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European developments addressing safety and reliability of tunnels

Georgios Katalagarianakis
European Commission, DG Research



Basis of EU Research Programmes

- *Objective “Lisbon”*: to become the most dynamic and most competitive knowledge-based economy
- *Objective “Göteborg”*: sustainable development (environment, health, economy, employment)
- *European Research Area (ERA)*: 'Integrating, reinforcing, structuring and stimulating investment in R&D...'

...from 1,9% to 3,0% of Gross Domestic Product (GDP)



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Objectives of Industrial Research under the 5th Framework programme

- ***modernisation*** of industry;
- substantially improve ***quality, safety*** and ***resource efficiency***;
- reduce ***resource consumption*** for all sectors of industry



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Objectives of Industrial Research under the 6th Framework programme

Transformation of EU industry with a view to sustainable development

- From resource-based to knowledge-based
- Promote real breakthroughs not just incremental research
- Integration of production and consumption patterns
- Integration of education and skills development



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FP7, Theme 4: NMP

Overall objective : To improve the competitiveness of EU industry and ensure its transformation via:

- the effective transition from a resource-based to knowledge-based industry
- generation of new breakthrough knowledge
- strengthening EU leadership in nano, materials and production technologies
- emphasis on integrating different technologies and disciplines across many industrial sectors

... strong continuity with FP6

Importance of **Technology Platforms** to help establish common research priorities



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Instrument in FP6 and FP7

Integrated Projects (IP)

Aim: flagship, ambitious, leading to radical innovation and transformation of industry in the long term

- Strong **industrial** participation and even **leadership**
- From fixed objectives to new **applicable** knowledge
- **Positive image** of industrial research
- Include inter-related activities





Tunnel safety

Project	2001	2002	2003	2004	2005	2006
FIT	Consultable databases & guidelines					
DARTS	Cost-optimal & durable new design					
Safe Tunnel		Preventive safety measures				
Sirtaki		Advanced tunnel management				
Virtual Fires		Tunnel fire simulator				
UPTUN			Upgrading of existing tunnels - innovation			
SafeT			Harmonised European Guidelines			



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Fire in Tunnels network: FIT

- Launched in March 2001, for 4 years
- EC funding 1.45 M€
- Optimise European efforts on tunnel fire safety
- Information and dissemination network
- State of the art in design fires
- Guidelines on fire safe design
- Best practice
- <http://www.etnfit.net/>



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Durable and Reliable Tunnel Structures: DARTS

- Launched in March 2001, for 3 years
- EC funding 1.65 M€
- New tunnel design
- Cradle-to-grave approach
- Life-cycle tunnel optimisation
- Decision tools, operational methods, construction procedures, upgrading



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Systems for traffic safety in road tunnels: Safe Tunnel

- Launched September 2001, for 3 years
- EC funding 2.2 M€
- Reduce traffic accidents through detection of anomalies and blocking of access
- Speed control inside the tunnel
- <http://www.crfproject-eu.org>



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Safety Improvement in Road and rail Tunnels using Advanced IT and Knowledge Intensive DS models SIRTAKI

- Launched in September 2001, for 3 years
- EC funding 1.45 M€
- Tunnel management system
- DSS for real time information, crisis management and emergency response means



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Virtual Real Time Emergency Simulator: Virtual Fires

- Launched in November 2001, for 3 years
- EC funding 1.5 M€
- Training of fire fighters
- Test fire safety
- Mitigation measures testing
- <http://www.virtualfires.org/>



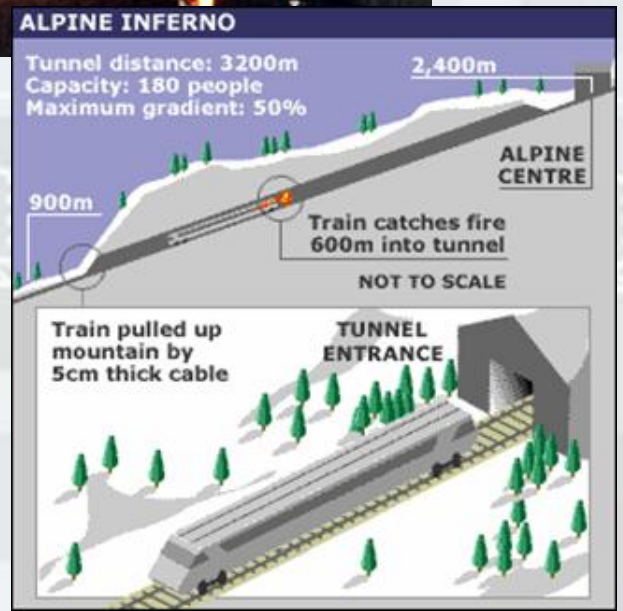
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Cost-effective, sustainable and Innovative Upgrading methods for fire safety in existing Tunnels UPTUN

