

NORTHERN ROCKIES MISSION AVIATION SAFETY PLAN

2024 Aerial Ignition Operations

Unit: _____

MASP INSTRUCTIONS

Page 1 through the end of the Risk Assessment Worksheet require completion prior to regional office review and approval signatures. The Aerial Hazard Analysis and Map page through the end of the MASP document may be completed as information becomes available. Partial completion of these pages is recommended during the submission process and all pages **shall** be completed prior to mission start. A Mission Planning Sheet (MPS) or UAS Flight By Notification (FBN) with this information is considered completion of these pages. Insert Unit Specific Hyperlink to MPS/FBN as able.



RISK MATRIX INSTRUCTIONS

The risk outcomes on the risk assessment matrix have been incorporated into the risk assessment worksheet's drop-down menus. Risk Assessment Category (RAC) outcomes are categorized as follows:

LOW **MODERATE** **HIGH** **EXTREMELY HIGH**

In no case will the overall risk of the mission be less than the highest specific factor. (Example: One extremely high, one high, and two moderate threats results in an extremely high risk assessment category outcome).

SIGNATURES

Route all MASP's through the Unit/Forest Aviation Officer for Regional Office review. Signature blocks on page 2 are listed in the order required for MASP approval. The MASP's will be routed back down through the Unit/Forest Aviation Officer (AO) for line officer approval or as appropriate. MASPs should be submitted as a PDF document (if possible) to allow for digital signatures for Forest/Unit Aviation Officer, RASM, RAO, and Line officer.

All signature boxes for Mission Prepared Unit level will be signed in typed text:

Example: /s/ John M. Smith

Line officer signatures may be signed with a wet signature or link pass digital signature at their discretion.

RETENTION AND FILING OF PLAN

MASPs that have been reviewed by the Regional Office will remain in Pinyon and archived by fiscal year. These plans are accessible by the Regional Office, Unit/Forest Aviation Officers, and select aviation managers. Plans approved by the line officer will be maintained in the dispatch office and referenced during flight. Retention of the safety plan by dispatch shall be three years. Retention of the plan and daily briefing sheets by the mission manager shall be three years.

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Unit: (Insert Local Unit)	Sub Unit:
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Agency Requesting Mission			Calendar Year		
FS <input checked="" type="checkbox"/> NPS <input checked="" type="checkbox"/> BLM <input checked="" type="checkbox"/> FWS <input checked="" type="checkbox"/> BIA <input checked="" type="checkbox"/> STATE <input checked="" type="checkbox"/> OTHER <input checked="" type="checkbox"/>			Anticipated Date(s): YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Calendar Year: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		
Aircraft Type			*Use start and end date below only if anticipated date(s) box is selected*		
Fixed	Rotor	UAS	Start Date	End Date	MASP Objectives
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Training <input checked="" type="checkbox"/> Resource <input checked="" type="checkbox"/> LE&I Mission <input type="checkbox"/> Incident <input checked="" type="checkbox"/>

Mission prepared by:	Title:	Date:
Mission reviewed by: (OPTIONAL) Regional Level:	Title: UAS Program Specialist	Date:
Mission reviewed by: (OPTIONAL) Regional Level:	Title: Helicopter Operations Specialist (HOS)	Date:
Mission reviewed by: (REQUIRED) Aviation Officer:	Title: Forest Aviation Officer (FAO)	Date:
Mission reviewed by: (REQUIRED) RASM:	Title: Regional Aviation Safety Manager	Date:
Mission reviewed By: (REQUIRED) RAO:	Title: Regional Aviation Officer	Date:
Mission and Risk Assessment approved by: Line Officer:	Title:	Date:
Mission and Risk Assessment approved by: (REQUIRED) - Line Officer:	Title:	Date:

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*** Participant's qualifications and responsibilities shall be verified and discussed during daily briefing***

