The TIR-FOR (*Tabula Imperii Romani - Forma Orbis Romani*) project and the contribution of Romania. State of research

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Abstract

This study provides an overview focusing on the new digital TIR-FOR project and the results of the Romanian team involved in this project. The first part of the study is a short introduction to the topic, looking at the old TIR volumes published in the past which focused on the territory of the province of Dacia. The second part of the paper includes some aspects regarding the methodology of the project adopted for this new stage. The third part presents case studies related to some settlements in Roman Dacia, while the final part is devoted to the current results of the project and some concluding remarks, together with some future plans to continue this research.

Keywords: TIR-FOR, Roman Dacia, mapping archaeological sites, gazetteer.

1. The history of the TIR project in Romania. A short overview

In 1965, D. Tudor published the first work of the TIR (*Tabula Imperii Romani*) series for Dacia, covering a narrow strip of the southern part of Romania (Tudor (ed.), 1965). In 1968, the second volume was published (Soproni (ed.) 1968) and the third volume in 1969, covering section L35 (Russu (coord.) 1969).

Developed during the last century, the *Tabula Imperii Romani* (TIR) project represents, as of now, the most complex, scientific project dealing with the topography of the Roman world. The volumes published so far (114 in total)[2], comprising 56 sheets at a scale of 1:1,000,000 for the entire Roman world, produced significant scientific impact: for each settlement in the Roman Empire, the first work cited in any bibliography is TIR. However, the TIR volumes have led to two unresolved issues: 1. The maps have a very small scale (1:1,000,000), which obviously does not enable the sites to be mapped accurately. In other words, the use of geographical coordinates to indicate the precise location of the sites was useless; 2. Certain areas of the Roman world need more detailed maps (e.g. 1:20,000 or 1:25,000). To resolve the second issue, in 1919 the idea of *Forma Orbis Romani* (FOR) was developed to produce detailed maps for various Roman cities. The FOR is actually an enlargement of TIR with more accurate and detailed cartography for certain regions.

Almost 50 years have passed since TIR L34 and TIR L35 were published. Inevitably, the requirements of professional researchers regarding the topography of the Roman Empire in general, and of Roman Dacia in particular, far exceed the outdated information contained in the old TIR volumes. Due to ongoing research, digital cartography and databases also need to be implemented in archaeology. Moreover, constant infrastructure developments for residential and agricultural areas, which endanger archaeological heritage, can be better managed using an online database containing the archaeological sites.

The old TIR maps use a small scale (1:1,000,000) which obviously does not suit the need for accurate macro-scale geo-referencing. More suitable are the maps with a larger scale (1:5,000, 1:10,000, 1:25,000), which enable sites to be positioned in detail using decimal coordinates. Another drawback of the old TIR maps is that it is almost impossible to see the accurate position of any site, while it is obviously impossible to update the printed version of TIR maps. Furthermore, the obsolete reference system used is another important weakness in the old TIR volumes.

There is a third major (scientific) problem with the old TIR volumes: the outdated information for both old and also newly discovered sites (from settlements to relatively isolated spots). Half a century of archaeological research has contributed significantly not only to a better understanding of the topography of any Roman province but also to a rapidly increasing number of newly discovered sites.

Another scientific issue is the old bibliography cited in the TIR volumes. For example, the bibliography for Roman settlement and the Roman road segment from Aiton stops in 1915, while the three volumes of the TIR series for Dacia contained around 725 records of archaeological sites. However, since the late 1960s the number of known sites in Dacia has doubled. For instance, in 2005 there was evidence for approximately 1,300 sites in Roman Dacia (Bărbulescu (coord.) 2005) and today we know of around 1,400 sites. In addition, over the last few years digital technology has advanced so fast that the complexity and potential of geographical information systems have obviously gained the upper hand compared with the rigidity of scaled, printed maps.

2. The new TIR-FOR digital project (2015-2021). Developments. Methodology

In 2015, following the invitation of our colleagues from the Institut d'Estudis Catalans in Barcelona, we gladly agreed to form part of the international team planning the beginning of a new digital TIR-FOR project. From the start, we realised the project has several technological aspects that highlight the importance of a TIR-type database developed via an online platform. The databases of each team are created in connection with and through a brand new platform (https://tir-for.iec.cat/tirforAdm/edicio/llistaTir.action?request_locale=en).

The Romanian team is made up of young doctoral students from Babeș-Bolyai University Cluj-Napoca and is coordinated by Mihai Bărbulescu and Florin-Gheorghe Fodorean. Soon after the work started, the Romanian team established several key objectives: 1. To enter digital records for all the archaeological sites in Roman Dacia via an already functional online platform; 2. To update the information for all these sites, as the data for almost every site contained in the old TIR volumes are very general and brief (e.g. Aiton – "Römische Siedlung" etc.). Also, the bibliography cited is absolutely obsolete; 3. To classify all the data entered online using particular criteria so that a range of theme-based maps can be produced by the end of the project. Now we are approaching the final stage in terms of fulfilling these objectives, with the aim of obtaining a complete, updated, easily accessible catalogue (in English) of all the recorded sites in Roman Dacia. The contribution made by our project is not only this catalogue but also the online database, because every site will also be recorded on the aforementioned platform.

