

Joe Leone

THE EXPERT'S EXPERT

Who do top RFID engineers turn to when they need help? For many, the answer is Joe Leone.



It could be argued that Joe Leone has more hands-on, in-the-trenches experience implementing RFID than anyone else. He was instrumental in determining how to overcome problems and successfully create the largest implementation to date, a \$100 million+ global network for the U.S. Department of Defense in the early 1990s. He is also one of the key players helping Wal-Mart begin its installations. Add to that work for clients like Procter & Gamble, Target and Johnson & Johnson, among others, and it is hard to imagine a greater depth of experience. Today, he's CTO and founder of RFID Global Solution. Editor Andy Kowl sat down with Leone to learn more about him and RFID.

Tell me how you first got involved with RFID.

Leone: I have a software engineering background. When I joined the military, I got involved in supply chain-based software development. I got involved with RFID and with what they call Automatic Identification Technology back in 1990, '91—right around Desert Storm, before and after.

Did they tap you because of your background?

Leone: Yes, I was repairing computers. Then they realized I could program, so they had me writing custom solutions for military supply and maintenance. When I left the military, I was working with optical memory cards. They look basically like small credit cards, the same texture as CD-ROMs, and are very robust and durable.

I had been transitioned out and was working for a government contractor. We worked with the optical memory cards,

and we also worked to write that same data to RFID tags. The RFID tags were being applied to pallets and containers going to “hot” locations.

I was deployed to Bosnia in 1996 to support that effort. And the date an accord was signed, my company stepped up to provide support in the area of operations.

As I said, the system used both the optical memory card media and the RFID media. It was a very aggressive environment, very taxing. From the logistics perspective, it was very hard to manage inventory because you were working in a potential war zone. You were basically setting up shop wherever you could find a location—in this case we were in an old coke-smelting plant.

There were pallets all over the place. And, in order to make the optical memory card work, I had to go out and collect all the cards and feed them into the machines. Then I had to remember which card that was and figure out which of the 175 or 200 pallets that card came from.

So there was a card on each pallet?

Leone: Right. But there was also an RF tag on each pallet. I said, “Wait a minute. I got this RF tag. It's got the same data. I can actually query the tag, all the tags in the area.” And I could actually find the container that had those specific items in it. So I didn't have to keep this detailed grid map of cards. The system would tell me. And I said, “You know, I need to be working for the RFID guys because this stuff is amazing.”

The optical memory cards contained data about what was on the pallet?

Leone: That's correct.

And at the same time, the RF tag was a backup?

Leone: It was a redundant medium. The tag was actually placed on the pallet to help give visibility to the pallet during its in-transit phase. The card was to be used where it reached its final destination. You would then take the card off and feed it into your system of record,

populating all that inventory into your system. But in this contingency environment we were more interested in finding the parts because of the operational tempo—meaning how fast things were being used and how aggressive the environment was from the soldiers' perspective.

It was hot, up tempo. So they were going through parts much faster than they had originally predicted. Patrolling the borders led to what was called the ZOS, the Zone of Separation, an area where neither the Serbs nor the Croats nor the Bosnians could be. So they had Humvees, Cutvees [commercial utility cargo vehicles], Bradleys [armored personnel carriers], M1A1s [main battle tanks] that were all being used constantly.

So this was not a matter of inventory control. This was a matter of trying to find parts to bring up equipment that was no longer able to be used by the soldiers, which was critical to the mission.

So, there were generals, literally 1- and 2-star generals up there, driving the use of this

technology because they're saying “I want to know where my stuff is. If you tell me there's an RF tag on it, then I trust it. If there's no RF tag on it, then you better do the due diligence to find out where that stuff is.”

Shortly after that you were hired by SAVI. Talk about when SAVI was given a large contract to do a major implementation.

