

## Abstracts

### SESSION 1

# SIMON R. *Vienna* **Recogito 2: new developments in linked data annotation of maps and texts** Recogito<sup>1</sup> (<http://recogito.pelagios.org>) is a geographically focused online annotation tool for maps, images and texts, developed by the Pelagios project (<http://commons.pelagios.org>). We have recently (December 2016) launched our second version of the tool, which represents a complete redesign from the first version presented previously at CartoHeritage.<sup>1</sup> This presentation introduces key novelties in Recogito 2, including: a new organization of the tool into “personal workspaces” for scholars, or groups of scholars working together; improved user interfaces for text and map annotation; and additional annotation options, which extend the original gazetteer-supported geo-resolution functionality with features for general commenting and discussion as well as tagging. The presentation also provides an overview of technical additions like Recogito 2’s enhanced versioning and provenance tracking; support for the IIIF protocol; and the possibility to handle tabular data alongside texts and maps. Like its predecessor, Recogito 2 is open source software (Apache 2 licensed), and can be easily customized for institutional requirements, e.g. for deployment with different gazetteers and Named Entity Recognition Engines.<sup>1</sup> Simon et al. 2015. Linking Early Geospatial Documents, One Place at a Time: Annotation of Geographic Documents with Recogito, *e-Perimtron*. Vol.10, No.2, 49-59.

# BLACKLER A. *Birmingham* **Negroponte in the 14th century: a reconstruction integrating contemporary cartographic and documentary evidence with the archaeological record** Negroponte, the Modern Greek island of Euboea, was annexed in 1204 by Latin forces of the Fourth Crusade. Initially under the rule of three Lombard lords, it came fully under the control of the Republic of Venice in 1390 until its conquest by the Ottoman Sultan Mehmed II in 1470. This paper investigates the evidence provided by the portolan charts and isolario maps of the 14th and 15th centuries. Integrating them with contemporary documents and the surviving recorded monuments from the period, it utilises GIS to reconstruct the topography of the island in the late 14th century.

# KOZICA K. *Warsaw* **The map of the Polish-Lithuanian Commonwealth by Andrzej Pograbka published in Venice in 1570 from the Niewodniczański Collection Imago Poloniae at the Royal Castle in Warsaw – Museum Andrzej Pograbka** (Andreas Pograbius, ca. 1540 – ca. 1602) is the author of this very rare (only eight known copies) map of the Polish-Li-

thuanian Commonwealth or as the title says: the new representation of the part of European Sarmatia under King of Poland Sigismund August (copperplate engraving, printed on two sheets; 47 × 69 cm; scale ca. 1:1,900,000). This original edition of the map of Andrzej Pograbka appeared in Venice in 1570 as a separate publication engraved by Nicolo Nelli (fl. 1563–1570). According to the dedication the map manuscript was finished in summer in 1569. The dedicatee was Mikołaj Tomicki, son of Gniezno castellan, friend and comrade of Pograbka in Italy. The dedication also mentions the cause for which Pograbka drew this map. Namely, he wanted to correct the maps of his motherland that he saw published in Venice, on which names and locations of his country were not shown accurately. Obviously, Pograbka meant the outdated Giacomo Gastaldi map from 1562 that was based on information of Bernard Wapowski and Gerard Mercator.

# SEN A. *Istanbul* **Comparison of past and present maps of Istanbul historic peninsula in Gis, based on the insurance maps of Jacques Pervititch** The Historic Peninsula is the urban and historic protected area because of having a rich monumental and architectural heritage in Istanbul, Turkey. This area was added to the UNESCO World Heritage List in 1985. The insurance maps made by topographer and engineer Jacques Pervititch between 1922 and 1945 for the Central Office of Turkish Insurance Agents carry different meanings today from when they were first issued. At the time, the aim of Pervititch’s maps was to illustrate the risk factors considered by insurance companies to mitigate the heavy burden of large fires occurring in Istanbul. Today, this work is an artistic corpus that contains unequalled documentation of an architectural heritage that has largely been lost. In this study, a comparison of past and present views of four neighbourhoods of Eminönü in the Historic Peninsula has been analyzed in GIS. The database about the past has been produced based on Pervititch insurance maps. According to the results of the study, monuments lost their surrounding context, and therefore their former meanings, which erased the most important places of daily life during the period. The results of similarity analysis have been presented via thematic maps.

# TSORLINI A., R. SIEBER R., L. HURNI *Zurich* **Combining current vector data with historical textual data and data extracted from old maps to study the development of the city of Zurich, Switzerland** The development of settlements and the spatial changes happening to the environment through time are signifi-

cant topics holding the attention of many researchers. For the study of the settlement development, the researcher uses mainly historic city plans; maps or topographical diagrams existed for the studied area on different time periods. In cases where there are no historical data available for specific time periods, the researcher has to rely on historical textual data coming from official registers.

For the visualization of the settlement development in Switzerland from 19<sup>th</sup> to 21<sup>st</sup> century, the Atlas of Switzerland (<http://www.atladerschweiz.ch/>) uses current vector data for buildings from the Federal Office of Topography and the Swiss Cadaster, which includes textual information concerning their construction year. This textual information is also enriched by information existed for buildings with residential use and dwellings in the relevant Federal Register for Buildings and Dwellings, provided by the Swiss Federal Statistical Office. The weakness of this data is that there are mistakes and missing information concerning the construction year or even the shape of the buildings. For this reason, it is necessary to find another source of information to check and revise the data. Information for the development of settlements in Switzerland is also mined from old maps. Siegfried Map series (1870-1926) in scales 1:25,000 and 1:50,000 and its revisions (until 1949) can be used for this purpose, since they depict buildings and show the situation of the settlements in different time periods between 1870 and 1949. Siegfried Map series were replaced by the series of the National Map of Switzerland providing also map sheets in different time periods, which can be used for the study of settlement development in Switzerland. In this paper, we use the vector data and the textual information provided by the official registers for the city of Zurich and we combine it with the information extracted from historic maps. Our main goal is to compare the textual information concerning the construction year of the buildings with relevant information extracted from maps, in order to correct mistakes or fill in gaps in textual data. Based on this analysis and processing, the final goal is to create a unified and more precise dataset, to be used for the visualization of the city’s development.

# SANTAMARIA VARAS M., P. MARTINEZ DIEZ *Barcelona* **The historic charter of Barcelona (CHB)** This paper presents the development of the Historic Charter of Barcelona. The CHB is a research compiling, to date, all knowledge about the urban history of the city and its documentary and cartographic sources via an online tool made for researchers and citizens

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with the aim of explaining the history of Barcelona through 26 maps.

# METCALF A., SMITH S. M. *Houston TX The 1870 Cadastral Map of Rio de Janeiro* This paper intends to assess the way that the Cadastral Map (1870) of the municipality of Rio de Janeiro, was made, for whom, and with what impact. Because this map has always been fragile, it has been difficult for historians to study. The purpose of this paper is to digitally reassemble the individual sheets and to georeference each in order to understand the purpose of the map and how it was created. The map, which resides in the Arquivo Nacional, Rio de Janeiro, exists in 281 sheets. According to the Arquivo Nacional catalog, the stated author of the original map is A. Santana, Engineer, as noted on the back of sheet 3, but the surviving version was copied by Leopoldo José Silva and several others. The original map was made using the triangulation method, and it included the entire municipality (Município Neutro) of Rio de Janeiro. The method used to make the map is described briefly in Menezes and Graca (2012). Because it appeared at a time when urban plans

for the city were being discussed in some detail (Andreatta: 2008) it is especially significant. In ArcGIS, we will geo-reference each sheet. We will be using the street data in the imagineRio geodatabase. Once georeferenced, we shall evaluate the Cadastral Map for historical information on the urban infrastructure of Rio de Janeiro. The significance of this map is two-fold: it exists as a document at an important moment of cartography in Brazil, and it is a new, untapped source for the historians interested in the spatial history of the city. The georeferenced map will unlock a wealth of data on the infrastructure of the city; especially interesting to us is the provisioning of fresh water.

