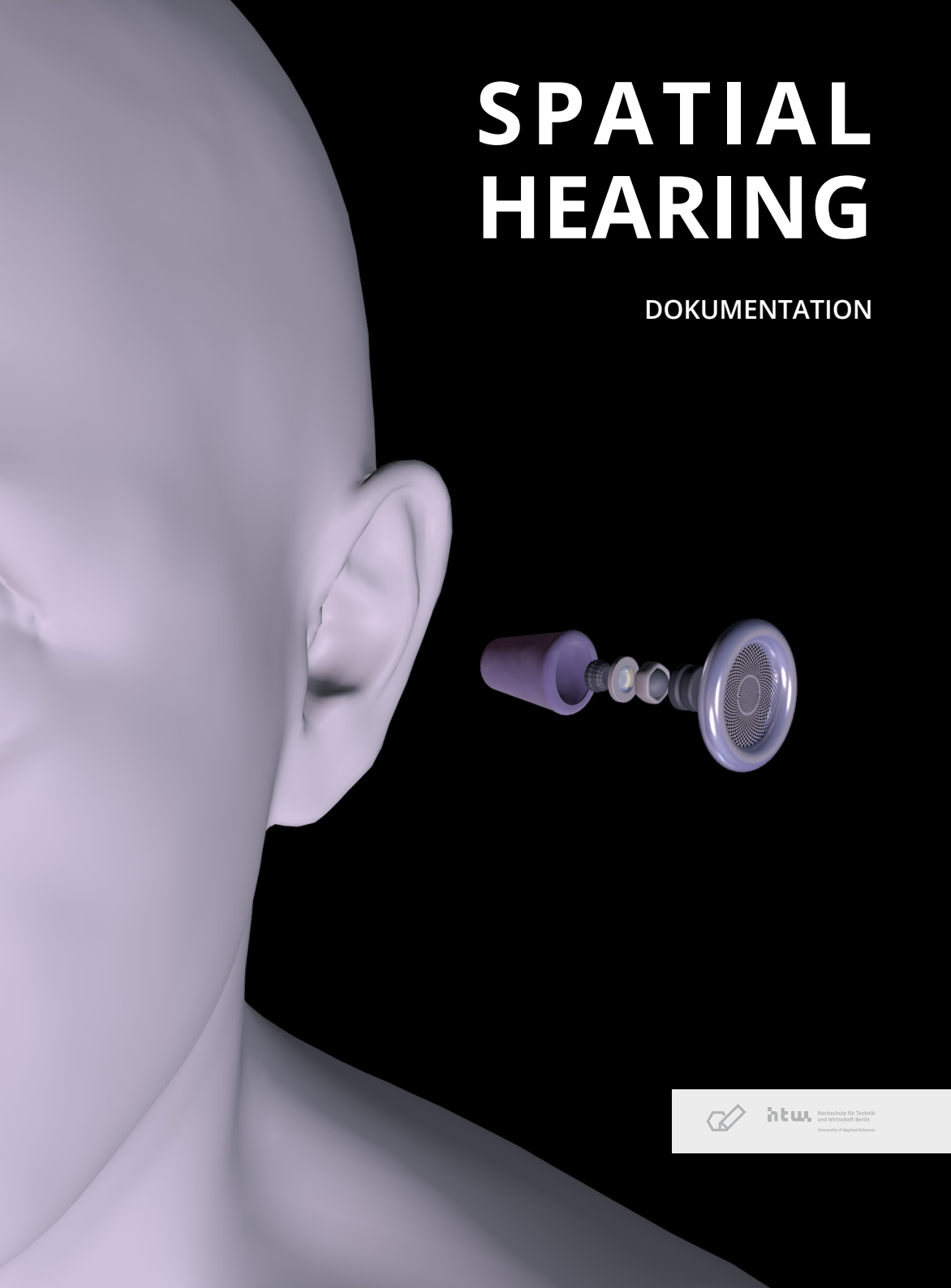
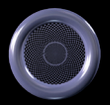
SPATIAL HEARING

DOKUMENTATION



htw Hochschule für Technik und Wirtschaft Berlin
University of Applied Sciences

SPATIAL HEARING 

how do we deal with the topic of aging in the future? due to radical demographic and technological change peolpe tend to live longer and stay more active till their last days. generations of the new old will have a greater need to stay independent, active and open to new experiences! in order to enable so-called "Aging in Place", new innovative approaches and speculative design perspectives are needed

as a response to those future challenges, a speculative future scenario as well as small everyday object - spatial hearing device - which allows self-directed aging and positive interaction were created.

the ‘spatial hearing’ device provides an assistance in orientation & training for older people, whose spatial abilities undergo a physiological decline as a result of aging. the device will help them to navigate through overpopulated megacities with overdeveloped infrastructure & high noise levels, which can be too overwhelming and distracting for elderly citizens.

CONTENTS

INTRODUCTION

the goal of the project "Aging in place – little everyday objects" was to study new reality of aging based on the society development predictions. such generations as Generation X (1965-1979) & Generation Y (1980-1995) will radically change the process and experience of getting older, especially with regard to digitalization and technological sovereignty. they will incorporate technological inovations and smart devices into their everyday life in order to stay self-determined, active and healthy.

in order to enable so-called "Aging in Place", students had to implement innovative approaches as well as new speculative design perspectives into creative processes. that's why as part of the project such methods as 'speculative design' (design practice that is concerned with future design proposals of a critical nature) and 'designpate' (a UX design practice of including an interested person from the target audience into design process in order to receive precious input from outside of project and develop visionary ideas in a participatory way) were actively used.

as a result of the research, various design practices and future scenario setting, a small everyday objects for self-directed aging and positive interaction, which could be based on such technologies as robotics, AI, Voice UX, had to be created within the project. the 'spatial hearing' device was designed as a response to the Hauptprojekt's „Aging in Place" challenge - to provide better self-navigation, orientation and spatial abilities traning for elderly citizens.

the Moduldokumentation of the Hauptprojekt „Aging in Place" aims to communicate design decisions and the creative process of 'spatial hearing' project.

RESEARCH & ANALYSIS

SPIRITUALITY

the research phase started with the understanding of the different topics relevant for the process of aging. after brainstorming in the project group we have identified the most relevant areas of life to explore for a better understanding of older people gain & pain points. this part of research was carried out together with Wei Wang and considers such areas as spirituality, death & love within elderly

- Spirituality means not just one compartment of life, but the deepest dimension of all of life. The spiritual is the ultimate ground of all our questions, hopes, fears, and loves.

- Spirituality is the consciousness and awareness of a relationship with gods/spirits and personal beliefs.

- Spiritual well-being is the affirmation of life in a relationship with gods/spirits, self, community, and environment.

BABY BOOMERS

- direct spiritual experience
- spiritual, but not religious
- individualistic
- mystical religious beliefs and practices
- faith - spiritual journey or quest

BEST TIME FOR SPIRITUAL DEVELOPMENT

- the need to devote more time & energy to spiritual practices
- the need to find stronger meaning in life

UNIVERSALIZING FAITH (LATE LIFE)

- the power of being
- willingness to promote justice in the world
- fellowship with others regardless of their faith stage or religious tradition

with few exceptions, research on numerous groups of older adults has shown that the levels of religious beliefs, behavior, and experiences that reflect spirituality increase with age.

reasons for that:

- to help face impending death
- to help find and maintain a sense of meaningfulness and significance in life
- to help accept the inevitable losses of old age and discover compensation values
- to meet secular social needs

LIFE SPACE & OPPORTUNITY

religion allows an outlet for those over sixty to remain active by investing emotional energy and making a commitment

EGOCENTRIC DEFENSE

one of the gerontological functions of religion is to help face impending death.

DECREASED MENTAL CAPACITY

older people are more likely to have a tendency to be annoyed by minute wrongs, and they give more moralistic views about behavior

STEREOTYPE-CONFIRMING VISIBILITY

since it is expected that aged people become more religious, their high degree of visibility and presence in religious functions may be more apparent.

148 PARTICIPANTS in preconferences White House Conference on Aging

86 % had a different perception of God from that of their childhood

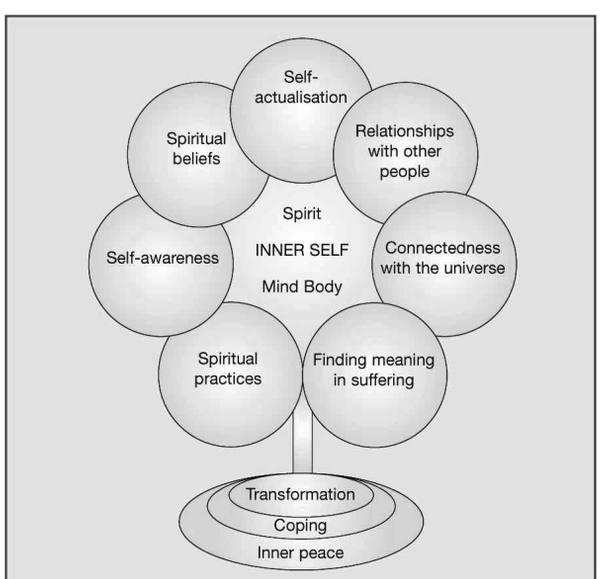
74 % felt closer to God

59 % more application of their faith in daily life

61 % deeper sense of spirituality

studies show that religious elders are less likely to become depressed when confronted with negative life events such as physical illness.

moreover, most studies also report that higher religiousness and spirituality are associated with lower levels of anxiety, less alcoholism, fewer suicides, better marriages, greater adaptation to Alzheimer's disease caregiving, reduced loneliness, hopefulness among disabled elders, and general mental health.



DEATH

topic of death within elderly is obviously one of the most painful and disturbing, but at the same time the most taboo topics. because death is a crucial incident of life that is unavoidable. for senior citizens, the concept of death has a strong impact on every area of life, and how they look at death and accept it exerts an influence on their life attitude.

75+ for most adults in the fourth quarter of life death awareness embodies the meaning of aging in its spiritual dimension.

older people were less fearful of death on the conscious than they are on the unconscious level

FEAR

approximately 50 to 75 % of older adults experience fear or anxiety about death

HOPE

even though hope lies at the center of every human life, the elderly often experience hope-lessness.

LOSS

dealing with these losses is one of the greatest spiritual challenges of aging. It's critical factor in the (un)happiness of the elderly person.

in addition, the elderly people want to remain consious, to live a comfortable life without pain and to die asleep.they also wanted to maintain their relationship with their families. the familiy members were the most important people who gave them happiness or sadness. when they thought of their own death, they first thought of how much their families would be in pain.

the subjects in the study were seven senior citizens. they were at the average age of 81.29. out of them, six were female, and one was male. one was married, and seven have lost their spouses. three were Christian, and four were Buddhists

Theme Cluster	Theme
1. Death as the final journey of life	The age at which dying is a cause of worry. Death without regret
2. Ambivalence about family	Sorriness and thanks for family Sadness about family
3. Desire for a comfortable death	Dying without being insane Dying in a manner to look like a sleeper
4. Meeting death with gratitude and joy	Life of gratitude Life of joy

based on the survey and discussion with the participants, several topics were identified that concern the elderly the most:

RELATIONSHIPS

warm, intimate personal relationship with family, friends, or health professionals

DISCUSSION

an open supportive environment to allow discussion of end of life issues

MEANING

a sense of meaning and mission in life; feeling of achivement and completeness

99 ELDERLY PEOPLE in the Well-Dying program conducted by the hospice center

85 %

wanted to have natural death

42 %

wanted to be with their children most when faced death

53 %

have death experience from family members or friends

52 %

sometimes thought of death in recent one year

57 %

responded that religion plays an important role in death

ON THE BASIS OF PRESENT FINDINGS IT MAY BE CONCLUDED THAT SPIRITUALITY AND MENTAL HEALTH ARE SIGNIFICANT PREDICTORS OF DEATH ANXIETY.

LOVE & SEX

the society tends not to acknowledge older people, particularly in relation to sexuality and the expression of older people's sexual needs, even though intimacy is at the centre of meaningful personal life and one the basic human needs. silence surrounding older people's sexuality can also mirror older people's invisibility in other areas of society and that's why this silent topic must be precisely studied.

80-90 older adults report being sexually active well into their 80s and 90s, and that they engage in a wider variety of sexual behaviors

10 % approximately 10% of older men and women report a sexual orientation other than heterosexual

~50 % nearly half of middle-aged and older women and men fail to seek help for sexual problems, often due to fears of embarrassment.

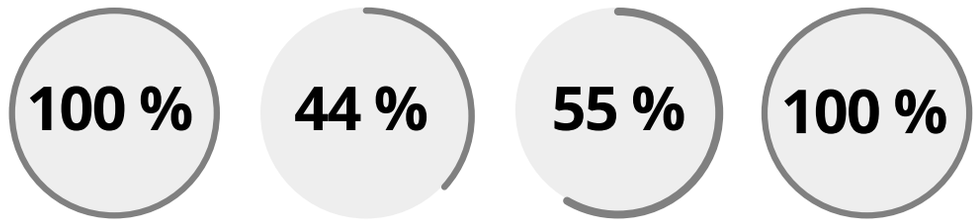
> the studies showed substantial expression of increased knowledge, confidence and sensitivity within love and sex topics

our youth-oriented culture views aging as a tragic event rather than an opportunity for personal growth and change.

:(many older adults internalize and generalize such negative societal attitudes and ageist stereotypes, and diminish/stop their participation in romantic relationships and sexual expression out of fear and shame.

<3 older adults are more selective when it comes to the age, race, religion, income, and height of a potential dating partner.

45 ELDERLY PEOPLE 60-92 Y.O. 21 men and 25 women.



desired long-term relationships

only made short-term or casual connections

developed long-term connections

reported that their relationship include intimacy

participants were interested in developing democratic, intellectually and sexually fulfilling partnerships, and were willing to move on when these relationships no longer suited their needs!

older adults were looking for meaningful ongoing relationships which were egalitarian and based on shared intimacy, in other words, they desired the idea of the pure relationship. most of the adults were hoping for long-term, committed relationships, although not ones that were necessarily monogamous nor involved cohabitation.

QUOTES OF OLDER PEOPLE ABOUT THEIR LOVE LIFE:

"but I said ... 'Buy some house close to my house and we can see each other every day'. He said, 'no I don't want a friend, I want a wife' and we marry in 75 days."

- Ursula, 69

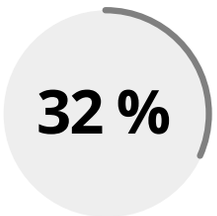
"The sort of man I want is an educated, well adjusted man who is capable of sharing an equal relationship where we can enjoy our like interests."

- Stewart, 66

"We couldn't keep our hands off each other when we were first together."

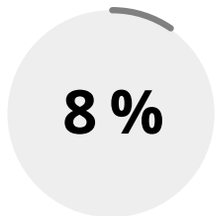
- Mike, 82

118 ATTENDEES 56-82 Y.O. both male and female

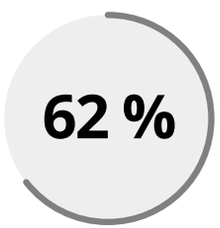


reported that the frequency of their sexual activity had not changed during the past 10 years

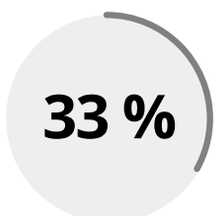
reported a decrease in frequency of sexual activity



reported a increase in frequency of sexual activity



desired an increase in frequency of sexual activity



of those over 70 years old reported more enjoyment

while older people experience sexuality from a broader and richer point of view, its social expression can be stigmatized. myths and stereotypes that deny their unique senseof sexual well-being and the right to express it

relationship quality may mediate the experience of the ageing, as a recent study found that while elderly people were frequently unhappy with themselves, this was less important to them in a loving relationships

STEEP

the STEEP analysis, also called PESTE analysis, is a strategy of external environmental analysis for understanding trends and problems of particular field. it lists the factors of the individual categories that may influence the unit under investigation. In the analysis, the factors are examined socially, technologically, economically, ecologically, politically and their mutual dependencies. the analyzed facts are then selected and weighted according to the problem.

SOCIAL

- more than 10% of elderly are openly not heterosexual
- the demographic change: less youth, more elderly › change of approach
- people tend to be more open to sex prectices & topics
- elderly seek long-term loving relations
- people tend to become more spiritual/religious with age
- in general religion don’t play a main role in people’s lifes
- elderly stay more active nowadays
- they try to stay closer to their loved ones

TECHNOLOGICAL

- social media & messengers › easier communication
- elderly use online services a lot (e.g. dating)
- 88% of older people have smartphones
- the development of healthcare system and nursing homes in particular › longer lifes
- a lot of accessories, devices, systems etc. are integrated into the life of elderly

ECONOMICIAL

- wealthier elderly in the developed countries
- modern economy can let elderly stay integrated to the system (e.g. work even after retirement)
- elderly people are special consumer group and marketing target
- the investment to the well-being & comfort – more money ‹› longer life
- overall people tend to earn more (& can afford taking care houses
- from capitalism's point of view - seniors are not employees anymore (which equals useless)

ECOLOGICAL

- mobility of elderly can be reduced - they use less transportation
- if elderly consume & travel less (& their activity is dicreased), can we say they have more sustainable lifestyle?
- in terms of design & production › if the product is universal & suitable for elderly it's more sustainable as there's no extra manufacturing of special goods needed

POLITICAL

- the age of retirement increased during last decade - people work for most of their lifes
- elderly can get help/ benifites from state
- due to deterioration of learning ability & (as a consequence) tendency to be more conservative elderly tend to be loyal and stick to one political party and regime

MOODBOARDS

the next step was to express the ideas and issues discovered during research by creating a moodboard - feature a collection of colors and images that represent a study, theory, problem. for this part of the research i decided to use my favorite technique of creative ideas mapping - an analog collage. the main goal during this practice was to select images and words that induce a complex emotional response to a certain stimulus such as reflecting about highlighted topics.

fear of death

culture | social

closeness

ideal place to age

haus kratz

footage of life

intimacy

SPECULATIVE FUTURE

during live meetings in class we had several workshops on how to use UX & speculative design methods. one of the workshops was aimed to create a futuristic stenario and to reveal a main statement of it. we proceeded to work in a group with Way and started with brainstorming on various future scenarios to to find the direction of the creative process.

more people become spiritual › well-being of one depends on spirituality › the significance of the religion increases › god/spirit/religion › to maintain calmness meditation/ repetitive moves

people are aware of the reincarnation process › they can save the spiritual life/soul of dead person › people have devices to be able to find the relative (or follow their new life)

demographic change › technological development › people can have kids in any age › love and family plays significant role › younger people have to work hard and therefore the family institute is shifted to the end of life › all of the elderly are forced to find a partner, be sexually active till the late 90s and deliver children to maintain demographic development › however the drive/lust/wish to be close with anyone can be lost with the age › extra stimulation is needed for finding partner and being closer to others

scenario based on William S. Burroughs literature › beat-generation ideas are life! no words, no junk, no control › cyberpunk?

elderly are not buried anymore › their spiritual life is saved & continues on another level of reality › their loved ones can connect to the conscience of elderly › the spiritual heritage/ knowledge is saved

elderly are buried in special textile cocoon › placed next to each other those cocoones form a larger structure › the structure connects the spiritual lifes of people/ cultivates fruits which can be eaten to get persons inner life › fruits of knowledge

AI is a leading technology › it's so developed that it can predict the possible outcome and scenarios in any situation › mental health issues are increasing within the society › people can't rely on their own decisions anymore › the world is variative & unpredictable › chess is an ultimate tool for maintaining cognitive health and to help solving daily issues/unclear situations and answer questions › also connected to ones faith and spirituality › calmin, solving, training, play

STATEMENT

elderly people want to spend more time with their family when facing death, they also tend to be more nostalgic when their life slows down with age. simple warm actions and emotions they evoke can gift elderly more love and the feeling of being huged. but can we make it work through connecting to their senses such as smell?

