



The Invisible Interface of the check-in process - and its importance for the use of Self Service Units

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Abstract

When a computerized artefact is introduced as a tool in an activity it is not possible to only consider the design of this tool to understand the actual use of it. It is also necessary to study the context in which it is used and to rig the environment to support the use of this tool. This I have tried to show in this master thesis where I have studied how travellers behave in the check-in process, using or not using Self Service units for check-in at airports in Sweden and Norway.

Key words

Check-in, Self Service unit, Tool, Invisible Interface, Mediation, Accountability, Affordance

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I. INTRODUCTION

The routine for check-in at airports have been similar for many decades. When arriving to the airport for a flight departure travellers have approached a stationary check-in desk, manned by airline staff who have taken care of both traveller and baggage, printing boarding cards for passengers and attaching baggage tags to baggage, placing it on a convey band at the check-in counter. During the last decade however the check-in procedure is changing. The introduction of computerized units for Self Service flight check-in at airports is increasing as airline companies seek new ways to make the check-in process smoother and quicker for travellers. On a strained market with keen competition an increased use of Self Service check-in units could also be a way for the airline to reduce their costs. But *how does this change in the check-in procedure affect the traveller? And why is it that airlines such as SAS have to put effort in trying to increase the frequency of use of these machines for check-in? Why do some travellers still not use them, even if they have been available for some time now?* To be able to find an answer to this there is a need to understand the actual use of these units and a need to understand how travellers behave in the check-in process. To gain an understanding of travellers' actual behaviour at check-in and their use of Self Service units, I have made a study, using ethnographical field methods, of travellers when checking in at airports in Sweden and Norway. My questions at issue when doing this study have been;

- *What is the reason why some travellers do not use the computerized units for Self check-in?*
- *Are there any visible differences between users and non-users?*
- *What has to be done for the Self Service units to become the primary choice for travellers when doing check-in at airports?*
- *Are there ways to increase the use of Self Service units?*

I will try to answer these questions by discussing and analysing my findings using some central terms which I will define in the theoretical part below.

I have made a conscious choice not to focus on the organizational structure of the airline studied, i.e. SAS. Neither have I focused on the employee's use of these Self Service units (they are also users although not from the same perspective as the travellers). Nevertheless some of their work has been noted in my studies to complete the picture of what is going on around Self Service units at airports.

Disposition

I have divided this report into four major parts; Introduction, Theoretical terms, Empirical Study and Discussion, ending the report with my design recommendations and conclusions. In the Introduction I explain the purpose of this report and give some background information about check-in and the Self Service units. In the part Theoretical terms I define and present some theoretical terms that are of importance for the report. In the empirical study part I present my study and give some examples of different, typical flights using excerpts from my

observations. In the discussion part I discuss my findings and end the report with my design recommendations and conclusions.

Check-in

As the concept check-in is of importance in this report, when talking to travellers and SAS staff at airports, I have asked them how they would describe the meaning of the term "check-in". I came to the conclusion that the two different groups, travellers and SAS staff, have a similar understanding of the meaning of this term. For most of the travellers that I have spoken to, check-in means a procedure to get ready for boarding. By check-in the traveller confirms that he has arrived to the airport and that he is going to use his prior reservation on the actual flight. For the traveller it also meant dropping his baggage. The check-in procedure is closed when receiving a boarding card or a confirmation printed on the ticket, however if the traveller carries baggage the task closure is when dropping the baggage.

For the SAS staff the task check-in is also something the traveller does to confirm that he is going to use his prior reservation on the actual flight. This is done by confirming the reservation, get a seating, tag baggage if carrying any, and drop baggage. For the staff however it is important for the traveller to get "ready to go"¹ as soon as possible as this will reduce the work at gate or avoid having to solve possible problems near take-off. For the staff the check-in task is not seen as completed until the traveller has passed the gate. This is different from the view travellers have.

Check-in options

Self Service units

There are several different ways for check-in. One is using computerized Self Service units, which is the way of check-in that I have focused on in my study. All travellers having an e-ticket² or a paper ticket, unless it is handwritten, can use the Self Service units. If there are more than one traveller registered on the same e-ticket however or if the traveller brings an infant, he has to be manually checked-in by a staff. This is also the case if the traveller carries overweight, odd sized or more than two baggage or if he wants to change his seat after already having performed a Self Service check-in. I will go further into the features of Self Service check-in later on in this part of the report.

Internet check-in

It is possible to check-in by Internet from 22 hours before departure until one hour before departure. If a traveller has checked-in by Internet he can go directly to gate if not carrying baggage. If he is carrying baggage he has to go to a Self Service unit to print baggage tags for his baggage. After attaching the tags to the baggage he has to go to the baggage drop before going to the gate.

¹ free translation of the word "resklar" which was used by a SAS staff during an interview

² please see wordlist for explanation of e-ticket

MSU

In connection to the Self Service units there are also mobile service units, called MSUs, which are used by SAS staff for check-in, in those cases where the traveller himself can not use a Self Service unit.

Manual check-in desks

At some airport e.g. Stockholm Arlanda, it is still possible to go to a manual, stationary, staffed check-in desk for personal check-in. In front of this there is a rope snake³ (which I, in this report, will refer to as the snake) to organize lines of people waiting to be served. This manual check-in is primarily for those travellers holding tickets that are not possible to use in Self Service units or for reasons as those mentioned above, e.g. bringing an infant, carrying more than two baggage etc. Still many travellers observed, that theoretically could have used Self Service units, instead use this manual check-in desk. At Arlanda T5⁴ there is therefore a SAS employee standing in the entrance to the snake to decide whether the traveller shall enter the snake or should go to a Self Service unit instead. The same is lately introduced at Arlanda T4⁵, where I have made most of my observations when visiting Arlanda.

Gate check-in

Earlier it has been possible for travellers carrying only hand baggage to go direct to the gate for gate check-in. It has also been possible to be re-seated or change departure flight at the gate, provided the ticket type bought permits changes. After October 26 2003 however, SAS have made changes at gate at ten airports⁶. The idea is to transform the gate to a pass through control only. Problems that earlier have been solved at gate shall instead be solved at latest at check-in in the departure hall.

Future possibility - PC-kiosks at airport

In addition to Self Service units there is a suggestion within SAS to put pc-kiosks in the departure halls at airports as an additional way to check-in. The pc-kiosks would allow travellers to do @check-in, i.e. to check-in by Internet, at the airport. By the end of November 2003 this had not yet been introduced.

SAS Self Service units

SAS Self Service units, which are owned by SAS airlines, were introduced some ten years ago and have been improved in different versions since then. The initial purpose was to make travelling easier for business travellers by cutting the time in queues at check-in desks at the airport. Today most SAS travellers can use the units⁷. In these machines travellers can confirm their flight, change their flight⁸, choose amongst available seats, check-in up to two baggage and register for receiving bonus points.

³ Ropes arranged as a path resembling a coiling snake. The ropes are drawn between movable posts and the path can be rearranged in different ways depending on the number of travellers waiting. Travellers have to enter the snake and follow it through to reach the manual, staffed check-in desk.

⁴ Terminal 5, international flights

⁵ Terminal 4, domestic flights

⁶ ARN, CPH, OSL, GOT, MMX, BGO, SVG, TRD, LON and HEL. Please see word list for names in full.

⁷ Unless there are more than one traveller registered on the same e-ticket, if bringing an infant or if carrying overweight, odd sized or more than two baggage.

⁸ Provided that the traveller has bought a ticket allowing this type of change.

Below are two examples of the appearance of SAS Self Service units used at the airports where I have done my study. The first picture demonstrates the latest version found at Stockholm Arlanda (SE), Molde (NO) and Växjö (SE). The second picture demonstrates how the Self Service units appear at Kallinge airport in Ronneby (SE). Even though the physical appearance of the machines differs, the graphical user interface on the display is the same on both versions.

The latest version of Self Service unit hold a computer screen with a touch-screen function, an input for credit card⁹/bonus card, an input for ticket, a printout for the ticket after updates or for printing boarding cards and a printout for baggage tags. There is also a thin shelf for leaning handbags on¹⁰.



Fig. 1: Self Service unit at Arlanda airport

The older version of the Self Service unit has the same features as the above newer version with the exception of the handbag shelf and the addition of a special reader for tickets holding EAN-numbers instead of a magnetic stripe.



Fig.2: Self Service unit at Ronneby / Kallinge airport

⁹ It is not possible to buy tickets in the machine but a credit card can be used as an e-ticket provided that the card has been registered as the card chosen to hold the booking

¹⁰ As I have noticed during my observations at airports this thin shelf has only been used twice during my whole observation period starting in September ending in November 2003.

How to check-in at a SAS Self Service unit

Below is shown an illustration of the steps a traveller has to go through when using the graphical user interface on the display if he holds a round-trip, business class ticket with the possibility to change his reservation and carrying a minimum of one or maximum two baggage, besides one hand baggage. This illustration is taken from the SAS leaflet "Check-In" and is therefore presented in Swedish.



Fig 3.1 This is the first step in the check-in process at a Self Service unit



Fig 3.2 Here the traveller has to tell if he travels on an electronic ticket or paper ticket.



Fig 3.3 Here the traveller can see and/or change his reservation. If he choose to change his reservation the next step is fig.3.4. If he chooses to continue with check-in he will instead proceed to fig. 3.5



Fig 3.4 Here the traveller can change his flight and/or confirm his flight.



Fig 3.5 Now the traveller is asked to register his bonus card if he has not already done this when booking the flight.

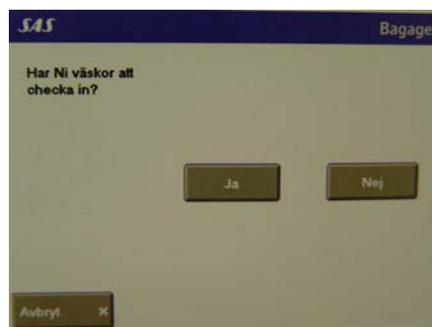


Fig 3.6 The traveller now has to tell if he has baggage to check-in or not.

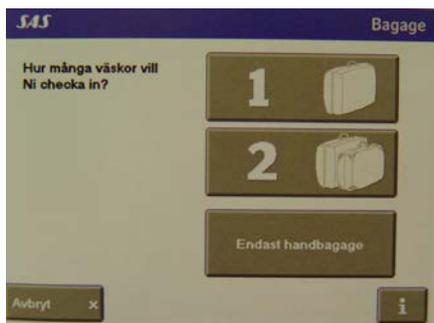


Fig 3.7 If the traveller has baggage to check-in he has to tell how many.



Fig 3.8 If the traveller is not pre-seated he now has to chose his seat otherwise he can chose to keep his pre-seating.

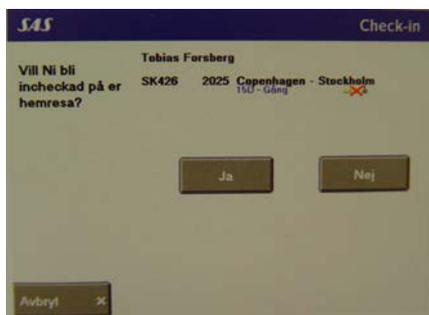


Fig 3.9 If the traveller has a return flight the same day registered on his card and only carry hand baggage then he is now asked if he want to check-in for his return flight as well.



Fig 3.10 Check-in is now completed. If the traveller has used a paper ticket he will receive it with printed information about seating, baggage etc. If he has used an e-ticket he will receive a boarding card with the equivalent information. If he has baggage he will also receive baggage tags.

II. Theoretical terms

When a computerized artefact is introduced in a work-process this artefact and its use will affect the old process in some way or another. This is well known and written about by many authors, e.g. Bannon & Schmidt [1991] who writes "*The system is an organizational change agent. That is, knowingly or unknowingly, the designer does not merely design a computer system. What is being designed is a work organization.*" or as Winograd [1986] express it "*Every time a computer-based system is built and introduced into a work setting, the work is redesigned – either consciously or unconsciously. We cannot choose to have no impact, just as we cannot choose to be outside a perspective. We can make conscious choices as to which ones to follow and what consequences we anticipate.*"

When the Self Service units were introduced at the airports it changed the work-process at check-in both for travellers and staff, introducing new ways for travellers to check-in by themselves which in turn affected the way airline staff worked when assisting travellers at the airport. By ignoring the new artefact i.e. the Self service unit, not using it, the work is not changed in reality, however when efforts are being made lately to make more travellers use these computerized Self Service units, this use will affect the situation both for staff as well as for travellers. The question though is how or in what way it affects it. In this report I have chosen to look at the check-in process and the use of Self Service units from the traveller's point of view. I will discuss the Self Service units as being a tool for check-in and the importance of affordance of this tool when used as well as the need of affordance of the check-in process. I will talk about the accountability in the check-in process and how artefacts in the environment where check-in takes place, together mediate to users what are expected of them to do. To be able to discuss my observation in these terms I will describe the terms and their definition in short below, referring to them later. I will also discuss the term interface, introducing my view of how artefacts, processes and people in the check-in environment together make an invisible interface for new travellers, which affects the use of SAS Self Service units at airports.

An invisible Interface

When looking up the word Interface in e.g. Cambridge Advanced Learner's Dictionary the word, as a noun, can mean either; 1.) "*a connection between two pieces of electronic equipment, or between a person and a computer*" or 2.) "*a situation, way or place where two things come together and affect each other*". Researchers within the area of Human Computer Interaction, HCI, usually talks about user interfaces as being the user interact surface on computer displays or controls, which is equivalent to the first interpretation of the word in the dictionary. However there is not always a uniform idea of what this word stands for within the HCI community. E.g. Bannon and Bödker raises the question what the interface exactly is and where to draw the boundaries for it [1991]. In *Exploding the interface* the authors talks about different kinds of visible interfaces, which together becomes a larger interface [Bowers & Rodden, 1993]. They discuss how the term user interface within HCI usually evokes the image of two distinct domains; a human and a computer. They however illustrate how the interface is exploding into

many fragmentary sites, becoming a larger interface, when users use several applications at the same time for one task and also interact with other users while using them.

