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# ABBdroid

## Final Report



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ABBdroid is a sales tool designed for ABB  
on Android platform,  
to enhance the communication of sales information  
of HVAC products  
between the ABB's salespeople and the clients.



# Acknowledgement

We would like to acknowledge everyone who had a positive impact on ABBdroid:

A big thank you to Model Master Kari Kääriäinen for his work on the 3D models, to Teemu Ronkka and Mikelis Studers for the electronics design and assembly; to Jussi Hannula, Esa Santamäki, and Päivi Oinonen for helpful ideas and comments throughout the creation process; and to Harri Toivonen for insights on rapid prototyping methods.

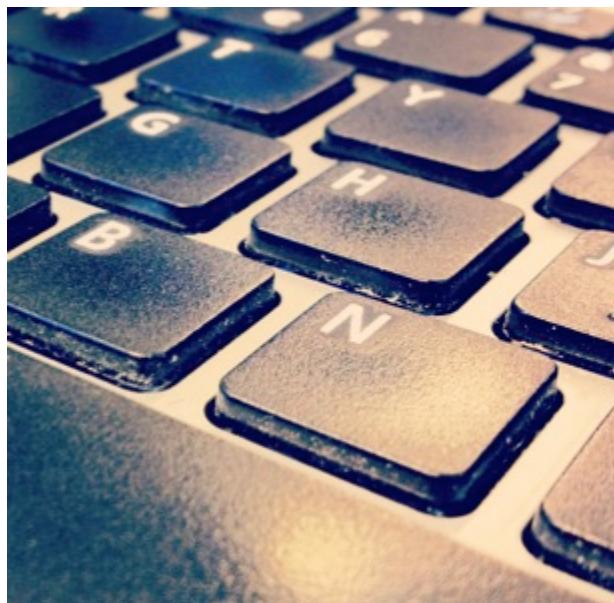
We would also like to thank our sponsor representative Robert Glass for constant support and feedback, Professor Kalevi Ekman (Eetu) supporting a co-creating workspace and the amazing PDP program, and to Justus Reinikainen and Peter Tapio for constant direction and project coordination.

We are very grateful to Lauttasaari Lukio upper secondary students and especially Headmaster Mikko Hakala for co-creating with our team. The co-creation helped us focusing our efforts greatly.

All of these people have been essential to our success, and we are glad to have had the wonderful opportunity of working with each and every one of them. Thank you to every person that helped accomplish the goals of ABBdroid.

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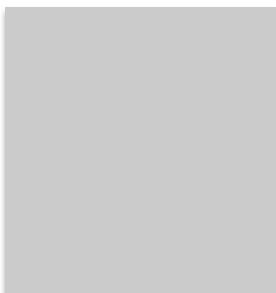
# Editorial Page



It is tough to take responsibility but it feels great when you accomplish it. Working for the Final report and carving it in a magazine to create a new genre is challenging and interesting. We would like to thanks Jouni specially for the constant motivation, Taru and also Nina for the quick response and putting efforts on the text. We just did it ☺. Hope you enjoy reading it.

**Arindra Kumar Das  
Vivek Anand**  
*Design and Printing team*

Reviewer: Jouni Kari and Taru Kesavuori  
Budget: Taru Kesavuori  
Contributions: Team ABBdroid



**Nina Freeman**  
*Storyboard*

ABBdroid Final report  
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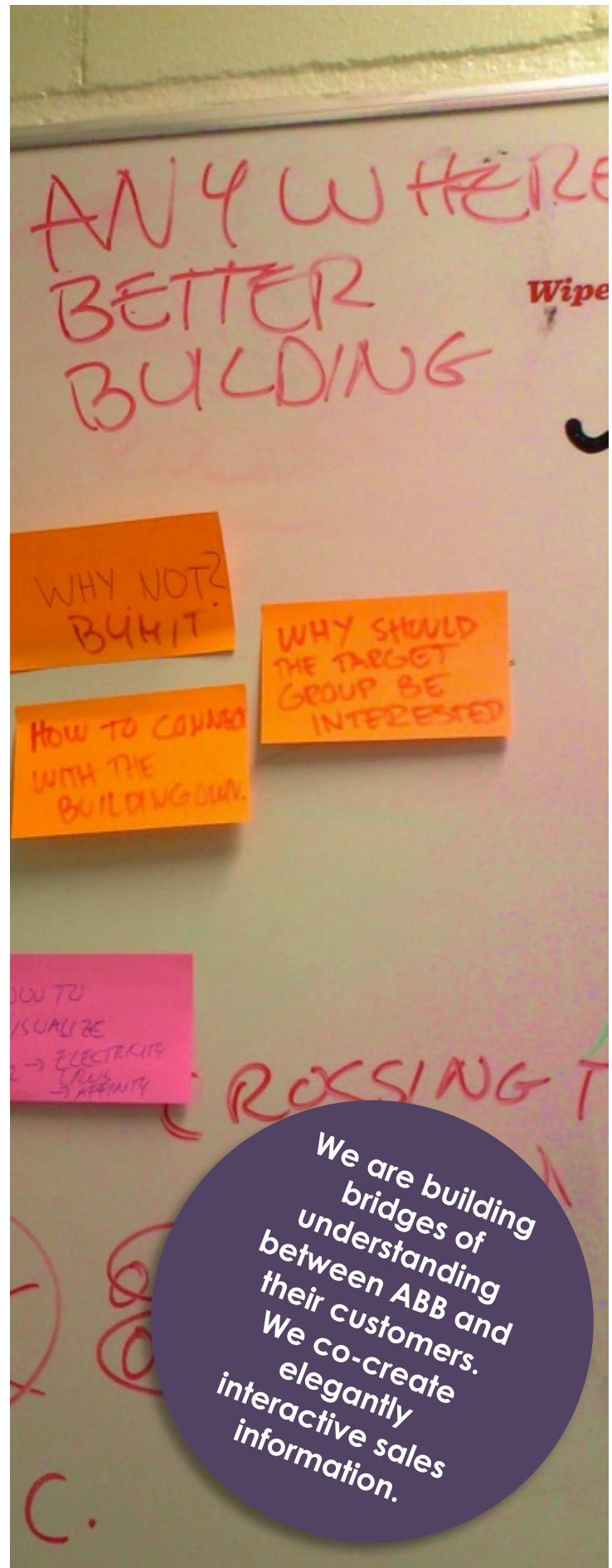
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# Introduction

ABB is a multinational company that provides access to energy efficient and environmentally friendly technology. The goal of ABBdroid is to visualize the benefits of ABB frequency converter technology to optimize the sales experience. The driving force of ABBdroid is at the core of marketing and technology.

ABBdroid software is built on the Android platform to be used with modern mobile devices.

We create value in helping ABB salespeople provide customers with a simple way to make the most environmentally friendly and energy efficient decisions for their customers' needs.





It has been an immense joy to work in product development with team ABBdroid. To work in such a magnificent team through all the phases of the project has been very rewarding.

We have produced many beautiful and valuable results. Marketing is the backbone for any business. It is very valuable to understand how a customer makes decision when buying services.

Product development is like entering an unknown area with only a blank map. When creating something new with great value, not all the steps are clear. It has been remarkable how flexible and motivated and determined a team we have become.

As a team we are very diverse in many aspects, which helped us on our journey by being able to teach each other in the team the key concepts.

In behalf of our great team I Would like to offer a big thank you to Robert Glass of ABB for the great support and the exemplary attitude from the sponsor side. We have got a great deal of excellent guidance and investment in time and devotion to make ABBdroid effort worthwhile for ABB. Also the Design Factory staff have had a great role in focusing our team efforts. Big thank you to Professor Kalevi Ekman and the researchers Satu Luukkonen and Harri Toivonen. Special thanks to Kari Kääriäinen for the insights in prototyping.

--Jouni Kari

# THE TEAM



"Individuals play the game,  
but teams beat the odds."



## Team manager

**Jouni Kari** is a Master's Degree (M. Sc.) student at Aalto University School of Engineering. His major is product design and development, and his minor is Innovation management.

He is adept at generating fresh points of view, core insights, and is sensitive to cultural and human factors. These skills help to transform insights into measurable and marketable products. Prior to attending Aalto University, he spent 10 years in air traffic control while also maintaining a hobby of designing dazzling products and services. Jouni's goal is to design meaningful interactions and his passion is to give depth and value to the customer experience.

## Vice Manager and Safety Office

**Ida Lehmuskoski** is studying The Industrial Enterprise of the Future in the School of Electrical engineering at Aalto University.

Her educational background is also in bionics and she gets excited creating new ideas in multidisciplinary teams.



## Service Design Manager

**Taru Kesavuori** is a T-shaped business, technology and design student with primary interest in service design and development. She is studying International Design Business Management at Aalto University School of Economics.

Taru is entrepreneurial in spirit, and from the beginning of the year 2011 she has been employed through her own company Luovo Consulting.



## Collaboration and Connections Manager

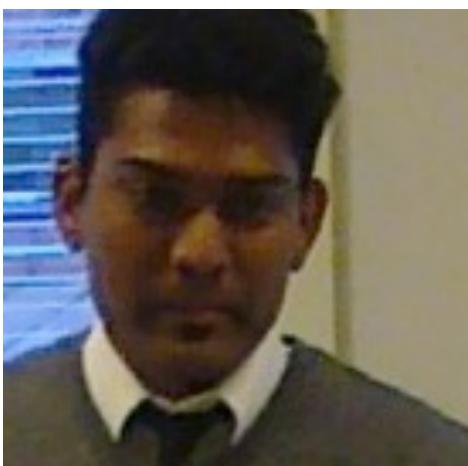
**Arindra Kumar Das** is pursuing his Masters in Communication engineering in the School of Electrical engineering at Aalto University.