- smell
- love/attachment/memories/warmth

demographic change › technological development › people can have kids in any age › love and family plays significant role › most of the elderly would like to find a partner and be sexually active despite of age

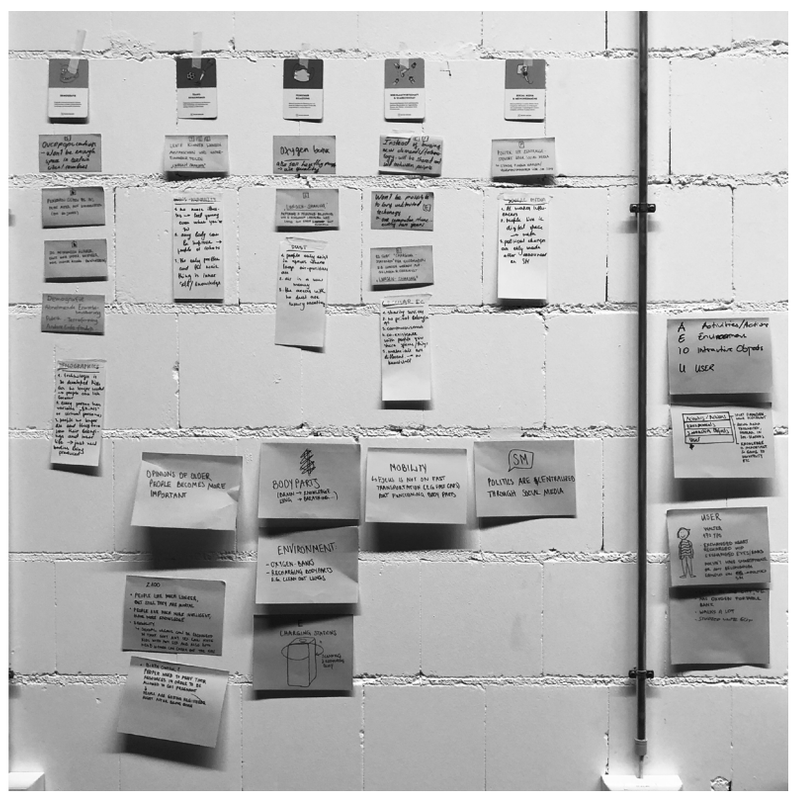
› people connect and build relationships based on smells › smell can not only tell a lot about particular person, but also either attract or push away › the relationships based on the smell compatibility are longer, healthier and more loving › everyone has a device to recognise the smell, analyse it (e.g. origin and ingredients) and see if the person is the one for you › long-term (never ending?) intimacy

› people can remember their love very deeply and for a long time › they connect smells to the special emotions evoked in that moment or by the loved person › everyone has a device to recognise the smell and save the unique mixture of the particular odor › it recreates the smell and brings you to the memories › long-term (never ending?) intimacy

Walter is 75 y.o. › feels lost and lonely preparing for sleep every night › he seek intimacy and love › by recreating the smell of his/hers first love to feel young, loved & fullfilled again

› at the same time Walter would love to find a long-term partner › he takes the smell recognizing device with him as he goes to the elderly cafe › once he met a woman of his dream and the device recorded her smell › their compatibility is 95% › they got married and live very happily

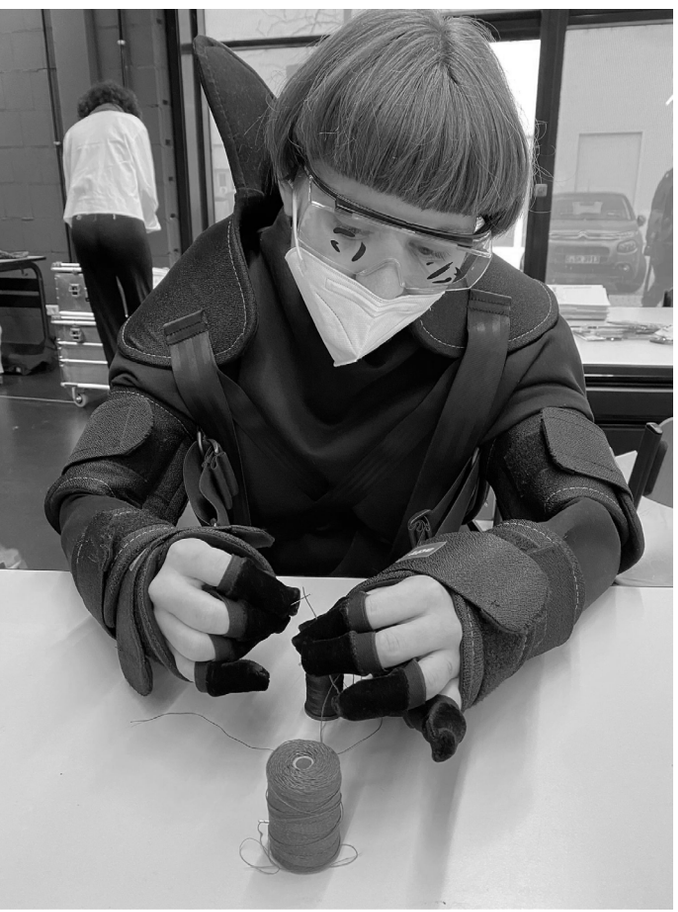
during another workshop about future scenario creation we worked in larger groups to quickly make scenario based on future cards and visualize it with sticky-notes and perfomance.



AGING SUIT

the aging suit workshop was held in order to feel ones-self much older and in many aspects disabled or physically limited. during the workshop I put the suit on and tried to complete some simple tasks such as thread a needle or use the stairs.

during those task I felt miserable and lost, however I have a strong muscle corset which helped me to stay active and control my body during all the movements. I still felt much more pressure not only physically but also psychologically as I was literally locked in my own aged body.



DESIGNPATE

'designpate' is an UX design methode, which helps designers create products and artifacts with the support of so-called design mentor. this design mentor or designpate is an older person chosen by a designer, but who is not a designer himself. I found a great designpate - Edmund Philipp - on the online advertisement platform Ebay Kleinanzeigen. he became a person with whom I was able develop visionary ideas for an "aging in place" in a participatory way.

DEMOGRAPHICS

Male, 63 y.o.

Berlin, Germany

divorced, has a 24 y.o. son

handcraft with wood
indusrial salesman
researcher/inventor

QUOTE

"Dumb people do smart things, and smart people do dumb things"
— Forrest Gump

PERSONALITY

introvert — extrovert

partly, so-so, only in touch with close friends & appreciates quality communication

analytic — creative

a mix, learns from experiences rather than analysis, ausprobieren means a lot, trusts a feeling, loves creativity

passive — active

most of the time passive and doesn't have any energy, sometimes active - all depends on health and mood

conservative — open-minded

offen - always looking for new experiences. has conservative sides, but trying to bring them to the new point, development is important

HOBBYS

- photography & literature
- inventions & handcrafts
- sustainable materials

LEISURE

- photography
- music (jazz & classical)
- talking with good friends
- science & education
- playing smart games (chess)

PASSION/GOALS

to be careful, calm and in piece, be mindful.
to get the patent for the invented textiles, but still doesn't want to be depended from it, thinks about his place in life in general

IDEAL PLACE TO AGE

green with a garden (which is important for elderly, but sometimes they can't take care of it - so better common garden with others), peaceful and has accessible furniture

STRESS FACTORS/PAINS

- existencial problems and thought of death, not much time left
- a lot of health problems - joints and vision are getting worse
- changes in self-attitude, self-control
- doesn't need status symbols anymore, more self-reflection
- climate change
- old-age poverty

ROUTINE

8.00-8.30 wake up & eat
check e-mail & kontostand
grocery shopping
listen to music & read magazin
chess ocasionally
12.00-12.30 lunch
house-keeping routine
time for work and/or hobbies
around 22.00 night-time routine

WAYS

- old auto or bike

SITUATION

- public transport is too expensive and is too difficult to use for elderly (same for the shopping - service to improve)
- a lot of older people are suffering old-age poverty or just don't have enough money to cover all their needs

Edmund hosts guest students and thinks reality is going to be so, that elderly will live together and/or with younger people - new form of Zusammenleben (co-existence)

SOME NEEDS

Edmund says the most important thing in his life now is to really take care of his health and be aware of the changes in his body

he also often feels lost, helpless, lonely and sad because he's spiritual needs are not satisfied and therefore life feels meaningless

WALK IN A PUBLIC GARDEN

- for Edmund it was easier to sit and talk then to walk and have an active discussion due to shortness of breath
- he was much more attentive and excited about nature and surroundungs –› therefore he wanted to walk slow and enjoy, be present
- Edmund thinks walks are great for the health, but at the same time they're exhausting & take to much of his energy needed for the more important activities

QUICK GROCERY SHOPPING

- Edmund wanted to buy some yogurts, so we went to aldi, which is "cheap & good"
- it took him much more time to find the fridge and needed products than it would take me
- it was not easy for Edmund to navigate in the shop
- he also checked the prices precisely to be sure the items are affordable

ONE DAY IN LIFE

11.00 - coffee time + chating

11.45 - small apartment tour, showing cameras and tripods, chess, Edmund checked his e-mails, showed me new software he uses

12.30 - we put some music on (light jazz - one of the Edmund's favorites) + he started Eintopf preparations with cutting the veggies. during the whole process we talked about several topics

14.30 - lunch with soup

15.00 - went to the BSR nearby to properly dispose the old cooker hood

15.15 - end of the day near Frankfurter Allee

~ 11.00 - 15.00

PAIN POINTS/PROBLEMS:

- lost, inattentive, easily forgets things, inaccurate/sloppy

  ↳ *does not notice (in time) such things as - the water in the kitchen was pouring past the sink while washing vegetables; the soup spilled on the stove; during the use of tripods, he was very fussed, did not understand exactly how to fix the desired height (despite knowing it beforehand!); forgot how to use the software he showed me (he already worked with it)*

- cooking took about 2 hours
- lonely, really keen on sharing his passions and personal communication makes him very excited and happy
- don't have a source of income to cover his needs –› lives with a student (untermieter) –› not comfortable with sharing his space
- struggling to find a proper job –› "too old" for the handwerk/ photography/freelance –› only found jobs "ganz unten", which means offered positions are low-paid and give Edmund no opportunities to improve his skills/passions and grow
- bad vision (short sight), pain in the joints and back, low mobility, lack of energy
- it was difficult for Edmund to speak with me all the time, he needed more time to think/ process the information, sometimes he lost his thoughts/ words –› reduced cognitive abilities

GAIN POINTS/POSITIVE:

- Edmund is very intelligent, he has a quick and critical mind, constantly consumes various content (reads scientific articles, learns about innovations, analyzes the vector of technology development, attends cultural events); well educated in varity of fields, politically active.
- handy –› maintaines the apartment in perfect condition, all is very clean; he just repaired the kitchen last week and proceeds with the apartment renovation
- kind, very emotional, caring, empathic, willing to help and do good for people he trust (but can be very wary and closed –› trust issues?). creative –› has brilliant futuristic ideas and dreams of numerous projects.

Edmund Philipp
in his 40s →

EDMUND'S MOODBOARD & FAVORITE PLACES

within the task for design probe kits, which our group used to collect more informations and insights about target audience - elderly citizens, Edmund printed and gave me film pictures of his happy places. those are very important to understand the designpate emotionally and get an idea of outer world from his perspective.

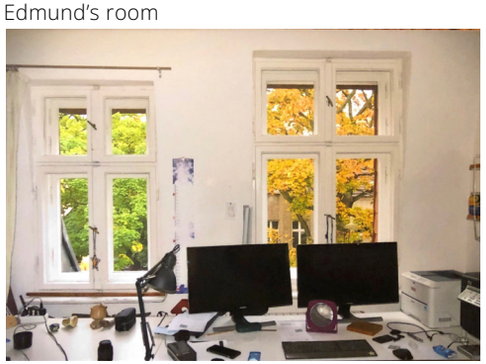
tempelhofer feld

room

tempelhofer feld

htw area

Edmund's room

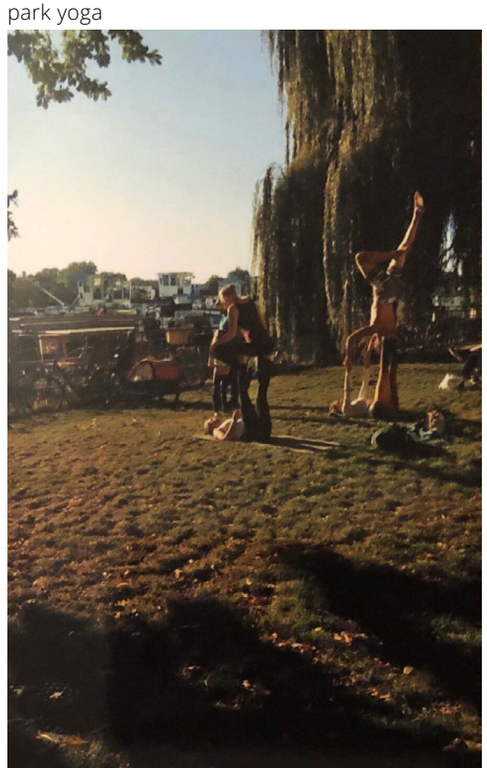


view

sunset

bike trip

park yoga

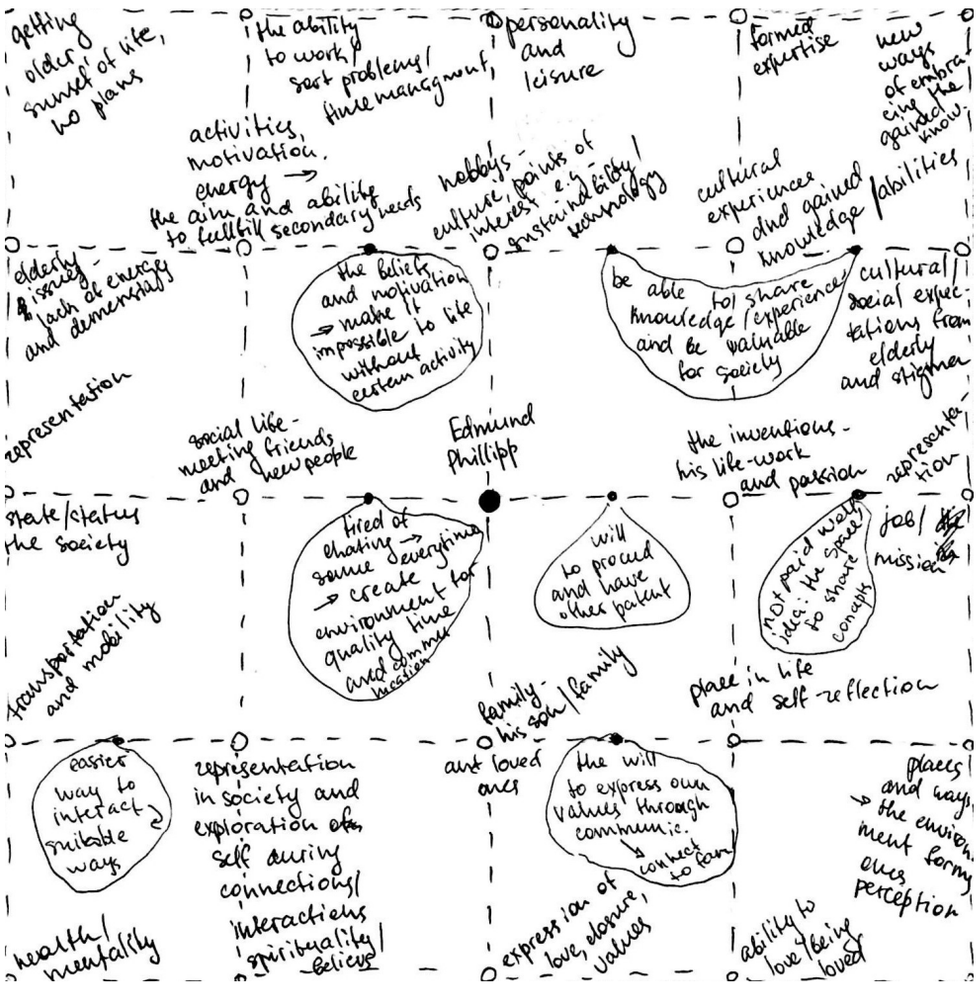


winter

GRID

the grid is the methode to generate ideas by folding a paper to the form of grid and connecting points and phenomenons which may show interesting links and interplays. the main focus of this grid was the designpate Edmund Philipp and his inner-life.

off the grid - are we allowed to put a person into the any kind of grid?

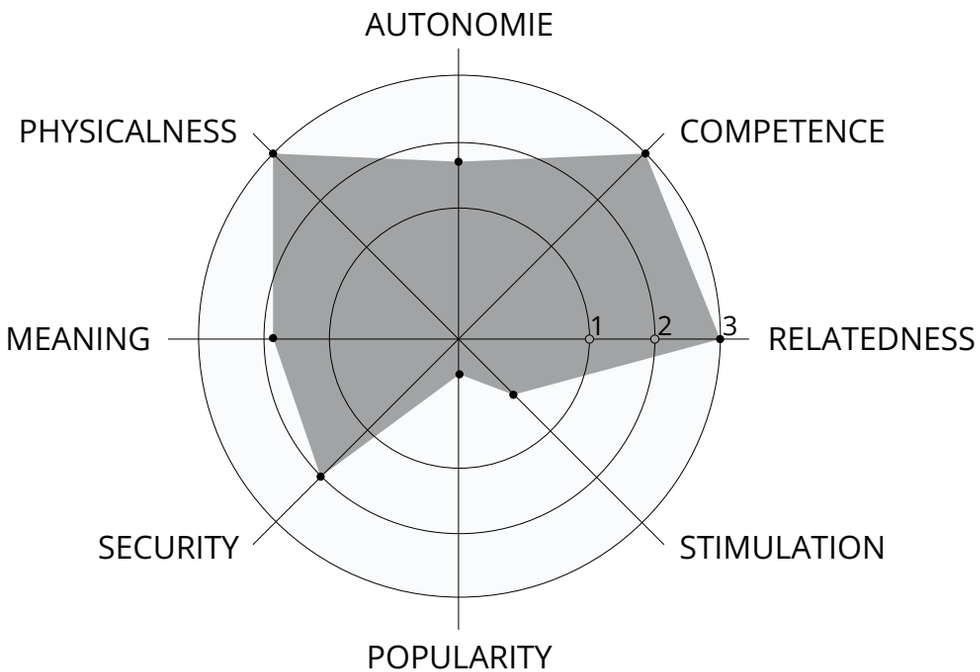


NEEDS

during the workshop the main needs of Edmund were identified and the meaning of 8 main needs that have to be taken into account while designing a product/service. the process was based on the cards "UX Bedürfnisse", whcih were studied and discussed toghether with Edmund.

first, I figured out which of the needs would be most relevant for the Designpate in my opinion. those were: meaning, relatedness and physicalness, cause during out meetings and activities such problems as loneliness, disapointment, frustration and poor health were detected.

after the discussion of all 8 needs with Edmund the priority of needs in his opinion turned out to be a little different. the most important aspect for Edmund is competence, as it is the basis of all others and without being competent or having a field of interest/activity a person won't be completely satisfied with other life dimensions. therefore competence, physicalness, relatedness are the main needs of Edmund.