In my report I wish to take this one step further by talking about an invisible interface which affect if and how the traveller see and interpret the smaller, visible interfaces such as e.g. the Self Service unit and the graphical user interface presented on its display. Through this invisible interface the traveller gets access to several visible part-interfaces, which together serves the purpose of completing one major task through the interaction with each separate one. When talking about the invisible interface I do not talk about an interface as being the user interact surface on computer displays or controls as is common within traditional HCI, instead I choose to use the second interpretation of the word interface presented in the dictionary. I also refer to Grudin's [1999] thoughts that a computer's interface to users is not the same as users' interfaces to computers. By this he means that the interface which the user interact with is more than just what the computer can offer. The computers interface to users is e.g. a screen, a keyboard and a mouse. The user using this is influenced not only by this though, but also by other artefacts in the environment, the learning process of learning how to use the computer etc. This is the users interface to the computer. Like Grudin I believe that it is more in the user's interface than just what the computer can offer. He writes;

"...Is a user's interface to a computer the mirror image of the computer's interface to the user? It is not, unless one defines "interface" extremely narrowly. The user's interface to the computer may center on the software-controlled dialogue, but it also includes any documentation and training that are part of using the computer. It includes colleagues, consultants, system administrators, customer support, and field service representatives, when they are available....." he continues " ...These artefacts, processes, and people are so significant in shaping our interactions with a computer that it is myopic not to see them as part of a user's interface to the computer".

In this report I want to illustrate how artefacts, processes and people in the check-in environment together affect the use of SAS Self Service units at airports. I will also discuss how these artefacts, processes and people, which the traveller meet in the check-in process, can be seen as being connected by an invisible interface which a traveller, with no prior knowledge of check-in, must interpret before he can interact with specific interfaces within the check-in process. Travellers that travel frequently however may learn to find their way even if this invisible interface is not visible to them right away, as they know from prior experiences what kind of services and artefacts they are supposed to interact with. Inexperienced travellers on the other hand do not necessarily understand the connection between different action points and artefacts at first. For them there is a need to make the invisible interface visible in some way, when entering the airport.

In the figure below I try to illustrate how each separate interface, which the user might need to interact with during check-in, together build a larger and invisible interface, here marked by a dotted line.

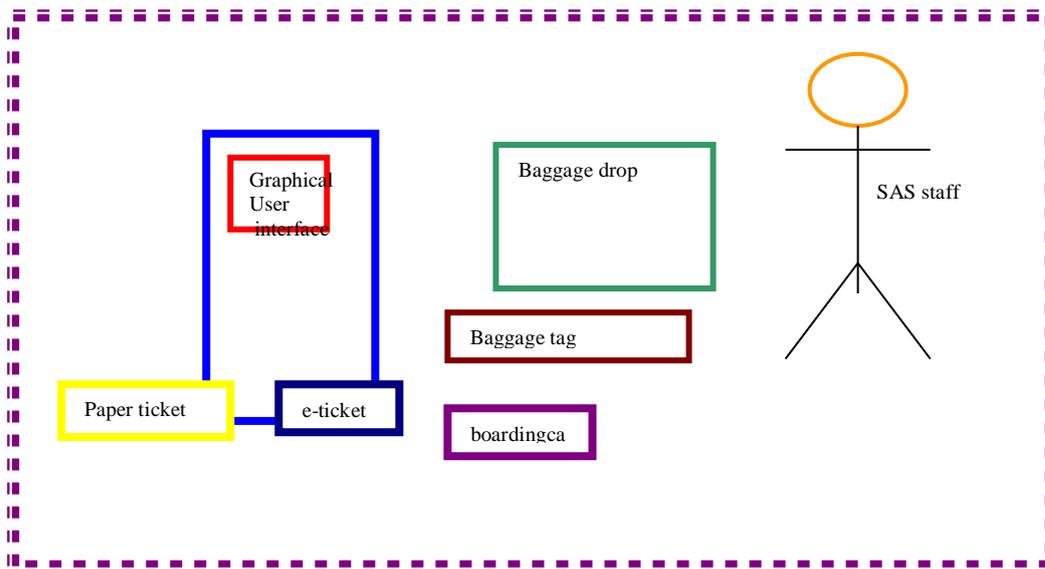


Fig. 16

The invisible interface has to be made visible to the traveller before he can see and interact with each part-interface which he needs to be able to interpret to be able to check-in. After the traveller understands what interfaces he has to deal with to complete the task check-in he then has to interpret each interface to complete the whole check-in process. He needs to understand that the check-in procedure comprises using the Self Service unit, baggage tagging, baggage drop and possibly needing assistance by a SAS staff. He has to understand what ticket type he holds, i.e. if it is possible for him to check-in at a Self Service unit or need assistance. If he is able to use the Self Service until he has to understand how this machine is used, i.e. where physically put the ticket (paper or e-ticket), where to receive his ticket back, receive boarding card and where to receive his baggage tag. He also has to understand how to use the graphical interface on the machine. Then he has to understand where the information is printed on his ticket if not receiving a boarding card holding this information. If receiving a baggage tag he has to understand how to attach it to his baggage. After this he has to understand where to go for baggage drop and how he is expected to behave there, i.e. having to show his ticket to a person or not. If he needs assistance during this process he has to be able to figure out where to go for assistance.

My use of a term such as an invisible interface might be a bit provocative to people active within the HCI area. However I do not find another word that I feel can better explain what I am after. In this report I therefore choose to stretch the boundaries for the word interface to comprise the contact surface, the invisible interface, of a group of separate artefacts and their interfaces to the traveller used in a whole process, rather than being the contact surface for interaction with a single user interface.

In my studies I noticed that it is often the first impression of, or interaction with, this invisible interface that is decisive of if the travellers will approach the Self Service units, and thereby use them, or not. If the travellers do not notice, or rather acknowledge, the Self Service units as a part of their task at hand, i.e. check-in, the traveller will not approach the Self Service units.

If this invisible interface does not mediate to the user, i.e. the traveller, what artefacts he has to use, and in which order, to complete the check-in procedure, then he will not approach them, unless he has the prior knowledge or experience

that he should. This leads to that he does not see or use the different part-interfaces such as e.g. the Self Service unit and its display, which is necessary for him to do to be able to check-in.

The invisible interface is only publicly available as a resource for interaction if made "visible" to the user. I would like to compare this with the thoughts Gunnel Andersdotter has about software being invisible to its designers [Andersdotter, 1999]¹¹. She talks about how software designers have to rely on artefacts to be able to see and feel what they work with. She writes "*..an important aspect of software design as work, as profession, could be understood as the art to make, through representations, the invisible visible in the meaning interpretable*"¹². In the same way the invisible interface that I talk about here must be made visible with the aid of the artefacts, the separate interfaces that has to cooperate to make the design process work and which together creates this larger invisible interface, so that the check-in procedure become interpretable for the traveller. Each separate contact surface such as the Self Service unit itself, the graphical user interface on it, the ticket, the baggage drop and the SAS staff provide separate contact areas having to work together to make the check-in process work. In the same way software designers designing separate parts of a system must make sure that each interface they design work together to make the system work.

Tool

I will discuss the Self Service unit as being a tool for check-in. To describe the definition of a tool I refer to Bannon and Bødker who, in *Beyond the Interface*, writes that "*a tool is what it is used for*" [Bannon & Bødker, 1991]. E.g. If somebody uses a book to hammer a nail into a wall, this book is not used as a book for reading. It is used as a hammer in this situation, i.e. a tool for hammering a nail into a wall. In the same way the Self Service units, which are basically computers, becomes a tool for check-in when used. To further describe the word tool I would like to use a quote of Samuel Butler¹³, which was quoted in Bannon and Bødkers [ibid] introduction. This quote gives a very good explanation of the description of a tool.

"Strictly speaking, nothing is a tool unless during actual use.

The essence of a tool therefore, lies in something outside the tool itself. It is not in the head of the hammer, nor in the handle, nor in the combination of the two that the essence of mechanical characteristics exists, but in the recognition of its unity and in the forces directed through it in virtue of this recognition. This appears more plainly when we reflect that a very complex machine, if intended for use by children whose aim is not serious, ceases to rank in our minds as a tool, and becomes a toy. It is seriousness of aim, and recognition of

¹¹ Free translation; "the art of making the invisible visible"

¹² Free translation of the quote "*..en viktig aspekt av mjukvarudesign som arbete, som profession, [skulle] kunna förstås som konsten att via representationer göra det osynliga synligt i bemärkelsen tolkningsbart*".

¹³ Samuel Butler, Notebooks late 19th century

suitability for the achievement of that aim, and not anything in the tool itself that makes the tool."¹⁴

I want to show that to be able to increase the use of Self Service units considerations have to be taken to the affordance of the unit and its features, the accountability of the use of it as well as how the situation and environment mediate the unit to be the central tool to use in the process of check-in.

Accountability

At check-in the travellers need to be able to decide what they have to do to get their task done. This could be possible through accountability, which implies that travellers observe and make a judgement of what has to be done according to the situation at hand and the activity itself. Dourish [Social computing, p.80] discuss the notion of accountability as a fundamental feature of the ethnomethodological perspective. He cites Garfinkel [1967:1-2] and come to the conclusion that accountability means that "*other members can observe and report, that is, make sense of, the action in the context in which it arises*". He continues "*The analytic concept of accountability emphasizes that the organization of action, as it arises in situ, provides others with the means to understand what it is and how to respond in a mutually constructed sequence of action*". By looking at how other people act in the check-in situation and how they and artefacts are placed or introduced in this environment, the traveller interpret the situation at hand; it becomes accountable for him.

Mediating artefacts

A piece of string tied around a finger can be seen as a tool for remembering something. If this string has been tied their in the purpose to remind about e.g. a dentist appointment then this string mediate this to the person having the string attached to his finger. In the same way, a chair placed in front of a stair e.g. can mediate to someone that he should not climb the stairs. Mediations can be seen as intermediary and connecting. Engeström[1994], writes about how the mind is mediated by tools, signs, rules and division of labour created by the given community while Susanne Bødker writes about computer applications being mediating artefacts in her text *Computer applications as mediators of design and use* [1999]. At the airport there are several, different, mediating artefacts affecting the traveller at check-in. The traveller's behaviour in the check-in process partly depends on what the artefacts and the context of the check-in procedure mediate to its users.

Affordance

There have been many discussions about the meaning of the term affordance since the psychologist J.J. Gibson created it in his study of human perception and Donald Norman later tried to appropriate it and extend the term for its application to the world of design. In his book *the invisible computer* Norman tries to clarify the

¹⁴ This quote is used as an introduction to chapter 12, *Beyond the Interface: Encountering Artifacts in Use*, by Bannon L. & Bødker S., in the book *Designing Interaction: Psychology at the human-computer interface* edited by Carroll J.

use of the term by dividing it into real and perceived affordance. He explains affordances as the set of possible actions one can do with an object, claiming that it is not a property but a relationship between the object and the organism acting on it [Norman, 1998]. This means that depending on who is acting on the object the affordances of the object can differ. Norman also means that it is the perceived affordances that tell the user what actions can be performed on an object and, to some extent, how to do them. It is the perceived affordances that determine the usability.

There are also other authors trying to explain this term. Gaver [2001] e.g. describes affordances as *“properties of the world that are compatible with and relevant for people’s interactions”*. Bonnie Nardi & Vickie O’day [2000] write about affordance as *“those properties of an object that neatly support the actions people intend to take with the object”* while Bill Sharpe [2001] writes that *“affordances offer a direct link between perception and action”*. He also says that *“Our peripheral awareness and attention are things that make our environment work”*. Bill Sharpe here refers to appliance design where an appliance is a technical artefact supporting a single use or activity. Interpreted this way the Self Service unit could be seen as an appliance. Even if it is possible to do several tasks through this unit such as change the flight, register bonus points, choose a seat etc., all these tasks are made for one purpose; to check-in. Also these tasks are made during check-in, they are not made separately on separate occasions. Still I choose not to call the Self Service unit an appliance in this report, as I believe the use could be altered easily by only adding a new computer application to it, or make slight changes in the existing one. All the same there is a need of affordance of the Self Service unit. But I do not want to talk about affordance only for the Self Service unit. I want to stretch the importance of affordance also to apply for the invisible interface that travellers have to interpret to be able to interact with separate artefacts in this environment. I understand that some people may react on this use of the term questioning if it is possible to talk about affordance of something that is not visible. Especially since there have been vivid discussions about this term being used improperly for some time, which has also been written and discussed by e.g. Gerard Torenvliet [2003] in an interaction whiteboard column, where he claims that we need to reclaim the original meaning of affordance, i.e. Gibson’s use of the term to describe properties of the environment with respect to an organism. All the same I still believe that it is possible to use this term to describe the need for the invisible interface to mediate some sort of logic to traveller about the check-in process and how to handle it.

How the terms relate to each other

I am aware of that the terms mentioned above¹⁵ resemble and may overlap each other depending on how they are interpreted and how they are used. Depending on how they are used, these terms can describe different features, or nuances, of the same activity. Used in this way the terms complement each other in the purpose to give a richer description of the overall view of a situation. To use the terms in this way demand an explanation of how they are related to each other

¹⁵ tool, accountability, mediation and affordance

when used. Below I will try to clarify *my* use of the terms and how *I* relate them to each other.

To explain how I would use the terms when describing an activity of some sort I will give an example below;

A person arrives to a parking lot to pick up his car. The car windows are full of snow and needs to be cleaned before departure. As the driver do not have a proper scraper for this he takes out a cd-cover and uses it as a tool to scrape the snow off the windows. The affordance of this tool, being thin and broad, having a sharp edge, resemble features of a scraper and make it usable for the purpose of scraping snow off the car windows. The users earlier experiences of how a scraper look like and the use of it helps in the decision to use the cd-cover as a tool for the task at hand. Other drivers coming out to the parking lot see the driver use a cd-cover for scraping his car window. By watching the driver scrape snow from his window it becomes accountable to the other drivers what is happening. It also becomes accountable that it is possible to use a cd-cover as a tool for this purpose and how it is used. As it is cold outside and there are snow on the windows, the whole situation mediate to the drivers that this is an adequate behaviour and that they probably also have to scrape their car window. It may also mediate to them that they should take it easy when driving as the roads might be slippery. If they do not have a scraper themselves the situation may mediate to them that they should buy a scraper. For others the situation may mediate that they should change to winter tires.

