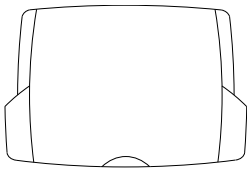

hEI_acs

The High End Interaction in Advanced Control Systems

sebastian wagner

Degree Project in Industrial Design
Division of Architecture and Development Studies
Lund Institute of Technology

Lund University
SWEDEN

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hEl_acs

The High End Interaction in Advanced Control Systems

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Degree Project in Industrial Design

Examensarbete i industridesign

This Degree Project has been completed at the Department of Architecture, Lund Institute of Technology in close cooperation with the National Aeronautics and Space Administration, NASA, and the Institute of Microelectronics in Gothenburg, IMEGO.

I would like to thank all people, not mentioned in this document, that have contributed to this project in some form.

Examensarbetet är utförd vid Institutionen för arkitektur, Lunds Tekniska Högskola i nära samarbete med framförallt NASA, National Aeronautics and Space Administration samt IMEGO, institutet för mikroteknologi i Göteborg.

Jag vill passa på tillfället att tacka alla de människor som bidragit på något sätt med sin kunskap eller med kommentarer till detta projekt.

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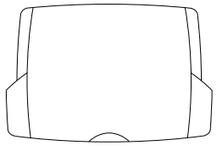

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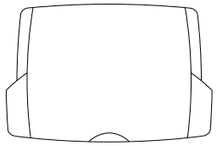


Sammanfattning

Vad är hEI_acs?

hEI_acs är både ett system, en produkt och eller en idé om att göra det självklara uppenbart, det lätta tillgängligt och det oåtkomliga allmänt gods. Det här arbetet sträcker sig över flera ämnesområden, förenar ett flertal discipliner och fångar dagens teknik i nya konstellationer för att föra oss vidare, närmare framtiden.

Det finns inte något som vore omöjligt utan endast sådant vi inte prövat ännu. Vår fantasi är vår guide in i den fort framåtskridande utvecklingen av vår verklighet. Ingenting står stilla. Ingen vet var det slutar. Någon skulle säga att detta är en bra början.

Produkt

hEI_acs som artefakt är en blandning mellan en bärbardator, TablePC, PDA och eller ett anteckningsblock, en handbok eller en övervakningsterminal. Artefakten är skräddarsydd för en specifik miljö och uppgift men kan likaväl användas i andra sammanhang såsom hemma på jorden eller vid en bemannad utpost på planeten Mars. Dess utformning och användning härstammar från dagens idéer om framtida användning av elektronisk utrustning med hänsyn

Abstract

What is hEI_acs ?

hEI_acs is a system as well as an artefact or an idea addressing issues on how to make the obvious things, apparent or the comprehensible and available, common to the user. This work covers many fields, combines different scopes of subjects and grasps contemporary technology into new constellations in an effort to make us move nearer the future.

There are not such things as impossible; only the ones we have left to achieve or solve. It is a journey towards discovering new solutions and our imagination is there to guide us into a fast-forward developing reality. Nothing stays still. No one knows were it will all end. Someone would say that the hEI_acs is just a good beginning.

A product

The hEI_acs as, a product, can be defined as a cluster comprising the PowerBook, the TablePC, the PDA and or the Note Pad, the manual binder and the screening terminal. The artefact is tailor-made for its specific environment and assigned task. This, however, does not exclude other use back home on Earth or

till hur olika behov kommer att förändras över tid. Produkten bygger på modern teknologi och kan tack vare sin utformning följa den snabbt framåtskridande, tekniska utvecklingen. Den unika systemsammansättningen gör den till en produkt överlägsen jämförbara system idag; kort sagt är den enkel, tidlös och oumbärlig.

System av tillämpningar

hEI_acs är ett system av tillämpningar och strukturer. Den övergripande strukturen med fokus på modultänkande, utbytbarhet, föränderlighet, flexibilitet och anpassningsförmåga var dominerande i mitt designarbete. Under projektets gång togs varierande frågeställningar upp ur olika perspektiv. En sådan central fråga handlade om användargränssnittets samspel med sin omgivning samt en annan om hur de fysiska delarna interagera med varandra, förhoppningsvis besvarar mitt arbete en del utav dessa frågor.

Detta arbete fokuserar dock på själva produkten. Under resans gång har jag självfallet tagit fram dellösningar för gränsytor, tillbehör och eller systemsammansättningar. Möjligheterna är outtömliga. Just känslan av möjligheter utan begränsningar hoppas jag att läsaren av detta arbete fylls av.

perhaps at the first manned outpost based on the planet Mars.

The hEI_acs system originates from ideas of today with focus on predicting future needs and demands on technological equipment. The product is based on present state of the art technology and will, due to its design, be easy to upgrade in the future in order to make use of new technological landmarks. The unique composition of common ideas makes the hEI_acs superior to other systems of today. In short; it is simple, timeless and indispensable.

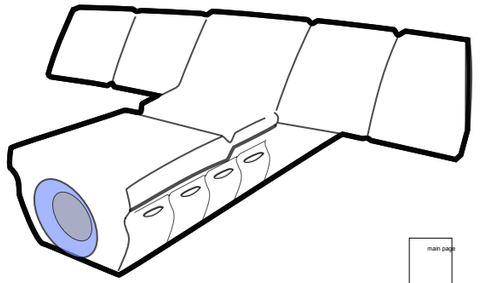
A system of applications

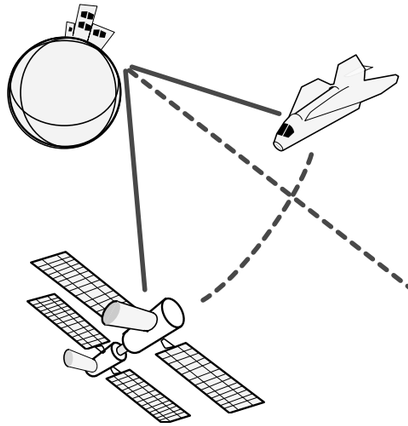
The hEI_acs can be defined as a system of applications and structures with the concept of interchange ability, modularization, flexibility and adaptability as central focal points in this work. During the course of the project, several questions addressing issues related to the focal points were raised. One pivotal question dealt with the user interface's interaction with its surroundings and how the physical parts work and interact with each other.

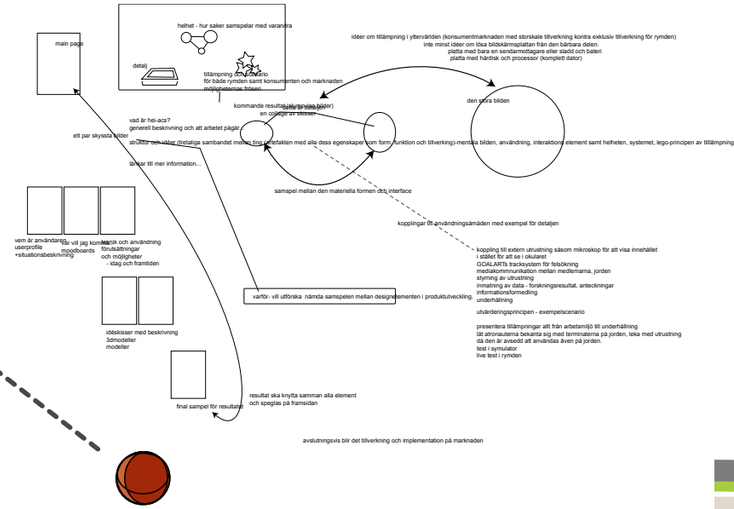
This Degree Project focuses on the product itself. Quite naturally, different solutions have been dealt with and tested at several stages of

Projekt management

Det övergripande målet med arbetet var att sätta den klassiska designprocessen på prov i arbetet att framställa en produkt för absolut extrema miljöer, som till exempel arbete i rymden. Designarbetet var menat att möta och hantera både produktens fysiska kvalitéer och aspekter liksom de kognitiva och rutinmässiga hanteringsmönstren av systemet..







the project in order to visualise ideas concerning interface, accessories and or construction of systems or clusters of a range of systems. The possibilities are infinite. It is the vision of unlimited thinking I would like to share with others through my work.

Project management

The objective was to put the classical design process to the test in designing an artefact for extreme environment such as usage in outer Space. The design of the product should address both the physical aspects and qualities of the object as well as the cognitive and procedural aspects of it.

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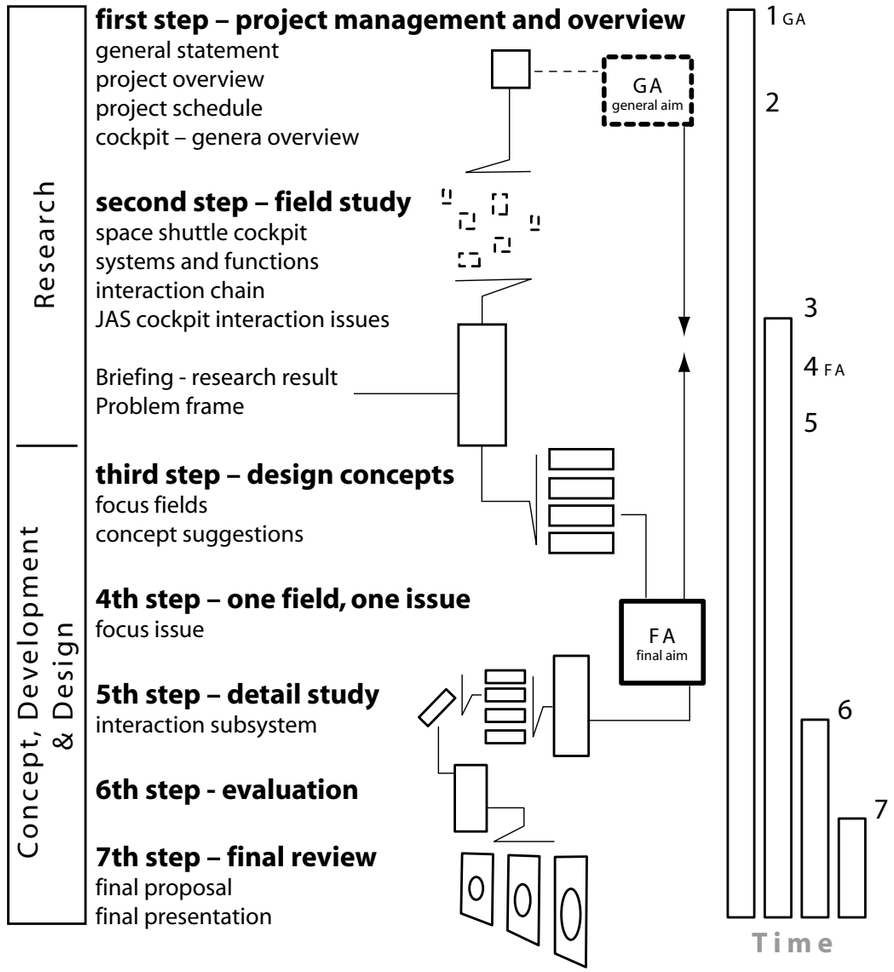


1 Working method

The project consists of several layers and levels. The overall layer can be described as the project structure itself. This is where the project schedule is decided and the time line and the working schedule created. In short; this is the planning and project construction layer – the next layer is the deciding layer.

