

## **Introducing the DASH7 Alliance**

Bringing Balance and Vision to Active RFID Markets

**Michael J. Liard**  
Practice Director, RFID

### **Executive Summary**

A unique alliance is forming in the active RFID market. Centered on the ISO 18000-7 standard, the DASH7 Alliance is a cross-industry initiative to expand the use of active technology in the government and commercial markets. The coalition's focus is on promoting greater interoperability and reliability, as well as enabling greater innovation around a common standard.

While many active RFID vendors and solutions providers have been successful, the total available market across industries remains largely untapped. ABI Research believes the active RFID segment requires greater collaboration among cooperative, complementary, and in some cases, competitive organizations in order to enable, grow, and sustain the market over the long term.

The DASH7 Alliance will bring stakeholders together to share and discuss ISO 18000-7 technical issues. Such issues include advancing the standard on a global scale, identifying and eliminating potential gray areas, and sharing information about wins and pitfalls. Additionally, the Alliance will work to build applications on top of the core standard, including electronic seals, RTLS, sensing and monitoring, long-distance communications, and more.

## Section 1. INTRODUCING THE DASH7 ALLIANCE

### 1.1 DASH7 Alliance Overview

Reinforced by its wide deployment within the US Department of Defense (DoD) and allied forces, as well as its continued penetration in non-military sectors in numerous country markets, ISO 18000-7 (“DASH7”) has rapidly become the de facto global standard for active UHF RFID solutions. Simply put, ISO 18000-7 outlines the parameters for air interface communications at 433 MHz.

In today’s active RFID landscape, a number of market growth inhibitors and development challenges exist. Among these are numerous proprietary architectures, limited cross-vendor interoperability, hardware price sensitivity, a general lack of cohesion in partner ecosystems, and end-user confusion.

Enter the DASH7 Alliance. The DASH7 Alliance is positioned as an interoperability initiative operated independently from Savi Technology, a Lockheed Martin company and a leader in the active RFID market, to accelerate the adoption of active RFID across the world. Interoperability is defined as enabling the ability of technologies to communicate with each other and with common networks. In ABI Research’s opinion, the role and importance of the newly formed DASH7 Alliance is both timely and mission-critical to growing the active UHF segment of the RFID market.

ABI Research believes the DASH7 Alliance has embraced a well-balanced approach. First, the Alliance is keenly focused on cross-industry collaboration through market development efforts such as educational outreach programs, cross-marketing strategies, and solutions development, as well as improving and expanding the ISO 18000-7 standard. In addition, the DASH7 Alliance will work to address interoperability testing and certification via DASH7 Interoperability Labs. Through these labs, the DASH7 Alliance hopes to add ease and flexibility to the certification process.

The level of determination and commitment among DASH7 Alliance participants is compelling and refreshing. An enhanced sense of collaboration around a common cause exists within the group. With some time and demonstrative actions, ABI Research foresees the DASH7 Alliance will become a potential model for standard-centric market development that other RFID-related and wireless technologies can emulate.

### 1.2 Key Alliance Partners

ABI Research believes having the right mix of participants is one of the critical success factors for the DASH7 Alliance. The value chain must be well represented, inviting a cross-blend of industries, competitors, partners, and market participants. In addition, the Alliance needs to be open and accessible to all interested parties. Finally, the Alliance should foster a ‘call to action’ among participants – in this case, collaboration around a common standard. Such collaboration includes common product, solutions, and market development goals. In our view, the DASH7 Alliance satisfies these early requirements.

First, the initial participant list already represents a solid mix of industry participants, ranging from vendors to end users to academia/research. Moreover, participation is open to technology providers, software developers, systems integrators, ISO 18000-7 licensees, semiconductor manufacturers, end users, and research organizations.

Lastly, DASH7 Alliance participants are rallying around a common cause – a clearly defined mission: to enable ISO 18000-7 innovation, advocate interoperability, and increase adoption on a global scale.