He has an indomitable quest for knowledge. He finds motivation in people who have the courage to think differently and inspiration in their vision of changing the whole world. His long term goal is to be a part of global development in remote locations. He has taken a keen liking to being a part of an international culture, and is working to develop his credentials in a more comprehensive manner as part of a transformation.experience.

## Scrum Master

**Sami Verkkopera** is pursuing his Masters in Software engineering and Management, in the School of Science at Aalto University.

Sami has played floorball for 10 years, beginning as a forward and has worked his way up to become a defenceman. He started this season with the M-team, and during the post-season he played for Erä Akatemia. He is unsure where he will be next season, but will play for Flob in the sell games in May.



## Design Manager

**Vivek Anand** is pursuing a Masters of Design at IIT Kanpur. He has prior experience as an Architect, but his passion is to make design popular, like popular science.

He interprets, teaches, and researches design intended for a general audience and common applications. Vivek's research involves cognitive based surveys on ethnography and human behavior in any stream of design.



## GUI Design Lead and Safety Officer

**Sami Kiviharju** is studying Industrial design in the School of Arts, Design and Architecture at Aalto University. In addition to industrial design, he is very interested in graphic design.

He believes that good design strongly reflects its time and users. In addition to usability, a good designer should always pay attention to forms and features that currently prevail in other similar products. Sami works toward sensing current trends and believes in deviating from comfortable norms to achieve innovative and effective design.

## Coding Expert

**Wang Rong** is a Master's (MSc) student in Aalto University School of Electrical Engineering with Signal Processing and acoustics as his major.

His likes to play football and PC games during his spare time and wants to be a programmer after graduation



## Concept Master

**Yoshifumi Otaki** is studying Research and Development Strategy in the graduate school of Innovation Management at Tokyo Institute of Technology. He also has a bachelor's degree in Mechanical Engineering.

Otaki came to Aalto University as part of an exchange program. His plan is to work as engineer in an automotive company after graduation. He is interested in automotive HV, EV, and ITS technologies and his hobby is watching Formula One racing.



## Storyboard

**Nina Freeman** is pursuing her B.A. in English Literature with minors in Poetry and Medieval/Classical Studies at Pace University in New York City.

Her passion for poetry is very much involved with her interest in technology and the digital humanities. She is active in promoting a positive relationship between poets and scientists, and is interested in the role of science fiction poetry as a tool to create a bridge between the disciplines.



# **Sponsor and Facilitator**

ABB is a multinational ABB is an innovative global leader in the field of power and automation technologies with a firm belief in the importance of integrating high-performance technology and environmentally aware ideals. ABB offers sustainable solutions to the world through advanced technologies ranging from HVAC drives to industrial robots. ABB's history stretches back all the way to 1883 when Ludvig Fredholm

established Elektriska Aktiebolaget (ASEA), a manufacturer of electrical lighting and generators. ASEA would later merge with Brown, Boverie & Cie, established in 1891 as the first company to transmit high-voltage power, to form ABB and now it have 135,000 employees worldwide providing services to companies in nearly 100 countries. ABB Oy in Finland have its headquarters in Helsinki.



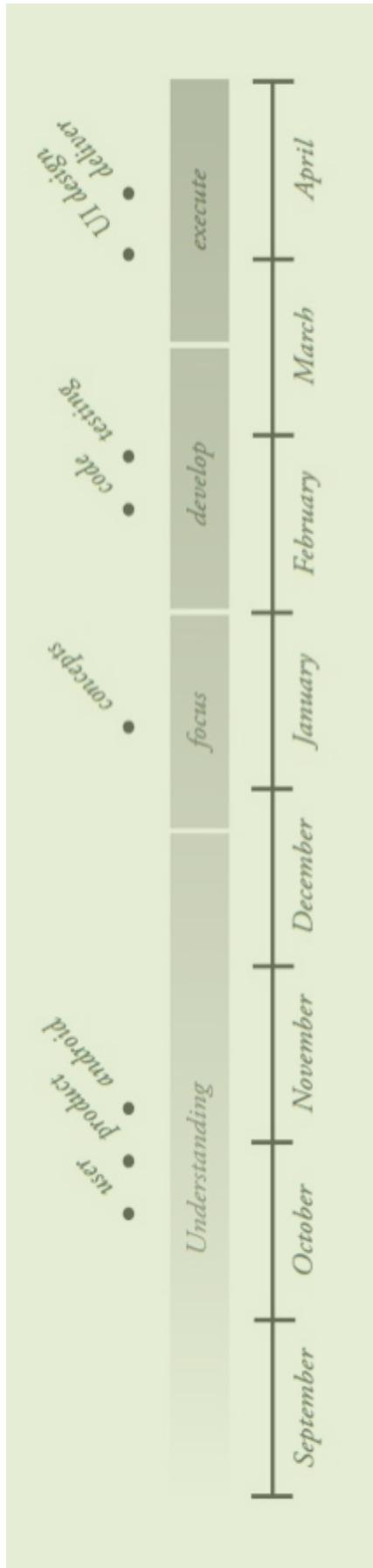
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**ABB**

Design Factory is one of the three such facilities of Aalto University. It is located in Betonimiehenkuja 5, Espoo and directed by Professor Kalevi Ekman. DF facilitates learning environment geared towards teaching, research and industry co-creation related to product development and design.



# Time-



## SPENDING TIME WITH SPONSOR

Our sponsor contact from ABB, Robert Glass, has been very helpful to us throughout the project. We communicated with him actively during the year. Robert arranged for us to have an HVAC learning workshop at ABB and took us to delicious dinner in the evening. Robert has taken part in the team meetings and in addition to that, we have had lunch meetings with him at ABB.

## TOOLS AND METHODS

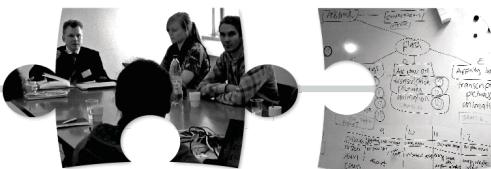
We utilized different methods and tools throughout the design process. We used the observation method, through which we gathered insight on selling situations and data visualization in collaboration with Lauttasaari high school. We utilized design probe (self-documenting user research kits) to get a better understanding of the user. We also conducted user interviews, and used the protostate tool for quick ideation and testing of the concepts.

## TEAMING UP AND HAVING FUN

Our multi-skilled team consists of members from five different nationalities. During the project we have got to know each other better during team meetings and also outside of the project context. For example, we have spent time together by having coffee and lunch. In the autumn, we organized a wonderful sauna evening.

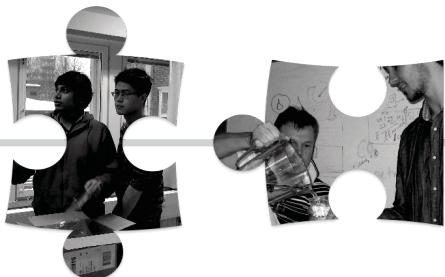
# -line

## + Doings & Learnings



### DECISION MAKING

Challenge: A major challenge for our team was in deciding who made the big decisions, when these decisions would be made, and how to prioritizing the decisions.  
Solution/Learning: We started highlighting the importance of the decision making. We divided our team in smaller groups, which would make decisions independently. We also started to schedule time for decision making during team meetings.



### COMMUNICATION AND OPENNESS

Challenge: The structure of our team was not consistent and went through many changes. Due to this, we had an excess of informal face-to-face time with the team that was not necessary in the long run. We also had some language barriers.  
Solution/learnings: We had a feedback session with Satu Luukkonen and presentation training with Elina Aalto. We had discussions within the team and things were opened up to the course staff. We learned that if a problem occurs it's important to deal with it with determination and as soon as possible.

