AeroScout T6 GPS Tag

User Guide

T6GPS-UG-090113-06

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REVISION HISTORY			
Revision	**Date**	**Comments**	**Author**
1	2 September 2009	New format	M Sharon
2	03 Jan 2009	Maintenance warranty sections Update	Itai R
3	23 February 2012	External Power Option	Refael Blanca
4	11 September 2012	New battery P/N	Tal Marcus
5	09 January 2013	New battery P/N	Tal Marcus
6	15 May 2013	Intrinsic safe option	Ohad Yahalom

Introduction

The AeroScout T6 GPS Tag is a key component of the AeroScout Visibility System. The AeroScout T6 GPS Tag is a first of its kind solution that combines GPS and Wi-Fi to improve operations in large, outdoor environments. The tag is a battery-powered, wireless device that uses GPS to determine location and standard Wi-Fi to transport asset location and other valuable information to the customer's 802.11b/g-compatible Wi-Fi network. The T6 GPS Tag provides an ideal solution for organizations that need accurate location information for asset management in outdoor areas with minimal or basic Wi-Fi coverage. The tags help customers improve productivity and operational efficiency, while leveraging Wi-Fi infrastructure to keep total costs low.

Figure 1: AeroScout T6 Tag

T6 Tag Features

GPS Location

The innovative tag combines GPS and Wi-Fi to enable accurate asset management. Equipped with a built-in GPS receiver and attached to outdoor assets, the tag can deliver location reports based on GPS signals.

Bidirectional Communication

Other than the standard AeroScout unidirectional beacons transmitted by the tag periodically, the T6 Tag are capable of bidirectional Wi-Fi communication with full network association and authentication. The tag can operate with up to 5 different network SSIDs in secure or non-secure mode.

Over the Air Firmware and Configuration Upgrade

The T6 Tag is capable of associating with the Wi-Fi network at pre-configured intervals and receiving automatically firmware upgrades and configuration updates.

Visual Indications

The tag includes a Bi-color LED. The LED indication can be activated from the network to provide acknowledgement for various events such as entering a zone.

Flexible Mounting and Usage Options

The tag can be mounted on flat hard surfaces using screws or on cylindrical forms (such as poles) using tie-wraps.

Motion Sensing

T6 Tags are shipped with on-board motion sensors that report when it starts to move and whether it is in motion or not. The motion sensor can be used to define tag behavior when in motion or when it is stationary.

Long Battery Life

A powerful, replaceable battery provides power for a period of up to 3 years (depending on the tag's transmission interval, operating temperature, and the number of times a day it associates with the network). The tag periodically provides a report on the battery level so that when the battery level runs low, it can be replaced efficiently with minimum down time. Replacing the battery is simple. The AeroScout T6 Tag can also be easily deactivated in order to conserve battery power.

Tag Management

The T6 Tag can be programmed via a wireless interface using the AeroScout Tag Activator. Together with the AeroScout Tag Manager software it allows for easy and efficient tag configuration, activation or deactivation and programming. T6 Tags are supported by Tag Manager, version 4.2 and above.

Tag Programmability and Storage

The T6 Tag can store up to 15 messages of 15 bytes each. These messages can either be pre-programmed via the Tag Manager or programmed on the fly by an AeroScout Exciter when a tag is in proximity to it. These messages can also be transmitted in addition to the standard location messages (the tags can be either configured to transmit one of the messages or triggered by an AeroScout Exciter to transmit a specific message).

Active RFID Functionality

Using the AeroScout Exciter, the tag sends out specific location reports upon arrival at chokepoints or gateways. The tag behavior can also be automatically modified while passing through a chokepoint such as a doorway or gate. This includes

activating/deactivating tags or changing the tags' transmission rate to accommodate different usage patterns.

Compatibility and Non-interference

AeroScout Tags are 802.11b compatible. The tag's clear channel sensing techniques avoid interference with Wi-Fi networks. The use of the unlicensed 2.4GHz frequency band at low power levels ensures no interference with other wireless equipment, making AeroScout Tags safe for use with such sensitive equipment as medical devices in a hospital.

