Issue 13 – June 2006

News from .aero

the domain of aviation

www.information.aero

In this issue...

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Welcome

More than one billion people worldwide now have access to the Internet. Impressive as that number is, perhaps even more extraordinary is the imminence of the so-called 'Internet of Things' – the intelligent infrastructure that is being created through the linking of technologies such as RFID, Wi-Fi, 4G networks, with the ubiquitous presence of the Domain Name System (DNS), the database that underpins the Net.

This issue of the .aero newsletter is focused on explaining why the aviation's own community domain is so much more than 'just' the provision of a domain name. Important as some of the basics introduced by .aero have been over the past four years, there are a great many innovations set to be introduced in the years ahead. Most are based on leveraging the DNS to underpin our community's own 'Internet of Things' – which will help make a real contribution to the major tasks facing air transport, dominated by the need to reduce costs and enhance customer service.

As ever, there's a lot happening in the .aero domain – and we want you to be an active part of it. If you have any comments, don't forget to get in touch, at www.information.aero.

.aero team, SITA

The challenge set by RFID community services

RFID (radio frequency identification devices) technology can bring substantial benefits to the Air Transport Community in the form of cost reductions, improvements in productivity, customer services and safety, but also as a means to generate new revenues. As an emerging technology there are still many barriers to community–wide adoption, one of them being the risk associated with the deployment of RFID infrastructure and development of applications. This is a risk that can be substantially reduced through the introduction of a shared infrastructure and service. But how does this relate to .aero and how can .aero leverage RFID to add extra value to partners across the air transport community?

The global supply chain is moving ahead with implementation of RFID, but this is often driven by one major player in the supply chain (such as Wal-Mart).

Shared services offer one crucial advantage. By sharing infrastructure and know-how to operate business processes common to many in the Air Transport community, individual members can cut the cost of building data processing networks for common processes and instead focus on differentiation and the provision of innovative, reliable services to passengers and cargo customers. The same logic applies to adoption of RFID technology, and it is only a matter of time before community services and shared facilities for processing RFID data are introduced.

A number of RFID projects are already under way, but these are mostly one company activities – such as RFID-based baggage handling to speed up processing and accuracy at an airport (e.g. Hong Kong) or the tracking of cargo containers by one carrier or alliance (e.g. Lufthansa's joint venture with Trenstar). Some early adopters in the air transport community can demonstrate business cases for investment in RFID technology on their own, while others struggle. As a result, today's

deployment of RFID technology will not help a bag stranded in a foreign airport find its way to its destination and a container will be only tracked if it moves through the premises of the airline/handling company which tagged it.

From bags to spare parts

However, the community expects that:

- every piece of baggage will be tracked eventually with the help of RFID technology, perhaps from the traveller's home or office through to its destination. While RFID offers the potential of improvement in the processing of bags at the airport (RFID readers read more reliably than bar code readers without a line of sight constraint), the greatest benefit of the technology will be its ability to be integrated with existing IT systems . Technology, coupled with community standards, will allow systems at any airport to identify immediately and automatically a mishandled piece of baggage, collect handling instructions from the airline responsible for the bag and route it to its correct destination.
- similar benefits and more are expected from handling cargo and containers such as ULDs,(unit loading devices) or the management of other asses, used at the airport (e.g. vehicles of all kind) or within an aircraft (e.g. catering trolleys, flight jackets, oxygen tanks etc..).
- Boeing and Airbus are promoting the RFID tagging of aircraft parts, to allow tracking and tracing, to facilitate maintenance and to ensure that no grey parts enter the market.

The benefits of the technology are clear. However, historically the deployment of community-based technologies is slow. The global supply chain is moving ahead with implementation of RFID, but this is often driven by one major player in the supply chain (such as Wal-Mart). The air transport community is different. It is much more homogenous and standards are set by consensus rather than by the mandate of an influential player. Consequently, investment in infrastructure is often shared among community members sharing a common process or processes.

Obtaining consensus and joint investment is currently putting the brakes on the deployment of RFID within the Air Transport community.

So what is SITA doing to help ...

SITA is working with Air Transport community, as well as in partnership with relevant experts (such as the Cambridge UK-based Aerospace ID Technologies Programme launched by Auto ID Labs) to define the community service model – allowing flexibility and choice whilst ensuring that the community benefits from shared facilities. At the heart of this model are two sets of community services – those at shared locations such as airports and those that allow multiple business partners to securely interact with each other globally. SITA is defining the technical details and will be setting up a pilot project.

...and what about .aero?

When .aero was launched, some considered as crazy the idea that an aircraft seat or an individual item of baggage might each have its own IP address. But the idea was not as far fetched as it may seem. In fact, when Auto ID Labs designed the first version of the RFID data processing standard, they assigned a domain name to every RF identifier to allow processing of data over the world's biggest network – the Internet.

Today, the standards are going through many changes, and it may be that not every object will actually require a domain name. It has already become clear, however, that some naming structure will be required to trace these objects – and more likely than not, each will have its own IP address.

This is where .aero as a policy platform comes into play. While .aero is not itself involved in implementation of RFID technology, the .aero policy framework could be used as a robust platform, enabling the community to maintain policies relating to allocation of digital identifiers. Additionally .aero might also manage the registry service associated with these identifiers, thereby making the RFID signal data much more useable.

For more information contact aero.enquiries@sita.aero.

SITA's Voice Exchange and .aero

The imminent introduction of the SITA Voice Exchange will add a further incentive to customers to move towards convergence of voice and data. The technology at last brings together the strengths of IP VPN, the public switched telephone network (PSTN) and the Internet – and it originated in the early development work of the .aero team.

