



Funded by the Horizon 2020
Framework Programme of the
European Union



Cost Action CA18203 - Optimizing Design for Inspection (ODIN)

PRACTICAL INFORMATION GUIDE TECHNICAL PROGRAMME



Management Committee Meeting

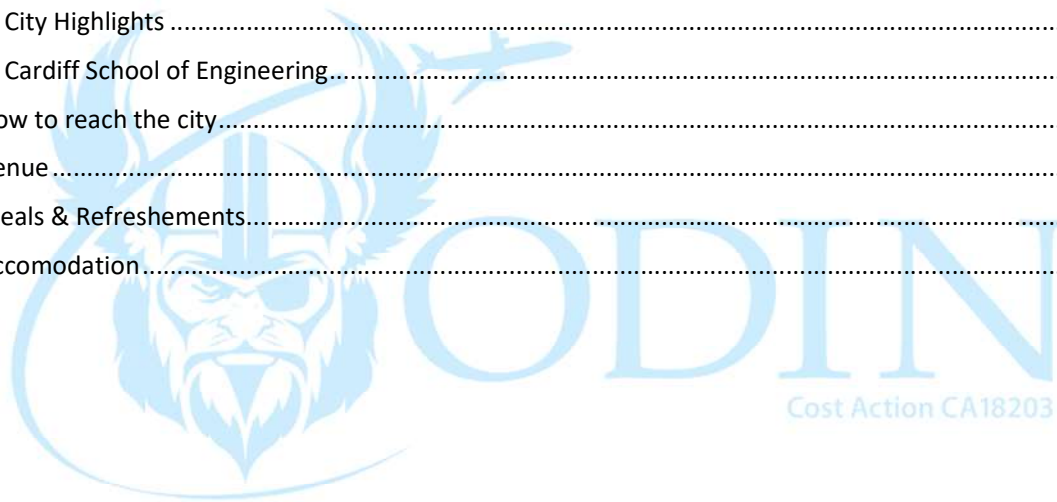
Cardiff, United Kingdom

Date: September 27th and 28th, 2023



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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, ITC¹). 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
Action Chair
+442920879374
pullinr@cardiff.ac.uk

Runar UNNTHORSSON
Action Vice Chair
+3545254954
runson@hi.is

Petar DIMITROV
Science Communications Coordinator
+38976266263
dipetar@outlook.com

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

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



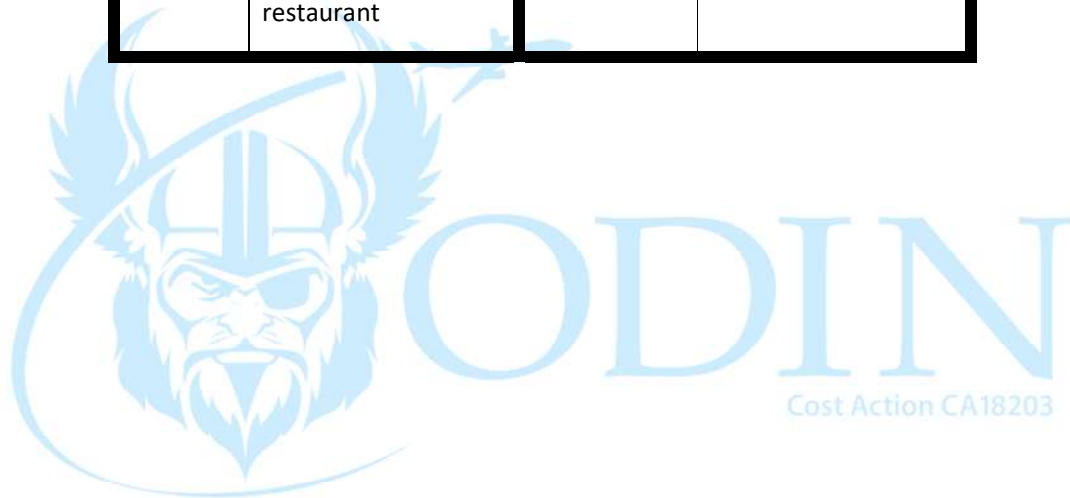
Action's Working Groups

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

Time	Day 1 – 27.09.2023	Time	Day 2 – 28.09.2023
10:00 - 12:00	MC Meeting	10:00 – 13:00	Testing of structure
12:00 - 13:00	Lunch	13:00 – 14:00	Lunch
13:00 - 17:00	Test Instrumentation	14:00 – 16:00	Data sharing and management
19:00	Evening meal at local restaurant		