Rugged Performance

AeroScout Tags are designed to function in harsh work environments and weather conditions. The tag enclosure is water-resistant (IP-67) and designed to withstand significant physical shocks.

Intrinsic Safe option

AeroScout offers an intrinsically safe (IS), explosion proof version of the T6 GPS Tag, which is specifically built to deliver high-value asset tracking, while meeting strict international regulatory certifications ensuring safety in hazardous environments.

External Power Input

An external power input option is available for the T6 IS GPS Tags. When connected to an external power source the Tag will not consume power from the battery. Once the external power source is disconnected the Tag will automatically revert to the battery power source.

Figure 2: T6 IS Tag with external power input

Tag Mounting

The AeroScout T6 Tag is enclosed in a compact case and offers a variety of mounting options described in this section. To receive the satellite signals the tag should be mounted vertically.

Double Flange

The tag enclosure includes two flanges on the two narrow sides of the device.

The flanges can be used to thread two straps through them.

Figure 3. AeroScout T6 Tag (back view)

In addition, the holes on the two sides of each flange (four holes in all) can be used to firmly secure the tags on a flat surface, using two or four screws (when using two screws, consider fixing them through the holes on the opposite sides).

Fixing the Tag to a Surface Using Screws

1. Position the tag on the asset in a vertical position allows reception of maximal satellite signal.

2. Attach the tag to the asset, using four screws.

Attaching the tag to a Pole

Thread the straps through the two pairs of strapping holes on the tag's flanges.

Position the tag vertically and attach it to the pole.

Tag Management

Managing tags Using AeroScout Tag Manager

The AeroScout T6 Tag can be configured, programmed and activated via a wireless interface. This is done with the help of the AeroScout Tag Manager Version 4.2 and the AeroScout Tag Activator.

In addition, Tag Manager is used to activate and deactivate tags and to program stored messages and the GPS receiver.

The Tag Manager functions can also be activated via APIs that enable easy integration with third-party applications.

Please refer to *AeroScout Tag Manager User Guide.*

Automatic Tag Management through the Wi-Fi Network

The AeroScout T6 Tag's configuration can be managed automatically through the Wi-Fi network. This is possible thanks to the tag's bidirectional communication abilities.

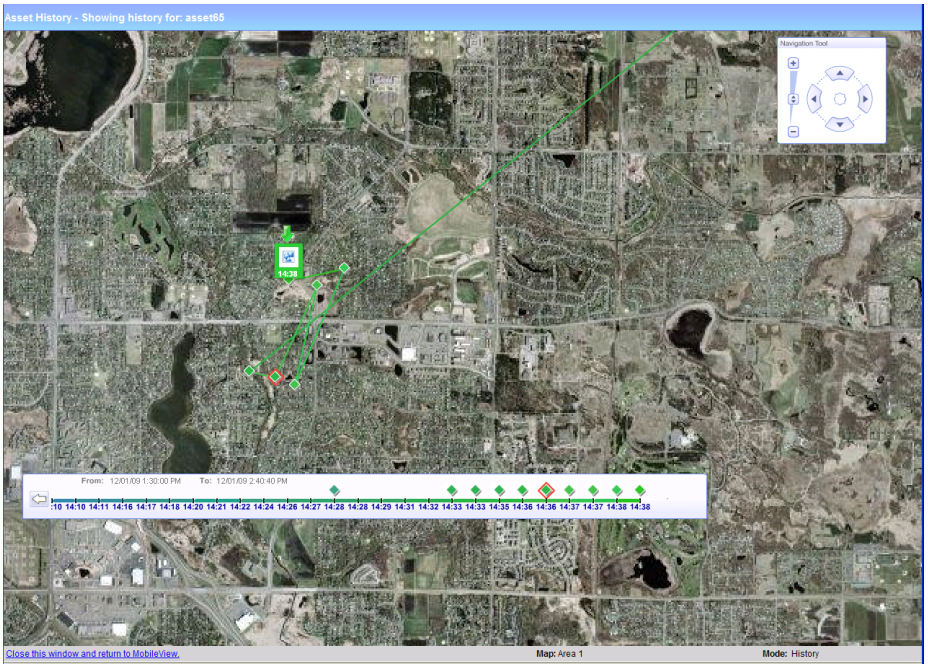
This is done by creating a configuration file using the AeroScout Tag Manager and saving it, exporting the configuration, and then loading the file into the AeroScout Bidirectional Tag Controller application. This application automatically updates the configuration to all the tags found in the site, through the Wi-Fi network. Tags get the update when they associate with the network. Typically, tags associate with the network once or twice a day.