SPECULATIVE SCENARIOS

for the interim presentation 3 different future scenarios and artifacts for new realities were created and showed in short mood-videos. the purpose of this project stage was to develop and define the main 'aging in place' scenario, which would then become the starting point for further design process and creation of an everyday assistant device.

artifacts:

› interactive chess board

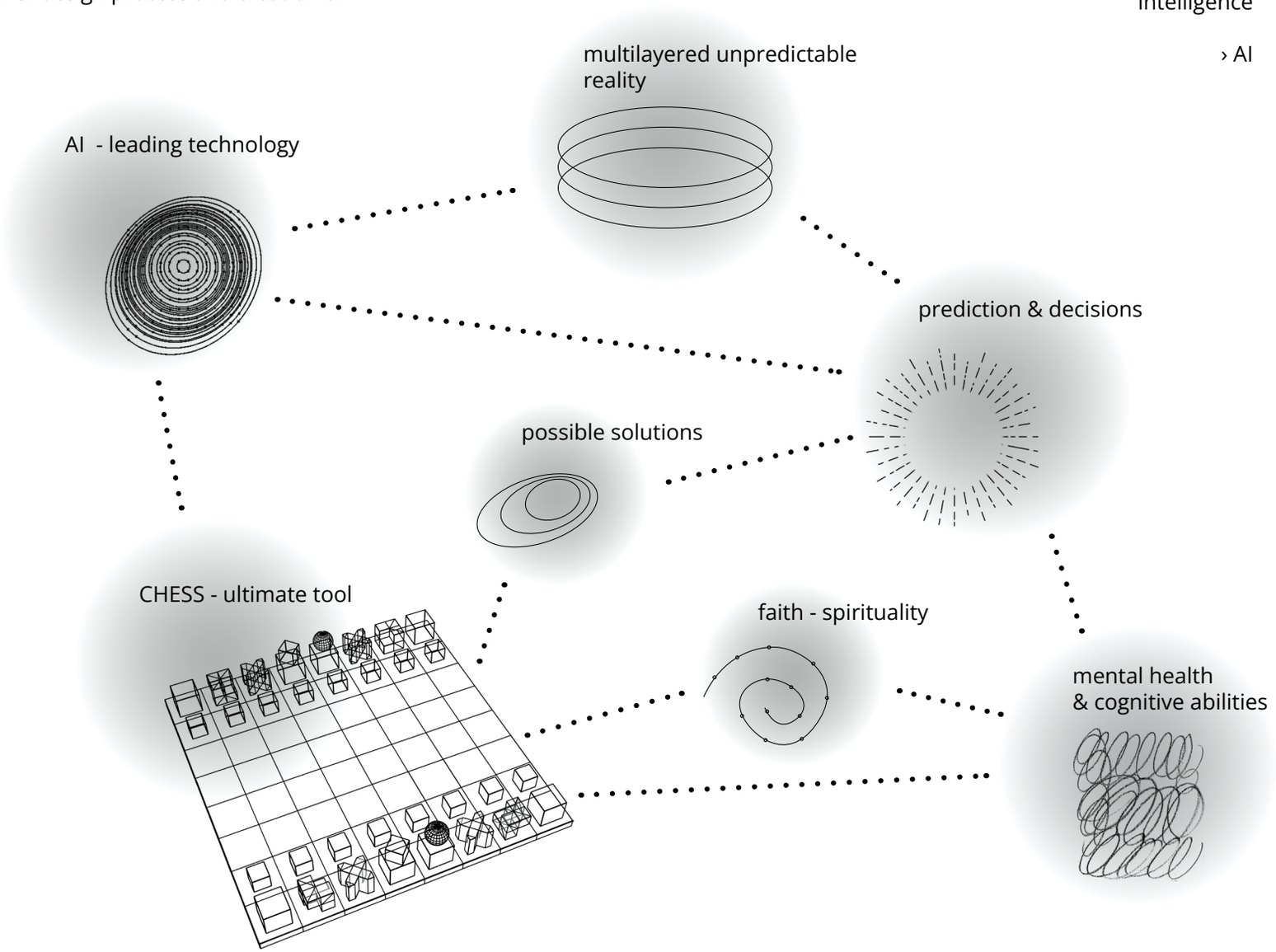
› super-intelligence

› AI

CHESS

AI is a leading technology. It's so developed that it can predict the possible outcome and scenarios in any situation. Mental health issues are increasing within the society and people can't rely on their own decisions anymore, because the reality is so multi-layered and complicated. The whole world is variable & unpredictable. Chess is an ultimate tool for maintaining cognitive health and to help solving daily issues, any unclear situations, answer questions with the power of all-knowing AI. The activity of playing chess is also connected to ones faith, spirituality and beliefs. People use this artifact not only to find the most reasonable solutions, but also to understand their place in the world, reflect on their own destiny and improve their cognitive abilities. The whole process is meditative, includes solving, training, playing and competing.

to the video ›

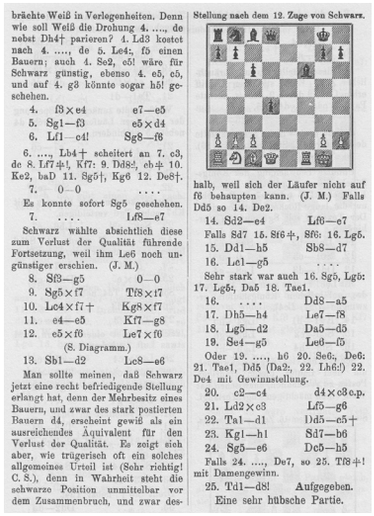


IDEAS

- mini-chessboard
- function › boost cognitive abilities anytime
- interactive tool including UX design & AI technology
- an integrated software (?)
- a all-knowing developed mind (super-intelligence, who playes with the user and gives them precious insights
- possible to solve a problem of loneliness using chess tool

ASSOCIATIONS & INSPIRATIONS

- alice in wonderland and chess
- meaning of the dicisions during the game › dicisions people make in life
- old chess books aesthetics
- the strategy as a slowly revealing secret
- a tool for divine revelation
- rosary beads › symbol › act of communicating with spirits



brächte Weiß in Verlegenheiten. Denn wie soll Weiß die Drohung 4. ..., de nebst Dh4† parieren? 4. Ld3 kostet nach 4. ..., de 5. Le4:, f5 einen Bauern; auch 4. Se2, c5! wäre für Schwarz günstig, ebenso 4. e5, c5, und auf 4. g3 könnte sogar h5! geschehen.

4. f3×e4 e7—e5
5. Sg1—f3 e5×d4
6. Lf1—c4! Sg8—f6

6. ..., Lb4† scheitert an 7. c3, de 8. Lf7‡!, Kf7: 9. Dd8‡, ch‡ 10. Ke2, baD 11. Sg5†, Kg6 12. De8†.

7. 0—0 ....

Es konnte sofort Sg5 geschehen.

7. .... Lf8—e7

Schwarz wählte absichtlich diese zum Verlust der Qualität führende Fortsetzung, weil ihm Le6 noch ungünstiger erschien. (J. M.)

8. Sf3—g5 0—0
9. Sg5×f7 Tf8×f7
10. Lc4×f7† Kg8×f7
11. e4—e5 Kf7—g8
12. e5×f6 Le7×f6

(S. Diagramm.)

13. Sb1—d2 Lc8—e6

Man sollte meinen, daß Schwarz jetzt eine recht befriedigende Stellung erlangt hat, denn der Mehrbesitz eines Bauern, und zwar des stark postierten Bauern d4, erscheint gewiß als ein ausreichendes Äquivalent für den Verlust der Qualität. Es zeigt sich aber, wie trügerisch oft ein solches allgemeines Urteil ist (Sehr richtig! C. S.), denn in Wahrheit steht die schwarze Position unmittelbar vor dem Zusammenbruch, und zwar des-

Stellung nach dem 12. Zuge von Schwarz.

halb, weil sich der Läufer nicht auf f6 behaupten kann. (J. M.) Falls Dd5 so 14. De2.

14. Sd2—e4 Lf6—e7

Falls Sd7 15. Sf6†, Sf6: 16. Lg5.

15. Dd1—h5 Sb8—d7
16. Le1—g5 ....

Sehr stark war auch 16. Sg5, Lg6: 17. Lg5:, Da5 18. Tae1.

16. .... Dd8—a5
17. Dh5—h4 Le7—f8
18. Lg5—d2 Da5—d5
19. Se4—g5 Le6—f5

Oder 19. ..., h6 20. Se6:, De6: 21. Tae1, Dd5 (Da2:, 22. Lh6:!) 22. De4 mit Gewinnstellung.

20. c2—c4 d4×c3 e.p.
21. Ld2×c3 Lf5—g6
22. Ta1—d1 Dd5—c5†
23. Kg1—h1 Sd7—b6
24. Sg5—e6 Dc5—h5

Falls 24. ..., De7, so 25. Tf8†! mit Damengewinn.

25. Td1—d8! Aufgegeben.

Eine sehr hübsche Partie.

Le petit échiquier

Fixé sur un socle gros comme une pièce d'un sou, le petit échiquier ne chancelle pas. Cinq Genevois, de 17 à 19 ans, ont consacré 400 heures de travail pour réaliser ce qui est peut-être (le «Livre des Records» fait des recherches pour le confirmer), le plus petit échiquier du monde. Ses dimensions : 8 mm sur 8. Il sera exposé lors de la journée «portes ouvertes» de l'Ecole d'horlogerie. (Photo Leverington)

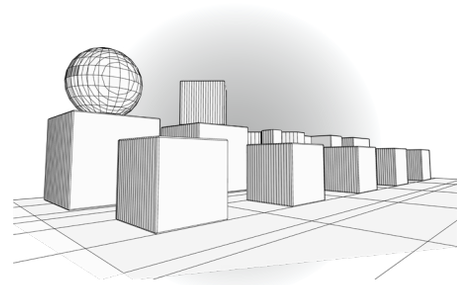
L'article de Jean-Noël en page 9

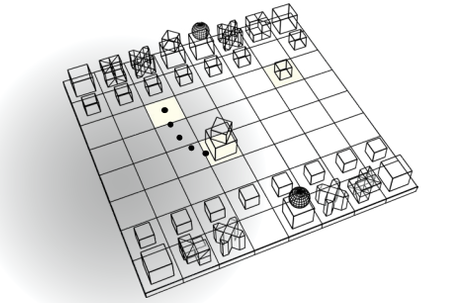
FEEDBACK LOOP WITH EDMUND

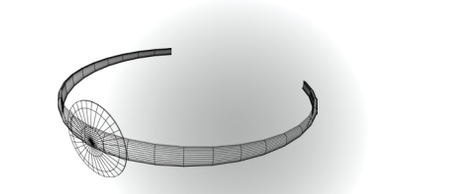
- glasses with VR feature for chess game › large figures, chess board as an environment
- it's too complicated for Edmund to use the chess educational books - more interactivity needed!
- chess strategies can be used for the creation/developing of the interactive chess board
- if the system is AI based, should it be able to learn?
- another forms of playing: e.g. band for the forehead › move the chess with power of thought › develop cognitive abilities
- feedback program › shows possible next steps (not too much, just a bit of help for futher thinking) › helps to impove your skills and learn new strategies

"You always find out how you feel during the chess game: how stressed and tired you are, how fit is your brain - it's like a barometer to measure your inner state!"

— Edmund Phillip







LOVE MOVEMENT

The demographic shift has led to a change in the distribution of social roles. Due to technology which lets people live longer and maintain their reproductive health when they're getting older, they are to have kids in any age. Love and family plays a significant role within society. Younger people have to work hard and therefore the family institute is shifted to the end of life. All of the elderly are forced to find a partner, be sexually active till their late 90s and deliver children to support demographic development. However, the sexual drive, a desire to be close or intimate with anyone is often lost with the age. Extra stimulation for finding partner and being closer and intimate with others is needed. Elderly want to connect on a deeper level with a suitable partner, which can be achieved with a meditative movements and dancing. For those processes the special medium is actively used by the elderly, allowing them not only to plunge into a meditative state, but also to move at a certain, comfortable pace. Attraction and emotionality are increased through the involvement of certain receptors, nervous system parts and (as a result) with the active production of happiness hormones.

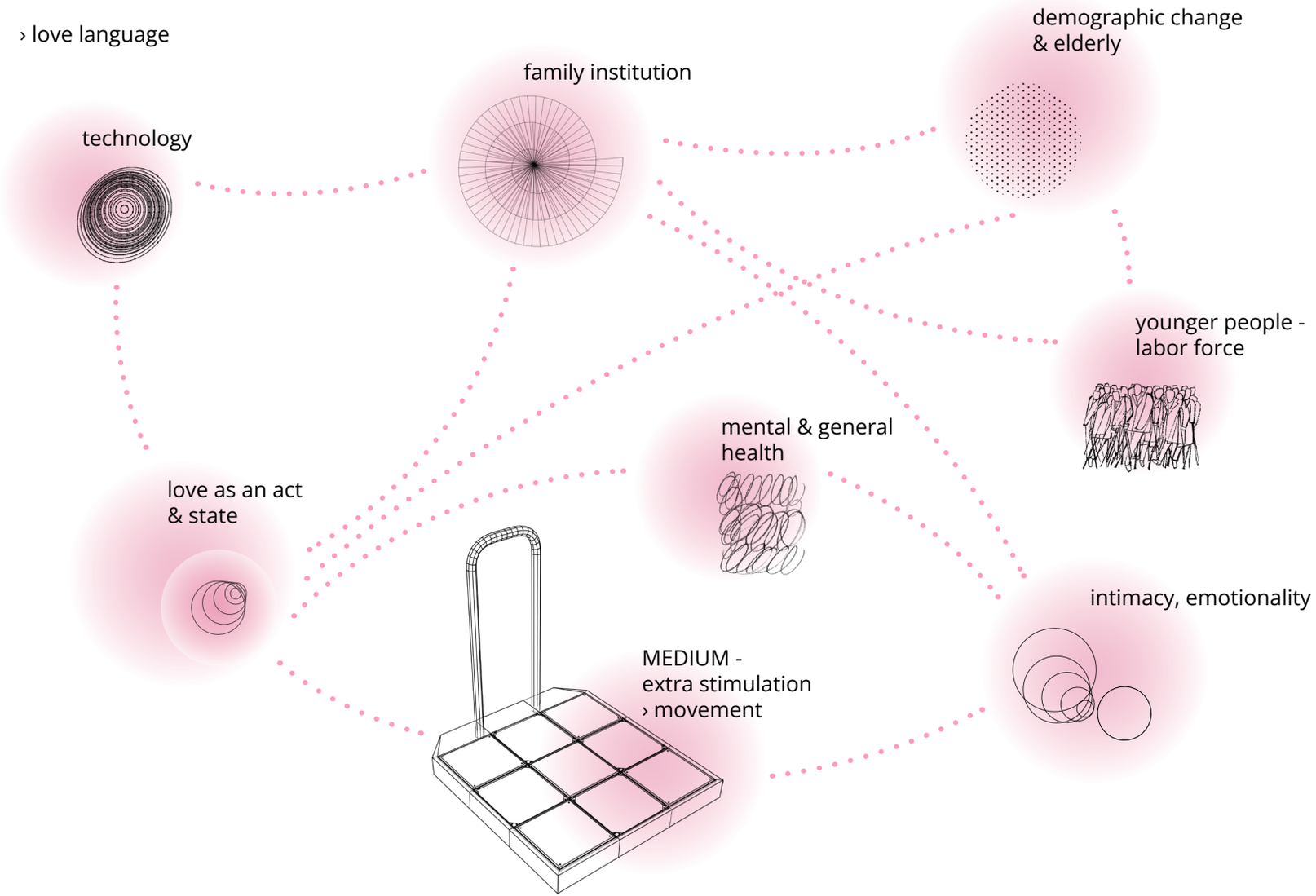
to the video ›

artifacts:

› platform-medium

› meditation dancing

› love language

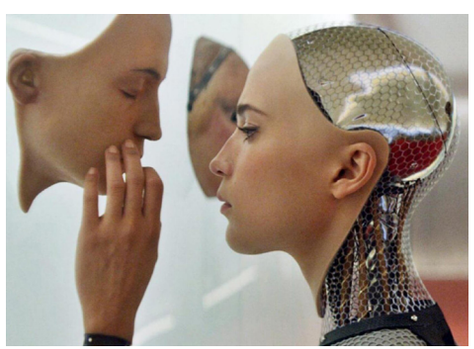


IDEAS

- small device for easier communication & to express feelings and emotions
- finding a partner based on your own background, history and culture
- support/ partner's warmth through the device (?)
- replacement of care and assistance
- tool for boosting communication skils

ASSOCIATIONS & INSPIRATIONS

- nano sextoys › indirect stimulation
- music vibrations › movements
- the feeling of being hugged
- replacing interpersonal relationships and falling in love with clearly calculated compatibility › communicating on a deeper level with a suitable partner
- digitalization of physicality



FEEDBACK LOOP WITH EDMUND

- "too much going on, I don't want to be closer or intimate with anyone! let's find another idea."
- find connection between emotions and ones perception of the environment
- combine with hearing aids
-
- small device in ear for better understanding of the environment, space around oneself and danger and a better idea of spatial dimensions › implement stereo
- waves to analyze spatial attributes
- for both ears for better navigation & orientation
- noise, sounds, vibrations › mediums to communicate with the user
- include gps into device › intuitive, for finding ways and things, which can easily get lost
- analyse of the noises with the AI › user hears less than a device, cause it filters, analyses and only deliver key sounds › user only receives the main results and infos about environment/ surroundings
- device should connect to the (everyday) objects and find them when needed
- other idea: connect people through device › privat and medical purposes

SPATIAL HEARING

The world is overpopulated and overdeveloped, large cities continue to grow constantly. Competition between people is growing as fast as their stress levels since the number of jobs is limited due to automation. More and more infrastructure, traffic and public spaces are appearing, which leads to an increase in overall noise level. The urban space became overwhelming and distracting. As a result, people struggle with mental and cognitive health, especially as they become older. Such illnesses as dementia and change in memory are very common within the society. With the age it becomes even more difficult to find ways and navigate through the giant cities. Elderly are often disoriented, lost or even in danger. Their life tempo and reaction speed decrease with the age and become too slow for the outer world. Older people need an assistance in order to get better idea of the surrounding space dimensions, to find convenient routes easily, navigate through any environment and be warned in case of possible danger. Therefore they use an additional small device, which is placed inside ones ear and helps to get better idea of the urban spaces, sense of direction and to warn about danger. The device analyses the sounds from the surroundings and stereo waves.

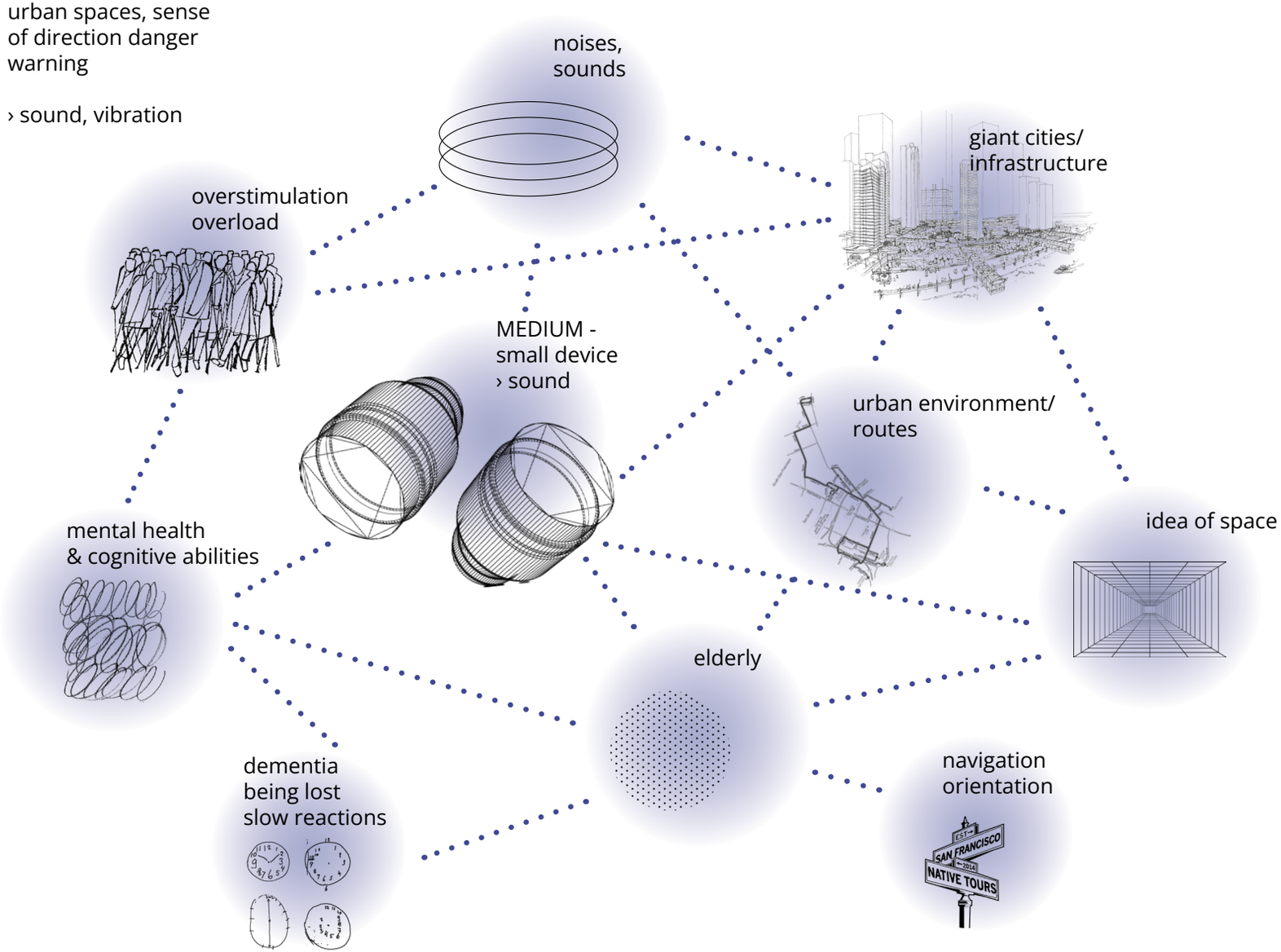
to the video ›

artifacts:

› small device inside ear

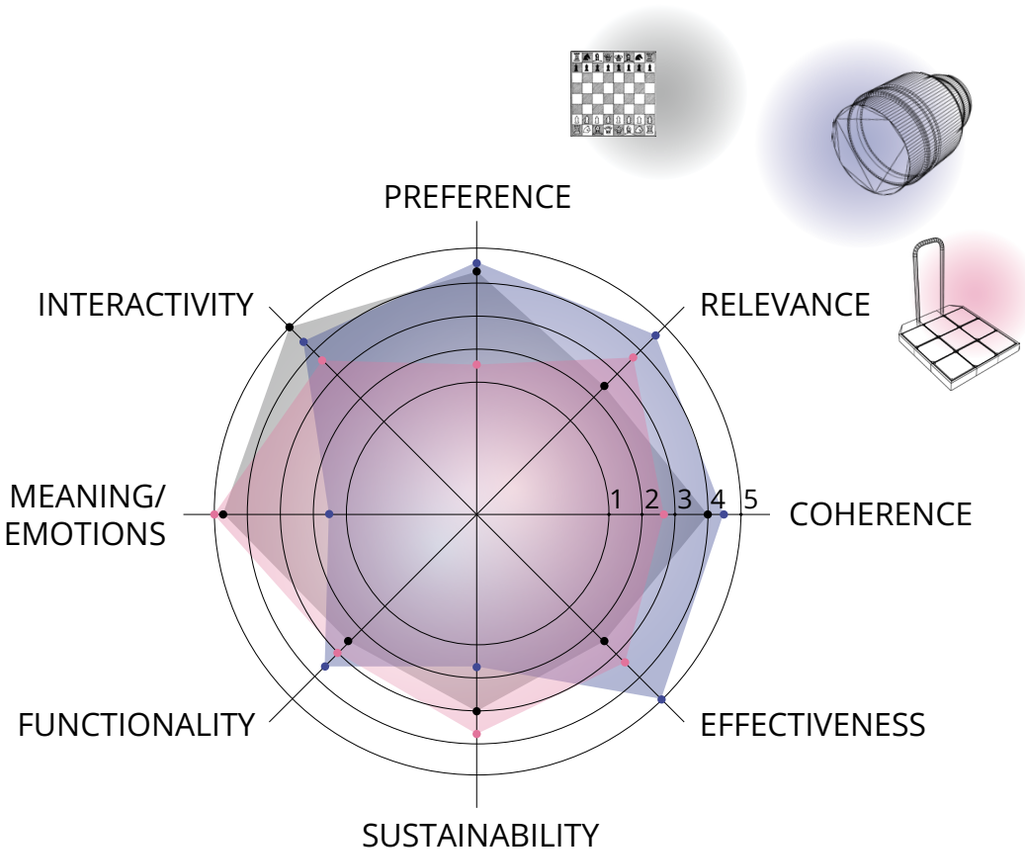
› better idea of the urban spaces, sense of direction danger warning

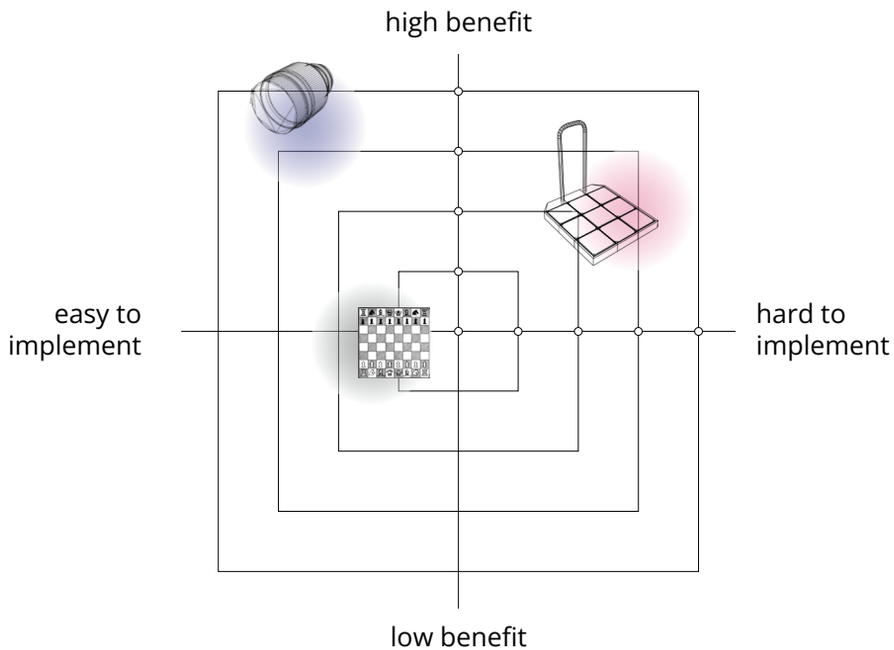
› sound, vibration



EVALUATION

in order to decide on the future scenario to proceed with, the methode of spider diagramm was used. it includes 8 categories which affect the final decision on scenario. those sre : relevance › whether the project fulfils an important function & whether its design was fundamentally suited to achieving the goals associated with the project; coherence › systemic and context-coherent manner, distinguishing between internal and external coherence; effectiveness › whether a project achieves main goals and fulfills needs of users; impact › overarching developmental impact (e.g. the impact on health); sustainability › achieve not only short-term improvements, but also sustainable results.

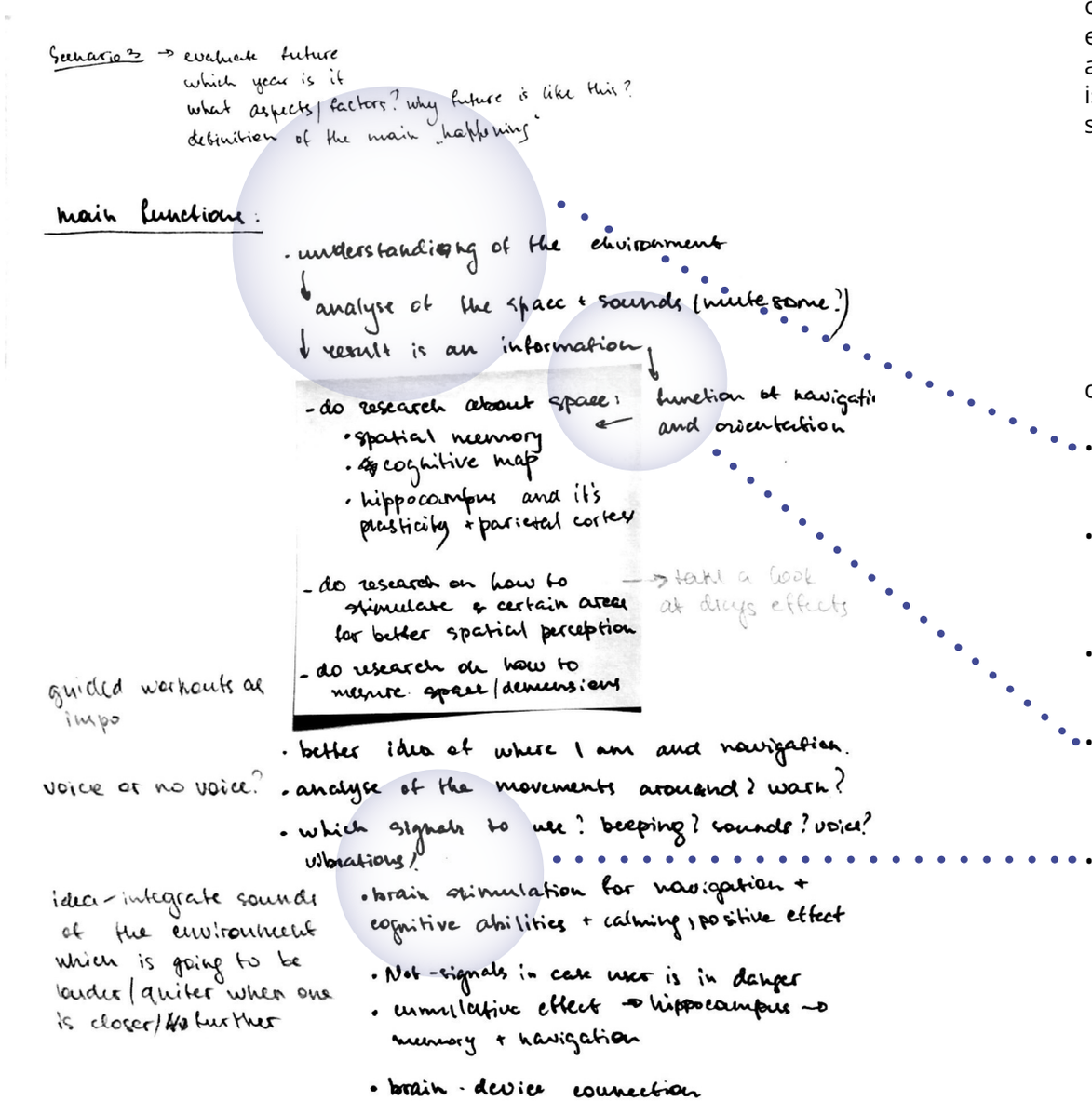




as a result, the 'spatial hearing' scenario was chosen to continue the design process. this means that next steps of the project is in-depth study of the reality of the scenario, the creation of an interactive artifact and user experience testing.

BRIEFING & GOALS SETTING

CONCEPT DEFINITION



the result of the described research and analysis is a precise design brief, which will lead the design process through the next steps of the product development.

THE CONCEPT: users seek a support during their navigation through the overdeveloped, overwhelming city space, they are willing to enjoy the exploration of new outdoor environments and stay independent in both familiar and unfamiliar places. The main idea is to create a small helper - a device, which is going to fullfil user needs, provide interactive responses and improve their spatial abilities in the long run.

defined functions:

- analyse of the environment, space, sounds and potential dangers around a user
- the result of the surrondings analyse process is an informative review delivered to the user by a certain medium (voice? sound? signal? direct transmission to the brain?)
- support and development of user's navigation and orientation in the |urban| environment.
- device creates a prolonged stimulation of the brain parts responsible for spatial abilities (egocentric & allocentric frames) - hippocampus & parieto-frontal cortical network
- therefore such abilities as navigation in familiar or unfamiliar environments, understanding the location of oneself in space, memorizing spatial locations are continuously improved

IDEATION

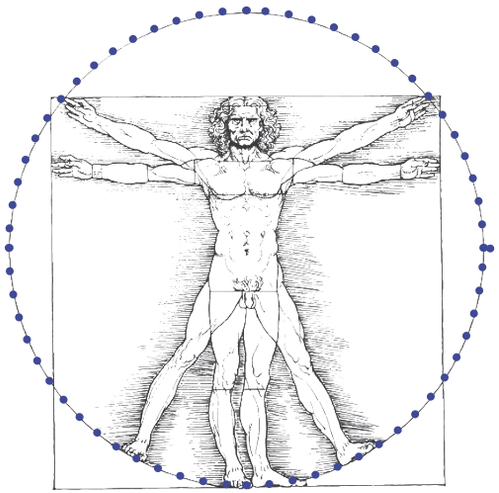
RESEARCH

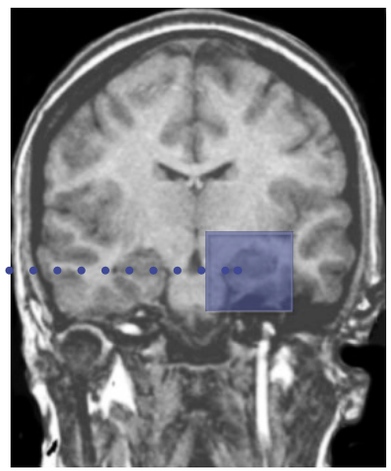
after the definition of main concept and next steps within the project's creative part, another loop of research was needed in order to get a better idea about proncips of device functions. as the 'spatial hearing' device has to be able to directly stimulate human's brain and affect spatial abilities positively, those physical processes had to be precisely studied.

SPATIAL ORIENTATION

the egocentric frame

spatial information about the location of the individual in space › body-centered representations

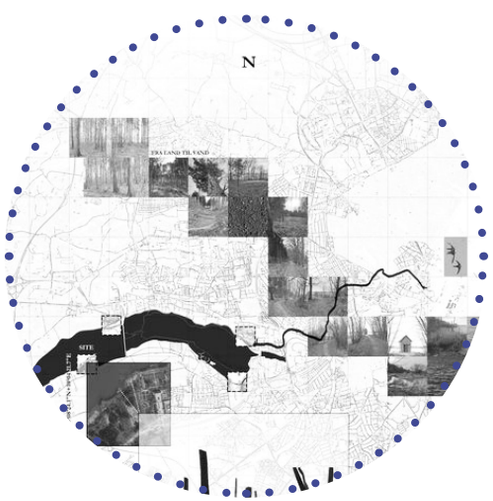


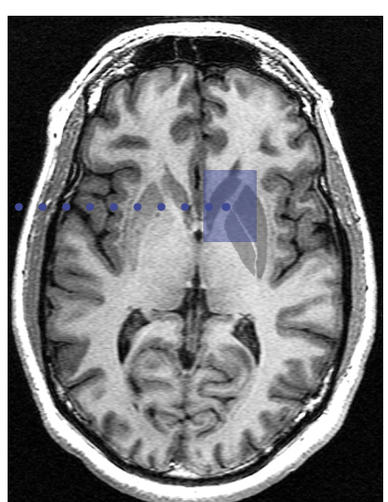


supported mainly by hippocampus place cells

the allocentric frame

spatial information about the position of objects around › world-centered representations





relies primarily on the caudate nucleus

SPATIAL ORIENTATION

spatial abilities play an important role in everyday life, as they allow individuals to navigate in familiar or unfamiliar environments ›

two types of “frames” used to represent spatial information:

› the egocentric frame, which includes spatial information about the location of the individual in the environment (leads to the creation of body-centered representations)

› the allocentric frame, which involves the spatial information about the position of objects around (locations are described using object-to-object relationships, independently from the subject’s point of view - world-centered representations)

older adults often report reduced spatial skills, with important consequences on quality of life, safety and autonomy › the elderly may avoid navigating and exploring new environments

an increasing number of studies have investigated the neurobiological correlates of egocentric and allocentric frames, pointing out both different specific neural circuits and a shared bilateral fronto-parietal network

› the egocentric frame relies primarily on the caudate nucleus and, more generally, on the medial parietal lobe

› the allocentric frame is supported mainly by hippocampus place cells as well as the parahippocampal and the retrosplenial cortex (RSC)

› the ability to switch from one frame to another (environmental navigation) involves the posterior cingulate cortex (PCC) and the RSC

› cells that are supposed to be specific for analyzing and converting spatial information: grid cells, mainly located in the entorhinal cortex, are involved in updating spatial information in relation to self-motion

spatial information is provided by the sensory organs and it is then collected based on the position of the body in the external space › as a consequence of head and body movements within an environment, egocentric spatial maps need to be continuously integrated and updated by proprioceptive, vestibular and motor signals in order to maintain accurate spatial representations.

› this process would serve as an egocentric frame and it involves a parieto-frontal cortical network, with a major role played by the posterior parietal cortex and the premotor cortex

brain is also able to build and store stable representations based on the allocentric frame, responsible for the offline update of memorized spatial locations › the precuneus would play a critical role in this process

issues among elderly

depending on specific neural systems, spatial abilities and allocentric/egocentric computations undergo a physiological decline through life, reflecting the underlying changes in the aging brain.

navigation requires a flexible adoption of both egocentric and allocentric strategies

two important structures in spatial cognition, show a great loss of volume

the elderly show difficulties in spatial skills, like spatial memory, spatial navigation - especially regarding the creation of cognitive maps and path integration - and a decline in the ability to switch from egocentric to allocentric frame

studies showed that older participants required more time to learn the locations of the targets and to form a cognitive map of the virtual environment

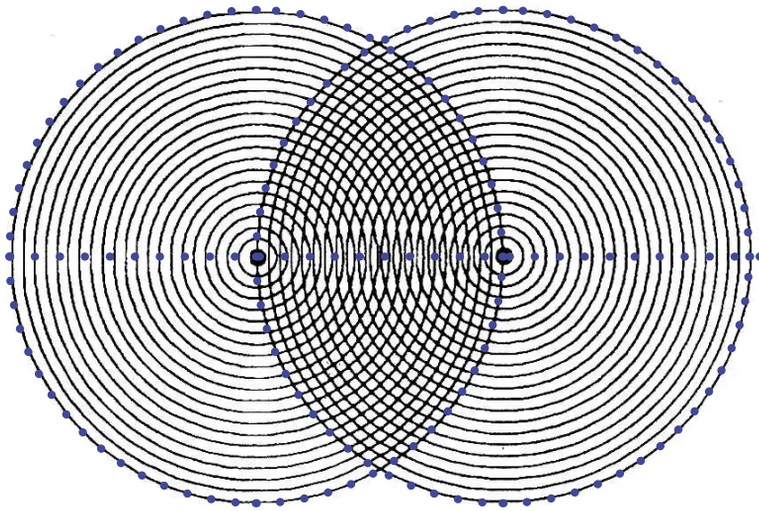
aging affected allocentric performances in terms of response time, and egocentric trials in terms of accuracy

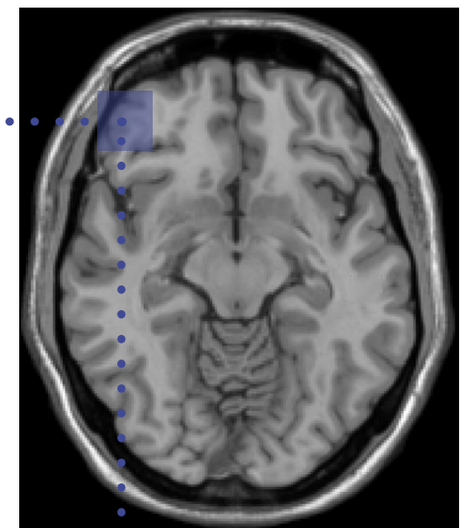
INNER VOICE

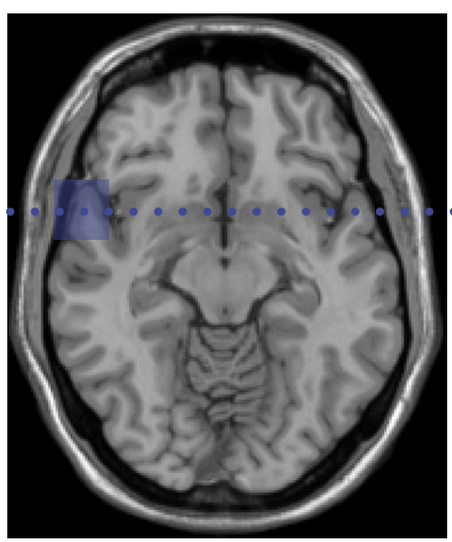
monologic internal speech

single-speaker scenarios where single speaker's voice or perspective is sufficien

inner speach in form of taking to ones-self & supporting memory







involves the activation of the left inferior frontal gyrus

involves the activation of the superior temporal gyrus

INNER VOICE

everyday inner speech is often reported to be involved in self-awareness, past and future thinking and emotional reflection, while in cognitive research, inner speech appears to fulfill a variety of mnemonic and regulatory functions.

functional MRI imaging studies have shown that monologic internal speech involves the activation of the superior temporal gyrus and the left inferior frontal gyrus, which is the standard language system that is activated during any kind of speech.

two types: inner speech involving conversations ('dialogic inner speech') and single-speaker scenarios ('monologic inner speech') - relevant for the project - in monologue, a single speaker's voice or perspective is sufficient.

possibly: language system of internal dialogue works in conjunction with a part of the social cognition system

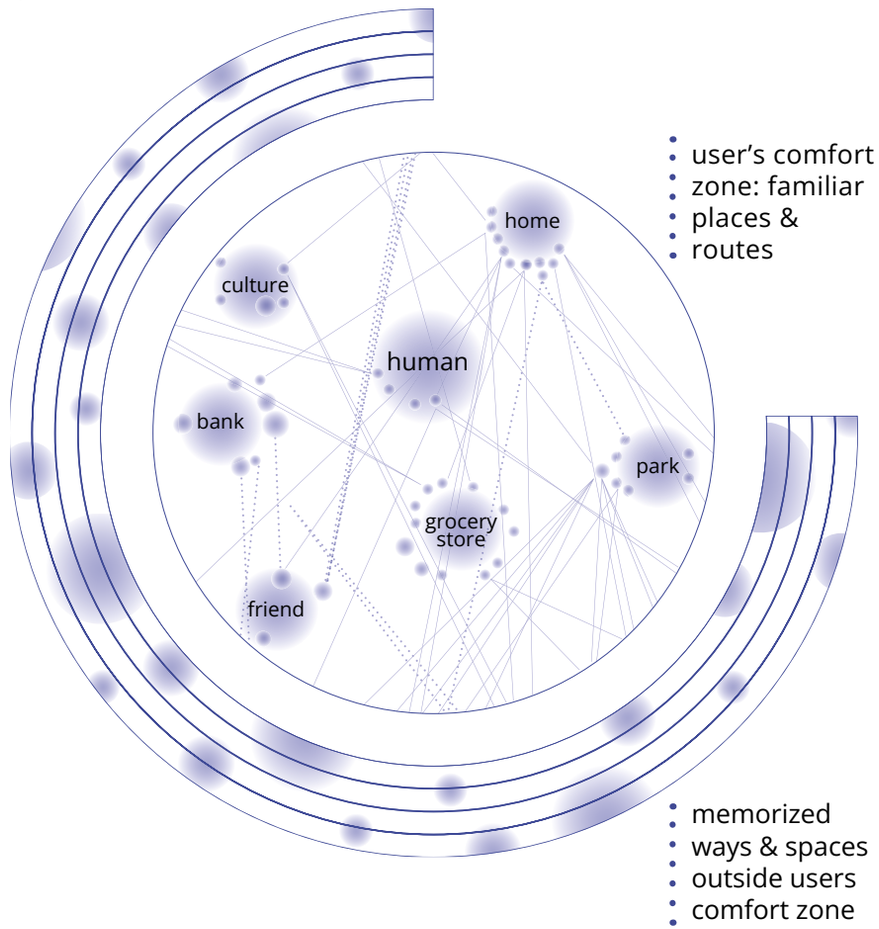
! the regions of the brain activated during spontaneous, natural internal speech diverge from those that are activated on demand !

internal monologue can be:

- verbal, when a person essentially "talk" to him/her/their-self
- inner speech can help support working memory
- the form of a conversation with ones-self
- internal voices in form of having songs stuck in your head

SPATIAL MEMORY

spatial memory is a form of memory responsible for the recording and recovery of spatial information about locations and directions. spatial memory is necessary for orientation in space and can also be divided into egocentric (body-centered) and allocentric (world-centered) spatial memory. it's essential for navigation in any - even familiar - spaces.

