



FOREWORD

This publication provides a glimpse of the type of aviation design projects we conduct at the Faculty of Industry Engineering at Delft University of Technology. These projects range from students doing a Bachelor project in either an individual or group context, to Master projects, Ph.d projects or even research projects of staff members.

Central to our projects is the passenger experience, whether it is during a flight, at the airport, or already home while booking a flight, by putting the passenger at the center of our work, we are able to design new experiences, overcome silo's, and develop entire new future visions for the industry. Page 6 further elaborates on how design can contribute to the aviation industry. For an easy read, we have grouped the presented projects into three themes: "Inflight experiences", "Seamless airport flow", and "Future". With this publication we aim to invite companies to collaborate with the faculty and start up new projects either with staff and/or students. We already have long-lasting contracts with numerous companies in the aviation industry such as KLM, Schiphol Airport, Type22, Zodiac Aerospace and others. Because of new projects such as European PASSME project (see page 41), we are on the lookout to extending our expertise to others.

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AVIATION DESIGN TEAM

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DESIGN IN AVIATION

Design and the aviation industry, match made in heaven?

No longer is design merely about styling of products, more and more companies recognize design as a set of skills, a different perspective to look at their practice.

The following aspects of design have proven great value for our industry partners:

Design brings in a human perspective behind the numbers and explains the underlying reasons of numbers.

Designers have a natural capability of looking into what matters to people, why they are doing things a specific way, what motivates them. As such, bringing the underlying reasons of numbers to the surface is a main drive for designers.

The 'Persons with Reduced Mobility' project of Stijn Veeger (p.32) had a great impact
on KLM's strategy regarding PRMs as Stijn was able to capture stories of real people.
These stories stressed the urgency to change the current situation, enabled employees
to relate to PRMs, and feel personally responsible to improve the situation.

Design supports in dealing with complexity

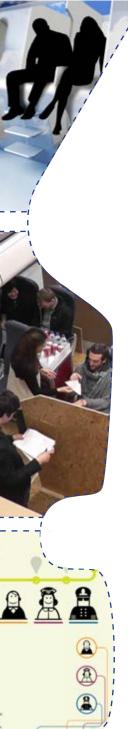
Many organizations realize they have problems, or let's call them uncovered opportunities. But they don't know how to deal with them, or what the cause is of the problem. Designers are able to grasp a situation in all its complexity, find the underlying problem and suggest solutions.

KLM approached us saying that they had a hand-luggage surplus but had difficulties
finding out what exactly caused the problem other then having too many trolleys on
board as hand-luggage. Xander van der Broek found out which flights had this problem
(something previously unknown), why the problem occurred at the specific flight and
suggested several opportunities for KLM (see p.30 for more info).

Design revolves around prototype and trying out guickly

In order to gain feedback in an early stage in the design process, and to validate decisions made, designers use prototypes. These can range from cardboard mock-ups up to working models.

• In the 'Smart Boarding' project (p.29) Roland Vincent encountered many reservations from both the airport and the airline towards implementing a new way of boarding without proof of its value. Therefore Roland prototyped his design and tested it at one gate during various moments in the design process. These tests gave the desired results, convincing all stakeholders to roll out the new 'Smart Boarding' concept.



Designing for a future context

In an industry where airworthiness is the main drive for innovation, developing new products is primarily based on weight reduction, safety and materials. There is often hardly time to investigate the future of aviation, and starting designing it. Designers are able to based on research imagine possible futures and visualize them.

 Christina Wang explored for Airbus what the future cabin interior might look like of the concept plane "Blended Wing body" became reality (p.39).

Design hands-on means (tools) for aviation industry

In order to operationalize something new means are needed. When a company decides to change its strategy from designing for airworthiness towards including the passenger and/or crew perspective, it often lacks the ability to do so. Designers can aid in developing hands-on means that support companies in their daily practice.

Basil Vereecke developed the "Experience Lab' for Zodiac Aerospace (p.12) to enable
them to include the passenger and crew perspective. It is a physical environment, a
mock-up of an aircraft where engineers can tryout early prototypes with actual users.
Basil not only developed the mock-up, its requirements to enable the prototyping
taking place, but also the underlying processes, hands on means and suggesting
methods.

Designing in the aviation industry requires dealing with various stakeholders. Not a single aspect in the aviation industry is carried by on company alone. Take for example galleys in a aircraft, it takes a caterer, an OEM such as Airbus or Boeing, often also airlines, as well as a cabin manufacturer to design it. Designers are used to work in multi-disciplinary and multi-stakeholder environments. They also know how to create shared understanding and common ground among these stakeholders.

Jenny Tsay brought in her project (p.36) all stakeholders to the table during workshops, which she facilitated. During multiple moments all major stakeholders were present enabling fast decision-making.

A report from the UK Design Council from 2015 descripting "Leading business by design in the aerospace sector" can be found through this link- $\frac{1}{2}$

http://www.designcouncil.org.uk/resources/report/leading-business-design-aerospace-sector



AVIATION DESIGN CHALLENGE

106 projects in 12 weeks for KLM

106 Master students worked during the Aviation Design Challenge for a period of three months on assignments coming from across the entire organization of KLM. The topics ranged from making a roadmap for social robotics at the airport, improving communication during turnaround, new opportunities for inflight Wifi, improve pilot safety training based on data, to developing approaches for innovating at the gate. The challenge ended in a final presentation day at KLM Headquarters in Amstelveen.

The results of the challenge are presented at the Passenger Terminal Conference in Cologne, March 2016 and the Future Travel Experience in Amsterdam, April 2016.

Details: 106 students 12 weeks 14 assignments 26 employees of KLM 6 departments

Supervision: Dr. Christine De Lille



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IN-FLIGHT EXPERIENCES

The following projects all take place in the context of improving the in-flight experience of passengers.

They include both the passenger and crew perspective.



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SENSE THE TRANSITIONS

Sense the transitions is a service design concept that enhances the in-flight experience for long duration flights by engaging passengers in multi-sensory and interactive 'geo-tainment'. It proposes a video interface with per-curated location-triggered video footage that engages passengers by making them realize the vast distances they're traveling, and keeping them entertained and informed.

About the course "Service Design Process"

The MSc. Elective course "Service Design Process" takes place in collaboration with Zodiac Aerospace and KLM focusing on designing new services from both company perspectives by putting passengers and crew central. During the design assignment, students learn to user service design methods while collaborating with employees from both KLM and Zodiac Aerospace.

Who? Dr. Christine De Lille, Dr. Froukje Sleeswijk Visser & Julia Debacker MA.

