

First Joint Working Group & Management Committee Meeting



Meeting Report

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REVIEWED BY: SAGA Core Group

Contents

About SAGA	3
Aims & Objectives	4
Venue & Local Organiser (LO)	5
Programme	6
Participants	11
Daily Summary	14
DAY 1: Brainstorming	14
DAY 2: WG Meetings	22
DAY 3: Wrap-up & 2nd MC Meeting	23
References	24
Annexes	25

List of Figures

Figure 1: Illustration encapsulating SAGA's concept (by Carmen Cuenca-García)	3
Figure 2: Overall management structure of SAGA (by Carmen Cuenca-García).....	3
Figure 3: Figure 3 shows the participants of ISSGAP Workshop 1 during a discussion session	4
Figure 4: Participants of the SAGA's kick-off meeting in Brussels (26th October 2018).....	4
Figure 5: General view of the IMS_FORTH institute	5
Figure 6: LO Committee (by Carmen Cuenca-García)	5
Figure 7: Participants during the first day of the meeting ((by Kleanthis Simyrdanis).....	10
Figure 8: Meeting participants (by Carmen Cuenca-García).....	11
Figure 9 Marija Slijivic-Ivanovic during her presentation (by Kleanthis Simyrdanis).....	15
Figure 10: Neli Jordanova during her presentation (by Kleanthis Simyrdanis)	15
Figure 11: Dragana Stamenov during her presentation (by Kleanthis Simyrdanis).....	16
Figure 12: Carmen CG & Arne Stamnes during their presentation (by Kleanthis Simyrdanis).....	16
Figure 13: Kseniia Bondar during her presentation (by Kleanthis Simyrdanis).....	17
Figure 14: Anne Roseveare during her presentation (by Kleanthis Simyrdanis).....	18
Figure 15: Jörg Fassbinder during his presentation (by Kleanthis Simyrdanis).....	18
Figure 16: Hana Grison during her presentation (by Kleanthis Simyrdanis).....	19
Figure 17: Nikos Papadopoulos during his presentation (by Kleanthis Simyrdanis).....	19
Figure 18: Mahmut Göktuğ Drahor during his presentation (by Kleanthis Simyrdanis).....	20
Figure 19: Ivana Pandzic during his presentation (by Kleanthis Simyrdanis).....	20
Figure 20: Participants during the WG meetings (by Agenese Kukela & Carmen CG).....	22
Figure 21: Participants during the WG Leaders summary session (by Kleanthis Simyrdanis	23
Figure 22: Group photo (by Kleanthis Simyrdanis).....	24

About SAGA



Figure 1

SAGA is **funded by the European Cooperation in Science & Technology (COST)** for four years (26th October 2018 - 25th October 2022). The alliance brings together geophysicists, archaeologists, soil scientists, geologists and a wide range of experts in other geoscience sub-disciplines coming from research, commercial and cultural heritage management institutions.

The alliance is structured into four Working Groups (WG) that will focus efforts to achieve a number of specific scientific tasks (Figure 2). The objectives and tasks of these WG are described in **SAGA's published proposal** (Cuenca-Garcia et al., 2018). Each WG is coordinated by a WG Leaders and managed by a Management Committee (MC) composed by MC members nominated by COST countries signatory of SAGA.

Soil science & Archaeo-Geophysics Alliance: going beyond prospection

SAGA is **a new network of scientists** that aims to develop, promote and facilitate scientific activities focused on integrating geophysics and soil science. Figure 1 encapsulates SAGA's concept (by Carmen Cuenca-García).



In order to achieve SAGA's objectives and tasks, the alliance will make use of a range of **networking tools** available for all funded COST Actions (e.g. management meetings, workshops, conferences, short-term scientific missions-STSM, training schools and conference grants).



Aims & Objectives



Figure 3

After SAGA's kick-off meeting in Brussels (26th October 2018) (Figure 4), the **"First Joint Working Group (WG) & Management Committee Meeting (MC)"** was the first proper scientific event of SAGA. This 3-days event was held in Rethymno at IMS-FORTH. This was also the host institution where the original idea behind SAGA was conceived during the first **"Interactions between Soil Science & Geophysics in Archaeological Prospection (ISSGAP)"** workshop (Armstrong, Cuenca-García, & Moffat, 2015). Figure 3 shows the participants of ISSGAP Workshop 1 during a discussion session. The COST proposal drafted during the second ISSGAP workshop also held at the same institution.

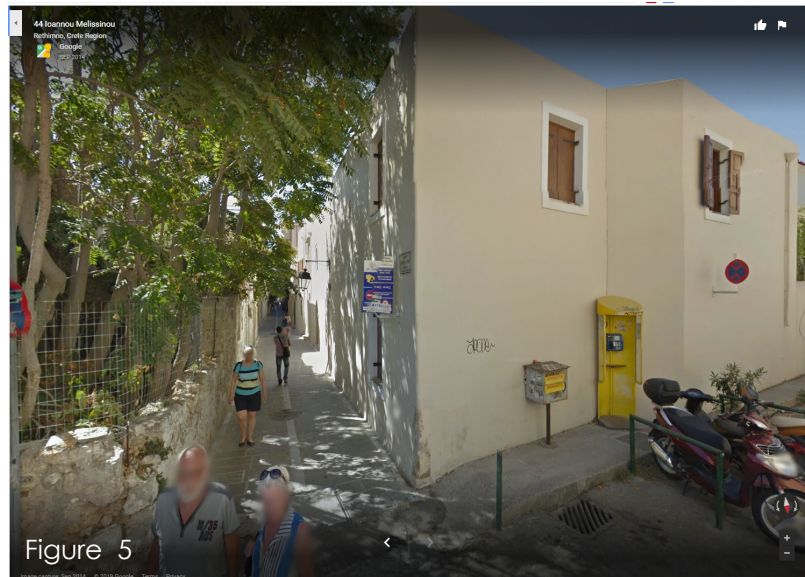
The overall **aims** of this "First Joint WG & MC Meeting" were to:

- facilitate communications between SAGA participants with the **objectives** of networking & developing an Action Plan for each WG
- have a second management meeting



Figure 4

The meeting venue was the Institute for Mediterranean Studies (IMS)-Foundation for Research & Technology (FORTH) located in Rethymno, Crete, Greece (Figure 5). The Local Organiser (LO) Committee (Figure 6) was led by Apostolos Sarris & Nikos Papadopoulos (GeoSatReseArch, IMS-FORTH). Elina Aidona and George Vargemezis (Aristotle University of Thessaloniki) produced the conference booklet, prepared the Pecha Kucha session and provided general support during the meeting. Aris Kidonakis & Angelos Chliaoutakis (IMS-FORTH) provided technical support. Kleanthis Simyrdanis, (GeoSatReseArch, IMS-FORTH) took all the official pictures of the meeting.



