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Nice Travel

- Opportunities and challenges that airports, airlines and service providers are facing
- Enabling better passenger services, more efficient baggage handling, improved security and giving the passenger a nice travel experience using AutoID/RFID technology



Authors: Håvard Sunde, Heino Winther, Petter Thune-Larsen

Nice Travel

**Enabling better passenger services,
more efficient baggage handling
improved security,
and
giving the passenger a nice travel experience
using Auto-ID/RFID technology**

Cover illustration: Gunnlaug Moen

Participants in the Nice Travel project:

The project partners who have been responsible for the Nice Travel project are:

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Norwegian owned innovation centre offering RFID lab testing, proof of concept tests, education and advisory services on the Nordic market.

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Lyngsoe Systems is a Danish owned company, focusing in optimising logistic processes for customers within supply chain, postal and airports. LS have supplied numerous RFID based solutions among them solutions for baggage handling at Hong Kong International Airport and Milano Malpensa International Airport.

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UPM Raflatac (UPM) www.upmraflatac.com

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Companies who have contributed through participating in workshops are:

- Copenhagen Airport, Kastrup
- Finnair
- Helsinki Vantaa Airport
- Norwegian Air Shuttle
- Oslo Airport, Gardermoen
- SAS Norge, SAS Sverige (incl. SAS Group level)
- Sterling Airways
- Stockholm Airport, LFV Arlanda.

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Abstract: Nice Travel has focused on the opportunities and challenges facing airports, airlines and service providers with regard to the new Auto-ID-technologies. RFID (Radio Frequency Identification)" and Biometric Solutions will during the next 5-years enable substantial improvements to the logistic, the security and the passenger processes at the airports. Radio Frequency Identification (RFID) is one of the fastest growing and most beneficial technologies being adopted by businesses today. Adoption of this automatic data collection technology has recently been fuelled by the establishment of key standards, retailer and government mandates, improved technology performance, and falling implementation costs. Auto-ID-technologies like RFD and biometric solution will allow aviation companies to better manage operating expenses and provide higher levels of service to customers, while operating more safely and securely. The most important benefit areas are: - Cost-reductions and better utilization of airport an airline resources: - o Minimise the time and resources in locating passengers and staff - o More effectively deploy and manage equipment - o Lower costs regarding delayed and lost baggage. - Easier Tracking and Tracing: - o Minimise the time and resources in locating passengers and staff - o More effectively deploy and manage equipment - o Keep track of baggage, and reduce mishandling of bags. - Cuts in average Service Time: - o Shortening Check-in, immigration and boarding time - o Efficient transport of passengers - o Enabling "people" to handle critical incidents. - Improved Communication and Information services: - o Improved use of passenger data to plan for peaks - o Fast Track directing transfer and other priority groups - o Real Time information to passengers.		
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1 EXECUTIVE SUMMARY

Main Objectives

The main project objectives for the Nice Travel project have been:

- To visualize the potential efficiency and security improvements with the new technologies and thereby create preliminary (and/or generic) business cases for baggage and passenger processes.
 - *Individual workshops with four airport and 5 airline companies where business potential challenges regarding implementation of Auto-ID-technologies in passenger and baggage process were discussed.*
 - *Joint industry seminar with presentations and discussions on the Nice Travel business issues for the aviation industry.*
- To establish new business clusters / networks within the Nordic countries, in order to create growth through closer relations and partnering in the vertical and horizontal value chain.
 - *The project has established a foundation for a network and better collaboration between Nordic airports and airlines.*
 - *The results are to be used to organize a joint effort to gather the benefits from the Auto-ID-technologies.*
- To create awareness and better skills within the aviation industry on the potential for improvement of baggage and passenger processes, e.g. by utilization of the RFID and other new Auto-ID-technologies.
 - *The project has taken the first steps in an important awareness process focusing on the business potential and the success factors in the implementing of Auto-ID-technology.*
 - *The limited time for the project, did not make possible to target the other parts of the tourism sector.*
- To create ideas for new business models for the Nordic tourism.
 - *Ideas on how to benefit from the use of the Auto-ID-technologies in other part of the traveller value chain have been discussed.*
 - *The Auto-ID-technologies may stimulate the innovation efforts in the industry, and make travelling easier and more enjoyable within the Nordic countries.*

Method/implementation

The project has been implemented in 3 main phases:

- Workshops with major Nordic aviation companies
Airports: Copenhagen (Kastrup), Stockholm (Arlanda), Oslo (Gardermoen) and Helsinki (Vantaa)
Airlines: Finnair, Norwegian, SAS Norge, SAS Sverige (SAS Group) and Sterling Airways.
- Seminar for the aviation industry
40 people from the industry gathered at a one-day seminar held at Gardermoen Airport in Oslo with participants from airports, airlines and technology providers.
Seminar presentations are available on request to RFID Innovasjonssenter AS
Telephone: +47 2206 7660. Email: petter@rfidlab.no or roar@rfidlab.no.
- Workshop and seminar conclusions - reporting
Printed version of this report may be ordered free of charge from Nordic Innovation Centre
PDF-version of the report may be downloaded.

Results and conclusions

The Auto-ID-technology is one of the most important enablers for process improvements in passenger and baggage processes at large airports. Travelling should be an enjoyable experience and should not include elements of stress and hassle. A minimum of queuing, fewer delays, shorter waiting time, easier check-in, faster bag pick-up are all factors that influence the customer value in the travelling process.

An airport is one of the most advanced logistic operators and information hubs in the modern industry. Many efforts to move parts of the processes to off-airport sites have already been successful. You can check-in and make seat reservation before arriving at the airport. The Auto-ID-technologies may also be used to complete the check-in process including bag tagging off-airport. Central bag-drops at the airport and special services for passenger groups (loyalty offers, transfers e.g.) may simplify the processes further.

Successful implementation of RFID will minimize short shipped and lost baggage. SMS messages when the baggage is unloaded from the airplane could be a new passenger service offering. Better information on “baggage on belt” is wanted from most passengers.

The airlines and the airports are serving the same customers, but they have distinct differences in business models, cost drivers and income flow. Collaboration between airport and airline is a key element for successful implementation of Auto-ID-applications.

We recommend that the major Nordic industry players make a joint effort in a collaboration project targeting:

- Implementation of RFID- handling and RFID tagging of all baggage between the major Nordic airports within the next 2-3 years.
- Close cooperation between airports, airlines, ground handlers and service providers ensuring common goals: improved customer service, cost reduction, and resource utilization e.g.
- Improving the passenger information services by means of combining Auto-ID-technology and mobile phone/wireless technologies.

The Nordic airport owners, operators and the airlines with many flights within the Nordic region should participate. The benefits are multiple, service and quality improvement, cost reductions, operations efficiency e.g., and they have been documented in business cases from implementations at international airports.

We recommend the Nordic IATA-member airlines to be proactive vs. IATA with regards the action plans defined for 2008

Passenger self service programs (PSS): IATA will launch a series of projects to meet their vision “Simplifying the business”. They are also creating the standards and processes to support Passenger Self-Service, see appendix 8.4.

Baggage Management Improvement Programme (BIP): IATA will provide stakeholders a methodology and a set of solutions to reduce baggage mishandling. In 2008 they want to secure participation of 6 airlines and airports in BIP.

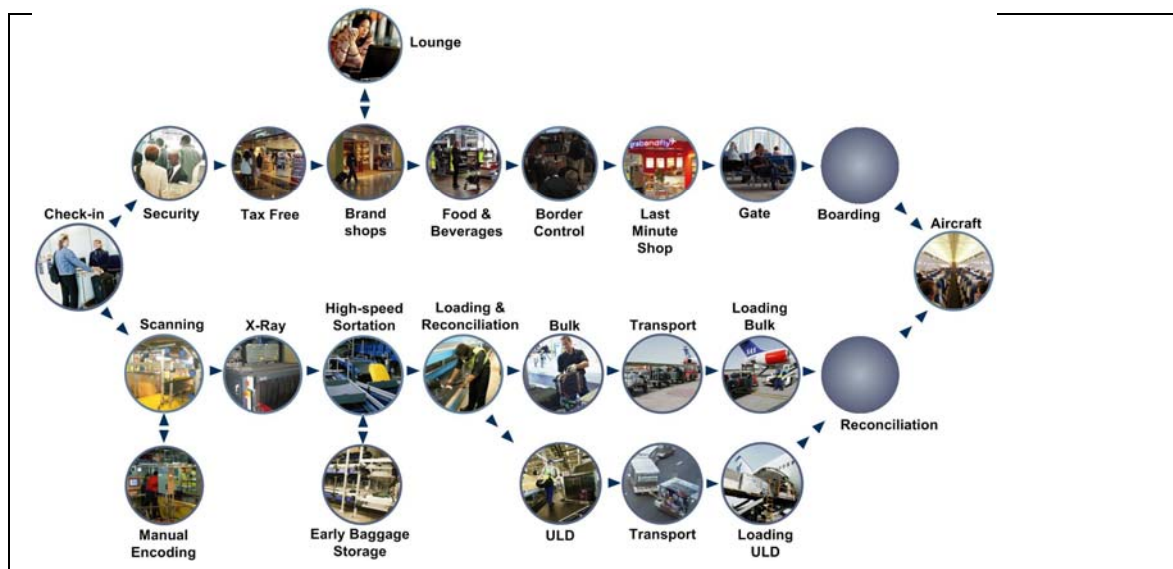
2 INTRODUCTION

The Nordic Tourist & Travel industry is facing new expensive requirements regarding security, efficiency and service expectations. The increasing competition in the aviation market is causing airports and airlines to seek ways to improve their efficiency and cost-effectiveness. The industry is still growing rapidly, and many Nordic airports are expanding and planning major investments in new terminal buildings and more advanced technology solutions. Fast efficient baggage handling, on-time scheduling and real-time traveller information will be important competition parameters in the coming years.

