

Smart Assets...Smarter Business

An Aerospace Story



What Energy Companies Can Learn from their Aerospace Peers



The Aerospace Challenge and Response

Continuous Improvement and Innovation – Visibility and Traceability

- Tagging thousands of assets (flyable and non-flyable)
- Enabling new solutions across enterprise and across industry
- Enterprise level benefits
 - High information accuracy
 - Lower inventory
 - Less non-conformance
 - Less cost
 - Labor productivity
 - Reduced inventory and capital cost



“Can’t improve what you can’t measure..

Can’t measure what you can’t see.”

– Carlo Nizam, Airbus



Aerospace Return for Flyable Parts Tagging

“The deployment of high memory flyable tags on airplane seats and life vests reduced the service it took to attest an A330/A340 aircraft from 14 labor hours to 26 minutes and for smaller airplanes from six labor hours to less than five minutes.”

*- Carlo Nizam, Airbus
Keynote Speaker RFID Live, 2014*

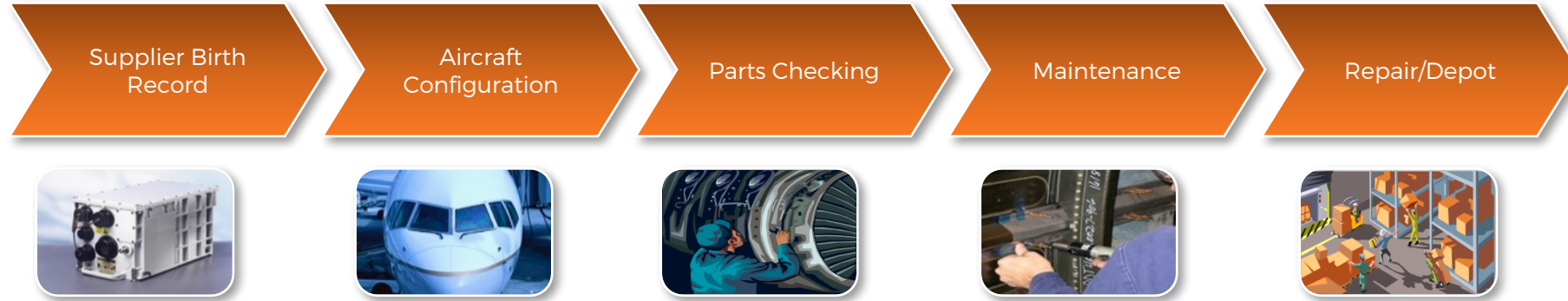


Tego's Role in Defining the Smart Asset Standards for Aerospace

- Invented TegoChip™ in response to aerospace demand and Airbus RFP
- Championed and co-authored the aerospace standard
 - ATA Spec 2000, Ch.9-5 RFID on parts
- Created the industry leading point of use software – TegoView
- Working with partners, created the leading tags for deployment on parts
- Led the implementation of parts tagging in aerospace



The Smart Solution for Aircraft Maintenance



- Manufacturer
- Part number
- Serial number
- Fabricator
- Date of manufacture
- Country of origin
- Hazardous material code
- Warranty expiration date

- Parts configuration
- Aircraft ID number
- Assembly part numbers
- FAA air worthiness
- Build Status

- Incoming Inspection
- Airline Stock Number
- Current Part Number
- Station Code
- Modification Level
- Condition Code

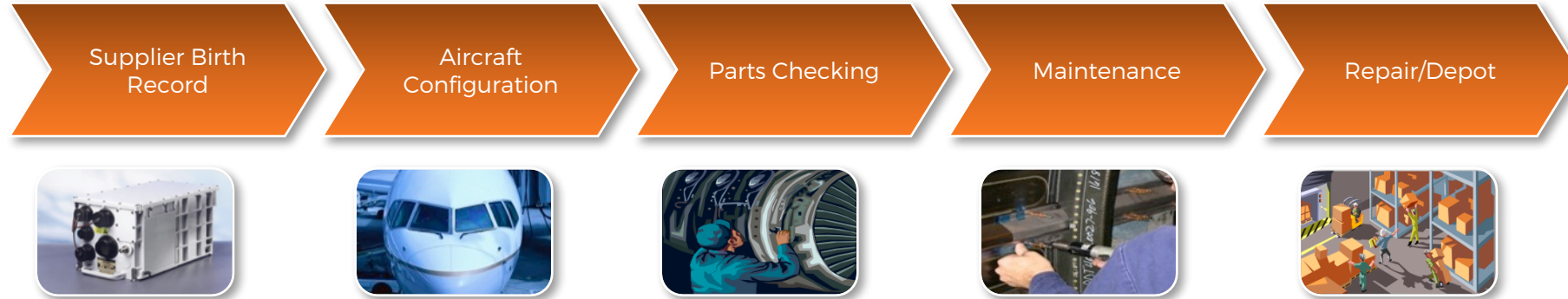
- Repair agency ID
- Overhaul date
- Serviced by
- Modification upgrade
- Inspected by
- Installed/removed

- Tested by
- Warehoused at
- Received from
- Shipped to
- Repair action

TegoTags can retain all the data required over the life of the asset



The Smart Benefits



- 8KByte Tags
 - Stores a lifetime of maintenance records
- Passive
 - Keeps batteries off the aircraft, out of inventory
- Long data retention times
 - Suitable for parts with long lifetimes
- Memory survives harsh environments
 - Withstands high temperature, magnetic fields, radiation, RF



From Aerospace to Energy, Mining & Construction

Focus on technology platform that brings many downstream advantages:

- Chip innovation and point of use reader software at the protocol layer
 - Product integrity & optimization/integration with other systems
 - Rapid response/adaption to product innovation and/or updates
 - Ease designing new chips, tags and software
 - Enables continuous innovation and backwards compatibility
- Straightforward deployment with solution providers, system integrators and tag manufacturers across many industries.

