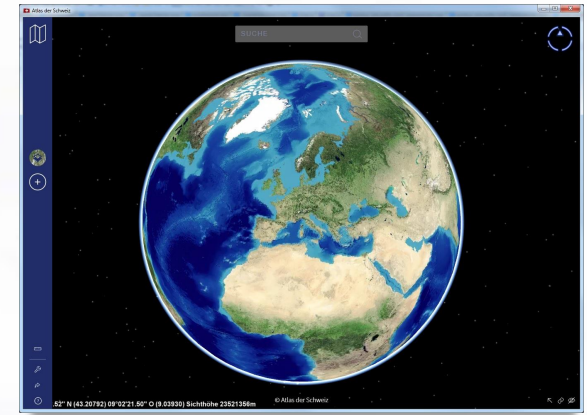
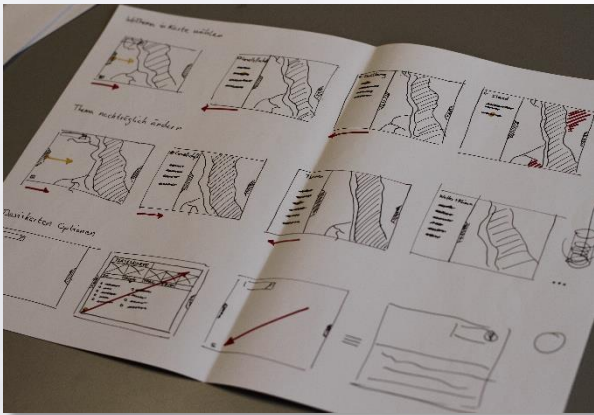


Designing Graphical User Interfaces for 3D Atlases

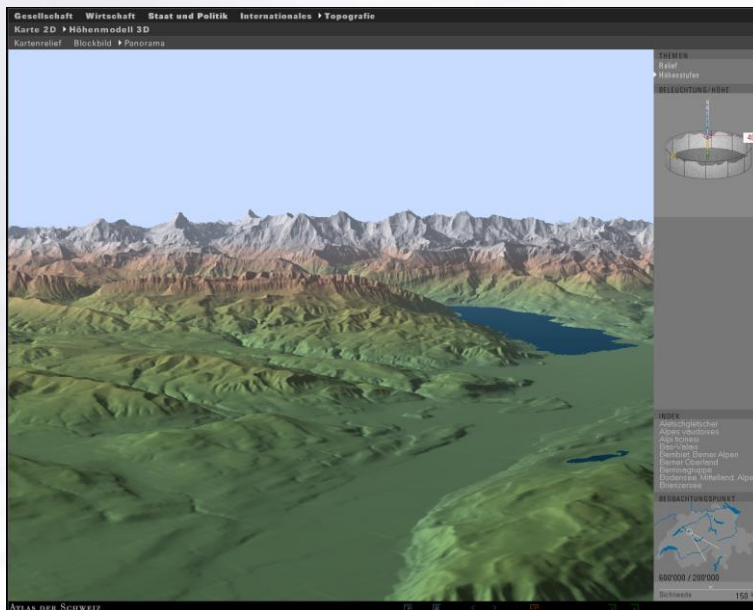


René Sieber
Raimund Schnürer
Remo Eichenberger
Lorenz Hurni

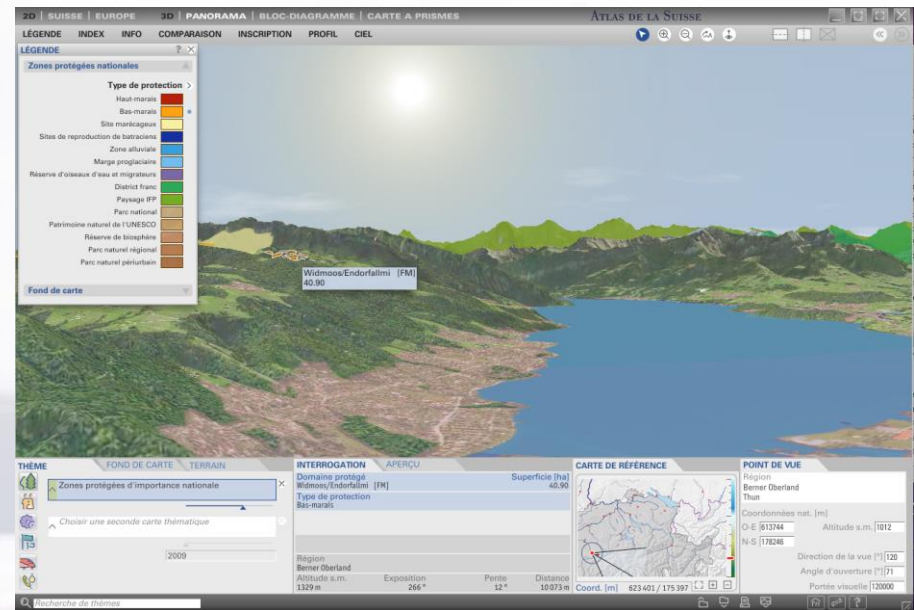
Institute of Cartography and Geoinformation
ETH Zurich

The Importance of the Atlas GUI

- Complexity: Thematic Content, Map Design, Functional Structure, User Needs ...



