

System: Aircraft		2008 Infrared Program Assessment						
Sub-systems	Hazards	Pre Mitigation			Mitigation	Post Mitigation		
		Likelihood	Severity	Outcome		Likelihood	Severity	Outcome
Avionics	Loss of electrical power	Remote	Critical	Medium	Keep your cell phone handy (and charged up), Have the required 2 "D" cell flashlight working and charged, Have a spare hand-held VHF-AM radio, Training on	Remote	Critical	Medium
	Erroneous read-outs from the equipment	Occasional	Critical	Serious	Training, Pre and post season avionics checks	Remote	Marginal	Medium
	Non-Standard (type/lay-out/location) of equipment	Frequent	Critical	High	Update the equipment/design for standardization & Train to the new equip. & Maintain currency in all A/C, Standardize fleet to same make aircraft	Improbable	Marginal	Medium
IR Equipment	Electrical Interface (A/C Mods)	Frequent	Negligible	Medium	Coordinate with all staffs on modifications prior to the installations, Refresher (preseason) mission training	Occasional	Negligible	Low
	Increased exposure to land/take-off to hand-off imagery	Frequent	Critical	High	Install and utilize satellite up-link capability	Occasional	Critical	Serious
Maintenance	Nitrogen servicing (Improper technique), not wearing proper PPE and ultimately causing personal injury	Frequent	Marginal	Serious	Proper training/procedures	Frequent	Negligible	Medium
	Maintenance providers (lack of skilled technicians/repair stations)	Occasional	Catastrophic	High	Coordination with maintenance personnel and repair stations	Remote	Catastrophic	Serious
	Undocumented open discrepancies	Occasional	Marginal	Medium	Follow SOPs	Improbable	Marginal	Medium
	Not performing Functional Check Flight (FCF) before releasing aircraft after maintenance (when applicable)	Remote	Catastrophic	Serious	Perform FCFs when applicable, coordinate with maintenance technician; if possible take maintenance technician on FCF	Improbable	Critical	Medium
Standardization	Non-Standard Aircraft	Frequent	Critical	High	Update the equipment/design for standardization & Train to the new equip. & Maintain currency in all A/C, Standardize fleet to same make aircraft	Improbable	Marginal	Medium
Modifications	Effects of modifications that decrease aircraft capabilities causing additional crew workload/exposure/performance issues(fuel burn, flight planning)	Frequent	Marginal	Serious	Correction to existing modification; coordination and testing of future modifications.	Remote	Negligible	Low
	Increased exposure to mid-air collision due to necessity of turning off TCAS during mission because of interference between TCAS and IR equipment.	Frequent	Catastrophic	High	Testing and relocation of system components to correct the interference; for future modifications include testing for interface interference.	Improbable	Negligible	Low
Fuel	Bad Fuel	Remote	Catastrophic	Serious	Observe fueling; sump fuel as required.	Improbable	Catastrophic	Medium
	Improper fuel loading	Remote	Catastrophic	Serious	Observe fueling; confirm loading.	Improbable	Catastrophic	Medium

System: Environmental		2008 Infrared Program Assessment						
Sub-systems	Hazards	Pre Mitigation			Mitigation	Post Mitigation		
		Likelihood	Severity	Outcome		Likelihood	Severity	Outcome
Weather	Flying in bad weather	Probable	Critical	High	Preflight planning, Just say NO (accept the fact that the mission cannot be completed)! PIREPS, Call local area, change priority of mission flight, Equip monitoring (i.e. Wx Radar, Storm scope, XM radio, etc...)	Occasional	Critical	Serious
	Pressure to complete the mission regardless of the Wx	Frequent	Critical	High	Just say NO! Education/Training of the ground personnel regarding go-no-go situations. Preflight	Occasional	Critical	Serious
	Icing equipment (aircraft) failing	Remote	Marginal	Medium	Preflight checks of icing equipment, proper maintenance of icing equip.	Improbable	Marginal	Medium
	Smoke Column	Occasional	Critical	Serious	IR Technician reports, PIREPS, Debrief other fire air ops crews (lead plane, airattack, etc...) Fly out of	Remote	Critical	Medium
Topography	Controlled flight into terrain	Improbable	Catastrophic	Medium	Maintain Situational Awareness, File IFR, Train and	Improbable	Catastrophic	Medium
	Moderate (plus) turbulence	Occasional	Marginal	Serious	Preflight briefing, PIREPS, Fly different altitude or out of	Remote	Marginal	Medium

