

Designing a Bluetooth Speaker

A Collaboration with Orlo AB

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Designing A Bluetooth Speaker

A Collaboration With Orlo AB

Degree Project for Master of Fine Arts in Industrial Design
Lund University, School of Industrial Design
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Abstract

This report details the collaborative project between the Author, Zenit Design AB which is performed on behalf of the bluetooth speaker manufacturer, Orlo AB. The Project is divided in two parts, where the first aims to identify a new market where Orlo's technical expertise will benefit the user in a unique way and the secondary part is about designing a speaker for the said market.

Several potential markets are identified through analysis and among all candidates, Hotel Rooms are chosen as the definite field of work. Hotels in Lund and Malmö are visited to learn more about the needs of hotels and their guests. The findings from these visits are used as foundation in a brainstorming session that results in wide range of potential concepts. These concepts are visualized and evaluated through sketches and quick mock-ups.

Ultimately, it's decided to proceed with a wall mounted speaker concept. The Design phase is set up by Orlo providing the necessary technical specifications requirements and combining these with thoughts on how to protect the speaker from being stolen and preventing

mis-usage and disturbance amongst the guests. Competitor speakers are then studied from an aesthetic point of view, with the intention to learn what has already been done and not. Finally, several inspiration boards are used to frame the different visual aspects of the project, such as how to work with forms, materials and color e.g.

The Actual design phase is initiated by experimenting with different forms with the set volume of one liter. One of these shapes are chosen for further work and developed through several stages to the final design. Parallel to the overall design process, smaller topics such as in-depth thoughts on wood and coating processes, working with meshes, branding the product and incorporating visual feedback through lighting are discussed too. Lastly, the concept is finalized through the development of the inner components such as the orifice and manifolds ■

Summary

This Report details a R&D-project which investigates markets that might hold innovative design opportunities for the bluetooth speaker manufacturer Orlo AB. The Project selects hotel rooms as its field of work and designs a speaker for the said market, where it aims to investigate following questions:

1. How might the hotel experience be improved through the implementation of speakers?
2. What requirements does the speaker need to meet in order to be sold to hotels?
3. How should the speaker be designed in order to work within various hotel interior styles?

The Project utilizes qualitative research, which means semi-structured interviews, the usage of mind maps, function analysis, matrices, field studies and open-question surveys. The Result of these methods declares that speakers can be used for entertainment purposes, but also as a form of communication between the hotel

and its guests. Incorporating speakers in hotels rooms require the speaker manufacturer to guarantee that the performance of the speakers can be limited to not cause disturbance amongst the guests. Neither can the speaker be allowed to be stolen.

The Report concludes that the design of the speaker should utilize natural materials and be colored in base colors in order to work within various interior styles. It should also be independent towards other furnitures within the room. In coherence with this, the report presents a freely placed speaker with details made out of wood, fabric and plastic as its end-result. The Design incorporates iconic elements ascribed to speakers, like active bass reflex ports, meshes and the round speaker drivers and uses these components to communicate the functionality of the product.

The Report has some limits in its consumer-research and therefore recommends that the functionality of the speaker as a channel of communication is prototyped and undergoes evaluation by different test groups ■

Background

During my fourth year of study at Lund University, I realized which direction I wanted my professional career to take. I felt attracted by the idea of working as a consultant on a design agency, as I believe that route will provide me with a steady stream of challenges and allow me to meet and help people from a wide range of industries and business. I wanted my last project to take aim for this direction and collaborate with a technical company. Through supervisor Charlotte Sjödel I got in contact with Jonas Svennberg (CEO) and Carl Forslund, Senior Designer and one of the founders of Zenit Design in Malmö. Carl told me that Zenit are shareholders in a local bluetooth speaker company called Orlo and that there might be a possibility to do a project together with them. Since I had yet to work within the field of speakers I was thrilled about this opportunity given to me. Together, we sat up a first meeting where Carl and I discussed the requirements and interests of all partners (Zenit, Orlo, Lund University and Me) involved. As we found common ground we decided on a secondary meeting where the

CEO of Orlo, Fredrik Bågenholm also would partake. Together the three of us started to frame the project that would investigate market Orlo should focus on in order to grow as a company. This report is about the process and what it the project resulted in ■

Honorary Mentions

This project has been a fantastic experience on both a professional and personal level and I'm really thankful to everybody that in one way or another contributed to it. I would like to dedicate this work to my family: Birgitta Englund, Sander Samuelsson and Linn Samuelsson and my friends for their continuous support. Finally, I would like to bring additional attention to those whose participation played a decisive role in the execution of the project.

A special thank you goes to Carl Forslund and all the people at Zenit Design for their involvement and interest in this project. I also want to thank Fredrik Bågenholm and Markus Friberg at Orlo AB for the opportunity and their support throughout the project.

Furthermore I wish to thank Charlotte Sjödel for her invaluable work as the leading supervisor, as she brought clarity to the process through her professionalism and decisiveness. Her guidance helped take the project beyond my own expectations and I'm forever grateful for that.

I also want to highlight the excellent performance of Gabriel von Gertten and Isak Bergwall as they helped creating the final renderings of the speaker. Last but not least, I wish to commend the Instructors of the Workshops at LTH, namely Jan-Åke Larsson, Jonny Nyman and Peder Karlsson for their involvement in the building process of the visual model ■

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Disposition

Within the practice of Industrial Design there exists a lot of tools and methods to analyze data, draw conclusions and evaluate concepts and ideas. Depending on the purpose of the project some tools are more useful than others. This means that the design process always will be carried out in different ways, depending on the personality of the designer and the nature and objectives of the project itself.

While other disciplines of academic studies may have a more linear work flow, Industrial Designers are heavily dependent on feedback from clients, user-groups or colleagues in order to make improvements on their original concept in order to deliver a credible end-result. In reality this means that

a designer often may take a step back and redo- or perform adjustments on the original design until the desired result is achieved. However, this would be a very inconvenient way of communicating the work, which is why the report has been arranged in a more linear way, divided into six different categories, to simplify reading and understanding the project as a whole ■



01

Introduction

- Meeting Partners
- Framing Project
- Creating Timeplan
- Launching Project



02

Research

- Testing Speakers
- Conducting Interview
- Analyzing Field of Audio
- Screening Markets
- Selecting a Field of Work
- Redefining Brief



03

Specific Research

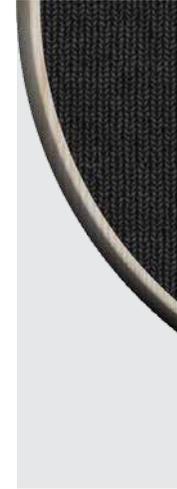
- Field Studies
- Target Groups
- Directed Surveys



04

Synthesis

- Brainstorm & Ideation
- Building Mock-Ups
- Defining Constraints
- Technical Solutions
- Directed Market Research
- Inspiration Boards



05

Realization

- 3D-model & Renderings
- Materials & Coating
- Visual Prototype (1:1)
- Presentation



06

Presentation

- Written Report
- Oral Seminar

Introduction

The Probability of creating a successful project can be increased by defining a clear brief with concrete goals and demarcations that allows for the results to be evaluated in an easy way. With that in mind, this chapter begins by presenting Zenit Design and Orlo with the aim to describe their interests for this project. This is important since their involvement heavily influenced the project layout and ultimately how time best should be spent between the different steps of the design process – Simply put: what tasks should be given a high and low priority? ■

01



Client

Fig. 2 Logo



Fig. 1 Fredrik Bågenholm.



Orlo AB

Bluetooth Speaker-Manufacture
Founded 2009
5 Employees
CEO : Fredrik Bågenholm
Website : www.orlo.se

Orlo is a small Malmö-based bluetooth speaker company. It was founded in 2009 after the founders had gotten tired of seeing the speaker market being flooded with under-performing speakers with inferior sound quality. Orlo currently employs five persons and have an ownership structure that consists of 10 different shareholders, where Fredrik Bågenholm (CEO), Markus Friberg and the Zenit Design Group holds the largest positions.

Orlo's specialty is to optimize sound quality to a specific shape that's low in volume and/or has a flat design. This is made possible through their combined years of working experiences when it comes to product development and computer programming.

Their first product ever made was the portable laptop speaker Cup-11. However, Orlo's limited financial resources combined with the challenges of establishing a company on a saturated market, like private consumers led Orlo to begin producing speakers under license to more established brands instead.

Company Strengths

- Achieving High Sound Quality from small Acoustic Volumes
- DPS : Adapting Sound to the Anatomy of the Human Ear
- An Optimized Construction of The Bass Reflex Port
- Class-D Receiver With Optimized Output
- Customized Speaker Drivers
- Power Management When it Comes to Surges
- Competence: A Team With Many Years of Experience From the Fields of Design, Manufacturing, Economics and Electronics Mechanics.

This would allow them to minimize risk while making a profit that later could be re-invested in their own business. Their first collaboration was made with the urban streetwear company WeSC. Unfortunately, the project never made it to production due to financial problems within WeSC. Luckily Orlo bounced back and developed the Orlo CAB speaker that would be mounted in cabinets for the bathroom interior manufacturer Aspen. The success of this project sparked a new interest within Orlo about the potential in built-in sound and new markets where large batches of products could be sold to one single client. This would allow for reduced manufacturing costs and increased profit for Orlo ■



Fig. 3 CUP-11, The First speaker created.

Fig. 4 (Left-Below) Orlo CAP, A Collaboration with WeSC that never reached production.

Fig. 5 (Below) Orlo CAB, A Built-in speaker for the bathroom interior company Aspen.



Partner

Fig. 6 Zenit Design, Industrigatan 4 Malmö.



Zenit Design AB

Swedish Design House

Founded 1994

36 Employees

CEO : Jonas Svennberg

Website : www.zenitdesign.se

Fig. 7 Logo

zenit design
vision into value

Zenit is multidisciplinary design firm located in central Malmö, which was founded 1997 by four friends from the Industrial Design program of Umeå University. In 2010 they expanded their business and opened a branch office in Gothenburg. Zenit have a long history of working with big industries like Sandvik, Sony Ericsson, Axis etc and offer services within the fields of product design, graphic design, mechanical engineering and animation.

Zenit are one of the major shareholders in Orlo AB and are therefore keen on the company becoming a profitable business. However, since Zenit are at full capacity with their own business, finding time for Orlo is difficult. This arrangement is therefore a win-win situation where Orlo and Zenit outsource a real-life project to a Master Student. To Support the student, Zenit offers the author to work from their HQ in Malmö and provide supervision through Carl Forslund to ensure that the project stays on the right track and achieve a satisfying academic height ■



Fig. 8 Carl Forslund - One of the Four Founders of Zenit Design and The Secondary Supervisor of this Project.



Fig. 9 Zenit designed the wireless airbuds sold by Earin.

Fig. 10 The Primare CD32, one of two premium hi-fi products Zenit designed for Primare. Both were awarded with the Red Dot Design Award.

Timeline

Fig. 11 50% Milestone Presentation at IKDC



The Project is consists of two parts, whereas the first aims to identify a market with new design opportunities and the second part aims to transform the insights of this market into a new type of speaker.

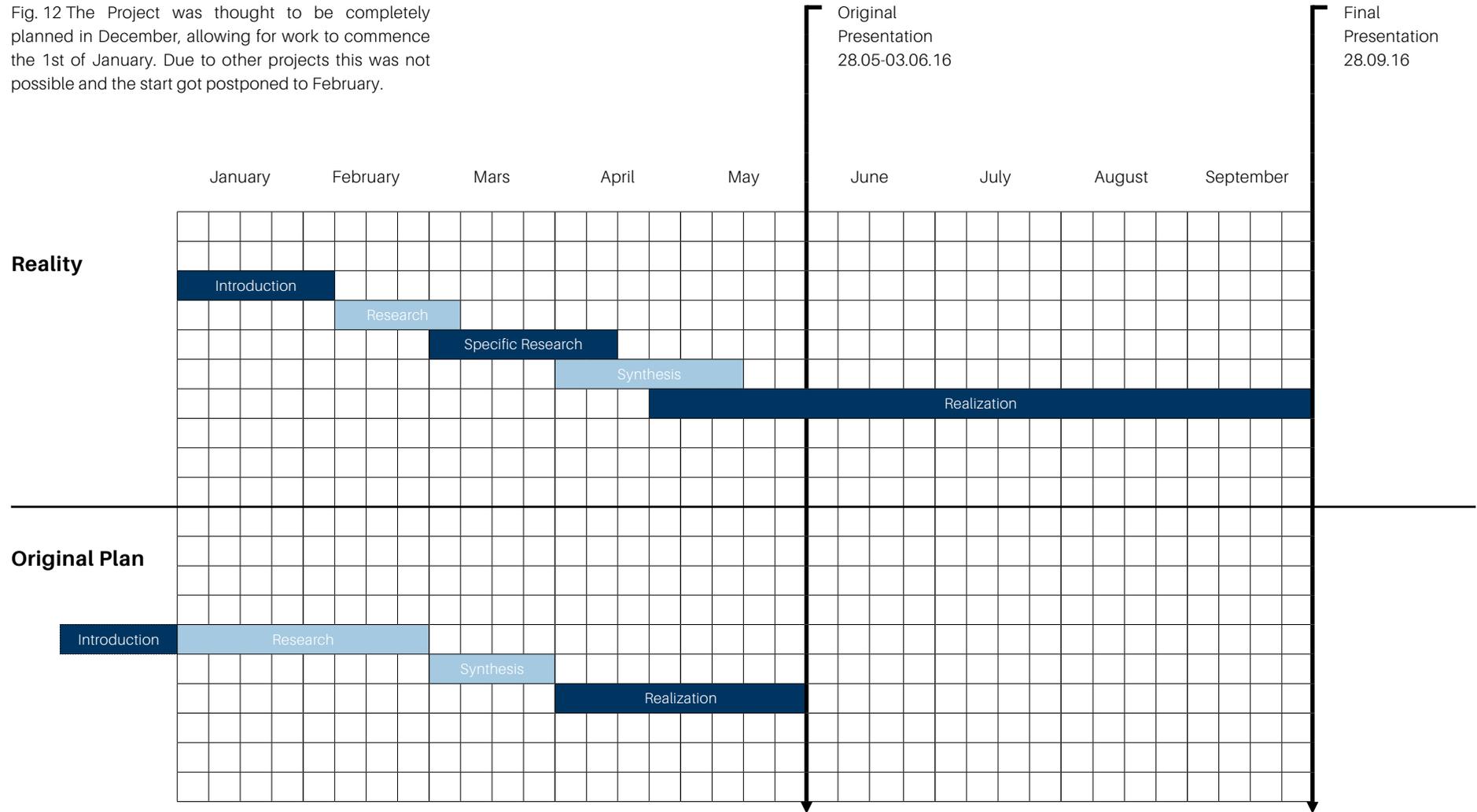
Delivering both grounded research and a credible design solution demands a strategic plan and this is where the timeline comes in handy. The Timeline is a valuable tool to communicate the work process both internally and externally. There are multiple variations of this tool, but they all share the goal to visually explain how time will be divided in between different parts of the project. In this Project a model called Overlapping Waterfall are utilized. The Idea behind this model

is to ultimately finish one section before moving on to the next phase.

It was mutually agreed amongst all partners that this project should put emphasis on developing the design and building the prototype. Thanks to Zenit and Orlo providing the project with data sheets of components and required dimensions for key features, it was possible to reduce the time spent on researching and instead put it into executing the finished result.

However, things don't always go according to plan which causes the timeline to be revised and the presentation to be postponed from may to the end of September. The Reasons behind this are explained in the Discussion-chapter ■

Fig. 12 The Project was thought to be completely planned in December, allowing for work to commence the 1st of January. Due to other projects this was not possible and the start got postponed to February.



Project Description

During our first meeting, Orlo and Zenit asked the project to predict changes in music listening and design a product that would answer to those needs. The Main question was: “How will we consume and listen to music in 10, 20 and 30 years?”. Lund University however, was concerned about the topic was more of a marketing project than industrial design. The Brief was therefore reworked to the following ►

Purpose

Design a product or system adapted for contemporary and future needs allowing Orlo to gain market shares and grow as company.

Brief Research and determine the markets that allows for Orlo to sell large quantities of products and design a product or a system for a selected market ■

Method

The Project is based on Industrial Research (also known as R&D), where the purpose of the research is to support product development. It was chosen to work with qualitative research as it's great for generating soft data, meaning abstract matters like human behaviors and underlying patterns of problems; basically things that are difficult to explain in numbers.

The Research begins with a semi-structured interview with the sound engineer of Orlo, Markus Friberg. The Interview is recorded and summarized in written for the report. By using open questions, the respondent is

allowed to answer more freely and providing in-depth explanations of sound engineering and Orlo's product development process. The Research proceeds by visiting local hotels to learn about the hotel business and their interest in equipping their facilities with speakers. The Visits were documented by still photos and recorded video. Additional checklists (See the Appendix) are created to support the visits and help logging the different kinds and numbers of interior details. Complementary to this are the implementation of various design tools, such as mind maps, matrices, function analysis and markets research.

Fig. 13 The Introduction of Smartphones gave birth to several streaming services and changed the way we listen to music.



Objectives

The Project aims to identify a new market and/or new opportunities within an already existing market where Orlo's technical expertise could benefit the consumers in new ways. The Requirements for the chosen market is that it allows for Orlo to sell larger quantiles of products to one single buyer. This will result in a reduction of production costs and increased profits. The Knowledge required from researching this market and its consumers will form the basis when designing a new speaker that should be presented as the final result. The Design of the speaker should take both human behaviors and technical

constraints into consideration while simultaneously answering to contemporary trends in form and color. Furthermore it will be based off the same element used in earlier Orlo products.

The Result shall hold a 3D-model with renderings and a visual 1:1 prototype. The Prototype should be built off the intended materials or closely related alternatives. Furthermore, the design process should be communicated in a clear way from start to finish. Focus will lay on discussing how changes in form will affect the overall design and how the product is being perceived.

Demarcations

- The Project primarily focuses on the aesthetic aspect, i.e. the designing of the physical product. The Finished result shall support the technical requirements specified by Orlo. It does not promise to deliver any software coding that might be needed to make the speaker operational.
- The Responsibility of selecting and placing the electronic components will be left for Orlo, in case they decides to make the speaker production-ready.
- The Aspect of cost will not be a driving factor when making the important design decisions. However, it should be kept in the back of the mind in order to avoid unrealistic design proposals.
- The Research phase will focus on the national Swedish markets.

Research

The Research phase is about gathering information, analyzing it and use it as foundation for the end-result. The Phase begins by examining Orlo and acquiring knowledge about their business, product development process and audio in general. These findings are then compared to the requirements of potential markets in order to find the best suitable match. After meeting this goal, the research will move into the next phase, which will be about acquiring in depth knowledge about the chosen market ■

02



Fig. 14 . Orlo CAB



Reviewing Orlo CAB

The Project is initiated with the goal to increase the knowledge of sound and speakers. By alternating between different research methods, this process can be accelerated considerably. So far, the work has consisted of reading articles while simultaneously experimenting with mind maps. All with the mutual goal to improve the understanding of Orlo, their products, consumers and markets. The CAB-speakers are auditioned because understanding and distinguishing between good and bad sound quality can only be achieved through listening and comparing products in real life

Evaluation

The CAB-speaker is designed to be used in bathrooms and therefore the audition was set to take place in a 15 m² group room at the Zenit Design. The Speaker performs excellent in all genres of music, ranging from

Orlo CAB

Interface: Bluetooth V4.0, A2DP1.2
Ingress Protection: IP44
Power: 100-240VAC / 50-60Hz
Frequency: 70Hz - 20kHz
Sound Pressure: 89dBA @ 1m

classical music to rock and heavily bass-influenced hip hop-songs. The Sound is very clear and remains so when turning up the volume. In regards to the personal of Zenit the audition is terminated well before reaching the maximum volume output. The Specification states that the speaker delivers 89 decibels at a 1m distance and while listening a deeper understanding of exactly how loud 89dBA is arose. This speaker contains way more power than what's needed for this particular room.

Compared to Ebay-Speaker

Down the road a second audition is performed. This time the CAB-speaker is compared against a 50 SEK shower speaker bought from a Chinese Ebay-seller. The difference between it and the Orlo CAB (approximately worth 1200 SEK) is not even comparable. The Chinese speaker cost about 1/20 of the CAB-speaker and is substantially smaller in size. However, the sound is flat and

Chinese Shower Speaker

Interface: Bluetooth V3.0+EDR
Ingress Protection: IPx4.
Power: DC5V / 100-120mA
Battery: 3.7V 400mAh lithium
Size: ~ 85 x 85 x 45mm

distorted. The Speaker is not worth the 50 SEK at all, but serves is a good example on how sound quality has been traded off for a smaller size and lower price. By personally experiencing both extremes it has been clear that Orlo's products indeed delivers great sound quality ■



Fig. 15 . Chinese Shower Speaker

Fig. 16



Markus Friberg

Personal Career

Markus Friberg holds a degree as a Civil Engineer within the field of Computer Science where he is specialized on Consumer Electronics. After graduating from Lund University, Markus got employed by Sony Ericsson, where he spent several years working at the department of accessories. He currently works as consultant for Lundinova and is one of the major shareholders in Orlo AB.

The Early discussions with CEO Fredrik Bågenholm had proven useful for understanding Orlo as a company and client. The Purpose of interviewing Markus Friberg was to lay the next piece of the puzzle and learn about Orlo's product development process. Secondary Supervisor Carl Forslund joined in on the interview. Carl took-on the role as moderator and also interjected with follow-up questions directed towards Markus or elaborated on specific ideas and topics. This text is a summarization of the most vital parts that are considered relevant to the continuing progress of this project. The Interview can be read in its full length back in the appendix section.

Summary

The Interview led to a deeper understanding of speakers and sound in general. Perhaps, the most essential insight was that high sound quality is more about how you work with the components, rather than the components themselves. Shortly put – Exclusive components don't automatically lead to high sound quality. Through Orlo's connections with Chinese hardware suppliers, they are enabled to customize components upon ordering and then work with computer programming, like DSP (Digital Signal Processing) to bring out their maximum performances. Orlo's expertise lies in delivering full range-sound from small acoustic volumes, "Which is why our products would be

suitable for built-in constructions", as said by Carl Forslund. According to Markus are a vast majority of today's speakers (equal in size to Orlo CAB) are unable to play the frequencies (130-150Hz) which create the rich, deep bass sound. Orlo manage this by using active bass ports in their designs. This Method is advantageous in sound quality compared to passive elements, but requires a higher level of engineering. With some help from Markus, this project will also utilize active bass ports in the final design.

Wireless Audio Transmission

The Wireless audio transmission is made possible by different wireless protocols and there are a lot to choose from like: wLan, NFC, DLNA, Chromecast, Spotify Connect, Apple Airplay and Bluetooth. The Competition is fierce amongst these developers since there's a lot of money to be made for the one who becomes the the go-to-option. Currently, Bluetooth is in lead and Markus estimates it to stay that way for some time. Orlo's products all use Bluetooth as it's the cheapest, most accessible and widespread protocol available. Within the Bluetooth-family, there are several sub-protocols as well. This project will implement

one of those, namely the Bluetooth A2DP (Advanced Audio Distribution Profile), which allows for password protection and prevents the users from connecting to the wrong unit by mistake.

Potential Opportunities

A few years back Multiroom-speakers entered the market. These are separate, wireless speakers that together can form a scalable speaker system. The Next generation of Multiroom speakers will probably allow for multiple users to operate different units simultaneously and stream different content. Another feature could be that the speakers tracks your position and that the music follows you throughout your home. There is also an opportunity to speak through your smartphone and broadcast it directly through a PA-system. This feature could be very useful in both classrooms and lecture halls to improve hearing and thereby the learning rate. The Developers of the wireless protocols are currently working on making this feasible. Even though these features can't be implemented today, this project will explore them as potential scenarios in order to identify new possibilities and opportunities ■

Exploring Sound & Audio

A big challenge of the project is to go from having no previous knowledge about the speaker industry, to deliver a credible design proposal. Also, Lund University requires the student to demonstrate critical thinking in order to approve the work as a master thesis. Meaning that the project should stay objective. Perhaps Orlo shouldn't design speakers. Maybe there are better opportunities to be found elsewhere? This Segment therefore aims to determine what kind of products and markets Orlo really ought to focus on.

Using Mind Maps

There are different ways one can go about to close this gap in knowledge. After some consideration, it's decided to initiate the process by using mind maps as a starting tool. By placing the word Sound in the center of a sheet of paper and writing down the associative words that come to mind, one can discover interesting patterns that indicate opportunities to work



with. However, it turns out that Sound is a too broad term. It holds everything from abstract matters to physical products, making it too difficult to interpret the result and get any useful information out of it.

