ Office of Safety and Mission Assurance (OSMA) - [within 1 Hour of Type A Mishap, Type B Mishap, High-Visibility Mishap, or High-Visibility Close Call].
b. Notify the GSFC Director of Safety and Mission Assurance (SSMA).

2.3 The BPO Chief shall:

a. Activate the MPCP, when appropriate, in the event of a BPO mishap or close call.
b. Notify the WFF Safety Office Chief - [within 1 Hour of Type A Mishap, Type B Mishap, High-Visibility Mishap, or High-Visibility Close Call].
c. Notify the Director, WFF/SSOPD.
d. Notify Balloon Program Executive and Senior Scientist.
e. Notify WFF Public Affairs Office (PAO).
f. In consultation with the Chief of WFF Safety, will determine and declare the mishap classification. This declaration will determine the additional response(s).

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g. Ensure the incident, whether mishap or close call, is entered into the NASA Mishap Investigation System (NMIS) (https://nmis.sma.nasa.gov/) - within 24 hours of the incident.
h. Verify that all notifications have been made; schedule first report telecom with NASA Management - as soon as possible after declaring a mishap
i. If civil servant drug testing is required, call NSSC at 1-877-677-2123. If a contractor is identified, notify the Contracting Officer, the Contracting Officer Representative, and the other relevant management/organization.
j. Provide funding and support for BPO mishaps or close calls.
k. If authorized for incident (e.g., for type C, D, close call), appoint an Investigation Authority (e.g., MIB, MIT, MI) within 48 hours of the mishap or close call.
l. Ensure the incident is worked to closure in NMIS.

2.4 The BPO Mission Manager shall:

a. Notify the BPO Chief.
b. Activate the IRT, upon direction from the BPO Chief.
c. Serve as the IRT Lead for the campaign.
d. Maintain communication status with the IC to ensure the flow of critical information, the securing of the mishap site, and the avoidance of further damage or injuries;
e. Once cleared by the IC, act to secure and impound data, preserve evidence, and take witness statements.
f. Coordinate IRT activities.
g. Relinquish control of the site command to the Investigating Authority (IA).

2.5 The CSBF Campaign Manager (CM) shall:

a. Notify the Emergency Response.
b. Serve as the IC for the campaign.
c. Take any necessary Emergency Response Team actions to minimize damage or injury resulting from the mishap and cordon off the mishap site. Restrict non-emergency access to the site.
d. Notify all operational personnel and supporting organizations of the mishap.
e. Coordinate with the IRT Lead once cleared by the Emergency Response Team.

2.6 The Interim Response Team shall:

a. Once cleared by the IC, act to secure and impound data, preserve evidence, and take witness statements.
b. Perform investigation-related activities until the IA is appointed.
c. Document the scene using photography, video, and debris mapping.
d. Identify witnesses and collect written witness statements [Civil Servant only].
e. Impound hardware and software evidence [Civil Servant only].
f. Implement the chain-of-custody process [Civil Servant only].
g. Provide liaison and coordination with other entities, as required.
h. Coordinate with the contracting officer to obtain and impound data at contractor and subcontractor sites unless the mishap occurs during a mission with a pre-established IRT.

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2.7 The CSBF, in accordance with the contract requirements, shall:

a. Provide support and membership to the IRT.
b. Provide support and membership to Accepted risk investigations, as required.

3 TRAINING REQUIREMENTS

Training is available through NASA SATERN and Federal Emergency Management Agency (FEMA) Emergency Management Institute (https://training.fema.gov/nims/). Once initial training is complete for investigating authorities, retraining will be performed at least once every three years, and a refresher training event to be held annually with Mission Operations Manager (MOM).

Balloon Program IRT members are required to have previous experience supporting balloon launches. Onsite Balloon Program IRT members will be composed of BPO and CSBF Lead Personnel. The MM/IRT Lead will be familiar with NPR 8621.1 and GPR 8621.4 and will provide an overview to IRT members and principal personnel of the documents in addition to Balloon Program mishap documentation and WFF Safety reviews.

The list of required IRT training shall be tracked and verified by the BPO MOM. Designated IRT members are directed to complete the following IRT training requirements prior to the Campaign FRR. IRT members may be replaced during a campaign upon approval by the IRT Lead and as documented in the BPO MM Launch Procedure.

The IRT Lead shall verify documented compliance of the required IRT training prior to any individual taking part in IRT activities. All Balloon IRT members shall be trained and equipped with Personal Protective Equipment (PPE) for the hazards associated with Balloon launch operations.