"Sensing the transitions" was Crystal Cabin Award winner in 2014.

"Enable" (see project description on p.15) was finalist for the Crystal Cabin Award in 2015.

'The Crystal Cabin Award is the only international award for excellence in aircraft interior innovation. The Crystal Cabin Award's main intention is to initiate a significant improvement in passenger comfort.'

Project by Anna-Louisa Peters, Karan Shah, Dorine van Meeuwen, MSc Elective: Service Design Process

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Staff: Dr. Christine De Lille, Dr. Froukje Sleeswijk Visser & Julia Debacker MA

Project Partner:



THE ZODIAC EXPERIENCE LAB

A new atmosphere for innovation





Traditionally being a successful technical manufacturing company, Zodiac needs to make a leap towards user-centered design practices to keep its lead. The goal of this project was to implement a strategy for change towards a culture of product-service system innovation. The Experience Lab is the tangible result of this project, which is a learning tool specially designed for conducting user research, creative facilitation and



other stakeholder sessions. A year after the end of this project, the Experience Lab has moved into a newly established Innovation Center together with an expanded Product Development and R&D department. With this unique setting, the business unit in Alkmaar is becoming increasingly known as a hotspot for innovation within the Zodiac network.

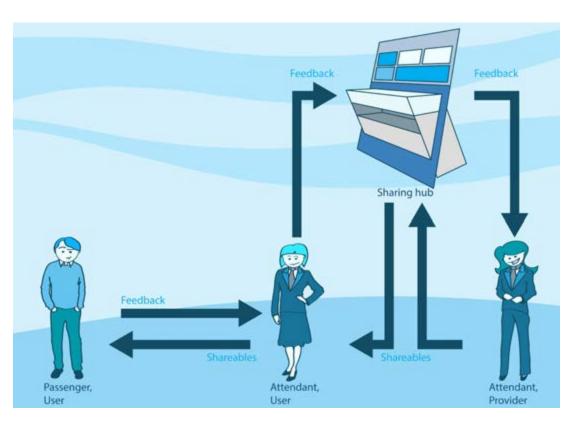


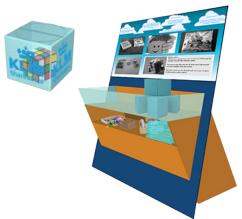
Contact: Vereecke@zodiacaerospace.com Staff: Prof. Sicco Santema & Dr. Christine De Lille



THE SHAREABLES

In-flight gifts for passengers





The topic of this master thesis was improving the experience of passengers on long intercontinental flights. The Shareables concept is a service that aims to achieve this improvement through crew generated products.

It is designed to provide KLM flight attendants with the means to surprise their passengers with an extraordinary service that exceeds expectations.

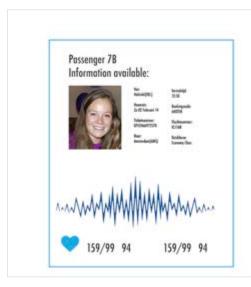
Project by Roderick Giovanni Huijgen , Master Thesis DFI

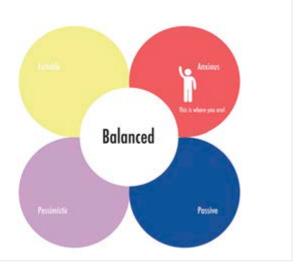
Contact : Rghuijgen@gmail.com Staff : Prof. Pieter Desmet & Dr. Steven Fokkinga



FLIGHTBEAT

Check your own heartbeat







Flightbeat is a platform that monitors the wellbeing (physically and mentally) of passengers through heart rate sensors, which are integrated



in the seats of an airplane. FlightBeat aims to personalize inflight service and foster interaction between cabin crew and passengers.

Project by Flaminia Del Conte, IJsbrand Karman, Mirthe Monnikhof, Alexander Vervoort, Quirine van Walt Meijer, MSc Elective: Service Design Process



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Staff: Dr. Christine de Lille & Dr. Froukje Sleeswijk Visser





ENABLE

One Tray Table, infinite Possibilities?





Enable. redefines a common in-flight hindrance, the seatbacktraytable into a new, touch-based interactive and personalized entertainment platform to provide a unique, engaging and productive experience for the user. The IFE tray table is a simple and innovative

solution that displays an interactive touch-based projection onto a passenger's tray table, rethinking preconceived ideas of the traditional tray table. The concept was a finalist at the Crystal Cabin Awards 2015.

Project by Hayagreev Narayan, Kathryn Hing, Lexi in, Paul van Eeghen, MSc Elective: Service Design Process



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Staff: Dr.Christine de Lille, Julia DeBacker MA.

Project Partner : Zodiac Aerospace

PASSENGER EXPERIENCE IN THE CARGO HOLD







In today's market environment benefits are rising when traveling lightweight by plane. This trend has resulted that a minority of the cargo area is used. An opportunity is explored in which the cargo hold is transformed into a passenger seating configuration.

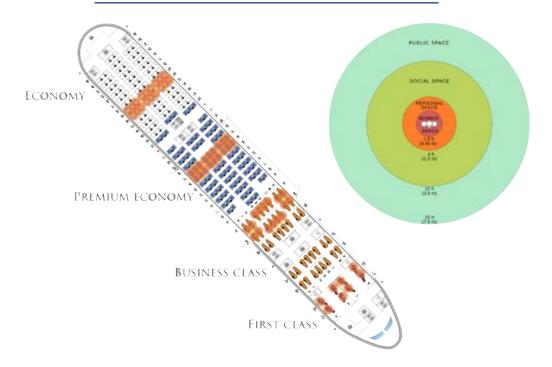
Project by Ir. Ramon Blauwhoff, MSc SPD Project

Contact: mail@ramonblauwhoff.com

Staff: Prof.Sicco Santema, & Julia Debacker MA



ENHANCING THE IN-FLIGHT PRIVACY PERCEPTION



Within an aircraft there is a limited amount of space that is shared. When people experience discomfort caused by a lack of privacy they are not capable of being comfortable anymore. This project was aimed at increasing privacy for premium economy passengers during long haul flights while also reducing discomfort in two main discomfort areas.

The final concept managed to increase the privacy perception of the user as well as score lower on discomfort in the main discomfort areas

Due to an embargo it is impossible to go into further detail on this project.

