





## WTC 2023

Digital Press Conference 04/25/2023











Arnold Dix ITA-AITES / President (2022-2025)



Olivier Vion
ITA-AITES Executive Director



Nikolaos Roussos President of Greek Tunnelling Society



Ioannis Fikiris
Chair of the Organizing Committee

### Global Tunnelling Progress: Challenges and prospective

#### **Progress**

- Tunnelling and Underground Space is continuously developing in new countries, but also for new uses
- The global tunnel construction market has reach in 2022 the level it had in 2019
- The number of projects (km/ investment) is still growing +25% vs 2019

#### Challenges

- · Availability of personnel, Skills, training
- Complexity of new infrastructure
- Sustainability, acceptance
- Costs



### Global Tunnelling Progress: Challenges and prospective

#### Perspectives and innovations

- Development of new materials
- Integration of IA
- Not only tunnels but use of underground space
- Answer the climate changes
- Resilience



### **Highlights of WTC 2023**

#### On ITA side

- New sustainability Committee
- Client Forum
- New ITA Member Nation: Pakistan
- New WGs and Committees guidelines

#### Plenary session on Tuesday on resilience

3 round tables

Round table in the Cosuf session on Tuesday afternoon

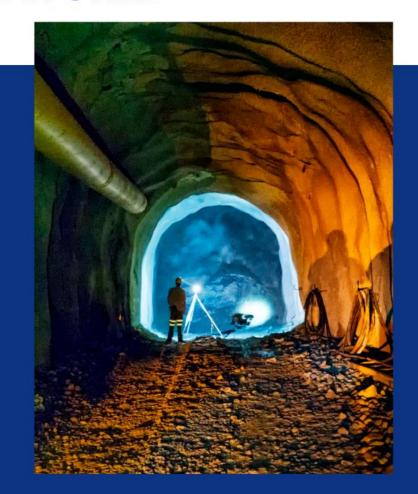




### **EXPANDING UNDERGROUND**

# KNOWLEDGE & PASSION TO MAKE A POSITIVE IMPACT ON THE WORLD

WTC2023 in Athens will highlight the multiple advantages and solutions that underground space can provide, at the prospect of a whole new era of smart technology where sophisticated "digital tools" change investigation, design, construction and operation methods and strategies rapidly.





The Megaron Athens International Conference Centre (MAICC) is one of the finest and most technologically advanced conference venues in Europe.



It has dedicated exhibition space and multileveled sweeping foyer areas frequently used for exhibitions. Exhibition space 12.000 m<sup>2</sup> in total



It has ample choice of hall size and style for plenary and parallel sessions. Can host up to 6.000 delegates simultaneously









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# WTC2023 will be a Hybrid Congress

The Greek Tunnelling Society developed and applies for the first time in a WTC a back up plan in order to be prepared for any unforeseen event

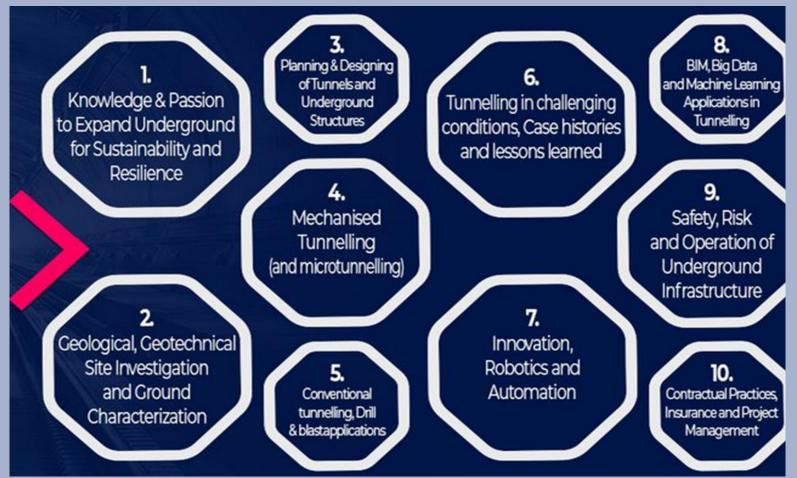
The detailed back- up plan is available in the WTC2023 web page and covers all potential financial agreements between the organizers and the registered participants, the exhibitors and the sponsors.

