OBJECTIVE: Develop and deliver prototype hardware capable of beam steering a laser designator on moving targets during typical handheld operations when coupled to a sighting optic.

DESCRIPTION: Ground designation events are typically static scenarios (non-moving targets; designators on stable platforms). This type of scenario increases carry weight (stable tripod) and restricts Concepts of Operations (ConOps). However, munition platforms are capable of flight corrections during designation events for a period of time up to terminal guidance. In order to capitalize on the munitions capability, technology must be developed to not only stabilize the beam but lock and track moving targets as well. The Army desires a device that can be paired with an appropriate see-spot (images the laser energy) camera, track and designate a target (4.6 m²) moving >35 kpm at 3 km (Threshold) or >45 kpm at 5 km (Objective) for >30 seconds under typical User hand motion. The overall designator portion of the development, to include batteries, shall be <3.25 lbs, <100 in³, and <15 W Steady State, >30 mJ output energy (3 km range) or >50 mJ output energy (5 km range). The device must also produce visual indicators to the operator pertaining to the limits of beam steering travel. Full rate production costs should be <$30k. In addition, the system shall utilize the statistical Effective Designator Range equation (EDR95) in order to deduce the appropriate beam divergence and designator jitter appropriate for the application. This equation can be provided once under contract if necessary.

This device would support primarily the Long Range Precision Fires CFT by providing increased standoff distance to aircraft/munition platforms by providing Laser Guided Bombs (LGBs) greater “fire and forget” capability against mobile threats. The expanded ability for guiding LGBs from the ground provide improved Multi-Domain Operations, with a tactical, layered approach possible when encountering a more mobile adversary. In addition, this effort directly supports the Lethality CFT as well by increasing Lethality (expanded Tactics, Techniques, and Procedures [TTPs] across air and sea assets), Mobility (less required equipment; less weight), and Protection (expanded direct overwatch).

PHASE I: The proposer shall provide a complete prototype design. An approximate bill of materials should be provided as part of the design, including necessary components, power, and cost; this bill of materials shall be refined in Phase II. A complete and thorough understanding of the algorithms necessary, if any, to make the sensor successful shall be demonstrated. Rigorous modeling and data collection shall be performed to estimate system performance to include handheld motion, minimum SWaP (size, weight, and power) beam steering mechanisms, appropriate camera pairing for resolution and frame rates, etc.

PHASE II: Using the results of Phase I, fabricate and deliver a fully integrated prototype meeting SWaP and performance goals. Prototype should meet all requirements for TRL 5: “basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment,” and be on the way to meeting TRL 6: “prototype system, which is well beyond that of TRL 5, is tested in a relevant environment.”

PHASE III DUAL-USE APPLICATIONS: Transition applicable techniques and processes to a production environment with the support of
an industry partner if needed. Finalize a sensor design with appropriate SWAP-C and form factor based on human factors testing. Determine the best integration path as a capability upgrade to existing or future systems, including firmware and interfaces required to meet sensor interoperability protocols for integration into candidate systems as identified by the Army. Commercially, this could be used as part of a laser deterrent system for border patrol or police force when used with different laser wavelengths.

REFERENCES:


KEYWORDS: Laser Designation, Forward Observer, Terminal Guidance, Missile Seeke