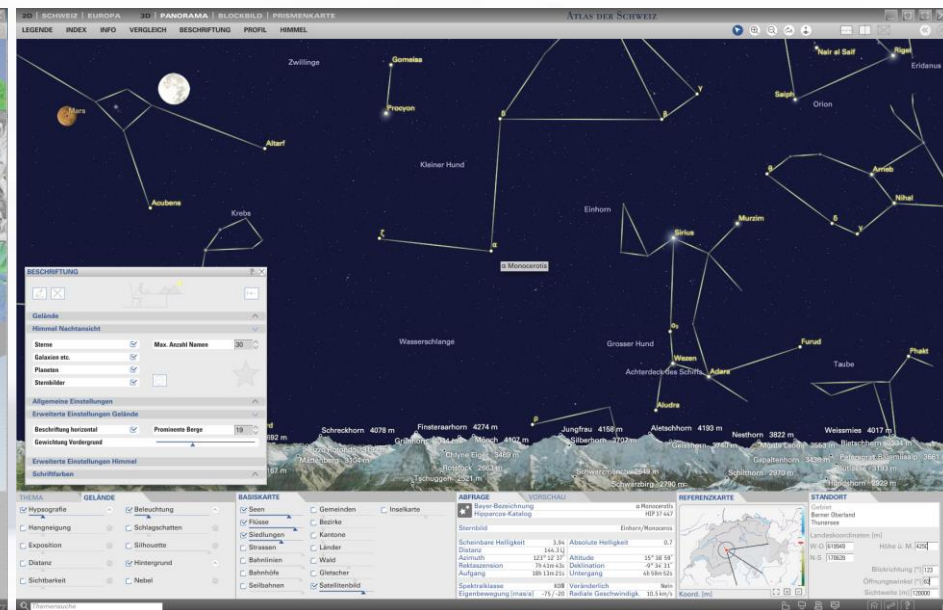
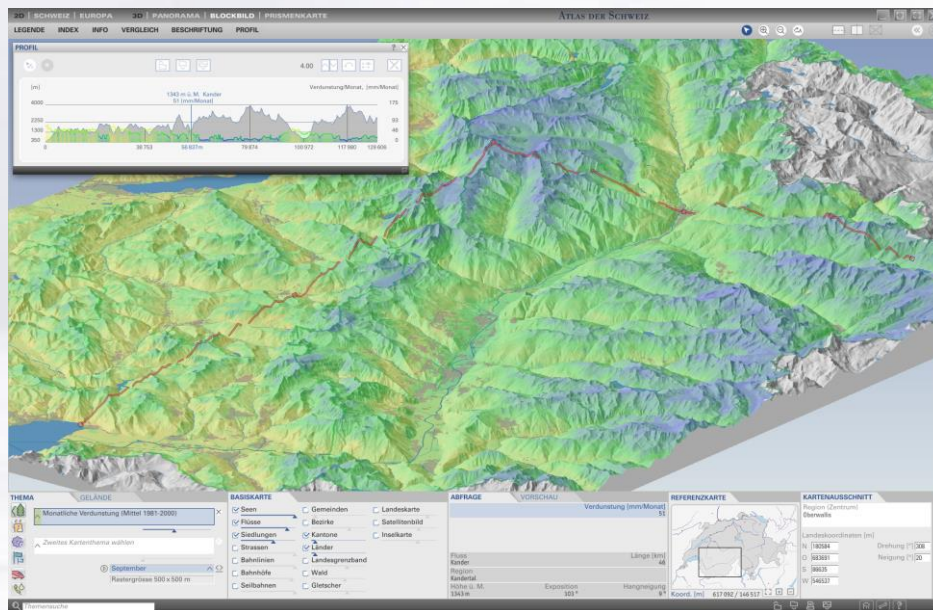
Atlas of Switzerland 1 (2000)



Atlas of Switzerland 3 (2010)

The Atlas GUI: Success or Mess ...

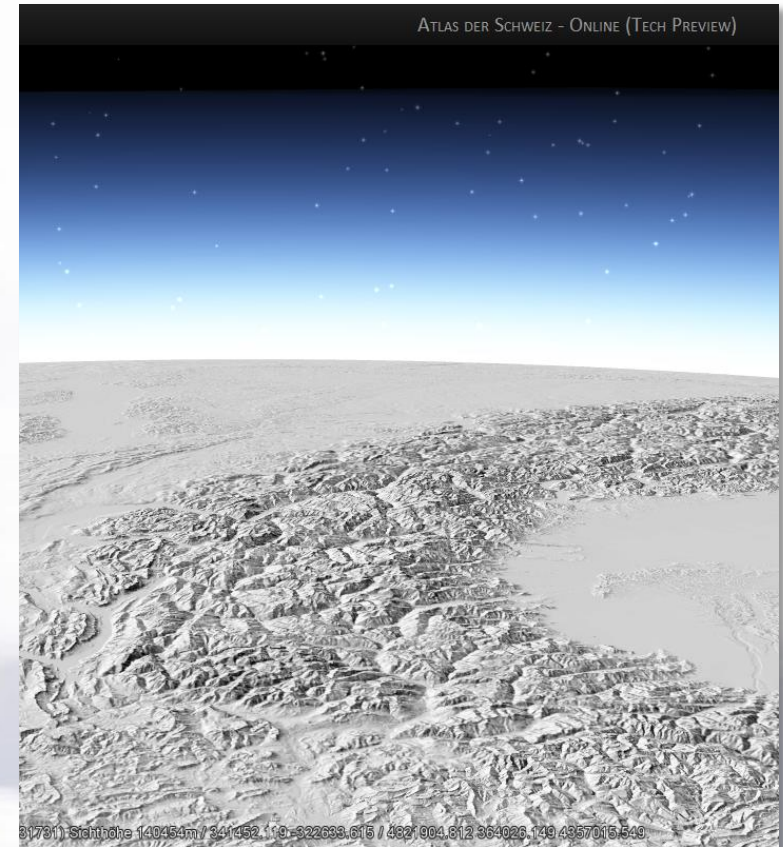
- Complexity: Thematic Content, Map Design, Functional Structure, User Needs ...



Atlas of Switzerland 3 (2010)

A new Atlas of Switzerland

- Desktop and Mobile Version
AoS – online / AoS – mobile
- Web-based
- **3D Virtual Globe** >> Visualize & Explore
- **3D Cartography**
- **GUI** Responsive Design
- **GUI** Reduced Complexity
(functional & visual)

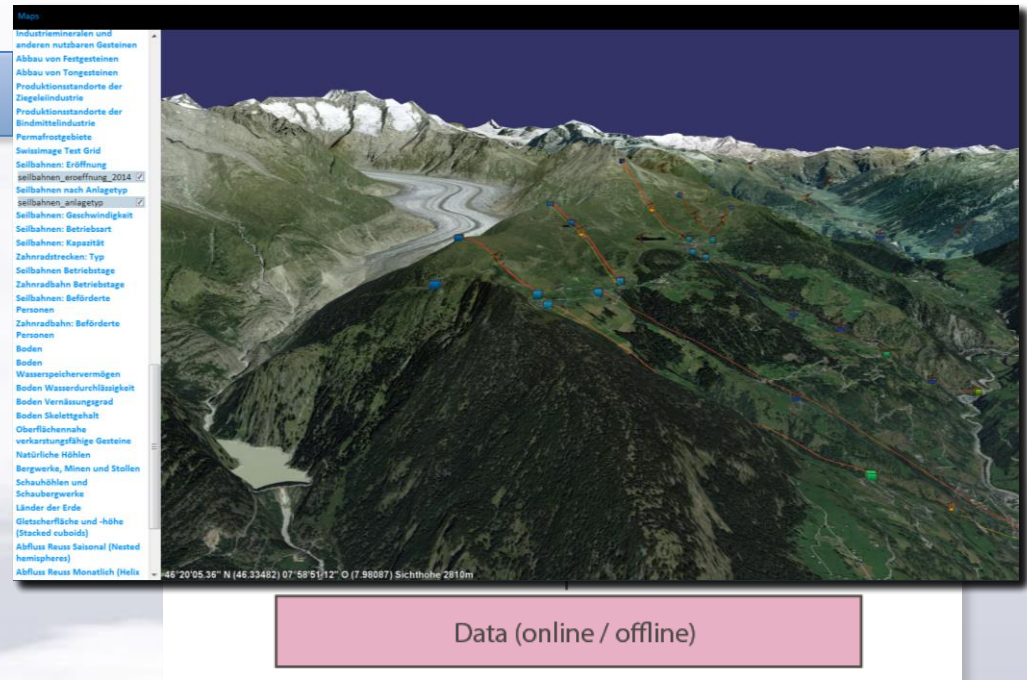


osgEarth [Pelican Mapping]

A new Atlas of Switzerland

Atlas Platform (APS)

