

# SWIFT-Thinking Satellite Radios that Adapt and Evolve: Tethers Unlimited Lands NASA Contract to Bring Advanced Cognitive Radio Capabilities to the SmallSat Market

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**Bothell, WA**, 17 April 2017 – With dozens of new commercial ventures launching constellations of tens to thousands of small satellites to provide new Earth imaging and communications services, the radio spectrum above Earth is becoming increasingly congested. To enable these space ventures to deliver the vast amounts of data they create through the crowded airwaves, Tethers Unlimited, Inc. (TUI) has entered into a \$750,000 Phase II Small Business Innovation Research (SBIR) contract with NASA to upgrade its industry-leading SWIFT® software defined radio platform with advanced cognitive radio capabilities.

TUI's SWIFT radios are a family of high-performance communications systems that are compact enough to fit in satellites as small as a loaf of bread, but are powerful enough to handle massive amounts of data and provide advanced sensing capabilities. For example, SWIFT radios will transmit immersive virtual reality images of Earth orbit for SpaceVR's Overview-1 mission, and will serve as radar transceivers in the Synthetic Aperture Radar satellites under development by Capella Space. TUI has high-maturity SWIFT solutions for UHF, L, S, and X-band frequencies, and is planning to bring several K- and Ka-band solutions to market over the next year.

The NASA-funded SBIR effort will develop a suite of "OpenSWIFT™" software tools and an application programming interface (API) that will enable the SWIFT SDRs to sense and analyze the radio frequency environment in which they operate and then use machine learning to actively adapt to the changing environment, adjusting their operation to mitigate interference from other radios and optimize aspects such as modulation, frequencies, and antenna pointing to maximize the amount of data they deliver to the ground. The OpenSWIFT API will also enable TUI's customers to run their own proprietary algorithms on the radios.

"The SmallSat revolution is truly reinvigorating and transforming the space industry by enabling commercial, NASA, and DoD programs to get new services to market faster and far more affordably than previously possible," said TUI's CEO, Dr. Rob Hoyt. "But already we are seeing some of our customers encounter real obstacles to getting access to the spectrum they need to deliver the data their satellites create. We are very grateful that NASA recognizes the importance of addressing this challenge and is supporting our work to deliver advanced cognitive radio capabilities to these customers. The OpenSWIFT tools will bring advanced machine learning capabilities to our radios enable the swarms of satellites currently in development to avoid interfering with each other and make much better use of the available spectrum to deliver data to the commercial and government markets."

## **About Tethers Unlimited, Inc.**

Tethers Unlimited, Inc. develops transformative technologies for Space and Defense missions. Its technology portfolio includes advanced space propulsion systems, programmable radios for small satellites, and systems for in-space manufacturing of spacecraft components. To learn more about TUI and its products, please visit [www.tethers.com](http://www.tethers.com).

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