Any online geographical information system or database has advantages for users compared with hardcopy (printed) methods. In our case, the first advantage is the possibility of producing digital, interactive maps at different detailed scales (1:5,000 up to 1:25,000), following various chronological, typological and functional criteria. These maps will be produced for the FOR part of the project, using an integrated GIS platform (ArcGIS) in connection with the TIR database platform. The two 1:1,000,000 scale maps for TIR L34 and L35 were geo-referenced using the World Geographical System (WGS). Moreover, data were stored in attribute tables, providing accurate information for any point with Roman archaeological finds. The format of these attribute tables (columns and rows) were developed to ensure they could contain all essential data, such as: location, coordinates, site typology, description and bibliography. The technological dimension of the TIR-FOR

database represents an advanced instrument for every future topographical study regarding Roman Dacia, from a thematic study in a micro-region to various geo-statistical analyses closely connected with the archaeological and historical background. We can therefore use a wide range of entry criteria, from the type of site, chronology and detailed descriptions to bibliography and photographs. The database will be regularly updated with the latest information regarding every single site and findspot.

The project provides not only innovative methods for recording and classifying archaeological sites but also stimulates new research perspectives regarding the digitisation of archaeological heritage, which now represents a major priority in Europe. Numerous countries have already developed digital instruments to record, update and protect their archaeological heritage.

The project offers a new approach, a new methodology, and it also provides a triple impact: 1. Economic: recording each site will provide a fundamental tool for the precise location of all sites; 2. Cultural: using this database, steps will be made to protect the archaeological sites; 3. Scientific: the project integrates all the information into a single database.

Therefore, the project: 1. has the capability to strengthen cooperation between researchers with expertise in archaeological heritage and those specialised in digital cartography and interactive tools; 2. promotes the use of online technologies, making information easy accessible for those interested in the archaeological heritage of the Roman world; 3. enhances the possibilities to protect heritage, following the recommendations of the La Valletta Convention (1992) which strongly recommends the following (Art. 7): "For the purpose of facilitating the study of, and dissemination of knowledge about, archaeological discoveries, each Party undertakes: i. to make or bring up to date surveys, inventories and maps of archaeological sites in the areas within its jurisdiction". Last but not least, in order to protect cultural heritage, the project uses digital innovations so to follow the recommendations from Art. 9 of the same Convention, which recommends: "Each Party undertakes: i. to conduct educational actions with a view to

rousing and developing an awareness in public opinion of the value of the archaeological heritage for understanding the past and of the threats to this heritage; ii. to promote public access to important elements of its archaeological heritage […]."[3]

The interface has eight interactive fields. The first one, 'Sites', allows us to view the sites in alphabetical order. By clicking on the site name, a new page opens containing a wide range of data about the site, data previously entered using the second, third, and fourth field: 'New Site', 'Typology' and 'Elements'. The 'New Site' page contains input fields for basic information about the site: ancient name (if known), modern name, the county and modern administrative division, grouped together under 'site information. The second section contains fields for the coordinates of the site: the Ptolemy coordinates (if they exist), universal coordinates (origin), universal coordinates (current), and UTM coordinates. In our case we used decimal UTM coordinates due to the fact that the interface maps are connected to the larger Google Maps platform. Next is the 'Typology' section, to enter the main category of the site, and the 'Elements' section for more details regarding the typology. There is also a 'Notes' section to enter a description of the site and/or the finds, and the 'Bibliography' section. The 'Chronology' table gives us the possibility to enter the absolute chronology for every site.

The third field is called 'Typology'. For every site the interface offers the possibility to choose the main type, a type that defines the general characteristics of the site/find.

The fourth field is in close connection with the third. This is called 'Elements' and it enables us to detail the typology more precisely. The online list on the platform contains elements such as 'mosaics' for a *villa* type structure, or *palestra* for the *thermae*. The fifth field is for ancient sources. Here we can select a predetermined textual reference from the online database. The sixth field is entitled 'Coordinate conversion' and its purpose is to convert coordinates from different systems to the decimal system, which is compatible with the

3. Full list (coe.int).

interface. 'Map' is the seventh field, supported by the Google Maps interface. Every point on the map is connected to the 'Sites' field. With a single click we can see the information about the site that has been entered in the aforementioned fields. Once the decimal coordinates are inserted in the specific field, the point is simultaneously marked accurately on the map. Finally, the last field allows us to download all the data in an Excel table. Every site will also contain the name of the author who entered the data. Any information entered in this database can be modified or updated at any time.

A third level of the methodology corresponds to the GIS analyses and geo-statistical exports. Based on a database that can be constantly updated, certain results can be exported due to the fact the TIR-FOR interface is closely connected with the GIS-dedicated programs. Through this connection we can export mainly the topographical features of the sites, in attribute tables. Such tables represent the foundation for every GIS-based study in the future, from precise general maps at different scales and thematic maps containing selected types of sites, to geo-statistical analyses for scientific research related to the landscape, impact of the Empire, distribution patterns, network analyses and many more.