As the DASH7 Alliance launches, initial participants announced include the following:

Analog Devices* (technology provider)	Northrop Grumman* (systems integrator)
Argonne National Labs (research organization – national lab) – DOE	Oak Ridge Laboratories (research organization – national lab) – DOE
Dow (end user)	Pacific Northwest Laboratory* (research organization – national lab) – DOE
Evigia (technology provider)	RFind (technology provider)
Hi-G-Tek (technology provider)	Savi (technology provider)
Identec (technology provider)	STMicroelectronics (semiconductors/hardware developer toolkit provider)
KPC, Inc* (technology provider)	Texas Instruments* (semiconductors)
Lockheed Martin (systems integrator)	Unisys* (systems integrator)
Michelin (end user)	University of Pittsburgh (research organization – academia)
	US Department of Defense (DOD) (end user)
	US Department of Energy (DOE)* (end user)

\* *Non-founding participant*

## Section 2. KEY STRATEGIC GOALS OF THE ALLIANCE

### 2.1 Closing the Active Interoperability Gap/Proactive Interoperability Certification

Simply because a standard exists does not mean that all vendor products are interoperable. Rigorous and reliable testing and certification procedures are required. In addition, standards are not always perfect. For example, areas of ambiguity in ISO 18000-7 could mean that interoperability is not guaranteed.

DASH7 Alliance participants fully understand that the existence of a standard only represents the foundation on which to build a market. Therefore, if the standard is the foundation, then interoperability and compliance are the nails to help hold the house together as they build the market.

There are a few initial areas requiring greater industry coordination to achieve minimal acceptable levels of interoperability within major and emerging ISO 18000-7 markets:

- **Basic interoperability** – Although interoperability in the active 443 MHz RFID space remains a formidable challenge, a test platform to verify compliance to the ISO 18000-7 standard will be established and recognized. Alliance participants will jointly define basic interoperability standards.
- **Low-frequency wakeup interoperability** – The US DoD will likely continue its deployments of 123 kHz signposts through the In-Transit Visibility (ITV) network, and its RFID III RFP calls for portal-based location systems using a unique signpost identifier. ISO 18000-7 licensees are currently unable to offer interoperable LF wakeup devices. Thus, Alliance participants will work together to coordinate LF interoperability testing and will have OEM access to Savi LF wakeup ASICs and/or Savi LF wakeup specifications.
- **Sensor interoperability** – The US DoD is expected to deploy sensor-enabled tags on a global scale, but ISO 18000-7 vendors are currently unable to offer interoperable sensor-enabled devices. Consequently, Alliance participants will develop a common approach to ensure sensor interoperability. They will base the solution on what is currently in development with the ISO's air interface-agnostic 24753 sensor standard (air interface commands for battery assist and sensor functionality) in the ISO 18000-7 standard. Such a level of cooperation within DASH7 will facilitate the ISO process once submitted as an enhancement to the standard.
- **Cargo security interoperability** – The US (via the DoD) and other nations have deployed a limited number of container security devices throughout supply chains (such as the ITV network). This trend is likely to accelerate over time, and the US DoD RFID III RFP calls for container security devices that require access to certain intellectual property. Thus, DASH7 Alliance participants will collaborate on e-seal certification efforts, address standards concerns, and promote the broader use of e-seals within the government, as well as commercial transportation and logistics, markets.

To execute on interoperability testing for each of these areas, DASH7 Alliance participants will have access to the new DASH7 Interoperability Lab (the University of Pittsburgh has been proposed), which will charge a nominal rate for testing. After completing DASH7 testing and certification successfully, Alliance participants will then

be able to deploy a “DASH7 Certified” logo on their products to demonstrate reliability and interoperability to customers. This is analogous to certification efforts seen with Wi-Fi technology in the 802.11 space.

ABI Research believes the DASH7 Alliance has taken a very proactive stance toward interoperability testing and certification. By focusing on certifying commercially available products and formalizing a process for certification (complete with a logo), the Alliance affords participants a path to certification while offering end users certainty that their chosen hardware is compliant with ISO 18000-7.

## 2.2 Potential Impact on Standards Development

The original ISO 18000-7 standard was ratified in 2004 and then modified in 2008. While the standard may be in place, this does not mean that standard development efforts should cease. A standard should be treated as a living document. In other words, the standard must evolve as technology and applications evolve. This is not uncommon with standards during market development. A standard is often monitored and altered as necessary to foster adoption and market growth.