The benefits of convergence are increasingly well understood. At its heart is the fact that – before the introduction of IP telephony – operations, maintenance and customer premises equipment (CPE) was highly distributed and heterogeneous. After the adoption of IP telephony, operations are centralized, while maintenance and CPE are the same as for IP.

An increasing proportion of the air transport community appreciate the benefits. Convergence programmes have been successfully implemented in the US, South America, Europe, Australia, South Africa and India.

The facts are clear: IP is the way to go, via IP VPN and DSL systems. Voice services are increasingly becoming VoIP with PSTN numbering. But convergence will only be complete once the PSTN and Internet are working together transparently.

SITA's Voice Exchange introduces that process by aggregating travel and transport community data, voice (and, in the future, video) traffic for carriage via IP. Crucially, and for the first time, this includes integrating PSTN numbering into a voice community framework. The key feature of the project is that participating members will be able to dial their counterparts seamlessly. The call will be automatically routed to the preferred destination of the dialled participant, whether this is VoIP or PSTN. Airline and airport staff will have one device to call from to make any type of call. Airlines and airports will also be able to configure how they wish to be reached, perhaps even requesting that their recorded voice mails are delivered to their e-mail box.

What has .aero to do with this?

The service is made possible by maximizing the processes and conventions available through the community-owned .aero domain. The key enabling elements are provided by the DNS (Domain Name System, or Service) and ENUM (Electronic NUMbering).

DNS is the crucial distributed database that underpins the Internet by mapping structured names to 'things'. It has almost infinite scalability. A wide variety of information can be distributed using various records defined in DNS. The records may contain host IP addresses or e-mail server addresses – as well as VoIP addresses, phone numbers, fax numbers, individual e-mail addresses, URIs (universal resource identifier) which identify available services, or even public cryptography keys. ENUM is a means of mapping phone numbers to Internet addresses, in the same way that domain names are mapped via the DNS.

The technology is complex, but just as complex is the way the technological and regulatory intersection of the Internet and the Public Sector Telephone Network (PSTN) is handled – including whether telephone numbers (of which there are already billions in place and which are language neutral) or Internet style addresses (using existing styles of Uniform Resource Indicators, or URIs) will be the optimum medium.

Initiated by .aero in 2004

The use of DNS and ENUM was first described in a five page technical concept paper prepared by the .aero team in late 2004. Since then, the concept has been fully embraced by SITA and turned into a major community project in its own right. The entire numbering scheme (ENUM) is being built in a domai name operated within the .aero naming structure – voip.aero.

One forward-looking element of the project is the introduction of a dialling plan based on functions typically used in the air transport community. For example, users or a user application could dial a supervisor on the current baggage management shift of a given airline at a given airport, simply by dialling the mnemonic codes that could easily be associated with this function, such as baggage.gva.lh.aero.

It may be that the dialling process could be even more user friendly, accomplished by the application itself, leaving users time to focus on customers. In either case, the key advantage remains – the airline can itself configure HOW it wishes to be reached. The configuration, as well as any changes to it, are automatically propagated through the DNS system without a caller having to maintain an ever-changing phone number directory. This will foster a dramatic improvement in customer service AND deliver additional flexibility – simply because the destination user does not have to worry that a change of one phone number will require synchronization with multiple parties and carry high transition cost.

To be successful, such a dialling plan has to be open to any user from the community using any service provider. That independence is provided through its location within .aero and maintained as a policy development effort within .aero.

"The next decade will see the Net spread even further and start to become the basic communications infrastructure for almost anything ... the Net will stop being a part of the telephone network. Instead the telephone network will become a part of the Net."

Vint Cerf, the man who wrote the original TCP/IP, in an interview with the BBC.

Internet governance – a view from the world's first community-sponsored domain

On 17 March 2002, .aero the first top level Internet domain to be sponsored and introduced by a specific community sector, opened its doors for business..

With hindsight, it was an obvious step for the air transport community to embrace the idea of creating and running its own top level Internet domain. Although the domain is sponsored and managed by SITA, the agreement negotiated by SITA with ICANN was always premised on the basis of a governance system that ensures the air transport community as a whole remains actively involved in the evolution of standards, the maintenance of the domain's integrity and the pioneering of new services. As such, many of the broadly spread governance issues that have been discussed during the past couple of years have been addressed within this community environment.

Linking with WGIG and WSIS?

In the context of .aero, it is worth reminding ourselves of some of the key points that arose from the Working Group on Internet Governance (WGIG) Report that was placed before the World Summit on the Information Society (WSIS) in Tunis last November.

First, the WGIG August 2005 Report provides the following working definition of the phrase 'Internet Governance': "Internet governance is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet".

The Report goes on to make it clear that Internet governance includes not only issues dealt with by ICANN, but also other significant policy issues, "such as critical Internet resources, the security and safety of the Internet, and developmental aspects and issues pertaining to the use of the Internet".

In terms of global action, the WGIG Report "identified a vacuum within the context of existing structures, since there is no global multi-stakeholder forum to address Internet-related public policy issues" – and went on to propose the "creation of a new space for dialogue for all stakeholders on an equal footing on all Internet-governance related issues". The Tunis Summit approved this proposal with the creation of the Internet Governance Forum, which was meeting for the second time in Geneva as this newsletter went to press.

This is where the air transport community's experience through a sponsored domain assumes such relevance.

When the Internet was first introduced, many of the ICAO and IATA designators and codes were legitimately taken as domains by companies and organizations that had nothing to do with air transport (e.g. sas.com is not the airline but the software services company). With millions of domains registered using almost every word in the English language, predictability is crucial. So the .aero domain has gradually introduced a structured naming convention based on the long-established designators and codes, without in any way conflicting with those air transport businesses that have a well-established Internet presence via the company name and top level or country domains.