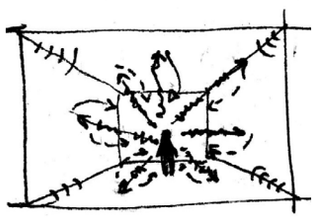


in order to structure spatial memory and make it more efficient even among elderly people, who tend to show difficulties in spatial abilities, the device could capture and intensify the familiar & unfamiliar for user places.

FUNCTIONALITY

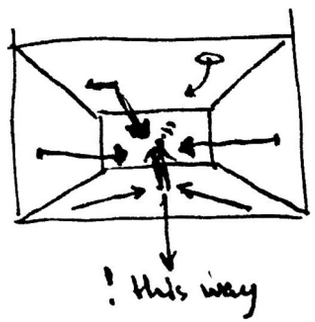
what exact function should 'spatial hearing' device have? if it not only analyses and tests the environmental phenomenons, but also proveides integrated navigation and noises suppression? should user be able to control the amount of support provided by device? and which reasonable functions could be implemented to the design? that were the questions I was answering during the next phase - functional concept development.

ANALYSIS



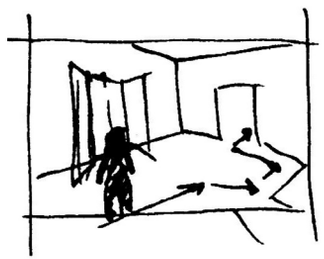
- capture spatial attributes
- analyse of the present phenomenons
- deeper evaluation of the most relevant dimensions and of the potential danger signs

REVIEW & NOTIFY



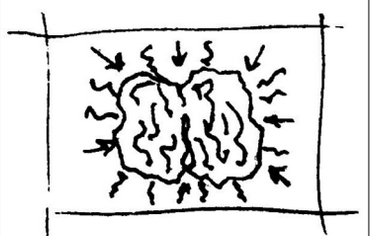
- clustering of the phenomenons
- review and matching with a request/given task
- informing the user through a medium
- direct impact on brain centers › improvement of egocentric & allocentric frames operation › better spatial understanding

NAVIGATION



- leading signals based on the environmental features
- suppression of unnecessary noises and amplification of the sounds that are relevant for orientation
- warning the user about dangers on a way

STIMULATION



- stimulation of the brain parts for spatial abilities
- influence on hippocampus & parieto-frontal cortical network
- improvement of spatial memory
- better ability to switch from one frame to another › environmental navigation

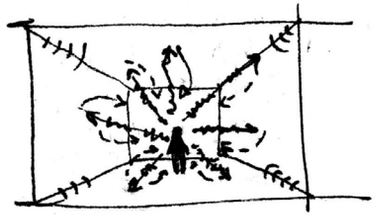
TRAINING

- orientation becomes easier with the usage of the device
- the capacity and accuracy of spatial memory are developing
- faster updating of spatial information in relation to self-motion
- better perception of spatial locations and feeling of presence

FUNCTIONALITY

the idea behind first function - spatial analysis - is that the device will always start it technological cycle from the definition of user's position in space, and then proceed with the precise capturing & testing of the spatial phenomenons around. then, on this stage of the process, the device should evalute most relevant for the user information and move to the next functional step

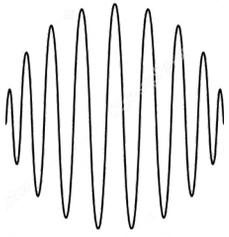
ANALYSIS



- capture spatial attributes
- analyse of the present phenomenons
- deeper evaluation of the most relevant dimensions and of the potential danger signs

spatial hearing

zone of enhanced action



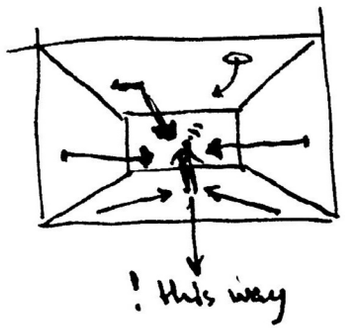
sound analysis

space & ways analysis

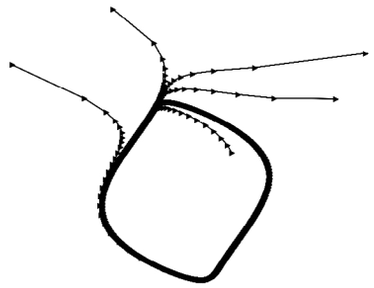
FUNCTIONALITY

next step for the device is to review the information about surroundings already collected by 'analysis' phase. this process has to be mainly based on the user's spatial mapes and location even during movement. the phase aims to give user a clear idea of own direction and objects around

REVIEW & NOTIFY

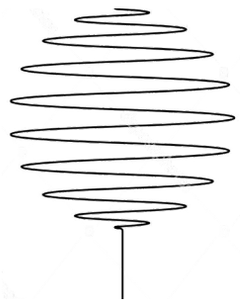


- clustering of the phenomenons
- review and matching with a request/given task
- informing the user through a medium
- direct impact on brain centers › improvement of egocentric & allocentric frames operation › better spatial understanding



pathway analysis

given task



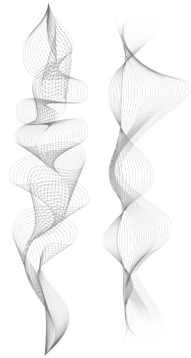
information/ medium

FUNCTIONALITY

after the device clustered all the relevant phenomenons and transmittered those to the user with the help of chosen medium, the navigating function enters into force. it 's intensity can be varied as well in order to only provide user with desired instructions. it's also important to integrate the function of danger warning into the device as elderly people often lose their attentiveness because of aging

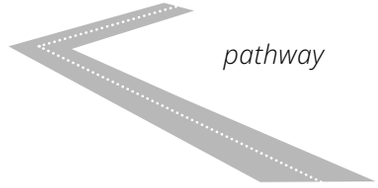
NAVIGATION

- leading signals based on the environmental features
- suppression of unnecessary noises and amplification of the sounds that are relevant for orientation
- warning the user about dangers on a way



noises to be amplified/ suppressed

potential danger

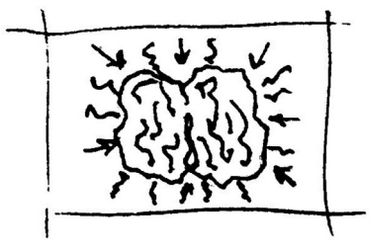


pathway

FUNCTIONALITY

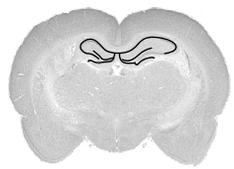
stimulation opens the cycle of another functional level of the device - the one responsible for the direct influence on user's cognitive and nervous systems. it betters spatial abilities of one by the stimulation of brain frames responsible for orientation and therefore impoves the whole complex of important spatial skills

STIMULATION

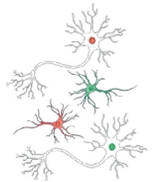


- stimulation of the brain parts for spatial abilities
- influence on hippocampus & parieto-frontal cortical network
- improvement of spatial memory
- better ability to switch from one frame to another
  › environmental navigation

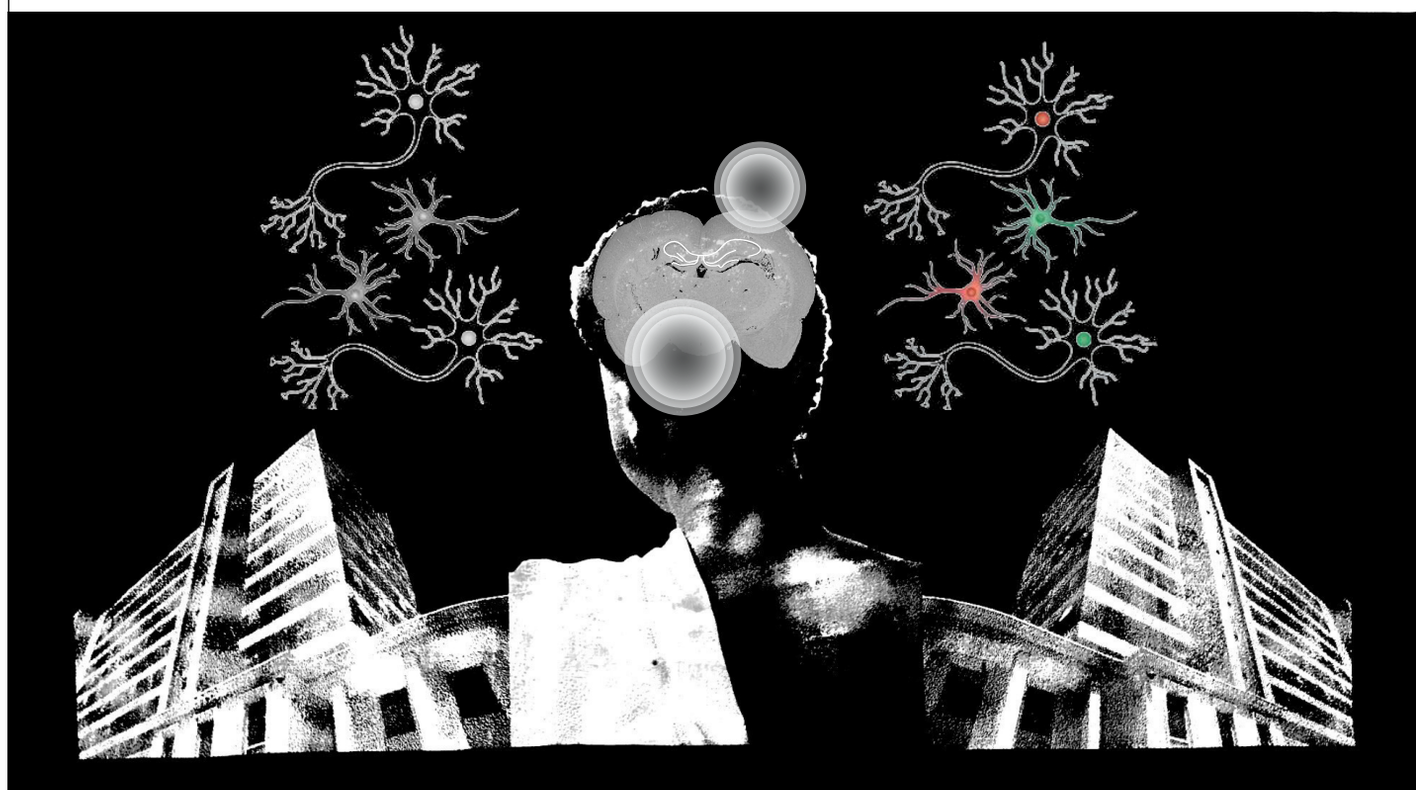
stimulated zones



hippo-campus scheme



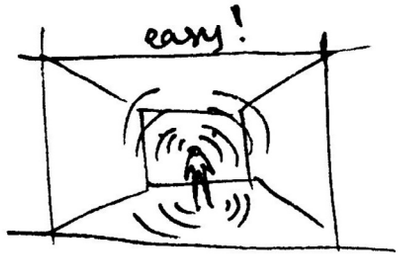
response to stimulation/ activation of neural connections



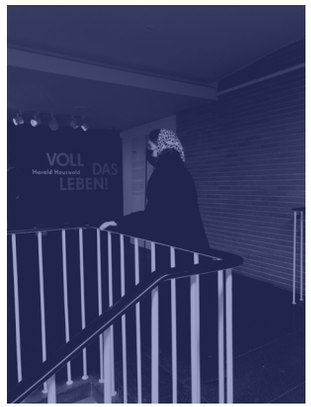
FUNCTIONALITY

in order to create a pleasant user experience, the device not only provides support for the elderly while in usage, but also trains their brain cells to consolidate the result of the 'spatial hearing' processes. that means, with every time an older person uses a device, it becomes less needed due to cumulative effect of spatial abilities training

TRAINING



- orientation becomes easier with the usage of the device
- the capacity and accuracy of spatial memory are developing
- faster updating of spatial information in relation to self-motion
- better perception of spatial locations and feeling of presence



correlated

correlated

correlated

CONCEPTUAL LAYERS

In order to organize the future work after first concept highlights creation and functianal breakdown, main conceptual features and layering of how the design development of the device will be continued had to be set.

In order to create an understandable and easy to use product, the amount of functions should be reduced, while the intuitivity & unity of the whole system - increased. Therefore environmental analyse and navigation phases were combined in one phase of device performance.

AS COMBINATION

ENVIRONMENTAL ANALYSE

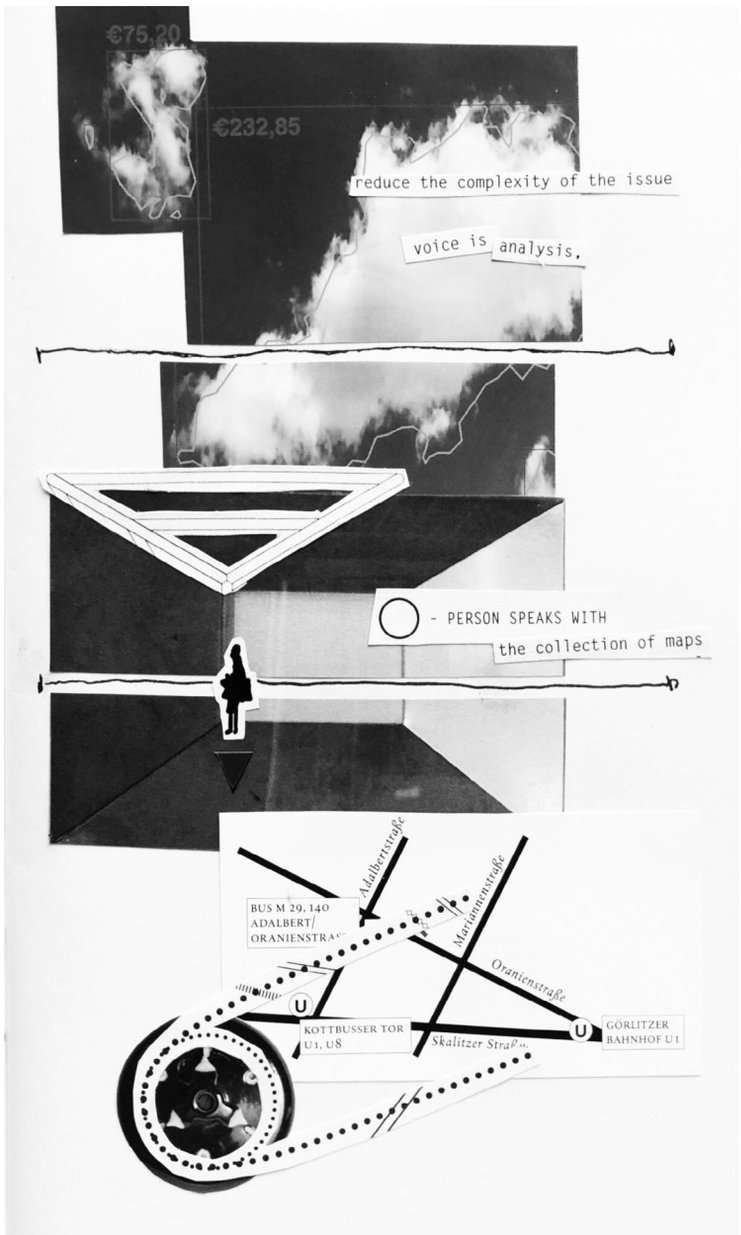
surroundings mapping; noise reduction/ relevant sounds amplification; urban space phenomenons; review and clustering of the happening; space dimensions identification...

SPACE PERCEPTION

stimulation and training of spatial abilities; mental health improvements; better self-perception in spaces and environments; creation of body-centered representations; proprioceptive, vestibular & motor signal; pleasure of explorint new spaces...

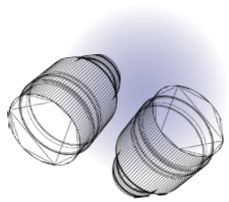
NAVIGATION

support and development of user's navigation and orientation in the surroundings, providing information about the environment and possible danger sourse, different detailed levels instructions are possible: medium dictates each step or only informs about important points of the path change...



MEDIUMS

as the core of the project consisted of the UX design methods, it was important to focus on the interactivity of the device and define mediums, which will transmit and receive information to and from user. in the end, the design have to be responsive, understandable and exciting. in order to create an overview of the possible mediums to be used for interactivity, the "morphological box" metode was used. it is a a creative thinking tool for generating whole solutions to complex problems. the approach is to logically decompose the problem into a number of variables/factors for which solutions or ideas can be identified.

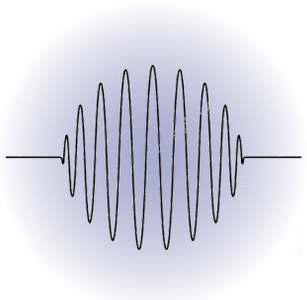


- the voice used for the navigation is the inner/internal personal one, which can possibly accure due to brain stimulation
- the device beeps and makes noises only in case of danger in order to not create an extra distraction for the user
- to provide stimulation of the brain centeres and therefore create cumulative effect of better spatial orientation and perception such technologies as transcranial ultrasound stimulation, frequency-specific sounds/vibrations and direct brain stimulation are used
- the information is communicated directly to the allo- /ego-centric frames - user just “knows” and “feels” the direction, space dimensions, own location etc.
- the device doesn’t suppress any sounds or noises in order not to create a sense of artificial silent world

MEDIUM	CONFIGURATION				
voice	no voice	quite murmuring voice	external voice	loved, familiar voice	inner personal voice
notification sounds	no sounds	beeping in case of danger	+ navigation sounds	+ environment analysis results	+ space description
stimulation	no extra stimulation	transcranial ultrasound stimulation	transcranial magnetic stimulation	frequency-specific sounds/vibrations	direct brain stimulation
information	delivered directly to allocentric/egocentric frames	by request	suppression/ampli-fication of sounds around	signals & descriptions	leading voice
external noises	complete suppression	suppression of all unrel-evant noises	no change	amplification of most important noises	complete amplification

MEDIUMS

after main mediums and their configurations were defined, some questions to be answered accured as part of the on-going ideation process.



inner personal voice

- is it possible to cause it to sound by brain stimulation?
- is it a voice or does it imitate the thoughts of user?

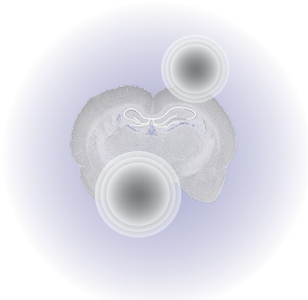
thoughts or knowledge

there're studies that show that there's particular brain parts responsible for the monological speach. in the selected future scenario the technology is much more developed and lets people govern their brains by devices with direct stimulation function. see more under the 'research' section

vibration in case of danger

- how frequent and annoying is the vibration?
- when does it notify about possible danger?

as soon as possible - means at the same time as device has collected and check all the spatial phenomenons features



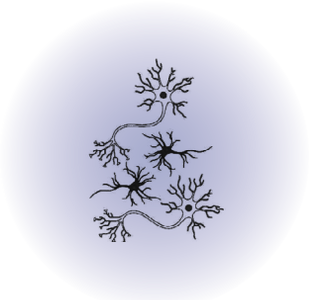
transcranial ultrasound stimulation

frequency-specific sounds/vibrations

direct brain stimulation

- the principle of operation?