3. CASE STUDY. SETTLEMENTS IN ROMAN DACIA

We have chosen to present some data for one important rural settlement in Roman Dacia, namely Aiton, to show how we have managed to present all the new data available for this site.

3.1. Aiton (commune, Cluj County)

Three important discoveries have been recorded within the territory of the village: a possible *mansio* in the northern part, a Roman milestone dated in 108 AD and the remains of an important rural settlement, scattered over the terrain, identified in numerous courtyards as well as outside the village, mostly in the centre and south-eastern part of Aiton.

a. The mansio

In 1913 Márton Roska excavated an L-shaped building with five rooms (recorded as A, B, C, D, E) in the northern part of the village (Fig. 1), in an area entitled "Podul de piatră" (Roska, 1915, p. 48-50). The foundations of the walls (0.50 m in width) were well preserved. On the western side of the building an apse was identified. Room "E", the one with an apse shape, was provided with a *hypocaust* installation. A *praefurnium* was identified in the southern part of room D.

Close to this construction, another building was excavated (Fig. 2) (Moțu, 1990-1991, p. 175-219). The point where the building was located is called "Locul lui Poțu" by the local inhabitants. The area is located at the exit from the village, on the right of the current road and very close to the former Roman road (Fig. 3, Fig. 4). The traces of the building were visible on the surface, scattered around an area of approximately 60 m². About 35 m² of the entire building were excavated. Three rooms were identified here, along with elements from another *hypocaust* installation. Among the artifacts, a bronze coin from Faustina the Younger was identified.
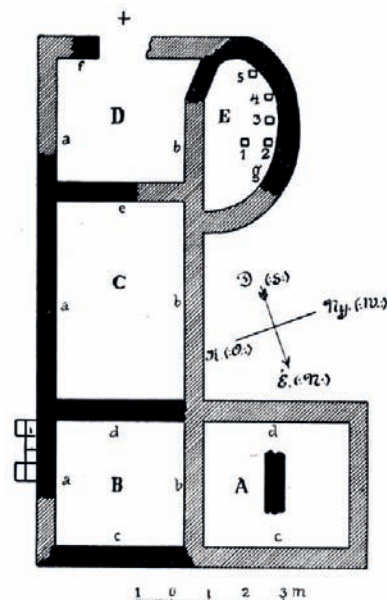

FIGURE 1. The building excavated in 1913 by Márton Roska in the northern part of Aiton (after Roska, 1915, p. 49).
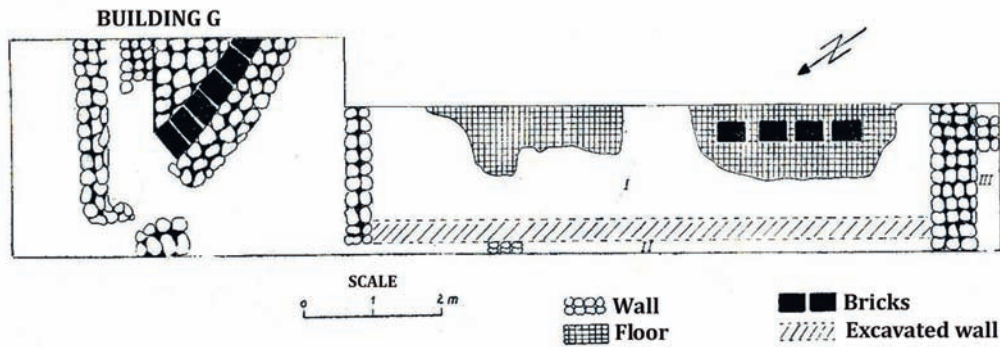
FIGURE 2. The drawing published in 1991 by I. Moţu (after Moţu, 1990–1991, p. 194).

South of these buildings, very close to them, another area with Roman artifacts was identified on the surface: the foundations of a stone wall together with ceramic fragments, tiles and fragmentary monuments. Close to this point a fragment from a column was discovered.

Between these two buildings excavated by I. Moţu, fragments of inscriptions, two weapons and other artifacts were identified. This area corresponds with the one described in the archaeological repertory of the Cluj County (Crişan, Bărbulescu, Chirilă, Vasiliev, Winkler, 1992, s.v. Aiton, p. 23, no. 13). This is, in fact, the courtyard of house no. 346 in Aiton, positioned at the exit to the village, on the right of the current road and close to the former Roman road.