Project by Kenzie van der Klooster, Master thesis, IPD with Automotive Specialization



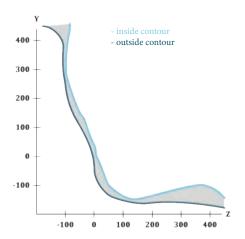
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DESIGNING COMFORTABLE PASSENGER SEATS



The aim of this PhD research has been to provide new knowledge on how to design comfortable passenger seats and to provide recommendations for design and research. The focus of the experiments performed in this PhD research has been on the influence of passengers' body sizes, the activities they perform, and the properties of the seat, on the comfort and discomfort perception of passengers. For example, one of the projects investigated what the ideal seat contour for aircraft seats would look like based on the human body contour. Therefore, a number of body contours have been collected by using 3D scanning. Instead of scanning the passengers, the imprint left by the passengers in a special mattress was scanned. The contours were aligned and combined into a largest, outer contour and a smallest, inner contour. This outer contour can be used to design a hard shell out of a composite material, whereas the difference between the outer and inner contour can be filled up by a special foam to provide support



for small passengers. Using this technique, seat manufacturers will be able to provide a better fit to the human body, while at the same time reducing weight by applying new materials. Further research is needed to build prototype seats and to evaluate the comfort and discomfort and possible improvements on the contour shape.

The results from this and other projects have been translated into a practical flowchart on how to design comfortable passenger seats on the basis of context, human and seat characteristics.

Project Partners:







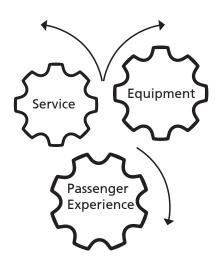




Project by Dr. Suzanne Hiemstra-van Mastrigt, Ph.d Project

Contact : S.Hiemstra-vanMastrigt@tudelft.nl Staff : Prof.Peter Vink & Dr. Lottie Kuijt-Evers

ENGINEERING THE PERFECT IN-FLIGHT SERVICE EXPERIENCE





"My aim is to raise the on board service experience via the use of performance enabling equipment". Engineering the Perfect In-flight Service Experience is a research project conducted by Zodiac Aerospace. The focus is to address aircraft cabin interior design strategies and develop products that best deliver value



to the end users. This research identifies potentially untapped opportunities for achieving service innovation through the investigation of how user-centered design can enable and enhance services and crew performance.

Project by Julia Debacker, Ph.d Project



Contact: Julia.debacker@zodiacaerospace.com Staff: Prof.Sicco Santema & Dr. Christine De Lille



AIRCRAFT SEATING

An estimation of the human head, neck & back contour in an aircraft seat



The models of two airplane chairs that were used, the Z300 and Signature concept seat of Zodiac.



In this research, the head, neck and back contour of a human while sitting in two different aircraft seats, performing two tasks (namely watching in-flight entertainment (IFE) and working on a laptop) are estimated by using a kyphometer. The research question was to find if anthropometric properties, the design of the chair and the performed activity has influence on the back contour of a person. This research

indicates that the maximum variation of these contours occur on the upper back, neck and head. By dividing the data in four groups, based on the upper body length, the height at which significant difference occurs was determined.

Project by N. Nijholt, T. Tuinhof, J.M.A. Bouwensa, J.Y.Jung, P.Vink, BSc Elective



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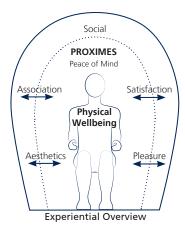
Staff: Prof.Peter Vink



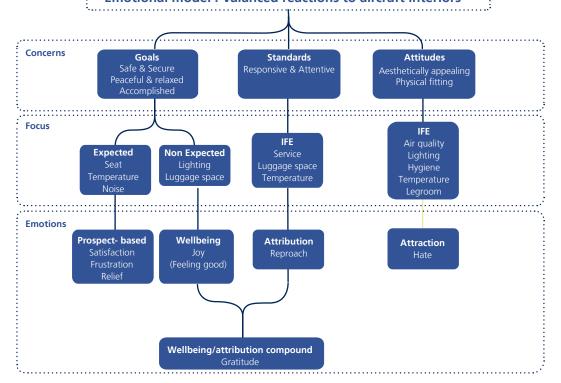


AIRCRAFT PASSENGER'S EXPERIENCE OF COMFORT

Subjective variables and links to emotional responses



Emotional model: Valanced reactions to aircraft interiors



Aircraft passenger comfort is a complex state, improving which is possible through delivering certain type of experiences (e.g. peace of mind, social, etc.), Enhancing positive emotional responses (e.g. joy, gratitude) and preventing

negative emotions (e.g. frustration). Each of those is elicited by the contextual inputs from the cabin interior (e.g. seat, legroom) and the links were uncovered in this project.

Project by Naseem Ahmadpour, Ph.d Project

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Staff: Prof.Jean-Marc Robert & Prof.Gitte Lindgaard



DISCOVERING NEEDS OF LESS ABLE BODIED PASSENGERS

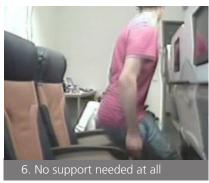












Persons with reduced mobility use aircraft cabins differently. As there is little room for special solutions catered to their needs, it is of paramount importance to know what their needs exactly

are. This research project focused on a detailed comparison between the ingress and egress in aircraft seats by PRM's and able-bodied test persons.

Project by Willem Lijmbach, MSc Thesis, IPD



Contact : wlijmbach@gmail.com Staff : Prof.Peter Vink

Project Partner:

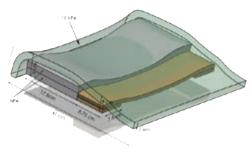


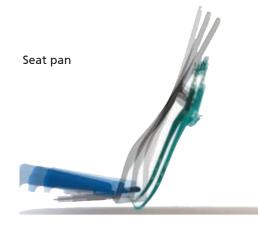
LIGHT WEIGHT AIRCRAFT SEAT





Picture of the seat





The project's goal was to create a lightweight, comfortable and healthy seat that is good for the environment. The metaphor 'sit on the clouds' was used to convey the feeling that people should have when sitting on this seat. They should feel free, relaxed and healthy.

The seat is really unique with a light weight netted back rest and a new reclining mechanism

not disturbing the passengers behind you and the seat pan was constructed with a human contoured 3D spacer fabric seat pan seat pan and to prevent sliding out of the seat.