Cardiff

Cardiff is the capital and largest city of Wales. Cardiff had a population of 362,310 in 2021, forms a principal area officially known as the City and County of Cardiff, and the city is the eleventh-largest in the United Kingdom. Located in the south-east of Wales and in the Cardiff Capital Region, Cardiff is the county town of the historic county of Glamorgan and in 1974–1996 of South Glamorgan.



It belongs to the Eurocities network of the largest European cities. A small town until the early 19th century, its prominence as a port for coal when mining began in the region helped its expansion. In 1905, it was ranked as a city and in 1955 proclaimed capital of Wales. Cardiff Built-up Area covers a larger area outside the county boundary, including the towns of Dinas Powys and Penarth.

Cardiff is the main commercial centre of Wales as well as the base for the Senedd. In 2011, it ranked sixth in the world in a National Geographic magazine list of alternative tourist destinations. It is the most popular destination in Wales with 21.3 million visitors in 2017.

Cardiff is a major centre for television and film production (such as Doctor Who, Torchwood and Sherlock) and is the Welsh base for the main national broadcasters. Cardiff Bay contains the Senedd building (home to the Senedd, the Welsh Parliament) and the Wales Millennium Centre arts complex.

Cardiff University



Cardiff University is a public research university in Cardiff, Wales, United Kingdom. It was established in 1883 as the University College of South Wales and Monmouthshire and became a founding college of the University of Wales in 1893. It merged with the University of Wales Institute of Science and Technology (UWIST) in 1988 as the University of Wales College, Cardiff (University of Wales, Cardiff, from 1996). In 1997 it received degree-awarding powers, but held them in abeyance. It adopted the operating

name of Cardiff University in 1999; this became its legal name in 2005, when it became an independent university awarding its own degrees.

Cardiff University is the only Welsh member of the Russell Group of research-intensive British universities. Academics and alumni of the university have included three heads of state or government, two Nobel laureates, 15 fellows of the Royal Society, 11 fellows of the Royal Academy of Engineering, seven fellows of the British Academy, 21 fellows of the Academy of Medical Sciences and 34 fellows of the Academy of Social Sciences.



City Highlights

National Museum Cardiff is a museum and art gallery in Cardiff, Wales. The museum is part of the wider network of Amgueddfa Cymru – National Museum Wales. Entry is kept free by a grant from the Welsh Government; however, they do ask for donations throughout the museum.

[National Museum Cardiff - Amgueddfa
Genedlaethol Caerdydd | Museum Wales](#)

Cardiff Castle is a medieval castle and Victorian Gothic revival mansion located in the city centre of Cardiff, Wales. The original motte and bailey castle was built in the late 11th century by Norman invaders on top of a 3rd-century Roman fort. The castle was commissioned either by William the Conqueror or by Robert Fitzhamon, and formed the heart of the medieval town of Cardiff and the Marcher Lord territory of Glamorgan.



[Cardiff Castle • 2000 Years of History in the Heart of the City](#)

Castell Coch (Welsh pronunciation: [ˈkas.tɛt̪ koːχ]; Welsh for 'Red Castle') is a 19th-century Gothic Revival castle built above the village of Tongwynlais in South Wales. The first castle on the site was built by the Normans after 1081 to protect the newly conquered town of Cardiff and control the route along the Taff Gorge. Abandoned shortly afterwards, the castle's earth motte was reused by Gilbert de Clare as the basis for a new stone fortification, which he built between 1267 and 1277 to control his freshly annexed Welsh lands. This castle may have been destroyed in the native Welsh rebellion of 1314. In 1760, the castle ruins were acquired by John Stuart, 3rd Earl of Bute, as part of a marriage settlement that brought the family vast estates in South Wales.