The project is permeated with a couple ideas; e.g. the number three, layers of information, information streams, system methodology, chains of association, learning, cognition and intuitive design. These ideas are omnipresent in various ways and at all stages through the whole process and are applied to the final result. The ideas handle aspects of interaction; they deal with different issues of communication, memorizing and learning and take human anthropometric conditions into consideration. I will come back to this in detail later on.

The project is constructed out of three levels, which in their turn are subdivided into several layers. Each level contributes to the final product with their specific results. The first level provides a definition of the problem at hand, the second level points out possible solutions and the last level final synthesis of ideas thus becoming the final product.

1.0 Management map

1 finding field of interest

2 design process

1.1 Result vs. concept

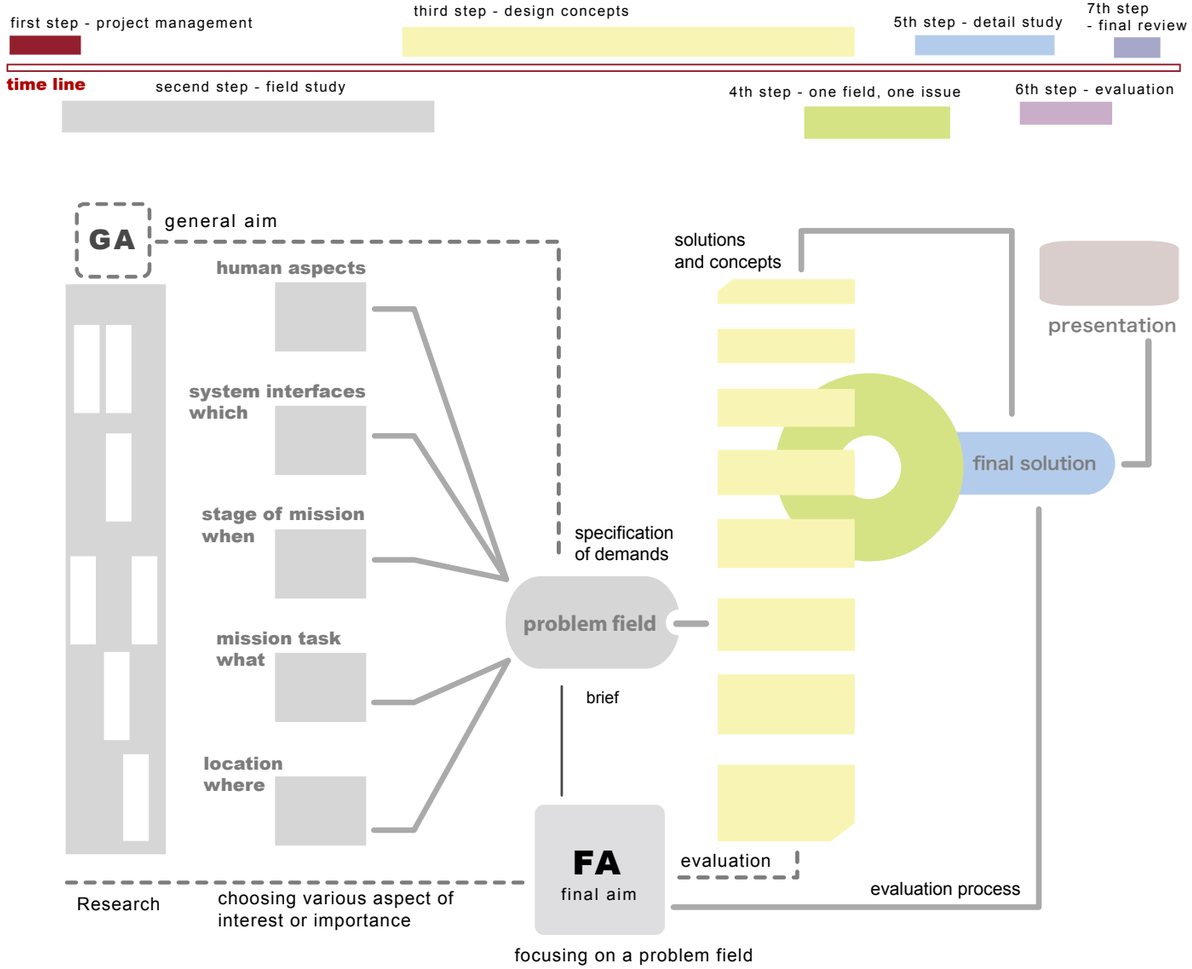
Concept for the project

The project was specifically intended to create a system limiting the subject matter into a pure design concept created from gathered information. The overall objective was to transform the information into a product that would possess material as well as cognitive, procedural and intellectual qualities. The detailed objective was to be determined in the latter part of the design process.

Concept for the Design

A system for distributing information and man-machine communication. An example of an application could be an information and evaluation-system for different work processes during Extravehicular Activities, EVA's in Space.

hEI_acs working method



Solution
According to the design process.

Result
The results will be of material, immaterial and system-procedural nature.

Presentation
Ideas for different system solutions will be addressed in the presentation.

2 Design process

2.0 Problem mapping, the art of choosing

The Art of Choosing is not merely an automated procedure where you decide in favour of one alternative or against the other; it is a conscious process concerning taking out a far more precise navigational direction.

It is about equipping yourself with a tool for navigation, a tool needed regardless of who you are. Regardless if you happen to be the actual user, the designer or the manufacturer, sooner or later you will be faced with equal alternatives. In situations like that, one needs to be able to navigate correctly in order to choose wisely.

Products are rarely found without a context, wheatear it be an environment, a situation of usage, an interaction with other artefacts inside or outside a complex web of social and or cultural structures. The Space Shuttle forms precisely such a given context. The Shuttle both defines and confines possibilities and givens in the form of socio-cultural environmental needs.

The hEI_acs system has evolved from examining needs from different perspectives using all kinds of “filters”. For the sake of simplicity, I have chosen to focus on five perspectives.

Location
The location of product deals with issues of its physical whereabouts when being used or in idle status. The Space Shuttle is divided into three decks, each and one of them equipped to meet their specific

purpose and demands. These decks are called the Crew Compartment. The latest upgrade of the Shuttle provides the astronauts with more flexible areas to work in or adapting it to ones tasks using e.g. multi-task screens.

On certain missions, a special research module can be flown with the Shuttle, thus providing the astronauts with an extended area to work in. Further expansions are made when docking the Shuttle to the International Space Station, the ISS. The Space Shuttle and the ISS together forms the largest pressurized environment for humans to work in when positioned in lower orbit.

T-system

The Space Shuttle is constructed out of a large number of systems. How and where these systems interact with the astronauts depend on that particular system in question, e.g. cooling systems, navigational and manoeuvring systems, communication systems or heat-sensor based systems.

Assignment

Different missions require an individual set-up of equipment and approach on how to layout the work-schedules. E.g. a product conveying information on what and when a specific task is due to be performed, should be reasonably easy to adapt for variations and new demands as they arise.

Time

A mission is comprised to some ten phases. The environmental characteristics changes radically during these phases and subsequently affect the usage of artefacts in a dramatic fashion.

Human Factor

Where humans are involved, diversity and variation will be found intertwined with dynamic changes and renewal. Psychological and social aspects on how we function, individually or together with others, play an important role in how we perceive and interact with a product or an artefact. The way we use products is also affected by anthropometric, physiological and cognitive skills.

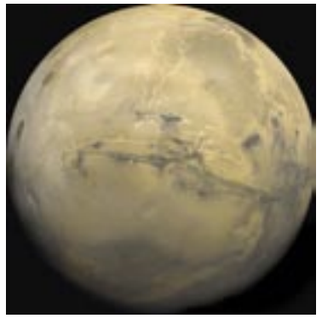
2.1 Background

Working environment of the Space Shuttle

Working in outer Space offers a unique experience and presents humans to the most hostile working environment known to man. The Space Shuttle poses a safe haven in this context, a pressurized shelter for humans to survive, exist and work in, when positioned in space. The compartments for the crew are dual in their confining role. On one hand you have the givens of the actual area to work in and on the other hand the givens dealing with what to be able to do and create within these limitations. There is a constant risk for life threatening incidents and at the same time the private sphere is cut to a minimum. Under these circumstances, astronauts and cosmonauts are supposed to carry out their qualified tasks under constant supervision and with limited access, communication wise, with the home planet.

The International Space Station, ISS

The working and living conditions onboard the International Space Station resembles the ones onboard the Space Shuttle very much.



Differences can be found in terms of duration of missions, characteristics of the assignments and the fact that the Space Station is placed in orbit whereas the Shuttle and its crew experience several dramatic phases spanning from launch to landing.