3.1 Interim Response Team Training

Training will be in accordance with the defined training requirements in GPR 8621.4 and 803-GS-PLN-INST-01. This is includes:

a. SMA-002-07, Overview of Mishap Investigations
b. SMA-002-08, Mishap Investigation Roles and Responsibilities
c. SMA-002-09, Completing the Investigation and Mishap Report
d. SMA-002-10, Introduction to Root Cause Analysis
e. SMA-002-11, NASA Interim Response Team Training
f. OCC-001-07, Blood Borne Pathogens
g. ICS-100, Introduction to the Incident Command System [FEMA]
h. Familiarization with NPR 8621.1 and GPR 8621.4
i. Familiarization with 803-GS-PLN-INST-01

3.2 BPO Mission Manager IRT Lead Training

In addition to the IRT Training requirements, BPO MMs will be required to take the following requirements:

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a. SMA-001-07, Introduction to Human Factors in Mishap and Close Call Investigations
b. SMA-002-15, NASA Human Factors in Mishap Investigations
c. SMA-002-14, NASA Root Cause Analysis
d. ICS-200, ICS for Single Resources and Initial Action Incident [FEMA]
e. IS-700, An Introduction to the National Incident Management System [FEMA]
f. IS-800, National Response Framework, An Introduction [FEMA]

The following are not required, but recommended:

g. Ordnance Handling (WFF class)
h. Operational Systems Safety Training (WFF class)
i. OSHA 30-Hour Training
j. SMA-002-13, MIB Chair Training
k. SMA-002-12, Root Cause Analysis Tool

3.3 Investigating Authority (IA) Training

Training will be in accordance with the defined training requirements in GPR 8621.4 and 803-GS-PLN-INST-01.

3.4 Mishap Preparedness and Contingency Plan Practice Exercise

IRT members shall participate in all onsite training exercises and simulations. The IRT Lead shall lead IRT exercises, simulations, and nominal operation dry runs prior to flight readiness, with the goal of the IRT being knowledgeable of requirements stated in NPR 8621.1 chapter 2. The NASA Balloon Program MOM will verify that the IRT is prepared, has taken required training, and has conducted the tabletop simulation and dress rehearsal with the CSBF Launch Management Team. These steps shall be performed in advance of the campaign FRR. This shall be verified at the campaign FRR and WFF Director ATP meeting.

The emergency response team and IRT shall conduct an internal dry run as well as support the Balloon Campaign Nominal and Off-Nominal exercises for additional awareness of the mission and this plan. The BPO MPCP, including emergency response where appropriate, shall be practiced during contingency simulations that occur prior to the Campaign FRR. The science teams shall be briefed on safety hazards and mishap preparedness in accordance with applicable documents prior to the Mission FRR.

Prior to the Campaign FRR, the IRT will do the following:

a. Complete the WFF IRT Training.
b. Meet the qualifications and training requirements for IRT as specified in section 3.1.
c. Meet and discuss each person's roles and responsibilities.
d. Conduct a tabletop IRT simulation including activating the call list.
e. Prepare an IRT Go-Kit and verify contents are appropriate (see 820-MPCP-FORM-2019-01).
f. Obtain all forms (*e.g.* evidence log, written witness statement) from 820-MPCP-FORM-2019-01.
g. Make updates or additions to the IRT checklist in 820-MPCP-FORM-2019-01.

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4 MISHAP MANAGEMENT

4.1 Interim Response Team Appointment

The BPO Chief is responsible for appointing the BPO IRT. All IRT members shall take the required IRT training (reference Section 3.1). In addition, BPO MM is required to complete the IRT Lead specific training as defined in Section 3.2. The IRT Lead shall document the IRT roles and responsibilities, which can be found within the BPO MM Launch Procedure, during the mission tabletop meetings. Each mission within a campaign will have documented IRT roles and responsibilities; however, between missions in a campaign the assigned personnel may change.

The IRT is responsible to gather and protect all evidence associated with the mishap or close call for the IA. Until the IA has been formed and has selected support resources, the IRT will be responsible for impounding and preserving all data pertaining to the incident.

Additional information on IRT and IA appointment may be found in the following documents:

a. NPR 8621.1, Section 2.4.2, 3.2.1
b. GPR 8621.4, Section 1.10, 1.14, 4.1.1
c. 803-GS-INST-01, Section 5.2
d. NASA Mishap Investigation Handbook, Section 2.2

Additional information on IRT roles and responsibilities may be found in the following documents:

a. NPR 8621.1, Section 2.1.5, 2.23
b. GPR 8621.4, Sections 1.13, 3.2
c. 803-GS-INST-01, Sections 1.6 IRT, 4.2, 4.3, 5.6
d. NASA Mishap Investigation Handbook, Sections 2.1.2, 3.1.1

