



Graphical Interfaces for Historical Data

Bénédicte Bucher, François Golay

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**EuroSDR Seminar Report
Graphical Interfaces for Historical Data
June 26th 2017 – Saint Mandé, France**

Bénédicte Bucher, François Golay

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EuroSDR Seminar Report

GRAPHICAL INTERFACES FOR HISTORICAL DATA

June 26th 2017 – Saint Mandé, France

Index of Figures	6
1 ABSTRACT	7
2 NATIONAL PORTALS	7
3 PRESENTATIONS FROM RESEARCH	11
4 PERSPECTIVES FOR AN EUROS DR ROADMAP	14
5 ACKNOWLEDGEMENT	15

EuroSDR Seminar Report

GRAPHICAL INTERFACES FOR HISTORICAL DATA

June 26th 2017 – Saint Mandé, France

With 7 figures.

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Index of Figures

Figure 1: The meta-database is detailed in order to make searching through the Norwegian Historical Map-portal practical. By the Historical Map-portal the user is able to query for county, collection and time-period.....	8
Figure 2: Visualization paradigms experimented on the portal https://remonterletemps.ign.fr/ to explore changes for an area over time.	9
Figure 3: The resources behind a journey through time on https://map.geo.admin.ch/ : archives and an open source technologies stack.	10
Figure 4: Registering iconographic documents interactively or automatically and retrieving them through a query by content interface in the French project POEME.....	11
Figure 5: Example of digital models on Venice and Geneva, based on different technologies but with a concern to contribute to one consistent 4D digital framework in the Time machine project.....	12
Figure 6: Example of registering pictures on a digital globe, in the Smapshot project, either to finely reference a picture or to add texture to a 3D model.	13
Figure 7: The collaborative vectorization of the French Cassini maps through the geo-historical data platform.	14

1 ABSTRACT

Digitized archives of national mapping agencies are valuable assets for a number of usages. One is to evaluate hypothesis about a past state of earth –for example to assess the past presence of water sources based on old maps-, another usage is to observe dynamics – for example to describe urban sprawl based on series of images and maps- and to geo-reference documents that can be indexed and integrated based on their location in time and space. Last, a growing need is to provide a referencing framework in space and time for thematic digitized data, typically in the digital humanities or in the cultural industry. Besides, more and more data are being produced and the question of how to archive them efficiently is tightly related to the expected usage of the archives. Late 2014, EuroSDR started a specific initiative targeting the valorization of existing digitized archives of national mapping agencies and cadasters - following up the EuroSDR Archiving project - extended to any geodata that has been or will be replaced by newer one. A first seminar in December 2014 led to define a strategy comprising two facets. First facet was to reach out users to learn from them what are the priorities and requirements. Second facet was to share more elements between NMCAs' good practices, and then maybe infrastructure components, datasets, servers, software, licenses, etc. but also with other actors. A follow up seminar targeted both facets through the focus on graphical interfaces. It aimed at presenting latest research and developments about graphical interfaces to interact with geographical historical data, at getting more insight on user communities' requirements and fostering collaborations between national mapping agencies, academics and the industry in this domain.

This report presents the highlights of this EuroSDR seminar of graphical interfaces for historical data, which took place in Saint Mandé (near Paris, France), on June 26th 2017. It was organized in three parts: presentations from national portals, presentations from research, discussions to draft a EuroSDR roadmap on graphical interfaces for historical data.

2 NATIONAL PORTALS

The Norwegian portal set up by Kartverket, <https://www.kartverket.no/Kart/Historiske-kart/>, was presented by Sidsel Kvarteig. After a systematic digitization of historical maps and a long effort to build a meta-database about the new digital assets, this portal was released in 2014. The portal allows the visitor to access online the digitized archives, thanks to a multi-criteria query interface. Historical data are under CCB license. A specific functionality is to display a high quality image for printing. Some archives have been accessed by users that were never retrieved before. The users are not only citizens but also professionals. A partnership has been established with Mapire - The Historical Map Portal.