Trying a Different Approach

The Solution is to shift focus and instead focus on audio in a broader sense, like how it's being used and how the those phenomenas relates to each other. These ideas are illustrated

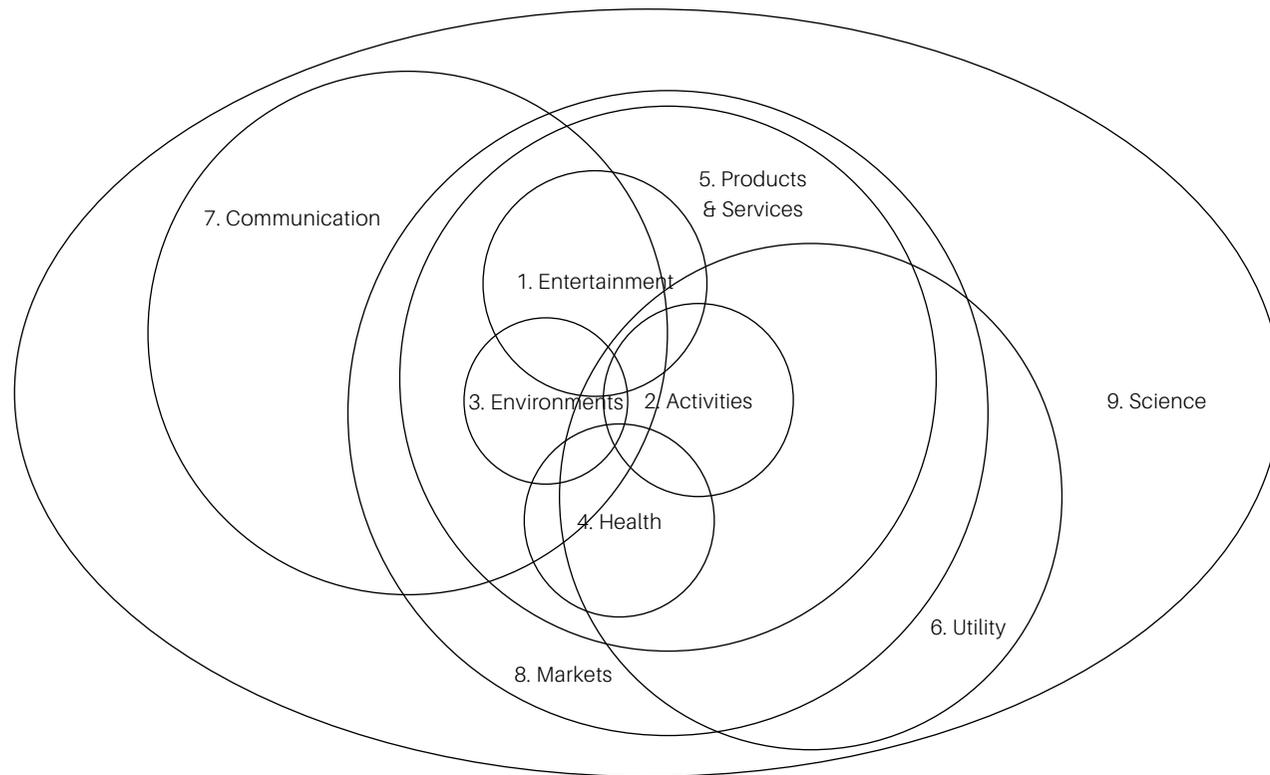
by drawing intersecting circles, where each circle holds a specific aspect of audio. However, this approach also fails to provide a clear message on where the design opportunities are and which market to focus on. Though the success might be missing, these failed attempts actually manage to improve the overall understanding of the topic and what to do next. By ruling out these methods, the project can now go and look for the answers elsewhere instead.

Conclusions

While using these tools, a feeling of doubt grew stronger. Instead of narrowing and making the project clearer, it became even more confusing on what which path to take. Finally, it came to a realization that this is a design project and not a thesis on business development. Focus should be on demonstrating the skills of a designer and not obsessing over on identifying the most mind blowing business opportunity. Though, the importance of mind maps was overplayed, they did manage to generate a confidence-boost and to trust the gut feeling on what that feels right, rather than looking to everybody else for approval. Indirectly the mind maps strengthened the belief that the project should find its base in Orlo's existing expertise. Since Orlo already are experts on designing loudspeakers they should continue this path. So from here on, the project will examine which markets and applications Orlo should design their speakers for ■

Fig. 17 (Left) An attempt to organize mindmaps by using different colors.

Fig. 18 (Below) Interpretation of how different aspects of audio co-relates to one another.



1. Entertainment is a major driver for consuming audio and is therefore placed in the center of the map.
2. Activities are whatever action performed while audio is being consumed.
3. Environments indicates where the activities are being performed, like running *outdoors* e.g.
4. Health is an important area, since audio can be use to enhance performance or cause damage, if used wrongly.
5. Product and Services means all things that supports audio consumptions.
6. Utility holds all beneficial ways of using audio, like hearing aid that improves learning rates e.g.
7. Sound is communication. This field therefore is the absolute essence of and it holds a big variety of things.
8. Markets contain all commercial markets that offers the user all the products and services listed previously.
9. Science dictates the terms for what kinds of products and services we currently can use.

Matrix & Function Analysis

It is determined that an appropriate continuation is to try another tool, called Matrix. Matrix is a method where data are added to a grid-like system resulting in an overview of how the data correlates to each other. It's an effective way to identify and communicate opportunities to partners and clients. The Goal here is to differentiate the areas where speakers are used based on: the type of user (public or private) and the environment and method of usage (indoor/outdoor and flexible/permanent). This will ultimately generate multiple sectors containing different working areas. In the upcoming pages, these segments will undergo separate function analysis to determine which are the minimum functional requirements for the speaker to be sold in that particular segment. These requirements will then be compared to Orlo's strengths and business model, in order to select the most suitable area to work with.

Conclusions

While performing the Matrix, an unforeseen problem occurs. A lot of areas happen to fit into multiple segments. Preschools are one of those. A speaker intended for preschools could be consider a product for permanent indoor usage, but their daily operations also consists of outdoor activities and there are even specific daycares that only operates outdoors. So, theoretical speaking preschools could be placed in within three different slots. There is no definite answer on how to handle these kinds of situations. This shows that the design tools not infallible. In this case, two slots were actually left empty, because no valid examples could be found. The Result of this Matrix should therefore be viewed in relation to how the data is being defined. Another person might choose to handle the data in a different way which would allow for other patterns to occur ■

	Flexible Indoor	Flexible Outdoor	Permanent Indoor	Permanent Outdoor
Public	<ul style="list-style-type: none"> • Preschool • Exhibition Fair • Fitness Centre • Pop-Up Store • School • Shopping Mall • Social Gathering 		<ul style="list-style-type: none"> • Cinema • Concert Hall • Preschool • Gym • Hospital • Hotel Room • Night Club • Public Restroom • Restaurant • Retirement Home • Security System • School • Sport Arena • Public Transportation 	<ul style="list-style-type: none"> • Drive-Through • Outdoor Gym • Outdoor Park • Playground • Recreation Facility • Train Station
Private	<ul style="list-style-type: none"> • Home Improvement • Interior Design Enthusiast • Party • Rental Housing (Airbnb) • Shared Housing • Virtual Reality Gaming 	<ul style="list-style-type: none"> • Camping • Festival • Party • Sunbathing • Temporary Gathering 	<ul style="list-style-type: none"> • Entertainment System • Recording Studio • Security System 	

Fig. 19 . The Matrix

Fig. 20 The Shopping Mall Emporia in Malmö

Public Flexible Indoor

Fig. 21 This Segment contains situations where audio is distributed in public environments and where flexible usage is desirable. It can be temporary events or public instances where lots of people move around.



Grade	Verb	Noun	Explanation
MF	Distribute	Sound	
NF	Prevent	Theft	Avoid the possibility of the unit being stolen
NF	Allow	Mobility	Between rooms and movable within the room itself
NF	Simplify	Installation	Reduce installation time or the impact inflicted on the interior
NF	Increase	Afford-ability	Attractive to consumers with smaller budgets
NF	Enable	Scalability	Up - or Downsize the system according to personal needs
NF	Provide	Intuitively	User friendly, meaning no previous knowledge is needed
NF	Be	Durable	Resists harsh treatments
NF	Create	Sensation	Through high sound quality
NF	Automate	Settings	Limited possibilities to tweak the characteristics of the sound
NF	Convey	Functionality	Through interface and graphics how to use the product
NF	Resist	Water	Manage spills from liquids
DF	Be	Wireless	Simplifies the installation process and moving the speakers
DF	Reduced	Optionality	Limited functionality reduce the chances of failure
DF	Evade	Maintenance	Simplifies the job for the cleaners

Fig. 23 Student Corridor Party at Delphi, Lund.

Fig. 22 This Segment holds situations within home environments where speakers are used in a flexible manner and cables undesirable. It may be a party where varying activities occur and where people move around a lot.

Grade	Verb	Noun	Explanation
MF	Distribute	Sound	
NF	Simplify	Installation	Reduce installation time or the impact inflicted on the interior
NF	Access	Power source	Connected to wall socket or battery powered
NF	Hold	Performance	High sound quality output
NF	Refrain	Wires	Wireless solution
NF	Possess	Lightness	
NF	Support	Lifting	Allow for the unit to be moved around
DF	Enable	Scalability	Up- or downsize the system according to personal needs
DF	Allow	Customization	Tweak the settings according to personal preferences
DF	Grant	Connectivity	Play content from different devices

Private Flexible Indoor

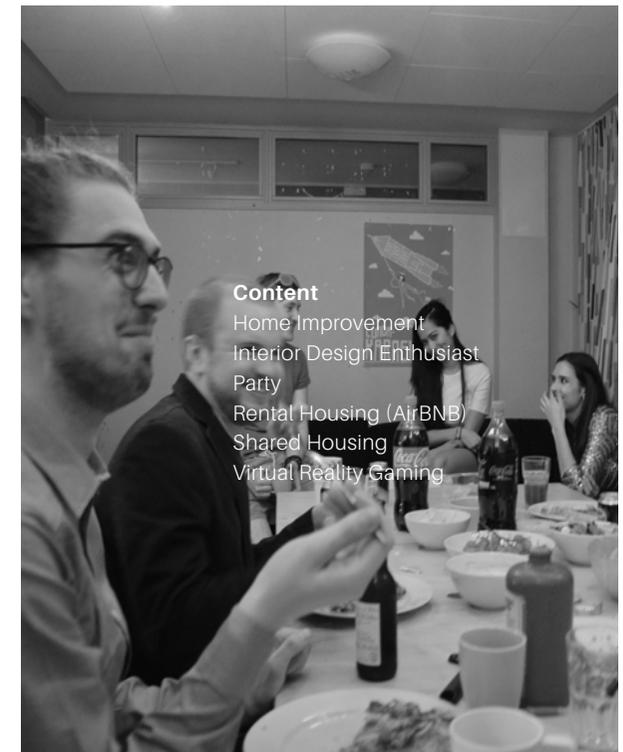


Fig. 24 Festival Visitors.

Private Flexible Outdoor

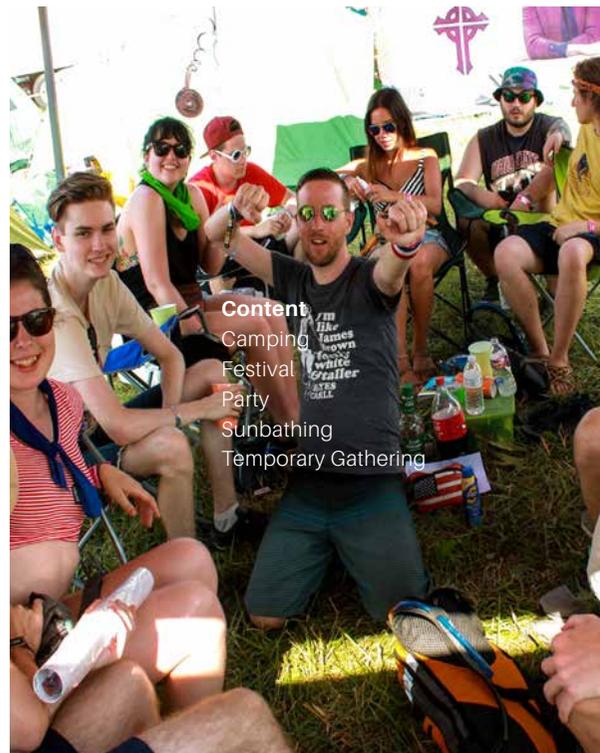


Fig. 25 This Segment holds situations where audio is used outdoors and where flexibility is desirable. The Important design drivers here are: power supply and resistance towards bad weather and harsh treatment.

Grade	Verb	Noun	Explanation
MF	Distribute	Sound	
NF	Simplify	Installation	Reduce installation time or the impact inflicted on the interior
NF	Access	Power source	Battery Powered
NF	Hold	Capacity	Deliver high sound quality
NF	Refrain	Wires	Wireless solution
NF	Resist	Water	Rain
NF	Possess	Lightness	
NF	Support	Lifting	Allow for the unit to be moved around
DF	Enable	Scalability	Up- or downsize the system according to personal needs
DF	Allow	Customization	Tweak the settings according to personal preferences
DF	Grant	Connectivity	Play content from different devices
DF	Offer	Simplicity	Intuitive interface and controls

Fig. 27 Lund University Hospital

Fig. 26 This Segment holds situations where stationary speakers are used to broadcast audio at public places. The Design drivers are centered around cost-effectiveness and the speakers should be easy to install and operate.

Grade	Verb	Noun	Explanation
MF	Distribute	Sound	
NF	Resist	Thievery	Unattractive as stolen goods or kept out of reach from thieves
NF	Access	Power source	Connected to wall socket or battery powered
NF	Hold	Performance	High sound quality output
NF	Shorten	Installation time	Helps keeping the cost down
NF	Allow	Customization	Tweak and adjust the sound according to your liking
NF	Improve	Lifespan	A longer lifespan can justify a higher product price
DF	Enable	Scalability	Up- or downsize the system according to personal needs
DF	Minimize	Cost	The aspect of cost is of high importance for these clients
DF	Convey	Functionalities	Be usable for people with different technical knowledge

Public Perm. Indoor

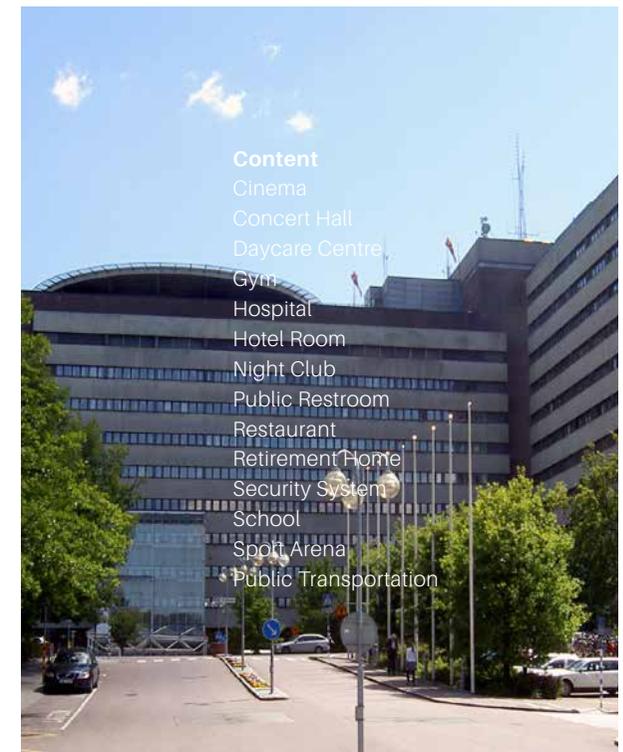


Fig. 28 Hi-Fi Klubben – A Reseller of exclusive Home Entertainment Systems.

Private Permanent Indoor

Fig. 29 Within this segment are the situations where private users broadcast high quality audio indoors. The Speakers within this field are mainly intended for stationary use and designed for professionals that prioritizes performance.



Grade	Verb	Noun	Explanation
MF	Distribute	Sound	
NF	Simplify	Installation	Reduce installation time or the impact inflicted on the interior
NF	Access	Power source	Connected to wall socket
NF	Hold	Capacity	Deliver the best sound quality possible
NF	Hold	Identity	Brand identity is of high importance
DF	Enable	Scalability	Up- or downsize the system according to personal needs
DF	Allow	Customization	Tweak the settings according to personal preferences

Fig. 31 Lund Central Train Station.

Fig. 30 This Segment lists the static outdoor situations where sound is distributed to the public. The Main design drivers are resistance towards weather, resistance to vandalism and the reach of the sound waves.

Grade	Verb	Noun	Explanation
MF	Distribute	Sound	
NF	Resist	Thievery	Unattractive as stolen goods or kept out of reach from thieves
NF	Access	Power source	Connected to Power grid
NF	Hold	Capacity	Distribute sound over greater distances
NF	Resist	Weather	Changes in temperature and humidity
NF	Improve	Lifespan	Due to the demanding installation process
DF	Enable	Scalability	Up- or downsize the system according to personal needs
DF	Minimize	Cost	Avoid expensive materials and production methods

Public Perm. Outdoor



► Conclusions from Function Analyzes

As the work proceeds, it becomes clearer that any decisive result shouldn't be expected, since the differences between the segments are too few and minor. Simply put: the list of features remains almost identical between some segments. What separates them are instead the way the features are classified. The Same function might be considered a necessary for one segment and desirable for another e.g. The Fact that some areas could or are being placed in multiple segments simultaneously contributes to an increased complexity. Furthermore, the function analysis easily becomes bland, the more entities the segments hold. The Increment in entities also make it more difficult to identify common features they all share. In conclusion: these analysis don't specifically indicate what strategic decision to make or not make. There are no product segment that is out of Orlo's reach. However, it might be preferable for Orlo to keep focusing on indoor speakers since that's something they already have proven themselves good at ■

Screening Markets

Since the project initiation, different design tools have been applied after each other, in order produce a scientific answer to which area this work should be focus on. While the purpose of design tools are to produce concrete results for which the designer can base their upcoming work on, the tools implemented so far has resulted in mere indications of possible directions this project could take. Unfortunately, this is not good enough and due to the limited time available, it's now crucial to narrowing down the scope and decide for one area as soon as possible. This is why it's decided to try a more subjective approach to the problem, called screening.

Screening means to briefly

research a topic in order to determine whether it holds any potential or not. By comparing pros and cons between the different areas a winner will be appointed. The Areas that will be subjected to this screening process are picked from the previous Matrix based on gut-feeling. Each area will hereafter be presented and evaluated on the following pages. The Selected areas for this process are the following: School, Store, Shared housing, Train station, Hotel Room and Boat. Lastly, all conclusions drawn will be shared and discussed with Carl Forslund in order to establish consent on the important choice to be made ■



Fig. 32



Fig. 31



Fig. 20



Fig. 23



Fig. 33



Fig. 34

The Markets from the top left: Boats, Train Station, Stores, Shared Housing, School and Hotels.

Boats

Fig. 32



Presentation

Multiple means of transportation like, buses and trains are listed within the matrix as potentials areas. However, amongst these candidates, boats (for the private user) seems like the most suitable area for doing a master degree project, which is the reason why the others aren't included in this screening. Boats are depending on size, type and brand, best described as luxury

products. As with all products, consumers expects better quality the more money they choose to spend on a purchase. One design opportunity could be to offer the manufacturers a way to increase the sound quality on their boats. There might also be opportunities connected to Orlo's ability to design flat speakers or adapt the speakers design to different shapes.

Evaluation

During the screening it's discovered that boat manufacturers uses a standardization for their interiors, including the cut-outs for speakers. The Question is however improved sound quality is an incentive strong enough for manufacturers to modify this bastardization? This reason along with not having any personal connections with the boat industry makes this area feels like an unsafe gamble to make and is therefore discarded ■

Presentation

Due to frequently across the country by train, the author regards the sound quality of many train stations PA-systems to be far from acceptable. This result in inconvenience for travelers that have a hard time

Evaluation

Swedish train stations are operated by the state owned, Jernhusen. Kjell Lindberg at Dateli Partner AB (which supervise the station's sound systems) explains that Jernhusens budget determines how the money will be spent. The Audio systems usually holds a lower priority, meaning that old systems only are replaced when failing or when building a new station.

Public Tender

Before the construction of a new station can take place, Jernhusen will issue a public tender for the contract. The Winning builder has in turn procured with suppliers on materials and equipment (sound system) to use. Orlo should market themselves

detecting important information. Why is this a problem? Is there an opportunity for Orlo to work with public environments and design speakers to broadcast information in a better way?

towards the building industry, if they're interested in this market.

A Matter of Cutting Costs?

Without prior knowledge about Orlo's sales and profit margins, it's difficult to decide if this is a good opportunity or not. Kjell Lindberg states that the newly built Trelleborgs railway station uses a system based on the Bose DS 40 SE-speakers. Can Orlo match this speaker price and performance-wise? This Topic needs more research and though it holds economical potential. The Topic is regarded unfavorable as a MA-project, since there's a possibility that the topic is more about minimizing costs than designing a new speaker ■

Train Station

Fig. 31



Store

Fig. 20



Presentation

All stores work with lights, placement and advertisement to highlight products and increase sales. Thoughtful marketing strives to involve multiple senses to awaken positive feelings about the products. Our eyesight, touch and smell are all heavily involved in shopping, but what about hearing? What would

happen if stores would incorporate audio more consciously? Restaurants utilize music as a tool to set the mood and some clothing brands play music that matches their style of clothing. With today's technology there should be much more potential than using speakers as background noise. What could Orlo do in this area?

Evaluation

Conceptually, this is an interesting area where potential design opportunities could mean highlighting products by pin-pointing audio. Or allowing the sound to follow the visitor around the store and use the audio as a way of story telling. The difficulties of this area lay in defining how it should work on a systemically level and determining what kinds of stores it's suitable for. However, there is a risk that the basic ideas prove unrealistic to implement or there are no interest

amongst stores to support them. With these unknown factors in mind and a tight timeplan, it is chosen to disregard this topic in favor for one where the project idea is clearer from the start ■

Presentation

Living together with multiple people demands respect amongst each other. Common rules are created to reduce the chances of conflicts arising within the household. Chores, furniture and tools is easy to share, but how do we share music when people's taste and listening preferences differs widely? Are there human behaviors and needs

Evaluation

The Opportunities within this area lies in identifying new, useful features enabled by the new protocols for transmitting audio wireless. An example of such a feature could be allowing for multiple users to take turnings controlling the music, or take control over individual units in different rooms. Another potential feature is to use the speaker system as a two-way communication radio and use the smartphone as a microphone. This could be useful for a family

that have yet been supported through today's speakers? What can Orlo do provide a better audio experience for people living together?

living in a bigger home, where you might want to communicate or gather all family members directly. The Advantage of this area is that Orlo are very interested in improving their products by new technology. The Downside is that no concrete ideas for how a project within this area, could be framed has yet to be discovered. What's currently missing is a clear scenario or problem definition to build the project on and therefore this area is discarded ■

Fig. 35 The Opportunity is to allow multiple smart devices to control the speaker simultaneously. In addition to existing multiroom speakers this concept holds a two-way communication feature that allow users to connect and broadcast their voice throughout the connected units. An Useful feature within a big family home.

Shared Housing



Fig. 36 (1) Speakers would improve the hearing and thereby the overall quality of the lecture.

Fig. 37 (2) The Teacher uses the speaker to broadcast the lecture and general instructions.

Fig. 38 (3) The Students can use their smartphone to broadcast their questions.

School

Fig. 39 Swedish Students in a Classroom.



(1)



Presentation

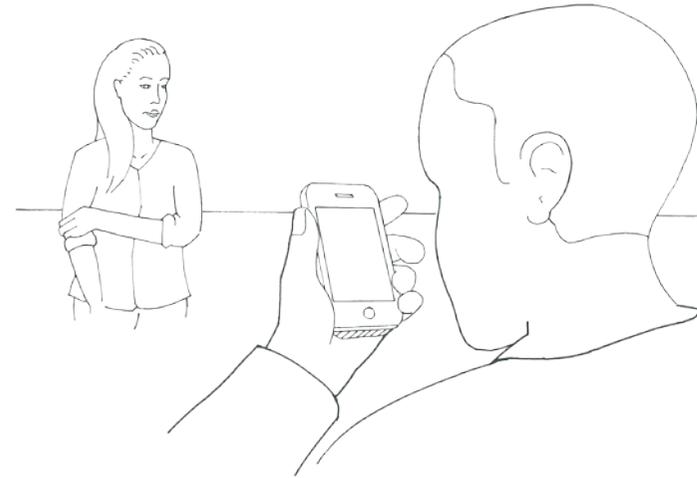
In recent years, Swedish students have been under performing in the PISA-survey compared to other nations. This is a dangerous trend that needs to be reversed as soon as possible. At the same time, researchers have established that academic underachievement partly can be blamed on the students not hearing the teacher properly. In an attempt to overcome this problem, a few schools are now installing speakers in their classrooms. However, these

schools are a minority, meaning there are a lot more potential clients out there. Based on this, there is an opportunity for Orlo to help raise the academic performance nationwide through their high sound quality and small designs. How might Orlo incorporate new technology in a way that surpasses competitors speakers in usefulness?

(2)



(3)



Evaluation

The School is a really interesting area, where Orlo would be given the important task to help improving students learning experience. The Advantages of this area is that there are few competitors and Orlo could potentially grow along with the development of the market. There might be an opportunity to work with new wireless audio streaming protocols to support teachers and students using their smartphones as microphones. This would ensure that both teachers and fellow classmates would be heard clearly at all times. However, this area might be more complex than it looks, due to the fact that Swedish schools are a part of the public sector, which is heavier regulated than the private consumer market. The Public

sector requires for public procurement and democratic designs, where every individual are supposed to be able to understand and use the product. With this also comes ethical questions that need to be addressed, such as: should the school require students to own a smartphone in order to partake in the education on equal terms? What are the potential downsides of involving smartphones in classrooms? Though this area is very interesting, it also demands a lot of investigating and researching. Due to the limited time it is therefore discarded for another more straight-forward area ■

Fig. 40 (1) The Speaker broadcasts a welcome message when entering

Fig. 41 (2) Stream different content in different rooms simultaneously.