# LIVIERATOS E., C. BOUTOURA *Thessaloniki The Ing. Raseau manuscript large-scale maps of Cyclades, a case of military thematic cartography of late 17th century with remarkable aesthetic value* In 2016 a unique ensemble of rare large dimension manuscript maps, representing a number of islands of the central Cycladic archipelago in the Aegean Sea, was found in the important *Tricoglou Library* part of the Aristotle University of Thessaloniki

Central Library. The maps of this ensemble, mounted in a volume called *Receuil Raseau*, made after the orders of Louis XIV of France in the period between 1685-1687 by the engineer Raseau, are considered as exceptional example of military medium-to-large scale mapping, in the context of the French naval mapmaking of the last quarter of seventeenth century. The maps stand beyond the cartographic stereotypes of the Archipelago made by skilled amateurs and scholars, well known and documented in the history of cartography of the Aegean Sea. The general first approach analysis of the *Receuil Raseau* maps, in the cartographic terms of “internal” and “external” map recognition as well as in terms of the relevant historical context has been already presented by Livieratos et al., (2016). The research on this extraordinary example of naval military mapping has since then advanced and new results came in evidence; some of them are presented in this paper, focusing especially into the thematic cartographic component of the map content.

## SESSION 2

27 April 2016 08.30-10.30

# BALLETTI C., M. CALZAVARA, F. CONTÒ, S. MEGGIATO, M. MAZZANTI, F. RIZZI *Venice The luav Maplibrary: digitising, cataloguing, dissemination and teaching* The Laboratory of Cartography and GIS and its Maplibrary, active for thirty years within the University luav of Venice, has always oriented and developed its research and experimentation to the recovery of the cartographic heritage, supporting the knowledge of territory's characters and transformations in its multidisciplinary aspects. Cartography is investigated and applied in its numerical form, which allows to store and structure data in a GIS (Geographical Information System) and to disseminate them.

# VARDAKOSTA I., S. KAPIDAKIS *Athens, Corfu Geospatial collections in IRs: a survey in map/GIS libraries* Changes in scholarly publishing along with the rapid developments in technology are affecting user expectations and are forcing academic libraries to significant changes in providing access to geospatial data and develop new services. Institutional Repositories (IRs) are considered effective tools for showcasing an organization's scientific research by making them publicly available. The aim of this study was to determine the awareness of the development of locally produced geospatial data in an institutional repository, among the Map/GIS libraries of the western world. An anonymous survey of 56 questions, divided into 6 sections and covering several topics, was sent to Map/GIS libraries, members of Map and Libraries' Organizations of western world. The survey took place on July and October 2015 after two

phases of pilot distribution. Out of 382 questionnaires we sent, a total of 80 were finally adequate to be used. This paper will present those results related with the collection of geospatial data in the IR produced by the members of library's academic community. The responses showed a statistically significant trend to the development of a locally produced geospatial data collection in the IR. The Map/GIS Librarians consider the annual budget as “not at all satisfying” while the majority of the respondents indicate as such the use of policies for the locally produced geospatial data collection in the repository. As the three most important issues for this collection, the respondents indicated: 1) Data and metadata 2) Policies and 3) Finance. As the development of a geospatial data collection is rather complex, particularly with respect to issues related to organizational challenges and use practices, Map/GIS Librarians seem to be convinced that the formulation of policies, the open access to the data, and the establishment of cooperation among stakeholders will be the critical points to accomplish a beneficial collection of the locally produced geospatial data in the IR.

# VĀVERS R. *Riga The map collection of the National Library of Latvia: into the digital* The National Library of Latvia (NLL) holds the largest collection of printed maps and atlases in Latvia. Cartographic materials are being collected since the foundation of the NLL in 1919, but a separate map collection was created in 1948. Today there are more than 40 thousand units in the map collection. Most of

the maps of the 18th century and older are stored in the Rare book and manuscript collection. The digitization of maps in the NLL started in 2000 when some of the topographic map series of Latvia were scanned. First digital map collection “Latvia in the 16th-18th century maps” were created in 2002, and it is still available online (<http://data.lnb.lv/nba05/kartes/frame.htm>). In 2013 the map portal was created as a part of Digital Library of the NLL. It includes more than 100 georeferenced separate maps and plans as well as 12 georeferenced old topographic maps that can be used as a base map to compare different maps. It is possible to search for an address or the existing or historical toponym to find the right place.

# WALT R. *Zurich MapSeries – Web based application to support cataloguing of map series* In 2015, ETH Library developed in cooperation with Klokan Technologies GmbH the browser based application MapSeries to support librarians in cataloguing single map sheets of map series. MapSeries delivers geographical parameters and periodical information to cataloguers for efficient and direct cataloguing of map sheets within library systems. Before using electronic resources, manually updated overview grids showed which map sheets out of a specific map series were detectable in a library or map collection. This cartographic heritage – which is still in use in several map collections – had been transferred into a GIS-based system called Toporama at ETH Library as early as 1997 and allowed to record and query map sheets from all avail-

able map series. The overview grids were implemented into Toporama (based on ArcMap) and holding data could be added and updated electronically. Because of the technical progress and trends towards interactive library systems and web-based applications, Toporama as a non-interactive system had to be replaced. The implementation of Kartenportal.CH, a portal for maps from libraries and archives in Switzerland, increased the necessity of up-to-date catalogue information, which Toporama could no longer satisfy. The development of MapSeries increased the efficiency of map cataloguers by cataloguing map series direct in library systems and therefore made the holdings and new maps immediately visible and researchable for users. Using Kartenportal.CH, users are able to see available maps out of a specific map series as overview grids. In MapSeries, the visualization of holding information will be part of a further enhancement. The presentation will focus on the technical challenges when converting holding information of map series from manually updated overview grids into the interactive and innovative application MapSeries, which is not tied to a specific location. Some planned enhancements will be presented as well.

# KLIMEK T. *Prague* **Interconnection of medieval texts and historical maps on the example of Manuscriptorium Digital Library** Interconnection of maps and textual data can become an important functionality of digital libraries. This paper focuses on the correlation between Latin medieval manuscripts and early modern and modern historical maps. It describes the example of Manuscriptorium Digital Library, an international digital library based in the Czech National Library providing access to historical written heritage. The paper discusses basic methodological questions related to the task. Interconnection of medieval texts and historical maps can help users not only to study spatial connections and consequences

of historical documents and make easier their representation, but it can also provide totally new possibilities for searching in the texts and sorting information. However, the way to an efficient solution is not easy. The paper shows difficulties and challenges related to digital editing of medieval texts (identifying medieval texts, combining various types of full-text editions – critical, and pragmatic, identifying texts layers, HTR, etc.), problems connected with unstable forms of local names and difficulties caused by the problematic mutual relevance of correlated documents.

# FOWLER I., K. GWINN BECKER *Portland ME* **Beyond the framework: transforming twentieth-century library websites into twenty-first century digital collections** The Osher MapLibrary and Smith Center for Cartographic Education (OML) at the University of Southern Maine has partnered with digital history company HistoryIT on a new project to create a truly innovative twenty-first century digital collection. We recognize the importance of maintaining IFLA standards for the library's catalogue records, which are accessible through the university's OPAC and WorldCat, but for OML's digital presence we have rejected established standards for conceptualizing digital items (FRBR, ISBD, MARC, RDA). We have instead transformed the library's decade-old website into a new digital collections site based on a dynamic reimagining of metadata designed to take into account the user perspective and to take advantage of the wealth of information available from academic works on the history of cartography and related fields. Our new, unique, enhanced metadata schema builds upon standardized lists such as name authorities and Library of Congress Subject Headings but vastly improves access through the creation of new macro- and micro-level tags. These tags enhance the user experience through more meaningful and deeper linkages of items, imagery, and historical context that

go far beyond traditional cataloguing or existing metadata models. Examples of macro-level tags include plain-language translations of titles, new geographic area aliases to enhance authority headings, and context from modern academic works. Micro-level tags include detailed information for cartouches, borders, and other map attributes such as artistic motifs, specific mythological and ethnographic subjects, and types of sailing vessels and fortifications. This paper will demonstrate how, by moving beyond the prescriptive frameworks provided by current metadata standards, institutions can create twenty-first century digital collections that are highly searchable and seamlessly connect digital assets through a new conceptualization of metadata and utility.

# NANETTI A., A. CATTANEO, S. A. CHEONG, Y. Y. CHIANG, C. Y. LIN *Singapore, Lisbon, Dornisife CA, Beijing* **Visual knowledge aggregation in library contexts** The authors will present how they used Renaissance Italy world maps to distill ontologies and design computer applications able to visualise the information encoded in historical cartography. As case studies the authors will present their theoretical approach and their solutions to decode information from the 1457 World Map (Florence, Biblioteca Nazionale Centrale, Portolano 1) and the Fra Mauro World Map (Venice, Biblioteca Nazionale Marciana) and automatically link them to other available historical as well as contemporary information via digital technologies. These solutions can be seen as a visual knowledge aggregator to be proposed to scholars in a library context. *Acknowledgements:* The research has been funded by NTU Singapore (2014-2016 Start-Up-Grant), the 2014 and 2016 Microsoft Research Asia Collaborative Research Programs, 2015 and 2016 Microsoft Azure for Research (PI, Andrea Nanetti).