Please refer to *AeroScout Bidirectional Tag Controller User Guide.*

Tag Management via MobileView

MobileView delivers a simple yet powerful means of tracking the location and status of assets with a full range of visualization, reporting management and automated alerting options. It also provides the ability to deliver valuable location data to a variety of third-party applications.

MobileView consolidates asset visibility data from a variety of resources, including the T6 GPS Tag which enables real-time asset tracking and triggers events and alerts.



For information about the deployment and configuration of GPS Gateway for T6 Tags, please refer to MobileView Installation and Deployment Guide

Tag Maintenance

Upgrading the Firmware

The AeroScout T6 Tag's firmware too can be upgraded automatically through the Wi-Fi network.

This is done by sending the upgrade to all tags found in the site, through the AeroScout Bidirectional Tag Controller application. In this case too, tags receive the update when they associate with the network.

Replacing the Internal Batteries

The AeroScout Tag uses a battery pack consisting of two 3.6V Lithium-Thionyl Chloride (Li-SOCl2) batteries, with 38 AH capacity. The life expectancy of the batteries depends on the tag's configuration. For example, shorter transmission intervals and a higher number of network associations per day consume more energy.

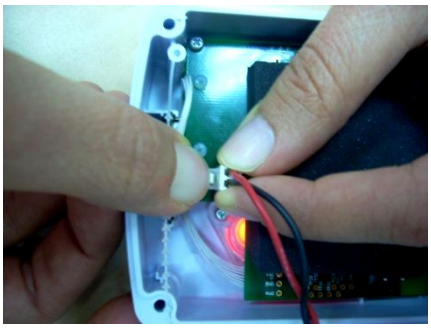
Figure 4. T6 Tag battery

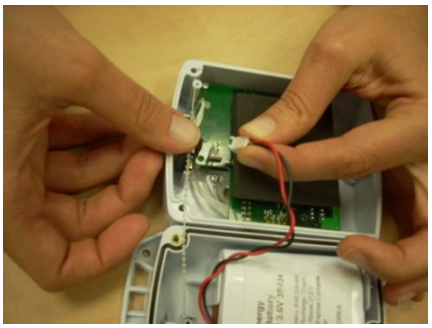
To replace a battery:

1. Deactivate the tag using Tag Activator and Tag Manager (recommended).
2. Remove the three screws on the tag's cover.

3. Remove the tag cover.

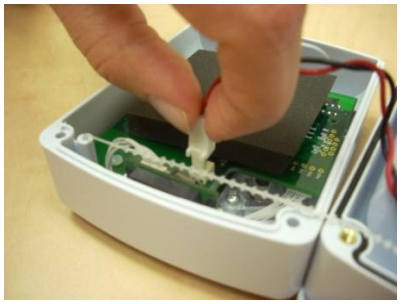
4. Gently separate the socket cord connected to the batteries from the PIN header placed on the tag PCB. In order to release the socket properly, you need to shift the prong aside and pull the socket cord out.





5. Remove the old battery pack from the tag's housing.

6. Place the new battery pack in its place and connect the socket cord to the PIN header connection on the tag. Notice the socket direction before connecting it to the PIN Header.



7. Put the tag cover back.
8. Fasten the screws.

Make sure that the sealing rubber around the battery compartment has not moved during battery installation. If it did, gently put it back in place using a sharp device.