<p><u>Project Aviation Manager (IAW IAT Guide):</u> Complete or See MPS/FBN</p>	<p><u>Alternate Proj. Aviation Manager (IAW IAT Guide):</u> Complete or See MPS/FBN</p>
<p style="text-align: center;"><u>Mission Name</u> Aerial Ignition Operations</p>	
<p><u>Mission Description and Location:</u> This MASP details the utilization of aerial ignition to achieve resource or fire objectives. The overall intent is to utilize aerial ignition as a tool. Other Agencies may be the requesting entity, however this MASP is only applicable when the Forest Service has aviation operational control. This plan may be used for the ignition of multiple burn units in the same vicinity when acceptable conditions exist. Note: Both UAS and helicopter platforms with aerial ignition carding could be utilized for the missions, potentially concurrently.</p> <p><u>Helicopter:</u> All missions may include standard fire operations (crew transport, internal/external cargo, recon, bucket work) and aerial ignitions utilizing a plastic sphere dispenser (PSD) or Helitorch. All participants will receive an operational briefing before performing missions. Helitorch and PSD bench testing, configuration, and operations would be conducted with qualified personnel and in accordance with NWCG Standards for Aerial Ignition, and NWCG Standards for Helicopter Operations.</p> <p><u>UAS:</u> Flight missions could include aerial reconnaissance (examples include but are not limited to; infrared imagery, video, still photos, post burn missions etc.) and aerial ignition operations. In the event UAS operator trainees are utilized, they will operate under the direction and guidance of qualified UAS personnel. Aerial ignition operations would be conducted in accordance with approved aerial firing plans. Additionally, all UAS operations and mission planning will be conducted in compliance with the NWCG Standards for Fire Unmanned Aircraft Systems Operations.</p> <p>Areas ignited will not exceed the capability of resources needed for control, considering current and expected fire behavior conditions. Ignition may occur over several operational periods. Reconnaissance, shuttling authorized crewmembers, transporting cargo, and bucket operations are covered under this plan.</p> <p>This MASP or a specific Mission Planning Sheet (MPS) and/or UAS Flight By Notification (FBN) will be utilized that details the project name, funding codes, aircraft assigned, specific mission, communication plan, project site location(s), specific helispot and/or landing zones, participant signatures, and mission/flight hazard maps. Site or project specific hazards not identified in the attached Risk Assessment need to be documented (e.g. FRAT/GAR); consider developing a mission specific MASP if the hazards exceed the scope of this plan. The mission may include both hand and aerial ignition. Both PSD and Helitorch may be used to create different fire effects resulting in mixed severity burning. Firing patterns will be determined by the Firing Boss/Burn Boss and may be dependent on several factors such as weather, ground operations and intended effects. Ground and aerial ignition may occur simultaneously.</p> <p>The pilot will be briefed prior to commencing any flights on known hazards, MTR's/MOA's, TFRs and NOTAMs and local weather. Current and forecasted weather/fuels conditions will be observed and discussed prior to operations.</p> <p>An Operational Risk Assessment (e.g. FRAT/GAR) will be conducted prior to flight operations. If at any</p>	

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point during this briefing any or all participants are uncomfortable to continue, or a NO-GO assessment is found, or the ORA risk level exceeds the approved rating level, the mission will be cancelled or delayed until the issue/s can be rectified.

Aviation personnel will be equipped with required PPE and radios. Positive communication between all air and ground resources will be in place and utilized. In the event of a mishap the Aviation Mishap Response Guide and Checklist will be initiated by contacting Dispatch as applicable.

Mission Objectives: Mission Objectives: The objective is to use aerial ignition to reduce exposure to personnel assigned to meet management objectives.

The number one priority objective is providing for Firefighter safety. Other objectives with the use of aerial ignition include:

- Reduce wildland fire threats and impacts to the communities, public facilities, and improvements to various resource and ecosystem components.
- Increase safety and effectiveness of fire suppression crews.
- Further the development and operational approach to aerial ignition with the utilization of new and advancing technologies.

Aircraft Justification For Mission:

Justification statement for low-level manned flights: Management has deemed aerial ignition as the best method of achieving this agency goal. **Aerial Ignition may be conducted below 500 feet above ground level (AGL) when necessary to meet the mission objectives.**

Minimum helicopter performance for aerial ignition within the Northern Rockies shall be at 5000'/30C with a HOG payload of 800 lbs. when using the LNF & IPNF IDIQ RX contract or 7000'/30C with a HOG payload of 700 lbs. when using the CWN MATOC contract (MATOC payload category 3.700).

UAS will be used when available and where appropriate to reduce exposure to firefighters and pilots during the ignition and monitoring phase of the operation. UAS will utilize an agency approved UAS and/or other approved equipment with a Plastic Sphere Dispenser and an IR/EO camera to assist with the ignition and monitoring.

A combination of manned and unmanned flight may be used to limit the length of time the manned flight crew is exposed to low level flight and ground crews are exposed to the hazards of fire. Mitigation measures noted in the risk assessment will be in place prior to the mission. These mitigations will include the separation either vertical, horizontal, or temporal in nature. This separation will be decided between the pilots.

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Aircraft Information:

Check all that apply, if name is unknown, add information as it becomes available

Leave text fields blank if unknown

All cooperators require an annual approval letter onboard except DOJ aircraft

Cooperator:

Agency:

Vendor:

Military:

Other: Federal Partners

Mission Category: Complete or see MPS/ FBN

Check all that apply, if unknown, add information as it becomes available

Pax Transport Detection Recon Aerial Ignition (PSD Helitorch) UAS

External Load Backcountry Training Other _____

Rotor Wing:

Type One:

Type Two:

Type Three:

***Document additional requirements beyond standard typing in aircraft justification and on the resource order* (performance capabilities, equipment, etc.).**

Fixed Wing:

Single Engine

Twin Engine

Document mission needs for turbine, twin-engine, air conditioning, high or low wing, pressurized cabin, radio package, etc. in the aircraft justification section and on the resource order.

