

RFID
JOURNAL
LIVE!

20 **YRS**
2003 - 2022

MAY 17 - 19, 2022
MANDALAY BAY | LAS VEGAS, NV

Transparent Data Collection in Aerospace/Defense

Jon Andresen

Jon@TechSoln.com

+1(510) 531-2201

www.TechSoln.com

Background

Other Industries vs. Aviation

- **15 years ago – watched retail implementation – that wouldn't work for us!**
 - We need to fix airplanes out on the tarmac everywhere around the world – not exactly a controlled environment...
 - WiFi was not available in airplane locations
 - Cellular technology was not ubiquitous
 - If we couldn't connect to a database, reading a RFID tag for understanding what the part is in our hand – we needed data on the part itself
 - The process had to work anywhere around the world because we all need the same Birth Record data on the part.
- The aviation RFID system design gives us the flexibility to do our job wherever it needs to be done.

Industry Standards:

Same / differences

- Same – all the important stuff:
 - Readers
 - Tags
 - Communication protocols
- Difference:
 - More memory in EPC and User
 - More filter bits – 64 vs. 4 values
 - ASCII data – real data (vs. AE5370FF112BD)
 - Common data standards
 - Expensive parts have a SSN

RFID Filter Bits

- Other industries – 4 choices: 0, pallet, carton, item

- Aviation – 64 choices

8 Seat cushions

9 Seat covers

10 Seat belts

11 Galley, Galley carts

12 Unit Load Devices

13 Aircraft Security items

14 Life vests

15 Oxygen generators

16 Engine components

17 Avionics

25 IFEs Systems

55 RFID shipping label designation

56 Location Identifier

58 Tools

59 Ground Support Equipment

Technology

Technology**Solutions**
Integrating People and Technology



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Advantages of RFID

- Barcodes only read data; with RFID you can also write/update data
- Automatic reads; Reduced human intervention
- Robust, read at a distance
- No line of sight required
- Read 500 items per second
- Have a small 'database' on the item and have current data (e.g., expiration date)

Limitations of RFID

- More expensive than barcode technologies
- Physics still has limits that challenge the technology
 - Metals – but we have substantially solved this one!
 - Liquids – this is tougher
- You can't see where the radio waves are bouncing
 - And they can go through walls!
- You can't use RFID to count things – only verify!

RFID Chip Size

This is it !

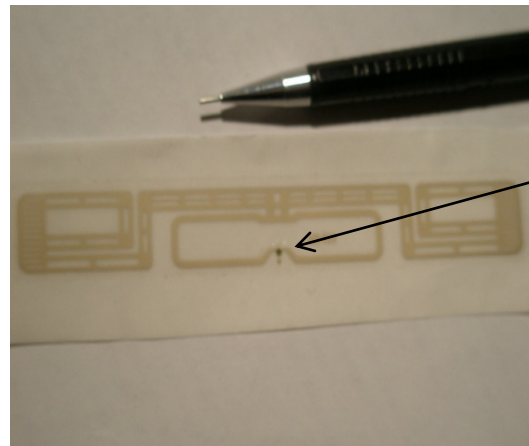


RFID Memory Sizes

512 bits
Simple gummed
label



512,000 bits
'domino-size'



Here's the RFID chip

2kb tags are most popular now – big
EPC Memory and lots of User Memory

RFID Tag Shapes and Sizes



SSN for Parts

Your company's unique CAGE Code

+

Your unique Serial Number for the part

Example: CAGE: 3RVP8 Serial #: ABC123-1

SSN: 3RVP8ABC123-1

This is the part's identity cradle-to-grave

And the same method the DoD uses in IUID

Birth Record Data

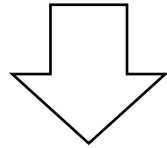
- Spec2000 defines Birth Record data:
 - CAGE Code (MFR)
 - Unique Serial # (SER)
 - Original Part # (PNO)
 - Date of Mfgr (DMF)

Key data that every participant across supply chain wants to know

Spec2000 RFID User Memory Standards

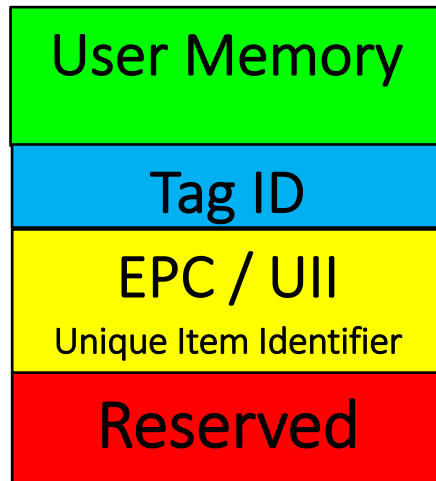
RFID tag structure = EPC standards-based (not proprietary)

EPC Class 1 Gen2
= ISO 18000-6c

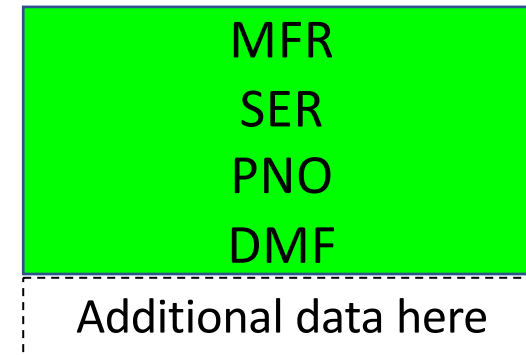
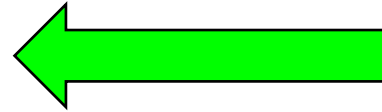


Aviation also uses

SSN



Low-mem Tag
(e.g., 512 to 2000 bits)