### SESSION 3

# ZENTAI L. *Budapest* **A crypto-cartophilatelist's thoughts on cartographic heritage** Thirty-fourty years ago postage stamps were quite frequently mentioned and presented on ICA events: there were stamp exhibitions on some conferences; there were also papers, presentations on stamps. Although there are much less people collecting stamps nowadays, but it is important to mention that postage stamps and other philatelic materials can be part of the cartographic heritage. The significance of postage stamps notably decreased in the last few decades, but there are still important official national proofs of all times. Maps are not the most frequently represented themes on postage stamps and other philatelic materials, but in some cases there are really important and special cartoheritage documents. Artists design stamps so the representation can be

influenced by their limited cartographic skills, but sometimes it is more interesting the intentional governmental or cultural impressions and actions. Maps on stamps are good tools of the propaganda, like presenting and declaring territorial claims, establishing internationally not recognized entities. We have to pay attention for such special piece of papers amongst of the cartographic heritage documents. Thanks to the small sizes of stamps we regularly don't need special digital technology to digitally store and investigate stamps, but it may require special approach.

# VAN EGMOND M. *Utrecht* **A new online historical atlas: the Dutch Bosatlas digitized and annotated (1877-1939)** By far the most important school atlas of the Netherlands is the Bosatlas, named after its first editor Pieter

Roelf Bos (1847-1902). This atlas first appeared in 1877, and until now 55 editions are published. In co-operation with the publishing company Noordhoff and Amsterdam University Library, Utrecht University Library recently digitized all 36 pre-war editions of the Bosatlas, offering online access to them. In a digital exhibition (<http://bc.library.uu.nl/bos-atlas-mapping-world-1877-1939>) each edition is accompanied by a scientific commentary, describing the historical context and the differences with its predecessor. In this way the users of the website – primarily high school pupils – will find out the way the Dutch in general and the atlas editors in particular viewed the world in the past, as well as the changes in those views and attitudes as reflected in the maps and in the structure of the atlas. As such, a new online historical atlas has co-

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me into being, allowing users to see the changes in our knowledge of the world, as the results of marine and terrestrial exploration, and to grasp the changes in the world itself due to urbanization, armed conflicts, and constructions of infrastructure. To facilitate comparing the different editions of the Bosatlas, a special viewer was developed. With this viewer the monitor screen is subdivided, having two map images from subsequent editions side by side. Simultaneously zooming is possible, and a commentary clarifies the changes between the maps. Furthermore users can intuitively browse through multiple editions of the Bosatlas as well. The paper will shed light on the specific development of the Bosatlas, the online presentation of the digitized editions, and the usability of the digital exhibition of atlas editions and especially the synchronized viewer. Potential future functionality will also be dealt with.

# BLUNT N. *Andover MA The Cognita Project: a new digital approach to teaching with cartography at a secondary school* Phillips Academy, located in Andover, Massachusetts is a residential secondary school. Founded in 1786, it has been at the forefront of excellent, innovative educational initiatives for over two centuries. The academy is also home to the Sidney R. Knafel Map Collection. This assemblage of rare, antique maps and atlases is the only collection of its kind at a secondary school in North America. Beginning in the spring of 2015, the curator of the map collection and the director of the Academy's library began to work with a software development firm to create a new, exciting program for engaging with digitized versions of the maps. This presentation will highlight the vast potential of this online tool to enhance engagement with historical cartography. It will also elucidate the collaborative efforts among, educators, librarians and software developers to create a bespoke, yet broadly useful program. This online tool, called the Cognita Project, allows individuals, and groups of all sizes to create, add and tag their own metadata layers to the digitized maps. This approach enables more robust and dynamic engagement with historical/antique maps, while also enhancing student and teacher access to and research within this particular collection. Users can embed text, video, audio, and images in order to add greater context and deeper meaning to the digital maps. Using Cognita, students and teachers can engage deeply with historical map collections and enhance the way in which we all understand the stories that historic maps can tell. This program has been developed for a unique map collection at one secondary school, however, the story of its development and its utilization can provide a useful model for schools, universities and museums as these institutions continue to consider digital approaches to cartographic heritage.

# GALAMBOS C., L. MAKÁDI, E. BODOR, B. PÉTERDI, Z. LANTOS, K. PALOTÁS *Budapest From the depths of a drawer to Google Earth: digital exhibition of Hungarian fossils, minerals and decorative stones* The researchers of the Geological Institute of Hungary (now: Geological and Geophysical Institute of Hungary) have been studying the secrets of the geology of Hungary for nearly 150 years. During their surveys, many interesting fossils, minerals and stones have been found, most of which are housed at the Institute. Thus, the museum of the Institute has become the largest geological collection of the country. In the depths of the collection drawers there are more than three hundred thousand fossil, mineral and rock samples. 200 vertebrate and 50 plant remains, as well as 150 mineral and decorative stone pieces, covering the most various areas of the country, were selected for a public digital – and georeferenced – exhibition. The data of these items were originally stored in paper inventory books. They were digitized in the past years to electronic spreadsheets. Currently, any digital search can be performed on these data except spatial ones. The collecting localities, mostly settlement names, sometimes completed by additional data, such as quarry or mine names, or stratigraphic positions, are stored as text strings. In the present work, we 'translate' them into geographic coordinates. First, a settlement gazetteer tried to be used for obtaining geographic latitudes and longitudes for settlement centroids. Unfortunately, only a part of the records could be coordinated this way, mainly the drill core material; any misspelling or change in settlement names led to no, or in worse cases, bad coordinates. The collecting localities of these specimens were systematically crosschecked based on the settlement locations, and with the help of the known quarry or outcrop locations, thus their coordinates were made as precise as possible. The centre of the settlement was selected in cases when only the settlement name could be found in the database. The accuracy of the location estimation is also stored as metadata. Thus, the most relevant items could be represented in a Google Earth data file, together with a small popular description and a photo of the specimen. Interestingly enough, the accuracies of the protected collecting localities were intentionally decreased for the Google Earth publication to draw off the numerous 'private collectors', searching for similar fossils/minerals.

# SARIN P., N. ULUGTEKIN, R.N. CELIK, M. GEDE *Istanbul, Budapest Database of maps in Turkish journals* Written and visual media have very easily reached almost all people all over the world. When written media technology was not so advanced newspapers and magazines had the main access to the people. So, the maps are very powerful communication and visual tools in the newspapers. They

make the contents more comprehensible for the readers. The aim of this study is collecting, categorizing and archiving maps' contents of 10 newspapers, which were published since the Alphabet Revolution of Turkish Republic (1928) to year 2000. Using newspapers and Web archive of one of the biggest and most important library, the 'Atatürk Library' in Istanbul, carried out the study. Maps in the newspapers were recorded by taking their photos. Maps and visuals resembling maps have been examined and classified by cartographic rules and their themes. The primary objective of the study is to archive these maps, analyze their cartographic levels and determine their roles in the news. During the research, so many thematic maps have been found in these newspapers. Meteorology, natural disasters, elections, traffic, propaganda, vital statistics, divorce rates, violence against women etc. are good examples of some of the subjects of the maps in the newspapers. The fundamental aim of the study is to prove the importance of Cartography in spreading knowledge through maps in the news. This study is unique in the field and is an important contribution to the existing literature. The authors also examine the possibility of automatic extraction of geographic names and geotagging of newspaper maps.

# BUONORA P. *Rome The cartographic collection of the State Archive of Rome online: archival issues and digital models* Cartography in the archives has a different semantic value than in a library, or in a museum: a relevant part of the information provided connects to the context of the administrative documentation that maps belong to. Nevertheless, these maps do have content, an authorship, and everything else make it similar to librarian maps collections, including preservation issues. In consequence of that, maps often get out from the files and become part of external collection, were in time the original archival bond is often lost. Making the new finding aid of the main Map collection of the State Archive of Rome took a very long time for the team directed by Daniela Sinisi; nevertheless, a complete reengineering was necessary to migrate all information in a model able to make the digital library implemented this year. The paper will provide a general survey on the themes and structure of this rich and beautiful map collection, and will focus both on the archival issues and on technical choices that we made to provide an access on the web.

