











# ISTOS - center of Innovative SoluTiOns for building Safety

#### Project Overview and Main Outcomes

H2020-WIDESPREAD-2018-2020
Coordination and support action (TWINNING)

Project number: 952300
Proposal acronym: ISTOS

Duration: 36 Months

Launch: November 1st, 2020

Project Officer: Ms Nikolina Milojovic

Dr Petros Christou, Frederick Research Center

**Project Coordinator** 

08 / 02 / 2024





13:35-14:15

14:15-14:30

14:30



development pathways

Closing Remarks

Light lunch







AGENDA	
08:30-09:00	Registration
09:00-09:15	Welcome
09:15-09:45	Project ISTOS Overview and main outcomes Petros Christou, Project Coordinator, Frederick Research Center (FRC)
09:45-10:25	Latest advances in seismic hazard and risk assessment for urban environment and critical infrastructures Kyriazis Pitilakis & Evi Riga, Soil Dynamics Geotechnical Earthquake Engineering Research Unit, Aristotle University of Thessaloniki
10:25-11:05	Crisis at Campi Flegrei Caldera: Risk assessment activities in the emergency planning and management Giulio Zuccaro, Scientific Responsible of the PLINIVS Study Centre, University of Naples Federico II
11:05-11:45	The role of the Centres of Competence in the Italian Civil Protection System  Mauro Dolce, President of Centre of Competence ReLuis
11:45-12:15	Coffee Break
12:15-12:55	Procedures and methodologies for the management of natural disasters in Cyprus Kyriacos Kouros, Director of the Technical Services, Ministry of Interior, Republic of Cyprus
12:55-13:35	Natural Disaster Management in a time of evolving climate crisis Efthymios Lekkas, Professor of Dynamic, Tectonic and Applied Geology & of Natural Disaster Management, University of Athens

Climate Resilience: Integrating mitigation, adaptation and sustainable

Mattia Federico Leone, PLINIVS Study Centre, University of Naples Federico II



#### Contents of the Presentation

- Motivation;
- ISTOS at a glance;
- Training activities;
- ISTOS today;
- Competencies;
- Sustainability.



#### **Motivation**

- 1. The report Territorial Dynamics in Europe Natural Hazards and Climate Change in European Regions, states that "The majority of the regions with high to very high natural hazard exposure are situated in the South and South East of Europe"
- 2. According to EM-DAT, for the period 1998–2009, earthquakes in Europe rank second in terms of fatalities and third in terms of overall losses
- 3. Flooding, along with storms, is the most important natural hazard in Europe in terms of economic losses
- 4. These problems are alarming in the Eastern Mediterranean region, and in Cyprus in particular. Relevant seismic risk assessment studies indicate that in the event of a large earthquake, the infrastructure can be extensively damaged, causing severe societal and economic breakdown throughout the island

The objective of the "ISTOS" project was to develop, in Cyprus, a research center concentrating on the structural safety of buildings and infrastructure, the disaster risk reduction and the post disaster management



The "ISTOS" project achieved its goal by creating strong links between the FRC and CUT in Cyprus and the two internationally leading research-intensive institutions, the Aristotle University of Thessaloniki (AUTH) of Greece and the University of Naples Federico II (UNINA) of Italy.



#### **Partners**

FRC: Advanced Infrastructures and Materials research group is established at the Frederick Research Center (FRC)

**CUT:** Structures group is established at the Cyprus University of Technology (CUT)

**AUTH:** Unit of Soil Dynamics and Geotechnical Earthquake Engineering (SDGEE) is established at the Aristotle University in Thessaloniki (AUTH)