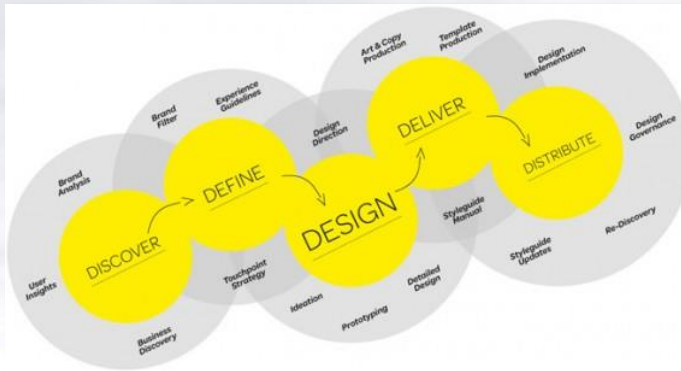
- Graphical User Interface
- 3D Virtual Globe (APSGlobe)
- Productive Database



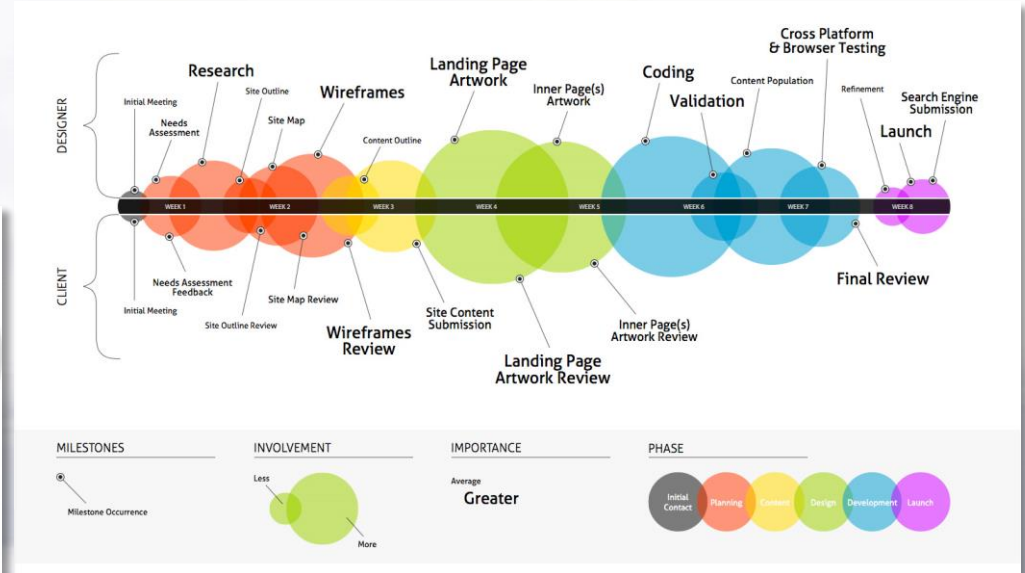
APS Swiss Atlas Platform

The GUI Design Process

- **UCD** User Centered Design
 >> Interaction process between the user and the product interface
- **IxD** Interaction Design
 >> Technical and graphical design process



Spies (2012)



Armen (2014)

The Interaction Design Process IxD

- 1 Discover** Investigation stage
Get knowledge of the market, the target group; Economic aspects
- 2 Define** Analysis and conception stage
Goals of the project; Concepts; User profiles, scenario and use cases
- 3 Design** Creation of design versions and evaluation
General design direction; Detailed design; Improvement of the versions
- 4 Develop** Prototyping and usefulness tests
Task & function, Look & feel, Feasibility; Test of usefulness (utility and usability)
- 5 Deliver** Implementation and realization stage
Co-operation between graphic designers and engineers; Monitoring
- 6 Distribute** Final tests
Test functionality; Publication

Spies (2012) | Moggridge (2007), Herczeg (2006), Saffer (2006)

The Atlas GUI Design Process

How can these principles be applied to an atlas project?

Do 3D maps require a special GUI, or at least specific functions?

- 1 GUI Investigation stage
- 2 Conceptual GUI design stage
>> **DDP** Design Direction Presentation
- 3 Detailed GUI Design stage
>> **DDD** Detailed Design Documentation
- 4 GUI Implementation stage
>> **Operational GUI**

1 Atlas GUI: Investigation

A State-of-the-Art Investigation

>> GUI feature cross board

Brief analysis of competitor studies, similar products and good GUI design examples

B General Requirements

>> Setup of general affordances

Reference design for atlas layout; Technical compatibility and responsive design;
Basic graphical issues (e.g. using vector / raster graphics)

C Use Cases

>> Setup characteristic tasks and actions

Definition of user groups and profiles (“persona”), scenarios and activities

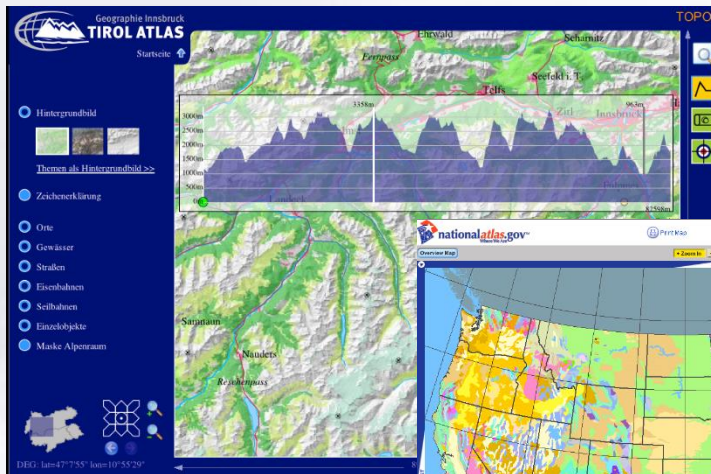
D Interactive Functionality

>> Setup of all atlas UI-elements

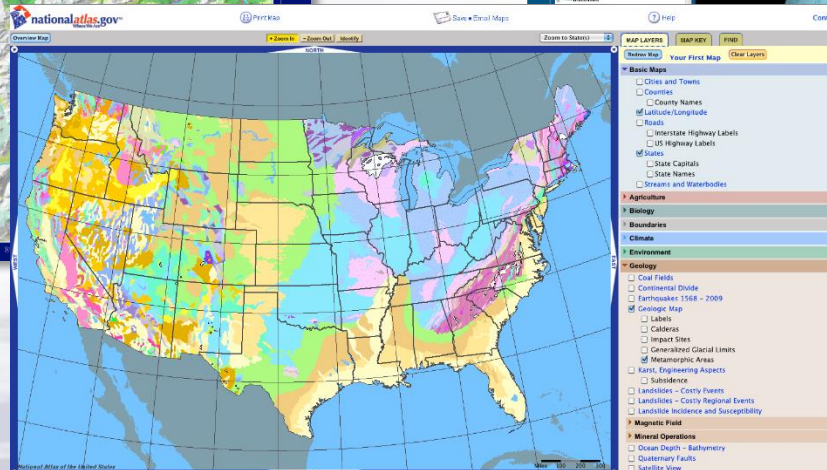
Elaboration of the static and dynamic atlas GUI features (icons, tools);
interactions, dependencies, and behavior