New technology is the most important enabler to satisfy the new demands, and Auto-ID-technologies will play a major role in the new wave of technology implementation at airports and other service providers within the tourism industry. Technology based on common standards that can be used in many parts of the industry will be an important enabler for innovation within this fast growing industry.

The Nice Travel Project has been met with great interest by the aviation industry.

- With RFID on the baggage tag, a mini transponder is embedded in the tag. The transponder returns radio frequency signals to a receiver. In this way, the system will know at all times where the bag is located. The use of RFID tagged baggage will lead to more efficient baggage handling and fewer lost bags.
- Biometric Solutions with Fingerprint recognition make the check-in process faster and more secure. Reconciliation between passenger and baggage is a requirement of the authorities. SAS has implemented this solution in the Nordic countries, and announces automatic bag drop as the next Biometric step.



The figure describes the different processes that the passenger must go through at the airport before entering the plane. The majority of these processes mean queuing for the passenger.

Source: Lyngsoe Systems AS

The International Air Transport Association (IATA) ¹ has one major goal for its strong focus on the RFID-technology – “Simplifying the Business”. The use of RFID in baggage handling gives benefits to the industry and to its customers – the air travel passengers:

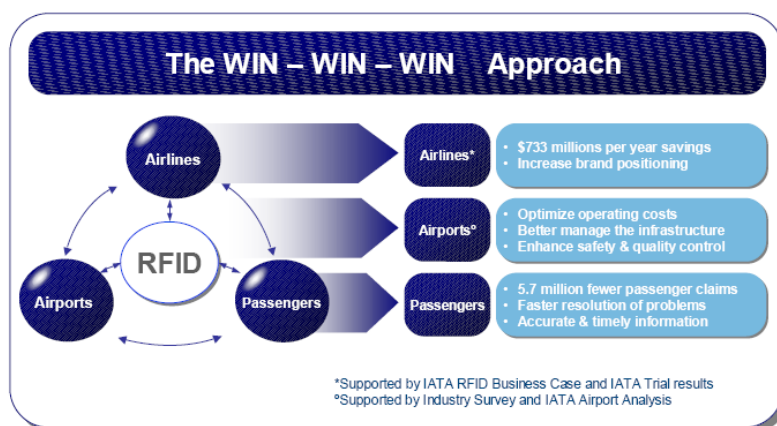


Figure 1 Reference: IATA

Analysis made by IATA, state these major benefits for the passengers:

- Reduce the number of mishandled bags
- Put passenger mind at ease by providing a high level of service
- Benefit customers by helping ensure quicker and more accurate baggage handling and transfer
- Improve customer information & query resolution.

Interest groups

This Nice Travel Project has mainly focused the aviation industry, and the target group for the project has been the major airports and airlines in the Nordic countries.

There are many different stakeholders that have interest in the issues related to the use of the Auto-ID-technologies within the tourism and travelling industry. The main interest groups are of course the traveller and the service provider. What is a bit special within this sector, is that the customers include almost all people in the modern society. The service providers are also of great diversity, from multi-billion global enterprises to small local enterprises.

1. Nordic Airports and airport owners/authorities

The major airports at the Nordic capital cities have been one important target group:

- Oslo Airport Gardermoen, Stockholm Arlanda Airport, Copenhagen Kastrup Airport, Helsinki Vantaa Airport and Reykjavik Keflavik Airport.

Other important airport related businesses that have interest in the project results and this report are:

- Mid-sized regional airports

¹ IATA organizes 240 airlines- representing 94 percent of scheduled international air traffic.

- Airport owner companies and airport authorities
- Private service providers at airports (engaged by the airport)
- Public bodies on duty at airports (police, customs etc) and bodies responsible for security and privacy issues.

2. Nordic Airlines and their subcontractors

Major airlines:

- SAS (HQ in Sweden and local companies in Sweden, Denmark and Norway)
- Finnair
- Norwegian Air Shuttle
- Iceland Air
- Sterling.

Airline service providers:

The airlines are engaging a lot of service providers to support them in logistics services, check-in /boarding, catering, cleaning and technical services. The service companies will be affected by process changes relates to the AIDC-technologies.

3. Other service providers within tourism industry and travel sector

- Main cruise lines and railway companies operating in the Nordic region
They are offering many services that are comparable to the services offered by the airlines.
- Bus services and railway companies with airports services:
Is an important part of the air traveller value chain, and combined services may easily be offered. It depends on the willingness for closer cooperation, and in some part to security regulations (E.g.: authorized ground handler must be responsible for the baggage when it is checked-in).
- Main hotel chains:
Hotels may offer new services for air travellers, e.g. check-in and baggage handling.
- Travel agencies and congress service organizations:
These travel service providers may be able to offer e.g. new RFID-enabled services through the complete traveller value chain.

These businesses are serving the same clients: the business travellers and the leisure travellers and Non-Nordic tourists visiting our countries. To some extent they will be able to offer value added services to one or more of these travellers groups.

A vision for the future is that standard RFID-tags are provided to the traveller, and that same tag may be used by different businesses within the tourist sector. It could be baggage tags, payment/ticket cards, tourist adventure cards etc.

3 AVIATION INDUSTRY PROCESSES AND CHALLENGES

3.1 Aviation Industry Challenges

The aviation industry is facing a growth of more than 5 per cent per year in both passengers and cargo. Due to the long timeframe for improving the infrastructure, the growth must be handled within the current infrastructure. At the same time increasing security requirements must be handled.

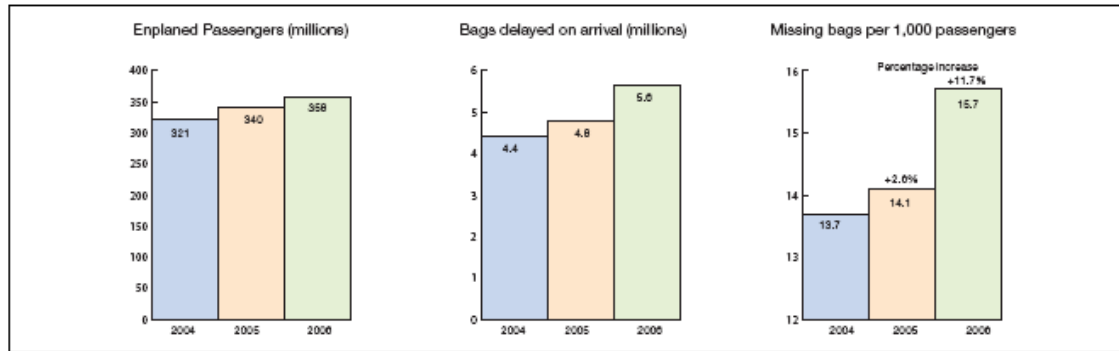
These challenges force airports / airlines to implement improved operations / procedures for both passengers and cargo. Due to strong competition within the aviation industry and the increase in the number of low-fare operators, the changes must be implemented without additional cost for the passengers. Simultaneously, the number of mishandled bags per passenger has increased.

According to The Association of European Airlines (AEA) the number of mishandled bags has grown from 13.7 per thousand passengers in 2004 to 15.7 in 2006. This makes an annual increase representing **1.2 million extra bags** reported missing on arrival by the major airlines in Europe.

Below are IATA's figures for mishandled bags.



Together with the increase in the number of passengers all airlines focus on improving efficiency of all equipment as shorter and shorter turn-around time for each aircraft is demanded. E.g. Ryan Air has a clear target that the time from landing to take-off must be no more than 25 minutes.



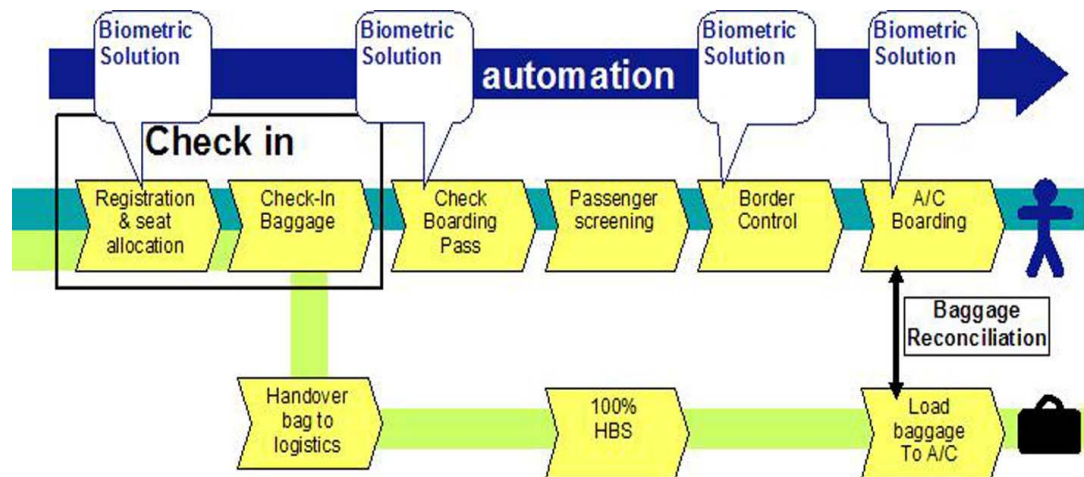
Source: Association of European airlines (Consumer Reports) www.aea.be

What will the airport of the future look like?

"Passengers will encounter less congestion than today and will benefit from an improved flow of information through the increased use of personal devices. All this will be offered with a very high degree of security, which should be less intrusive than today. Let's not forget, our customers wish to fly and not spend too much unnecessary time on the ground."

Jaen Albrecht, CEO of Star Alliance. Source: <http://www.staralliance.com>

3.2 Aviation Industry - passenger and baggage processes



3.2.1 Booking of Ticket

All airlines try to motivate the passengers to book their tickets on the internet so that the passenger can receive an e-ticket or travel ticketless with a credit- or a bonus/loyalty card. When the passenger is booking over the internet, he is more relaxed and thus motivated to investigate other products provided by the airline such as car rental and hotel reservation. Extra costs are related to issuing a paper ticket; this cost is normally added to the ticket price for the passengers requesting a paper ticket.