UAS:

Fixed Wing

Rotor Wing (VTOL)

Aircraft Make and Model: If unknown, add information as it becomes available. All information shall be filled out prior to mission start. Complete or see MPS/ FBN

Unknown CWN:

Unknown EU:

Vendor:

FAA Registration #:

Make:

Model:

Carded for Mission: YES NO

Card Expiration Date:

Aircraft Color Scheme:

** CWN helicopter information attained after hiring process, ensure CWN inspection sheet has been completed and a copy of the aircraft data card is on file prior to mission start. **

Procurement and Cost Information: Check unknown if unable to provide accurate or estimated information.

Procurement Type:

Unknown

Estimated Flight Hour Cost:

Unknown

Mission Flight Hours:

Unknown

Estimated Miscellaneous Cost(s):

Charge Code:

Unknown

Unknown

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UAS Missions Only

Crew: Other Than Pilot: <u>Complete or see MPS/ FBN</u>			
UAS Crew Leader:	Contact Number:		
UAS Data Specialist (1):	Contact Number:		
UAS Data Specialist (2):	Contact Number:		
UAS Visual Observer (1):	Contact Number:		
UAS Visual Observer (2):	Contact Number:		
Additional Crew:	Contact Number:		
TFR Information:			
Airspace Authorization:			
<input checked="" type="checkbox"/> Part 107	<input checked="" type="checkbox"/> 107/LAANC	<input checked="" type="checkbox"/> SGI Waiver	<input checked="" type="checkbox"/> FAA/DOI MOA
Authorization Comments -			
Lost Link and Flyaway Procedures-Protocols:			
<p>Approved UAS have built in failsafe systems. GPS coordinates and elevations will be confirmed prior to mission. The aircraft will return to home (LR2) in the event of low battery voltage or loss of link with the GCS. In the event of loss of control, communication, or visual contact with UAS: Notify aerial supervision/helibase/dispatch, aircraft in the area, and ground personnel as applicable. Clear the affected airspace and suspend air operations in the area. Wait for the duration of the fuel/battery load. Resume air operations. Search for the missing UAS. Follow established mishap reporting procedures.</p>			
Special Consideration-Safety Concerns-Comments Section:			
<p>All fire personnel will be briefed on communications, Medivac, aerial ignition operations, lost link protocols, and ignitions outside of control lines.</p>			

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****Risk assessment must be completed prior to mission approval****

****Risk assessment hazards shall be reassessed prior to starting the mission, see FRAT****

****Ensure appropriate management level for approval ****

****See the National Aviation Safety Management System Guide, Yellow Book, and ORM guide for additional guidance with Risk Assessments**

****This Risk Assessment does not negate the requirement to complete a FRAT prior to flight. ****

Risk Assessment Matrix		Probability <i>Likelihood of Mishap if Hazard is Present</i>				
		Almost Certain <small>(Continuously experienced)</small>	Likely <small>(Will occur frequently)</small>	Possible <small>(Will occur several times)</small>	Unlikely <small>(Remotely possible but not probable)</small>	Rare <small>(Improbable; but has occurred in the past)</small>
Severity/ Consequences <i>Consequence if Mishap Occurs</i>	Catastrophic <small>(Imminent and immediate danger of death or permanent disability; major property or facility damage; loss of critical system or equipment)</small>	Extremely High	Extremely High	Extremely High	High	Moderate
	Critical <small>(Permanent partial disability, temporary total disability; moderate environmental damage; extensive damage to equipment)</small>	Extremely High	Extremely High	High	Moderate	Moderate
	Moderate <small>(Hospitalized minor injury, reversible illness; minor damage to equipment, property or the environment)</small>	High	High	Moderate	Low	Low
	Negligible <small>(First aid or minor medical treatment; little or no property or environmental damage)</small>	Moderate	Moderate	Low	Low	Low

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Risk Assessment Code	Severity of Consequences
Extremely High	<ul style="list-style-type: none"> • Complete or near complete failure to meet objective • Major property or facility damage • Death or permanent total disability • Severe environmental damage • Loss of major or critical system or equipment
High	<ul style="list-style-type: none"> • Significantly degraded capability for meeting the objective or accomplishing the project/incident/work activity • Injury that results in permanent partial disability, or temporary total disability lasting more than three months • Serious environmental damage
Moderate	<ul style="list-style-type: none"> • Degraded capability for meeting objective or accomplishment of the project/fire operation • Lost days due to injury or illness not exceeding three months • Moderate damage to property or the environment
Low	<ul style="list-style-type: none"> • No adverse impact to meeting objective or accomplishment of the project/fire operation • Little or no medical treatment required • Little or no damage to equipment, systems, property or environment