#### FIND OUT MORE ABOUT THE BACK UP PLAN

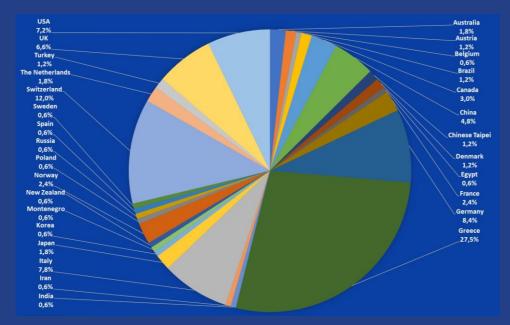
https://wtc2023.gr/hybrid-congress-policy/



### **Congress topics**







Distribution of countries of origin of the Scientific Committee members

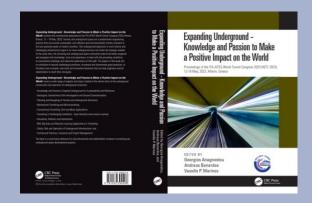


Papers per Topic

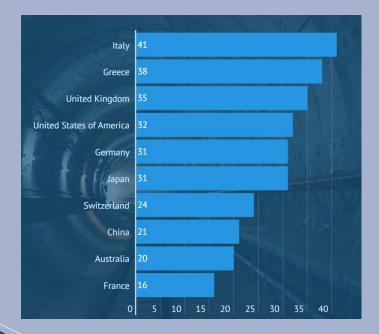
# SCIENTIFIC COMMITTEE MEMBERS

WTC2023 aimed to ensure the highest possible scientific level thanks to the contribution of highly skilled professionals and academics from 29 different countries around the world.

The total number of the members of the scientific committee exceeded one hundred fifty (150).



#### Max Number of Accepted Papers Per Country

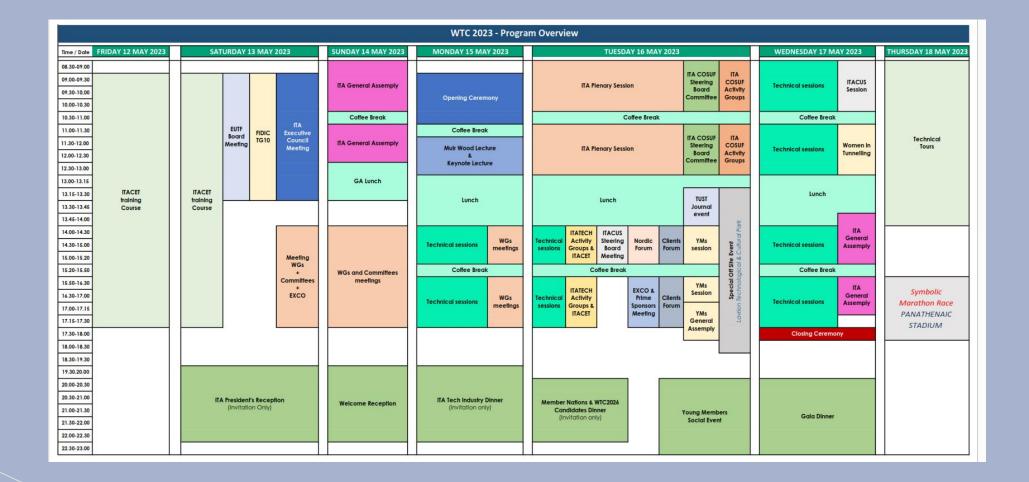


### Number of Accepted Papers for Publication per Country

_		
	Argentina	
	Australia	20
	Austria	8
/	Belgium	4
ľ	Bhutan	
	Brazil	4
	Canada	
١,	Chile	3
/	China	21
/	Denmark	4
	Ecuador	1
	Finland	2
	France	16
l	Germany	31
\	Greece	38
\	Iceland	1
/	India	12
	Islamic Republic of Iran	3
	Iceland	1
	India	12
/	Islamic Republic of Iran	3
/	Israel	2
	Italy	41

	Japan	31
	Luxembourg	1
	Malaysia	1
	Mexico	1
	Netherlands	2
	Norway	5
	Pakistan	2
	Poland	1
	Portugal	2
	Qatar	4
	Republic of Korea	16
	Russian Federation	1
	Serbia	2
	Singapore	
1	Slovakia	
	Spain	8
	Sweden	
\	Switzerland	24
	Taiwan	2
	Thailand	2
	Turkey	11
	United Kingdom	35
	United States of America	32





WTC2023 Program at a Glance



### ITACET Training Course | WTC 2023 | 12-13 May 2023 Risk Management in Tunnelling and Underground Sustainable Solutions

The theme of the 2-day course is chosen to cover two of the most representative challenges underground space believers need to address these days. Risks in tunnelling and underground space constructions often lead to disputes and claims. Hence clear recognition of the uncertainties, fair responsibilities allocation and sound on-site recognition procedures could not be more timely. Sustainability on the other hand, needs to be part of underground space development and be taken into consideration throughout the planning, design, construction and operation stages. Our speakers are underground space engineering experts from around the globe, so you have no choice but to join us in our 2-day ITACET course journey.