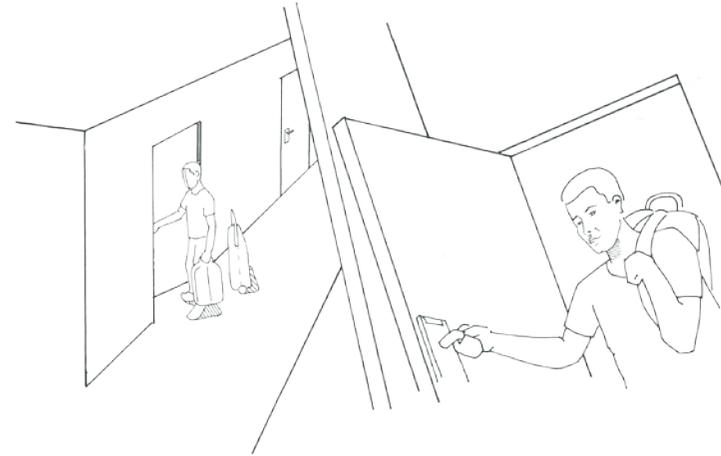
Fig. 42 (3) Use the speaker to enjoy music, podcasts or audio books.

Hotel Room

Fig. 43 Clarion Hotel Amaranter, Stockholm.



(1)

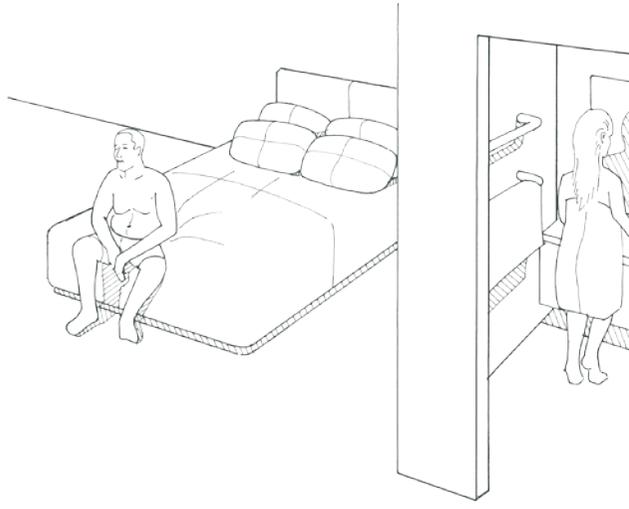


Presentation

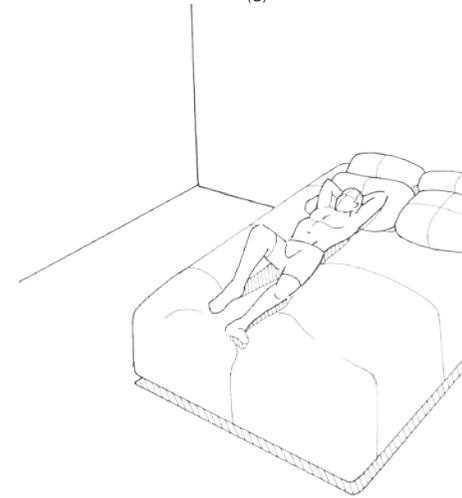
The Way we consume music has changed significantly since the introduction of smartphones. From physical formats like CD's, audio is more and more consumed through streaming services such as Spotify. This increment in availability has led to a change in human behavior where people use these services in their multiple hours a day in, like when commuting or working out etc. Why aren't hotels supporting this change in behavior? Why are hotels still stuck

on using CRT-TVs as the sole form of entertainment for the guests? How can Orlo help creating a better hotel experience through the usage of their skills and knowledge?

(2)



(3)



Evaluation

There are several opportunities within Hotel Rooms. The First is entertainment, to enable the guests to enjoy music, audio books and podcasts according to personal preferences. The Second opportunity is an evolution of existing multiroom speakers, where new streaming protocols allows guests to stream different content in the main room and bathroom e.g. The Third opportunity is to use speakers as a new line of communication between the hotel and guests. By installing motion sensors into the door frame, the speaker is activated upon entrance. This triggers a countdown, just enough to let the guest enter the room before broadcasting a welcome message. The Message may be a simple hello, or more

advanced, like informing about check-out time, when breakfast is served etc. Instead of printing brochures, the hotel can store information as audio-files on the speakers. Zenit have previously worked with the smart lock company, Zaplox so this idea is indeed feasible. The Speakers could even be used to alert the guests during an emergency and provide instructions for evacuation. Furthermore, it should adapt its communications according to time, like saying “good evening” e.g. The Guest should also be allowed to customize this feature to avoid annoyance.

The Chosen Field of Work

Of all areas screened, hotel room is the most straight

forward with several advantages. Firstly, it comes with clear opportunities. Secondly, Orlo have already made a move in this direction by selling wooden soundbars (based of the Orlo CAB) to the Winery Hotel in Stockholm. Hotel Rooms is also preferable from a personal standpoint. It will complement the Authors portfolio and is regarded easier to manage than a project for a public sector. By selecting a project where the buyer is already identified, less time will be spent on researching, leaving more time for developing the design. Based on these arguments, hotel room is chosen as the working field for this project ■

Redefining Brief

The Project was initially framed in a more open manner, with the intent to quickly unite all partners involved and also because the field of work was unknown at the moment. Since then, the project scope has been narrowed down to focusing on speakers within hotel rooms. Due to this action, the initial brief is redefined to be coherent with the new direction ►

Brief Design a Bluetooth Speaker for Hotel Rooms. The Design shall take both the Hotels and the Guests interests into account and improve the overall hotel experience ■

Objectives

To Explain the design process in a clear and understandable manner from start to finish, ending in a credible design proposal. The Result will be visualized in the form of a 1:1 visual prototype and complemented with a 3D-model and renderings. The Finished Design will be founded on the acquired findings from the research phases and it should take human needs, physical limitations and technical production aspects into account.

Questions

1. How might the hotel experience be improved through the implementation of speakers?
2. What requirements does the speaker need to meet in order to be sold to hotels?
3. How should the speaker be designed in order to work with the hotel's many different interior styles?

Fig. 44 Hotel Lundia, Lund.

Demarcations

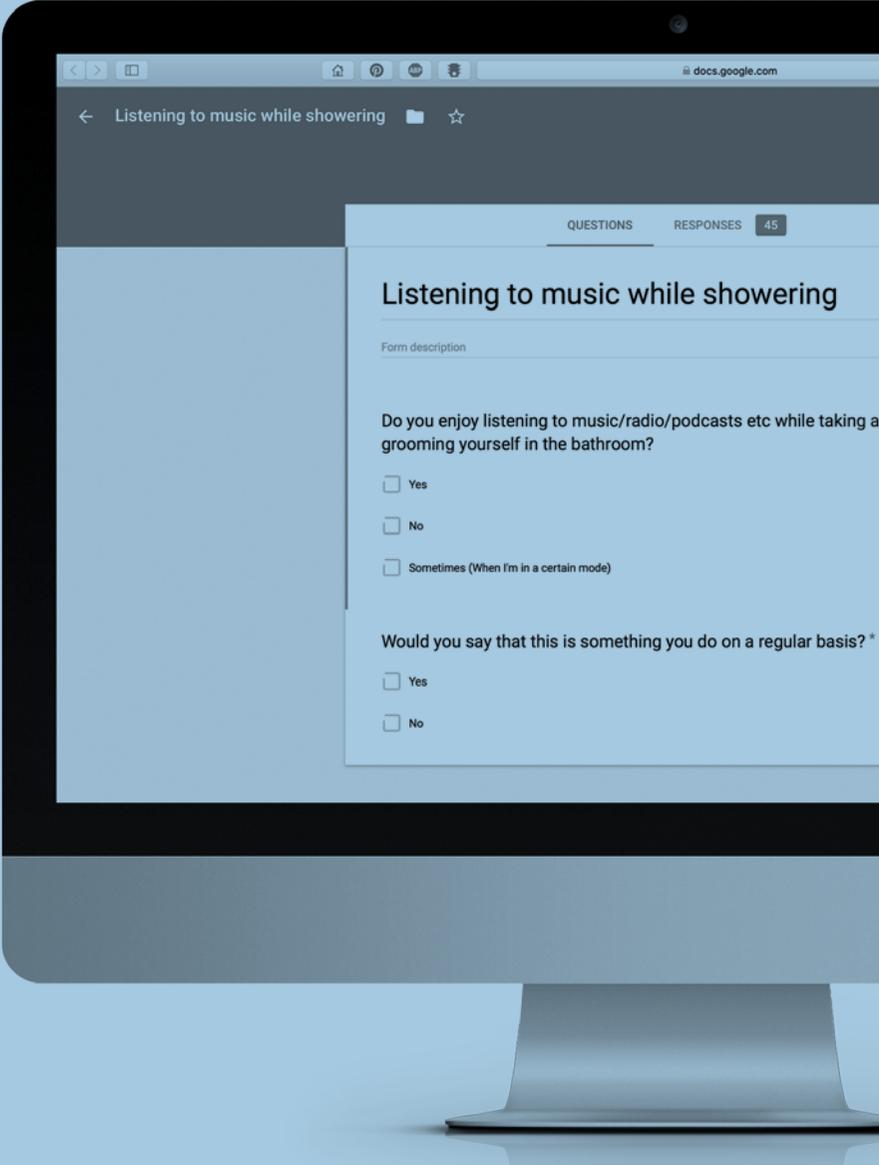
- The Project focuses primarily on the aesthetic aspect, i.e. the designing of the physical product and does not promise to deliver any software coding that might be needed to make the concept feasible.
- The Responsibility of deciding what electrical components to use and where to place them will be left for Orlo to decide in case they wish to develop the project further later on.
- The Aspect of cost will not be a driving factor when making the important design decisions during the process. However, it should be kept in the back of the mind in order to avoid unrealistic design proposals.
- The Research phase will focus on the national Swedish markets.



Specific Research

The Project consists of two parts. Firstly, it focus on determining a specific market with good design and business opportunities for the project to be based on. After completing this goal, the project now moves into a secondary research phase called Specific Research. This chapter aims to study and acquire all the essential knowledge needed to design speakers for hotel rooms. The Chapter starts by visiting several hotels and then continues by looking deeper into the different target groups and ther specific needs. ■

03



Listening to music while showering

Form description

Do you enjoy listening to music/radio/podcasts etc while taking a grooming yourself in the bathroom?

- Yes
- No
- Sometimes (When I'm in a certain mode)

Would you say that this is something you do on a regular basis? *

- Yes
- No

Field Visits

Fig. 45 The Checklist.

Field Study
Scandic Stortorget

New building Old building

Who is the creator of the current interior?
Is the interior design decided by HQ?
When did you last rebuild your facilities?
How often do you switch the decor of your rooms?

Single Room

Furnitures

Bed	Misc	Light
<input type="checkbox"/> Headboard	<input type="checkbox"/> Window sill	<input type="checkbox"/> Floor light
<input type="checkbox"/> Bed boards	<input type="checkbox"/> Curtains	<input type="checkbox"/> Bed boards
<input type="checkbox"/> Sides	<input type="checkbox"/> Wardrobe	<input type="checkbox"/> Built-in table
	<input type="checkbox"/> Power outlets	<input type="checkbox"/> Desk light (W&FP)
	<input type="checkbox"/> Mirrors	<input type="checkbox"/> Desk light (W&FP)
	<input type="checkbox"/> Paintings	<input type="checkbox"/> Ceiling light (Hanging/Fixed)

Entertainment

TV (W&FP)
 Media furniture

Workspace

Desk (W&FP)

Seating	Visible Cables
<input type="checkbox"/> Armchair	<input type="checkbox"/> Looks messy
<input type="checkbox"/> Chair/stool	<input type="checkbox"/> Looks neat and clean

Fire Alarm Placement

Materials

Homogeneous Different materials in different sections

Floor Wood Fabric Other Stone

Ceiling Wood Concrete Other Plasterboard

Walls Wood Concrete Other Plasterboard

Double Room

Furnitures

Bed	Misc	Light
<input type="checkbox"/> Headboard	<input type="checkbox"/> Window sill	<input type="checkbox"/> Floor light
<input type="checkbox"/> Bed boards	<input type="checkbox"/> Curtains	<input type="checkbox"/> Built-in table
<input type="checkbox"/> Sides	<input type="checkbox"/> Wardrobe	<input type="checkbox"/> Desk light (W&FP)
	<input type="checkbox"/> Power outlets	<input type="checkbox"/> Desk light (W&FP)
	<input type="checkbox"/> Mirrors	<input type="checkbox"/> Ceiling light (Hanging/Fixed)
	<input type="checkbox"/> Paintings	

Entertainment

TV (W&FP)
 Media furniture

Workspace

Desk (W&FP)

Seating	Visible Cables
<input type="checkbox"/> Armchair	<input type="checkbox"/> Looks messy
<input type="checkbox"/> Chair/stool	<input type="checkbox"/> Looks neat and clean

Fire Alarm Placement

Materials

Homogeneous Different materials in different sections

Floor Wood Fabric Other Stone

Ceiling Wood Concrete Other

Walls Wood Concrete Other Plasterboard

Visiting hotels seems like the most straight forward way to understand the hotel market. The Purpose of these visits is to identify potential opportunities and limitations within the rooms. However, as an inexperienced hotel guest, it's difficult to beforehand know what to look for. Therefore, inspiration is taken from Google's product development process. Google's strategy has historically been to collect as much data as possible and look for a new business opportunity within it. In this project, that translates to documenting as much as possible and to get a more refined view, the author will visit both single and double rooms, looking for similarities and differences.

Goals and Preparations

The Objectives of these visits is to learn more about the daily operations of hotels and identify interesting patterns to base potential concepts on. A checklist is therefore designed to simplify and streamline the visits. The Purpose of the list is, for example to log the different kinds and quantities of interior details used. Parallel to developing the checklist, the first contact hotels with hotels are made. In order to save time, the visits are focused solely on hotels in Lund and Malmö. The Initial aim is to visit a wide range of hotels. However, contacting hotels is a time consuming task and therefore it's decided to settle for five visits. This feels like a good balance between managing time and building a truthful knowledge base ■



Fig. 46 All visits were documented through still pictures and videos.

Fig. 47 View of The Hotel Entrance.

Scandic Stortorget

Address : Stortorget 15, Malmö
Telephone : 040 - 693 49 00
Website : www.scandichotels.se
Contact : Tina Kaic

Scandic Stortorget is located in an old, rustic building in the very heart of Malmö city. The Tour begins with visiting the double room. The Room is decorated with a surprising amount of furnitures. A few of them are a combination of different furnitures. Supposedly their purpose is to be perceived as a part of the room, but the way they are arranged makes the room cramped instead. There are also a lot of freely placed items, which is a bit unexpected. There are quite a few of vertical mirrors and paintings to emphasize the height of the ceiling. Both rooms visit follows the same concept style-wise. A sudden revelation is that both rooms are equipped with a generous amounts of wall sockets. ►



Photos from the double room at Scandic Stortorget, Malmö.



This evokes an interesting question on how to power the speakers? Should they be battery powered, connected to the wall socket, or straight to the electric power grid? Two big pieces such as the desk and the bed headboard have integrated power sockets, which would be a neat solution if the chords beneath them weren't visible. It feels strange to see simple interior mistakes like this in a hotel, which is supposed to look better than private homes. The Overall impression is that both rooms holds to many furnitures and therefore feels a bit cramped ■

Grand Hotel Garden

Address : Baltzarsgatan 20, Malmö
Telephone : 040 - 665 60 00
Website : www.ligula.se
Contact : Hilma Liljeqvist

Grand Hotel Garden feels like a step above Scandic Stortorget interior-wise. The Rooms are more thorough designed and up to date with contemporary interior trends. Pretty reasonable since the hotel were bought by its currents owners and renovated in 2011. The Hotel is a part of a chain, however each facility is free to choose their own style and concept. While the style of the rooms remains the same the double room has wooden flooring and the single room a fabric mat. The Walls are made of concrete and the whole facility seems very soundproof. However, both rooms have (like Scandic Stortorget) visible cables that reduces the overall impression. Both rooms are decorated with fewer objects, making the room ►

Fig. 51 View of The Hotel Entrance.



Photos from the single room at Grand Hotel Garden, Malmö.



feel more spacious. Grand Hotel has chosen to equip their rooms with a foldable suitcase holders – A better decision than the bulky furniture-solution of Scandic Stortorget. The Single room has bed lights mounted to the headboard of the bed. The Lights have dual function with the ability provide both direct and ambient lighting. These are examples of smart thinking from on the hotel's part. Visiting Grand Hotel Garden sparked some inspiring thoughts about a ceiling mounted speaker. From an audio-broadcasting perspective this is pretty interesting. Perhaps the speaker could be combined with a ceiling light? ■

Moments Hotel

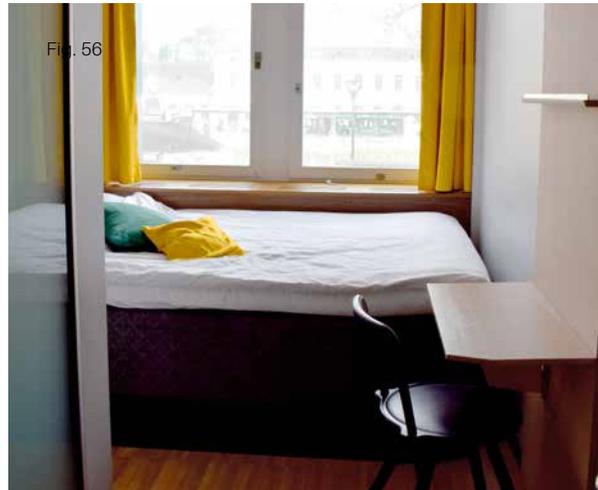
Address : Norra Vallgatan 54, Malmö
Telephone : 040 - 23 50 40
Website : www.momenthotels.com
Contact : Gustaf Deijnoff

Moments hotel is located across the road from Malmö central station and has been open to the public since 2012, making it the youngest of the five hotels visited. They are the candidate who is most up to date with current interior trends. Their approach is also the most holistic, meaning: there are no visible cables and light switches and furnitures are smoothly integrated. Moments have developed a concept they call “Lean Lux Living”. This means they have slimmed down their operations and removed furnitures and services that the guests don’t use in order to offer a cheaper price. Examples of this are smaller rooms (10 m²) and instead of hosting a huge breakfast buffet Moments serve what they call ▶

Fig. 55 View of The Hotel Entrance.



Photos from the single room at Moments Hotel, Malmö.



a Café-breakfast , which consists of premade sandwiches, intended to be eaten on the go. This benefits the hotel which can minimize preparation and food waste and also the guest, which can bring the breakfast with them.

Moments Hotel isn't the natural choice for spoiling your romantic partner with a weekend of grandiose living, but it's excellent in providing single travelers a combination of affordability and luxury living with their 140cm beds. An ongoing renovation will result in double rooms with toilets that are adapted for guests with disabilities, which feels rather unique. They are also growing the salad used for the sandwiches and have plans to grow tea plants that for the guests to pick from ■

Hotel Lundia

Address : Knut Den Stores Torg 2, Lund
Telephone : 046 - 280 65 00
Website : www.lundia.se
Contact : Christian Weste

Hotel Lundia is a family-owned hotel located 100 meters from Lund Central Station. This specific single room is the most unique one in the whole hotel and amongst all the hotels visited. The Unique thing with it is that the bathroom is separated from the room with only a transparent glass wall. The Interior itself consist of custom-built wooden furnitures and many of them are attached to the walls. There is no sign of standardization or cheap IKEA products. It feels like the Hotel went all-in when renovating it last time. Perhaps this style was trendy at that time, but now the extensive use of yellowish wood makes the rooms be perceived as murky and damp. It feels like the interior drains the visitor of energy ►

Fig. 59 View of The Hotel Entrance.



Photos from the single room at Hotel Lundia, Lund.



instead of the other way around. The Use of CRT-TV 's and fixed telephones also add to the feeling of the interiors being out of date. In this state any modern speaker would look misplaced here. The Double Room is decorated with furnitures in the same wooden style. However, the room feels kind of bland due to the walls and floors. The Single Room for example used stone tiles, which created a nice dynamic. This dynamic is unfortunately missing here ■

Fig. 63 View of The Hotel Entrance.

StayAt Lund

Address : Laboratoriegatan 10, Lund
Telephone : 046 - 423 60 00
Website : www.stayat.se
Contact : Måns Friberg

StayAt is a small hotel chain with facilities in Lund and Stockholm. Their primary target group are companies that need to house employees for a longer period of time. Due to this orientation, the layout and equipment of their rooms greatly differ from other hotels. For starters, StayAt has more of small apartments than rooms. These apartments are equipped with small kitchens allowing the guests to cook their own food instead of eating out. Their facilities are also equipped with laundry rooms and indoor gyms. All this is done to make sure that living at StayAt feels as equivalent to living at home as possible. This approach is also visible in the interior style within the rooms which is light, simple and without ►



Photos from the double room at StayAt, Lund.



Fig. 64



Fig. 65



Fig. 66

unnecessary frills. The Furnitures are from IKEA or equivalent manufacturers. Together this helps create a sensation of a regular Swedish home. By working with colorful details such as paintings and pillows StayAt managed to create a personal touch despite the ordinary interior. This is a nice touch compared to the feeling of total anonymity that is the case with the other hotels visited. Still, there is room for improvement. Some furnitures are placed too close to each other and there are also visible cables at a few places ■

► Conclusions

The Hotel Business

The Field studies provided the project with new knowledge and interesting insights. In correlation to the visits, brief interviews with the front desk managers were conducted. These conversations sparked an essential understanding that hotels are very cost-conscious and evaluates the potential of forthcoming investments by calculating how many overnight stays they must sell to earn back the money spent. Furthermore, hotels only renovates when it's absolutely necessary. According to the front desk managers it can range 7 to 15

years between the interiors being fully replaced. Due to this, it was assumed that the hotels would be cautious to fastening interior details to the walls, but it's actually the opposite. Hotels can't afford to shut down operations, so renovations are made in different scales and stages. What one can say is that all hotels operate in different ways. There are hotel chains where the headquarter decided the concept and there are chains that allow their hotels to freely create their own concept. Some hotels hire an architect to redesign the interior, while others make their own decisions or take the help of the contractor hired.

Disturbance and Thievery

There are two major reasons for speakers not being a self-evident product in hotel rooms. First off, hotels are afraid that guests might abuse the equipment and cause disturbance amongst neighboring guests. Prior to these studies, it was assumed that the fear of theft would be the biggest problem and therefore it was confusing to witness numerous freely placed objects (such as bed lights e.g) in the rooms. To bring some clarity to the matter, the managers were later questioned about this phenomena over the phone (Those interviews

can be read in their full format in the appendix section). In summary; none of the managers stated thievery as a problem. Hotels have simply decided to refrain from furnishing the rooms with expensive objects in the first place. This means that speakers are discarded because the hotels fear they can't protect them. The Freely placed bed lights (seen during the visits) are considered to hold a too low value to be stolen. Hotels accounts for small things such as shampoo bottles to be taken and draws the line for thievery when bathrobes disappears. During the circumstances where expensive products are missing, the hotel firstly contacts the guest requesting him/her to return the item. If the guest can't be reached, the hotel will charge the credit card. It might seem straight-forward, but the situation is a bit more problematic. It can be very difficult to contact or charge the credit card if the guest happens to be an international traveler. Hotels are also afraid of angering the guests and getting bad reviews. The Whole process is a time consuming task that steals time and energy to from the daily operations. The Front Desk Manager, Gustaf (Moments Hotel) captured the situation the best by stating "It's equally tough to

be accused of being a thief, as it is accusing somebody to be a thief". This means that a lot would be won if one could prevent the situation from happening in the first place.

Personal Insights

During the visits it's discovered that the sizes of the hotel rooms had been exaggerated in the mind of the author while sketching etc. By visiting the hotels and drawing parallels to the early test play of Orlo CAB, it became clear that the performance (89dB @ 1m) would be more than enough to fill the rooms with high quality sound. Rather, the problem would be to figure out a way to prevent guests from playing too loud and causing disturbance. One of the opportunities presented during the screening chapter is the possibility to stream different content in the bathroom and the main room. That feature would require two units per room. If that's not a desired feature, one unit is sufficient enough.

Another interesting observation was that hotel rooms hold more power outlets than a room in an ordinary household (5 and 7 pieces in single and double rooms). Time will tell if this information will be of relevance to the project or not ■

Issues to Address

By conducting the hotel visits, it's possible to identify six different issues that the project will need to address.

Theft Protection

There are different ways to prevent the speaker from being stolen. One option is to secure it using screws and bolts. Another is to equip it with an alarm, placed it out of reach, or use the hotel to make it difficult to resell.

Disturbance

The Hotels business is dependent on guest satisfaction. For this speaker to become a success, Orlo must be able to guarantee the hotels that the speaker can't be misused and cause disturbance amongst the guests. In which ways can this goal be fulfilled?

Placement

The Speaker's placement can be discussed from multiple standpoints. The Most important one is the sound dispersion, but it can also be discussed from the aspects of maintenance and prevention of thievery.

Aesthetics

This area holds two objectives. One aims to create a versatile design that pairs with different interior styles. The second is about communicating the functionality of the speaker. How should the speaker be designed for the user to identify it as a speaker?

Connectivity

Installing wireless speakers in rooms adjacent to each other might cause technical problems, where the users risk connecting to the wrong unit or having trouble finding the right speaker. How can this be avoided?