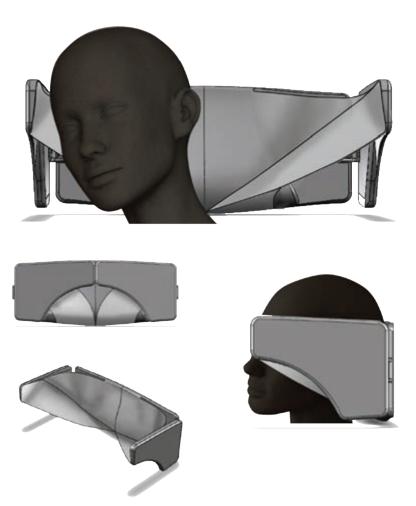
Project by Alkisti Kokuroku, MSc Thesis, IPD

Contact: alkistikokorikou@gmail.com Staff: Prof.Peter Vink & Dr. Ingrid de Pauw



"BEING ABLE TO STAY IN MY OWN LITTLE WORLD"

Helping passengers to make themselves comfortable during long-haul economy flights



Unfolding the side wings of the headrest reveals a hammock construction to cradle your head as you lean side-ward and offers subtle privacy at eye level. This gives you the control to rest your head and retreat subtly within the space of your seat, increasing autonomy, control and privacy.



Contact: Manonkuhne@gmail.com Staff: Prof. Peter Vink & Ir. Jelle Zijlstra MSc.

HAPPY TRAVEL







How can you reduce galley space, at the same time provide personalized passenger service and additionally keep crew motivated?

In our concept passengers can choose their meal type, its size and serving time. They are warmly welcomed at their seat with a first drink. Next to this flight attendants are supported with a smart watch to be informed about each passenger.

Project by Chun Wei Chang, Jonathan Schanz, Fabian Bitter, Luca Baldini, Felix Marschner Msc Elective: Service Design Process

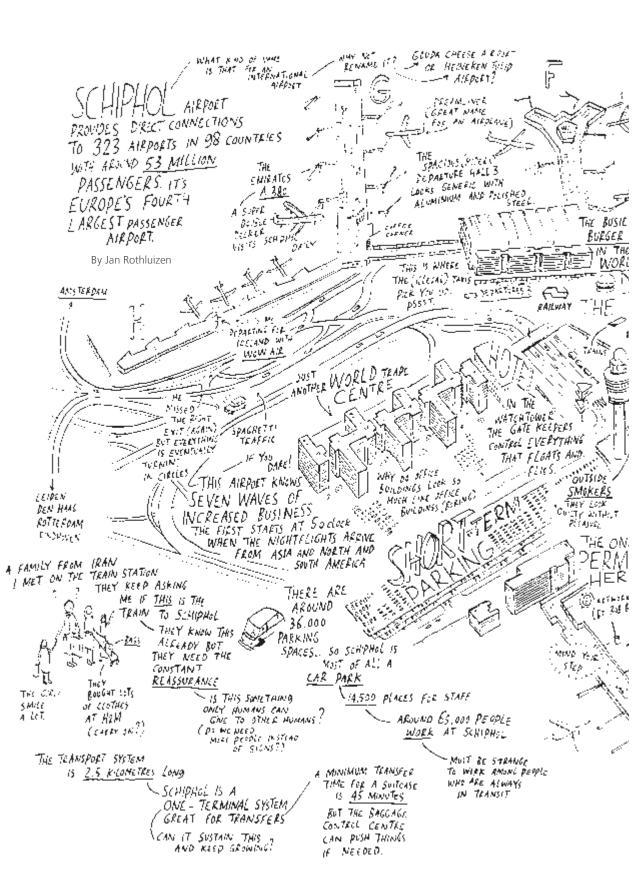


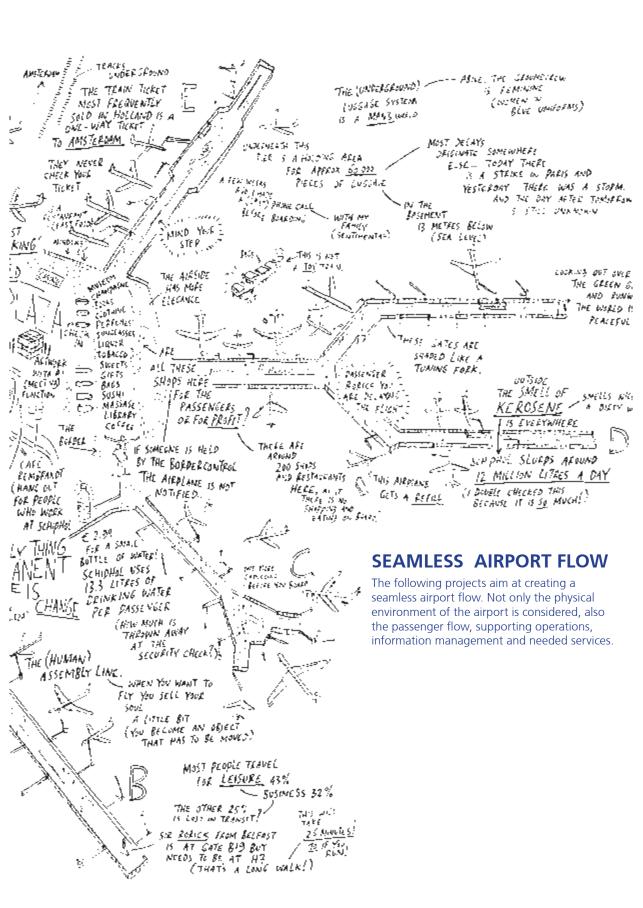
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Project Partner :

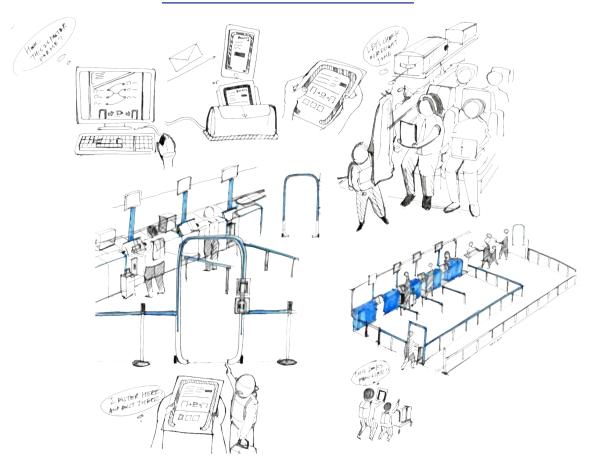








COMMUNICATION OF SELF SERVICE



When introducing the idea of "Self Service" process in airports, the service landscape has changed. Because of that, experience of travel is no longer the same as before. Correctly communicate the change of service to passengers and guide them intuitively will secure passenger experience and hence increase self-service adoption rate. It is a challenge for airports and airlines today. In thesis Redesign the self-

service check-in process, exploration and design iteration was conducted with the purpose of giving guidelines and passenger- centric thinking to airport suppliers. This will be used while introducing self-service in airport process. When improving the self- service process from the passengers' point of view, a friendly airport can be successfully shaped.