3.2.2 Check-In

The airline is responsible for all check-in procedures. Most airlines have made agreement with a handling agent present in that specific airport to take care of the check-in operations. To limit the number of operators taking care of check-in procedures a majority of airlines are using self check-in terminals and automatic or manned bag drops. Some airlines also offer online check-in over the internet or by mobile phone.

Check-in time before departure depends on the baggage handling system provided by the airport. Not all airports have “Early Baggage Storage” so here the opening time before departure is typically 2 hours. Some airlines/handling agents also have limited opening hours because of cost of check-in personnel.

In order to use fully automated check-in some kind of biometric identification of the passenger is necessary in order to identify the passenger. This is possible with biometric passports and with fingerprint recognition.



3.2.3 Security Check

The authorities are responsible for the security checking of passengers. Due to the increased number of security demands, focus is high on methods that automatically perform these checks on the passenger. After the security check the passenger has access to airside which is considered a restricted zone. One of the new and disputed methods of security checking is the full body scan that has been tested in several airports.

3.2.4 Airport services for departing passengers

The modern airport has a wide offering of services for passengers waiting for the boarding sign. The RFID-technology may be used for payments, at information terminals, securing/tracking your hand luggage.

For some passenger groups (e.g. elderly people), frequent travellers and transfer passengers it may be difficult and confusing to find the right gate. RFID-enabled

boarding passes may help them find the fastest way to the transfer check-in, gate, and shop or service desk and finally to the right pier and gate.

3.2.5 Boarding

Before boarding, the passenger must be approved for boarding, typically by showing both boarding card and personal ID. Many airlines have replaced the boarding card with different types of ID cards (credit cards, bonus card, etc.). Again biometric solutions may be used to automatically recognise / approve the passenger for boarding. SAS has implemented this in Sweden, Denmark and Norway.

3.2.6 Baggage Reclaim

When the passenger has reached his final destination, the passenger must pick up their baggage at the baggage reclaim area. Most passengers go directly to the reclaim area to pick up their baggage because they expect the baggage to be there shortly after arrival.

In many airports it takes more than 30 – 45 minutes before the baggage is ready at the reclaim area. In these situations the airport prefers that passengers use shopping facilities, etc. instead of queuing up in the reclaim area. It is the responsibility of the airline/handler to move the baggage from the aircraft to the baggage reclaim area. Normally Service Level Agreements (SLA) between the airline and the ground handler often set rules for the time lag from airplane gate parking to when the baggage is delivered at the reclaim area.

3.2.7 Baggage Handling System

When the baggage is removed from the check-in desk or baggage drop the responsibility for the baggage is moved from the airline/handler to the airport that is responsible for the baggage handling system. The check-in system exchanges information with the Baggage Handling System about each piece of baggage by BSM data (Baggage Source Message). This is the same information that is printed onto the baggage tag used to sort the baggage in the baggage handling system.

The authorities require that all hold baggage is screened before being loaded onto the aircraft. This is done automatically on the baggage handling system. The baggage handling system delivers the baggage to a chute / box allocated to a specific departure / handling agent. It is the responsibility of the handling agent to transfer the baggage to the correct aircraft.



Some aircrafts use Unit Load Devices (ULDs.), small containers for the baggage. The baggage is loaded into ULDs before the ULDs are loaded onto the aircraft. This makes it easier to sort the baggage into different categories in the aircraft (transfer baggage, transfer to specific locations, business class etc.). There is also a business benefit in RFID-tagging the ULD as an asset and a transport unit.

3.2.8 Baggage Reconciliation

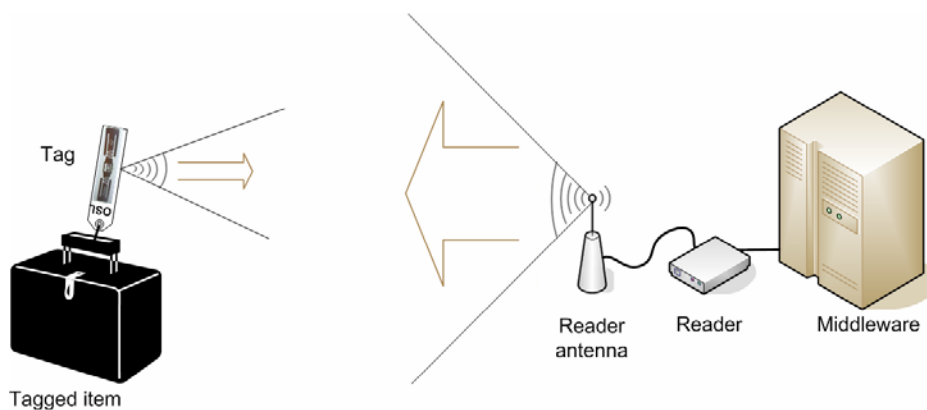
According to most air transportation authorities, a person's baggage must be retrieved from the aircraft before take off if the passenger fails to arrive before the gate is closed. Making sure passengers board flights on which they have checked baggage is called "passenger-baggage reconciliation."

Typically, the baggage is loaded onto the aircraft as the passenger boards the plane; this means that if the passenger does not show up at the gate, the passenger's bags have to be unloaded again. This situation will normally cause a delay.

4 AUTO-ID TECHNOLOGY – POTENTIAL

4.1 RFID

Radio frequency identification (RFID) is a general term that is used to describe a system that transmits the identity of an object wirelessly, using radio waves. The system consists of four main components: Tags, Reader antennas, Readers and Middleware, as shown below.



The tag, which is also referred to as transponder, smart label or smart tag, represents the actual data carrying device of an RFID system. It usually consists of a coupling element and an electronic microchip. The reader retrieves the tag identity, which is in the form of a unique serial number, through one or more antennas, and the data is processed and stored by the middleware.

RFID systems are mainly classified by whether or not the tag contains an on-board power supply, respectively called active or passive tags. Active tags have longer read range and more precise data transfer than passive tags. Passive tags are simple and small in construction, and usually cheaper than active tags. The system's characteristics and performance vary substantially with its operating frequency. These frequencies are mainly divided into the low, medium, high and ultra high frequency range. RFID readers do not need direct line of sight to communicate with tags, and can read better, longer and faster than ordinary bar code systems. The frequencies most often used by RFID systems are:

- Low frequency (LF)
- High frequency (HF)
- Ultra high frequency (UHF)
- Microwave frequency

4.2 Biometric Solutions

Biometrics is the science and technology of measuring and analyzing biological data. In information technology, biometrics refers to technologies that measure and analyze human body characteristics, such as fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes. Authentication by biometric verification is becoming increasingly common in corporate and public security systems, consumer electronics and point of sale applications. In addition to security, the driving force behind biometric verification has been convenience. To prevent identity theft, biometric data is usually encrypted when it's gathered.

Biometric devices, such as finger scanners, consist of:

- A reader or scanning device
- Software converting scanned information into digital form and compares match points
- A database that stores the biometric data for comparison.

4.3 Mobile phones – the NFC-technology



NFC is a combination of contactless identification and interconnection technologies that enables short-range radio frequency (RF) communication between personal electronic devices, such as mobile phones, digital music players, or PDAs. Once the two devices are wirelessly connected, they can exchange information or access content and services. NFC operates in the 13.56 MHz frequency range, over a

distance of a few centimetres, which means the devices need to be practically touching, but there are still no wires to cause trouble. The mobile phone has an integrated RFID reader.

4.4 What part of the technology is ready for implementation now?

RFID has its roots from the Second World War radar systems, but until recently the cost has limited its use. The Auto-ID Centre has, together with private industry, been able to drive the costs down, and users are continuously finding new applications for this technology. In November 2005 the International Air Transport Association (IATA) approved a recommended practice (RP 1740c) to use ultra high frequency (UHF) for baggage handling systems. This frequency challenge has been overcome with a standard for communication and is now designed so that tags can be used globally. Tests have shown that the RFID technology is ready for global usage. Many airports are now testing the technology, and some have fully implemented RFID in their systems.

The biometric technology like RFID is not a new technology. The adoption of biometrics solutions have been considered successful during the implementation in a constantly increasing number of airports. The market is regarded promising for NFC, though it is not intended for NFC to replace plastic cards but to create several new business segments. Nokia and others are driving the technology, but there is a need for the stakeholders to agree upon a common standard before NFC is ready for implementation.

5 MAIN WORKSHOP FINDINGS

5.1 General conclusions

Early in the project some criteria were defined as to what the project group thought should be the goals for the aviation industry with implementing RFID. Speeding up the airport operations, eliminating bottlenecks and increasing the baggage tracking read rate were some of the main goals. Using IATA standards and recommendations was considered important, and a suggestion was to have new infrastructure and solution so that every traveller can check in at any counter or at any self service box.

Major findings are.