#### Day 1: Risk Management in Tunnelling | Session 1: Risk management principles



09:10 – 09:50 | How to handle risk in Subsurface Engineering

Uni. Prof. Robert Galler, Montanuniversität Leoben, Austria *ITACET Committee Chair* 

ustria

09:50 – 10:30 | Geological uncertainty, geotechnical investigations, and observational design within the context of risk management

Uni. Prof. Mark Diederichs, Queen's University, Canada



10:45 – 11:25 | Main risks associated with deep tunnelling

Gerard Seingre,
Civil Engineer, BG Consulting Engineers Ltd.

11:25 – 12:05 | Risks in planning, design, construction of large diameter tunnels



Dr Sotirios Vardakos, Technical Director for Tunnels in HNTB's National Tunnel Practice



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Day 1: Risk Management in Tunnelling | Session 2: Tendering & Implementation during construction



13:30 – 14:10 | Monitoring for avoiding hazard situation during construction

14:10 – 14:50 | Contractual Practices and Geotechnical Baseline Reports



Klaus Rabensteiner,
Mining Engineer, Managing Director Geodata Survey & Monitoring

Matthias Neuenschwander,
Managing Director Neuernschwander Consult Eng., ITA WG3



15:05 – 15:45 | Conventional tunnelling cost assessment and benchmarking

15:45 – 16:25 | Examples of Risk management in mechanized tunnelling

Uni. Prof. Chrysothemis Paraskevopoulou, University of Leeds, UK ITACET Committee Member, General Secretariat GTS

Dr Karin Bäppler, Head of Business Development and Geotechnics & Consulting, Traffic Tunnelling Group, Herrenknecht AG, Germany



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#### Day 2: Underground Sustainable Solutions | Session 3: Sustainability Issues



09:10 – 09:50 | Introduction to Sustainability Issues in Tunnelling - A look underground in delivering a sustainable future for our people and planet

Prof. Arnold Dix, ITA-AITES President, Barrister, Australia
Antonia Cornaro, ITACUS Co-Chair, Urban Planner Amberg Engineering, CH

09:50 - 10:30 | Sustainability issues in tunnelling

Dr Giovanny Alvarado, Senior Project Delivery Leader for Ground Engineering and Tunnelling, AECOM, Australia





10:45 - 11:25 | ITACUS Workshop on Sustainability

Uni. Prof. Marilu Melo, University of New South Wales in Sydney, Australia ITACUS Committee Member 11:25 – 12:05 | Life cycle assessment and sustainability

Uni. Prof. Panagiotis (Panos) Spyridis, University of Rostock, Germany ITA WG21





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Day 2: Underground Sustainable Solutions | Session 4: Implementation during design, construction, and operation



13:30 - 14:10 | Digitalization and numerical methods contributions towards sustainability

14:10 – 14:50 | Holistic Management of emergencies handling on Road Tunnels: The experience from safety drills



Uni. Prof. Mike Mooney, Colorado School of Mines, USA **ITACET Committee Member** 

Uni. Prof. Konstantinos Kirytopoulos, NTUA, Greece



15:05 – 15:45 | Example in CO<sub>2</sub> reduction in tunnel construction from a material technology point of view

15:45 – 16:25 | Examples of resilient tunnel evacuation



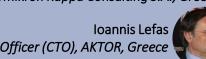
Dr Wolfgang Aldrian Principle Expert Tunneling and Mining & Head New Business, MBT, Austria

Day 2: Round Table Discussion | 16:35 – 17:25 | Future of Tunnelling – underground experts from Greece



Uni. Prof. (Em.) Sergios Lambropoulos, NTUA, Greece President of Hellenic Construction Industry Council (HCIC)

Nikos Koronakis, President & CEO, Omikron Kappa Consulting S.A., Greece



Ilias Michalis Senior Tunnel Engineer & Consultant, SALFO Associates & AVAX S.A., Greece