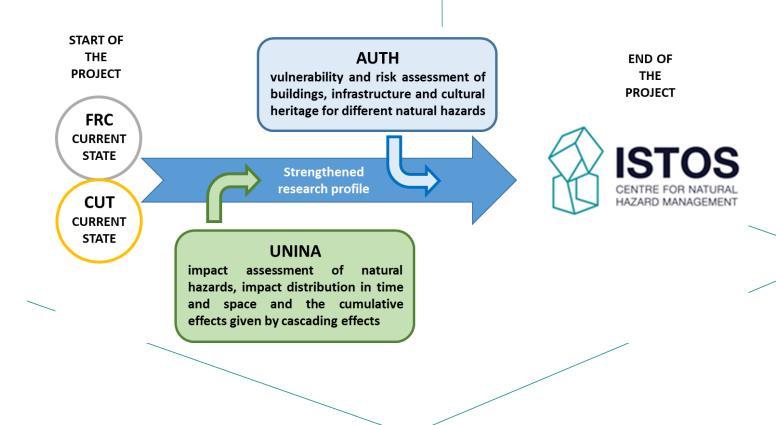
**UNINA:** PLINIVS – LUPT Study Centre is established at the University of Naples Federico II (UNINA)

#### **Expertise FRC:**

- Structural Analysis and Design;
- Repair/Strengthening using FRP;
- Computational Mechanics;
- Optimization;
- Concrete Technology;
- Protection of Structures against Blast and Impact Loading.

#### **Expertise CUT:**

- Earthquake Assessment and Retrofitting;
- Health monitoring of monuments;
- Structural Materials and UHPFRCC;
- Textile Reinforced Mortars for Infill wall retrofitting.





#### Vertical and Horizontal Priorities of ISTOS

Training and Knowledge Transfer

Communication and Networking

ESR Integration and Development

Dissemination and Exploitation

**Project Management** 

Structural safety of buildings and infrastructure

Disaster Risk Reduction

Post Disaster Management

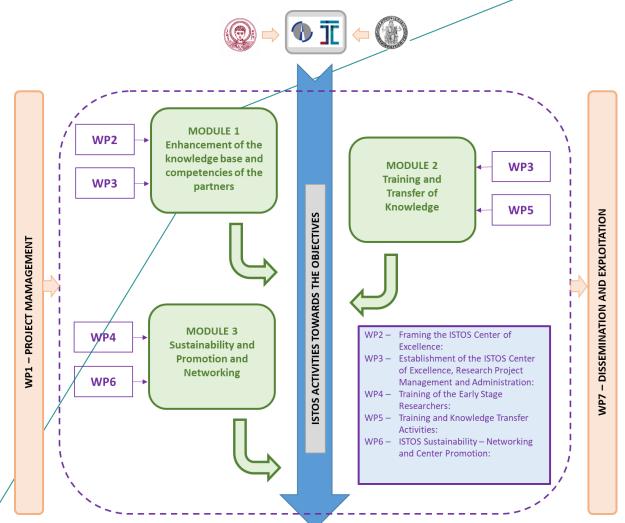
ISTOS CENTRE FOR NATURAL

#### Major Interest of "ISTOS"

Structural Stability of Buildings and Infrastructure	<ol> <li>Vulnerability analysis;</li> <li>Structural retrofitting approaches</li> <li>Hazard characterization (natural hazards and cascading events/NaTech);</li> <li>Elements at risk to be considered and inventory (exposure).</li> </ol>							
	1. Emergency planning;							
Disaster Risk	2. All-hazards approach in disaster risk reduction and climate change adaptation;							
Reduction	3. Simulation and modelling of disaster risk reduction measures;							
	4. Decision support tools (e.g. Multi-criteria and cost-benefit analyses).							
	1. Risk and impact assessment (for different natural hazards including cascading effects analysis);							
Doot Discotor	2. Technical management of emergency (e.g. Post-event technical surveys);							
Post Disaster Management	3. Implementation of mitigation and adaptation measures aimed at the resilience of built environment and society;							
	4. Implementation of mitigation and adaptation measures aimed at the resilience of built environment and society.							



