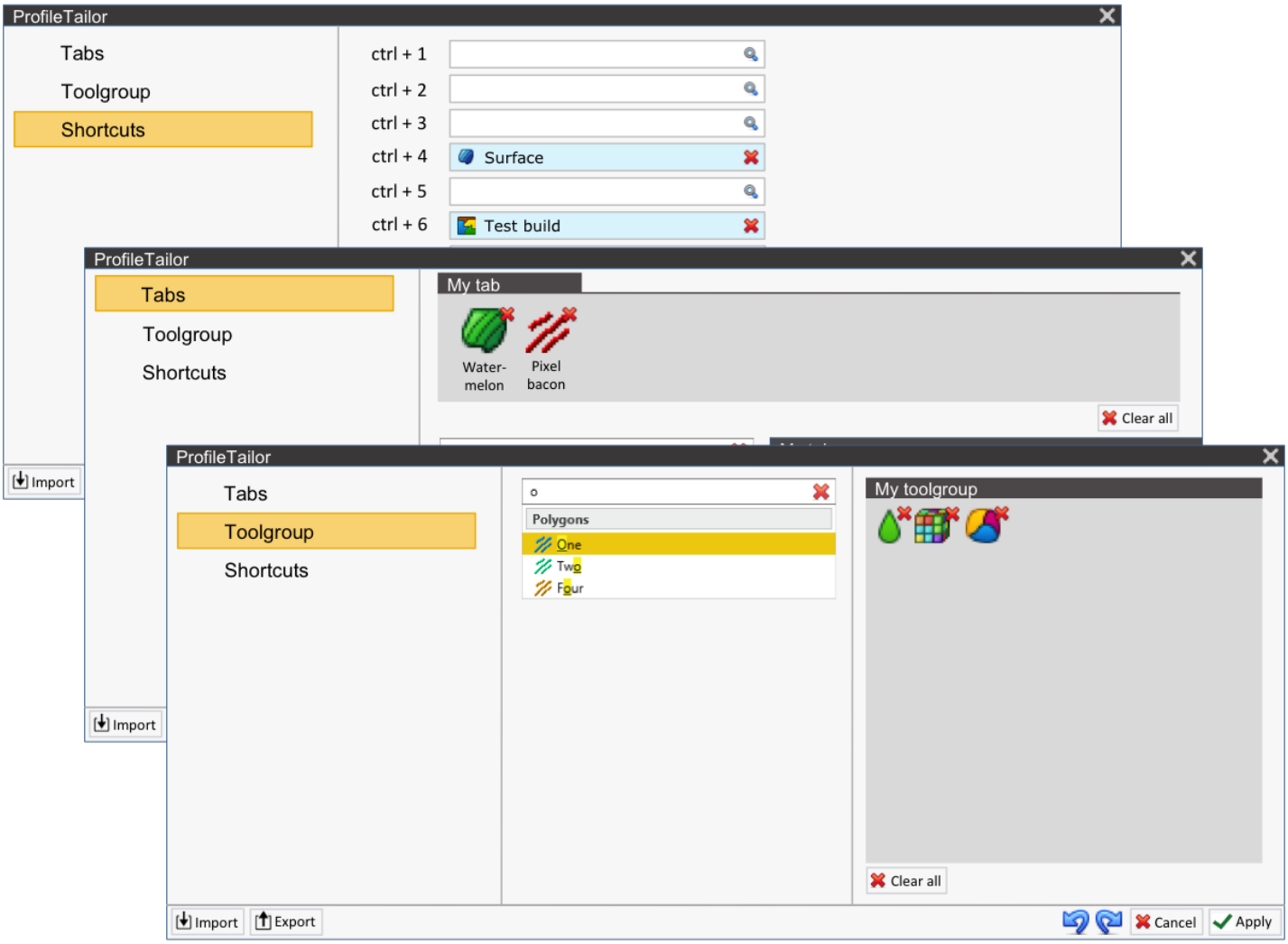
Profile Editor

INF2260 Høst 2014



Kaja Stene, Andreas Kristiansen, Andreas Holskil and Dawood Ahmad

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Introduction

Aim

The aim of our research has been to explore to what extent Petrel can be customized for personal use, and through this design an interface editor. We will also look into which areas the users will benefit from customizing, how to balance freedom with constraints and what effects the editor will have on the Petrel user experience as well as supporting cooperative work.

