1. INSCRIPTIONS TO GO: Mobile platform for offline epigraphic data collection

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Abstract

This paper presents an open source digital tool for field epigraphers allowing them to collect the spatial information, structured data and multimedia about each and every inscription on a single mobile platform that also works offline and is highly customisable. The "Epigraphic module" was built using the open - source FAIMS mobile platform specifically for digital collection of Greek and Latin inscriptions in the field in the various areas of Mediterranean.

Keywords

Field epigraphy, open source, FAIMS, mobile application, digital recording, customisation, xml

1.1.Transitioning from paper to digital data collection

Not all epigraphers work in the comfort of their office within an easy reach of their laptop, camera and online written resources. Some collect evidence of ancient writing in the field, while on the move and in a degraded network environment. Often these field epigraphers resort to paper, cameras and perhaps a GPS as the most versatile, yet complete, means of recording the spatial coordinates, and the appearance and the context of their find. All of these data need to be transcribed, downloaded and integrated after fieldwork, a process that is slow and error-prone. The group of field epigraphers consists of people running out in the field, collecting data and facing challenges such as being in the middle of nowhere with a degraded network (e.g. limited or none internet access), or carrying around all different sets of equipment necessary for the proper epigraphic documentation. If you belong to the latter group, or at least occasionally collect epigraphic data in an environment with no internet connection, such as dark museum basements and backyards, this paper offers a solution to the problems you may have encountered.

1.2. My situation in 2012, one of many…

In 2012 I was myself facing the challenges of being in the field and trying to create a consistent digital record of inscriptions found in the territory of ancient Troezen, in Greece. In September 2012 I was invited to do preliminary archaeological fieldwork in Troezen. Upon the team's arrival the first Greek inscriptions were found in situ and I was immediately given the task of documenting them. The inscriptions were already published, but no one knew their exact position and it was necessary to document their exact location and the current preservation [Legrand 1893; 1900; Fraenkel 1902; Welter 1941]. I had to deal with some initial problems, primarily that the small hand-held PDAs that we were using for digital recording were lost somewhere between Singapore and Sofia. That left me only with a print-out satellite image, paper and pen. Considering we live in the 21st century, I was wondering there had to be some king of digital tool to help me with the task. After an unsuccessful search for any available digital recording and mapping tool, I gave up and returned to the traditional means of paper, pen, a digital camera and GPS. Even though I was able to record the inscriptions by the traditional means, I would have welcomed any digital help; especially, when I realised that after several days in the field, I had to then spend several weeks digitizing and cleaning the paper

records before I was able to do anything else.[1] Even though I later started working on other projects, I still kept in mind the lack of digital tools that many field epigraphers have to face.

I was introduced in early 2015 to an existing open source Android mobile platform developed by the Australian based FAIMS Project[2] that was originally developed for field archaeologists, but it has been already adopted by many related disciplines and projects [Sobotkova et al. forthcoming].

1.3. FAIMS Project

The FAIMS Project was launched in 2012 as a national, domain-wide information management project for archaeology with funds from the Australian National eResearch Collaboration Tools and Resources (NeCTAR) eResearch Tools program. In consultation with Australian and international archaeological communities, FAIMS developed a mobile, offline, multi-user collection platform for structured, free-text, geospatial, and multimedia data. The project also supported enhancements to the Heurist online data refinement and analysis service developed at the University of Sydney, and established an Australian implementation of the Digital Archaeological Record (tDAR), an online data archive developed by Digital Antiquity [Ross et al. 2013, 2015; Sobotkova et al. forthcoming].