Risk Decision Authority		
Risk Level	Fire	Mission
Extremely High	Incident Commander or Operations Sections Chief	Line Officer
High	Incident Commander or Operations Sections Chief	Line Officer
Moderate	Air Operations Branch Director	Supervisor or Lead
Low	Base Manager	Individual

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SAFETY MANAGEMENT SYSTEM ASSESSMENT AND MITIGATION

System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation				Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
Mission - Policy	Operational/Mission goals may be unstated, unclear or conflict with policy.	Possible	Critical	High	Conduct thorough briefings, ensure organization is in place, and adhere to interagency policy, procedures & Guides.	Unlikely	Critical	Moderate
Mission - Policy	MASP and/or GO-NO GO checklist absent or not complete (Policy Deviation).	Possible	Critical	High	Ensure MASP and risk assessment are completed and approved at appropriate level. Ensure Forest Aviation Officer is involved in mission planning. MASP should be used as a briefing tool. Stress that on a "GO-NO GO" checklist a "NO GO" halts the operation. Ensure that all parties are available for mission briefings.	Unlikely	Critical	Moderate
Mission	Burn Crew transport/ pre-burn recon; Unimproved landing zone / helispot	Unlikely	Critical	Moderate	Ensure load calculations/manifests are completed, reviewed & signed. Landing zones approved by qualified personnel. Landing zone staffed by qualified helitack.	Rare	Critical	Moderate
Mission - Communications	Frequency management, cockpit overload, inadequate briefing, and/or loss of communication.	Possible	Critical	High	Ensure frequencies are reviewed and operational. Consider a discrete channel for air operations. Ensure thorough communication briefing and understood. Halt operations if loss of Communications.	Unlikely	Critical	Moderate

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System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation				Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
Personnel	Unqualified employees working in or around aircraft. Personnel not proficient with equipment/mission.	Possible	Critical	High	All personnel will be fully qualified to perform the duties associated with a position. Trainees will have direct supervision. The Firing Boss, if not a helicopter crew member, will be loaded and unloaded by qualified personnel.	Unlikely	Critical	Moderate
Personnel Human Factors	Acceptance of high risk missions as normal. Lack of CRM, Task saturation or fixation, hazardous attitude. Poor mission analysis. Fatigue. Management pressure/mission driven sense of urgency. Unknown change in project objective. Experience level of air crew and vendor.	Possible	Catastrophic	Extremely High	Conduct thorough risk assessments & brief/debrief. Pilot and flight crew trained in CRM and work together in mission planning. Conduct daily briefing and complete worksheet including real time FRAT. Ensure management does not place undue pressure or sense of urgency on flight crews. Ensure project objective has not changed and re-evaluate mission if changes occur	Unlikely	Catastrophic	High
Human Factors	Ground Crews / Public within the planned burn area	Almost Certain	Critical	Extremely High	Conduct thorough briefings, ensure Organization is in place, and Adhere to Interagency policy, procedures & Guides (PMS 501 , PMS 510)	Rare	Critical	Moderate

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SAFETY MANAGEMENT SYSTEM ASSESSMENT AND MITIGATION								
System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation				Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
Human Factors	Multi-tasking - Pilot, Helicopter Manager, Helibase Manager, Helitack Crew personnel, fuel service personnel	Almost Certain	Critical	Extremely High	Ensure existing staffing, supervision and management policies & procedures are met. Order resources early when the need is anticipated. Management needs to recognize aviation staffing is a critical safety priority. Limit collateral duties in key supervisory positions. If unable to fill key positions, operations will be shut down or use of aircraft will be limited until span of control issues are resolved.	Unlikely	Critical	Moderate
Aircraft	Aircraft Performance not suitable for mission	Unlikely	Catastrophic	High	Ensure appropriate aircraft is ordered, utilized and operated in accordance with appropriate flight manuals. Utilize agency load calculation process for all flights (NWCG Standards for Helicopter Operations). Ensure pilot/aircraft are carded for mission. Conduct thorough pre-mission briefing and planning.	Rare	Catastrophic	Moderate
Aircraft	Missions may require operating in the avoidance area of the height velocity curve; Low Level Flight below 500 feet AGL	Likely	Critical	Extremely High	Reduce time spent at speeds and altitudes from which a successful autorotational descent and landing cannot be completed. Identify and brief emergency landing areas in close proximity to the burn. Use equipment that allows greater airspeeds and altitudes. Consider reduced burn efficiency for greater safety margins.	Possible	Critical	High