Currently, all existing airport and airline codes are pre-registered by SITA and reserved for the use of designated code holders.

Thanks to these conventions and the strict eligibility verification processes, implemented by SITA on behalf of the community, there has been little evidence of any hijacking of domain names in the .aero domain, and little evidence of cybersquatting or domain name speculation in the three and a half years since the .aero domain was introduced.

So what will happen in the future?

Magical as the Internet undoubtedly is, the public domain structure is a mass-market solution that can be inflexible, inconsistent and insecure. By leveraging the advantages of the domain name system (DNS), even greater certainty, predictability and flexibility can be achieved for the benefit of those using .aero domains. For those within the community, for anyone having contact with an air transport community-related business, the guaranteed convention for airlines and provides certainty, transparency and predictability.

"I have always imagined the information space as something to which everyone has immediate and intuitive access," wrote World Wide Web inventor Tim Berners Lee in his book Weaving the Web, (HarperSanFrancisco 1999). Thanks in large measure to the predictability of the naming structure and the exclusive nature of the .aero domain, that expectation could be met in a variety of ways to the benefit of passengers and operators. These are just some of the ideas that we have been considering in recent months:

- Passengers could complete transactions from any Web-enabled device relating to a specific flight and date, including flight alteration and payment.
- Passengers could access and pay for services such as airport parking and duty free goods - simply by knowing the three letter airport identifier and .aero suffix.
- Passengers, airlines and airports could administer and process elements such as lost luggage through the use of predictable e-mail addresses.
- Aircraft themselves can become a network: an engine can have its own IP address and communicate remotely with ground maintenance.
- Containers for cargo (known as unit load devices, or ULDs) can be given their own .aero addresses.

The ability to present this level of joined-up thinking over the development and evolution of the Internet depends on the operation of a domain that offers security and predictability to domain name owners, together with transparency and predictability for users.

The option of a sponsored domain for global communities run along the lines of .aero – based on the needs and aspirations of that community within the broader community, run by that community for the benefit of its members and for the broader community at large – has much to recommend it in resolving issues of governance and future development.

Of course, what suits the air transport community will not necessarily suit other communities. And there is no doubt that issues of root server security, stability and interoperability need global coordination. But it is surely better for an identifiable community, to be able to retain the maximum freedom for innovation and the evolution of communal standards, than to be governed wholly by a dominant global body applying generic standards and policies. That was the basis on which ICANN agreed to endorse the introduction of the .aero domain – and it remains the guiding light for the .aero domain, its sponsor and its community as a whole.

* This article is based on an essay prepared for the Council of European National Top-Level Domain Registries (CENTR) and published as part of the Council's WSIS input.

More than just the provision of a domain name, .aero is enabling air transport to leverage the benefits of a complex world

The air transport community is working hard to save billions in annual costs through initiatives such as IATA's Simplifying the Business programme, focused on five core projects: e-ticketing, common use self-service (CUSS), bar-coded boarding passes, RFID and e-freight. Each of these areas depends on technology – and underpinning the technology is the need for secure, predictable communications, with .aero increasingly able to provide the enabling, relevant and neutral standards.

A longtime observer of the air transport industry, Ian Tunnacliffe of Travel Technology Research, appeared to contradict the logic of the Simplifying the Business theme when speaking at SITA's 2005 Airline IT Summit. He suggested that IATA's programme is about preserving complexity, not simplifying it.

Thankfully, he went on to clarify his comment. The programme, he said, is about hiding complexity from customers and staff, lowering the cost of complexity and delivering improved service levels. Edward Nicol, Director of Information Management and CIO at Cathay Pacific, took the same tack when he said that: "External customer-facing simplicity often leads to internal supporting complexity. So while simplicity is 'in', so is complexity – 'good complexity', that is. The trick is to get the balance right. IT should have a huge role to play in all this".

The role of the .aero top level domain in facilitating the dimension change needed at a community level is becoming more self-evident, as the evolution of the domain name system (DNS) and Internet technologies and standards themselves evolve. Talk of .aero as the enabler is valid and true.

Global standards, open systems

Building on the well-established predictive naming conventions commonly used within the aviation community, the .aero top-level domain offers the opportunity to develop community-wide Internet standards to take advantage of cost effective means of communications, while also retaining the flexibility of open systems and security for all participants.

The existing communications infrastructure continues to prove robust. But it is widely recognized that the transition to Internet-based communications offers the potential for significant cost savings to the air transport community. Those companies that have already transitioned to the Internet have done so on a case-by-case basis or within alliances, but there is now a realization that this bespoke approach, which offered advantages to first adopters, lacks flexibility and does not deliver the cost saving effect traditionally enjoyed by the community from solutions based on community standards.

The Internet's Domain Name System (DNS), the technology behind .aero, is arguably becoming the world's largest distributed database, tracking a wide variety of elements such as Internet addresses, phone numbers or even individual products. The potential is exemplified by the introduction of RFID processing technologies (one of IATA's SimpliBiz elements), that work most effectively by linking with the DNS.

The point was forcefully made by Viviane Reding, the European Union Commissioner responsible for the Information Society and Media, in a keynote speech at the recent International CeBIT Summit in Hannover, Germany: "RFID technology as we know it today will evolve and reach unprecedented levels of functionality, of memory storage and processing capabilities. In the near future, we will see the breakdown of the boundary between cyberspace and real space. The worlds of data and things will merge so that the virtual world of the Web will be rendered physical as we move towards – what computer scientists have called 'the Internet of Things'. "We're heading for a world in which billions of networked objects and sensors will report their location, identity, and history. Such a phenomenal development, hard to imagine not long ago, should open up tremendous opportunities for both economic prosperit and the quality of life of citizens. For instance, over the next 50 years, the innovative marriage of RFID tags, sensors, Galileo, 4G networks, Wi-Fi and artificial intelligence, will create an 'intelligent infrastructure' that has the potential to dramatically reduce congestion and pollution, and enhance security, passenger monitoring and comfort."