Leone: In the beginning, there was what they call pilot use of the tag. There are 20, 25 sites set up with what they called critical choke points around the world, from the U.S. to the European site, and from the U.S. to the Korean site—the two major pipelines fed by the military. One system was set up on the West Coast out of San Joaquin, Calif., the other on the East Coast out of Dover, Del. Those were your points of embarkation.

About what year is this?

Leone: I believe it was '94. The military saw a lot of potential and said, “Focus on RFID.”

On the West Coast, SAVI was building this enormous demonstration capability out of Davis-Monthan Air Force Base in Arizona. We wound up winning a \$111 million contract. Military officials evaluated their pipelines and said: "Where are the points where we're having the most pain?" It's interesting, because this is the approach and methodology I still use today.

So they looked at some of the major aerial ports and sea ports where they have almost no visibility and a lot of congestion and the potential to have freight bumped without ever knowing it. And we instrumented those facilities, as well as some of the critical base camps, to know whether the pallet ever got from the aerial port to the base camp or not. This is critical information. Was it sitting on a trailer on the side of a road somewhere between point A and point B? Did it get hijacked?

They were able to show with great success how well this would work. A soldier could go onto a Web page on the Internet, query a specific P.O. request number, and find the exact RFID tag. Then, click on a link and find out the history of where that tag had been.

In the chain?

Leone: In the chain. In the transportation pipeline. So it left Dover at 8:15 on Monday morning. It flew to Ramstein [Air Base in Germany] and got there at 10:30 on Monday night. It sat there for three days.

The beautiful part about this was, for the first time it gave commanders in the field the ability to reach out from what they call Green Shield, expedited critical parts. So we know they're going to take the next 10 pallets in the queue, but we say, "Hey, you know what? I don't need those tires and those mattresses. I really need those rebels and go plugs. So I want you to find that pallet and bring it to the front of the queue." And for the first time, in Bosnia, they were able to do this.

Put it in perspective. Some \$53 million worth of excess parts were ordered in the first six months of the Bosnia operation. As the commanders in the field began to understand the abilities that RFID offered, they were able to dramatically drop that. From what I heard, they were able to cut

that threefold or fourfold.

So overall this SAVI contract was a successful pilot program?

Leone: When I got there, there were about 28 nodes in Europe in about five countries. When I left in 1999, we had put up over 140 nodes in 26 different countries, including Kuwait, and we did all the commercial seaports.

These were very significant implementations. These were not simple. This covered literally square miles of container storage area. And we're working on commercial real estate. This was not military only. There are now about 1,000 nodes. NATO [members] helped perpetuate the technology in their own countries as well.

But in understanding what RFID could do for them, the problem still exists in what they call the First Mile/Last Mile. First Mile, in other words: What am I putting in the box? What's going in that big Tri-Wall? That big multipack? Did I pack all the things ordered?

And the Last Mile, how do I gain visibility of these parts? How do I put them away more affectively? How do I inventory them?

Will the technology that was put in place to support active RFID also support passive? Or do they have to start from scratch?

Leone: No. There are some standards that are being developed to help lend more synergy to the two technologies. And they are complementary. But right now, they are still two separate technologies.

Will these nodes be using active in a different way, simultaneously?

Leone: Some suppliers may not realize that for certain types of technology they're going to get stuck with two different mandates. Because certain types of products, some of the rolling stock, are also going to be mandated with an active tag.

At some point you moved from the military application of RFID to the commercial. What was your first involvement with consumer applications?

Leone: The first project I started to work on was actually the U.S. Postal Service doing an RFID test. All in the

Pennsylvania, Indiana area. And so I got involved in understanding deployment nuances. One of my other first projects on the commercial side was Procter & Gamble. And the Meijers food chain. We ran some of the first shelf monitoring systems, which were little push antennas on pieces of PVC pointing back at a shelf in the middle of a Meijers food store back in 1999.

What were they trying to accomplish?