**Birth
Record
Data**

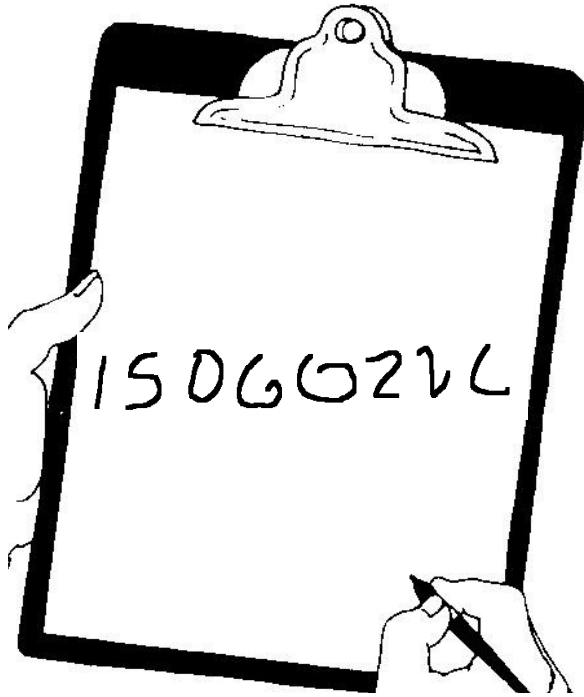
How does Aviation do it better?

- We give every part a social security number (SSN)
 - Concept can be applied to every part you want to track, whether the OEM has tagged it or not
- The SSN provides a cradle-to-grave ID for that item so that every one in the supply chain calls it the same thing. This Traceability aspect is key in our industry.

Aviation's Solution?

- Transparent Data Collection® – RFID
 - Keep fat fingers, poor eyesight, and poor writing out of the data process
 - We also use barcodes to complement the business process
- Use intelligent data for entering into our systems
- Automatic data collection using RFID and/or barcodes
 - Gather data at the source
 - read digital format
 - transmit it in digital form
 - store it in digital form

Ever seen characters like this?



1506622L

What's your interpretation?

Is this a problem in your company?

Intelligent Data

What's this Number?

263265930

Part Number ?

Serial Number ?

Employee Number ?

Order Number ?

Location ?

SSN without the dashes ?

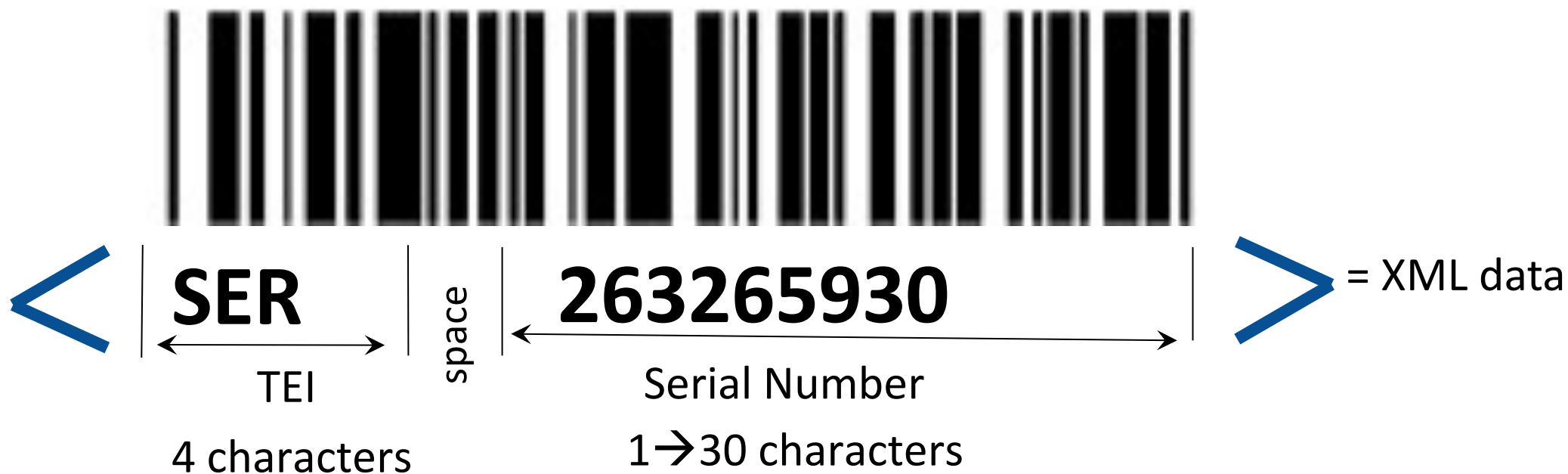
Does the computer know ? How??

This is a NAKED number with no intelligence whatsoever !

Spec2000 uses Intelligent Data

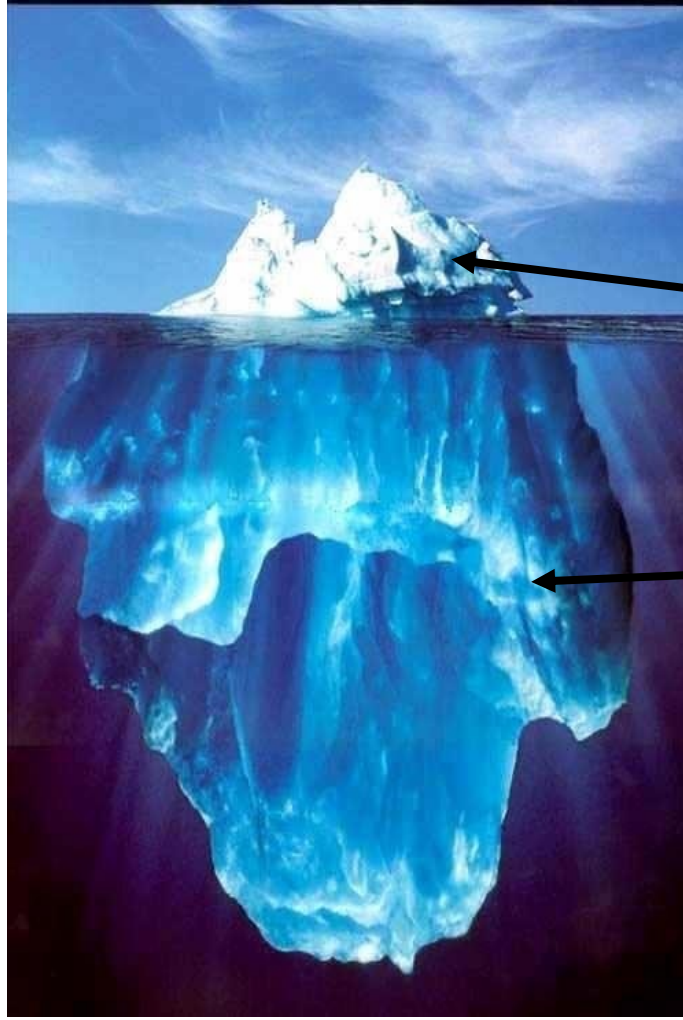
Example of an Intelligent Number – same whether barcode or RFID

