

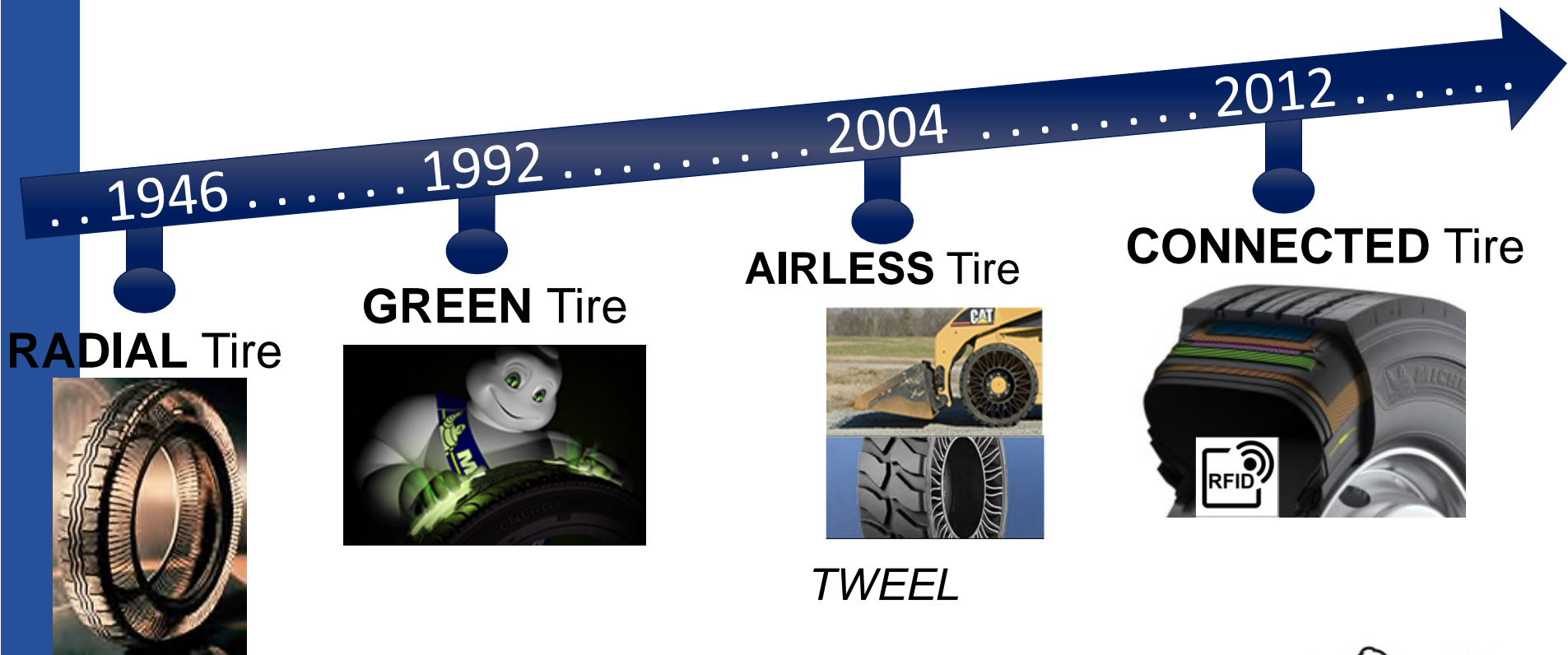


RFID FOR TIRES ***an enabler for new services***

Julien DESTRAVES
R&D
MICHELIN



INNOVATION is in MICHELIN DNA



AGENDA



- **Benefits of RAIN RFID for tires and the associated challenges**
- **A Worldwide Standard for the Industry: ISO TC31 WG10 RFID Tire tags**
- **A Use Case example: Racing Tires**

LIFE CYCLE AGAINST TIRE TAG INTEGRATION SCENARIOS

Manufacturing



Storage

1st mounting
OEM



Dealer

After manufacturing equipment



Retreading

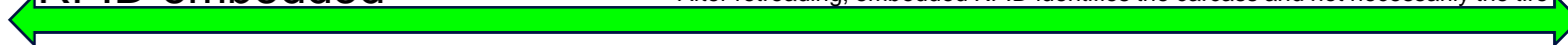


Retrofitting



End of Life

RFID embedded



After retreading, embedded RFID identifies the carcass and not necessarily the tire

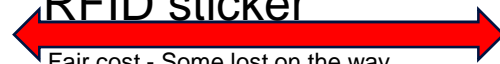
RFID patch possible



RFID patch

RFID patch can identify the tire when not initially equipped with RFID

RFID sticker



Fair cost - Some lost on the way



● Why to use RFID?