4.2 Employee actions required as a result of an Incident

The following actions should be carried out by employees in the event of an incident:

a. The initial response by personnel in the area when an incident occurs is very critical. The first priority is to get help. If an employee is involved in or witnesses a mishap that needs ambulance or fire department response, call 911 or ext. 1333 at WFF (in the United States) or the emergency number for the campaign location. (See Emergency Response Appendix in campaign MPCP).
b. In the case of a fire or explosion, activate the fire alarm if safe do so.
c. If imminent danger is not present, employees should perform emergency shutdown procedures and safe the area.
d. Employees should notify their supervisor, the CM, and the BPO MM.
e. Employees shall remain on the scene in a safe location until all necessary information is provided to Emergency Responders (ER) and/or the IRT.
f. Once an area has been secured, employees should not enter that area until it is released by the IC to the IRT.

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4.3 Emergency Response

In the event of a mishap requiring emergency services, the following teams shall be activated:

4.3.1 Onsite Incidents

The Emergency Response Team shall be led by the CSBF CM and will consist of members of the BPO, Safety Office, CSBF Personnel, and local ER, as necessary. They shall direct emergency response actions and activities to clean up a hazardous materials release or injuries requiring medical attention, and will brief the IRT Lead when it is safe to begin to collect evidence.

In the event of a mishap, the IRT Lead will coordinate with local officials to conduct removal of equipment and impoundment. Impounded equipment shall be packed for shipment to the IA location under advisement from the IA. Science equipment and data shall be released by the BPO Chief to the science team after release by the IA Chair.

Additional campaign specific information on emergency response will be documented in the campaign annex.

4.3.2 Offsite Incidents

The Emergency Response Team shall be led by local officials and include local ER. The team may include the CSBF recovery team, if local and available. The BPO shall be immediately notified following initial response. The team shall direct emergency response actions and activities to clean up a hazardous materials release or injuries requiring medical attention.

In the event of a mishap, the program will coordinate with local officials to conduct removal of equipment and impoundment. Impounded equipment shall be packed for shipment to the IA location under advisement from the IA. Science equipment and data shall be released by the BPO Chief to the science team after release by the IA Chair.

Additional campaign specific information on emergency response will be documented in the campaign annex.

4.4 Interim Response Team

The IRT is to quickly and safely guard, preserve, gather, and impound all evidence associated with a mishap or close call, pending the appointment of the IA. The IRT shall resist any pressure to cede custody of obviously relevant physical or real property evidence to others unless there is a safety risk. For offsite or remote locations where the IRT will likely not be available, the BPO Chief shall direct the IRT to conduct activities as much as practical.

4.4.1 Securing the Mishap Site

The site shall be secured, to the extent possible, to preserve the mishap evidence for the IA. The CSBF CM, MM, the Safety Office Representative, and Emergency responders (ER) shall determine if there are any hazards (*e.g.*, hazardous materials and chemicals, radiation, blood-borne pathogens, etc.) present

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and ensure needed precautions are taken to safe the scene. Hazards due to payloads will be documented in the GSP for the campaign. If ER has been called, the ER IC is in charge of the scene until it has been deemed safe and release control to the IRT.

The IRT should preserve all evidence from compromise while not hampering essential rescue operations and while protecting people and property from hazards posed by the evidence itself. If the site is on private property, the IRT shall receive the owner's consent prior to accessing the property.

The IRT should understand where the zones of potential evidence exist. IRT members, with support from other organizations, are responsible for establishing the physical property limits of the scene over which they will assume control using techniques such as perimeter control and establishing physical barriers around the scene. Once the IC has deemed the scene safe, the IRT shall control access/entry to the site to prevent unauthorized access/entry and potential compromise of evidence. Anyone requesting access to the site shall be accompanied by a member of the IRT until the mishap site is turned over to the IA.

Additional information on securing the mishap site may be found in the following documents:

a. NPR 8621.1, Section 2.1.4
b. GPR 8621.4, Section 3.2
c. 803-GS-INST-01, Section IRT
d. NASA Mishap Investigation Handbook, Section 3.1.1

4.4.2 Witness Statement Process

The IRT or appropriate safety personnel will identify witnesses using the witness list form in 820-MPCP-FORM-2019-01. There are three types of witnesses: principal witnesses, eyewitnesses, and general witnesses. Principal witnesses are people who were actually involved in the accident; eyewitnesses are people who directly observed the accident or the conditions immediately preceding or following the accident; and general witnesses are those with knowledge about the activities prior to or immediately after the accident (*e.g.*, residents, bystanders, launch observers). Principal witnesses and eyewitnesses should be identified and interviewed as soon as possible.