# JACKSON C. *Las Cruces NM Against 'animal farm holism' and 20th-century Constructivism: why cartographic heritage must start with preserving pixels* Most of the successes and failures of the twentieth century can be characterized by a shared attempt to reduce complexity by simplifying some portion of an unrestricted totality or all-encompassing domain. Regrettably, this now global enterprise

of quantification has been disastrous for most, if not all, vague things. From the Adriatic coastline to global warming, notoriously vague things have typically either been reduced to something else or reduced to nothing. However, the same can also be said of any artifact, no matter how well defined its boundaries may in fact be. The last half-century of geography, cartography and geoinformatics has been dominated by the amended relationist metaphysics promulgated by Waldo Tobler. Tobler's first law of geography is a worldview in which everything becomes va-

gue leaving only a totality of unequal relations, a worldview that I refer to as 'Animal Farm holism'. But because no vague things exist within the Quinean scientific worldview, when Tobler's first law is framed as traditional domain ontology, any individual thing, whether it is a relation, object or process, thereby becomes nothing other than a construct, a truly incoherent and thoroughly anthropocentric position. Beginning with the arguments of Maurizio Ferraris and Markus Gabriel, I show how and why we must extricate ourselves from this untenable position. Using Markus

Gabriel's ontology of fields of sense, Graham Harman's object-oriented philosophy and Tristan Garcia's two systems and new order of time, I then make an ontological case for notoriously vague things as well as their cartographic translations. Strangely enough, this begins with making a case for pixels, objects or artifacts that have been regarded as mere appearances from the start, so as to finally make a case for a truly pluralistic cartography and dispel with the myth of a modern and objective era.

## SESSION 4

27 April 2016 13.30-15.30

# GUARDUCCI A., G. TARCHI *Siena The first geodetic map of the Grand Duchy of Tuscany (scale 1:100,000, approximately 1840): georeferencing and applicated studies* In the 1830s and 1840s Giovanni Inghirami created a map with a 1:100,000 scale, using and updating the maps of the geometric cadastre of land parcels; there are two manuscript versions of this map preserved respectively in the IGM - Geographic Military Institute of Florence and the National Archives in Prague. The Lorraine government, only after the 1848 revolution, however, accepted this project, when the Military Topographic Office was founded. This Office was only able to begin the operation for a portion of the northwestern territory of the Grand Duchy. After making the Chorography map of Tuscany, in the scale of 1:200,000 (1830-1831), the astronomer, surveyor and cartographer Inghirami invented a larger scale topographic map; he based his invention on the French Cassini model because the map could be better applied to the needs of city-planning and territorial policies. This is an extraordinary cartography (representation), able to provide useful documentation to anyone (geographer, historian, architect, urban planner etc.) who wants to study the territory with geo-historical purposes. The georeferencing of this map was made with use of the *Carta d'Italia* produced by the Geographic Military Institute of Florence, during the preparation of the Tuscany Regional Government Landscape Plan, has revealed extraordinary potential applications. In fact, the georeferencing allows one to identify the landscape-territorial organization and specific historical themes (settlements, roads, river basin planning, municipal administrative boundaries, toponymy, etc.) that developed during this extensive period, almost until the national unification. Such content can be used to prepare government plans for territorial management in order to preserve and enhance cultural and landscape heritage.

# TIMÁR G., C. GALAMBOS, S. KVARTÉIG, E. BISZAK, S. BARANYA, N. RÜTHER *Budapest, Hønefoss, Trondheim Coordinate systems and georeference of Norwegian historical topographic maps* The metadata of the Norwegian

historical topographic maps are given, in order to make its georeference possible, using just their corners points as control points. The earliest systematic topographic map product is the square mile-maps (kvadratmil kart). They cover the southern leg of the Swedish border region of Norway as it was in the end of 18th century. The flagpole of the Kongsvinger fortress is the origin of the Cassini projection. The field extents of the sheets are 1\*1 Old Norwegian mile; this is the origin of the name of the map system. The projection origin is at a sheet corner. The quality of the geodetic control is quite inhomogeneous. This map-series was followed by the rectangle-maps (rektangelkart). This system again covers only a part of Norway, mostly the area of the square mile maps plus Trondelag and the southern coast and the Bergen area. The scale is 1:100,000-survey time is the end of the 19th century and the first decade of the 20th one. The projection is still the Kongsvinger-centered Cassini type. The geodetic basis is much more precise than the one of its predecessor. With the relatively low scale, horizontal errors are practically eliminated. The terrain extent of the sheets is 4\*3 Old Norwegian mile. The next and last studied series are the degree maps (Gradteigskart). In the beginning of the 20th century, the Norwegian mapping authority switched to application of the Gauss-Krüger (transverse Mercator) projection grids. The still missing, non-mapped parts, then almost the whole country was covered by the degree maps, in Gauss-Krüger zones. Corner GCPs can make the georeference and their geodetic coordinates (latitude and longitude) in the NGO datum, then re-project them to the respective Gauss-Krüger zone coordinates.

# ABSHIRE C., D. GUSEV, S. STAFÉYEF *West Lafayette IN, Bloolington IN, Moscow The Fertile Crescent in Ptolemy's "Geography": a new digital reconstruction for modern Gis tools* The Fertile Crescent was defined by the celebrated U.S. archaeologist J. H. Breasted as a semicircle spanning the territory from the southeast corner of the Mediterranean to the north end of the Persian Gulf and passing through the area located immediately north of Arabia. In the classical Geography by Claud-

ius Ptolemy, this land corresponds to the provinces of Judaea Palestina, Syria, Mesopotamia, and Babylonia, renowned for their ancient civilizations. In this paper, we utilize our mathematical methods involving triangulation, flocking, and Bayesian correction to convert ancient coordinates from Ptolemy's *Geography* into coordinates that can be used directly in modern GIS tools, such as ArcGIS, QGIS, and Google Earth. We expand our coverage from India and Arabia to the aforementioned regions of the historically important *Fertile Crescent*. Known, unknown, tentatively identified and duplicate points are determined in the study. As part of the digital reconstruction process, the region of interest is surrounded by known points from adjacent regions – Arabia, Cilicia, Cappadocia (including Lesser Armenia), Greater Armenia, Assyria and Susiana. We compare the precision of reconstruction achieved for Ptolemy's *Fertile Crescent* with the precisions that we had computed earlier for his India before the Ganges and provinces of Arabia. The expansion of the digital reconstruction coverage to the *Fertile Crescent* as described by Claudius Ptolemy represents a novel contribution to the study of our cultural cartographic heritage improving our ability to visualize and explore the ancient world using popular modern GIS tools.

# TALICH M. *Zdiby Digitising of old maps and on-line tools for using them* Old maps are one of the most important historical sources. Today's modern methods of digitization for on-line access allow much more than just making copies of old maps for viewing. Is it possible to fully exploit the potential of old maps as cartographic works with all of their specific characteristics? On the first place shall be made available common tools for measuring distances, directions, areas etc. Next thanks to georeferencing of a digitized images of old maps followed by layering associated with opacity can be effectively compared the contents of the different maps between themselves. For these purposes are important on-line tools for georeferencing of raster images of old maps and for display of georeferenced maps in 3D view. On-line tools of new generation can do also automatized processing of georeferenced

raster images of digitized old maps. These are e.g. searching for occurrences of map symbols, classification of digitized old maps, automated extracting of texts etc. In addition to the above, this contribution also deals with the requirements for proper digitization of old maps.

# CAJTHAML J., T. JANATA *Prague* **Correlation testing of Müller's map of Bohemia and the First Military Survey maps in the area of today's Czechia** The paper attempts to bring answer to a hypothesis assuming a relation of origin of maps of the First Military Survey, performed by the Habsburg Empire in the last third of the 18<sup>th</sup> century, with their predecessor – maps of Bohemia and other lands created by Johann Christoph Müller. Records in literature mention the geospatial origin of the military maps as miniatures of Müller's maps but no clear evidence to this statement has been performed. Within the paper, a correlation analysis using seamless rasters of joined map sheets adjusted to their original sheet size has been used for both map works. The preliminary results show a significant closeness of the mentioned statement to the truth. Within the computations, the ratio of scale numbers of both works has been defined, allowing estimating the scale number of Müller's map using the known value for the military mapping. Furthermore, deviations of rotation and position accuracy of both works have been examined. As an intermediate environment, the Křovák's system to which the Müller's maps had formerly been georeferenced was chosen. Using it, testing of normal probability distribution of errors of both map works has been performed allowing drawing conclusions about systematic or random character of the deviations. At last, visualizations showing differences between rendition of the maps' deformation grid to an ideal state as well as further outputs have been presented. A relatively serious issue in the computations is constituted by large amount of control points (several thousand for both map works and whole Bohemia), which limited deployment of more robust solutions of spatial transformation computation.