1. **Guarantee of readability** in all conditions
 - During the shelf life of the tire
 - During the entire tire life for a rolling tire
 - Leading to a far better **traceability** (even during tire manufacturing)
 - End of Life management **potentially improved**
2. **Unfalsifiable**: Ull coding locked by the tire manufacturer
3. More robust against **damages/ageing/robbery/counterfeiting**
4. Fitting the needs of **most stakeholders (OEM, Dealers, Governments, Retreaders, Tire manufacturers)**
5. **Better cost/benefit ratio** (including the time to write and to read)
6. **ISO standard for RFID Tire Tags available in 2018/19**
7. **Future readability of the RFID by the vehicle**



BENEFIT FOR THE TIRE INDUSTRY

Depending on the tag implementation technology

1. Improvement of inventory control (manufacturing, storage...)
2. Better fleet management (tool to improve maintenance) *
3. Safer retreading for truck tires (in providing complete history of tires) *
4. Increased protection against robbery (already observed) *
5. Simplification of custom verification, police checking (already enforced in UAE)
6. Closing the gaps in the tire recall system**
7. Better transparency in the used tire business ***

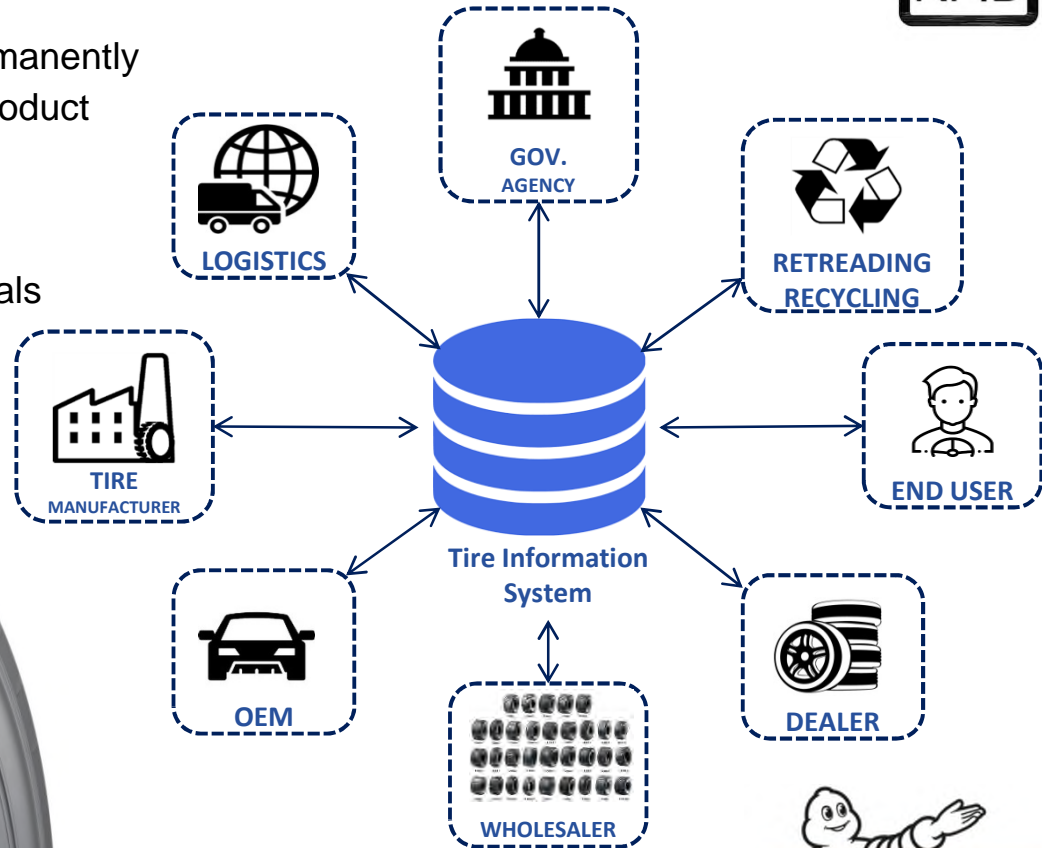
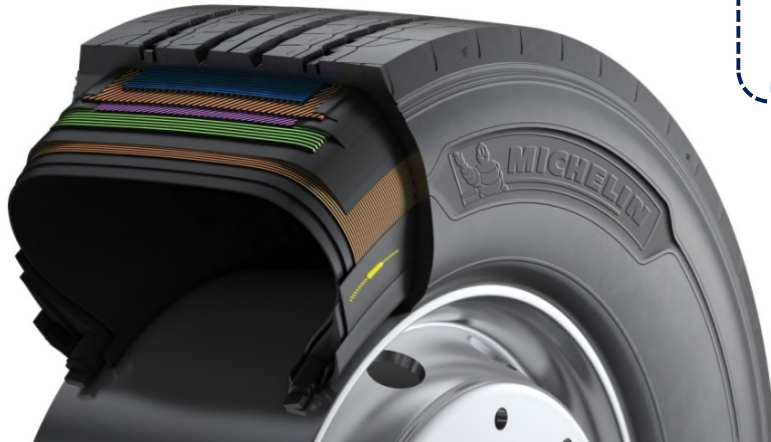
* Source: *Tire Recalls and Tire Safety: the RFID Solution*, by Safety Research and Strategies, Inc., November 1st, 2007

