



Challenges of a Global Systems Integrator

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Been There, Doing That

- 75 years worldwide industry experience
 - Systems integrator
 - Operations and maintenance
 - Customer service and violation enforcement
 - Software and hardware



Pennsylvania Turnpike, circa 1940



Dubai, UAE



Puerto Rico

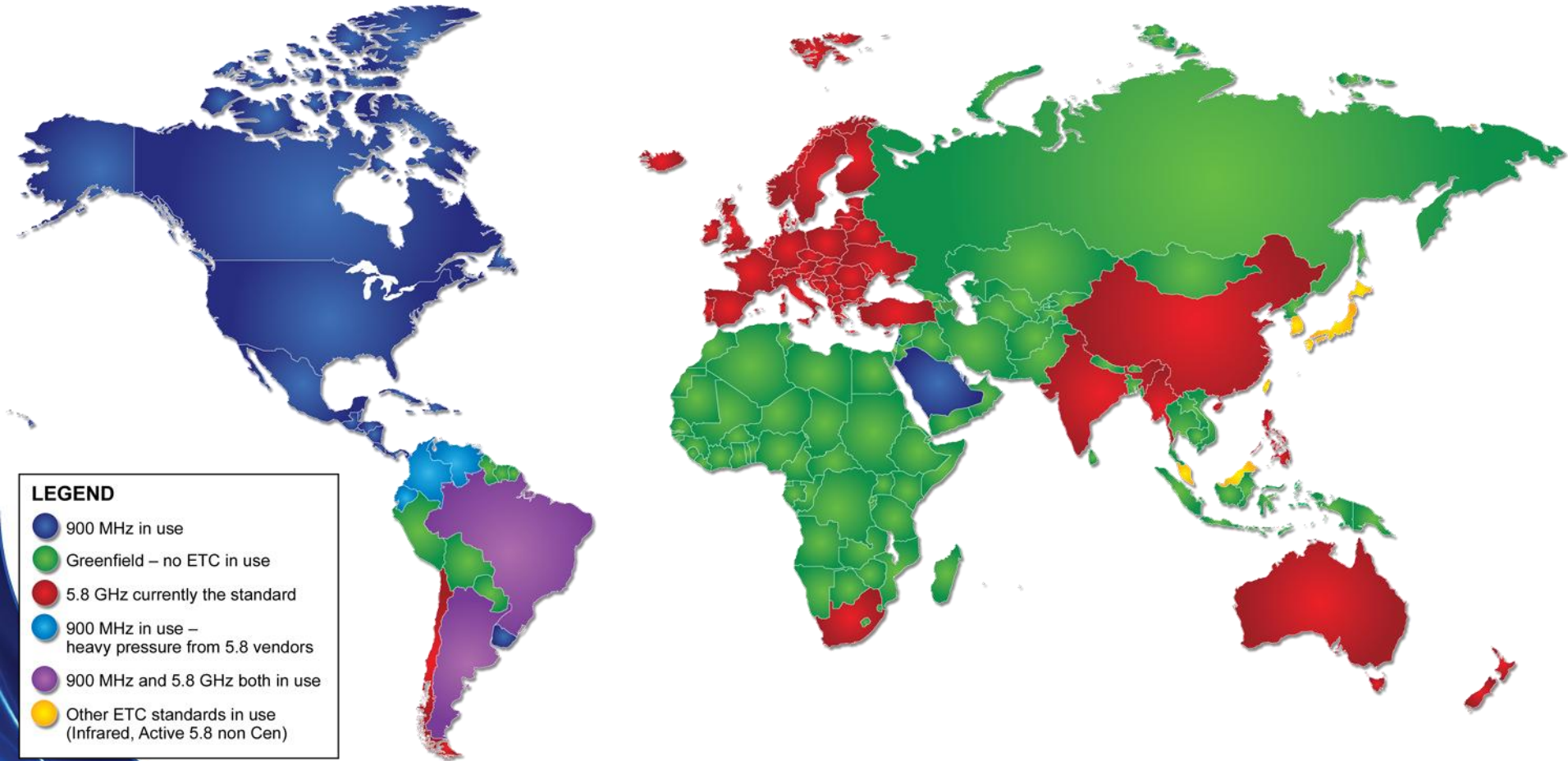
TransCore – 51 Countries & Counting



***“A market is never saturated
with a good product,
but it is very quickly saturated
with a bad one.”***

~ Henry Ford

Worldwide Frequencies



Standards Challenge

- The myriad variations in regional standards and regulatory requirements add to the plight of a global systems integrator.
- For reasons of efficiency and economy, an integrator generally desires to develop and use standard ‘cookie-cutter’ solutions.
- Local requirements – or even preferences – can force integrators to customized solutions that add cost and/or complexity.