Leone: What they were trying to show was exactly the problem that Wal-Mart is trying to solve right now. Trying to understand how products are being used on a shelf or how they're being looked at. How they're being taken off the shelf. The timing, the historical information about



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when the last product was sold. How many still exist. If they're not there can we intervene more rapidly to get products on the shelf?

Right. Let me use that as a segue to take you over to Wal-Mart. How did you first get involved with Wal-Mart?

Leone: In 2002 I decided I wanted to get back to the East Coast. I did some consulting work for Matrics and a few other companies. I realized during that time what Matrics had was really the next step in the evolution of the passive technology.

Some of the technology that was out there showed that if it was a little better, it would really be a viable solution. It was, "hey, if it ever gets any better, it'll be great." But it was not something you could bet your business on. The new technology that Matrics was bringing into the market was everything it needed to be. Gave you the right read rates; the read rang-

es; data capture capability; was deployable, scalable.

So I decided to take a position with them.

And what year is this now? 2002?

Leone: This was in '02-'03. In August of '03, I made a trip down to [Wal-Mart headquarters in] Bentonville, Ark. So I went down there and after spending one day with them realized that if we didn't put somebody on the ground and help them, we would be doing them an injustice. And it was really in our best interest.

A month later, I was on the ground in Arkansas. And they were working on getting a lab set up. I mean, they knew that they wanted to do this; they just didn't know how to get it started. Symbol was going to be our big brother in this.

And so, we went in and started to do the site surveys. And then it went on from there.

So, then, obviously at some point, Wal-Mart decided to make the famous announcement of the mandates. And at that time, had they been testing it on their own?

Leone: Yes. I wasn't working with projects directly. I'd only get involved when they needed some help. Gentlemen by the name of John Coburn and Al Marney were the original principals involved from the Wal-Mart side. They then said: "Look, this isn't an R&D project anymore. We believe in it and we're going to start to look at how we deploy it." So they put Simon Langford and his team in on the operations side.

And were you involved with getting their DCs or their stores ready at all?

Leone: Oh, absolutely. The whole purpose for going down there was, obviously, the Matrics spin on it. But it was really to help them be successful with RFID. Our CEO and I talked and we both believed and agreed that the Matrics agenda really had to be put on the back burner here. It was in the best interest of the industry to make sure that regardless of what it took, whether it had been somebody else's readers, somebody else's tag, it didn't make a difference. We really needed to make sure that Wal-Mart was successful with RFID. We put a lot of

hardware in. As the lab came up we started to do testing and pushed the limits of the technology. We then were given the OK to start the first deployment.

What were some of the bigger software challenges?

Leone: Well, the interface to the reader was critical. They didn't want a black box solution. They wanted to be able to work with the reader directly. So the new reader, the AR400, was a step forward because it wasn't just a dumb device. It could be an intelligent device with a PC on board. That gave Wal-Mart the ability to manage each reader as almost a small computer or a data appliance that you now could communicate with; send data to it; pull data from it; send commands or instructions to it. You could change its configuration, virtually over the network.

Were there surprising problems; or any problems, surprising or not?

Leone: No, actually there were no surprises. The only problem that we really encountered was that requirements were basically being developed on the fly. And to Wal-Mart's credit, they're the epitome of an early adopter. In many cases, though, the problems that you run into are problems that you try to plan for and say look, you're not going to be able to put a reader next to this big fire hydrant system that you have in here. Just simple things like that. Another one was the stands that Matrics had made were at about 6'2", 6'3" high. And they have these big fans that they point into the trucks as they offload or upload, that are used to cool down the trailers. And that there would be an issue with these fans being able to be swung.

But really there were no major problems. It went very smoothly.

What do you think about the state of RFID and the market now?

Leone: It's a very exciting time for RFID. There's an incredible amount of mind share. The brain trust that being brought to bear on this... is unbelievable. There are a lot of thought being put into truly solving business problems with RFID and to do that you need to have the tools. So you're seeing the product lines mature and become more application specific. ■