For the air transport community, RFID offers a technology that allows for accurate tracking and tracing of things such as baggage, spare parts, cargo and asset management. This can be effectively teamed with the policies and naming conventions of the .aero TLD to create a solid foundation for a secure and reliable systems for community applications, becoming the aviation community's own 'Internet of Things'.

Nor does the potential for RFID stop at baggage tracking. There are many other potential uses for RFID within the air transport community, including the tracking of aircraft spare parts, ULDs, and even passengers who fail to arrive at the boarding gate on time.

"External customer-facing simplicity often leads to internal supporting complexity. So while simplicity is 'in', so is complexity – 'good complexity', that is."

Edward Nicol – Director of Information Management and CIO at Cathay Pacific

Other benefits from the magic of DNS

There are other important applications that will benefit from the DNS technology. They include these examples:

- Airline e-ticketing applications must be able to establish rapid and reliable links with an interline partner's application. Today, each interline systems needs to maintain a list of IP addresses that describe the network locations of their counterparts, very much like a person would maintain a phone book. When one system moves to another location, all partners have to update their 'phonebooks' before they can talk again. This is an administratively complex exercise. Deployment of DNS technology and the application of standard naming conventions would vastly improve the flexibility and scalability of current systems and remove costs associated with maintenance of this information by each carrier.
- Domain name holders can configure a VoIP address associated with a given predictable name so that callers can use their VoIP application to place a call. For example gva.dcs.lh.aero zone could contain a VoIP address for Lufthansa's departure control at Geneva Airport (see article on SITA's Voice Exchange on page 00).
- One domain name can identify an array of services, since multiple records of different types can be associated with one domain name. For example, gva.bag.lh.aero could be used by different systems to locate a phone number, fax number, e-mail address or Web service URI relating to baggage processing at Geneva Airport.
- DNS applications already 'parse' RFID values to locate a system that supports data provided by the manufacturer. Baggage management systems can follow the same method of data processing as interline e-ticketing – storing data relating to a bag in the database of the originating airline. In this scenario, the application can parse bag identifiers (RFIDs or barcodes) to locate the database of the originating airline. The same logic can apply to any other identifiers.

What does this mean for the aviation community and .aero?

The world will move forward with or without .aero. The .aero team is making no claims to 'own' the world. But the .aero initiative was created as a place where air transport policy and Internet policy can meet.

As a dedicated community resource, the .aero team can and does develop policies, with the full involvement of the air transport community, for the use of the .aero TLD. We ensure that relevant standards are in place to operate community specific domain naming structures and underlying networks, and work to create a low-cost infrastructure for further exploitation of ID technologies such as RFID.

This dedicated community resource represents an excellent platform on which to base secure, simple and low-cost new RFID applications, and from which to foster the development of .aero as a key resource for new community-wide information systems.

The importance of this platform can also be understood when considering the wider use of RFID. Commissioner Reding also made this point in her CeBIT address: "Technical developments will eventually make it feasible to give virtually every object on Earth an Internet identity! This means that we will be confronted with a new debate on the governance of the Internet: the governance of the 'Internet of Things'. This will be essential given that the root servers matching RFID tags to information about products will carry important economic intelligence".

More than just a domain name: .aero's activities and vision

The .aero top level domain is first and foremost an aviation community initiative. Sponsored by SITA, it comprises three sets of activities:

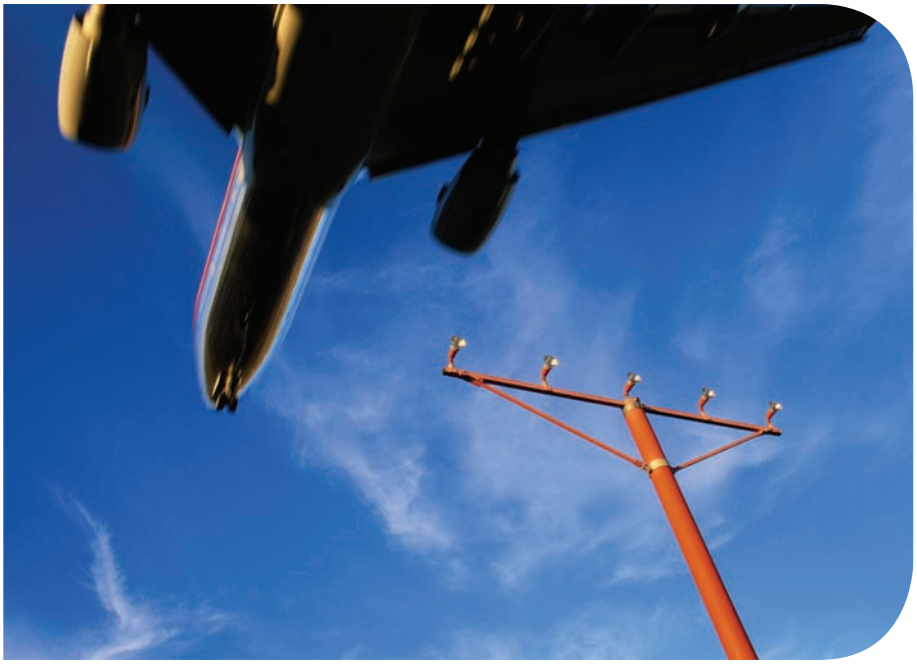
- Operation of a world class registry service for the .aero top level domain and distribution of .aero domain names to aviation entities, organizations and individuals.
- The development and maintenance of policies for, and on behalf of, the aviation community in close consultation with major aviation associations and organizations represented in the Dot Aero Council.
- The development and promotion of innovation opportunities based on structure use of the DNS– the technology behind .aero.