Standards Challenge – Example 1

- Allowed frequencies vary around the world
 - Driven mostly by differences in allocations
 - ‘Re-purposing’ frequencies is very expensive
- U.S. uses 902-928 MHz (part of an ISM band)
- Europe uses 5.8 GHz (another ISM band)
- Japan uses 5.8 GHz (but not all same freqs)
- Some considering use of 850-950 MHz
- Many considering use of 5.9 GHz band (but with differences in precise frequencies)

Standards Challenge – Example 2

- Approved transmission power varies broadly according to local requirements
- Even when frequencies and allowed system technologies are identified in different global regions, power limitations can make a system allowable in one place and unallowable (illegal) in another.
- For example: allowed power in the ‘915 band’ can vary from 0.1 Watt to 40 Watts

Business Structure Challenge

- Regional and national business certifications
- Foreign Corrupt Practices Act
- National tax challenges

Aging Infrastructure Challenges

- Most roads are being converted to road pricing
- Few have new technology
- Antiquated roads



Regional Challenge/Success – *Puerto Rico*

- AutoExpreso™
 - Challenge – Unbanked patrons
 - Answered the Challenge – Convenient sales, in-lane replenishment



Regional Challenge/Success – *Dubai*

- Salik Open Road Tolling System
 - Challenges – Greenfield, frequency, 30-min limit road closures, no pavement cuts, harsh weather, multi-language, aggressive launch date/tag sales
 - Answered the Challenge – 820 MHz, overhead gantries, world's widest ORT tolling zone, petrol station tag sales, SMS and gift card replenishments

هيئة الطرق والمواصلات
ROADS & TRANSPORT AUTHORITY



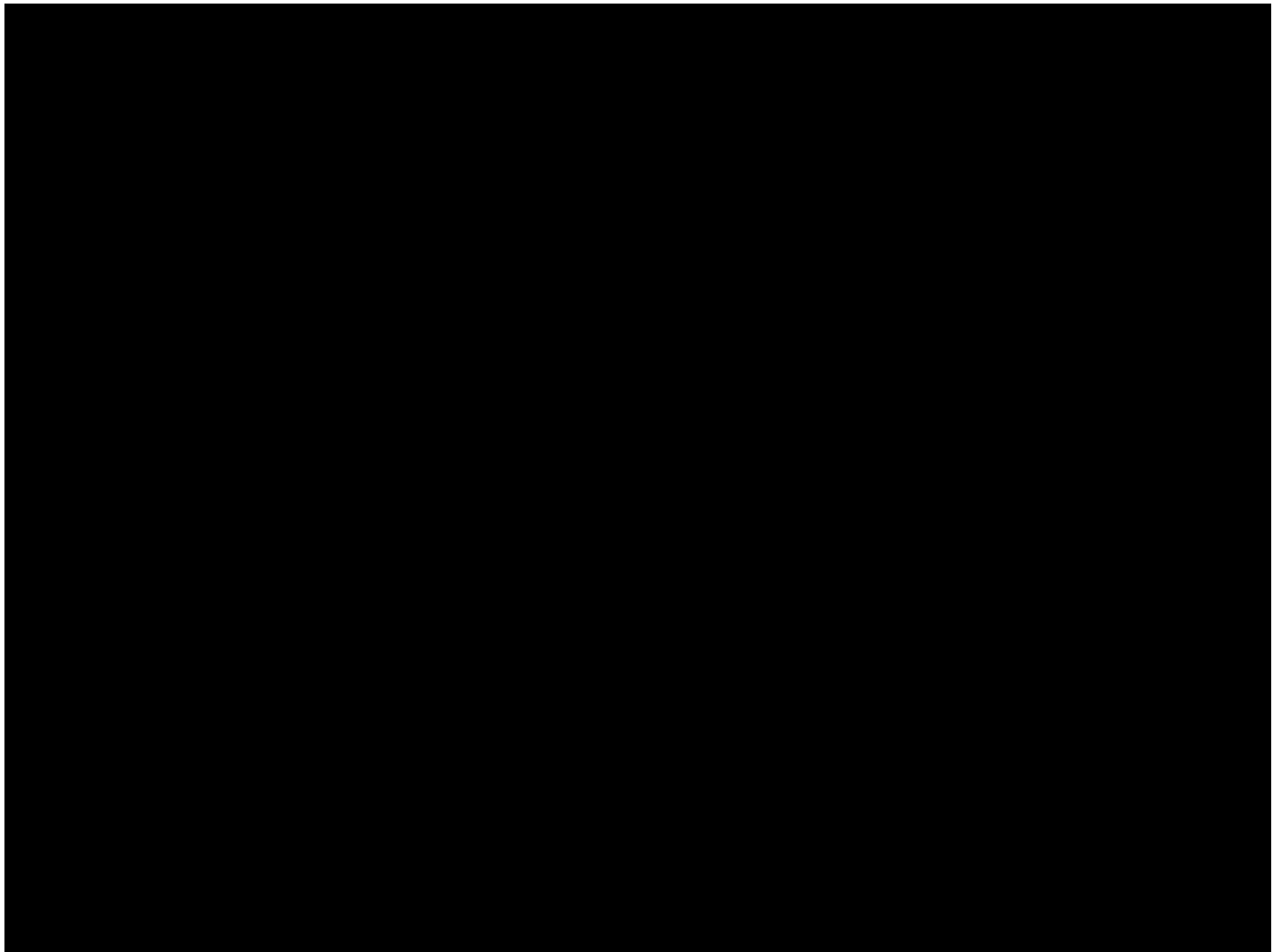
And a Few Other Unique Challenges

- Multiple classification schemes
 - Detect and toll all axels – even raised axels
 - Differentiate and provide free/discount rates for patron vehicles at one specific toll plaza
- Geometric concerns with roadway and vehicles



We Help Solve These Challenges

*And the results are a world-class
transportation system like Dubai*



Questions?

Thank You

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