

RFID Journal Live! 2006
May 1-3, 2006
MGM Grand Conference Center
Las Vegas, Nevada



Putting RFID to Work



The Math Behind RFID in Logistics

Robert Hadow, Partner, N.C. Cuthbert



Putting RFID to Work





The Math behind RFID in Logistics

- RFID for Containers, Trailers, Chassis, Tractors, Drivers, and Seals.
- If you want to hear about factory floor, store door, item-level, case-level, and pallet tracking, you're in the wrong room.



Robert's elevator speech

- Container RFID is a slam-dunk proposition
- Engineering says, "Go".
- Finance says, "Go".
- There remain some political issues.
- After the trigger is pulled, installation will be rapid



The Math behind RFID in Logistics

- There is economic justification to apply RFID to every container.
- Everyone agrees.
- “It’s just not the right time yet.”



- Every time a container goes through a gate – into or out of a seaport – the container number must be reported
 - Clerk/keypunch – 5 minutes
 - OCR – 20% failure rate
- Logical alternative is RFID



- Every time a container is moved within a terminal, or loaded to or from a ship, the container must be recognized.
 - Perpetual Inventory
 - Keypunch or selection from a list diverts an operators attention (a safety issue)
 - OCR – 20% failure rate
- Logical alternative is RFID



Tagging transport units is old news; US Railroads led the way.

- 1988 – test of 915 MHz passive
- 99.9% read rate

- 1989 – Installation of 4.2 million tags and 6000 readers



Railroads took a KISS approach

- 915 MHz Passive Backscatter
- Fully passive – no batteries
- Nominal 10 m read range
- Actual 2 m read range
- 100 mph reads
- Remains operational today



Railroads and toll roads have similar needs

- No maintenance
- Read range approximately the same as the width of a lane
- High vehicle speed

- No requirement for tag-locating functions ... beyond the lane



Logistics Units of interest

- Containers
 - Container itself
 - Shipment ID
 - Seal
 - Container integrity
- Chassis
- Genset
- Tractor

The Math behind RFID in Logistics



RFID JOURNAL LIVE!

4th Annual Conference
& Exhibition

May 1-3

MGM Grand • Las Vegas



Tracking Containers

- Container itself
 - Container License Plate
- The shipment within
 - “Supply Chain Tag”
- Container doors
 - E-seal
- Container integrity
 - “Smart Container”

The Math behind RFID in Logistics





Container License Plate

- ISO 10374
- Applied to container for its life
- Container Number
- Container Type, Size

RFID JOURNAL LIVE!

4th Annual Conference
& Exhibition

May 1-3

MGM Grand • Las Vegas



Supply Chain Tag

- ISO 17363
- Applied by the shipper
- References to the shipment contents

- Best practice – shipment reference number only. No readable shipment data on tag.



Electronic Seal (“e-seal”)

- ISO 18185
- RFID-enabled door lock

- Best practice – shipment reference number only. No readable shipment data on tag.



Smart Container

- No ISO standard yet
- A shipping container with integral monitoring technology
- Likely RFID enabled

- Likely to be very expensive.



Tracking Chassis

- No ISO standard for chassis markings
- Chassis pool increase tracking needs
- Chassis utilization in the US is *terrible*



Tracking Gensets

- High value equipment
- Subject to theft
- Operating parameters

- Candidate for satellite and cellular telemetry



Tracking Tractors

- Choke point tracking proven millions of times per day



So why hasn't it happened?

- Container manufacturers don't benefit from tagging.
- Ocean carriers may lease containers on a short term basis.
- Terminal Operators may not see the same container twice.