First Joint Working Groups & Management Committee Meeting (Rethymno, 4-5-6 March 2019)



The Local Organisers (LO)



Apostolos
Sarris

Nikos
Papadopoulos

Aris
Kydonakis

Angelos
Chliaoutakis



FORTH
INSTITUTE FOR MEDITERRANEAN STUDIES

GeoSat
ReSeArch
Lab of Geophysical-Satellite
Remote Sensing and Archaeoenvironment



Elina
Aidona

George
Vargemezis



ARISTOTLE
UNIVERSITY OF
THESSALONIKI

Figure 6

Programme

6

Monday 4th March 2019			
PLENARY (Big Conference Room)			
9:00	9:30	Morning coffee	
Session 1 – Introduction (by the Chair)			
9:30	09:45	Welcome	
09:45	10:00	Meeting Objectives & Schedule	
Session 2 – Brainstorming (Chaired by the LO)			
10:00:00	10:06:40	Session Introduction	Apostolos Sarris (Vice-Chair & LO)
TOPIC 1: General presentations of SAGA MC members			
10:06:40	10:13:20	Delivering a message: ambitious plans of an Intermediary	Agnese Kukela (SAGA's SCM)
10:13:20	10:20:00	Clare Wilson	Clare Wilson (WG 1 Leader)
10:20:00	10:26:40	Mercedes Solla	Mercedes Solla
10:26:40	10:33:20	My research activity	Yuval Goren
10:33:20	10:40:00	Soil physico-chemical properties: characterization and data processing (Research group from Belgrade)	Marija Sljivic-Ivanovic
10:40:00	10:46:40	The application of geophysics for archaeological purposes in Lithuania	Andra Strimaitienė
10:46:40	10:53:20	Research expertise of Palaeomagnetic Laboratory in Sofia, Bulgaria	Neli Jordanova
10:53:20	11:00:00	My research	Nurit Shtober Zisu
11:00:00	11:30:00	Break	
11:30:00	11:36:40	Question time TOPIC 1	
11:36:40	11:43:20	Microbiology Laboratory	Dragana Stamenov
11:43:20	11:50:00	The TEMAR research group at the NTNU University Museum in Trondheim, Norway	Carmen Cuenca-Garcia & Arne Anderson Starnes
11:50:00	11:56:40	The Discovery Programme: Remote sensing past and future	Robert Shaw
11:56:40	12:03:20	Research activity of archaeo-geophysical group from Taras Shevchenko National University of Kyiv (Ukraine)	Kseniia Bondar
12:03:20	12:10:00	Question time TOPIC 1 presentations	
12:10:00	12:16:40	Geophysics, Geophysicists and Soils – Commercial Considerations	Anne Roseveare
12:16:40	12:23:20	Soil magnetism and magnetometry	Jörg Fassbinder
12:23:20	12:30:00	Utilisation of enhanced derivatives in low-amplitude anomalies recognition in archaeomagnetic maps	Roman Pasteka
12:30:00	12:36:40	Magnetic properties of soils	Hana Grison
12:36:40	12:43:20	Soil parameter analysis for GPR prospection	Roland Linck
12:43:20	12:50:00	Minimal-invasive heritage management in Vestfold County, Norway	Petra Schneidhofer
12:50:00	12:56:40	Electrical Resistivity Tomography for Archaeological & Environmental Applications	Nikos Papadopoulos
12:56:40	13:03:20	The Šapinuwa Integrated Geophysical and Archaeological Project	Mahmut Göktuğ Drahor
13:03:20	15:00:00	Lunch	

15:00:00	15:06:40	Role of microgravimetry research in cavities and low-density zones interpretation	Roman Pasteka
15:06:40	15:13:20	Archaeology in Republic of Srpska. Application of modern methodology - study case Kastel Banja Luka	Ivana Pandzic
15:13:20	15:20:00	Archaeological site Vižula near Medulin, Istria, Croatia - Excavation & new archaeological approach	Kristina Dzin
15:20:00	15:26:40	Question time TOPIC 1 presentations	
15:26:40	15:33:20		
15:33:20	16:00:00	Break	
TOPIC 2: Presentation of research/project ideas related to SAGA			
16:00:00	16:06:40	Position monitoring of the position of a GPR antenna on vertical surfaces	Raffaele Persico
16:06:40	16:13:20	Presentation of Geophysical and Archaeological Team from the Czech Republic	Jaroslav Barta
16:13:20	16:20:00	Implementation of COST policies	Mercedes Solla
16:20:00	16:26:40	Question time on TOPIC 2 presentations	
TOPIC 3: Proposals to host a Training School			
16:26:40	16:33:20	Training school proposal - Finland	Satu Koivisto
16:33:20	16:40:00	The basics of Archaeological Geophysics in Iturissa	Ekhine Garcia
16:40:00	16:46:40	Training School Proposal - Malta (or Sicily)	Sebastiano D'Amico
16:46:40	16:53:20	Training School Proposal	Miljenko Jurkovic
16:53:20	17:15:00	Question time on TOPIC 3 presentations	
17:15:00	17:30:00	Sessions feedback, other communications (by the LO) & Group Picture	

*Adriano Sofo's presentation is out of the schedule and will be delivered as soon as he reaches the venue.