Project by Jyni Shen, MSc Thesis, SPD

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Staff: Prof.Sicco Santema & Dr. Christine de Lille

Project Partner:



SMART BOARDING





In the conventional boarding process, you have to wait for passengers blocking the aisle, or passengers have to get out of their aisle seat to let you in to your window seat. This leads to congestion in the airplane, queues in the jet bridge and delays. Smart Boarding allows passengers to



board in a more efficient way; One by one, from back to front and from window, to middle, to aisle. This results in a 20% faster boarding process and reduces queening by 60%. Smart Boarding has won the KLM Innovation Award in 2013

Project by Roland Vincent, MSc Thesis, SPD



Contact: Vincent@scenter.nl

Staff: Prof.Sicco Santema & Dr. Valentin Gattol



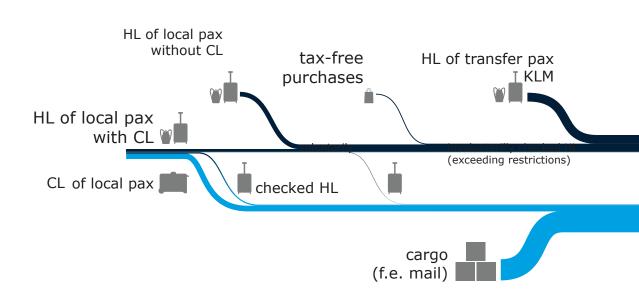
SOLVING KLM'S HAND LUGGAGE PROBLEM

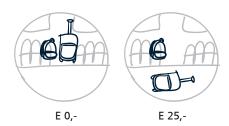


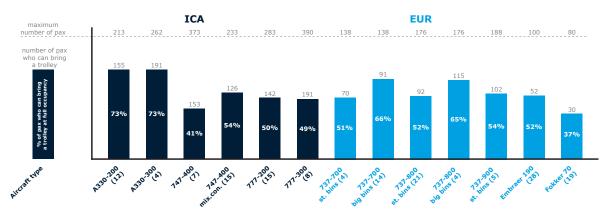
Having to deal with more hand luggage at the gate than can fit the aircraft has been a widespread complaint at KLM. Passengers become frustrated

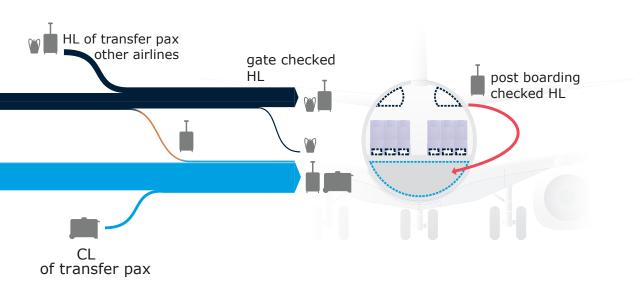


when they have to check their baggage at the gate and flights get delayed as a result. Several service alterations were designed to tackle the problem.













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Staff: Prof.Sicco Santema & Dr. Christine De Lille



REDESIGNING KLM'S SERVICE

Passengers with reduced mobility







Of all passengers KLM is serves each year, 1% consists out of passengers with reduced mobility; a group with very diverging needs and a group that has to prepare a lot to have a worry-free journey. Think about bringing medication, wheelchair

transport and the mobility facilities on the destination.

How can KLM make sure that this varying group of passengers receives the same pleasant journey as everybody else?

Project by Stijn Veeger, MSc Thesis, SPD

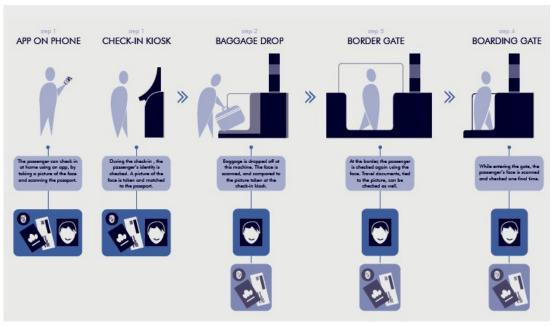
Contact : Stijn.veeger@klm.com

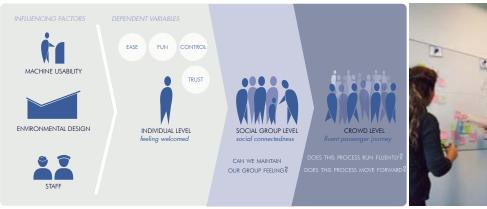
Staff: Prof. Sicco Santema and Dr. Christine de Lille



DESIGNING HAPPY FLOWS

Optimizing Passenger Flows through Technology & Experience Design





on a variety of on-site observations, interviews, experience assessment sessions, creative design sessions, as well as vision design projects.

A vision was developed on how new security technology can be applied to optimize passenger flows, especially from the perspective of the passengers' experiences. The vision was based

Proje

Project Partner :



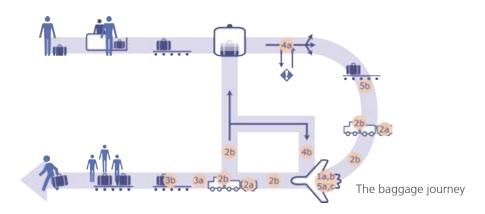




Contact : A.P.O.S.Vermeeren@tudelft.nl

TIME FLIES ... WHEN YOU KNOW YOUR BAG HAS BEEN UP IN THE SKIES

Designing individual tracking events for incoming baggage, its applications towards the passenger and KLM











To design tracking events for incoming baggage, where to place the events, how to optimize the baggage processes and how to communicate the most relevant

data to KLM's customer: the passenger. "It can be in Shanghai! I never know whether it will arrive, it has happened that it didn't, also that they opened it!"

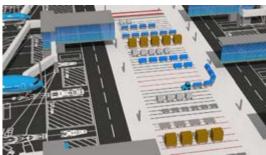


Project Partner:



FUTURE APRON FOR KLM







The design of a future apron of the A-pier for KLM might sound complex and somewhat holistic. However by using methods learned during the bachelor and master of IDE the actual problematics

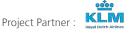
of the current aprons have been identified. The final result is visualized through an animation that combines the turnaround process and apron design.

