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Cost Action CA18203 - Optimizing Design for Inspection (ODIN)

PRACTICAL INFORMATION GUIDE

TECHNICAL PROGRAMME

Training School on INspection, SIGNal processing, Identification and Analysis (INSIGNIA)

Ohrid, N.Macedonia

Date: September 18-20th, 2023

Contents

About COST

The European Cooperation in Science and Technology (COST) is a funding organisation for the creation of research networks, called COST Actions. These networks offer an open space for collaboration among scientists across Europe (and beyond) and thereby give impetus to research advancements and innovation.

COST is bottom up, this means that researchers can create a network - based on their own research interests and ideas - by submitting a proposal to the COST Open Call. The proposal can be in any science field. COST Actions are highly interdisciplinary and open. It is possible to join ongoing Actions, which therefore keep expanding over the funding period of four years. They are multi-stakeholder, often involving the private sector, policymakers as well as civil society.

Since 1971, COST receives EU funding under the various research and innovation framework programmes, such as Horizon 2020.

COST funding intends to complement national research funds, as they are exclusively dedicated to cover collaboration activities, such as workshops, conferences, working group meetings, training schools, short-term scientific missions, and dissemination and communication activities. For more information, please go to the Funding section of the COST website (https://www.cost.eu/).

The COST Association places emphasis on actively involving researchers from less research-intensive COST Countries (Inclusiveness Target Countries, ITC[1]). Researchers from Near Neighbour Countries and International Partner Countries can also take part in COST Actions, based on mutual benefit. For more information, please visit the global networking page (https://www.cost.eu/).

[1] Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Macedonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Turkey

Cost Action CA18203 - Optimizing Design for Inspection (ODIN)

This Action will maximize the full benefit of in service, continuous monitoring of critical aerospace structures by integrating ultrasonic wave based non-destructive evaluation (NDE), energy harvesting and wireless sensor technologies at the design conception phase.

Optimization (of sensors and structures), computational modelling, advanced signal processing and advanced design approaches will be integrated to produce a novel framework, design tools and guidelines for the delivery of the first generation of self-sensing aircraft capable of delivering accurate structural prognosis.

Ultrasound based NDE techniques, energy harvesting and wireless sensor networks are being increasingly demonstrated to be effective in monitoring damage in aerospace components at a laboratory setting.

These components include critical elements such as airframe, engines, landing gear and control surfaces. However, there is an urgent need to integrate these approaches and techniques at the inception of an aircraft. This COST Action will bring together the top European experts across these areas to support the development of an integrated framework for optimized self-sensing structures capable of diagnosis and prognosis, together with demonstrators and educational activities, including training programs, which will ultimately lead to cleaner and safer skies.

General information

Start of Action: 02/10/2019

End of Action: 14/04/2024

MAIN CONTACTS

Rhys PULLIN	Runar UNNTHORSSON	Petar DIMITROV
Action Chair	Action Vice Chair	Science Communications Coordinator
+442920879374	+3545254954	+38976266263
pullinr@cardiff.ac.uk	runson@hi.is	dipetar@outlook.com

Action website: https://odin-cost.com/

Domain website: https://www.cost.eu/actions/CA18203/

Action's Working Groups

Working group 1	**Design, Optimisation and Integration** This group will encompass industrial aerospace design engineers and experts, mathematicians, computer scientists and optimizers with the objective to analyse the requirements for integrating SHM systems at the inception of an aerospace design. A significant challenge for this group is to ensure that specific aerospace requirements are communicated effectively and efficiently to the SHM system designers.
Working group 2	**Damage detection** This group will focus on the analysis of existing strategies including sensor technologies. They will quantify the capability of systems to identify damage in new structures, power level requirements and compare state of the art signal processing approaches to damage location and characterisation. Finally, the group will deliver a strategy for sharing data and signal processing algorithms.
Working group 3	**Power management and energy harvesting** Power requirements are a crucial element of this Network. Currently there is a power gap between low power systems and the available energy through current harvesting approaches. Furthermore, there are large disparities between published data and that which is achievable based on methods of testing and analysis. Therefore, this group will seek to develop a detailed understanding of current vibration levels and temperature differences and the location or position they would be found on an aircraft and standard testing procedures to allow a comparison across European research groups. There will be cross work group activities associated with this group.
Working group 4	**Wireless Communications** Wireless communication is of great importance to unlocking the potential of SHM systems in aerospace, bridge structures and wind turbines. However, the greatest challenge lies in aerospace where there is a restriction in allowable wireless protocols and the complex geometry that signals have to propagate through and around. The working group will focus on aerospace protocols and strategies that will reduce power requirements at a sensor node. In addition, the working group will review the safety and security of existing protocols.
Working group 5	**Data management and signal processing** This working group will focus on human interface, data interpretation, data presentation, data mining, data efficiency/reduction and hardware integration. There are three tasks associated with this working group. The group will be heavily linked to WG1 and WG2. In addition, there will be strong activities focused on low power processing to reduce power consumption of systems.