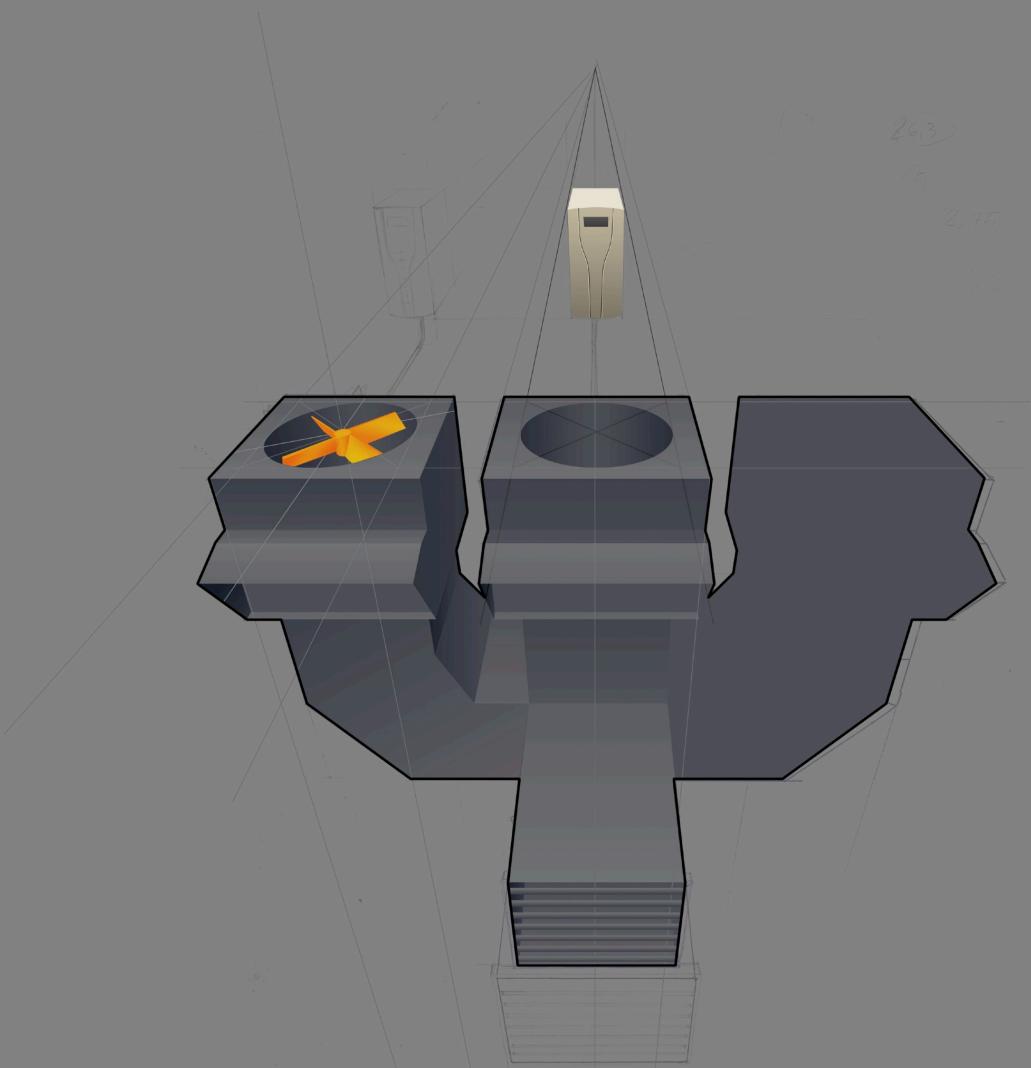


### BRAINSTORMING AND IDEATION

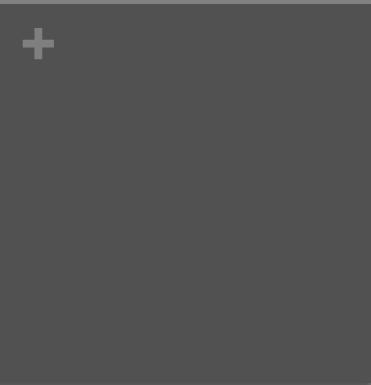
Challenge: We had challenges in documenting the fruits of our brainstorming. We also had experienced shyness in communication inside the team which effected the input during of team meetings.  
Solution/Learning: We started applying systematic brainstorming methods (O-P-E-R-A & Laddering) and made ideas concrete by using visualization. We also divided up the responsibility of idea documentation. Dividing the team into smaller groups that started to do things more independently helped us to develop our teams communication.

Working with a multinational corporation and extraordinary team incurred me with many qualities like idea development techniques, concept and UX design, time management, multidisciplinary teamwork and professional ethics. Things which you don't learn in University you learn in this course. Definitely give a try to test if you pass the Darwin's law of Survival of the fittest.

-- Arindra Das,  
C&C Manager



# About the **PROJECT**

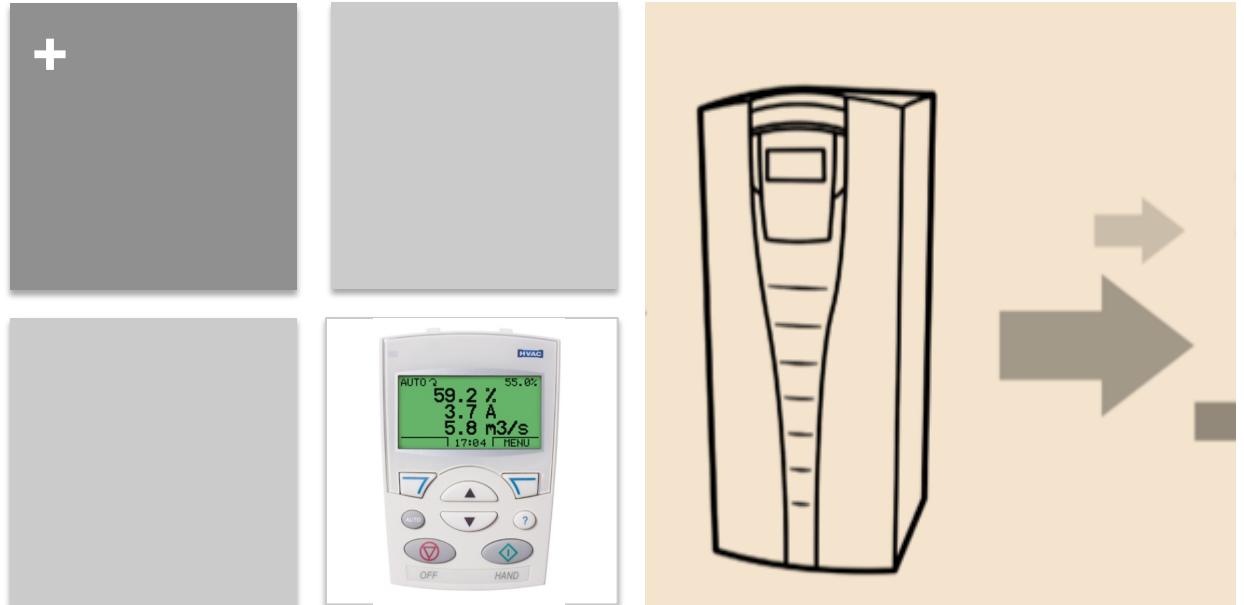


## Objective

Our goal is to develop an Android based software for better user experience within sales and the sales process in coordination with ABB's needs. The software should combine information with presentation about products in order to improve the user experience of the sales process. It might also provide users with customer information for enhanced sales, purchasing experience and the manufacturing process.

## Our Problem Statement

Android devices are everywhere. So are our sales people. Your task is to figure out how we can bring them together.



## The Product HVAC & ACH 550

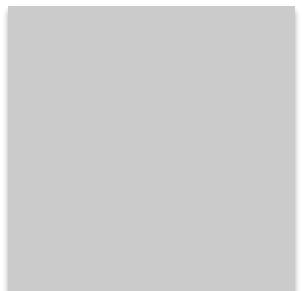
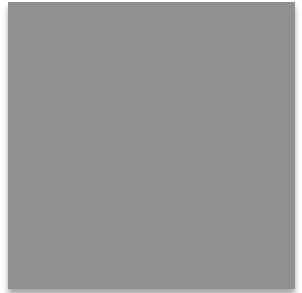
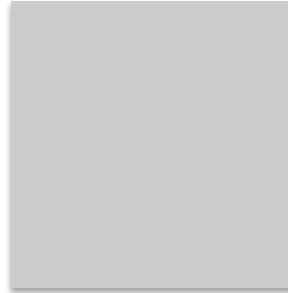
This product is used in residential, commercial and industrial buildings in heating, ventilation and air conditioning (HVAC) systems to maintain the desired air quality by controlling temperature, pressure, humidity, air change and carbon dioxide content. Optimum air flow is determined using measurements by sensors located throughout the building that determine the activity of Air Handling Unit's (AHU), which feed air in and out of the building. Within the AHU there are cooling and heating coils which are connected to a cooling or a heating system. The incoming air passes over these coils and is warmed or cooled depending on the air quality indoors.

AC drives improve air quality and optimize energy use within this process by helping control the pumps, fans and compressors in the most effective way. ABB standard drives for HVAC (ACH 550) provide users with ready-made macros for the most common HVAC applications such as pumps, fans and condensers. The drives contain a standardized BACnet as the communication protocol, which eases product integration into the building management system (BMS). This detachable device is fully equipped with user-friendly macros with an intuitive control panel that is included with every ACH 550 for HVAC.

# Requirement & Challenges

Our requirement includes software production design, software architecture design and GUI programming. In short, software project management is key to the success of this project. Also user research plays a vital role.

Key challenges are also found in implementation: how to design visual identity and usability in such a way that it is intuitive and provides access to the most direct pathways intended for routine use by the sales people. For this part of the challenge we need direct, accurate and insightful information about the customer needs.



My goal for this course is to get some corporation experience and to learn what I can contribute to the team's accomplishment of a project. In the end, I thought some of the goals that I made before this course were realized.

--Wang Rong, Coding Expert

## + Budget

BUDGET (situation 18th of April 2012)

Category	Realized Costs	Planned Costs
Android Courses	0.00 €	2,500.00 €
Equipment	1,382.90 €	2,000.00 €
Other material	27.55 €	400.00 €
Travel, food, transportation	5,352.65 €	2,800.00 €
User testing and prototyping	303.65 €	600.00 €
Marketing, branding and Gala preparations	1,338.55 €	800.00 €
Tools	0.00 €	100.00 €
Other	9.99 €	800.00 €
TOTAL (€)	<u>8,415.29 €</u>	<u>10,000.00 €</u>

# Development

ABBdroid, PDP 2012



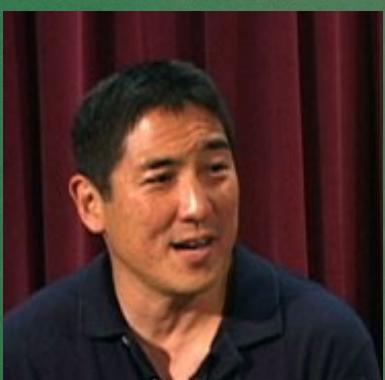
# Inspiration

**Guy Kawasaki's** method was our main inspiration in moving ahead as a team, and it consists of three important approaches: **increasing the quality of life**, **righting a wrong**, and **preventing the end of something good**. He also urges teams to come up with a mantra. Our **mantra** is: "**Elegantly Interactive Sales Information**". We did our best to use these concepts and the mantra as guides during the product development process.