If however it had been really warm outside, with no snow on the windows and the drivers saw someone standing with a cd-cover pretending to scrape his windows, it would be accountable to other drivers that he is standing pretending to scrape his windows with a cd-cover. The whole situation though probably would mediate to the other drivers that this is not a normal behaviour and that the person is not in his full mind.

What I try to explain is that I have chosen to interpret mediation as taking place in the mind of a person. It is a comprehension or a connection one does between an artefact, or a situation, and an activity or a way to act. A person himself creates the connections needed to connect a situation or an artefact to an activity or a way of action. Mediation can not be understood only by looking at a specific artefact or situation; it must be mentally connected to something else. The environment and the context of the situation as well as artefacts together influence what is mediated.

In difference to this accountability is more obvious. By looking at and interpret how people act in a specific situation or environment the activity become evident for other people. This also gives them clues of how they themselves may act. The way people act in a specific situation or environment does not necessarily have to be the desired way of action though. By rigging the context in a way that make it natural or easier for people to act in a certain way it should be possible to influence how people act. Seen this way it would be possible to influence how new users learn how to behave in a specific situation or environment.

Affordance I see as a gathering term for the real or perceived properties an artefact has. Properties making it possible, or suitable, for it to function for a certain purpose. I have however chosen to use the term affordance also for the invisible interface. The invisible interface can be seen as an invisible connector between different "action points" within the check-in process. Artefacts at each action point have affordances. Used together they make a check-in process. If the artefacts in this process are designed and arranged in a way that considers the use and dependence of each other, then the whole situation will mediate to travellers that these artefacts belong to the same activity and are needed to interact with before check-in is completed. The situation must mediate some kind of appropriateness of using the artefacts involved. What I try to say is that rigged together the involved artefacts must, in some way, together mediate an affordance of being appropriate to use, to be able to complete check-in. This affordance does not belong to a single artefact within the process but belong to the invisible interface, i.e. the invisible connection one does between the artefacts involved. The role of the invisible interface is to mediate a totality and a sense of connection between artefacts and action points in the check-in process, to travellers.

III. Empirical study

Method

Inspired and informed by a research area, having an inter-disciplinary perspective, called Work Practice and Technology¹⁶, which focuses on the interaction between people and technology, I have performed observational studies, in the real context, conducting a microlevel study [Fetterman, 1998] of travellers doing check-in at airports. I have taken field notes, mostly using pencil and paper taking handwritten notes and making sketches of the environment, which I later have typed in my computer for further analysis. I have also made informal and ad hoc conversations as well as more formal interviews with travellers and SAS staff. I have used a digital camera to take photos of specific situations and matters that I have found interesting and a video camera for recording some activities around the Self Service units. This to be able to, back at my desk at school, repeatedly study activities and the flow of travellers.

Field work

During the period September 2003 through November 2003 I have spent approximately 45 hours performing field studies, observing travellers doing check-in at departure halls at three different airports in Sweden; Kallinge airport in Ronneby on twelve occasions, Växjö airport twice and Stockholm Arlanda airport on five occasions. I have also performed observations at an airport in Norway; Molde airport. All four airports have been consciously chosen.

Ronneby I chose as it is located nearby where I live and therefore easy to visit on a frequent basis. It is also an airport where the use of SAS Self Service units is rather high according to statistics (30% in May 2003), compared to other airports in Europe. Växjö I chose, as it is also quite easy to reach only one hour drive from where I live. Stockholm Arlanda was chosen because it is the largest airport in Sweden and one of the base stations¹⁷ in Scandinavia.

The decision to visit an airport in Norway was because a SAS employee informed me that Norwegian travellers seemed to be more positive about using Self Service units than travellers in other parts of Europe. Also the frequency of use of SAS Self Service units in Norway is generally believed to be higher than in Sweden, although it is based on the same technology. I therefore wanted to compare the use at Ronneby and Växjö with the use at Molde. Molde was interesting as it presents one of the highest percentages of use of SAS Self Service units in Europe. In addition this airport has come far in putting the Self Service units in centre of the organizational development at the airport. E.g. they do not use stationary, manual check-in desks for SAS or Braathen flights but depend solely on Self Service units, mobile service units (MSU) used by staff and a service desk for problem solving. In addition they always have a staff walking the floor from 45

¹⁶ Within this research area sociologists, anthropologists, cognitive scientists and computer scientists work together in interdisciplinary projects with the aim to study the use of technology in the actual context. Strategies and analytical methods are ethnographic field methods, conversation analysis and video based interaction analysis. This research area also has an interest in how results from actual studies of practices can contribute to finding new ways to think about and inform design of IT.

¹⁷ Stockholm Arlanda (ARN), Copenhagen Kastrup(CPH) and Oslo Gardemoen(OSL)

minutes before departure¹⁸. As this resembles the way I have seen SAS staff work on the floor towards travellers in Ronneby (although the SAS staff in Ronneby and Molde do not have the same distribution of work) I wanted to compare the activities in Molde with Ronneby to see if travellers act in the same way or not on these two airports.

Interviews

To complete my study I have also made several interviews with travellers. The interviews have been more like private conversations where I let the travellers tell me about their experience of using SAS Self Service units for check-in and their own travel experiences. I have tried to avoid asking leading questions as I am aware of the fact that the answer one gets depends on how the question is formulated [Runfors, 1992].

The travellers interviewed have been people of the age 25 through 60, of both sexes. They have been students, frequent business travellers and less frequent travellers. I have also performed ad hoc conversations with SAS employees at airports and also with a Swedish SAS pilot, who I was seated beside on a flight from Oslo to Arlanda. I did not make more than one ad hoc conversation with a traveller at an airport as I felt that many travellers do not have much time to spare for interviews as they, at least in Ronneby, often arrive late before departure. Talking to a traveller while doing check-in at a Self Service unit I also believe might make the traveller feel uncomfortable and more insecure. This would disturb the actual interaction and the study would not be as reliable as if travellers are observed without prior knowledge. However there has been no difficulty to make appointments for conversations with travellers afterwards in a more relaxed environment.

Setting

To better illustrate how the Self Service units are introduced in the actual environment at airports I choose to illustrate this with pictures of Self Service units at the different departure halls¹⁹. In addition to this I also present rough outlines and/or pictures of the departure halls at Arlanda T4, Kallinge/Ronneby airport and Molde airport as I will discuss these three departure halls further on in the report and the reader needs to orient himself in these environments. I want to point out that the outlines are not drawn to scale. Also they do not in detail present all features at the airports. The reason I have made these outlines is rather to give a rough idea of how the Self Service units are positioned in relation to each other, the entrances, the MSUs and, at Arlanda T4, the snake and manual check-in desks.

Arlanda

By the end of October there were seven Self Service units placed at Arlanda T4. In November two additional Self Service units were placed in this terminal's departure hall (see the X marks in fig. 4 & 5). The placement of the units has also been

¹⁸ They used to be three staff walking the floor a year ago when closing the stationary, manual check-in desk but have now reduced the staff on the floor to one. The other staff work with tasks related to start and landing or are manning the service desk.

¹⁹ As I have no pictures or sketches saved from Växjö airport nor from my transfer visit at Oslo Gardemoen airport I chose to exclude these airports in my illustrations below.

discussed recently and it is possible that there will be some more changes soon. Beside the nine Self Service units mentioned there are also three units of the older model, used for youths²⁰ and staff only. In addition to the Self Service units there are also two MSU for manual check-in used by SAS ground staff. These are used for check-in if it has not been possible for a traveller to do check-in himself at a Self Service unit or for additional tasks that the travellers can not do themselves at the Self Service units, e.g. re-seating after the check-in is already done, demand assistance at arrival for handicapped travellers etc. Below you will find an outline of the departure hall at Arlanda T4, domestic flights.

²⁰ Youths between the age of 12 to 26.

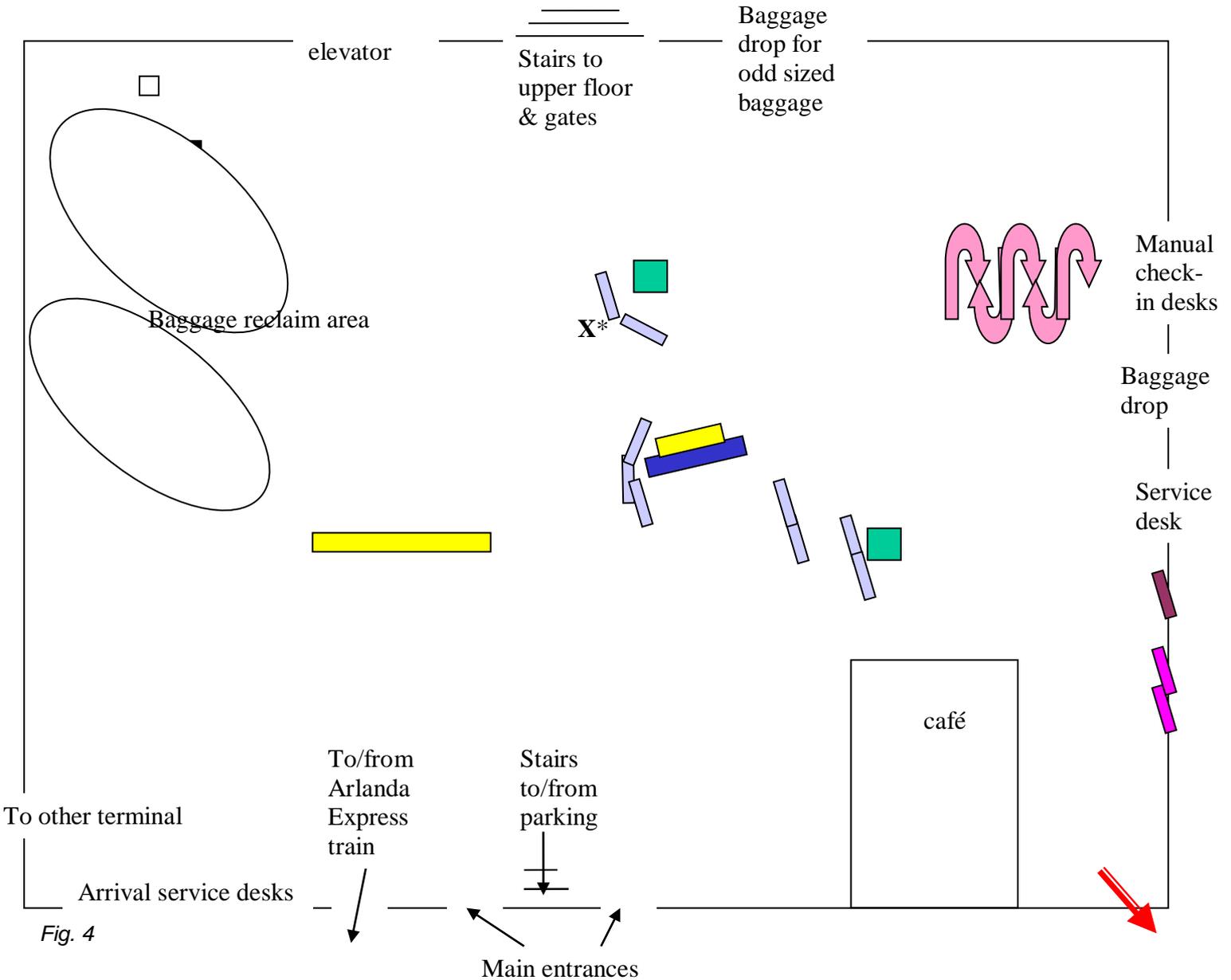


Fig. 4

-  = MSU
-  = Self Service unit
-  = seats
-  = LFV flight information monitors
- X*** = introduced in November 2003
-  = for staff only
-  = for youths <26 only
-  = To Sky City, T5, Systembolaget & entrance
-  = rope snake

The Self service units found in the outline above is illustrated below with pictures, except for the two additional Self Service units which were introduced in the departure hall in November 2003. These two Self Service units are positioned in the area marked with an X in fig.5. Please note that the rope seen on the right hand side in fig. 5 & 6 were only temporarily placed there on the occasion when the photos were taken. On earlier visits it had not been there and on later visits this rope had been removed.



*Fig. 5
This is three of the Self Service units at Arlanda T4. To the right you can see a part of the Self Service unit which is to the left in fig.5, the blue arrow indicates this. In November there was an additional two Self Service units and one MSU placed at the mark X in the picture above.*



*Fig. 6
Behind the two Self Service units placed furthest away in this picture there is a MSU for staff.*



*Fig. 7
This picture shows the snake and the SAS check-in floor sign by the manual check-in desk at Arlanda T4. The pink line shows where the snake is placed in relation to the Self Service units.*

At Arlanda T5, International flights, by the end of October there were 15 Self Service units distributed in the departure hall as illustrated in the pictures below. In addition to these there are a number of MSUs placed in connection to the Self Service units. The pictures of the Self Service units in fig. 8.1-8.4, are placed in the same order as they occur when entering the departure hall at Arlanda T5 from SkyCity.



Fig. 8.1



Fig. 8.2



Fig. 8.3



Fig. 8.4

The pictures in fig. 8.1-8.4 show the placement of the 15 Self Service units at T5. The order of the pictures also pictures show the order in which the Self Service units appear to a traveler when arriving from SkyCity.

In difference to the placement of the Self Service units at T4, here, at T5, the units are placed in five groups, spread out in the departure hall.

Behind some of the Self Service units there are MSUs placed to be used by SAS staff assisting travellers having problems using the Self Service units. The placement of these can be seen in the pictures below (fig. 8.6-8.7).



Fig. 8.6



Fig. 8.7

Fig. 8.6-8.7 shows how the MSUs are placed in relation to the Self Service units at Arlanda International, Terminal 5. Fig. 8.6 being the Self Service units to the left in fig. 8.2 and The Self Service units in fig. 8.7 being the same units as in fig. 8.3.

At Arlanda Terminal 5 there is a rope snake for travellers lining up in front of the manual, stationary check-in desk. At the entrance to this snake there is a SAS staff standing to check each traveler's ticket to assist the traveler in deciding if he can use a Self Service unit instead for check-in (fig. 8.5).



Fig. 8.5

Fig. 8.5, shows the snake and the check-in floor stand in front of the stationary, manned check-in desk. It also shows the SAS staff standing in the entrance to the snake checking travellers tickets to see if they hold a ticket type making it possible to check-in at a Self Service unit instead.