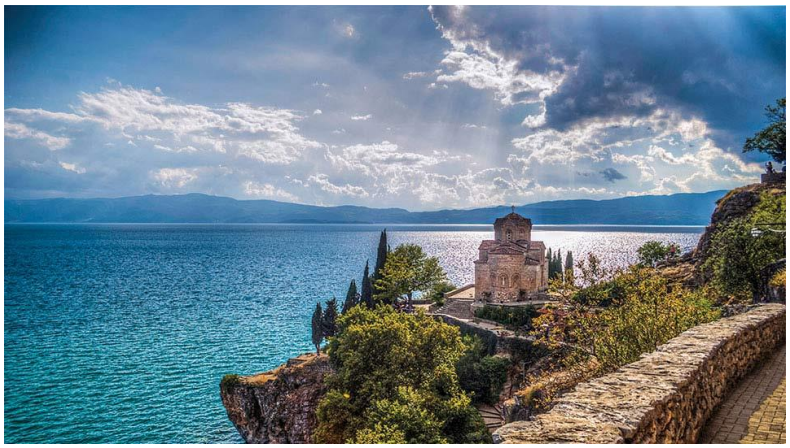
Agenda[2]

	Day 1 – 18.09.2023		Day 2 – 19.09.2023		Day 3 – 20.09.2023
Time		**Time**		**Time**	
09:00 - 10:30	Welcome / First session	09:00 - 10:30	Fourth session	09:00 - 10:30	Seventh session
10:30	Coffee break	10:30	Coffee break	10:30	Coffee break
10:45 – 12:00	Second session	10:45 – 12:00	Fifth session	10:45 – 12:00	Eight session
12:00 - 13:30	Lunch	12:00 - 13:30	Lunch	12:00 - 13:30	Lunch
13:30 - 17:00	Third session	13:30 - 17:00	Sixth session	13:30 - 17:00	Nineth session
				17:00	End of the training school

[2] Please note, this is a provisional agenda. A more detailed one will be sent to you as we approach the beginning of the training school.

Ohrid

Ohrid and Lake Ohrid are one of the main tourist destinations in Macedonia. The Ohrid Lake is estimated to be more than 4 million years old and it's also one of the deepest lakes in Europe with a maximum depth of 287 meters.



The lake is home to more than 300 endemic species and it has been a UNESCO Heritage Site since 1979.

Ohrid is a a city where you can literally breath history and is also known as the Jerusalem of the Balkan. At one point in time Ohrid had 365 churches: one for every day of the year but during the Ottoman era, many of them were destroyed.

This city is located in the southwestern part of Macedonia, on the north-eastern coast of the Ohrid Lake.

Near the city is the very small but international Ohrid Airport, through which air traffic takes place with certain destinations outside the Republic of Macedonia.

Traffic on the waters of the Ohrid Lake is of little importance. It is used in the function of fishing and for tourist purposes.

We strongly recommend following this link to find out more about the city and the attractions.

Landlocked and nestled between mountains from all four sides, Macedonia is one of the least visited countries in Europe.
Not because there's nothing to see but simply because it's off most people's radar.

