



# High-Memory RFID for Aerospace, Manufacturing, MRO and Remote Asset Management

## GOING OFF THE GRID Using High Memory RFID

Electronic asset tracking with radio frequency identification (RFID) is now the industry standard for the military, aerospace and retail markets. Generally, the method of storing information on the RFID tag is customized for each market. While the retail industry relies on a 96-bit electronic product code (EPC) number that acts like a unique electronic barcode, other industries require more memory storage capabilities.

For situations where an asset does not have guaranteed access to a network or does not want to share information across organizations, high memory tags provide a compelling value proposition. Manufacturers can get visibility into production demands and reduce parts inventory. Suppliers could improve manufacturing efficiencies and verify the authenticity of their parts to fight counterfeiting. Airlines and maintenance companies could make MRO operations, largely paper-based, more efficient so spare parts could be located more quickly, reducing flight delays and cancellations, and potentially saving hundreds of millions of dollars each year.

In this whitepaper, we will take a look at high memory RFID tags, applications that can utilize high memory tagging, and the advantages that can be gained by integrating high memory RFID tags into an application such as maintenance, repair and overhaul (MRO) and asset management.

# High Memory RFID Tags

RFID tags are commonly used as an electronic barcode. However, the disposable nature and short lifetime of retail supply chains is hardly a good analogy for applications like the life-cycle optimization of important assets – and nor is it therefore a good blueprint on which to base a solution.

High Memory tags have memory sizes up to 32 Kbytes that allow users to add, edit, and recall records. The tag data format is readily configurable and complies with an open standard format ISO/IEC 18000-6 Type C (EPCglobal Gen 2).

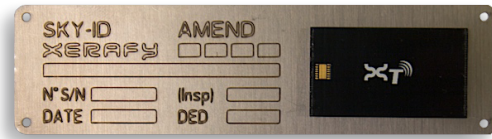
High memory tags can deliver significant value in the following areas: operating location, information sharing across organizations, durability, security, information availability, and simplification of deployment without the need for complex IT integration.

Remote locations do not have easy access to networks. High memory tags take RFID into the field, providing information in remote locations and reducing the need for contact with network.

Several organizations are typically involved in the process of manufacturing, using and maintaining any asset, and within an organization, several groups are involved in procuring, installing, using and decommissioning it. As a result, the key life-cycle history information for that asset is widely distributed, and the implementation and integration complexities associated with making this information available over a network can be punitive in terms of both cost and time-scale. Organizational issues and concerns can arise.

High memory tags enable the "just the right amount" of data to be shared, controlling dissemination of data and reducing the probability of any liability issues occurring.

Since Xerafy has the toughest UHF RFID on-metal and embed-in metal tags on the market, the XL series tags are a perfect fit for high memory chip, which are needed in some of the most challenging applications out there.



**Xerafy's Sky-ID Global Tag with Tego's 8K byte IC**

Available in the smallest form factor that survive the extreme applications without sacrificing performance, and in contrast to inexpensive memory technologies used in consumer markets, high memory tags incorporate "bulletproof" technology that can withstand time, temperature, pressure and radiation. Tags that are designed to withstand extreme conditions such as repeated gamma sterilization and exposure to high temperature are the safest solution for long-life assets in harsh environments and greatly reduce the risk of an expensive field recall or maintenance to address tag memory issues.

The information about a tagged asset is always available with the asset, ensuring availability of information at all times. This is especially valuable when for example infrastructure is impaired as a result of a disaster such as catastrophic weather conditions. After such events, if any telecommunications circuits remain intact, they are typically overloaded. High memory tags can still provide valuable information about the maintenance and configuration history of parts and accelerate the process of getting infrastructure up and running again.

Since these tags are designed to operate anywhere, they can also be deployed rapidly without the need at the outset for complex IT integration or additional server and networking capabilities.

All of the components necessary for a solution, such as hardware, enabling software and interoperability standards are already in place. Indeed, many customers have been live in less than a week reading and writing information to key assets.

