



TOYON RESEARCH CORPORATION

MINIATURE ANTI-JAM GPS/INTEGRATED COMMUNICATIONS ANTENNA FOR GUIDANCE INTEGRATED FUZE



T-MAGIC Antenna System

48

Topic Number: N01-120 (NAVSEA/PEO-SHIPS, IWS, & SUBS)

SBIR Investment: \$1.1M
Project Revenue: \$2.4M

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About the Technology

New weapons for Naval Surface Fire Support use GPS as their primary means of navigation. The loss of GPS signal due to interference is a real threat to naval communications, positioning, and navigation systems. The Navy needs a system that measures interference of GPS signals, analyzes the affects of interference on navy weapons, and mitigates the impact of interference. To address the Navy’s needs, Toyon Research Corporation (Toyon) developed a low-cost Miniature Anti-jam GPS Integrated Communications (MAGIC) antenna system for the Guidance Integrated Fuze (GIF).

Toyon’s MAGIC (T-MAGIC™) antenna system occupies less than 0.5 cubic inches and comprises anti-jam GPS electronics and two antenna elements that fit within a given trapezoidal volume. T-MAGIC’s two antennas can be electronically reconfigured and has a closed-loop radio frequency interference (RFI) suppression system. The antennas provide anti-jam protection (nulling) for the GPS receiver without consuming more than 150 milliwatts of power. The electronically reconfigurable system is designed to maintain optimal performance across large temperature variations. The first generation T-MAGIC was successfully launched at Naval Surface Warfare Center Dahlgren, in a test firing of a 155mm Howitzer round, and operates at rotations of up to 250 Hz.

Military and Commercial Significance

Achieving good RFI rejection has become more difficult as military and civilian electronic systems become smaller, lighter and cheaper. The small size of the T-MAGIC antenna system allows it to meet military and commercial industries space and cost requirements for GPS and communications systems. T-MAGIC’s anti-jam capability boosts the robustness of precision guided munitions, reduces the possibility of collateral damage, and increases the performance of standard artillery systems by using GPS to achieve improved “metal on target” accuracy, all at a lower cost. Because the GIF is a potential replacement for the NATO standard Multi-Option Fuze for Artillery, T-MAGIC technology is applicable to many existing 155mm, 105mm, and 76mm projectiles, and 120mm and 81mm mortars.

About the Company

Toyon Research Corporation is a leader in technical analysis, modeling, and simulation of sensors and weapon systems used in hostile environments. Toyon’s longstanding participation in the SBIR Program has led to the development of successful antenna design services. The company has received SBIR funding for a number of software technologies that have resulted in the development of several simulation products used Government-wide, and acclaimed by industry and DoD customers. Toyon anticipates significant increases in revenue from the use of its T-MAGIC technology on alternative platforms, such as UAVs, and an estimated 100,000 T-MAGIC units per year.

APPLICATIONS

- NAVSEA: Naval Surface Warfare Center: 155mm and 105mm artillery systems, small munitions - GIF and Course Correcting Fuze
- Army: Tank Automotive and Armaments Command: Army Research, Development and Engineering Center - Course Correcting Fuze
- Commercial – GPS, wireless and telecommunications industries, Mobile Ad-hoc Networks