NASA civil servants will obtain written witness statements using the written witness statement form in 820-MPCP-FORM-2019-01. Witness statements taken by civil service members of the IRT within the first 24 hours of the incident are considered privileged information and shall be properly protected and secured. NASA will not grant privilege to witnesses for written or verbal witness statements when an external investigating body is expected to be the sole mishap IA.

If the IRT needs to use contractors to take witness statements, the contractors should inform the witnesses that they as contractors cannot extend offers of NASA privilege. If contractors need to be interviewed, the IRT shall coordinate with the contracting officer representative or designate civil servant.

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Additional information on the witness statement process may be found in the following documents:

a. NPR 8621.1, Section 2.1.5
b. GPR 8621.4, Section 3.2
c. 803-GS-INST-01, Section 4.3
d. NASA Mishap Investigation Handbook, Section 3.1.1

4.4.3 Drug Testing

Drug testing is required when a mishap that results in a fatality or personal injury requiring immediate hospitalization or in damage estimated to be equal to or greater than $10,000 to government or private property. It is recommended that testing be completed within 4 hours; however, attempts may be abandoned if not done within 32 hours. Civil servant drug testing shall be conducted in accordance with GPR 8621.4, Section 3.4, and BPO Chief will call NSSC at 1-877-677-2123. If a contractor is identified, the Contracting Officer, the Contracting Officer Representative, and the other relevant management/organizations shall be notified by the BPO Chief.

Additional information on the drug testing process may be found in the following documents:

a. NPR 8621.1, Section 2.2.3.d
b. GPR 8621.4, Section 3.4
c. 803-GS-INST-01, Section 5.5
d. NASA Mishap Investigation Handbook, Section 3.1.1

4.4.4 Evidence Preservation, Collection, Chain-of-Custody, and Impoundment

Evidence for an incident needs to be systematically protected, preserved, collected, recorded, and controlled in order for the IA to ultimately determine how and why the incident occurred and what the causal factors were that led to the incident. The IRT with other support (*e.g.*, supervisor, safety, and security) will impound appropriate data, records, documents, equipment, hardware, software, and/or facilities involved in the mishap or close call. The IRT Chain-of-Custody Coordinator will maintain control of the evidence until it is released to the IA. All evidence collected will be entered into the evidence log, have an evidence property tag attached, be impounded, and follow the chain-of-custody process. The IRT Handling and Impound Coordinator will ensure the evidence is properly documented. The campaign MPCP will document where all data and evidence is stored and impounded. All impounded evidence, after release by the IA Chair, becomes the property of the Program until released by the BPO Chief.

Due to the vast operational area of the mission, there is the potential that the scene will not be immediately contained or accessible and remote contingencies may preclude the IRT and IA travel to the mishap or close call site. In such cases, the Balloon Program will coordinate with the IA to determine further actions. In addition, NASA will work to contain the evidence by working with local authorities and responders, as documented in the campaign MPCP. Offsite debris shall be documented in accordance with IRT processes. In accordance with NPR 8621.1, NASA may only impound NASA equipment unless prior arrangements are in place.

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Additional information on the evidence preservation, collection, chain-of-custody, and impoundment may be found in the following documents:

a. NPR 8621.1, Section 2.1.5
b. GPR 8621.4, Section 3.2, 3.5
c. 803-GS-INST-01, Sections 1.6 IRT, 4.2, 4.3, 5.6
d. NASA Mishap Investigation Handbook, Sections 2.1.1, 2.1.2, 3.1.1

4.4.4.1 Evidence Preservation

One of the IRT's primary responsibilities is to preserve all potential evidence associated with the mishap or close call. Preservation efforts shall not hamper essential rescue operations while ensuring the evidence is not compromised and performed in such a way as to protect people and property from any hazards posed by the evidence itself. Evidence can be both perishable (*e.g.*, environment at time of incident, impact trench) and non-perishable (*e.g.*, debris). Evidence includes data, records, documents, equipment, hardware, software, and/or facilities (see Guidelines for Impoundment in 820-MPCP-FORM-2019-01). Preservation of evidence comes in many forms, including incident scene mapping, photography, videography, physical barriers, impoundment, and, if requested, the scanning of records. Precluding IA on scene arrival, photographs and physical measurements of the evidence will be made by the IRT prior to removal.

The IRT shall document the incident scene as soon as possible after the scene has deemed safe and prior to the collection of physical evidence with a debris map (see Guidelines for Mishap Sketch in 820-MPCP-FORM-2019-01), photographs, and/or video (see Guidelines for Photographs and Video in 820-MPCP-FORM-2019-01). Do not move any physical evidence prior to documenting the original location via a photograph and geographical location and/or a debris map. All photographs and video will be indexed on the Imagery Log Form in 820-MPCP-FORM-2019-01, including GPS location, time of photograph/video, file name, and a short description. The IRT shall download and store the photographs and videos in a secure location designated within the campaign MPCP and as described below in the evidence impound section.