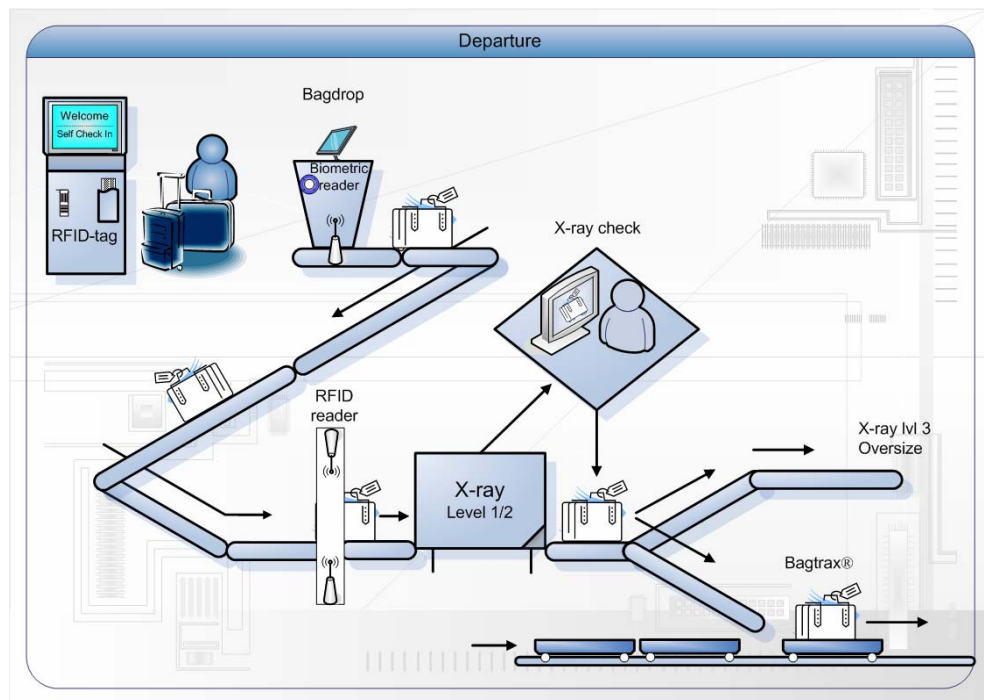
- The airlines have the best benefits from RFID-solutions, but they depend upon airport infrastructure investments.
- The best Business Case is dependant on a close collaboration between the Nordic airports and the airlines.
- Off-airport services will make the “on airport” processes faster and more efficient.
- Offerings tailored for different passenger groups may be enabled by new technology solutions. The general interest in new technology is accelerating, and the individual technology adoption ability is increasing every year.
- The traveller experience can be improved by focusing on the combined use of Auto-ID and ICT in the complete travelling value chain.
- Innovation is the key to continued business success - and nowhere is this more vital than in the highly competitive tourism sector.
- RFID solutions have to be in accordance with IATA recommendations (IATA Recommended Practice).
- It is important to have accurate information on passenger arrival patterns. That can be used to plan in advance the necessary resources to limit queues, and predict the load on the infrastructure.
- For the airlines cost reduction in airport operations is important. The airport focuses on an improved passenger experience, and that the traveller probably uses the free time to spend more money in the shops / restaurants within the airport.

5.2 Visions for the baggage handling process

To illustrate the baggage process, and how it could be improved with RFID, the following visions were made. The vision, illustrated by the pictures below, just exemplifies one of several possibilities for the future baggage handling.

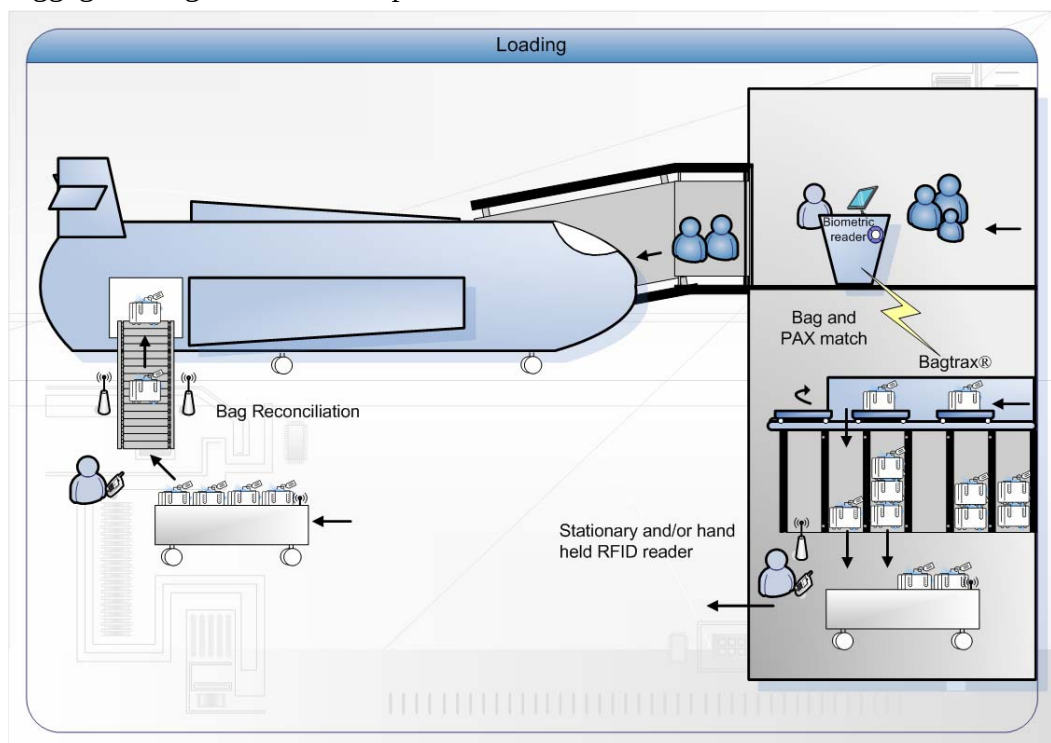
a) Departure process

The passenger receives an RFID tag for each bag at the self check-in terminal and sends it into the baggage handling system by the bag drop. By using RFID readers at key placements the bag is directed and traced through the transport system.



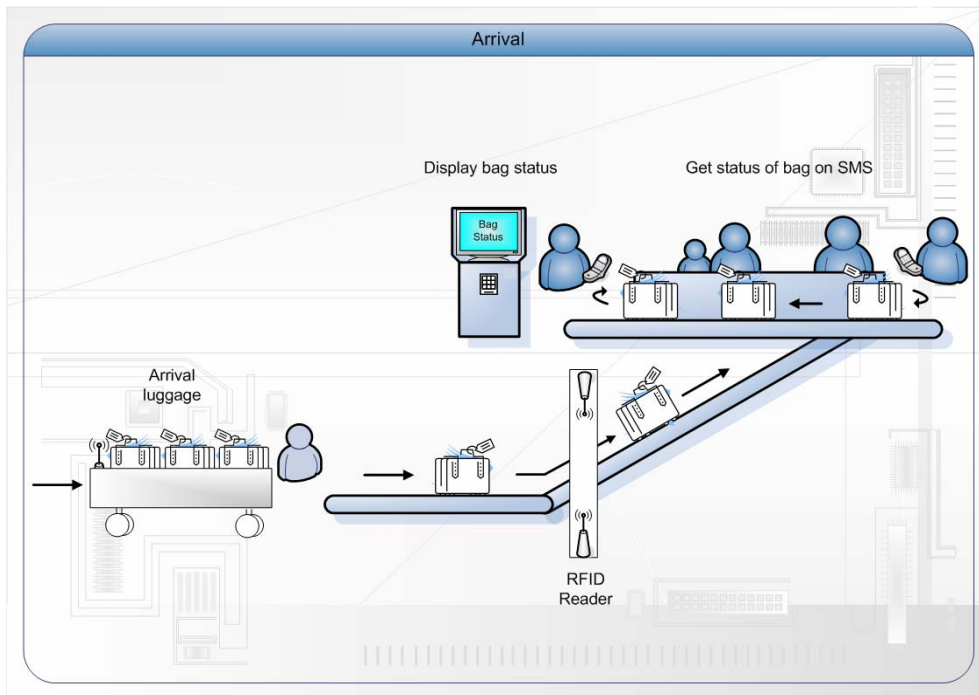
b) Baggage loading process

The biometric reader at the gate ensures a match of bags and passengers when bags are loaded onto the baggage carts, called unit loading devices (ULDs). While loading into the aircraft the baggage tag is read with RFID to fully track the baggage through the whole airport.



c) Arrival – Baggage claiming process

At Arrival baggage is read to confirm time and date of arrival. Passengers are able to check the status of their baggage by SMS or other applications, like the screen shown below.



5.3 Baggage process

5.3.1 Main findings from airport workshops

- **Improved resource management**

The airport operations must be very flexible with regards to handling peaks, bottlenecks and problems due to weather conditions and staff irregularities. In security control, check-in, boarding and baggage handling processes there are substantial fluctuations in the manpower requirements and infrastructure utilization.

- **Sorting on inbound baggage**

The airports were asked about their thoughts about the impact of implementing RFID in the baggage handling system, with regards to the airport side. They pointed out that one of their biggest needs for RFID is to enable sorting of inbound baggage. Active RFID on the transport carts can be a supplement to passive tags on bags. Improving the read rate of baggage tags, so that the process is handled more automatically, is essential.

- **Faster transfer baggage handling**

Due to the rough handling of tags on transfer baggage they have a lower read rate, an average of 75 %, which leads to delays and additional manual work. These are the most critical bags in the baggage system, and airports consider RFID to be the best solution for these challenges. New and improved handling services for transfer baggage may be offered, though at some airports Customs need a central area for inspection of

transfer baggage. RFID can increase read rate and speed up the handling of rush transfer baggage, to make sure it reaches its planned flight in time.

- **Better handling of odd and oversized baggage**

The aviation industry has experienced an increased number of odd-sized bags, and most airports have poor or no tracking for odd sized baggage. Since RFID offers cheap readers with high read rate compared to bar code readers, it would be an imperative solution.

- **Overall baggage read rate improvements**



Airports also want to address the issue of increasing the overall read rate in their baggage handling system. Bar code printers need time consuming maintenance because poor quality tag printing leads directly to reduce read rates. RFID reduces the need for printer maintenance, but as the airports point out, does not provide a solution for all the mishandled and missed bags. If the tags are of poor quality or not fastened well, they can fall off. Some airlines do not follow IATA rules and are expected to be reluctant to implement RFID. The airports are also interested in achieving more accurate data on waiting and loading time at baggage reclaim. Airports claim that airlines often do not want to pay for better read rates. But if the service level is higher, this should be a good foundation for new price negotiations.

- **Improved baggage tags**

It is essential that RFID-tags are attached to the bag in a secure way. Baggage tags need to be improved so they do not decrease performance of the automatic baggage handling systems. A combination of a fixed reusable tag on the luggage and RFID in the ordinary Bag-tag may be a good solution.

