

Micro-Inertial Navigation Technology (MINT)



Photo Courtesy of U.S. Army



**MINT can find you anywhere.
No satellites needed.**

ENGINEERING THE FUTURE OF ROBOTICS

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NREC's wearable navigation aid goes where GPS can't



IMU and miniaturized radar sensors are embedded in a boot.

- Shoe-mounted sensors locate personnel by tracking their footsteps
- No satellites or external references needed
- Works in GPS-denied areas: underground, indoors, in dense forests
- Localize personnel at all times
- Mission coordination, visualization & rehearsal

MINT Milestones

MINT met DARPA's performance requirements for Phase I and is on track to meet its Phase II goals.

	Current Performance	Phase II Goals	Phase III Goals
Walking navigation accuracy	10 m @ 0.5 hours	5 m @ 4 hours	1 m @ 10 hours
Velocity sensing bias (per step)	4000 $\mu\text{m/s}$	250 $\mu\text{m/s}$	20 $\mu\text{m/s}$
Form-factor & power for velocity sensor (excluding IMU)	10 cc, 300 mW	3cc, 50 mW	1 cc, 5 mW

How MINT Works

- Miniaturized radar and inertial measurement units (IMUs) are embedded in boots and sense footsteps
- Wearable computers track each step and update each other and the command center on their locations

Localization

- Know precise locations of personnel at all times
- Locate personnel in places with limited or no GPS: inside buildings, underground, beneath forest canopy, in canyons and urban areas

Mission Coordination, Visualization & Rehearsal

- Coordinate soldiers on missions such as clearing buildings and caves
- Accurate positioning and tracking improves mission visualization and aids in mission rehearsal