1.4. FAIMS Mobile Platform

The FAIMS Mobile Platform[3] is a generalized and customizable application that can capture and relate structured data, free text, geospatial data, and multimedia [Sobotkova et al. 2015]. Some of the unique FAIMS features support the automatic synchronization of data among multiple users, versioning of data allowing for review and reversion of all changes, backup, data export, internal and external sensor management, flow control and other automation, etc. The FAIMS Mobile Platform is an open-source software that anyone with an Android 4.4+ device can download from the Google Play Store[4]. FAIMS moreover provides freely several demo modules – digital recording forms for trial [Ross et al., 2015]. Each of these modules accommodates specific data and workflow requirements, required by different archaeological methods,

[1] The report was submitted in November 2012 to the archaeolgical ephorate in Athens, still avaiting for its publication.
[2] The Federated Archaeological Information Management Systems Project, www.fedarch.org
[3] The Field Acquired Information Management
[4] Faims App 2.0

driven by different research agendas: for example archaeological survey, excavation, and artefact processing methodologies.

Moreover, if you are IT skilled, or willing to learn how to code in XML, you can customise your own module with the help of provided instructions and upload it on the server and use for your own research. Knowing this, I was already interested in creating a module for field epigraphy that I can use for my own fieldwork, but that can be also available for anyone to download, use as is or customise to own needs.

1.5. My "Epigraphic module" design

The "Epigraphic module's" design was influenced by my own PhD research that is focusing on the spatial and social mapping the Greek inscriptions from Ancient Thrace. I have been working on the project several years and the data structure is well established. As I am also participating on archaeological projects in Bulgaria, I wanted come up with my own solution to the in-field recording that I can use. I have background in Archaeology and Classics, but I am always open to digital technologies and to some extent I am familiar with the database principles. Moreover, I have found my education in Classic Languages particularly helpful in understanding the structure of programming languages. Unfortunately, as a PhD student I had very limited resources, which could not cover the development of the module by the FAIMS team. But on the other hand, FAIMS has good documentation online for DIY module customisation[5] and I was eager to create my own module. I had time and energy to learn about the internal structure, XML coding of the modules. When I needed help, I contacted the FAIMS team via email and they provided occasional consults via email or Google Hangout.

For the best result and to understand what FAIMS can do, it is good to read the FAIMS documentation and trial some of the demo modules first.[6] I would recommend anyone to reserve at least one or two weeks of intensive work and reading the material. Don't hesitate to contact the team if you need any clarification. A significant amount of time is taken by designing of the module structure. Established projects with proven methodology are easier to translate from paper to digital workflow than new pilot projects. It took me at least one year of conceptualising different data models relevant to my PhD research prior I was able to start defining the module structure.

Once your data model (conceptual structure) is finalised, then the actual programming takes less time. In order to code the module, I simply followed the

[5] https://faimsproject.atlassian.net/wiki/display/FAIMS/Mobile+Platform+Home

[6] https://www.fedarch.org/resources/demoFeatures.pdf

developer documentation provided by FAIMS. The prerequisites included knowledge of English, a fairly new computer, reliable Internet and an Android 4.4+ device. The developer documentation took me through the basics of the XML language and basics of Linux. As any other language, XML has its rules that have to be followed. The XML learning curve is rather steep, but once you have successfully coded one module (which the developer guide will take you through step-by-step), you can make the next one substantially faster. The time needed for actual coding and associated testing always depends on the complexity of a given module. Practice makes perfect, though, so once you understand the principles, the coding gets easier. To give an estimate, the "Epigraphic module" took me two weeks to create and test thoroughly.

After finishing the module design you can deploy it via the FAIMS server. You can use the FAIMS demo server online (but let the FAIMS team know first) or you can install FAIMS server on your own computer's virtual machine, simply by following the developer documentation. FAIMS server is essential for the following reasons:

> "Server facilitates data storage and export, module configuration and management, and user management. It also facilitates advanced data editing, such as the rolling back version history, resolving data conflicts and enforcing validation."[7]

FAIMS server is the second component of the FAIMS Mobile Platform and provides administrator access to the data collection system. To run and to administer the Linux server was easier than previously thought. Even as Windows OS user, I was able to set the server environment with the help of FAIMS developer documentation fairly quickly. Therefore, there is no need to feel intimidated by learning new software while coding own modules.