Historiske kart

nnriap586/historiskekart/ 70% Search

Historiske kart - Metadata

Karttegner / graver Serien Fylke / region

ID	Serienavn / Seriekortbeskrivelse	Teknikk	RuteID	RuteVIS	KartID	Kartnavn	ForkortID
10759	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-97	97	amt2_nordre-Trondhjems-amt-97_1778	Nordre Trondhjems amt nr 97: Plann over Stenke Schanoe og Rastrangement	nordre-Trondhjems-amt-97_1778
10764	Amtkartsamling, Amt2, 1649, 1999	Kode	amt2_nordre-Trondhjems-amt-100-4	100-4	amt2_nordre-Trondhjems-amt-100-4	Nordre Trondhjems amt nr 100-4: Krokier fra egnen omkring Sjødalsfjælae	nordre-Trondhjems-amt-100-4_1857
10763	Amtkartsamling, Amt2, 1649, 1999	Kode	amt2_nordre-Trondhjems-amt-100-3	100-3	amt2_nordre-Trondhjems-amt-100-3	Nordre Trondhjems amt nr 100-3: Krokier fra egnen omkring Sjødalsfjælae	nordre-Trondhjems-amt-100-3_1857
10762	Amtkartsamling, Amt2, 1649, 1999	Kode	amt2_nordre-Trondhjems-amt-100-1B	100-1B	amt2_nordre-Trondhjems-amt-100-1B	Nordre Trondhjems amt nr 100-1B: Krokier fra egnen omkring Sjødalsfjælae	nordre-Trondhjems-amt-100-1B_1857
10761	Amtkartsamling, Amt2, 1649, 1999	Kode	amt2_nordre-Trondhjems-amt-100-2	100-2	amt2_nordre-Trondhjems-amt-100-2_1857	Nordre Trondhjems amt nr 100-2: Krokier fra egnen omkring Sjødalsfjælae	nordre-Trondhjems-amt-100-2_1857
10760	Amtkartsamling, Amt2, 1649, 1999	Kode	amt2_nordre-Trondhjems-amt-100-1A	100-1A	amt2_nordre-Trondhjems-amt-100-1A_1857	Nordre Trondhjems amt nr 100-1A: Krokier fra egnen omkring Sjødalsfjælae	nordre-Trondhjems-amt-100-1A_1857
10751	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-8a	98-8a	amt2_nordre-Trondhjems-amt-98-8a_1852	Nordre Trondhjems amt nr 98-8a: Tilhørende Croquet af Terrainet om Graaelven	nordre-Trondhjems-amt-98-8a_1852
10752	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-8b	98-8b	amt2_nordre-Trondhjems-amt-98-8b_1852	Nordre Trondhjems amt nr 98-8b: Tilhørende Croques af Terrainet om Forbord	nordre-Trondhjems-amt-98-8b_1852
10753	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-9	98-9	amt2_nordre-Trondhjems-amt-98-9_1852	Nordre Trondhjems amt nr 98-9: Croquis af Terrainet mellem Medbroen og Forbord i Skatvold	nordre-Trondhjems-amt-98-9_1852
10754	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-10	98-10	amt2_nordre-Trondhjems-amt-98-10_1852	Nordre Trondhjems amt nr 98-10: Croquis af Terrainet mellem Hammer og Høking Vande	nordre-Trondhjems-amt-98-10_1852
10755	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-11	98-11	amt2_nordre-Trondhjems-amt-98-11_1852	Nordre Trondhjems amt nr 98-11: Croquis af Veien fra Vaardal til Vedulan og fra Vedulan til Hællem	nordre-Trondhjems-amt-98-11_1852
10756	Amtkartsamling, Amt2, 1649, 1999	Silhou	amt2_nordre-Trondhjems-amt-102	102	amt2_nordre-Trondhjems-amt-102_1904	Nordre Trondhjems amt nr 102: Kart over Parler af Lexdal og Malasa Almindinger	nordre-Trondhjems-amt-102_1904
10749	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-6	98-6	amt2_nordre-Trondhjems-amt-98-6_1852	Nordre Trondhjems amt nr 98-6: Croquis af Terrainet ved Næsvand Aasen	nordre-Trondhjems-amt-98-6_1852
10750	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-7	98-7	amt2_nordre-Trondhjems-amt-98-7_1852	Nordre Trondhjems amt nr 98-7: Tilhørende Croquet af Langstien	nordre-Trondhjems-amt-98-7_1852
10748	Amtkartsamling, Amt2, 1649, 1999	Håndtegnet	amt2_nordre-Trondhjems-amt-98-6	98-6	amt2_nordre-Trondhjems-amt-98-6_1852	Nordre Trondhjems amt nr 98-6: Croquis av Forbordsklevene eller Langstien	nordre-Trondhjems-amt-98-6_1852