It was a visionary step to apply for sponsorship of the .aero TLD, back in the year 2000. When SITA did so, it had an approximate understanding that the underlying technology (DNS) might one day be an important factor in leveraging the Internet to build flexible and cost effective communication systems.

However, any doubts about the directions of technology development that may have been present in 2000 were rapidly dissipated once the DNS was embraced as the key underlying technology to bridge classical telephony and Internet into one unified framework of communications, using a standard based on DNS called ENUM.

Today, the .aero registry is fully operational, running on world class technology operated by Afilias, a technology company powering some of the largest TLDs in the world, including the .org and .info domains. There are six .aero distributors and well over 4,000 domain names have been registered since the launch in March 2002.

With the registry fully operational and distribution channel in place, the .aero initiative is now focusing on fulfilment of its vision – to be the enabler that allows the air transport community to build contemporary communications systems based on next generation network technologies.



"Technical developments will eventually make it feasible to give virtually every object on Earth an Internet identity! This means that we will be confronted with a new debate on the governance of the Internet: the governance of the 'Internet of Things'. This will be essential given that the root servers matching RFID tags to information about products will carry important economic intelligence."

Viviane Reding, the European Union Commissioner responsible for the Information Society and Media

RFID and ENUM deployments promise to slash costs and strengthen airlines' strategic future

CIO's today in the air transport industry must make wise spending decisions and provide strategic direction that improve productivity, efficiency and deliver better customer service. The .aero domain, with its strong policy framework, versatility and focus on the aviation community provides excellent leverage for the continued growth of the industry's technology solutions.

In 2004 Afilias successfully operated the pilot ENUM registry for Ireland. Its technical experts participate actively in many standards organizations such as ICANN, the IETF, the W3C, and the EPC Global EPCIS Discovery Services Working Group.

Afilias Global Registry Services, the technology provider for the .aero domain, is expanding its service offering to include support for ENUM and RFID services for the aviation community.

SITA's 2005 survey shows that 75% of airports will have invested in and deployed an airport-wide communication network to support new services such as VoIP by 2007. ENUM services, which route telephone calls through existing Internet connections, have the added benefit of providing secure and private Voice over IP (VoIP) networks without a significant hit on the capital or operating budget. For example, contact information for each individual can be stored in hierarchical order within the ENUM database, providing a virtual telephone exchange with each ENUM identifier. Since airlines have already heavily invested in purchasing IP networks, they can leverage these networks to implement

private VoIP systems using ENUM, and ultimately realize savings in long distance costs between members of their network. Using ENUM as a central database can also help in the initial transition period, as it is capable of keeping track of whether the caller is using a traditional or VoIP PBX.

The global coordination of rules developed for each national numbering system has often been a roadblock in implementing ENUM seamlessly. As a global top level domain under the full control of aviation community, .aero is in control of its naming conventions and can facilitate faster deployment of ENUM, for the benefit of its community.

RFID and its associated services have been the subject of a lot of attention of late. From Afilias' perspective, RFID solutions, especially those that are shared by the utilization of service providers, hide the complexity and reduce the cost of deploying RFID with a community standpoint. Many companies are starting to use RFID tags for asset tracking and inventory management. RFID related services, such as EPCIS Discovery Services, will permit partners of supply chains to locate one another and securely exchange relevant data surrounding RFID tagged products. Currently under development, EPCIS Discovery Services aims to be a standards compliant and globally available system that enables other existing RFID services. EPCIS Discovery Services that will be offered by Afilias will provide individual networks that companies can implement outside of the broader EPC global network to connect their specific member partners across their own RFID network.

Afilias is a pioneer in the development of next-generation registry technology and has specialized in globally available database and DNS operations since its founding in 2000 by a group of industry leading domain name registrars. Afilias has been the first to launch many registry technologies such as a gTLD registry based on the newest registry standard, Extensible Provisioning Protocol (EPP), and was the first registry to implement an RFC-standards compliant Internationalized Domain Name (IDN) solution.

Afilias is continually investing in R&D needed to support technology enhancements and extendable lines of business. In 2004 it successfully operated the pilot ENUM registry for Ireland. Its technical experts participate actively in many standards organizations such as ICANN, the IETF, the W3C, and the EPC Global EPCIS Discovery Services Working Group. Afilias believes in contributing to development of standards needed for better and more reliable and advanced global information technologies. Afilias is keen to build on its expertise and support SITA and the air transport community to implement specialized solutions in VoIP (ENUM) and RFID, for more information Contact Ajay Nambiar at anambiar@afilias.info.

Afilias℠ GLOBAL REGISTRY SERVICES

This article was submitted by Afilias Global Registry Services. Afilias Global Registry Services (www.afilias.info) supports more than 7 million Internet domains including .info, .org, .aero,. mobi, and many country code domains, and offers private RFID and ENUM registry services customized for industry verticals such as the air transport industry.

SITA's 2005 survey shows that 75% of airports will have invested in and deployed an airport-wide communication network to support new services such as VoIP by 2007.

DNSSec workshop explores future air transport usage

The air transport community increasingly relies on the Internet to transmit business messages, yet the risk that a message will be altered when passed between servers ranks high among the top security challenges faced by the Internet's domain name system.

This is one of the conclusions made in a pre-publication issue of "Signposts in Cyberspace", a new study from the US-based National Academies Press.[1] The same study recommends that the Internet community focuses on implementing DNSSec. This protocol was born of the need to keep Internet navigation safe for the transmission and communication of sensitive and critical data and as a means of avoiding many (but not all!) of the vulnerabilities facing the current DNS infrastructure.