Terrestrial Applications

There are major differences comparing working conditions in Space to the ones on Earth. The idea equipping a crew for a Space mission has primarily concerned to find and use existing products and systems, altering and testing them for use in Space. The need for more tailor-made approach for manufacturing Space equipment is growing, as are the demands making those systems- or product solutions easy to apply on applications back home on Earth.

A journey to Mars

In about a decade, man will be travelling to Mars. That journey will be as long as it will be strenuous and dangerous for the chosen crewmembers. Equally dangerous will the stay on the actual planet be for the full duration of the expedition. The contact with Earth will be limited and all communication will be delayed with several hours. In the event of a crisis, no rescue operation will be possible to launch from Earth. The chosen crewmembers for the mission to Mars must rely solely on themselves and the systems designed to support them.

Contemporary technology and the market

The consumer market is flooded with all kinds of gadgets used for e.g. communication, memorizing, media and recording. The technical achievements result in new generations of product every quarter of a year. What do we have to do to succeed in a fast accelerating technological evolution? What do we have to do to secure future success and how can we minimize the risk for choosing technology that will be obsolete? Today's news is already history tomorrow!

The user and consumer market

The astronaut is a "superman in Wellingtons". Growing up I used to play with my friends the journey to and the landing on the Moon. We ran in the garden with our wellingtons "simulating" walking in reduced gravity. That was fun! It is still fun, only today it is for real and on the Television.

Sooner or later the Space Technology will touch down on our dinner plates. Breakthrough is followed by breakthrough. The technological gains developed for Space is commercialized and adapted for the consumer market. Ordinary sneakers are one of many such successful stories where Space know-how has been implemented in consumer products. The technique used in the "air-cushions" in the soles of the shoes was originally developed for the Space suit for astronauts at NASA. The need to find new applications for Space know-how is pressing if we are to justify such technological development from an economic perspective. On the other hand; what can economical growth give back to Space? Would it be possible to apply the mechanisms of a market economy to cutting edge technology without endangering the visions? If so, how would we go about doing that?

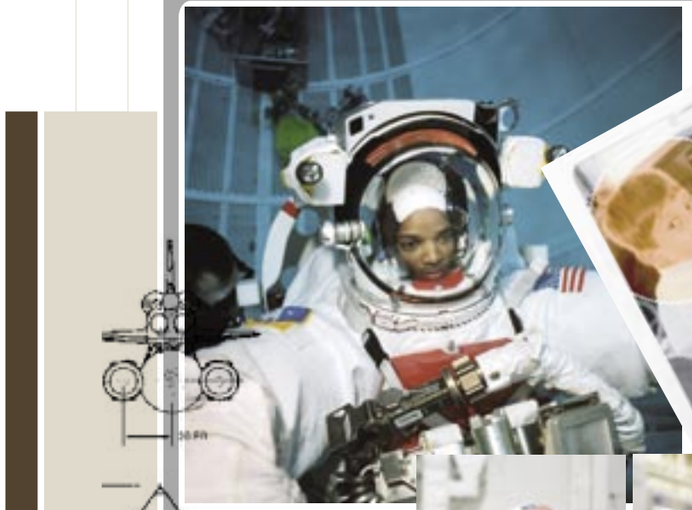
2.2 The user, who is the user?

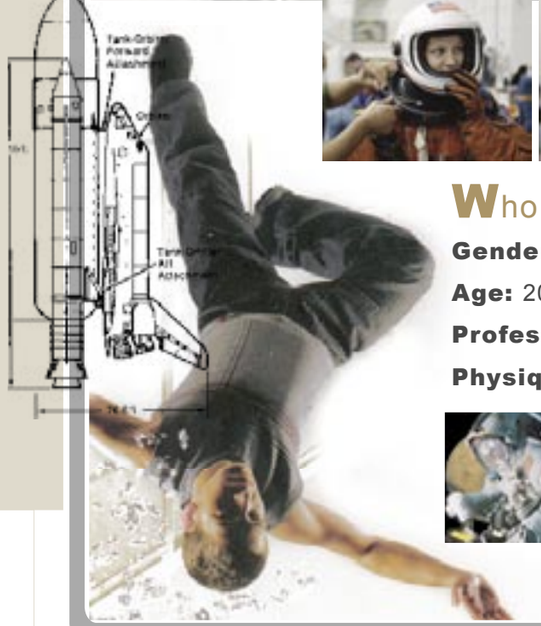
The users are both men and women. They are people that grow up

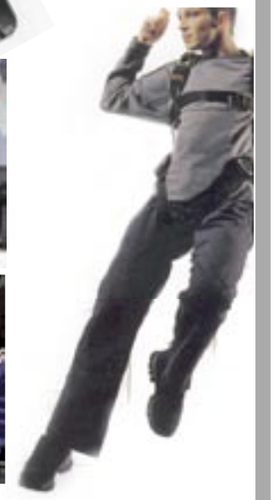
with a dream of reaching the stars, they strongly believe in their work, they are prepared to take the risks and find deep satisfaction in what she or he is doing. In most cases, the age of these “users” span between 20 up to 45 years combined with a professional background as a pilot, a scientist, a field expert, and or as a mission specialist.

The astronauts and the cosmonauts come from different countries and have varying cultural backgrounds as well as individual areas of interests. They are equipped with perfect health and are well educated. Every one of them has trained for years waiting for their mission to Space. And when they are selected for a mission, they are well prepared for the challenge of living and working in Space.

The astronauts and the cosmonauts come from different countries and have various backgrounds of culture as well as different fields of interests. They have a perfect health and are well educated. Every one of them has trained for years to prepare themselves to live and work in space. Therefor, when the opportunity comes, they are all well prepared for their upcoming mission.







_the user

Who is the user?

Gender: men and women

Age: 20 - 45

Profession: pilot, scientist, field expert, mission specialist

Physique: perfect health, well-trained

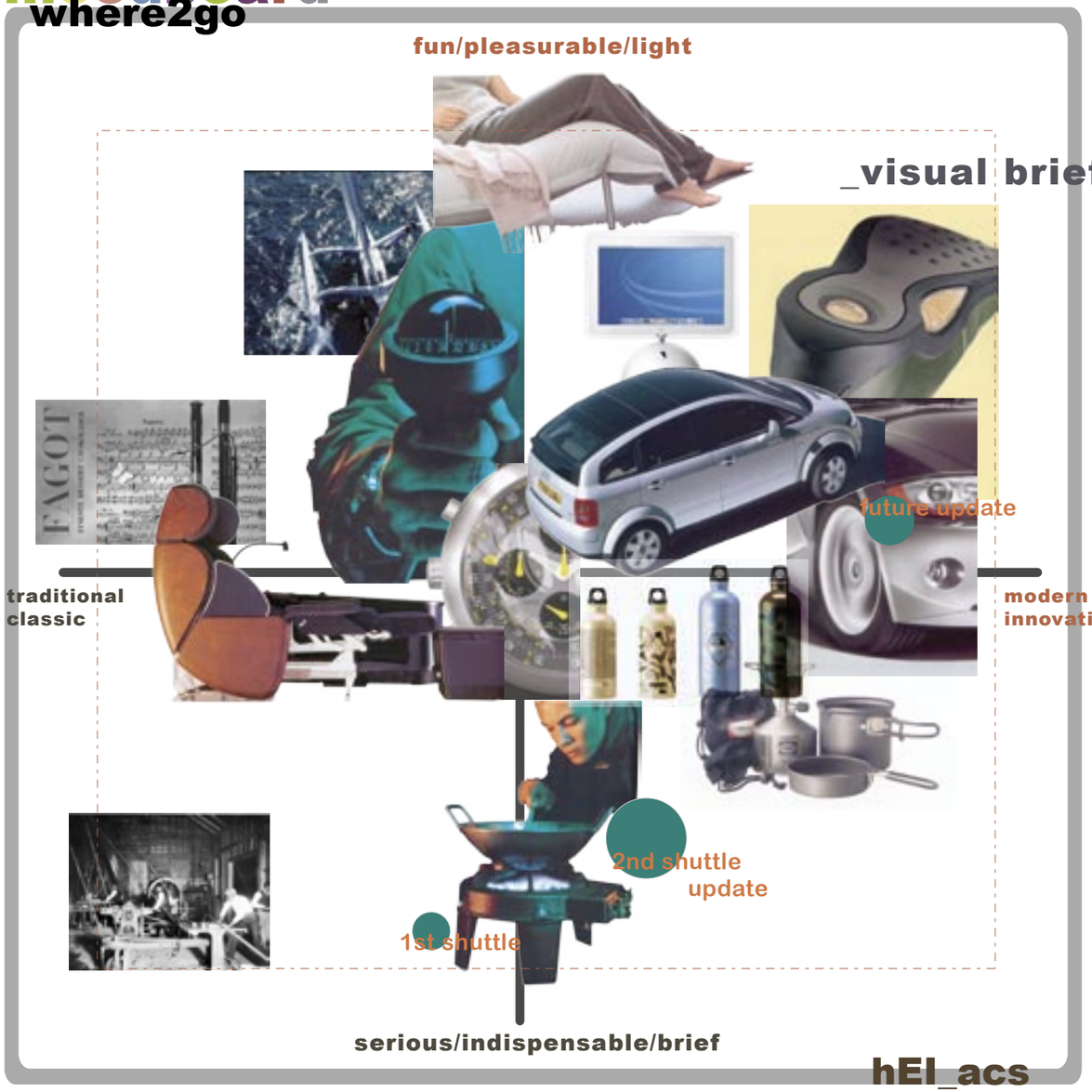
2.3 Visual brief

The visual brief demonstrates how different updates can be positioned relative to a variety of terms and at the same time shows the desired direction for upcoming updates.

Time as a technical and stylistic époque is an invisible factor in this context why the pictures shown in this brief are there solely for symbolic reasons. The essential factor to judge is the one dealing with inner relations. The early solutions applied to the Space Shuttle can be described as low-tech relative today's standards. Even so, the style can be described as timeless, very formal and dependable, even straightforward military in its design. This conception stems from historical facts and the fact that values, taste and requirements changes over time, and has changed since the first Shuttle was designed.