Spec2000 Serial Number showing the Text Element Identifier (TEI)



Simple, plain text, WYSIWYG, easy for people - easy for computers

Why Use RFID/Barcode ?



10%

To Avoid Errors !

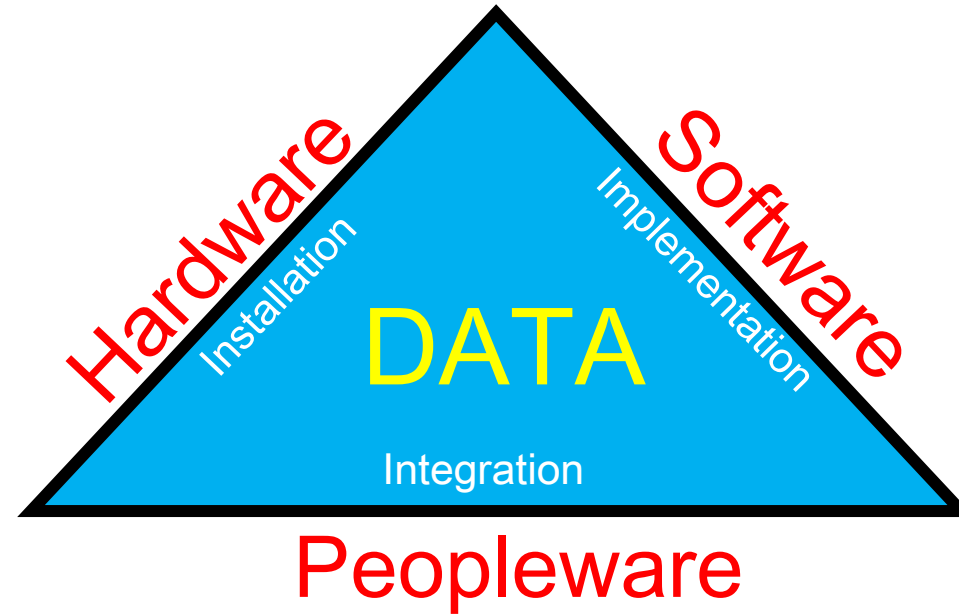
Errors follow the Iceberg Principle

If this is what you're seeing ...

90%

This is what you're not seeing !
(and these errors will hurt you!)

Successful Project Implementation



But what is Peopleware?

- Good business process
- Bad business process
- Training, or lack thereof
- Understanding
- Changing priorities, resource constraints
- Money, leadership
- Communications

