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SBIR INVESTMENT: \$1,851,196

PHASE III FUNDING: \$3,854,071

DEPARTMENT OF THE NAVY

# NAVY SBIR/STTR SUCCESS STORY



## WIDEBAND RADIO LOCAL INTERFERENCE OPTIMIZATION TECHNIQUES

*Bascom Hunter developed a unique active cancellation technique which automatically optimizes interference removal, enabling and enhancing communication among the fleet.*

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## THE CHALLENGE

Wireless interference is one of the biggest causes of disruption in communications among the fleet, and it becomes even more challenging as more people use wireless communications and satellites to send data. While various methods have been achieved to mitigate interference in narrowband (5 kHz and 25 kHz) Ultra High-Frequency (UHF) satellite communications (SATCOM) systems, replicating this success in wideband (5 MHz) channels has remained a difficult task, one in which the Navy has continued to seek solutions. If some information about the interference is available, e.g., its modulation format, one could potentially estimate the wideband interference and subtract it from the received signal. If no prior information is available; however, mitigation of interference has posed a difficult challenge. Through this SBIR solicitation, the Navy sought innovative ideas for wideband interference mitigation in SATCOM channels without prior knowledge of the interference.

## THE TECHNOLOGY

Unlike conventional radio frequency (RF) and digital interference mitigation or cancellation techniques, this new technology provides unmatched levels of cancellation by using electro-optic based interference cancellation technique. This approach allows for the removal of strong interferers in the same channel as the signal of interest and allows for improved SATCOM and COMM operations in anti-area area-denied operating environments.

## THE TRANSITION

Bascom Hunter was awarded a \$3.8M Phase III cost plus fixed fee contract from the Naval Information Warfare Systems Command. The goal was to build off the prior Phase II awards to help reduce disruptions in wireless networks and continue the development of a Mobile User Objective System User Equipment notching algorithm. While the Navy didn't ultimately continue on this path, the beauty of SBIR is that it opens up opportunities to work with the U.S. government in other capacities. Such was the case with this SBIR. Shortly after the first Phase III was awarded, the Navy asked Bascom Hunter to switch gears and develop a full system to system solution for satellites.

## THE NAVAL BENEFIT

The solution developed under the SBIR allowed the Navy to recover its signal from interference whether from jamming, misconfigured radios, or other causes. This enhanced and optimized communications among the fleet and protected the channels of communication from parasitic users, e.g., civilians using military satellites for personal use. With the new techniques being developed, testing and verification for satellites will be streamlined in a way that provides cost-effective solutions. Using Bascom Hunter's solution from the beginning will allow the development and testing to be done in a quicker, modular fashion via less multiple rounds of regression testing.

## THE FUTURE

When Bascom Hunter first began its journey on this SBIR project, it was the first time the company had interacted with the Department of Defense. Now, they are adept at government contracting—continuing to aid the Department of Defense in SATCOM solutions and proposing novel interference mitigation techniques to the National Science Foundation. The next option exercised under the Phase III project will continue to evolve the system to system solution that will help system producers in the common test environment and eventually common support environment.

"WITHOUT SBIR, SMALL BUSINESSES HAVE NO REAL ABILITY TO BREAK INTO A MAJOR DEFENSE WORLD, BECAUSE OF THE LARGE PRIME CONTRACTORS. THIS IS A GREAT EXAMPLE OF A SMALL BUSINESS YEARNING TO TAKE THEIR INNOVATION TO THE NEXT STEP, AND A WINDOW OF OPPORTUNITY OPENING FOR THEM. TAXPAYERS GET A COST EFFECTIVE SOLUTION, AND THE NAVY GETS A MORE REFINED PRODUCT AND THE BENEFIT OF DELIVERING CAPABILITIES RIGHT TO THE WARFIGHTER. "

Bill Joo  
Special Projects Engineer  
PEO C4I PMW/A 170