Over the last years, several improvements and upgrades of the Shuttles have been made. One of the most radical changes dealt with the cockpit where most of the old systems were replaced by modern technical solutions. This upgrade is noted in the visual brief as the second update. The update, as such, meant that modern approach was gaining on tradition, a way of thinking that has been introduced relatively fast into the space-programme. The style is still basic and extremely functional but has a tendency towards alternatives, in a designed fashion The third upgrade is projected to deal with those issues as well as the design in this work.

moodboard
where2go



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2.4 Brief

The Space Shuttle constitutes very demanding working environment. Workspace is scarce and the time allocated to accomplish the given tasks is very limited. How can one make life easier for the astronauts in an environment demanding the highest level of focus and concentration?

Today most schedules, manuals and notes are handled in hard-copies. Numerous PDA's, portable computers and small terminals are used during missions today. All electronic units are composed by proven components to meet the specific requirements of the hostile space environment. The communication with the outside world is limited and it is first after returning to Earth that all data and material is fully transmitted and processed. There is a specific need for making procedures simpler and to standardise communication procedures. It would have been optimal to combine the existing formula without adding to the complexity of the procedures.

2.5 Demands

The system or artefact has to meet some initial demands. Interfaces have to be understandable in any given situation. Ad behaviour should be avoided and procedures should follow each other in a logical manner. Information should offer different levels of complexity and at the same time give an exact understanding of the displayed data. The product must follow Man-System Integration Standards for NASA, have shockproof components, be durable over the time in space and add value to the work of the astronauts.

Demands on interface

Understandable
Logical
Complex
Exact
Reliable
Pedagogic

General demands

Safe and secure
Persistent
Fun
Serious
Ergonomic
Appeal to the user

2.6 Ideas

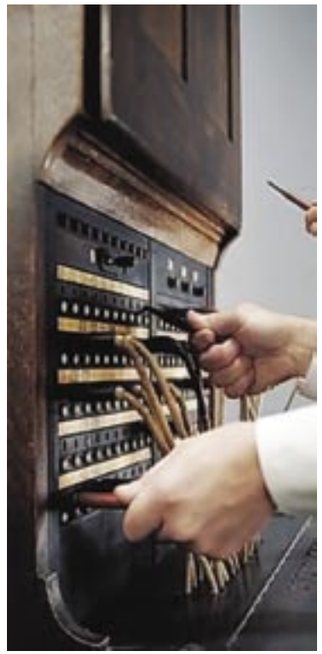
The leading thought was for the user to be able to write on a touch sensitive screen with traditionally mechanical keyboard, e.g. the Ericsson phone, P800. It is essential for the interaction that the body is used for direct contact with the screen without using tools e.g. a pen or a mouse, if the user shall interact with the product in a more natural and convincing way.

Slide 1

The keyboard consists of only mechanical parts and is slide onto the display from both sides. When the keyboard is not in use, it can be placed in reversed position thus functioning as support for the display. The display automatically sense if the keyboard is in position and subsequently adjusts the screen area to fit its position.

Slide 2

The keyboard is fixed on a pivotal joint. In working mode, the keyboard is placed in front of the display while it is rotated under the display when not in use.



Slide 3

This circular version has a split keyboard. The parts are fixated in an anthropometric angle with mechanical fittings as in picture two. The outer part is walled with added and padded material for additional gripping comfort.

Slide 4

In this version, the keyboard is extended from the sides. It can be extended from the front, left or right side. There is a variation of this function in a opposite way, very much like ancient scrolls. Displays like these can be manufactured today in an organic technique [Acreo Microelectronic Technology] where the soft display material is rolled into the handles on the sides.

Slide 5

A collection of ideas where the keyboard is folded or where the keyboard is part of a larger construction as a support or a foot.

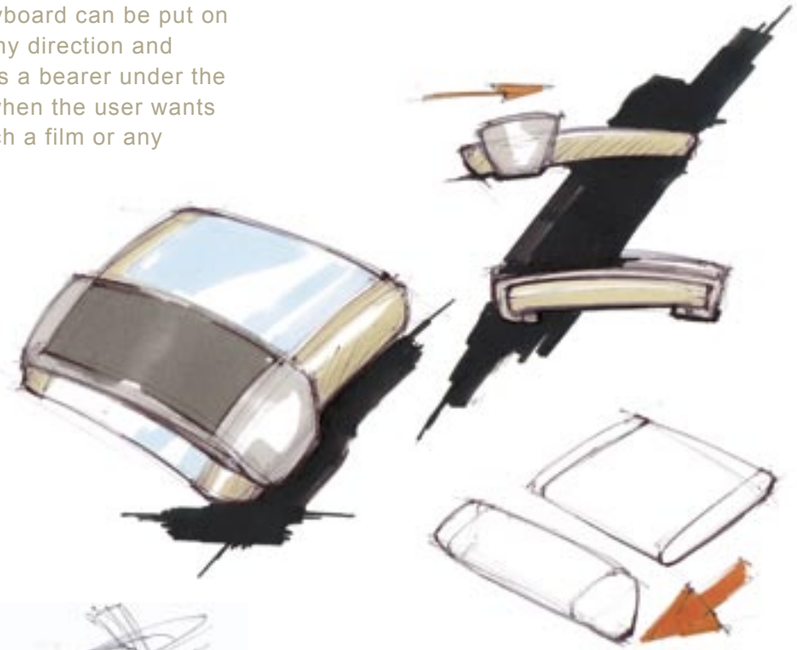
Box design

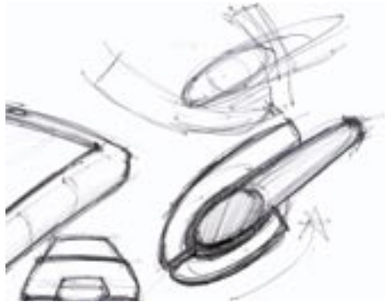
The details make up the whole structure. All parts are inter changeable or can be assigned to carry out tasks originally assigned to other components. The connections in between the different parts can be described as a neutral network where every critical component can be replaced with a similar component from the same hardware family. E.g. screens, displays or control panels coming from different product families can be constructed using a conformed size and equipped with standardized connections thus becoming independent components.

Leading thougth

to write on a touch sensitive screen with a real keyboard

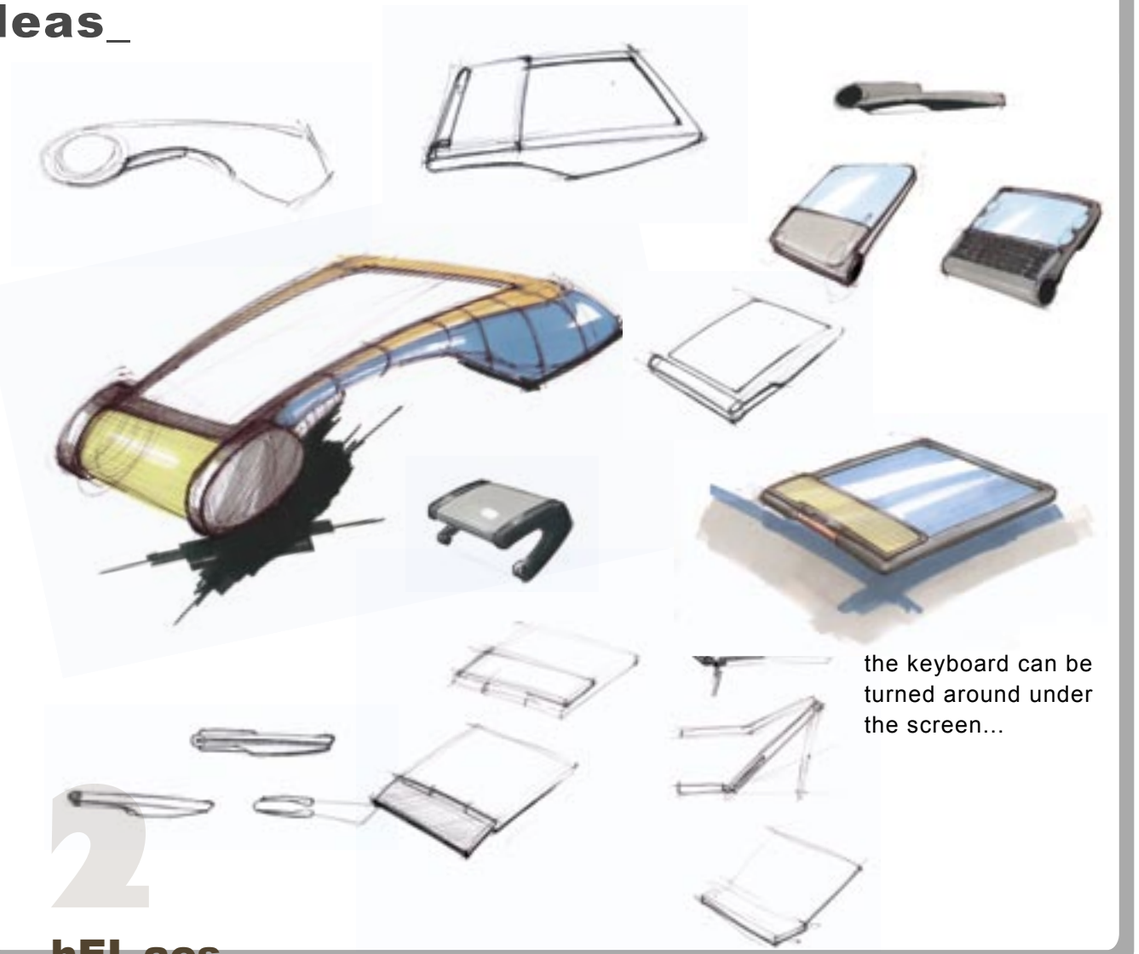
the keyboard can be put on from any direction and used as a bearer under the plate when the user wants to watch a film or any media





Leading thougth
to write on a touch sensitive screen with a real keyboard

ideas_



the keyboard can be turned around under the screen...