[Castell Coch | Cadw \(gov.wales\)](#)

Bute Park and Arboretum is a park in Cardiff, Wales. It comprises 130 acres of landscaped gardens and parkland that once formed the grounds of Cardiff Castle. The park is named after the 3rd Marquess of Bute, whose family owned the castle.

[Homepage - Bute Park \(bute-park.com\)](#)



Cardiff Bay (historically Tiger Bay; colloquially "The Bay") is an area and freshwater lake in Cardiff, Wales. The site of a former tidal bay and estuary, it serves as the river mouth of the River Taff and Ely. The body of water was converted into a 500-acre (2.0 km²) lake as part of a UK Government redevelopment project, involving the damming of the rivers by the Cardiff Bay Barrage in 1999. The barrage impounds the rivers from the Severn Estuary, providing flood defence and the creation of a permanent non-tidal high water lake with limited access to the sea, serving as a core feature of the redevelopment of the area in the 1990s.



[Cardiff Bay – Official Website](#)

Cardiff School of Engineering



Cardiff School of Engineering is part of Cardiff University's College of Physical Sciences.

Cardiff School of Engineering has approximately 1,600 undergraduate and postgraduate students and employs around 300 academic, research, technical and administrative staff. The School offers taught undergraduate and postgraduate degrees (BEng, MEng, and MSc) and postgraduate research degrees (PhD) in a range of engineering subjects, as well as being involved in a number of community, commercial and industrial partnerships.

The school hosts academic conferences and is involved in large scale research and engineering projects, particularly in the field of renewable energy such as wind turbines, power grid efficiency and tidal power generation. Other topics under research include traditional engineering studies such as metal fatigue and waste disposal engineering as well as new fields of study such as carbon management in energy production.

The school of engineering is organised into three departments with associated research groups. [11]

- Architectural, Civil and Environmental Engineering
- Electrical and Electronic Engineering
- Mechanical and Medical Engineering

Location

[School of Engineering - Cardiff University](#)

Address:

Queen's Buildings
The Parade
Cardiff
CF24 3AA



How to reach the city



BY PLANE

London Heathrow – train connections to Cardiff (approximately 3 hours)

[Heathrow: Welcome to Heathrow Airport | Heathrow](#)

Bristol Airport – bus connection to train station (approximately 1.5 hours)

[Bristol Airport - Arrivals, Departures, Flights and Airport Parking](#)

Cardiff Airport – bus connection to train station (approximately 1 hours)

[Cardiff Airport \(cardiff-airport.com\)](#)



BY TRAIN

Eurostar to London St Pancras from many European Cities. St Pancras has direct links via the underground to Paddington. Direct train from Paddington to Cardiff.

[National Rail Enquiries - Official source for UK train times and timetables](#)



BY BUS

National Express from London to Cardiff. The bus leaves central London and drops off in the centre of Cardiff near to hotels. There are transport links from London Heathrow to Victoria Coach Station.

[London to Cardiff coach tickets from £7.90* | National Express](#)

Megabus from London to Cardiff. The bus leaves central London and drops off in the centre of Cardiff near to hotels. There are transport links from London Heathrow to Victoria Coach Station.

[Bus from London to Cardiff with megabus](#)

Venue

Meeting Location – Cardiff School of Engineering (room TBC)

Getting to the venue, public transportation

All hotels are within walking distance of the venue. However, if you would like to catch a bus use the Cardiff City Bus application.

[Download the Cardiff Bus app - Cardiff Bus](#)

Meals & Refreshments

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



Accommodation

Cardiff has numerous options for hotels and accommodation. Below is just a small sample at four different price ranges:

- Mercure Holland House and Spa Cardiff (5 minute walk to Engineering)

[Mercure Cardiff Holland House Hotel - ALL \(accor.com\)](#)

- Sleperz Hotel Cardiff (next to train station and 20 minutes walk to Engineering)

[Contact Us | Sleeperz Hotels](#)

- Ibis budget Cardiff Centre (10 minute walk)

[Cheap Hotels in Cardiff | ibis Hotels \(accor.com\)](#)

- Easy Hotel Cardiff (5 minute walk to Engineering)

[easyHotel Cardiff | Cheap Hotel Cardiff City Centre | easyHotel](#)