Group

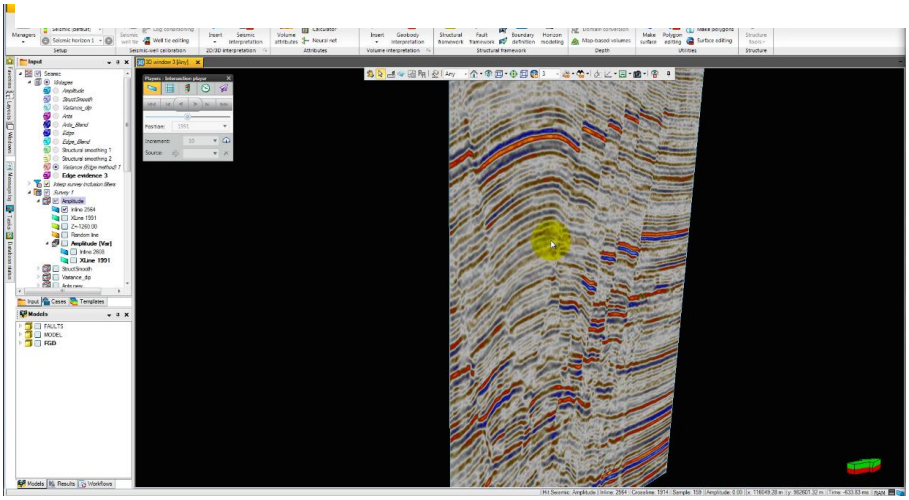
Table 1: work distribution in group

Group Member	Tasks
Andreas Holskil	Interviews, paper prototyping, programming, data gathering, analysis, writing, design
Andreas Kristiansen	Test leader, paper prototyping, programming, data gathering, analysis, writing, design, final presentation
Dawood Ahmad	Video recordings, user contact
Kaja Stene	Interviews, paper prototyping, programming, data gathering, analysis, writing, design, midterm presentation

Petrel

Developed by Schlumberger, Petrel is a software used in oil industry worldwide. The Exploration and Production (E&P) sector of the oil industry, which deals with finding and producing oil, use Petrel for processing a variety of data such as seismic data, creating models of the seabed, planning wells and interpreting data from wells. As a result there is a vast amount of functionality merged into a single platform.

Figure 1: Petrel interface showing seismic data



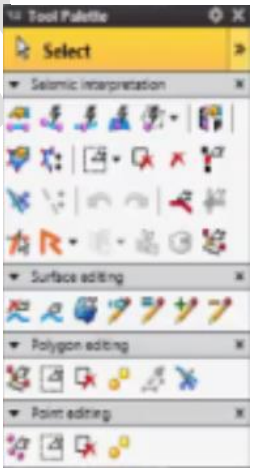
Petrel is used by a variety of professions (geologists, well engineers, geophysicists etc.) across companies worldwide, and there is a large variation geographical, cultural as well as professional context of users.

Consequently, the interface can be intimidating to new users and difficult to navigate, even for expert users this can be a hassle. We hope to improve the user experience by letting users customize the interface and hide information that is not necessary at all times.

Terminology

This section will explain some of the terms used about the interface in the report.

Figure 2: The tool palette with several tool groups



Because of Petrel's complexity, the developers introduced *perspectives* in the 2014 edition. This feature allowed users to select a perspective based on the user's profession. For example, a drilling expert can choose the perspective name "Drilling", which includes the relevant functions and tools while hiding anything else.

Ribbon refers to a section of the "top-menu" which is always visible and is divided into *ribbon tabs.* Each ribbon tab has a set of commands. Which *ribbon tabs* are in the ribbon depend on which *perspective* you are in. The user will choose the perspective that fits their profession best, and will normally only use one. *Figure 3* is the ribbon in the geology and geophysics perspective, where File is a tab, Tool Palette is an example of a process, and view, insert and search are *groups.*

Figure 3: Ribbon

Tools are categorized in two different ways, if you right click on an object you get a *mini tool bar* containing the tools that can be used on that object. But there is also a *tool palette* which is a floating box containing different *tool groups*, the user can now pick which of the existing tool

groups are shown in the tool palette. *Figure 2* shows a tool palette and seismic interpretation is a tool group.

Profile Editor

Schlumberger wanted us to make an application that enabled users to customize their Petrel interface and create profiles, which could be distributed among users working together in a project. The final product was to be a design, detailed specification and storyboard (*Figure 4* is taken from this) that would enable the developers implement the design right away, without having to make design decisions themselves.