The Gross Numbers

- 16,000,000 containers worldwide
- 93,000,000 TEUs shipped per year worldwide
- 15,000,000 TEUs shipped per year USA
- *A billion container reads a year*



The Net Numbers

- The average new container costs US\$1,800
- Installing an RFID tag costs today US\$30



The Total Cost

- 15 million tags \$480,000,000
- 50 thousand readers \$200,000,000
- Total \$780,000,000



First year payback

- Positive when equipment utilization increases 0.6%
- Replace a \$7.50 clerk discussion with a \$.78 read.
- *Easy decision*

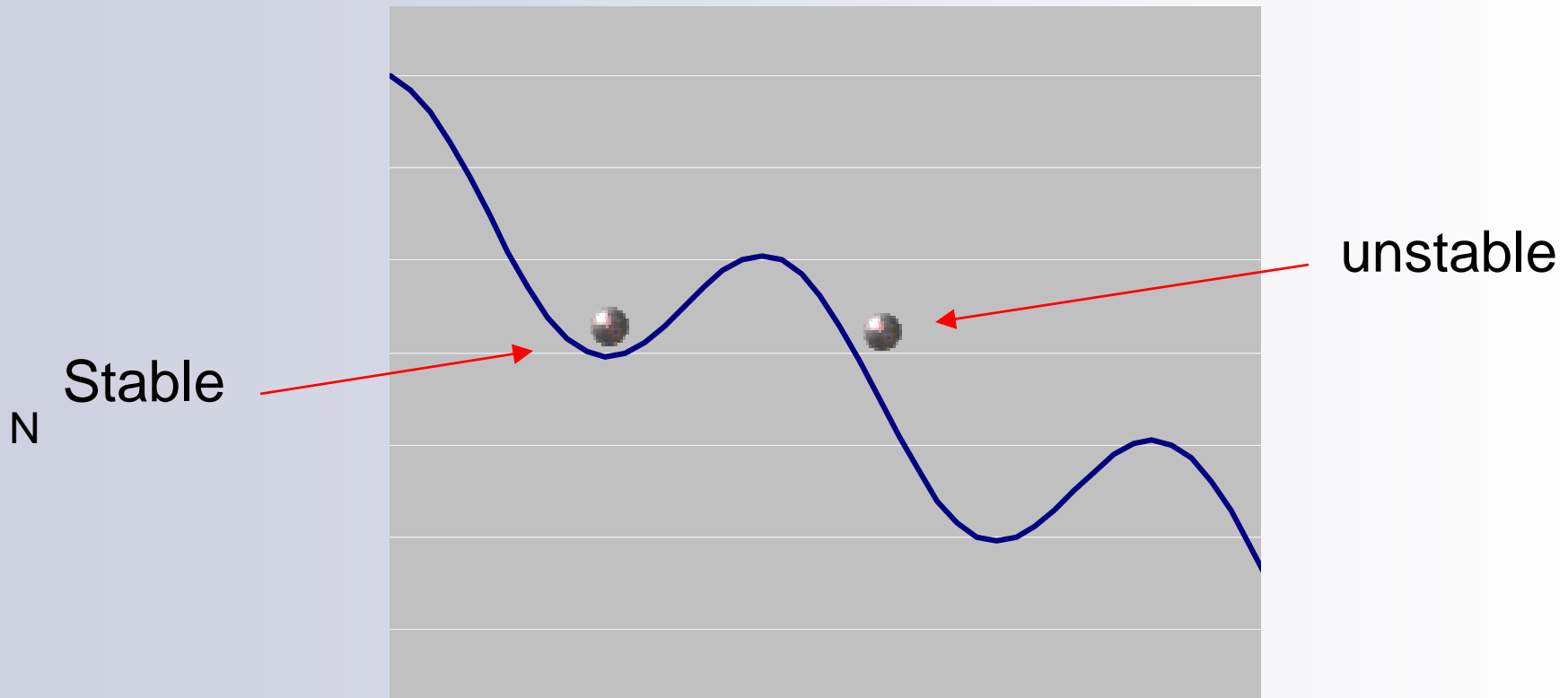


Easy decision, but not taken.

- Why not?