Atlas of Switzerland: State-of-the-Art Investigation

Analysis of competitor studies, similar products and good GUI design examples



Tirol Atlas



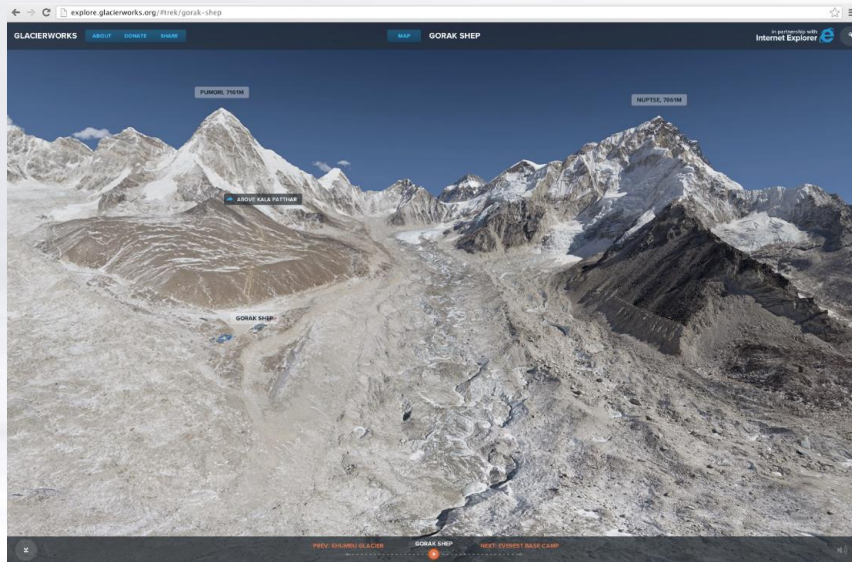
National Atlas USA



Schweizer Weltatlas – interaktiv

Atlas of Switzerland: State-of-the-Art Investigation

Analysis of competitor studies, similar products and good GUI design examples



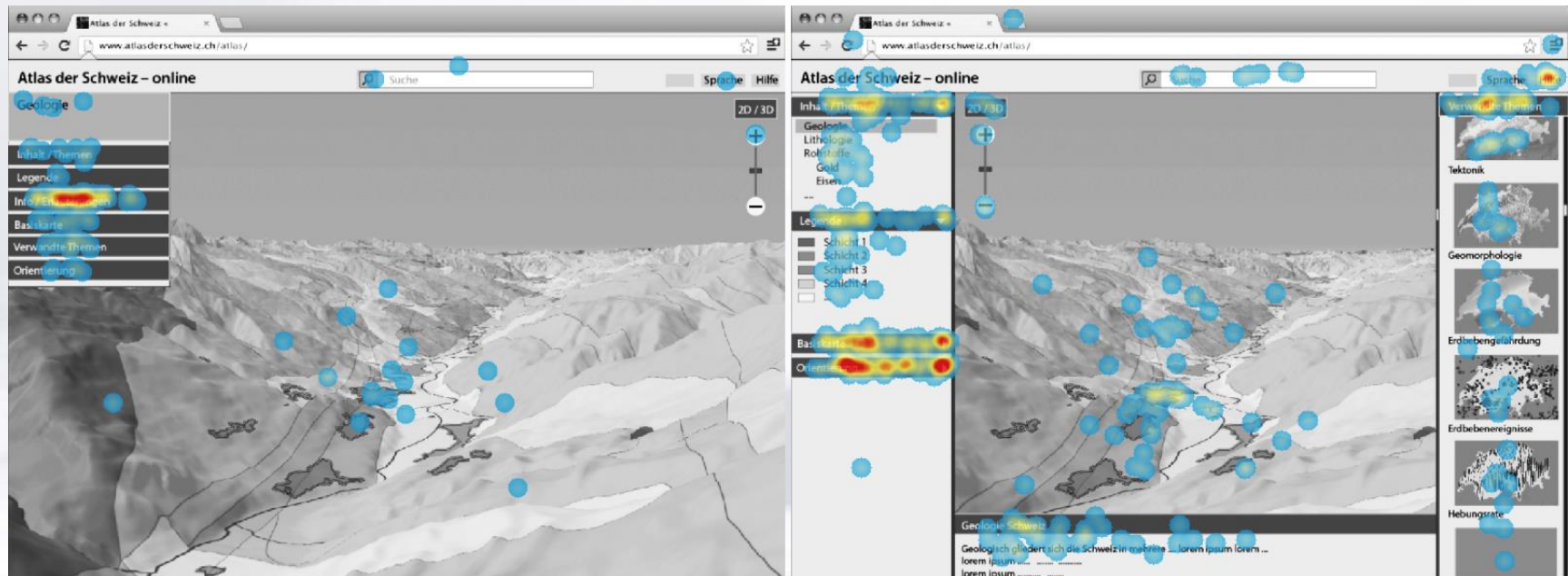
explore.glacierworks.org (2013)



www.barefootworlddatlas.com (2013)

Atlas of Switzerland: General Requirements

Reference design for atlas layout: Survey on desktop atlas GUIs



Schnürer et al. (2015)

Atlas of Switzerland: Use Cases

Definition of user groups and profiles (“persona”), scenarios and activities

Retirees	
Age	65+
Purpose	Leisure time
Gender	mostly male
Experience in geography/cartography	intermediate
Place of usage	At home
General use case	Browse different topics + query data and read legend + read map info + read help and try out different things
Concrete example	An elderly man, particular interested in railways, looks for some historic railway routes, navigates to the Rigi-Scheidegg documentation that you can make virtual tour atlas.

Hikers	
Age	18+
Purpose	Leisure time
Experience in geography/cartography	low-intermediate
Place of usage	At home, in nature
General use case	Plan a walking tour+ get useful information during the tour + analyze a walking tour afterwards
Concrete example	Before a tour, a hiker checkouts the panorama from a mountain hut near Grosser Mythen. During the tour, the hiker gets to know on which rock bed he is currently walking. After the tour, he finds out which distance he has covered.