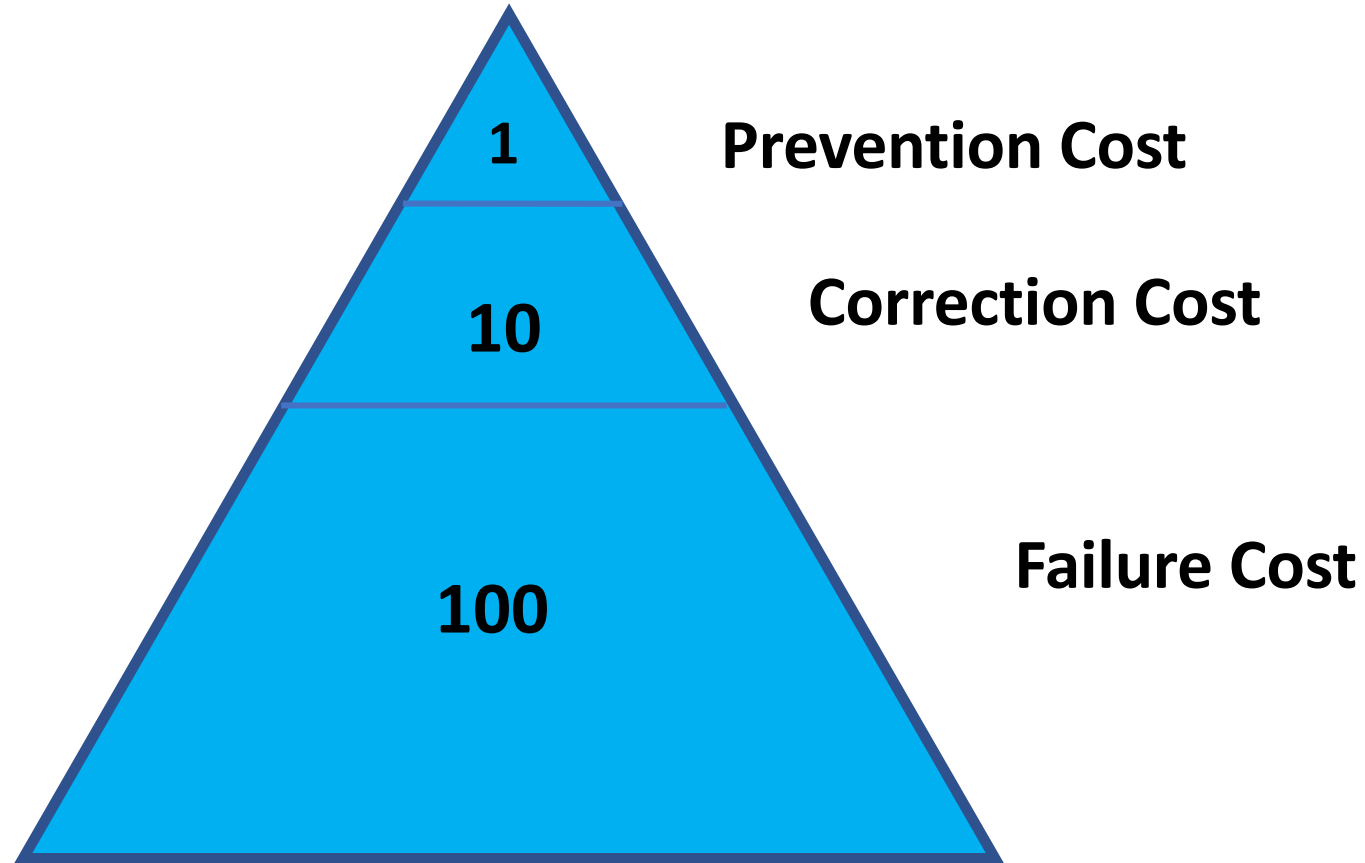
Business

What Problem is Aviation Solving?

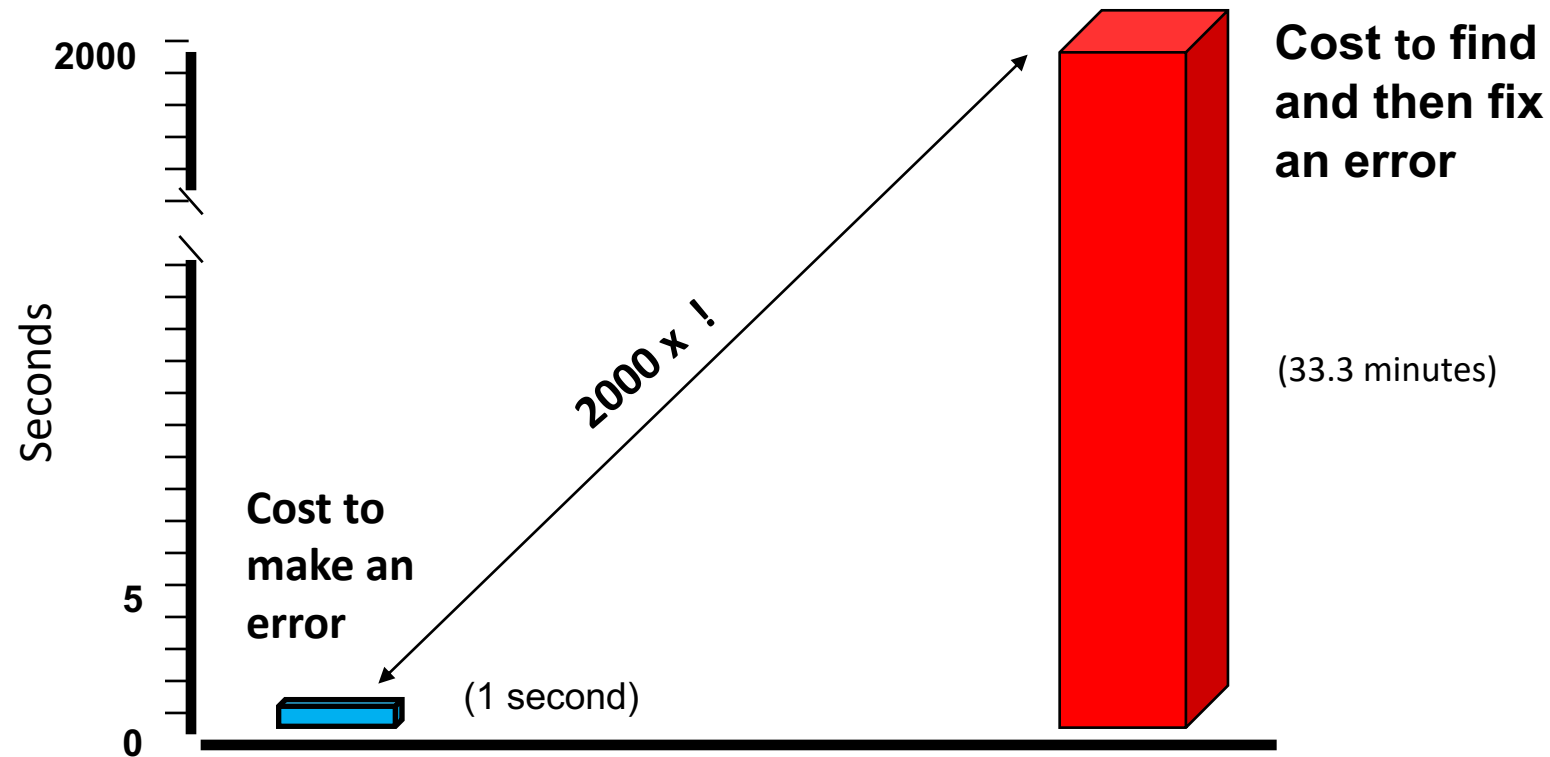
1. 50 years after the 'computer revolution' in aviation, we still have poor data
2. Data is being entered by hand poorly, and then stored in databases forever – bad decisions continue to be made for years based on that data
3. We need more data but it is too hard to collect, so we do without it
4. Safety and Traceability is important

Good data is like having clean water – if you have it, you can make coffee, tea, lemonade or drink it straight! And we need that with aviation data.