Therefore, the discoveries grouped in the northern part of the village, close to the Roman road, might suggest the existence and functioning, during the Roman period, of a *mansio* (Fig. 5). The most important argument is, in fact, the location of these discoveries, very close to the Roman road (the sector Potaissa-Napoca). Such constructions, *mansiones* or *stationes*, provided accommodation for travellers in the immediate vicinity of the roads.

b. The milestone

In 1758 a Roman milestone was found in Aiton, within the territory of the village. Unfortunately, we do not have accurate data concerning the exact location of this monument. This situation has led to several suppositions, summarised here: the milestone was discovered south, north or within the territory of the village. We also lack a detailed description as the milestone has been lost. Fortunately, Iudita Winkler discovered a drawing of the monument in a manuscript kept in the central library of Cluj-Napoca (Fig. 6) (Winkler, 1982, p. 83). The drawing belonged to M. P. Szathmári. During the 18th century, in 1773, J. Seivert was the first person to read and publish the text of the milestone (Winkler, 1982, p. 80). In the 19th century, other historians debated the text of the inscription. K. Torma was the first who actually read and commented on the inscription (Torma, 1864, p. 30). In 1982, Iudita Winkler discussed the milestone's inscription in a short note (Winkler, 1982, p. 80-84).

A copy of it can be found in the courtyard of the local school in Aiton. The text (CIL III 1627; Fodorean, 2006, p. 66; Fodorean, 2015, p. 220; Fodorean, 2016, p. 90) is:

Imp(erator) / Caesar Nerva / Traianus Aug(ustus) / Germ(anicus) Dacicus / pontif(ex) maxim(us) / [tribunicia] pot(estate) XII co(n)s(ul) V (sic) / imp(erator) VI p(ater) p(atriae) fecit / per coh(ortem) I Fl(aviam) Ulp(iam) / Hisp(anorum) mil(liariam) c(ivium) R(omanorum) eq(uitatam) / a Potaissa Napocae / m(illia) p(assuum) X

This piece of evidence indicates that this section of the road was built by *cohors I Flavia Ulpia Hispanorum milliaria civium Romanorum equitata*. This troop is mentioned among the military forces used by Trajan in the war against the Dacians. After fulfilling its mission, it was garrisoned at Orheiul Bistriţei, along the north-
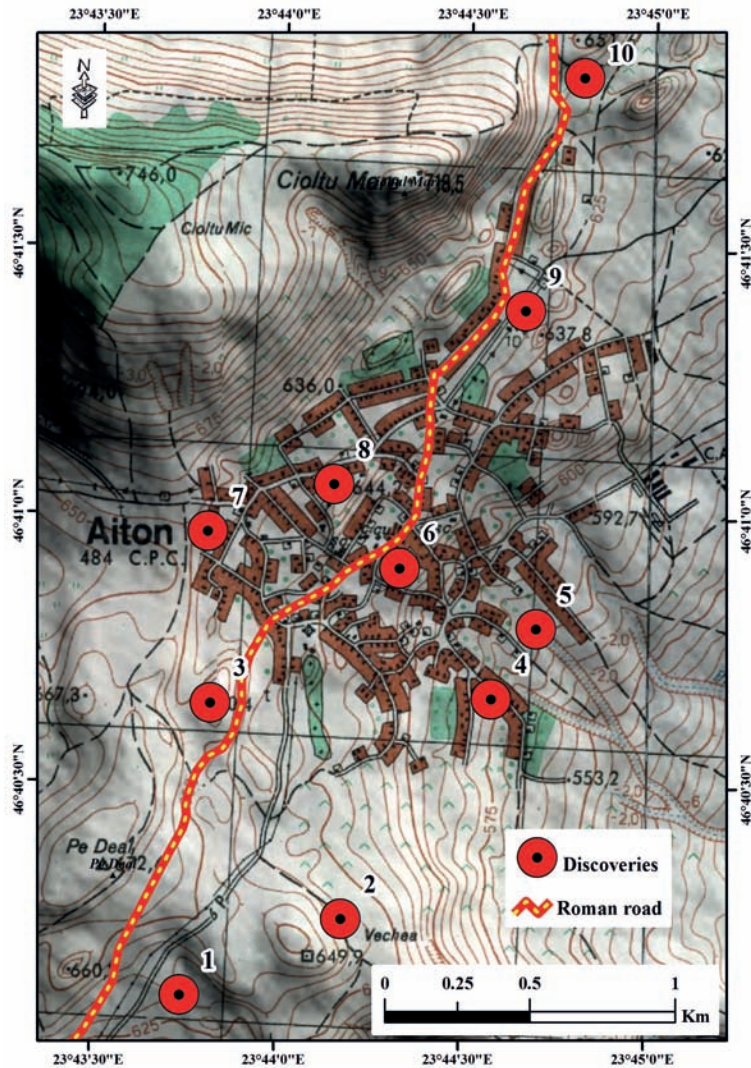
FIGURE 3. The repartition of the Roman sites indicated in the archaeological repertory of Cluj County (Map: F. Fodorean).

eastern frontier. The term *equitata* suggests the use of this cavalry unit to reconnoitre the terrain of northern Dacia.

