



The nation's first campus-wide private 4G/5G infrastructure within higher education

meets growing COVID demands for deterministic wireless connectivity, coverage, and performance

CUSTOMER

CSU Stanislaus

LOCATION

Northern California

CHALLENGE

Eliminate the cost and complexity of extending existing wireless infrastructure for online collaboration and community access while enabling new use cases requiring more deterministic connectivity

VERTICAL

Higher Education

CUSTOMER SIZE

228-acre campus service more than 10,000 students, faculty and staff



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**5G LAN
technology is
a real game
changer allowing
us to meet new
demands driven
by COVID while
future-proofing
our infrastructure
for new use cases
that haven't been
feasible with
conventional
wireless.**

*Geoffrey Cirullo
Deputy Chief Information
Officer*

BUSINESS REQUIREMENTS

- Deploy a CBRS overlay to support the campus-wide extension of existing Eduroam network
- Eliminate the cost of pulling and trenching new fiber for backhauling traffic especially in temporary deployments
- Seamless integration with existing campus network and policy framework
- Low-cost deployment in days that could be easily managed by internal IT staff
- Simplify and streamline the onboarding of new client devices
- Uninterrupted connectivity for video surveillance, police safety and other critical IoT systems

SOLUTION

- Celona outdoor 4G radio access points operating in the unlicensed CBRS spectrum
- Celona cloud-native edge software and cloud-based orchestration system
- CBRS-to-Wi-Fi gateways
- Aruba AP for end-user device connectivity

OUTCOME

- A robust and pervasive private mobile network enhancing education
- Fast, flexible extension of wireless broadband connectivity without additional fiber runs
- Ability to offer broadband connectivity to adjacent communities
- Seamless integration with existing CSU network architecture
- Deterministic wireless connectivity for IoT, public safety and video surveillance use cases
- Simplified and highly secure client device onboarding

California State University Stanislaus took a big technological leap forward in higher education by deploying the first campus-wide private LTE/5G network that operates in the newly available Citizens Broadband Radio Spectrum (CBRS) wireless space. Phase I of the private LTE/5G rollout called for the deployment of a robust, flexible, and interference-free wireless backhaul which extends outdoor network access across the entire 228-acre Turlock campus.

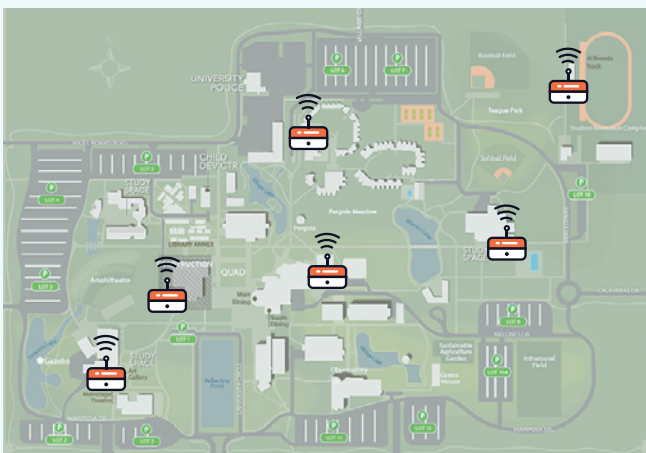
The initial goal of the private cellular network was to facilitate the creation of dynamic outdoor learning centers for the 10,000 faculty and staff occupying the campus as well as to support the use of remote IoT sensors, augmented reality services and a unified public safety communications platform. In phase 2 of CSU private mobile network rollout, the focus is intended to shift to indoor wireless use-cases aimed at bolstering public cell phone coverage across all CSU student and faculty buildings.

