

Bob Jones University Raises the Bar With RFID

The university is using a passive RFID system to monitor vehicles entering and exiting its main parking lot, and to operate an automated gate system.

By Claire Swedberg

Dec. 13, 2007—With some creative engineering and brick-building from within its own ranks, a few RFID readers and a couple thousand decals with embedded EPC Gen 2 RFID tags, [Bob Jones University](#) (BJU), located in Greenville, S.C., is tracking vehicles as they enter and leave the campus' main parking lot. The solution employs hardware provided by [Intermec](#) and integration services from logistics provider [Regan](#). It enables the college to monitor traffic and replaces an automated gate system that, more often than not, required manual intervention.

The new system—which went live in August, as the school year began—represents a shift from the school's previous RFID system, which leveraged active RFID technology to control a gating system utilized from 7 p.m. to 7 a.m. (the gate remains in its open position during the day). Between those hours, an average of 750 vehicles enters the lot each day, driven by students attending late classes, athletic events and evening programs.

Paul Litzenberger, manager of IT and telecommunications at BJU, calls the active RFID system "completely unsuccessful" because it was able to read tags, on average, only 19 percent of the time as cars entered the lot, and about 25 percent of the time as they exited. Prior to installing any RFID system, the campus relied on a public safety officer to manually open the gate at night for those with parking permits.

Little changed with the active RFID system, Litzenberger says. The officer had to work nearly as hard as he had under the manual system, opening the gate himself for those whose RFID windshield tags could not be read. Several causes were likely for the low read rate, Litzenberger speculates. The parking lot entrance is just a few hundred feet from a highway, so those arriving at the gate often enter at speeds too fast for the active reader to scan the decal. If the angle between the reader and decal wasn't exactly right, the system would fail. And the tag batteries, he says, which should have had a lifecycle of five years, only lasted about two years. (Those two years are how long the university attempted to use the active system before moving to Intermec's passive technology this summer.)

The new system was installed in conjunction with construction improvements being conducted at the entrance, Litzenberger says, and at the university's welcome center. He and members of his staff built brick posts to house the two Intermec IF4 RFID readers and four antennas (two for the two-lane entrance, another two for the two-lane exit) so they'd be relatively safe from collisions and couldn't be seen.

However, the system needed to be re-engineered to meet the university's needs. The initial IF4 read range was about 13 feet, but BJU required at least twice that range to reach all vehicles passing through the wide entrance. According to Litzenberger, members of the BJU engineering department teamed with representatives from Regan and Intermec to develop a system that now can accomplish an occasional 43-foot read, but reliably operates at 35 feet.

The group accomplished the longer read range by shortening the coaxial cable connecting the reader to the antennas. It also worked on positioning the antennas and finding the best tag location on the windshields. In addition, the team was able to increase the read range by using quarter-inch-thick adhesive tape to raise the Intermec IT32A EPC Gen 2 tag off the vehicles' glass windshields. This, alone, doubled the distance of the read range, Litzenberger says, adding, "It was a real design triumph." Testing began in May, and the RFID reader system was fully deployed within the concrete columns by Aug. 13.

Currently, 2,900 faculty, staff and students enter and exit the campus on a regular basis. As a motorist enters or leaves the parking lot, the vehicle's tag ID number is captured by the reader and transmitted through a cabled connection to BJU's intranet server, so that BJU can track data to better understand parking volumes, length of stay and other metrics. Regan designed the automated gating system; the RFID interrogator reads the decal, verifies it and sends instructions to the gate regarding whether to open.

The cost of the system, Litzenberger says, including installation, antennas, readers, tags and software, was equivalent to the cost of one two-year cycle of the active tags previously purchased, minus other hardware or software. "That was a no-brainer for us," he states.

RELATED_ARTICLES BJU also employs an Intermec mobile computer and IP4 handheld readers so campus police can verify tags on vehicles parked in the lot.

"This was a combination of good products and a good team of systems engineers," says Chris Kelley, Intermec's director of RFID and data capture, who describes the results as "a marriage of standard equipment and technical services." Kelley notes that the engineering and design work accomplished by Intermec, Regan and BJU was the success story behind this implementation.

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