AoS (2013)

2 Atlas GUI: Conceptual Design

A Wireframes

>> Storyboard

Sketching techniques to run through sequences of actions; hierarchical structure of the GUI

B Moodboards / Artboards

>> Showcase layouts

“Look and Feel” of the atlas (color schemes and styles, object animations and actions)

Arrangement of GUI elements

C Overall GUI Design

>> Design Direction

Creation of 2-3 reference screens (Intro / Map screen)

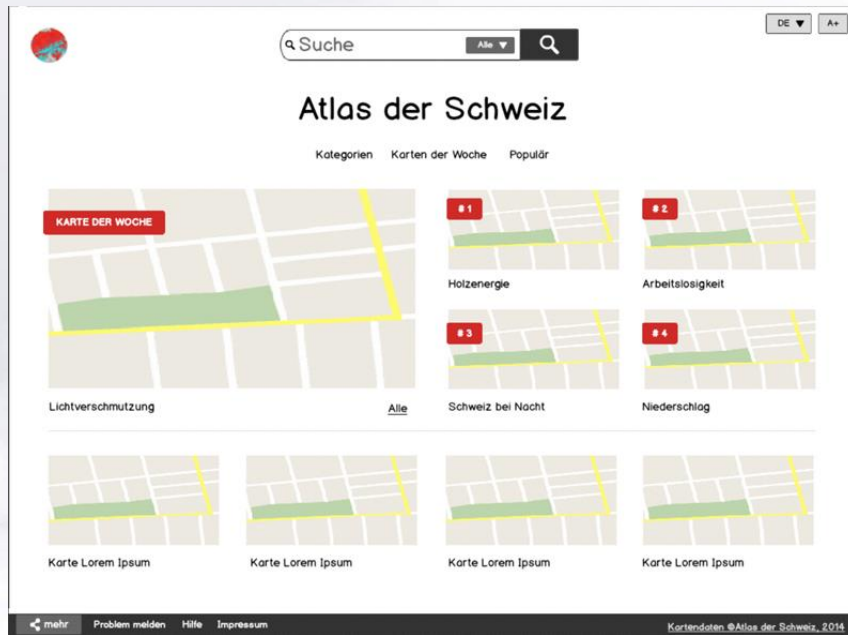
DDP Design Direction Presentation

Final conceptual decision on GUI graphics and behavior;

Acceptance for release by the customer

Atlas of Switzerland: Wireframes and Moodboards I

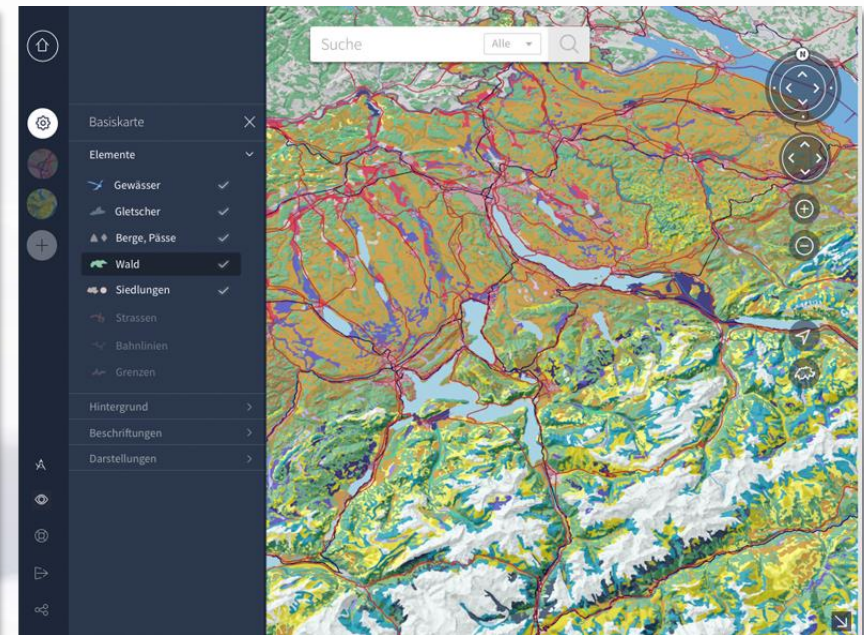
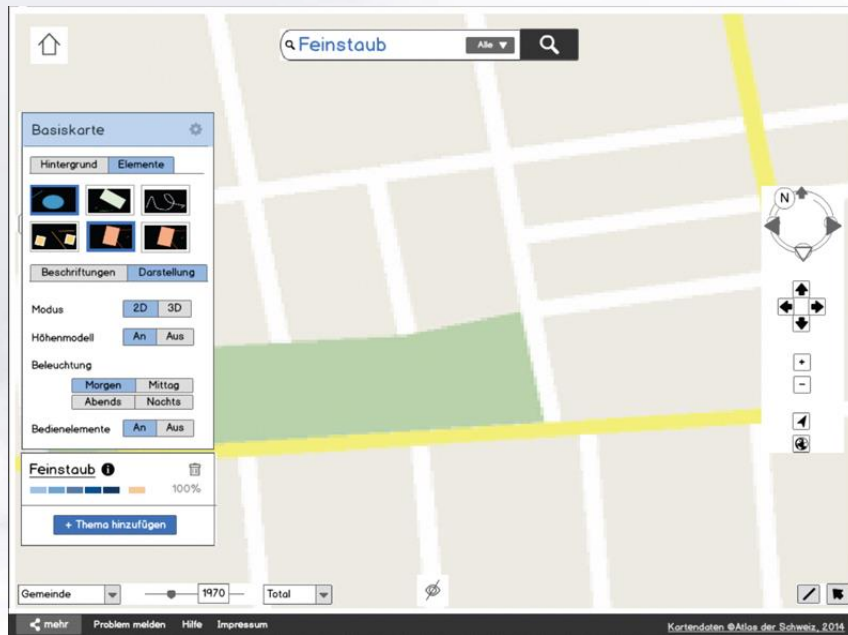
Storyboard for actions and animations; Artboard for “Look and Feel”



AoS | dreipol (2014)

Atlas of Switzerland: Wireframes and Moodboards II

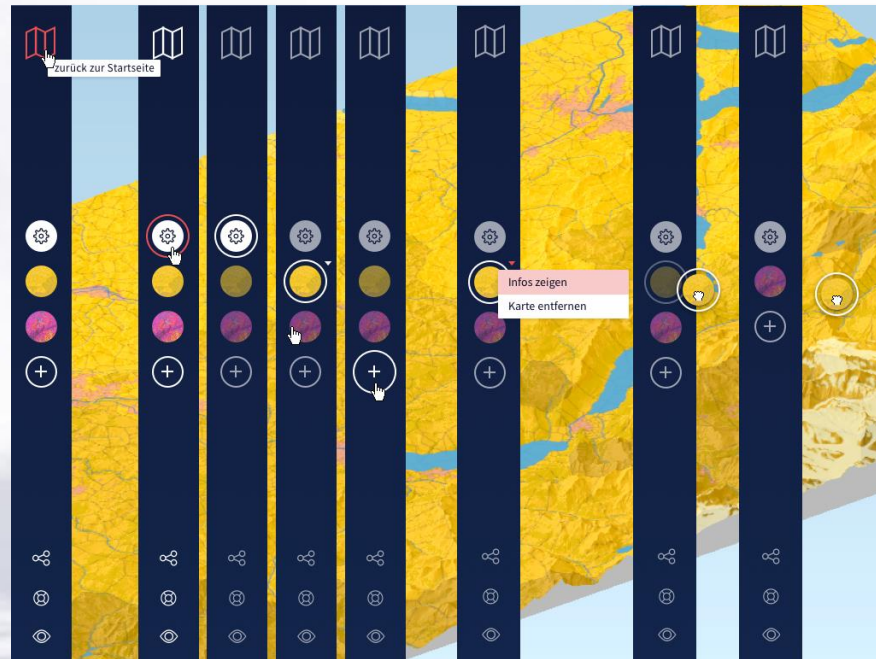
Storyboard for actions and animations; Artboard for “Look and Feel”