Cost of a Mistake



How much improvement comes with accuracy?

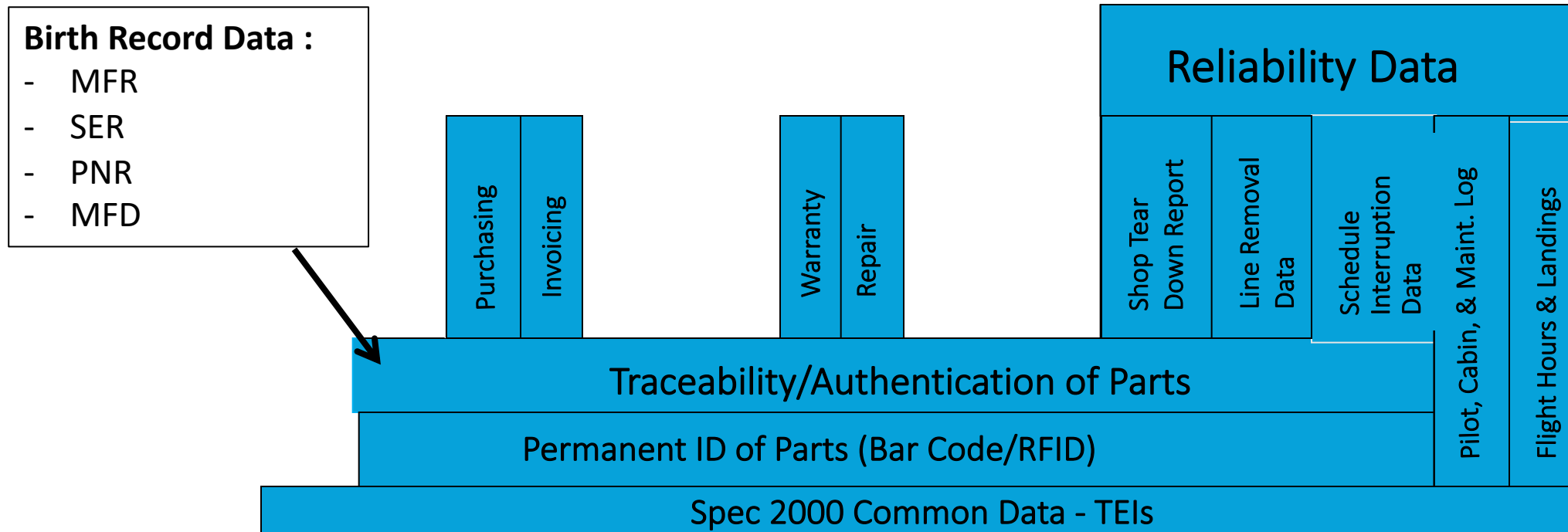


Spec 2000 Functional and Data Architecture

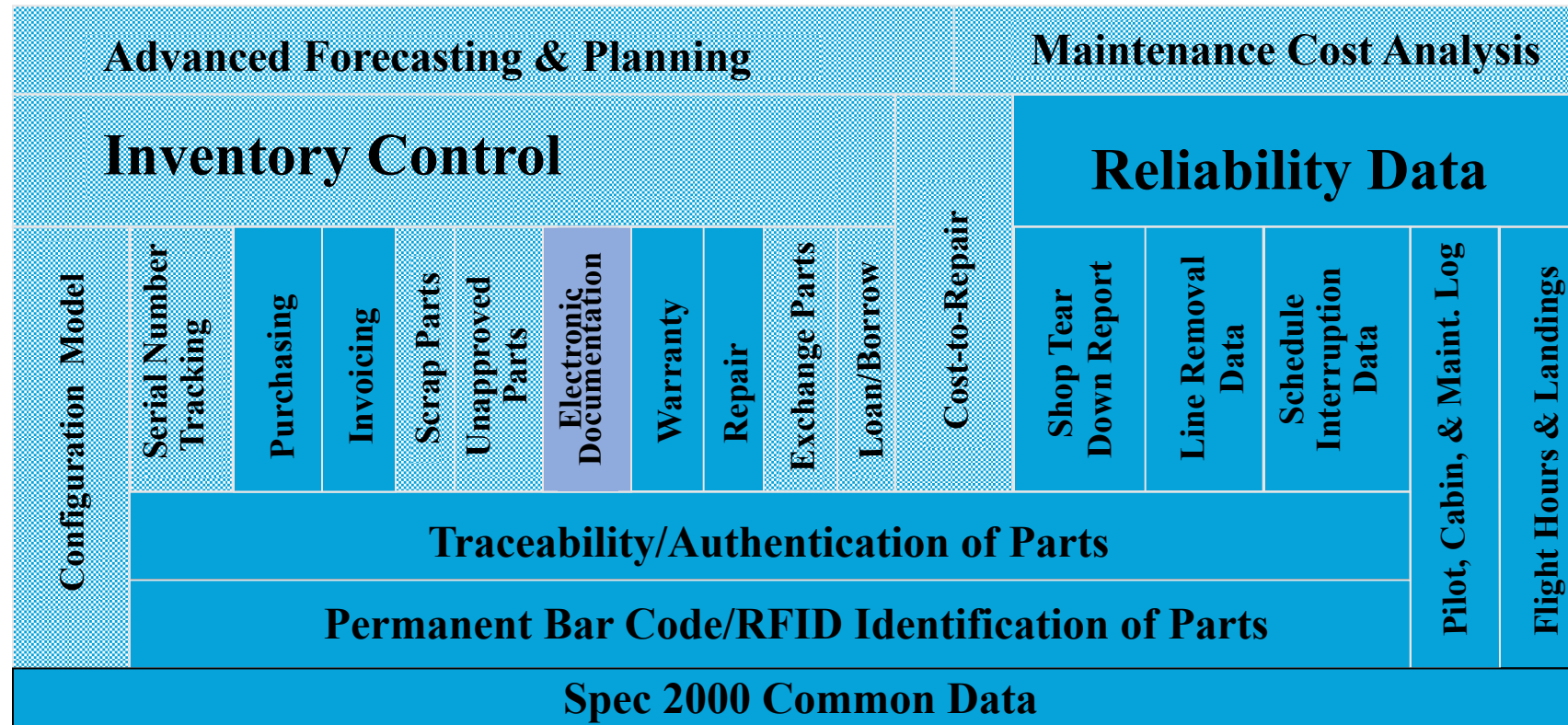
The Foundation is there!