HISTORISKE KART

Velg fylker

☐ Alle på/av

☐ Østfold

☒ Akershus

☐ Hedmark

☐ Oppland

☐ Buskerud

☐ Vestfold

☐ Telemark

Lukk

Velg kartserier

☐ Alle på/av

☒ Amtskartsamling

☐ Ekserseerplasskart

☐ Fossummålinger

☐ Generalkart

☐ Gradteigskart

☐ Gradteigsmålinger

☐ Grevskapsmålinger

Lukk

Velg tidsperiode

Fra år Til år

1750 X 1800 X

Lukk

Søk




Figure 1: The meta-database is detailed in order to make searching through the Norwegian Historical Map-portal practical. By the Historical Map-portal the user is able to query for county, collection and time-period.

The French portal, <https://remonterletemps.ign.fr/>, operated by IGN, was presented by Eric Breton. Archives are little by little being digitized and geo-referenced to offer a seamless browsing experience. Additional functionalities have been developed to allow the user to compare between different epochs and analyse dynamics. Several paradigms have been tested: side by side, transparency control, spyglass.

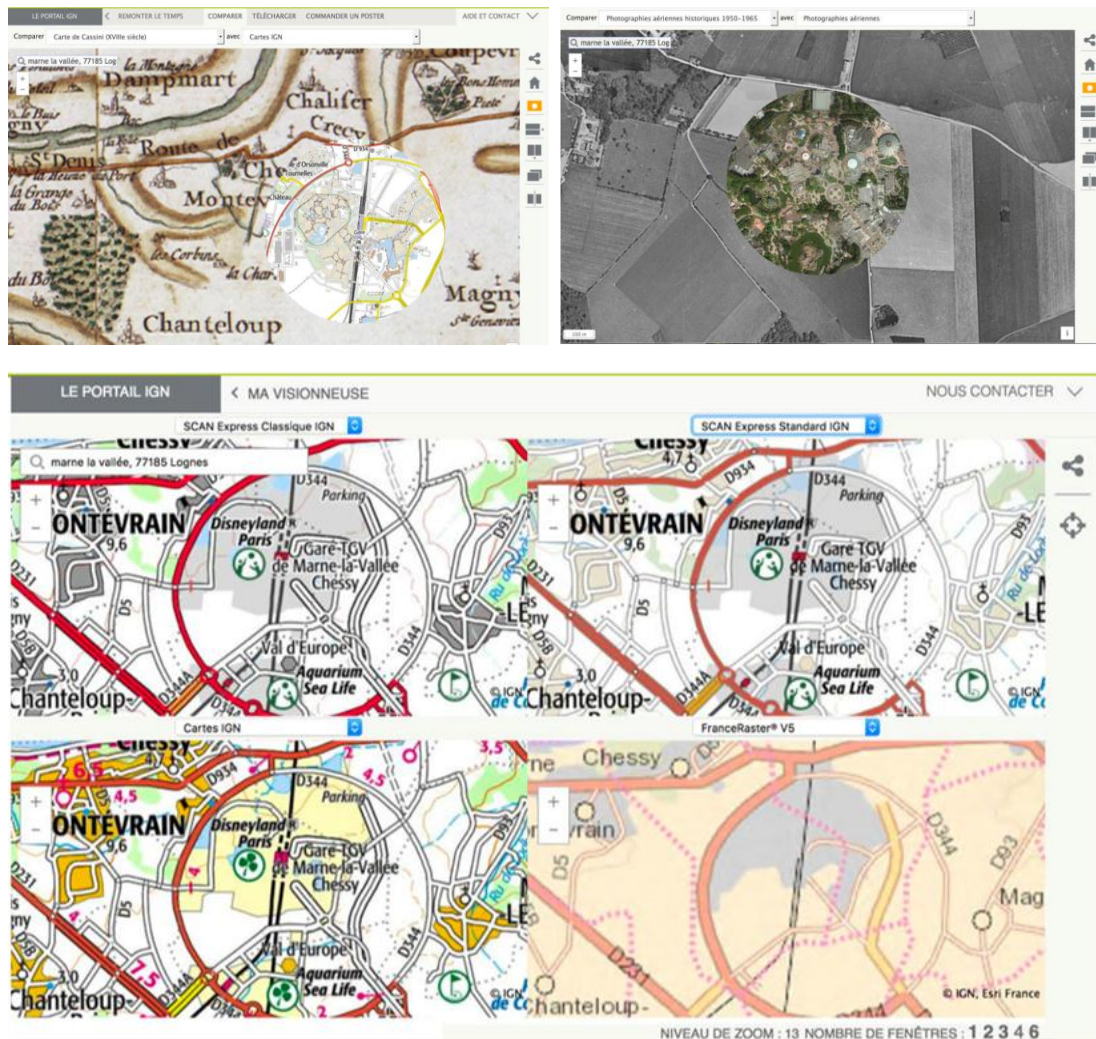


Figure 2: Visualization paradigms experimented on the portal <https://remonterletemps.ign.fr/> to explore changes for an area over time.

Helen Gollin ended this first session by a presentation of the ‘Travel through time’ application developed by Swisstopo available through the portal <https://map.geo.admin.ch/>. Archives have been digitized and indexed so that specific functionalities can give the user the travel through time experience: comparison through transparencies, slide bars, side by side windows that can be edited. An example of such a graphical comparison is that the user may draw a shape on one window that will be reproduced on the other one. The application is integrated in the global portal of geo-services for data for all federal agencies, map.geo.admin.ch. The software used is open source and developments are pushed on an open development platform, using the git technology, to encourage contributions by the community.