Power Source

The Speaker can be powered through batteries, a power cable or directly to the power grid within the walls. It's important to identify how the different options would affect the stakeholders, like who'd be responsible for charging and replace the batteries?

The Guests

There are three stakeholders to consider within this project. So far the focus has been on the client and the buyers, meaning Orlo and The Hotels. Now, it is time to discuss the third party, namely The Hotel Guests that will be using the speaker.

Since almost every person, will stay at a hotel during their life, the demographic of these target group becomes irrelevant. Instead the focus is directed towards determining the purpose of their stay and how

different reasons promotes different desires. Based on this, three categories of guests are identified. Those are: Adventurers, Couples and Business Travelers. All groups are thought to contain guests ranging from teenagers to senior citizens. Briefly described the purpose of the Adventurers are usually to attend a type of event and they will therefore only use the hotel as a place to get ready and sleep. The Business Travelers are kind of similar, but they could also spend a lot of time

in the facility working. The Group that stands out are The Couples, who priorities quality time. They are the group that utilizes the hotel's amenities to the highest degree too.

The Objective of this section is merely to examine if people are interested in having a speaker in their hotel room and get some hints of where it should be placed ■

Fig. 67 A crowd photographed from above.



Adventurers

Adventurers usually stays at hotels when they wish to attend an event, like a concert etc. They are not keen on spending time at the hotel and uses it solely to get ready and sleep.



Fig. 68



Fig. 69

Fig. 70



Fig. 71

Couples

This Category of Guests prioritize quality time together, taking things slow and get the most out of their stay. These Guests are the most keen on utilizing the hotels amenities.



Fig. 72



Fig. 73

Fig. 74



Fig. 75

Business Travelers

The Stay of this target group is purely work-related. They have where little interests in the hotel itself, but rather values services that simplify their visit and help them be productive.



Fig. 76



Fig. 77

Fig. 78



Fig. 79

Surveys

Two online surveys are conducted. The First asks if the respondents enjoy listening to music while showering/grooming themselves. The Majority (58%) of respondents answered that they do, while 39% stated “Sometimes, when I’m in the mood” and the last 4% answered “No”. The follow-up question is “Do you do this on a regular basis”, to which 47% answered “Yes” and 53% “No”.

The Second survey consist of one single exhortation asking the respondents to describe the things they do when entering their hotel room for the first time. The Purpose of this particular survey is to identify where the speaker should be placed.

Almost all respondents answers that they start of by inspecting the room, the view from the window and then tries the bed. After this initial stage peoples actions starts to differ. Some chooses to take a nap, while others shower, unpack or check for the WiFi.

Conclusions

The Outcome of the secondary survey failed to meet the expectations set beforehand. While it was interesting to read about the respondents habits it didn’t help bring the design process forward. Though, the survey reminded the author that the core purpose of a hotel stays is a bed to sleep in. So it’s therefore decided that

the speaker should be placed either close to, or in the field of view from the bed.

The Result from the first survey clearly indicate that people would appreciate having a speaker in their hotel room. Though, a speaker will never be the key argument for choosing a hotel over another, it can provide hotels with a competitive edge. Since today’s society is getting more focused on wireless streaming of multimedia, the implementations of speakers would surely pave the way for new (at this moment unforeseen) opportunities to improve the guest experience even further. In conclusion, the result of these surveys is coherent with the brief ■

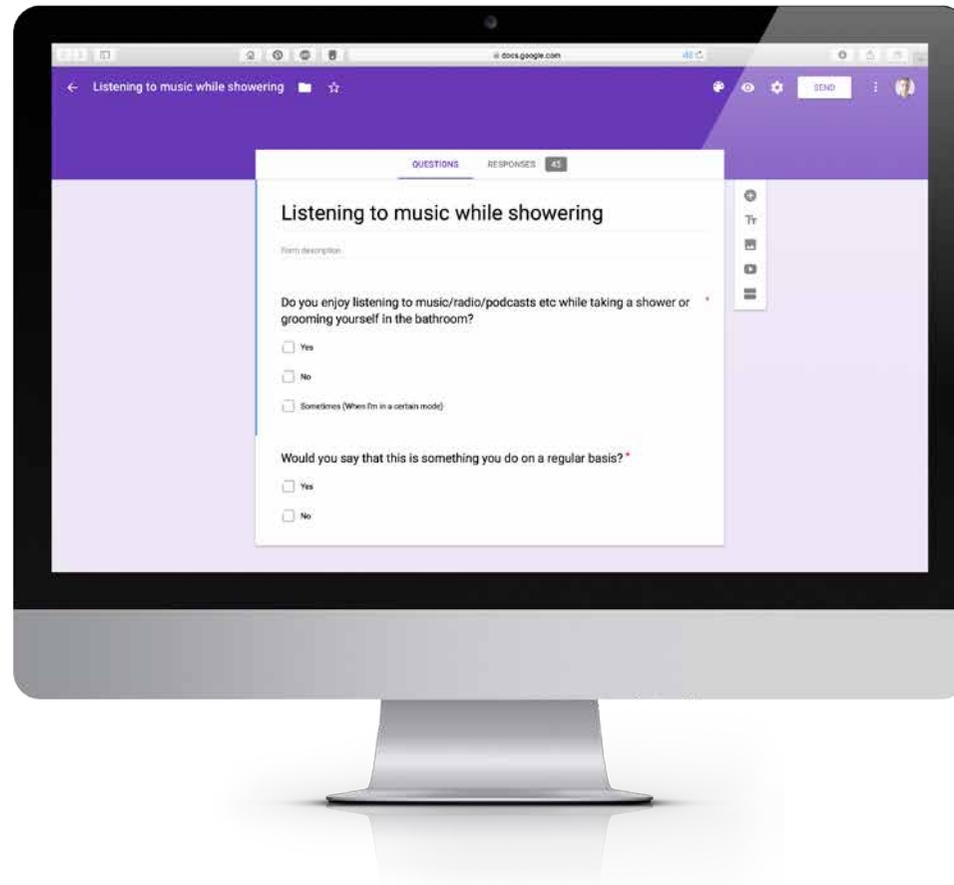
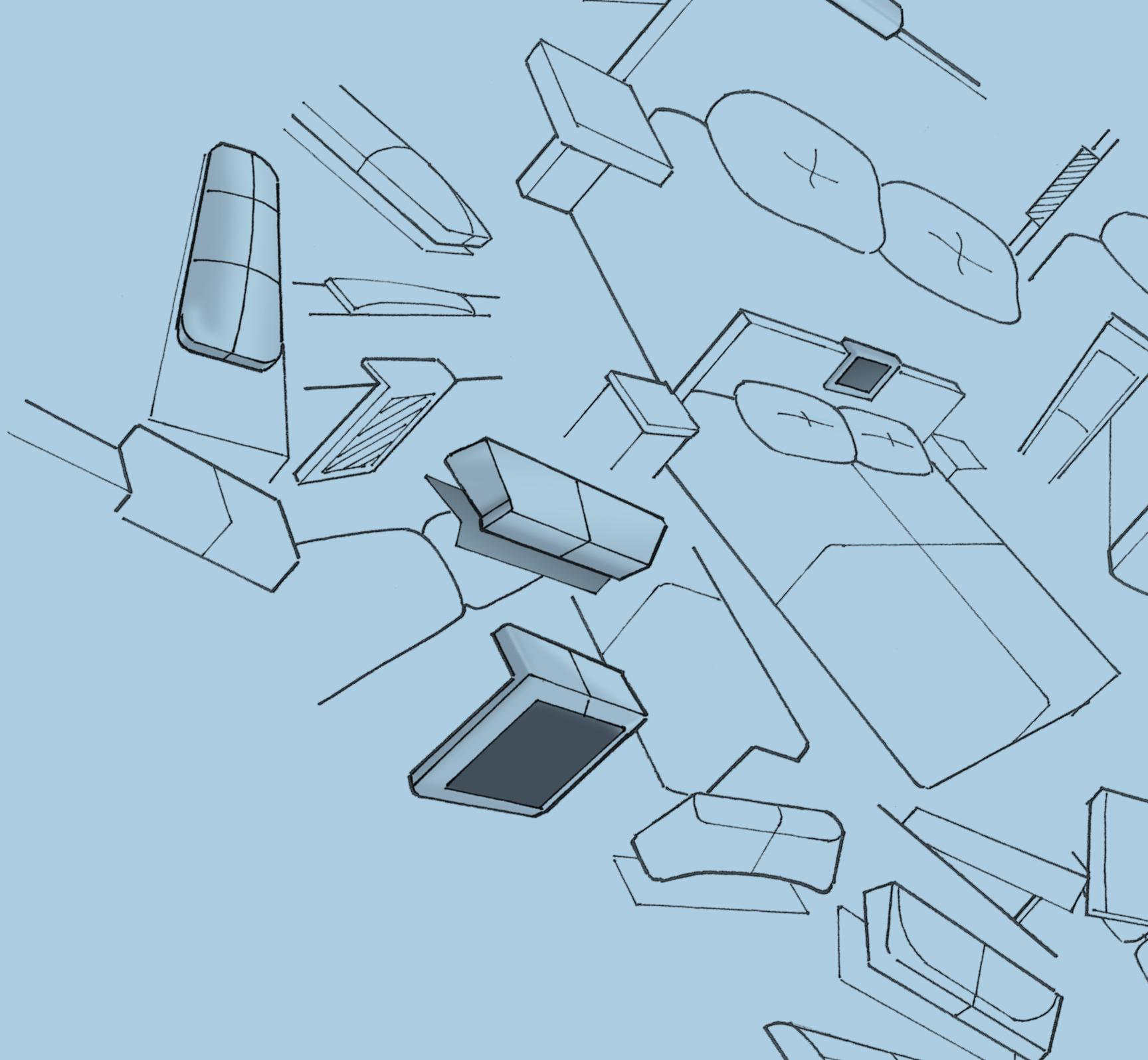


Fig. 80 The Surveys were created by using Google Form and shared through Facebook-groups.

Synthesis

Now time has come to make use of all newly acquired knowledge and mold it into what will become the finished concept. Chapter begins with the ideation and creation of several concepts through sketching. The Concepts are evaluated and one is selected for further development. Several image boards are then created and used as aesthetic guidelines before entering the 3D-modelling phase. This approach allows the project to stay on the right track and be developed consistently ■

04



Brainstorming

Fig. 81 Photo from the Brainstorming-session.



In order to design a credible concept, the previously identified issues need to be addressed. A brainstorm method frequently used by Zenit comes in handy here. The Principle behind this method is to through doodles, generate large quantities of ideas and build on them to create variations. By brainstorming around each issue for 15 minutes, the process becomes more focused and qualitative. The Ideas are then organized by adding numbers and letters to them. Numbers are used to describe unique solutions, while letters are assigned to variations of these solutions. In this case, the result is a whopping 54 ideas. The Continuation of this method consist of evaluating and grading these ideas based on their level of feasibility. All the ideas are hung onto the wall to get an overall view of all the potential solutions. By experimenting with different combinations of ideas the foundation of potential concepts may be chiseled out ■

The Continuous theme of the concepts is best described as integrative thinking, meaning they focus on how a speaker could be incorporated in preexisting interior details, or based on common factors amongst the hotels. They also include examples on modularity, scalability and theft protection. Through the generated ideas, eight concepts plus four additional variations are developed – A promising start of the design process. The Concepts are developed in two rounds with a break in the middle, where the current direction is discussed with supervisor, Carl Forslund. Carl's thoughts are that the project is a great opportunity to think outside the box and design an unique product that demonstrates innovative thinking to future employers. Especially the idea of combining the speaker with a light speaks to Carl. It's therefore decided to spend some extra time on exploring the potential of this particular line of thought ■

Creating Concepts

Fig. 82 All the potential ideas (54) were organized according to the issue they address and mounted onto the wall for analytic observation.



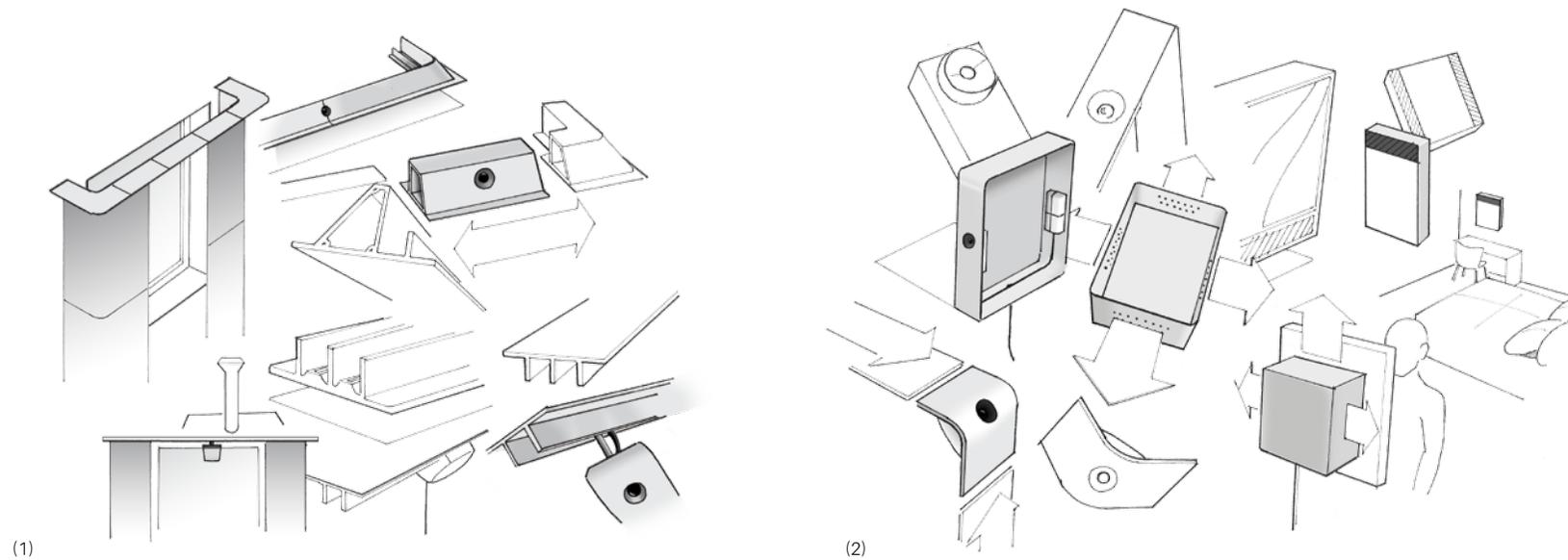


Fig. 83 Curtain Rack (1)

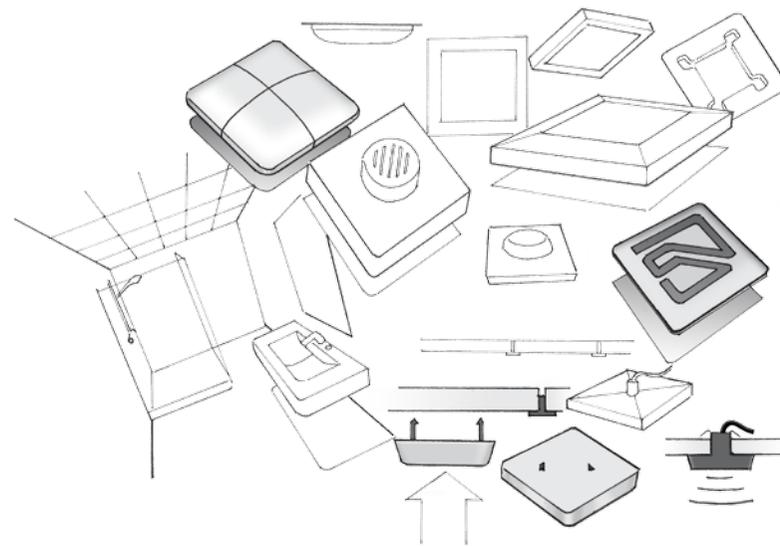
A modulus system that combines a curtain rack with a speaker. A discrete way to integrate the speaker in the rooms.

Fig. 84 Frame (2)

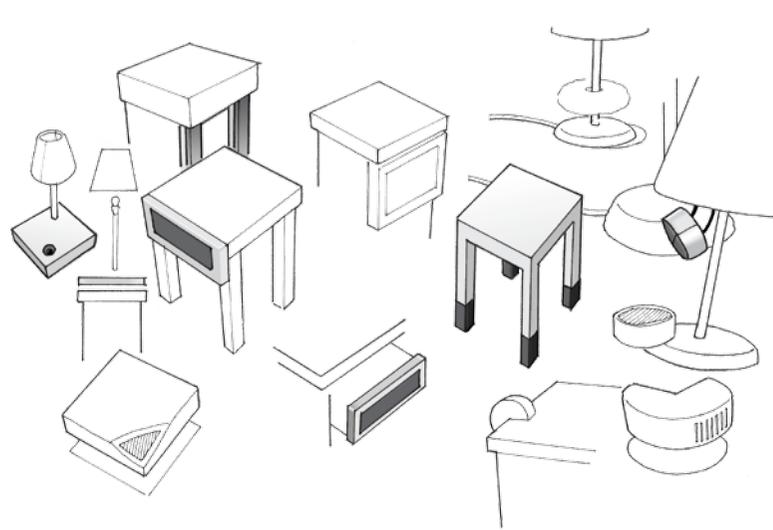
A flexible and modular structure that integrates speakers. The Frames are used to hold paintings and mirrors e.g.

Fig. 85 Ceiling Tile (3)

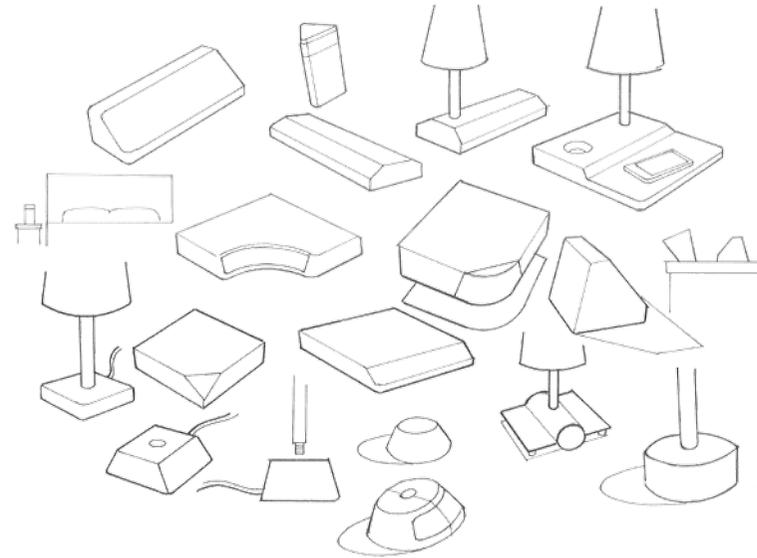
Combining speakers with standardized ceiling tiles could open up business opportunities outside the hotel market.



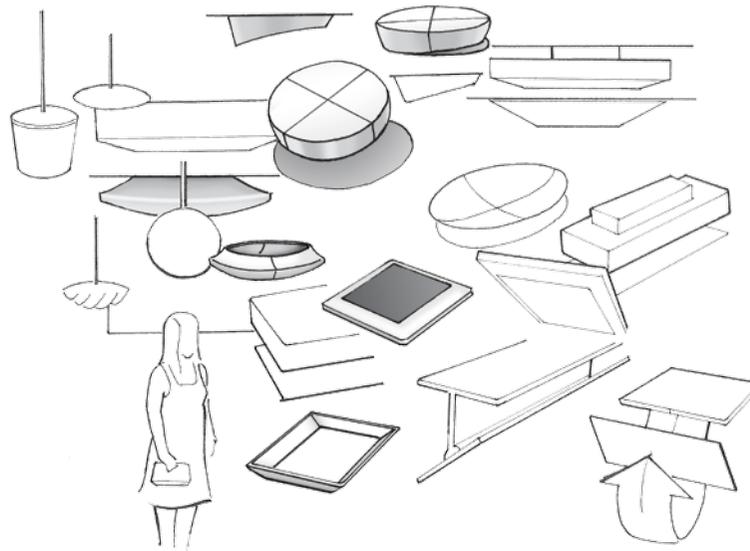
(3)



(4)



(5)



(6)

Fig. 86 Bedside Table (4)

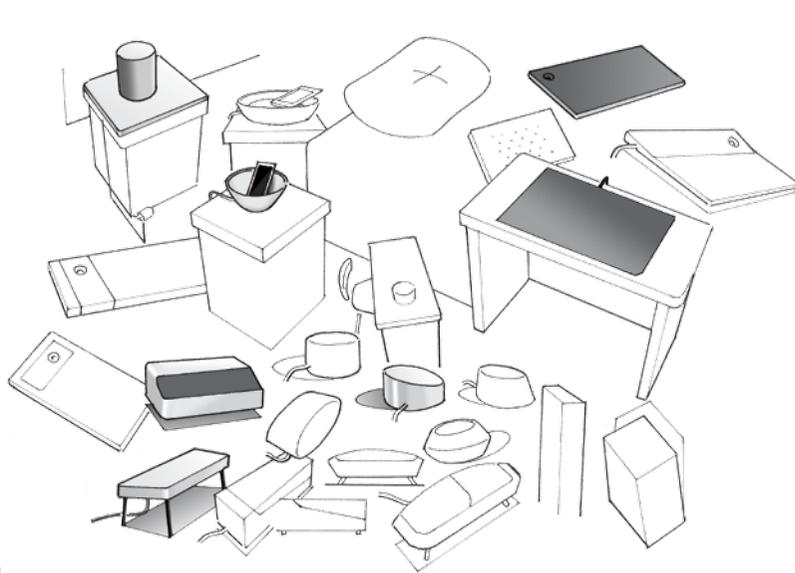
The Speaker could be integrated with the table or designed as an add-on product that's attached to the tables.

Fig. 87 Desk Light B.(6)

A modular concept where the Hotels chooses the materials and type of lamp shade that best suits their interior style.

Fig. 88 Ceiling Light (5)

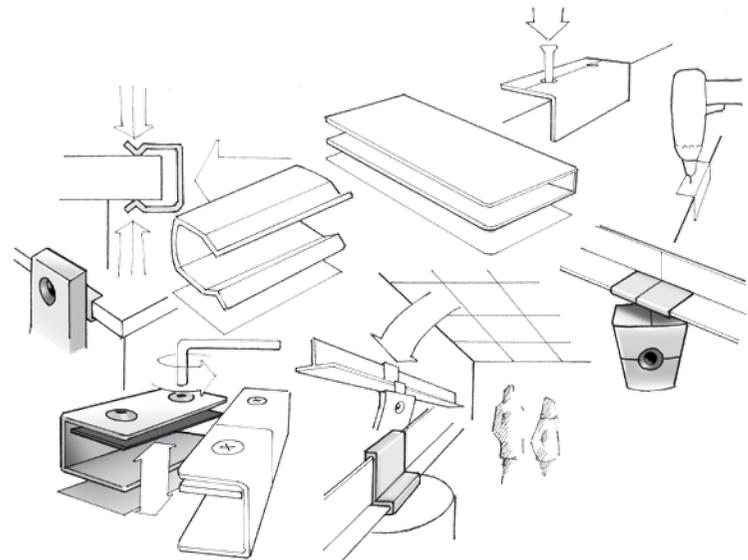
The Speaker is combined with a light source to move it out of reach, while ensuring that the sound travels freely.



(7)

Fig. 89 NFC-Pads (7)

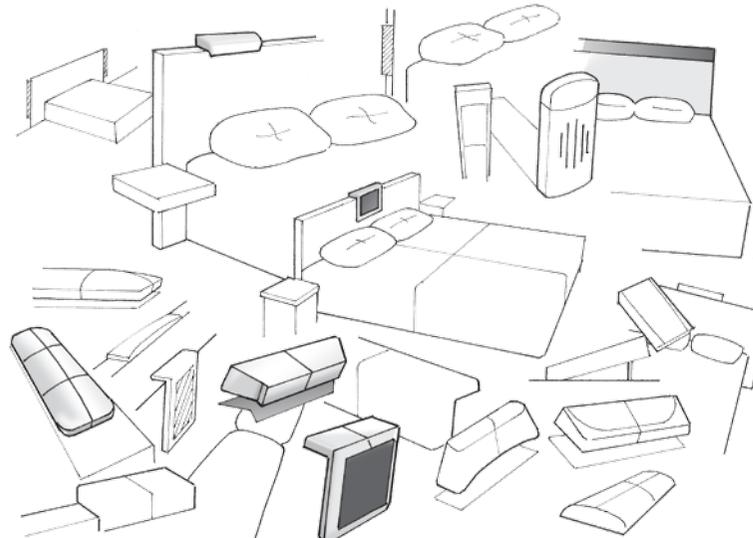
The Guests rents a wireless speaker at the Front Desk and powers it through NFC-charging pads installed in the rooms.