Evidence may require preservation from the natural elements through the use of a tarp to cover or by bagging it; however, do not move the evidence without first documenting the original location via a photograph and geographical location and/or a debris map.

4.4.4.2 Evidence Collection

The IRT will systematically collect all the potential evidence associated with the mishap or close call. Evidence includes data, records, documents, equipment, hardware, software, and/or facilities (see Guidelines for Impoundment in 820-MPCP-FORM-2019-01 for types of evidence to be collected). All evidence collected must be documented on an evidence log (see Evidence Log Form in 820-MPCP-FORM-2019-01), have an evidence property tag attached (see Evidence Property Tag Form in 820-MPCP-FORM-2019-01), and will be impounded in the appropriate location (see Campaign MPCP for specific locations). Where evidence is known to contain hazardous materials, ensure the tag is marked accordingly and a SDS is attached. The IRT Handling and Impound Coordinator, which shall be a civil servant, will ensure the evidence is properly documented on the Evidence Property tag and Evidence

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Log. All evidence from an incident will be made safe and will follow the chain-of-custody and impoundment processes described below.

In the collection of physical evidence and after the evidence has been photographed in the original location, the IRT shall document on the Evidence Property Tag (see 820-MPCP-FORM-2019-01) the location found, a description of the evidence, the condition, and any other notable details. Location documentation can be: Latitude and longitude (GPS coordinates), and/or grid map of locations. Additional photographs may be required during the collection of evidence, documenting the underside of evidence or notable details. All debris should be photographed, numbered, and described at the mishap or close call scene prior to preparation for transfer to the impoundment area. An evidence log will be maintained that states at a minimum the debris item number, name, description, date found, location found, and current status (*e.g.*, transport, holding facility).

The IRT shall initiate a user hands off policy for evidence collected in the form of data or information technology (IT) (*e.g.*, video tapes, laptops, electronic records, test data, test support systems). The IRT shall gather relevant information before disconnecting and impounding the hardware. The CSBF IT Specialist shall be notified of these actions. The IRT will include an IT professional from CSBF to support the collection, maintenance, and security of IT data that has been collected and impounded.

In the case of personal cameras, the transfer of memory cards to the IRT evidence custodian is adequate to capture evidence, while the camera is returned immediately. Personal articles of general witnesses (*e.g.*, smart phones, cameras) may not be impounded but the IRT Lead shall request copies of media (*e.g.*, photos, videos), which will be then impounded. Furthermore, laptops and other equipment not participating in the operation will not be impounded.

4.4.4.3 Evidence Impoundment and Storage

In the event of an incident, the IRT will impound all evidence associated with the mishap or close call and designate a civil servant as the IRT Handling and Impound Coordinator. The impound process is a control method that protects the evidence from compromise and/or being lost. Impounded evidence will be assembled in secure, controlled areas and the designated IRT Handling and Impound Coordinator will retain an evidence log and control access to the records in order to safeguard the evidence for the IA.

Impound storage locations spaces will vary according to the campaign and can be based upon onsite and offsite operations. The campaign specifics of an impound storage site shall be determined and will be documented in the campaign MPCP by the IRT Lead prior to the campaign FRR. The evidence log, property tag, and chain-of-custody forms are located in 820-MPCP-FORM-2019-01 and will document the location where the evidence is secured stored (or impounded).

The storage site for impoundment shall be dependent on the size and mobility of the equipment, and/or physical evidence, as well as the availability of an appropriate storage area (e.g., clean room, warehouse). The impounded document data shall be stored in a locked container (*e.g.*, file cabinet, storage cabinet). The key to the storage area(s) and container(s) shall remain in the possession of the IRT Handling and Impound Coordinator until is transferred to the IA. For IT impounded information (*e.g.*, photographs, video, electronic records), the CSBF IT Specialist shall create a secure website/server for storage.

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Impounded evidence may be packed for shipment to the CSBF facilities or the IA location under advisement from the IA.

4.4.4.4 Evidence Chain-of-Custody

The IRT shall assign a Chain-of-Custody Coordinator who shall be a civil servant responsible for the tagging, securing, and releasing of the impounded items. The IRT Chain-of-Custody Coordinator will maintain control of the evidence until it is released to the IA. The evidence chain-of-custody process shall be used for all impounded articles, including but not limited to, personal effects and sensitive information related to injured or deceased individuals. An IRT Chain-of-custody form can be found in 820-MPCP-FORM-2019-01. The IRT Chain-of-Custody Coordinator will maintain accountability for all impounded evidence; however, for personal effects and sensitive information related to injured or deceased individuals that accountability shall be 100%. The chain-of-custody form will be used to track the "who, what, where, when, and why" of the movements of impounded.