Before arriving to Macedonia, important to note:

- Macedonia is not yet part of the European Union/EEA/Schengen area. Therefore, some of the rules/procedures that are known to you/you are accustomed to, do not apply here! Take your passport!
  Be aware!
- The national currency is used for payments/monetary matters.
  Cards/Euros for payment/exchange are used for exchange here; the national currency is DENAR (MKD). Unless you must, we advise not to exchange money. There won't be any place other than Macedonia where you can actually use them.
  Usually, 1€=61.5/62 MKD. This is the average.
- European power plug is used.
- Water is safe to be drunk from the tap, ask just in case.

How to reach Ohrid

By Plane

Arriving by plane to Ohrid (OHD)

Arriving by plane to Ohrid (OHD) is probably the best option.

Ohrid airport is located 9 km northwest from Ohrid, it is an alternative to Skopje International Airport and caters mainly to flights bringing in tourists destined for Ohrid. Usually, connections go through the following bigger destinations:

- Belgrade,
- Vienna,
- Dortmund,
- Malmo,
- Zurich,
- Memmingen
- Basel-Mulhouse
- Seasonally – Maastricht, Amsterdam, Warsaw/Katowice(LOT), Manchester, London-Gatwick (Tui).

We understand that it might be a challenge to plan your arrival to this airport.

- **After landing, taking a taxi from the airport**

Ohrid is a small city, locals are quite aware when flights land/depart.
After landing, outside the small outdated airport terminal building you will see a lot of people and a lot of taxi services providers.
Generally, they are all safe, they usually approach you first, asking if you need a transportation, not all of them have licenses however. The service around Ohrid is generally cheap and not expensive.

Before getting in the taxi, if the taxi is not licensed/official ask/arrange for the final price upfront. Make sure to have some cash with you.

According to the airport's website the only licensed taxy company is Mercedes Taxi. You can arrange transportation by contacting them on the e-mail below.

E-mail: taximercedes13666@gmail.com
Phone: +38970269192

- **Renting a car**

Ohrid has a lot of offer, so renting a car is also an option for this area. Check the airport's website for companies and their information.

Arriving by plane to Skopje (SKP)

Skopje International Airport is the main Macedonian airport (*which is not recommended to be used as it is far away and it requires planning and additional transportation charges*).

In order to reach Ohrid and the venue, the steps required to be taken after landing at the airport in Skopje are as follows.

There are two options to arrive to Ohrid from Skopje International Airport.

A. Take a taxi directly to your Ohrid accommodation. This will cost ~130 euros. Keep in mind Ohrid is far from Skopje airport and the ride will take around 200 minutes.
B. Bus to get to Ohrid:
   - Take the bus/taxi from the arrivals exit at Skopje International Airport to the Skopje international bus station
   - From the Skopje international bus station you buy a bus ticket for a bus that goes to Ohrid city bus station. More info here.
   - After arrival to Ohrid city bus station you take a taxi that will take you to your accommodation / venue.

Please plan ahead in order to get the most economical connection.
Any issues regarding booking a flight contact dipetar@outlook.com

How to reach the training school

Ohrid, has an official public transport operating around the city and the city's outskirts, but it is not reliable. The main mean of transport, for someone visiting is the taxi/rent a car.

Venue

Meeting Location – **Hotel Granit**, Sv. Stefan BB, 6000 Ohrid, Macedonia see this link
(Exact room[s] for the Training school - TBA)

From the Ohrid airport to the Hotel Granit a taxi ride one way should cost ~17 euros as seen here.

Meals & Refreshements

Refreshments will be served during the meeting according to the program schedule/as agreed.

Accomodation

Ohrid has numerous options for hotels and accommodation. Feel free to pick the one you find suitable and appropriate.

The local organizer has arranged rooms to be allocated at Hotel Granit for the training school participants with an adequate and fair price. This will be announced after we have collected the responses from the Google questionnaire.

Please fill in the Google questionnaire that can be found at this link. It would help us better in organizing the event. Responses can be changed after being submitted.

Social event

Here we have two options.

1. Have a dinner in the city.
2. The local organizer will arrange renting a small boat. The boat will come to pick the participants up from Hotel Granit. Sufficient time shall be planned on cruising on Lake Ohrid, exploring its beautiful surroundings, including a visit to the stunning St. Naum Monastery. Lunch will be possibly organized on the boat, and if desired, the participants can even conduct one whole working day while onboard - TBA.