System: Airports		2008 Infrared Program Assessment						
Sub-systems	Hazards	Pre Mitigation			Mitigation	Post Mitigation		
		Likelihood	Severity	Outcome		Likelihood	Severity	Outcome
Location	Mountainous Terrain-Unfamiliar, leading to CFIT,	Occasional	Catastrophic	High	Preflight planning, instrument approaches, refusal of delivery point, landing during daylight hours	Remote	Critical	Medium
	Collision with wildlife on the runways leading to damage/injury of personnel or property	Occasional	Critical	Serious	Perform fly-by, contact personnel on ground to check field, air-drop, install gun on nose of aircraft	Improbable	Critical	Medium
Limitations	Airport surface condition is not conducive to landing resulting in damage to aircraft	Remote	Critical	Medium	Check the AFD, NOTAMS, local traffic, Tower,	Improbable	Critical	Medium
	Runway length is not appropriate for the aircraft's capabilities	Occasional	Critical	Serious	Perform performance calculations/preflight planning, NOTAMS	Improbable	Critical	Medium
	construction hazards/equipment	Occasional	Critical	Serious	NOTAMS, ATIS, Local traffic, Tower, UNICOM	Improbable	Critical	Medium
IAP	Lighting systems are inop/inadequate leading to a short landing/go-around, CFIT	Remote	Catastrophic	Serious	ATIS UNICOM, visual cues, preflight planning	Improbable	Catastrophic	Medium
	Unfamiliar with the missed approach procedures (MAP), leading to CFIT	Remote	Catastrophic	Serious	Preflight planning. Performing approach briefings, training/proficiency, current charts, CRM	Improbable	Catastrophic	Medium
	Not having an IAP leading to a CFIT	Occasional	Catastrophic	High	Preflight planning. Performing approach briefings, training/proficiency, current charts, CRM, Do NOT land if conditions are such that it is unsafe to make a safe	Improbable	Catastrophic	Medium
Airspace	Congested, task saturation of controller and/or pilots/crew, midair possibility	Remote	Catastrophic	Serious	TCAS, SA, CRM, Training, Communications, Chose another airport	Improbable	Catastrophic	Medium
	No Tower-pilots operating without radio or wrong frequency-Possible midair	Remote	Catastrophic	Serious	SA, communications, CRM, UNICOM, PIREPS, aircraft lighting, TCAS,	Improbable	Catastrophic	Medium
	Incursions on the runway and parking areas	Occasional	Critical	Serious	SA, CRM, TCAS, Communications, A/C lighting, training, parking tenders, familiar with the airport	Remote	Critical	Medium
Support Personnel	Unqualified Personnel (ground/ramp or agency) leading to misfueling, hazardous parking, leading to damage to the aircraft or injury to personnel	Occasional	Critical	Serious	SA, CRM, Communication, Training of support personnel	Remote	Critical	Medium

System: Personnel		2008 Infrared Program Assessment						
Sub-systems	Hazards	Pre Mitigation			Mitigation	Post Mitigation		
		Likelihood	Severity	Outcome		Likelihood	Severity	Outcome
Human Factors	Fatigue-Chronic, errors due to fatigue (SA)	Frequent	Critical	High	Scheduling management (reduce duty hrs and/or flight time), sufficient staffing levels , sleep-power naps, Training, CRM, support of crew decision to decrease	Remote	Marginal	Medium
	Fatigue-Acute, errors due to fatigue (SA)	Frequent	Critical	High	Training, CRM, sleep-power naps, support of crew decision to decrease duty day	Remote	Negligible	Low
	Trans-cockpit authority gradient, junior crewmember not confident in speaking up about a hazard	Occasional	Critical	Serious	Education/Training, CRM, communications, tailgate sessions/AAR (after action review, debrief)	Remote	Critical	Medium
	Mission pressure from management, leading to fatigue, harried decisions leading to hazardous mistakes	Frequent	Catastrophic	High	Training, CRM, Support of crew decisions, neutral person (arbitrator) to share issues/disputes/conflict resolution	Remote	Marginal	Medium
	Mission pressure from other factions (dispatch/fire teams), leading to fatigue, anxiety, harried decisions leading to hazardous mistakes	Frequent	Catastrophic	High	Education/training, attending the IMT/dispatch meetings, ensuring open communication between IMTs, dispatch and coordinators, AARs (debriefings)	Occasional	Marginal	Medium
	Stress and fatigue from insufficient staffing levels leading to the can-do/will-do attitudes	Frequent	Critical	High	Staff and budget at appropriate levels, support the crews decision to manage workloads that are commensurate	Remote	Negligible	Low
	Logistical issues with non-co-located personnel leading to additional exposure of flight/landings/take-offs ultimately leading to fatigue/stress/damage/injury to the aircraft and or personnel	Frequent	Catastrophic	High	Co-locate personnel at single base/unit, RON at single location	Improbable	Negligible	Low
	Personnel dissention between factions of the IR "System" leading to stress and anxiety, resulting in degraded decision making and ultimately possible damage/injury to aircraft or personnel	Probable	Critical	High	CRM & teambuilding training for all IR systems staff; open communications; pre/post season meeting to include all factions of IR systems staff; AARs; clearly defined policies, procedures & roles (Infrared Operations Guide).	Improbable	Negligible	Low
Training	Unqualified personnel flying the aircraft- Resulting in: CFIT, emergency procedures, incidents, accidents	Occasional	Critical	Serious	Qualified and mission proficient personnel flying the aircraft, adequate staffing levels.	Improbable	Negligible	Low
	Unqualified IR technicians leading to damage to aircraft and/or personnel	Remote	Critical	Medium	Qualified and mission proficient personnel operating/maintaining the equipment.	Improbable	Negligible	Low
Medical	Flying with known physiological conditions leading to degraded decisions, and hazardous mistakes	Occasional	Critical	Serious	CRM, communications, training and education, take additional time off to recover, see the Doctor, support from other factions	Improbable	Negligible	Low
Night Ops	Accidents while driving to lodging after mission completion late at night.	Occasional	Critical	Serious	Use of shuttles, most alert crewmember drives	Remote	Critical	Medium
	Incidents or errors caused by physiological challenges (circadian rhythm deviations, vision, fatigue)	Frequent	Catastrophic	High	Education and training; implement CRM; knowing and employing personnel limitations	Occasional	Critical	Serious
Management	Lack of skilled leadership/managerial skills in supervisors and upper management leading to stress/anxiety of crews resulting in errors and/or degraded decision-making skills.	Probable	Critical	High	Leadership training, participation in pre/post meetings of IR system staff.	Remote	Marginal	Medium