4.5 Turning Investigation over to Investigating Authority (IA)

Prior to turning an investigation over to the IA the IRT Lead and IC will provide a briefing to the IA chair. The briefing should capture all essential information for continuing safe and effective operations. After the IA chair has been briefed, the following actions should be taken by the IA:

- Make a decision about how secure the accident scene must remain during the initial phases of the investigation. If there are any concerns about loss or contamination of evidence, play it safe and keep the scene restricted from use.
- Take custody of all evidence gathered at the scene and all data pertaining to the investigation including impounded records. If required and as needed, the CSBF IT professional will continue to support when the investigation is transitioned from the IRT to the IA.
    - Confirm evidence has been preserved and impounded.
    - Confirm relevant perishable evidence has been collected, photographed, and documented or impounded or both.
    - Confirm all necessary data, records, and equipment have been impounded and stored in a secure site.
- Determine the status of impounded records, hardware, software, and equipment;
- Develop a record of the actions taken by the IRT, the cognizant Safety Office, emergency response, and protective services personnel
- Assume responsibility only for activities directly related to the accident and investigation. The chairperson and board members should not take responsibility for approving site activities or procedures, or for recovery, rehabilitation, or mitigation activities.

The IRT shall relinquish control of the site command to the IA. The IRT is not necessarily released when the turnover is complete. The lead must have the concurrence of the IA, specifically the MIB or MIT chair, to disperse. The IRT lead should retain or obtain duplicate notes and records sufficient to gather and debrief the team soon after being released. This recap with the IRT of what was learned and how to improve processes and systems, is invaluable when communicating outside the team, as well as when a change in resources or coordination is needed. An IRT member should keep an inventory of any

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IRT gear loaned to the IA so it can be claimed or replaced before it is needed again. Expendables and damaged gear should be noted for replacement.

Additional information on the evidence preservation, collection, chain-of-custody, and impoundment may be found in the following documents:

a. NPR 8621.1, Section 4.2.1
b. GPR 8621.4, Section 1.13
c. 803-GS-INST-01, Section 1.6 IRT
d. NASA Mishap Investigation Handbook, Sections 3.1, 3.1.1

5 ANNEXES AND ATTACHMENTS TO THIS PLAN

The following are template annexes for this BPO MPCP and is where specific information will be provided for the campaign. A campaign MPCP will entail the location template completed with the given specifics, the notification attachment and the form attachment.

- 820-MPCP-NOTIFICATION-2019-01: is the Mishap Notification Call List and is attached to the campaign annex.
- 820-MPCP-FORM-2019-01: has all forms and checklists that may be required for an incident and is attached to the campaign annex.
- 820-MPCP-Antarctica-2019-01: is the Antarctica Campaign Template Annex and will have the campaign specifics filled in for the campaign MPCP.
- 820-MPCP-Australia-2019-01: is the Australia Campaign Template Annex and will have the campaign specifics filled in for the campaign MPCP.
- 820-MPCP-Ft.Sumner-2019-01: is the Fort Sumner Campaign Template Annex and will have the campaign specifics filled in for the campaign MPCP.
- 820-MPCP-NewZealand-2019-01: is the New Zealand Campaign Template Annex and will have the campaign specifics filled in for the campaign MPCP.
- 820-MPCP-Palestine-2019-01: is the Palestine Campaign Template Annex and will have the campaign specifics filled in for the campaign MPCP.
- 820-MPCP-Sweden-2019-01: is the Sweden Campaign Template Annex and will have the campaign specifics filled in for the campaign MPCP.

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APPENDIX A. TYPICAL BPO IRT MEMBERSHIP

Position	Function	Civil Servant or Contractor
IRT Lead	Mission Manager(s)	Civil Servant (CS)
Mishap Scene Security Coordinator	CSBF CM, OM, CC	Contractor
Chain-of-Custody Coordinator	Mission Manager(s), MRSO, NASA CS OSS	CS
Handling and Impound Coordinator	Mission Manager(s), MRSO, NASA CS OSS	CS
Debris Identification Specialist	CSBF CC, Rigger, other	Contractor
Photographic Support	CSBF Meteorology Support	Contractor
Written Witness Statement Coordinator	Mission Manager(s), MRSO, NASA CS OSS	CS
Office of Communications Advisor	WFF Public Affairs Lead	CS
Secured Website/IT Support	CSBF IT Support	Contractor

Note 1: Only NASA Civil Servants (federal employees) may perform the following tasks:

- IRT Lead
- Chain-of-Custody Coordinator
- Handling and Impound Coordinator
- Written Witness Statement Coordinator
- Office of Communications (OC) Advisor

Note 2: The IRT Lead may assign additional qualified personnel and/or make task assignment changes, as required.

