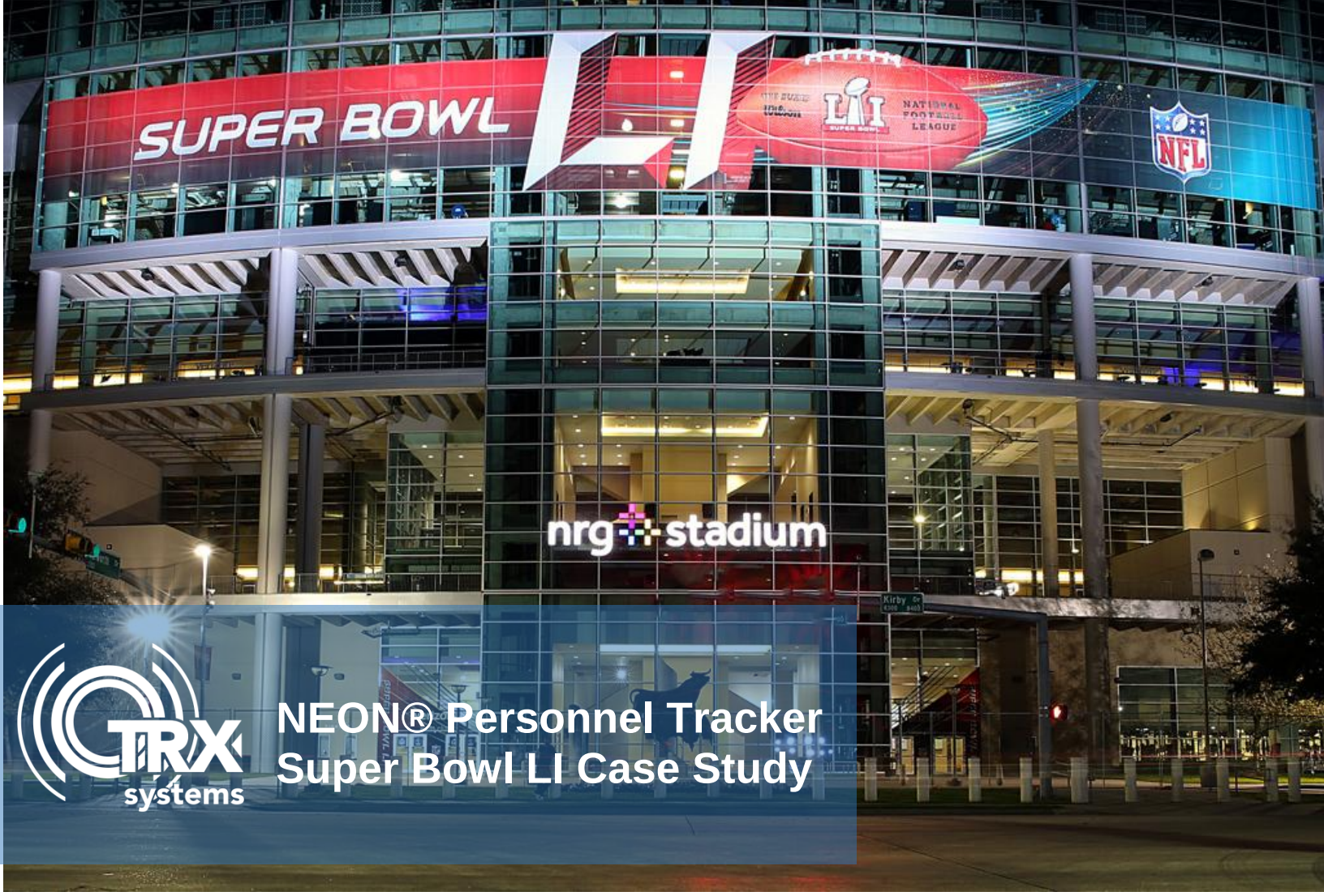

NEON® Personnel Tracker
Super Bowl LI Case Study

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Summary

In February 2017, during Super Bowl LI between the New England Patriots and the Atlanta Falcons, TRX Systems played an integral role insuring public safety in NRG Stadium. TRX Systems' NEON Personnel Tracker application was used by the Houston Police Department during the game to accurately determine the location of its officers throughout the stadium.