#### Ο ΕΘΝΙΚΗ ΟΔΟΣ ΟΚΗΦΙΣΙΑ Λυκόβρυση ΛΥΚΟΒΡΥΣΗ Μεταμόρφωση Опечкн Ο ΜΑΡΟΥΣΙ HPAKAEIO O OTE ΝΕΡΑΝΤΖΙΩΤΙΣΣΑ Ο ΑΓ.ΝΙΚΟΛΑΟΣ ΒΑΣΙΛΙΣΣΗΣ ΟΛΥΜΠΙΑΚΟ ΣΤΑΔΙΟ Ο ΑΝΩ ΠΑΤΗΣΙΑ ΑΓΙΟΣ ΕΛΕΥΘΕΡΙΟΣ Ο ΑΛΣΟΣ ΒΕΪΚΟΥ ΑΝΘΟΥΠΟΛΗ Ο ΠΕΡΙΣΤΕΡΙ Ο ΓΑΛΑΤΣΙ ΚΑΤΩ ΠΑΤΗΣΙΑ Χαϊδάρι ΕΛΙΚΩΝΟΣ ΝΙΚΟΛΑΟΣ ANTONIO Ο ΧΟΛΑΡΓΟΣ Ο ΚΥΨΕΛΗ ΦΑΡΟΣ Ο EONIKH AMYN P AFIA MAPINA Χολαργιά ΔΙΚΑΣΤΗΡΙΑ Αγία Βαρβάρα ΣΤ.ΛΑΡΙΣΗΣ ΑΙΓΑΛΕΩ ACIA BAPBAPA ΕΛΑΙΩΝΑΣ Παπάγου Ο ΑΜΠΕΛΟΚΗΠΟΙ METAEOYPPEIO O OMONOIA Αιγάλεω Κορυδαλλός Ο ΓΟΥΔΗ Ο ΖΩΓΡΑΦΟΥ ΚΟΡΥΔΑΛΛΟΣ ( Ο ΙΛΙΣΙΑ ΚΑΙΣΑΡΙΑΝΗ NIKAIA ΣΥΓΓΡΟΥ-ΦΙΞ ΚΑΛΛΙΘΕΑ ΒΥΡΩΝΑΣ ΝΕΟΣ ΚΟΣΜΟΣ ΑΓΙΟΣ ΙΩΑΝΝΗΣ Βύρωνας ΜΟΣΧΑΤΟ Δάφνη Καλλιθέα ΔΑΦΝΗ ΑΝΩ ΗΛΙΟΥΠΟΛΗ Νέα Σμύρνη ΔΗΜΗΤΡΙΟΣ

# Major Projects in Greece Tunnelling in Athens

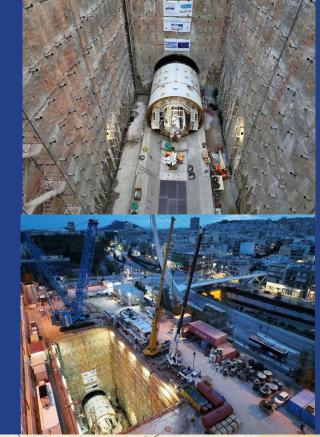
Athens Metro Lines Development plan



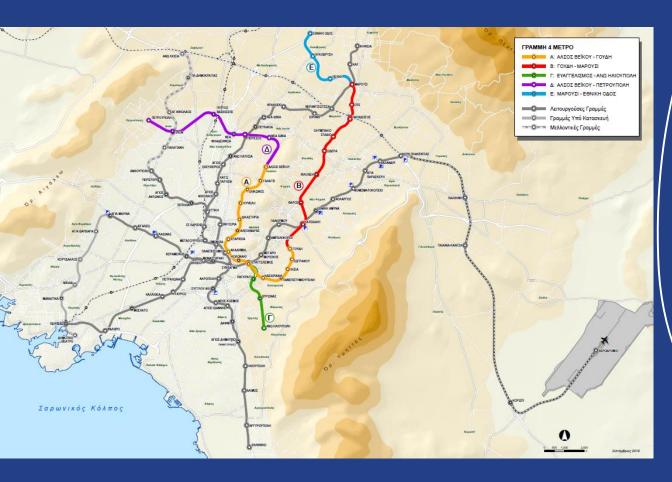
#### **New Metro Line 4**

- 12.8 km, 15 stations, 9 intermediate and/or terminal shafts,
- 2 x EPB-TBM ø9.53m
- C&C up to 52m excavation depth
- NATM Sections up to 250sq.m excavation
- Budget: 1.65 billion €
- Time schedule : 8 years







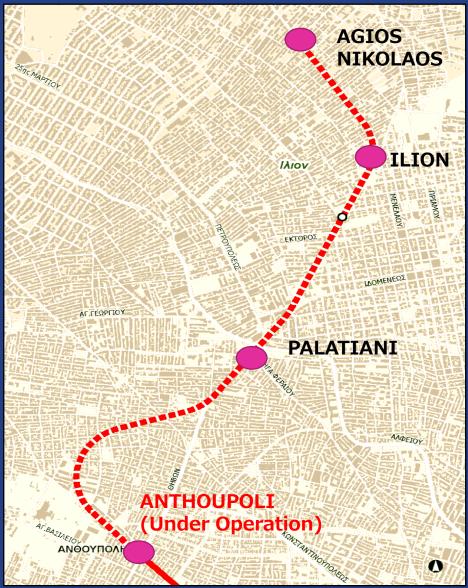


### EXTENSIONS OF ATHENS METRO LINE 4 Preparatory design

#### **Project Characteristics:**

- Total: 20 stations, 23 Km double track tunnel, Estimated budget 2.05bn
- Goudi Marousi (red): 8 stations, 9 Km tunnel. Estimated budget 800m.
- Evagelismos Ano Helioupoli (green): 3 stations, 3.5 Km tunnel. Estimated budget 350m.
- Alsos Veikou Petroupoli (mauve): 6 stations,
   7 Km tunnel. Estimated budget 600m.
- Marousi A1 motorway (blue): 3 stations, 3.5
   Km tunnel. Estimated budget 300m.