Our plan of action was to experiment with many different technologies. We chose to work on Android since it is among the best technologies available and is used widely by ABB sales people. Our project took the holistic approach by learning more about the sales and marketing process in ABB surrounding the HVAC ACH 550 drive. We tried to figure out the traditional sales problem from the point of view of both sales person and customer.

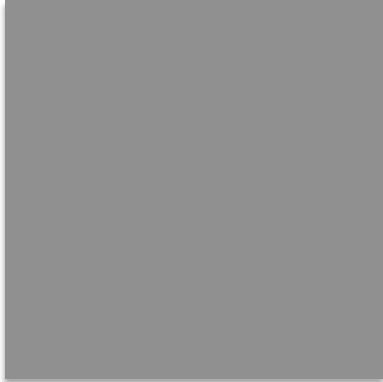
It's been quite a challenging project but I think that we have done a good job. I'm very happy to have had the opportunity to work with such great people! I didn't have any special expectations; I was just very excited to work with people from different backgrounds. I worked quite a lot on our visual material, which was very good practice for me. Of course this project was also a good way to improve our team work and communication skills. I think the most important thing in a project like this is effective communication. In the beginning, we tried to use too many tools that did not end up being useful to accomplish our goals. It is important to choose the means of communication wisely and avoid making things too complicated.

-- Sami Kiviharju,  
GUI Design Lead



Guy Kawasaki (born August 30, 1954) is a Silicon Valley venture capitalist, bestselling author, and Apple Fellow. He was one of the Apple employees originally responsible for marketing the Macintosh in 1984. He is currently a Managing Director of Garage Technology Ventures, and has been involved in the rumor reporting site Truemors and the RSS aggregation Alltop. He is also a well-known blogger

([http://en.wikipedia.org/wiki/Guy\\_Kawasaki](http://en.wikipedia.org/wiki/Guy_Kawasaki))



# The Power of Learning by Doing: the story of the protoslate.

As we began our project by focusing on the "Kawasaki methods," we determined our mantra and goal: "Elegantly Interactive Sales Information." Once you have a clear meaning and goal, the brainstorming and prototyping process begins.

We did not have much of an idea of how to create an effective user experience coming into this project. We had to act fast and began prototyping in order to overcome this lack of

knowledge. We came up with the idea of a protoslate, inspired by a tactical slate used by Jouni when he was an assistant coach for a floorball team.

We began to pursue the idea of a protoslate by approaching Design Factory model master, Kari Kääriäinen. He made some sketches for us of a slate that resembled an enhanced memo pad. The idea was exchanged in the team and solidified; Kari produced the final 3D sketches with our consent.



## Get Going: Lightning Speed Prototyping. It all happens in 6 days

The first physical prototype was made out of cardboard, painters tape, a stick and a notebook. It was made to emulate the feeling of a tablet computer.

We proceeded to make a larger prototype out of same materials in order to fine tune it's size. After the success of our physical prototype, we had Kari Kääriäinen make a 3D model using CAD software. Different design options were tested rapidly on the screen and the conclusive model was decided within 2 hours.

Modelmaster Kääriäinen then went to carve the chassis of the design out of blue prototyping plastic. Extra features were added: a rod holding the papers, plates where the drawings

can be made, and attachments for the magnetized buttons. An "augmented reality emulator," the opaque plastic plate, was also made.

The plastic buttons were carved and hand finished and the painting of the chassis was done with the extra touch of a retro IBM/Commodore 64 colour scheme.

Finally, the MP3 players that we bought were dismantled, the wiring was soldered, the amplifier was made and installed, and the magnets were cut and glued under the buttons. The final assembly was done.

Voilà! A state of the art prototype was done in less than six days of work.

There are fewer foreign students at my university than at Aalto University, so PDP gave me the environment to engage in creating new types of products with international people. I began expecting to learn teamwork, organizational skills, and specific programming skills that are needed to create an Android application. During PDP, I learned more about the steps of product development and the brain storming, bench marking, designing, and technological skills involved.

--Otaki Yoshifumi, Concept Master



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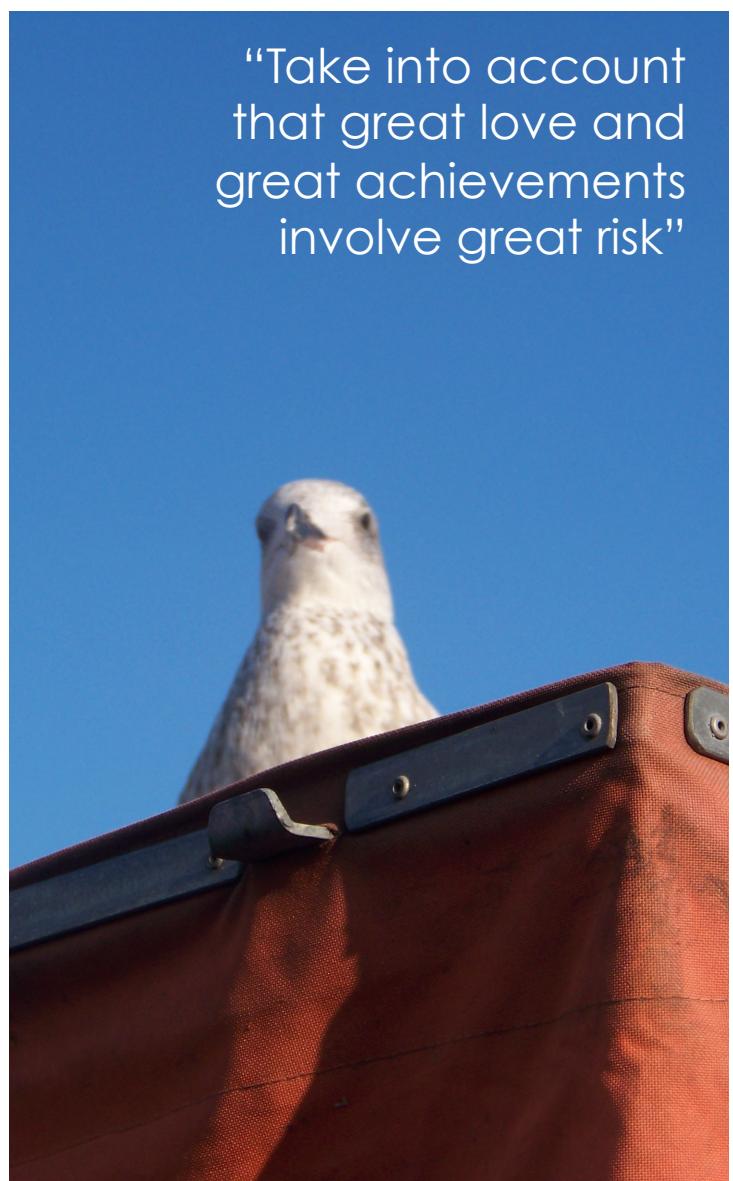
# Challenges

For a team with 10 members from different background of studies along with 3 remote members, it's obvious that there were many challenges. But we were able to overcome them.

As a team we lacked Android skills whose SDK was new to many, the members left the course in between which needed more things to be sorted out, there were difference in ideas between team members. For the remote members the problems were to communicate, information exchange, and the effective formation of relationships to foster teamwork. ABBdroid tackled these problems in many ways including video conferencing and consistent meetings with shared memos. Finally, the biggest challenge was to make the group work efficiently. Many times it felt like we were disorganized and didn't have a clear goal. Luckily we managed to make things work in the end.



“Take into account that great love and great achievements involve great risk”



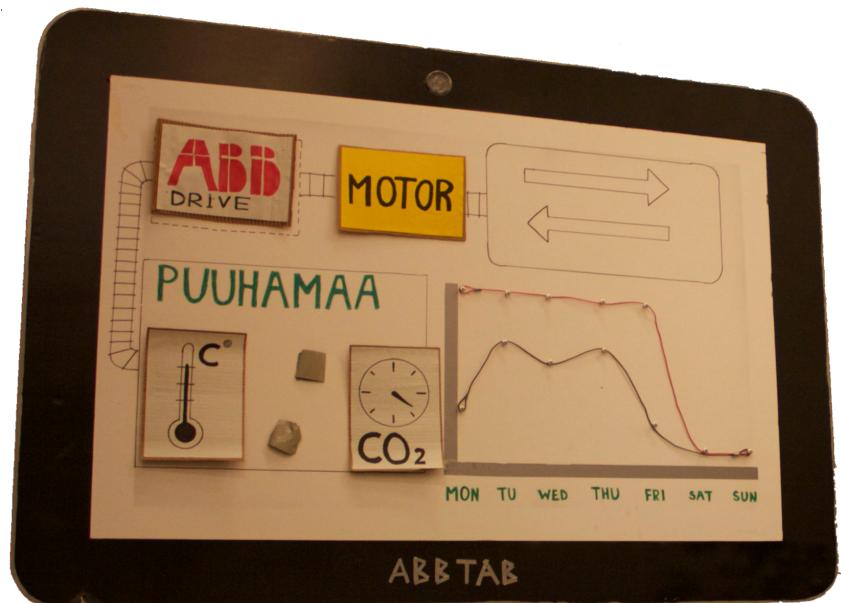
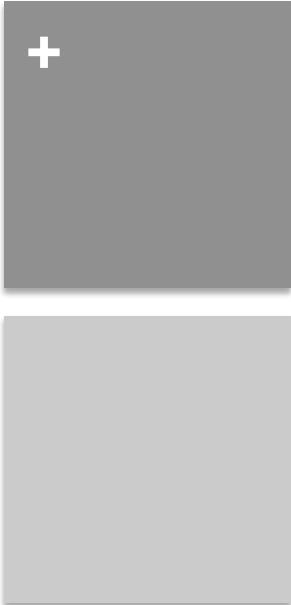
# Promotional materials

The phrase, “**a picture is worth a thousand words**” rings true for any design oriented project. Since we are working on a project related to marketing and sales we think that promotional materials are very important. Promotional materials are integral part of the total communication of any organization. With this material we wanted to explore the possibilities of marketing in general. We were fortunate to have great designers and thinkers in our team to produce and distribute very attractive printed and PDF flyers. The biggest task was to build the Stand and A0 poster, as it would depict the 8 months of work done by the 10 fabulous ABBDroid team members.