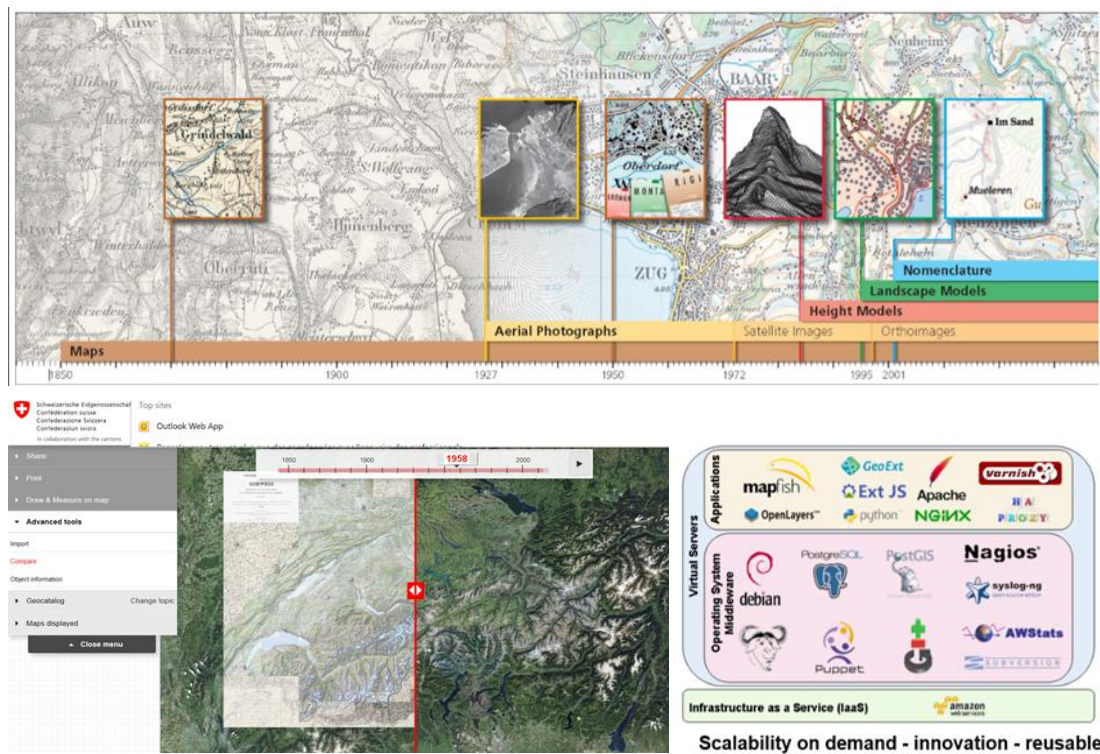


Figure 3: The resources behind a journey through time on <https://map.geo.admin.ch/>: archives and an open source technologies stack.

Some common experiences and findings were assessed by all presenters in addition to the provision of their vision for next steps. Publishing historical data had tremendous success and media focus. This was also the case for the Danish portal presented in the first EuroSDR Seminar on historical data in 2014 and for the Dutch portal. Different kinds of users are interested in these data and services: amateurs, professionals and scientists. The economic model is yet to find since digitizing archives, generating metadata, developing the software component and also the hardware infrastructure have a cost. Yet most of the data are released within a free license model and the provider make the data accessible to portals who already have a community (global portals for administrative data or application specific portals). Among the functionalities that need to be improved or developed, the first one is the geo-referencing of digitized maps and images which is more or less simple (one point for each source, a re-projection of each source on a 2D, 2D5 or 3D environment, a mosaic of sources, a location model) and present different tractabilities. The next one is that these interfaces could give access to more sources like oblique imagery, ortho-imagery, old postcards and also vector data. Then much improvement can be brought to switch between different types of visual representation (e.g. image viewer to map viewer), between more than two views, between several maps to see the timelines. More comparison enhancing visual comparison by automated calculus could also be useful as well as automatic connectors with other data. Last it would be relevant to enhance the edition and annotation.

3 PRESENTATIONS FROM RESEARCH

These NMCA contributions were followed by presentations from research, which fortunately showed that current concerns expressed by the NMCAs are being addressed by researchers.

Valérie Gouet Brunet, researcher at IGN and leader of the MATIS team, presented results of several French collaborative projects oriented towards the promotion of iconographic fund collections of institutions (POEME: <http://www.agence-nationale-recherche.fr/Projet-ANR-12-CORD-0031>). This refers to two kinds of interfaces: 1) users querying by example a large collection of iconographic documents and 2) users visualizing an image document of a place (e.g. old postcards) which has been finely registered so that it can be displayed on top of geographical data (see Figure 4 below). Her research is more specifically focused on automated data matching for the purpose of indexing such collections by content and the purpose of registration. Multi-descriptors have been developed to address the requirements of cross domain content matching and indexing. Current challenges includes to scale up the development as well as to add more functionalities and to register in 3D environments.