Spec2000 Functional and Data Architecture



Spec2000 Functional and Data Architecture



Legend:



Existing Standards

'In-Process' Standards

Future Standards

Jon Andresen, President

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Benefits? Reasons like. . . .

- Part visibility
- FAA Traceability
- Security
- TSA mandates
- Reliability data
- Dispatch reliability improvement

This is what your management wants to see !

What is Traceability ?

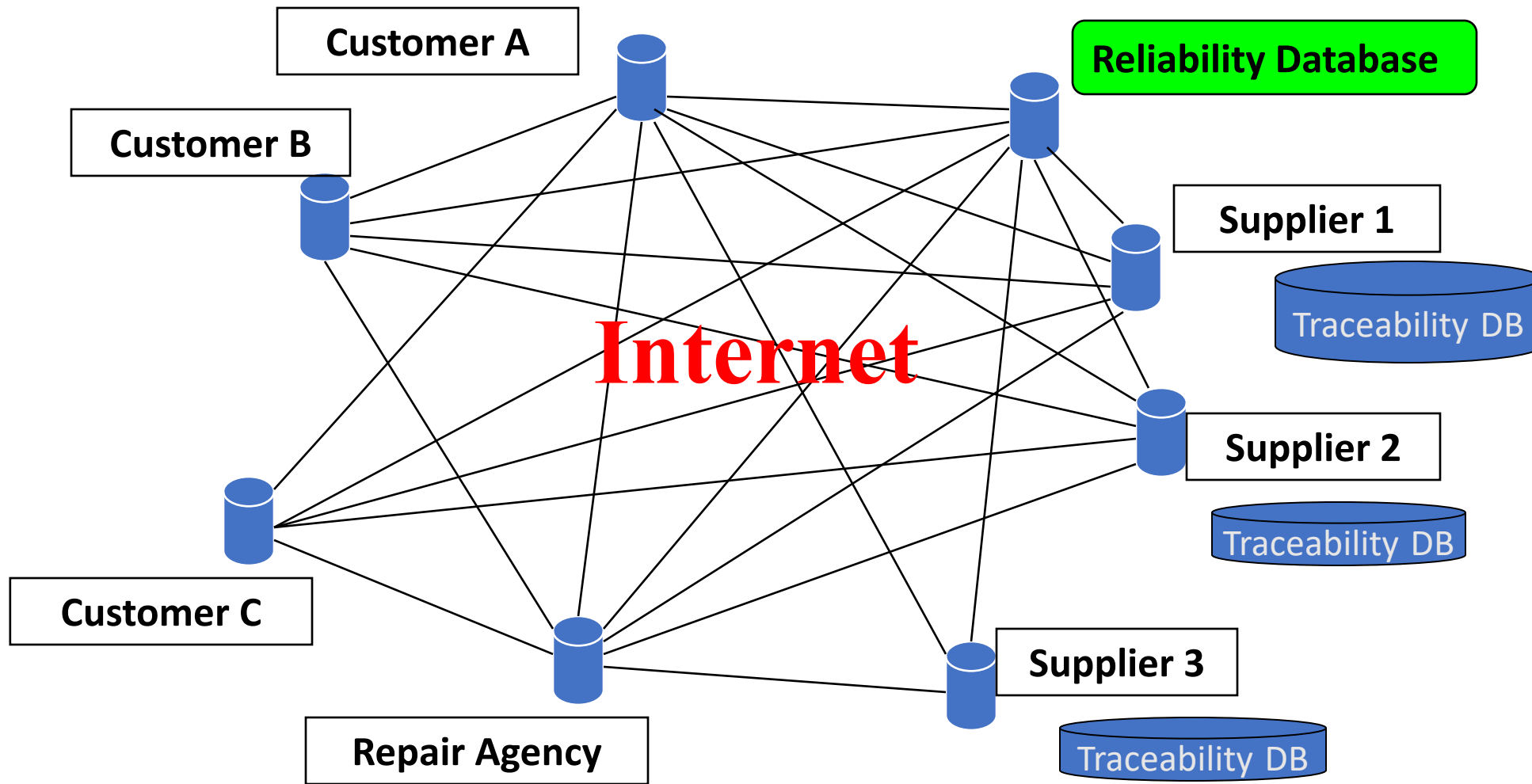
- The ability to show where a part has been since it was manufactured/last certified.

How do you get it ?

- By sharing appropriate data with others – Customers, Suppliers, distributors, repair agencies, others you choose

How do we share it ?

Parts (and Data) Flow with Spec2000 !