Ronneby

In Ronneby there are two Self Service units placed as the outline and picture below show (fig.9.1-9.2). In addition to these two, there is also one Self Service unit for youth tickets (fig. 9.3) and two MSUs (fig.9.4). Fig.9.4 shows the placement of these two MSUs in relation to the Self Service units seen in the background.

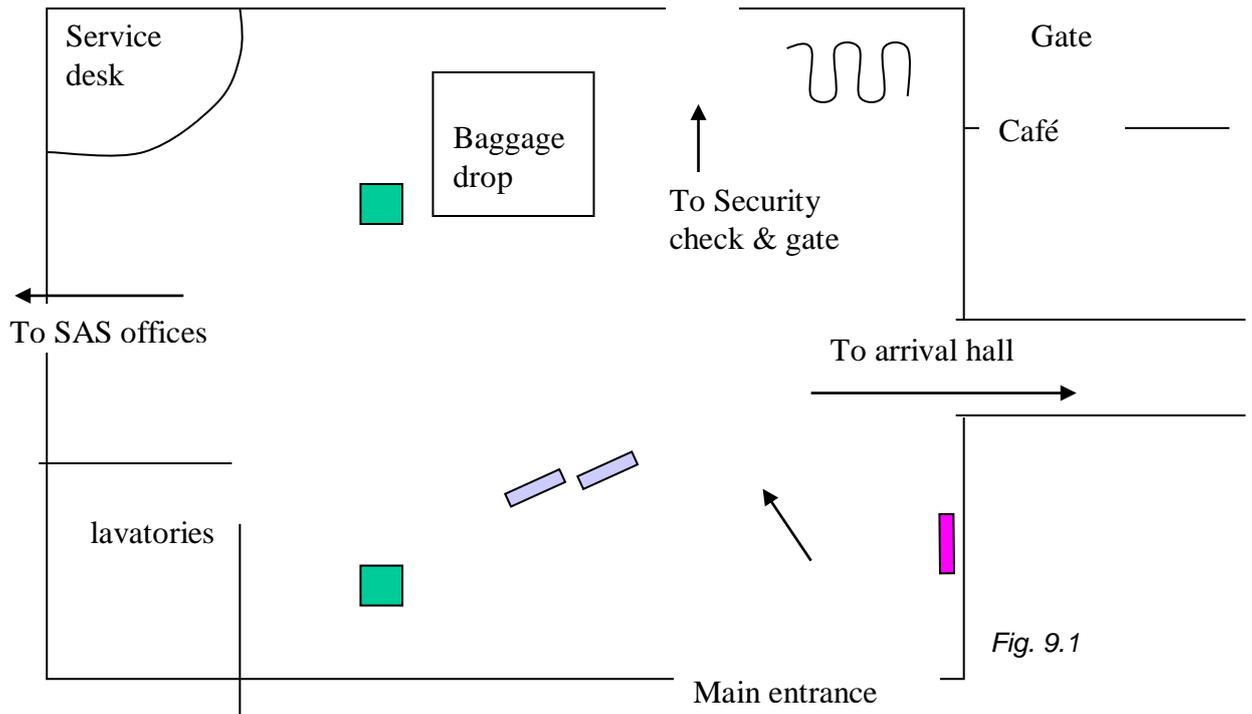


Fig. 9.2 Self Service units in Ronneby



Fig. 9.3 Self Service unit used for youth tickets



Fig. 9.4 This picture illustrates the placement of the two MSUs at Kallinge airport in relation to the two Self Service units placed on the middle of the departure hall floor.

Molde

In Molde there are three Self Service units and one MSU in connection to these. Below you can see how they are placed in a semi-circle with the baggage drop on the wall behind the units. This baggage drop will be rebuilt and moved to the side of the service desk in short due to security reasons. To the right there is a service desk for ticketing and problem solving.

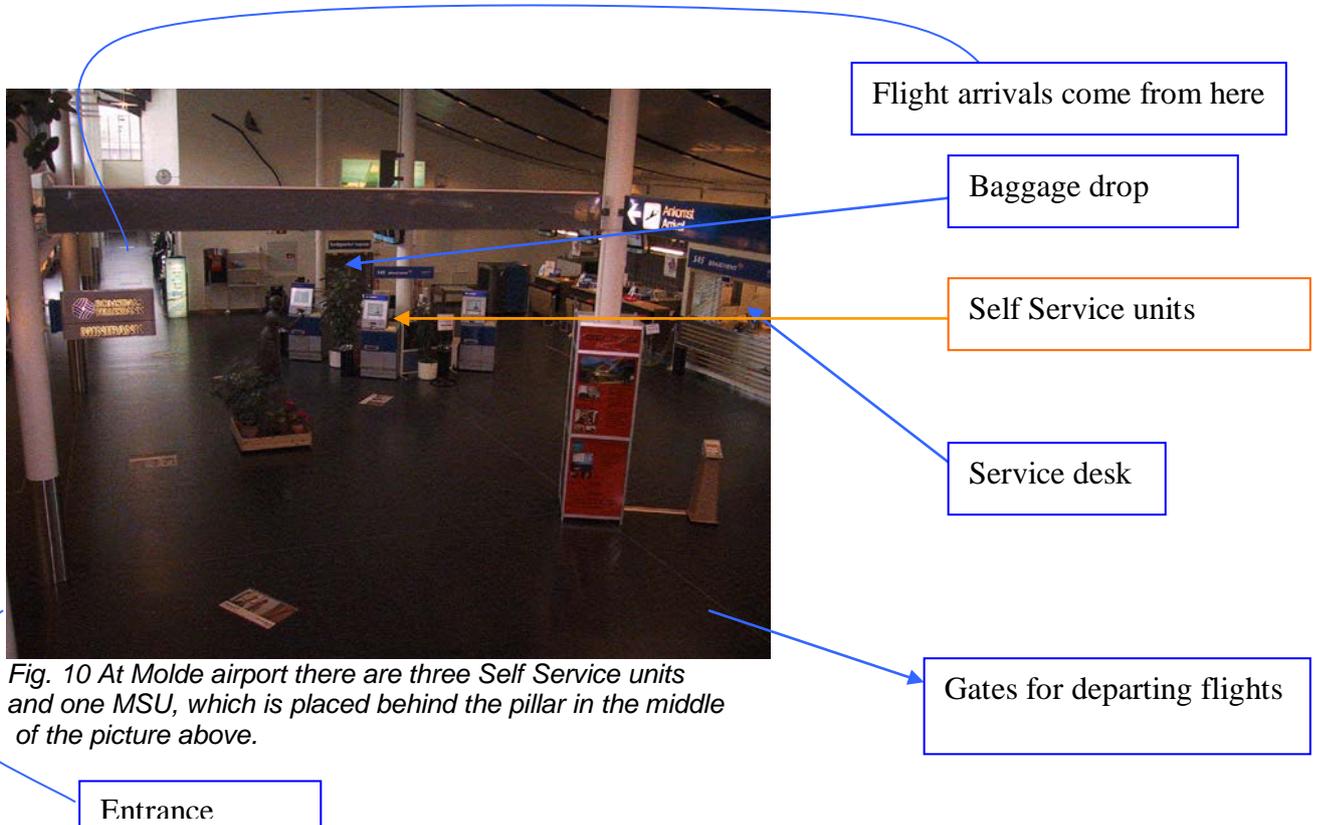


Fig. 10 At Molde airport there are three Self Service units and one MSU, which is placed behind the pillar in the middle of the picture above.

Check-in procedures

In this part I want to describe what happens around the Self Service units when travellers arrive to the airport and are about to check-in. In my observations I have seen patterns of how different flights, depending on departure time and day of the week, carries different kind of travellers, behaving differently at check-in. To illustrate the differences I will describe three typical flights from and to the same destination, i.e. Ronneby to Stockholm Arlanda, at different departure times and weekdays. Below I will describe the flights in general using excerpts from part of my field notes, which I have rewritten in English.

I have chosen to illustrate a typical flight from Ronneby on a Monday early morning flight²¹, a late morning flight²² on a Tuesday and a late morning flight²³ on a Friday. The reason I have chosen these three flights is because they are similar flights but the travellers do not act in the same way on these. Some of the traveller's behaviours at check-in on these three flights are also similar to behaviours I have seen repeatedly at other airports observed.

Business travellers and leisure travellers

One of my questions starting the study was if there is a difference between travellers using the Self Service units and those who do not. Even if travellers are not a homogenous group I have found a distinct difference between two kinds of travellers; business travellers and leisure travellers. Business travellers are often frequent travellers, being men and women in the age between 30-60 years. Often they travel one by one, only carrying small suitcases on wheels and/or a briefcase or computer bag. Leisure travellers that I have observed, on the other hand, often travel together in groups, being of different ages including children and senior citizens. They also tend to carry heavier baggage than business travellers and more often need to check-in baggage.

These two different kinds of travellers, leisure travellers and business travellers, do not usually go on the same flights, as shown in this part of the report. Business travellers choose flights depending on the departure times and leisure travellers tend to choose flights depending on price. Also leisure travellers tend to travel more during weekends and business travellers more during weekdays.

Most of the travellers I observed immediately walking up to the Self Service units for check-in, or walking directly to the gate, looked like business travellers. According to SAS staff most of the travellers walking direct to gate had not checked-in earlier but were doing this at the gate, as the SAS Scandinavian Direct concept prescribes²⁴. These travellers moved in a self secure way, not hesitating in their interaction with the machine or moving towards the gate as the examples will show below. Departures carrying mostly business travellers, such as e.g. early morning departures 06.30 on weekdays from Ronneby, also proved to provide a smooth flow at check-in. This even if the flight was fully booked, carrying a large

²¹ Departure at 06.30 a.m.

²² Departure at 09:20 a.m.

²³ Deaprture at 09.20 a.m.

²⁴ Scandinavian Direct is a concept used for all flights within Scandinavia. The aim is to present the traveller with an easy way of travelling. For more information and details; visit SAS website on <http://www.scandinavian.net>

number of travellers of which many arrived only short before departure. One of the SAS staff in Ronneby also confirmed this when I spoke to her during one of my visits to Ronneby airport.

*“People travelling on morning flights here in Ronneby get on by themselves very well. We just stand here and watch most of the time. Even if I assist at the gate in the morning many of the business travellers prefer to manage it [check-in] themselves. They are tired and do not want a happy smile and someone saying good morning. They look away and want to get on by themselves. But you should have been here during the summer when it was almost only leisure travellers. They needed help with everything and were very insecure....”*²⁵

Also in Växjö a SAS staff I spoke to confirmed that at some departures the travellers use the Self Service units more independently, as for example on departures on Mondays and Tuesdays, when there are mostly business travellers on the flights.

Of course, Self Service units are not only used by business travellers. I have also observed how leisure travellers use them for check-in. The overall impression that I got though, is that people who are less frequent travellers hesitate more and search for assistance more often when using the Self Service units, which I will show in the examples below.

What I discovered being applicable for both business travellers and leisure travellers were that those travellers that actually used, and thereby interacted with the machines, did not experience many problems unless the machine was out of order or the ticket type was of such type that it could not be used for Self Service check-in²⁶. Even travellers searching for assistance by looking around in confusion or hesitating before using the machines on their own, managed very well to check-in themselves when assisted slightly by a SAS staff.

An early morning flight

A morning flight 06.30 on a Monday from Ronneby, heading for Stockholm Arlanda, is usually fully booked. This flight takes more than 170 travellers. Most travellers observed at check-in for this flight looked like business travellers, neatly dressed carrying only a briefcase or computer bag, travelling on their own. The first travellers start arriving to the airport about 35 minutes before departure, with a peak about 10-15 minutes later. Many of the travellers go directly to the gate, via the security check, others stop at a Self Service unit for check-in. The SAS staffs walking the floor are standing still, assisting occasional travellers at an MSU or Self Service unit. There are many travellers in the departure hall at these flights. Only occasional travellers have problems at the Self Service units needing assistance by a SAS staff, most travellers however seem to be able to check-in using the Self

²⁵ Translation of filed notes from a conversation with a SAS staff at Källinge airport in Ronneby.

²⁶ E.g. If the ticket is handwritten, if more than one person is travelling on the same e-ticket, if the traveller is bringing an infant or have more than two baggage.

Service units without assistance. The gate closes 15 minutes before departure and usually all travellers are checked-in by then.

Even though I have made several observations at morning flights departing 06.30 on weekdays from Ronneby, most of the activities before the departures are equivalent to what I have described above²⁷. The behaviour when using the Self Service units at these flights was often as the following excerpts from my field notes show:

“Man with baggage walks up to the Self Service unit. Inserts his card, chose seating, receives a baggage tag. Steps aside. Attach his baggage tag to the baggage. Another man at the other Self Service unit starts pressing the touch screen buttons. Takes out his wallet from an inner pocket. Takes out a plastic card from the wallet and insert it to the unit. The card is returned. Chooses number of baggage on screen. Receive a boarding card and baggage tag. He attaches the tag to his baggage and walks to the baggage drop. Drops baggage.”

“A man with a portable wardrobe and a briefcase walks up to the Self Service unit. Look around. Hesitate. Looks at the screen. Chose seating. Look around, look at flight information monitor then walks to the gate. Turns around as the gate is not yet open”

“A neatly dressed man in his forties, wearing a suit, carrying a portable wardrobe walk up to the Self Service unit. Inserts a plastic card. Presses some touch screen buttons. Receives his card back. Choose seat. Receives a boarding card. Then he walk rapidly to the gate”

“A man in his mid twenties, wearing a blazer, carrying a briefcase and large suitcase walks up to the Self service unit. Inserts a plastic card. The card is returned. He choose number of baggage on the touch screen. Receives a boarding card and baggage tag.”

When observing other departures though, the activities change. Below I will describe activities observed on a morning flight with departure 09.20 from Ronneby to Stockholm Arlanda. Departures at 09.20, such as the departure described below, generally felt more “confused” than the early morning flight although the early morning flight carried more travellers. I also observed how SAS staff had to assist travellers more on flights departing 09.20 than 06.30. They also more often handled check-in at the MSUs.