EXTENSION OF LINE 2 TO ILION and ELEONAS DEPOT EXTENSION

Project under tender - 1st phase

#### **Project Characteristics:**

- Line 2 northern extension of 4 km, 3 stations
- 20,000m2 extension of Eleonas Depot in Line
   3 with stabling and maintenance facilities
- 1st phase (Prequalification) to be announced Dec. 2022, tender documents under preparation
- Budget: 600 million, Duration: 6 years
- Special point: The Line 2 extension will deviate from the existing Line 2 Anthoupoli forestation tunnel which will need to be demolished to form a junction. This is to avoid a chartered maze of old lignite mines



### ATHENS METRO LINES 2 & 3 COMPLETED & OPERATIONAL PROJECTS SUMMARY TABLE

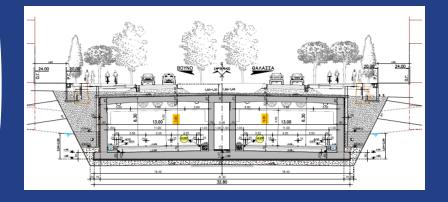
							PROJECTS BENEFITS	
PROJECT		COMPLETION TIME	PROJECT LENGTH (km)	STATIONS	OVERAL PROJECT BUDGET (€)	DAILY RIDERSHIP (passengers)	REDUCED CO <sub>2</sub> EMISSIONS Per DAY (ton)	
1.	BASE PROJECT LINES 2, 3	2000-2003	17.6	19	2.2 b	490,000	400	
2.	EXTENSIONS PHASE A'	2004-7	33.6	11	1.5 b	180,000	150	
3.	EXTENSIONS PHASE B'	2009-13	8.5	10	855 m	210,000	180	
4.	LINE 3 EXTENSION TO PIRAEUS	2022	7.6	6	730 m	130,000	120	
TOTAL		-	67.3	46	5.3 b €	1,010,000	850 ton	



# THE HELLINIKON PROJECT UNDERGROUND COASTAL ROAD

- Project Characteristics :
- Fully private project of public interest implemented by the investor. Completion is scheduled at the end of 2024.
- Total length 1.34Km (1.14 C&C 0.2 access and exit ramps.
- 3 traffic lanes per direction (locally 4 and 5).









### UNDERGROUND CONSTRUCTION OF NATIONAL RAILWAY LINE IN ATHENS

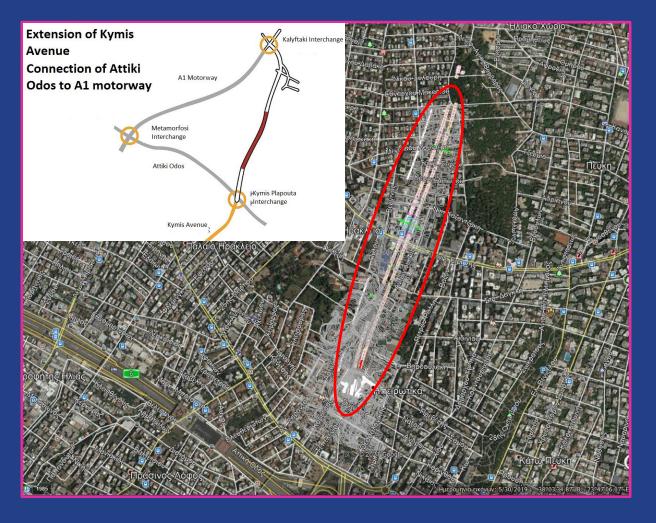
- Four-track rail corridor, 2,36 km long, of which 1.91Km consists of a fully underground alignment,
- Public Contract value 70M