Figure 4: Tab editing in final design

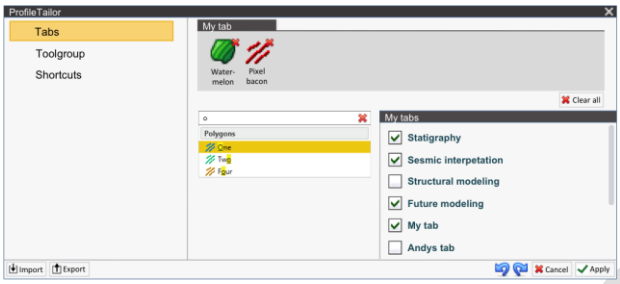
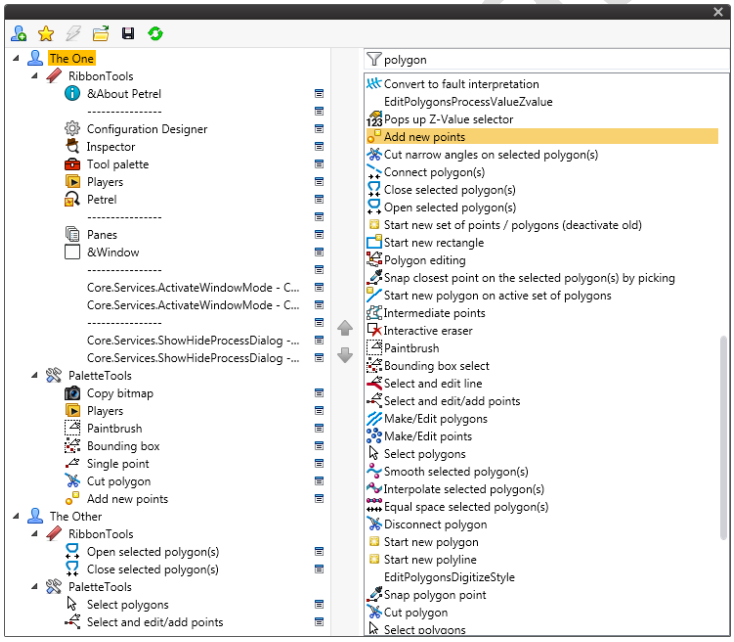


Figure 5: Integrated Prototype



With the Profile Editor, we introduce personal profiles and customization to Petrel. With this application a user can create custom interface profiles. Each profile contains a personal tab, a tool group and ten shortcuts. These three are edited through each their section of the editor. One user can have several profiles and switch between them at any time, bring their profile with them if working remotely, or distribute the profile to colleagues.

Our contacts at Schlumberger created an integrated prototype of a profile editor *(Figure 5).* It contains the idea of one profile containing one tab and one tool group, but is not supporting drag and drop yet, a more time consuming implementation.

Relevant literature

With the Profile Editor, we enable collaborative work through profile sharing, which is made possible through creating and distributing profile-files. Research on a similar system for sharing e-mail customization files in an organization (Mackay, 1990) found several patterns of sharing. Although the study is old, the system for sharing is the same, and so the sharing patterns might be expected to be similar. She found that customization sharing would become a part of the way employees helped new people who were unfamiliar with the software, and the more tech-oriented people would often distribute customization files to the less tech-oriented ones. In our project is should be a goal to develop a design that encourages not only the most tech-oriented users to want to create and share files.

However, Mackay researched a customization tool that required a relatively high level of technical ability, as it was code based. Creating a visual and interactive interface, we hope to encourage the average Petrel user to customize regardless of interest in software. Newer research (Weiss & Heidenbluth, 2012) finds that the ability to customize software is to an increasing extent becoming a requirement when creating new software, and something that users expect. The ability to customize has a positive effect both on usability and the way the user feels about the software. Furthermore, they show that removing functionality that is not used is likely to increase efficiency as well as user satisfaction among people who often customize software (Weiss & Schweiggert, 2013). We found during the interviews that removing content was one of the most important goals for the users in being able to customize the software, and is a focus in the design.

Customization can also affect software learning in a positive way, by adapting software to different user abilities, skills and learning styles (Weiss & Schweiggert, 2013). Another application for our design will in training programs, by creating a simplified teaching profile tailored for a specific training course. This will enable a more gradual introduction to the interface for beginners. Though we designed mostly for making Petrel more effective for the expert user, enabling for a less painful training process is another valuable aspect to us.

The application will also to some extent enable mass customization (Kumar, 2007), which would be used by companies to create their own customized version of a software and distributing the company profile to their employees. If the particular company work in a specific area, or with a narrow field, their employees might benefit from using the company profile rather than the

custom one, and be saved the time it takes to create a personal profile. But, as Kumar points out, personalization on an individual basis is only increasing in popularity, and mass customization is losing terrain as users are more accustomed to highly personalized technologies. This support our decision to focus on personal profile and leave the idea of company profiles out of the scope of this project.

Research Methods

This section describes the HCI research methods we have used throughout this project. Whenever we interacted with participants, a consent form was signed. This form informed about the project, the study and the participants rights including the treatment of the data gathered.