Between Potaissa and Napoca this road was identified in the terrain and mapped with accuracy (Fig. 7) (about the road, selectively: Blăjan, Cerghi, 1978, p. 21-27; Fodorean 2015a; Winkler, Blăjan, Cerghi, 1980, p. 63-73; Winkler, 1982a, p. 587-589). The total length of this section is 36 kilometres; i.e. 24 Roman miles.

c. The rural settlement

During the Roman period, Aiton was an important rural settlement within the territory of Potaissa. Based on several studies published in the last 50 years, we are now able to distinguish, topographically, an area with consistent discoveries, mainly located in the east, south-east and south of the current village (Fodorean, 2015, p. 217-232; Fodorean, 2015b). These discoveries are mainly registered as scattered on the surface of the terrain, consisting of wall foundations, ceramic fragments, tiles and some special artifacts (Blăjan, Cerghi, 1978, p. 21-27). Besides the usual fragments of ceramics, two discoveries are of special interest. One is a fragment from an amphora handle with the stamp VIRGIN. The other artifact is a small terracotta statue, representing a female. The authors mention the place called "Cânepi", in
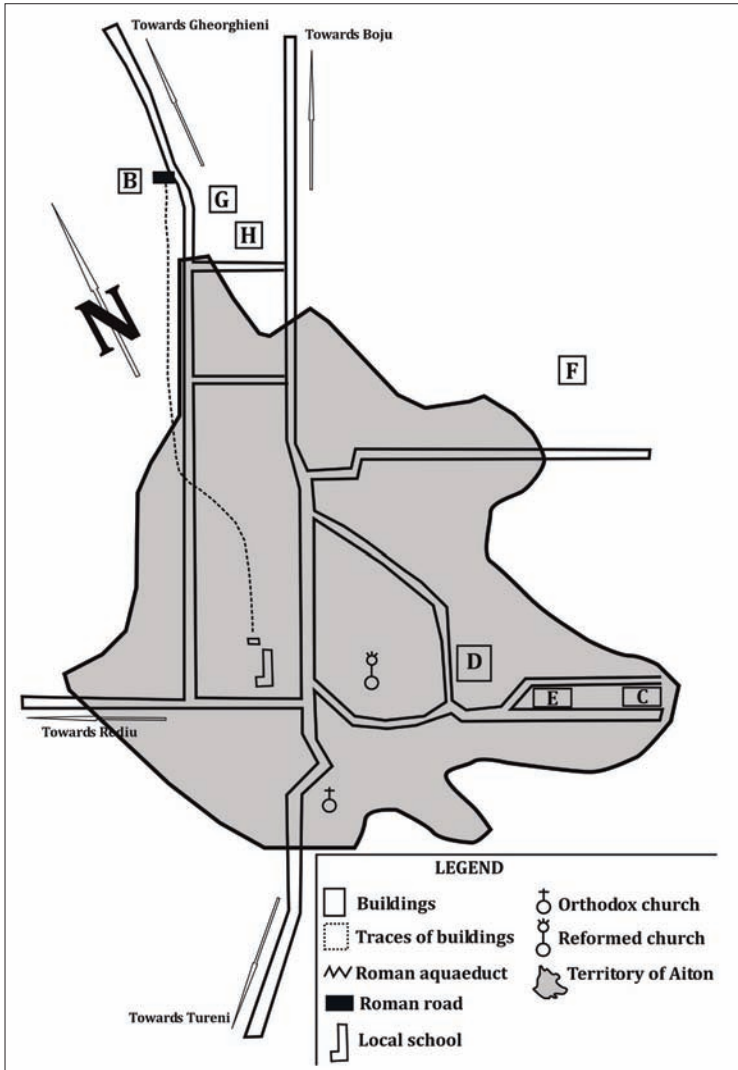
FIGURE 4. So-called "building G", located in the northern part of Aiton (redrawn after Moțu, 1990–1991, 194, Figure 2).

the south-east of the village, where fragments of tiles and stones have been found, scattered on the surface due to the agricultural work. Traces of another building have been identified 0.5 kilometres south-west of the village. The same authors mention another point, located about one kilometre south of the rivulet Togu, on its right terrace, where ceramic fragments have been identified. All these data are more or less difficult to locate and have never been accurately mapped.

The local gazetteer (Crișan, Bărbulescu, Chirilă, Vasiliev, Winkler, 1992, s.v. Aiton, p. 22-26), records 22 points with archaeological discoveries in Aiton. Arranging these records from south to north and in summary, we are able to provide the following topographic details: 1.

