



SOLUTION BRIEF

AUTOMATIC VEHICLE IDENTIFICATION (AVI)

Many potential applications have been waiting for a technology that identifies vehicles reliably and at the speed of a car. Finally RFID has unlocked these applications including: vehicle registration, open road and high occupancy tolling, parking, congestion charging, compliance etc

The Problem...

- Identify a moving metallic vehicles at up to 100 mph
- Read multiple cars simultaneously
- Reduce toll-fee avoidance (with minimal infrastructure cost)
- Provide high volumes of data back to a central fee management system with minimal infrastructure cost
- Use data to:
 - Optimize traffic routing for congestion management
 - Create cost (and travel time) optimal new road layouts
 - Improve registration compliance
- Open new revenue models for road usage



How Does Alien Technology Solve the Problem?

Alien Technology Class 1 Gen 2 UHF tags are optimized for use in challenging environments with many fast moving objects. What is it about Alien Technology that addresses the problems above?

Alien Technology	Description	Benefit
IC and Tag Read and Write Sensitivity and Selectivity	Best industry cost performance combination. Higgs™4 IC provides industry top-tier read and write sensitivity when used in challenging or harsh conditions.	Enables high accuracy, rapid, long distance reads and writes that are critical to AVI. Single tags can be “singulated” and updated information written back to the tag while the tag remains in range.
Purpose Designed RFID Inlays for high-dielectric and AVI applications	Enables automobiles, trains and rail carriages to be tagged in a manner that allows high-quality rapid reads/writes.	Tags can be applied to a variety of surfaces such as plastics, windshields, head lamps and bumpers and maintain high quality read/writes.
Unique Non-Chipset based Fixed Reader Platform	ALR-9900+ is a “discrete” design using Alien intellectual property not shared with any other reader on the market.	Highest tier of performance, robustness and fast data read-rates that are required for reading fast moving automobiles. Vehicles may be re-routed in real-time for congestion management with minimal central computer involvement.
Autonomous Reader Operation	Alien Readers can process more locally and burden the network and compute infrastructure around them less.	Meaningful data from tolling, parking or registration systems can be quickly and inexpensively processed allowing routing with minimal field infrastructure.
Dynamic Authentication™ and Unique Pre-Encoded 64b UTID serial number	A unique 64b serial number is backed up with an anti-cloning and anti-counterfeit technology. An example of how the unique knowledge of both chip and reader can produce unique IP and value.	<p>Avoid counterfeit tags being used to bypass tolls. Guarantees a one-to-one relationship between the tag and the vehicle.</p> <p>This knowledge allows the creation of new business models that can assume a serial number is the same as a specific car: parking, registration etc</p>



What is the Financial Benefit of the Technology?

Specific results include:

- Greater tolling compliance (higher revenue) and less expensive violation recovery
- Average speed increased from 15mph to 60+mph on specific California toll ways
 - Reduced commute time of 20-30 minutes increase road throughput and reduce need for additional road capacity
- A US High Occupancy Tolling system surpassed goal of 98% accuracy and consistently achieved 99.6% accuracy (as determined by independent audit)
 - Maintained a system availability in excess of 99%, 24 hours per day, seven days per week
- Congestion “up-charges” allow increased revenue and congestion management
- Automatic charging is “instantaneously” reflected in the participants account accessible via web-portal or smart-phone
- Other side benefits:
 - Determining travel habits, frequency of travel, origin and destination points, and other data necessary for state DOTs to use in preparing future construction services and desires of the traveling public
 - Determine when the real “rush hour” occurs
 - Highway ramp usage – are all ramps used optimally or are other entries and exits needed? Enables less-expensive road planning.
 - Compare travel times and speed of the toll and HOT lanes
 - Provide information for congestion or variable rate tolling based on travel times or lane load

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HANDLING PRECAUTIONS Observe standard handling practices to minimize ESD.

DISCLAIMER Application recommendations are guidelines only - actual results may vary and should be confirmed. This is a general purpose product not designed or intended for any specific application.

IC products are covered by one or more of the following U.S. patents: 7967204, 7931063, 7868766, 7737825, 7716208, 7716160, 7688206, 7671720, 7659822, 7619531, 7615479, 7598867, 7580378, 7576656, 7562083, 7561221, 7559486, 7559131, 7554451, 7551141, 7542301, 7542008, 7522055, 7500610, 7489248, 7453705, 7452748, 7425467, 7417306, 7411503, 7385284, 7377445, 7364084, 7353598, 7342490, 7324061, 7321159, 7301458, 7295114, 7288432, 7265675, 7262686, 7193504, 7173528, 7172910, 7172789, 7141176, 7113250, 7080444, 7070851, 7068224, 7046328, 6998644, 6988667, 6985361, 6980184, 6970219, 6952157, 6942155, 6933848. Other patents pending.
 Tag products are covered by one or more of the following U.S. patents: 7967204, 7931063, 7868766, 7737825, 7716208, 7716160, 7688206, 7659822, 7619531, 7615479, 7598867, 7580378, 7576656, 7562083, 7561221, 7559486, 7559131, 7554451, 7551141, 7542301, 7542008, 7531218, 7522055, 7500610, 7489248, 7453705, 7425467, 7417306, 7411503, 7385284, 7377445, 7364084, 7353598, 7342490, 7324061, 7321159, 7301458, 7295114, 7288432, 7265675, 7262686, 7260882, 7253735, 7244326, 7218527, 7214569, 7199527, 7193504, 7173528, 7172910, 7172789, 7141176, 7113250, 7080444, 7070851, 7068224, 7046328, 6998644, 6988667, 6985361, 6980184, 6970219, 6952157, 6942155, 6933848, 6927085, 6816380, 6780696, 6731353, 6693384, 6683663, 6665044, 6657289, 6623579, 6606247, 6600079, 6590346, 6586338, 6566744, 6555408, 6527964, 6479395, 6468638, 6420266, 6316278, 6291896, 6281038. Other patents pending.
 Reader products are covered by one or more of the following U.S. patents: 7716208, 7716160, 7688206, 7671720, 7659822, 7619531, 7615479, 7598867, 7580378, 7576656, 7562083, 7561221, 7559486, 7559131, 7554451, 7411503, 7385284, 7377445, 7364084, 7353598, 7342490, 7324061, 7321159, 7301458, 7295114, 7288432, 7265675, 7262686, 7215249, 7214569, 7199527, 7193504, 7173528, 7172910, 7172789, 7141176, 7113250, 7101502, 7080444, 7070851, 7068224, 7046328, 6998644, 6988667, 6985361, 6980184, 6970219, 6952157. Other patents pending.



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