Recruiting Participants

The branch of Schlumberger located in Oslo is mainly Petrel development and support, so we had trouble recruiting primary users of the system for requirements gathering as well as evaluation. As a response to this, we have worked with a small group from the support branch, some of whom have participated several times. Although we can only support out findings in data gathered from a small of expert users, software support provide an interesting perspective. They communicate with users on a daily bases, and have provided insight into different user groups' experiences with Petrel. The limited access to primary users also contributed to our decision to focus on qualitative data gathering.

Interviews

We conducted interviews with three participants from Schlumberger, in order to explore the scope of our project as well as getting a better understanding of Petrel, how it is used the terminology and how the users in our group feel about customizing the interface.

Having broken the interface down into five main areas of investigation as listed in *table 2*, we chose a semi structured interview form. This enabled us to explore further ideas that came up while discussing a few main topics with all the interviewees.

The second part of the interview was a demonstration of the software where we asked the participant to show us a typical workflow while asking some questions about the interface. By asking the participant questions in their office and letting them demonstrate using their own

computer we aimed at a contextual interview (Rogers et. al, 2013), knowing that they would recall more through this rather than if they had been taken out of their work environment.

Paper Prototyping

Using the user goals we compiled from the interviews, we created sketches and eventually a paper prototype. In this stage, we discussed several ideas but ended up developing only two of them further. We labeled them *edit mode* and *on-the-fly*. The two approaches were meant to support integrated interface customization in Petrel either by activating a mode that enables customizing (*jiggle mode*), or by making the interface customizable at all times (*on the fly*). For both prototypes we created a textual description of interaction as well as paper and cardboard prototypes for usability testing. The prototype prototypes some of the most significant interactions of the design which enabled us to test which of the ideas were preferable.

Figure 6: Cardboard prototype of Edit Mode

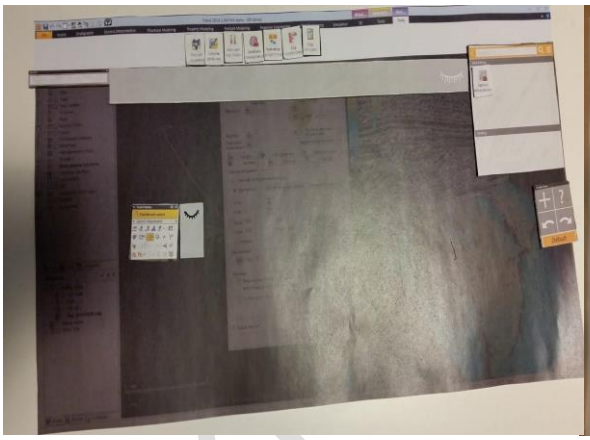
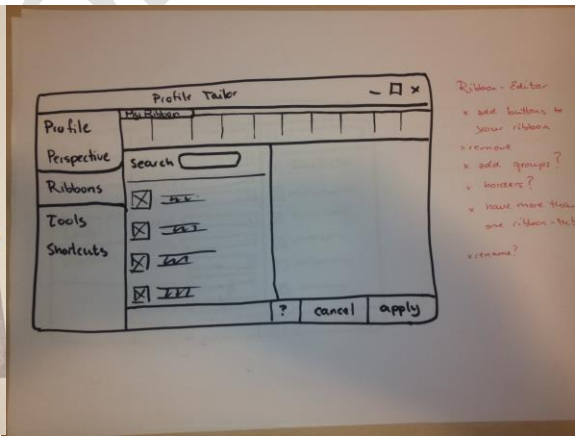


Figure 7: Sketch of Profile Editor



We also used sketches for discussing ideas and guerilla testing before creating the high fidelity prototype *(Figure 7).*

Focus Groups

We conducted a focus group with four participants where we compared and evaluated the two paper prototypes, to get a basis to decide which one to develop further and in which direction to take the development. The participants sat around a table with the prototype (*Figure 6*) in the middle, and the test leader at the end. The participants got a demonstration of the prototype after

which they could play with it by dragging buttons around, while the test leader changed screens and explained what happened, like when using the "Wizard of Oz" approach (Rogers et. al., 2013). Finally, the test leader opened a discussion with thinking aids in form of pen and paper.

The focus group was captured on audio recording in addition to two observers taking notes. The results are grouped according to topic and discussed in empirical data and findings section.

Guerilla Testing

Throughout the project, every time we have had a new sketch or changed something in the design, we have tried to do informal tests. This sometimes involves just showing a sketch to someone in the hallway asking "what does this look like?" or "what do you think that button does?". When we had any disagreement in within the design group, we conducted a guerilla test (Toftøy-Andersen&Wold).