The extent to which DNS is rising in the political agenda was also evidenced recently by the announcement of the US Government's new Federal Plan for Cyber Security and Information Assurance Research and Development. Issued by the White House Office of Science and Technology Policy, the Plan provides a blueprint for coordination of Federal R&D across agencies that will maximize the impact of investments in this key area of the national interest. A preprint, available at www.nitrd.gov/pubs/csia/FederalPlan_CSIA_RnD.pdf, notes the expanding role of the domain name system, and with it, an increased need to assure the authenticity of DNS responses and an increased possibility that the DNS itself will be targeted for attacks.

While DNSSec still faces a level of skepticism and resistance, some community sectors and governments in particular are working on DNSSec deployment schemes to handle more effectively fraud threats that might undermine consumer trust in electronic transactions. DNSSec is expected to become a vital Internet security infrastructure component, a cryptographic key management mechanism for many security solutions – for example to reduce e-mail spam and to deploy dynamic virtual private networks.

1 Signposts in Cyberspace, The Domain Name system and Internet Navigation, National Academies Press 2005 (ISBN 0-309-54979-5), www7.nationalacademies.org/cstb/dns_prepub.pdf

As in so many other cases, a new technology will generally be adopted more quickly if it can do more than address general threats. Adoption usually starts around a number of small, clearly defined scenarios, where benefits are clear and solutions can be designed with a minimum level of investment and with very practical results. For example, an airline using data received via the Internet to maintain its aircraft needs to be sure that the data is appropriate for the aircraft, has not been modified in transit and comes from an authoritative source, such as an authorized employee of the manufacturer or OEM.

October forum dates

To help customers understand the technology better and identify cases specific to air transport, the .aero team, together with SITA and ARINC (both members of Dot Aero Council), are arranging a workshop as a part of the digital security stream at the US Air Transport Association's (ATA) annual e-Business Forum from 18-20 October in Louisville, Kentucky.

The workshop will focus on two subjects:

- building awareness among airline and aerospace IT experts about the technology and its potential, primarily based on examples from other industry sectors; and
- determining where and to what extent this technology can help create cost effective security solutions in the air transport community – and how that fits with digital security standards currently under development within the ATA's digital security working group.

The .aero team has invited representatives of the DNSSec deployment initiative – organized under the auspices of ICANN's security and stability committee and supported by the Science and Technology Directorate of the US Department of Homeland Security – to participate in the workshop. They will explain and demonstrate the technology, and discuss how it may impact deployment of Internet-based technologies across the air transport community.

Solving problems

One essential issue currently preventing faster deployment of Internet-based technologies within air transport is the lack of a cost-effective and flexible mechanism to distribute public keys. On the other hand, DNSSec introduces cryptographic material in the DNS and allows for the addition of other (non-DNS) keys.

A solution based on DNSSec in a controlled domain name space could well help address this issue. Such a facility, used in conjunction with other, existing, technologies for end-to-end authentication, could greatly enhance productivity, efficiency and the flexibility of community systems. The need for such solutions has already been recognized – for example an "Identity management" presentation from Jim Homer at Lockheed Martin (to be found at www.tscp.org) concludes that "Each namespace approach (DNS, LDAP) can offer part of the total solution". In short, the biggest potential of this technology for our community is in its promise to simplify distributing public keys between members of ATI. Whether or not this is a real promise will be the subject of discussion during the workshop.

The workshop is also open to SITA IT summit attendees. For more information, please contact marie.zitkova@sita.aero.

What is DNSSec?

DNSSec (short for DNS Security Extensions) is a technology that adds security to the Domain Name System. It is a hierarchy of cryptographic signatures that assure the integrity of DNS queries by providing origin authentication of DNS data, data integrity and authenticated denial of existence. These measures protect against tampering in caches and transmission and enhance infrastructure security, thereby contributing to increased trust in the Internet – as well as the systems, services and markets that rely on its secure operation.

DNSSec is expected to become a vital Internet security infrastructure component, a cryptographic key management mechanism for many security solutions – for example to reduce e-mail spam and to deploy dynamic virtual private networks.

.aero at EBACE

The .aero team took on a new hospitality role in early May, when they hosted the Internet café at the sixth Annual European Business Aviation Convention & Exhibition in Geneva – the only major European event focused solely on business aviation. Jointly organized by the US-based National Business Aviation Association (NBAA) and the European Business Aviation Association (EBAA), this was the strongest event in the show's six-year history, with almost 10,000 attendees, up 27 percent on last year.

Highlights from the event – including articles, photos, podcasts, transcripts and PowerPoint presentations – are posted on the official EBACE web site at www.ebace.aero.

The opportunity to learn more about .aero was enthusiastically taken by a wide range of visitors – with many requesting their .aero ids. Many identified with the logic of aviation having its own exclusive Internet space – including consequential benefits, such as the online directory. This segments the industry into specific groups – offering faster search but also an opportunity for those companies with memorable names and the .aero suffix to stand out as specialists in aviation.

We were also delighted to see a number of .aero users exhibiting at the event. They included:

- **www.jetex.aero** – headquartered in Dubai, Jetex Flight Support is an executive charter flight operator and aviation services provider. The company owns and operates six executive aircraft, and also supports other operators with worldwide clearances, flight planning, ground handling arrangements and credit fuel uplift.