Project by Pieter Oorsprong, MSc. Thesis, IPD



Contact: p.oorsprong@gmail.com

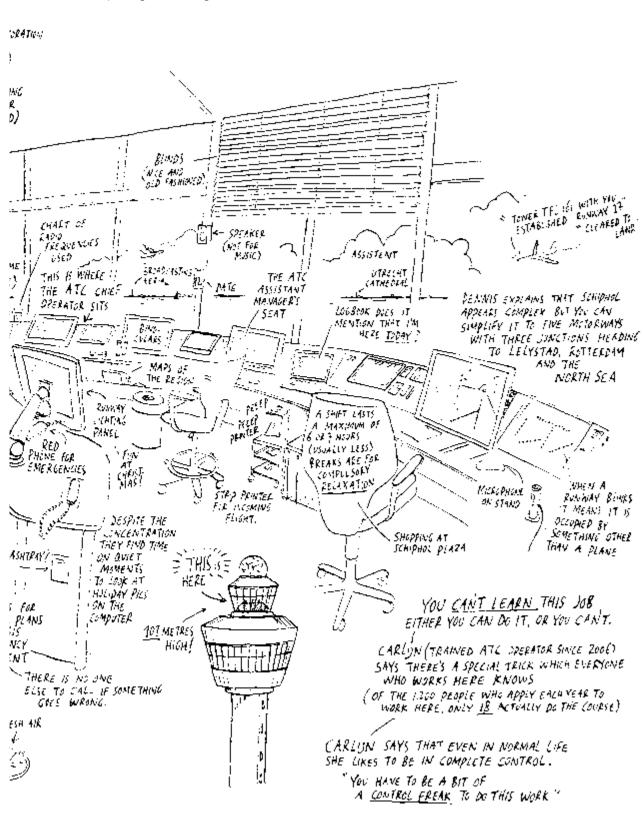
Staff: Prof. Santema, Ir. S. Minnoye, Dr. J. Kaelen



SPEAKER? FIRE ALARM CHRISTMAS DECL THIS CONTROL TOWER SPECTS TAPE STILL ALACRAFT FLYING IN AND OUT AROUND 1.300 A774:HED) ог бенірнац влен флу. By Jan Rothluizen TOWER SHIP IN A RADIUS INDICATOR 76/5 15 OF 15 KILOMETRES (IMPROVISED MCT A 29ST PLANE MONTER (BUND SPOT) FOR GROUND CONTROLLES TRIS IS AN IC EMIRATES A380 THE STRIPS Becoming NIMEN CLOCK SET ZIGGO DOME SMEKE N MARE A D28FEB TO UTC TIM (GNGER HALL) ! CLICKING \otimes powerterer. These Hobbic (2016 TIME SGUND LIKE IN A SAME FLIES BY EACH DAY. Marval of Staubard COFFEE PRILEDURES PAPERS (TROM THE THE STRIPS SHOW STRIPS) РОК СЕНФЦЕТЕО information FLIGHTS STORED ABOUT ALL HEZETHE DIFFERENT flichts The STRIPS ARS PASSED To THE GROUND. CONTRollers EACH STRIP SHOWS Spage A4VIS MEGRMATION GRADUALLY ABSUT A DIFFERENT EMPTIES WHILE 306 54860 FLIGHT CAR MASAZNE үм неке. ic were f(A)THESE , Rive strips for THIS IS SUPERVISOR OUTGOING PLANTS AND DENNISS CHAIR YELLOW STRIPS FOR TODAY FOLDERS ARRIVALS. it WAS MISTY THE MORNING SO HE RELES DISASTER ON EXPERIENCE TO GET AND CRIS. CONTINSEA A PLANE FLYING FROM SCHIPHOL TO PARIS THROUSH THE BACKLOS. MANAGEME. SOMETIMES A PLANE CAN CUT CORNERS, SAVES JUICE IS DIRECTED BY IS DIFFERENT AS WELL ATC OPERATORS IN ALL KLM PLANES DON'T GET 138 THE CODE ASSISMED PRIORITY AT SCHIPHOL HERE STAYS THE FIRST COME, FIRST SERVED SAME THROUGHOUT HON DOES THAT, MORK ABROAD! TYPICALLY Detent

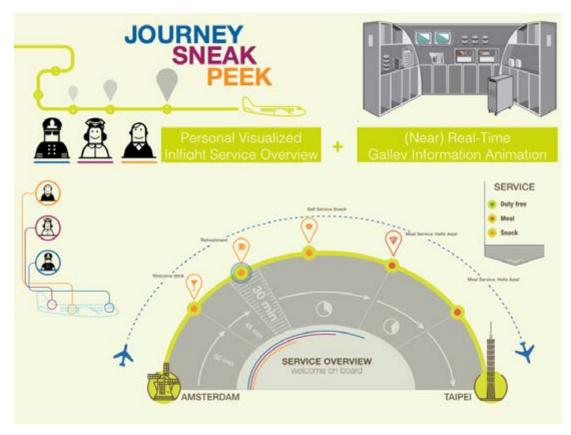
IN THE FUTURE

The following projects discuss future visions for the aviation industry. Breaking away from existing conventions, with affinity for technological opportunities, new paradigms are designed.



PASSENGER EXPERIENCE DRIVEN

In-flight Service Concept Design for 2020



This project proposed a change for the innovation process, where the wishes of customers/ users become the main driver for product development. By applying the Vision in Product design approach as an innovation process, a Vision Statement for 2020 was co-created with the sales team and design team within Zodiac Aerospace and its airline partners. Inputs that formulated the future context came from the exploration phase of,

1) In-context passenger concern research (applying design for emotion and context-mapping tools) (2)

Service routine analysis with cabin crews; 3) Trend analysis with multiple stakeholders(airport/ in-flight service design team/cabin crews/ ZA designers/ ZA sales)

The future vision for 2020 was materialized into a concept proposal, Journey Sneak Peek, as the first project outcome. Secondly, the entire process that led to the final design was structured and analyses to create the resulting material for the Zodiac Aerospace User-Centric Innovation Approach.

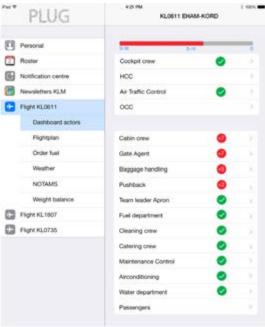
Project by Wan Jen Tsay, Msc Thesis, DFI Project

Contact : Wanjentsay@gmail.com Staff : Prof. P. Vink & Dr. Christine De Lille Project Partner:



AVIATION OF THE FUTURE







Our challenge was to provide a different perspective on the use of communication within the aviation industry. We found that information is not shared and dishonest, the communication is diffusive and prone to errors and employees do not work together towards a common goal. PLUG decreases communication channels and stimulates working towards the same goal.