Close to the rivulet Togu there is a small terrace, 1 kilometre south of the entrance to the village. Ceramic fragments belonging to the Roman period have been discovered here; 2. In the south-east of the village, at a point indicated by the toponym "La Cânepi", numerous archaeological remains have been discovered: stones, tiles, ceramic fragments. Several sections have been excavated over an area of approximately 40 × 50 m. The foundations of a building of 17.6 × 14 m have been discovered. The building had several rooms. Below the Roman level, fragments of prehistoric ceramics have also been found; 3. On a small terrace, positioned close to the southern entrance to the village, traces of several former walls have been observed, scattered on the
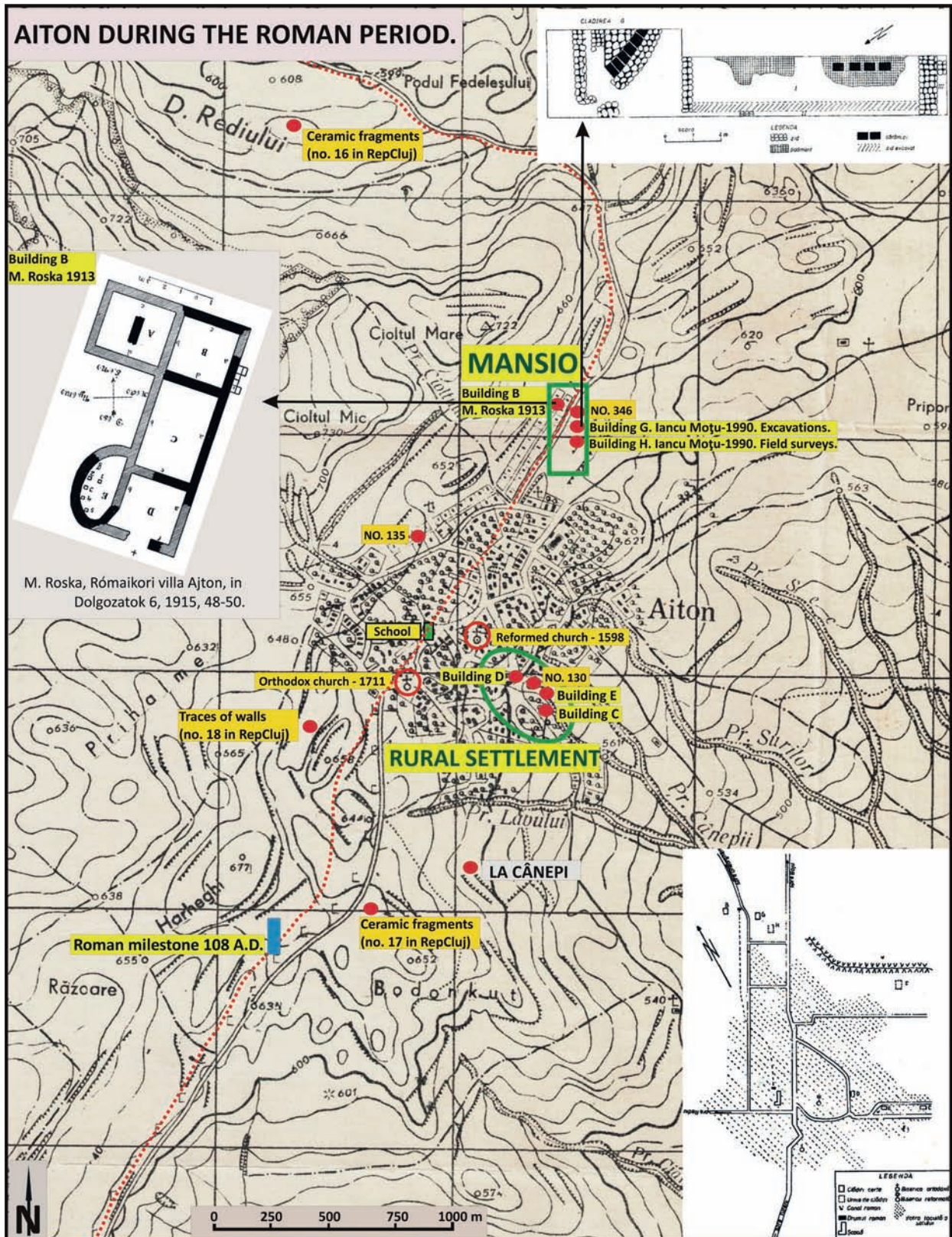
FIGURE 5. The topography of Aiton, indicating the location of a possible *mansio* and the rural settlement (Map: F. Fodorean).
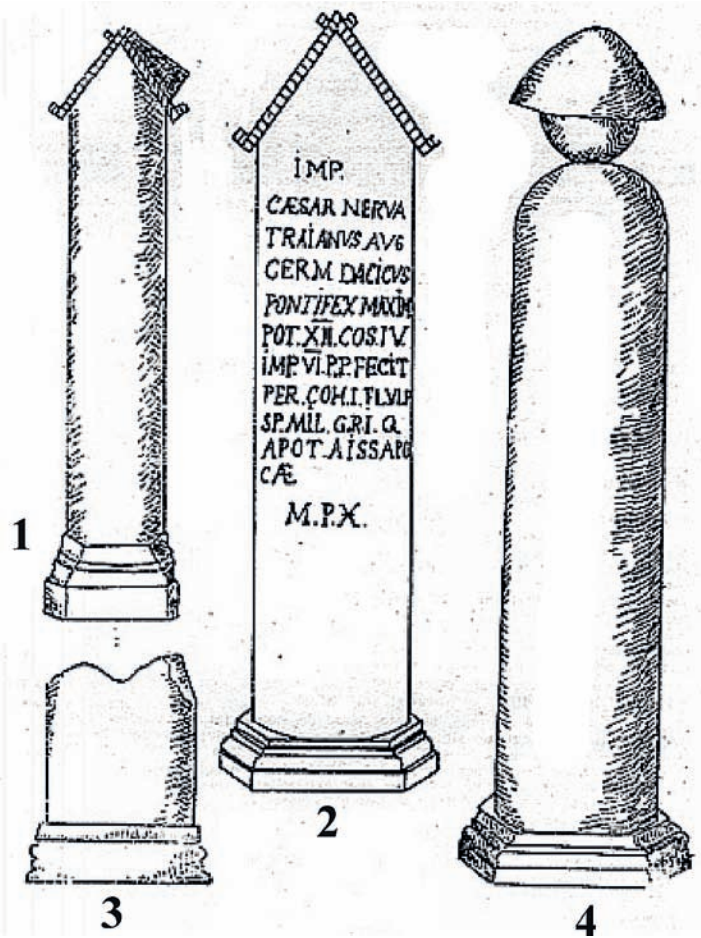
FIGURE 6. Drawing with the milestone discovered in 1758 in Aiton
(after Winkler 1982a, 83).

