Connect and communicate anytime, anywhere

Soldier Modernisation talks to Robert Bills, President, NAL Research about the Quicksilver (QS-100)

There's no disputing that communication capability is one of the most powerful weapons in any government or defense sector's arsenal. As the world of warfare continues to evolve, from the need for more data to the changing nature of combat environments and locations, that communication has required constant evolution. Predicting future needs when it comes to this kind of communication is something NAL Research has made its business for some 25 years, leveraging the Iridium Satellite Constellation to provide state-of-the-art communications systems for the defense, research, and commercial sectors. Soldier Modernisation spoke to NAL Research's President Robert Bills about the company's latest product, the Quicksilver (QS-100), and how it meets the challenges of today.

"With more data needed on the battlefield or, as we've termed it for the past few years, the 'digital battlefield', a main need is extending communications to areas not covered in existing communication systems, but also to remote locations with no communications at all," says Bills. Power, weight, and size remain key factors in the world of defense, along with mobility and the ability to operate in rugged environments, all made even more challenging when in remote locations. The trump card for NAL Research is its use of the Iridium satellite constellation, which operates in the L-Band rather than K-Band, allowing it to work anywhere in the world, and in all-weather situations. NAL Research's latest solution, Quicksilver (QS-100), uses Iridium to provide the remote capability required by the military that ticks the boxes of being low power, lightweight, mobile and rugged, using the Iridium Certus 100 mid-band service to add speed to its list of attributes. "It is 40 times faster for received capability than Iridium's prior generation of technology. It's a massive improvement in throughput. And, coupled with that, it's really well suited for remote independent sensors, unmanned systems, soldier-carried devices, small vehicles, small maritime platforms, and the Quicksilver itself is the lowest powered, smallest, lightest weight system of its class available in the market today." Additional benefits include Iridium's omnidirectional antenna, providing added flexibility and resilience in military environments. Such fundamental features are what make NAL Research's capabilities ideal for what the military requires for unmanned systems, says Bills, and predicts that this will become even more important in coming years as remote environments become more commonplace for such operations. "Working in the polar regions, whether it's the Arctic or the Antarctic, has become increasingly important. And Quicksilver, utilizing the Iridium constellation, will work at the poles whereas some other systems do not."

Another issue is security, with Bills pointing out that any network capability nowadays has to have security as a foundational feature in concept. At NAL Research, that starts with commercial level security such as Data at Rest Encryption (DARE) and virtual private networking that's automated into the system so customers can set up encryption or security features at a level that fits their mission. But for military customers, it goes further - addressing the need for classified levels of security. "The products that we build, and Quicksilver in particular, is able to connect to Type 1 encryption devices," he explains, while newer encryption capabilities also have scope to be a future support capability of NAL Research's Commercial Solutions for Classified (CSFC). Security doesn't stop at the device level, which is where Iridium comes in again, says Bills, providing the ability to connect to standalone clouds, creating a completely private government network environment.

NAL Research's championing of Iridium as a network isn't just based on the capabilities it provides, but its proven track record and longstanding role in serving its customers. "Iridium is perfect for the military and government", says Bills, "and we have used Iridium to support military and government applications around the world. First off, the

** OCTOBER 2022 - Field testing the Quicksilver's midband data transmit capabilities and global connectivity at Murphy Dome Air Force Station, just south of the Arctic Circle.*

constellation has been around for over 20 years. When it came out, there was nothing like it and still there's nothing quite like it that's fully operational." Low Earth Orbit (LEO) satellites may be in the spotlight thanks to developments such as Elon Musk's Starlink or Amazon's Kuiper, but in Bills' words, "Iridium was doing LEO before LEO was cool". Not only is the constellation's network fully global and all weather, it is also technically proven, he says, with its first generation of satellites working 15 years longer than originally intended, and Block Two expected to be as longstanding. Alongside its technical capabilities, Iridium boasts a proven business model - a not-so-easy achievement in the world of commercial satellite communications, making it an obvious choice when it comes to commercial providers, in Bills' view.

Iridium may provide the capability, but it is NAL Research's own ambition to be at the cutting edge of satellite communications that has made it the number one provider of Iridium connected solutions to the US government for 15 years, says Bills. "Nobody delivers more stuff leveraging Iridium to our government partners than NAL Research does. Our viewpoint is that we have probably delivered somewhere between 50–60% of all Iridium capabilities to the US government over the past 15 years. We're always at the cutting-edge and when somebody wants to do something new or unique with Iridium, we're typically the first phone call that they make." Not only did NAL Research pioneer the market space for personal recovery or Blue Force Tracking devices, but it is now leading the way in Assured Position, Navigation and Timing (A-PNT), providing additional non-GPS based capabilities. "Now, in addition to all of our sort of SATCOM expertise, we have become experts in this Assured-PNT technology space and we've tied that into our SATCOM products to make them more useful, and more valuable to our partners." But it's not just a case of offering both capabilities, says Bills, but mixing those ideas together to maximize the value for customers.

"For the future, things that are going to matter are different types of networking systems, so terrestrial and SATCOM capabilities, and mixing those two things together. I think that that's going to be critically important going forward - the Army has taken to calling it convergence - where different types of networks "converge" together. And then you've got to look ahead to where you might need to work and operate. So, the polar regions, those sorts of things, global warming, if those trends globally continue, then we're going to have to be prepared in order to operate in those areas. So, picking the right technologies, the right things to do, will be very, very important."

As challenges and environments continue to evolve, so too will the technology that ensures communication is possible wherever and whenever. But with 25 years' experience keeping at the forefront of such challenges under its belt, NAL Research will continue to stay one step ahead. ■

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