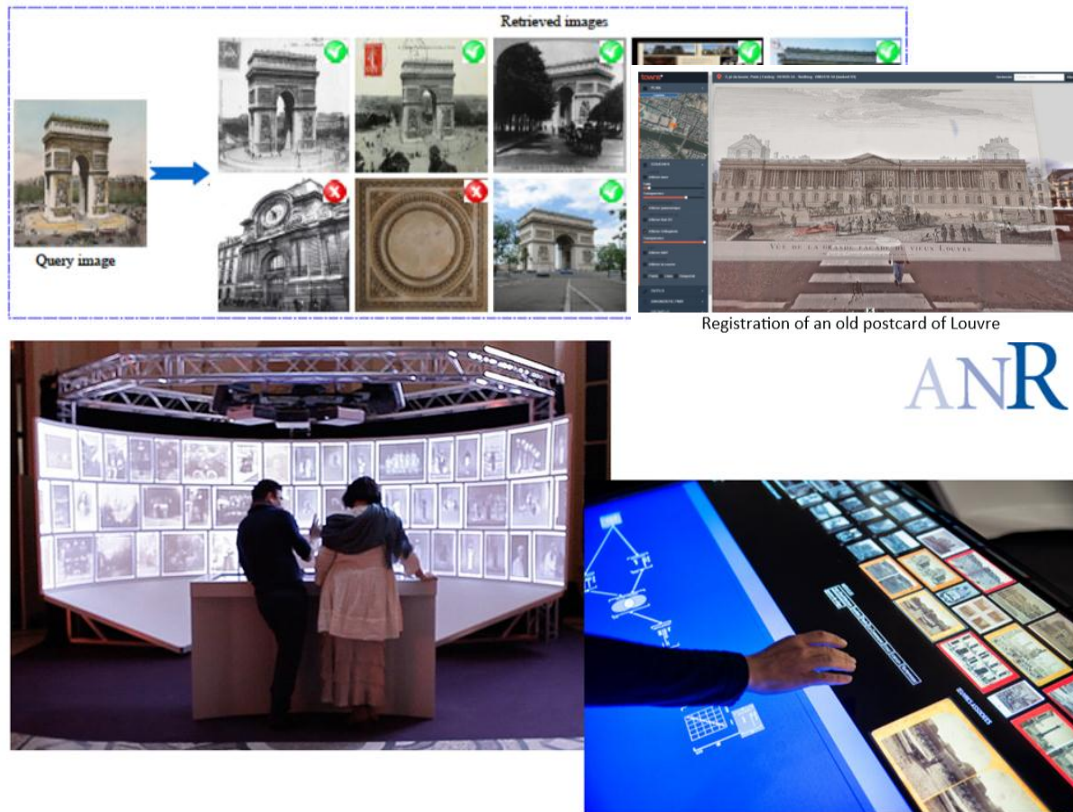


Figure 4: Registering iconographic documents interactively or automatically and retrieving them through a query by content interface in the French project POEME.

The Time Machine project was then presented by Frédéric Kaplan and Isabella di Leonardo from the DHLab of EPFL, <http://timemachineproject.eu/>. The motivation of this project is to put a slider on the digital representations of the world, to support user's navigation in representations of the past such as we may know it through existing digitized sources and also navigation in representations of hypothetic futures supported by current knowledge. They argued this is the next great scientific and technological challenge and invited

participants to join the FET flagship EU project Time Machine. It is aiming to build a 4D model at European scale with shared, open technologies in a common engine. Depending on the existing observation capacities and documents of interest different techniques must be integrated, for instance data matching cross domain, deep learning techniques, lidar acquisition. A series of examples were presented including representations of Venice, Geneva, and Paris. Future perspectives that the FET flagship would address are: the unification of existing tools to achieve standard tools available for communities related to web content, archives and digital representations of earth, scaling up solutions to improve their efficiency and footprint on earth designing user-oriented services. An important concern for the presenters was to enrich the representativeness of the Time Machine flagship where the surveying community was too little represented as compared to archivists, computer scientist and digital humanities.