Working closely with the Houston Police and the Harris County Central Technology Service, TRX deployed NEON Personnel Tracker in a solution integrated with the Motorola LEX L10 Mission Critical LTE Handhelds. The NEON solution on the LEX L10 used the Harris County Public Safety Broadband network at NRG Park where each officer carrying the LEX L10 with the NEON application was able to be tracked in 3D from the command center throughout the nearly 2 million square-feet of NRG Stadium.

"Applications enabled by Public Safety LTE networks are part of our continuing investment to safeguard the public and effectively manage our resources at major public events such as the Super Bowl."

-Shing Lin, Director
Harris County CTS

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TRX Systems Overview

TRX Systems is the developer of the NEON® Indoor Location Solution, delivering location and mapping indoors, underground and in dense urban areas where GPS is not available or is unreliable. NEON delivers ubiquitous, low-cost, 3D indoor location through the use of advanced sensor fusion, ranging, and dynamic mapping algorithms.

TRX Systems got its start technology research in the public safety market, responding to the need to safeguard public safety personnel when they are operating indoors where GPS doesn't work. Working with the public safety industry to solve this extremely important and challenging problem has enabled TRX Systems to develop state of the art, cloud based solutions based upon patented technology that seamlessly locate public safety, military and industrial personnel both indoors and out, anywhere GPS is not available or is unreliable.

The TRX team is made up of industry experts in sensor fusion, RF ranging, crowd-sourced map building, statistical modeling, control theory, and robotics. TRX has strong primary research expertise combined with strong product delivery capabilities. The company has a large portfolio of intellectual property including 12 patents issued in the United States, 15 internationally, and 24 pending.

Safety & Security

Commercial

Defense

Safety and productivity, through indoor location. That's our mission at TRX.

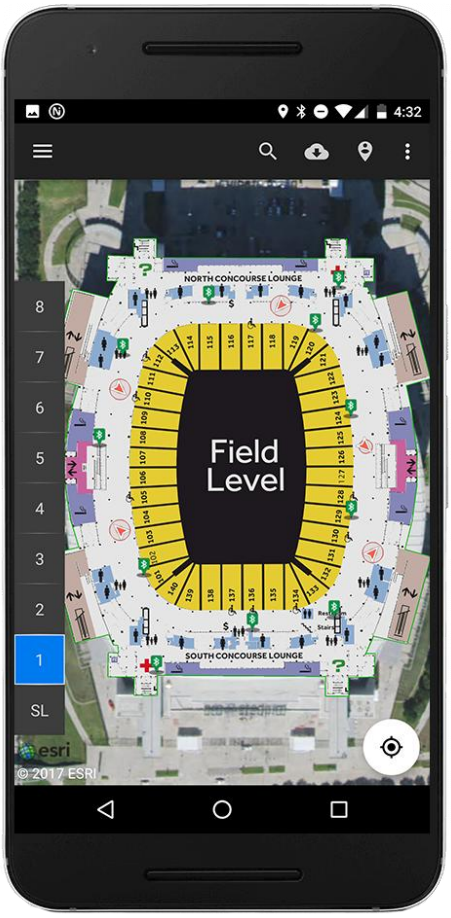
Challenge

During a large event, such as the Super Bowl LI at the NRG Stadium in Houston, Texas, there are multiple incidents occurring simultaneously, usually without a clear “picture” of where all potential resources are located. A major issue can arise when the remote commanders may unknowingly dispatch too many resources to one incident and be left without enough resources for another incident.

The Houston Police Department, like many police departments across the country, has applications that enable them to track and communicate with their officers. These applications use GPS to show the officer’s location and to improve situational awareness and operational efficiency during incidents. However, GPS is not available indoors and underground and, as a result, officers cannot be tracked adequately, which hampers a team's accountability and situational awareness for all. NRG Stadium, like most indoor event facilities around the world, represented a challenge for the Houston Police using their existing applications to track officers inside the nearly two million square-foot facility where GPS is unreliable or provides poor location accuracy.