** RFID tags can close the gaps in the tire recall system. By providing a quick and easy way to identify recalled tires, RFID tags can save lives and reduce the recall costs and liability for tire manufacturers (same source)

*** With individual tire tracking capability, tire sellers can do a more credible job of truly certifying a tire's soundness for re-use (same source)

3 MAJORS CHALLENGES

- Identifier: unique, **reliable**, unfalsifiable, permanently readable over the whole life cycle of the product
- Standard coding
- Good RF communication through Tire Materials



UHF OFFERS A FAIR PERFORMANCE SPECTRUM

UHF frequency band :

- Reasonable tag/antenna size
- Fair read range
- Single product identification AND Inventory are both accessible

Passive Class 0,1,2



LF

ISO 18000-2

HF

ISO 18000-3

UHF

ISO 18000-6 (860-960Mhz)

ISO 18000-7 (433Mhz)

UHF

ISO 18000-4 (2,4Ghz)

Frequency →



What about the data format & BRANDING

**Tire / Product
Identification**



Format SGTIN96 compliant to the EPC Standard

Header

Company



Item

Serial



RFID emblem (ISO/IEC 29160)





- **A world wide Tire Industry Standard is underway**

- **4 texts under discussion**

- **ISO/NP 20909** - Radio frequency identification (RFID) tyre tags → Q1 2019
- **ISO/NP 20910** - Coding for Radio frequency identification (RFID) tyre tags → Q1 2019
- **ISO/NP 20911** - Embedding methods for Radio frequency identification (RFID) tyre tags → Q2 2019
- **ISO/NP 20912** - Testing methods for Radio frequency identification → Q2 2019

*Kick-off meeting on 12-14 July 2016 in Brussels,
Belgium (hosted by ETRTO)*



Challenging FUTURE USE CASES



USE CASES	KEY FACTORS
Stacked tires inventory	<ul style="list-style-type: none">• Chip sensitivity• Reader sensitivity• ETSI and FCC frequency band harmonization• Antennas setup
On pallet tires inventory	
Tire localization on vehicle (dual tires)	
Retread flag (after locking EPC)	<ul style="list-style-type: none">• Standard

Stakes:

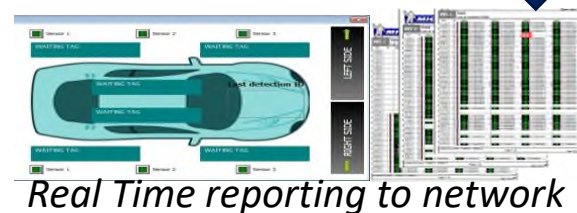
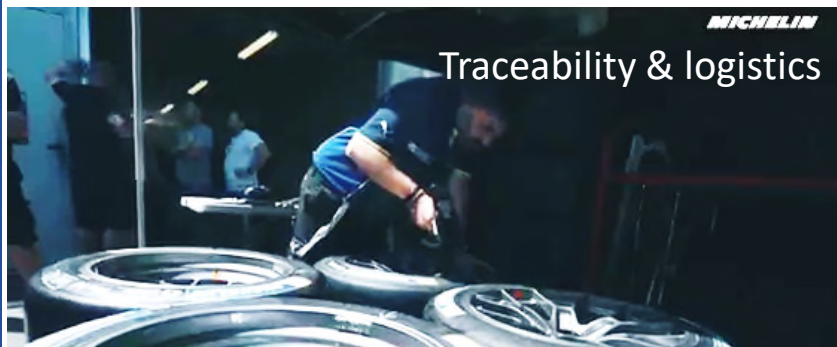
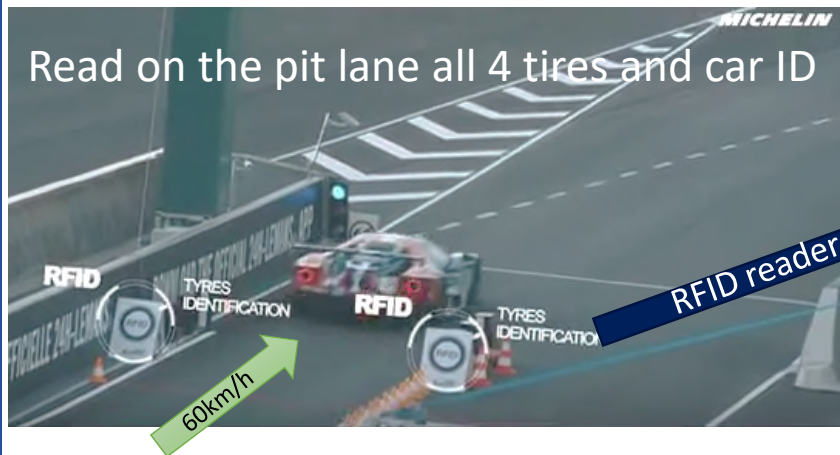
- Traceability of tires from the factory to the event
- **Automatic** control of tire consumption per vehicle (along FIA rules)
- Save the cost and the pain from manual control
- Flexible implementation when changing FIA rules
- Enhance Tire & Team information on TV



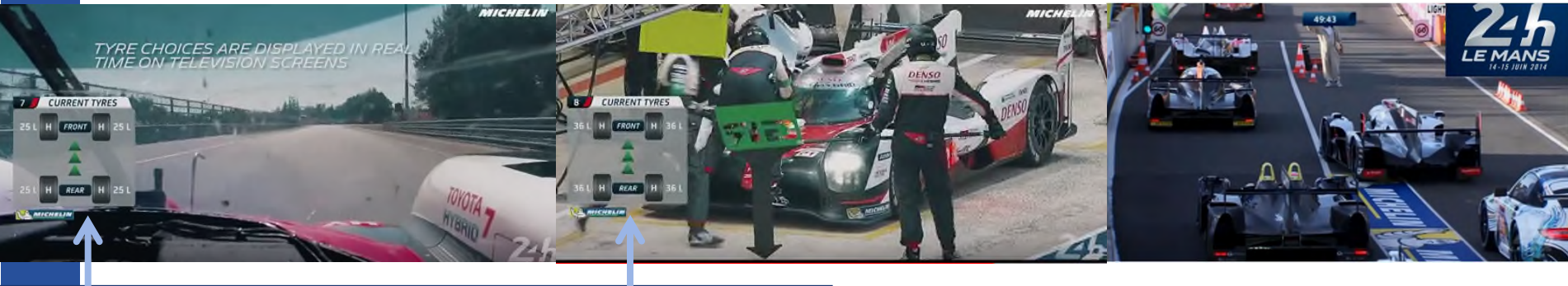
Aim was to design a system including a RFID portal which could read the tags of the car and the 4 tires at the exit of the pit lane

12/05/2018 (www.lemans.org) : Previously, at each tyre change, the pit marshals had to read the bar codes on each tyre to check that they matched the list. Today, the tyres contain an RFID tag. An automatic reader at the pit lane exit detects in real-time [...]The system then checks the tyres against the list and monitors the quantities used instantly.

Car racing RFID use case



Car racing RFID use case



RAIN RFID enables Live Tire information on TV

Benefits for the race promoter

- Regulation evolutions are possible (2 revisions done since 2014 for the “24h Le Mans”)
- Live display on TV (since 2017 for the “24h Le Mans”)



THANK YOU FOR YOUR ATTENTION!

***VIELEN DANK FÜR IHRE
AUFMERKSAMKEIT!***

MERCI POUR VOTRE ATTENTION !