SPT (Simplifying Passenger Travel)

A New Dimension in Travel

With the advances in new technology, we are on the verge of an era of greater comfort and safety in travel brought on not merely by an extension of conventional methods but a completely new dimension of travel that utilizes biometrics and information technology.

The airport has numerous checkpoints. First, the check on passports or driver's license at the airport gates. Next, the check-in baggage screening at the terminal and the passport check at the airline counter. Then comes the passenger screening and outbound passport control. And finally, another check at the boarding gate. (Not required by some airlines)

The trend in recent years has been to simplify these complex procedures by using biometric technologies, automatic check-in machines, electronic mediums for storing travel data and various other means.

Also, since the September 11 terrorist attacks in the US, airports around the world have had to step up security screening and improve security systems as well as install hi-tech devices that use iris and fingerprint recognition and other forms of biometric technologies to prevent terrorists and criminals from boarding aircraft and entering the country.

The numerous Simplifying Passenger Travel (SPT) projects that are underway across the world bring these two lines of development together in simplifying travel procedures and improving security both at the same time.

The e-Check-in project at Narita Airport is the launching pad in Japan for the global SPT drive. NAA carried out e-Check-in proving trials in fiscal 2002 using iris and facial profile recognition in conjunction with Japan Airlines under the direction of the Ministry of Land, Infrastructure and Transport.

In fiscal 2003, it carried out trials with all Nippon Airways passengers on advance check-in using mobile telephones, and simplified procedures through the use of facial profile recognition. It broadened the scope of the trials with Japan Airlines and worked with Incheon International Airport in Korea on international trials with non-Japanese participants.

In these trials, priority lanes were set aside for passengers who had pre-registered their biometric data, passport information and other details. Because of the reliability of these passengers provided by the pre-registered information, automated verification using biometrics simplified the vetting process and streamlined the procedures. The time saved could also be devoted to more lengthy checks on all other passengers, thereby improving security.

However, the scope of these trials only included airline check in, security check and boarding procedures; passengers underwent passport control in the conventional manner.

Then in fiscal 2004, the Japan Government looked at the inclusion of IC chips on passports and related airport procedures based on the e-Japan Strategy II Accelerated Package of February 2004 and set out the parameters for e-Passport proving trials to be conducted jointly by the relevant government ministries headed by the Cabinet Secretariat.

IC passports issued by the Foreign Ministry to diplomatic passport holders for the trials and IC cards (SPT cards) issued by the Ministry of Land, Infrastructure and Transport provide passenger identification and are used in airline check-in and boarding procedures as well as passport control through the cooperation of the Justice Ministry as a means of testing their application for all passenger procedures at international airports. This enables testing for the simplification of all departure proceedings including check-in, security check, outbound passport control and boarding.

The e-Check-in project conducted by the Ministry of Land, Infrastructure and Transport will be continued, but as part of the coordinated e-Passport proving trials by the Cabinet Secretariat and other related ministries. The SPT drive will undoubtedly pick up pace as it links up with e-Check-in, the Foreign Ministry's e-Passport and the Justice Ministry's passport control automation.

In fiscal 2005, the Government announced its new IT revolution strategy, vowing to promote SPT in Japan with

respect to personal identification and procedural automation to facilitate safe and speedy airport procedures by fiscal 2008, and to offer international interoperability within East Asia by fiscal 2010.

Accordingly, the coordinated e-Passport proving trials that were conducted in fiscal 2004 were continued in fiscal 2006 so as to review departure procedures and the SPT trials of 2007 were implemented to assess the feasibility of combining check-in and outbound passport control procedures.

In practical terms, the objective is to provide the option of simplified inbound and outbound procedures particularly for frequent travelers by integrating airline boarding procedures at the passport control checkpoint using self check-in kiosks in conjunction with the biometric identification verification system for passport control procedures, Automated Gates, which were introduced on 20 November 2007 by the Ministry of Justice. The trials aim to improve security and simplify travel procedures with the use of IC cards known as trial SPT cards issued by the Ministry of Land, Infrastructure and Transport containing biometric identification information and passport details.

During the trial period, passengers on ANA and JAL services departing from Narita were asked to participate voluntarily at Terminal 1 South Wing and Terminal 2 South passport control areas. An SPT demonstration corner was also set up in the Terminal 2 departure level to enable a wide range of customers to try out the new passenger procedure model.

