APPENDIX I

WEATHER EFFECTS ON INTELLIGENCE AND ELECTRONIC WARFARE

Intelligence operations, primarily sensors, are influenced by weather. Collection and dissemination may be hindered by weather. All-source processing requires evaluation of all weather conditions as they impact enemy and friendly operations and systems. Listed below are other weather effects for IEW operations that are not listed in the WTDA tables.

CLOUDS AND SKY COVER. Overcast skies with low cloud bases reduce the effectiveness of infrared and photographic collection systems, and may restrict the use of UAVs.

ICING. In addition to icing conditions associated with aircraft, ice is also a problem with electronic systems that depend on ice-free antennas for optimum operation.

ILLUMINATION. NVD require about a quarter (23 percent) of the moon, 30 degrees above the horizon, scattered clouds, and the sun more than 5 degrees below the horizon. See Appendix F for further information.

PRECIPITATION. Even moderate amounts of rain and snow will obstruct vision and degrade photographic and infrared collection systems. Heavier amounts of rain can generate background electronic noise that reduces the efficiency of GSR.

SURFACE WIND. Strong winds may damage or prevent erection of system antennas.

TEMPERATURE. Frozen soil increases the difficulty of grounding equipment. At extreme cold temperatures cables snap and wire is unmanageable. Extreme cold also shortens battery life and may put systems requiring a good source of battery power out of service.

VISIBILITY. Low visibility decreases the effectiveness of visual, photographic, infrared, and E-O collection systems. However, LRSU's may benefit from restricted visibility and increase their infiltration success. This condition may affect visual, laser range finding, and target acquisition systems.

Table I-1. Weather effects from cloud ceilings.

WEATHER VALUE (FEET)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 50	NOE UAV, any terrain	Flight operations		
LT 300	IROQUOIS (EH-1H), flat terrain	Below VFR minimums	NOE UAV, flat terrain	Flight operations
LT 500	MOHAWK (OV/RV-1D) and BLACKHAWK (EH-60A), mountain terrain or night, flat terrain	Below VFR minimums	NOE UAV, flat or mountain terrain	Target require-ments
LT 1,000	IROQUOIS (EH-1H), mountain terrain	Below VFR minimums	NOE UAV, mountain terrain Army aviation	Flight operations See app E

Table I-2. Weather effects from reduced visibility.

WEATHER VALUE (METERS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT 800	BLACKHAWK (EH-60A) and IROQUOIS (EH-1H), daytime, flat or mountain terrain	Below VFR minimums		
LT 1,000	Engagement, collection plans, photographic missions			
LT 1,600	Aircraft daytime, flat terrain	Below VFR minimums		
LT 2,000	UAV		Engagement, collection plans, photographic missions	
LT 3,200	Aircraft nighttime, flat terrain	Below VFR minimums		
LT 4,800	Aircraft nighttime, mountain terrain	Below VFR minimums		

Table I-3. Weather effects from surface winds.

WEATHER VALUE (KNOTS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
GT 7			Radars (PPS-5 and PPS-15)	Increased noise in tall grass
GT 13			Radio receiver (TRR-20)	Antenna must be guyed
GT 15			Acoustic sensors MRDFS (PRD-10), MANPACK (PRD-11) Radars (PPS-5 and PPS-15)	Less effective DF degraded, antennas degraded, can't set up Heavy vegetation moved by wind degrades
GT 15, with heavy rain	MRDFS (PRD-10), Man portable radio receiving set (TRQ-30), MANPACK (PRD-11)	Exceeds system operating limits		
GT 17, in sand/ dust	HEXJAM (PLT-1A)	Exceeds operating limits		
GT 20			Communications antennas, radar (PPS-5)	Antennas degraded
GT 21 in heavy rain	Radio receiver (TRR-20)	Exceeds antenna operating limits		
GT 25	Radar (PPS-15)		TACFIX (TRQ-37)	DF degraded
GT 30	SASS TEAMMATE (TRQ-32)	Cannot operate Antenna hard to erect	TACJAM (MLQ-34) PIRANHA (OG-181), TACFIX (TRQ-37)	Antenna performance Antenna erection

Table I-3. Weather effects from surface winds (continued).

WEATHER VALUE (KNOTS)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
GT 35	Countermeasures system (GLQ-3B), TEAMPACK (MSQ-103C)	Antenna mast cannot be fully extended	TEAMMATE (TRQ-32(V)) Countermeasures system (GLQ-3B) PIRANHA (OG-181), TEAMPACK (MSQ-103C) GUARDRAIL (USD-9),	DF degraded Antenna extending Antennas should not be erected Antenna operations
GT 40	Personnel Radar (PPS-5)	Antenna breaks		
GT 45	Acoustic sensors IEW antenna systems BLACKHAWK (EH-60A)	Less effective Exceeds limits	TEAMMATE TRQ-32(V)), TRAILBLAZER (TSQ-114B(V))	DF degraded
GT 50	Communications antennas, PIRANHA (OG-181), TEAMMATE (TRQ-32(V)), REMBASS (GSQ-187) Countermeasures set (TLQ-15)	Antenna should not be erected Affects antenna performance	REMBASS (GSQ-187) PIRANHA (OG-181) Radio receiver set (TRR-20)	Antenna performance Antenna should not be erected Antenna damage
GT 60	Fixed-wing aircraft DRAGONFIX (TSQ-164), TRACKFINDER (TSS-11)	May cancel mission (see app E) Exceeds antenna limits		
GT 78	TRAILBLAZER (TRQ-114B(V))	Exceeds antenna limits		

Table I-3. Weather effects from surface winds (continued).