Project by Gina Henselmans, Vivianne Driessen & Thomas Follender, Interdisciplinary Msc. Research Project

Contact: tfollender@gmail.com

Staff: Prof.Sicco Santema, Roland Vincent Msc &

Dr. Christine De Lille







VR - HYPERSPACE





Adopting radical approaches using virtual reality and mixed reality technologies, and the latest studies in neuroscience and psychology, we are carrying out fundamental research and development leading to a paradigm shift in relation to passenger comfort.

Project Partners:

This is a FP7 EU-funded project.

The university of Nottingham (UK) was the coordinator. The other partners were: Fraunhofer Institute for Industrial Engineering (FhG IAO) Germany, Valtion Teknillien Tutkimuskeskus (VTT) Finland, Bauhaus Universität Weimar



(BUW) Germany, Institute of Communications and Computer Systems (ICCS) Greece, University of Barcelona (UB) Spain, MPI for Biological Cybernetics (MPG) Germany, Thales Alenia Space Italia S.p.A (TASI) Italy, AIRBUS GROUP Innovations Germany

VR-HYPERSPACE (AAT-285681) was an ambitious 4.6M project funded under the European Commission's Seventh Framework Aeronautics and Air Transport (AAT) programme. Begun in October 2011, this project consisted of 9 internationally leading universities, research institutes and industrial partners from 6 European countries. The project ended in September 2014.

Project by Prof.dr.Peter Vink



Contact : p.vink@tudelft.nl Staff : Dr. Mirabelle D'Cruz

Staff: Dr. Mirabelle D'Cruz (coordinator), Prof. Peter Vink (advisory board of the project)

AIRCRAFT INTERIOR DESIGN 2050





In the society individuals are connected and formed into groups based on reasons yet in the plane passengers are arranged randomly.



To achieve the well being in the group of passengers, the whole interior is focused on requirements of crowd well-being in future air travel.

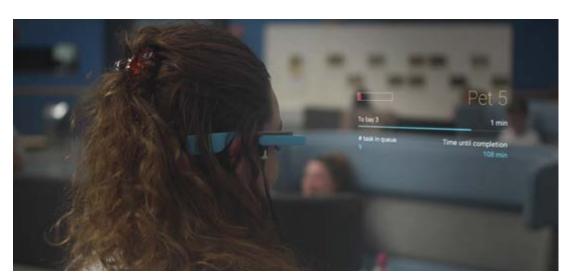
Project by Yu Ting Christina Wang , Msc, IPD Elective Project specialization in Automotive Design

Contact: christina.wang.yuting@gmail.com Staff: Prof. Peter Vink and Jie Li MSc.



WAREHOUSE AUTOMATION

with an autonomous vehicle & Google Glass





Envisioning a cargo warehouse of the near future, we developed an autonomous pallet transport system for KLM Cargo. With the use of Google Glass and Android tablets, workers can control a network of robotic vehicles, from a shared working environment. With everything and everyone connected in real-time, productivity is improved.



Project by Maaike Leichsenring, Max Kersten, Douwe Jolles & Timme van der Meer, BSc, Elective courses Mechatronics & Software

Project Partner :

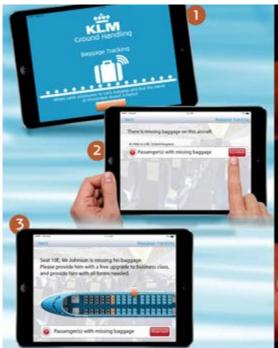


Contact: timmevandermeer@gmail.com

Staff: Dr.Jouke Verlinden, Adrie Kooijman & Zjenja Doubrovski, Msc



"WE'VE ALWAYS DONE IT THIS WAY"









This thesis aimed at improving the strategic position of the Customer Ground Handling division of KLM Royal Dutch Airlines. I had the freedom to look at the internal and external aspects with an outsider-perspective and was asked not to take anything for granted.

Project by Ir. Stijn Jochems, MSc.Thesis, SPD



Contact: stijnjochems@gmail.com

Staff : Prof.mr.dr.ir. S.C. Santema, S. Bakker-Wu, M. Bordes (Marlou), W. Bongers (Wouter)

Project Partner : KLM

THE GUARDIAN

Intensive care unit onboard



The Guardian presents a viable solution to safely and swiftly transport both Intensive and Medium Care patients on long-haul flights. It consists of a cabin-like construction, with a complete Intensive Care environment on the inside, that can be quickly installed and used on regular, commercial flights.





Project by

Msc. Joint Master Project - Corette Arts-Posthoorn, Janrein Jobsis, Leon Neve, Roeland Reitsema, Jeroen van de Ruit, Anne Toorneman

Msc. thesis - Jeroen van de Ruit- 'A holistic and user-centered design approach to optimize patient transport by airplane.'

Msc.thesis - Anne Toorneman- 'A user- centred interior design of the Guardian to safely and securely transport IC patients in the future.'

Staff:

Msc. Joint Master Project- Prof. Dr. Peter Vink Graduation Project Jeroen van de Ruit- Prof. Dr. Peter Vink & A. Albayrak Graduation Project Anne Toorneman - Prof. Dr. Peter Vink & Dr. ir. M. H. Zonneveld

Project Partner: Jan van den Bosch- Electronic House Rotterdam

MODULAIR

A Galley made for Change







Modulair is a modular, easily adaptable galley which enables airlines to react on changing catering demands and route requirements by exchanging functional elements or even replacing the whole galley with seats.

Flight attendants benefit from an improved working environment and automated processes which gives them more time to provide better, personalized services to their passengers.