We also had the opportunity to test our new design with a student from the faculty of geology, who were familiar with Petrel, just before we started programming the high fidelity prototype. Through this quick way of getting feedback on a design question, we have saved a lot of time and settled many disagreements in the making of both low and high fidelity prototypes.

Expert evaluation

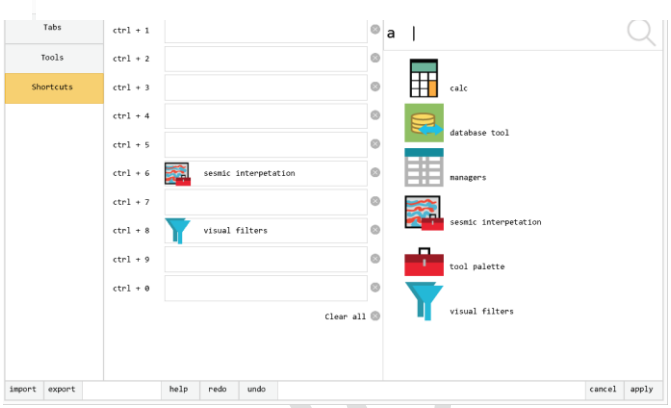
Whenever we had made some progress, or at least every other week, we sought advice from our contact at Schlumberger. Here we presented the design we had and the findings we made from the latest data gathering activity, to get some feedback or constructive criticism. The insight gained from these sessions were invaluable, and really kickstarted further progress.

High-Fidelity Prototyping

In order to facilitate a summative evaluation of our design, we created a high-fidelity prototype. In the prototype we focused on how the prototype interacts, gives feedback and the process of building a personal profile. We have not prototyped the sharing mechanisms because it is independent of Petrel and we cannot access the actual interface. We have also not focused on how the prototype should look. Color choices, icons and the size of every object was decided in the last part of the process. Also, not looking like the Petrel interface, the prototype communicates that it is not finished and might make it easier for the users to propose changes.

Figure 8: hi-fi prototype tabs view

Figure 9: hi-fi prototype shortcuts view



Summative Evaluation and Usability Testing

Using our high fidelity prototype we designed a usability test aiming to find out . The participants were assigned to a computer with a running prototype, and was to perform a set of tasks that we had prepared. The participants were encouraged to think aloud during the test, the test leader could not help them if they had trouble, unless the participant got completely stuck. After the test they filled out a questionnaire, before the test leader conducted an unstructured interview where the participants could share their thoughts on the interface, its interactivity, the aesthetics, and what changes could be made.

The usability testing involved video and audio recording of the participants while they performed given tasks. The video was captured through the webcam on the test computers. At the same time, the screen was captured so the users interaction with the prototype could be well documented, including pointer operations. Through this we could analyse the recordings and determine whether there were moments of confusion and exactly what the user was doing at that time.

Empirical Data and Findings

Interviews

Table 2: Interview data coded according to topic

Topic	Pilot	Participant 1	Participant 2

Customization	Content of panes Layout of mini-toolbars	Likes to customize as much as possible Has customized panes Personal customization complicated software.	Has not customized much, only main panes It is not well communicated what can be customized Interested in customizing ribbon
Perspectives	Not everything in perspective is relevant "Sometimes it is hard to remember how we classified something" Would like to have fewer tabs Never has to change perspective	Switches between two perspectives Prefers to work with the smaller perspective Would like to hide stuff from perspectives	Never switches perspective It contains too much
Tools	Prefers tool palette to mini toolbars Want to remove the windows toolbar	Mostly uses the mini toolbars Tool palette gives more detail	Windows toolbar is not very user friendly, uses the shortcuts in stead. There are too many floating boxes Uses tool palette
Shortcuts	Frequent shortcut-user Shortcuts are complicated in the different toolgroups.	Would like to make own shortcuts Some very useful ones are to long	Uses shortcuts a lot Would like to create own shortcuts
Search	Uses search to find objects and drop objects into dialogs	Frequently uses search	Uses this a lot, should work for ribbon Some clients are unaware of it

Analysis

After the interviews, we had a much clearer idea of how users normally use Petrel, and already existing customization options. They had all customized panes, which is the only currently customizable area in Petrel, and we got the impression that because Petrel users are often expert users, many find it useful to customize the software to their particular workflow.

Everyone seemed to agree that the perspectives contained too many tabs, and too much functionality that they never used. Participant 1 had the particular problem that he needed to

change between two perspectives. Ribbon-tabs seems to be one of the most important things to customize.