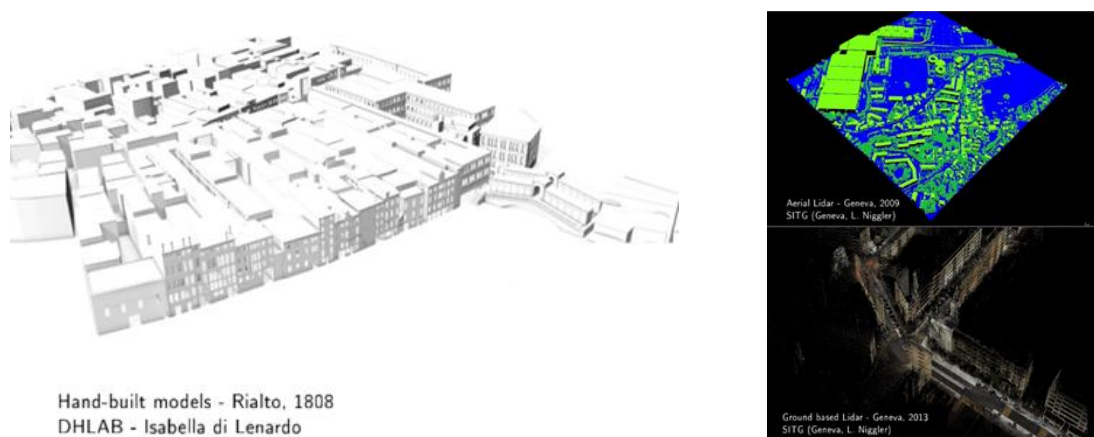


Figure 5: Example of digital models on Venice and Geneva, based on different technologies but with a concern to contribute to one consistent 4D digital framework in the Time machine project.

The Smapshot project, presented by Timothée Produit from HEIG-V, aims at designing a virtual globe enabled with time navigation using high resolution photographs and local knowledge from the crowd to locate these photographs on the globe. More specifically, the smapshot project offers an interface for users to geo-localize and re-project the images on the globe more efficiently than the automated tools alone. It aims at being a reused engine to do this not only in Switzerland.

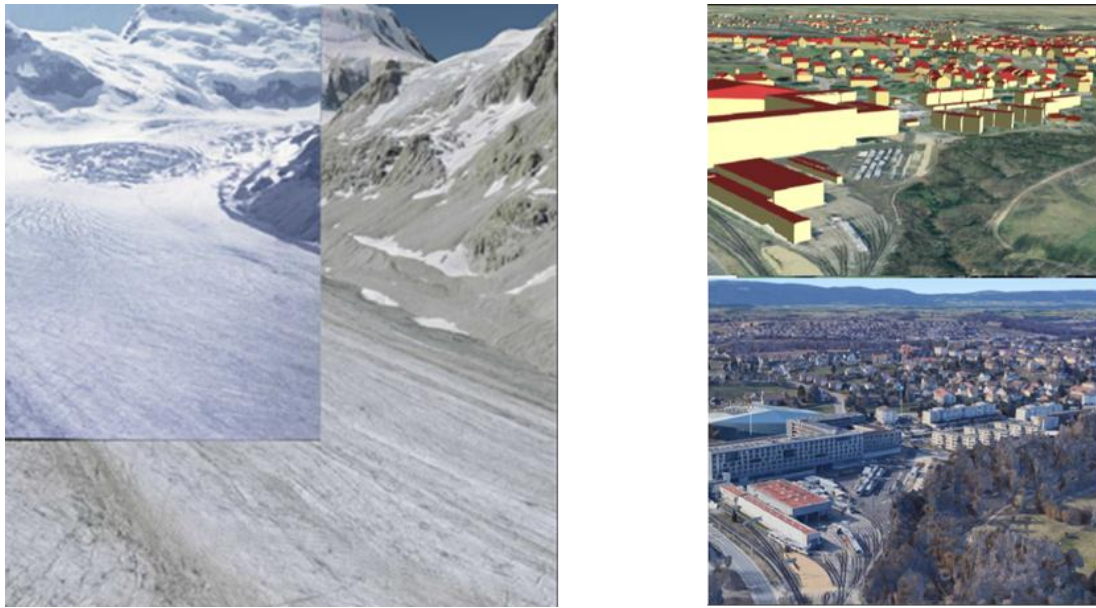


Figure 6: Example of registering pictures on a digital globe, in the Snapshot project, either to finely reference a picture or to add texture to a 3D model.

