

Topic: N141-035

## GIRD Systems, Inc.

JTRS Compliant Waveform for LCS Unmanned Vehicle Communications

GIRD Systems has developed a novel anti-jam waveform for maritime environments with high J/S ratios with throughput of several Mbps. The highly flexible waveform is parameterizable for different channel conditions and throughput. GIRD Systems is an innovative and agile small business satisfying DoD's signal processing and communications needs. The target application is line-of-sight (LOS) communications between Littoral Combat Ships (LCS) and mission packages for the Multiple Vehicle Communication System (MVCS). The anti-jam LOS waveform has been demonstrated in the laboratory with worst case conditions. The new waveform needs to be ported into an existing military radio platform. We are seeking input from the end customer and DoD prime contractors.

### Technology Category Alignment:

RF Components for sensing, transmission and communication

Networks and Communications

Unmanned Ground and Sea Vehicles

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**SYSCOM:** NAVSEA

**Contract:** N00024-16-C-4037

# Department of the Navy SBIR/STTR Transition Program

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NAVSEA #17-579

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JTRS Compliant Waveform for LCS Unmanned Vehicle Communications

GIRD Systems, Inc.

## WHO

**SYSCOM:** NAVSEA

**Sponsoring Program:** PMS 420

**Transition Target:** PEO LCS

**TPOC:**

(850)230-7015

**Other transition opportunities:**

Commercial Maritime

Coast Guard

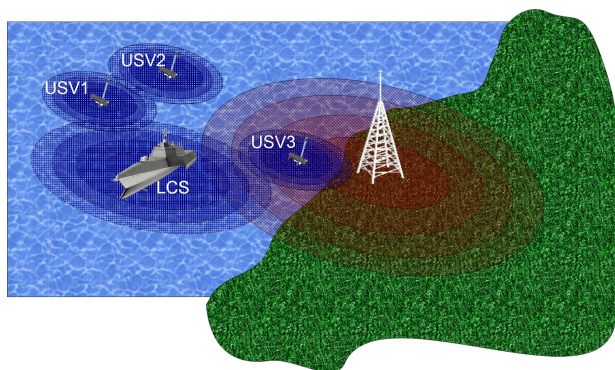
Army

SOCOM

**Notes:** GIRD Systems has developed a novel anti-jam waveform for maritime environments with high J/S ratios and supporting a minimum throughput of several Mbps.

GIRD Systems is a small business defense contractor that is innovative and agile in satisfying DoD's signal processing and communication needs.

[www.girdsystems.com](http://www.girdsystems.com)



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## WHAT

**Operational Need and Improvement:** The current radio uses Line Of Sight (LOS) communications for Multiple Vehicle Communication System (MVCS). The LCS Capability Development Document (CDD) has a requirement that future spirals of the external communications equipment must operate in a jamming environment. The new radio will provide enhanced robustness in high levels of interference and jamming environments.

**Specifications Required:** The developed AJ LOS waveform must at least maintain the throughput requirements of the current system while operating in jamming environments with high jammer-to-signal (J/S) power ratios. Each LCS network must support up to three unmanned vehicles, with one potentially acting as a relay to further increase the operating range and provide increased standoff for critical operations. In order to avoid excess integration costs, the prototype SDR must provide a "drop-in" replacement to the current radios. Portability of the waveform is also of interest to allow porting of the waveform to existing or future military SDRs.

**Technology Developed:** By utilizing advances in robust modulations, error correction, and signal processing, GIRD has developed a novel anti-jam waveform (physical layer (PHY) and networking) meeting the above specifications. The waveform can operate in as little as 10 MHz and is expandable to wider bandwidths to enhance jamming resiliency. Waveform flexibility allows easy parameterization of the waveform for different channel environments and robustness constraints. Software and firmware designed with portability in mind to accelerate the adoption of the waveform to existing or future SDRs.

**Warfighter Value:** Warfighter capabilities are improved by ensuring high resiliency to contested communication links, thereby allowing access to critical information needed to complete a successful mission.

## WHEN

**Contract Number:** N00024-16-C-4037 **Ending on:** December 29, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Single Link (PHY) Lab Demonstration	Low	Throughput at specified J/S & SNR	4	April 2017
Network Compatibility	Low	Message compatibility / UI	4	April 2017
Single Link (PHY) OTA Demonstration	Med	Throughput at specified J/S and distance	5	September 2017
Relay Capability	Low	Throughput through relay	5	February 2018
Networked OTA Demonstration	High	Throughput in relevant environment	6	November 2018

## HOW

**Projected Business Model:** GIRD intends to license the advanced waveform to DoD primes. The portable, hardware agnostic waveform and software design ensures the waveform is easily able to transition to capable platforms. GIRD will engage industry partners to assess the contribution of the technology to the communication equipment market and identify a strategy for the potential market and potential customers.

**Company Objectives:** Development of the robust communication system ties in with GIRD's long-term goal of becoming the preferred provider of advanced waveform and communication capabilities to the DoD and other government and commercial sectors. GIRD's past and current communication system architectures and designs for Navy SPAWAR, ONR, Army and AFRL, and this program comprise major thrusts in this direction.

**Potential Commercial Applications:** For commercial applications, GIRD's novel AJ waveform can be parameterized to meet specifications (bandwidth, throughput, interference resilience, etc.) and integrated into communication systems supporting mission critical applications.

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