The greatest difference between our participants was in how they preferred to use tools, participant 1 preferring the mini toolbars which have been common in the old versions, whereas the pilot participant and participant 2 used the tool palette.

All of the participants were frequent shortcuts users, and would like to map their own shortcuts. In addition, the pilot participant and participant 2 expressed a wish to hide the windows toolbar as they only use the shortcuts for these commands.

Findings

After the interviews we focused the scope of our project to a number of functions we wanted to include in the design.

- pin and attach dialogues
- hide irrelevant information (windows toolbar, panes, icons, tabs)
- customize ribbons
- change windows layout
- change keyboard shortcuts
- not have to switch between perspectives
- chose to show search

Focus Group

The two tables contain some of the most essential topics that came up during the focus group. The data is grouped into each of the prototypes and under each prototype we separated between comments on the usability, the functionality and design.

Table 3: Data and interpretation according to topic for Edit Mode-prototype

TOPIC	EDIT MODE	INTERPRETATION
Prototype Interaction	"I would like to have everything really close to my mouse"	change mapping?
	"Like on a Samsung?"	Recognizes usability from mobile interfaces
	"Maybe you want a different profile for a different project"	
	"Are there different universes?"	No clear separation between tools and tab-icons because drag

		and drop breaks down barriers
Functions	"It would be nice to have a history list of undo-actions"	Action-history
Look-and-feel	"Can you open the eye?"	Ambiguous eye-symbols
	"How do I get out of the edit mode?"	The done-button should be more visible.
	"It would be nice to have some subcategories in here"	Categorize hidden field.

Table 4: Data and interpretation according to topic for on-the-fly-prototype

	ON-THE-FLY	**INTERPRETATION**
Prototype interaction	"It only has one search!"	Several searches for different things was messy
	"That is great so I could just search for a process and then directly drag and drop it here!"	Appreciates the effectiveness.
	"No I don't need to move [the edit menu]"	It should be a popup but can be pinned
Functions	"Can I undo actions?"	Bad choice to open a menu to redo?
	"Is the hidden field common or one for each tab" "I think it should all be in the same container"	Common hidden-field
	"Could you have all dialogs in one and then you can switch between them?"	A master dialog so they don't pop up on top of each other.
	"Sometimes you can have many of them open"	
Look-and-feel	"I would like to have [the hidden field] more structured" "An intelligence in the system like a library where I can put it back and find it again"	Categories in hidden bar helps the user organize.

Analysis

The participants seemed positive to the idea of customizing the ribbon and the tool palette, but there were a number of things in the interface that seemed to be confusing. The participants were confused by the fact that there were several search fields, and the eye symbol was not obvious. There was not as much interest in hiding and showing the search-field and the windows toolbar as we had thought after the interviews.

Instead of getting a clear answer to which of the prototypes we should develop further, the participants liked elements from both of the prototypes. They were enthusiastic about the ability to customize ribbon tabs and tool groups, and seemed to find the mobile interface inspired interaction simple.

However, this type of application that changes already existing parts of Petrel was very unlikely that they would implement, and we were urged to design something that did not disrupt any existing structure, but build on top of the interface. This might also be less confusing to the users than the current design which adds more complexity to an already complex interface. Having a separate window to work in will allow us to work with a cleaner separation between the different areas of customization in order to simplify the design.

Findings

After the focus group we decided to focus on the following points in the next prototype:

- Create an application inside a window
- Group into areas of customization instead of having everything in the same space
- Keep drag and drop interaction
- Keep tools and ribbon as main areas of customization
- Start working on profile sharing

Summative Evaluation

Table 4 presents the time spent by each user completing the different tasks. We can see here that the time spent on the tasks in the first view is generally longer than time spent in the other views. This shows how the user learned the interaction model from the first tab, and continued to solve tasks in the same way.

Table 5: Time spent by participants on tasks

VIEW	TASKS	PARTICIPANT 1	PARTICIPANT 2	PARTICIPANT 3	PARTICIPANT 4
Tabs view	find my tab	00.02	00.01	-	00.02
	add the manager	02.20	00.35	-	00.30
	add the calculator	-	00.46	00.16	00.01
	remove one thing	00.01	00.03	-	00.03
	give my tab a new name	00.04	00.06	00.16	00.18
	Find out which tabs are visible	01.27	00.16	-	00.59
	Make my tab visible	00.01	00.03	00.29	00.01
Tools view	Add any tool	00.30	00.26	00.21	00.13
	Remove one	00.01	00.01	00.01	00.01
	Give a new name	00.19	00.05	-	00.03
Shortcuts view	Find the shortcuts	00.01	00.02	-	00.01
	Set up you own shortcut	00.14	00.50	00.36	00.14
	Total time	8:46	5:43	5:40	5.04