The DASH7 Alliance will bring stakeholders together to share and discuss ISO 18000-7 technical issues such as advancing the standard on a global scale, identifying and eliminating potential gray areas, and sharing information about wins and pitfalls. ABI Research views this knowledge sharing and thought leadership as critical to refining the existing standard, advancing penetration in government sectors, and fully enabling a suite of active 433 MHz solutions for the commercial market.

The DASH7 Alliance will help drive new wireless data innovations based on the ISO 18000-7 standard, including advanced sensor networking, electronic seals, mobile phone integration (whereby a phone becomes a reader), emergency mustering, access control (such as associating an event with a person by linking wide-area tracking and monitoring with access control), and others. However, in order to enable these new areas, continued attention must be paid to the ISO 18000-7 standard itself. ISO 18000-7 is an open and flexible basic air protocol standard that can be leveraged and built upon in the active 433 MHz market.

A current example is the complementary nature of the ISO 18000-7 technical standard and the application standard for e-seals, namely ISO 18185. The DASH7 Alliance could work to propose an e-seal standard as part of ISO 18000-7. Future initiatives could include building upon ISO 18000-7 to account for and enable sensing, location, security, power management, and application-specific features.

An early initiative of the DASH7 Alliance is the ratification of ISO 18047-7, a compliance specification that includes test methods for active 433 MHz devices. The document is presently in development. ABI Research views this as a key enabler for interoperability testing and certification, as well as for advancement of the standard itself.

The DASH7 Alliance will also work to streamline the regulatory process and help lift restrictions in key markets. This will be achieved through open knowledge sharing among participants, clear communication with government agencies as well as standards organizations, and an emphasis on “strength in numbers” through a collective body.

Having an international standard is extremely important, but having regulatory approval and acceptance in a country is just as critical. Regulations can sometimes present significant adoption and market development challenges, particularly in emerging wireless technology markets. If a technology cannot be used in a specific country, then that window of opportunity is closed to a vendor or solutions provider until restrictions are lifted. The DASH7 Alliance aims to open as many windows as possible in the 433 MHz space. It has already seen 433 MHz regulatory success in the US (via the DoD), Australia, India, Israel, Korea, China, and elsewhere, and hopes to replicate this achievement in challenging country markets.

For example, in late 2006, China's State Radio Regulation Committee (SRRC) gave its approval for vendors to sell 433 MHz RFID equipment in China that is compatible with the ISO 18000-7 standard. This act solidified the protocol as an international 433 MHz RFID standard in Asia. With regulatory approval, vendors can market their ISO 18000-7-compliant products in China more easily, since they no longer have to gain separate approvals for each 433 MHz installation. Nearly every developed country, with the exception Japan, has developed RFID regulations specific to 433 MHz. This widespread regulatory acceptance is a sharp contrast to the limited regulatory activity observed to date in the 2.45 GHz space.

### 2.3 Promoting/Extending 433 MHz Active RFID Adoption vs. Alternatives

Active UHF solutions are not alone in the marketplace. A number of alternatives exist, including passive RFID, Wi-Fi, ZigBee, and General Packet Radio Services (GPRS). Each technology has its own merits and challenges. The DASH7 Alliance's strategy is to set 433 MHz apart from the rest. This can be accomplished through many actions, most notably by effectively communicating the differences, advantages, and benefits associated with ISO 18000-7 solutions. It is also important to consider that in RF-based solutions, the frequency is often as important as the standard itself. In this case, 433 MHz is more globally available than 915 MHz and 2.45 GHz.

ABI Research has long stated that user and application requirements ultimately drive technology and vendor selection in the RFID market. However, we also contend that vendors and solutions providers must educate end users and continuously enable technology, advance applications, and refine standards in their respective segments of the RFID industry. After all, if an end user selects a particular wireless technology or RFID frequency, then it is in the industry's best interest to have the most reliable, flexible standards-based products available to those end users.

