

Operational Considerations

The military personnel using the Target Location Device is expected to be:

- Mobile immediately before and after determining a coordinate, and thus any potential solution requiring use of a stationary tripod is expected to be operationally unacceptable.
- Located near ferrous materials or in a magnetically dynamic environment, and thus any potential solution using Earth's magnetic field is expected to be unreliable.
- Located in diverse conditions where lines, vines, branches, buildings, clouds, or aircraft may be partially obstructing a view of the sky/stars above. Solutions utilizing a view of the sky/stars are expected to overcome these partially obstructed views.

System Characteristics

Size:

The summation of the system's length, width, and height shall be less than or equal to 21 inches.

Weight:

The system, with battery/batteries shall be less than or equal to 6.0 pounds.

Target Location Accuracy:

The system shall meet the performance in Table 1 at ranges of 1000 meters minimum during daytime, and 500 meters minimum at night.

Observation Day / Night Performance:

The system shall be able to see a person carrying an object, at the distances described below, in all possible conditions that allow a clear LOS. The system shall allow the user to differentiate between a rifle and a two-handed object. The system is not required to allow the user to differentiate one type of weapon from another, or perform facial recognition.

Threshold distance for the system is 1500 meters daytime and 500 meters at night.

Objective distance for the system is 5000 meters daytime and 3000 meters at night.

The system shall meet the performance in Table 2 under the modeled conditions outlined in Tables 2 and 3 for day and night performance.

Table 1: Target Location Accuracy

	GPS Unavailable	Sky Obstructed	No Pre-Planned Reference Points	Inability to Generate Reference Points	TLE – SE90 Threshold	TLE – SE90 Objective
Scenario 1					< 6.4 meters	T=0
Scenario 2	X				< 6.4 meters	T=0
Scenario 3		X			< 6.4 meters	T=0
Scenario 4			X		< 6.4 meters	T=0
Scenario 5				X	< 6.4 meters	T=0
Scenario 6	X	X			< 15.5 meters	< 6.4 meters
Scenario 7	X		X		< 15.5 meters	< 6.4 meters
Scenario 8	X			X	< 15.5 meters	< 6.4 meters
Scenario 9		X	X		< 15.5 meters	< 6.4 meters
Scenario 10		X		X	< 15.5 meters	< 6.4 meters
Scenario 11			X	X	< 15.5 meters	< 6.4 meters
Scenario 12	X	X	X		≤ 304.8 meters	< 6.4 meters
Scenario 13	X	X		X	≤ 304.8 meters	< 6.4 meters
Scenario 14	X		X	X	≤ 304.8 meters	< 6.4 meters
Scenario 15		X	X	X	≤ 304.8 meters	< 6.4 meters
Scenario 16	X	X	X	X	nothing required	< 6.4 meters

Definitions:

GPS Unavailable – Position of the device is not available from the Global Positioning System.

Sky Obstructed – The sky is fully obstructed from the device’s position.

No Pre-Planned Reference Points – The system does not have any pre-planned reference points loaded or the pre-planned reference points are not in view.

Inability to Generate Reference Points – The horizon is obstructed and/or there are no recognizable, mapped structures in view from the device’s position. The user cannot generate new reference points.

Table 2: Day/Night Requirements

Parameter	Day	Night
Illumination	Overcast Sunlight	Clear Starlight
Threshold Performance	≥ 1.5 km	≥ 0.5 km
Objective Performance	≥ 5.0 km	≥ 3.0 km

Table 3: NV-IPM Model Parameters

Parameter	Emissive (MWIR/LWIR)	Reflective (VIS/SWIR/NIR)
Task Difficulty (V50)	4.0	3.0
Target Contrast	2 degrees Celsius	40% target / 20% background (reflectivity)
Target Size	0.25 x 0.25 meters	
Probability	70% probability of recognition	
Atmosphere	Modtran	
Atmosphere Model	Mid-Latitude Summer	
Aerosol Model	Rural (Visibility = 23 km)	
Atmospheric Turbulence	$1e-15 \text{ m}^{-2/3}$	
Sky to Ground ratio	3.0	
Display Brightness (Modeling only)	70 cd/m ²	
Minimum Frame Rate	30 Hz	
Display Contrast	0.25 (RSS Contrast Level)	
Observer Mode	NV-IPM observer model (2013)	