My experience with PDP has been truly unforgettable. Not only did PDP give me the chance to travel from New York City to Finland, but it gave me the unique experience of working on a project with a team overseas. I was expecting the communication to be relatively impersonal, but I was pleasantly surprised with the amount of team engagement and felt involved despite my distance. I am happy with the role I played, since I got a chance to practice my image editing and technical writing skills for different parts of the project. Being a part of such a talented team has been a rewarding opportunity. PDP is a great exercise in teamwork, organization skills, and communication. Anyone preparing to be a part of it should be ready to work towards pushing the limits on their personal abilities in order to come up with some great ideas!

-- Nina Freeman, Storyboard



## Important milestones

We started the project with idea of "**Path Known and Destination Unknown.**"

Our journey to the Final gala consisted of four principles which were used to ensure our progress, which began with the PD6 session in which we developed a prototype in 6 hours. This experience gave us the chance to grow as a team and to give us good insight about the project goals. The principles we chose to guide our project were: understanding, focus, develop and execute. Christmas Gala was the mid-point of the project where we presented our five processes: learning, quick and dirty, observation and analogies, understanding the user, and software development.

## Other experiences & training

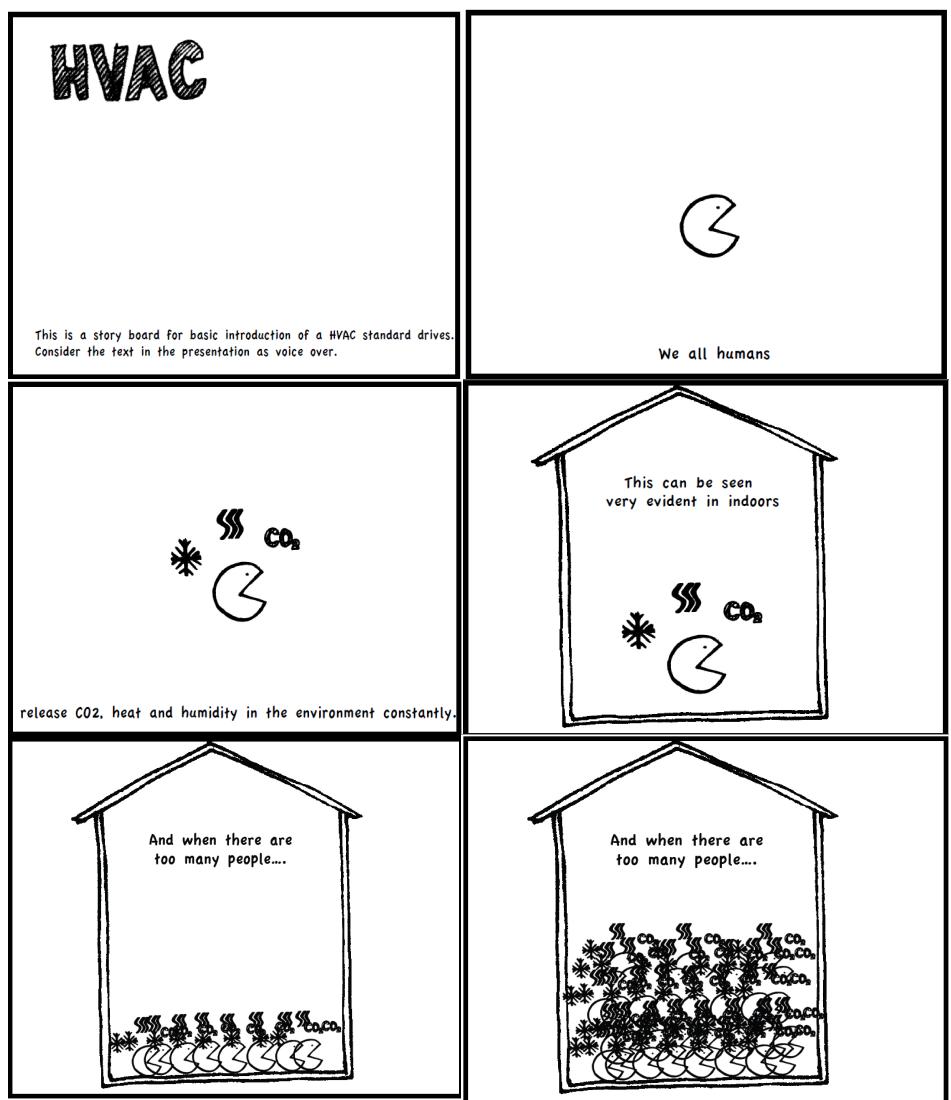
The benefit of doing a project during your studies is that it prepares and trains you for real world work in many ways.

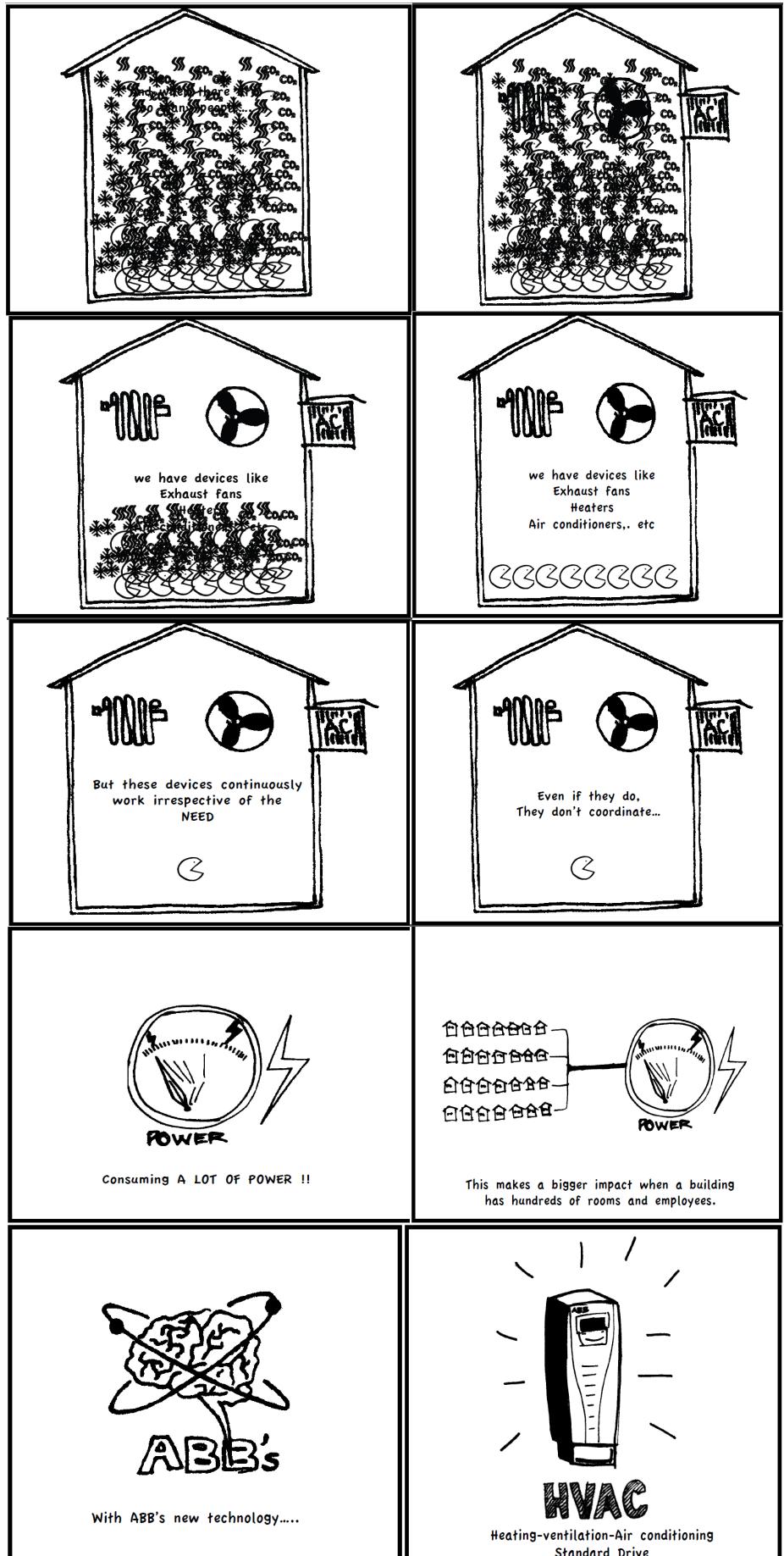
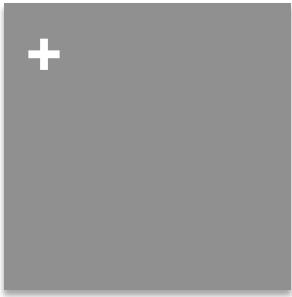
The Presentation training we had by Elina Aalto was a great experience in which we learned about improvisational presentation and our remote member arrangements gave us a chance to exercise our organization and planning skills. It is always necessary to get to know the team with whom you are working for 8 months, so Design Factory Researcher Satu arranged a session on how to best coordinate with your team.