surface; 4. In the garden of house no. 130, archaeological excavations led to the discovery of a channel 11.60 m in length. Roman ceramic fragments have been discovered close to this channel. Below this level, prehistoric fragments of ceramic have been found. Above the channel, two fragments of Roman monuments have been identified, one of them dedicated to IOM; 5. Agricultural works led to the discovery of Roman materials in the gardens of houses no. 83, 84, 116, 121, 126, 160 and 316; 6. In the garden of the Orthodox church, a Roman terracotta statuette representing a female was discovered; 7. In the garden of house no. 135, fragments of Roman ceramics have been discovered. Archaeological excavations were carried out here. Four sections were excavated, revealing a corner from a building; 8. In the garden of house

no. 346, other remains from a Roman settlement have been found, together with a large quantity of Roman ceramic fragments.

To summarise, all these discoveries represent solid proof of the existence, during the Roman period, of a rural settlement within the current territory of the village Aiton, in direct connection with the most important road in Roman Dacia.

4. THE CURRENT RESULTS. SOME CONCLUDING REMARKS. THE FUTURE OF THE **TIR-FOR** PROJECT IN ROMANIA

After six years of involvement in the project, the Romanian team has managed to reach several important milestones. We are approaching the final stage for our text. All the sites from Roman
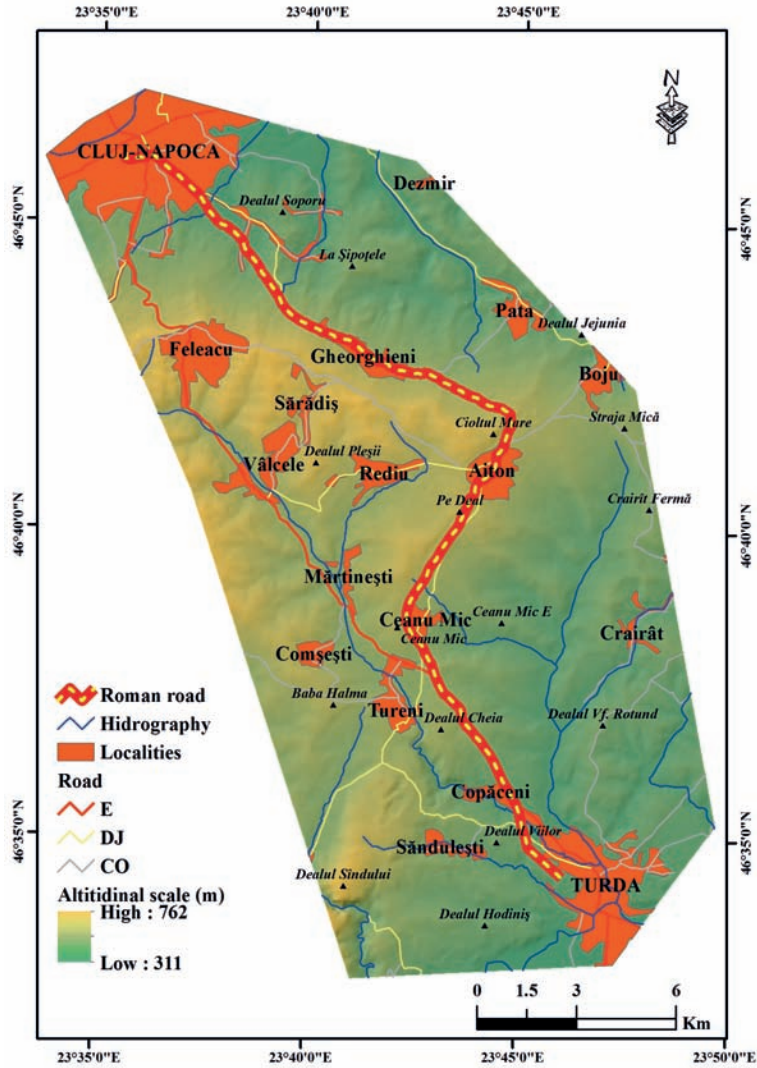
FIGURE 7. Digital map with the route of the imperial Roman road from Turda (Potaissa) to Cluj-Napoca (Napoca) (Map: F. Fodorean).