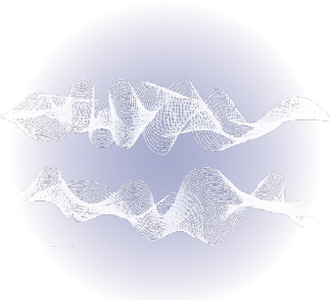
the vibration should be between 130 and 180 hertz



information is delivered directly to allocentric & egocentric frames

- how to communicate and deliver insights from surroundings?
- gut feeling, knowing for sure, intuition & spirituality aspects?

user's allocentric and egocentric brain frames receive all the relevant infos and instructions



no noise reduction

- in order to preserve the natural sounds of the environment, the device won't suppress any noises

for sure, as the device aims to create a feeling of independence and own expertise and minimize the feeling of the constant presence of an assistant

ONE-PAGER • FUNCTIONS • INTERACTION

ENVIRONMENTAL ANALYSE & NAVIGATION

surroundings analyse; relevant sounds amplification; review and clustering of the information; closed space dimensions identification; support and development of user's navigation and orientation in the surroundings

SPACE PERCEPTION & STIMULATION

stimulation and training of spatial abilities; cumulative effect of spatial orientation; better self-perception in spaces and environments abilities

INTERACTION WITH USER

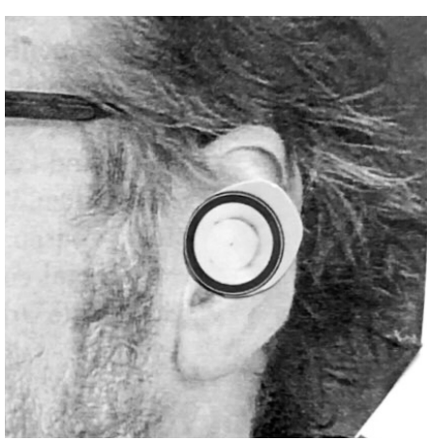
› information about space is communicated directly to the egocentric & allocentric brain frames - user just "knows" and "feels" the direction, space dimensions, own location etc.

› vibration warns in case of danger

› users inner voice transmits instructions of different levels of detail

› transcranial ultrasound brain stimulation

› stimulation through frequency-specific sounds/vibrations



HAPTICLABS.IO WORKSHOP

hapticslab. io makes special toolkits with sensors, which allow designers to create an interactive experience due to customised tactile feedback. with the help of the kits first prototypes and design feedback characteristics were built and tested. and before that a small task aimed at finding the right response for the everyday interactions with the given product.

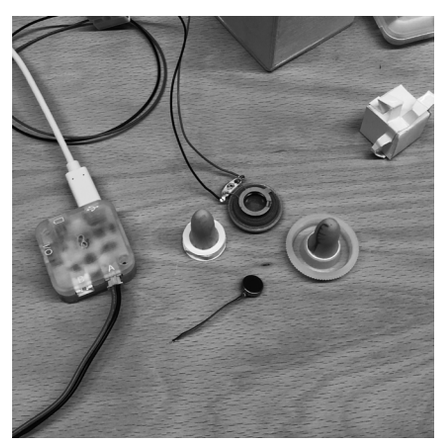
object: remote control

- **who?** Garry, watches TV everynight after work until he falls asleep

- **what?** the remote control initiates interaction, when Garry doesn't touch it for a period of time (e.g. 1 hour). vibration + light. if no answer from user - TV off

- **where?** several keys

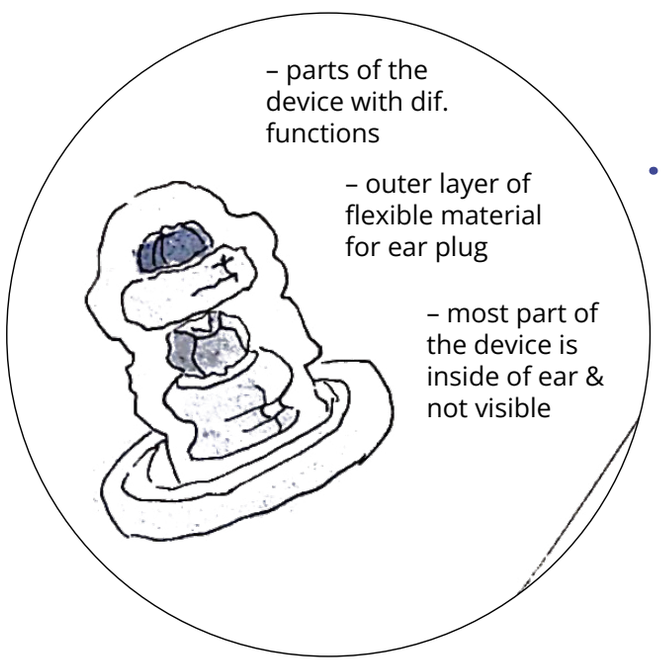
- **pro:** reduced background noises during sleep, saves energy
- **con:** if Garry doesn't sleep (just watches a movie for a long time) repeating vibration can irritate him

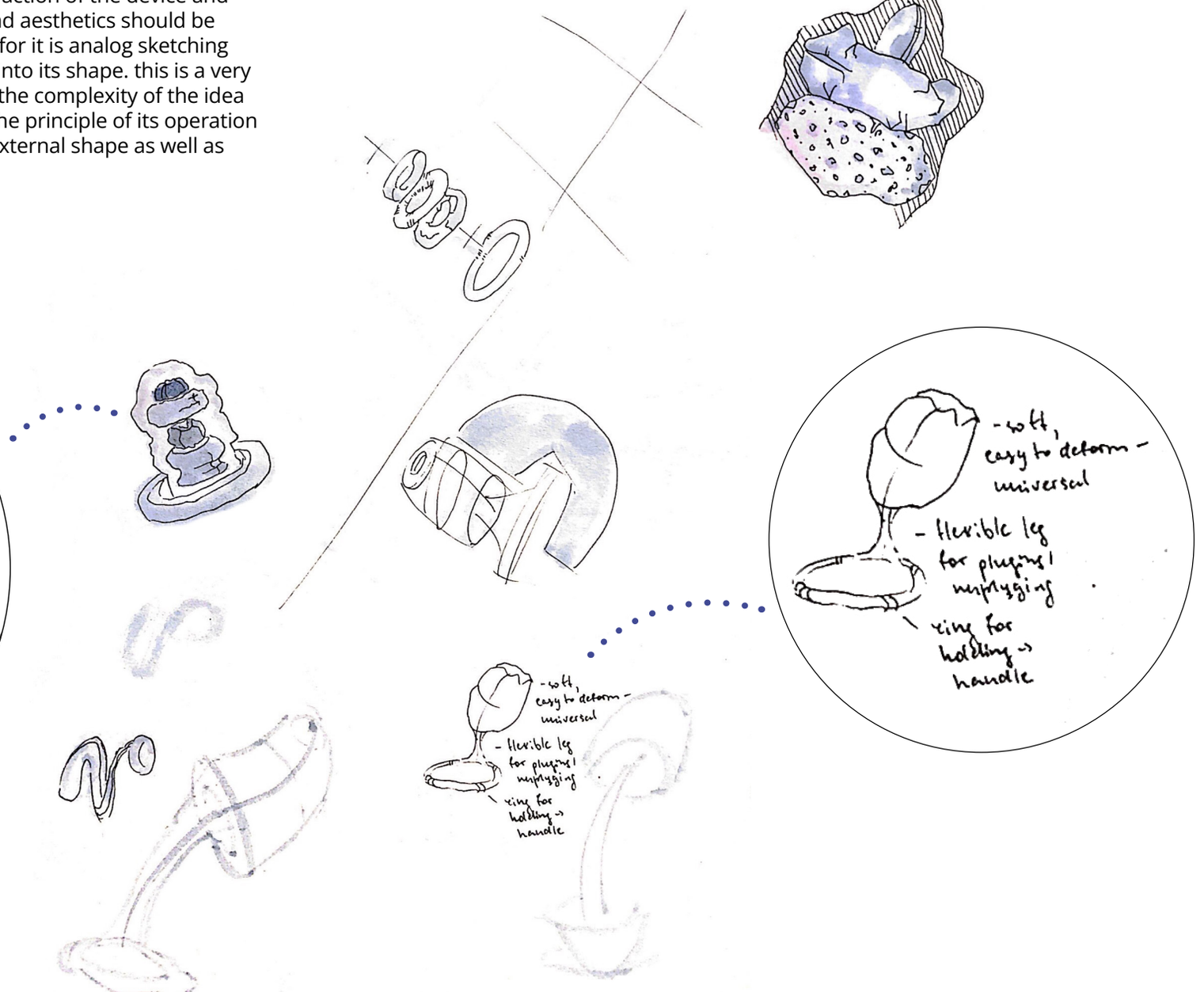


DESIGN PROCESS

SHAPE SEARCHING

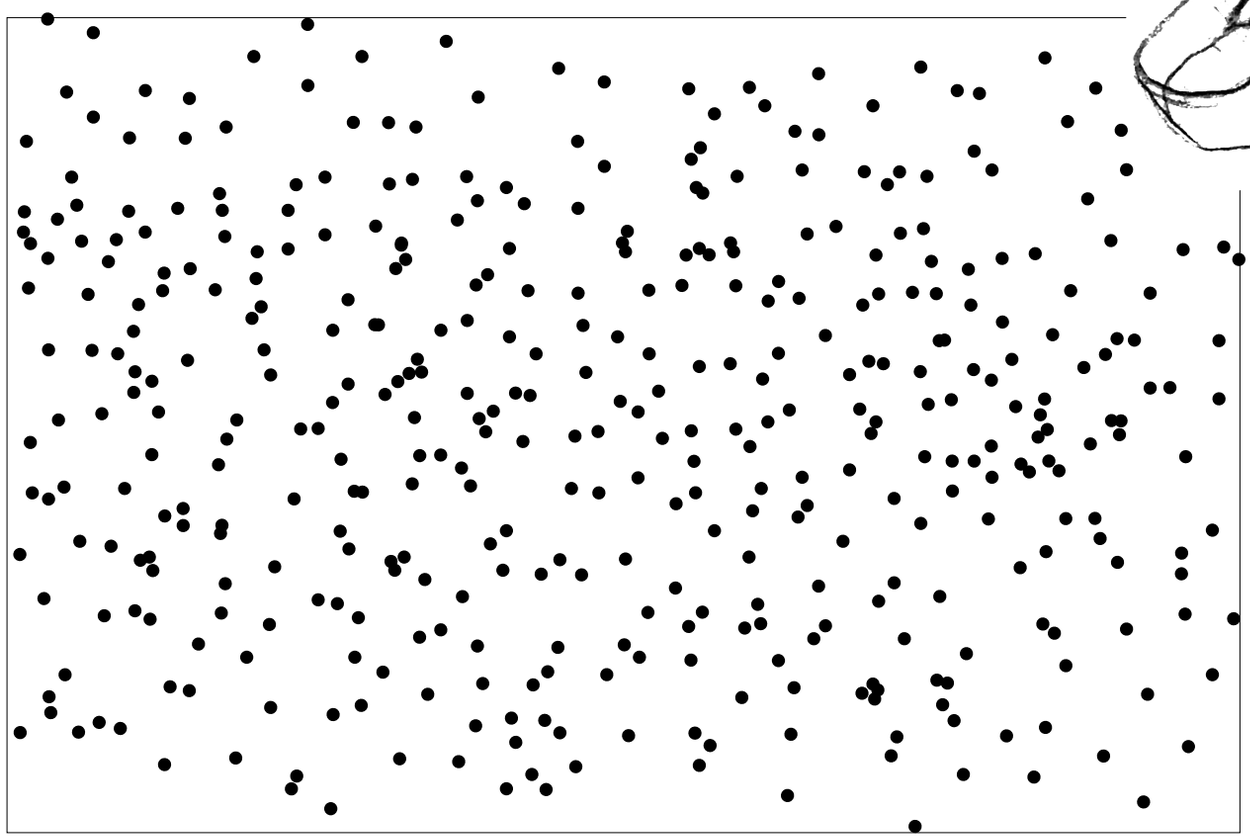
after all of the functionsl, mediums and way of interaction of the device and user were stated, the perfect outer shape design and aesthetics should be revealed during the creative process. a perfect tool for it is analog sketching and transferring the functional layers of the device into its shape. this is a very important aspect - I want to emphasize that due to the complexity of the idea and device's technological cycle, I wanted to show the principle of its operation and emphasize the conceptual layers through the external shape as well as components inside the 'spatial hearing' device.

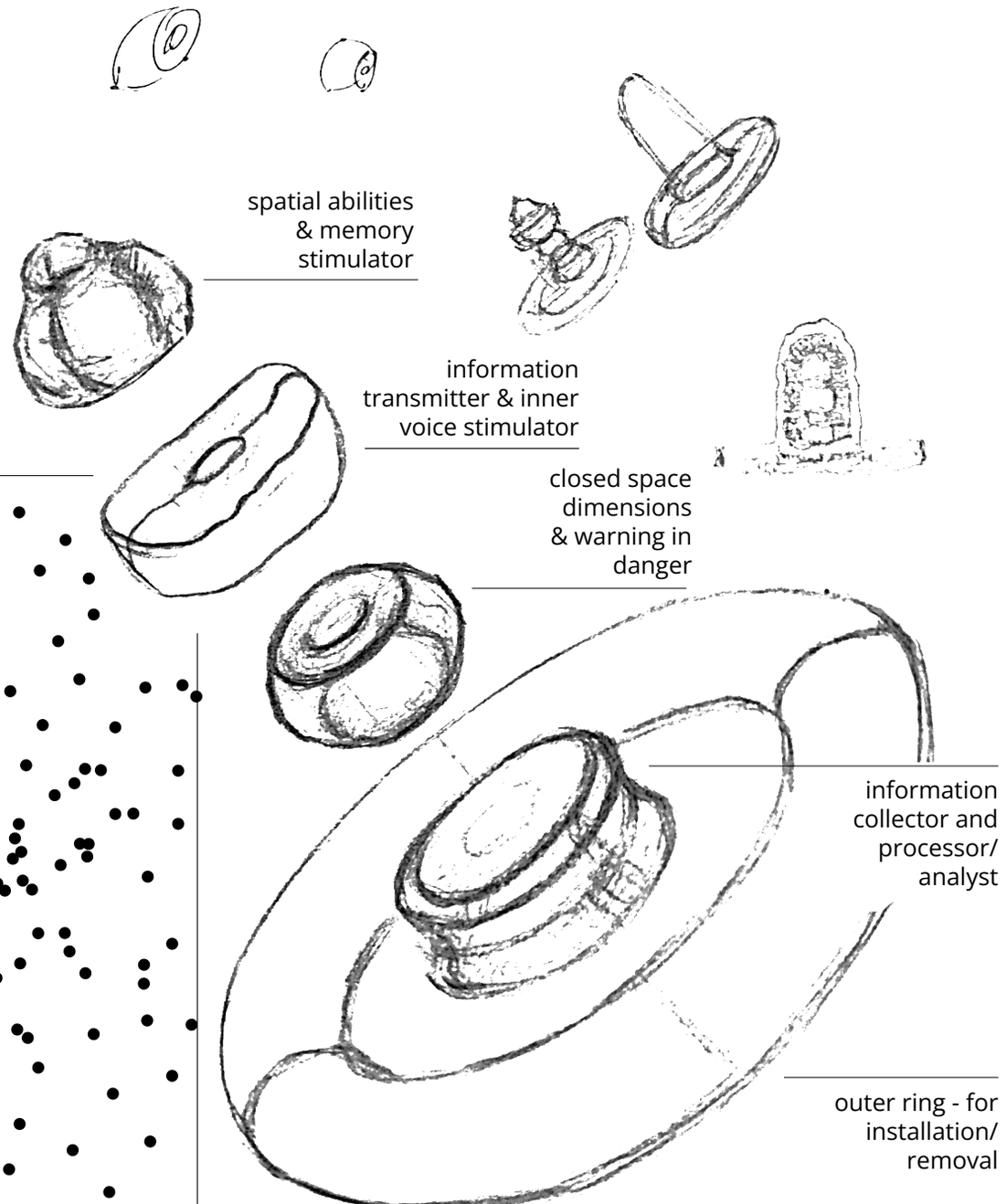




SHAPE SEARCHING

parts of the construction align with the technological cycle of the device. it occurs in stages in accordance with the functional hierarchy. a sample of the environmental mapping is taken and isolated for processing and analysis (the Surroundings-Tester). specifically constructed device layers (the Measurer; the Transmitter-box; the Exerciser-activator) all contain a capsule, a space provided for direct contact between observer & device.

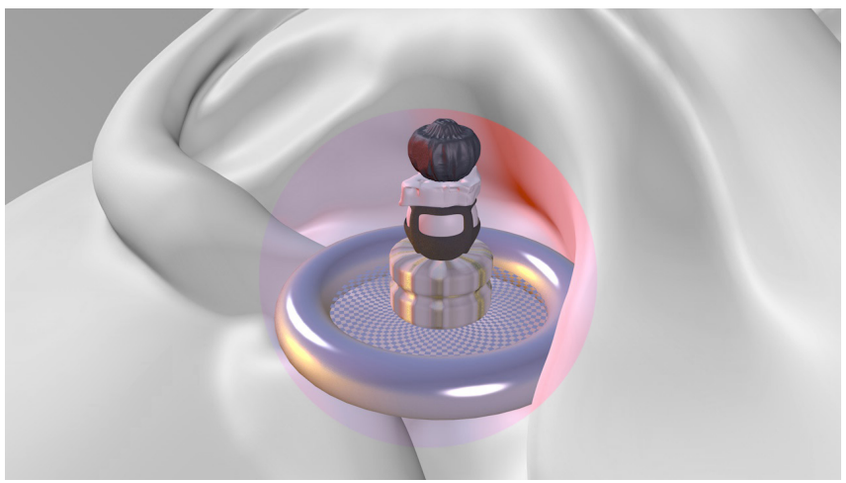




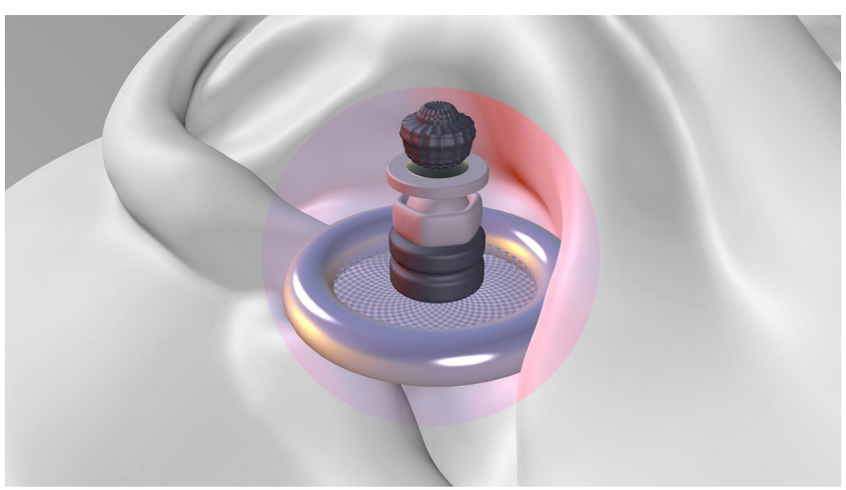
the layer of porous material (memory foam) around the technological cycle parts

LAYERING

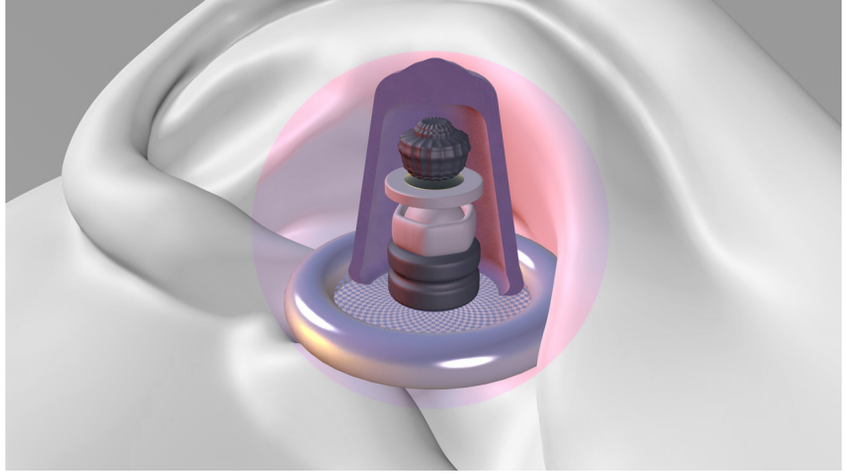
this section of the Dokumentation shows the process of creating a chosen shape of device in c4d software. first, I started with creating all parts of the device in more organic, "magical" style. however, it didn't quite met the requirements for the device parts (to illustrate and communicate their functions & to correspond the aestetics of spatial hearing). therefore during the next stages of the design process all the parts of the technological cecle were improved in their aestethics.