# ISTOS Implementation



WP#	WP Title	Lead	
1	Project Management	FRC	
2	Framing the ISTOS Center of Excellence	CUT	
3	Establishment of the ISTOS Center of Excellence, Research		
3	Project Management and Administration	FRC	
4	Training of the Early Stage Researchers (ESR)	HŢÚA	
5	Training and Knowledge Transfer Activities	UNINA	
6	ISTOS Sustainability – Networking and Center Promotion	FRC	
7	Dissemination and Exploitation	CUT	





### Coordination and Support Measures

**Expert Visits (EV):** Exploited by senior researchers of all partners

Workshops (WS): Utilized for the involvement and input of the

stakeholders

**Short Term Scientific Missions (STSM):** Exploited by the ESRs for the purpose of training







**Summer Schools (SS):** Utilized for training purposes and the reinforcement of the ISTOS knowledge base as well as dissemination

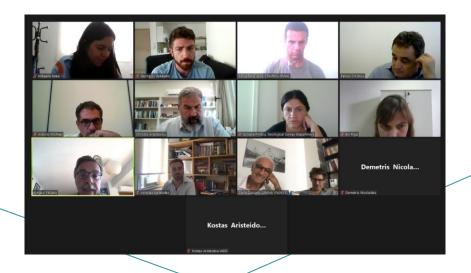
Webinars (WB): Used for dissemination and for networking purposes

Virtual Training (VT): Virtual training is used for training purposes and the reinforcement of the knowledge base



#### Virtual Trainings (VT)

- VT 1: Hazard identification and impact mitigation;
- VT 2: Vulnerability analysis, space and time dependencies;
- VT 3: Simulation-based disaster risk reduction planning: methodology and case studies;
- VT 4: Pre-seismic checking and risk assessment.





#### Summer Schools (SS)

- SS 1: Disaster
   Management Issues;
- SS 2: Disaster Risk
   Reduction Plan
   Development.







### Short Term Scientific Missions (STSM)







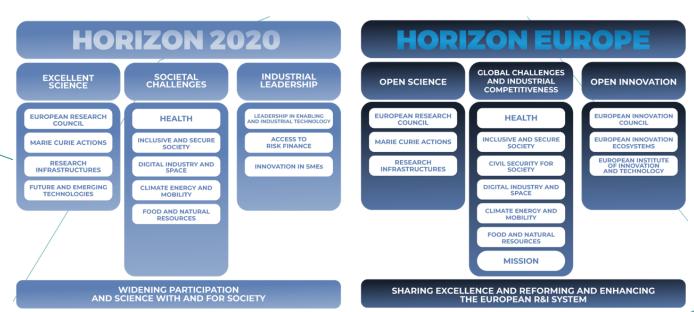
Greece Italy Cyprus





#### Workshops (WS)

- Stakeholders presentations;
- Establish the Cyprus baseline;
- Successful proposal writing.





( ISTOS

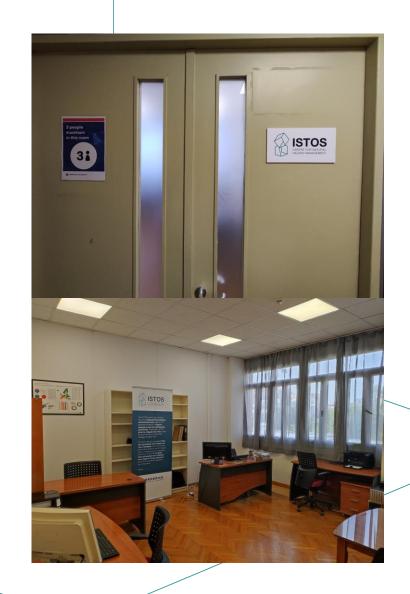
Stakeholders meeting: Assess the current Cyprus Baseline

September 2021



## **ISTOS Today**

- The ISTOS center is established;
- Researchers:
  - Faculty from 4 partners;
  - Post doctoral students;
  - Currently 5 PhDs;
  - MSc students;
  - BSc students.





