FTF 2016
TECHNOLOGY FORUM

UCODE DNA

WORLD'S FIRST UHF TAG IC WITH SECURITY

MARTIN LIEBL
DIRECTOR PRODUCT MANAGEMENT
FTF-AUT-N1925
MAY 18, 2016

PUBLIC USE

AGENDA

- E-license plates explained
- The problem…
- …and the solution
- System deployment options
- Conclusion

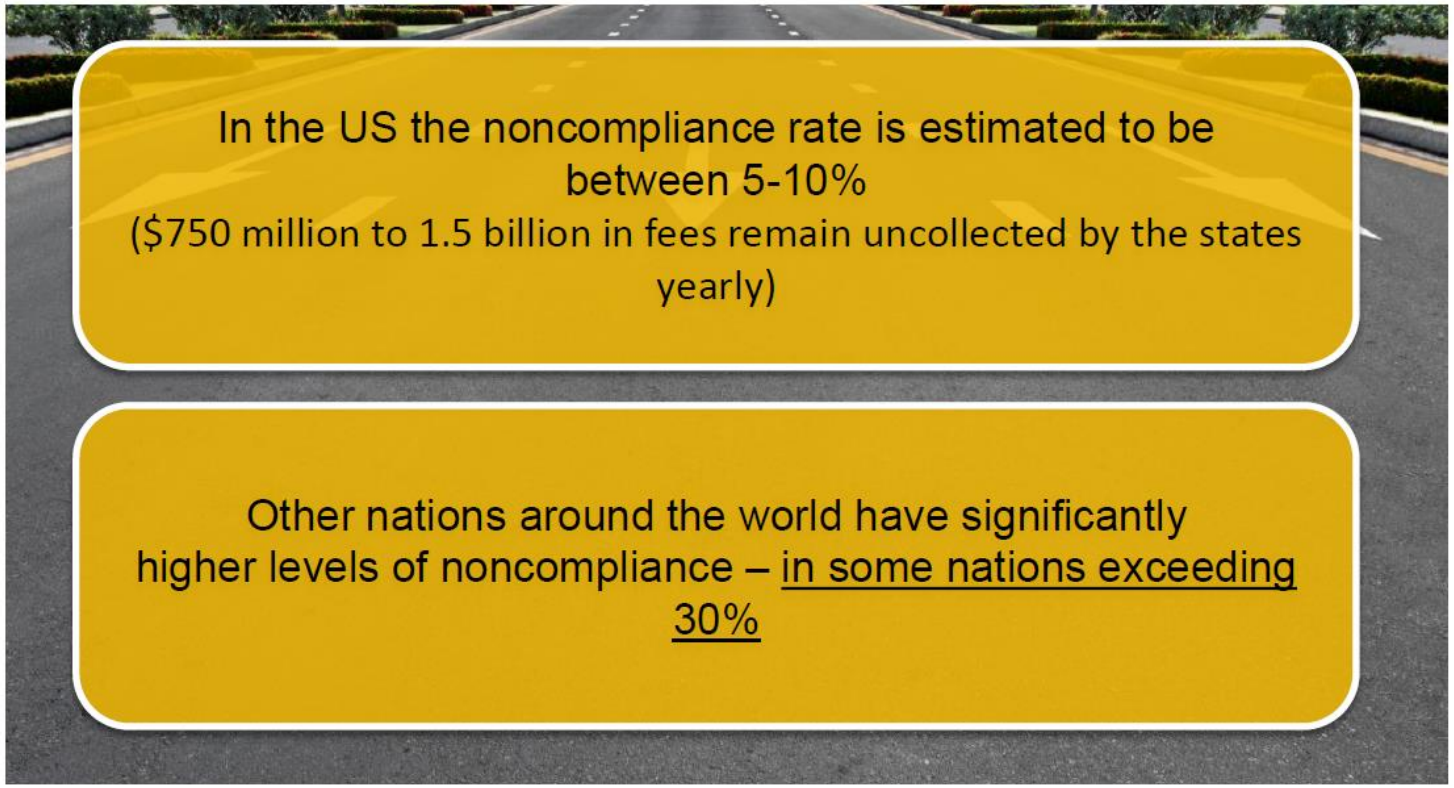
E-LICENSE PLATES EXPLAINED

License Plate: Government-issued Document

- It is not a piece of paper
- It is not a plastic card or a booklet
- Nevertheless, even though it is a metallic plate...
  - still a government-issued document
  - establishes identity
  - it is linked to various obligations and benefits
  - there is monetary value associated with it

