

Department of the Navy SBIR/STTR Transition Program

Distribution Statement A: Approved for public release, distribution is unlimited NAVAIR 2015-1103

Topic # N131-011

Wireless Rotor Head Power and Data Bus

KCF Technologies, Inc

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA-261

Transition Target: Future Vertical Lift

TPOC:

(301)342-8396

Other transition opportunities:
IHSMS, CH-53K, Flight Test

Notes: Image Description - A CH-53E Super Stallion assigned to the "Condors" of Helicopter Light Squadron Four Sixty Four (HMH-464) lifts off the deck of USS Kearsarge (LHD 3). U.S. Navy photo by Photographer's Mate 1st Class Jeffrey Truett.



030323-N-0068T-041 (Released by C5F PAO)

WHAT

Operational Need and Improvement: Wiring to flight test instrumentation on rotors is expensive, fault prone, and time consuming to implement. Retrofitting existing equipment with the necessary technology to collect the sensor data required for thorough rotor health monitoring adds extra weight and power demands to existing systems, leading to additional expenses and maintenance to keep the sensor systems in working order. In order to make current and future rotor health monitoring capabilities available for the retrofitting of existing equipment, a modular, expandable sensor system and power supply will need to be developed.

Specifications Required: Provide a light weight, modular, and low cost tool to support test instrumentation and sensors on rotor systems

Technology Developed: • Modular energy harvester powered by spinning rotor

- High throughput, reliable Ultra-Wideband (UWB) wireless communication
- Generalized solution requiring minor customization for maximum applicability
- Platform agnostic using modular construction and energy harvesting to enable retrofitting of current equipment and expansion for future developments

Warfighter Value: • System is an alternative or independent supplement to slip ring

- Lower cost flight testing – less time installing, less time diagnosing faults
- Expanded testing capability – more channels, flexible implementation

WHEN

Contract Number: N68335-14-C-0293 **Ending on:** August 20, 2015

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Bench Testing Completed	N/A	Transmitted Fiber Bragg grating (FBG) sensor data via UWB wireless	4	August 2015
Design Updates Completed (per Phase II Option)	Med	Revise hardware for use in whirl test environment	4	August 2016
Whirl Test Completed (per Phase II Option)	Med	Successful harvester powered data transmission in a representative environment	5	October 2016
Prototype Delivery Completed (per Phase II Option)	Med	Deliver flight test capable prototype hardware for full test on Navy aircraft	6	April 2017

HOW

Projected Business Model: KCF Technologies is a dynamic technology company that develops and commercializes products and solutions for industry and the military. Our business model is unique, as it is based on partnering rather than taking products directly to market. KCF identifies partners that already own pieces of the market to which our products are geared and we put our technology in the hands of those companies. KCF Technologies' primary partner for this technology is the LORD Corporation. KCF will license and/or exclusively produce the sensor subcomponent and software technology for implementation in the LORD slip ring.

Company Objectives: KCF Technologies will develop a generalized solution using modular construction that allows for customization in order to be tailored to specific needs of many different platforms. Current and pending rotorcraft flight test programs are being targeted, including the CH-53K program under PMA-261. Additional opportunities within the Navy on current and pending platforms include the test programs for the V-22 (PMA-275), the H-60 (PMA-299), and the MQ-8C and other unmanned programs under PMA-266.

Potential Commercial Applications: Commercial aircraft structural health monitoring; Oil pipeline and refinery health monitoring; Fiber Bragg grating strain sensor monitoring; High data rate wireless data communication; Submarine systems health monitoring; Acoustic emission tracking; Impact detection

Contact: Dr. Jacob Loverich, Director of Research
loverich@kcftech.com (814) 867-4097