- **Who makes the investments in new hardware and software**

The airport will always own the basic infrastructure (buildings, baggage belts, check-in desk) and the equipment that all airlines are supposed to use. But with regard to new equipment like²) DCS, BRS, CUTE, CUSS, there can be different opinions.

- **The Business Case for tagging outgoing baggage is tricky to prove**

There is a common opinion, that the benefits from RFID-tagging vs. barcode tagging are increased on the incoming/transfer baggage flow. The simple reason, is that the bag tag read rate is much higher before the bags are loaded/unloaded one or more times. Therefore it is crucial that the business case is considered based on the complete value chain.

² DCS= Departure Control Systems, BRS= Baggage Reconciliation Systems, CUTE=?? CUSS=Common Use Self Service.

5.3.2 Main findings from airline workshops

The major Nordic airlines are in many cases among the global leaders in their use of new internet and mobile-phone technologies. Regarding Auto-ID-technologies, SAS' implementation of fingerprint check-in procedures (passengers with baggage) is among the first world wide. Norwegian Air Shuttle has been an early adaptor of eTicket solutions, and is very focused on using ICT to make it easier for the customer. Finnair has for several years joined forces with IBM to develop innovative e-Business Solutions.



It is important for the airlines that the airports make the necessary basic investments in common infrastructure, and that the new RFID-technology can be utilized by the airports

service providers.

Some airlines find it most interesting to start focusing on special areas where the result of the implementation is evident. The airlines have different views on where they have the best business case potential, and this is due to the business strategy and priority customer segments.

Important areas for process improvements are:

- **Faster check-in – central bag drop**

Airlines suggested a central automatic baggage drop, perhaps totally unmanned, as an airport base service. Today every airline has its own self-service

- **Improved handling of odd-sized / special baggage and rush baggage**

Equally to airports the airlines are interested in implementing RFID for rush and oversized baggage. This is an interesting area for pilot testing of RFID solutions, because the investments are more modest.



- **Improved control to avoid insurance fraud**

Some of the companies showed interest in improving their baggage control to avoid insurance fraud. Today airlines have problems with dishonest people that are exploiting the self service check-in procedures by claiming non sent baggage as lost.

- **Tagging of hand luggage**

The airlines also reported their interest in tagging of hand luggage for security and service purposes. RFID-tagging of hand luggage can give better service to passengers and may improve the security processes.

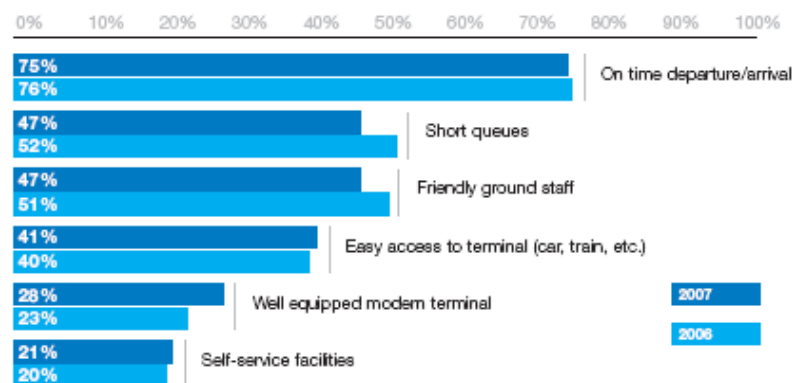
- **Retrieving loaded baggage before take-off**

The procedure for finding and unloading bags that need to be unloaded before take-off is time consuming and often causing delays and lost slot times. This is due to a passenger “no-show” or passengers leaving after boarding (before take-off).

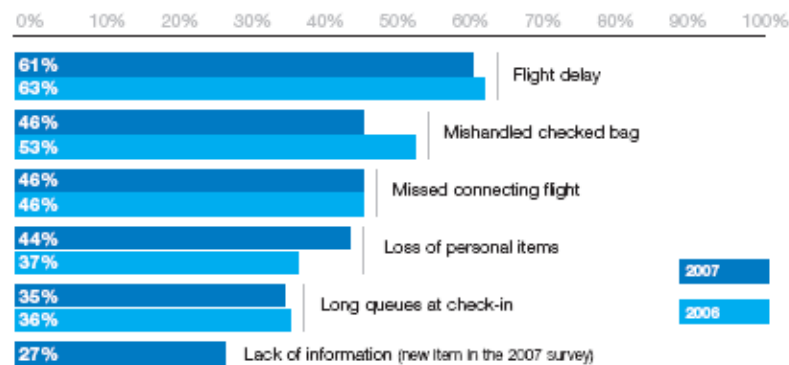
5.4 Passenger process

SITA has made a passenger self service survey at three of the worlds most busiest airports (Atlanta, London Heathrow and Hong Kong International)

What do passengers associate most with a pleasant trip?



What do passengers consider the most annoying experience, other than flight cancellation?

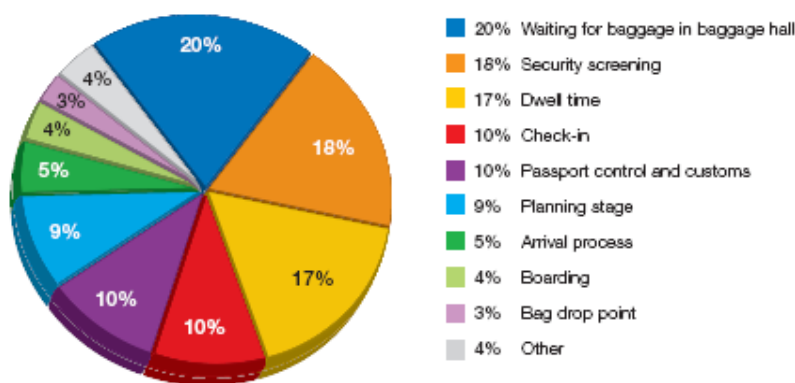


The survey confirm that many of the issues that are included in the business case for Auto-ID-technology projects, also are directly related to the customer value

5.4.1 Main goals for passengers

It is a main issue to remove stress and hassle elements for passengers, and to make it simpler for the passenger at the airport. Improved and more accurate information is very important for many passengers groups, especially the business travellers. Lack of information makes it difficult to make rearrangements, and “time is money” for many travellers. More individual and optional passenger service offerings will also be appreciated by the air travellers.

Which step of the journey would passengers most likely change?



The SITA survey shows that waiting for baggage in the baggage hall, security screening and dwell time are the steps of the journey the passengers would like to change. With better information and predictability of the airport processes the dwell time may be reduced. The waiting in the baggage hall can be cut by a better bag tag read rate and by information on your bag status. Waiting time at baggage claim at arrival because of missing / inaccurate information about when the baggage will be ready is very irritating for almost everyone.

5.4.2 Main issues related to passengers

- **Minimizing the queues at check-in, security, passport control and boarding**

All queuing is a stress element and inconvenient for passengers who are looking for the fastest way to the gate. Security rules especially regarding liquids, rules for hand baggage and new ID-controls have to some extent delayed the processes. Fast turn around for the airplanes at the gates, makes it necessary to board all passengers within a short time span. Biometric solutions have proved to be of great value in the work to cut the queuing time.

- **SMS services from automatic RFID-data capture**

The Airlines also expressed interest in improving their tracking system for arrival. One of the most popular ideas that were discussed was the SMS service. RFID readers are cheaper and therefore more readers can be installed through the system to create better tracking. They liked the idea of being able to offer the extra service for passengers to check their bag status through the journey. This would only be possible if both the departure and arrival airport have integrated RFID. Separating bags in the ULDs dependent for further distribution is something that they are looking into.

- **Guiding the transfer passengers the fastest way to connecting flight**



Delays are often caused by late incoming flights with transfer passengers. Critical transfer passengers are those with short connection and transfer between non-Schengen and Schengen. Critical passengers should be identified and assisted to ensure that they use the correct routes to the connecting flights. They could be directed to a fast lane, through security if they could be easily identified with RFID.

- **Make insurance fraud more difficult**

Airlines are concerned about the high percentage of lost baggage that is related to insurance fraud. Today this is very difficult to avoid. Use of RFID-tagging with read points at all important check points, if possible combined with camera control will give the airline better control of the process. Some kind of information exchange on people who have claimed lost baggage, will also give the airline better chance to avoid these kinds of problems.

6 AVIATION – TOURISM AND TRAVELLER PROCESS

The air flight can not be seen isolated from the complete travel process. Air travel will always be combined with booking services and some kind of ground transportation, in many cases with other hospitality and tourism services.

We are encouraging that a follow up Nice Travel project also focuses on the extended air traveller value chain. It is also important that the project includes tasks on how the Auto-ID can be combined with other new technologies, particularly other ICT-technologies like Internet service, Wlan/Wi-Fi, mobile phones, business intelligence software etc.



From the booking to arriving at the airport departure hall:

The more you have done off airport, the faster and more comfortably you can be at the gate:

- Check-In: from home at your PC or mobile phone or at Self Service Boxes at city or hotel kiosk.
- Baggage collection and delivery services: RFID make new services for bringing luggage from your home or hotel to the airport easier.
- Flight delays information: You receive SMS-messages when weather conditions, traffic situation, strikes or other issues make it recommendable to come early to the airport. If your flight is cancelled or delayed, you are perhaps able to reschedule your trip to the airport, or to make other travel arrangements.

The transfer processes

Transfer processes may be from one air flight to another one, or may be from airplane to bus/car, railway or ship. A traveller may use his RFID-enabled cell phone to pay for the train ticket, or may leave the tagged baggage at the service desk of the cruise line, or perhaps use a self service check-in procedure.

From your first step on your destination airport

The future traveller may use his RFID-tagged baggage to get special courtesy services by shuttle bus and taxi companies at his destination. The tagged suitcase may be picked up and brought to your hotel, while you spend some hours on sightseeing before going to your hotel room. When the hotel receives your baggage, you are automatically through most of the hotel check-in procedures.