1.5.1. The "Epigraphic module" components and its use

The design of the module is influenced by my past archaeological and epigraphic fieldwork experience in Bulgaria and Greece. At the same time I follow the standard typology of inscriptions as known from other epigraphic corpora such as the Inscriptiones Graecae or Inscriptiones Graecae in Bulgaria Repertae [Mihailov 1956 – 1997].

[7] https://faimsproject.atlassian.net/wiki/display/MobileUser/Server

I want to emphasize that the "Epigraphic module" was developed to collect structured digitally-born data about inscriptions found in situ, and is therefore not designed for creating a critical edition of the text. There are other solutions and well established databases for publishing epigraphic editions and as such "Epigraphic module" is not aiming for such use. As the fieldwork environment can be quite unsuitable for thorough documentation on the spot and the time schedule is often very limited, the "Epigraphic module's" strengths are in facilitating controlled data entry on the fly.

The main advantages of the FAIMS-based "Epigraphic module" are:

- The offline functionality;
- All-in-one Mobile app (containing GPS, map, notebook, camera, sketchbook, video and voice recorder);
- Predefined controlled vocabulary and detailed instructions in your hand;
- Picture dictionary;

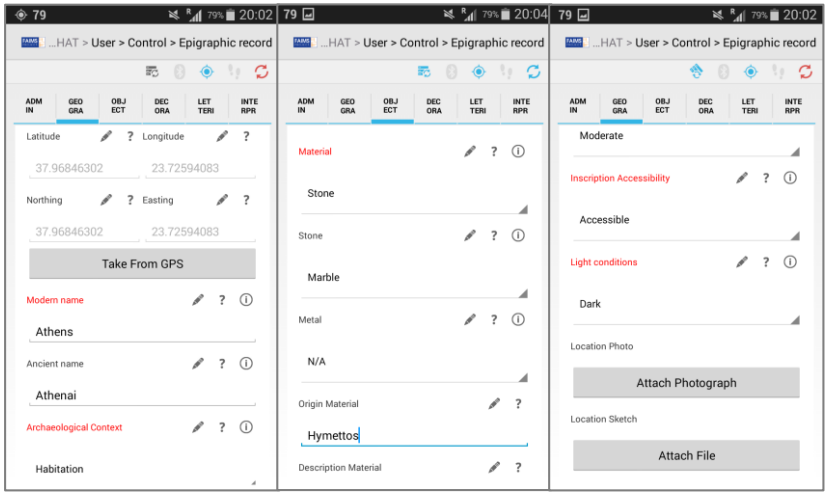

Fig. 1.1. The screenshots of the "Epigraphic module": Geography Tab with an example of spatial data taken from an internal GPS, Object Tab with an example of structured data, Geography Tab with an example of Photo Attachments

One of the major advantages of the FAIMS-based "Epigraphic module" is the full offline functionality. As the fieldwork is often in places with no internet connection, I personally see this as the primary benefit: I am able to access the recording form while in the middle of nowhere, or in the museum basement in a foreign country with no internet connection. When I finish the fieldwork, I can easily connect to the server and synchronise my digitally-born

data. Everything is therefore safe, backed-up on the server, in case I drop my tablet or smartphone on the rock the next day. I can also access the data, modify it and export in most common forms, such as CSV, shapefile, KML file etc. No need of transcribing the data from paper forms for the next few weeks!

Moreover, I really like the fact that I am able to record everything in the field with just one device: I am using my personal smartphone a Samsung Galaxy S III with Android 4.4 Kit Kat. The device has built in internal GPS with 3-5 m accuracy, 8 megapixels camera and a voice recorder. I am thus able to collect all the data with just one electronic device. If I need to connect to external GPS, the Mobile App supports that as well. If I make any external record such as high resolution photos or if I make squeezes or sketches, I can keep track of them by assigning them to the particular record. This way, I should never be searching for missing or misplaced photos, notes on the piece of paper. The Mobile App minimises the data loss as much as possible.