Tuesday 5th March 2019		
PARALLEL SESSIONS		
9:00	9:30	Morning coffee

WORKING GROUP 1 (Meeting Room: Kalos Ontas) / G3 Leader: Clare Wilson				
09:30	09:45	Introduction to WG 1 and its Objective / Deliverables (WG Leader)	Brief overview of specific objectives, tasks and deliverables in WG1	
Session 1				
09:45	11:00	Delivering in SAGA WG1: Who, What and How	Introduction to members, review of WG objectives existing tasks and identification of new tasks. Discuss what is missing from the manifesto, how we may take the manifesto forward within COST WG1.	
11:00	11:30	Break		
Session 2				
11.30	13.00	Planning for WG1	Discussion of WG priorities and schedule. Development of an out-line work plan and identification of ways of working within WG.	
13:00	14:30	Lunch		
Session 3				
14:30	16:30	Detailed planning of GP2 events and tasks	Knowledge database (D1.2) and Workshop (D1.3)	Plan delivery of D1.2 and D1.3, as well as additional tasks identified in the morning and assign tasks.
16:30	17:00	Summary of WG Meeting Outputs (by WG leader)	WG meeting report (D1.1)	Draft the WG meeting report and objectives for Day 3 of the meeting

*Adhoc break (c. 15:45-16:15)

WORKING GROUP 2 (Meeting Room: Big Conference Room) / WG2 Leader: Philippe De Smed†		
WG2 - Intro/Objectives/Deliverable (by WG Leader)		
WG2 - Session 1: Who, what and how		
09:30	11:00	<p>A) General introduction</p> <ol style="list-style-type: none"> 1. What: Presentation of the SAGA>WG2 objectives and deliverables; 1. Who: working group member composition (and presence), overview of collaborators' background; 1. How: which means do we have to address WG2 goals, and how can members/participants/... contribute. <p>B) Detailed overview of WG2 Tasks</p> <ol style="list-style-type: none"> 1. Presentation of tasks; 2. Leader responsibilities; 3. Link to outcomes of Day 1 general sessions <p>C) Questions/Discussion</p>
11:00	11:30	Break
WG2 - Session 2: Planning		
11:30	13:00	<p>A) Schedule</p> <ol style="list-style-type: none"> 1. Tentative overview of yearly planning (2019 - 2022) <ol style="list-style-type: none"> a. reprise of tasks (taking into account input of Session 1) b. prioritisation and sequence of tasks: proposal and discussion 2. Planning Grant Period 2 (04.2019 - 04.2020) <ol style="list-style-type: none"> a. specific objectives b. timing c. feed into grant period 3 d. discussion
13:00	14:30	Lunch
WG2 - Session 3: Getting started		
14:30	17:00	<p>A) Grant period 2: specific tasks</p> <ol style="list-style-type: none"> 1. Reprise of conclusions Session 2 2. Concrete action plan 2019-2020: Listing of conferences, STSM proposal, workshop & training school ideas; Presentation of ongoing initiatives; Call for ideas 3. Future workflow: How we proceed, on- and offline; Tentative meeting schedule; Reporting 4. Any other business 5. Conclusion

Adhoc break (c. 15:45-16:15)

WORKING GROUP 3 (Meeting Room: Library of Ottoman Studies) / WG3 Leader: Jan Horak		
WG3		Intro/Objectives/Deliverable (by WG Leader) / General discussion on ideas of WG3
09:30	10:00	<p>(WG leader and all)</p> <ol style="list-style-type: none"> 1. Introduction of WG3, objectives and deliverables according to MoU 2. Who we are – brief presentation of participants of WG3, their specialization and so on 3. Introduction to proposed and pre-discussed topics 4. Some things are obligatory – objectives and deliverables of MoU 5. Present Action plan report guidelines – what are the important obligatory things to discuss for every objective / task
10:00	10:30	<p>(All)</p> <ol style="list-style-type: none"> 1. Discussion on idea of WG3 2. Discussion should also follow and gain from SAGA brainstorming from day 1 (4 March) 3. What is the aim of WG3 – should we add something? 4. What are the goals of WG3 5. Who should be the beneficiary of WG3 work 6. Are there any objections to proposed objectives? 7. Are there any ideas on new / other objectives which should be accomplished? 8. We should agree on list of objectives to achieve in WG3 9. The objectives should be prioritised

10:30	11:00	(All) 1. Discussion on ways, how to achieve the goals 2. Vary according to the objective character – e.g. info in WG3 activity proposal document sent to participants
11:00	11:30	Break
11:30	12:00	(WG leader): Planning – introduction to what should be planned, what should have been done and when (MoU objectives and deliverables etc.), what is necessary (plan the budget, time schedule, numbers of participants...)
12:00	12:30	M 3.2, D 3.3, D 3.4 (All) 1. Detailed plans for Grant period 2 2. Time, location, number, aims and objectives... of Meetings, STSMs, research coordination with WG2, ITCs, conference sessions, training schools...
12:30	13:00	(All): Plans for whole SAGA duration
13:00	14:30	Lunch
14:30	14:45	(WG leader) 1. Introduction to detailed proposed topics / objectives and work 2. Why the topics/objectives are proposed 3. How they contribute to WG3 objectives and deliverables 4. How they contribute to SAGA 5. Basic characteristics of the topics/objectives
14:45	16:30	(All): Detailed discussion on proposed topics and work
16:30	17:00	(All) 1. Conclusive discussion 2. What was achieved during the day 3. What objectives have been chosen to be accomplished 4. What are the main ways to do it 5. What are bases for the work in Grant period 2 6. What are the links/needs for cooperation with other Working Groups 7. This will be the basis for the meeting report 8. This will be the basis for the day 3 (6 March) joint all WGs meeting

*Adhoc break (c. 15:45-16:15)

WORKING GROUP 4 (Meeting Room: Smaller Conference Room) / WG4 Leader: Sebastiano D'Amico
SCHEDULE TBC

*Adhoc break (c. 15:45-16:15)

17:00	17:30	Meeting @ Kalos Ontas Room (only Core Group)
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Wednesday 6 th March 2019		
PLENARY (Big Conference Room)		
9:00	9:30	Morning coffee
9:30	09:45	Intro of the Day (Chair: Carmen Cuenca-Garcia)
Session 1 – WGs Action Plans & Synergies		
9:45	10:00	Presentation of the Action Plan & Schedule for WG1 by Clare Wilson
10:00	10:15	Presentation of the Action Plan & Schedule for WG2 by Philippe De Smedt
10:15	10:30	Presentation of the Action Plan & Schedule for WG3 by Jan Horak
10:30	10:45	Presentation of the Action Plan & Schedule for WG4 by Sebastiano D'amico
10:45	11:00	Discussion & feedback on WG session organisation
11:00	11:30	Break

