

# CheetahNAV

Tactical Navigation System



## SYSTEM OVERVIEW

**CheetahNAV** utilises real-time moving map technology that provides the driver and crewmembers continuously with accurate situational awareness information. **CheetahNAV** has a user-friendly graphical navigation capability, combining inertial and satellite position information for accurately navigating between pre-set waypoints towards the final destination. **CheetahNAV** makes use of an advanced inertial navigation system (INS), comprising several aids, including accelerometers and gyroscopes to provide accurate position, velocity, heading, pitch and roll of the platform using an advanced Kalman filter-based algorithm. The integrated Inertial Measurement Unit (IMU) ensures jamming free operation or during emergency conditions where normal communication networks has been compromised.

Ideal for tough operational conditions, the ruggedized **CheetahNAV** is designed and has been tested to withstand severe customer environments. The **CheetahNAV** offers various options for vehicle installation, is vehicle agnostic, and is configurable to specific user needs, allowing flexibility as dictated by different mission requirements.

**CheetahNAV** multi-language option ensures successful joint multinational operations.

The crew of the vehicle is provided with the following guidance queues to execute the planned tactical manoeuvres:

- Current Vehicle Speed and True Heading of the vehicle
- Current Vehicle Position
- Desired Heading towards the Next Waypoint or Destination
- Desired Vehicle Speed to reach the Next Waypoint or Destination at the planned time
- Next Waypoint or Destination Position and Distance to the Next Waypoint
- Pitch and Roll Attitude of the vehicle
- Track travelled by the vehicle

### Moving Map Display



**CheetahNAV** is a versatile tactical navigation system designed for security services, emergency services and light All-Terrain Vehicle (ATV) using user controlled offline navigation maps.

**CheetahNAV** is field proven, PNT- capable high precision GNSS-Aided Inertial Navigation System (INS) which utilize tactical grade, MEMS sensors based Inertial Measurement Unit (IMU); embedded, multi constellation and multi frequency GNSS receiver; Advanced Kalman Filter based algorithm providing very accurate position information, navigation, time, velocity and orientation in GNSS enabled and GNSS-denied environments.

An optional slave module is available for use in space constrained areas where specific information needs to be communicated to personnel i.e. the driver.

### Key Features

- Route planning functionality
- Improved situational awareness
- Enhances mobility of vehicles
- Real time tactical moving map
- Arabic language pack
- MIL-STD-2525B symbology
- Touch screen display
- Ruggedized design
- Compact, MIL-STD qualified Inertial Navigation System (INS)
- Embedded GNSS receiver
- Tactical-grade IMU
- Dead reckoning accuracy within 0.2% of distance travelled (DT)
- Non ITAR controlled
- Technology Readiness Level 9

### Optional

- Blue Force Tracking display
- Battle management system integration
- Multifunctional HD display sharing for other vehicle systems
- Freeform messaging
- Anti GNSS spoofing and jamming
- Additional slave displays
- External IP Video or SDI Video input processing option

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## SPECIFICATIONS

### Navigation

Heading Accuracy (Static)	1.0° RMS
Heading Accuracy (Dynamic, GNSS)	0.2° RMS
Pitch/Roll Accuracy (Static)	0.06° RMS
Pitch/Roll Accuracy (Dynamic)	0.06° RMS
Horizontal Position Accuracy (with GNSS)	1.8m RMS
Horizontal Position Accuracy (GNSS-denied, free inertial, RMS) <sup>(1)</sup>	0.2% of distance travelled
Vertical Position Accuracy	1.8m RMS
Velocity Accuracy	± 0.06 m/s RMS
Angular Resolution	< 0.04° RMS
Output Rate (IMU Data)	2000 Hz
Output Rate (INS Data)	200 Hz

Note 1 : Under specific test conditions or with optional odometer input to INS

### GNSS

Receiver Type	184 Channels - F9 Engine
Enabled Navigation Signals	GPS L1/L2, GLONASS L1/L1, Galileo E1/E5, BeiDou B1/B2
GNSS Solution Update Rate	10 Hz
Time to First Fix (Cold/Warm Start)	< 30 s
Time to First Fix (Hot Start)	< 10 s

IMU	Accelerometers	Gyroscopes	Barometer
Range	± 15 g	± 450° /s	300 - 1100 hPa
In-Run Bias Stability	< 0.02 mg	< 1° /hr	2 Pa
Noise Density	0.035 m/s/√Hz	0.2° /√Hz	0.8 Pa/√Hz

### Environmental

Temperature (Operational)	-20°C to +71°C
Temperature (Storage)	-40°C to +80°C
Vibration	MIL-STD810G 'Operational Service' as for Category 20 Ground Vehicles. MIL-STD810G 'Transportation' as for Category 6 Large Assembly Cargo.
Shock	MIL-STD810G 'Procedure I – Functional Shock' of 40g as for Ground Equipment.
Humidity	MIL-STD810G Procedure I – Natural' of 80%RH at 40°C.
Sand and Dust	MIL-STD810G Dust (<150µm) Procedure' as for Ground Vehicles.
Electromagnetic Compatibility	MIL-STD-461F Class B.
Altitude	MIL-STD810G 'Procedure I – Storage/Air Transport' up to 15 km (50,000 feet).
Input Voltage	28V DC MIL-STD-1275E
MTBF	15,000 hours @55°C G <sub>M</sub>

The vehicle navigation system is a 'map based' navigation system that will allow maximum tactical advantage by enhancing the situational awareness of the crew at a reasonable cost. The system uses an inertial measurement unit, combined with a GPS to allow dead reckoning and positional accuracies, to allow the vehicle to fulfil its role in a tactical offensive or emergency operations when normal communication systems are not operational.

### Master Display Unit

- ▶ Display
  - 11.6" Diagonal 16:9 TFT
  - 1920x1080 Resolution
  - Sunlight Readable
  - Resistive touch
- ▶ Interfaces
  - Ethernet (UTP)
  - 28Vdc (MILSTD 1275E)
  - RS422 / USB / CAN
  - GPS Antenna interface
  - IMU/INS interface
  - Wheel sensor/Odometer interface
  - Optional SDI or IP video interface

### Slave Unit

- ▶ Display
  - 3.5" Diagonal TFT
  - 240x320 Resolution
  - Sunlight Readable
- ▶ Interfaces
  - Serial RS422
  - Ethernet (POE UTP)
  - Optional touch screen interface