AoS | dreipol (2014)

Atlas of Switzerland: Moodboards II

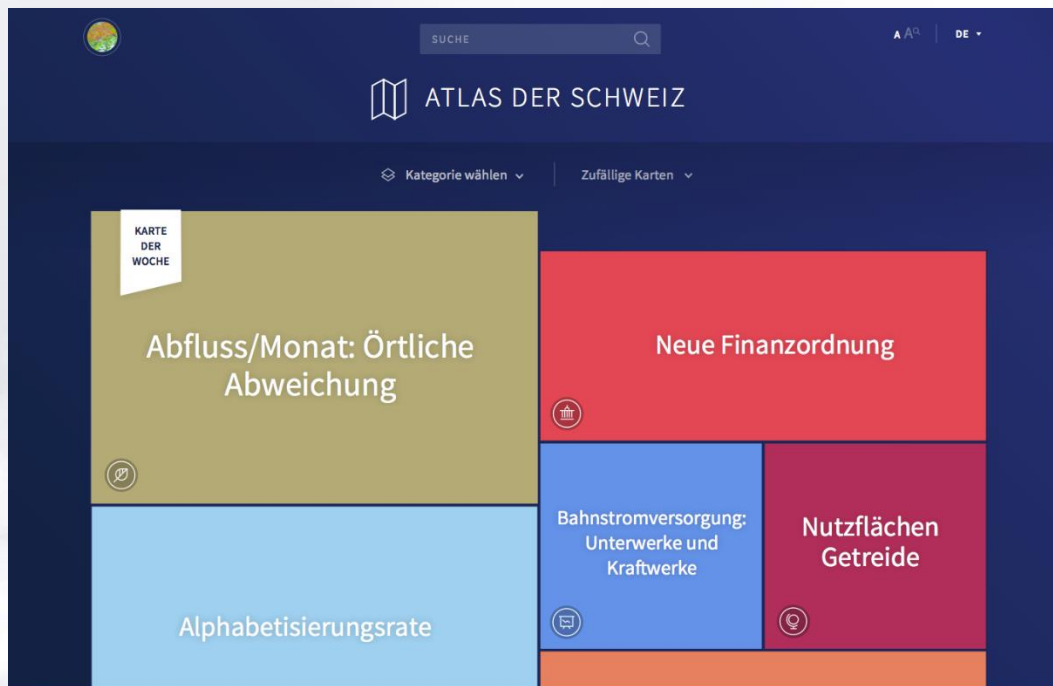
“Look and Feel” (color scheme, animations, actions)



AoS | dreipol (2014)

Atlas of Switzerland: Overall GUI Design I

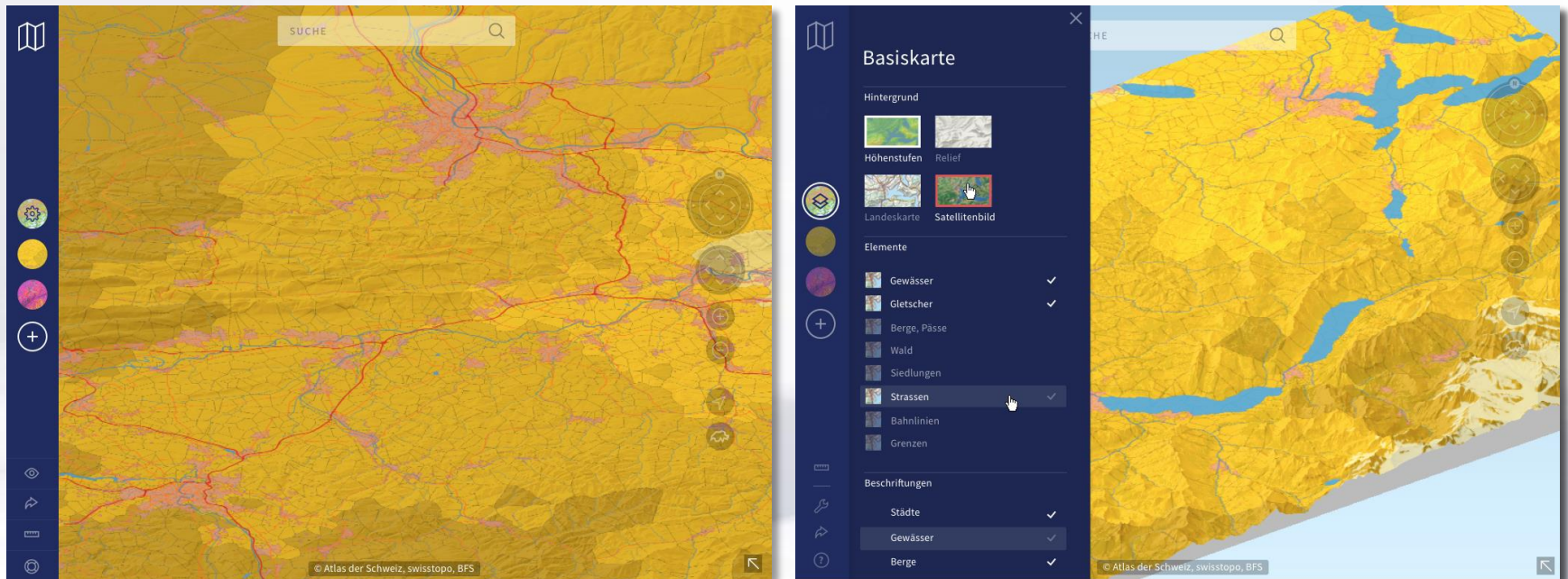
Creation of 2-3 reference screens (Layout, Responsive concept, Typography, Colors)



AoS | dreipol (2014)

Atlas of Switzerland: Overall GUI Design II

Creation of 2-3 reference screens (Layout, Responsive concept, Typography, Colors)



AoS | dreipol (2014)

3 Atlas GUI: Detailed Design

A Detailed Design

>> Final artwork

Design of structural elements (windows, icons, controls);

Design of GUI interaction elements (statuses, interactions, and animations)