Photo courtesy of Flutra Osmani

Photo courtesy of Flutra Osmani

- **www.spectrum.aero** – US-based Spectrum Aeronautical makes the Spectrum 33 all-composite business jet, with 2+7 passengers. Currently under flight testing with FAA with certification expected by the end of 2007, the price per aircraft is currently set at US$ $3.65 million.
- **www.thommen.aero** – Swiss-based Revue Thommen specializes in designing and manufacturing electro-mechanical and solid state aircraft instruments such as altimeters, airspeed indicators, vertical speed indicators, clock chronographs, engine and cabin instruments as well as digital air data computers.
- **www.rusaero.aero** – Rusaero is the company is market leader in the provision of ground handling services in Russia and the CIS.
- **www.jeteng.aero** – UK-based Jet Engineering Technical Support (JETS) serves the business aviation and regional airline sectors with maintenance and technical support.

News from the .aero domain

Changes to the registration process, reductions in registration fees

Following successful transition of registry services to Afilias, the new registry operator for .aero, a number of enhancements have been made to the name registration process. This includes a cut in the time it takes to register a domain name to less than five minutes – thanks to improved DNS speed resolutions.

The .aero registry now operates on the world-standard Extensible Provisioning Protocol (EPP).The upgrade allows increased flexibility, standardization, and access to a broader distribution channel of ICANN-accredited registrars. In turn, this has lead to a reduction in the price of domain name registrations. For example, the retail price for domain name registration can now be as low as 45 euros.

Manage your .aero ID on-line

A new online tool has also been implemented that allows potential .aero domain name registrants to apply for their .aero ID and subsequently manage it in a simple and expedient manner. The .aero ID is a prerequisite for registering .aero domain names, and is issued as part of a unique validation process that screens potential domain registrants – so ensuring the integrity and exclusivity of the .aero domain.

New policy to protect names of states, provinces and geographical areas

Following recommendations from the Dot Aero Council (DAC), SITA has introduced a new .aero policy reserving domain names relating to states, provinces and geographical areas, effectively removing these as registration options. The names join the existing list of reserved country names.

Names that had already been registered at the time the new policy came into force will automatically become reserved as soon they expire (un-renewed) or are deleted by the current registrant.

The new policy ensures that the .aero TLD continues to manage the standardization of naming schemes within .aero to the benefit and use of the community as a whole.

The DAC has also upheld the recommendation that all registration in sub-domains other than airline.aero and airport.aero remain suspended. In addition, they endorsed have SITA's proposal to modify the current policy, so that sub domains remain assigned to their current registrant groups whilst specific registration rules of sub domains are being defined.

The new policy has been published in the revised Domain Management Policy document, effective 3 April 2006. This can be found at www.information.aero, where a full list of reserved domain names may also be viewed.

Members of the aviation community who would like to see a change in policy – or would like to propose a new policy – can make such a request to their sector representative on the DAC, or directly to SITA.

For further information, see the .aero domain policy page at www.information.aero.

SSAC advisories

The ICANN Security and Stability Advisory Committee, formed in 2002 to advise on the security and integrity of the Internet's naming and address allocation systems, has recently published two important advisory notices. The following paragraphs are quoted verbatim from the executive summaries1.

ICANN SSAC Advisory SAC008: DNS Distributed Denial of Service (DDoS) Attacks

In early February 2006, name servers hosting top level domain zones were the repeated recipients of extraordinary heavy traffic loads. Analysis of traffic by TLD name server operators and security experts at large confirmed that DNS packets comprising the attack traffic exhibited characteristics associated with previously attempted DDoS attacks collectively known as amplification attacks.

This advisory describes representative incidents, identifies the impacts, and recommends countermeasures that TLD name server operators can employ for immediate and long- term relief from the harmful effects of these attacks. Certain countermeasures may adversely affect legitimately operated domain name resolvers whose configurations contribute to the success of DDoS attacks; specifically, by operating in the manner they do, some resolvers facilitate DNS amplification attacks. Countermeasure that name server operator might implement to assist in their timely restoration of normal service could also adversely affect name server operators who rely on the service they provide. TLD operators may need to take specific measures to assure they do not worsen the effects of the attacks.

Respected security organizations and advisory groups worldwide encourage name server operators to adopt measures to disable open recursive service and to protect their infrastructures against DDoS attacks. SSAC joins these organizations and makes the following recommendations:

Recommendation (1): For the long term, SSAC recommends that the most effective means of mitigating the effects of this and numerous DoS attacks is to adopt source IP address verification.

Recommendation (2): SSAC specifically recommends that each ROOT and TLD name server operator should:

- Document operational policies relating to countermeasures it will implement to protect its name server infrastructure against attacks that threaten its ability to offer service, give notice when such measures are implemented, and identify the actions affected parties must take to have the measures terminated.
- Respond faithfully and without undue delay to all questions and complaints about unanswered traffic, and
- Act with haste to restore service to any blocked IP address if the owner of that IP address can demonstrate that it has secured its infrastructure against the attack.

Recommendation (3): SSAC recommends that name server operators and Internet Service Providers consider the possible remedies described in Section 3 of this Advisory. In particular, SSAC urges name server operators and ISPs to disable open recursion on name servers from external sources and only accept DNS queries from trusted sources to assist in reducing amplification vectors for DNS DDoS attacks.

ICANN SSAC Report SAC009: Alternative TLD Name Systems and Roots – Conflict, Control and Consequences

This report examines alternative root server systems and alternative TLD name system administrators generically, i.e. according to the characteristics SSAC associates with a class of operator rather than by the characteristics of individual operators. By elevating our examination to this level, we can focus on the common characteristics of each class of operator, and perhaps more accurately assess whether TLD name system administration and root name service operation of a given class create security and stability issues.

The Committee offers these findings and recommendations in the spirit of open review, comment and evaluation, with the expectation that they will be considered carefully before they result in action.