## SESSION 5

# NOVOTNÁ E. *Prague* **The Czech portals for visualisation of cartographic culture heritage** The contribution acquaints with the Czech portals that make cartographic heritage accessible in its entirety. According to the research conducted by the author there were digitized about 400,000 cartographic materials at the end of 2016 and 300,000 of them were made accessible. The level and unification of metadata corresponds to subsequent possibilities of search. Thematic portals work with special thematic subject groups. Most of the institutions make accessible georeferen-

# TIMÁR G., B.P. KOCSIS, G. MOLNÁR, M. DELIGIOS, V. BAIIOC-CHI, C. GALAMBOS, E. BISZAK *Budapest, Rome, Bergamo* **Habsburg topographic cartography of the Italian peninsula in the first half of the 19th century** The geodetic point lists of the Habsburg survey of the Italian peninsula, carried out in several steps after the Napoleonic wars, were digitized and analyzed together with the modern coordinates of the identified points. Assuming the usage of the Zach-Oriani hybrid ellipsoid, the Burša-Wolf type datum transformation parameters were estimated between the local, historical triangulation Datums and the WGS84. The results show interesting accuracy differences in the Italian regions; since the points and coordinates in Lombardy, Piedmont and Lucca shows surprisingly high accuracy and consistency, the survey of Venice, Tuscany, the Papal State, the Adriatic coasts and the Kingdom of Naples is less controlled. The results enabled us to geo-refer the corresponding map series, stored in the Austrian Military Archives, in Vienna, in four different parts. Venice, Lombardy and Lucca (with other small regions at their southern border) were a part of the Habsburg Second Military Survey, with same scale and technology and legend. Part of the series of Piedmont was also found in the Vienna archives and geo-referred. South of these regions, Tuscany and the Papal State was mapped in 1:86400 scale, in a Cassini projection with the centre in the Duomo S. Salvatore, Milan. The southernmost systematic mapping work in the peninsula was in the Kingdom of Naples in the 1820s, with the same scale as used in mid-Italy, projection centre was in Capodimonte (Naples). Albeit the relatively high accuracy of the geodetic network, these map mosaics are refined horizontally applying a local correction grid (GSB) to keep the horizontal errors below 200 meters.

# BALLETTI C., R. GIBIN, C. GOTTARDI, E. LIVIERATOS *Venice, Thessaloniki* **Preliminary numerical investigations on "Liber de Existencia Riveriarum et Forma Maris Nostri Mediterranei"** The discussion about the origin and the evolution of the portolan charts, more than seven centuries after the appearance of the

oldest extant the *Carta Pisana*, is still lively on going. Despite the advances made in the recent years both in the historical – thematic and the geometric aspects of this map typology there is still open and inviting the research especially in the view of the textual data appeared in the meantime. The issue of the geometrical properties of the portolan charts is a field of great interest deserving advanced research not only on the map content but also on texts related to historical evidence and to geometric and numerical entities relevant to the cartographic features depicted on the charts. Since the *Carta Pisana* dates from almost the last quarter of thirteenth century any relevant texts and written sources from that period or earlier is worth studying and analysing, especially when it provides numerical values and quantitative descriptions about the lengths and directions governing the important "geometrical fabric" of the portolan chart. A text of such value deserving major interest is the *Liber de Existencia Riveriarum et Forma Maris Nostri Mediterranei* unveiled in the middle '90s by Patrick Gautier Dalché. The strong point in dealing with the numerical analysis of *Liber* is the fact that the text, written in the second half of twelfth century, almost a century earlier than the *Carta Pisana*. In this paper a first approximation of *Liber*'s numerical content is attempted and a comparative analysis is carried out concerning the base line lengths as given in the text with respect to the corresponding lengths as defined today. Following a typical data acquisition and elaboration procedure, known in modern numerical spatial analytics and statistics, a Gis system has been implemented in order to manage and analyse the relevant metrical and geographical data, also in the context of their temporal evolution. Particular attention has been given to the issue of the determination of the conversion ratio of the nautical mile used in *Liber* into today's kilometer, a fundamental requirement for any further comparative study of the base line length given in *Liber*, with respect to today's counterpart lengths.

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ced documents on current or historical base maps or they export them to the portal Staremapy.cz for collaborative processing. Images quality and loading are improving and depend on the technical possibilities of the researcher. Older digitals migrate to newer formats. Collections allow image zooming, possibly for 3D documents (globes, models) their rotation or unrolling into the plane. Most of the images are protected with watermarks. The direct download or saving of the whole image is not mostly supported. Researcher must contact the owner to be able to use the work. There

are also other services such as working with map series, searching by map symbols, personal license portals of cartographers, e-learning for the work with old maps, georeferencing for researchers, detection of cartographic projection etc. Metadata with links are aggregated into higher national and international wholes including "Europeana".

# BISZAK E., S. BISZAK S, G. TIMÁR, D. NAGY, G. MOLNÁR *Budapest* **Historical topographic and cadastral maps of Europe in spotlight – Evolution of the MAPIRE map portal** Four years ago, the MAPIRE (name comes from His-

torical MAPs of the Habsburg Empire) has been launched to provide an exhibition surface of the processed and partially offline published georeferenced map products of the Habsburg cartography. After finishing the scanning, processing and georeference the first, second and third military surveys of the Austrian Empire, the collection and exhibition has been extended to the cadastral products of the same are (the former Habsburg Empire) and to maps compiled by the imperial surveyors about some territories of temporary occupations (South Romania, Italy). Later came the other collection items found in the military map archives in the Austrian State Archive in Vienna, such as the Cassini map of France, the Ferraris map of the Austrian Netherlands, maps covering the British Isle, the southern Germany, and, as our last publications, Norway and Southern Finland. Besides these products, large-scale city maps are also shown for major European cities. Our last metropolitan database is the orthophoto mosaic of the wartime Budapest from 1944. All of the above maps are shown in a common map coordinate system, as an overlay on the OSM (OpenStreetMap) or the HERE satellite base map. The georeferenced is usually based on the known or computed geodetic and projection metadata of the old map systems. However, the applied technology can be effective also if no precise metadata is given. Providing a real or virtual image mosaic of the map sheets, and defining ca. 100 ground control points, a correction grid gives a rather acceptable horizontal control, which can be further refined at the most important parts of the region.

# GUŽAUSKYTĖ E. *Wellesley, MA Spatio-temporal dimensions of Christopher Columbus's naming discourse through visualization*

In my book, Christopher Columbus's Naming in the diarios of the Four Voyages (1492-1504): A Discourse of Negotiation (Toronto University Press, 2014), I examine the corpus

of 264 place names that Columbus granted to places in the Caribbean Basin and along the South American continent shore, during his four voyages of discovery and conquest, or which he integrated into his naming discourse from native languages, mostly Taino. While naming as a political and rhetorical tool has been amply recognized, little attention had been devoted to understanding the meanings of the place names themselves, both taken individually and in relation to one another, a task I undertook at length in my book project. In a new project, I am using digital humanities visualization techniques to deepen and expand my findings about what the meanings of the names tell us about Columbus's enterprise in the New World. In particular, visualization exercises allow me to delve deeper into the relationships among the names, and in particular, the temporal and spatial dimensions of the naming discourse.

# KEPKA VICHROVA M., R. FIALA, P. HÁJEK, M. KEPKA, O. DUDÁČEK, O. ČERBA, V. ČADA, W. DORNER, P. VONDRÁČEK *Pilsen, Deggendorf, Klatovy Peregrinus Silva Bohemica – cartographic and historical heritage along the ways of Silva Bohemica* The paper describes expected results of a Czech-Bavarian project Peregrinus Silva Bohemica. The project is focused on the cross border historic trails in the Bavarian-Bohemian Forest. Digital and multimedia forms of tourist guidance using advanced technologies like 3D modelling, augmented reality and web mapping will be used to make historical cultural landscape more attractive. The main innovation of this project will be based on a transfer of theoretical studies and state-of-the-art technologies to a real solution used for practical issues in tourism. One specific example route (Baroque Tour through the Bavarian-Bohemian Forest) will be developed as a case study; an online map portal offering the possibility to discover the cartographic and historical heritage along the

ways of Silva Bohemica. The map portal will be enriched with augmented reality functions that make possible to provide the 3D reconstructions as well as detailed information to interested visitors directly in situ.