On-Aircraft Solutions

Adult Life Vests

Infant Life Vests

Crew Life Vests

Oxygen Generators

Crash Axe

Wheelchair

Wheelchair storage strap

Seatbelt Extension

Portable Oxygen Bottles

Supplemental Oxygen Bottle

Halon Fire Extinguisher

Water Fire Extinguisher

Radio Beacon / Emergency Locator Transmitters (ELTs)

Medical kits

First Aid Kit

Automated external defibrillators (AEDs)

Enhanced Emergency Medical Kit (EEMKs)

Flashlights

Megaphone

Polar Gear

Slide/Raft Inflation Assembly

Portable Breathing Equipment / Smoke Hood (PBEs)

Equipment Furnishing Manual

Demo Equipment Pouch

Baby Bassinet

Slide/Raft Assembly

Slide/Raft Lighting System Battery

Survival Kit

EPAS Battery

Smoke Detector Battery

Required Paperwork

Tamper Seals on Vest Containers

Tamper Seals on Lav Components

Tamper Seals on Secure Panels

Tamper Seals on Galley Carts

Galley Carts

Seat Covers (cleaning cycle count)

Anything else you need to track

On-Ground Solutions

Tool Check-out/Check-in

Calibrated Tool Tracking/Prevent Check-out

Mechanic Clock-in/Clock-out

Wheel Tracking/Consumption

Flame Cabinet Chemicals

Stockroom Life Limited Parts

Stockroom Inventory

Stockroom Check-out

Transfer to other Stockroom

Expense Bin Automated Refurbishment

FIFO Tracking

Geiger counter mode to find parts

Seat Cover Cleaning Cycle tracking

Rebuild of Slides/Raft and Subcomponents

Galley Cart Tracking

ULD Tracking

Cargo Tracking

GSE Tracking / Location

Vehicle Tracking / Location

Parking Lot Access

Security Gate Access

Employee Access to Buildings or Specific Rooms

Delivery Tracking – Receiving to Delivery Point

WIP Tracking – Work in Process

Just about anything else you want to track...

Aviation achieves this with
Transparent Data Collection®

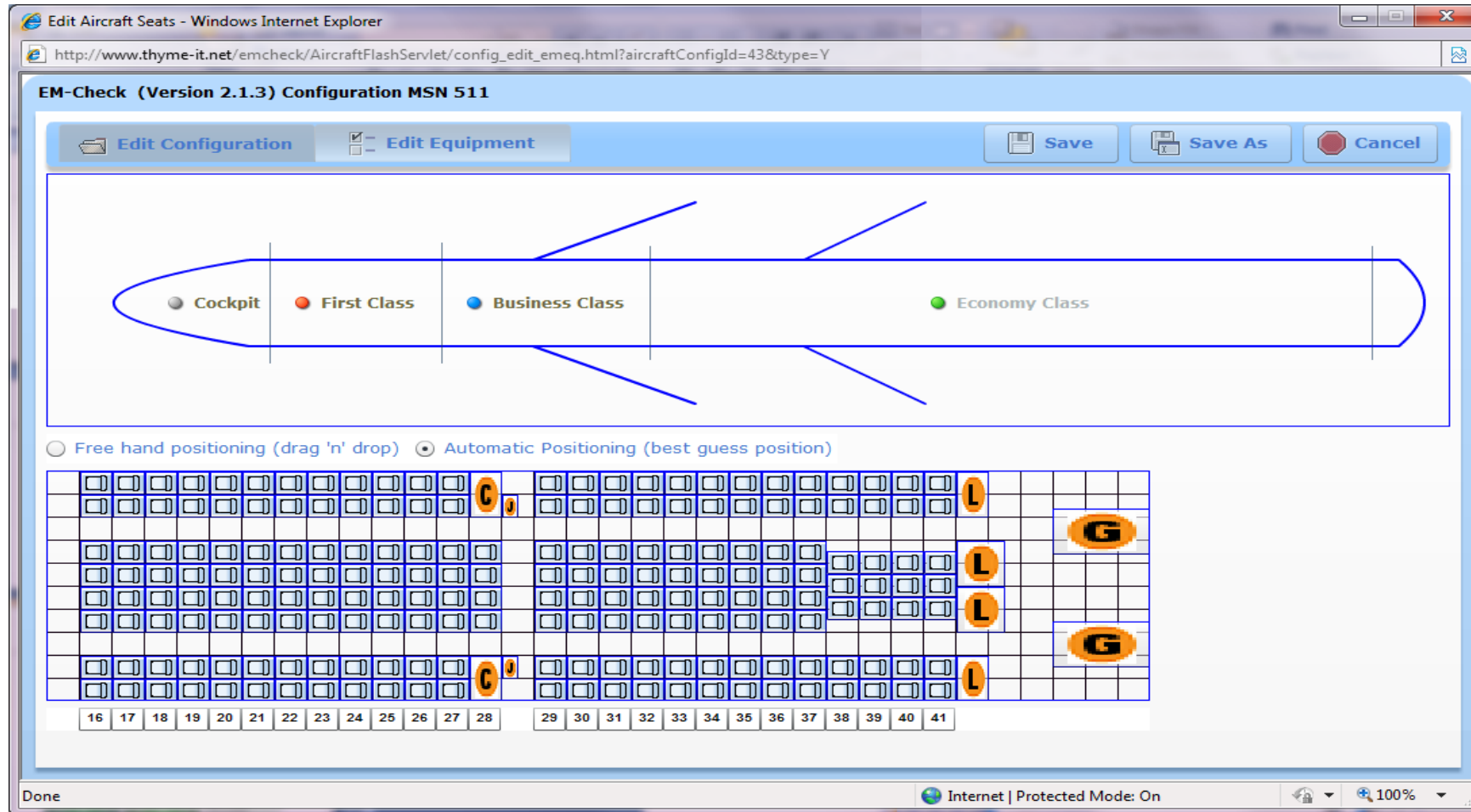
- When was item last seen?
- Where was it last seen?
- Which direction was it going?

Aviation RFID Providers

- ASD - Aerospace Software Developments
- EAM
- Brady
- Tego

Note: Some providers only offer a limited suite of RFID solutions

LOPA / Aircraft Configuration setup



How good is the technology?