2

Commercially, mass production is ”lurking” around the corner waiting to address such described demand. To conform and standardize modules using advanced quality control could mean a dramatic cut in space programmes’ expenses. Such scenario would benefit from finding ways to utilize space components in ordinary consumer products thus creating a substantial volume market.

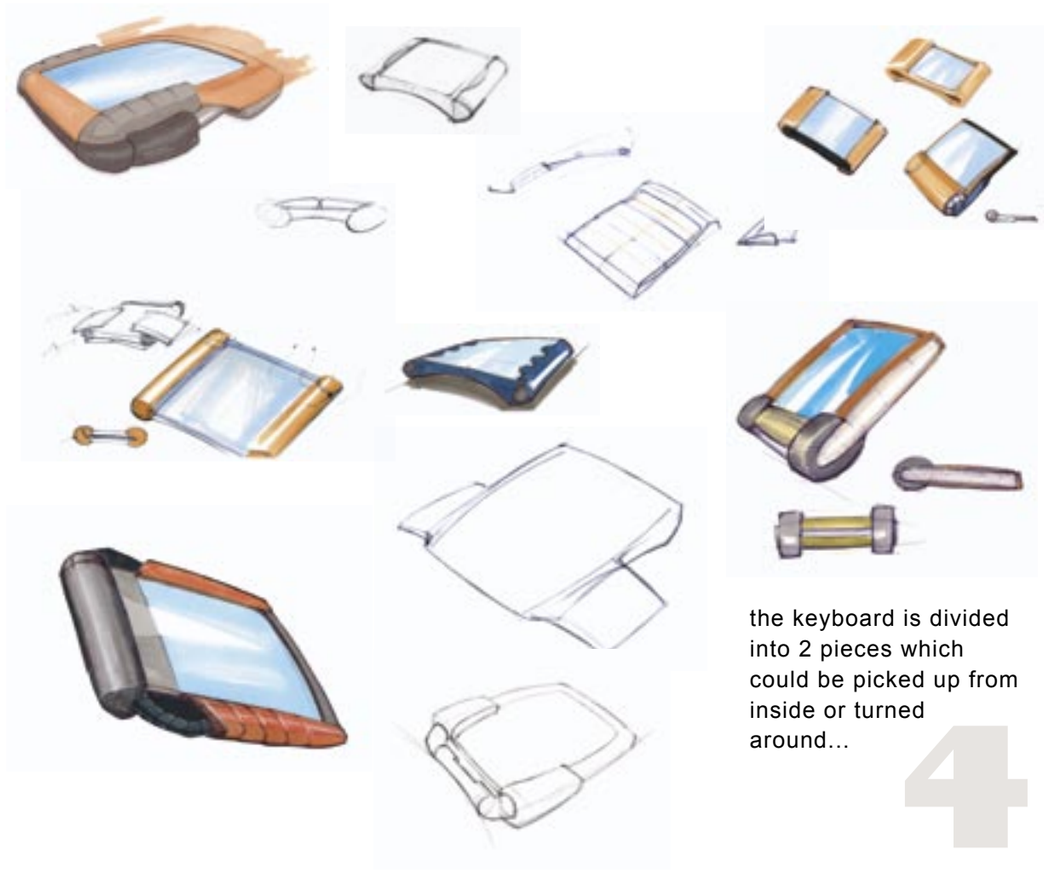
A Space Shuttle is made out of hundred of thousands detail parts. If one could cut expenses by ten percent it would mean a substantial free of resources and would mean a ”cost free” trip for the Shuttle to and from the ISS. Several times.

Information flows

A constant flow of information is the prerequisite for a successful mission. These currents of information are governed by their individual perspective. From a macro perspective, information exchange deals with communication between the Space Shuttle, Earth and the International Space Station. The micro perspective deals with inter-human communication, man-machine communication and machine-machine communication.

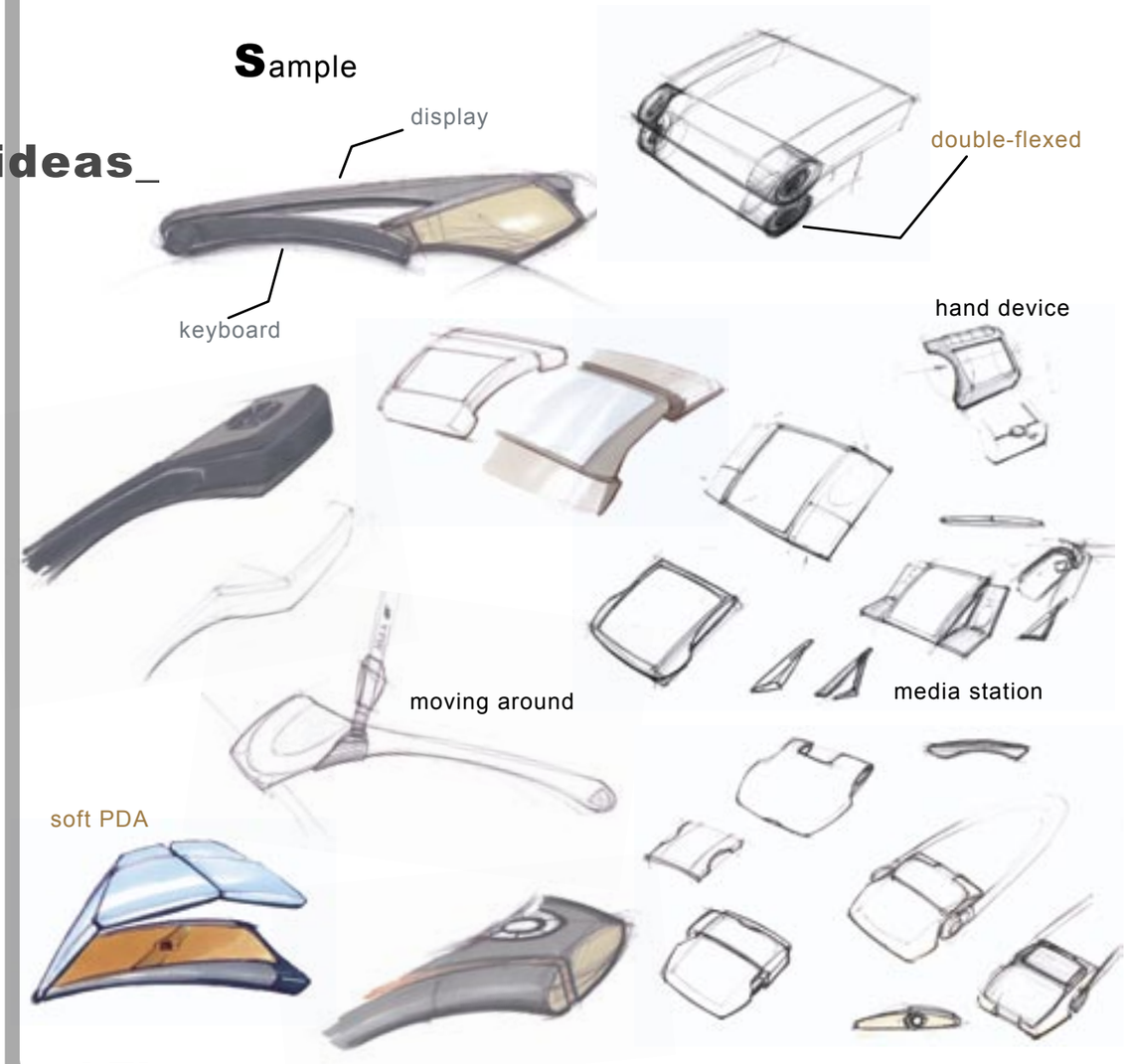
Mirroring information

Safety is crucial when addressing Space missions. Cosmic radiation amongst other factors, contribute to a shortened life circle of products. The process of mirroring data in hEI_acs products simply means that the modules are updating themselves with the same type of data within the product family given the time factor. This system enables a broken hEI_acs pad to be replaced without any delays as another pad will be able to replace the broken one instantly.