Vehicle Registration Related Fraud Causes Huge Income Loss for Governments Worldwide

Electronic Vehicle Registration



Source: Frost & Sullivan White Paper: The importance of tamper-evident RFID tags in Electronic Vehicle Registration (EVR) solutions

THE PROBLEM…

The Problem We Want to Address Is…

How to…

RELIABLY

COST-EFFECTIVELY and

SECURELY

IDENTIFY

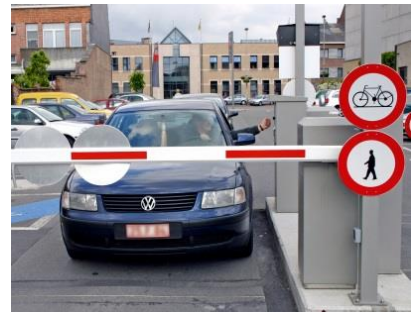
vehicles in various traffic situations

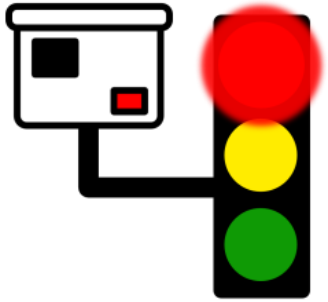
Why Are These Four Factors Important?

RELIABILITY	every car, every time, at every condition
COST-EFFECTIVENESS	benefits are great, but not at any cost
SECURITY	often, money is involved, so we need to be sure
IDENTIFICATION	not to bill A for something B needs to pay not to give A a privilege which should go to B

Where Is This of Benefit to Us?

- There are number of traffic-related use cases where reliable, cost-effective and secure identification of vehicles comes in very handy:
  - **electronic toll collection**
  - access control (e.g. at parking facilities)
  - classification and processing (e.g. at border crossings)
  - law enforcement (e.g. speed control, red light control, EVR)
  - asset tracking (e.g. for fleet management)





Objective: Enable Many Use Cases for Governmental and Commercial Entities

- Speed control
- Red light control
- Vehicle tracking

- Toll fee collection
- Access control
- Plate & car matching

- Check if registration expired
- Check if technical inspection done
- And much more…

Illustration from: http://www.toennjes.com/en/rfid-vehicle-identification/

…AND THE SOLUTION

RFID Is the Only Technology Which Meets All AVI Requirements

	Inductive Loops	Optical Systems	RFID
RELIABLE	✓	✗	✓
COST-EFFECTIVE	✓	✗	✓
SECURE	✗	✗✓	✓
IDENTIFICATION	✗	✗✓	✓

From the Perspective of AVI Requirements, Until Recently the RFID Picture Was Not Complete…

	Active RFID	Passive UHF RFID
RELIABLE	✓	✓
COST-EFFECTIVE	✗	✓
SECURE	✓	✗
IDENTIFICATION	✓	✓

As a leader in passive RFID…

and as a leader in security.

NXP Now Brings Secure Passive UHF RFID Meeting All AVI Requirements

	Active RFID	Passive UHF	Secure Passive UHF
RELIABLE	✓	✓	✓
COST-EFFECTIVE	✗	✓	✓
SECURE	✓	✗	✓
IDENTIFICATION	✓	✓	✓

Passive UHF tag IC
with cryptographic authentication

world-leading
long range
contactless performance

cutting-edge
security implementation
for tag authentication

All based on international standards
* GS1 EPCglobal™ Inc. UHF RFID Generation-2 Version 2.0
** ISO/IEC 29167-10 for proof of origin
based on AES (Advanced Encryption Standard)

