

RISK ASSESSMENT MATRIX		PROBABILITY					
		Likelihood of Mishap if Hazard is Present					
		Almost Certain (Continuously experienced)	Likely (Will occur frequently)	Possible (Will occur several times)	Unlikely (Improbable; but has occurred in the past)	Rare (Remotely possible; but highly improbable)	
SEVERITY	Consequence if Mishap Occurs	<b>Catastrophic</b> (Death, Loss of Asset or Mission Capability or Unit Readiness)	Extremely High	Extremely High	Extremely High	High	Medium
	<b>Critical</b> (Permanent Disabling Injury or Damage, Significantly Degraded Mission Capability or Unit Readiness)	Extremely High	Extremely High	High	Medium	Medium	
	<b>Moderate</b> (Non-Permanent Disabling Injury or Damage, Degraded Mission Capability or Unit Readiness)	High	High	Medium	Low	Low	
	<b>Negligible</b> (Minimal Injury or Damage, Little or No Impact to Mission Capability or Unit Readiness)	Medium	Medium	Low	Low	Low	
		Risk Assessment Codes (RAC)					
		Extremely High=1 High=2 Medium=3 Low=4					

### Risk Assessment Codes

RAC Value	Risk Category	Action Required
1	Extremely High	Stop, Mitigation Required
2	High	Mitigation Needed, Consider Stopping
3	Medium	Mitigation Recommended
4	Low	Possible Acceptance, Mitigation Optional

*\*Reference specific agency policy regarding action required based on risk category*

## Risk Assessment Worksheet

SYSTEM: Helicopter/UAS Aerial Ignition Operations		Pre-Mitigation				Post Mitigation							
Sub System	Hazard(s)	Probability	Severity	Risk Level	Mitigation(s)	Probability	Severity	Risk Level	Additional Local Mitigation(s)	Probability	Severity	Overall Risk	Mitigation Achieved?
													Yes/No
<b>Mission - Policy</b>	Operational/Mission goals may be unstated, unclear, or in conflict with policy.	<i>Possible</i>	<i>Critical</i>	<i>High</i>	Conduct thorough briefings, ensure organization is in place, and adhere to interagency policy, procedures, & Guides.	<i>Unlikely</i>	<i>Critical</i>	<i>Medium</i>		Choose an	Choose an	<i>Medium</i>	YES
<b>Mission - Policy</b>	MASP/MPS/FBN, GO/NO-GO Checklist, Operational Risk Assessment not complete (Policy Deviation).	<i>Possible</i>	<i>Critical</i>	<i>High</i>	Ensure MASP/MPS/FBN, FRAT/GAR, and GO/NO-GO are completed or approved at appropriate level. Ensure Forest Aviation Officer is involved in mission planning. MASP/MPS/FBN should be used as a briefing tool. A "NO-GO" on the GO-NO-GO Checklist halts the operation. Ensure all parties are in attendance for mission briefings.	<i>Unlikely</i>	<i>Critical</i>	<i>Medium</i>		Choose an item.	Choose an item.	<i>Medium</i>	YES
<b>Mission</b>	Burn crew transport/ pre-burn recon; Unimproved landing zone/helispot	<i>Unlikely</i>	<i>Critical</i>	<i>Medium</i>	Ensure load calculations/manifests are completed, reviewed & signed. Landing zones are approved and staffed by qualified personnel. UAS conduct orientation flight with burn personnel.	<i>Rare</i>	<i>Critical</i>	<i>Medium</i>		Choose an	Choose an	<i>Medium</i>	YES
<b>Mission - Communication</b>	Frequency management, cockpit overload, inadequate briefing, and/or loss of communication.	<i>Possible</i>	<i>Critical</i>	<i>High</i>	Ensure frequencies are reviewed and operational. Consider a discrete channel for air operations. Ensure thorough communication briefing. Halt operations if loss of communications occurs.	<i>Unlikely</i>	<i>Critical</i>	<i>Medium</i>		Choose an	Choose an	<i>Medium</i>	YES