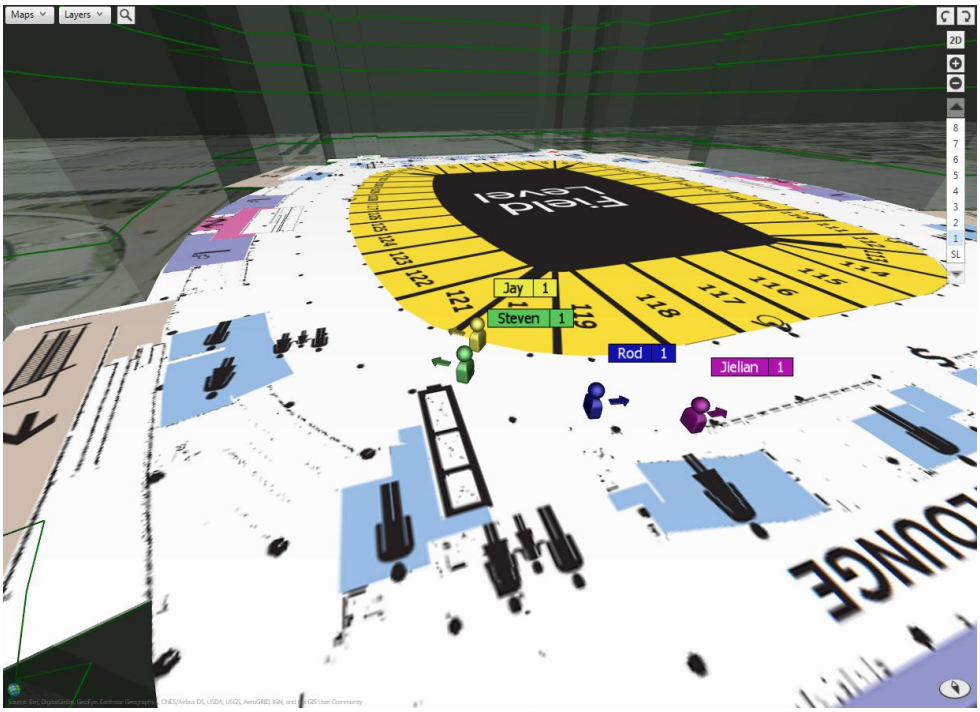
Solution

For Super Bowl LI, TRX Systems worked alongside the Houston Police and Harris County, Texas Central Technology Services (CTS) to deploy the NEON® Personnel Tracker application with Motorola LEX L10 Android phones to many of their police officers working inside the stadium. NEON Personnel Tracker delivers mapping and location in environments where GPS is unavailable or unreliable such as inside large office buildings, in stadiums and underground. By delivering location in these "GPS-denied" environments, NEON improves both command effectiveness and safety for public safety and security personnel. NEON Personnel Tracker delivers location in both 2D and 3D and provides tracking and visualization of personnel in complex indoor and outdoor environments. Accurate tracking is accomplished using NEON's patented location algorithms which leverage all available device sensors including inertial, magnetic, pressure, light, Bluetooth, Wi-Fi and GPS signals (where available) to calculate location.



NEON Personnel Tracker Android UI

NEON is the first location solution to deliver the precision and seamless coverage required to improve situational awareness and safety within such GPS-denied environments for first responders, soldiers, and security personnel. NEON is unique in the ability to use very small and low cost sensors along with mapping algorithms that use inferred and known mapping data (structural, RF, magnetic). This allows TRX to deliver accurate and reliable 3D location in buildings where infrastructure cannot be installed (i.e., not under control of the user). TRX has also developed a Command Application precisely tailored for public safety, supporting cloud-based map access, rapid 3D building modeling, easy import of known building information, real time personnel location monitoring, logging of location data, and flexible after action review.



NEON Command User Interface

During Super Bowl LI, TRX's NEON Location Service running on the Android phone fused together all available map and sensor data to compute the officer's location in real-time during the game while they were responding to incidents in the 2M square foot facility. The location data was sent to the NEON cloud using the Harris County Public Safety LTE Network where it was available to be remotely viewed in the Houston Police Command Center for both real-time situational awareness and after action review.

By using the NEON Personnel Tracker at the Super Bowl, the Houston Police were able to know the relative locations of the officers in 3D. Knowing the locations in 3D allowed team commanders located in the remote command center to allocate resources in the most effective and efficient way. "Public Safety LTE is a reality and happening right here in Texas. Harris County is committed to enhancing public safety through the use of leading edge technology," said Shing Lin, Director Harris County CTS.