²⁷ At single occasions though the pattern of these flights differed as e.g. when the Self Service check-in computer system was not working properly being out of order occasionally or all at once. E.g. when there was a major system breakdown with the result that no Self Service units could connect to the general server. The staff at the airport had to solve this by manual check-in of all passengers and free seating on board the airplane as a result. Another example was when an airplane could not take off from Ronneby due to fog. All passengers had to either be rebooked to a flight from Kalmar or to another flight later the same day. At this time the Self Service units could have been used by some of the passengers. However the SAS staff decided not to make this an option as they felt a need to control the process of rebooking.

A late morning flight

Travellers on a morning flight 09.20 on a Wednesday, departing from Ronneby heading for Stockholm Arlanda, tend to arrive to the airport longer in advance compared to the early morning flight. It is not unusual that some travellers arrive up to an hour before departure. While travellers on the early morning flight started to arrive half an hour before departure, on this later morning flight there are many travellers already in the departure hall at this time. Also there is generally more SAS staff available on the floor. Still many of the travellers are neatly dressed, wearing suits carrying briefcases, looking like business travellers. In addition though, there are also some travellers more casually dressed, bringing more baggage than those on the early flight. The over all impression of later morning flights are that travellers in common ask for assistance by SAS staff more frequently and hesitate more at the Self Service units. Also there are more travellers doing "mistakes" at check-in such as trying to drop baggage before it is checked in. Below are some examples taken from my field notes²⁸, noted at 09.20 flights on weekdays:

"A man in his sixties walks up to an unoccupied Self Service unit, his hands in his pockets. A woman in her fifties walks up to him with a plastic card in her hand. She says something to the man and then turn around and walk towards the MSU placed near the baggage drop, where she has left her baggage while walking over to the man at the Self Service unit. The man does something at the Self Service unit and a boarding card is printed as well as a baggage tag. The woman is looking towards the man. She leaves the baggage in the line and walk to the man at the Self Service unit. She hand him her plastic card and he check her in. They walk together to the baggage in the line to the MSU. Picks the baggage out of the line, attach the baggage tags and drop their baggage before heading for the gate."

08:41 A man in his mid thirties, carrying a suitcase, walks up to one of the Self Service units. Two elderly women with suitcases walk directly to the MSU beside the baggage drop where SAS staff no1 is standing. One of the women tries to put her suitcase on the baggage drop convey band but SAS staff no1, at the MSU beside the baggage drop, stops her and explain that she has to put a baggage tag to it first. The SAS staff assists the two women with check-in at the MSU.

"08:43 SAS staff are coming out on the floor. Travellers start arriving. A young woman walk up to a SAS staff and hand him her ticket. SAS staff do not take the ticket but point to a Self Service unit and instructs the woman how to do. The woman listens and then does all steps on the display herself."

²⁸ The examples given above are excerpts from field notes and are not rendered in full. The notes are also translated from Swedish to English.

08:48 Two elderly women in their seventies line up in the queue to one of the Self Service units. One of the women is carrying a stick for blind people. SAS staff no1 is now assisting travellers at the Self Service unit to the left in the departure hall. SAS staff no3, who is standing by the nearest MSU, walks up to the women and asks if she can help them. "Oh yes, will you?" the women smile. "then we have to go over here" says SAS staff no3 and starts to walk towards the MSU. The women follow her, the one not being blind assisting the blind one. SAS staff no3 check in the blind woman. She then directs the two women to some seats by the side of the wall. The women sits down.

08:50 A young man wearing jeans is standing beside one of the Self Service units with a plastic card in his hand. He looks perplexed, looking around from one side to the other. He looks at SAS staff no1 and smiles. She walks up to him and instructs him while he check in himself. 08:52 Some men only carrying hand baggage pass the Self service unit without looking at them, walking straight to the security check.

Midweek departures at 09.20 still carries many business travellers but also other travellers such as the elderly blind woman, and the young man in the example above. The flow of travellers entering the departure hall is not the same as in the early morning flight. Travellers arrive more "spread out" over a time scale longer than on the early morning flight, making lesser lines to the Self Service units, but more lines to the MSUs. The same morning departure on a Friday morning differs even more compared to an early morning flight in the beginning of the week. Friday flights at 09.20 generally seemed to carry more travellers and also it seemed to be even less business travellers on this flight than on the same flight earlier in the week. The SAS staff also seemed busier at check-in than at the same flight on other weekdays.

A late morning flight on a Friday

On Friday morning flights at 09.20, departing from Ronneby heading for Stockholm Arlanda, the travellers differs in kind from the ones travelling on early morning flights or late morning flights on other weekdays. While travellers on early morning flights generally are wearing more strict clothing, such as suits, carrying briefcases and/or computer bags, travellers on these Friday flights are generally more casually dressed. The persons travelling are more often travelling together in parties of two or more, often having one or two baggage to check in each, sometimes even bringing pets such as dogs and cats. On these flights there are also more children and senior citizens than at the same flights earlier in the week. Generally on this flight travellers also need more assistance, partly because they have ticket types not possible to use for Self Service check-in²⁹. Travellers also seem more hesitating when using the Self Service units, asking for assistance more frequently:

²⁹ E.g. families travelling on the same e-ticket or parents travelling with an infant. Also if travellers need assistance boarding the flight or at arrival, e.g. handicapped people or children travelling on their own, they have to be checked in by a SAS staff.

“08:38 A SAS staff (no1) enters the floor and is immediately approached by an older couple, asking for assistance with check-in. Another SAS staff enters the floor. She walks up to the MSU placed nearest the entrance. A couple (man and woman) follows her. They ask her if they can check-in themselves at a Self Service unit. “No, not if you are two persons travelling on the same e-ticket” “How many baggage do you have?” The man answers “Only hand baggage” “then you do not need to check-in now, you could have walked straight to the gate as you do not have any baggage to check-in.” The couple walks away”

“The travellers arrive in smaller groups, mostly women in groups of two three or four in the ages thirty to fifty. They are leisurely dressed and carries big suitcases. There are also several families with smaller children. A line is building up on the floor. There are some people standing, looking at the Self Service units and other travellers line up behind them seeming to believe that it is a line to the security check. (I have seen them already check-in). They discover that the line is not to the security check, commenting this, they take their hand baggage and walk around the people standing by the Self Service units at the floor.”

“A fourth SAS staff (no4) enters the departure hall and walk up to the MSU placed nearest the entrance. One of the Self Service units is still out of order. There are people everywhere in the departure hall and lines to the Self Service on the middle of the floor. There are lines of travellers waiting by both MSU. The line by the MSU placed beside the baggage drop is very long, stretching almost to the other MSU. Only one person though is lining up to the working Self Service unit on the middle of the floor. On the floor are children running around, prams and a couple of small cages with animals (cat & dog).“

“08:50 Now the gate opens and thereby the security check open. People lined up start moving in a slow pace through the security check. Now there is a line of people waiting to pass the security check, almost stretching to the entrance doors. A SAS staff (no4) starts walking amongst the travellers in the departure hall asking for already checked-in and tagged baggage. He help travellers lift the baggage through the departure hall and put it on the baggage drop. He works efficiently and is very calm. In a few minutes he has almost cleaned the floor from baggage. There are still groups of people waiting to be assisted at both MSU.”

“09:07 A woman in her mid thirties arrive together with an eight year old boy. The boy is wearing a blue document pouch around his neck. I understand that he is going on his own on the flight to Arlanda. SAS staff no4 hurries out to the MSU by the baggage drop to greet

them. He starts to check-in the boy, then he hesitates, turns around towards SAS staff no3 and ask "Do we have youth papers?" "We shall see". SAS staff no3 disappears through a door and soon come back with a paper in her hand. "There you go". They help tagging the boy's baggage and SAS staff no4 instructs the woman how to fill in the information on the paper. The boy stands beside with his hands in his pockets, wearing a backpack. SAS staff no3 puts his baggage on the convey band at the baggage drop. The woman stills fill in information on the paper. Another SAS staff, no 1, approaches the woman and the boy, "Have you filled in all telephone numbers?" ".murmur.." "Good, in case we have to contact you". "How old are you" (turned to the boy) "eight". Now there is a call for a missing passenger. A woman working in the security check looks out in the departure hall and hen walks into the gate, talking to the SAS staff there, pointing at the boy through the window. "Shall we go out directly?" says SAS staff no4 to the boy. "OK" "Then we go, is everything alright". The boy turns around waving to the woman and then he disappears through the gate together with the SAS staff."

Travellers arriving late, needing assistance with check-in, is not that rare on this kind of flight. I have seen similar occurrences at Ronneby on other occasions, and at Växjö where, e.g. at one visit a blind woman with a small baby arrived only fifteen minutes before departure to the airport, needing assistance of three SAS staff at check-in. Travellers arriving 15 minutes before departure on a 06.30 flight generally do not need the same amount of assistance, here is an example from an observation on a Monday morning;

"06:15 a man arrives rushing in, through the main entrance, carrying a briefcase. He rushes directly to the security control and out through the gate."

Another behavior I have noted is how travellers tend to line up by the MSUs for assistance if there are other travellers already standing there, as shown in the example below. At other occasions I have seen how travellers in the same way line up in front of Self Service units when there is a SAS staff standing there, assisting a traveller. This even if there is a Self Service unit available nearby. It seems as if one traveller, for some reason, seek or get assistance by a SAS staff, then other travellers will also ask for assistance. This shows how travellers tend to act in the same way as they see other travellers before them do, because this behaviour is accountable for them. As in the examples given above and the example below.

08:36 SAS staff (no 1) is assisting a man at a Self Service unit. She holds the ticket and the man is standing beside her. She attaches the baggage receipt to his baggage. He attaches the baggage tag to his suitcase. The SAS staff takes his card and go to the MSU placed by the baggage drop to register bonus points on it. 08:38 Another man, carrying two suitcases, walks up to her by the MSU. She finishes what she is doing before she looks up and greet him.

Another man with two suitcases walks up and line up behind the other man at the MSU. Two men, only carrying briefcases, walk up to one of the Self Service units. They then turn around and walk over to the line of travellers at the MSU beside the baggage drop. A second SAS staff (no 2) enters the departure hall and walk out on the floor. She asks the two men if she can assist them. She starts walking towards one of the Self Service units and the men follow her. At the Self Service unit she asks "are you only carrying this hand baggage?" pointing to their briefcases. "...yes." ".yes.". "Well, then you don't need to use this [the Self Service unit] you can proceed direct to the gate". The men walks straight to the security check and out to the gate.

Flows

The flights presented above were all from Ronneby, however the behavior of travellers when checking-in is similar at all four airports studied. At Arlanda however the size of the airport and the distance between departure hall and gates made it more difficult to observe travellers from arrival to departure, which have been possible at smaller airports such as in Ronneby. At Arlanda the flow of how passengers moved when entering the departure hall has therefore been of major focus on my visits there. When observing this flow a distinct pattern have occurred of how travellers arriving to T4 on weekdays between 4 p.m. and 6 p.m. proceed directly to the gates without first checking in at a Self Service unit or at the manual, stationary check in desk in the departure hall. This has been especially distinct when observing travellers arriving by the Arlanda Express train. Travellers observed arriving with this train on the above noted days and time, almost always carried only hand baggage. At arrival with the train to Arlanda T4 these travellers, with few exceptions, all walked in a long line from the train entrance heading for the stairs as shown by the blue, striped arrow in the figure below (fig. 14). At the occasions when I made these observations, the Self Service units in the departure hall were mostly unoccupied or used by a few travellers only. Travellers not heading directly for the stairs tended to walk to the snake, for check in at the manual check in desk as the pink, dotted arrows show in the figure below (fig.14).

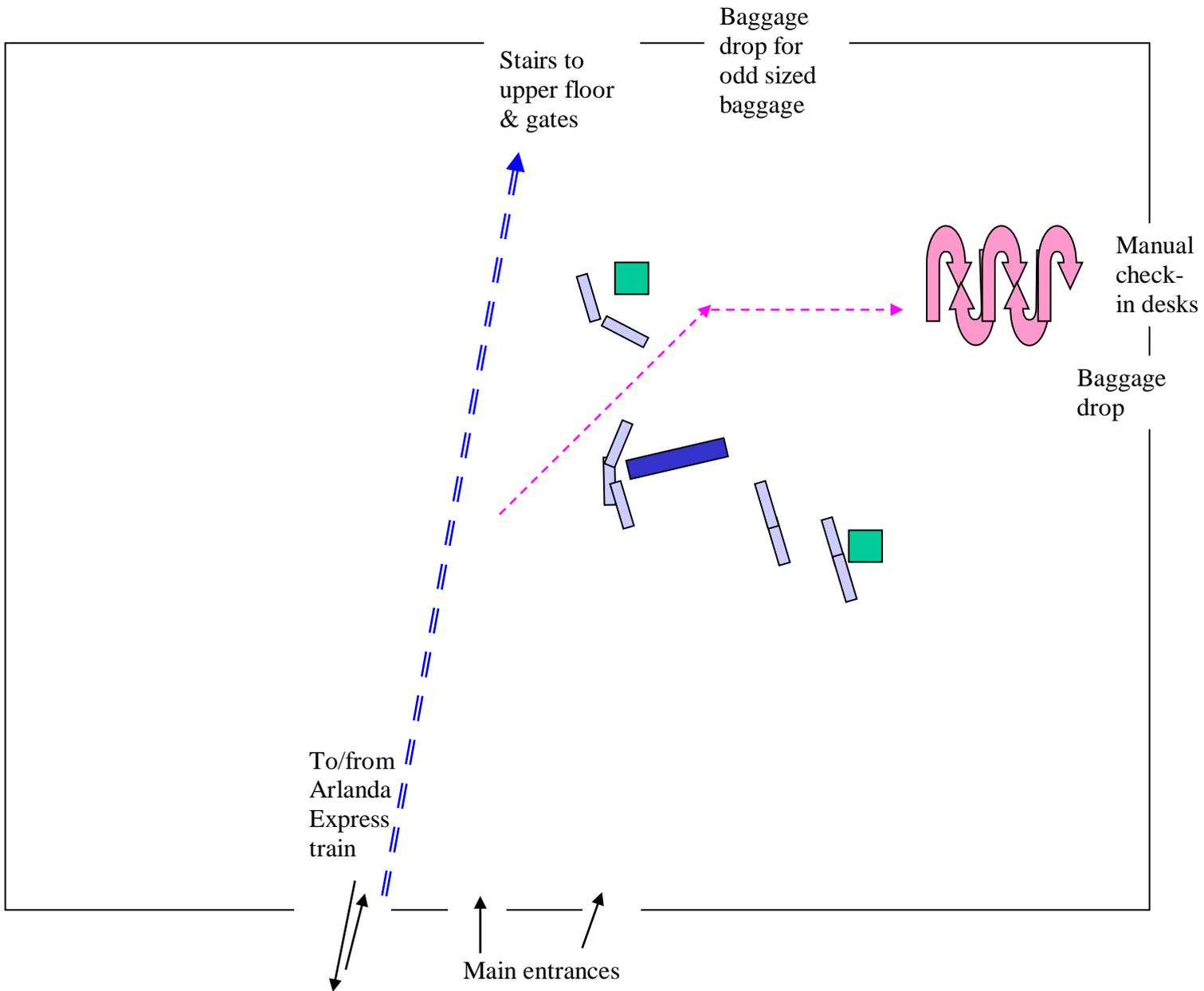


Fig. 14

The blue arrow in this figure show how travellers arriving with Arlanda Express before 26th of October moved upon arrival to Arlanda T4, heading direct for the gates without prior check-in at Self service unit or manual check-in desk. The pink dotted line show how travellers not heading directly for the stairs instead moved towards the manual check-in desk for check-in.