<b>Personnel</b>	Unqualified personnel 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 their position(s). Trainees will have direct supervision. The Firing Boss, if not a qualified HECM, will be loaded/unloaded by qualified personnel.	Unlikely	Critical	Medium		Choose an	Choose an	Medium	YES
<b>Personnel - Human Factors</b>	Acceptance of high-risk missions as normal. Lack of CRM. Task saturation or fixation. Hazardous Attitudes. Poor mission analysis. Fatigue. Management pressure/mission driven sense of urgency. Unknown change in objective. Experience level of personnel, including vendor.	Possible	Catastrophic	Extremely High	Conduct thorough risk assessments & brief/debrief. Pilot, UASP, VO, and qualified non-crewmembers trained in CRM and work together in mission planning. Perform FRAT/GAR with pertinent personnel. Ensure management does not place undue pressure or sense of urgency. Ensure objective has not changed and re-evaluate mission if change occurs.	Unlikely	Catastrophic	High		Choose an item.	Choose an item.	High	YES
<b>Human Factors</b>	Workload Management - Pilot, Helicopter Manager, Helibase Manager, Helitack Crew personnel, FSV Personnel, UASP, VO	Almost Certain	Critical	Extremely High	Ensure existing staffing, supervision, and management policies & procedures are met. Order resources early when the need is anticipated. Aviation staffing is a critical safety priority, limit collateral duties in key supervisory positions. If you are 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	Medium		Choose an item.	Choose an item.	Medium	YES
<b>Aircraft</b>	Aircraft Performance not suitable for mission	Unlikely	Catastrophic	High	Ensure appropriate aircraft are ordered, utilized, and operated IAW appropriate flight manuals. Utilize agency load calculation process for all flights (NSHO). Ensure pilot/aircraft/FSV are carded for mission. Conduct thorough pre-mission briefing and planning. Remote pilots will ensure the aircraft is operated within policy and the provisions of the aircraft operations manual.	Rare	Catastrophic	Medium		Choose an item.	Choose an item.	Medium	YES

<b>Aircraft</b>	Mission may require operating in the avoidance area of the height velocity diagram (HVD); Low level flight below 500' AGL	<i>Likely</i>	<i>Critical</i>	<i>Extremely High</i>	Reduce time spent at speeds and altitudes from which a successful auto-rotational descent and landing cannot be completed. Educate personnel on the limitation of auto-rotations. Identify and brief emergency landing areas with proximity to the burn. Use equipment that allows greater airspeeds and altitudes. Consider reduced burn efficiency for greater safety margins.	<i>Possible</i>	<i>Critical</i>	<i>High</i>		Choose an item.	Choose an item.	<i>High</i>	YES
<b>Aircraft</b>	Aircraft experiences an engine, transmission, hydraulic, or tail rotor failure while in low and slow flight profile	<i>Unlikely</i>	<i>Catastrophic</i>	<i>High</i>	Aircraft maintenance records reviewed during aircraft inspection. Aircraft manager will work with vendor personnel to ensure contract maintenance standards are being adhered to. Reduce the amount of time spent operating in the avoidance areas of HVD. Conduct contract compliance/QA visits.	<i>Unlikely</i>	<i>Catastrophic</i>	<i>High</i>		Choose an item.	Choose an item.	<i>High</i>	YES
<b>Environment</b>	Adverse wind speed/direction, thunderstorms, etc.	<i>Likely</i>	<i>Critical</i>	<i>Extremely High</i>	Ensure flight crew obtains current forecast and updated weather briefings. Continually monitor winds and sky conditions to ensure flights are conducted within approved parameters. If winds or conditions become unfavorable, postpone or delay to another day.	<i>Rare</i>	<i>Catastrophic</i>	<i>Medium</i>		Choose an item.	Choose an item.	<i>Medium</i>	YES
<b>Environment</b>	Smoke limiting visibility	<i>Possible</i>	<i>Catastrophic</i>	<i>Extremely High</i>	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.	<i>Unlikely</i>	<i>Catastrophic</i>	<i>High</i>		Choose an item.	Choose an item.	<i>High</i>	YES