(8)

Fig. 90 Brackets (8)

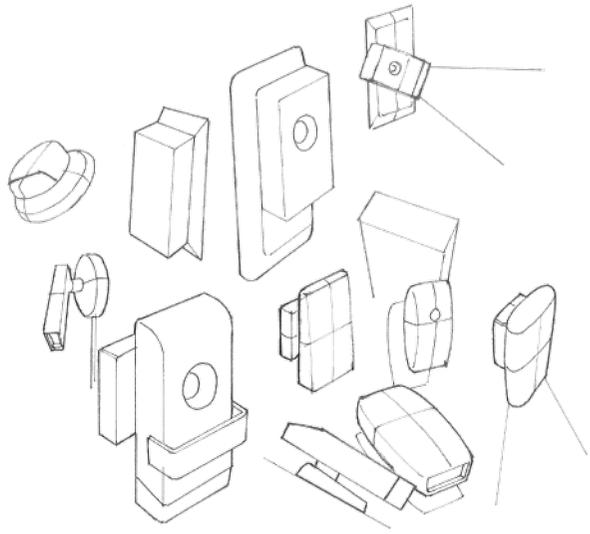
Focus on security and mounting the speaker to existing details. Could also make up a part of the ceiling tile concept.



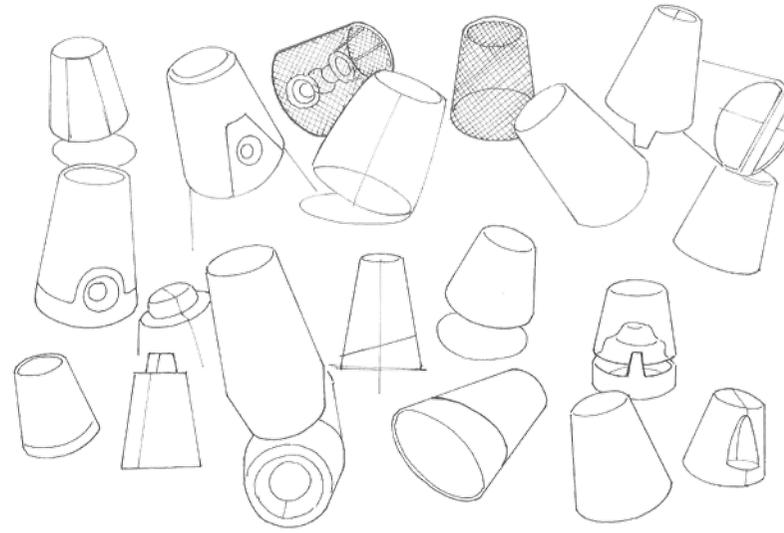
(9)

Fig. 91 Headboard (9)

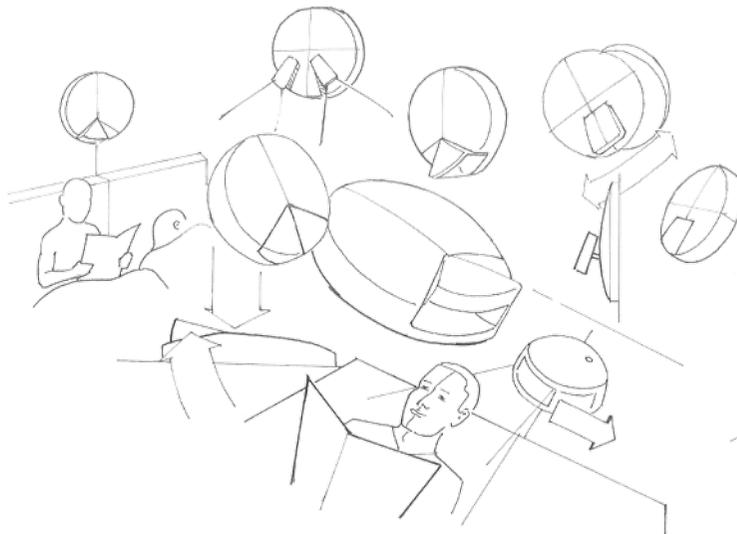
An add-on product that is mounted onto the headboard, placing the speaker in close range to the hotel guest.



(10)



(11)



(12)

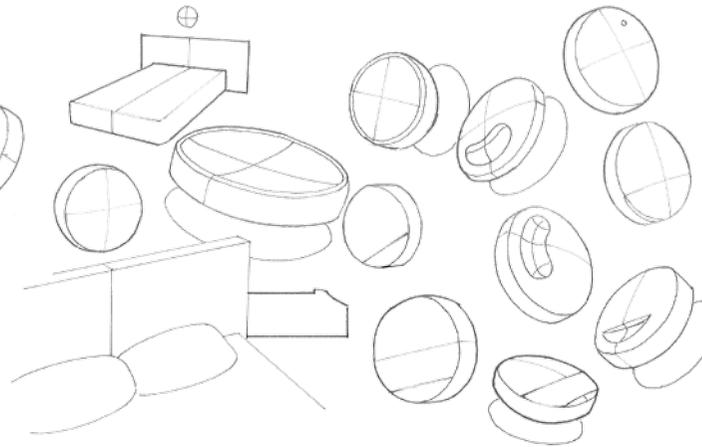


Fig. 92 Spotlight (10)
 Combining the speaker with spotlights makes for an interesting solution for integrating the speaker in the room.

Fig. 93 Lamp Shade (11)
 A versatile idea that reaches beyond the market of hotels. The Design is altered by working with different fabrics.

Fig. 94 Wall Mount. (12)
 Designing a versatile and discrete wall piece that matches different interior styles. Lighting could also be included.



Fig. 95 Photo of all the foam prototypes built.

Initial Prototyping

While sketching is a great way to communicate ideas, building mock-ups and prototyping will help the designer discover and avoid potential pitfalls at an early stage. Combining these tools is a great way to streamline the design process and save time. The Advantages of early prototyping is that it allows the designer to get a better feel of sizes and proportions, what will work and not e.g. At this time, work is alternated between sketching and building simple form volumes of the most interesting ideas. During this time Orlo also reveal more details concerning the technical specification requirements. Though, this will be described in-depth within a later chapter. However, it is now clarified that the final concept should hold two elements and that these elements require an acoustic volume of roughly one liter in total. This affects the project in the sense that some ideas that previously were considered promising, are now turning out to be inadequate. The Reason for this is this requirement for a larger volume that forces the dimensions to be increased in a way that renders these ideas unattractive ■

Fig. 96 Examining the appearances of different shapes.



► Evaluation

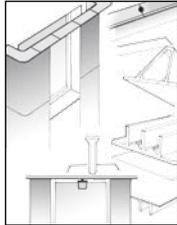
The Concepts are evaluated based on their level of feasibility and uniqueness. There are for example several cool ideas on modularity and multi-purpose products, but in one way or another they are regarded too complex or too time consuming for the set time of this project. The Selected concept is therefore the wall mounted speaker. This Concept will allow the designer to focus on the form development and working towards aesthetic impression that communicates interior detail instead of home electronics.

The Discarded Concepts

Generating concepts is easy. The Difficult part is finding a concept that's feasible for all stakeholders involved in the project. The More stakeholders, the more time needs to be spent on analyzing the feasibility and the probability of them succeeding. This is why so many of the ideas are easy to discard. For example: to incorporate the speaker in a piece of furniture would ultimately require a collaboration with a furniture manufacture to become a success.

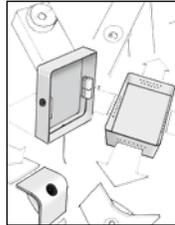
The Concept with the NFC-surfaces is considered a cool idea, but it requires more work to be mapped out theoretically. The Possibility of hitting a dead-end at a later stage causes it to be discarded as well.

While the idea of multi-purpose products and modular systems always seems appealing, there is always the risk of ending up with a solution that performs mediocre in several ways. By combining the speaker with a light the product is destined to be placed at certain places within the room. Therefore, it seems wiser to stay away from multi-functional concepts and focus on designing an excellent speaker instead. The Only real option to the wall mounted speaker is the ceiling tile concept, since it holds the potential to be applicable in other environments as well and not just hotels. The Downside to this path is that the speaker will be out of sight for the guest. That is not the ideal situation for a company that wants to gain brand recognition, nor a design student that wishes to demonstrate the range of artistic skills acquired throughout the education ■



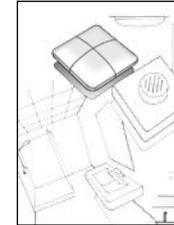
Curtain Rack (1)

Discarded due to being too complex and material consuming. A lot of materials would be used to simply hide two small speaker drivers.



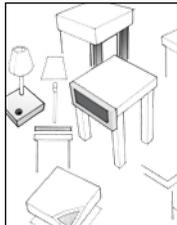
Frame (2)

Discarded due to complexity. Supporting different frame sizes would demand a large inventory and the many components would also increase production costs.



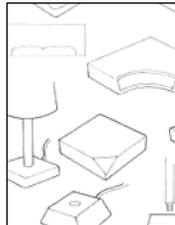
Ceiling Tile (3)

Discarded due to being too discrete of a speaker. Orlo needs to gain brand recognition in order to grow. This Idea should be saved for later.



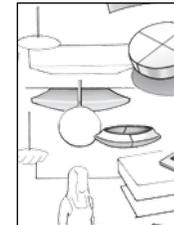
Bedside Table (4)

Discarded. Holds a low probability of success. This Idea should only be carried out as a collaboration with a furniture manufacturer.



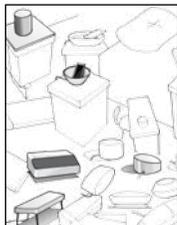
Desk Light Base (5)

Discarded. An Interesting concept, however the minimum required acoustic volume renders the design too big to be an attractive solution.



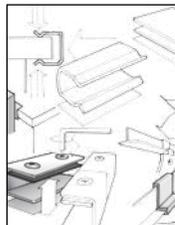
Ceiling Lights (6)

The Trends within lighting and interior decoration changes too rapidly for this to be a feasible idea and it is therefore discarded.



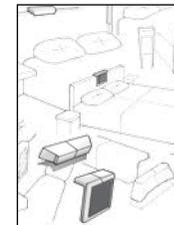
NFC-Charging Pads (7)

The Charging Pads are discarded due to being too complex. The Idea will result in additional work for the staff, affecting them in a negative way.



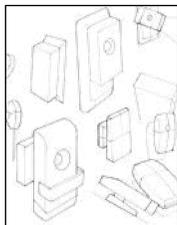
Brackets (8)

This Idea might make up a solution for another concept. However, it doesn't hold any weight on its own and is therefore discarded.



Bed Headboard (9)

This Idea is discarded for the same reasons as the bedside table concept.



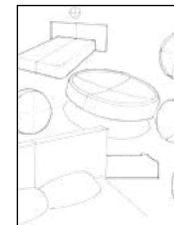
Spotlight (10)

This Idea is discarded for the same reasons as the ceiling light concept.



Lamp Shade (11)

Considered too vulnerable to theft and is therefore discarded. It's also dependent on the placements of the light sources within the room.



Wall Mounted (12) - Picked

Chosen for being the most straight forward candidate. This Concept solely focus on delivering high quality sound, while being a stylish interior detail.

Defining Requirements

MF = Main Function
 NF = Necessary Function
 DF = Desired Function
 UF = Unwanted Function

Fig. 97 The Conducted research along with the first sketching phase now makes it possible to define the exact specific issues that need to be addressed in order to design a successful hotel room speaker. It is chosen to use the function analysis tool as a way of communicating this internally and externally with the client. This will make it easy to evaluate the project afterwards and determine whether it managed to solve the problems it set out to address. Another advantage with the function analysis tool is that it allows the designer to communicate the internal hierarchy between the different functions. One can say that this marks the starting point of the design process that will result in the finished design proposal ■

Grade	Verb	Noun	Explanation
MF	Distribute	Sound	-
NF	Receive	Current	Through power cord connected to a wall socket
NF	Support	Mounting	Onto walls
NF	Prevent	Thievery	-
NF	Limiting	Volume	Preventing guests from causing disturbance
NF	Provide	Stereo Sound	Using 2 speaker drivers
NF	Hold	Volume	Acoustic Volume of min. 900 ml (450 ml per chamber)
NF	Possess	Thickness	Minimum 2 mm (injection molded parts)
NF	Prevent	Air-leakage	By incorporating rubber gaskets
NF	Possess	Buttons	1 Power-switch and 1 button for resetting bluetooth
NF	Support	Connectivity	Wireless and password-protected through Bluetooth A2DP
NF	Be	Analogous	Through 3,5 mm AUX-port
NF	Contain	Manifolds	1 Manifold/Chamber that ends in a trumpet-like opening with a min. radius of 5 mm. Required length (end-to-end) 170 mm and a cross sectional area of 155 mm ²
DF	Give	Feedback	By working with sounds and lighting
DF	Offer	Flexibility	Changing colors and materials to create variations
DF	Scalable	System	Multiroom-functionality
DF	Broadcast	Information	Welcome messages, check-out time, evacuation routes etc
UF	Support	Home Theater	Connectible to the TV
UF	Receive	Phone Calls	Function as speaker phones
UF	Support	Dialogue	2-way communication between the guest and hotel

Preventing Disturbance



Fig. 98 Mock-up of the potential cloud based service and its interfaces.

As mentioned earlier, hotels dread bad reviews and unsatisfied guests. This means that they fear anything that can cause nuisance, like guests disturbing each other by playing music too loud e.g. Limiting the maximum playable volume is therefore a crucial cornerstone that determines whether this product will become a success or not.

Two Possible Solutions

There are two ways to solve this problem. The First one means that Orlo would conduct an acoustic investigation of the rooms upon signing a contract with a hotel. Orlo would determine which volume can be played without being overheard in neighboring rooms and use this data to set a digital limitation in the speakers during production.

The Second option is more of a big scale, long term idea where Orlo develops a cloud-based service that the hotel manager uses to monitor and adjust the performance of the speakers installed. This concept would also allow for more advanced features to be added later on. An example of such a feature could mean to upload customized welcome messages and escape-plans for each speaker. Ultimately this approach

would make for a product where the functionality and performance lies more in the software than the physical body. The Advantage to this is that the product can be updated over time and thereby given a longer life. However, due to Orlo's current situation the first option with a digital limitation seems the most appropriate. After all, it's the most cost-effective and easy solution to implement ■

Technical Specifications

These requirements are based on the laws of physics, choice of components, feasible manufacture methods e.g. Using the requirements as guidelines enables faster decisions-making and a more streamlined workflow.

Speaker drivers

In order to achieve synergy, the final concept shall utilize the same speaker drivers as in Orlo's previous products. The Concept will use two elements in order to generate stereo sound. The Drivers need to be diverted into separate chambers, where each chamber holds a minimum acoustic volume of 450 ml. Acoustic volume is defined as the inner volume after subtracting the total volume of all interjecting components. The Number 450 ml has been calculated by Markus Friberg and applies for these drivers specifically. Different drivers would require different volumes etc. Markus explains it like this: "The Bigger the speaker, the easier it becomes to achieve high sound quality". When asked on how to orient the drivers, Markus answered that they should be placed wide apart and directed towards the listener for optimal dispersion.

Bass reflex ports

Orlo creates the bass frequencies by using active bass reflex ports, where a manifold transports the bass sounds

from inside the speaker to the outside. Each speaker driver (chamber) needs a separate port. The Dimensions of the manifolds and ports need to correlate with drivers, or else the sound will become distorted. Once again Markus provides the correct calculations. The Manifolds should hold an end-to-end length of 170 mm (measured in the center of the tube) and a cross sectional area of 155 mm². Furthermore, they should end in a trumpet-like opening with at least a 5 mm radius. No fabric or mesh are allowed to cover the openings, since that'd cause sound distortion.

The Construction

To avoid distortions and ensure high sound quality, it's important to prevent air leakage and vibrations within the construction. For this purpose, it's decided to use injection molding as the primary production method. Markus recommends the insides to the surfaces to be reinforced with structural patterns (honeycomb e.g.) to increase the sturdiness and prevent vibrations. The Same result can be achieved through increasing the wall thickness from 2 to 3 mm, as told by Markus. In reference: ordinary consumer products usually have 1,5-2 mm thick walls, while heavy duty plastics are between 3-4 mm.

The Project will implement rubber gaskets to prevent air leakage and seal the construction with evenly spaced bolts, which will help spread out the forces evenly. This is the same approach as used in the Orlo CAP-speaker ■

Fig. 99 The Bottom-part of the Orlo CAP holds the bass reflex port (the opening) and the connecting manifold. The Construction is sealed by four pillars in which bolts are inserted.



Market Analysis

Before commencing the actual designing, it's worth taking the time to study the aesthetic expressions of existing speakers. This is done through a brief market analysis, which is focused to wireless speakers for home usage, since that's the environment most similar to hotel rooms. The Purpose of this excessive is to distinguish ways to create a design that diversify itself from its competitors.

Conclusions

The Majority of the competitor's speakers are based off the cuboid-shape, but there of course exceptions like Bang&Olufsen, Podspeakers and Harman/Kardon. In terms of colors and materials the aesthetics are leaning towards colder sensations, through combinations of plastic and metallic details. However, there are brands like Muemma, Polk and Vifa which have incorporated wood and fabrics to create softer and warmer aesthetics.

Through the analysis, it's decided that the project should go for an organic form, rather than a cuboid. It's design language should be reserved and tight. The Design should also incorporate wood and fabrics as key components. The Vifa speakers are beautiful examples on what can be achieved by using fabrics. However, in the context of hotel rooms these speaker would be too anonymous. The Goal is to find a middle ground where the guest instantly recognizes the product as a speaker ■

audio pro



Fig. 100



Fig. 102



Fig. 103

Fig. 101

BANG & OLUFSEN



Fig. 105



Fig. 106



Fig. 107

Fig. 104

BLUESOUND



Fig. 109



Fig. 110



Fig. 111

Fig. 108

BOSE



Fig. 113



Fig. 114



Fig. 115

Fig. 112

Bowers & Wilkins



Fig. 117



Fig. 118



Fig. 119

Fig. 116

**CAMBRIDGE
AUDIO**



Fig. 121



Fig. 122



Fig. 123

Fig. 120

PHILIPS



Fig. 141



Fig. 142



Fig. 143

Fig. 140

DENON



Fig. 125



Fig. 126



Fig. 127

Fig. 124

PODSPEAKERS
Shaping Sound



Fig. 145



Fig. 146



Fig. 147

Fig. 144

harman / kardon



Fig. 129



Fig. 130



Fig. 131

Fig. 128

SONOS



Fig. 149



Fig. 150



Fig. 151

Fig. 148

JBL



Fig. 133



Fig. 134



Fig. 135

Fig. 132

SONY



Fig. 153



Fig. 154



Fig. 155

Fig. 152



muenma

Fig. 136



Fig. 137



Fig. 138



Fig. 139

vifa

Fig. 156



Fig. 157



Fig. 158



Fig. 159



Fig. 160 The Boards are mounted onto the wall of the workstation, making them accessible at all times.

Inspiration Boards

Inspiration Boards is a great way for the designer visually communicate the direction he or she wishes to take the project. This may help avoid misunderstandings and situations where the result presented fail to meet the clients expectations. In this project, the boards solely focus on the aesthetic aspect, but they may also be used to discuss technical solutions etc. The Boards are created around multiple topics, in order to make the information more specific and easier to understand and discuss. The Topics are following: Project Vision, Color, Environment, Materials, Connectors, Meshes, Variations, Buttons and Displays. Together they form a good picture of the direction and intended aesthetic expression ■

Project Vision

The Aesthetic vision means to move in a direction where the design communicates a laid-back, yet vibrant expression. The Speaker should be perceived as an interior detail, rather than a traditional home electronics-gadget. It should have character, without being braggadocious.

Since people have different levels of understanding and using technical products, the speaker should allow the guests to instantly identify and understand the product upon seeing it. To achieve this recognition-effect, the design will work with iconic speaker details like: drivers, bass reflex ports and speaker cloth/grills ■



Fig. 68 A lot of speakers are designed to emphasize the performance, which tend to result in attention-seeking aesthetics.



Fig. 161 This Project aims to move in another direction and design a speaker with a calm, confident and yet vibrant expression.

Fig. 162



Fig. 163



Colors

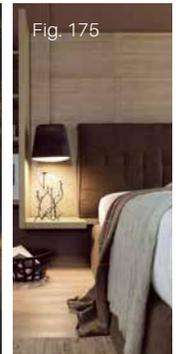
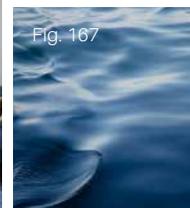
This board showcases the feelings the design aims to evoke. The Selected colors are mostly saturated hues inspired by nature, like forests and oceans. They are picked with the intention to create a cool and sedative palette to work from. The Strategy is to use base colors for the major parts and add vibrancy through colorful details. This should allow the design to separate itself from the remaining decor in a subtle way. The Board is clarified further by adding inspirational words as a complement. The words are: Harmonic, Homey, Contrasts and Vibrant. They will serve as guidelines for decision-making regarding the design ■

Vibrant

Contrasts

Homey

Harmonic



Environment

The Speaker will be designed with modern hotels in mind. This means tidy and well-planned rooms with built-in details etc. The Rooms are reserved in their decoration and soberly colored to withstand changes in trends. Colors and textures are instead added through replaceable details like pillows etc. All together this creates a chill and refreshing atmosphere within the rooms ■



Fig. 177



Fig. 178



Fig. 179

Form

The Design shall find its base in round or organic shapes. The Aesthetics should play with a combination of concave and convex surfaces, creating interesting meeting points. It should also work with re-appearing circular elements in order to create a stronger affinity. To ensure that the dynamics of the design isn't lost, the repetitive aesthetic should be interrupted with an element of asymmetry as well ■

Fig. 180 Concave / Convex



Fig. 181 Repetitive Forms



Fig. 182 Asymmetric Details



Materials

The Aim is to combine hard and cold materials (metal and plastics) with warmer counterparts, like fabric and wood. This should help the speaker be perceived more as an interior detail, than a home electronic product. The Project chooses to practice a design philosophy known as *right material at the right place*, which means the designer applies the materials where they are best suitable ■



Fig. 183



Fig. 184

Connectors

While designing consumer products, the design usually prioritizes the surfaces and details that will be visible to the user, hence neglecting the backside e.g. The Goal in this project is to focus on the entity of the product, meaning thoughtful detailing when it comes to the connectors and their interface ■

Fig. 185



Fig. 186



Meshes

One of the iconic features the design aims to work with is the grill/mesh. At this point it is still unknown whether a fabric cover or a hard mesh is the better choice for meeting the goals. Since they visually look very different, some experiments will have to be conducted. The Advantage of using a hard mesh, is the ability to create patterns through different hole formations ■



Fig. 187



Fig. 188

Variations

A smart approach to creating variations of a design is to choose one (or a few) detail(s) to modify, while the remaining parts stays the same. Keeping the amount of components to a minimum is a good approach to keeping the costs down. This Project aims to work with different coloring to create diversity and allow the speaker to better match multiple interior styles ■

Fig. 189



Buttons

The Speaker should easily be recognized and understood as a bluetooth speaker by the guests. User friendly interfaces are a cornerstone to this. A few inspiring photos are selected for this board. However, it's still uncertain what level of interface to use, or if the speaker should completely leave out buttons/displays and solely be operated through the guest's smart devices ■



Fig. 190



Fig. 191



Fig. 192

Displays

What kind of information does the speaker need to communicate visually? Or does it need to communicate at all? In case the design chooses to incorporate a display, then it should work with a backlit-type of solution ■

Fig. 193



Fig. 194



Design Process



Fig. 195 The Shape selected for continuous work.

Starting Point

The Design phase begins with an exploratory approach using the parabolic shape as its starting point. The 3D-modeling software Rhinoceros allows for easy experimenting with proportions (like the ratio between width and depth). This enables variation of the 1-litre volume to be generated quickly. During this process, two aesthetic principles are identified. These principles will together play key roles in the final design. The First principle is to contrast the convex curvature by making a subtle concave cut to the top of the shape. Apart from creating in an interesting visual expression, a flat/concave top seems advantageous from other aspects such volume efficiency and placement of buttons e.g. The Second principle means to allow the side of the shape to creep back inwards, creating a drop against the wall. This makes the form pop out from the wall and design feel more dynamic. Both these principles will be tweaked along the way of this design process ■

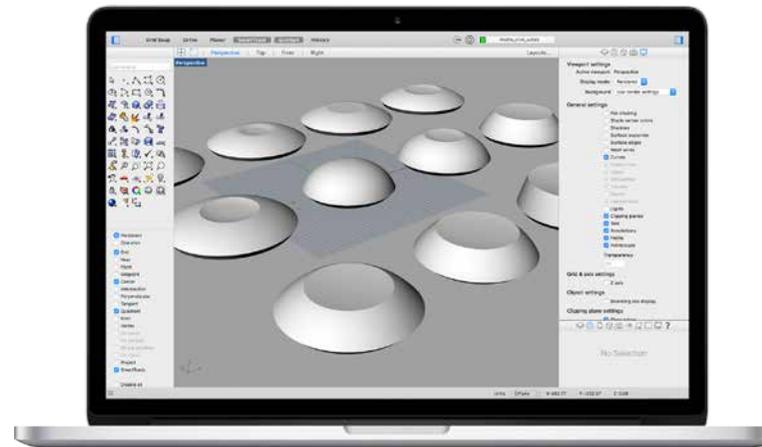


Fig. 196 The Starting Point. Created variations of a 1 liter volume by playing around with different dimensions.

Stage 1

The Attention is directed towards the technical requirements and how the speaker should be designed from a fabrication perspective. The Shifting curvature demands it to be a two-part solution, meaning a separate top and bottom part. Adding a ferrule in between the two would make it possible to secure the construction while separating the parts visually. During this stage, materials like aluminum and fabric are assigned to the model with the purpose to determine how combinations of materials will affect the shape and its visual expression.