After changes at gate, effective from October 26, at Arlanda T4, the check-in procedure for travellers at Arlanda changed. From this date it was not longer possible to check-in at gate. In addition to this change there was also changes made in the departure hall were e.g. a SAS staff was positioned at the entrance of the snake, (leading to the manual, stationary check-in desk) directing travellers to the Self Service units for check-in when and if possible. This change led to a new pattern of how travellers move at peak on weekdays when entering the departure hall at T4, arriving by Arlanda Express. This new pattern of how travellers walk is shown in figure 15.

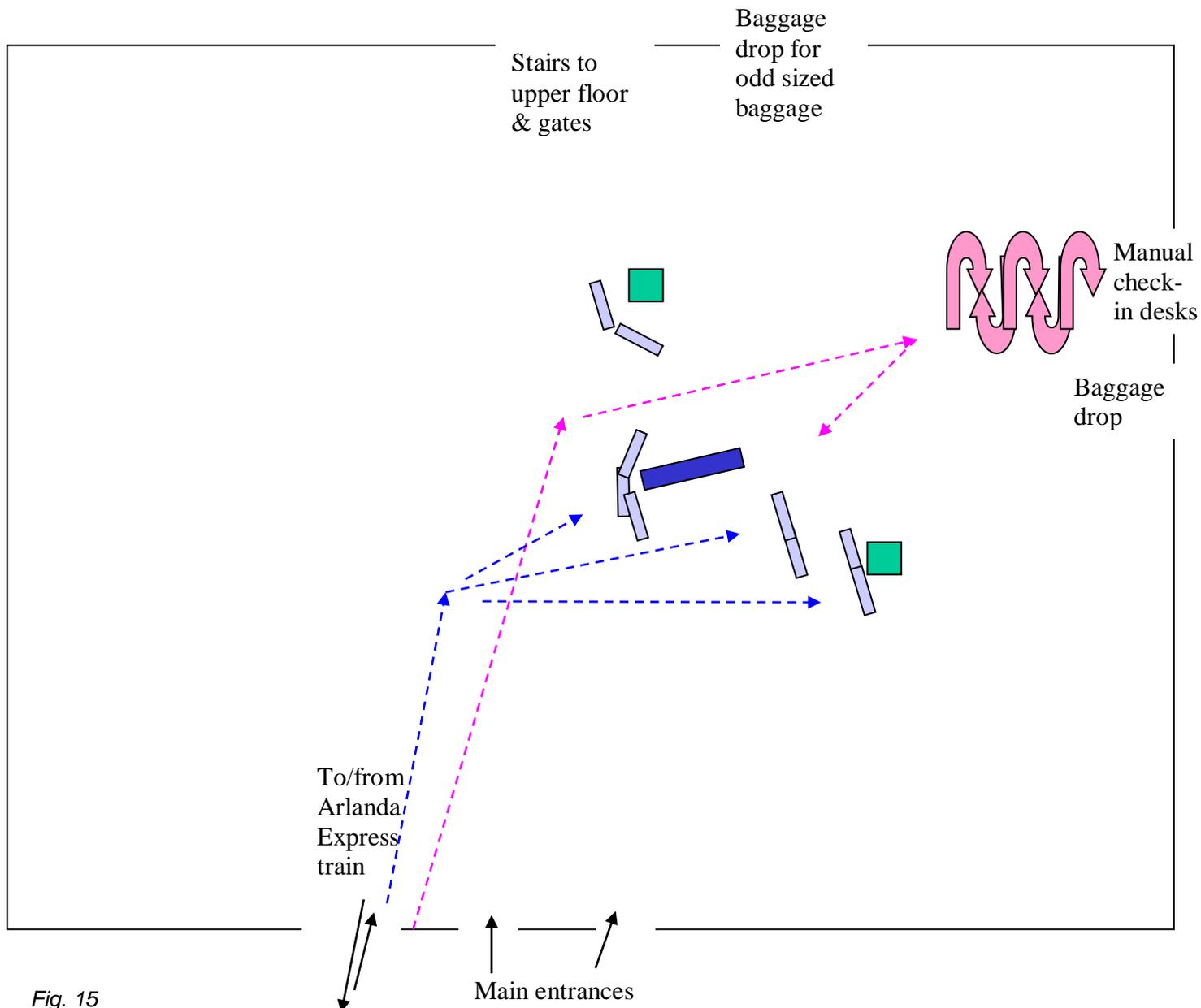


Fig. 15

The blue arrow in figure 14 show how travellers arriving with Arlanda Express after October 26 moved upon arrival to Arlanda T4. The pink dotted line show how travellers walking direct to the snake at the manual check-in desk, was redirected to a Self Service unit, if possible, by a SAS staff.

This change of travellers' behaviour when arriving to the airport affect the use of the Self Service units at peak. For e.g. occasional out of order occurrences, not noticeable when there is no pressure on all Self Service units at the same time, can be disturbing to the overall check-in process if many travellers are using the machines simultaneously, e.g. at peaks on weekdays at Arlanda between 4p.m. and 6p.m. after changes made on October 26. Earlier if some of the Self Service units were out of order, e.g. due to being out of boarding cards or baggage tags, it did not cause much trouble. The traveller could easily move to a nearby unit instead. However when passengers line up behind all Self Service units at the same time a unit being out of order causes much more problem and annoyance for the travellers. Also when more travellers use the Self Service units for check-in they get out of order more often. This not only results in annoyed travellers but also provide a more stressful situation for the SAS staff, as they have to take the role of serving the machines rather than serving the travellers.

The flow of travellers at the airports also have to be reconsidered as it has changed since the airports were built. E.g. have the flow of passengers moving around at Arlanda changed since the security procedures changed after the terror attack in USA on September 11, 2001. For example do all travellers, including those arriving from Sky City and T5, have to pass the departure hall on the ground floor before they can reach the gates on the upper floor. This to pass the security control situated at the top of the stairs from the departure hall. Before the change end of 2001 it was possible to move directly to the upper floor from sky city through an upper level passage which is now closed. Also the escalator is closed lately and only the stairs are used from the ground floor to the upper floor at T4, making more travellers use less space for transit between check-in and gates.

IV. DISCUSSION/ANALYSIS

The fact that travellers, who actually used the Self Service units and its graphical user interface for check-in, managed to do this either by themselves, or supported slightly by a SAS staff standing beside them, shows that the design of the graphical user interface is not itself an obstruction for the use of these machines. At least not once the travellers have got acquainted to them. Also the fact that travellers I saw on repeated occasions during my fieldwork, managed very well using the machines, proved that travellers that have once learned to use the machines do so independently and in a confident way. A 60 year old business woman I spoke to e.g. said *"the first time I needed help, but now I have done this so many times so I know how to do. I feel it is great to manage it myself.."*³⁰ I think this fact is important to consider as, even though there is an aim to make technology easy to use, this *"does not necessarily mean instant or walk-up ease of use"* [Sharpe, 2001]. New users must be allowed to be a bit confused meeting specific technology the first time, they have to learn how to use the new artefact. The airport staff in Molde had noticed this fact saying *" People need to learn how to use the machines [Self Service units], then they do it easily"* . However, if the users are still confused meeting the same specific technology on repeated occasions the design solution may have to be reconsidered. This is not the case for the software graphical user interface displayed on the Self Service units as I perceive it though. When used it seem to mediate an adequate affordance of its use.

Even if business and leisure travellers using the units seemed to get on quite well, as long as they did not experience technical problems, still there were a lot of travellers not walking up to, and thereby not using, the units at all during my observations. It is these travellers that I will focus on in my discussion from now on, leaving those travellers out, who actually already use the machines for check-in, as I search for an explanation why some travellers do not use the machines for check-in.

Travellers not using Self Service Units

After a couple of weeks of observations I started to see a pattern of how some travellers, upon arrival to the airport, headed directly for a SAS ground staff for assistance, even if many of these travellers held ticket types possible to use for Self Service check-in³¹. These travellers, i.e. travellers not using the self-service units for check-in, often travelled on departures other than the early morning departures on weekdays. Instead e.g. they travelled on departures from Ronneby on afternoon departures, on Fridays or on Saturday departures (*For an example of how some travellers walked when entering the departure hall from the main entrance at Arlanda T4, see dotted, blue line in fig. 16. For example of how some travellers walked when entering the departure hall at Kallinge airport in Ronneby, see example in fig. 17*). Those flights generally seemed to carry more leisure

³⁰ Transcript from an interview with a 60 year old woman travelling frequently on domestic as well as international flights in her work as a consultant nurse.

³¹ The reason I know that they held tickets possible to use at a Self Service unit, is that when walking up to a SAS staff for assistance with check-in, many of them were then accompanied to one of the Self Service units by the SAS staff, who then assisted them with check-in at the unit. In those cases that the tickets actually were of a type not possible to use for Self Service check-in, the SAS staff accompanied the travellers to an MSU instead for manual check-in.

travellers and also proved to be more stressful for the staff, who had to assist travellers more frequently at check-in, even if the number of travellers were much lower on these flights. Travellers arriving late for the flights mentioned above also demanded increased assistance from SAS staff in comparison to travellers arriving late for early morning flights.

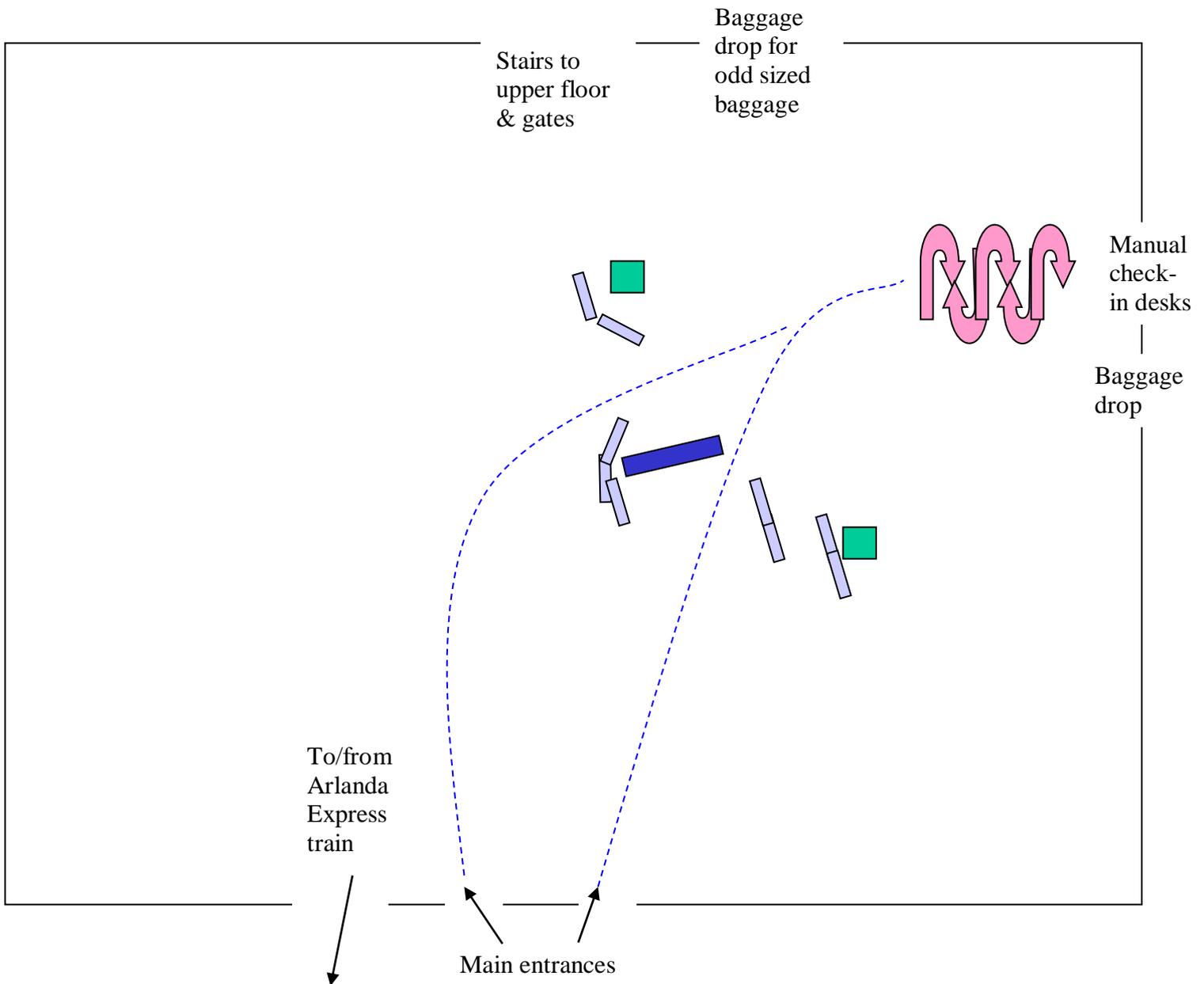


Fig. 16
The blue dotted lines in this figure illustrate how some travellers walked when entering Arlanda T4, arriving through the main entrance. The Self Service units marked as light blue rectangles, MSU as green boxes. The pink arrows illustrating the rope snake positioned in front of the manual, stationary, staffed check-in desk. Please note that this illustration of the Arlanda T4 departure hall is not drawn to scale. I have also left out many other details in the departure hall, to make the sketch as simple as possible.