Note 3: IRT members shall complete the appropriate training, as listed in3.10.

Note 4: All IRT personnel shall be trained and equipped with the PPE appropriate for their IRT task assignment.

Note 5: Photographic Support is provided by NASA MM/MRSO/OSS and CSBF personnel and collection for impoundment is coordinated by IRT Lead.

Note 6: Civil Servants include Mission Range Safety Officer (MRSO), NASA OSS, and MM at campaign.

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APPENDIX B. TERMS AND DEFINITIONS

NOTE

For the current terms and definitions, verify with the latest revision of the noted document.

Accepted Risk: 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 (820-PG-8621.1.1); the risk that is understood and agreed to by the program/project, governing Mission Directorate, PI and other customer(s) such that no further specific mitigating action is required (800-PG-8621.0.1).

Anomaly: Any isolated accident, failure, or event that results in damage to flight hardware or could cause a significant schedule slip, significant cost growth, inability to meet mission requirements, and/or inability to transmit or process data (820-PG-8621.1.1) (800-PG-8621.0.1).

Close Call: An event in which there is no or minor injury requiring first aid, or no or minor equipment or property damage (less than $20,000), but which possesses a potential to cause a mishap (NPR 8621.1).

Damage: Either material or mission objective loss that is calculable as a Direct Cost (see Direct Cost of Mishap or Close Call) (NPR 8621.1).

Direct Cost of Mishaps or Close Calls: For mishap classification, the sum of the costs (the greater value of actual or fair market value) of damaged property and/or destroyed property (public or NASA), or mission failure, actual cost of repair or replacement, labor (actual value of replacement or repair hours for internal and external or contracted labor), cost of the lost commodity (e.g., cost of the fluid 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 8621.1).

First Aid: Refer to OSHA definition in 29 CFR pt. 1904.7 (NPR 8621.1).

High-Visibility Mishap or Close Call: A mishap or close call, regardless of the amount of property damage or personnel injury, that the Administrator; Chief, Safety and Mission Assurance (SMA), OSMA; CD, Executive Director, Office of Headquarters (HQ) Operations; Aircraft Management Division Director; or Center SMA Director judges to possess a high degree of safety risk, programmatic impact or public, media, or political interest including, but not limited to, mishaps and close calls affecting flight hardware or software, or completion of critical mission milestones (NPR 8621.1).

Incident: An occurrence of a mishap or close call (NPR 8621.1).

Incident Commander: The person responsible for directing or controlling resources by means of explicit legal, Agency, or delegated authority. The IC is responsible for all aspects of incident response including developing objectives, managing operations, setting priorities, and defining the Incident Command System organization for the particular response (NPR 8621.1).

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Interim Response Team: A team called to the mishap scene immediately after an incident to secure the scene; document the scene using photography, video, sketches, and debris mapping; identify witnesses; collect written witness statements and contact information; preserve evidence; impound evidence at the scene and other NASA locations as needed; collect debris; implement the chain-of-custody process for the personal effects of the injured and deceased; notify the PAO about casualties, damages, and potential hazards to the public and NASA personnel; advise the supervisor if drug testing should be initiated; and provide all information and evidence to the IA. 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 IA takes control (NPR 8621.1).

Investigating Authority: The individual MI, MIT, or MIB authorized to conduct an investigation for NASA. This includes the MIB chairperson, voting members, and ex officio, but does not include the advisors and consultants (NPR 8621.1).

Life-Threatening Injury: An injury involving a substantial risk of death; loss or substantial functional impairment of a bodily member, organ, or mental faculty likely to be permanent; or an obvious disfigurement likely to be permanent (NPR 8621.1).

Lost Time Injury or Illness: A nonfatal traumatic injury resulting in any loss of time from work beyond the day or shift it occurred; or a nonfatal, non-traumatic illness or disease causing disability at any time (NPR 8621.1).

Mishap Investigation Board (MIB): A NASA-sponsored board that is appointed for a Type A, Type B, or high-visibility mishap or close call; requires concurrence from the Chief/OSMA and the Chief Engineer on membership; consists of an odd number of Federal employees where the majority of the members are independent from the operation or activity in which the mishap occurred; has a minimum of five voting members for Type A mishaps and three voting members for Type B mishaps; Includes a Safety Officer, Human Factors MI, and for all Type A mishaps involving injury, illness and fatality also includes an Occupational Health Physician (or flight surgeon for aircraft-related mishaps) as members and is tasked to investigate a mishap or close call and generate a mishap report in accordance with NASA and GSFC requirements (GPR 8621.4).