WARNING: Use only batteries listed in Table 1 or batteries that have been approved by AeroScout. There is a danger of fatal tag damage if the battery is replaced incorrectly or by another battery type. Dispose used batteries according to the instructions.

9. Activate the tag.
10. Dispose of the old lithium battery properly.

WARNING: Local regulations vary. Federal regulations allow up to 100 kg./month of lithium manganese dioxide batteries to be disposed in common landfill. All leads (the terminals) should be taped to prevent short circuit. The user is responsible for safe disposal.

Table 1lists of the approved battery types for the T6 Tag:

Manufacturer	Battery Part Number
XENO	XL-205F/1S2P

Table 1 – T6 Tag Approved Battery Types

Tag Battery Life

In order to ensure the longest battery life from the tag, the GPS receiver is activated intermittently.

The battery life of the T6 GPS Tag is depended on the chosen operation mode in Tag Manager. The battery life is also dependant on the transmission intervals in motion and stationary. The below table describes the calculated battery life per use case:

GPS Operation Mode	Application	Expected Battery Life
Outdoor Storage	For assets which move infrequently (in motion between 5-10% of the time) such as crates, airplane parts and other long term storage items.	Up to 2.3 Years
Trailer and Containers	For assets in motion 10-20% of the time and are located in yards such as trailers and mobile containers.	Up to 1.4 Years
Ground Support Equipment	For assets in motion between 30-50% of the time such as Airport dollies and other ground support equipment in large logistics areas.	Up to 1 Year

Table 2 – Battery Life per GPS Operation Mode

Note

The calculations above are true for an operating temperature of 20ºC/68 Fahrenheit and for a 3-channel transmission in unidirectional mode. The calculations do not take into consideration additional factors such as Exciter activations of tag and bidirectional transmission.

Except for the parameters stated above, the battery life also depends on parameters such as the time it takes the GPS to get a position fix between intervals. This is a changing non-configurable parameter.

T6 Tag Models

Use the following information to determine the correct part number of the tag depending on the required hardware:

Mark	Meaning
TAG-6000	T6 GPS Tag
TGH-6000	Empty T6 Tag housing with AeroScout logo
TAG-6000-BP-X1	T6 Intrinsically Safe GPS Tag
TAG-6000-XP-X1	T6 Intrinsically Safe GPS Tag with external power connection

Table 2 – Regular T6 Tag Models

Tag Accessory Models

Mounting Accessories	Comments	Model
Tie wraps– up to 2'' diameter		TAC-060
Tie wraps– up to 5'' diameter		TAC-061
Tag Management		
Tag Management Suite	Includes Tag Activator, Tag Manager Software and 110/220V to 12V adaptor	
US Suite	Includes 110/220v to 12v adapter (US)	BWH-1000-02-TA-U
Europe Suite	Includes 110/220v to 12v adapter (Europe)	BWH-1000-02-TA-E
Japan Suite	Includes 110/220v to 12v adapter (Japan)	BWH-1000-02-TA-J

Battery		
T6 Tag battery 25-Pack		TAC-630
T6 Tag battery 50-Pack		TAC-631

Table 3 – Tag Accessory Models

Tag Specifications

Wi-Fi RADIO

- Compliant with 802.11b/g networks (2.4 GHz)
- Transmission power: up to +19dBm, ~81mW

GPS RECEIVER

- SIRF Single chip receiver GSC3E/LP
- Tracking sensitivity: -158dbm

PHYSICAL AND MECHANICAL

- Dimensions: 100mm x 80mm x 55mm (3.9" x 3.1" x 2.2")

FUNCTIONALITY

- GPS coordinates are periodically sent over the Wi-Fi channel in pre-programmed intervals.
- Transmission interval is configurable.
- Built-in motion sensor enables more frequent transmissions when in motion and less frequent when not in motion.

ENVIRONMENTAL SPECIFICATIONS

- Temperature: -30° C to +75° C (-22° F to +167° F)

ELECTRICAL

- 2 x D lithium 3.6V battery pack (replaceable)
- Battery life: up to 3 years (dependent on usage scenario and other factors)
- Optional external 12V DC input/ 1 Ampere for the Intrinsic safe tag.