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System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation				Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
Aircraft	Aircraft experiences an engine, transmission, hydraulic, or tail rotor failure while in low and slow flight profile	Unlikely	Catastrophic	High	Aircraft maintenance records reviewed during aircraft carding. Aircraft manager will work with vendor mechanics to ensure contract maintenance standards are being adhered to. Reduce the amount of time operating within the avoid zone of the height velocity chart during PSD operations. Regional Quality Assurance audits conducted within the region.	Unlikely	Catastrophic	High
Environment	Adverse wind speed / direction, thunderstorms, etc.	Unlikely	Catastrophic	High	Ensure flight crew obtains current forecast and updated weather briefings and continually monitor the wind speed and direction. If winds become unfavorable, postpone or delay to another day.	Rare	Catastrophic	Moderate
Environment	Smoke limiting visibility	Possible	Catastrophic	Extremely High	Utilize smoke observations, coordinate with ground ignition and set decision points for discontinuing or delaying the mission. The pilot/PLDO has the right to refuse or modify the request of the firing boss/ burn boss.	Unlikely	Catastrophic	High

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System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation			Mitigation	Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level		Likelihood	Severity	Risk Level
Environment	Flying in Mountainous Terrain while focused on a low-level mission	Possible	Catastrophic	Extremely High	Carded and experienced pilot. Chosen aircraft will have enough performance to allow for more options flying in mountainous terrain. Recon of the areas to be treated will occur prior to the mission. All boundaries aerial hazards will be pre-identified. Division of tasks between pilot, burn boss, and PLDO and communicating frequently location relative to terrain.	Unlikely	Catastrophic	High
Aerial Hazards	Powerlines, towers, birds, UAS, other aircraft.	Possible	Catastrophic	Extremely High	Brief personnel of known aerial hazards. Complete high-level reconnaissance prior to committing aircraft to low level operations. Practice "see and avoid". Communicate using principles of CRM to identify/mitigate hazards.	Unlikely	Catastrophic	High
Hazardous Materials	Transportation of Hazardous Materials in the Helicopter	Possible	Catastrophic	Extremely High	Follow the directions spelled out in the Standards for Aviation Transport of Hazardous Materials Handbook (PMS 513) for any and all Hazmat associated with the mission.	Unlikely	Catastrophic	High

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System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation				Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
Equipment – PSD /Helitorch	Aerial Ignition equipment not maintained, tested or functioning. Burn fuel mix inappropriate. PSD Spheres faulty. Malfunction of the machine. Hang Fire in machine.	Possible	Critical	High	Ensure equipment is well maintained, tested & operational. Replace equipment if needed. Check fuel mix ratio. Check condition of spheres. Ensure reservoir is full & additional water on board. Ensure all items are properly secured. Brief emergency procedures with pilot, burn boss, and operator.	Unlikely	Critical	Moderate
Equipment - Helitorch	Helitorch Malfunction or Hang Fire	Possible	Critical	High	Helitorch personnel will be qualified (or Trainer onsite) on equipment type and understand Emergency procedures. Ensure Emergency procedures are briefed and understood by all personnel involved. Helitorch preplanning and mission “GO-NO GO” checklist will be utilized.	Unlikely	Critical	Moderate
Equipment – PSD	Doors Off Flight Operations could cause fall and/or unintended equipment exiting the aircraft	Unlikely	Catastrophic	High	All agency missions that require aircraft doors to be removed prior to flight, or open during flight shall receive hands-on secondary restraint refresher training. All Secondary Restraint Operations will be in accordance with Interagency / Forest Service Safety Alert 18-03 and Interagency ALSE Handbook.	Rare	Catastrophic	Moderate

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Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
UAS Collision	Collison with another aircraft	Unlikely	Catastrophic	High	The remote pilot will utilize a visual observer (VO) who will scan the area for air traffic and other hazards to aviation. PMS 515 will be utilized for all incident flights and implemented when appropriate on RX projects. The remote pilot will file a NOTAM as per Interagency/ FAA policy. Flights within TFRs will be coordinated with the controlling authority and participating aircraft. The remote pilot will give way to manned aircraft. The remote pilot will confirm de-confliction with local aviation about the mission. Utilize CRM for visual or audible encounters with manned aviation, communicate using principles of CRM to identify/mitigate hazards. Practice “see and avoid”. As able use available tools such as ADS-B, Foreflight etc.	Rare	Catastrophic	Moderate
UAS Collision	Collision with personnel or vehicles	Possible	Critical	High	The remote pilot will conduct a pre-flight briefing which will include flight patterns and safe observation/parking areas. VO will be utilized.	Unlikely	Critical	Moderate