GT 90	GSM (TSQ-168), antenna	Cannot endure winds above 100 kn. Weather warning required at 90 kn.		

Table I-4. Weather effects from temperature.

WEATHER VALUE (°F/°C)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
LT -25/-32	QUICK LOOK II (ALQ-133) Countermeasure system (GLQ-3B), TACJAM (MLQ-34), HEXJAM (PLT-1A) TEAMPACK (MSQ-103C) PIRANHA (OG-181) Personnel	Exceeds aircraft limits Exceeds generator operating limits Exceeds battery operating limits Requires arctic kit	Radar (PPS-5) Radar (PPS-15) TRAILBLAZER (TSQ-114B(V))	wo shelter wo generator, arctic kit Carrier requires several heater kits to operate
LT -20/-28			Maintenance	Takes five times longer
LT 0/-18	Radio receivers (TRR-20, TRR-33A)	Antenna rotor won't operate	Wheeled vehicles Dry cell battery Radar (PPS-15)	wo winter kit Only 40% effective Battery 5598 required
LT 17/-9			Radars (PPS-5 and PPS-15)	
LT 20/-6			Platoon early warning system (TRS-2) OUTS	wo BA3090 battery Env system cannot sustain personnel
LT 32/0	TACFIX (TRQ-37)		Personnel	See app L for wind-chill
Between 60/16 and 100/38			TRAFFICJAM (TLQ-17A)	Transmit no longer than 15 continuous minutes

Table I-4. Weather effects from temperature (continued).

WEATHER VALUE (°F/°C)	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
GT 68/20			MANPACK (PRD-11)	Degrades receiver accuracy
GT 80/27			GSM (TSQ-168), shelter	Requires internal temp remain between 65°F-80°F
GT 85/29	QUICKFIX (ALQ-151(V)) MANPACK (PRD-11)	Affects lift Affects receiver accuracy	Personnel	See app L for temp/ humidity index
GT 95/35	Personnel	See app L for water consumption	Dry cell battery	Will not hold charge
GT 100/38			TRAFFICJAM (TLQ-17A)	Transmit no longer than 5 continuous minutes
GT 120/49	QUICKFIX (ALQ-151), GUARDRAIL (USD-9), TACJAM (MLQ-34), TRAILBLAZER (TSQ-114B(V)), TACFIX (TRQ-37)	Exceeds limits		
GT 125/52	Generators, REMBASS (GSQ-187), TEAMPACK (MSQ-103C), PIRANHA (OG-181), TEAMMATE (TRQ-32(V)), TRAILBLAZER, (TSQ-114B(V),) HEXJAM (PLT-1A) Man portable radio receiving set (TRQ-30), Radars (PPS-5 and PPS-15)	Exceeds limits BB-622 battery degraded		

Table I-5. Weather effects from precipitation.

WEATHER CONDITION	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
Light rain or snow			Wheeled vehicles	
Moderate rain or snow	Wheeled vehicles		LOS communications Personnel movement Laser systems Target acquisition Equipment storage Platoon early warning system (TRS-2)	
Heavy rain or snow	Laser systems Personnel movement LOS communications HEXJAM (PLT-1A) TEAMPACK (MSQ-103C) Target acquisition		REMBASS (GSQ-187) SLAR Radars (PPS-5 and PPS-15) GSM (TSQ-168), antenna	Infrared detection People detection Must be drained when exposed to heavy moisture
Heavy rain with 15 kn or more surface wind	MRDFS (PRD-10) Man portable radio receiving set (TRQ-30) MANPACK (PRD-11)		GSM (TSQ-168)	Must move if rainfall exceeds 4 inches/hour
Thunderstorm/ lightning			Ammunition Radar (PPS-15) Aircraft operations Refueling operations Communications Equipment storage	 AR 95-1 Safety Interference
Light freezing rain	Aircraft wo deice	AR 95-1		
Moderate freezing rain	Personnel movement		Aircraft with deice	AR 95-1

Table I-5. Weather effects from precipitation (continued).

WEATHER CONDITION	SEVERE DEGRADATION		MODERATE DEGRADATION	
	SYSTEM/EVENT	REMARKS	SYSTEM/EVENT	REMARKS
Heavy freezing rain	Aircraft with deice	AR 95-1		
SNOW DEPTH (INCHES)				
GT 3			Personnel movement	
GT 6	Personnel movement		Wheeled vehicles	
GT 12	Wheeled vehicles			
GT 20			Tracked vehicles	
GT 30	Tracked vehicles			
HAIL (INCHES)				
Large hail GT .5	GSM (TSQ-168)	Must be protected from hail		