RFID-enabled loyalty /credit cards



Booking is simplified, and you are able to use information stored on your card to make the booking easier and quicker from your PC or mobile phone by collecting data from the RFID-tag.

RFID-tickets will be used at many events



RFID-enabled permanent baggage tags

We all have name tags on our suitcases. These can be RFID-enabled, and by defining a “travel industry standard” for the information on the tag, all businesses servicing the traveller may utilize the same tag information.

It is still a long way to go for the ideal solution, because a global standard has to be adopted by the industry.

To stay competitive, all industry players need to meet new market and political demands;

- Increased speed for travellers
- Reduced personnel cost for carriers and service
- Increased security
- Planes that make money in the air
- Travellers that spend money at ground
- Comfort, speed and security for employees

Steria AS : From presentation at Nice Travel Seminar

7 WHAT IS NEXT?

A successful implementation of RFID and new biometric solutions in the Nordic tourism and aviation industry depends on the willingness and ability to innovate. The aviation industry is the innovation leader within the tourism and travel industry, and may stimulate the innovation efforts in other sectors of the industry. Important success factors for the implementation of RFID technology solutions at the major airports in Nordic Countries are:

Collaboration between the major Nordic airports

Nordic airport owners and operators should meet and discuss how to set up a joint project, and how to build the scope and the business case for a coordinated investment in new RFID-enabled infrastructure for baggage handling. The benefit potential will be significantly better if the Nordic countries cooperate and share knowledge and resources.

Airports and airlines should join forces in their innovation efforts

Airports and airlines are serving the same customers, but have different business drivers and cost models. Implementation of RFID systems at airports can only be started if the airport owner makes the necessary infrastructure investments. Some equipment and systems may be owned by each airline/ground handler, or may be offered as new services to the airlines. We encourage Nordic airports and airlines to join forces in a project targeting new passenger services enabled by Auto-ID solutions.

The Nordic Auto-ID-solutions providers are acting in a global market

There are not many Nordic owned companies in the Auto-ID market. Cooperation in the home markets will increase the innovation level and the global competitiveness.

Packaging of new information services to travellers, collaboration with other service providers within the tourism and travelling industries

The aviation enterprises are only a part of a big and fast growing industry. The Auto-ID-technology makes it possible to offer a higher customer value and new services to all sectors with the tourism & travel industry. It is therefore important that the complete traveller value chain and the synergy potential are evaluated.

IATA as a match-maker

It is a part of IATA's role to act as a match-maker between airlines and solution providers. IATA has signed Memoranda of Understanding (MoUs) with some key system providers that the industry depends on to implement their StB (Simplifying the Business) projects. The Nordic system providers should also consider joining IATA's partner programs.

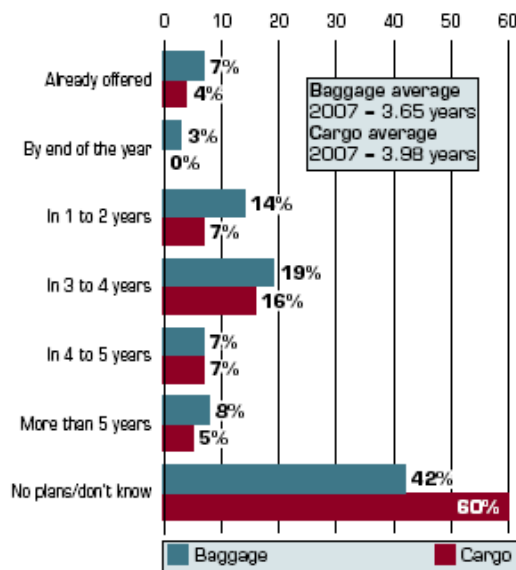
Airport Innovation, Lyngsoe Systems, RFID Innovasjonssenter and UPM Raflatac (the companies who have been responsible for the Nice Travel Project) will in the near future discuss the next steps in our cooperation. We hope to be able to initiate a new project with a substantial involvement from major enterprises in the Nordic aviation industry, and if possible also including some service providers from other parts of the tourism industry.

8 APPENDIXES

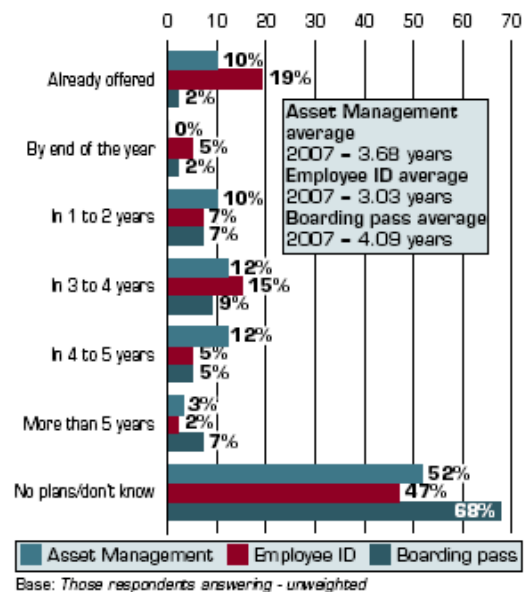
8.1 Appendix A: From SITA Airport IT Trends Survey 2007



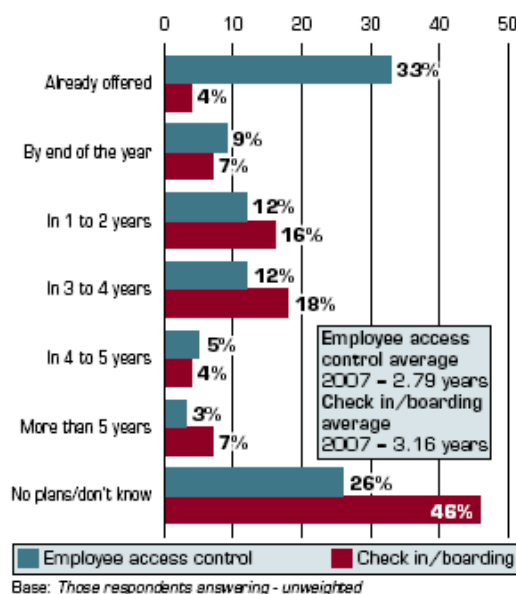
Use of Radio Frequency Identification tags (RFID)



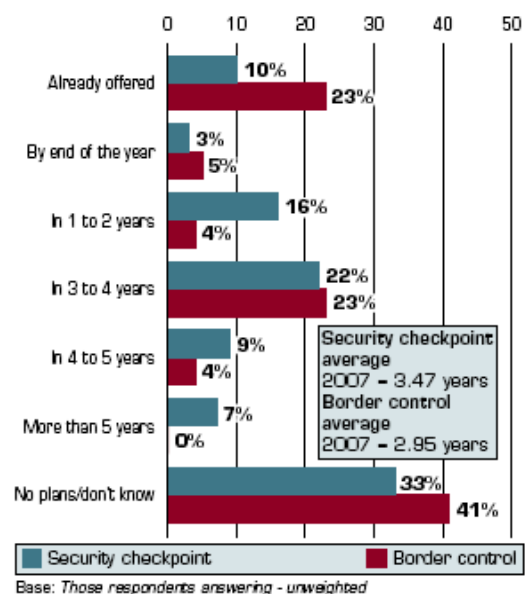
Use of Radio Frequency Identification tags (RFID) (continued)



Use of biometric identification



Use of biometric identification (continued)

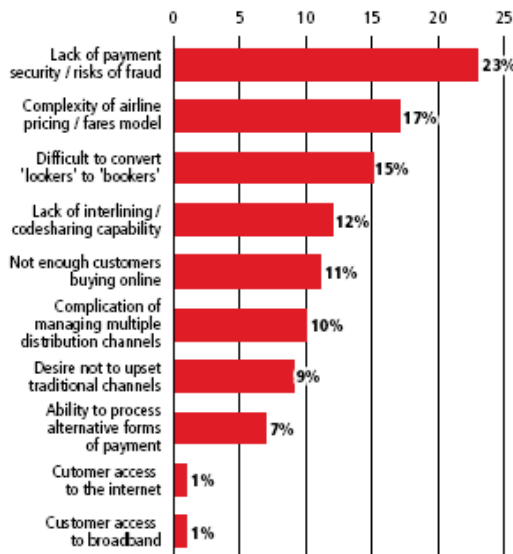


8.2 Appendix B: From SITA Airline IT Trends Survey 2007



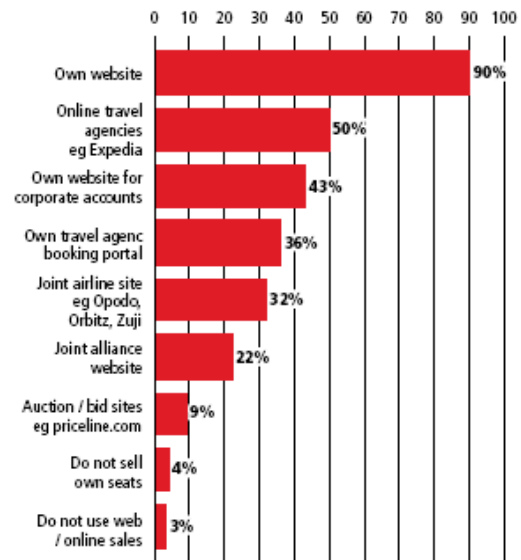
Part four: Passenger Services

Most important business issue associated with online travel sales



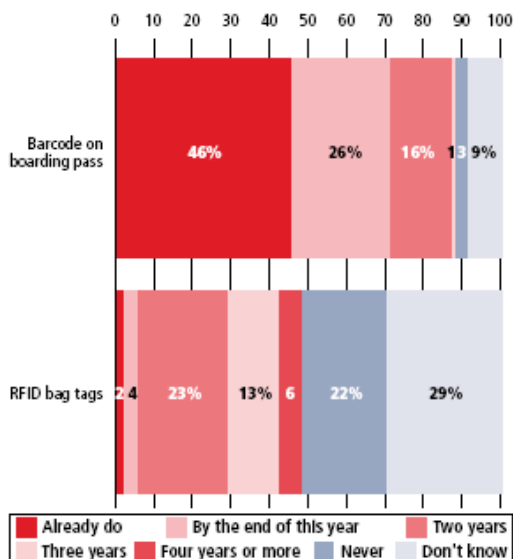
Base: All respondents answering who carry passengers