Dacia have been carefully documented and mapped (Fig. 8). We have followed a precise methodology in order to produce up-to-date information for each and every point with Roman discoveries within the territory of Dacia. We have also selected a significant number of illustrations, photographs and a topographic plan of important settlements because they are useful in understanding complex aspects concerning the topography of certain sites. Following all these achievements, we have uploaded data on 1446 sites (*Tabula Imperii Romani* - Institut d'Estudis Catalans - Union Académique Internationale (iec. cat)). This year we hope to publish the printed edition of the new volume for TIR Romania, L34 and L35.

Regarding the FOR part of the project, the site of Potaissa has been chosen to begin this part of the project for several reasons. First, we have good knowledge of this site (the legionary fortress, the city and its *territorium*), based on archaeological excavations carried out here since 1971. Fifty campaigns of archaeological excavations have revealed important areas of the fortress, such as the *principia*, the *thermae*, the defensive elements, the interior roads, the *horrea*, the barracks of the soldiers, and an exceptional grave of a Germanic princess buried in the baths of the abandoned fortress during the second half of the 5th century AD. The ancient city is less known but, in the last 50 years, preventive archaeological research has also revealed parts of this (the *officina*, sections of
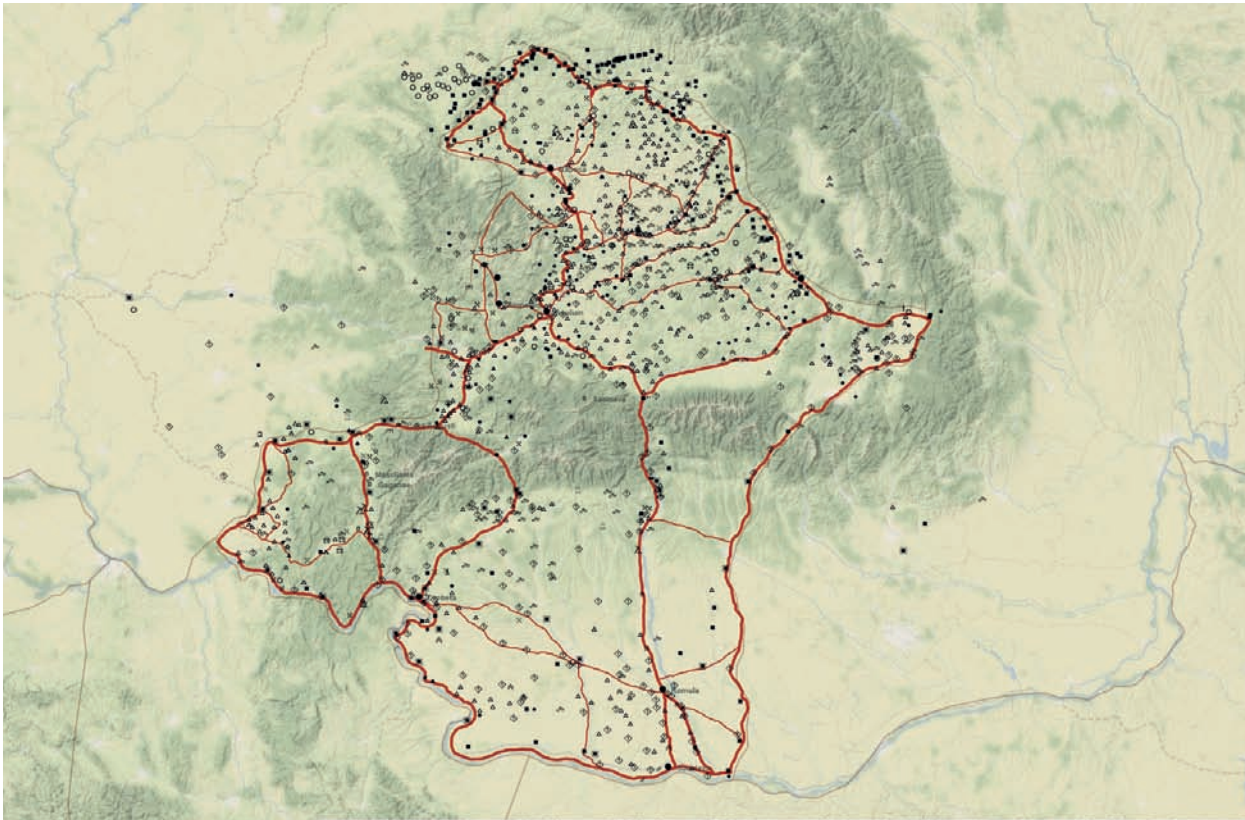
FIGURE 8. Roads and settlements from Roman Dacia digitised in the online TIR platform (*Tabula Imperii Romani* - Institut d'Estudis Catalans - Union Académique Internationale (iec.cat)).[4]

roads, aqueducts, tombs belonging to two cemeteries, a *cella vinaria* excavated in 1978, etc.). For the FOR part of the project, we will produce maps at different scales (1:5,000, 1:10,000, 1:25,000), with different types of sites.

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4. I would like to express my gratitude to my colleague, Pau de Soto, who helped me during the process of producing this map.

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