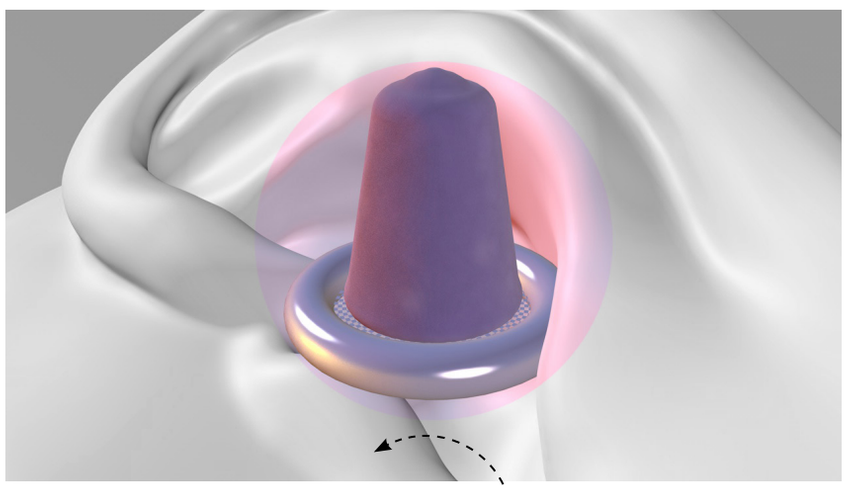
first shape ideas



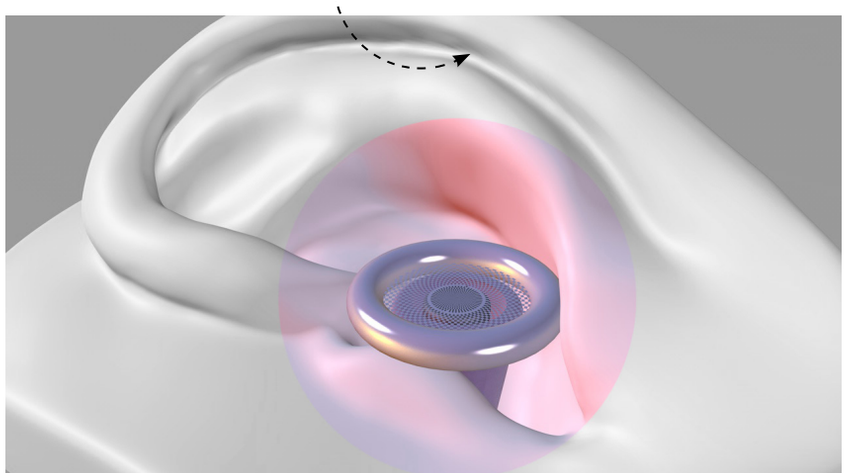
improvement of shape language



structure inside in-ear plug

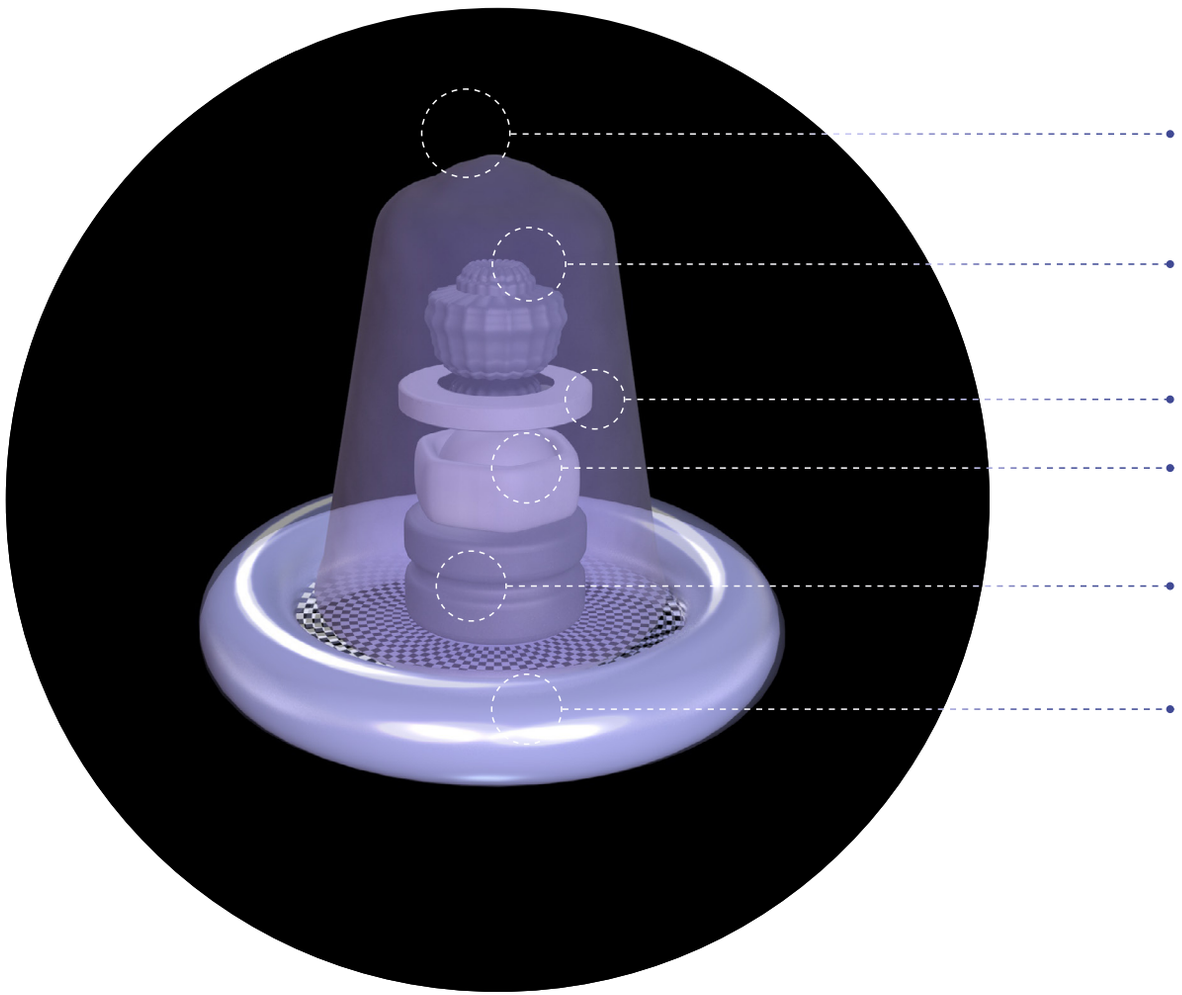


full device & instalation



LAYERING

user joyrney starts with the instalation of device as all the components begin to function progressively. they are unfolding, constantly analyzing and complementing the environmental context in order to provide effective spatial abilities stimulation.



6. stage: soft memory-foam earplug transmits signals of specific parts, being a conductor between the neural activity of the user and spatial hearing device

5. stage: complex structure of exerciser-activator trains spatial abilities: swith from ego- to allo-centric frame; refinement of the individual location in the environment - as well as spatial memory (recognition of the (un) familiar directions/places and cumulative effect of gained skills

4. stage: the transmitter box provides fast communication of the analysis results directly to users spatial “frames” - allocentric and egocentric ones; it also stimulates monologic internal speech to increase user's self-awareness and improve navigation

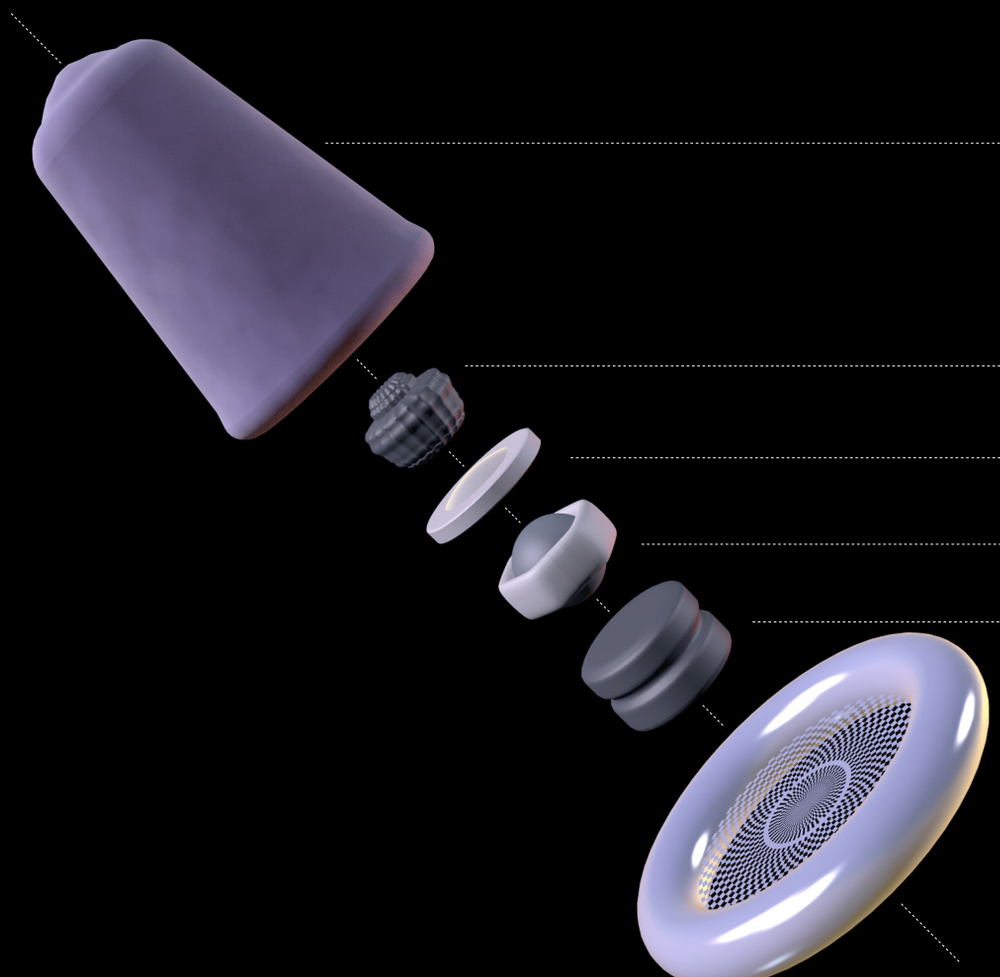
3. stage: if there's a potential danger, the core of measurer warns user using vibration. in case user is inside, the measurer body updates spatial maps & starts capturing closed space dimensions

2. stage: based on spatial information collected by membrane, the surroundings tester complements it with details and specifies results. then it proceeds to analyze & test spatial phenomena

1. stage: after instalation of the device with the help of flexible outer ring the membrane starts capturing & collecting informations from external space. it’s also responsible for updating spatial information in relation to self-motion

MATERIALS

during a next roject development phase it was reasonable to think about possible materials and structures to use for the construction being designed. after some research and discussion with designpate, recycable, in some cases elastic enough and durable materials were chosen, which is important for the outdoor-object design.



the In_ear_plug

- material: soft, silicone alike, slight memory foam effect, inner ear protection & fit-everyone technology

the Exerciser_activator

- material: deformed rubber/ pvc with unique training tech

the Transmitter_box

- material: solid cylinder - ceramics; glass & sand inside

the Measurer

- material: hollow capsule & pvc convex surface

the Surroundings_tester

- material: abs - thermoplastic with the built-in analysing technology & collector space

the Outer_ring & the Membrane

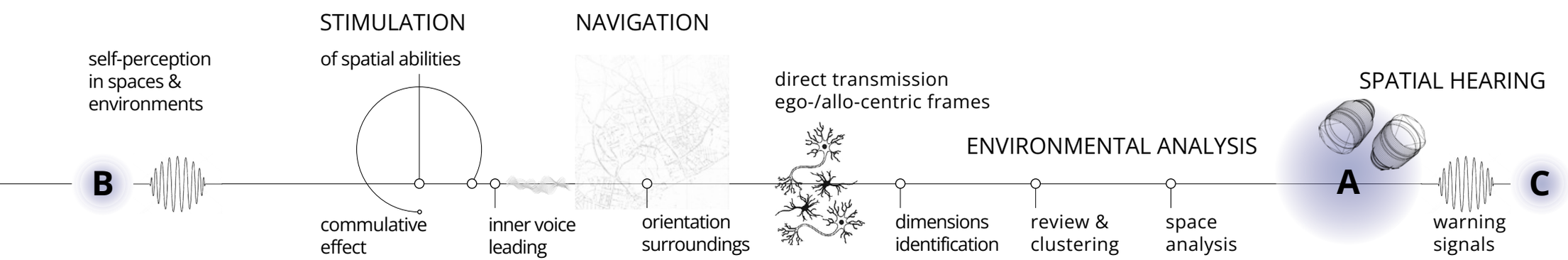
- material: soft pvc/rubber ear tip for inserting foam mesh filter as a membrane

MAPPING

a line scheme of the main functions constructed in accordance with the measure of their disclosure and unfolding.

next page shows creative mapping of the experience & journey (from a user's point of view), which shows a relation between the device, the environment and spatial abilities of the user. relational, emotional and chronological mapping captures main function of the concept.

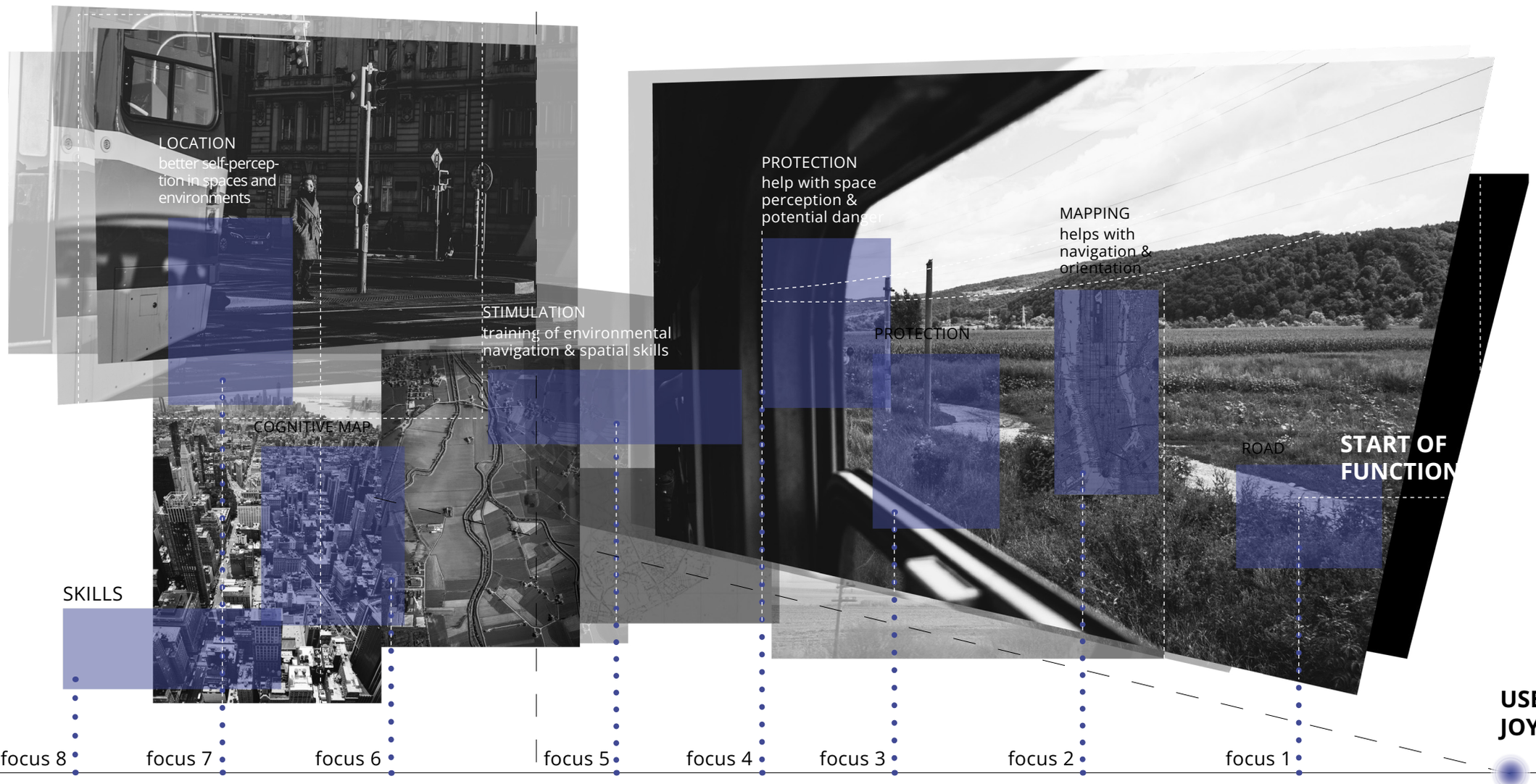
graphics isnpired by work of Mei Fang Liao



ALLOCENTRIC FRAME (WORLD-CENTERED REPRESENTATIONS)

FLEXIBLE ADOPTION / SWITCHING

EGOCENTRIC FRAME (BODY-CENTERED REPRESENTATIONS)



focus 8
cumulative effect of spatial orientation abilities

focus 7
spatial information: the location of the individual in the environment

focus 6
spatial memory: collection of spatial information about locations & directions

focus 5
spatial abilities: swith from ego- to allo-centric frame

focus 4
in case inside: closed space dimensions identification

focus 3
transmission of the instructions and warning by inner voice

focus 2
support of users joyrney through the surroundings

focus 1
analyse of the environment and location

SPATIAL HEARING

FUNCTIONS

as already known from the previous stages of the design process, the defined functions of 'spatial hearing' device can be clustered in two catgories:

ENVIRONMENTAL ANALYSIS AND NAVIGATION and SPACE PERCEPTION WITH STIMULATION.

the first category includes surroundings analysis; review and clustering of the information; closed space dimensions identification; warning in case of danger. the results of those processes are communicated directly to one's egocentric and allocentric brain frames - user just "knows" and "feels" the direction, space dimensions, own location etc.

the second part of the device main functionality is stimulation and training of spatial abilities, which has cumulative effect, for better self-perception in spaces and environments.

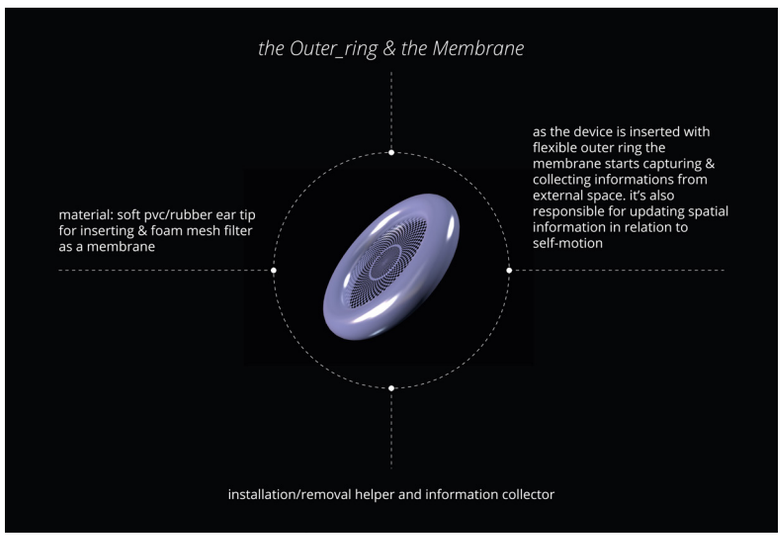
the technological cycle of the device occurs in stages in accordance with the functional hierarchy. it consists of four specifically constructed components, which provide step-by-step implementation of analysis, navigation and stimulation.