Design Characteristics

TLE Confirmation:

The system will provide feedback to the operator by displaying the TLE by category:

- The system shall report “CAT 1” if TLE is ≥ 0 meters and < 6.4 meters, SE90.
- The system shall report “CAT 2” if TLE is ≥ 6.4 meters and < 15.5 meters, SE90.
- The system shall report “CAT 3” if TLE is ≥ 15.5 meters and < 30.7 meters, SE90.
- The system shall report “CAT 4” if TLE is ≥ 30.7 meters and < 91.7 meters, SE90.
- The system shall report “CAT 5” if TLE is ≥ 91.7 meters and ≤ 304.8 meters, SE90.

Power Source:

The system will allow for two continuous hours of observation while providing 30 targeting solutions within that time. (T) The system will allow for eight continuous hours of observation while providing 60 targeting solutions within that time. (O)

Removable Data Storage:

The system will accept, and be able to read to and write from, a commercially available and commonly used removable storage device. Primary use will be for storage of picture/video, maps, and software upgrades.

Interoperability

The system will interoperate with Android Tactical Assault Kit (ATAK). The targeting information from the system will be transmittable to ATAK.

Electromagnetic Radiated Susceptibility *MIL-STD-461F RS103*

In accordance with MIL-STD-461F, the system performance shall not be affected by electromagnetic emissions from battlefield electronic devices operating in the immediate vicinity (up to 3 meters) of the system nor experience performance degradation when subjected to the electric fields outlined in the table below. Per MIL-STD-461F, all referenced field strengths are measured at the device under test.

Table 4: Electromagnetic Radiated Susceptibility

Frequency Range (MHz)	RMS Field Strength (V/M)	Polarity
2 MHz – 30 MHz	50	Vertical
30 MHz – 100 MHz	50	Vertical + Horizontal
100 MHz – 1 GHz	50	Vertical + Horizontal
1 GHz – 18 GHz	50	Vertical + Horizontal
18 GHz – 40 GHz	n/a	n/a

Vibration MIL-STD-810G(1) Method 514.7

The system will be able to withstand the vibration effects during transport in accordance with Table 5. System can be enclosed within its field-carry case during this testing.

Table 5: Vibration Table

Transport Type	Category	Name	Procedure
Trucks and Trailers	4	Secured Cargo	I
	5	Loose Cargo	II
Aircraft	7	Jet	I
	8	Propeller	I
	9	Helicopter	I

Low Temperature

Storage Temperature MIL-STD-810G(1) Method 502.6 Procedure I

The system will operate without malfunction, damage, or degradation of performance following storage at -40°C.

Operating Temperature MIL-STD-810G(1) Method 502.6 Procedure II

The system will operate without malfunction, damage, or degradation of performance during exposure to temperatures as low as -19°C.

High Temperature

Storage Temperature MIL-STD-810G(1) Method 501.6 Procedure I

The system will operate without malfunction, damage, or degradation of performance following storage at +71°C.

Operating Temperature MIL-STD-810G(1) Method 501.6 Procedure II

The system will operate without malfunction, damage, or degradation of performance during exposure to temperatures as high as +49°C.

Low Pressure (Altitude) MIL-STD-810G(1) Method 500.6

The system will operate without malfunction, damage, or degradation of performance following exposure up to 35,000 feet Above Sea Level (ASL). (T) The system will operate without malfunction, damage, or degradation of performance during exposure up to 25,000 feet ASL. (T) The system will operate without damage or degradation during exposure up to 50,000 feet ASL. (O)

Immersion MIL-STD-810G(1) Method 512.6 Procedure I

The system will be capable of operating without malfunction, damage, moisture intrusion, or degradation to performance following exposure to fresh water depth of 1 meter for 30 minutes. The device switches will not be inadvertently activated or damaged during immersion testing.

Blowing Sand and Dust MIL-STD-810G(1) Method 510.6

The system will operate without malfunction, damage, or degradation of performance after exposure to blowing sand and dust as encountered in current military operational environments. Exit-port covers and connector covers may be used during the test.

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