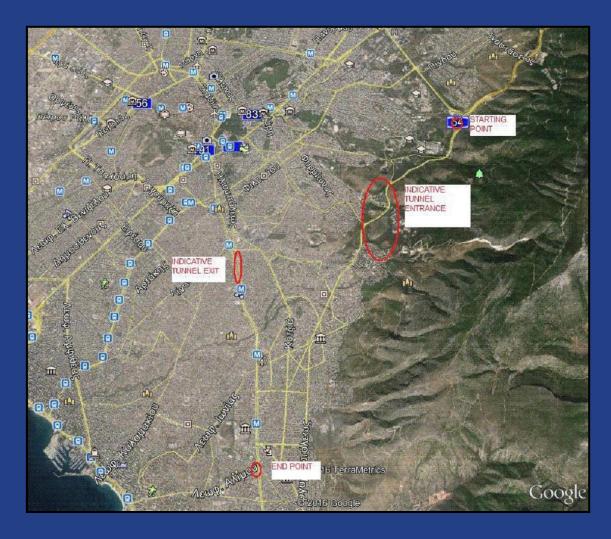


CONNECTION OF ATTIKI ODOS TO A1 MOTORWAY - KYMIS TUNNEL

#### **Project Characteristics:**

- The Project was assigned last year to the Consortium "TERNA-AKTOR-INTRAKAT" but due to judicial conflict, no contract has been signed yet. Project budget 400m.
- Total length 3.8Km (1.26Km conventional tunnel in urban residential area, 1.16 Km C&C, 1.38 open road).
- Critical traffic project to decongest the only exit to the A1.
- A modern traffic management system to avoid congestion.





### Major Projects in Greece Tunnelling in Athens – Future Projects

South extension of Ymittos Ring Road from connection with Attiki Odos to Vouliagmenis Avenue via an urban tunnel

#### **Project Characteristics:**

Construction of a 3Km long urban road tunnel connecting existing Ymittos Ring Road with Vouliagmenis Avenue,

It seems that the intention is to promote the contract as an innovation partnership once the relevant legal framework has been adopted





### Major Projects in Greece Tunnelling in Athens – Future Projects

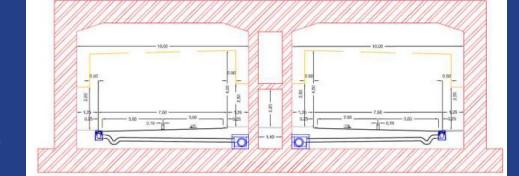
North extension of Ymittos Ring Road to Rafina port and north entrance of Athens airport and suburban railway access to the port of Rafina

#### **Project Characteristics:**

- Twin bore Road tunnel 1.6Km
- Suburban railway tunnel in residential area ending at Rafina port 1.3 km
- Call for tender at the end of 2022.







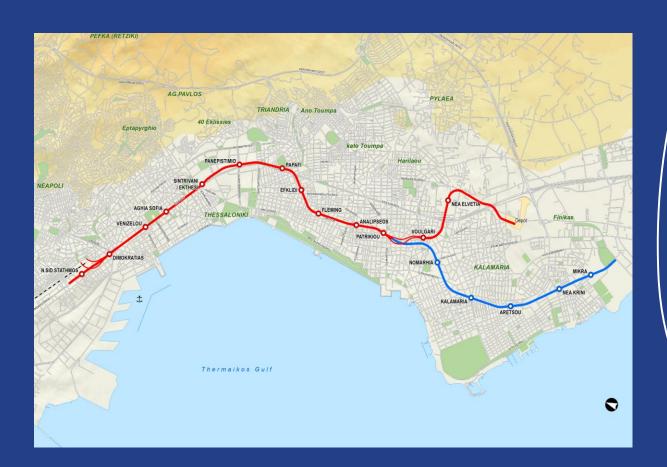


### Major Projects in Greece Tunnelling in Athens – Future Projects

#### SALAMINA UNDERSEA TUNNEL

#### **Project Characteristics:**

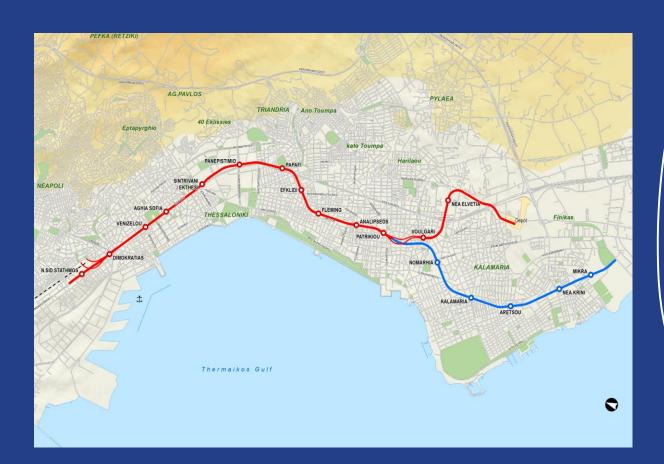
- 1.1Km long twin spaces plus central corridor immersed tunnel
- 2 conventional tunnels 4.5 Km long single tube
- 2 C&C 0.5 Km long
- Three consortia filed a bid for this Project. The Environmental Impact Assessment study of the project is at the phase of approval and following that the tendering process is expected to finalize.