The primary competition for 433 MHz solutions comes from 2.45 GHz/Wi-Fi and UWB-based active RFID systems; however, many of these systems are proprietary. In comparison, 433 MHz offerings are backed by ISO 18000-7, an open international standard. Active 433 MHz devices also boast better power efficiency, lower power drain, no 802.11n (2.45 GHz) interference, better tag-to-tag communication, military-grade reliability, and lower cost than their primary alternatives.

ZigBee is another 2.45 GHz alternative. It faces similar challenges to Wi-Fi-enabled systems, but it does afford better tag-to-tag communications. As a standard, ZigBee is less mature than ISO 18000-7, and the semiconductor industry has been disappointed with ZigBee results to date. Passive RFID is another option. Yet, unless

passive RTLS is considered, these solutions typically do not compete directly with active solutions in most application environments. In fact, the DASH7 Alliance is currently evaluating two RTLS proposals that would operate on top of ISO 18000-7, including one that operates exclusively at 433 MHz.

A mature set of players is already a part of the DASH7 Alliance (which includes end users), and ISO 18000-7 technology is supporting one of the largest RFID deployments in the world (via the US DoD ITV network). There is a compelling story being written in this segment of the RFID market. In terms of promoting and extending the adoption of 433 MHz active RFID, we believe the DASH7 Alliance has the commitment, resources, and drive to actively promote ISO 18000-7 education, awareness, and messaging amid existing technology alternatives across the world.

## 2.4 Cross-Industry Collaboration

One of the most impressive considerations about the formation of the DASH7 Alliance is the early high level of cross-industry collaboration. Its participant list includes organizations from the hardware value chain, software developers, systems integrators, government and commercial end users, research organizations/national laboratories, and academia. The DASH7 Alliance expects participation to expand rapidly, particularly among end users in commercial sectors, as efforts progress.

The importance of end-user involvement cannot be emphasized enough. Vendors, software developers, and integrators need to understand end-user requirements in order to enable new ISO 18000-7 applications and technology solutions. End users are critical to adoption and their voices must be heard in an open forum such as the DASH7 Alliance.

Given the sheer size of its ITV network deployment and overall commitment to ISO 18000-7, it is not surprising to see the US DoD listed as a participant in the DASH7 Alliance. The US DoD is significantly invested in ISO 18000-7 – both financially and logistically. It is a very active participant in the RFID community and is considered a thought leader and an early adopter.

However, with end users such as Michelin, Dow, and the US Department of Energy already a part of the DASH7 Alliance, the reach of the initiative will extend far beyond the military sector. By embracing end users from a broad range of vertical markets and regions, the DASH7 Alliance is fostering a true cross-industry, cross-discipline, and cross-border collaboration.

## 2.5 Early Focus on the Government Sector, but Commercial Sector in Sight

For years, militaries have been using asset management systems to track goods shipped into combat areas, as well as to manage goods on hand. The US DoD, US Coast Guard, the North Atlantic Treaty Organization (NATO), coalition partners, and other foreign military agencies have actively deployed ISO 18000-7 systems.

Without question, the US DoD has led the adoption of active 433 MHz RFID. Today, the US DoD's ITV network operates as the largest active RFID-based network in the world. With nodes stretched across more than forty countries and 4,000 locations, the ITV network tracks an average of 35,000 supply shipments per day across the entire supply chain. The ITV network deployment has proven to be a successful multi-site global deployment that supports a full-scale infrastructure.

In addition, the total investment in ISO 18000-7-related technologies by the US DoD cannot be ignored. It totals in the hundreds of millions of dollars. As a result, the DASH7 Alliance is committed to preserving the US DoD business opportunity.

For example, the new RFID III contract from the US DoD – which calls for active 433 MHz RFID tags and interrogators compliant with the ISO 18000-7 standard – is valued at \$429.4 million. This figure includes all procurements, which would be the aggregate of the hardware, software, and services solicited from selected vendors over the life of the ten-year contract. The first three years are allocated for new purchases of hardware, software, and services, with the remainder of the contract pertaining only to options and upgrades for products already purchased, as well to services and maintenance for those goods.