IECEX TegoChip qualification if configured in "W" tag



Process Industries: The Challenge



“Who did what when??”

“How long has it been in service?”

“How many times was it cycled?”

“Who pressure tested it?”

“Is that new sleeve in this one?”

“When did it fail?”

“When was it last rebuilt?”

“Many different job functions touch these critical assets. Keeping track of all data necessary to do meaningful process improvement was problematic”

Chemical Company – Tego Customer



Process Industries Solution: Smart Asset



- **Tego Smart Asset Solution**
 - Tag asset with High Memory RFID TegoChip
 - TegoView Configured to Capture Critical data and Information
 - Manufacturing Details
 - Safety Tips
 - Critical Operating Points
 - Key Inspections/Testing Info
 - Maintenance Records
 - Warrant/Contact Info
 - Link to Manuals



The Problems Tego Solves

- **Connectivity**
 - Reliability, responsiveness, 100% uptime
- **Database complexity**
 - Asset data stored in many databases with multiple owners
- **Communication**
 - Sharing data among all supply chain partners
- **Security**
 - Share only the data you want



Tego Solution for MRO Applications

Component Tracking

- Mapping all of the RFID transactions from the point of entry into service to the retirement of a component provides a means by which all of the non-value added processes can be identified and eliminated. **Results in inventory reduction.**

Root-Cause Analysis

- Component failure or damage trends are quickly identified by RFID data management processes.

Configuration Management

- RFID data contributes to airplane configuration management. One great example is **emergency equipment confirmation check.**

Theft and Loss Prevention

- Loss of airplane safety equipment due to theft, especially life jackets, is quickly corrected with a RFID application.



Tego Solution for MRO Applications (cont.)

Communication

- By allowing limited free text, Tego RFID solutions provide a means by which critical information is shared between the OEM and the operator.

Counterfeit Parts

- TegoChips provide a secure means of component identification that is extremely difficult to duplicate and easier to trace.

Warranty and Component Life Cycle Management

- Enables point-of-use warranty and component life cycle management processes that are often inadequate in current operations.

Paperless Transaction

- Replaces other paper documents and identifies such as the serviceability tag, aircraft number, locating tags, borrowed parts tag, etc.



Tego Solution for MRO Applications (cont.)

Modification Level

- Quickly identifies a component's modification status.

Lot Management

- RFID data identifies issues related to specific lots of components, which in turn assist maintenance in identifying and correcting issues before they occur.

Task Yield

- Enables the tracking and maximizing of component service yield.



Data For Lifecycle Asset Management



- Manufacturer
- Part number
- Serial number
- Date of assembly
- Pressure Test
 - Duration
 - By Whom
 - Date Tested



- Location
 - Shop
 - In Process
 - Reactor #
 - Configuration
- Status



- Valve Cycles
 - Date
 - Who



- Replaced Sleeve
- Total Overhaul
 - Date
 - Who
- Shim Replacement



The Smart Benefits



- **High Memory Tags**
 - Stores lifecycle maintenance records
- **Passive**
 - Keeps batteries off plant, out of inventory, out of procedure
- **Long data retention times**
 - Suitable for parts with long lifetimes: 30+ years
- **Memory survives harsh environments, weather, etc.**
 - Withstands high temperature, magnetic fields, radiation, RF



Smart Assets – New capabilities, New Solutions

Focus on the data of interest

- Instead of sharing database of all assets, share only the data on a single asset

Supplements network access

- Tag is always available, even when the network is not

Communications channel

- Writing to the tag is equivalent to sending a message

Distributed record keeping

- Formerly: asset data stored in many databases with multiple owners

More advantages

- No need for wires, batteries
- Placements can be extremely remote
 - *Inside* structural elements, hazardous locations



Challenge & Opportunity



■ Challenge

- Engineering & Construction – Active Tag Functionality
 - Locate and identify delivered construction materials
 - Out of sequence delivery, storage location – Where is it???
- Operations – Passive Tag Functionality “Smart Asset Visibility”
 - MRO data, 30+ year timeframe, rugged environment
 - Fixed location - asset data in one place - physically associated with asset
 - Support on-going maintenance, repair and overhaul at the facility

■ Opportunity – Smart Asset in the field

- Information at the source and network
- Enhanced security, efficiency, synching
- Remote, long-life, rugged environments

Source: RFID Journal - 2014



Smart Asset Benefits for Oil & Gas

RFID Tagging Programs can Improve Oil and Gas Business Processes in the following manner:

- Process Improvement Enabler
- Rework Reduction
- Safety
- Accountability
- Component Tracking
- Root-Cause Analysis
- Configuration Management
- Theft and Loss Prevention
- Improve Communication
- Reduce Counterfeit Parts
- Warranty and Component Life Cycle Management
- Paperless Transaction
- Modification Level
- Issues Related to Lots
- Improves Task Yield



Tego – Powering Assets with Intelligence

- Tego powers assets with intelligence.
- Insights about assets' lifecycle history, regulatory compliance and integrity drive operational excellence and new revenue models.
- Smart asset data is available for the right people and systems, including IoT, EAM, ERP, and Analytics applications.

Contact us: [+1.781.547.5680](tel:+17815475680) x2002 info@tegoinc.com