All System Components Are Available and Deployed in Projects Already

- RFID system includes
  - RFID Tags
  - RFID-enabled license plates
  - RFID-enabled windshield stickers
  - mobile / hand held RFID readers
  - stationary RFID readers
  - RFID reader antennas
  - RFID road curtains
  - RFID gates
  - RFID totems
  - backend SW solutions

- Some of the active AVI projects
  - China
  - Turkey
  - Brazil
  - Peru
  - Mexico
  - Russia
  - Nigeria
  - Malaysia
  - Myanmar
  - Egypt

SYSTEM DEPLOYMENT OPTIONS

There Are Multiple Ways Passive Secure RFID Can Be Attached to the Vehicle

Option 1

- **eLicense Plates**
  - integrated RFID tag
  - entire metal plate serves as the antenna → better read range and more reliable
  - possibility to combine optical and RF identification
  - drawback: potential removal from one vehicle to another

Option 2

- **Windshield Stickers**
  - integrated RFID inlay
  - less removal risk since it s inside the vehicle
  - self destruction if removal is attempted
  - drawback: lower RF performance (still sufficient!) due to smaller antenna size

For maximum protection and best read reliability, use of license plates in combination with windshield stickers is recommended.

Overview of Overall System Costs

	Tag	Reader	Backend
Optical Systems	-	$$$$$$$$$$$$$$ $$$$$$$$$$$$$$	$$$$$$$$$$$$$$ $$$$$$$$$$$$$$ $$$$$$$$$$$$$$
Active RFID	$$$	$$$$$	$$$$$
Passive RFID	$	$$$$$	$$$$$

CONCLUSIONS

Conclusions

- Of all the available AVI technologies, only RFID meets all requirements
- Among RFID options, only secure passive UHF meets all AVI needs and can drive adoption
- All system components are available and deployed in various projects
- Combination of eLicense Plates & Windshield Stickers gives best results
- NXP leads the market with secure contactless technologies and is a trusted partner for many governments, financial and other institutions

SECURE CONNECTIONS
FOR A SMARTER WORLD

ATTRIBUTION STATEMENT

NXP, the NXP logo, NXP SECURE CONNECTIONS FOR A SMARTER WORLD, CoolFlux, EMBRACE, GREENCHIP, HITAG, I2C BUS, ICODE, JCOP, LIFE VIBES, MIFARE, MIFARE Classic, MIFARE DESFire, MIFARE Plus, MIFARE FleX, MANTIS, MIFARE ULTRALIGHT, MIFARE4MOBILE, MIGLO, NTAG, ROADLINK, SMARTLX, SMARTMX, STARPLUG, TOPFET, TrenchMOS, UCODE, Freescale, the Freescale logo, AltiVec, C 5, CodeTEST, CodeWarrior, ColdFire, ColdFire+, C Ware, the Energy Efficient Solutions logo, Kinetis, Layerscape, MagniV, mobileGT, PEG, PowerQUICC, Processor Expert, QorIQ, QorIQ Qonverge, Ready Play, SafeAssure, the SafeAssure logo, StarCore, Symphony, VortiQa, Vybrid, Airfast, BeeKit, BeeStack, CoreNet, Flexis, MXC, Platform in a Package, QUICC Engine, SMARTMOS, Tower, TurboLink, and UMEMS are trademarks of NXP B.V. All other product or service names are the property of their respective owners. ARM, AMBA, ARM Powered, Artisan, Cortex, Jazelle, Keil, SecurCore, Thumb, TrustZone, and µVision are registered trademarks of ARM Limited (or its subsidiaries) in the EU and/or elsewhere. ARM7, ARM9, ARM11, big.LITTLE, CoreLink, CoreSight, DesignStart, Mali, mbed, NEON, POP, Sensinode, Socrates, ULINK and Versatile are trademarks of ARM Limited (or its subsidiaries) in the EU and/or elsewhere. All rights reserved. Oracle and Java are registered trademarks of Oracle and/or its affiliates. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org. © 2015–2016 NXP B.V.