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Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
UAS Collision	Collision with fixed aerial hazard	Possible	Catastrophic	Extremely High	The remote pilot will conduct a survey of the operations area prior to flight operations and consult an aviation hazard map and/or aviation sectional of the operations area.	Rare	Catastrophic	Moderate
UAS Aircraft Communication	Aircraft flyaway (loss of control)	Unlikely	Critical	Moderate	The remote pilot will utilize specific make/model emergency procedures. Aircraft, personnel and ATC/ARTCC having jurisdiction over the airspace will be notified with the last location, heading, speed and approximate battery/time remaining of the UAS. The crew actions to recover the UAS will be relayed as well.	Unlikely	Critical	Moderate
UAS Aircraft Communication	Aircraft loss of link with Ground Control Station	Possible	Moderate	Moderate	UAS will be programmed to return to home and land.	Unlikely	Moderate	Low
Injury	Injury caused by spinning propellers	Unlikely	Critical	Moderate	Preflight briefing will include safety precautions when working around UAS with motors running. Trainees will be supervised around equipment until they demonstrate proficiency working around aircraft.	Rare	Critical	Moderate

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Sub System(s)	Hazards	Likelihood	Severity	Risk Level	Mitigation	Likelihood	Severity	Risk Level
Weather	Adverse Weather (wind, thunderstorms, etc.)	Possible	Critical	High	Remote pilot will obtain a current forecast and ensure the aircraft is flown within approved parameters. The crew will monitor weather conditions periodically during flights. Cease aircraft operations when weather precludes mission objectives from being accomplished.	Unlikely	Critical	Moderate
UAS Night Operations	Night Operations	Possible	Critical	High	The UAS will have policy approved lighting. The launch and recovery area will be well lit. UAS pilots will be trained in UAS night operations and follow agency protocols.	Possible	Moderate	Moderate
UAS Battery Fire	Battery Fire	Unlikely	Catastrophic	High	Batteries will be stored in approved containers. Batteries will be inspected prior to each flight, if and damage or abnormalities are noted the batteries will not be used and specific manufactures guidelines will be followed. A fire extinguisher will be available on site.	Rare	Catastrophic	Moderate
UAS Capabilities	Operating aircraft outside of published parameters	Possible	Moderate	Moderate	The remote pilot will ensure the aircraft is operated within policy and the provisions of the aircraft operations manual.	Unlikely	Moderate	Low

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Sub System(s)	Hazards	Likelihood	Severity	Risk Level		Likelihood	Severity	Risk Level
UAS Personnel	Lack of training in Firefighting strategy, tactics, terminology, basic ICS, frequency management, etc.	Possible	Critical	High	Establish requirements for documentation of online training to meet basic, minimum level of knowledge for all contracts. Consider pilot academy. Ensure PMS 515 is utilized for all incident UAS operations and implemented when appropriate on RX projects. Follow all provisions of aerial ignition plan (project or incident) and the aerial ignition guide.	Unlikely	Critical	Moderate
UAS Personnel	Fatigue	Likely	Critical	Extremely High	Managers work with company personnel to ensure adequate rest. Manage missions to be most effective with proper use of pilots & aircraft. Implement Phase Duty Limitations as appropriate	Possible	Critical	High
UAS Personnel	Low CRM with crew rotations (multiple relief pilots)	Almost Certain	Critical	Extremely High	Ensure there incoming crews are thoroughly briefed. Practice CRM, conduct effective AARs, etc.	Possible	Moderate	Moderate
UAS PSD	PSD Miscommunication	Possible	Critical	High	Conduct orientation flight with Ignition Specialist, hang fire mitigation and escaped fire contingency established, complete all operational checklists prior to starting operations.	Unlikely	Critical	Moderate

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System Being Evaluated: Helicopter/UAS Aerial Ignition		Pre-Mitigation			Mitigation	Post Mitigation		
Sub System(s)	Hazards	Likelihood	Severity	Risk Level		Likelihood	Severity	Risk Level
UAS PSD	PSD dispenser fire	Possible	Critical	High	Emergency procedures covered by Remote Pilot, Visual Observer and Burn Boss/Ignition Specialist in pre-burn briefing. Emergency release operations tested before flight.	Unlikely	Critical	Moderate
Helicopter Rotor Wing – Final Assessment: Low <input type="checkbox"/> Moderate <input type="checkbox"/> High <input checked="" type="checkbox"/> Extremely High <input type="checkbox"/>		Date prepared: <u>(Insert Date)</u>			Prepared By: <u>(Insert Preparer's Name)</u>			
UAS PSD Final Assessment: Low <input type="checkbox"/> Moderate <input type="checkbox"/> High <input checked="" type="checkbox"/> Extremely High <input type="checkbox"/>								

NORTHERN ROCKIES MISSION AVIATION SAFETY PLAN

Aerial Hazard Analysis and map: A written analysis of aerial hazards surrounding the mission area in this box or in Mission Planning Sheet/FBN, e.g. towers, wires, sloping terrain, dust, proximity to airports, confined landing zones, etc. Provide a hazard map/QR code.

Project Specific Maps will be provided and briefed to prior to mission.