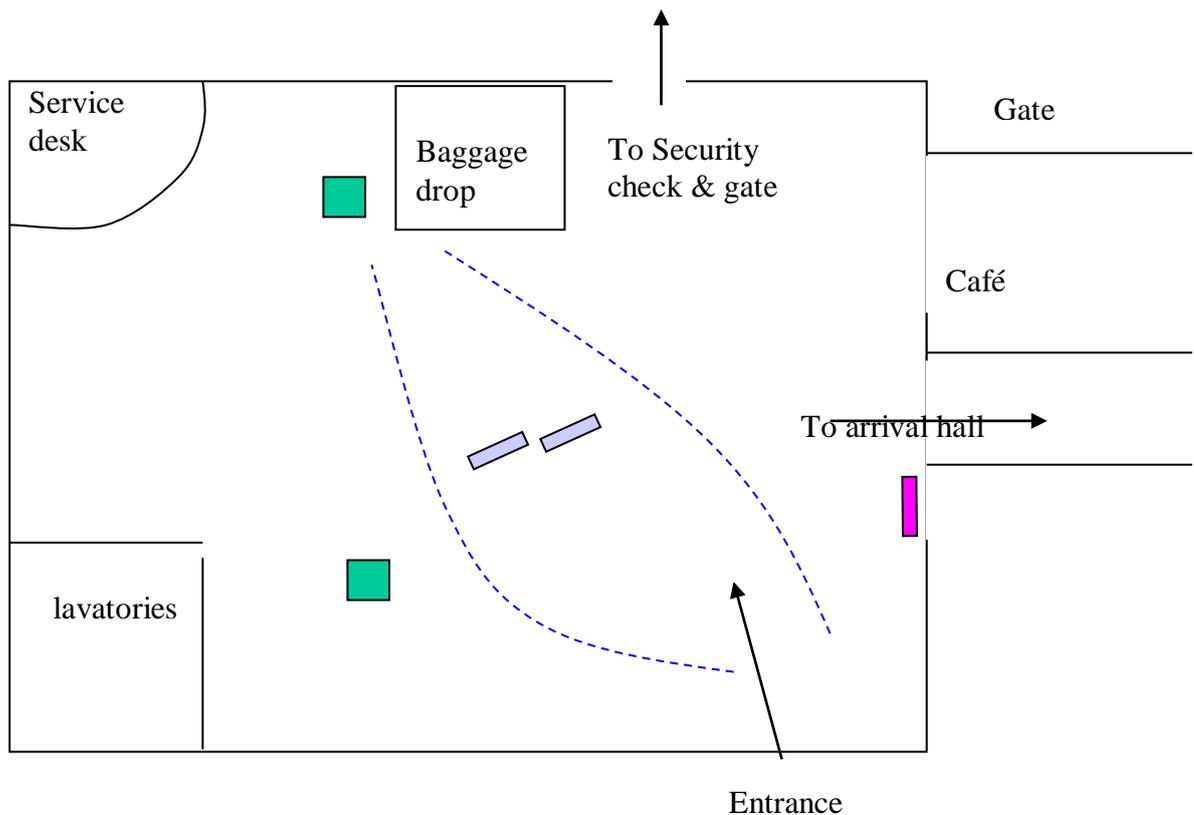


Fig. 17 Illustration of how some travellers walked when entering Kallinge airport in Ronneby. The Self Service units marked as light blue rectangles, MSU as green boxes. Please note that the illustration is not drawn to scale, some details in the departure hall have also been left out.

Reasons for not using Self Service units

There are several different possibilities to why some travellers do not walk up to the machines when entering the departure halls. One explanation for not using the Self Service units is technical limitations in the software, such as those I described in the introduction, e.g. it is not possible to check-in more than two baggage per traveller or check-in several persons travelling on the same e-ticket. If travellers know that they hold a ticket type which is not possible to use for Self Service check-in, due to these limitations, they will not approach the machines but search for a staff who can assist them with check-in.

Another reason why a traveller does not approach the Self Service unit when entering the airport could be that the traveller rather wants to be checked in by a SAS staff, meeting a person instead of a machine. A couple of the travellers I have interviewed said to me that they feel more confident meeting a real person at check-in "if I have any questions I can get an answer immediately, as for example

*when I did not know how to do with the curtain-rods that I had with me.*³² Other travellers indicate that they feel tenser when travelling by air than in normal every day situations, and experience travelling as a stressful activity. They might be heading for a place where they have never been before, meeting people they never met before, they will be up in the air without being able to control the action etc. This make them feel insecure in the situation at hand. Meeting a person instead of a machine when checking-in, makes them feel more confident.

Other travellers I interviewed claimed that they do not feel confident using the technology at hand worrying that the travel itinerary is not registered correctly on their e-tickets *"Just think if my booking is not registered on my card, what do I do then?"*³³ or that the Self Service unit shall keep their ticket or credit card *"Who will help me then, and if it takes time to sort out, what if I miss my flight?"*³⁴ One traveller interviewed also said he just want to do as he has always done before when checking-in *"I am a traditional person, I like to do things as I use to do them, that's why I go to the manual service desk as I always have done. Because it feels good."*³⁵ It is also a fact that if people can chose they will most likely look at a person before looking at an artefact [Underhill, 1999].

If the travellers do not use the units for check-in because they are aware of the fact that their ticket-type is not possible to use for Self Service check-in, then it is not strange that they pass the units at arrival to the airport, searching for assistance. The percentage of travellers who are not able to use the units for this reason are well known by the airline, who is in control of this as they have the possibility to make decisions about changes of the software enabling more ticket types to be used at Self Service units if wanted. Sometimes they might have reasons for keep handling some ticket types manually though.

The traveller does not see the Self Service unit as a tool for check-in

Travellers not using the units because they feel insecure using the technique or wanting to meet a person at check-in can be handled by the airline staff walking the floor, assisting travellers if needed. More problematic are if travellers do not experience the machines to be a tool for their task at hand, i.e. a tool for check-in. In this case they do not make a conscious choice whether to use the machines or not, they do not approach the machines because they do not connect the machines with the task of check-in. This may e.g. be leisure travellers usually travelling by charter flights or travellers who have not been flying for a long time. For these travellers the known and common behaviour at check-in is to line up in front of a manual, stationary, staffed check-in desk. If it is not accountable to them when entering the departure hall for check-in, that they are expected to use the Self Service units, they will do as they have done in similar situations when travelling before, i.e. look for a manual, stationary, staffed desk for check-in. If the check-in environment does not mediate to users in some way that the Self Service

³² Quote from an interview with a frequent female traveller in her early sixties at Ronneby airport. She travels in her job as consultant nurse and flies between Ronneby-Arlanda-Oslo on a frequent basis since 2001.

³³ Quote from an interview with a female traveller in her mid twenties flying in her spare time.

³⁴ Quote from an interview with a female traveller in her mid twenties.

³⁵ From an interview with a 37 year old male business traveller travelling approximately 3-5 times per year.

units are replacing the manual, stationary, staffed check-in desk, then travellers will pass them on their search for personal service.

Travellers passing the Self Service unit

In smaller airports such as Ronneby the Self Service units are placed near the entrance. Even if they are placed in an angle which is visible when entering through the main entrance doors, travellers sometimes walk past these units, before slowing down in their search for information on of how to check-in. In his book *why we buy* Paco Underhill talks about the need of a landing strip for people entering shops [Underhill, 1999]. The idea he is presenting is that people walks in a fast pace when transporting themselves from one place to another. When entering the place that they are heading for, they have to slow down and alter their pace before they can focus on details in this environment. This would mean that travellers entering an airport also need a landing strip before checking-in. When entering an airport, such as e.g. Ronneby, it means that travellers may “miss” the units when entering the departure hall, focusing on people and artefacts further on in the departure hall.

At Arlanda airport, T4, the Self Service units are placed to be visible when entering through the main entrance doors. During one of my observations I noticed that many travellers were entering the departure hall from Sky City (where e.g. the far distance trains arrive) or through the entrance beside Systembolaget³⁶, which is positioned right beside the Sky City entrance. Travellers entering this way arrived at an angle where they could only see the Self Service units from behind (see *fig. 18*). During the hours I spent watching travellers enter this way only a few approached the Self service units while most travellers observed, instead walked in to the departure hall, turning their head to the right, looking in the direction to where the baggage drop and manual check-in desk were positioned. What those travellers would have seen, if turning around at the point where the question mark is positioned in *fig. 19*, is illustrated in the picture below (*fig. 18*).



Fig. 18 Self Service unit from behind at Arlanda T4

³⁶ See *fig. 4*

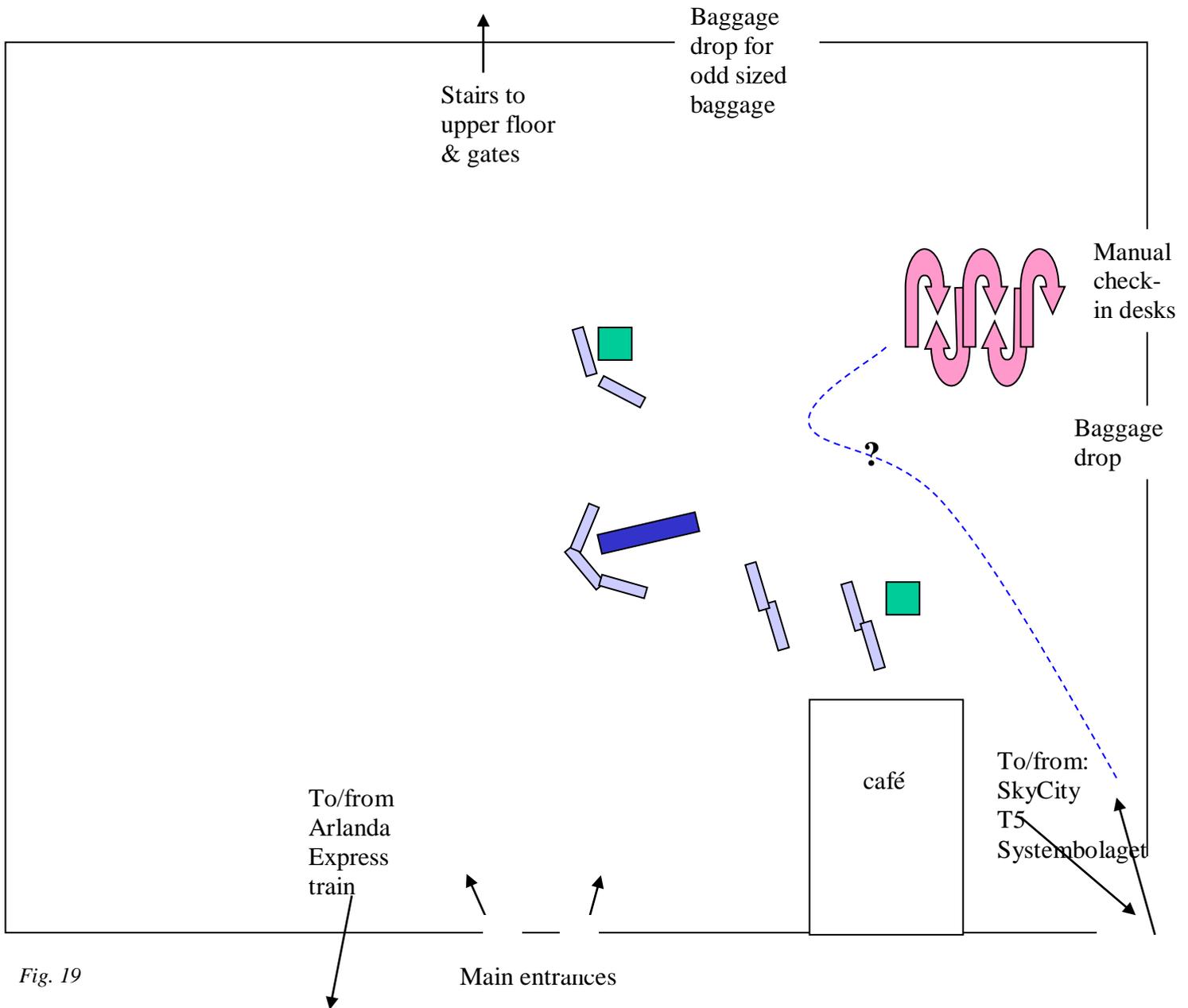


Fig. 19

Fig. 19 illustrates how travellers entering the departure hall at Arlanda T4 arrive “behind” the Self Service units. The question mark indicating the point where many of these travellers stopped to look to the right. If they had looked to the left fig. 18 illustrates what their view had been. Please note that the sketch above is not drawn to scale. Also it has left out many details in the departure hall, only showing a few of importance. The light blue rectangles illustrate the Self Service units, green boxes are MSUs and the pink arrows showing the position of the rope snake in front of the manual, stationary, staffed check-in desk.

In Molde the situation is a bit different. Even if Molde also has a quite small departure hall the layout of this hall is different to Ronneby, as is the placement of the Self Service units. The units are not placed as near the entrances, also they are not placed right in front of the service desk or in front of the passage to where the gates are. Nor is it possible to arrive behind them, as is possible at Arlanda T4. This I believe is the reason why I did not see travellers walk past the Self Service units when entering the airport at Molde. Instead travellers walked into the departure hall and after a halt, and a look around, they approached the Self service units. A sign with an arrow pointing towards the units, saying that if travellers were to check-in they should use the Self Service units, probably also helped the traveller in the decision to approach the units. In the airports observed in Sweden I have not seen similar signs. The placing of the Self service units, in relation to the shape of the departure hall and in relation to each other also enhances the affordance of the units as the units are more noticeable. Together with the sign this mediate to travellers that this is the place for check-in.

If a traveller do not understand that he shall approach the machine for check-in, then it does not matter how well the software graphical user interface, shown on the display, is designed or what affordance it might communicate to a traveller. The design and affordance of the Self Service unit and its options are relevant first when the traveller has walked up to the Self Service unit with the aim to check-in. What is important though is in what way the check-in environment may mediate to travellers that they should approach a Self Service unit for check-in, its affordance and where to find it.