THESSALONIKI METRO / BASE PROJECT & EXTENSION TO KALAMARIA

- 9,6 km, 13 stations
- 1 Depot
- 1 Operations Control Centre
- 1 Lumpsum Turnkey Contract
- 1,66 billion €
- Contractors : AKTOR / WEBUILD / HITACHI RAIL
  - 4,8 km, 5 stations
  - 6 Lumpsum Contracts
  - 540 million €
  - Main Contractor : AKTOR

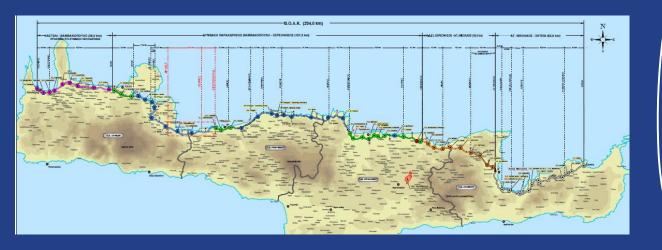




### THESSALONIKI METRO NEW EXTENSIONS

- Two extensions in preparatory design. East extension to Pylaea and airport (4 stations / Cyan line) and west extension to Evosmos (8 stations round line - Orang line).
- 11 km of Line (with two single track tunnels)





#### NORTHEN ROAD AXIS OF CRETA ISLAND

- Section Chania Heraklion 156Km (concession contract) 1.5b cost (design & construction)
- 16 twin tube tunnels 31.5 Km long single tube
- 18 C&C (5 Km length)
- Section Hersonissos Neapoli 23 Km (PPP contract) 230m cost (design & construction)
- 3 twin tube tunnels 6,8 Km long single tube
- 1 C&C (0,25 Km length)



#### Thessaloniki East Ring Road (Flyover)

- Project budget 370m, Total length 13 Km
- 4 Km Flyover, 9 Interchanges, 8 Bridges, 3 Tunnels
- PPP contract was signed in December 2022 with Contractor Consortium.









# Major Projects in Greece Future Projects

#### Lefkada Island - undersea tunnel

- Bidirectional immersed tunnel 0.7Km (shallow depth of seabed - small wave height · in situ concreting)
- 3Km bidirectional road in Avlemon lagoon



### Major Projects in Greece Future Projects

#### Motorway E65 twin tube road tunnels

- Tunnel Othryos: tunnel 6 Km long (single tube)
- 2 tunnels with total length 1 Km (single tube)

#### OTHER regional road tunnels

- Road tunnel (Klissouras) 1.36 km long in the highway connecting the towns of Castoria and Ptolemais in north Greece is at the final phase before contract signing with the contractor AKTOR SA. The cost will be approx. 71 million euros with EU funding while the construction period is estimated to 36 months.
- 2 Tunnels Brallos Amfissa 5 Km long. Funding alternatives are considered





# Major Projects in Greece Future Projects

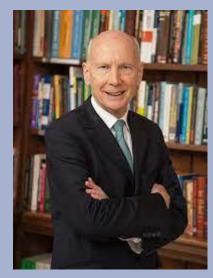
#### Igoumenitsa bypass road tunnels

- C&C-1, length 317m
- C&C-S1, length 160m
- Tunnel S1, length 231m
- Tunnel S2, length 277m
- Tunnel S3, length 531m



OPENING CEREMONY / Round Table

Underground Space for Mobility: Frontier Technologies



Prof. Lord Robert Mair Cambridge University Moderator



Prof. Tarcisio Celestino
<u>University of São Paulo</u> / Past ITA President



Dr. Kancheepuram N. Gunalan Past President of ASCE



Keynote Lectures / Monday 15-5-2023

"The Convergence – Confinement Method"



Professor Marc Panet
Ecole Nationale des Ponts et
Chaussees, Paris

"Seismic design and risk assessment of tunnels & underground structures"



**Kyriazis Pitilakis** 

Professor Emeritus, Aristotle University, Thessaloniki, Greece Vice- President of the European Association of Earthquake Engineering



COSUF Session / Tuesday 16-5-2023 / 14:00 - 15:30

"Holistic view of road tunnel safety and risks: composing all factors and perspectives for sustainable projects in difficult times"



Arnold Dix ITA President



NOBUHARU ISAGO (Professor at Tokyo Metropolitan University)



BERNHARD KOHL
Group Director Transportation & Urban
Spaces
ILF GROUP HOLDING GMBH)