****Insert local QR code OR attach aerial hazard map****

Optional: Insert Hyperlink in Field Below

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Aircraft Performance Planning:

The pilot is responsible for the accurate completion of load calculations or PPC (military performance planning). Trained personnel shall ensure that aircraft scheduled are capable of performing the mission(s) safely and within the capabilities of the aircraft selected. The helicopter or flight manager shall ensure that manifests, load calculations, weight & balance are completed properly using accurate environmental and aircraft data. Reference SHO chapter 7 or chapter 70 of the Military Use Handbook for additional information.

Personal Protective Equipment: *Always refer back to current ALSE, SHO, and manual direction*

Type of Operation- Check applicable boxes that may apply to mission or mission	Personnel protective equipment requirements. NOTE: Agency employees must be informed of the increased personal hazard that is associated with wearing non-fire resistant clothing or footwear when the full complement of PPE is not worn. The MASP for the project must document PPE exception(s) and in accordance with FSH 5709.16, Chapt 30, 36.53b.
<input checked="" type="checkbox"/> Rotor Wing Ground Operations	Fire resistant clothing, hard hat w/chin strap or SPH-5 flight helmet or other approved model, fire resistant and/or leather gloves, all leather boots, eye protection, hearing protection. *Refer to the NWCG Standards for Aerial Ignition for additional ground operation requirements.*
<input checked="" type="checkbox"/> Rotor Wing	Fire resistant clothing, approved flight helmet, hard hat w/chin strap, fire resistant and/or leather gloves, approved leather or flight boots, eye protection, hearing protection. Additional personnel restraints needed in the helicopter pending type of mission. * Refer to appropriate guides. * Charter flights, (non-agency controlled mission), shall comply with 14 CFR 135 requirements.
<input checked="" type="checkbox"/> Doors Off Flight(s)	Personnel will remain seated and inside fuselage during all flights, approved secondary restraint harness for doors off flights (only for PLDO, HRAP, HRSP, Aerial Photography, IR Operator, ACETA Gunner, Cargo Letdown, Short Haul Spotter, Cargo Free Fall Operations in type 3 helicopter) * Refer to appropriate guides*
<input checked="" type="checkbox"/> UAS	Fire resistant clothing, hard hat w/chin strap or SPH-5 flight helmet or other approved model, all leather boots, eye protection, hearing protection. *Refer to the NWCG Standards for Aerial Ignition for additional ground operation requirements*

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Helicopter or Fixed Wing Pilot Information: Fixed wing: use "other" box and state approved mission(s). Any unknown information shall be added after signature approvals. All personnel shall be qualified for mission or designated as a trainee with appropriate oversight. **Complete or see MPS/FBN**

<u>Pilot Name (P1): PIC/Primary</u>	<u>Pilot Phone Number:</u>																																																																																																																																																											
<u>Pilot Name (P2): Co-Pilot/Relief</u>	<u>Pilot Phone Number:</u>																																																																																																																																																											
Pilot Carded For Mission: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Charter Pilot <input type="checkbox"/> 135 Certificate and FAR's Apply ** Use of charter pilot requires regional forester approval** Check all boxes that apply to pilot's carding below:	<u>Pilot Card (P1) Expiration Date:</u> <u>Pilot Card (P2) Expiration Date:</u>																																																																																																																																																											
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Flight Following And Frequencies: TBD/Will confirm, complete or see MPS/FBN		
Confirm frequencies prior to flight		
FAA Flight Plan (chartered aircraft non-agency-controlled mission) no frequencies required		
Chartered 135 operator is responsible for communications and flight plan		
Flight Following Method: AFF <input checked="" type="checkbox"/> Radio (Local or GACC aircraft desk) <input checked="" type="checkbox"/>		
FAA Flight Plan: (Agency-owned or agency contracted aircraft mission) <input type="checkbox"/>		
FAA Flight Plan: (Charter aircraft non-agency controlled mission) <input type="checkbox"/>		
FM Receive:	FM Transmit:	RX:
		TX:
FM Receive:	FM Transmit:	RX:
		TX:
FM Receive:	FM Transmit:	RX:
		TX:
AM Receive:	AM Transmit:	No Tone

****Aviation Manager will coordinate Temporary Flight Restrictions (TFR) with dispatch if needed****

Military Training Route(s) (MTR'S) or Military Operating Area(s) (MOA'S)				
<div style="background-color: #ffff00; padding: 2px; display: inline-block;"> TBD/Will confirm, complete or see MPS/FBN </div>				
Aviation Manager shall confirm deconfliction in these routes and areas prior to the flight with dispatch or other approved local methods.				
Deconfliction will be discussed prior to mission start. Add Additional MTR-MOA information to the end of the document if necessary.				
MTR-MOA	Route Legs-Altitudes	Activity	Time	Time Zone
		Hot <input type="checkbox"/> Cold <input type="checkbox"/> N/A <input type="checkbox"/>	Start: Stop:	UTC <input type="checkbox"/> Local <input type="checkbox"/>
		Hot <input type="checkbox"/> Cold <input type="checkbox"/> N/A <input type="checkbox"/>	Start: Stop:	UTC <input type="checkbox"/> Local <input type="checkbox"/>