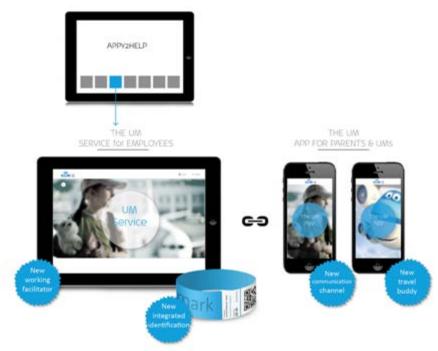
Project by Bente Bak Jonathan Schanz, Fabian Bitter, Sim Castle Felix Marschner Joppe van Dijk MSc.Joint Master Project



Contact : jonathan.schanz@gmx.de Staff : Prof.Dr.Peter Vink and Ruud Van Heur Project Partner :



THE FUTURE UNACCOMPANIED MINORS SERVICE



The new service consists on a new app for employees integrated on the "Digitizing KLM" platform









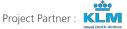
Every year KLM carries around 30.000 Unaccompanied Minors (UM), children between the ages of five to fourteen. KLM's UM Service is a complex process, which involves different actors and interactions through many steps. The connections and procedures between these different component parts of the service lack harmony and synchronization. Furthermore the

service still uses the same channels and paper forms than 20 years ago. This project focused on digitizing the UM Service, improving performance and increasing the UX of all stakeholders.

Project by Marga Uńa Borras, Msc.Thesis, DFI

Contact: Margaunaborras@gmail.com

Staff: Dr.Christine de Lille and Dr. Suzanne Hiemstra-van Mastrigt



THE FUTURE OF AUTOMATED PASSENGER PROCEDURE 2025





Designing a vision, concept embodiments and defining a set of standards for automated passenger procedures in 2025, using biometric data.

The context of an airport has changed rapidly in the recent past: the manual desk (controversial procedure) has been replaced by self-service kiosks. However, in designing the self-service kiosk, the key notion of user experience was abandoned, by offloading the responsibility for the front-end activity to the passengers. (Accenture

future of Service Design 2014, p.37). Having a holistic view on User Experience design, this project explored the possibility of creating a user-friendly automated procedure that meets different passenger needs and stakeholders ambitious, in order to smoothly lead passengers through the steps of the ground procedure.

Project Partners :







KICK-START FOR THE KLM CUSTOMER EXPERIENCE ORGANIZATION





Because of high financial pressure and other reasons, KLM is transforming into a customer experience (CX) focused company. To support the change of daily project practices and to create a CX focused mind-set, a strategy and the suitable



tools have been designed:

- A crowdsource campaign within KLM
- A digital toolkit
- CX Labs as physical spaces to work
- A new 'Networker' role
- The proposal of rotating leadership

Project by Jonathan Schanz, Msc.Thesis, SPD Contact: jonathan.schanz@gmx.de

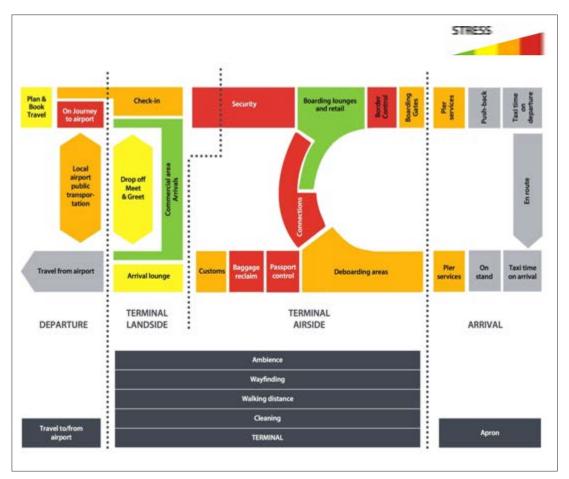


Staff: Jini Sankatsing (KLM) Tiddo Veldhuis (KLM) , Dr. Giulia Calabretta and Dr. Christine Lille



PASSME

Personalized Airport Systems for Seamless Mobility & Experience



PASSME aims to deliver industry-driven, passenger-centric novel solutions (up to TRL6) for passengers, airports and airlines to address the anticipated increase in demand for commercial flights in Europe by 2050. The goal is to reduce travel time by at least 60 minutes by integrating information between all stakeholders and transforming airport and aircraft

operations and interiors to make the passenger journey time efficient, seamless, robust and accessible. PASSME kicks off in June 2015 and will last 3 years.

Project by: Prof. Sicco Santema (project leader), Dr. Christine De Lille, Prof.Peter Vink, Orsi Toth (project manager), Dr. Katinka Bergema & Dr. Suzanne Hiemstra-van Mastrigt

Research Project within Horizon2020 of European Union

Contact: o.toth@tudelft.nl, s.c.santema@tudelft.nl









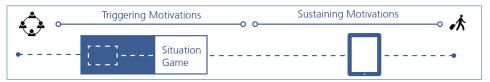
Project Partner:



Nottingham

HOW CAN EMPLOYEES BE MOTIVATED TO STEER EMPATHY AND MEANINGFUL INTERACTIONS WITH PASSENGERS?

Behavioral Change Roadmap for KLM front-line staff



Gamified service training session



App that motivates front-line staff to be more customer driven







The project aims to steer empathic behavior within KLM and make them more customer driven. KLM digitizing team has developed numerous apps to increase operational efficiency and improve communication among co workers. To support this activity this project has developed a serious game that triggers employees to establish team work and

make their service customer driven. Sustaining motivations comes next in the road map with the implementation of operational apps there will be a KLM trainer app. Both these solutions increase service orientedness by sharing experieces, playing a game and testing knowledge.





Contact: tanvi.a.pande@gmail.com Staff: Dr. Arnold Vermeeren, Kasia Tabeau and Maite Oonk (KLM)



COLLABORATIONS WITH TU DELFT

Industrial Design Engineering (IDE)

Join us in creating knowledge!

The faculty of Industrial Design Engineering seeks for partnerships with companies to create relevant knowledge for and bring inspiration to industry and society. Our faculty offers three types of collaboration opportunities:

Student projects (10-20 week design assignments)

In the curriculum for our students companies can bring in design cases to work on for 10 to 20 weeks. The assignments vary from more business oriented starting points to the whole design process, embodiment design and prototyping. Our students learn to design with the user(s), the technology and the business aspects of the product or service in mind.

Combined student projects (1-2 year programmed collaboration)

When combining several student projects with additional research and project management we can build a partnership programme in a specific domain. For instance, think of a medical design project with a hospital, an international medical company, researchers from the faculty and several student projects to inspire and feed research, all coordinated by a dedicated project manager from the university.

Research projects (2-4 year collaboration)

Research within the university relies on funding through EU, Dutch and private partners and combinations thereof. The faculty of IDE aims for research collaboration on topics that connect to our research agenda and expertise. This typically leads to projects between 2 and 4 years with PhD's and senior researchers, tackling societal challenges, wicked problems and contributing to innovation and economic growth. If you think this suits your organization, please contact us.

For all of these projects you can contact your contact person of the IDE faculty or the Valorization Team: http://www.io.tudelft.nl/en/cooperation/