B767-300 installed life vest check – cockpit, F/A seats, First, Economy, Spares

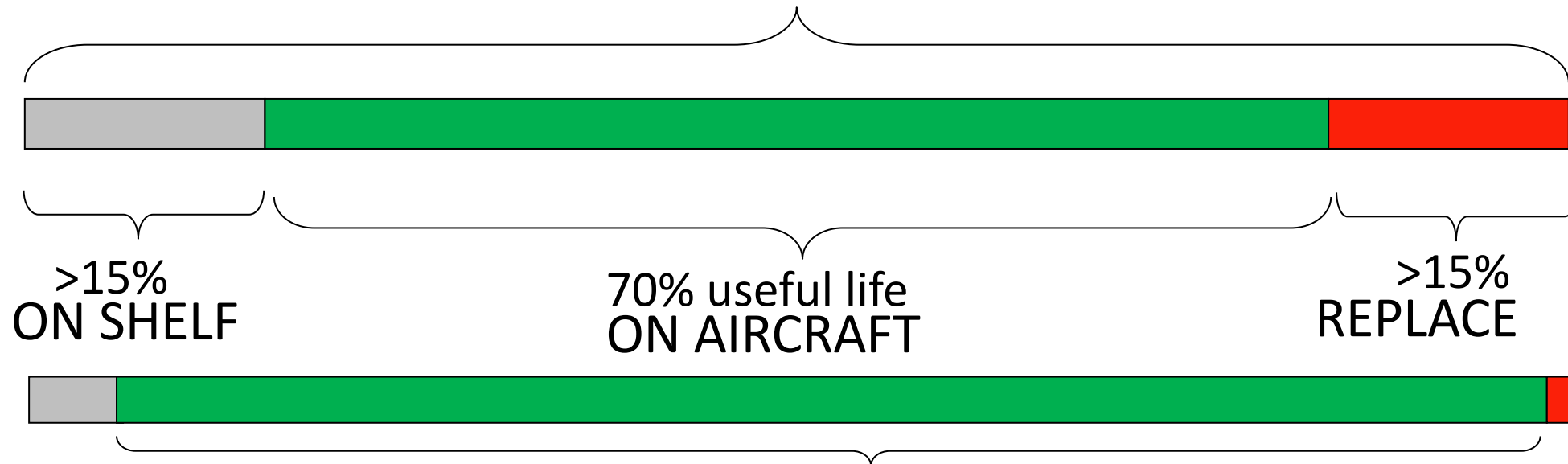


254 installed vests in 35 seconds! All present and none going to expire.

Benefits

- From previous slide: speed, labor savings, data accuracy
- Accurate forecasting of material needs
- Material cost savings are significant also:

Oxygen Generator, 15 year Lifetime



With RFID data, we can stretch the green time to more than 90%

How Long to Find the Wheel You Need?



RFID Benefit

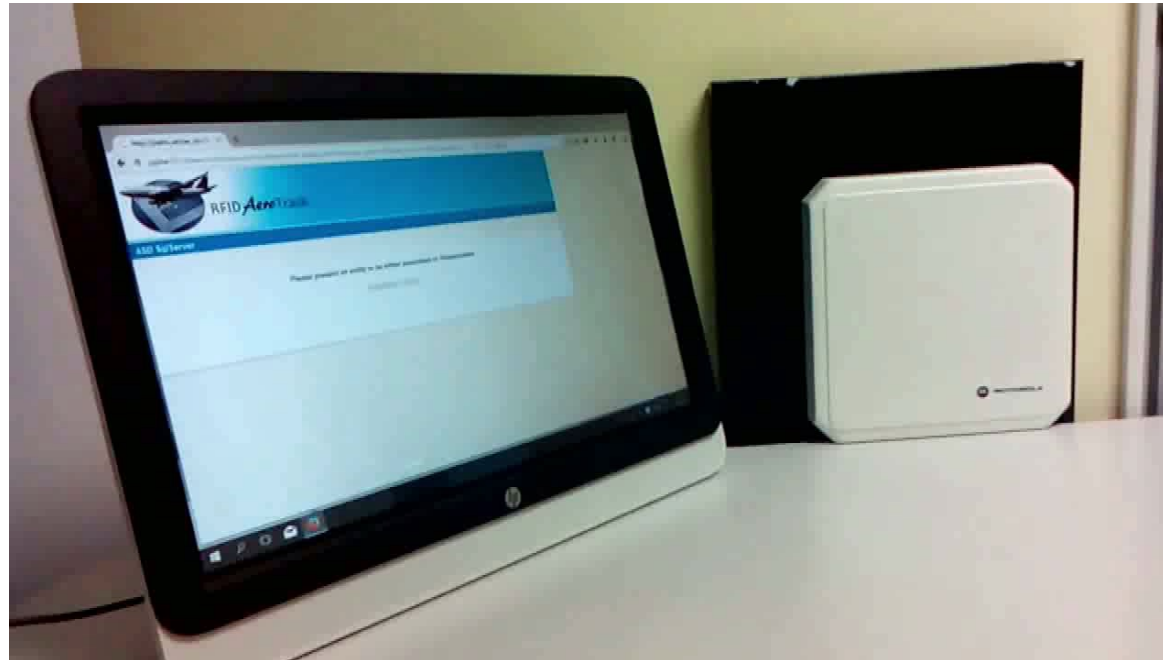


- 88 wheels scanned
- Old way = 2 hours (7200 Secs)
- With RFID = 15 secs

- Provides 100% accuracy
- Does it 480x faster !

RFIDAeroTrack – Tool Management

- User presents ID card and tool(s) to antenna
- Use the touchscreen to “Confirm association”
- If required, additional information is recorded



Tracking Consumables - TwinBins

- Automatic scanning ensuring continued supply of material with no outages...



Bottom Line:

RFID Transparent Data Collection[®]

=

Efficiency to the max !

Connect with me for any questions:

Jon Andresen

Jon@TechSoln.com

+1(510) 531-2201

www.TechSoln.com

And thanks for your time!

THANK YOU