The Technical Requirements says that the speaker shall have a two-chamber construction where each chamber hold a separate manifold and bass reflex port. The Project Vision declares that the design shall trade on elements that are iconic for speakers, like the bass reflex port etc. The Question from a design perspective then becomes whether the design should use a solution with two orifices, or use two ports that come together in one big orifice? ■

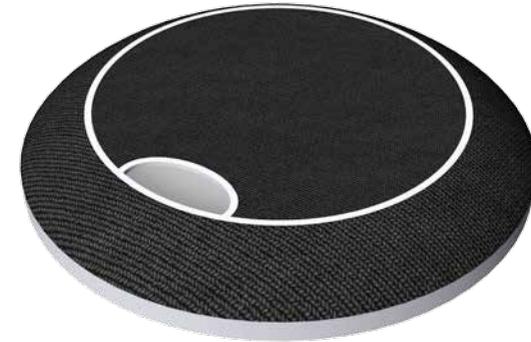


Fig. 197 Alternative 1 - The Idea of having the two bass reflex ports coming together in one common orifice.



Fig. 198 Alternative 2 - The Idea of having separate orifices for the two bass reflex ports.

Stage 2

It's now decided to work with one common orifice instead of two separate ones. This will generate a cleaner expression with fewer details for the eye to process, hence rendering the design more harmonic. In this stage, wood is introduced to the model and the aluminum ferrule is replaced with a black rubber gasket. This is done to ensure that the design won't be leaking air. The Profile curve is also going through some big changes. The Convex curvature shown in previous stages acts too restrictive towards the components inside. By replacing it with a more vertical profile, the volume can be used more efficiently. A new detail in form of a fillet between the top surface and side is added to improve the dynamics and play with repetitiveness of circular elements. The Slightly concave top-surface is kept from previous designs and also the drop towards the backside of the design ■



Fig. 199 The Design is divided unevenly between the top and bottom part and kept together by a black rubber gasket that replaces the previous aluminum ferrule. In this design, the profile curve has been modified to a vertical edge with a concave fillet at the top.



Fig. 200



Fig. 201

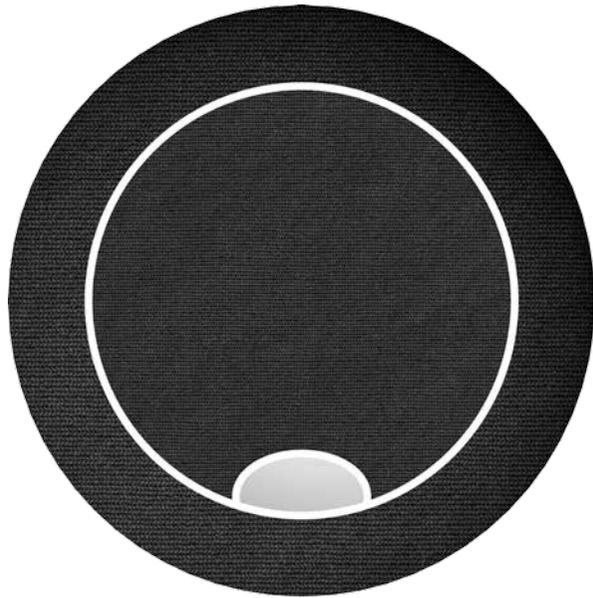


Fig. 202 The Orifice doesn't interact match the overall design in an aesthetically pleasing way.

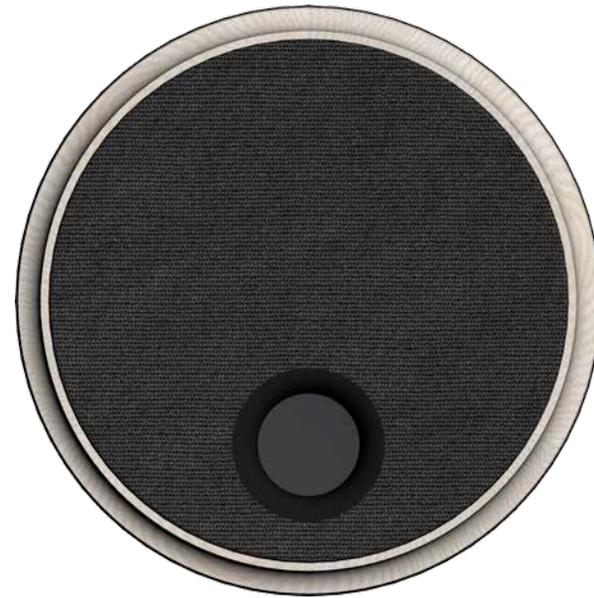


Fig. 203 The Orifice is improved by changing it to a circle that, which adds to the aesthetic principles of round forms and repetitiveness.

Fig. 204 The Design becomes more dynamic through the concave fillet between the top and the side, which exposes the wood and makes it visible when viewed from the front.

Wood and Coatings



Fig. 205 The Y-Chair in Ash. Designed 1950 by Hans J. Wegner

The Following texts are written summations that strives to discuss wooden materials suitable for the design. There are multiple options to choose from, depending on where and how the speaker will be used. In connection, the project also discusses how to protect the design by using different methods of coating.

Ash

Ash is a bright wood that historically has been used for tool handles, wooden wheels and furnitures due to its strength and durability. Despite its toughness Ash is pretty easy to process through machinery. In this project, it's mainly picked due to its beautiful light color and subtle texture. Unlike oak, Ash isn't water resilient and therefore needs to be protected through some sort of coating.

MDF

MDF is manufactured by mixing wooden fibers with glue and pressing it together using hydraulic force. Due to this composition, the MDF holds no fiber direction and can be cut in whatever direction desired. The Homogenous composition makes MDF advantageous compared to regular wood, in the sense that it doesn't deform erratically when being exposed to changes in humidity. If the intention is to use the speaker in the bathroom, then it'd be better to use MDF instead of ash. Neither does it make sense to use ash, if the speaker is set painted in solid color. MDF would be a more economical choice in that scenario. However, at this stage, it's uncertain how a change in materials would affect the users perception of

the speaker. Would it reduce its value or go by unnoticed? The Question is left for Orlo to investigate, in case they decide to realize the concept.

Thermally Modified Wood

By heating wood to a temperature above 180 degrees celsius in an oxygen-poor oven, the properties are improved and the wood color darkened. Wood that undergoes this process is referred to as Thermally Modified Wood. What this process does is that it increases the durability and the material's resistance towards moisture and insects infestation. The Process can be performed on any kind of soft- and hardwood and could be an alternative to using ash and avoid the coating process and its costs.

Coating Methods

Materials are coated to increase resistance towards wear and tear. When speaking about wood, coating means to apply a solution that blocks the pores and protects it from rot and insects infestation. Wood can be coated in numerous ways, ranging from painted in solid color, to lacquered or having wax applied. To identify the most suitable method one must first determine the quantity of speakers to be manufactured, the threats it should withstand, then the costs and whether to use chemicals or not. This report doesn't provide an answer to this question, nor does it recommend a specific solution. Rather it acknowledges that the question needs to be investigated deeper. But, unless it's decided to use thermally modified wood, the speaker must undergo a type of coating process ■

Fig. 206 Visual comparison between Thermally Modified Aspen and Non-treated Aspen.



Fabrics and Meshes

One of the objectives means to design a speaker that's perceived more as an interior detail than a home electronics product. Since the part that's covering the drivers represent a majority of the design, its look plays a crucial part in reaching this goal. However! There's a concern that a hard top will make the speaker look too cold. At the same time it's assumed to be a demand for this type of aesthetic. Instead of making a rushed decision, the project decides to present a soft cover as the primary design and a hard-top as a secondary proposal. Both will be prototyped, but the fabric version will be prioritized in the event that the project out of time.

Fabrics

Speakers as products are historically speaking a conservative group of products. This shows in the limited range of colors offered when it comes to speaker cloth. The Project fails to find a Swedish company that offers

anything else than black, gray and white and the schedule doesn't allow looking for international suppliers either. In order to guarantee a visual coherence between the 3D-model and the final prototype, it's decided to use traditional black acoustic fabric.

Meshes

The Mesh is intended to be built off an aluminum sheet where the pattern has been punched out. The Pattern should make sense from a manufacturing perspective while matching the overall design.

In this chapter a selection of both similar and diverse mesh patterns is compared in order to get a feeling for the different possibilities available. The Best options from an aesthetic point of view are the patterns with round holes as seen in A, B and C. This Project will seek inspiration in all three of them, creating a modified pattern that better match the outer edges of the surface and the orifice ■



Fig. 207 A



Fig. 208 B



Fig. 209 C



Fig. 210 D



Fig. 211 E



Fig. 212 F

Branding

The Branding aspect is introduced fairly late in the design process and therefore a bit tricky to handle. However, by looking at competitive brands for inspiration, the project can avoid bad branding decisions from being made. The Onyx Studio II-speaker from Harman Kardon (Fig. 129) is a good example on beautiful branding. It's discreet, stylish and visible from all directions. Within this project, the goal is to find a balance, where the design creates brand recognition for Orlo without being too conspicuous.

The First idea (Fig. 214) aims to engrave Orlo's logo into a plastic disc, covering up a bolt that holds the construction together. The Idea is discarded as it turns out that this single bolt-construction will cause air leakage. Neither does it play well with the design visually. The Second Idea (Fig. 215) is to engrave the brand onto the bottom of the orifice and backlight it using LEDs. Though, the idea is discarded because it will entail in increased engineering complexity. Also, as the logo is submerged, it will be difficult to see it from other directions than the front.

Finally, the project settles on engraving the logo onto the wooden frame using laser. The Inspiration for this decision comes from the Tork Xpresssnap dispenser (Fig. 213) that Zenit helped design. By taking this route, the design will keep its clean surfaces ■



Fig. 129 Onyx Studio II from Harman Kardon.



Fig. 213 The Tork Xpresssnap Dispenser.



Fig. 214 The Logo is engraved onto a plastic disc.



Fig. 215 The Logo is engraved and back-lighted.

Visual Feedback

All of Orlo's previous products utilize sounds to provide feedback to the user. The CAB-speaker broadcasts a sound when being turned on or paired with a device e.g. If the design were to include lighting as additional line of communication, the speaker would become more user-friendly as people would learn to operate it quicker. The Project gathers inspiration from the smart speaker Amazon Echo (Fig. 216), which uses a ring of light on its top to provide feedback. By shifting colors, adjusting brightness or moving the light around – the speaker is able to provide multiple kinds of messages. Through some investigative work it's concluded that this particular feature (Fig. 217) won't add to the design, but rather make it be perceived as messy and gimmicky. The Design will instead use a single diode (Fig. 218) to indicate whether the speaker is active or in stand-by mode. Any visual feedback beyond that will be provided through the applications used to stream the audible content and operate the speaker. Finally, it's decided to lower the diode into the edge of the orifice (Fig. 219) since this creates the cleanest look ■



Fig. 216 The Smart Speaker Amazon Echo.



Fig. 217 An early idea on incorporating a ring of light in the bottom of the orifice.



Fig. 218 It's eventually decided to include lighting in the form of a simple diode.



Fig. 219 The Project settles on having the diode recessed into the edge of the orifice.



Stage 3

Taking a break from the design development of the main shape turns out to be beneficial, as the design is viewed with fresh eyes. It's realized that the current form language is too rigid to match today's trends. This is addressed by gradually softening the design, starting by removing the rubber gasket. Instead of having the construction divided into two parts, the project decides to use a turning machine to craft the wooden frame from one solid piece of wood. Though this new aesthetic is coherent with the Form-inspiration board, the design feels heavier and less dynamic than before. In discussions with friends and supervisors the idea of flipping the design comes up as a possible solution ■



Fig. 220 This look feels more coherent with current design trends.



Fig. 221 The Idea of dividing the design into two separated pieces is scrapped.



Fig. 222 The Aesthetic is too rigid and edgy and shall therefore be tweaked.



Stage 4

The Profile curvature is flipped in the opposite direction while keeping the dimensions of the design intact (Fig. 223). This action brings back the drop towards the wall. However, this curvature looks too extreme and doesn't intersect well with the top surface. To counter this, the curvature is tightened (Fig. 224), causing the visible edge to completely disappear. This is too extreme in the opposite direction and unfeasible from a wood working perspective. A compromise is found in the third version (Fig. 225), as the curvature is smoothed out. It's now possible to get a small glimpse of the speaker's depth when viewing it from the front. Also, the thin wooden edge creates a beautiful contrast to the fabric, improving the overall aesthetic ■



Fig. 223 The Design looks too bulky after being flipped.



Fig. 224 The Tightening of the curvature is too excessive.



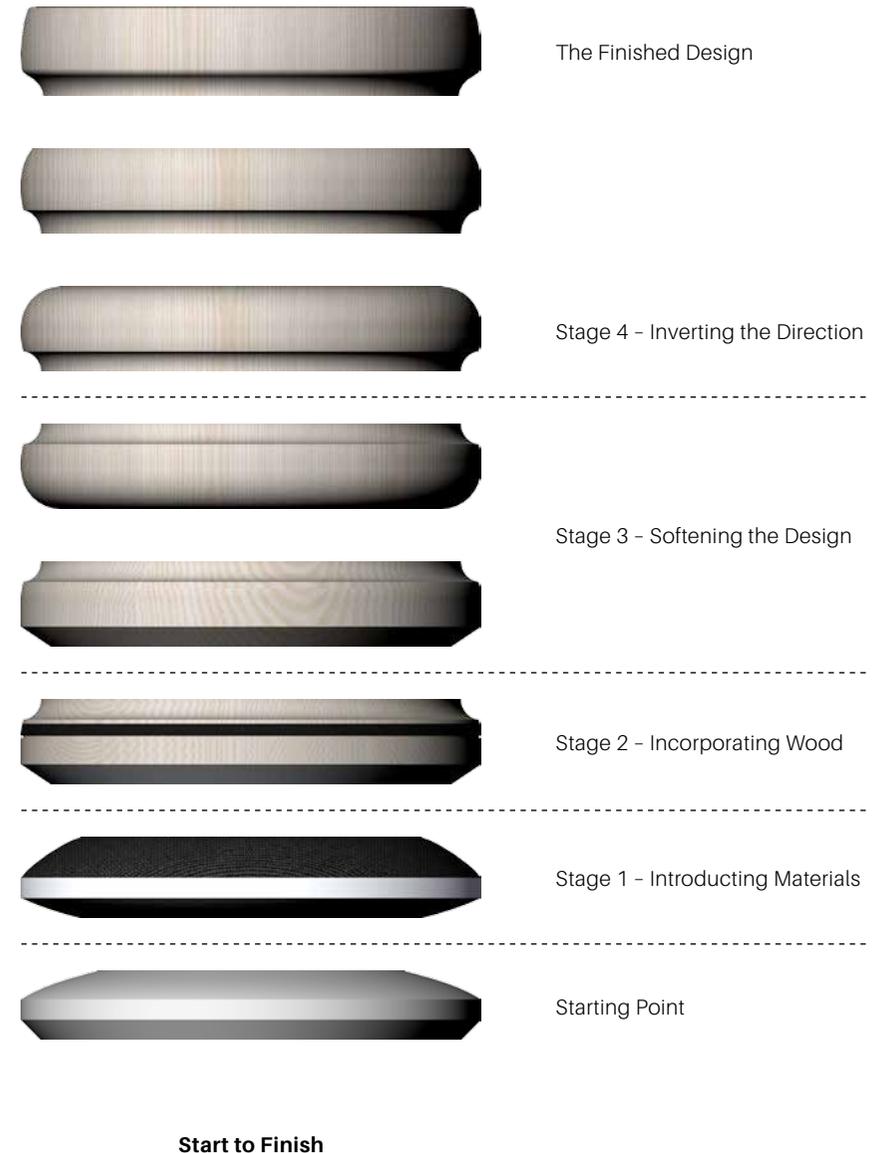
Fig. 225 A middle-ground is found in the final version.



Fig. 226 The Curvature of the design allows the user to get a glimpse of the speakers depth.

► Conclusions

Developing the main design was a demanding process, but worth its while in the end. It was satisfying to define the aesthetic guidelines (inspiration boards) before commencing the actual designing. And then seeing how this approach managed to keep the project on track all the way through. Though the steps were many, the increment of quality is clearly visible between all stages. The Finished shape manages to incorporate all principles, like working with round forms, repetitiveness and adding an element of asymmetric (the placement of the Orifice). It holds an unique character without being over-designed in a forced manner. This is attributed to the smooth profile curvature, which ultimately was the result of abandoning the idea on using a two-part solution. By turning the whole shape from a solid piece of wood, the design became more harmonic looking. It also felt more in touch with contemporary design trends ■



Developing Details

The Bass Reflex Port - Early Designs



Fig. 227 The First Idea

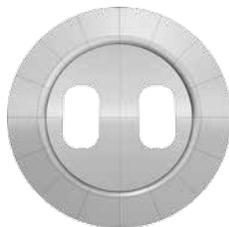


Fig. 228 The Second Idea

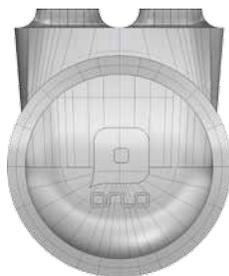


Fig. 229 The Third Idea

As the outer shape is completed, it's time to focus on the details of the speaker. To make this easier to comprehend, here's a quick recap: the speaker will be equipped with two speaker drivers, which demands the construction to be divided into two chambers with one individual bass reflex port and manifold each. Though, the project decides that the manifolds will come together in one common port (from now on referred to as orifice) instead. This Orifice will connect the inside with the outside of the speaker and since it'll become an eye-catching detail, it's crucial that it interacts with the top surface in a beautiful way. The Appearances of the manifolds are controlled by the specifications provided by Markus Friberg, meaning that this is more about determining how the manifolds and orifice should connect to each other. From a manufacturing perspective, it's decided to divide the manifolds into a bottom and top part and glue them together upon

assembling. Three different designs are generated before the definite solution is discovered and selected. The First idea (Fig. 227) resembles a well as it leads straight down into the speaker. The Second idea (Fig. 228) explores an idea of orienting the manifolds vertically to free space for the partition wall that separates the two chambers. The Third idea (Fig. 229) attempts to make the orifice more shallow and use it as a placement for branding. However, by looking at the design from the outside it's realized that the orifice should not be a straight-down hole, but rather an inclining surface that hides the exits of the manifolds (Fig. 230). Apart from being more subtle than the previous ideas, this design form a nice continuous slope for the sound waves to travel along ■

Fig. 230 Inside view of the finished design. The Manifolds flow in opposite direction and are separated by a partition wall.



Fig. 231 The Treble is distributed straight out from the speaker drivers.

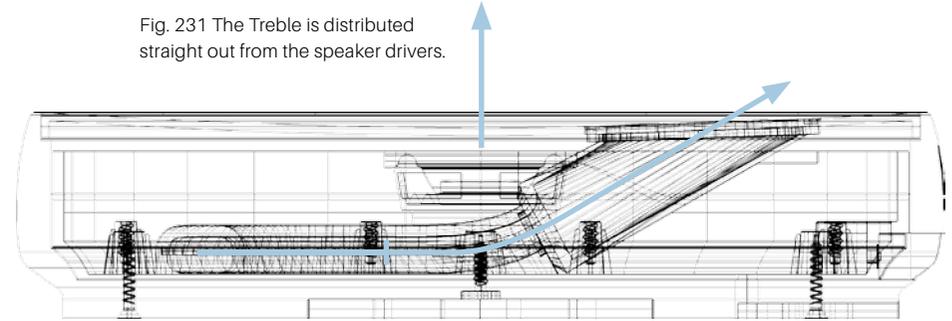


Fig. 232 The Bass travels through the manifolds before exiting through the orifice.

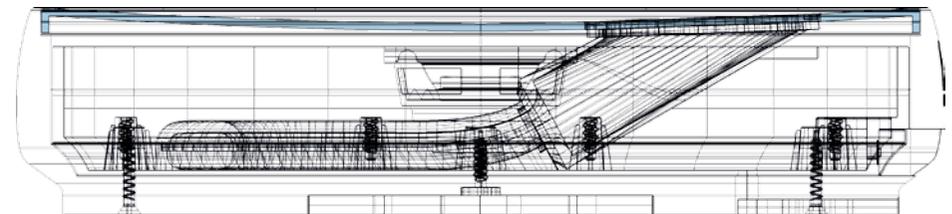


Fig. 233 Highlighting the intersection between the top surface and orifice.

Realization

The Previous Chapters explains the project and describes how the project goes from exploring initial ideas, to deciding on a set concept and developing it through different stages. Within this final chapter, the result is first shown as renderings and then complemented with explanatory texts and photos of the finished prototype. The Report finishes in an extensive discussion section. It debates both the successes and mishappenings, while at the same time giving recommendations for further work. ■



Fig. 234



Fig. 235



Fig. 236



Fig. 237



Fig. 238

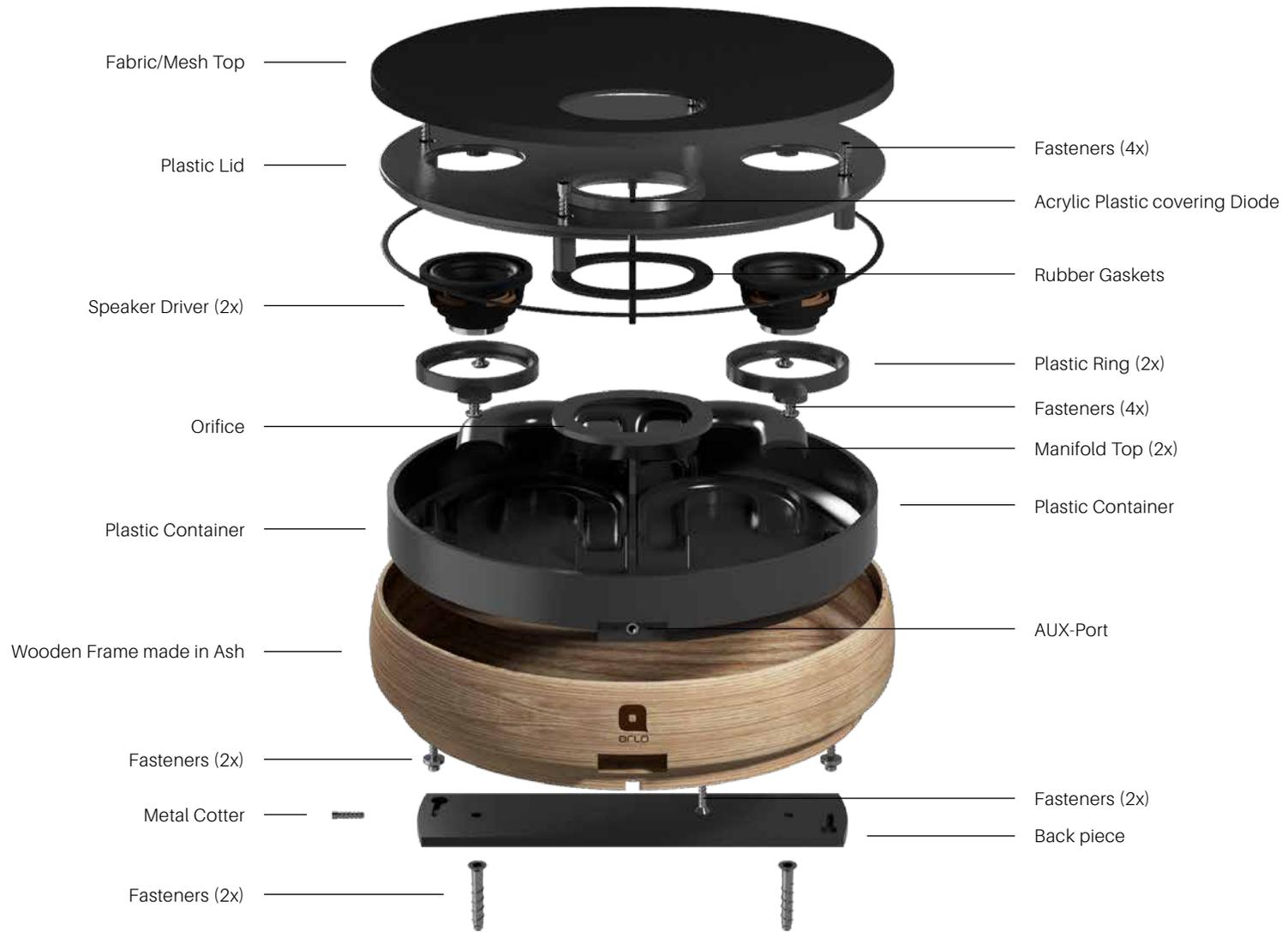


Fig. 239

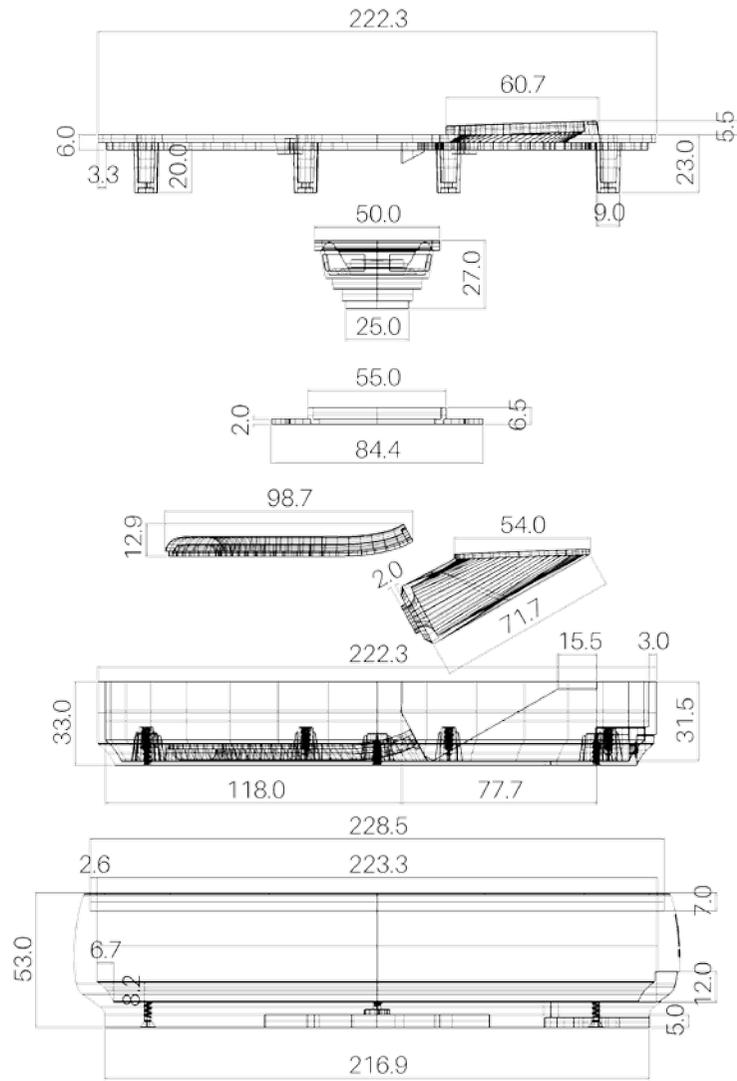


Fig. 240

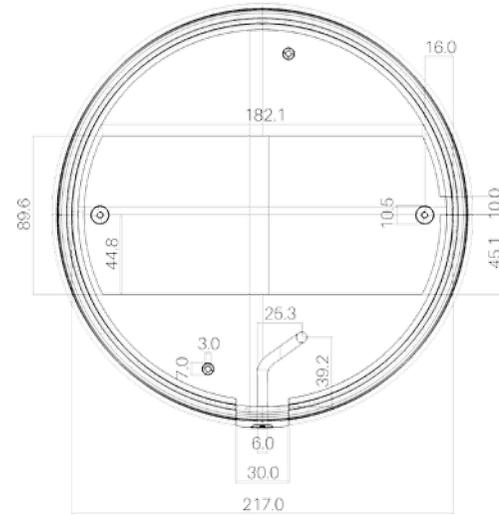
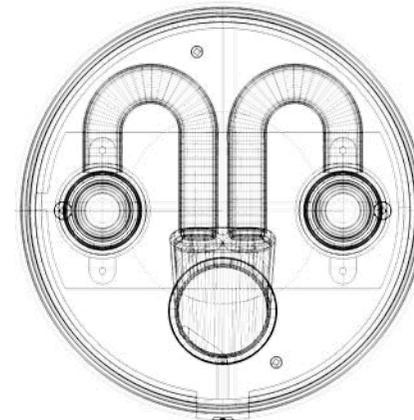


Fig. 241



The Project elaborated with the following colors before settling on using a 90% black for the plastic details.