Session 2 – Second MC Meeting (by the Chair & Grant Holder, minutes taken by the Vice-Chair)		
11:30	13:00	<ol style="list-style-type: none"> 1. Verification of the presence of two-thirds of the Participating COST Countries 2. Agenda adoption 3. Approval of minutes and matters arising of last meeting 4. Update from the Action Chair 5. Update from the Grant Holder: Action budget status 6. Update from the COST Association, if a representative is present
13:00	14:30	Lunch
14:30	15:45	<ol style="list-style-type: none"> 1. Implementation of COST policies on: ECI, ITC, 2. Follow-up of MoU objectives: progress report of working groups 3. Scientific planning
15:45	16:15	Break
16:15	17:15	<ol style="list-style-type: none"> 1. Requests to join the Action? 2. AOB 3. Location and date of next meeting
17:15	17:30	Closing



Figure 7

Full list of participants

Participants

A total of **54 participants from 25 COST Action SAGA signatory countries** attended the meeting (Figure 4).

The **biographies** of the meeting participants is available [here](#) and the full list of participants can be found [here](#). The final distribution of participants by Working Group (WG) is detailed below (Figure 6, Figure 7, Figure 8 & Figure 9).

Apologies were sent by:

- Frederic Nguyen (MC member from Belgium),
- Kyriacos Themistocleus (MC member from Cyprus)
- Kristina Dzin (MC member from Croatia)
- Sebastiano D'Amico (MC member from Malta & WG4 Leader) who was unable to attend the meeting. WG4 Deputy Leader, Yuval Goren, substituted Sebastiano on this role for the meeting.



First Joint Working Groups & Management Committee Meeting (Rethymno, 4-5-6 March 2019)



Figure 8

Check their biographies [here](#)

Participant list of WG 1: Knowledge Creation, Exchange & Development meeting

Clare Wilson (Leader)	United Kingdom	c.a.wilson@stir.ac.uk
Jörg Fassbinder (Deputy)	Germany	fassbinder@geophysik.uni-muenchen.de
Carmen Cuenca-Garcia (Chair)	Norway	carmen.cuenca-garcia@ntnu.no
Ana Strimaitienė	Lithuania	anasimnas@gmail.com
Dragana Stamenov	Serbia	agana.stamenov@polj.uns.ac.rs
Marijana Kapovic Solomun	Bosnia and Herzegovina	marijana.kapovic-solomun@sf.unibl.org
Natasa Cerekovic	Bosnia and Herzegovina	natalijabl@yahoo.com
Nurit Shtober-Zisu	Israel	nshtober@research.haifa.ac.il
Ökmen Sümer	Turkey	okmen.sumer@gmail.com
Roman Pasteka	Slovakia	pasteka@fns.uniba.sk
Rokas Vengalis	Lithuania	rokasven@gmail.com

Participant list of WG2: Integrated Field Methods & Testing meeting

Philippe De Smedt (Leader)	Belgium	philippe.desmedt@ugent.be
Mahmut Göktuğ Drahor (Deputy)	Turkey	goktug.drahor@deu.edu.tr
Petra Schneidhofer (Deputy)	Norway	petras@vfk.no
Apostolos Sarris (Vice-chair)	Greece	asaris@ret.forthnet.gr
Adriano Sofo	Italy	aiano.sofo@unibas.it
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Roland Linck	Germany	linck@geophysik.uni-muenchen.de
Martin Roseveare	United Kingdom	m.roseveare@tigergeo.com
Neli (Daniela) Jordanova	Bulgaria	neli_jordanova@hotmail.com
Robert Shaw	Ireland	robert@discoveryprogramme.ie
Satu Koivisto	Finland	satu.m.koivisto@helsinki.fi
Sebastian Różycki	Poland	sebastian.rozycki@pw.edu.pl
Simo Spassov	Belgium	simo.spassov@meteo.be
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Frédéric Nguyen	Belgium	f.nguyen@ulg.ac.be
Milan Gazdić	Montenegro	gazdic.milan@gmail.com
Simonida Djuric	Serbia	simonida@polj.uns.ac.rs
Arne Anderson Stamnes	Norway	arne.stamnes@ntnu.no
Ingrid Salvesen (Grant Holder)	Norway	ingrid.salvesen@ntnu.no

Participant list of WG3: Data Integration, Visualisation & Parametrisation meeting

Jan Horák (Leader)	Czech Republic	horakjan@fzp.czu.cz
François-Xavier Simon (Deputy)	France	fxsimus@hotmail.com
Julien Thiesson	France	julien.thiesson@sorbonne-universite.fr
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Meriç Aziz Berge	Turkey	meric.berge@deu.edu.tr
Ivana Pandzic	Bosnia and Herzegovina	ivanapandzic@gmail.com
Ivana Smičiklas	Serbia	ivanat@vin.bg.ac.rs
Marija Šljivić-Ivanović	Serbia	marijasljivic@vin.bg.ac.rs
Mercedes Solla	Spain	merchisolla@cud.uvigo.es
Nikos Papadopoulos	Greece	nikos@i.forth.gr
Jelica Gazdić	Montenegro	gazdic.jelica@gmail.com

Participant list of WG4: Training, Dissemination & Outreach meeting

Sebastiano D'amico (Leader)	Malta	sebastiano.damico@um.edu.mt
Yuval Goren (Deputy)	Israel	ygoren@bgu.ac.il
Agnese Kukela (SCM)	Latvia	agnese.kukela@gmail.com
Kayt Artmstrong (STSM coordinator)	United Kingdom	kate.l.artstrong@durham.ac.uk
Elina Aidona	Greece	aidona@geo.auth.gr
Wesa Perttola	Finland	wesa.perttola@helsinki.fi
Ladislav Smejda	Czech Republic	smejda@fzp.czu.cz



DAY 1: Brainstorming

During DAY 1 (Monday 4th March 2019), there was a plenary session where the participants were challenged to present their work, groups, proposals and ideas related to SAGA in a **speedy presentation**. The objective of this first session was to allow the MC members to learn a wee bit

more about each other and start networking. The presentations followed a Pecha Kucha format: an automated power point presentation with 20 images x 20 seconds each and designed to be completed in 6 minutes and 40 seconds. This allowed a total of 29 presentations during the session. The presentations are available [here](#).