Online channels used for selling seats



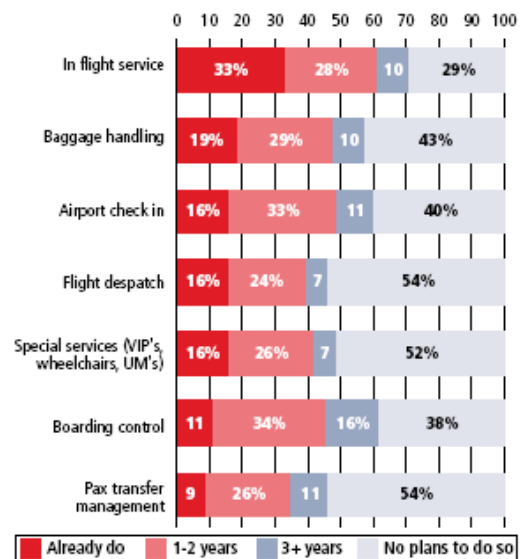
Base: Those answering who carry passengers

Expectations for offering RFID bag tags & barcodes on boarding passes



Base: All respondents who carry passengers answering

Plans to provide handheld devices



Base: All respondents answering who carry passengers

Ref.: Airline IT Trends Survey 2007 Executive Summary

http://sita.com/News_Centre/Industry_surveys_and_trends/default/default.htm

8.3 Appendix C: IATA Baggage management Improvement Programme



Fact Sheet

BAGGAGE MANAGEMENT IMPROVEMENT PROGRAMME (BIP)

Vision

Ensure passengers and their baggage are reunited at final destination by improving baggage handling processes to reduce the rate of baggage mishandling.

Drivers

- Rising baggage mishandling rates indicate that baggage handling systems and related processes are working at maximum capacity
- Mishandled baggage costs the industry US\$3 billion each year
- Increasing security measures add complexity to the baggage handling process
- The time for a passenger to recover a mishandled bag has increased by 15% from 2005 to 2006
- Low passenger confidence in baggage delivery

Strategy

Launch a programme to provide an industry methodology and tools to reduce baggage mishandling focusing on:

- Integrating systems – to optimise information sent between departure control and baggage systems
- Conducting training – so employees know how to avoid common pitfalls
- Ensuring messages needed to keep baggage flowing are available at the right time
- Improving read rates through better bar code labels
- Increasing passenger awareness of the value of checking baggage in early and attaching proper labels

IATA's Action Plan

- Deliver a toolkit offering proven solutions to the most common baggage problems
- Conduct workshops to communicate the benefits and tools of the Baggage Management Improvement Programme (BIP)
- Develop an internet tool to allow airlines and airports to identify baggage problems and appropriate solutions as well as to facilitate industry collaboration

Target

- Secure the participation of 6 airlines and airports in the programme in 2008

To learn more about Simplifying the Business visit: www.iata.org/stbsupportportal

8.4 Appendix 4: IATA Passenger Self-Service (PSS)



Executive Summary

PASSENGER SELF-SERVICE PROGRAMME

Vision

Enable passengers to manage all appropriate aspects of the departure and arrival processes through a range of self-service options.

Drivers

- Customer demand for self-service options increases as technology progresses
- Airlines need to reduce cost of operations whilst improving service to passengers

Strategy

Create the standards and processes to enable Passenger Self-Service and deliver a set of projects to meet the vision.

IATA's Action Plan

Check-in:

- Develop guidelines and a best practice to help airlines develop a check-in service utilising a range of channels
- Promote Common Use Self Service check-in kiosks where it makes sense – with a target of 130 airports by the end of 2008
- Promote the use of IATA standard 2D bar codes on mobile phones for check-in

Baggage Processing

- Develop standards for self-tagging of baggage and improve baggage processing on and off airport via common baggage drop off points and collections

Documentation Checks

- Develop a self-service option for processing of common documents such as Passports and ID cards

Irregular Operations

- Develop process and standards for self service options that give passengers the ability to choose onward travel options, get new ticket details, and obtain boarding passes or vouchers

Boarding & Post Flight

- Develop processes and standards for self-boarding gates
- Develop processes and standards that give passengers the ability to register baggage mishandlings on a self service machine

Target

- Conduct 2 pilots per project by end 2008

To learn more about Simplifying the Business visit: www.iata.org/stbsupportportal

8.5 Appendix 5: Figures from SITA WORLD Tracer Report

Baggage Mishandling Stats 2006

Global percentage breakdown of the irregularity coding for delayed baggage:

➤ RL 10	Tagging Error	3%
➤ RL 20	Failed to Load	14%
➤ RL 30	Loading/Offloading Error	4%
➤ RL 40	Arrival Station Mishandling	2%
➤ <u>RL 50</u>	<u>Transfer Baggage Mishandling</u>	<u>54%</u>
➤ RL 60	Airport/Customs/WX/Space-Weight	5%
➤ RL 70	Ticket Error/Bag Switch/Security/Other	18%

SITA World Tracer Report Apr'07

The Cost of Inefficiency:

Drivers:

- ▣ Achieving on-time departures:
 - 1 minute delay = **US\$ 7,500 per minute to the airline**
 - 9 month UK study indicated that avg. delays at top 10 UK airports cost the airlines in excess of 1.3MUSD
- ▣ Reduce turn-around time / Minimum Connecting Time (MCT):
 - Reduction of turn around time by 6 to 9 minutes will facilitate a whole new "bank" of flight departures/arrivals
- ▣ Regulatory Compliance – International Bag Match
 - Airlines have been advised by the TSA that they must comply with passenger bag match rules for international flights or be subject to penalties inclusive of fines.
 - The TSA is considering applying the international rules domestically.

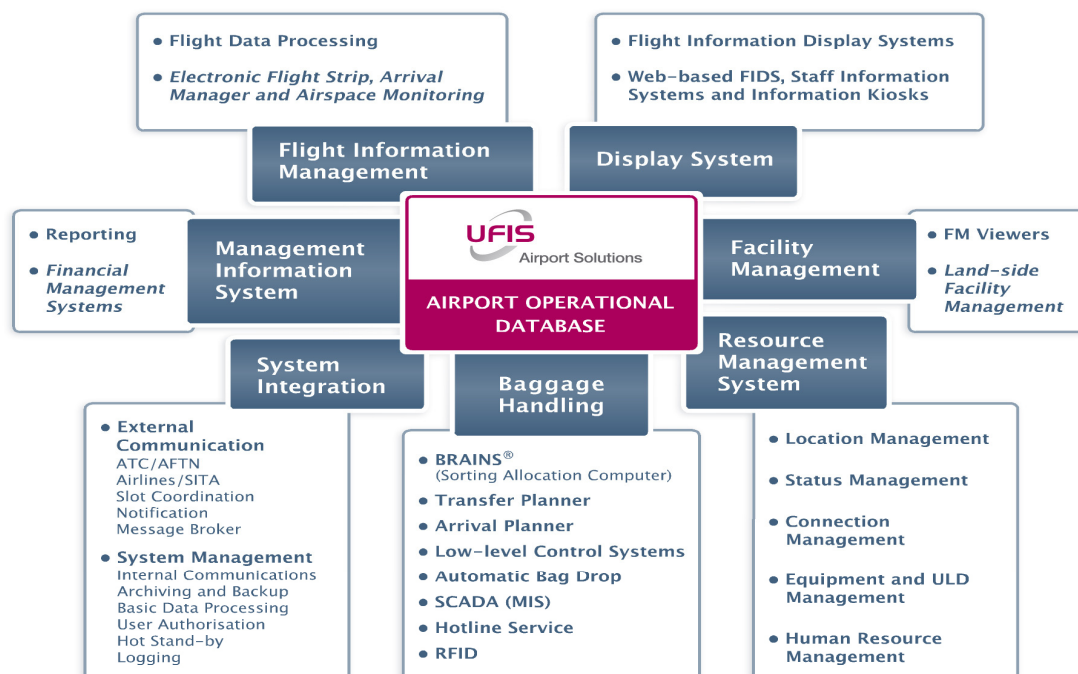
UFIS Airport Solutions is a group of 100% subsidiaries under the holding company UFIS Airport Solutions AS, Oslo, Norway. The UFIS-AS companies, represented in Europe and Asia Pacific supported by their partner form the structure to provide the best possible solutions and services to customers world-wide. The UFIS Group has major international references such as Oslo Gardermoen Airport, Norway, Helsinki Vantaa Airport, Finland; Aeroporti di Roma, Italy; Athens International Airport, Greece; Suvarnabhumi International Airport, Thailand; Dubai International Airport, UAE; Barcelona Mid-Field Terminal, Spain, as well as a number of main airports in India.

The UFIS Airport Solutions' subsidiaries, located in Austria, Germany, Singapore and Bangkok specialize in the Universal Flight Information System (UFIS®). UFIS® is a sophisticated traffic and resource planning and management system used to optimize resources and maximize service offers.

The UFIS Airport Solutions' subsidiary located in Oslo, Norway – **Airport Innovation AS**, has its focus on **baggage handling automation**, thus having a special place in the corporation and broadening the integrated airport solutions portfolio. Airport Innovation has delivered high- and low-level control systems to airports for more than a decade.

Airport Innovation provides fully integrated solutions for automated baggage handling. **BRAINS®** is UFIS Airport Innovation's trademarked total software concept for baggage handling systems, covering the range from low-level to high-level controls. **BRAINS®** increases the traceability and reliability of the baggage handling system for the customer and provides a powerful tool for the user in his or her daily work.