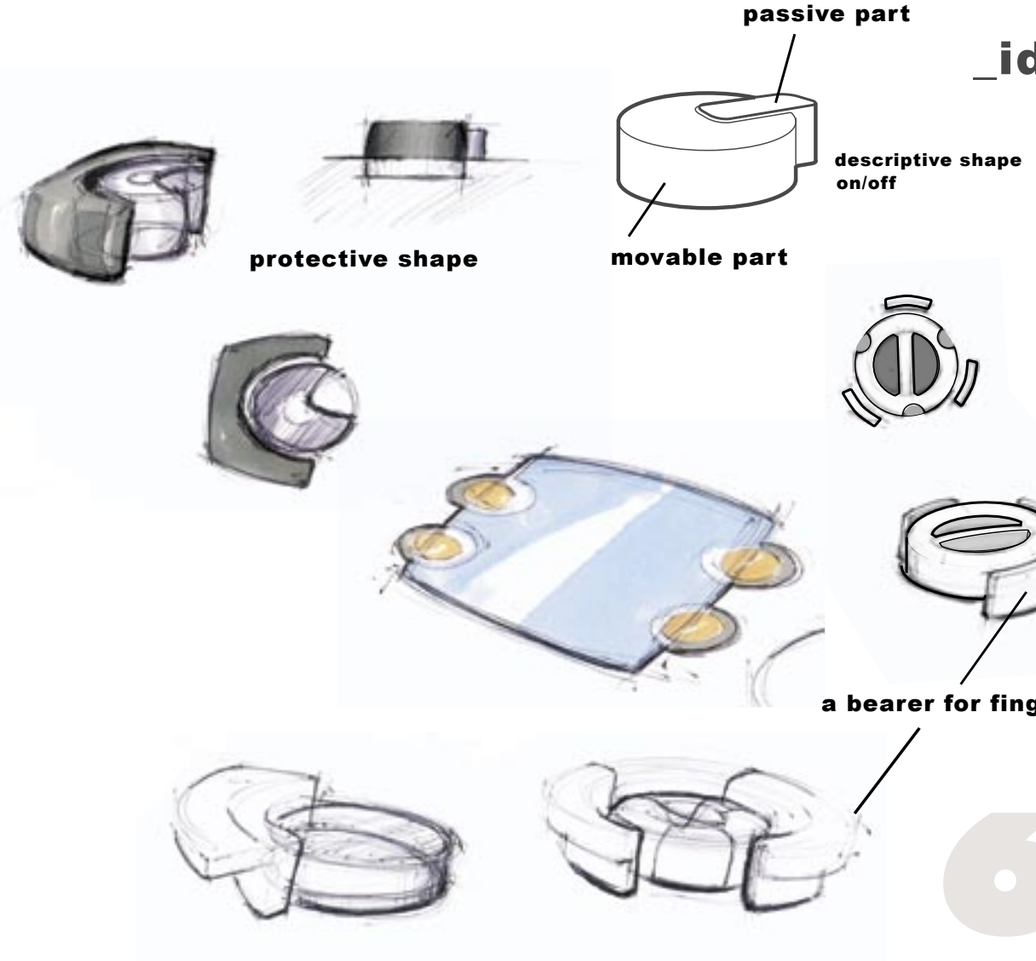


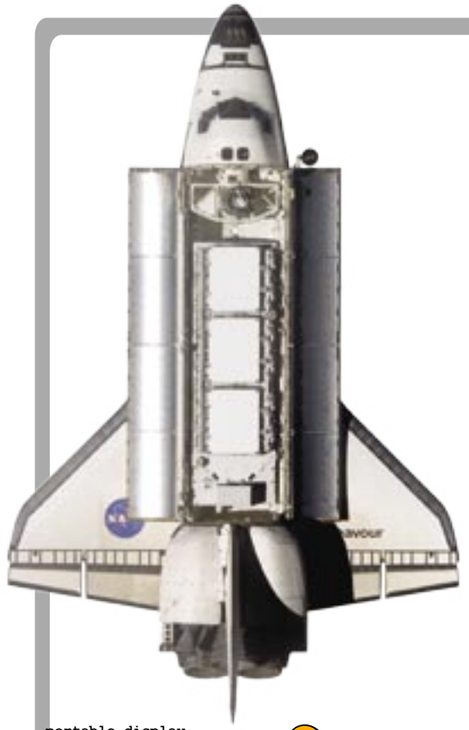
the keyboard is divided into 2 pieces which could be picked up from inside or turned around...

Sample

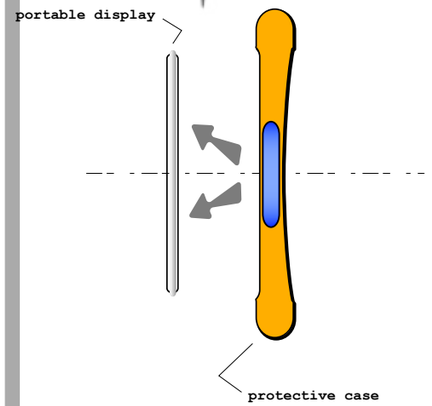


Details of interface (buttons, switches, etc)

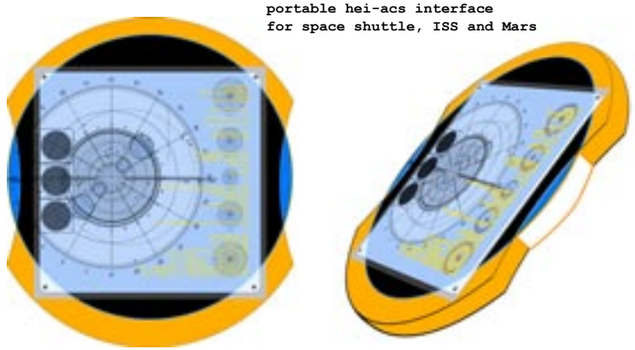




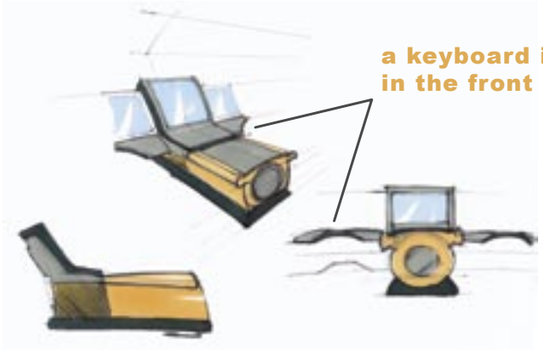
ATLANTIS' glass cockpit 2002

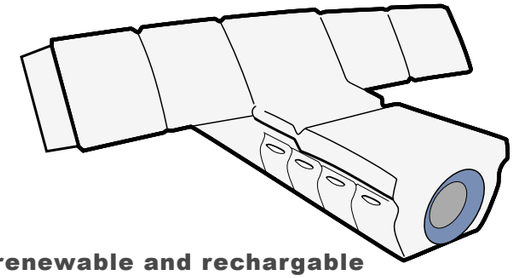


portable hei-acs interface
for space shuttle, ISS and Mars



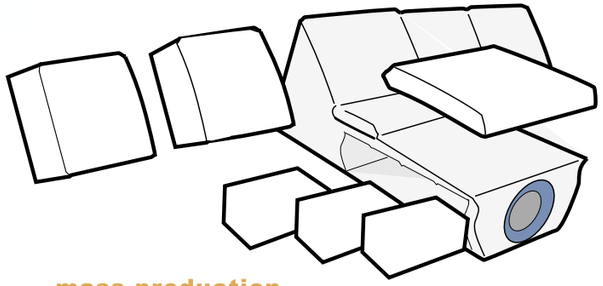
_ideas





renewable and rechargable
multifunctional parts

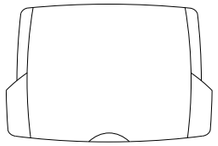
grip surfaces



mass production
of a modular system

_synthesis

two variations



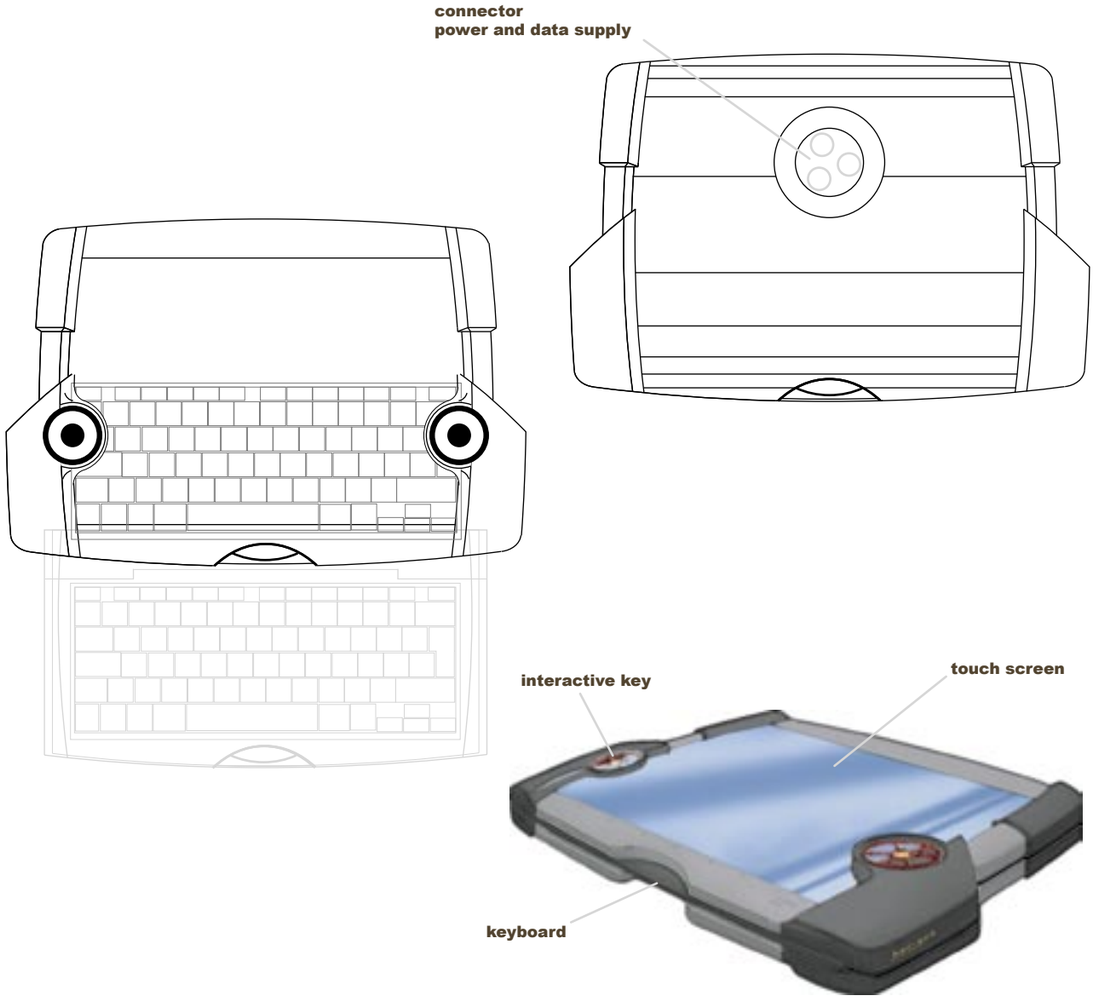
3 Result

3.0 Terminal

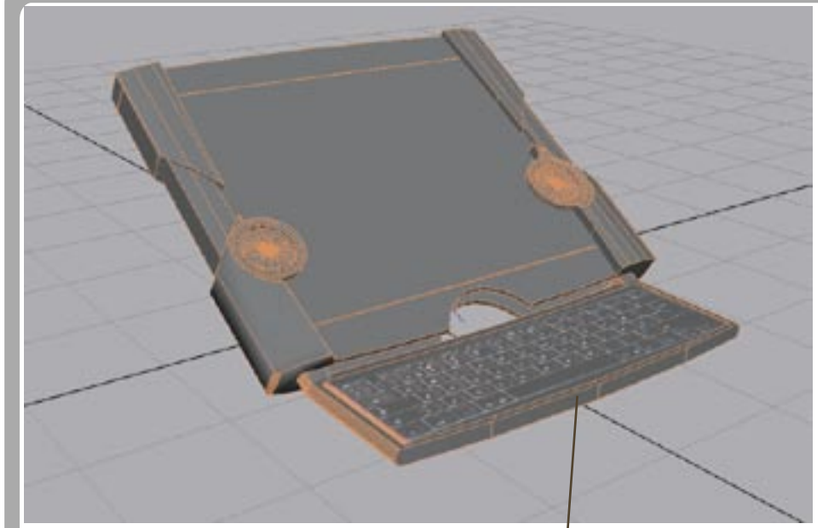
The final result is a portable terminal. It is a product mix of elements from a PDA, a TablePC and technical applications gathered from outstanding high profile products of today.