Table 6: Summative evaluation data

	PARTICIPANT 1	PARTICIPANT 2	PARTICIPANT 3	PARTICIPANT 4
NEGATIVE	Wonders how to find manager, explored the interface. Confused about tab-selection Expects to click tab and see what it contains	Trouble finding manager, eventually tries to search for it. Clicks tab selection boxes	Explores for a while before trying to search	Confused at first.
POSITIVE	Immediately understood delete and name change Learning: No delay when entering tool- and shortcuts view. Simple UI	Help texts were useful	Learning: Quickly started dragging and dropping in tools- and shortcuts views Deleting was intuitive Name change was intuitive	Freedom Well organized Easy to navigate left pane

Table 7: Summative evaluation data

SUGGESTIONS	Highlight my tab in tab selection Scrollbar in search	More specific help-texts Categories search More freedom (change shortcuts) Undo redo should be connected to view. Clear all in tools and tabs		Wants more freedom (making shortcuts, change existing tabs) Change help function to standard Petrel (?)
COMMENTS AND OBSERVATIONS	I want to make a tab that is a mix of two tabs Uses categories search	Visual/textual users will react differently to interface. Sees use for Petrel training with single tab.	Silent through test.	Would like to use this "As often in Petrel, the small things make a big difference"

Analysis

Common for all the participants was that they spent some time in the beginning wondering what to do. Some started reading the help-texts and quickly started searching, while others requested help from the test leader. One participant commented that the help text in search should be more specific as you have to search to begin doing anything else. However, as soon as they had figured out how to do it once, the rest of the views function in a very similar manner, and the participants could use them easily. Everyone understood how to delete immediately, and most also figured out very fast how to change the name of a tab and the tool group. The tab-selection box however seemed to be more difficult to understand, one expected it to be a search filter, and others were unsure what would happen when you ticked or un-ticked the boxes. It seems that the

interface is intuitive to use as soon as you can get over the first barrier of how to start, and if we can help the user start the usability could be very good.

All of the participants commented that it looked very little like Petrel, and spent a lot of time on things we had just not implemented such as what happens when you click apply, scrolling in the search field. These things might have taken the attention away from the things that were implemented and perceived as bad design rather than unfinished prototype, which is a disadvantage of high fidelity prototyping.

Although the time spent on completing the assigned tasks are included in the table, it might not be a good measure of how well the user understood the interface. Whereas one user very efficiently completed her tasks, another was more explorative and tried everything she could think of, whereas a third started a discussion with the test leader in the middle of testing.

The participants also had a number of suggestions to further development of the design, and interesting comments to look into. For example adding a "clear all" button to the tool group and the tab could be included right away. The help-functionality can be the way that is common in Petrel where small question marks that you can hover over and opens a small text box. We also realized that the tab-selection box needed more explanation.

Findings

To sum up main findings in the evaluation which we will address in the design.

- It is hard to get started the user has to search before doing anything else
- Having figured out how to interact with one view, they easily solved tasks in the other views.
- The help texts disappeared to fast, it could be useful to have question marks, the standard in Petrel
- A "clear all" function could be useful in tabs and tool groups
- All participants answered they would create a profile if the tool was made available

Design

At first we designed two different concepts. These were *edit mode* and *on-the-fly*. Both these concepts were designed to be implemented in Petrels core, not as an add-on. This was difficult to do since many parts of the interface, like the *ribbon*, where third-party software that could not be changed or customized in the way we wanted. Therefore we decided, with help of our contact, to

focus on a dialog box where users can customize some of the surrounding interface. This gave us more control and freed us from some of these types of constraints.

Our final design is categorized into three part: Tabs, Tools and Shortcuts. This makes it easy for the user to separate the three main functions from another. At the top of the side menu we had at first a drop down menu where you could change the profile. This later changed to instead be a function outside the dialogue.