Julien Perret, researcher at IGN presented several works performed in the COGIT team. The GeohistoricalData project gathered historians and geomaticians around a collaborative platform allowing them to produce digital data out of historical sources, old maps and textual registers, that can feed historians analysis (<http://geohistoricaldata.org/>). These digital data are produced thanks to a spatio-temporal integration model that allows for tracking changes through time. Key to this model is the vectorization of the sources and the matching of the vectorized data, keeping the traceability of transformations. It is supported by a collaborative platform which allowed for the entire vectorization of Cassini roads and other themes now like land cover data. The success of the platform is related to the fact that the producers of the digital data are the main users who need them.

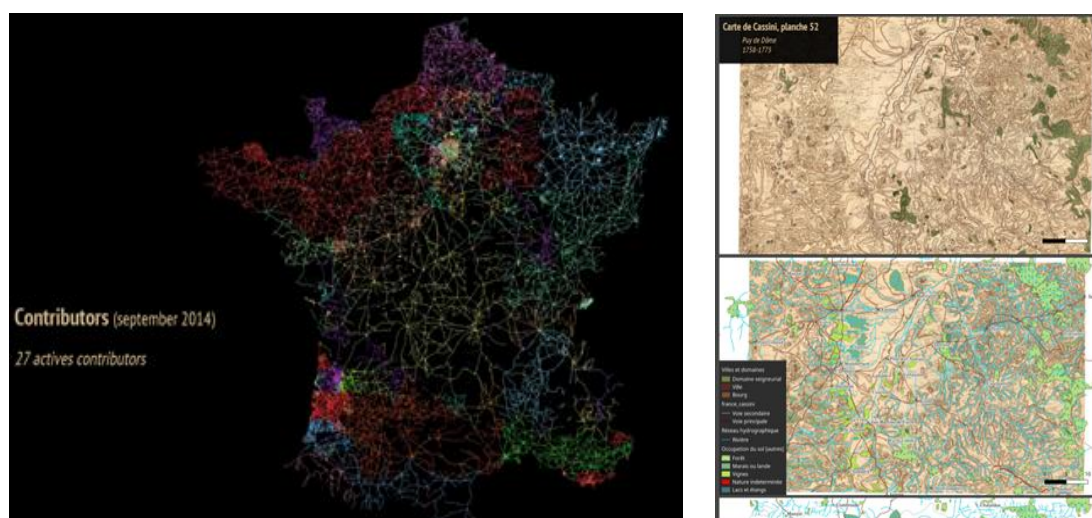


Figure 7: The collaborative vectorization of the French Cassini maps through the geo-historical data platform.

Usages of these integrated digital data are: supporting the referencing in space and time of ancillary documents which enrich the digital data performing data analytics (centrality at different epochs ...). An open issue is the required ontologies to improve spatio-temporal analysis, to account for “real world” evolution. Other on-going works at COGIT concerns the study of map keys and legend design. First results have been achieved with respect to the reproduction of old map design that was often manual in symbolization tools that can be used in automated environments and also with respect to deriving intermediate maps to ease the visual comparison of old maps.

The EuroSDR survey on usages of remote sensing archives was presented by Sébastien Giordano, researcher at IGN (MATIS), who presented some first potential applications for backdating objects through data and highlighted specific open research questions related to photogrammetry, remote sensing (high heterogeneity and missing learning data) and graphical interface.

4 PERSPECTIVES FOR AN EUROSDR ROADMAP

Following EuroSDR seminar format, time was devoted at the end of the seminar to discussion and identifying what common next steps could be undertaken, which are summarized hereafter. Several follow up actions have been identified by the participants.

First one is to constitute a technical group who would analyse the interoperability potential of current implementations, the codes and libraries that are used, maybe component by component, possibly propose one unified API for developers, study what are common pipelines and pre-processes, and possibly propose consistent GUI patterns for users who use the graphical interfaces. This needs to be addressed separately from research questions even if there are connections.

Presentations yielded altogether a very rich overview on users, usages and relevant communities around historical data. This overview is very relevant and could be published.

Last, the participants agreed on the potential for mutual benefit around this theme of historical data and the necessity to create a platform for discussion and collaborative work. These exchanges could help to construct cases to show the value of historical data or compare existing policies.

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