High memory tags behave as remote agents that intelligently gather, store and provide information

when and where it is needed and is applicable to many industries in use cases that include:

- Recording asset history: maintenance records in aviation, oil and gas, and industrial manufacturing
- Managing product configuration: traceability of parts in aviation, defense and automotive applications
- Increasing security: secure smart cards with biometric information that includes facial images
- Proving authenticity: authenticated legal documents and records via digital signature
- Tracking assets in harsh environments: tags that can survive high temperatures in engines or repeated exposure to radiation in nuclear power plants
- Recovering from natural disasters or other events: accessing inventory and configuration of in-field assets by utility companies
- Battery-free sensing, monitoring and control: temperature, pressure, shock sensing, and environmental monitoring by transportation, building, and alternative energy companies



Xerafy XL tags with Tego's IC

## Aerospace

The aviation industry has been the leader in establishing standards for tag interoperability across organizations, and Tego, a worldwide provider of high memory RFID integrated circuits, worked closely with industry organizations including aircraft manufacturers, maintenance and repair (MRO) organizations, airlines and equipment manufacturers to establish the Air Transport Association (ATA) Spec 2000 specification for "RFID on Parts."



The aviation industry has a compelling value proposition for tagging flyable parts, with a significant return on investment to the tagging organization, and a subsequent benefit for all organizations involved in the maintenance and management of aviation parts over their lifecycle.

Benefits include:

- Improved aircraft configuration management and line maintenance
- Visibility of full maintenance history across organizations
- Reduced occurrence of "no fault found" conditions
- Life-limited parts tracking and optimization
- Reduced cost of compliance documentation
- Recorded pedigree for end of lease

The A350 widebody will be the first Airbus aircraft to use the passive RFID tags on flyable parts. Boeing has said it will use RFID tags for "maintenance-specific parts" on the 787 Dreamliner. Airbus would apply RFID high memory tags to airplane components for its A350 extra wide-body (XWB) airplane at the source of manufacture. Information from the tags is used to better support aircraft configuration management and line maintenance, repair shop optimization and life-limited parts monitoring.

Airbus is requiring that most parts be tagged with RFID tags. Currently, Airbus expects that up to 3,000 aircraft parts will be tagged on each plane, with 2,000 of these tags being high memory tags carrying 4 kilobytes or more of storage. After the planes are delivered into service starting in 2013, carriers will use the high-memory tags to store maintenance histories directly on certain flyable

aircraft parts and components. The data will be used to improve a host of processes, including configuration management, repair operations and warehouse logistics.

## MRO Management



The aviation industry is only the beginning for high-memory, passive RFID tags. Smart solutions with intelligent tags will find their way quickly into many industries in asset management and other business areas. These include:

- Remote assets in renewable energy
- Valves and maintainable items in process industries
- Manufacturing equipment at CPG plants
- Trains and other transportation assets
- Hazmat material in the nuclear industry
- Operating tools and equipment in the healthcare industry

These industries share several common problems in asset management and MRO. Studies have found many examples where only 20 percent of a technician's time involved productive work. Eighty percent of repair time was spent gathering information and tracking parts and tools to set up the job.

Similarly, lifted assets or assets requiring periodic maintenance are regularly either taken out of service prematurely (reducing their economic life) or miss key maintenance events, creating potentially hazardous situations and exposing organizations to liability issues.

Other applications that would benefit from high memory tags include oil and gas exploration, military vehicle and material maintenance, utility pole configuration, and railroad maintenance. Utility companies face great difficulty in disaster recovery when crews from around the nation converge on a scene to restore infrastructure. Coordinating repairs and organizing parts to reconfigure every downed utility pole is a monumental effort. By tagging utility poles with permanent line/pole maintenance records, a crew sent from any distant region can simply scan a downed pole and know exactly what they need to replace it.

## Conclusion



High memory tagging solutions transform the life-cycle management and overall effectiveness of business assets, and do so in a manner that delivers the lowest total cost of ownership, and initial deployment that is rapid and inexpensive.

High memory RFID tags differ from license plate RFID tags because they store data on the tags and do not rely on a network and they are built to last the lifetime of the asset. High memory RFID tags can transform logistics, maintenance, and asset management in situations where storing information on the network is prohibitive due to availability, security, or complexity of the information sharing.

The fact that information is stored directly on the tag reduces overall cost of the management system since information is instantly received, recorded, and detected.

High memory tags can also be used in conjunction with regular RFID tags to provide a broad range of identification solutions. As Phil Coop, manager of Boeing's GoldCard services department for the Dreamliner and other fleets told RFID Journal: "One size does not fit all when it comes to RFID."

Rugged high memory RFID tags like the Xerafy XL series tags are set to revolutionize the way industries manage their assets. Right now there are pilot applications in multiple industries that are looking to expand their RFID tagging operations. The time to get started is now.

#### Contact Us

For more information on high memory RFID tag applications, product overviews or any other questions, please visit Xerafy, [www.xerafy.com](http://www.xerafy.com), and Tego, [www.tegoinc.com](http://www.tegoinc.com).