



Case study

5G and technological innovation help the Department of Defense explore new frontiers

verizon[✓]

Partnerships to unlock innovation



Marine Corps Air Station Miramar is no stranger to the cutting edge. Situated in San Diego, the eighth-largest city in the US, its proximity to renowned west coast technological innovation makes the base a great fit for testing new technology concepts in concert with industry.

The Department of Defense (DoD) enables industry collaborations through SoCal Tech Bridge, an entity that defines its mission as “focused on leveraging the Southern California convergence of Installations, Industry, and Research to unlock emerging technology through non-traditional partnerships.” Lt. Col. Brandon Newell is the Director of the NavalX SoCal Tech Bridge.

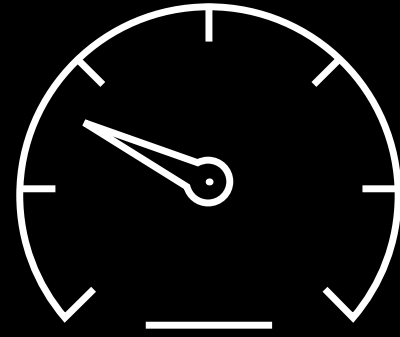
In the past, Miramar has set up a “living lab” to test energy resilience concepts such as microgrids and distributed energy resources. Those efforts have led to full-scale deployment of these technologies making Miramar one of the most energy resilient bases in the country. At the same time, the base has served as a guiding light on a national level.

“We have a history of aligning local opportunities with the aspirations of the Pentagon,” Newell says.

Located in the heart of San Diego, Marine Corps Air Station Miramar is a model for collaboration between the public and private sectors. The base is home to the 3rd Marine Aircraft Wing and serves as a testing ground for new and future technologies.



The challenge: keeping pace



Technology research is agile, fast-paced and shows no signs of slowing down. Industry engages in rapid prototyping of concepts, weeds out anemic ideas and makes room for more promising ones to take center stage. Unfortunately, says Newell, in recent years, the Department of Defense has not been able to keep pace with the breakneck speed of research.

“We are falling further and further behind the power curve when you compare us to Silicon Valley and the commercial sector,” Newell says.

“We are no longer the market that led to the internet and the GPS,” he adds. And the reasons, he admits, are complicated. “It’s not just that [industry is] investing four times in research dollars to our government dollars but it’s that they make capitalistic decisions and we make bureaucratic decisions.”

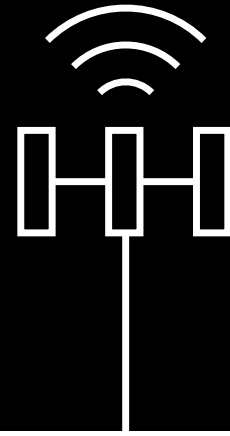
Recognizing that their work is not keeping pace, government officials have had to think of different ways for their technological innovation to contribute meaningfully to rapid progress. The path to achieving this goal involves building collaborative partnerships to leverage industry’s strengths, which is easier said than done.

Still, it was that goal that ultimately led the SoCal Tech Bridge to establish a four-year partnership with Verizon. As part of the collaboration, Verizon and the Marine Corps at Miramar are exploring ways the military and other United States DoD agencies can use 5G to their advantage. The partnership will help accelerate U.S. advancements in 5G-enabled technologies and security.

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The proposal: Miramar as proving grounds for 5G



In 2017, Miramar was testing the capabilities of autonomous vehicles (AV) and closely monitoring the work being done by original equipment manufacturers (OEMs) to better understand disruption in that space. Officials at Miramar were aware of AV technology supporting levels three and four of autonomy – highly and fully automated operation, respectively – and were keen to see how those solutions could work for the Marines.

Verizon's pioneering work on 5G made the company an ideal collaborator. At that time in 2018, Verizon had already been close at work with the city of San Diego on a smart city plan and had a presence close to the Marine base. Verizon also had experience setting up 4G small cells with the Navy in San Diego and used many of the same processes to set up at Miramar, expanding the base's 4G LTE service through 26 4G LTE and 5G small cells. The timing was fortuitous, Newell says.

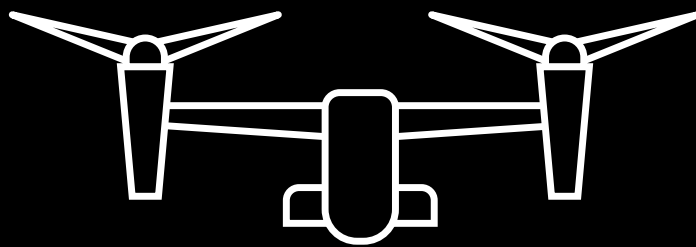
"We knew that 5G was going to be a huge disrupter to the future, not just for vehicles but in so many other markets," Newell says.

Just over a mile from Miramar, engineers at Qualcomm were looking for an opportunity to test and refine their groundbreaking AV technology as part of a comprehensive AV safety plan for testing in closed environments ahead of moving to public road testing. The collaboration was an ideal match and allowed both Qualcomm Technologies and Miramar to achieve their goals.

"Qualcomm Technologies¹ has a longstanding and strong relationship with MCAS Miramar that has seen numerous milestones, such as the testing of AV technologies, including both airborne drones and terrestrial vehicles, with robust 4G and 5G wireless technologies that can meet these applications' high safety and performance requirements," said Paul Guckian, Vice President, Engineering, Qualcomm Technologies, Inc. "The success of this project with Miramar and Verizon serves as another example of how organizations can utilize their expertise and assets to develop and test groundbreaking technological advancements."