Fig. 242 Bluish Gray



Fig. 243 Creme White



Fig. 244 Magenta Gray



Fig. 245 90% Black

Colors and Materials

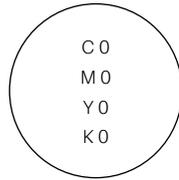
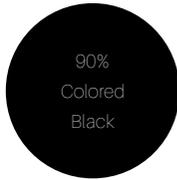
It's now time to discuss color and material assignment in relation to the finished design. The fact that the design consists of multiple parts makes it easier to generate design variations. Though, the report strives to introduce only a selective few of these possibilities. This is done to ensure a visual consistency amongst the variations. There are various ways to alter the design like: using different coatings for the wooden frame, changing colors/materials for the fabric/hard top or switch color in the plastic details. Initially, the project picks four different shades for the plastic details. The ambition is to use slightly smudged tones that'll differ from the commonly used base colors. Sadly, it turns out to be difficult to pair these colors with the colors selected for the fabrics etc. So, after careful consideration the project takes the safe route and chooses the 90% colored black as its final recommendation. To create the visual consistency, this color is set to be used for the renderings and the prototype. However, the project acknowledges the complexity of color picking and its importance for creating economical successful

products. The Project therefore presents white plastic as an alternative. Ultimately, it's recommended to subject these combinations to the evaluation of different test groups before making a final decision.

When it comes to coloring the fabric cover, the colors are derived from the early Color-inspiration board. The intention of this selection is to generate a versatile palette, where at least one variation will suit the hotel room. Also, the report previously talks about wooden materials (see page 100) and different coating methods that could be applied. Examples of these methods are shown on the following pages to demonstrate further possibilities when it comes to customizing the design. In the same way, the report illustrates through renderings how the hard top mesh could be made out of different sheet materials to create new interesting expressions.

Speaker on the materials involved – rubber is used for gaskets, aluminum for the back piece, ash for the wooden frame, polypropylene for the plastic details and acrylic plastic for covering the diode ■

Plastic Details Colors



Hard Top Grill



Materials



Acoustic Fabric Colors

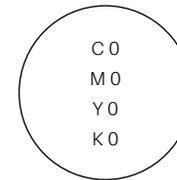
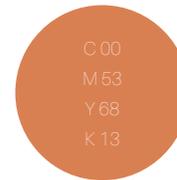
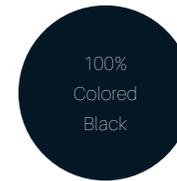


Fig. 255 Demonstration of different finishes. In the back: Gray stained, Solid Painted White and in the front, Untreated Ash.



Fig. 256 Comparison between the Fabric (Left) and the Grill (Right) design.

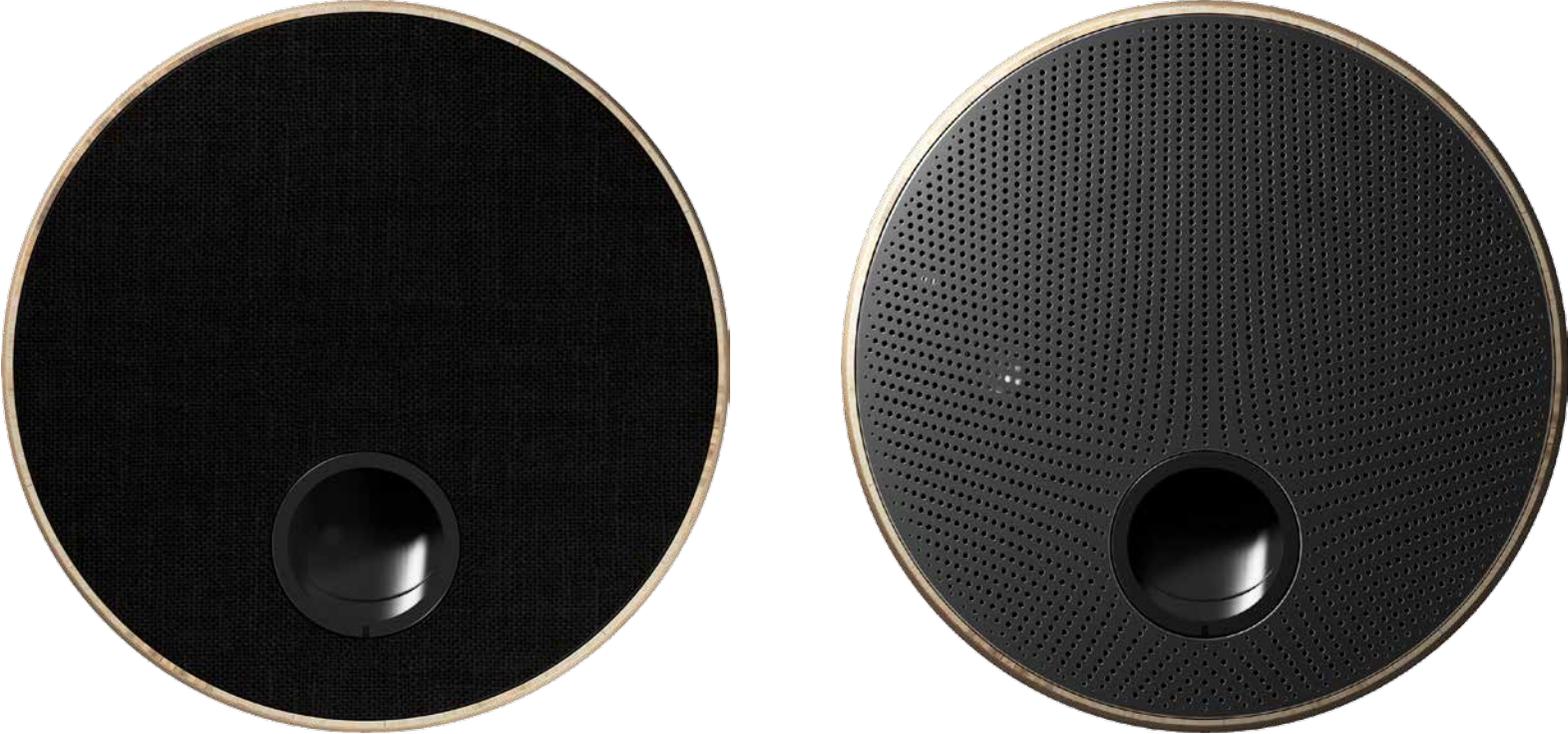


Fig. 257 Different color options for the acoustic fabric.

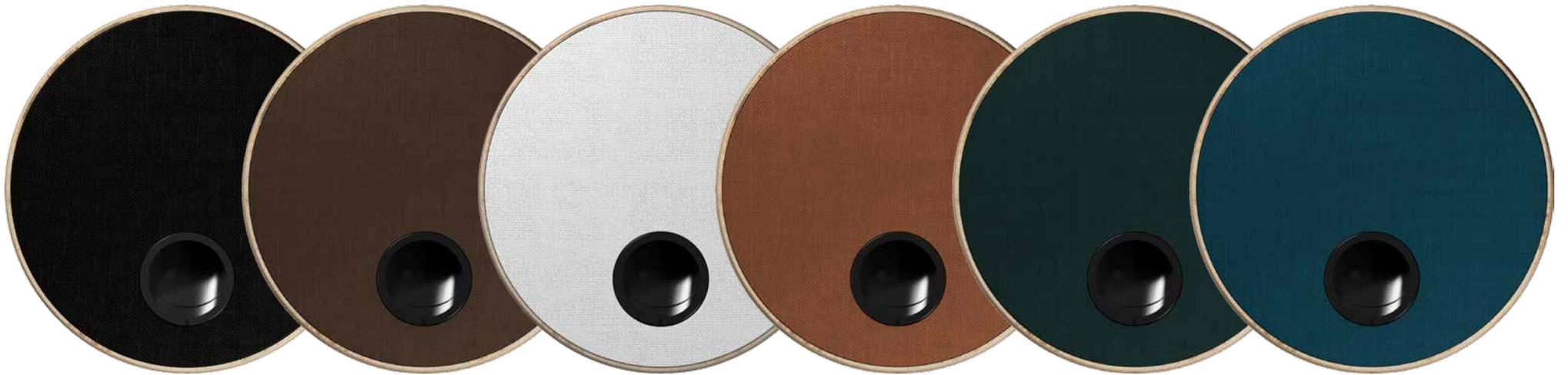
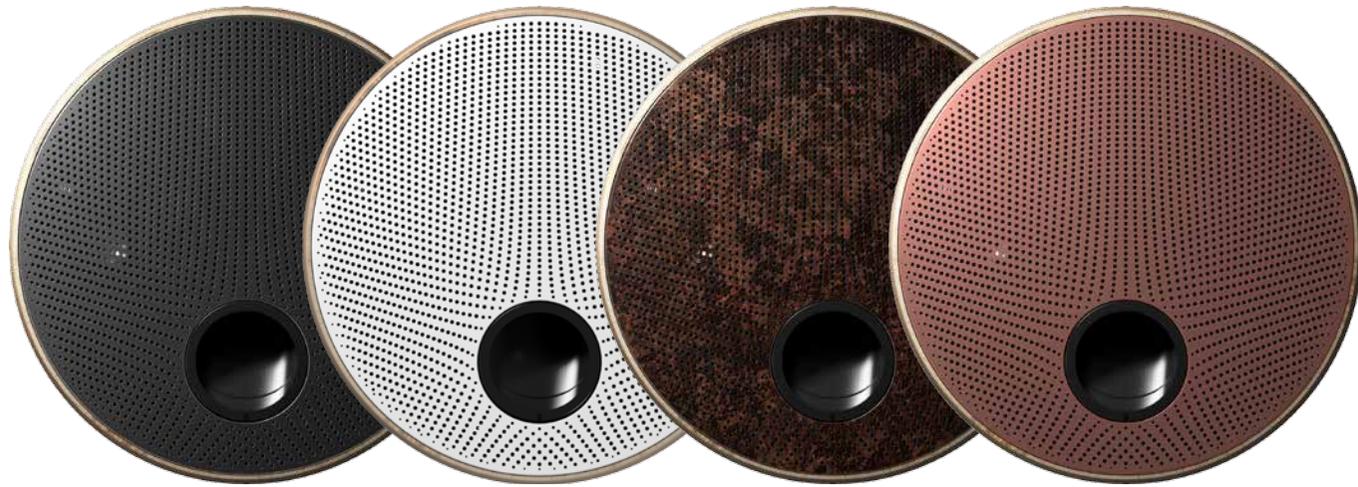


Fig. 258 The Grill can be manufactured from different sheet materials.
Black/White Anodized Aluminum, Oxidized Steel and Copper.



Completed Tasks

MF = Main Function
 NF = Necessary Function
 DF = Desired Function
 UF = Unwanted Function

- Accomplished Task
- Software Dependent Task

Fig. 259 Before the design phase, the project defined the requirements the final design needed to fulfill (see Defining Requirements at p. 82). It's now time to revisit these requirements for evaluation purpose. In this version of the table, the functionalities have been marked with different colored circles. The light blue circles indicates that the function is fulfilled, while the dark blue circles marks software-based functions which the project was demarcated for. Those functions have only been solved and discussed in theory ■

	Grade	Verb	Noun	Explanation
●	MF	Distribute	Sound	-
●	NF	Receive	Current	Through power cord connected to a wall socket
●	NF	Support	Mounting	Onto walls
●	NF	Prevent	Thievery	-
●	NF	Limiting	Volume	Preventing guests from causing disturbance
●	NF	Provide	Stereo Sound	Using 2 speaker drivers
●	NF	Hold	Volume	Acoustic Volume of min. 900 ml (450 ml per chamber)
●	NF	Possess	Thickness	Minimum 2 mm (injection molded parts)
●	NF	Prevent	Air-leakage	By incorporating rubber gaskets
●	NF	Possess	Buttons	1 Power-switch and 1 button for resetting bluetooth
●	NF	Support	Connectivity	Wireless and password-protected through Bluetooth A2DP
●	NF	Be	Analogous	Through 3,5 mm AUX-port
●	NF	Contain	Manifolds	1 Manifold/Chamber that ends in a trumpet-like opening with a min. radius of 5 mm. Required length (end-to-end) 170 mm and a cross sectional area of 155 mm ²
●	DF	Give	Feedback	By working with sounds and lighting
●	DF	Offer	Flexibility	Changing colors and materials to create variations
●	DF	Scalable	System	Multiroom-functionality
●	DF	Broadcast	Information	Welcome messages, check-out time, evacuation routes etc.
■	UF	Support	Home Theater	Connectible to the TV
■	UF	Receive	Phone Calls	Function as speaker phones
■	UF	Support	Dialogue	2-way communication between the guest and hotel



Fig. 260



Fig. 261



Fig. 262



Fig. 263



Fig. 264

Results

Answering Questions

How might the implementation of speakers improve the guest's hotel experience?

By visiting several hotels, talking to hotel managers, conducting surveys and performing analysis the project reached the conclusion that speakers can benefit both the hotels and guests in multiple ways. Speakers could work as entertainment, allowing the guest to enjoy music, relaxing sounds, podcasts and audio books. By installing more than one unit, a multiroom system can be created, which would make it possible to stream different content in the bathroom and main room, or having the music following the guest. A more innovative approach would be to use speakers as a new line of communication between the hotel and the guest. By working with smart door locks and motion sensors in the door frame the speaker could be activated and broadcast an audio message that welcomes the guest. This functionality could be expanded to include providing information about when to eat breakfast and check out e.g. It could also be used to provide instructions for evacuating the facility during an emergency.

What requirements does the speaker need to meet in order to be sold to hotels?

The Research showed that hotels fear thievery and unsatisfied guests (that might generate bad reviews). Orlo must be able to ensure the hotel that their product cannot be stolen. In the design proposal presented, this is done by

having the speaker mounted to the wall through a bayonet joint with a locking mechanism. In the terms of unsatisfied guests, it means that the hotels fear that speakers could cause disturbance amongst the guests and in the long run bad reviews and lost in profit. The Report determined that this problem could be solved by performing sound studies of the rooms and equipping the speakers with a digital limitation upon manufacturing. Another solution would be to develop a cloud-based service that allows the managers to adjust the performance of the speakers at any given time.

The Research also established that hotels are very cost-conscious and hesitant to making big investments. Reconditioning is performed a few rooms at the time, in small steps and with many years apart to ensure that the hotel remains fully operational. Orlo should therefore strive to keep the costs down when developing products for this market.

How should the speaker be designed, in order to work within different hotels and their variable interior styles?

Combining the findings of the research with the ideation processes resulted in several conclusions. Since none of the visited hotels looked or were furnished the same way, it was assumed that the speaker should stand on its own and not work as an add-on product. Due to different layouts

and building standards the best solution and placement was determined to be on the walls.

Since the Hotels greatly differs in style and their approach towards working with color it was believed that the design of the speaker should be based on base colors (like black, gray, white). Hotel rooms are intended to be experienced as a second home and therefore it was concluded that the design of speaker should express more an interior product-feeling, rather than home electronics. It was considered that the easiest way to achieve this goal is by incorporating natural material that are perceived warmer than plastics and metals, like wood and fabrics.

About The Speaker

By studying and analyzing speakers made by competitive brands, the project defined and framed several aesthetic guidelines like working with circular forms, repetitiveness and elements of asymmetry e.g. Through committing to these principles the project achieved a design that distinguish itself from speakers on today's market.

The Speaker consists of an outer wooden frame, an injection molded container that holds all the technical components, and a top-part that comes in two versions: a fabric cover or a grill made from an aluminum sheet. The Design contains additional details like the back piece,

which secures the speaker to the wall, rubber gaskets to prevent air-leakage and fasteners to hold the construction together. The Concave fabric top is intended to be manufactured by treating the fabric with starch and then pressing it to its desired shape. Since there wasn't enough time to prototype this properly, a hard top (mesh) was designed as a back-up plan. By changing the color of the fabric and working with different methods of coating the design can be altered to match different interior styles.

Operating the Speaker

The Speaker is powered through a power cord connected to an electric outlet. This choice of power source allows for the speaker to be installed and used instantly. The Cord can either be drawn along the outside of wall or inside for a more stylistic installation. The Speaker remains in standby-mode when being connected to the power source and is awakened when being paired to a smart device. A small diode engraved in the edge of the orifice indicates whether the speaker is active or in sleeping mode. The Same diode pulsates when performing a command like turning up the volume etc.

The Design contains a simplistic interface located at the bottom of the speaker. The Interface holds two buttons and an 3,5 mm AUX-port. One button is the power-switch, which allows the hotel to turn off the speaker if they find it necessary. The Second button is used to reset

the bluetooth functionality in case it freezes, which can happen to all kinds of wireless products that are built on the bluetooth protocols. The AUX-port is only included to ensure that guests without smart phones or devices that supports bluetooth connectivity aren't excluded. However, the speaker should primarily be promoted for wireless usage, as it's where it comes to its full potential. Ultimately, the guest shouldn't have to access this interface at all, which is the reason for its secretive placement. The Speaker is left without play/pause or volume buttons. Instead it is thought to be operated through the applications the guest streams their content from ■

Discussion

General thoughts on the project

The Project was positively received and praised by the parties involved. Performing the MA-thesis in favor of a company and having a representative of an external design firm as secondary supervisor has truly been a valuable experience. It has also been challenging at certain times, like trying to take all separate parties interests into account when framing and defining the project. This demanded confidence and an understanding of what questions to ask. Since this was my first real design collaboration with a company, I lacked in both regards at that given time, which caused some complications during the process. For starters was too much faith put on the different design tools such as mind maps and matrices. Progress could have been made faster if one had given up on the idea of these tool being able to generate the perfect answer to the question of what market to focus on.

The Most important lesson learned was to hereafter always determine all necessary facts as soon as possible. It was a big misconception to think that the technical requirement specifications and the set of components would change depending on the market chosen and what type of speaker to be design. By asking the client to reveal this information straight away, one would have avoided wasting time on developing unfeasible ideas.

Zenit and the Industrial Design program at Lund University have very different focuses when it comes

to design. Most students at the LTH Industrial Design-program begin their projects by conducting preliminary studies and inventing their own brief. This Results in less time available for developing the actual design and perfecting details. Though it was made clear by Zenit that the project should put emphasis on form studies, the full extent of what that meant wasn't grasped until much later. Also, the Project would have benefited from implementing the inspiration boards at an earlier stage, since they brought focus and clarity to the design process. Ultimately, the reason for failing the set time plan was not because of not working hard enough, but rather focusing on the wrong things that didn't move the project forward.

Identifying a potential market

The First part and goal of the project was to identify a market where speakers could be used in new innovative ways. The Project approached this by looking at contemporary trends, implementing several design tools and drawing conclusions from this process before making the decision to focus on hotels. It was difficult to assess whether the markets held true potential or would result in a dead-end later on. Working with hotel rooms felt like the safest and most manageable topic. The Choice could have been backed up studying statistics of the economic development for each potential market, even if the statistic were to be in favor of this choice there is no guarantee that

focusing on this market will lead to success. Basically, there is no way to predict the future and were innovation will happen and with that in mind, this research and approach is considered valid.

Visiting hotels

These field studies provided lots of valuable information that wouldn't have been achieved through any other research method. Learning about the hotels fear of thievery and disturbance and also their cost-consciousness were the most valuable findings of all the research performed. The Visits were documented through making notes on all the furnitures used in the rooms. In addition to this, the visits were documented through videos and still photos. This thorough approach was though to reveal hidden patterns and common denominators, that would indicate if a speaker should be placed inside the headboard of a bed e.g. Unfortunately, this wasn't the case. Frankly, the research showed no indication that a certain solution would suit all hotels. Rather, the conclusion is that the best way to achieve commercial success is by designing a freely placed speaker that's not dependent on the type of interior details the room is furnished with.

Basis for hotels to invest in speakers

Since the introduction of smartphones, the way we consume audio has drastically changed. The world has

more and more moved away from consuming physical products to services. Especially streaming services like Spotify and Netflix have blossomed. This thesis believes that this will affect the consumers demands in other markets such as hotels e.g.

Through the surveys conducted, it's determined that the hotel guest's main focus is the bed, then the view and overall feeling of the room. The Respondents also stated that they enjoy listening to music while grooming themselves and close to 50% do it on a regular basis. This led the project to conclude that the guests would appreciate speakers as a service, but most likely they won't be the key argument for choosing a hotel before another. Investing in speakers can still be very beneficial for the hotel though. Since today's hotels mostly compete by price and location, the adding of extra functionality through technology could provide the hotels with a competitive advantage. Speakers could also be used to differentiate rooms and help motivating an increment in price. Though the true potential of speakers lies in the future scenario where they are used as a line of communication between the guest and the hotel. This could help build stronger relationships and increase consumer loyalty. This thesis have yet to find a way to try out and evaluate this hypothesis. Rather than asking people on the matter, the functionality should be prototyped and tried on test groups in order to receive genuine responses.

Discussing the Final Design

The Project aimed to be innovative, yet credible in its final proposal delivered. By mixing natural materials with plastics the project achieved a design that allows for complex functionality and a calm aesthetic expression, all in line with the set project vision. The Design really pushed the margins to their limits in the process of fulfilling all the requirements while trying to remaining as neat as possible. The tight schedule prevented more prototypes to be built along the way. All the time spent inside the 3D-modeling software caused for the perception of dimensions to be distorted. This in turn resulted in some unexpected revelations upon 3D-printing and building the final model. For example; the tilt of the concave top is considered too flat in its current state. This detail would have benefited from being over exaggerated a bit. The Cut-out for the interface could also have been made larger in order to simplify usability. Perhaps one should have contemplated a completely different solution where the buttons are located directly at the surface of the wooden frame instead. Viewed from a conceptual standpoint it would have been interesting to completely leave out the AUX-port and even the power-switch too, in favor of a more stripped exterior. Though, including these features were considered a necessary compromise to be made.

The Project never intended to primarily base its decisions on the account of costs, however it did aim to keep Orlo's

limited resources in mind in order to ensure that the presented solutions were possible to implement in reality. Due to this, the final design was decided to have its performance limited digitally upon manufacturing. This solution was determined to be the easiest to implement and also the cheapest. In the same manner it was decided to protect the speaker from thievery by securing it to the wall using a bayonet joint. There were multiple solutions to choose between, but this approach seemed most straight forward and was considered to hold a good balance between complexity and level of security.