Through the latest years of changes in technology and needs, Airport Innovation has developed products together with their customers meeting the new demands for technological changes and improving the financial and operative efficiency. The company has also developed solutions for biometry and radio frequency identification (RFID). Airport Innovation has the resources and experience to solve the most demanding baggage handling challenges anywhere in the world.



Integrated Third-Party Solutions

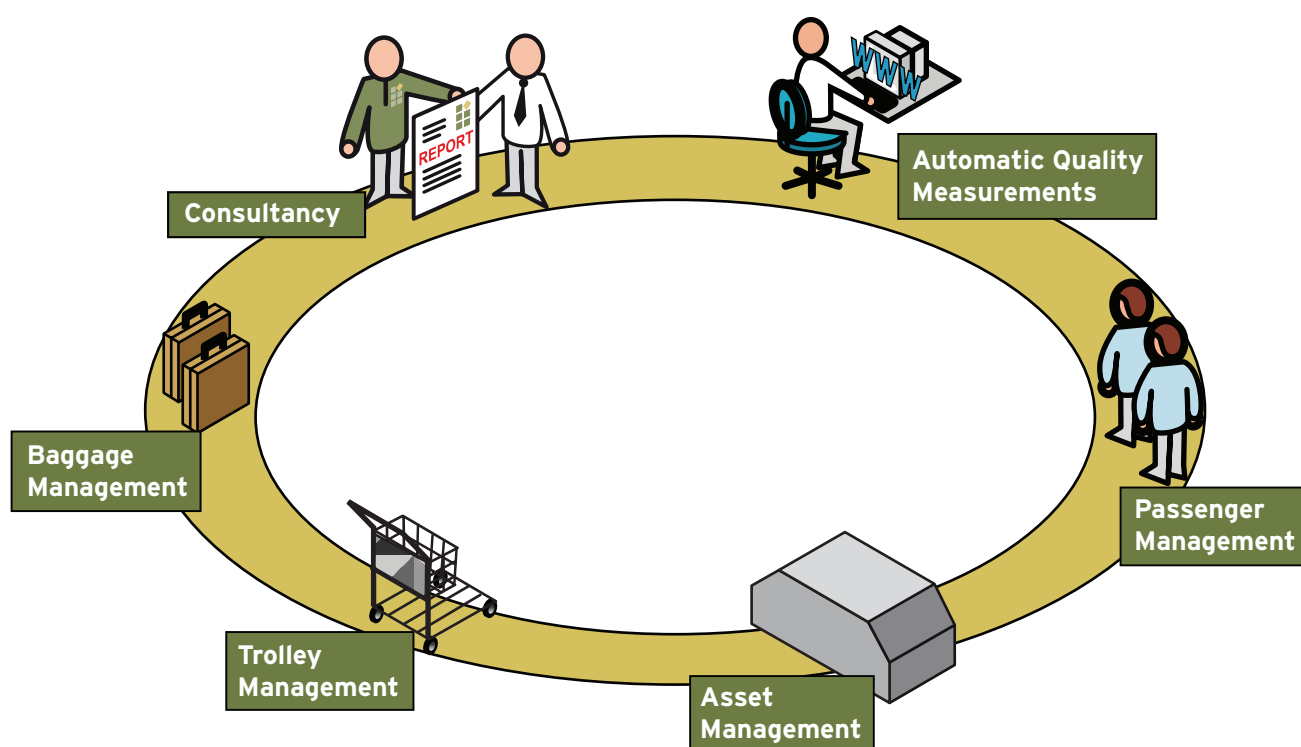
See the Company's web-site for further information: <http://www.ufis-as.com> and <http://www.airport-innovation.no>

LYNGSOE SYSTEMS

Lyngsoe Systems is one of the world's leading software manufacturer and systems integrator supplying a wide range of logistics solutions for monitoring and automating processes in complex logistics chain environments. The solutions enable our customers to improve their service, reduce costs and optimize returns on investments. Users of solutions developed and integrated by Lyngsoe Systems are to be found within the Airport, Postal and Supply Chain industries and many of them are among the Fortune 500 companies.

LYNGSOE SYSTEMS AIRPORT SOLUTIONS

Lyngsoe Systems Airport Solutions supplies turnkey control and track & trace systems for passenger, baggage and asset handling. Lyngsoe Systems Airport Solutions are dedicated to improving operations, identifying bottlenecks, increasing visibility and capacity within logistics flows of the airport industry and to reducing the amount of mishandled bags, trolleys, ULDs or other assets. Based on our extensive worldwide experience, we offer logistic flow analysis and recommendations for significant improvements of operations and performance, simulations as well as smooth integration and operational support.



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RFID Innovation Centre assists Nordic businesses in

- RFID and EPC advisory services
- RFID/EPC-training and workshops
- AutoID innovation studies and projects
- RFID technology evaluation and procurement
- Proof of Concept for RFID-enabled solutions
- RFID enabled business process improvements
- Lab testing, trial and field testing and RFID piloting



Member of
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Member of



RFID Innovasjonssenter AS is a test and innovation centre established by the Norwegian Computer Society, the Norwegian Packaging Association, The Federation of Norwegian Commercial and Service Enterprises, GS1 Norway, and SINTEF ICT.

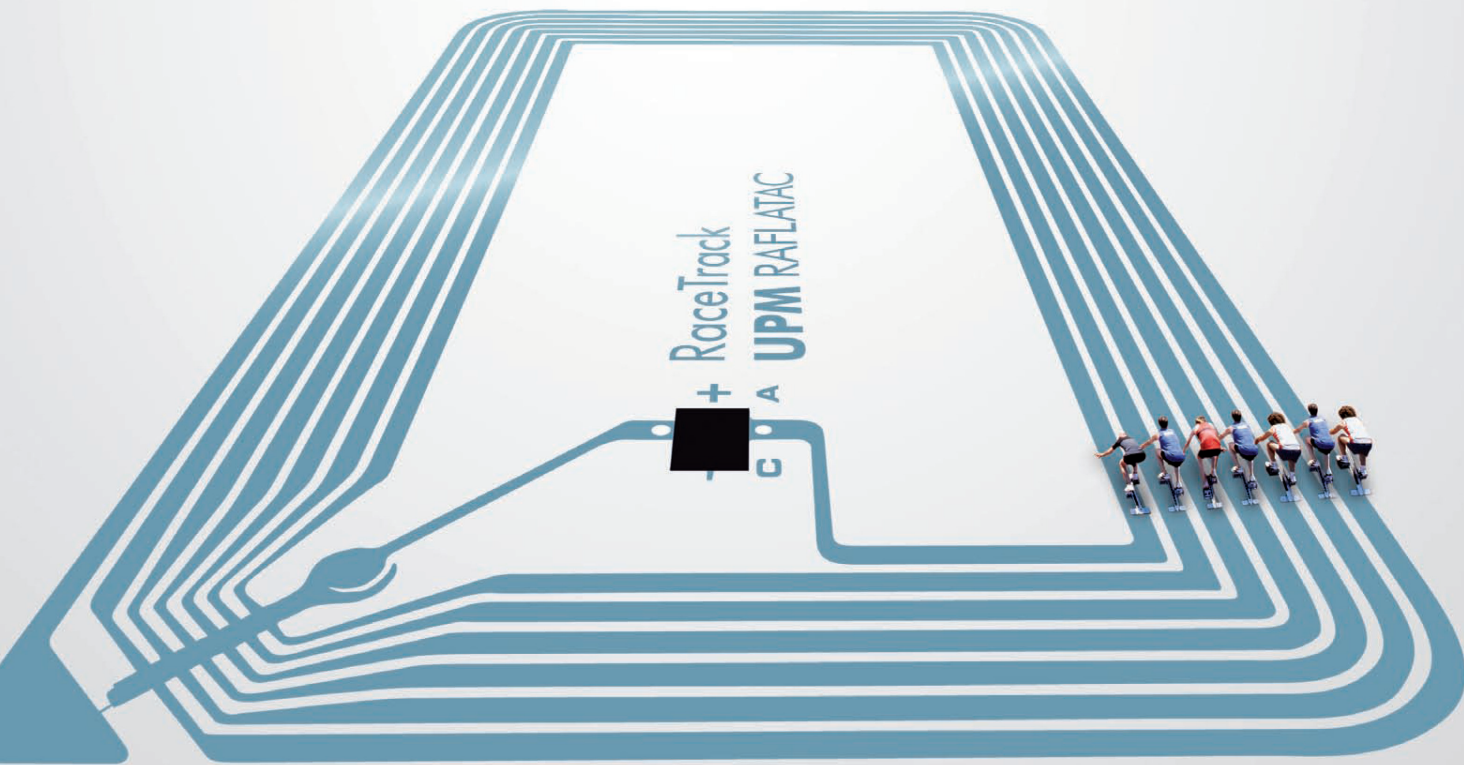
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WE LEAD.
WE LEARN.



Stay On The **Fast Track**



Making sure your company is running as well as possible can be a tough challenge. One way to keep it moving in the right direction is to efficiently manage your supply chain and logistics processes. At UPM Raflatac, we develop RFID technology that helps our customers do just that.

We have more than a decade of experience producing cost-effective HF and UHF tags and inlays for a wide range of

industries. Which means, if you're looking for a partner with the stamina to keep you on the fast track, your search is over.
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Nordic Innovation Centre

Nordic Innovation Centre

The Nordic Innovation Centre initiates and finances activities that enhance innovation collaboration and develop and maintain a smoothly functioning market in the Nordic region.

The Centre works primarily with small and medium-sized companies (SMEs) in the Nordic countries. Other important partners are those most closely involved with innovation and market surveillance, such as industrial organisations and interest groups, research institutions and public authorities.

The Nordic Innovation Centre is an institution under the Nordic Council of Ministers. Its secretariat is in Oslo.

For more information: www.nordicinnovation.net