# PRIDAL P., J. VYKYDALOVA *Unterägeri Web toolkit for old maps: georeferencing, research and feature extraction* This presentation shows a brand new set of online tools made for researchers, GIS professionals, university students, map librarians and cultural institutions. We will demonstrate how a scanned map can be easily matched to modern coordinate-based maps with a new version of Georeferencer (v4). Once this step is done a range of applications are available for the cartographic document: from an attractive presentation on the web and screens at the exhibitions to improved discoverability, reusable map services, up to displaying on mobile devices and at social networks. The new Compare and overlay online research tool allows to work with two or more maps together, stack the maps in a pile, discover nearby maps from various institutions and bookmark your favourites. Adjust transparency to compare the maps with each other or with a modern road map below. Study the evolution of a place of your choice across different time periods. It is easy to make a visual comparison of the information available on different maps and combine it with other historical sources. With the new GeoEditor web and mobile application, you can create and extract features from the maps, share the notes with your colleagues, export these and save on your computer or collect field data with GPS on your mobile phone, even offline. The presented mapping platform can help to bring the map collections from paper to screens and provide all the digital services the young researchers and consumers need. Let's breathe a new life into the cartographic heritage ecosystem.

## SESSION 6

# GALLIA A. *Rome Mapping Italian small islands. Cartoheritage and digital issues*

Since ancient times, there is a rich cartographic production having as subject the Mediterranean islands, but mostly influenced by Ptolemaic echoes and fantastic views. During the modern age, following several recognition to promote fortification and control, there was a great production of maps and description of the islands, especially the smallest ones. Up to the geodetic revolution, a big part of those maps were made approximately and incorrectly, and also then there was a non-mathematic production. This paper would present the first result of the project "Mapping Italian small islands", realized into the Geocartographic Lab "Giuseppe Caraci" (Roma Tre University). It aims to catalogue, digitalize and, when possible, georeference as

much maps as possible of Italian micro insular territories, preserving them as a whole Cartoheritage (actually scattered in several Italian and foreign archives). Moreover historical cartography will be used to analyse landscape changes and human impact on that and the transformation or persistence of insular place names. In this paper will highlight the project phases, the methodology used and some case studies, starting by Tyrrhenian islands, putting in evidence some epistemological questions about small territories. Then, there will be a focus on Digital tools to create a thematic portal were collect and disseminate all maps – and other historical sources – catalogued and digitized and all analysis, published in open access.

# RANZI R., K. WERTH, F. GENTILIN, S. MANGIAPANE *Brescia, Egna/Neumarkt The Adige River map in 1:20,736 scale of Leopoldo de Claricini-Dornpacher (1847)* In the 50th year anniversary of the November 1966 Adige river flood, which hit at the same time Florence and Venice 14 map sheets of the Adige river valley between Meran and Borghetto, in northern Italy, were scanned in high-quality and printed for the public access and use. The lithograph was printed in 1847 in a 1:20,736 scale (1":288° i.e. 1 Zoll=288 Klafter) in Innsbruck by Leopoldo de Claricini-Dornpacher (1812-1888) and depicts the river and its valley as it was in almost natural conditions when the river training works just started in the intermediate reach. A georeferencing of one sample sheet shows that a RMSE between 10 and 15 meters can be

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reached. A comparison with the actual geomorphology of the river especially in its southern reach is possible thanks to the map. One of the objectives of this study is, also, to make a beautiful map accessible to a wide public, to let people enjoying the river landscape as it was and will never return, until the next glacial era.

# KOUSSOULAKOU A., Y. MITZIAS, I. ANDREA-NIDOU *Thessaloniki Mapping the city walls of Thessaloniki through time* The purpose of the work is the creation of a spatiotemporal record of an old city's important element, namely its walls and fortifications. This is based on existing old cartographic material as well as other historic documents and finds. The application presented here concerns the city of Thessaloniki in Greece and its output is twofold: 1. An historic database coupled to a GIS, resulting from combining a variety of sources, such as old maps of the city depicting the walls in their various phases, historic information, documentation of older parts of the walls not appearing on maps etc. 2. The creation, in a following step, of a thematic map displaying the various historical periods and the respective geographical location of the city walls. Although there is a lot of information on the subject it is scattered and hardly georeferenced; therefore its treatment from a cartographic point of view is challenging.

# HAVLICEK J. *Prague Map application about castles and chateaux in the Czech Republic* Map application has been created to present chateaux and castles in the Czech Republic under the project "Historical photographic material - identification, documentation, interpretation, presentation, application, care and protection in the context of the basic types of memory institutions" funded by the Ministry of Culture of the Czech Republic. Selected chateaux and castles administered by the National Heritage Institute have been presented within. As an illustrative example of final map application, one of the castles is portrayed. As the base data, old maps – Imperial Imprints of the Stable Cadastre in scale 1:2,880 from the mid-19th century, state map derived in scale 1:5,000 from the mid-20th century, current cadastral map in vector form and base old maps collected in the archives – have been used. Area of interest around the monuments has been digitized into vector form. Furthermore, vector layers have been created for manor borders, municipalities and other important buildings and residences within the manor. Historical and contemporary drawings and photographs were placed into the map application showing development of the locality. Main output of the project is represented by map application including all of 61 chateaux and castles and corresponding domains.

# BITELLI G. R. CAMASSI, G. GATTA *Bologna*

**GIS and historical seismology: the case of the earthquake occurred in Italy in 1661** In historical seismology, a primary task is knowledge on the seismic history of territory, in order not only to evaluate the seismic hazard of a particular area, but also to improve risk communication towards citizens. To the latter aim, new ways of sharing and communication of this kind of information can play a fundamental role. In the present paper, an innovative mode of risk communication was tested. The case of the big earthquake that hit the Northern Apennines (Emilia-Romagna region, Italy) in 1661 (Mw 6) was used for the test. A strongly communicative tool, despite simple and replicable, was developed in order to systematize different kinds of information collected for this event: not only documented tangible damage (in some cases still recognizable), but also cultural and religious traces, i.e. inscriptions, votive offerings, statues, frescoes and local traditions that preserve memory of important past events. A HGIS (Historical Geographic Information System) was created, based on a map of 1620 (made by the famous Italian cartographer Giovanni Antonio Magini) depicting the entire studied area, digitized and georeferenced in a modern cartographic system. In the HGIS, all collected data – in part existing and in part newly acquired – were converted in multimedia form and georeferenced on the historical map. The created tool can support analysis on historical place names and creation of thematic maps, useful to effectively analyze and represent impact and extent of the seismic event damage.

# PANECKI T. *Warsaw Settlements and administrative units on old maps: a case study of semantic integration* The reconstruction of settlement network and administrative units is one of the most important research fields in the historical geography. Generally, the aim of the researcher is to indicate, name and locate all settlements and administrative units (i.e. the political landscape) in the particular area and in the given period of time. Settlements and relations between them should be identified along with their type (city, village, demesne, inn, farm, forester house), name (primary name, variants) and geographical location (certain/uncertain). Similar approach concerns administrative units. Many different types of data sources are used in the process of political landscape reconstruction: historical written sources and old maps – all using specific terminology and data classification. At the end, all semantic categories related to the political landscape have to be harmonized in order to be placed on the reconstruction map, database or encompassed in the written form. The paper has two goals: the first is to indicate and discuss types of settlements and administrative units represented by chosen old maps of Polish lands dating back to 16th century up to contemporary topographic

databases. The second is to propose an integration process between those various categories related to the political landscape. Maps will be surveyed in terms of following subjects: settlements and administrative units semantic categories, methods of their classification (with indication of common criteria), methods of depiction and onomastics. Finally, a proposition of semantic integration of those various categories will be proposed as well as their definitions and relations between them. During the research, it will be necessary to find the true meaning of given categories, i.e. what is the difference (and relation: semantic or spatial) between "village", "demesne" and "farm" or "city" and "town". Since Polish, German and Russian maps are used in the study, the case of translation is also crucial.