Around 2,300 customers took part in the trials and when surveyed, (approx. 70% responded), more than 80% of the participants felt that the initiative would help curb procedure times at the airport.

For the moment, the Automated Gates are still in operation. Passengers wishing to make use of the service can pre-register their fingerprint information either at Immigration or the passport control area at Narita Airport to complete their outbound passport control procedures. It is expected to streamline passport control procedures and facilitate suitable control by way of computerization.

Although this trial stage is just the beginning, the ultimate goal is the ability to identify people wherever they are in the world and to have on hand at all times necessary information related to travel. Conventionally, this was done by means of the photograph affixed to the passport. However, in this age of terrorism, it must be assumed that there are people with malicious intentions and conventional methods of ID inspections are no longer able to respond sufficiently. When biometrics is perfected and made available throughout the world, air travel will enter into a new dimension of safety.

SPT

SPT is the abbreviation for Simplifying Passenger Travel and was first aired in February 2002 with the objective of simplifying the complicated travel procedures endure by passengers. The principal members of the project are the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO), airport founders, operators, airlines, immigration authorities, Customs, and aviation related businesses, etc.

One Stop Check is the phrase used to express the vision of the project. The principal component is simplified travel so that all necessary travel information is distributed simultaneously to the relevant organizations during one check-in procedure, thereby allowing all of the procedures to be completed more quickly and efficiently. However, since the terrorist attacks in the US, the spotlight has focused on the security improvements to be gained through SPT. Biometric technology, which enables identification using unique physical characteristics of the individual is a particularly important core element in this project. Its perfection and widespread availability is, without a doubt, the key to the success of this project.

e-Tag Program (Hands Free Travel: RFID)

Introduction of e-Tags with IC Chips

The purpose of the e-Tag initiative is to use a new type of tag with RFID (radio frequency identification) technology to create a more efficiency baggage handling system.

Outwardly, the tags appear to be normal paper tags printed with a barcode. But they are actually revolutionary tags embedded with an IC chip containing passenger and security information. Radio waves from the scanner antenna not only read information written to the IC chip, they also write new information to the chip.

Their introduction is envisaged to reduce the incidence of lost baggage, curb baggage sorting costs and improve security.

Presently, barcode tags are affixed to baggage but these can often be difficult to read if the tag is creased or soiled. This causes missorted and missing baggage. However, because the information written to the chip in e-tags is scanned by radio waves from the antennas, as long as the chip is not damaged the information can be obtained regardless of the state of the baggage tag and this substantially reduces the incidence of lost baggage. This also promises to be a useful tool in the development of a new hands-free travel service, which will allows passengers to send their baggage ahead from home and travel unencumbered to their destination from home by linking the systems of the various services involved in baggage transport. This service combines air transport with delivery services to offer an integrated baggage delivery system.

The flow of procedures for hands-free travel is as follows: The passenger makes a request for baggage collection and checks in suitcases and other pieces of baggage at home. E-tags with IC chips are then affixed to the baggage and passenger details such as flight numbers are written on the tags. After delivery to the airport the baggage is checked for security using the explosives detection system (EDS). The passenger, meanwhile, checks in at the airline counter hands free whereupon the passenger's check-in details are transmitted to the baggage management system so that the baggage can be sorted automatically and loaded to the aircraft. All that is left is for the passenger to collect the baggage at the destination airport. In this way, the passenger can travel hands free from home to their destination.

The Advanced Airport Systems Technology Research Consortium (ASTREC), comprising airlines, airport delivery companies, delivery companies, printing companies and IT vendors etc. was established by NAA and the Ministry of Land, Infrastructure and Transport with the objective of improving baggage handling at airport and establishing an international air transport system with coherent ground-air delivery features at the earliest opportunity. Since March 2004, ASTREC has carried out various studies and proving trials such as RFID assessments and technical trials, as well as hands-free model tests.

Because ASTREC will only be operating for a limited period, it plans to use the remaining time focusing on e-tags and hands-free travel from its many study items. Two projects, the e-Tag Project and the Hands-free Travel Project have just been launched.