# Cartoon concept

Design lies in understanding problems and depicting the ideas in their simplest form. Every cartoon or sketch we made helped us understand the problem better.

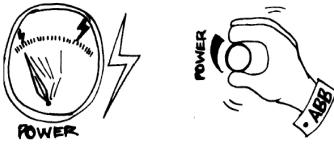




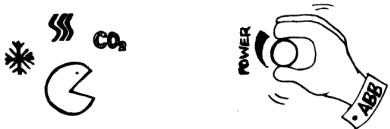
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These drives not only has controls,  
But ABB's technology to use the power to optimum



These standard drives save energy upto 300% every year  
(figure 300% needs citation)



It not only saves power  
but also make the indoors much comfortable.

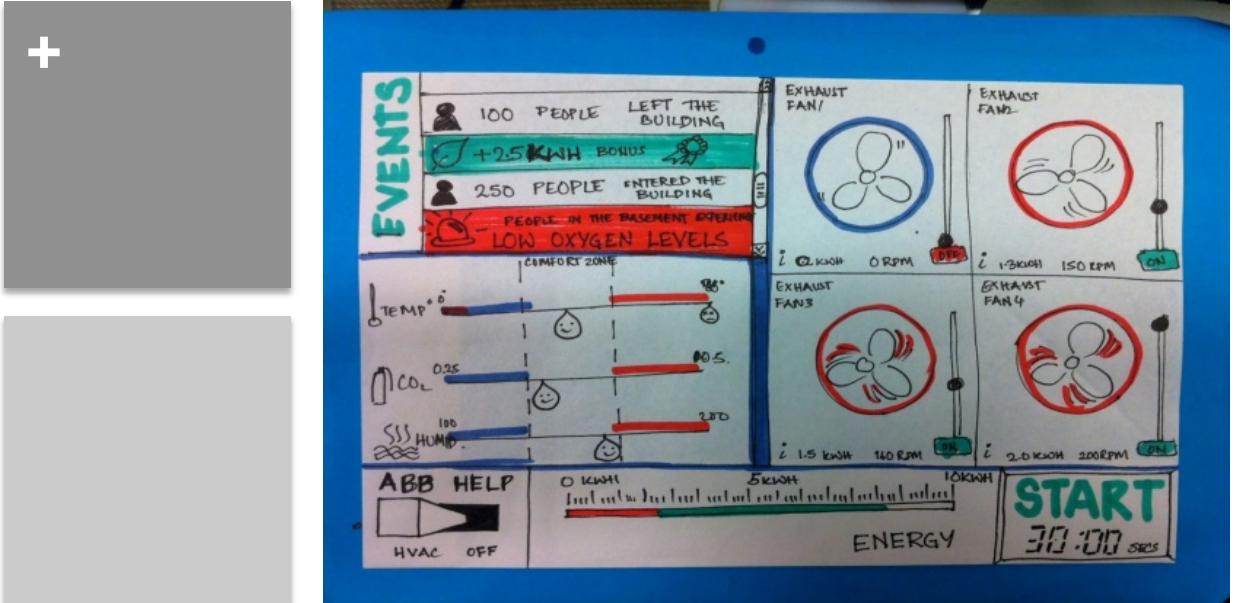


This comic narrative was targeted to convey what an HVAC does, and how it can help the customer and the environment, and also elevating ABB's emotional character.

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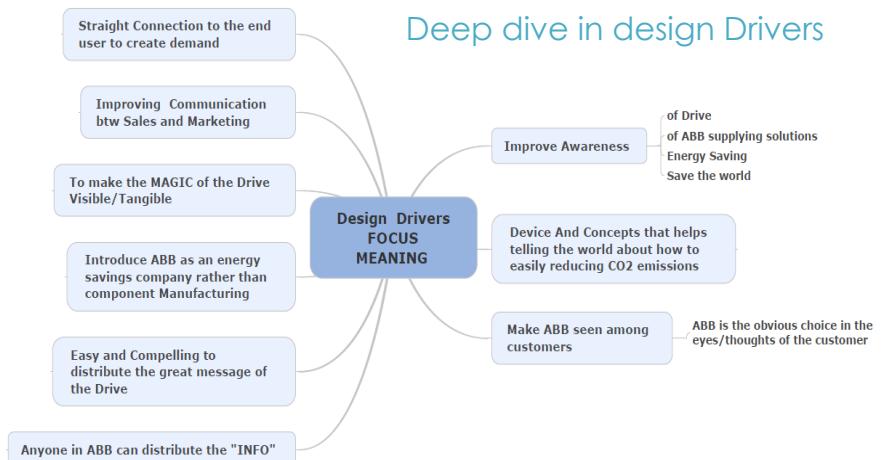
Despite challenges, working apart from the group became an advantage, since I could always offer a fresh point of view unique to my vantage point. This kind of input is so essential to moving forward as a team that it helps us approach problems from multiple perspectives in order to produce the most versatile result.

--Vivek Anand, Design Manager



## Game simulation concept

This idea came from the known fact that people prefer games and demos to written instructions.



This was an important approach to the research we did on ABB's sales and marketing process. We mapped all the possible ways of increasing the value of the ACH 550 drive. Our research included new technologies such as NFC,

RFID, QR code, Glyph Marking (Augmented Reality), 3G networks (Mobile Sim). We observed how these technologies distribute information that makes the "magic" of the drive a visible key element in a solution rather than just a component.



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## ABB Visits

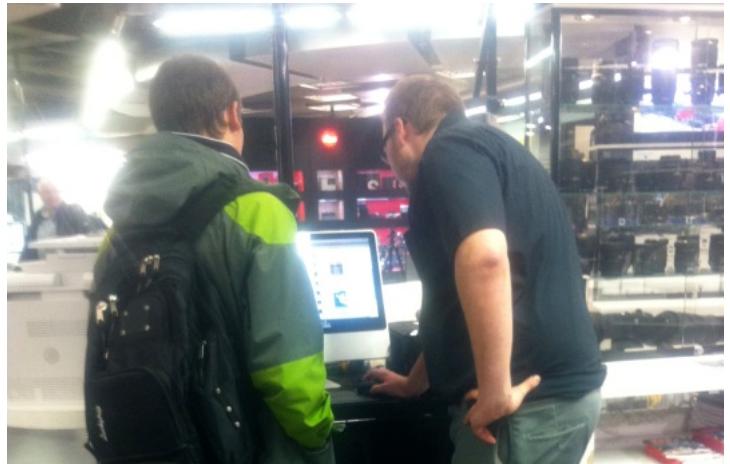
We were lucky to work for a company sponsor that took on an active role as guide. Many thanks to Robert Glass. We had three visits to ABB headquarters in Helsinki where we were taught about the drives and HVAC. On one of these occasions we got a big AHA moment: we understood the core benefits of the ABB Frequency Converter Drives. We were also able to easily collect valuable comments and materials from different employers in the organization.

## Methodologies

We began our project by planning to combine two different design approaches: design inspired by user understanding and design inspired by testing, mock-ups, and rapid prototyping. Our wish was to support the design process with quick ideation and testing, while also conducting field studies by meeting the users and listening to their needs. Our study of users was done with the design probe method and user interviews. We then started to design, with great help from the model master in Design Factory, our protoslate tool. Starting in February, we began to follow a SCRUM type of process, with an emphasis on UI design and coding.

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# Human Factors a.k.a “HF”



The human factors “HF” approach is aimed at putting people first instead of putting technology or devices first. We wanted to understand the user and the real life of sales people: what are the challenges in their work, how do they see selling, what are their wishes and hopes concerning the devices they use during a sales situation.

We collaborated with students from Lauttasaari high school in the first part of autumn in order to get fresh insight on how to start the design process, and to gather as many ideas as possible. Since our target device was a tablet, it was useful to collaborate with young students that live in the “tablet world.”

**Empathic Research** Focus groups  
Design Research **Ergonomics** Unfocus  
Human Factors engineering groups  
**User-centered design research** Commercial  
Usability testing Ethnography  
Qualitative market research



## ELEGANTLY INTERACTIVE **SALES** INFORMATION

We used observation methods to gather sales insight from different places in Helsinki's City Center with the students. The focus of the observation was to find out how people interact in sales situations; what inhibits and prohibits interaction in their natural environment. We also played the part of a customer to really grasp the sales process and took photos of interesting ways to visualize data that would inspire our design.

After that, we organized a PD6-day for the students in which they designed a sales tool for selling skate boards. We wanted to explore an analogous concept for ABB Drives, where modification of the end product plays a vital role in the sales process. The students came up with three different sales tool concepts which we utilized

to increase our understanding of the user. Design probes based on self-documentation were also used as a user research method; they contain different tasks that the user is instructed to do during the day. After filling the probes we interviewed ABB sales people to get more profound understanding of their needs in order to guide us in our design process.

One of the main findings was that ABB is considered to be a component manufacturer, as opposed to a system provider or solution provider. Our ABB representative Robert confirmed that we were on the right track, and we have continued to build our product using these discoveries.

# Software & tools we used

Tools for project management are important to the success of any project. Our team was quite new to many project management tools and attempted to make use of a powerful management tool called Trello. However, we did not use it consistently and decided to use e-mail as the primary tool for communication. For the meeting memos we used Mindjet Mind manager, but later switched to Microsoft Onenote, which was much more effective, simple, and streamlined. Eclipse was the base platform for our Android Application development. Instructions should be followed carefully before installing the Android SDK in eclipse in order to avoid mistakes. Adobe tools are great for design; we used Flash, Photoshop and Illustrator as per the requirements. Lastly, the backbone tool of our project was Dropbox.