# BALLETTI C., L. GALEAZZO, C. GOTTARDI, M. MASSARO, P. VERNIER *Venice From historical maps to digital technologies for the visualisation of the Venetian Ghetto's history* During the last decades, the development of new digital technologies improved research methodologies as well as furthering historical iconography and cartographic representation studies. Moreover, the multidisciplinary approach based on different disciplines of knowledge (history, cartography, computer graphics and sciences) enabled the development of new digital tools for the preservation of and access to the cultural heritage. During the last year, the Cartography and GIS Lab of the Luav University of Venice has been involved in the development of an exhibition entitled *Venice, the Jews and Europe (1516-2016)*, designed by the VISU research's group with the collaboration of the MuVe Foundation and the Jewish Community of Venice, to be hosted at the Ducal Palace of Venice. The project offered the opportunity to study the history of the Venetian Jewish Community in a new perspective: cartography was used as a fundamental tool for analysing the urban transformation of the Venetian Ghetto over time. The present paper introduces some of the case studies displayed in the Ducal Palace exhibition. Working with heterogeneous data from different sources and epochs required an information management tool with the ability to relate data together. Since the beginning of the research, a Geographical Information System (GIS) was employed in order to manage metrical and geographical data in their evolutions in space and time. Thanks to this procedure, it was possible to analyse different historical phases of the Venetian Ghetto and to study the volumetric development with the 3D reconstruction of digital urban models. Moreover, the project offered the opportunity to test different means of communication: multimedia and interactive installations were planned in order to disseminate knowledge to the general public. In particular, video animations and 3D mapping on a prototyped model allowed to dynamically describ-



SESSION 7

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# ANOYATIS-PELÉ D., C. TSIAMIS, I. ATHANASOPOULOU, C. BOUTOURA *Corfu, Athens, Thessaloniki* **Topographic changes and public health: the case of the national anti-malaria campaign in Messolonghi lagoon, Greece (1950-1960)** The aim of the study is to present the topographic changes of Messolonghi lagoon during the Greek anti-malaria campaign (1950-1960) as an example for the use of topographic archival materials in the historical study of Public Health. Our study is based on the archival topographic material of the General State Archives of Aetolia-Acarnania, which includes the collections of the Municipality of Messolonghi and the Archive of the Port Fund of Messolonghi. Located in western Greece the town of Messolonghi is surrounded by an impressive sea-lagoon. Data regarding the topography and the impact of the lagoon upon citizens' health are derived from the travellers of the 18th and 19th centuries. The most informative data are derived from the Proceedings of the Greek Society for Malaria Restriction in 1925 during the first national anti-malaria campaign. The report informs us about the location of the marshes around the town at the frontier of the lagoon. The morbidity rate of malaria was 30% within the town and 80% in the villages around Messolonghi. Few years later, the report of the Greek Ministry of Health suggests an increase of malaria mortality in the lagoon from 5,98% (1925) to 10,48% (1930). After the end of World War II, the Greek state inaugurates a new anti-malarial campaign and the area of Messolonghi was one of the priorities. The available topographic plans provide to us information upon the evolution of the draining works in the area of the lagoon during the period 1950-1960. Also, the landscape changes can be connected with the expansion of the urban network of Messolonghi and the new cultivated lands. It seems that the archival topographic material, as part of the Cartographic heritage, can be a useful tool in the study of Public Health of local communities in medical, demographic and socio-economic level.

# PICCARDI M., E. PRANZINI, L. ROMBAI *Florence* **Historical cartography and coastal dynamics of the Apuan littoral in the modern and contemporary periods: the port of Marina di Carrara (Tuscany, Italy)** Along the northwestern Tuscan littoral, using 18th to 20th century large-scale cartography together with reports from specialists and engineers, we can reconstruct the coastal dynamics, environmental evolution and organization of the territory - the marshland recovery and agrarian colonization of the lowlands and the construction of the two simple docking facilities serving the towns of Avenza-Carrara and

Massa. Since the late medieval period this area belonged to the Malaspina Principato, later the Cybo Malaspina di Massa Carrara, and from the 1730's until 1859 to the Este Duchy of Modena. The littoral was almost completely uninhabited until the construction plan for the port of Avenza (now known as Marina di Carrara) was undertaken. The history of this Italian port is well known, having the dubious honour of the longest period between initial planning and final completion: from the middle of the 18th century until the middle of the 20th century. Less well known are the territory's natural dynamics, costal advancement, erosion and wave action. For many years the littoral's only seaports were the problematic havens at the mouths of the Magra, Carrione and Frigido rivers. The study of these records allows us to bring the profound transformations of the Apuan landscape and costal environment between the 18th and 20th centuries to the forefront. At first characterized by littoral advancement and later, from the end of the 19th century until the present, by the littoral erosion that is undermining seaside tourism, the area's primary economic activity. These records also allow us to better understand the processes behind these transformations and to formulate plans for their management, in the attempt to reduce erosion without further burdening the coast with rigid defence works.

# BERTACCHINI M. *Modena* **CartoHeritage and the "Culture of the Landscape" in the Modena area (Northern Italy)** The Modena National Archive owns a Cartographic Heritage of extraordinary value. In 2015, the Estense Map Collection of the Archive (precious cartographic documents of the Estense Family-ruled Duchy of Modena and Reggio Emilia, dating from the XV to the XIX centuries) inspired an exhibition related to the border changes between the Modena and Bologna counties in the Po Plain area. This Science Fair project was organized in collaboration with the Department of Chemical and Geological Sciences of the University of Modena and Reggio Emilia, with the aim of greater public learning, understanding and appreciation of the region in which they live. Members of the public of all ages visited the exhibition together with classes from primary, secondary and high schools. The visit engaged local students in an in-depth map-reading exercise, in the search for the physical and human elements of forgotten landscapes that only these historical maps are able to recreate. The experience involved five classes from a Grammar School moving around the area covered by the maps to discover how these places are now. A bike tour was organized to explore the area more effectively and identify

traces of the elements observed in the maps and understand what changes have taken place. The bike tour attracted the interest of the local municipalities who are now using this initiative to stimulate tourism in their region.

# ZOLEZZI G., E. DAI PRÀ, D. ALLEGRI, S. ZEN, D-C. EFTAXIA, V. SCORPIO *Trento, Thessaloniki, Bozen-Bolzano* **Reconstructing river morphological dynamics. Historical Cartography for river management and restoration in Trentino** Historical Geography plays an important role for the management of regulated rivers, from flood risks prevention to environmental restoration. Within the research project "ETSCH 2000" a multidisciplinary team, composed by Geographers, Engineers, Geomorphologists and Archaeologists is working on Adige river, Trentino, NE Italy to reconstruct its past morphological dynamics before massive channelization occurred since the mid 1800s. Through georeferencing a series of ancient topographic maps produced during the 19th century the team have reconstructed the river channel pattern of Adige river before its rectification, which forms an invaluable knowledge base to understand its future development under different management scenarios. Specific digitalization and digital techniques put in evidence the multiple hydraulic works, protection structures on Adige flow which was made during ages. It also allows feed so far unavailable data to predictive model of river morphodynamics that can support planning future actions for the sustainable development of the Adige river corridor.

# SINISCALCHI S. *Salerno* **The value of the landscape in the individual and collective perception through the transformation of postal cartography** The geographical distances, as is known, are not only geometric but also qualitative: the perception of spatial extension is intimately connected to the time necessary to travel it. A relationship witnessed by cartography, a representation constitutively linked to time (suffice it to think about the connection between the calculation of longitude and the chronometer invention), and a tool for movement and territorial communication. An important example for this aspect is the road map, focussing on the depiction of roads, paths, remarkable places and post stations, which can be defined, in a figurative sense, a kind of "mapping of time". This is the case of the Tabula Peutingeriana, the "spiritual" travel (with the guides to the Holy Land or to Rome), the commercial cartography (nautical cartography) but, furthermore, with the improvement of road links, the modern cartography (referring to authors such as J. Metellius, C. Stigliola, M.A. Baudrand, G.

Cantelli) and that of eighteenth-nineteenth century (of chorographic, postal, military, tourism type), until you get to the maps of today and to the Information and Communication Technology. A development that, in addition to witnessing the actual “reduction” of the planet – including the space-time compression (Harvey, 1990) and the separation between social relationships and places of interaction (Giddens, 1990) – makes explicit the link between the individual and collective perception of space-time distances and the landscape value, the whose environmental, historical and territorial resources are today threatened by an excessive acceleration of production rates and of the lifestyle of the

urban population of the planet.

# SPERTI L., S. CIPRIANO, A. PAVEGGIO, E. DELPOZZO *Venice* **Altinum: discovering a hidden municipium through GIS, historical research and new excavations** The history and understanding of the ancient municipium of Altinum is lately drawing attention of an increasing number of scholars. In 2016 the Department of Humanities of Ca' Foscari University started a campaign of archaeological excavations, intended to investigate the urban area of this Roman site. We were able to identify this area through a comparative study between recent and historical cartography: ancient planimetries, cadastral maps, interpretation of old and recent aerial photographs

combined with the study of archaeological documents and – in some cases unpublished – manuscripts represent the core of this project. Integrating different types of data is crucial for the aims of our research, and it made possible to identify traces of the archaeological record still hidden under the ground, that have been inserted in a GIS system. We created an archaeological digital map inclusive of data from old and new field works, photo-interpretations, archives, and surveys (such as those conducted by Ca' Foscari University in 2012 and 2014); this resulted in a simple and interactive tool on cartographic base, collecting all we know about Altinum.