B Design Specifications

>> DDD

Precise dimensioning and definition of all GUI elements and layouts

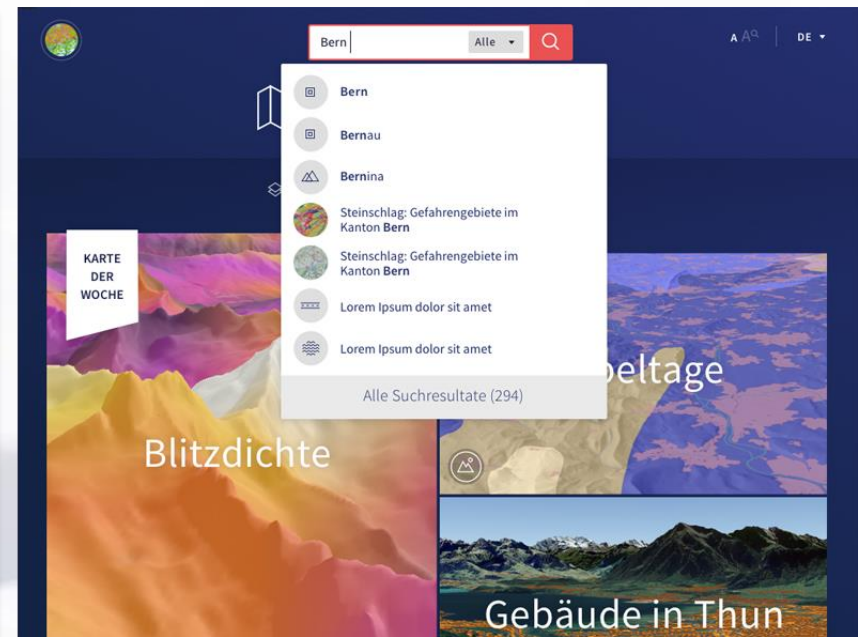
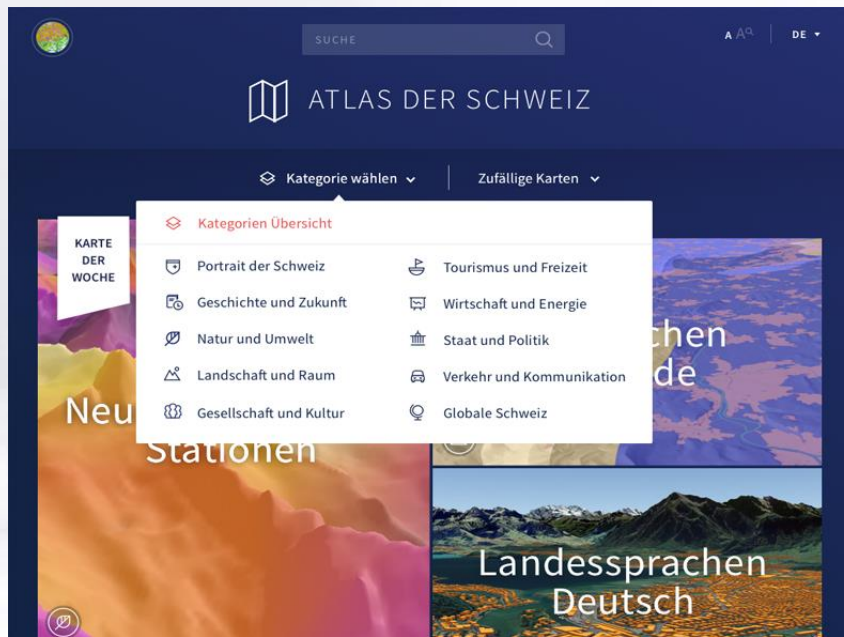
DDD Detailed Design Documentation

Final graphical design;

Reference document for the implementation phase

Atlas of Switzerland: Detailed Design

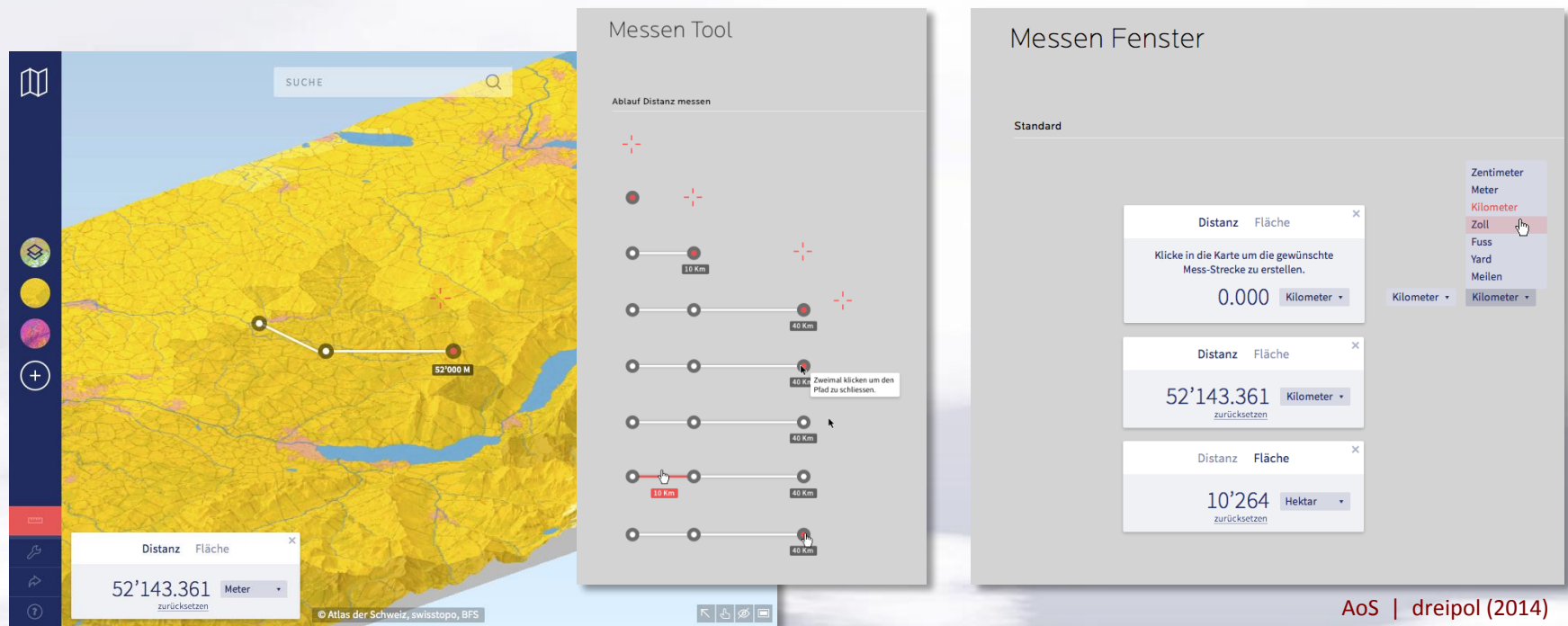
Design of structural elements and GUI interaction elements



AoS | dreipol (2014)

Atlas of Switzerland: Design Specifications

Precise dimensioning and definition of GUI elements



AoS | dreipol (2014)

4 Atlas GUI: Implementation

A Implementation of DDD

>> GUI Prototype

Technical and graphical specifications; Programming of GUI elements and their behavior