<b>Environment</b>	Flying in Mountainous Terrain while focused on low- level mission	Possible	Catastrophic	Extremely High	Carded and experienced pilot. Select appropriate aircraft performance category. Recon treatment areas prior to ignitions. Pre-identify aerial hazards and project boundaries. Division of tasks between pilot, firing boss/burn boss, and PLDO. Special emphasis on CRM principles regarding situational awareness and communication.	Possible	Critical	High		Choose an item.	Choose an item.	High	YES
<b>Aerial Hazards</b>	Powerlines, towers, birds, UAS, other aircraft, etc.	Possible	Catastrophic	Extremely High	Brief personnel of known aerial hazards, to include use of hazard maps. Complete high-level reconnaissance prior to committing aircraft to low level operations. Practice "see and avoid". Utilize CRM with special emphasis on CRM principles regarding situational awareness and communication. Confirm airspace deconfliction with Dispatch. Remote pilots will utilize VO and give way to crewed aircraft. For burn projects utilizing helicopter and UAS, the aircraft will be separated temporally (i.e. UAS on the ground when helicopter is in flight)	Unlikely	Catastrophic	High		Choose an item.	Choose an item.	High	YES
<b>Hazardous Materials</b>	Transportation of Hazardous Materials in Helicopter	Possible	Catastrophic	Extremely High	Follow Standards for Aviation Transport of Hazardous Materials Handbook (PMS 513) for all HazMat associated with the mission.	Unlikely	Catastrophic	High		Choose an item.	Choose an item.	High	YES

<b>Equipment - PSD/Helitorch</b>	Door Off Flight Operations could cause fall and/or unintended equipment exiting the aircraft	<i>Unlikely</i>	<i>Catastrophic</i>	<i>High</i>	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 the Interagency/Forest Service Safety Alert 18-03 and Interagency ALSE Handbook.	<i>Rare</i>	<i>Catastrophic</i>	<i>Medium</i>		Choose an item.	Choose an item.	<i>Medium</i>	YES
<b>Equipment - PSD/Helitorch /UAS</b>	Malfunction, Hang Fire, UAS Battery Fire	<i>Possible</i>	<i>Critical</i>	<i>High</i>	Ensure equipment is well maintained, tested & operational. Replace equipment as necessary. Inspect spheres. Ensure adequate glycol and full water levels. Ensure all items are properly secured. Brief emergency procedures with pilot, UASP, VO, firing boss, burn boss, PLDO, and/or helitorch personnel. UAS Battery storage and inspections in accordance with manufacturer guidelines and best practices. Fire extinguisher(s) on site.	<i>Unlikely</i>	<i>Critical</i>	<i>Medium</i>		Choose an item.	Choose an item.	<i>Medium</i>	YES
<b>UAS</b>	Injury or property damage by UAS	<i>Possible</i>	<i>Critical</i>	<i>High</i>	The remote pilot will conduct a pre-flight briefing which will include the flight patterns, safe observation/parking areas, and safety precautions when working around UAS with motors running. Trainees will be supervised around equipment until they demonstrate proficiency working around UAS. VO will be utilized.	<i>Unlikely</i>	<i>Critical</i>	<i>Medium</i>		Choose an item.	Choose an item.	<i>Medium</i>	YES
<b>UAS - System Communications</b>	Loss of Link with Ground Control Station	<i>Possible</i>	<i>Moderate</i>	<i>Medium</i>	UAS will be programmed to return to home and land.	<i>Unlikely</i>	<i>Moderate</i>	<i>Low</i>		Choose an	Choose an	<i>Low</i>	YES

<b>UAS - System Communications</b>	Flyaway (Loss of Control) & possible collision with crewed aircraft	<i>Unlikely</i>	<i>Catastrophic</i>	<i>High</i>	Remote pilot will utilize specific make/model emergency procedures. Aircraft, Personnel, Dispatch, and ATC/ARTCC having jurisdiction over the airspace will be immediately notified of last location, heading, speed, and approximate battery/time remaining for the UAS. Coordinate and communicate UAS recovery actions.	<i>Rare</i>	<i>Catastrophic</i>	<i>Medium</i>		Choose an item.	Choose an item.	<i>Medium</i>	YES	
<p><i>*Final Risk Value is the overall risk of the mission/flight after all mitigations have been implemented. Overall risk cannot be lower than the highest risk after mitigations. One high risk rating will result in the overall risk being high. It is not an average.</i></p>									<b>Final Risk Value:</b>	<i>High</i>				
<b>Prepared By:</b>			<b>Title:</b>							<b>Date:</b>				
<b>Approved By:</b>			<b>Title:</b>							<b>Date:</b>				