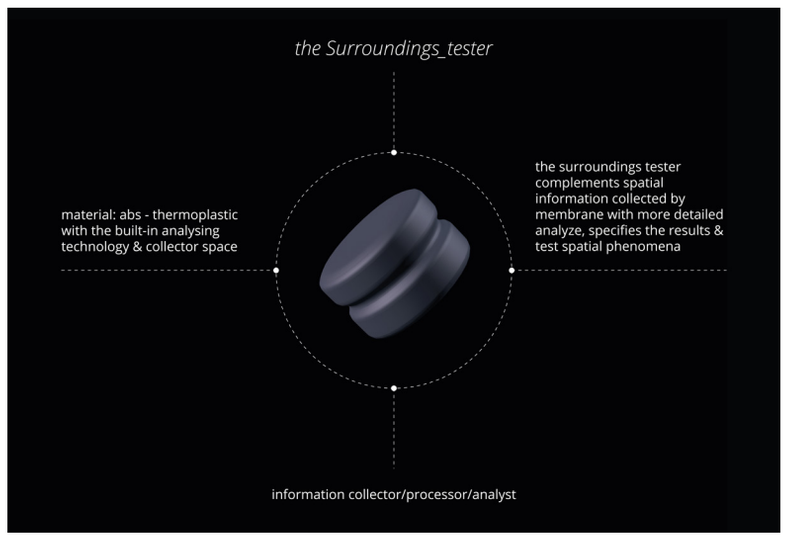
in the next section of the Dokumentation we'll take a closer look into the device operating principle to get a better idea of it's closed technological cycle.

OPERATING PRINCIPLE

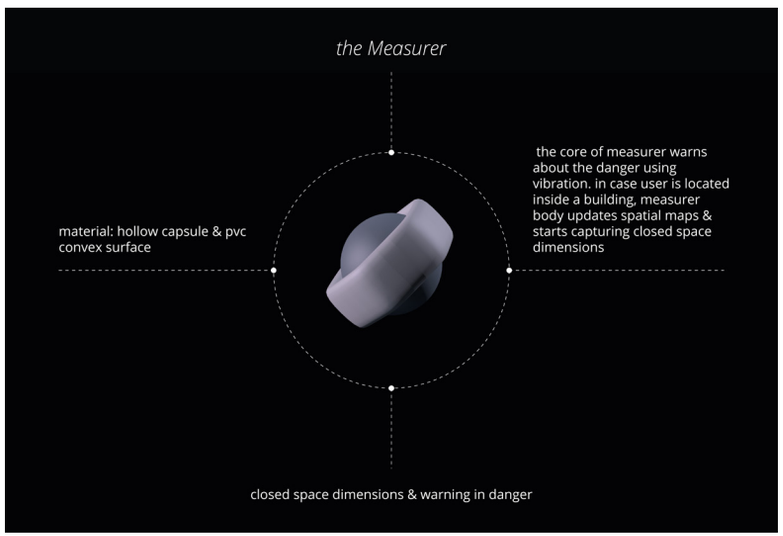
the spatial hearing process begins with the installation of the device into one's ear with the help of flexible outer ring. the sensitive membrane then starts capturing and collecting information about external space. it's also responsible for updating spatial information in relation to self-motion, which helps device get an information of user's direction and speed.

based on the first analysis results collected by membrane, the surroundings tester complements it with details and specifies results. then it proceeds to analyze and test spatial phenomena in the outer world.

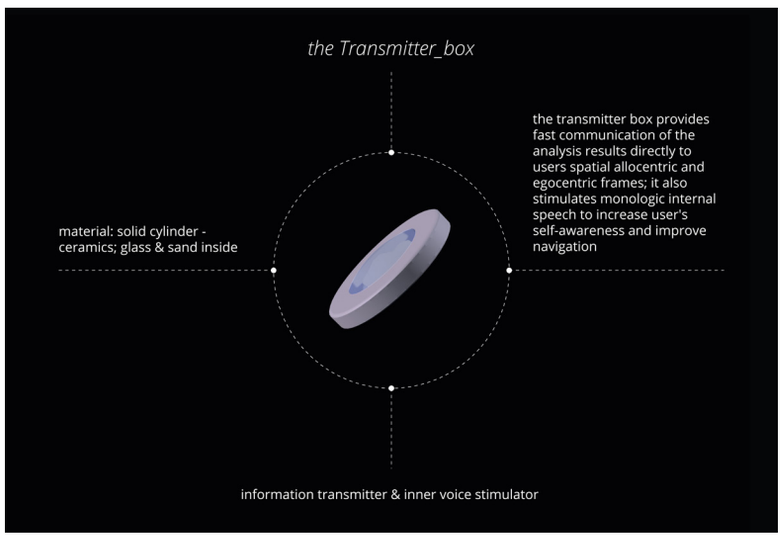


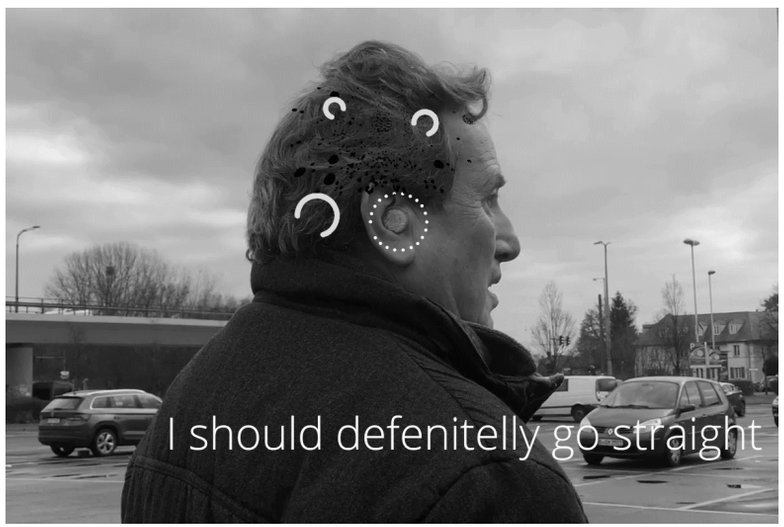


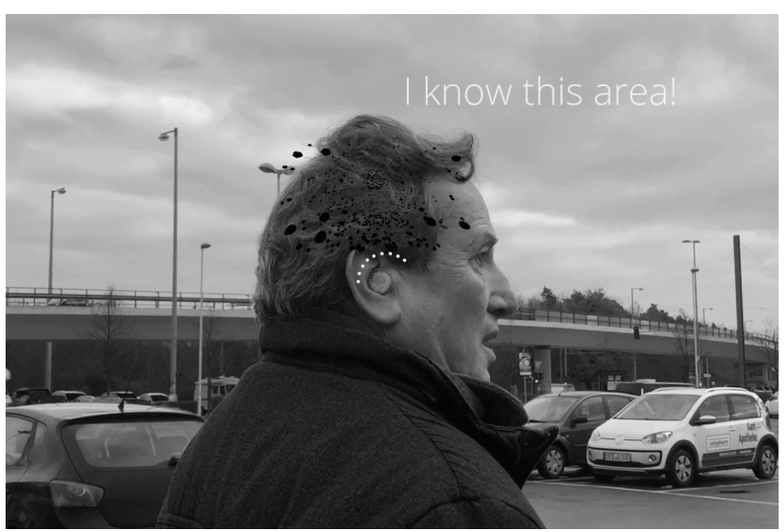
on the next stage of the cycle the core of measurer warns user using vibration if there's a potential danger nearby. in case user is inside, the measurer body updates spatial maps and starts capturing closed space dimensions.



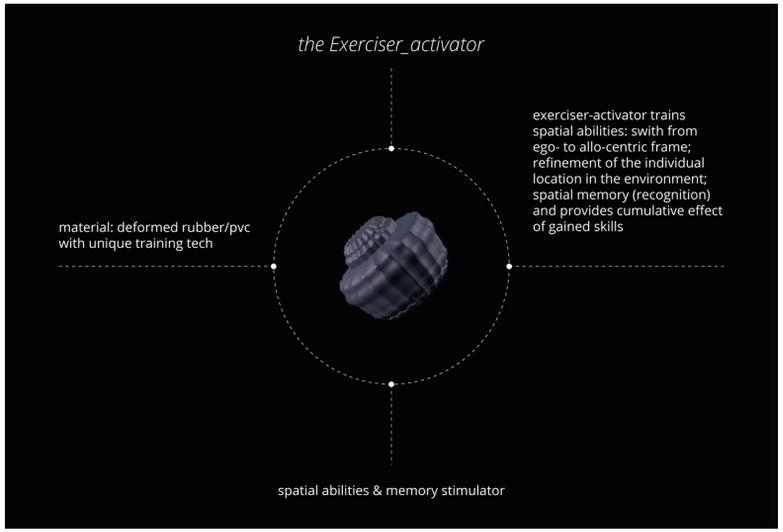
the transmitter box provides fast communication of the analysis results directly to users spatial “frames” - allocentric and egocentric ones. it also stimulates monologic internal speech to increase user’s self-awareness and improve self-navigation experience.







complex structure of exerciser-activator trains spatial abilities: swith from egocentric to allocentric frame; refinement of the individual location in the environment and spatial memory, which includes recognition of the familiar or unfamiliar directions and spaces as well as cumulative effect of gained skills.

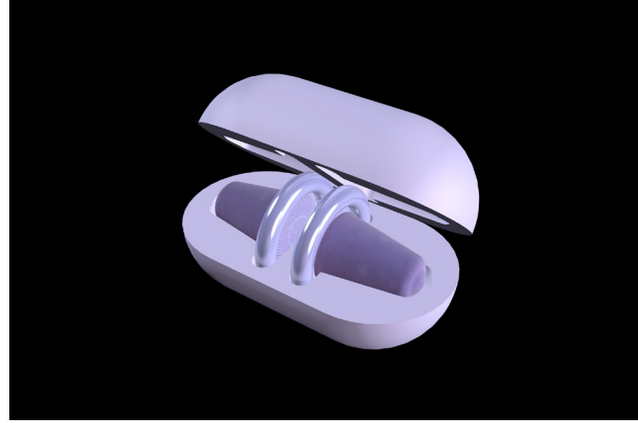


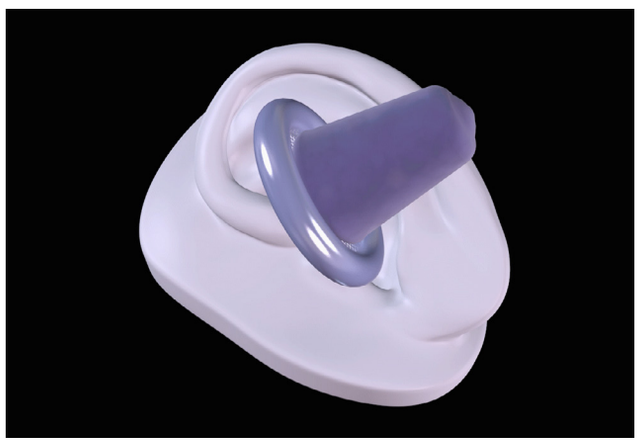
VISUALIZATIONS

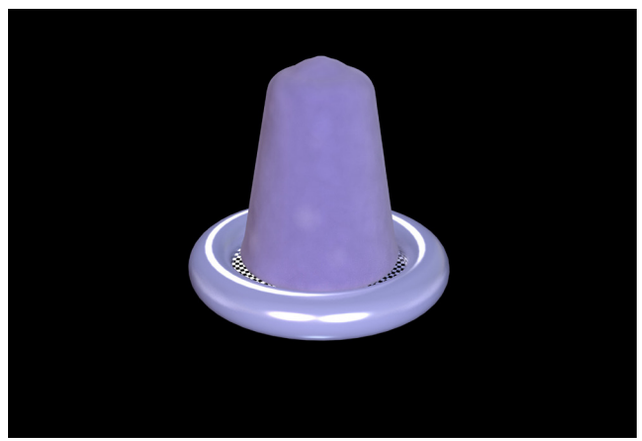
this section of the project is dedicated to the visuals of the device in operation - helping user to navigate in the urban environment. the images are part of the video created for the final presentation. on this page it shows 'spatial hearing' during usage by Edmund Philipp to create the most complete representation of the design project result.

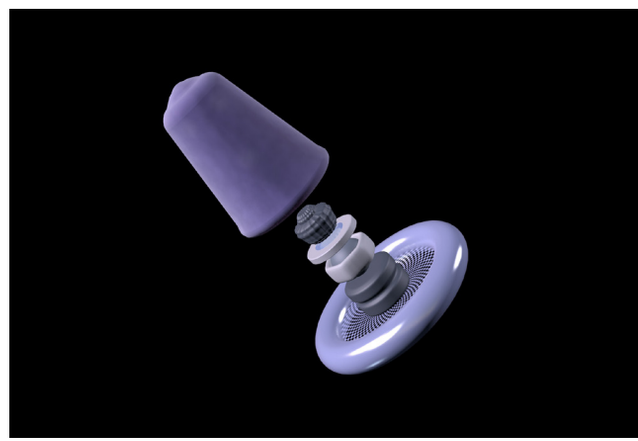
VISUALIZATIONS

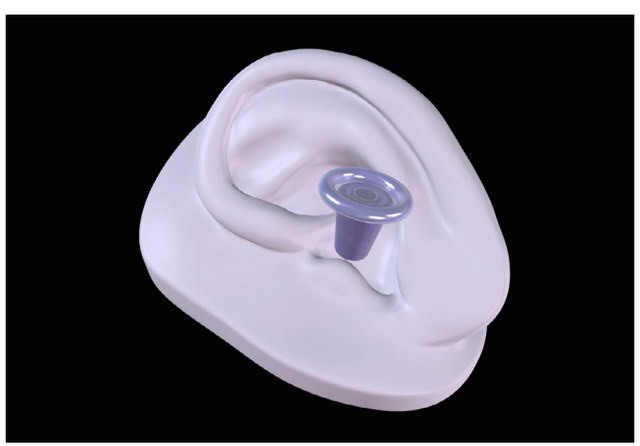
to show the technical components of the device as well as it's design, the series of renderings were created. I also had an idea of making a case for easier storage and transportation of the product since it's quite small and delicate. however the case wasn't included in the next steps of the design process or in a prototyping stage.

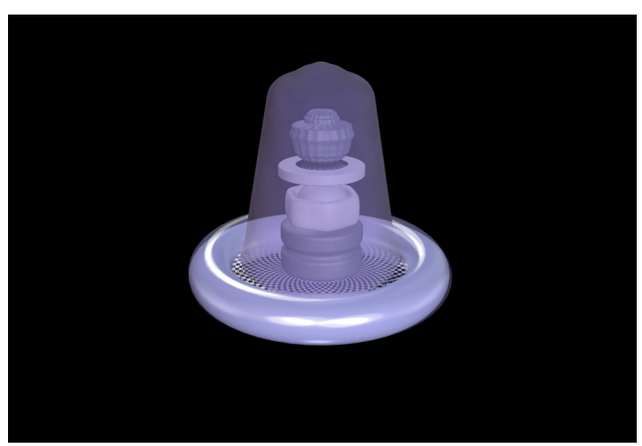


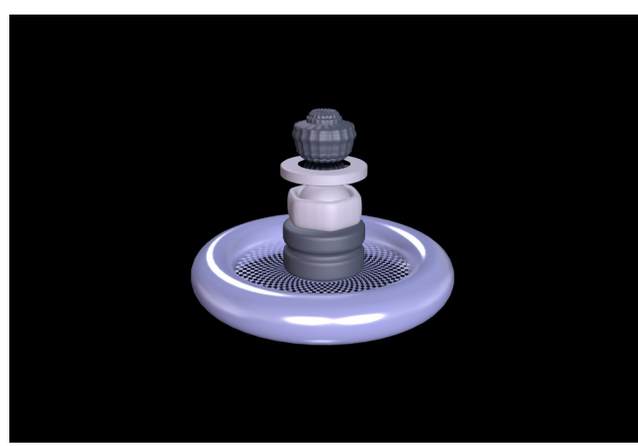










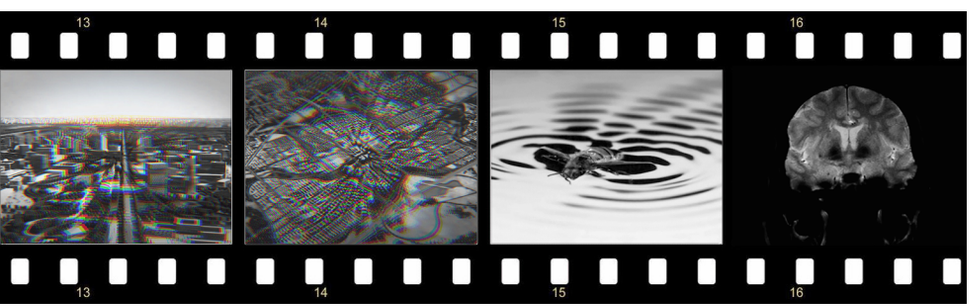


VIDEO

as mentioned in the previous chapters of Dokumentation, the result of the project 'Aging in Place' is a product video including chosen speculative future scenario. a video aims to tell a story of the constantly growing future world, shows a solution of problem within elderly, who have issues with navigation and experiense loss of spatial abilities, and highlights main features of the device. if you'd like to watch the whole video, please scan the qr-code above! following pages present a small content break-down of the footage and some frames from it as well.

00:00 - 02:00

- first minutes of the video are dedicated to adjusted speculative future scenario - it tells about the world, which is overpopulated and overdeveloped, about constantly growing cities, infrastructure, noises and traffic, which makes the environment overwhelming and distracting



02:00 - 04:00

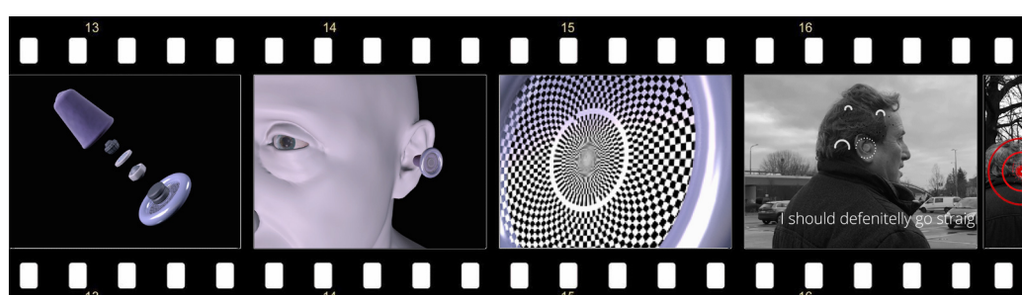
- then the video tells about the solution for the elderly living in the speculative future I created - a small smart helper, a ‘spatial hearing device’, which is placed into one’s ear and helps to get better idea of the urban spaces, sense of direction and to warn about danger. in this part of the video the main advantages and functions of the device are explaned and Edmumd Philipp shares his opinion and understanding on how the product could help not only older citizens, but also other user groups.

04:00 - 05:00

- this part of the video shows the defined device functions, which can be clustered in two catgories, one after another and gives an over-view about the general processes in the device and user’s brain cells.

05:00 - 06:45

- the footage after 5th minute is the most important one for understanding of the concept and designed product: it shows a technological cycle of the device. it consists of four specifically constructed components, which are precisely explaned and observed during operation from users perspective.



MODEL

prototypes and models are an essential element in the design process. model making in any stage of design process, -beside of enhancing creativity- helps to reach better and deeper understanding of the design's their initial goals and interactive features. moreover, making a model allows to visualise and test how a product looks and performs in real world and is a great way of checking a product's viability as well as convenience in use.

for the model I have decided to stick with the princip of "form follows function" and also create an interactive object to better communicate purposes of all four device's essential components. this means, the showcase consists of 2 prototypes: complete device model, which can be inserted in one's ear, and an explosion scheme (cut) that provides possibility to assemble all of the 'spatial hearing' parts with the help of magnets and tweezers. to prepare the instalation, I first made a digital layout of how the composition could look like.

SPATIAL HEARING

the device provides an assistance & training for older people, whose spatial abilities undergo a physiological decline as a reasult of aging.

the Exerciser-activator
spatial abilities & memory stimulator

the Transmitter-box
information transmitter & inner voice stimulator

the Measurer
closed space dimensions & warning in danger

the Surroundings_tester
information collector and processor/ analyst

the Outer_ring & the Membrane
for installation/ removal and capturing information about external space

please use the tweezers to assemble the device

after the idea of how to make a model had been defined, I proceeded with the preparation of the 3D printing files in order to print all the parts using Zortrax M200 Plus printer. the materials choosen were z-flex for the outer ring and soft in-ear part and z-glass for other componenets. I also used an alluminium mesh sheet for the membrane creation. bellow you can see photos of the final model on the presentation platform,

after you looked through the Dokumentation, it seems obvious that the 'spatial hearing' device has a potential to really changehow the urban spaces and environments are perceived and got through by the elderly. older adults often report reduced spatial skills with negative consequences on quality of life, safety and autonomy, which leads to avoiding self-navigation. the main purpose of the device is to provide daily support for elderly citizens & encourage them to explore new environments and stay active in various spaces without being overwhelmed, frustrated or lost!

SPATIAL HEARING is designed not only to improve the user experience in such public open spaces as streets, neighbourhoods or shops, but also to make the user's perception of city environment more human-centered and accessible.

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