Finding ones way / Signs

When observing travellers at Arlanda I paid some attention to signs as I saw travellers look for this when entering the departure hall at T4.³⁷ I noticed that signs and their placement at the airport sometimes mediate to travellers the opposite to what is wanted to be mediated by the airline. E.g. by the stationary check-in desk at Arlanda T4, there is a big floor sign with the text "SAS Check-in" (*fig. 21*). This is placed beside a rope snake (*fig. 20*) which, by its physical appearance and affordances, mediates to travellers that it is appropriate to enter the snake and follow the path through to the manual check-in desk.

³⁷ At Arlanda Luftfartsverket is responsible for part of the signs, such as information about arrival and departures etc, while SAS is responsible for signs concerning their own company and partners etc.



Fig. 20



Fig. 21

The positioning of the snake, in front of a manual, stationary and manned check-in desk with an attached conveyer band for baggage, and its form also mediate to travellers that this is the place for check-in and that they are expected to move in a certain way through this "snake". Other travellers already lined up in this snake together with the floor sign saying "SAS Check-in" make it accountable to travellers that this is where they are supposed to go, if they are about to check-in, unless they are aware of the fact that they can check-in at a Self Service unit.

By the Self Service units there is no visible snake mediating to travellers that they are expected to approach these. What are placed beside some of the Self Service units are signs a meter and a half high, holding all Star Alliance partner names (e.g. see fig. 5, 6, 8.1 & 8.2). There is no uniform text saying "Check-in" on the Self Service units, indicating this to be the primary reason for using these machines. As it was per October 2003, there were no, or very small, instructions of what the traveller can use the machine for in Ronneby. At Arlanda the Self Service units have lately been updated with additional information on the machines, however the information has been written in fairly small fonts³⁸, using several words for explaining the purpose. This means that the information is easy to read while standing beside it, but not visible if passing it several meters away, which can make a difference³⁹ [Underhill, 1999].



Fig. 14

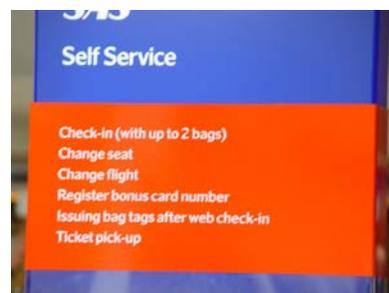


Fig. 14.1

³⁸ Considering that travellers at airports needs to see the text from a distance, while walking, trying to figure out where to go.
³⁹ Also at Arlanda T4 there have been trials of taking off the whole top of the machine as Luftfartsverket has commented that they are too high, blocking the travellers' views in the departure hall.

This could be compared to Lufthansa's Self Service units which have "Lufthansa Quick Check-in" written in capital letters on top (see fig. 11).



Fig. 15

To make the traveller understand that he is expected to use the Self Service units he must be informed about this in some way. You could compare this to highway signs. On the highway you have to be able to move from A to B in a secure way, without feeling insecure wondering if you have driven the wrong way. Paco Underhill [ibid] uses this metaphor for describing the necessity of adequate signs for shoppers to find their ways in to shops as well as find their way inside the shops. In the same way this should be important for travellers at airports. They should not be made to hesitate on what they have to do to check-in, it should be obvious to travellers what is expected of them to do, to get on board the airplane.

Also Bill Sharpe writes about signage in his text *Information appliances* [Sharpe, B. 2001] "*..signage is a 'right thing here and now' form of interaction. It is designed to enable us to make the right decisions at the critical moment as we approach each decision point. It references the information we find in a map (place names, for example), and connects it to relevant action in the moment (turn left) - It is positioned so that we encounter it only in the place where it is relevant to action, and its form and position are intended to be within the information processing capabilities we have available while continuing to control a vehicle, or cross a road.*"

But it is not only the design and existence of signs that is of importance when considering instructions for check-in at airports. After my study I believe it is necessary to get an overall view of the whole check-in process to understand the use of the Self Service units in a larger perspective, which in turn is necessary to find ways of increasing the frequency of use of these machines.

Need of an overall view

To get an overall view of the check-in process and the use of the Self Service units there is a need to understand the context where they are introduced. Sharpe [2001] writes:

"In understanding context we need to take into account not only the presenting nature of the task and its place in an overall activity flow, such as sending a quick message while walking along, but also how that

task is governed by influences on our emotions. Are we relaxed, in a hurry, in a safe or threatening environment? We group these influences under the general heading ambience, meaning the way our surroundings signal different possibilities –...” He continues “The ambience governs our affective or emotional response to the situation. This underpins our attitude – the role and approach we take towards the task, and what we perceive as the possibilities presented by particular appliances in the situation. For example, is this place where I feel is safe and appropriate to stand and give my attention to an information kiosk that requires concentrated interaction?”

This means that it is necessary not only to consider the usability of the actual appliance or graphical user interface. It is also necessary to consider flows and behaviours of users in the actual environment as well as in what state or mood the users are when performing the required task at hand in the actual environment. Something worth considering as travelling, according to my interviews, can be experienced as a stressful activity in itself.

The invisible interface of the check-in process

There is a need for travellers, especially not frequent travellers, to understand when they are entering an area where the check-in process takes place. This area does not have to be physically screened off but it must be interpretable for the traveller that the different artefacts, which are used for check-in, are connected to each other as being part of the check-in process. If these artefacts are spread out physically there is an increased need to mediate in some way to travellers that they belong to the same activity, that these artefacts are connected, or have a relation, to each other. This connector I call “the invisible interface”. First after interpreting this invisible interface it becomes evident for the traveller which artefacts to use for check-in, and in what order they should be used. After interpreting this the travellers can interact with each separate user interface within the check-in process. How the traveller perceives this connection, i.e. the invisible interface, between the different action-points involved within the check-in process, will affect the travellers check-in experience in whole. The perceived affordance of this invisible interface is therefore of major importance. I believe I skate on thin ice with this statement as the invisible interface itself do not have any physical features which can mediate any affordance to the users, but the artefacts and different steps within the check-in process have different affordances. If these artefacts are rigged in a way that mediate to the traveller that they belong together in the check-in process, than they together may mediate a perceived affordance of the process, a perceived affordance of the invisible interface. Of course, being a human being a traveller usually manages to handle a situation that is not evident at first sight, but it takes some more time which in turn may affect the general impression of the check-in procedure, and in the long run also of the airline he is travelling with.

When entering a departure hall where Self Service units are placed on the middle of the floor, baggage drop towards a wall, SAS staff walking the floor and people are criss-crossing the area for other purposes than to check-in (as for example at Arlanda T4), it is not immediately evident to all travellers what to do to be checked-

in. Frequent travellers may have learned from earlier experiences how to do and where to go but less frequent travellers do not have this knowledge and are therefore in more need of “clues” at the airport of what to do to be checked-in. Even at smaller airports it can be difficult to understand what to do at check-in when Self Service units, MSUs, baggage drop and staff are spread out in the departure hall. If the traveller can interpret the invisible interface of the check-in procedure when entering the airport, and thereby understand what he is expected to do to check-in, i.e. if he can see the affordance of the check-in procedure in whole, then he will be able to interact with the artefacts needed for check-in and feel more in control of the situation, than if he is confused or hesitate before proceeding with the task.

What I try to suggest is that to make this invisible interface visible to less frequent travellers there is a need to explore and plan the actual check-in process and the environment in which it takes place. It is important to consider travellers ability to interpret the check-in procedure to understand what is expected of them, as well as interpret and understand how to use the tools provided for this task. There is a need of affordance of the invisible interface for the interface to mediate to travellers what they have to do and what interfaces they have to interact with to complete their check-in.

Design recommendations for future work

Considering the need to get an overall view of the context in which check-in takes place and the travellers need to be able to interpret the check-in situation when arriving to the airport, I believe that there is a need for designing a more distinct check-in environment if the Self Service units shall become the primary choice for travellers when doing check-in at airports. Christiane Floyd speaks about a need of designing the design process [Floyd, 1992]. I interpret her as she means that there must be a richer understanding of software development to be able to facilitate it with methods in a meaningful way. In the same way I believe there is a need to design the check-in process. It is not enough to only design each individual tool used in this process. There must be considerations taken to the whole context, the situation in which the check-in takes place.

In his book *Where the action is* Dourish [2001] refers to Bowers, Button and Sharrock's [1995] ethnographic investigation of a print shop floor when writing:

“... the actual moment-to-moment organization of the work is contingent on the setting in which it emerges; the physical environment, the time of day, the stack of jobs awaiting completion, the materials available at hand, the understanding of the context of the work, and so forth. This is in contrast to the decontextualised view that the workflow system took, a view that focused on this job or that job but not on the whole work of managing the print shop. It failed to account for the real work of the print shop by divorcing that work from the setting in which it was carried out.”

What I would suggest is to design a check-in area which is more distinct than today. Even if this area is not screened off by visible walls it should in some way mediate itself as one activity which is screened off from other, non related activities at the airport. This could e.g. be done by using a specific colour, which stick out, on all artefacts used for check-in. Numbering of the different action points within the check-in procedure could also be used. The Self service unit shall have a central position in the check-in area. It must be visible from the directions where travellers enter the airport. Also the placement must consider the need of a mental landing strip. As some travellers experience travelling as a stressful activity in itself, Self Service units should not be placed so that travellers feel too exposed when using them, as feeling exposed may cause a stressful situation itself. Text, pictures or signs on the Self Service units, or its display, should make clear what the units are used for. Also lights could be used in different ways; on Self Service units for showing what unit that is available or out of order, lights screening off a specific area on the floor or lights pointing to the next step in the check-in procedure. In addition to this signs with short and clear directions telling the traveller what to do at each action point could be used. Examples of this is the sign seen in Molde, telling the traveller that check-in is done by using the Self Service units and that assistance is available from 45 minutes before departure, or the text on Lufthansa's Self Service units telling the traveller that it is used for quick check-in.

Having demonstrations using icons or pictures instead of text explanations might provide the user with a feeling of getting a grip of the situation quicker. The information on where to go for check-in and how to perform check-in should be as simple and direct as the safety demonstration on board the aircraft.

As people tend to look for human beings rather than artefacts this fact could be used to place assistant staff in a way that they are easy to locate. Instead of moving around over the check-in area the assisting staff could have a "base" where they are positioned when not assisting a specific traveller. This could be placed as a central pillar visible from the Self Service units and from entrances. At this base there could also be a possibility to call or wait for assistance if staff is not available at the moment. It should be made evident for travellers how to get in contact with staff if needed. Also there should be an option by the Self Service units to call for assistance.

The number of travellers searching for the baggage drop or not knowing what to do with their baggage after check-in could be decreased by using signs, lights and numbering of action points. Also the baggage drop could, if possible, be placed so it is passed on the way from the Self Service units to the gate.

When considering a design of the whole check-in process it is important also to consider a continuous development of the technical aspects to reduce technical limitations in the check-in procedure such as the system being down too often, or being out of order. The system must provide a sense of safety and trust; otherwise users will not feel confident when using it. Also it is necessary to consider what operations is offered as Bødker describes when writing "*The computer artifact constrains or disciplines use through what kinds of operations it allows the user to*

form, through the recurrent breakdowns that appear, through the conceptual understanding that it offers to the user – through the kinds of uses that it lends itself to, physically, handling wise and with respect to the foci that the user is "offered" in or through the computer application" [Bödker, 1999]

Of course all this are only some ideas of alterations that could be considered to improve the check-in procedure and in the same time improve the frequency of use of the Self Service units. To be able to decide what alterations that would be possible or adequate to do seen from a practical and economic perspective there would have to be a much closer investigation of the actual environment where the check-in process takes place and of the artefacts used. An investigation of this kind I believe should be done close together with the staff working in this environment, developers of the artefacts used, marketing people and end-users, i.e. travellers.

Conclusion

To understand why less frequent travellers do not use Self Service units at airports in the same compass as more frequent travellers do, or to find an answer to how the use of Self Service units may be increased without continuous assistance from the airline staff, it is not possible to look at the use of the Self Service unit and its features only. Also to be considered is the context of the situation in which the Self Service units are used, the context of the check-in process.

If the use of Self Service units for check-in at airports shall increase travellers must understand when and why they shall use them. To achieve this there is a need to design a check-in process which consider how travellers act in the specific context, creating a check-in process which mediate a sense of knowing what to do to travellers. If this shall be possible the check-in process has to be seen as *one* process, having *one* interface towards the travellers. An invisible interface which support less frequent travellers to mentally connect the different action-points within the check-in process with each other, mediating a perceived affordance of the whole process to them. The interpretation of this invisible interface will affect the way in which travellers behave in, apprehend and learn how to act in the check-in process.

By considering the context and look at traveller flow patterns at the airport, signs, what information to give and how to present it to travellers, as well as how to introduce and place Self Service units and staff in this environment I claim that it should be possible to find ways to arrange, or rig, the context in a way that support the notion of the check-in process as one process, giving the Self Service unit a central role in this process which may enhance its affordance of being the primary tool for check-in. This in turn is necessary if the frequency of use shall increase without continuous assistance by airline staff.

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Scandinavian Airlines
<http://www.scandinavian.net>

Word list

ARN = Stockholm Arlanda (Sweden)

OSL = Oslo Gardemoen (Norway)

CPH = Copenhagen (Denmark)

GOT = Gothenburg (Sweden)

MMX = Malmö (Sweden)

BGO = Bergen (Norway)

SVG = Stavanger (Norway)

TRD = Trondheim (Norway)

LON = London Heathrow (Great Britain)

HEL = Helsinki (Finland)

MSU = Mobile Service Unit

E-ticket = short for electronic ticket. The travel booking is registered on a credit card or on a SAS Euro bonus card. This card is used instead of a paper ticket when travelling. This card can also be used instead of a paper ticket when using the Self Service units for check-in.

Infant = A child under the age of two years accompanied by an adult. This child does not have his own ticket and is not allowed an own seat, but have to sit in the adults lap during the flight. Most airlines do not charge anything for bringing infants, however the infant must be registered on the flight for security reasons.

T4 = Terminal 4 at Arlanda airport, domestic flights

T5 = Terminal 5 at Arlanda airport, international flights