The Inner plastic components were envisioned to be available in multiple colors, and not just plain white and black. This vision had to be discarded because one didn't know if suggesting multiple colors would be unrealistic from the standpoint of inventory and manufacturing costs. Since there only were time for one prototype to be built, it was decided that it would be better for the project to be consequent in all aspects. It was therefore decided use black in both renderings and the prototype ■

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Orlo AB with Fredrik Bågenholm and Markus Friberg provided all the technical information needed to complete the project. As the client assumed this responsibility, the author did not need to seek information about these areas. In addition, Carl Forslund gave recommendations on production engineering decisions, such as injection molding plastic parts etc. Because of this structure, the project lacks external sources to refer to. Instead, the report strived to carefully pinpoint who provided the information and explain how the decisions were made. This arrangement allowed the author to rather focus on analyzing and developing ideas, than reading books and websites. The Project, however, do references to the hotel study visits, the interview with Markus Friberg and the chapter called Wood and Coating Methods, as those texts are rewritten summaries based of three different Wikipedia articles ■

Hotel Visits

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2016-03-23 Måns Friberg, StayAt

Interviews

2016-02-25 Interview with Markus Friberg. Communications continues throughout the projects through e-mails and phone calls.
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<http://www.ohgizmo.com/wp-content/uploads/2015/09/onelid-universal-cooking-pan-lid-3.jpg>



Fig. 189 at page 94
<https://s-media-cache-ak0.pinimg.com/736x/9e/74/0d/9e740d-273501c7e7ef063d-2c5f5d8d26.jpg>



Fig. 205 at page 100
<https://www.flinders.nl/media/catalog/product/c/a/carl-hansen-ch24-wishbone-stoel-classic-natural3.jpg>



Fig. 176 at page 91
<https://s-media-cache-ak0.pinimg.com/736x/45/e2/a1/45e2a1110f1ff0a-86f323a6161075510d.jpg>



Fig. 183 at page 93
http://leibal.com/wp-content/uploads/2015/09/leibal_beo-playa6_bo_7.jpg



Fig. 190 at page 95
<https://s-media-cache-ak0.pinimg.com/736x/ec/08/af/ec08afb848e108a0fa0f457e-26b21c8a.jpg>



Fig. 213 at page 104
https://publishingtool.stockholmssmassan.se/archive/228/images/54245_product_89130_picture_large.jpg



Fig. 177 at page 92
<http://www.magazindomov.ru/wp-content/uploads/2013/03/Apartment-Refurbishment-in-Pamplona-13.jpg>



Fig. 184 at page 93
http://www.stelt.gr/wp-content/uploads/2014/12/3-Withings-Home_pack2.jpg



Fig. 191 at page 95
<https://9to5toys.files.wordpress.com/2015/09/jbl-buttons-xtreme-9to5toys.jpg?quality=82&strip=all>



Fig. 216 at page 105
<http://www.mercurynews.com/wp-content/uploads/2016/12/amazon-echo.jpg>



Fig. 178 at page 92
http://diaria.co/wp-content/uploads/2015/08/SP34_JS_62.jpg



Fig. 185 at page 93
<https://s-media-cache-ak0.pinimg.com/736x/3b/2d/79/3b-2d79c711c2b0ba1fb-bcf4167547b3f.jpg>



Fig. 192 at page 95
<https://s-media-cache-ak0.pinimg.com/originals/b0/fb/b5/b0fb58d6fdb537a-4c674660373a6a21.jpg>



Fig. 226 at page 109
Purchased license from Fotolia.
<https://se.fotolia.com/id/140432713>



Fig. 179 at page 92
<http://mcr-inmobiliaria.com/wp-content/uploads/2017/05/alfombra-para-tu-cuarto.jpg>



Fig. 186 at page 93
<https://blueverticalstudio.com/wp-content/uploads/2015/04/Magnets.jpg>



Fig. 193 at page 95
http://www.stone-dsgns.com/cn/images/post/alarm_clock_radio_2011_stone_designs-150-8.jpg



Fig. 226 at page 109
<http://capitangeneral.com/wp-content/uploads/2016/12/textured-wall-designs-unique-5-free-high-quality-concrete-wall-textures.jpg>



Fig. 180 at page 92
https://www.ambientedirect.com/chameleon/mediapool/thumbs/6/1f/none_1200x1200-ID427969-5c3144add358b-ca9ed8e780937ae68c0.jpg



Fig. 187 at page 94
<http://img5.overboost.today/k39/renault/talisman-2015.jpg>



Fig. 194 at page 95
<http://www.thegreenhead.com/imgs/philips-wake-up-light-colored-sunrise-simulation-1.jpg>



Fig. 246 at page 121
<http://trunkweed.com/uploads/posts/images/1457505-wood-grain-hd-picture.jpg>



Fig. 181 at page 92
<http://akg.harman-japan.co.jp/product/k545/gallery/photo03.jpg>



Fig. 188 at page 94
<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcTeF552O4MHfj3gbx4riui7vCmi-XOP84FqcCrvP-cwJw82HjRk>



Fig. 196 at page 96
https://cdn.shopify.com/s/files/1/1239/4020/products/macbook_pro_128_1.jpg?v=1473064825



Fig. 247 at page 121
http://bgfons.com/uploads/aluminum/aluminum_texture1648.jpg



Fig. 248 at page 121
<http://2.bp.blogspot.com/-a7s-W8rROReU/UzUCXVQddLI/AAAAAAAAATs/lqwxKWxavfs/s1600/acrylic+2.jpg>



Fig. 249 at page 121
https://upload.wikimedia.org/wikipedia/commons/f/f5/Plastic_pellets_for_injection_molding.jpg



Fig. 250 at page 121
https://www.creationbaumann.com/portal/cbpd_b_produkte/pics/artikel/Arno/Pics/0101295_0701_Arno.jpg



Fig. 251 at page 121
http://hdwall.us/wallpaper/leather_textures_desktop_1683x1313_wallpaper-268086.jpg



Fig. 252 at page 121
<http://www.texture.com/albums/Metal-Textures/dark%20brushed%20metal%20texture%20steel%20black%20stock%20photo%20scratch%20wallpaper.jpg>



Fig. 253 at page 121
<http://www.myfreetextures.com/wp-content/uploads/2011/06/illust8.jpg>



Fig. 254 at page 121
http://t.wallpaperweb.org/wallpaper/development/1600x1200/T_Rusty_Metal_0691350.jpg

Appendix

The Report is crafted and based on a big variety of performed tasks. However, like all projects, far from all information will be relevant to display in its full length within the report. In these cases, the information is added as an appendix instead. This approach allows for the report to flow better, making it easier on the reader. Within this chapter is the full interview with Markus Friberg, the checklists that were used to log the hotel visits and the telephone interviews with the hotel managers about thievery and theft protection ■



Markus Friberg

The Interview begins with discussing Orlo's latest product, the Orlo CAB speaker. Markus explains that he is most satisfied with the technical solutions implemented in the design. By experimenting with material thickness and supportive walls structures, Orlo created a design which prevents resonance and distortions of the sound. Here from, the conversation moves into a broader discussion of Orlo's product development process. According to Markus, each project usually begins with Carl Forslund handing him a rough draft of a new product idea. Based on the measurements of the draft Markus begins scouting for suitable components to use.

Orlo's expertise lies in delivering full range-sound from small speaker volumes ("Which is why our products would be suitable for built-in constructions", Carl interjects). The term Full Range differs in meaning depending on the context. For example ordinary telephones operates within the span of 300Hz-300kHz. Regular dialogue between two individuals ranges between 100Hz to 12kHz and home theatre systems 40Hz-18kHz. (Fact: Most adults can't hear sounds above the frequencies of 18kHz). This means that designing products that deviates from this standards is to overdo things. The Rule of thumb is: Richer and more multi-layered sound equals a wider frequency range. Accordingly to Markus, the majority of speakers (equal in size to Orlo CAB that is) on today's market are unable to play frequencies below 130-150Hz, which are the frequencies that adds depth and warmth to the bass sound. Bass can be achieved by either using passive elements or by active bass ports. The first option means that the bass is generated by mounting an element facing a surface and causing it to vibrate in the desired frequencies. Active Bass Ports is a technique where customized manifolds are used to

guide the bass out from inside the speaker. Active Bass Ports generates the best sound quality, but requires more thoughtful engineering to work properly. For a long time Orlo was the only brand that incorporated the technique in such small speakers. "The Bigger the speaker, the easier it is to achieve great sound", Markus explains before elaborating further "Engineering flaws are more easy to detect in the sound quality of smaller speakers".

Tweaking and customizing components to achieve their maximal potential is something Orlo takes great pride in. This is possible through their great relationships with Chinese hardware suppliers that allows for Markus to customize the components before placing an order. "We have discussed it multiple times", Markus says before continuing "Why is so that established brands don't utilize the possibilities of the technology in a better way?". Carl nods his head and explains that Markus essentially designs PCB (Printed Circuit Boards) and uses computer coding in a way that's called DSP (Digital Signal Processing), enabling him to achieve high sound quality from ordinary components. The Conversation flows into discussing the future

and technical possibilities when it comes to wirelessly transmitting sound. In order to wireless transmit audio you need a form of protocol, Markus explains. There are a lot of options to choose from: like wLan, Spotify Connect, Apple Airplay, NFC, DLNA, Google Chromecast and Bluetooth, which is the method used most frequently. There is a lot of money to be made here so each author hopes that their protocol eventually will become the standard option in the future. Still, Markus believe that Bluetooth will be around for many years to come, since its usability has improved steadily since its release. As a manufacture you need to pay a license fee to use these protocols and currently the Bluetooth licenses are the cheapest ones to use. So even if a paradigm shift is unlikely to happen in the near future, it might be valuable to evaluate the potential of speaker concepts if different protocols were assigned to them.

During the interview it became clear that the quality of the speaker's performance is mostly dependent on how you work with components and computer programming. Meaning a lot can be achieved by small means as long as you posses the right knowledge.

A fairly new type of speakers are called Multiroom-speakers. They are built on the idea to pair multiple units together and stream the same content wirelessly. An extension of this concept would be to allow for multiple users to take control over different units and play different content in different rooms at the same time. There is also an opportunity to speak through your smartphone and broadcast it directly through a PA-system. This would be useful in both classrooms and lecture halls e.g ■

Scandic Stortorget

Who is the creator of the current interior? **Designer hired by HQ in Stockholm**

Is the interior design decided by HQ?

When did you last rebuild your facilities?

How often do you switch the decor of your rooms? **Every ten years or when needed**

FP / WM = Freely Placed / Wall Mounted

Hng / Fxd = Hanging / Fixed

Single Room

Furnitures & Details

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Headboard | <input checked="" type="checkbox"/> Curtains | <input checked="" type="checkbox"/> Built-in Spots |
| <input checked="" type="checkbox"/> Fixed Telephone | <input checked="" type="checkbox"/> 5 Power Outlets | <input checked="" type="checkbox"/> 2 Bed Light (WM / FP) |
| <input checked="" type="checkbox"/> 1 Desk (WM / FP) | <input checked="" type="checkbox"/> 2 Mirrors | <input checked="" type="checkbox"/> 1 Desk Light (Fxd / FP) |
| <input checked="" type="checkbox"/> 1 Wardrobe | <input checked="" type="checkbox"/> 2 Paintings | <input checked="" type="checkbox"/> 1 Ceiling Light (Hng / Fxd) |
| <input checked="" type="checkbox"/> 1 TV (WM / PF) | <input type="checkbox"/> Armchair | <input checked="" type="checkbox"/> 2 Bedside Tables (WM / FP) |
| <input type="checkbox"/> Media Furniture | <input checked="" type="checkbox"/> 1 Chair / Stool | |
| <input checked="" type="checkbox"/> Windowsill | <input type="checkbox"/> Floor Light | |

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement Centered in the room

Built-in Solutions None A few A clear majority

Materials

- | | | | | |
|---------|--|-----------------------------------|--------------------------------|---|
| Floor | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Fabric | <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Stone |
| Ceiling | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input type="checkbox"/> Plasterboard |
| Walls | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input type="checkbox"/> Plasterboard |

Double Room

Furnitures & Details

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Headboard | <input checked="" type="checkbox"/> Curtains | <input checked="" type="checkbox"/> Built-in Spots |
| <input checked="" type="checkbox"/> Fixed Telephone | <input checked="" type="checkbox"/> 7 Power Outlets | <input checked="" type="checkbox"/> 2 Bed Light (WM / FP) |
| <input checked="" type="checkbox"/> 1 Desk (WM / FP) | <input checked="" type="checkbox"/> 4 Mirrors | <input checked="" type="checkbox"/> 1 Desk Light (Fxd / FP) |
| <input checked="" type="checkbox"/> 2 Wardrobe | <input checked="" type="checkbox"/> 3 Paintings | <input checked="" type="checkbox"/> 4 Ceiling Light (Hng / Fxd) |
| <input checked="" type="checkbox"/> 1 TV (WM / FP) | <input checked="" type="checkbox"/> 2 Armchair | <input checked="" type="checkbox"/> 2 Bedside Tables (WM / FP) |
| <input type="checkbox"/> Media Furniture | <input checked="" type="checkbox"/> 1 Chair / Stool | |
| <input checked="" type="checkbox"/> Windowsill | <input checked="" type="checkbox"/> 1 Floor Light | |

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement Two Units placed in opposite ends of the room

Built-in Solutions None A few A clear majority

Materials

- | | | | | |
|---------|--|-----------------------------------|--------------------------------|---|
| Floor | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Fabric | <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Stone |
| Ceiling | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input type="checkbox"/> Plasterboard |
| Walls | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input type="checkbox"/> Plasterboard |

Grand Hotel Garden

Who is the creator of the current interior? **We decided the theme ourselves**
 Is the interior design decided by HQ?
 When did you last rebuild your facilities? **In 2011 by a company called Hoist**
 How often do you switch the decor of your rooms? **We bought the hotel in 2011**

FP / WM = Freely Placed / Wall Mounted
Hng / Fxd = Hanging / Fixed

Single Room

Furnitures & Details

- Headboard Curtains Built-in Spots
- Fixed Telephone 5 Power Outlets 2 Bed Light (**WM** / FP)
- 1 Desk (**WM** / FP) 1 Mirrors 1 Desk Light (**Fxd** / FP)
- 1 Wardrobe 1 Paintings 2 Ceiling Light (Hng / **Fxd**)
- 1 TV (**WM** / FP) 1 Armchair 2 Bedside Tables (**WM** / FP)
- Media Furniture Chair / Stool
- Windowsill Floor Light

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement Centered in the room

Built-in Solutions None A few A clear majority

Materials

- Floor Wood Fabric Other Stone
- Ceiling Wood Concrete Other Plasterboard
- Walls Wood Concrete Other Plasterboard

Double Room

Furnitures & Details

- Headboard Curtains Built-in Spots
- Fixed Telephone 7 Power Outlets 2 Bed Light (**WM** / **FP**)
- 1 Desk (**WM** / **FP**) 1 Mirrors 1 Desk Light (Fxd / **FP**)
- 1 Wardrobe 3 Paintings 3 Ceiling Light (Hng / **Fxd**)
- 1 TV (**WM** / **PF**) 1 Armchair 2 Bedside Tables (**WM** / **FP**)
- Media Furniture 1 Chair / Stool
- Windowsill 1 Floor Light

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement In the beginning of the room

Built-in Solutions None A few A clear majority

Materials

- Floor Wood Fabric Other Stone
- Ceiling Wood Concrete Other Plasterboard
- Walls Wood Concrete Other Plasterboard

Moment Hotels

Who is the creator of the current interior? **An architect from Stockholm**

Is the interior design decided by HQ?

When did you last rebuild your facilities? **2012 when we bought the facility**

How often do you switch the decor of your rooms? **2012 was the last time**

FP / WM = Freely Placed / Wall Mounted

Hng / Fxd = Hanging / Fixed

Single Room

Furnitures & Details

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Headboard | <input checked="" type="checkbox"/> Curtains | <input checked="" type="checkbox"/> Built-in Spots |
| <input type="checkbox"/> Fixed Telephone | <input checked="" type="checkbox"/> Power Outlets | <input checked="" type="checkbox"/> Bed Light (WM / FP) |
| <input checked="" type="checkbox"/> Desk (WM / FP) | <input checked="" type="checkbox"/> Mirrors | <input type="checkbox"/> Desk Light (Fxd / FP) |
| <input type="checkbox"/> Wardrobe | <input type="checkbox"/> Paintings | <input checked="" type="checkbox"/> Ceiling Light (Hng / Fxd) |
| <input checked="" type="checkbox"/> TV (WM / FP) | <input type="checkbox"/> Armchair | <input checked="" type="checkbox"/> Bedside Tables (WM / FP) |
| <input type="checkbox"/> Media Furniture | <input checked="" type="checkbox"/> Chair / Stool | |
| <input checked="" type="checkbox"/> Windowsill | <input type="checkbox"/> Floor Light | |

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement Centered in the room

Built-in Solutions None A few A clear majority

Materials

- | | | | | |
|---------|--|--|--------------------------------|---|
| Floor | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Fabric | <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Stone |
| Ceiling | <input type="checkbox"/> Wood | <input checked="" type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input type="checkbox"/> Plasterboard |
| Walls | <input checked="" type="checkbox"/> Wood | <input checked="" type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input type="checkbox"/> Plasterboard |

Moments only offers single rooms and that's why there's only data reported for one room.

Hotel Lundia

Who is the creator of the current interior? **Jonas Lyold, Architect**

Is the interior design decided by HQ?

When did you last rebuild your facilities? **We're currently improving the dim-out**

How often do you switch the decor of your rooms? **7-10 years. As rarely as possible**

FP / WM = Freely Placed / Wall Mounted

Hng / Fxd = Hanging / Fixed

Single Room

Furnitures & Details

- Headboard
- Curtains
- Built-in Spots
- Fixed Telephone
- Power Outlets **3**
- Bed Light (**WM** / FP) **2**
- Desk (**WM** / FP) **1**
- Mirrors **1**
- Desk Light (**Fxd** / FP) **1**
- Wardrobe
- Paintings
- Ceiling Light (**Hng** / **Fxd**) **2**
- TV (**WM** / FP) **1**
- Armchair **1**
- Bedside Tables (**WM** / FP) **2**
- Media Furniture
- Chair / Stool **1**
- Windowsill
- Floor Light

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement Centered in the room

Built-in Solutions None A few A clear majority

Materials

- Floor Wood Fabric Other Stone
- Ceiling Wood Concrete Other Plasterboard
- Walls Wood Concrete Other Plasterboard

Double Room

Furnitures & Details

- Headboard
- Curtains
- Built-in Spots
- Fixed Telephone
- Power Outlets **7**
- Bed Light (**WM** / FP) **2**
- Desk (**WM** / **FP**) **1**
- Mirrors **4**
- Desk Light (Fxd / **FP**) **1**
- Wardrobe **2**
- Paintings **3**
- Ceiling Light (Hng / **Fxd**) **1**
- TV (**WM** / PF) **1**
- Armchair **2**
- Bedside Tables (**WM** / **FP**) **2**
- Media Furniture
- Chair / Stool **1**
- Wall Mounted Light **2**
- Windowsill
- Floor Light **1**

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement In the beginning of the room

Built-in Solutions None A few A clear majority

Materials

- Floor Wood Fabric Other Stone
- Ceiling Wood Concrete Other Plasterboard
- Walls Wood Concrete Other Plasterboard

StayAt

Who is the creator of the current interior? **Freelancing architect**

Is the interior design decided by HQ?

When did you last rebuild your facilities? **2009**

How often do you switch the decor of your rooms? **The Facility was open 2009**

FP / WM = Freely Placed / Wall Mounted

Hng / Fxd = Hanging / Fixed

Double Room

Only data for one of the rooms are reported as all the rooms visited were identically furnished double rooms.

Furnitures & Details

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Headboard | <input checked="" type="checkbox"/> Curtains | <input checked="" type="checkbox"/> Built-in Spots |
| <input checked="" type="checkbox"/> Fixed Telephone | <input checked="" type="checkbox"/> Power Outlets | <input checked="" type="checkbox"/> Bed Light (WM / FP) |
| <input checked="" type="checkbox"/> Desk (WM / FP) | <input checked="" type="checkbox"/> Mirrors | <input checked="" type="checkbox"/> Desk Light (Fxd / FP) |
| <input checked="" type="checkbox"/> Wardrobe | <input checked="" type="checkbox"/> Paintings | <input checked="" type="checkbox"/> Ceiling Light (Hng / Fxd) |
| <input checked="" type="checkbox"/> TV (WM / FP) | <input checked="" type="checkbox"/> Armchair | <input checked="" type="checkbox"/> Bedside Tables (WM / FP) |
| <input checked="" type="checkbox"/> Media Furniture | <input checked="" type="checkbox"/> Chair / Stool | <input checked="" type="checkbox"/> Kitchen Table |
| <input checked="" type="checkbox"/> Windowsill | <input checked="" type="checkbox"/> Floor Light | |

Visible Cables Yes, looks messy Yes, looks tidy No visible cables

Fire Alarm Placement Centered in the room

Built-in Solutions None A few A clear majority

Materials

- | | | | | |
|---------|--|-----------------------------------|---|--|
| Floor | <input checked="" type="checkbox"/> Wood | <input type="checkbox"/> Fabric | <input checked="" type="checkbox"/> Other | <input type="checkbox"/> Stone |
| Ceiling | <input type="checkbox"/> Wood | <input type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Plasterboard |
| Walls | <input type="checkbox"/> Wood | <input type="checkbox"/> Concrete | <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Plasterboard |

Hotel Representatives

	How do you define thievery? Is taking soaps & bathrobes considered theft to you?	How often do you estimate that your hotel experiencing thievery?	Do you worry about your interior details being stolen?	Do you take active actions to prevent thievery, like securing interior details etc?	Would you worry about thievery, if you were to equip your rooms with speakers?
Gustaf Deijnoff Moment Hotels Malmö	As a matter of fact we have almost none incidents of that kind and at the same time we have almost no loose items in our rooms, except the TV-remote and small bottles of shampoo and conditioner.	Perhaps we will loose one-two towels per month, but we don't have any statistics of incidents like that. I know that many big-scale hotels are experiencing problems with their bathrobes being stolen, but we don't offer bathrobes and I assume that the majority of guests owns towels already so.	No, that I cannot say.	Yes, like now when we're reconditioning and expanding our facility we put great effort into planning and choosing an interior with as few loose items as possible. It's equally unpleasant to accuse somebody as to be the person being accused of thievery.	Yes, absolutely, we wouldn't choose a product like that for our rooms. Maybe if you would secure it in some kind of steal proof glass box or something like that.
Christian Weste Hotel Lundia Lund	To us it's considered theft or waste if you would remove bigger (more expensive items) like iPad's, TV, bathrobes, beverages from the mini-bar etc. When it comes to soaps, shampoo and conditioner, the packages sizes we use makes it unattractive to steal.	It's rare, more common are attempts to commit fraud when it comes to booking, payments and so on.	We don't worry, but we do our best to be observant for irregularities and strange behaviors within our facility.	Yes, as much as possible, but due to different circumstances it's not always possible to act consequent, for example we have a couple of rooms equipped with iPad's, that have been around for four years. During these years one have gone missing, which is sad, but after all negligible when we look at the operation and guest flow.	It's been up for discussion and yes, some worries concerns the products construction, what type of product and brand that should be placed at the rooms.

	How do you define theft? Is taking soaps & bathrobes considered theft to you?	How often do you estimate that your hotel experiencing theft?	Do you worry about your interior details being stolen?	Do you take active actions to prevent theft, like securing interior details etc?	Would you worry about theft, if you were to equip your rooms with speakers?
Hilma Liljeqvist Grand Hotel Garden Malmö	Thievery to us is taking the bathrobes or parts of the interior, like bed lights etc. Unfortunately, many guests seem to believe that it's okay to take stuff from their room when staying at hotels. First we try to contact the guest by phone or e-mail and if we can't get a hold of them we try to charge their credit card instead. That's what it usually takes for them to turn up with our goods. However, in cases when dealing with international guest the case is basically a lost cause as soon as they board the plane back home.	Not so often, and when it comes to small products like shower gel etc we are rarely notified by the cleaning staff at all. That aside, disappearing soaps and conditioners will happen and it's something you have to take into account.	No, we're not that type of hotel that keeps valuable items in our rooms.	No, not actively. I would assume that the contractors reconditioning our facility make smart decisions by themselves in order to improve our facility both from our and the guests perspective. And also, sometimes things get stolen even if they fastened into the interior.	On a personal level, I wouldn't worry, but it would be stolen. That's just how it is unfortunately.
Tina Kaic Scandic Stortorget Malmö	Keeping track of soaps is a bit too tricky, so we don't do that. However, if we're missing towels or bathrobes we contact the guests and charge their credit card for the costs.	That's really difficult to answer, since we don't always get notified by the staff when things missing, but it probably happens a couple of times each week to be harsh.	No, there's no point. All you can do is deal with the situation when it happens.	Yes, but only to a certain degree. Let's just say that you would think twice before placing expensive stuff in the rooms.	Yes, of course! If there's a new expensive item in the room, there's always a risk that somebody wants to have it. And at the same time you can't walk around worrying about something happening. We must have faith in our guests and that they are honest people that will leave stuff alone.
Måns Friberg StayAt Lund	There's very few incidents of that kind at our facility. We have fully equipped kitchens. However, we don't experience theft as common or bothersome problem.	Like it said, it rarely ever happens.	No	No	No, since every guest is registered in our computer system and is responsible for leaving the room in proper condition when checking out.

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