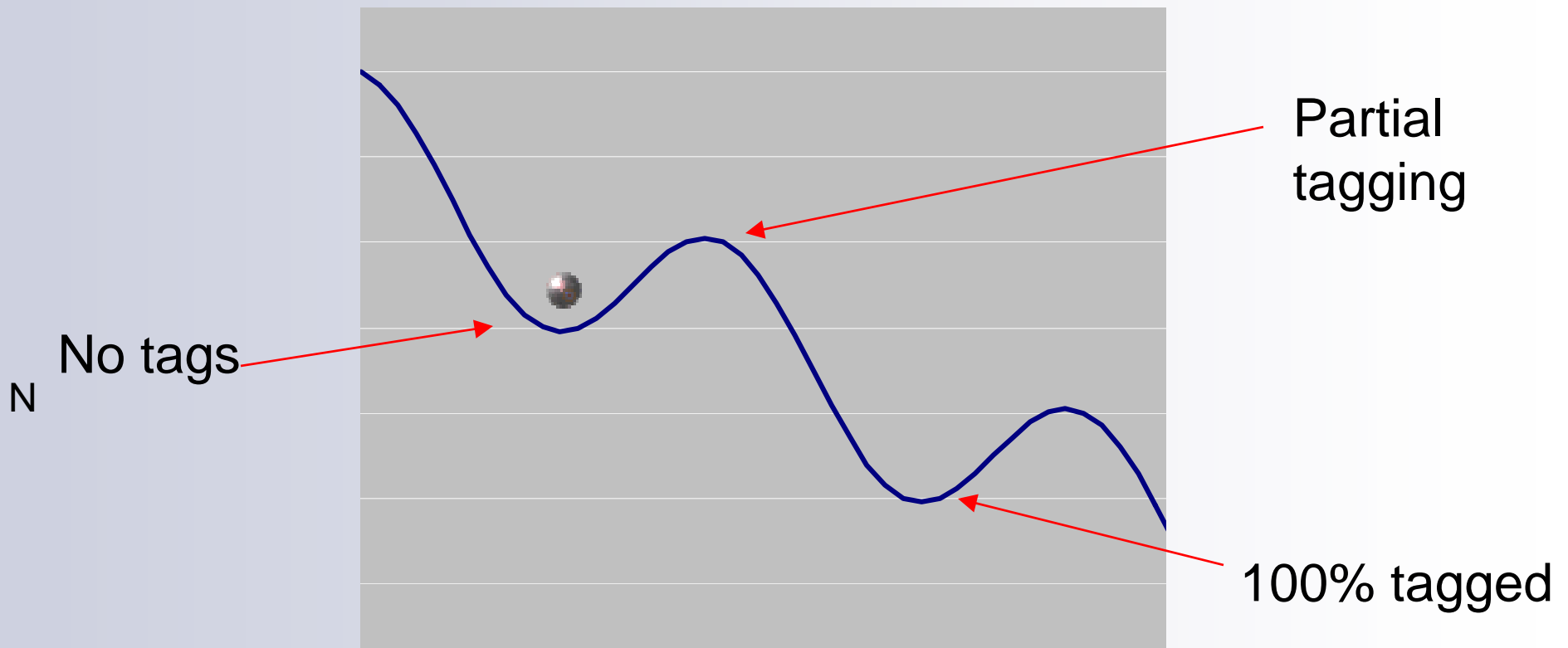


Equilibrium Conditions





Two Nash Equilibria





Current conditions (equilibrium).

- No decision = no mistakes.
- No change means no player may gain a competitive advantage.
- No capital expenditure



100% tagged (equilibrium).

- All parties endorse publicly
- Lower operating costs.
- Opportunities for value added services to shippers
- Possibility to use technology to differentiate service.



Excuses not to move

- Please add RTLS capability
 - Add additional frequencies to save my current investment
 - Open the standard to eliminate vendor domination
 - Add features for good reasons
 - Add features for bad reasons
- *Result: delay*



Catalysts for change

- Threat of requirement for smart container
- Government mandate
- Willingness to accept financial arguments for current technology over promises of things to come



When change comes ...

- It will happen quickly
 - All containers over 4 years
 - Chassis in the US in 2 years
 - Beijing, London, San Jose



Thank you

robert.hadow@nccuthbert.com