Abstracts

TOPIC 1: General presentations of SAGA MC members

1. "Clare Wilson" (WG 1 Leader)

(University of Stirling, Stirling, Scotland)

I am a senior lecturer in soil science at the University of Stirling, Scotland. I'm a soil scientist with research in more traditional soil areas such as soil disturbance, pollution, carbon sequestration, but my main focus (and that of my colleagues) is the application of soil physical, chemical and biological process knowledge from the micro-scale to landscape level, to archaeological questions and problems. I look at site formation processes, site use and past landscape management. There is a focus on risk mapping and risk reduction to cultural heritage from environmental and land use change, but to do this effectively we first need to have good 'visibility' of buried cultural heritage.

2. "Delivering a message: ambitious plans of an Intermediary"

Agnese Kukela (Science Communication Manager_SCM, University of Latvia, Riga, Latvia)

The main task of a Science Communication Manager of a COST Action is to communicate and disseminate, i.d., to act as a link - an intermediary between science and society. The presentation informs about possible dissemination channels used to deliver the message about COST Action SAGA, as well as shares some ideas on how to reach wider target audience of our project.

3. "Mercedes Solla"

(Defense University Center, Marín, Spain)

My research is focused on the application of the GPR to cultural heritage (mainly, historical buildings but also

archaeological). Commonly, we integrated the GPR results in a geomatic survey (LiDAR or photogrammetry). Additionally, we use thermography in combination with GPR for an exhaustive shallower investigation in buildings (e.g. Cracking). Lastly, I employ FDTD modelling for more accurate interpretations.

4. "My research activity"

Adriano Sofo (DiCEM, Department of the European and Mediterranean Cultures: Architecture, Environment, Cultural Heritage, University of Basilicata, Potenza, Italy)

I will present my department and my research activity in order to find common research fields to be applied in SAGA. I am available to organize the next SAGA meeting.

5. "Soil physico-chemical properties: characterization and data processing (Research group from Belgrade)"

Marija Sljivic-Ivanovic (Vinča Institute of Nuclear Sciences, Belgrade, Serbia)

This presentation aims to introduce the team of researchers from the Vinča Institute of Nuclear Sciences (Belgrade, Serbia). The underlying data about the "Vinča", the largest, multidisciplinary institute in the country, will be given. The chief scientific activities of the group will be presented, with the emphasis on those related to SAGA. The types of analysis so far conducted for soil characterization and the methods of data processing and interpretation will be briefly reviewed. Furthermore, the general capacities of the team and the Institute as a whole will be discussed in terms of possible contribution to SAGA action goals.



Figure 9

6. "The application of geophysics for archaeological purposes in Lithuania"

Andra Strimaitienė (Lithuanian History Institute, Vilnius, Lithuania)

The presentation initially briefly summarizes the historic background and general current situation in archaeogeophysics in Lithuania. Then it describes our own work related to SAGA with brief overview of the range of methods used for prospection purposes. Finally, it presents our recent joint project as an example of possible integrated strategy.

7. "Research expertise of Palaeomagnetic Laboratory in Sofia, Bulgaria"

Neli Jordanova (National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences, Sofia, Bulgaria)

Palaeomagnetic Laboratory in Sofia is unique for Bulgaria and possesses specialized scientific instrumentation for magnetic and palaeomagnetic studies. The main research directions are: Archaeomagnetism; evaluation of ancient firing temperatures of ceramics and burnt clay from destructions; Environmental magnetism, including: Paleoclimate reconstructions from loess-paleosol sediments; Magnetism of soils; Evaluation of soil erosion using magnetic methods; Application

of magnetic methods for evaluation of anthropogenic pollution of soils, sediments and urban areas.

The Bulgarian archaeomagnetic database is among the longest local datasets in the world, covering almost fully the last 8000 years going back to Neolithic. It is successfully utilized for archaeomagnetic dating of sites from Bulgaria and other countries from the Balkan Peninsula. Another recent research direction is determination of firing temperatures of ceramics and burnt clay from destructions using magnetic susceptibility method.

Second major research topic is soil magnetism. Depth variations of different magnetic parameters are utilized for obtaining a precise reconstruction of the particular micro-environmental conditions in different genetic soil horizons. Magnetic data base on topsoil magnetic properties from Bulgaria is compiled and data for different magnetic characteristics are shown in geospatial maps. Soil magnetic properties are applied as classification criteria in genetic soil classification system.



Figure 10

8. "Microbiology Laboratory"

Dragana Stamenov (Faculty of Agriculture, University of Novi Sad, Novi Sad, Serbia)

General presentation about our team, our work and expectation from the Action.



Figure 11

9. "The TEMAR research group at the NTNU University Museum in Trondheim, Norway"

Arne Anderson Stamnes (Norwegian University of Science and Technology, NTNU University Museum, Department of Archaeology and Cultural History, Trondheim, Norway)

The NTNU University Museum at the Norwegian University of Science and Technology (NTNU) in Trondheim is one of three institutions in Norway with competence and experience in archaeological geophysics, of which this is the only archaeological museum. The Museum has the responsibility to carry out all excavations in this region in Norway, making it easy to get access to all documentation from any excavations in the area.

The NTNU University Museum has had a strategic emphasis on archaeological prospection these last 10 years, resulting in a wide range of published articles, survey reports and experience. Today, this activity is part of the TEMAR (Terrestrial, Marine and Aerial Remote sensing) research group at the Museum, with access to cutting edge survey equipment and software, and with collaboration with other technical research environments at NTNU such as marine technique, geology, applied geophysics and natural geography.