System: Policy		2008 Infrared Program Assessment						
Sub-systems	Hazards	Pre Mitigation			Mitigation	Post Mitigation		
		Likelihood	Severity	Outcome		Likelihood	Severity	Outcome
Duty Day	Fatigue-Chronic, errors due to fatigue (SA)	Frequent	Critical	High	Scheduling management (reduce duty hrs and/or flight time), sufficient staffing levels , sleep-power naps, training, CRM, support crew decision to decrease duty	Remote	Marginal	Medium
	Fatigue-Acute, errors due to fatigue (SA)	Frequent	Critical	High	Training, CRM, sleep-power naps, support crew decision to decrease duty day	Remote	Negligible	Low
Qualifications	Unqualified personnel flying the aircraft-Resulting in: CFIT, emergency procedures, incidents, accidents	Occasional	Critical	Serious	Qualified and mission proficient personnel flying the aircraft, adequate staffing levels.	Improbable	Negligible	Low
Ill-defined policy and procedures	Procedures that do not reflect the entire IR system leading to ambiguity in the decisions that need to be made, adding stress and anxiety to the crew's workload ultimately leading to hazardous decision making with possible damage/injury to aircraft or crew	Occasional	Critical	Serious	Clearly defined policies, procedures, and roles (Infrared Operations Guide); Have IR Ops Guide approved by line officer authority.	Improbable	Negligible	Low

System: Flight Operations		2008 Infrared Program Assessment						
Sub-systems	Hazards	Pre Mitigation			Mitigation	Post Mitigation		
		Likelihood	Severity	Outcome		Likelihood	Severity	Outcome
CWN/Other A/C	Use of uncarded aircraft and crew. Failure to follow policy/safety recommendations resulting in use of pilots who are not proficient or current for the mission. Using aircraft that may have exceeded inspection and or component replacement deadlines.	Occasional	Negligible	Low	Check aircraft data cards and pilot qualification cards	Improbable	Negligible	Low
Night Ops	Incidents or errors caused by physiological challenges (circadian rhythm deviations, impaired vision, fatigue)	Frequent	Catastrophic	High	Education and training; implement CRM; Recognize and operate within personal limitations.	Occasional	Critical	Serious
Communication	Losing radio communications	Remote	Negligible	Low	Carry back up hand-held radio in the survival kit; cell	Remote	Negligible	Low
	Chance of striking person or property with drop tube because of a lack of clear communications during air drop	Occasional	Critical	Serious	Ensure clear communications prior to drop--no drop if no communications; follow established drop procedures	Improbable	Negligible	Low
Instrument Flying	Inadvertant flight into IMC Conditions	Remote	Marginal	Medium	Filing IFR; preflight planning; if you encounter IMC inadvertently fly instruments and exit IMC conditions	Improbable	Marginal	Medium
	Lack of currency and proficiency	Remote	Catastrophic	Serious	Maintain currency and proficiency; Do not allow non-current crewmembers to fly missions	Improbable	Catastrophic	Medium
	Controlled flight into terrain (CFIT)	Improbable	Catastrophic	Medium	Maintain situational awareness; training; file IFR	Improbable	Catastrophic	Medium
Airspace	Congestion, mid-air collision potential	Remote	Catastrophic	Serious	File IFR, TCAS, Situational awareness, visual scanning	Improbable	Catastrophic	Medium
	Non-radar/uncontrolled airspace-unknown aircraft, possible mid-air collision	Remote	Catastrophic	Serious	See and avoid, Use TCAS	Improbable	Catastrophic	Medium
Delivery of Imagery	Hot hand-offs resulting serious injury or death	Remote	Catastrophic	Serious	Ensure crew is adequately trained. Maintain Situational Awareness. Be sure communications are clear	Improbable	Catastrophic	Medium
	Air drop tubes striking an object or person causing damage or personal injury	Remote	Catastrophic	Serious	Ensure crew is adequately trained. Maintain Situational Awareness. Be sure communications are clear between air-ground personnel. employ data transfer via	Improbable	Catastrophic	Medium
	Low/slow flight profile in delivery of air drop resulting CFIT	Probable	Catastrophic	High	Training, Situational Awareness, CRM, clear and positive air to ground communications, IAPs, Use radio altimeter, Determine criteria for go-no go	Remote	Catastrophic	Serious