#### Risk or Impact

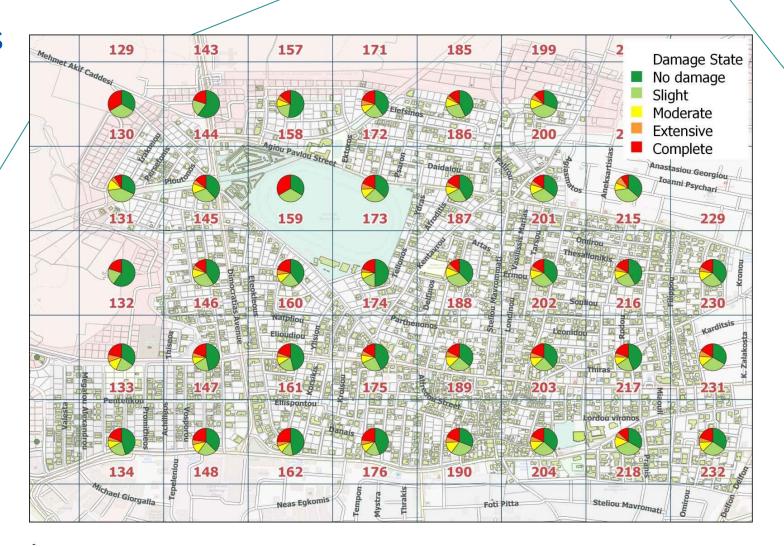


**RISK** = HAZARD x EXPOSURE x VULNERABILITY

- Hazard: Process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socionatural in origin.
- **Exposure:** Situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.
- Vulnerability: The characteristics determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.

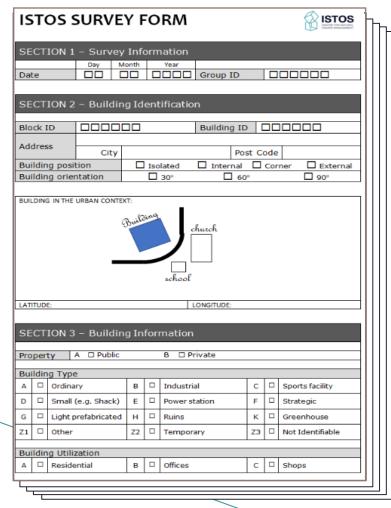


#### Risk Maps





#### Survey Work



SECTION 1: Survey information

SECTION 2: Building identification

**SECTION 3: Building information** 

**SECTION 4: Building characteristics** 

SECTION 5: Construction (Period)

**SECTION 6: Structural characteristics** 

**SECTION 7: Cladding** 

**SECTION 8: Openings** 

**SECTION 9: Interventions** 

SECTION 10: Regularity (Plan and Vertical)

SECTION 11: Factors affecting seismic response

SECTION 12: Geological characteristics



#### Survey Work

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SE	СТ	ION 1	- Surv	ey I	nfo	rma	ation					
			Day	Mor	nth		Year					
Date					Group ID			000000				
SECTION 2 – Building Identification												
Block ID				][]			Building ID			000000		
Address		55	City						Post Code			
SECTION 3 – Building Characteristics												
Construction Material												
А		Adobe			В		Alpha b	lock C				Clay brick
D		Concre	ete blocks		E □ Stone F						Tufa	
Number of floors □ Single-storey □ Two-storey												
SECTION 4 – Horizontal Structure (Only for Adobe)												
Tin	nber	ring b	eams (T	RB)	Г		Yes	□ No				
SE	CT.	ION 5	– Oper	ning	s							
Per	rcen	tage o	f openin	gs in	the	faç	ade					
Α		< 10%	)		В		10% - 2	25%		С		26% - 30%
D		30% -	50%		Е	_	> 50%					
Pri	mar	y mate	erial of th	ne wi	ndo	ws						
Α		Alumin	ium		В		PVC			С		Timber
D		Fibergl	ass		Е					F		
SECTION 6 – Geological characteristics												
Ground Type  Ground Acceleration (g)					☐ Type A			☐ Type B				☐ Type C
				☐ Type D			☐ Type E					
				□ 0.1			□ 0.2				□ 0.3	
						□ 0.4 □ 0.5						