We own a 3D-radar Multi-frequency GPR array, a 16 sensor magnetometer array, as well single channel in-

struments such as GPR, a hand-carried magnetometer array, a magnetic susceptibility meter and a sensor for measuring electromagnetic induction.



Figure 12

10. "The Discovery Programme: Remote sensing past and future"

Robert Shaw (The Discovery Programme, Dublin, Ireland)

The Discovery Programme is a state funded archaeological research company based in Dublin Ireland. Its approach to research has always been multi-disciplinary, looking to incorporate new technologies and approaches to further the understanding of archaeological landscapes. Core to this has been geophysical survey and topographical surveys, mapping micro-topographical detail from lidar or photogrammetric sources.

Currently, the Discovery Programme is working on an EU interreg project, CHERISH, working with Welsh and Irish partners studying the impact of climate change on coastal heritage sites. This 5 year project has expanded the equipment available, increasing geophysical survey capacity, adding multispectral imaging from UAV (drone) platforms, and marine geophysical sensors. Environmental components will contribute to the project with coring and thermoluminescence for dating.

SAGA presents opportunities to the Discovery Programme / CHERISH. We have lots to offer in terms of geophysical and topographic survey experience, but lots to learn in terms of soil science. With an intensive field work programme in the coming years we have the potential to host STSM's or even to host a Training School. Our team members are enthusiastic researchers and may be candidates to undertake STSM's at other institutions.

11. "Research activity of archaeo-geophysical group from Taras Shevchenko National University of Kyiv (Ukraine)"

Kseniia Bondar (Taras Shevchenko National University of Kyiv, Kiev, Ukraine)

The Research Group for Geophysical Prospection of Archaeological Sites has been working in the Institute of Geology of Taras Shevchenko National University of Kyiv since 2006. The Group conducted measurements on the large variety of historical monuments and archaeological sites dating from Early Palaeolithic period to WWII. Geophysical techniques applied include high-resolution magnetometry, ERT, GPR. We study magnetic properties and magnetic mineralogy of soils and cultural layer materials to help interpretation of magnetic data through forward modelling and inversion.. We participate in geoarchaeological projects studying magnetostratigraphy as well as paleoclimatic changes during Holocene – Upper Pleistocene on soils and cave sediments.



Figure 13

12. "Geophysics, Geophysicists and Soils – Commercial Considerations"

Anne Roseveare (Hereford, Tigergeo)

Anecdotal evidence, experience plus a detailed questionnaire undertaken a couple of years ago suggest that commercial archaeological geophysics is under-skilled and under-resourced when it comes to physics and soil science. The discipline has suffered through being popular and being viewed as a soft science, at the expense of proper technical and scientific understanding.

As a consequence, interpretation of the geophysical data is diminished and the archaeological record correspondingly suffers. The problem seems due to two factors: the demographic structure of the profession and the constraints imposed by the structure and external requirements of commercial archaeology.

Demographic structure is a problem due to a low theoretical knowledge of geosciences among the majority of personnel, i.e. ordinary surveyors who are rarely qualified geophysicists. The problem of low incomes hinders retention of qualified geophysicists, exacerbating the issue. Another demographic factor is a lack of interaction between commerce and academia.

Within commercial archaeological geophysics, key decision makers influencing survey design, scope, de-

gree of interpretation and ultimately budgets, are rarely geophysicists. This influence can be manifest alongside scientific ignorance, grandstanding and even disinterest and it is easy to see that incorrect decisions can be made and scientific endeavour stifled.

With a COST Action like SAGA, it will hopefully now become possible to identify and package training needs, plus exert influence, to support the needs of the commercial sector. How best to make a practical difference to technical teaching and scientific opportunity, by academia and commerce alike, will be an important challenge to overcome.



Figure 14

13. "Soil magnetism and magnetometry"

Jörg Fassbinder (LMU-München, Munich, Germany)

The presentation will review the pedogenic formation processes and the role of enhancement and enrichment of ferrimagnetic minerals in archaeological soils.

Furthermore I will highlight the importance and the relevance of the remanent magnetization of archaeological features particular with regard to the archaeological interpretation of magnetometer measurements.



Figure 15

14. "Utilisation of enhanced derivatives in low-amplitude anomalies recognition in archaeomagnetic maps"

Roman Pasteka (Comenius University, Department of applied and environmental geophysics, Bratislava, Slovakia)

Magnetometry is one of the most important methods among archaeogeophysical prospecting approaches - due to its high acquisition velocity and high data sampling rate. During the high definition magnetometric datasets interpretation it is very important to recognize and emphasize low-amplitude anomalies from archaeological objects and natural sources (geological and soil structures). Among the recognition of low-amplitude anomalies an important role is played by edge mappers, which are based on higher derivatives (enhances derivatives filters), numerically computed from the originally acquired magnetic field (or gradient). Majority of enhanced derivatives methods are based on the evaluation of various ratios of derivatives of different kind - mostly horizontal and total derivatives and their components. During the numerical evaluation of derivatives it is important to smooth them properly, because these have the tendency to emphasize errors and noise from the original data - we have introduced a concept of so called regularized derivatives. We try

derivatives. We try to show properties of different enhanced derivatives filters on various archaeomagnetic datasets and suggest the best of them for future application. Of course that these methods can not directly distinguish between anomalies of anthropogenic and natural (geology, soil) origin of interpreted anomalies, but could contribute to its joint interpretation.

15. "Magnetic properties of soils"

Hana Grison (Institute of Geophysics Czech Acad. Sci., Prague, Czech Republic)

Magnetic properties of minerals are making increasingly important contribution to different fields of study of magnetism in soils. In our contribution we will show our work and basic principles of soil magnetometry. In the scope of SAGA, we plan to combine our knowledge of soil science and geophysics in evaluation of soil erosion, detection of hidden objects in strongly magnetic background and much more...



Figure 16

16. Soil parameter analysis for GPR prospection

Roland Linck (LMU Munich, Germany)

Presentation of work done on the in-situ analysis of relevant soil parameters (e.g. dielectric value, soil moisture and conductivity) for GPR archaeological geophysics.