NAA is also intent on proactively promoting these initiatives. It is carrying out proving trials using UHF band RFID tags, prescribed by IATA as the international standard for RFID, and is driving forward with commitments aimed a utilizing e-tags in real-time operations at Narita. At the same time, it is hoping to perform proving trails on US routes which are yet to be tested and to continue with its deliberations on future business models eyeing greater use of RFID technology.

NAA is aiming to improve the convenience of the airport for its customers and all airport users through the implementation of the e-tag and hands-free travel initiatives in practical applications and expanding its collaborative framework, thus making the most efficient use of its facilities and improving security.

e-tag and hands-free travel proving trials to date

(a) Hands-free operational trials

These trials were carried out from March 2004 to March 2005 to test and study a system in which subjects handed their luggage to delivery companies before departing, checked in hands-free at Narita Airport, boarded their aircraft and collected their luggage at their destination airport overseas. More than 10,000 passengers took part during the period and were extremely satisfied with the system.

(b) e-Tag scanning technology proving trials

These trials took place from April to December in 2004 with approximately 200,000 e-tags fixed to passenger baggage at Narita International Airport. Four overseas airports took part in the trials with antennas installed in Narita, New York JFK, Vancouver, Frankfurt and Schiphol airports to test scanning accuracy. The results produced an average accuracy rate of 98.84% (with an actual range of 98.05% to 99.76%) under operational conditions. Because data on the e-tags was also retained at the airports overseas, the trials were able to observe that there was no evidence of data loss in transit. The trials were conducted with 13.56MHz (HF band) tags to prove the viability of using Japan's RFID technology in practical applications.

(c) Japan-US UHF band RFID trials

Legislation in each country regulates the frequency and band to be used by RFID. In Japan, there was no allocation of the UHF band to RFID. World attention has only recently focused on RFID technology on the UHF band and subsequent legislative amendments in Japan made some of the UHF band available to RFID from April 2005. In April and May 2004, scanning trials using UHF RFID tags between Narita and Honolulu were conducted under the guidance of the US Transport Safety Agency (TSA) but because Japan's legislation did not allow the use of the UHF band for RFID at the time, an application for approval of a trial station by the Ministry of Internal Affairs and Communications was required.

(d) Joint international operational compatibility trials using UHF band RFID

The frequency bands used for UHF RFID differ by country. In the US the band assigned is 902-928MHz whereas in Europe it is 865-868MHz. In Japan the band is 952-954MHz. From June through July 2005, global operational compatibility trials for these frequency bands were held again under the guidance of TSA between Beijing, Narita, Chicago, Amsterdam and Nairobi.

(e) JTB hand-free travel trials

In March 2006, proving trials were conducted on tours arranged by a hands-free service operator and a travel agent to assess the feasibility and to evaluate the operations of a new service for delivering baggage back and forth between the destination airport and the hotel. If this is feasible, hands-free travel can evolve beyond the current 'home to destination airport' services into return baggage delivery services between the home and the destination hotel.

Feedback from surveys of participants in the trials has been positive. Most participants were satisfied with the service and said that they would like to use it again when they next travel abroad. Trials for writing baggage delivery records on RFID tags also revealed that data records were effective, verifying the possibility of using RFID tags for guaranteeing security during baggage delivery.

NAA has been a member of the IATA RFID Working Group (now a sub-group under the Baggage Working Group) since 2001. It reports to IATA on initiatives at Narita and also offers suggestions based on the results of its tests. NAA contributes to the RFID standardization work being carried out by IATA and some of its recommendations have been adopted.

NAA plans to continue with its experiments and studies focusing on UHF band RFID tags in collaboration with IATA, TSA, other airports and various other organizations.

Presently, baggage is labeled with paper bar-coded tags for baggage management and sorting purposes but the barcode can often be difficult to read if the tag is creased or soiled and also because there is no single defined position where the tag is fixed to the baggage. Consequently, baggage can go missing. Barcode scanning accuracy at Narita International Airport is over 90% but globally, scanning accuracy averages only 70%.

RFID tags offer a solution to this problem. With embedded IC chips and antennas, a signal is emitted from the antenna, which functions as a scanning device, and information on the IC chip can be read and new information can be written to the chip. Because the information is read by signal, there is little effect from creasing or soiling of the tags and, regardless of where the tag is fixed, accuracy is around 100% as long as the chip is not damaged. This enables much faster and simpler recording of vast amounts of information than is possible with barcodes. It is truly a revolutionary tag.