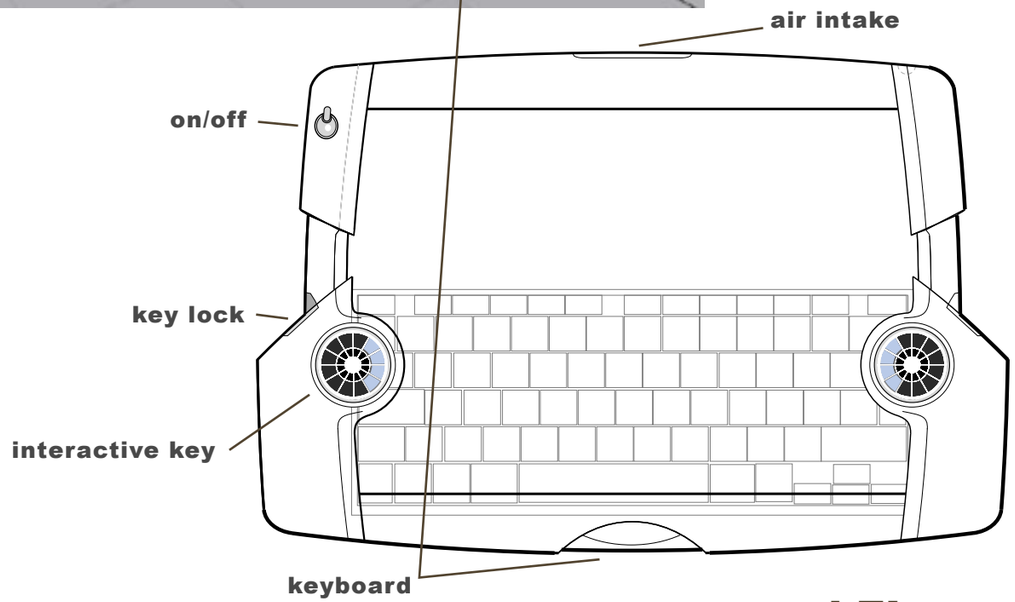
hEI_acs is adapted for the conditions in Space but is equally useful when working on Earth. The product can be operated using only one hand [iPod idea/Apple]. The originating idea being an attempt to bring together today's technique, forging them together into one future product replacing numerous communication methods of traditional cut. The effort is to truly make the handling of hardcopies obsolete in Space. Folders, files, notepads needs to be replaced by one single new product. This new product will also replace the onboard laptops, screening terminals and other types of non-fixed display systems.

The function as an operating manual is central to the product. It will be more simpler to handle than hardcopies made of paper and will contain much more useful information and can be equipped with media sequences such as movies or animations. It will be substantially lighter and thus easier to transport than dossiers of paper [usefulness relative to the product's physical weight]. A product's physical weight is less important when working in Space, but it matters substantially as a factor when launching the Shuttle and weight will be important as a sales argument back on Earth. The content will be dynamic as updates or upgrades will be performed instantly when working, receiving data and information from Earth


connector
power and data supply
interactive key
touch screen
keyboard

_terminal




air intake
on/off
key lock
interactive key
keyboard

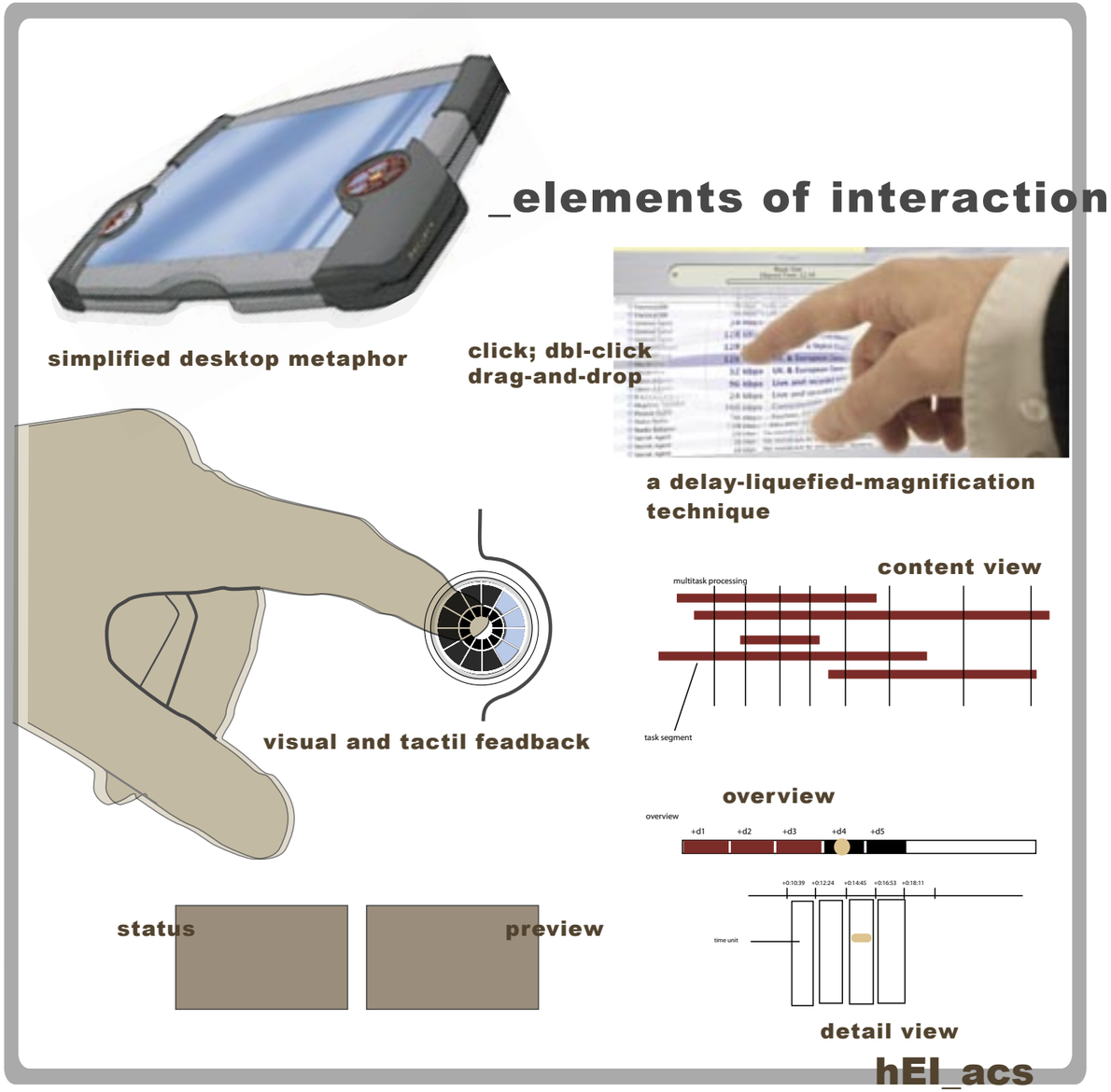
or from fellow crewmember's systems.

3.1 Elements of interaction

Standardised elements and exterior elements do not necessarily equal devastating conformity. Through variation of a rich and consistent vocabulary of colour, form and interface design, the logical interface language can be created. A "language" that support the learning procedures and minimizes operational mistakes, something that can make the difference under the most extreme and critical conditions. It is imperative that the process of information exchange support and mimic human ability and approaches on how to communicate and receive information.

The interface is constructed of a number of dynamic and static components with inherit operational modes guiding the user in how the system works and acts. The user interacts with hEI_acs directly, without the use of any tools e.g. a mouse. Instead, the user operates the system using the fingers. The screen is sensitive to pressure [e.g. Wacom, ScreenMedia, View Sonic] or is equipped with a code bar system for tracking the finger's movements on the interface as to adapt to user's demands. Command manoeuvrings such as clicking, double-clicking [tapping a finger onto the screen] are easily mapped to e.g. move work windows or make confirmations. To input information, the astronauts uses a keyboard that is neatly devised to be folded into the screen when it is not in use.

The hEI_acs's static parts consist of fixed design elements thus providing feedback to the user in the form of e.g. light [visual feedback], mechanical movements [tactile feedback]. The hEI_acs's



dynamic components are all part of the screen's interface showing information according to patterns and pre-set rules. The mental idea has been to create a simplified desktop metaphor for navigation and adjustment of information interface. It is simple to add, rearrange or to close information windows, as it is to scale or temporarily hide these windows.

The workspace on the screen uses a delay-liquefied-magnification technique [e.g. Apple computers Dock principle] adjusting the graphics to anthropometric givens. In simple terms; where the user points onto the screen, the information will magnify itself for precision. To avoid mistakes when e.g. clicking, choosing, scrolling, the magnifying process is partly delayed as were the elements moving in liquid oil.

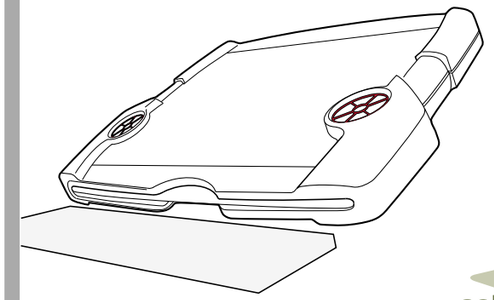
3.2 User view

The default user interface is the Schedule and Manual Mode (SMM), followed by Input and Output Mode (IOM) and finally the Settings Mode (SM). The SMM enables the user immediate viewing of information about e.g. tasks, schedules, and ongoing processes. The built in calendar function provides, informs and reminds the user of important tasks or moments.