Mishap Investigation Team (MIT): A NASA-sponsored team that is appointed by the CD for a Type C mishap, Type D mishap, or close call; consists of an odd number of Federal employees with the majority of members independent of the mishap operation; and includes a Safety Officer and human factors MI as members and is tasked to investigate a mishap or close call and generate a mishap report in accordance with NASA and GSFC requirements (GPR 8621.4).

Mishap Investigator (MI): A civil servant who has expertise and experience in mishap or close call investigation; has knowledge of human error analysis and mishaps; serves as the sole investigator for a Type C mishap, Type D mishap, or close call, and generates a mishap report in accordance with NASA and GSFC requirements (GPR 8621.4).

Mission Failure: A mishap of whatever intrinsic severity prevents the achievement of the mission's minimum success criteria or minimum mission objectives as described in the mission operations report or equivalent document (NPR 8621.1).

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Note

A mission failure applies only to a NASA program's mission, and not to a test or ongoing institutional operation. A program that accomplishes all minimum success criteria, but not full mission objectives, is not a mission failure, although in some cases, it may appropriately be classified and investigated as a close call.

NASA Mishap: A NASA mishap is an unplanned event resulting in at least one of the following:

a. Occupational injury or occupational illness to non-NASA personnel caused by NASA operations.
b. Occupational injury or occupational illness to NASA personnel caused by NASA operations.
c. Destruction of or damage to NASA property, public or private property, including foreign property, caused by NASA operations or NASA-funded research and development projects.
d. NASA mission failure before the scheduled completion of the planned primary mission (NPR 8621.1).

Occupational Injury or Illness: Work-related per 29 CFR pt. 1904 (NPR 8621.1).

Permanent Total Disability: A nonfatal injury or occupational illness that, in the opinion of competent medical authority, permanently and totally incapacitates a person to the degree where he or she cannot follow any gainful occupation and results in a medical discharge or civilian equivalent (NPR 8621.1).

Permanent Partial Disability: An 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 body part with the following exceptions: loss of teeth, fingernails, or toenails; loss of tip of fingers or toes without bone involvement; inguinal hernia (if it is repaired); disfigurements; or sprains or strains that do not cause permanent limitation of motion (NPR 8621.1).

Property Damage: Damage to any type of Government or civilian property including, but not limited to, flight hardware and software, facilities, ground support equipment, and test equipment (NPR 8621.1).

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APPENDIX C. ACRONYMS

AA	Associate Administrator
ATP	Approval to Proceed
BPO	Balloon Program Office
BRDL	Balloon Research and Development Lab
CC	Crew Chief
CD	Center Director
CM	Campaign Manager
COTS	Commercial Off The Shelf
CS	Civil Servant
CSBF	Columbia Scientific Balloon Facility
ER	Emergency Responders
FEMA	Federal Emergency Management Agency
FRR	Flight Readiness Review
FSP	Flight Safety Plan
FY	Fiscal Year
GASP	Gas Abundance Sensor Package
GPR	Goddard Procedural Requirements
GSFC	Goddard Space Flight Center
GSP	Ground Safety Plan
HQ	Headquarters
IA	Investigating Authority
IC	Incident Commander
IRT	Interim Response Team
IT	Information Technology
LDB	Long Duration Balloon
MI	Mishap Investigator
MIB	Mishap Investigation Board
MIT	Mishap Investigation Team
MM	Mission Manager
MMT	Mission Management Team
MOM	Mission Operations Manager
MPCP	Mishap Preparedness Contingency Plan
MRSO	Mission Range Safety Officer
NASA	National Aeronautics and Space Administration
NMIS	NASA Mishap Information System
NPR	NASA Procedural Requirement
NSSC	NASA Shared Service Center
OC	Office of Communications
OSHA	Occupational Safety and Health Administration
OSMA	Office of Safety and Mission Assurance
OSS	Operations Safety Specialist
PAO	Public Affairs Office
PG	Procedures and Guidelines
PI	Principal Investigator
PPE	Personal Protective Equipment

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RAR	Risk Analysis Report
RSM	GSFC-STD-8009 - Wallops Flight Facility Range Safety Manual
SATERN	System for Administration, Training and Educational Resources for NASA
SDS	Safety Data Sheet
SMA	Safety and Mission Assurance
SMD	Science Mission Directorate
SPB	Super Pressure Balloon
SSMA	System Safety and Mission Assurance
SSOPD	Suborbital and Special Projects Directorate
ULDB	Ultra-Long Duration Balloon
WASP	Wallops Arc-Second Pointer
WBS	Work Breakdown Structure
WFF	Wallops Flight Facility
ZP	Zero Pressure

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The campaign mishap preparedness and contingency action plan annexes shall be attached after this page.

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