



Maximum Manufacturing: Cisco and AeroScout Context-Aware Services Solutions in the Semiconductor Industry

The Cisco® and AeroScout Context-Aware Services Mobility solution for the semiconductor industry delivers powerful asset-management capabilities from corporate headquarters to the clean room, providing cost-effective, timely inventory administration and controls for work-in-process (WIP) production on the most demanding assembly line in manufacturing. This solution is part of the Cisco and AeroScout Connected Manufacturing platform.

The Cisco and AeroScout Context-Aware Services solution helps semiconductor companies track assets and personnel in real time to minimize losses due to waste, management inefficiencies, and damage. Built on the powerful Cisco Unified Wireless network, this technology allows manufacturers to achieve continuous, secure visibility between the factory floor and corporate supply chain management systems, taking advantage of:

- Complete integration with existing Cisco Unified Wireless LANs, enabling fast, cost-effective deployment
- Reliable signal coverage throughout the production floor and clean room without interfering with sensitive equipment
- More robust, flexible systems for tracking WIP as well as locating mobile and static assets with Wi-Fi tags
- An open standards-based solutions that integrates with existing corporate networks to facilitate companywide sharing and management of information

Challenges

In today's challenging economy, semiconductor manufacturers need to find ways to remain profitable. As consumers cut back on electronics spending, transportation costs rise, and companies increasingly explore the possibilities of emerging markets and global expansion, plant managers must find a way to address the problem of improving processes while becoming more cost-effective.

As part of this effort, companies are re-examining asset-management practices on the assembly line. Studies show that manufacturers routinely misplace tools, parts, and inventory at the cost of work stoppages, slowed production, and missed delivery dates. They need to be able to maximize WIP workflows through more efficient tracking and management of integrated circuit batches, equipment, chemicals, and material assets.

Many companies are finding that traditional methodologies and supply chain practices are no longer able to accomplish this critical task. As a result, they experience:

- A lack of visibility into the location of valuable equipment and personnel
- Errors in the workflow order, which can result in wasted batches if not caught in time
- Workflow bottlenecks, which can cascade down the line to increase cycle time
- A lack of visibility into the location of valuable assets and personnel
- Inefficient allocation and use of people and equipment
- Excessive costs of leased and purchased equipment to offset losses and theft
- Security issues that stem from lack of insight into the location and movement of people and assets

Solution

The Cisco and AeroScout Context-Aware Mobility solution helps semiconductor manufacturers increase asset visibility and minimize losses using Wi-Fi-based RF identification (RFID) technologies. Based on the Cisco Unified Wireless Network, it reliably tracks the presence and real-time location of high-value manufacturing assets, providing the reliable signal coverage needed to manage sensitive assembly areas.

This solution consists of a variety of components designed to help meet the specific needs of semiconductor manufacturers. These include:

- **Cisco 3300 Series Mobility Services Engine (MSE):** The Cisco and AeroScout Context-Aware Software resides on the MSE and integrates with the Cisco Unified Wireless Network and Cisco technology-compatible devices to expand the reach and value of the asset-management system.
- **Cisco open API:** The MSE supports an open API that passes along the contextual information captured from the RFID tags attached to the assets, through the wireless network. Developers can integrate this information into business applications such as inventory management, and gather more detailed information about assets including availability, status of components, and usage. The Cisco Context-Aware Software supports both the enhanced received signal strength indication (RSSI) and time difference of arrival (TDOA) algorithms, improving location accuracy and performance in challenging RF environments. Access to this API is available to any Cisco technology partner and allows a full integration into the business processes of customers.
- **Cisco Unified Wireless Network:** This multipurpose network is the only unified wired and wireless network solution to cost-effectively address the wireless network security, deployment, management, and control issues that businesses face, in addition to providing context-aware mobility.
- **AeroScout Active RFID tags:** AeroScout Active RFID tags are typically attached to the asset being tracked. When they pass within the range of a mounted access point, contextual information is passed to the MSE. AeroScout is a member of the Cisco

Compatible Extensions program for technology partners, which supports tag development by helping to ensure that RFID tags comply to a predefined standard and format. This allows the advanced information they send (such as motion, humidity, and other parameters) to be captured and made available to the rest of the solution, including business applications from other Cisco partners.

The Cisco and AeroScout approach to asset tracking helps ensure that, before assembly begins, inventory counts and pre-positioning are as accurate as possible. This is accomplished by tagging parts, containers, pieces of equipment, tools, and staff members with an active RFID tag, and taking an automated, real-time inventory at the start of each day's work.

This technology can also be used to monitor WIP workflows to minimize loss through management inefficiencies or human error. For example, it can track a tagged container of wafers through the mask shop, fabrication, and advanced test manufacturing facilities, alerting personnel if an item visits workstations in the incorrect order. It also monitors dwell times per station and send alerts to staff if a bottleneck is created that will lengthen cycle times throughout processing.

Business Benefits

Semiconductor manufacturing is one of the world's most precise, complex manufacturing processes. It involves the use of highly specialized equipment in clean room environments, a workforce of trained experts, and a detailed manufacturing procedure that lasts for about a month from start to finish. A failure or error at any point during this workflow can easily cause the waste of an entire batch, resulting in significant business losses. The Cisco and AeroScout Context-Aware Mobility solution for semiconductor manufacturing enables:

- Increased equipment utilization
- Decreased loss and theft
- Improved product quality
- Reduced costs
- Faster production and time to market

Based on open Wi-Fi standards, the solution can use existing access points and hardware, eliminating the need to purchase a new network infrastructure and dramatically decreasing deployment times. Integrated with the Cisco Unified Wireless Network, it makes asset information fully available to corporate systems, which facilitates companywide sharing and management of information. As a result, the Context-Aware Mobility solution can offer rack-level accuracy of parts, materials, and processing to help ensure completion and minimize waste.

Supporting Solutions and Partners

Cisco, AeroScout, and their partners work with manufacturers to install Context-Aware solutions from planning to deployment. In addition to a global network of qualified resellers, Cisco provides comprehensive design and support through Cisco CCIE® professionals, the Cisco Advanced Services team, and the award-winning Cisco Technical Assistance Center, all recognized as industry leaders. Cisco Advanced Services also offers services for deploying and managing this solution.

The Leadership Advantage

Cisco is the worldwide leader in industrial networking technologies, with a 20-year track record in working with manufacturers of all sizes around the globe. The Cisco and AeroScout Context-Aware Mobility solution forms part of the Cisco Connected Manufacturing platform, a suite of collaborative business solutions that integrate information and processes, spanning the entire manufacturing work flow and giving companies a secure, customer-centered view of their organizations. These scalable solutions are founded on the Cisco Service-Oriented Network Architecture (SONA), a conceptual framework that outlines how service-integrated enterprises can accelerate applications, processes, and resources to maximize business opportunities.

Cisco is committed to the development of open manufacturing industry standards—it is a founding member of the ODVA and participates in ISA standards committees.

AeroScout is the market leader in Wi-Fi-based active RFID, and the winner of several awards and endorsements. AeroScout invented the industry's first Wi-Fi-based tracking tag, and continues to innovate and help customers around the globe solve their critical visibility problems.

Next Steps

Manufacturing organizations all over the world are making widespread use of the solutions in the Cisco Connected Manufacturing portfolio. For more information, visit

<http://www.cisco.com/go/manufacturing>.

You can also contact your Cisco account manager or partner. To locate your Cisco partner, please visit <http://www.cisco.com/go/partnerlocator>.



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