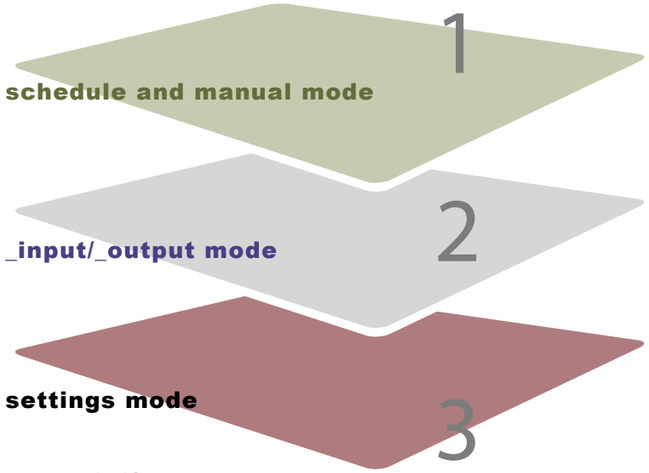
The IOM makes it possible to write and work and at the same time overlook the most important processes; meanwhile the SM is responsible for changing and customizing the user interface.

Schedule and manual mode

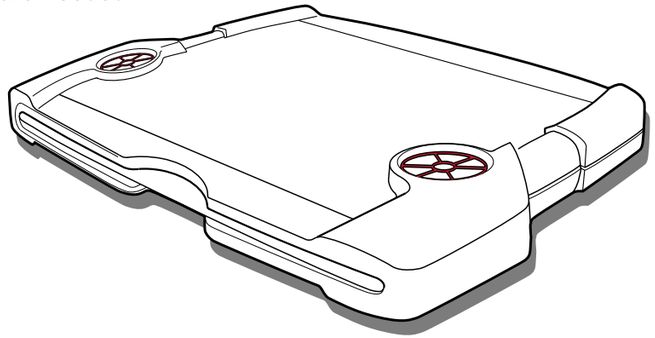
The information in the manual is arranged in sequences to match



user_view



What kind of interface modes are needed?



when things have to be done for each task as a procedures checklist. It is of course possible for the user to manually look for specific information in the manners of an ordinary dictionary. The traditional approach on how to look for information is not, however, this manual systems' primary method of providing information to the user. It is merely an added option for situations when astronauts are left to their own devices.

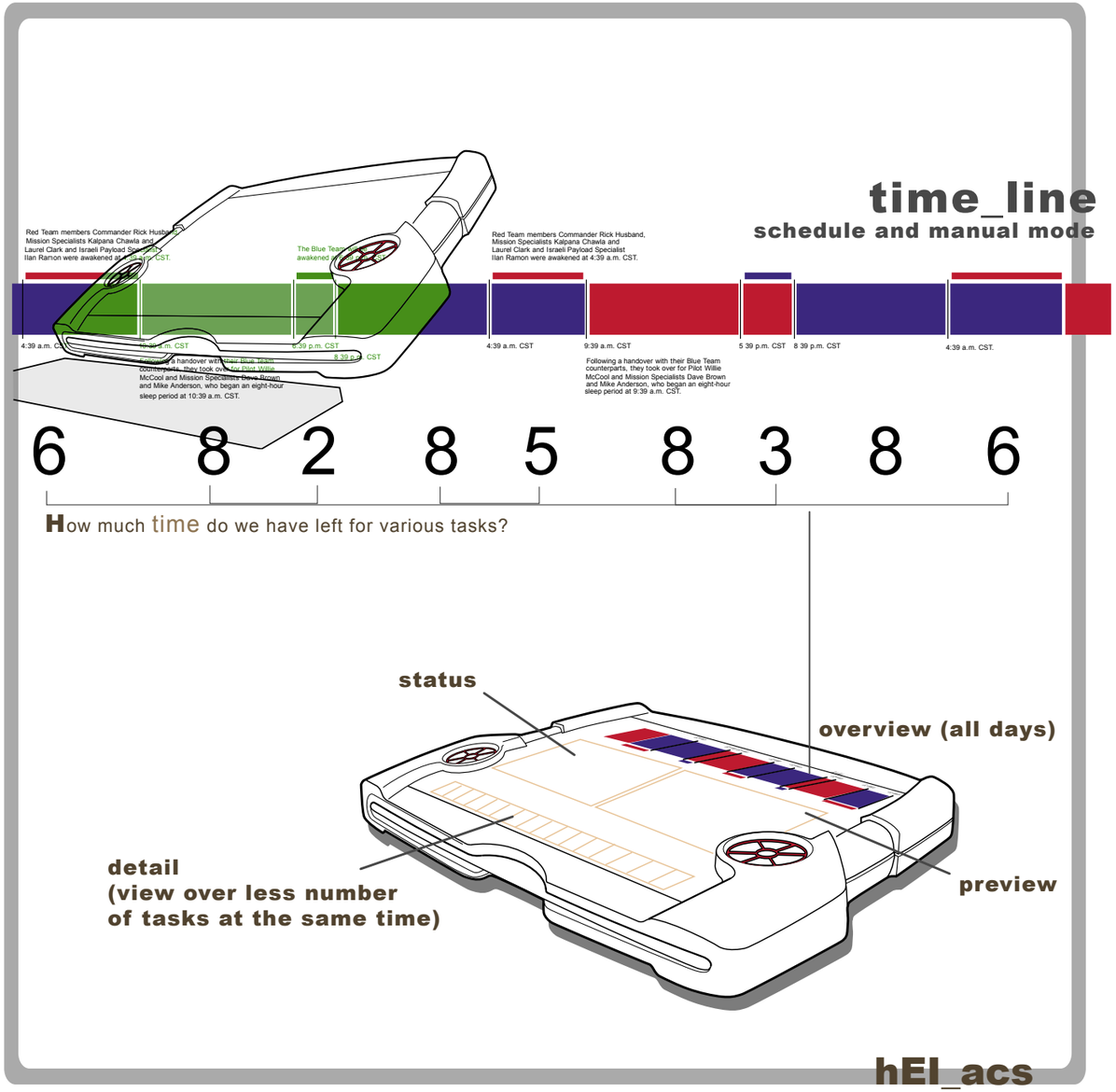
The interface is based on a time line. Added onto the time line are relevant and visualized information processing events in the most immediate past and future. Status of progress is displayed together with more detailed information regarding progress status. The latter information can easily be set in a more general mode, thus giving the user complete overview of operations in general.

Time line

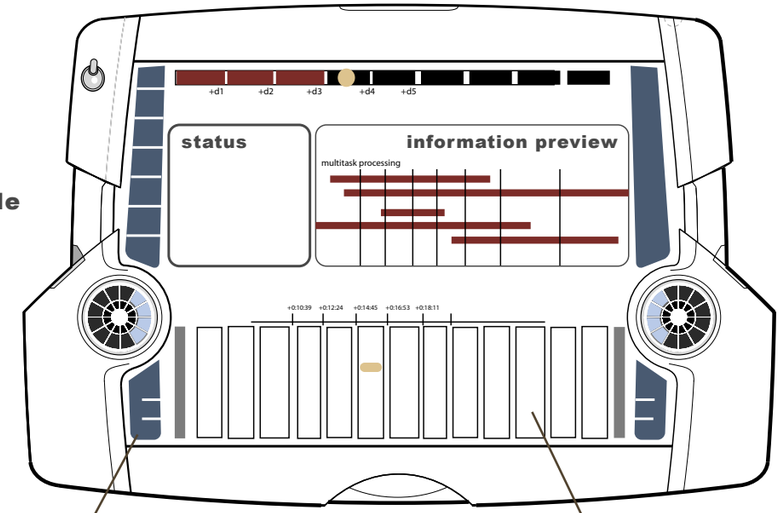
The time line should be perceived as a dynamic visualisation of the assignment. Its scale is adjustable to make the user choose between a detailed perspective or a more holistic one. The timeline is meant to provide help and support to the mental planning of the work, give the user feedback on advances in work and help make work become more efficient. The timeline is individually designed for each crewmember.

Interface

The interface is specially designed for each and one of the crewmembers. The Commander supervises the mission and can monitor the progress of every crewmember at the same time as he or she controls and participate in the actual work. Making use of a



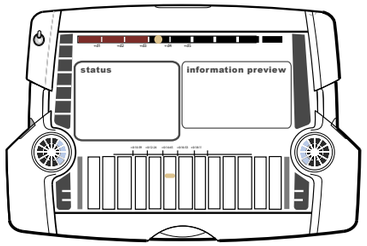
interface_
schedule and manual mode

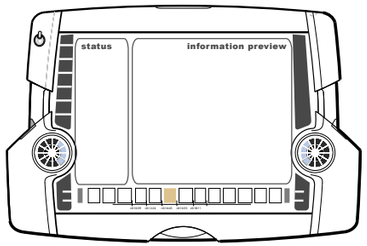


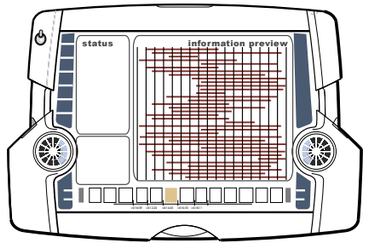
mode menu
for switching between various information states

detail
(few number of tasks)

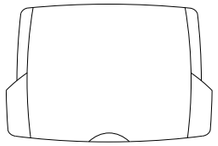
to add or cancel viewed processes the principle of drag-and-drop can be used







personalized interface means that the product will become user-oriented and concurrently, the possibility of customisation makes the hEI_acs pads user independent. It will therefore become easy to make the product task-oriented using interchangeable hEI_acs pads assigned for specific tasks.



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