I learned that the whole team can be efficiently utilized when there is a clear target and subtasks for everyone. Making a clear target should be a high priority in the early weeks of the project. I also want to add a special thanks to our ABB sponsor Robert Glass for being actively involved and supporting the course work!

--Ida Lehmuskoski, Vice Manager

# Having Fun

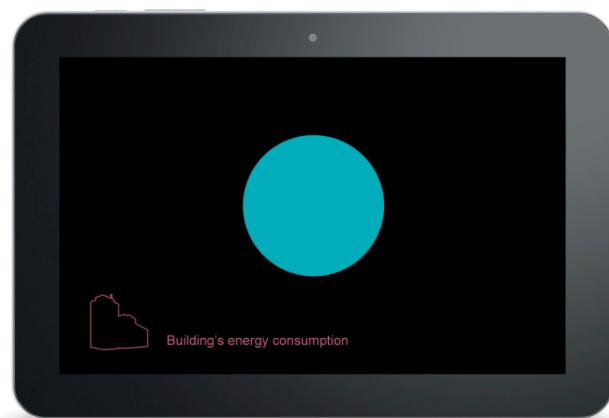


A very important part of team building is to have fun and relaxing experiences together, and also with your sponsor. Building friendships and good will between everyone involved in a project is the key to success. Our team spent an evening out with ABB in the Basecamp (a Nepalese restaurant) and also went to a sauna together.

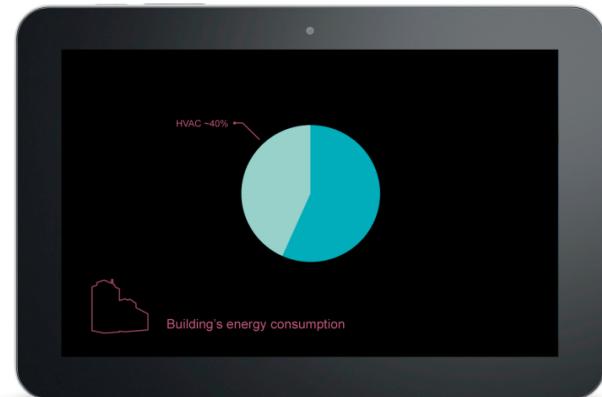
# Final Concept



# + The energy savings animation



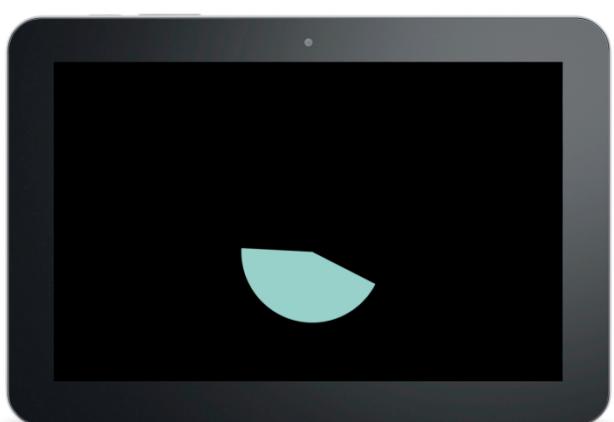
1. A bytechart indicating the building energy consumption



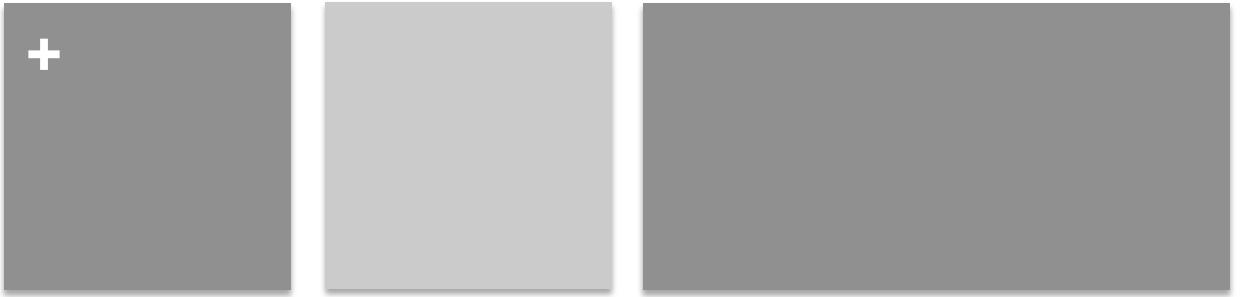
2. By tapping the screen HVAC energy consumption appears



3. HVAC section slides of the screen...



4. ...and lands on a surface



The next part was to visualize the energy saving, where it comes from. First it shows the surprisingly high proportion of energy usage in buildings because of the electrical motors that run the Heating, Ventilation and Air conditioning (HVAC).

Next screen shows the weekly energy usage BEFORE the ABB Frequency Converter Drive, also called as the Drive. Usually the weekly energy usage is quite constant, possibly dropping in the weekends.

Then the activation of the Drive is shown in a differential. That converts into a graphic that shows the proportion of the full energy saving, when using the Drive that optimizes the energy usage of the electrical motors. Basically Using the Drive can more than halve the energy consumption. That we showed graphically comparing the initial energy usage to the usage after the ABB Drive is functioning.

Energy saving in numbers only is very abstract to the customer, so visual representation helps to understand how much the saving can be.



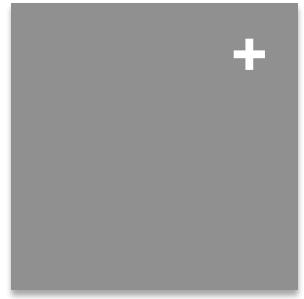
5. Section morphs into weekly HVAC energy use and a graph appears around it. Graph runs steadily.



6. By activating the ACH 550, a new graph appers. Old one fades to the background.



7. Finally, everything fades away except the overlapping area.

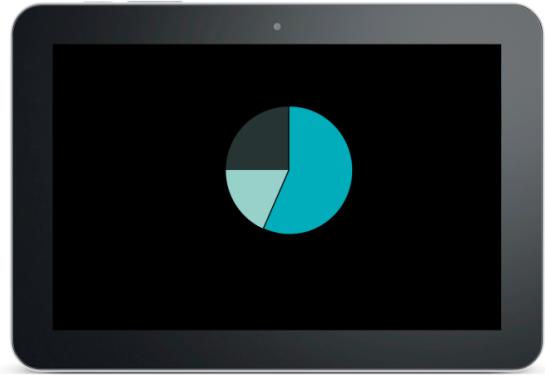


The course was much less structured than I expected, which turned out to be a positive factor in our growth as a team. It was easy for team members to express themselves more individually, and to do what we thought was right as a team. The different methods and approaches enriched me as a person more than any other course. I thought this would be another boring course with deadlines after deadlines, and was pleasantly surprised. Technically speaking,

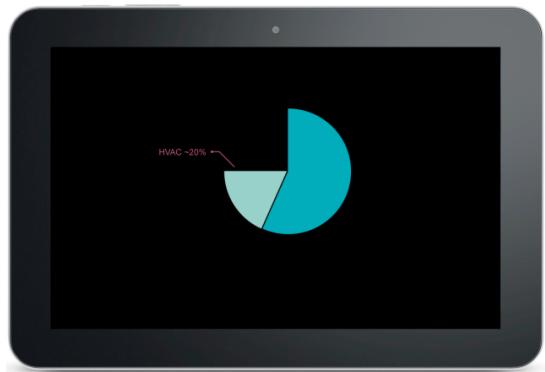
I learned Android, ActionScript 3, Flash, and Photoshop. AS3 and Flash were familiar to me, but in this course I had more difficult assignments than ever before. I learned about the power of stories from our project manager Jouni during our team meetings, which were productive. We did not always agree on things during meetings, and lost members due to lack of motivation or conflict, but always worked towards solutions regardless of these challenges.

Our sponsor's busy schedule was another challenge, since we were without much guidance until January. We had a great boost in morale once we began getting real results from our research in sales and marketing. After working on design, the animation became my responsibility, which took a lot of time and energy to work. I recommend deciding on a process method early, validating ideas early and always contact your sponsors early.

-- Sami Verkkopera,  
Scrum Master



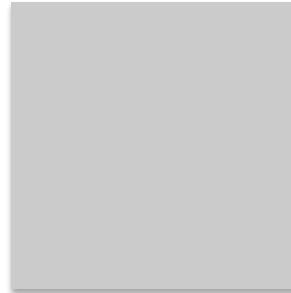
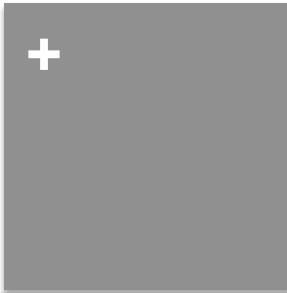
8. The area then morphs back to a section which is now smaller. The original circle appears behind it and energy savings are now visible.