ERIC PREMAT ITA COSUF



INGO KAUNDINYA PIARC TC4-4



KONSTANTINOS KOUTSOUKOS
President of HELLASTRON,
Second Vice-president of ASECAP
for 2023



RICARDO MIRANDA

Mirabit Consultoria e Treinamento Ltda

Anthony P Tierney

Chief Officer
Liverpool City region UK
police
Mersey Tunnels Police



ITA Plenary Session / Tuesday 16-5-2023

Part 1: Progress Reports of Working Groups & Committee

Special Presentation: CERN Existing and Future Tunnels

John Osborne Senior Civil Engineer Future Accelerator Studies



#### Part 2: Round Table Discussions

# "Underground infrastructures to strengthen resilience and reduce vulnerability to climate change"

- Building resilient infrastructures
- Tunnels part of city resilience
- Planning the future

The topics will be developed through the different initiatives taken by ITA, its Member Nations, Working Groups, and committees as well as other ITA stake holders and partners (development banks, UN Habitat, UNEP,.....).



Women in Tunnelling / Wednesday 17-5-2023 / 11:00 – 13:00 "Picture an underground expert: paving the road to diversity"



Dr. Paraskevi Yiouta-Mitra
Organising Committee
Tunnelling Laboratory NTUA



Dorina Vovou Senior Tunnel Engineer, Hatch



Dr. Linda Peli
Director, Earthquake Planning and
Protection Organization



Arnold Dix ITA President

More panelists coming from the industry:

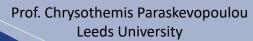








and more.. Stay tuned!





Prof. Mark Diederichs
Queen's University, Canada
TAC EDI Committee representative





Sunday 14-5-2023 (08:30 - 12:30) & Wednasday 17-5-2023 (13:45 - 17:15)



#### **General Assemblies**

Election of host Member Nation for WTC2026

#### Candidates:

- Canada
- South Africa

Election of the 4<sup>th</sup> ITA Vice-President (2023-2025)

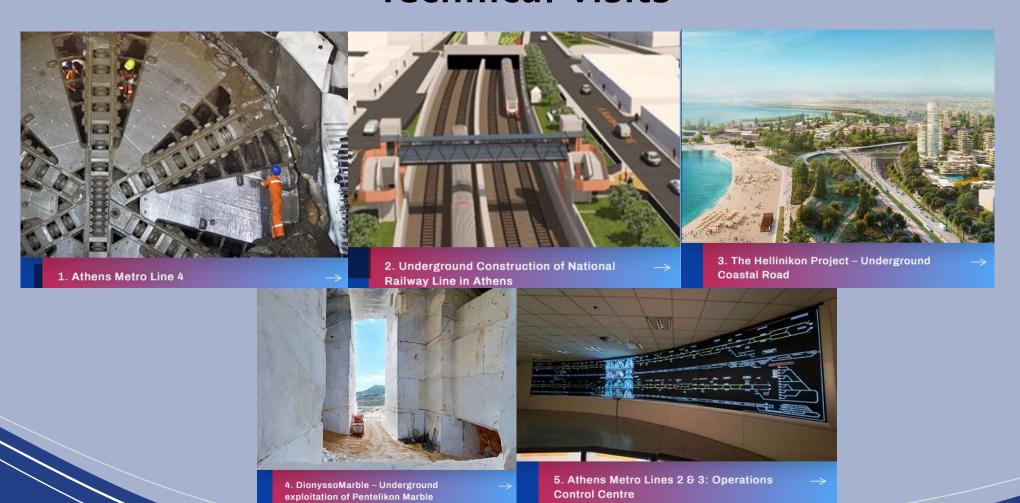
#### Candidates:

- Hamdi AYDIN, presented by Turkey
- Ioannis FIKIRIS, presented by Greece





### **Technical visits**





### Press technical visit

Tuesday 16 at 2pm

#### **Athens Metro Line 4**

The first phase of Line 4 (from Alsos Veikou to Goudi areas) is being constructed fully underground by the joint venture "AVAX AE – GHELLA SpA – ALSTOM TRANSPORT SA" following a tender award on 2021 from the Project Owner ATTIKO METRO S.A.

#### Main features of the Project

- •8km line: double track TBM tunnel
- •15 underground stations with platform screen doors
- •9 intermediate or terminal shafts
- •2km underground forestations, underground trumpet structures and connecting tunnels
- •A new Operation Control Center
- •A new repair workshop in the existing Depot area
- •Underground Train stabling and maintenance yards at both ends of the Line
- •Transfer connections at two existing Stations (Line 2 & Line 3)
- •20 new 4-car automated driverless trains.



#### The visit will be in two parts:

- Visit of the construction site
  - Visit of the control center



# Q&A