17. "Electrical Resistivity Tomography for Archaeological and Environmental Applications"

Nikos Papadopoulos (GeoSat ReSeArch Lab, IMS-FORTH, Rethymno, Crete, Greece)

The development of multiplexed and multichannel resistivity instrumentation in combination to the compilation of fast and automated inversion algorithms comprised a breakthrough innovation in the geoelectrical exploration, rendering Electrical Resistivity Tomography (ERT) a versatile and flexible method for ground exploration in two, three and four dimensions.

Over the last decade a considerable research effort has been placed on defining the optimum ERT survey and processing strategy and the implementation of diverse techniques to maximize the data inversion speed, reducing at the same time the memory requirements of large data sets.

Another field of active research is the experimental design of optimum configurations having the maximum resolution and its extension to three dimensional electrode arrays.

A number of archaeological and environmental field applications from eastern Mediterranean will highlight the efficiency and robustness of the method in illuminating the spatial and temporal subsurface resistivity changes attributed to specific structures and processes.



Figure 17

18. "The Šapinuwa Integrated Geophysical and Archaeological Project"

Mahmut Göktuğ Drahor (Dokuz Eylül University, İzmir, Turkey)

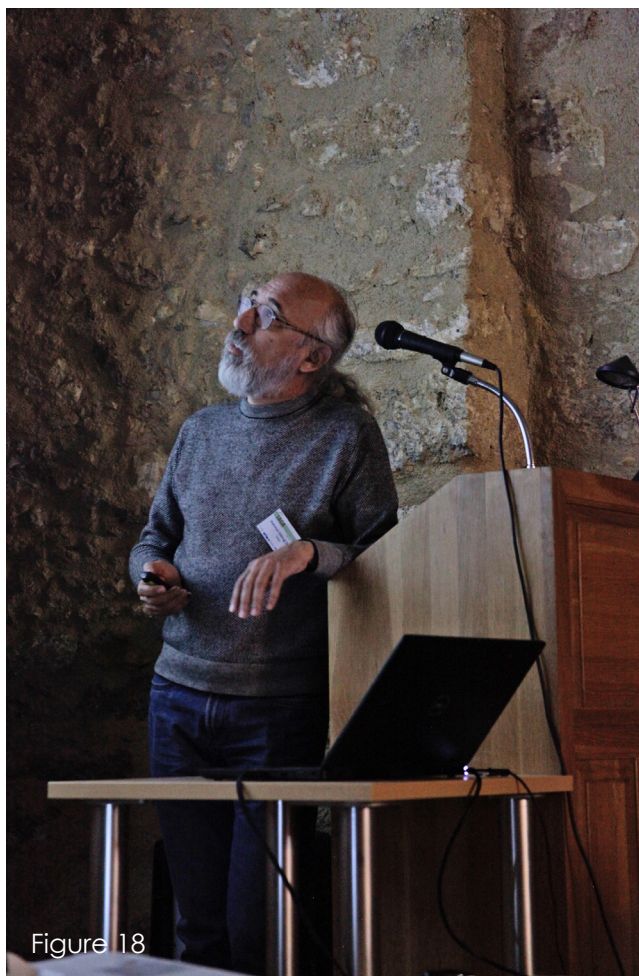


Figure 18

The Šapinuwa archaeological site is one of the important settlements of the Middle Hittite period in Anatolia and is an imperial city. Integrated geophysical studies in this site have been continuing since 2012.

The aim of this project was to better interpret the archaeological context by using integrated geophysical methods. In addition, the test excavations carried out in these areas, which are examined immediately after the geophysical studies, also provide a great benefit to the study.

The success of the integrated studies depends on the physical properties and the contrasts between the soil and the buried archaeological structures. Since the effects that constitute the anomaly are the physical changes of the archaeological structure and the soil covered archaeological target, before the processing of geophysical data sets, measuring the physical properties of soil such as magnetic susceptibility, dielectric permeability, electrical conductivity and pH would be enhanced the interpretation.

In addition, with fully integrated geophysical surveys,

we have clearly seen in our studies that we can better understand the problem. Magnetic gradiometry, GPR, ERT, induced polarization tomography (IPT), seismic refraction tomography (SRT) and Multiple Analysis of Surface Waves (MASW) tomography techniques were used in these studies.

With the help of SAGA, we aim to expand the project and become more holistic. In this context, we are also planning to add potential geophysical methods such as soil conductivity, micro gravity and self-potential (SP) to the current data sets. In addition, physical analysis of the soil is another goal. For this reason, we would like to open our project to interested SAGA researchers.

20. "Archaeology in Republic of Srpska. Application of modern methodology - study case Kastel Banja Luka"

Ivana Pandzic (Archaeology, Bosnia and Herzegovina)



Figure 19

This is the short presentation of archaeology in Republic of Srpska (Bosnia and Herzegovina) emphasizing the new project of geophysics recording of the Kastel in Banja Luka. Kastel is medieval fortress built on Roman remains but never fully researched by archaeologists. It remains are dated from Paleolithic period. The fortress is relatively well-preserved, and is one of Banja Luka's

main attractions, situated on the left bank of the Vrbas River in the very center of town. Currently there are numerous work on walls reconstructions, while neither experts nor the scientific public has a complete archaeological image of Kastel. What we want to do is to get the necessary results of the state below the surface by geophysical recording of the sites, which would be organized in educational sense (training for employees in the cultural sector, students and secondary school students). By analyzing the data we will find out whether in some parts of Kastel there are still hidden prehistoric and ancient (but also later) traces, and whether all parts should be explored by archaeological excavations or not.

21. "Archaeological site Vižula near Medulin, Istria, Croatia - Excavation and new archaeological approach"

Kristina Dzin (Institut for social science "Ivo Pilar", Zagreb, Croatia)

Archaeological site Vižula near Medulin is situated in the middle of Medulin Bay, South Istria. Extensions of archaeological findings are on 25 ha. In 60 years of archaeological investigations is excavated small quantity of architecture. In 2018 we started with an interdisciplinary approach in documentation an investigation of this archaeological site- villa marittima called Villa of Crispus from Imperial time.