Wireless Challenges at CSU Stanislaus

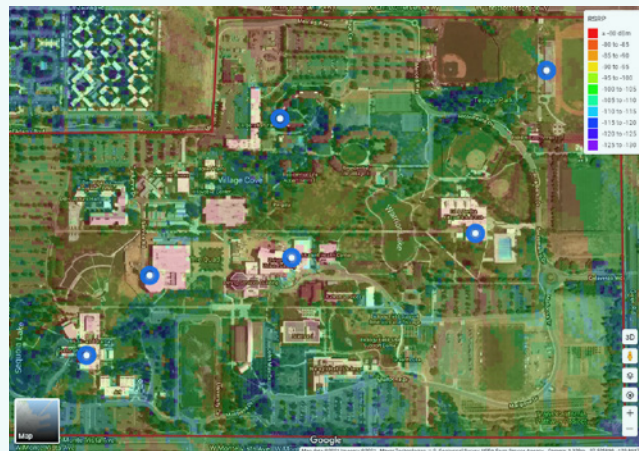
For some time, colleges and universities around the globe have relied on Wi-Fi to deliver convenient network access to faculty and staff across the campus. But when it comes to larger campuses like CSU Stanislaus Turlock that span multiple city blocks and include large open spaces, reliable wireless connectivity between buildings was simply problematic. Additionally, public cellular coverage has proven to be poor in many key campus locations where students and staff want to connect.

According to Geoff Cirullo, Deputy Chief Information Officer at CSU Stanislaus; “When we initially reviewed our campus wireless goals, we realized that traditional wireless technologies were not going to provide reliable end-to-end coverage and connectivity required for what we wanted to achieve. For each of our goals to be successful, we found that it would require us to either trench or run fiber across the entire campus.”

Cirullo noted that the cost to run fiber across the entire campus was a non-starter compared to overlaying a private CBRS network to their existing infrastructure. “What we really wanted was to deploy a deterministic cellular network that was effectively immune to interference, offered strict quality of service guarantees and was easy to deploy at a cost rivaling Wi-Fi. It’s a big ask but with Celona, that’s precisely what we found.



Six Celona access points deployed atop CSU buildings provide campus-wide coverage for cellular wireless service.



The Solution: A Celona-powered CBRS private mobile network

With the deployment of just six Celona access points (APs) installed atop campus building rooftops, a near-100% outdoor private LTE/5G coverage was achieved. This level of coverage would otherwise take several hundred Wi-Fi APs to accomplish. "With careful planning, the installation of each Celona access point took only an hour with full integration into the existing campus LAN taking only minutes using the centralized Celona edge gateway platform. "This allowed us to quickly initiate phase I of the project which included the installation of cellular-to-Wi-Fi gateways to extend Wi-Fi coverage across the Turlock campus for student and faculty use."

With Celona, CSU Stanislaus was also able to seamlessly extend Eduroam – a shared Wi-Fi network that allows visiting teachers, researchers and students to seamlessly and securely access remote resources – was fully functional over the private wireless network backhaul."

Thanks to the successful implementation of the Celona private mobile network, CSU Stanislaus remains enthusiastic about the potential that the private mobile network brings. Future phase I use cases in the works include the native use of the private LTE/5G network for:

- Remote outdoor surveillance cameras
- Intelligent parking meters and garages
- Augmented reality services
- In-vehicle public safety communication and notification systems

Phase II of the long-term private LTE/5G network rollout strategy includes the deployment of Celona indoor APs within student and faculty buildings. The goal for this phase of the project will be to bolster cellular phone coverage using a Neutral Host Network (NHN) architecture approach. NHN allows the propagation of both public and private cellular network services and interoperation between the two. All traffic is securely segmented while expanding indoor/outdoor coverage and capabilities of public LTE/5G carrier services from one end of the campus to the other.

Enhancing the student and faculty experience in a post-COVID world

Private LTE/5G and CBRS offer limitless opportunities for educational institutions of all sizes and use-case situations. For CSU Stanislaus, enhancing student and faculty experiences in a post-COVID-19 world was the top priority that faithfully embraces both new and returning educational and public safety services.

"The changes that have come about due to the COVID-19 pandemic will lead many in the higher education community to seek out a more flexible, reliable and secure wireless platform with which to build critical educational services on top of," concluded Cirullo. "The ability to reserve dedicated frequency blocks within CBRS allows us to create a robust and pervasive private mobile network that will enhance student and faculty experiences from both an educational and public safety perspective."

hello@celona.io | celona.io