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Crash Rescue/Medivac Plan: Additional medical information attached? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		
General Instructions (in the event of an incident): Mission site duties and actions to be coordinated through dispatch in accordance with local search & rescue (SAR) and emergency crash rescue plan(s). These items will be discussed and recorded during the daily safety briefing.		
<p>In the event of an accident, an IC for an incident within an incident will have been identified at each morning operational briefing. The IC will declare an incident within an incident and notify dispatch and will then activate the Aviation Mishap Plan. Incident information and instructions will be coordinated through the IC and Dispatch.</p> <p>Specified crash rescue duties will be assigned to ground operations personnel each day before flights of any kind. Crash rescue and first aid equipment will be located near the remote helibase, and equipment's location made known to all personnel. Additionally, during each morning briefing with all personnel, it will be stressed for ground resources to maintain a heightened situational awareness of the helicopter's location throughout the day's flight operations.</p>		
EMT(s) on site: YES <input type="checkbox"/> NO <input type="checkbox"/> <u>Complete or See MPS</u>		
Names: <u>Complete or See MPS</u>		
First responder(s) on site: YES <input type="checkbox"/> NO <input type="checkbox"/> <u>Complete or See MPS</u>		
Names: <u>Complete or See MPS</u>		
Available medivac helicopters: YES <input type="checkbox"/> NO <input type="checkbox"/> UNKNOWN <input checked="" type="checkbox"/> *Unknown: Select if medivac helicopter won't be ordered for the mission or incident prior to need. The helicopter will be ordered on demand through the dispatch process. Dispatch will provide medivac ship call sign or tail number, including capabilities and contact information. * Medivac helicopter on site? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Level of care medivac personnel can provide: ALS <input type="checkbox"/> BLS <input type="checkbox"/> Unknown <input checked="" type="checkbox"/>		
FAA Tail #(s)	Contact Information:	
Hoist/Rappel/Extraction Capable? YES <input type="checkbox"/> NO <input type="checkbox"/> Check all that apply: Hoist <input type="checkbox"/> Rappel <input type="checkbox"/> Short Haul <input type="checkbox"/>		
MEDICAL FACILITY	Name/Location/Helipad Information	Helipad YES <input type="checkbox"/> NO <input type="checkbox"/>
Latitude	Longitude	Contact Freq:
MEDICAL FACILITY		Helipad YES <input type="checkbox"/> NO <input type="checkbox"/>
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MEDICAL FACILITY	Name/Location/Helipad Information	Helipad YES <input type="checkbox"/> NO <input type="checkbox"/>
Latitude	Longitude	Contact Freq.
NEAREST BURN FACILITY	Name/Location/Helipad Information	Helipad YES <input type="checkbox"/> NO <input type="checkbox"/>
Latitude	Longitude	Contact Freq.
<input type="checkbox"/> Doors Off or Doors Open Flight(s)	<p>Personnel will remain seated and inside fuselage during all flights, approved secondary restraint harness for doors off flights (only for PLDO, HRAP, HRSP, Aerial Photography, IR Operator, ACETA Gunner, Cargo Letdown, Short Haul Spotter, Cargo Free Fall Operations-type 3 helicopter) * Refer to appropriate guides*</p> <p style="text-align: center;">**Safety Alert IASA 18-03 language**</p> <p>“Agency personnel involved in any public aircraft operations mission that require aircraft doors to be removed prior to flight, or open during flight, shall receive hands-on secondary restraint refresher training prior to conducting flight operations”.</p>	

Doors Off or Open Operations checklist: ****All items shall be covered and signed for prior to operations****

- Aircraft connection point and secondary restraint configuration (Interagency Safety Alert IASA 17-02)
- Proper donning and adjustment of secondary restraint system.
- Have an understanding of the secondary restraint interaction with FAA approved seat belts.
- Potential of secondary restraint interference with Airbus AS 350 fuel shut off lever if applicable.
- Know location and use of secondary restraint interaction quick- release.
- Perform buddy-check and Pilot in Command check of secondary restraints before flight.
- Practice egress with secondary restraint quick-release mechanism and function of seatbelt.
- Know location and use of rescue knife.

**Signatures –Risk Assessment, Doors off Operations, GAR, Briefing completed
Complete or See MPS /FBN**

Participants Name/Position	Date	Participants Name/Position	Date

****Use back of this form if needed for additional participants name and date.****