Advances have been made in recent years in the initiatives to simplify complex travel procedures for air passengers. These initiatives are known as SPT (Simplifying Passenger Travel). At the same time, however, security has become increasingly more stringent since the terrorist attacks of September 11, 2001. RFID fully meets the needs of the SPT concept and is also seen as the answer to improved security. The introduction of RFID tags promises to reduce the incidence of lost baggage, and cut sorting costs while also improving security. In anticipation of the full scale introduction of RFID tags, the International Air Transport Association (IATA) set out RP1740C (RP = Recommended Practice) of November 2005 as the standard specification for RFID tags in its Passenger Service Conference Manual issued in January 2006.

RFID tags offer new service possibilities. Narita International Airport is using them for its Hands-free Travel project in which passengers will be able to send their baggage from home before departure and pick it up again at their destination. When introduced, this new system will change the conventional style of travel by allowing passengers to travel abroad hands-free, unencumbered by their luggage.

In August 2002, the Ministry of Land, Infrastructure and Transport played a central role in the establishment of the Advanced Baggage Handling Systems Committee, which was tasked with examining the introduction of hands-free travel. The Advanced Airport Systems Technology Research Consortium (ASTREC) was established in August 2003 with the objective of establishing the basic technology for advanced airport systems such as baggage handling, etc. from RFID technology and enabling compatibility with an increasingly diverse, sophisticated information society. In addition to NAA, ASTREC comprises approximately 50 member companies including airport operators, airlines, delivery companies, RFID technology companies and system vendors. It is continuing to run trials and research aimed at the introduction of these systems.

The following three trials were conducted in 2004 (the RFID tags used in the trials at Narita International Airport are called e-Tags).

❶ Hands-free operational trials
❷ e-Tag scanning technology proving trials
❸ Japan-US UHF band RFID trials

❶ Hands-free operational trials

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Since 2001, NAA has participated in the IATA RFID Working Group (now a sub-group of the Baggage Working Group). It reports to IATA on the initiatives at Narita International Airport and offers suggestions based on the results of its trials. NAA has also contributed to RFID standardization with some of Narita Airport's recommendations being adopted in the standards for RFID technology.

In fiscal 2005, a feasibility study took place into a new service model linking the existing hands-free travel service with travel agency tours. The aim of this was to offer greater customer satisfaction by freeing customers from the burden of baggage beyond their destination airport to their hotel and also on the return leg.

In fiscal 2006, the following factors led to the launch of UHF RFID trials in conjunction with ASTREC and with the assistance of Air France:

• IATA resolved in November 2005 to recommend the UHF band only for the introduction of RFID tags
• The UHF band at the time was assigned solely for mobile telephone use in Japan but the relevant legislation was amended in January 2006 to open the way for use by RFID
• A request was received from Air France to participate in the RFID trials.

The trials took place after waiting for ASTREC member manufacturers to complete the trial antennas following the abovementioned legislative amendments and involved testing the scan accuracy rate on tags issued at Paris-Charles de Gaulle Airport when read by two antennas fitted on the arrivals baggage handling conveyor line at Narita International Airport.
Although the results are still being assessed by Air France, they were largely satisfactory.

Nevertheless, UHF signals, because of their characteristics, do not travel as far as HF signals and are susceptible to interference from neighboring frequencies. Therefore, solutions will need to be produced for information integration.
Follow-on trials with Air France on e-tags issued at Narita International Airport were also scheduled for fiscal 2007.

Research and trials on the use of e-tags in practical applications will continue in the drive to expand hands-free travel, offer more benefits to the users and improve service levels.

e-Airport Concept

The Future of International Travel

Information Technology will offer a brand new style of international travel in the very near future. The diagram below illustrates just how easy and convenient international passenger and baggage travel will become.

e-Airport Components

• Airport Net	Airport Internet access
• e-Information	Extensive public transport and flight information service
• e-Check in	Automated electronic passenger processing
• e-Tag	Advanced baggage handling system
• e-Navi	Extensive information service via mobile terminals