CERTIFICATIONS

- Radio:
  - FCC Part 15, sub-part C class B, sub-part B
  - EN 300-328, EN 301-489
- Safety:
  - o CE, cTUVus (EN60950)
- Intrinsic Safe Tags:
  - Intrinsically-safe operation in Class I, Division 1, Groups A, B, C, and D Hazardous (Classified) locations.
  - ensure temperature classification T4 at Ta = 50°C and T3C at Ta = 70°C

Safety and Warnings

FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and receiver.
c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
d) Consult the dealer or an experienced radio/TV technician.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:
a) This device may not cause harmful interference
b) This device must accept any interference received, including interference that may cause undesired operation.

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

WARNING: This device complies with Part 15 of the FCC Rules and RSS-210 of Industry and Science Canada. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Limited Warranty

Hardware. AeroScout Inc. ("AeroScout") warrants that commencing from the date of delivery to Customer and continuing for a period of one (1) year thereafter (the “Warranty Period”), the Hardware will be free from defects in material and workmanship under normal use subject to terms hereof. The date of shipment of a Product by AeroScout is set forth on the packaging material in which the Product is shipped. This limited warranty extends only to the original user of the Product. Customer's sole and exclusive remedy and the entire liability of AeroScout and its suppliers under this limited warranty will be, at AeroScout’s or its service center's option, shipment of a replacement within the period or a refund of the purchase price if the Hardware is returned to the party supplying it to Customer, if different than AeroScout, freight and insurance prepaid. AeroScout replacement parts used in Hardware repair may be new or equivalent to new. AeroScout’s obligations hereunder are conditioned upon the return of affected articles in accordance with AeroScout’s then-current Return Material Authorization (RMA) procedures.

Restrictions: This warranty does not apply if the Product (a) has been altered, except by AeroScout, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by AeroScout, (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident; or (d) is provided for beta, evaluation, testing, or demonstration purposes for which AeroScout does not receive a payment of purchase price or license fee.

Exclusions:

This warranty shall have no coverage of the following:

- Batteries (other than DOA -Dead On Arrival)
- Plastics (including defects in appearance, cosmetics, decorative or structural items including framing and non-operative parts).
- Tag Calibration
- Expenses related to removing or reinstalling the Product

Defects or damage that result from the use of Non-AeroScout certified Products, Accessories, Software or other peripheral equipment are excluded from coverage.
Defects or damages resulting from service, testing, adjustment, installation, maintenance, alteration, or modification in any way by someone other than AeroScout, or its partners, are excluded from coverage.

Extended Warranty:

AeroScout offers an extended warranty. The initial year of the extended warranty must be purchased at the time of the product purchase or before the original warranty expires. The extended warranty may be renewed again for a maximum of two additional years (on top of the initial warranty period). Warranty extensions must be purchased prior to the existing warranty expiration and will not be available after the original/extended warranty expires.

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This disclaimer and exclusion shall apply even if the express warranty set forth above fails of its essential purpose. Under no circumstances shall AeroScout’s liability under this limited warranty exceed the actual cash value of the Product at the time Consumer returns the Product for repair, determined by the price paid by Consumer for the Product less a reasonable amount for usage.

Please use the following link to submit your tickets using AeroScout’s support portal:
http://support.aeroscoutindustrial.com

About AeroScout

AeroScout is the market leader in Unified Asset Visibility solutions. Clients improve operational efficiency and quality using AeroScout products that leverage standard Wi-Fi networks to track and manage the location, condition and status of mobile assets and people. AeroScout's global customer base consists of leading hospital, manufacturing and logistics organizations, including many of the Fortune 500. The company originally invented the first Wi-Fi-based Active RFID tag, and today is widely recognized as leading the market in number of deployments and tags shipped. Headquartered in Redwood City, Calif., AeroScout has offices in Europe, Asia, the Middle East, Latin America and Australia. For more information, please visit www.aeroscoutindustrial.com.

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