Figure 10: design used as template for hi-fi prototype

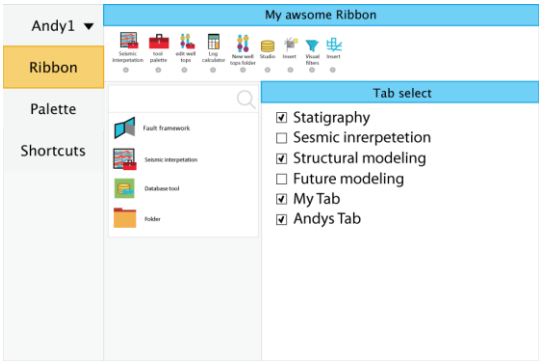


Figure 11: Piece of final design as we handed it in

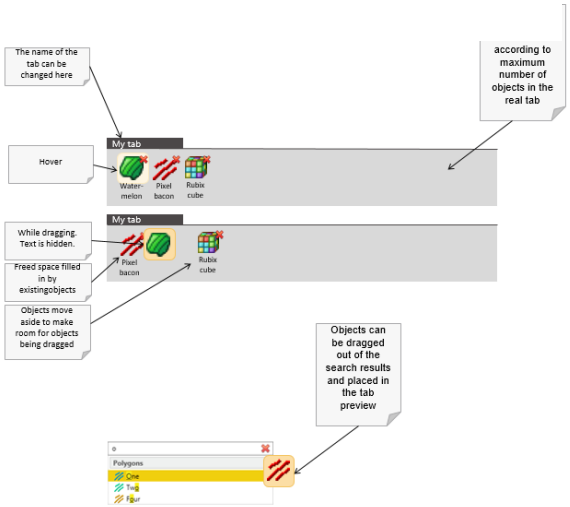


Figure 10 shows the design before the hi-fidelity prototype. *Figure 11* is a redesign to fit the "Petrel look" and including some changes we made after the evaluation. This design concept was then sent over to the folks at Schlumberger for further development.

Design thinking includes where different parts should be placed, the size of each element, mapping, constraints and so on. When we had our last design meeting with our contact at Schlumberger he pinpointed some things we should have thought about. Like, what if there are too many icons in the tab? Should there be a scrollbar? Or, is drag and drop convenient to use when adding objects from the search bar to the tab preview? Should there just be a "double-click to add" function?

To make consistency in the program we made the *drag and drop* functionality similar in both the tab and the tool group preview. We chose this because it as an intuitive interaction method, which gives good feedback and works well with the idea of an interactive preview. However, it is time consuming and expensive to implement. We were not used to thinking about weighing

cost of implementation against usability gains, our conversations with Lucas about this was one of the most valuable lessons for us on this project.

We chose to change the searchbar to a field containing all relevant commands or tools and a filter field, which filters the content. This aims to solve the problem of users opening the window and not realizing what to do, but gives a number of icons that are interactive. We have not spent much time on describing the functionality of the filter, as it already exists in other parts of the software and should look and function exactly the same.

The side menu is put there to give good visibility of what the program does. When you click on something you immediately get feedback in form of changing color. The left hand menu is a good example of this, when you click "Tabs" the tab customization comes on the right side and the tab button is highlighted in yellow.

Discussion and Analysis

In the relevant literature section we discuss how allowing for customization will often improve the user experience of a software. Though we had participants test our application, it did not at the time create a profile, and we have not had the ability to research how this will affect their daily work.

The participants in our evaluation reported that they would like to use this if it was available in order to customize their own profile. But in a lot of ways they are super-users as they are working with support and not primarily with tasks in the software.

We did not have the ability to test how sharing of profiles would be used, but it would be interesting to find whether it would form similar patterns to the ones found by Mackey. Would user prefer a more general customization distributed by a colleague or the company or spend the time to create a personal profile like Kumar predicts is becoming the norm.

Scope for Future Work

If we had the time to work more on the project, it would have been interesting to explore further how profiles was used if it was tested by a group of people over some time. Would it be something that everyone started doing, or only for users with a particular interest in customization? Would few distribute profiles to many like in Mackays case, or would sharing be both ways? Would it actually increase efficiency? One way to do this would be to introduce the profile editor to one workplace and conduct a case study focusing on patterns of sharing.

We designed the left pane of the application to contain only three views, but in a way so that more can easily be added and one could select other parts of Petrel to customize. The next area of Petrel that would be interesting to focus on is how you could customize is the "look-and-feel" of the interface. For instance, one could change the background which appears when Petrel is opened, This would probably not be of as much value for the individual user as for companies who could create their company profile of Petrel. Perhaps you could even have a super-editor for the company who could create super-profiles?

Throughout our project we have discussed ways of sharing files and working together with Petrel customization through profile sharing. We have designed for importing and exporting files. This involves the extra step of moving outside the application in order to send files. If we had the chance to work further with this project, it would be very interesting too work with a cloud sharing of profiles. In this way sharing and cooperation could become a more natural and integrated part of daily workflow.

Conclusion

Having studied the options for customizability on Petrel, we have made several interesting observations leading to our final design for the Profile Editor. The Profile Editor lets the users create a personal profile containing a customized ribbon, a custom tool group as well as ten custom shortcuts. If implemented, this would hopefully improve the user experience of Petrel by minimizing clutter, and functionality which is irrelevant to the user.

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