After more than two years of requests and reviews, the US DoD recently announced that it had chosen four prime contractors to compete for orders under the RFID III contract. The four prime contractors are Savi Technology, Northrop Grumman Information Technology, Unisys, and Systems & Processes Engineering Corp (SPEC).

Outside of the ITV network, military agencies are interested in using active RFID to manage assets, WIP, and parts during aircraft and vehicle supply and maintenance operations. These agencies include defense forces in the United Kingdom, Poland, Sweden, Denmark, Spain, and Australia, with other allies also considering active RFID solutions based on the active ISO 18000-7 standard. Another key application for the government sector is cargo tracking and security in shipping lanes, including electronic seals.

Non-military government agencies such as the US Department of Energy are also joining the DASH7 Alliance. Other participants could include the US Food and Drug Administration (FDA), US Department of Homeland Security (DHS), and NASA. These agencies can help increase the adoption of ISO 18000-7 solutions in non-military government environments to support applications such as asset management in the petrochemical industry.

The active involvement of commercial end users such as Michelin and Dow in the DASH7 Alliance is also a positive sign. Their involvement is expected to help lay the foundation for the expansion of ISO 18000-7 beyond the military/government sector.

A broad range of applications in the commercial sector are possible using ISO 18000-7 technology. Potential applications include tire pressure monitoring, IT equipment tracking, cold chain distribution, high-value asset tracking, access control, emergency mustering, small arms tracking, waste management, HAZMAT tracking, and many others. However, it takes time to nurture specific application opportunities and grow a market. The DASH7 Alliance understands this challenge and is wasting no time in getting commercial end users involved.

## Section 3. WHY THE DASH7 ALLIANCE MATTERS

### 3.1 ABI Research's Take on the DASH7 Alliance

Pilots are no longer the de facto project size for RFID-based asset management and supply chain logistics solutions. Real-world, full-scale implementations are occurring in a large number of industries, such as government, aerospace and defense, and transportation and logistics. The time of proving the mettle of RFID technology has passed.

Throughout the world today, RFID supports applications in warehouses, manufacturing shop floors, port facilities, shipping yards, government facilities, hospitals, corporate datacenters, hospitals, offshore oil rigs, mines, construction sites, and many other environments. Without question, RFID is here and now. However, there is a growing need to leverage key partnerships and ecosystems to effectively scale solutions and deliver business value to end users.

As active-based radio frequency and sensor-driven deployments expand, new collaboration choices allow vendors to be more flexible in addressing customer requirements. Thus, RFID ecosystems have been created to enable total solutions and drive growth.

While the RFID industry is long on partnership announcements, it often falls short on partner substance – partners that truly work well together and complement one another. This is an area where ABI Research feels the DASH7 Alliance can differentiate itself.

The DASH7 Alliance serves as an open forum for the exchange of ideas and approaches among all industry participants – from IC manufacturers to end users to academia. This type of collaboration is likely to reduce component costs and make ISO 18000-7-based devices more affordable, particularly in non-defense markets. In addition, competitors have agreed to work together for the common good of the ISO 18000-7 standard. This is another early achievement for the DASH7 Alliance.

In ABI Research's opinion, the growing and diverse participants of the DASH7 Alliance share symbiotic approaches to verticals and applications and a strong desire to enable core RFID value propositions, from the most basic to the most complex. Moreover, the DASH7 Alliance is committed to unifying the alignment of RFID strategies behind the ISO 18000-7 standard, interoperability, and market messaging in order to reach new customers.

Published 1Q 2009

©2009 ABI Research  
PO Box 452  
249 South Street  
Oyster Bay, NY 11771 USA  
Tel: +1 516-624-2500  
Fax: +1 516-624-2501

<http://www.abiresearch.com/analystinquiry.jsp>

**ALL RIGHTS RESERVED.** No part of this document may be reproduced, recorded, photocopied, entered into a spreadsheet or information storage and/or retrieval system of any kind by any means, electronic, mechanical, or otherwise without the expressed written permission of the publisher.

Exceptions: Government data and other data obtained from public sources found in this report are not protected by copyright or intellectual property claims. The owners of this data may or may not be so noted where this data appears.

Electronic intellectual property licenses are available for site use. Please call ABI Research to find out about a site license.