The promise: seeing the future with a living lab



Borrowing a leaf from its previous projects, the SoCal Tech Bridge chose to replicate the living lab concept to explore the capabilities of 5G-enabled technologies in partnership with Verizon. As part of the arrangement, Miramar continues to serve as a 5G living lab, facilitating DoD and commercial collaborations. Verizon's 5G Ultra Wideband delivers high bandwidth, fast speeds and low latency to support the project.

Three security towers on Miramar's perimeter also enable edge computing. The processing of data at the edge, close to the vehicles and other prototypes being tested, enables the capabilities of these technologies to be fully realized. At Miramar, the Verizon 5G Ultra Wideband network will enable future applications using Verizon 5G Edge, a mobile edge computing platform that connects to the Amazon Web Services cloud platform through Verizon's 5G network. This connectivity ensures that latency-sensitive applications now have a conduit for a true test drive.

Looking to keep pace with groundbreaking research, officials at Miramar turned to the idea of a living lab—a way to explore minimal viable products before pivoting to true prototypes.

The living lab, Newell says, is not just a test or a science project. "It's a 5G network that's alive and active. We're looking at what the actual concept of operation means and its application to a customer."

SoCal Tech Bridge zeroed in on four 5G-enabled technologies that could be explored through the Verizon 5G living lab: drones, connected vehicles, energy communications and management, and base security. In addition to pursuing those goals, the collaboration also aimed to develop a "digital fortress" to secure both the physical perimeter of the base as well as the wide array of internal communications. These pillars of technological innovation address three key priorities for military installations: protection, mobility and resilience. And of course, all of these efforts level up to a simple, singular goal: to make defense operations safer, smarter and more efficient for the people who carry them out.

Through partnerships with Verizon and Qualcomm, the base is equipped to test and refine cutting edge 5G applications in four core areas:



Drones



Connected vehicles



Energy communications



Management and base security

The wins: logging early success



The base is also lining up its two autonomous shuttles to test 5G and connected vehicles. Because of COVID-19-related restrictions, they will be used in place of personnel to deliver mission-critical parts and resources.

Miramar runs an unmanned logistics program with both air and ground vehicles. A closed-loop cellular network is used to test multifaceted unmanned systems – not unlike the way an unmanned drone can be used to deliver a package to a residence. This progress is not only keeping personnel safe from illness, it also helps to expand the possibilities for ways people might be protected from dangerous situations, be it an emergency response at home or an operation overseas.

The work thus far has been exciting, Newell says. “The living lab allows us to see [what a network can] support and enable, whether it’s on a base in the States or on the battlefield in the future,” he adds.

An additional advantage of such a living lab is that it allows Miramar to test drive smaller-scale prototypes without having all the technologies corralled under the DoD umbrella, which could lead to delays.

“If I waited for the Marine Corps to figure out all the networking security components [of the digital fortress], I’d probably be waiting a year before I even get the prototype. The beauty of the 5G living lab is that we can rapidly prototype and rapidly learn these lessons,” Newell says. “I don’t want to spend a lot of time figuring out the integration aspects as if this were a mature program.

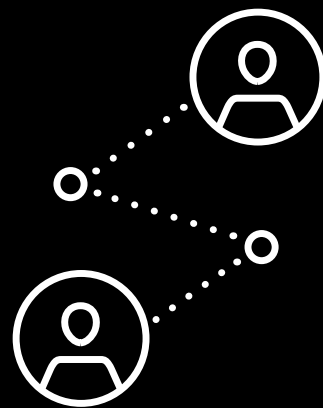
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The role is to rapidly explore what Silicon Valley would call a minimum viable product so that you can refine and pivot to an actual prototype. The 5G living lab allows us to do that in many different areas.”

It’s not about the cellular technology itself, Newell adds. “Cellular technology is the enabler, this is about what we can all unpack together to better understand those technologies, how we rapidly prototype those capabilities and learn from them.”

Among the lessons learned: you have to have a strategic and equal partner



“It really is a testimony to Verizon that Verizon’s equities in unlocking the future of 5G had to not just be on the other end of a contract. They have to be an equal partner through a collaborative research and development agreement. We are designing and creating [this living lab] together,” Newell says.

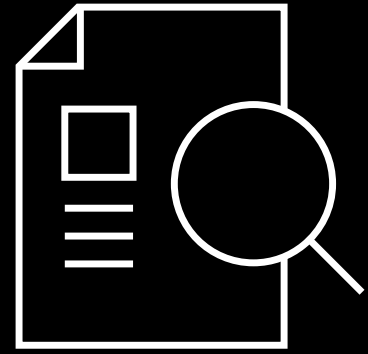
The result is a collaboration that is mutually beneficial and generates opportunities for a lot of people to be a part of technological innovation across both industrial and military sectors.

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The forecast: More agile research and mutually beneficial collaborations



The collaboration between Verizon and Miramar has been a model for government-industry partnerships, Newell says. “It’s not just about what we are doing on the base together, it’s really a national story. It’s about what government and private parties can do together to unlock the future.”

The other DoD agencies can look to what the Marine Corps and the Navy have done here through the SoCal Tech Bridge and similarly learn the technology, Newell says. Long term, the 5G living lab will help research national defense technologies and expedite the nation’s ability to leverage 5G for security. But Newell points out that it’s bigger than that.

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“[This is] about how the government and department of defense should be working with the industry. It’s really about the process that everyone can employ wherever they find themselves to ... help us all move forward,” Newell says.

He envisions the lab fueling technological innovation through non-conventional partnerships. “If we can inspire others who find themselves on the edge of the organization where innovation actually happens, then that is how we ... grow,” Newell says.



Learn more

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