TOPIC 2: Presentation of research/project ideas related to SAGA

22. "Position monitoring of the position of a GPR antenna on vertical surfaces"

Raffaele Persico (Institute for Archaeological and Monumental Heritage, Rome, Italy)

Monitoring the position of a GPR antenna on a vertical surface is an issue of interest for prospecting of walls, pillar, columns and possibly vertical rocks or even pedestals or large statues. Usually, these kind of prospecting are performed with high frequency GPR antennas, and consequently the precision of the positioning of the antenna should be of the order of one cm or less. This can be an issue worth considering, especially because a high frequency antenna is generally taken in the hand of the human operator, and it is difficult for him/her to keep constant the distance from the antenna and the soil while taking a long horizontal Bscan (i.e. a Bscan on a large wall at a fixed height). Mechanical positioning systems have been proposed, but in general they are bulky, heavy, expensive, difficult to transport and devoted for a specific case or for laboratory analyses.

Recently, laser methods for monitoring the position of the antennas have been commercialised too, but at the moment they are calibrated for areas of the order of one square meter or slightly more, which is not enough in most practical cases. In this contribution, some preliminary results will be presented regarding the monitoring of the correct position of a high frequency GPR antenna based on a laser meter attached to the antenna, which is a compromise solution between the required precision and the application on relatively large scale vertical prospecting.

23. "Presentation of Geophysical and Archaeological Team from the Czech Republic"

Jaroslav Barta (G IMPULS Praha spol. s r.o., Prague, Czech Republic)

The presentation informed about geophysical activities in Czech Republic and Armenia. We offer activities for WG2 and WG3: geophysical measurement with archaeological studies. The project will be suggested for the next call in participation CA17131. Principal geophysical methods: seismics, resistivity tomography (ERT) and IP tomography, DEMP method (Dipole Electromagnetic Profiling or Slingram), magnetometry and microgravimetry.

24. "Implementation of COST policies"

Mercedes Solla (Defense University Center, Marín, Spain)

This presentation will introduce the role of Policy Coordinator and its benefits for COST Action SAGA.

TOPIC 4: Proposals to host a Training School

5. "Training school proposal – Finland"

Satu Koivisto University of Helsinki / Finnish Heritage Agency, Helsinki, Finland)

26. "The basics of Archaeological Geophysics in Iturissa"

Ekhine Garcia (ARANZADI Society of Science, Donostia - San Sebastián, Basque Country, Spain)

This presentation has as objective to make a proposal to host a Training School at the archaeological site of Iturissa (North of the Iberian Peninsula). The archaeological geophysics is not included on the formation of archaeologists in Spanish education system, so the advantages are not known and the use is not common. This training would cover the theoretical basis and the practical activities at an introductory level. It would focus on multisystem approach and compared interpretation.

tation of the most used geophysical techniques. The basis of soil science and its relation with geophysical response would be included in order to complete the formation.

27. "Training School Proposal"

Miljenko Jurkovic (University of Zagreb, Zagreb, Croatia)

4 sites that I am excavating, that could be places for training schools.

28. "Training School Proposal – Malta (or Sicily)"

Sebastiano D'Amico (University of Malta, Msida, Malta)

During this training school, the following topics could be addressed: how to conduct a survey, GPR fundamentals (stepped-frequency versus pulsed radar systems), overview on the applications of GPR in archaeology, processing and interpretation of GPR data, use of resistivity methods and data interpretation. Two half-days will be devoted to practical training in archeological sites (it is worth to say that all the necessary permission from relevant Authority have been given and the access to archeological sites will be granted).

All the ppt presentations are available [here](#)

DAY 2: WG Meetings

On DAY 2 (Tuesday 5th March 2019), the participants were split into 4 groups - one for each of the WG in which SAGA is structured. They worked intensively to develop their respective Action Plan, including: tasks prioritisation, tasks leader designations, consideration of new tasks beyond of

those described in SAGA's Memorandum of Understanding (MoU), plan activities, etc. The decisions and plans made by each SAGA WG during the Day 2 were documented in four reports produced by the WG Leaders (Annexes 1, 2, 3 & 4).



Figure 20

DAY 3: Wrap-up & Second MC Meeting

During the last day (Wednesday 6th March 2019) all the participants gathered again in plenary. First, the WG leaders summarised the main outputs achieved in their groups and presented the Action Plans to all the participants (Figure 21).

The second half of the day was dedicated to the “Second MC Meeting” of SAGA. During this meeting the outcomes of Grant Period (GP) 1 were reviewed and further actions/mandates for GP2 agreed. The minutes of this MC meeting are included in this report (Annex 5).



Figure 21

Visit the [meeting website](#)

1. Armstrong, K., Cuenca-García, C., & Moffat, I. (2015). *Interactions between Soil Science and Geophysics in Archaeological Prospection (ISSGAP)*. *ISAP News*, Issue 43, 7. https://www.researchgate.net/publication/280154989_Interactions_Between_Soil_Science_And_Geophysics_in_Archaeological_Prospection_ISSGAP
2. Cuenca-García, C., Armstrong, K., Aidona, E., De Smedt, P., ... Lowe, K. (2018). *The Soil science & Archaeo-Geophysics Alliance (SAGA): going beyond prospection*. *Research Ideas and Outcomes*, 4, 25. <https://doi.org/10.3897/rio.4.e31648>
3. SAGA First Joint WG & MC Meeting website: <https://sites.google.com/view/saga-meeting2-rethymno-2019/home>
4. SAGA ResearchGate Project log: <https://www.researchgate.net/project/COST-Action-SAGA-the-Soil-Science-Archaeo-Geophysics-Alliance-going-beyond-prospection>
5. SAGA photo repository: soon available (if participants need access to pictures, please ask Agnese Kukela in the meanwhile)



Figure 22

Annexes

Annex 1: WG1 Action Plan Report
(by Clare Wilson)

Annex 2: WG2 Action Plan Report
(by Philippe De Smedt, Hanna Grison
(Task Force_TF1), Arne A. Stamnes
(TF2), Ekhine Garcia (TF3), Petra Schnei
dhofer (TF4)

Annex 3: WG3 Action Plan Report
(by Jan Horak)

Annex 4: WG4 Action Plan Report
(by Sebastiano D'Amico
& Yuval Goran)

Annex 5: Minutes of the 2nd MC
Meeting (by Apostolos Sarris)





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