**SECTION 1: Survey information** 

SECTION 2: Building identification

**SECTION 3: Building characteristics** 

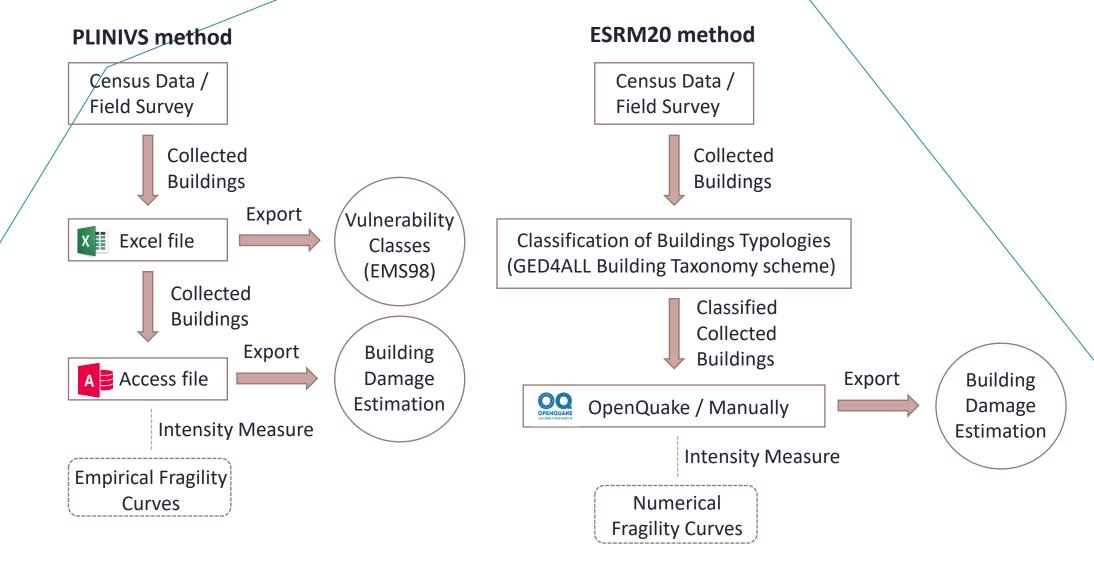
**SECTION 4: Horizontal structure** 

**SECTION 5: Openings** 

**SECTION 6: Geological characteristics** 



#### Risk Assessment





# **ISTOS** Visibility

- Dissemination
  - Journal publications;
  - Scientific conferences.
- Outreach
  - Newsletters;
  - Press releases;
  - Posters;
  - Infodays;
  - Researcher's night.

ISTOS RESEARCH
CENTER
NEWSLETTER

#### INSIDE THIS ISSUE

#### TOPIC 1

THE ISTOS PROJEC

#### TOPIC 2

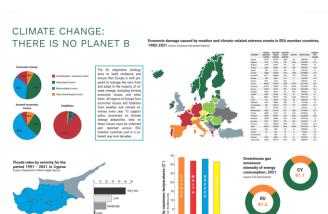
SUMMER SCHOOL

#### TOPIC 3



#### ISTOS

Throughout the last year, numerous activities were undertaken by the ISTOS project team. Papers were presented at various conferences, reflecting the hard work and research done by the team. In addition, articles were personed and then published in several reputable journals, showsaing our consistent sademic contribution. A significant evert was the organization and hosting of our second summer school. It saw a notable turnout, offering both attendees and our team valuable learning and networking experiences. Moreover, the Researchers' Might in Nicosia was another platform where our involvement was evident. Through all these engagements, the ISTOS project not only enhanced its visibility but also strengthened its ties with the broader research and academic community.







# ISTOS Sustainability

- Networking
  - Partner networks;
  - Stakeholders;
  - Municipalities.
- Research Projects
  - CoastWave (Tsunami);
  - ERA4CH (Cultural Heritage Protection);
  - ClimEMPOWER (Climate Change).

IOC-UNESCO EU DG-ECHO CoastWAVE PROJECT







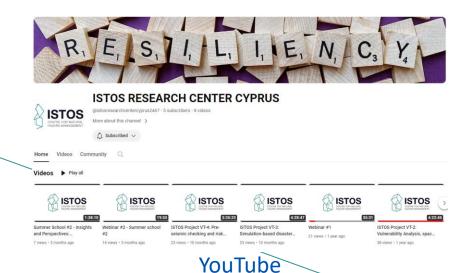


#### **ISTOS Information**





Home (istoscenter.eu)





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#### Acknowledgement

- Partners;
- Stakeholders;
- Funding Agency;
- Project Officer.













### THANK YOU