## SESSION 8

# HERNÁNDEZ CABRERA J. O. *San Cristóbal de La Laguna* **Nesonyms deturpation and computational palaeography: first approach** Nesonymy (from Greek *nesos* > island and *ónoma* > name; applied to Toponymy, the study of Islands' denominations) and deturpation (from Latin *turpis*, verb *deturpare* > to corrupt; applied to Palaeography and Ecdotics, word deformation by successive copy through time) are both neologisms in academic English, but they conform a common topic in History of Cartography and Portolan Studies, an object of concern from the very beginning of ancient map production. Some graphic exempla from textual criticism and re-reading of names attributed to “*insulas noviter repertas*” in portolan charts during Atlantic expansion were presented last year, at the First International Workshop on the Origin and Evolution of Portolan Charts, held in Museu de Marinha, Lisbon (6-7 June 2016). As I argue, nesonyms deturpation was conscious and deliberate and became a specialized practice to satisfy different approaches and opinions about uninhabited and untraceable islands, in a record context singularly determined by non-standard orthography and fuzzy unstable manuscript writing. Conditioned by the form of each grapheme, the reading of a letter, syllable or word/name is not infinite and only admits a few versions, because the number of variants are confined into very close and limited relationships of similarity and, more importantly, those graphic confusions follow precise alphabet fonts and, hence, we may expect any mistaken codification to be reversible, and its evolution over time susceptible to mathematical expression and representation, so software solutions might be feasible, fitting a known pattern. This type of word deformation has a peculiar and specific casuistry in portolan charts, different than medieval texts usually edited or (almost conjecturally) restored through Ecdotics. This presentation contains the approach of a research project in its first stage. We describe the main theoretical and observa-

tional aspects of the problem that we propose to solve looking for a processing pipeline in the Digital Humanities through scientific collaboration. Though the raised question does not have a perspective of general application (its field of applicability and usefulness is limited enough) it needs a very complex tool for the hypothesis testing in the checking of conjectural.

# ANOYATIS-PELÉ D., C. TSAMIS, I. ATHANASOPOULOU, C. BOUTOURA *Corfu, Athens, Thessaloniki* **Toponyms and cartographic confusions of Lepanto naval battle (1571)** The aim of the study is to present the cartographic depictions of the toponyms related to the great battle of Lepanto in the maps of 16th and 17th centuries, as an example of the impact of the cartographic heritage in the historical research. On the 7th October 1571, took place the greatest naval battle of the Renaissance at the sea of western Greece. It was the largest naval battle since Antiquity, in which the united fleets of the Christian powers of the time, the *Sacra Liga* (Habsburg Spain, Venice, Genoa, the Knights of Malta, the Papal States, Tuscany, Savoy, Urbino and Parma) under Don Juan of Austria, defeated the Ottoman fleet. In the epic battle were involved more than 400 ships and almost 150,000 men (soldiers, sailors and oarsmen). The maps before the year of the battle and those of the next decades provide us the grounds to identify toponyms related to this historical event, such as the bases and the route of the rival fleets. The main problem of many maps is the lack of the toponyms of the accurate places of the sea-battlefield i.e. the island complex of Echinades, miles away from the city of Lepanto (today Nafpaktos). The place name of Lepanto, as the sire reference of the battlefield, is euphemistically and improperly used in the sources. Also, it is extremely bizarre the fact that even if our knowledge about the formation of the fleets and the described strategic movements of the rivals during the battle, are accurate, the toponyms on the maps are not analogously accurate. More-

over, the route between the island complex of Echinades was a typical and well-known route for the Armadas for centuries. Actually, the cartographic study of the period shows the confusion of the spatial perception of the area by the cartographers of 16th and 17th century.

# BALLETTI, C. GOTTARDI, F. GUERRA, E. LIVIERATOS *Venice, Thessaloniki* **Oval projections: the Italian sixteenth century cartographic innovation** The research aims at the investigation of an important map projection appeared in the beginning of sixteenth century in order to satisfy the new representational requirements due to the discovery of the “New World”. This new typology of map projection called today the *oval*, first introduced in Italy by Contarini and Rosselli in 1506, is in fact the “advancement” and a step forward of Ptolemy's Second projection developed to represent the half of the earth-globe to which the “Old World” was extended. After Contarini and Rosselli, a number of well-known Italian cartographers used the *oval* in their World Maps (WM) in the course of sixteenth century namely Bordone, Agnese and Gastaldi, before Ortelius, who made this projection more widely known thanks to his popular and well marketed maps, and many other famous cartographers to almost the mid-seventeenth century, among them Ricci, whose WM completes the set of the six ovals studied here, covering a century from the beginning of the sixteenth to the beginning of seventeenth century. The research is based on the analysis of six oval projections associated to six important WM of the period of interest focusing also to the comparative analysis of the respective coastlines of the examined maps shaping the continents of the now expanded world. This is done both analytically - in the case the relevant formulation is explicitly given - and numerically in the cases the explicit formulation is missing. In the latter case the reconstruction of the graticule of the ovals, according to known geometric specifications, assists the implementation

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of numerical investigations implying best-fitting techniques.

# MOLNÁR G., G. TIMÁR, E. BISZAK *Budapest*  
**The advantage of publishing intermediate products of historical air photos** Aerial photography is a unique type of spatial datasets completing or continuing time series of historical to recent maps representing the actual state of Earth's surface. To fully take advantage of time series of historical maps, these maps should be georeferenced layers in Geographical Information System software or Web Mapping Services. The aerial photographs to fit geometrically into these systems should be orthorectified. Orthorectification is the process, how a raw aerial image is transformed (resampled) into a georeferenced image matching geometrically to georeferenced maps. In the first step, besides the photographic camera data (interior orientation), the position (coordinates) and attitude (angles) of camera orientation should be calculated. In the case of historical aerial photography these exterior orientation parameters are usually unknown, and are calculated using 10-15 features (Ground Control Points) identified both on aerial photographs and historical maps. In the second step the theory behind orthorectification (a pure spatial geometrical operation) is applied to project image pixels on Earth's surface. To achieve this, a Digital Elevation Model – a grid representing the topographic heights – is used. In this content, intermediate product refers to the scanned aerial photographs attached with the metadata calculated after achieving the first step, saved in 'GeoTiff' format. The advantage of providing intermediate product to end-users is making them able to generate orthophotos using their own Digital Elevation

Model. The overall accuracy of orthorectified air photos is limited by the accuracy of the Digital Elevation Model used, so an end user having an accurate surface model of the region is able to generate high accuracy orthophotos automatically. We demonstrate the practicability of the method on aerial photographs shot by the Royal Hungarian Air Force carried out a recon mission, photographing the metropolitan area of Budapest after the first bombing raid by the Allies at 3 April 1944.

# GEDE M. Z. UNGVÁRI, G. NAGY *Budapest*  
**Assessing the accuracy of photogrammetric reconstruction by comparison to laser scanned data** Photogrammetric reconstruction with Structure from Motion (SfM) methods became a popular approach of digitising 3D objects. It is hard, however, to assess the accuracy of this method when digitising a complex surface (such as a 3D relief model or a damaged globe) due to the lack of reference data. Such a reference can be the laser-scanned model of the same object. The authors therefore scanned a large relief model as well as a globe with terrestrial laser scanner and also created their models by SfM. This paper introduces the methods and the results of the comparison of the laser scanned data and the photogrammetric reconstruction.

# KRAAK M.-J. *Enchede* **Minard's flow maps redrawn** Minard is probably best known for his flow map of Napoleon's campaign in Russia in 1812. This *Carte figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813* has been made famous by Tufte's 1983 quote "possibly the best graphic ever made", and ever since it is used as the example of its kind.

One could argue Minard's map is a story map *avant d'lettre*, informing us about the dramatic faith of the French army via a map and a linked diagram. The map is both schematic (the flow) and exact (the base map), and shows qualitative (to and from Moskva) and quantitative (number of soldiers) information. By showing some of the highlights of Minard's less well-known flow maps I would like to emphasize the strength of his designs. How subtle he manipulates the map's base topography to accommodate his arguments. The flows themselves have been drawn to unravel the complexity of reality. Try this with current software and you will find it difficult if not impossible, despite that Minard's maps do not have a huge amount of flows as some of today dataset represent. Based on Minard's Napoleon map, the results of others who have tried to create better alternatives will be discussed, followed by demonstrating some of my own alternative creations.



For the full texts see:

E. Livieratos (ed.), 2017. Proceedings of the 12<sup>th</sup> ICA Conference *Digital Approaches to Cartographic Heritage*. Venice 26-28 April 2017. Thessaloniki: AUTH CartoGeoLab, ISSN - 2459-3893, pp. 350.



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