B Implementation Testing

>> GUI Alpha version

Functional testing; bug fixes

C Usability Testing

>> GUI Beta version

Testing the usefulness and usability

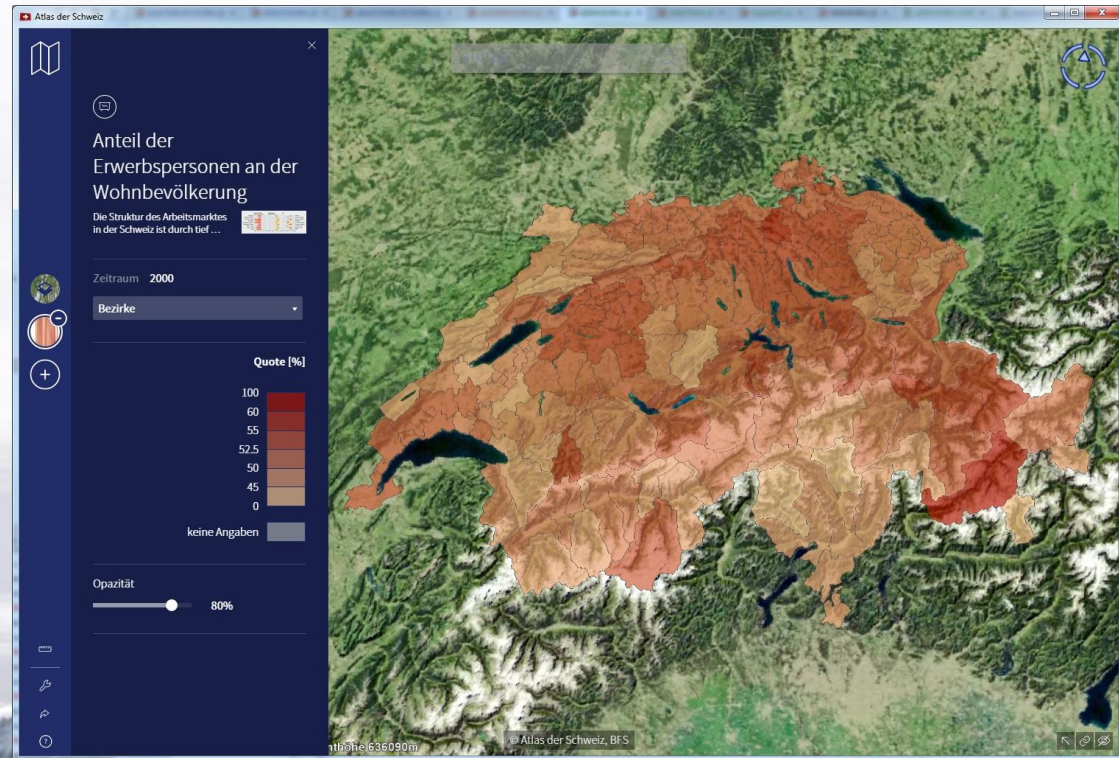
Operational Atlas GUI

A technically thin, robust and scalable GUI

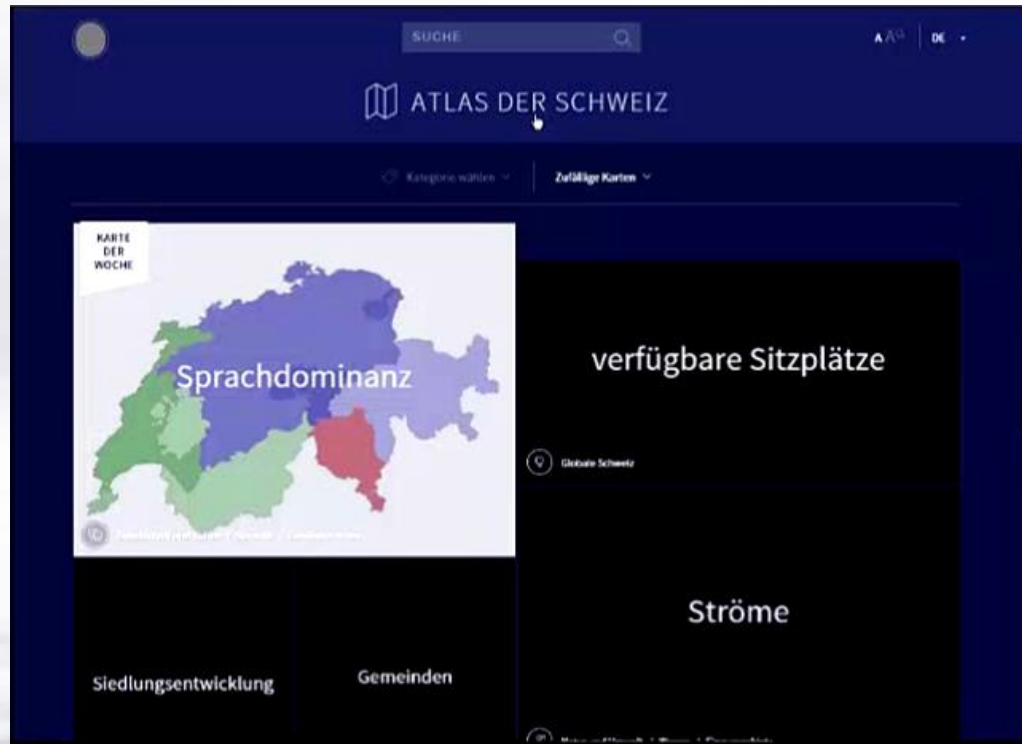
Atlas of Switzerland: Implementation

Programming of GUI elements and their behavior

CEF Browser Environment
Vue.js JavaScript framework
SASS CSS extension language)

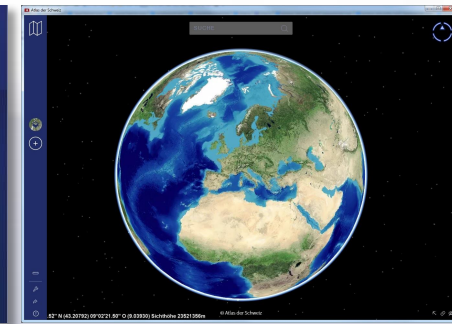
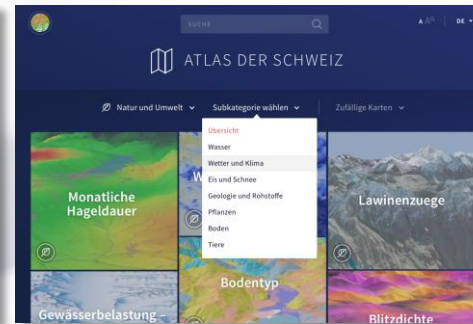
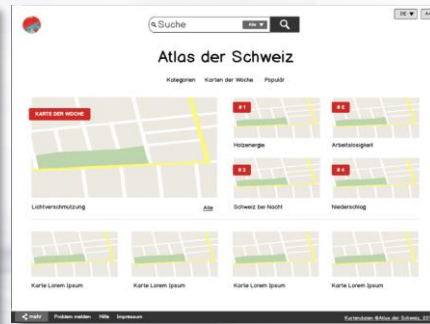
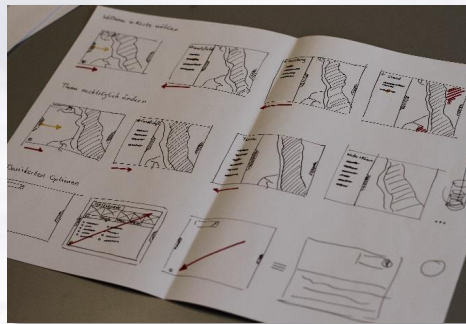


Atlas of Switzerland: Implementation



Conclusions

- Following an IxD workflow for Atlas GUI design is a successful approach
- The GUI design process has to be an integral part of the project
- 3D maps require some specific functions, but not a 3D GUI



It's late, but ...
are there some Questions?



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