

COLLIDING GRACEFULLY

5.9 GHZ DSRC FOR TOLLING? LIKELY NEVER

Lots of people are working lots of hours to bring 5.9 GHz DSRC to fruition. It's a great technology with much promise for many new automotive applications, but it's not likely for tolling, says one vastly experienced expert. And there are several reasons for that



Before starting, I should state clearly that I am an advocate of DSRC (Dedicated Short-Range Communications). I like the concept, I believe the development program is on track, and I have invested many personal hours to help make it successful. Likewise, I'll state that I am a tolling advocate, believing strongly in the 'user pays' model. Tollroads are good things (although not everyone would agree) and we're going to see more of them. They're the only way some needed new roads can be financed before the traffic on existing highways reaches complete gridlock.

So why not DSRC on tollroads? It seems like a natural marriage. In fact, many are saying that tollroads will be one of the first applications for DSRC. I think not. It's not lack of capability; DSRC was designed for far tougher jobs and could do toll collection in its sleep. But I don't think it will happen. Let me expand.

THE MARKET PULL....ISN'T PULLING

First, there's no real pressure to make it happen. Present day tolling systems have solved most of the congestion problems on modern toll highways. The migration from gated toll lanes to free-flow toll lanes to open road tolling without any real lanes is well along. The RFID tags and readers used in these systems are mature, well understood and, most important, already paid for. Road users are happy. Road operators are happy. Oh yes, there are occasional discussions about how nice national interoperability would be but few



believe they should rush to do anything to achieve it. Where it is advantageous to be able to read two (or more) types of tags, creating interoperability where different toll systems overlap, multi-protocol readers are available to service the need.

Second, and more importantly, DSRC is far away in terms of being interesting to a tollroad operator. And some dramatic changes in the way roads are used, maintained, and financed seem sure to arrive at approximately the same point in time.

LOTS TO DO BUT LOTS OF TIME?

There are tough issues to be solved before DSRC goes anywhere. Some are technical – the technologists are working hard on those. Others are more nebulous – and much harder to address. Privacy, liability, data ownership, and others. These haven't received as much attention yet and will not be solved soon.

An extensive evaluation program is planned, hopefully leading to a confidence level that supports deployment. DSRC is at the heart of numerous proposed safety systems – the next step beyond seatbelts, airbags, ABS brakes and the like.

Like those items, DSRC will be tested, re-tested and then tested some more. It'll have to be close to perfect before anyone will risk deployment. Someday, it'll be good enough – that's likely to require a redesign cycle or two. Even iPods, DVD players and other consumer electronics go through that cycle. How could an elaborate, electronics-based safety system see less?

SLIDE TO THE RIGHT....

This all leads to a DSRC deployment decision, scheduled to be made jointly by US DOT and the vehicle OEMs in late 2008. I've seen the master schedule and I've examined its pieces. I'm sorry, but there's too much to do for this decision to be made in 2008. Mostly, too much testing. The test schedule is very success-oriented and unlikely to finish on schedule. Though nothing official, strong signals have come from both US DOT and the carmakers that the decision will be delayed. But there's more.

DSRC is a complex device, designed to be part of an even more complex system. This is not just the next tolling tag – the old 'stick it in your window and go' approach. To do what it's designed to do, DSRC has to be connected to the automotive data bus. For many practical reasons, this means it'll be built into new vehicles rather than being a simple after-market addition. Few people will want to disassemble their dashboard to reach the right wiring bundle.

Therefore, DSRC penetration is virtually tied to the rollout of new, DSRC-equipped vehicles. That doesn't happen overnight. All things considered, an optimistic, but possible, vehicle deployment could begin in 2011. With a new technology, carmakers normally start small and ramp up. Eventually, it's hoped that all 16 million cars built in the United States each year will be equipped. An educated estimate of this vehicle deployment profile (again optimistic) is shown in the accompanying table:

DSRC IN-VEHICLE PENETRATION		
Year	Millions produced	Cumulative millions
2011	1	1
2012	4	5
2013	8	13
2014	12	25
2015	16	41
2016	16	57

Fifty-seven million is a big number but, since there will be approximately 250 million vehicles in the United States in 2016, it is only a 23 percent vehicle penetration. For toll operators, tag penetration is typically a lot higher than 23 percent – but they might be willing to equip some of the toll lanes for DSRC-equipped vehicles by 2016. So why wouldn't they?

ANOTHER CATAclySMIC CHANGE

It's called Road-User Charging. You probably know the concept: using GPS and assorted other onboard equipment to track vehicle-miles traveled and apply a charge per traveled mile to pay for roads. Road-user charging is generally seen as a replacement for the current process of collecting fuel taxes to pay for road construction and maintenance. The concept is actually in use in some European locations and in test in a few US West Coast locations. It's becoming a popular idea.

Suffice it to say, many transportation experts agree that some variation of road-user charging must be done to reverse the current

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trend of less and less fuel taxes paying for more and more roadway. And this alternative charging mechanism will be getting close by the year 2016, just as DSRC deployment reaches an ‘interesting’ penetration for tolling. What will be the effect on tollroads? No one really knows, but it’s hard to believe a toll authority would implement a radically new technology like DSRC for conventional tolling if road-user charging is imminent. This will be especially true for tollroads with relatively new RFID systems (with lots of life left), or roads using battery-free transponders offering a virtually endless life. Roads of both kinds will simply wait for the arrival of road-user charging. Even roads needing a technology update in the middle of the next decade will be more likely to stretch their existing systems than to adopt DSRC-enabled conventional tolling. DSRC is simply too expensive to be a short-term solution.

Although DSRC may never be engaged in conventional tolling, it can have a valuable role in new distance-based charging systems. Every deployed (and prototype) road-user charging system includes a dedicated, ubiquitous, secure, high-capacity link to facilitate the needed periodic data downloads and to perform communications related to the enforcement process.

DSRC has all the needed attributes. It’s the perfect adjunct technology for road-user charging. It arrives on the scene at the right moment. It’ll be installed in all new vehicles. It’ll be connected via data bus to all the right onboard elements. It’ll protect to a high degree both the data collected and the user’s personal information. I say again – perfect.

A TECHNOLOGY COLLISION

DSRC will happen – it just won’t happen as soon as many want to believe. Many people are doing their best to make it successful and I can’t wait to see it arrive. But I’m a realist. I’ve done my homework. I know the development cycle and understand the complexity of the pieces still ahead. I know the confidence level that must be achieved before this technology – this safety technology – is deployed. I know many of those who will be instrumental in finishing the technology and in deploying it, and I can feel the pressure growing to ‘slide to the right’.

Road-User Charging is also likely to happen. This is a radically new technology tied to a radically new way of collecting fees for road use. In addition to technology development, new operating mechanisms have to be invented. And legislation changes will almost certainly be needed. These things take time, but the pressures of maintaining a crumbling road infrastructure will be compelling. Many transportation experts believe that road-user charging must be in place in the 2015 to 2020 timeframe.

So, in the road-tolling world, the deployment schedules for DSRC and road-user charging seem to intersect, or at least begin to influence one another, by the middle of the next decade. Toll authorities will be closely watching the approach of both and will try to understand how these technologies affect them. Most will be wondering how they can ‘future-proof’ their systems and gracefully bridge the gap to DSRC, or Road-User Charging, or both. There are ways to do it. But that’s another story... ■