Another very practical feature for the fieldwork or any systematic research is the controlled vocabulary [Fig. 1.1.]. The user simply choose one or more from the predefined attribute values. This prevents typos or different spelling, or different language version to be entered. It may not seem as important while doing the actual fieldwork, but as someone who has spent hours and hours correcting other people's mistakes, I personally think of the controlled vocabulary as an essential part of any module.

The picture dictionary [Fig. 1.2.] goes in one hand with the controlled vocabulary. To describe the feature: it is basically controlled vocabulary attribute, where instead of textual explanations of objects, there are images and photos. This way user can compare the inscribed object in front of him with the picture in the device in order to maintain the data consistency. It also

works as a visual aid for untrained or unexperienced users.

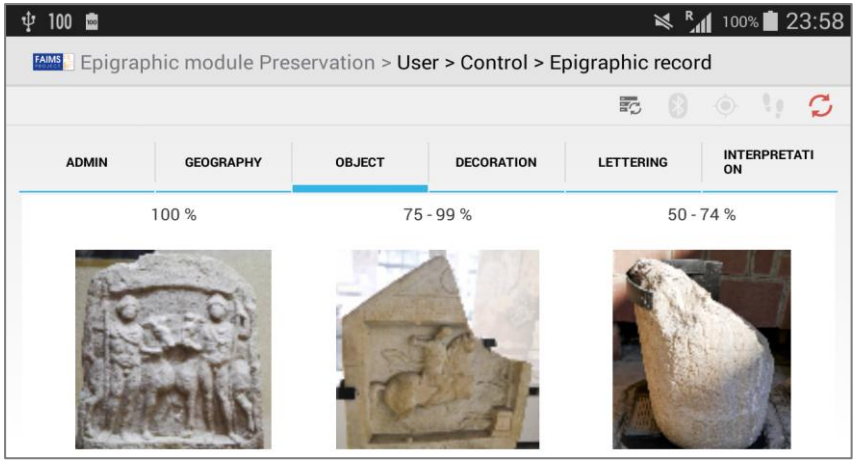

Fig. 1.2. The screenshot of the "Epigraphic module": Preservation values with an example of picture dictionary, the visual version of controlled vocabulary

This is, of course, not the complete list of the module's features. I have provided only few of the highlights and the tools that have proven useful for my personal fieldwork, but there are many more. Their full overview of the different functionalities with their simple description can be accessed at the FAIMS webpage[8].

The "Epigraphic module" should be used in the field when the inscriptions is being recorded on the fly, typically in a degraded environment where previously pen and paper were used. The aim is not to make a complete critical edition on the spot, but rather to record the current position, the state of preservation and any other relevant characteristics that one can think of when an inscription *in situ* is find.

1.6. How to access and trial the "Epigraphic module"

For anyone interested in the "Epigraphic module" there is a simple way how to download it and trial. Simple go to the Google Play, download the FAIMS 2.0 Mobile App to your Android device. Then connect to the Demo server and download the "Epigraphic module". If you need more guidance,

[8] www.fedarch.org

please refer to the FAIMS documentation and the Cheat-sheets 101, available at FAIMS webpage[9]. Any suggestions to the module's structure are more than welcome.

2. Conclusion

The presented "Epigraphic module" provides a case study and an example of how projects and individual researchers can solve the digital data collection in the field. The main aim of this module is to produce a digital record of inscriptions found during fieldwork, while making the record complete as possible. The geospatial position of an inscription is supplemented by structured data, such as predefined controlled vocabulary, as well as any unstructured data, such as notes and descriptions. The complete record contains also any relevant photo, audio and video records, directly attached and labelled by the record ID. However, the module does not aim to become a universal digital tool for any epigraphic project, but rather for those that are fieldwork oriented, and for those working in a degraded network environment. The module is made available for download and trial by any interested person on the FAIMS demo server.

[9] https://www.fedarch.org/resources/handouts.pdf

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