- **Finding (1):** SSAC can find little evidence to support claims that commercial alternative TLD name systems have or will attract a significant market share to fragment the root. Registrants who register names in alternative TLD name systems may encounter barriers to an estimated two trillion dollar ($ USD) e-commerce market, to global business-to-business collaboration, and to tourism, and other opportunities. Registrants who attempt to support global mobility for end users may be similarly affected when mobility solutions require universal resolvability. This is particularly important for the air transport community, because in this scenario the global traveller can no longer rely on the Internet to access the same Airline website gloablly.
- **Finding (2):** Sovereign nations and multi-national alliances that will not wait for ICANN to adopt a internationalized TLD policy and that choose to follow policy directions opposite to those arrived at using the ICANN collaborative policy development process can fragment the root. Many political reasons exist for countries to choose this course. ICANN cannot control how nations and alliances behave, but should (continue to) work with all parties towards a technically sound solution that is best for the Internet community.
- **Finding (3):** At a technical level, multiple methods for supporting international languages and scripts in top level domains labels (internationalized Domain Names) exist. ICANN has announced a time line for the development of a project for the technical test of internationalized TLD labels. SSAC believes that the technical test plan is essential. Technical alternatives must be evaluated, a choice must be made, and trials must be conducted to assure that the root level of the DNS is ready for a production environment before a consensus policy might be reached.
- **Finding (4):** ICANN will find it necessary to increase the number of TLDs to accommodate internationalized TLD labels and continued commercial interest. The root name server operations can accommodate a substantial increase in the size of the root zone. However, the technical aspects of name service are but one factor to consider. ICANN must review the existing TLD approval process as well as the processes whereby TLDs are introduced into the root zone (for subsequent ongoing administration) to ensure that all operations associated with adding TLDs can support the increase in TLDs.

On the basis of these findings, the Committee makes the following recommendations:

- **Recommendation (1):** ICANN and the community at large should take appropriate measures to ensure that a thorough analysis of two candidate methods for encoding strings in TLD labels - DNAME Equivalence Mappings and use of IDNA encodings – is concluded quickly. Based on the conclusions and recommendations of parties responsible for this analysis, ICANN should adopt the preferred method.
- **Recommendation (2):** ccTLD registries should actively participate in the ICANN IDN Experimental Testbed projects and provide their perspectives on the implementation of "internationalized" TLD labels in the root. SSAC recommends that ccTLD registries and national or regional linguistic organizations not implement standalone or alternate TLD schemes until the results of the IDN Experimental Testbed are evident.

The full content of the SSAC Advisories quoted here can be found at: www.icann.org/committees/security/dns-ddos-advisory-31mar06.pdf, and www.icann.org/committees/security/alt-tlds-roots-report-31mar06.pdf

TLD operators may need to take specific measures to assure they do not worsen the effects of the attacks.

Come meet with .aero and let us demonstrate we are more than just a domain name

Proving that .aero is far more than just a domain name, delegates to the SITA IT summit, Brussels will be able view a demonstration of SITA Voice Exchange, a service that was made possible by maximizing the processes and conventions available through the community-owned .aero. Visitors will also have the opportunity to meet with Afilias, their new .aero registry operator.

Not only does Afilias provide registry services that leverage proven Internet technology to deliver fast, reliable and secure service, but the company also offers support for the operation of new technologies such as ENUM and RFID. With .aero staff, delegates will have the chance to discuss the role of .aero as an Internet technology enabler its links to RFID, e-ticketing and digital identifiers.

Industry events

Airline IT Summit 2006: Thursday 22 June – Brussels, Belgium
Business simplification is a way for all airlines to transform their organizations – reducing their cost base and gaining efficiencies. Now carriers also need to increase their efforts to differentiate their service to become more competitive – integrated information and communication technology (ICT) solutions are key.

Jointly hosted by SITA and Airline Business the summit will also reveal initial results from the annual Airline IT Summit trends survey. Results of the survey are limited to survey participants and the summit attendees.

For more details visit - www.sita.aero

NBAA 59th Annual Meeting & Convention October 17, 18, 19, 2006 – Orlando, Florida
The world of business aviation will be in Orlando October 2006 for NBAA's 59th Annual Meeting & Convention. Over 1,100 Exhibitors will be featured with more than 110 aircraft on display. A comprehensive schedule of Informational Sessions will keep all abreast of timely issues impacting the business aviation community. Make your plans now to be part of the one event that nobody in business aviation can afford to miss.
Visit www.nbaa.org for more information.

ATA e-Business Forum October 18, 19, 20 – Louisville, Kentucky
This educational forum will provide a high level overview of the latest developments in information exchange for the commercial aviation industry to support engineering, maintenance, materiel and flight operations. In addition to learning about the industry's most widely accepted e-business specifications (iSpec 2200 and Spec 2000), learn about a new industry initiative to develop a single technical data standard for commercial and military applications (AIA/ASD S1000D).
For more information visit http://www.ataebiz.org/forum/

ACI Word General Assembly Conference & Exhibition November 7,8, 9,10 2006 – Cape Town, South Africa
Once a year, leaders in the aviation industry gather to debate present and future issues, share experiences and exchange ideas at the ACI World Annual General Assembly.

For more information on this event please visit www.aciworld.aero.

Online information and late breaking news are available at www.information.aero
e-mail enquiries to aero.enquiries@sita.aero

This newsletter is issued by SITA, the Sponsor of the .aero Top Level Domain. SITA also operates the official .aero web site www.information.aero – providing information about domain registrations, policies and procedures and new developments in the .aero domain.

If you would like to comment on any of the articles in this issue or you would like more information, please contact our editor, Paola Piacentini, at aero.enquiries@sita.aero

News from.aero – the domain of aviation

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