9. Section is then removed from HVAC's consumption and the gap is bridged.



10. By bridging the gap, the whole circle shrinks and the previous circle can be seen as ghost image.



Elegantly interactive ACH550 information



ENERGY SAVINGS CALCULATOR



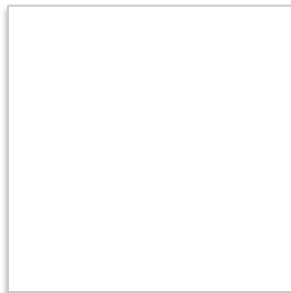
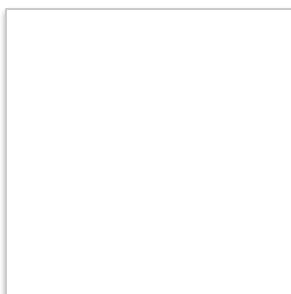
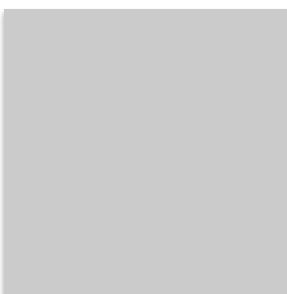
SAVINGS SIMULATION



FAN SIMULATION



REMOTE CONTROL UI DEMO



## The User Interface and User experience

We designed the UI to be very simple and straightforward. The focus is on key benefits that helps the marketing and sales at ABB and helps the customer understand the real benefits of the product. As one of our team members said "The benefits are so very obvious that it is utterly foolish not to buy ABB ACH550 Drive." The point is that these obvious benefits need to be

translated to the customer so, that it is easy for the customer to understand those benefits. And the benefits that ABB ACH550 Drive offers for the customer are solid and real. Converting our team's findings in a format that is interesting and easy to digest has been also a journey to understand the interface and interaction between the customer and the service provider.

# The Fan Simulator

*What is the magic behind the ABB ACH 550 Drive?*

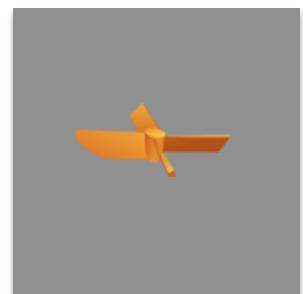
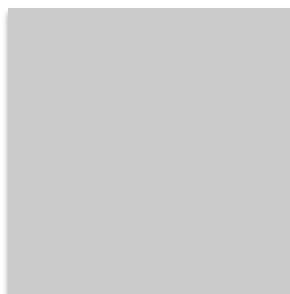
Two main components are at work: The physical laws of Alternating Current usage and the Affinity laws.



Both are very abstract in nature, we concentrated on the affinity law. Affinity law states that substantially less energy is required, when less rotation per minute are used running the fans. Since this is very hard to describe only using words, we wanted to show this graphically.

The Fan simulator is intended to emulate a typical smallish rooftop installation of a motor column cooling the air inside the buildings. Using ABB Drive optimizes the airflow in the air pipes inside the building by direct control of the motors. Usually Alternating Current motors are controlled using only ON/OFF settings for each motors. Sometimes even dampers are used blocking the airflow that the motors push on constant 100% speed.

ABB Drive optimizes the airflow so, that the energy consumption drops to the third root. That means that halving the rotations per minute of a motor more than halves the usage of energy.

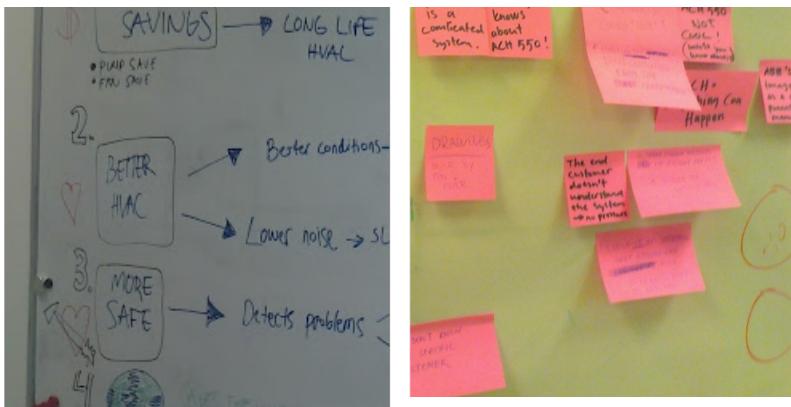


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## Why focus on key benefits?

When selling a product or a service quite a common notion is that sales focus on describing the features of the system. Customer just does not buy features. Customer needs information easily digestible in a form showing the benefits in exactly the situation of him/hers. The old adage is so very true: Features tell, benefits sell. Customer can easily be distracted when a great

amount of the technical features are used when describing any complex product. ABB ACH550 Drive does magnificent job: It saves a lot of energy for the customer. Starting from the day one of any installation. The payback time for the installation is easily merely few months. Such savings convert directly into monetary savings for the customer.



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## ACH550 User Interface Emulator

We wanted to add a final touch for the customer to experience. Since we had the possibility to add a complete component emulating the new User Interface of the ABB ACH550 Drive, we wanted to add that to our product. That is to give the salesperson a possibility to show the ease of use of the Drive, to show the key functionalities to the customer without the need of carrying the heavy full size package containing the actual Drive.



# Key findings

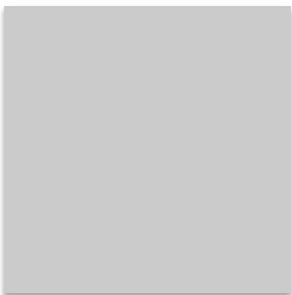
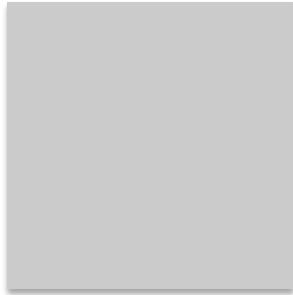
Exploration of new ideas played a huge role in ABBdroid. We had to learn a lot in order to produce the best product possible. One of our first discoveries was that we needed to focus on human factors and on the sales process itself; what the essential qualities of sales are from the perspective of salespeople and consumers alike. We researched the sales process called AIDA, which stands for: Attention, Interest, Desire, and Action. The modern addition to this model is CAS, which stands for: Cognition, Affect, and Satisfaction. This investigation proved to us that the product itself is not as important as the results the product provides. We needed to focus on producing value for the customer. This is how we directed our effort in product benefits.

Even more important to our project, was the needs of ABB. By conducting interviews at ABB, we found out that they can benefit from closer co-operation of sales and marketing. This fact helped us determine that providing better information flow between sales, marketing, the customer and product development is key; a potential solution for this problem is by using social media, or platforms like ABBdroid. Efficient communication is important to any companies' success. Communicating visually was the most effective way we used in presenting our ideas, since in sales situations visual representation helps a person understand abstract and technical concepts faster. In the case of ABBdroid, it was important to apply this concept to the technically advanced ACH550 Drive; understanding how the drive works convinces the customer about the benefits and establishes a positive bond between the customer and salespeople. Therefore it's crucial to make the "magic" and future benefits of the drive visible. Human factors, creating value,

co-creation between disciplines, efficient communication, and visual representation are all concepts that ABBdroid explored and utilized throughout the process of our product development project.

## The drivers of the design of our product:

- Salesperson's most important presentation tools were power point slides, product manual and the 30kg weighing demo-case.
- Salespeople don't often share their experiences about sales situations.
- One wish from the interviews: Find a way to replace PPT-slides
- In sales situations visual representation of the benefit understanding abstract and technical concepts easier
- ACH550 Drive must be presented focusing on the benefits: money savings, better HVAC etc. Technical details only impress engineers.
- The customer must be confronted with two scenarios: the current situation (unintelligent and costly HVAC without the Drive) and the alternative future situation (intelligent, money-in-the-bank HVAC with the Drive).



## Conclusion

- Always have an objective for the meetings: Decision, innovating, planning, producing.
- Divide the group very early in groups of 2-3 persons. The most effective teams are no less than 2, no more than three persons.
- Have clear deadlines for decision making also. Have clear emphasis what needs to be decided.
- Early on more emphasis on choosing the methods, then work with those choices.
- Email is not efficient in project management. Choose a collaborative software and make sure everybody uses the tool. Train team members for using it, if needed.
- Have constantly all the assumptions and the facts listed. Update the lists.
- Build to bring small successes in every meeting. The tasks should be divided in a way that they create a positive circle of small successes.
- Be brave with Quick & Dirty prototyping. Early failures are mandatory part of the process. Start small.
- If some key data is missing, start prototyping. Prototype as early as you dare!
- Be open with "Do, Then Think" method. Lower the "need for perfection" in prototyping. Prototypes are allowed to be really rough in the beginning.
- Give responsibility and ownership of the tasks. Make sure every task has an "owner".

# Executive summary

Teamwork and real world experiences are both essential parts of every student's education. PDP (Product Development Project) is a team based project in which a product is developed for a company sponsor based on their needs and requests. This project is an immersive way to help students exercise their skills in a way not offered by the standard classroom.

The workspace is the Design Factory at Aalto University in Helsinki, a learning environment geared towards teaching, research and industry co-operation related to product development and design. Diversity and professional relationships to great companies are what make Aalto University, the home of PDP, so great. Our PDP team, ABBdroid, is sponsored by ABB, a multinational company which provides access to technology that helps the world minimize energy consumption and CO<sub>2</sub> emissions.

During the initial stages of the project, our international teammates from India and the United States visited in order to meet the team in Finland and to visit ABB headquarters in Helsinki. These early meetings helped to shape relationships within the team and also with ABB, making the project a more enriching experience. After many meetings both in person and over the internet, our project ABBdroid, took form. We chose to build an Android based software for better user experience within sales and the sales process in coordination with ABB's needs. Marketing is at the core of ABBdroid by understanding how the customers make decisions. This solution is in response to the problem statement provided by ABB: "Android devices are every-where. So are our sales people. Your task is to figure out how we can bring them together." Our goal manifests in a marketing tool that boosts ABB sales. We are working as a team to build bridges of understanding between ABB and their customers by creating elegantly interactive sales information.

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# ABBdroid



pdp

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[www.abbdroid.tk](http://www.abbdroid.tk)