- Launched in September 2002, for 4 years
- EC funding 6.2 M€, total 12 M€
- Prevention, detection, monitoring, mitigation
- Holistic evaluation and upgrading
- International Symposia on safe and reliable tunnels, 2004 and 2006
- ITA-COSUF
- <http://www.uptun.net/>

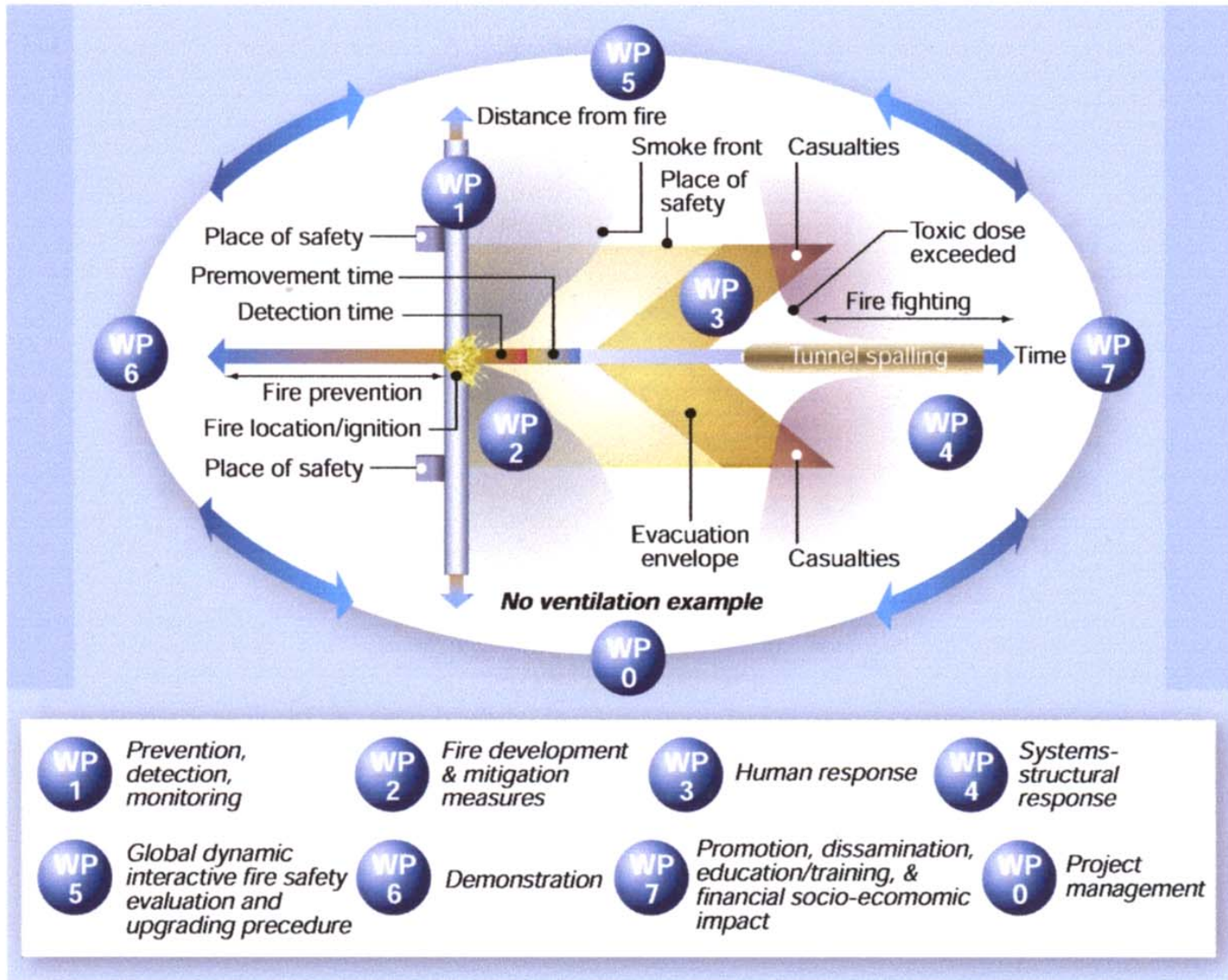


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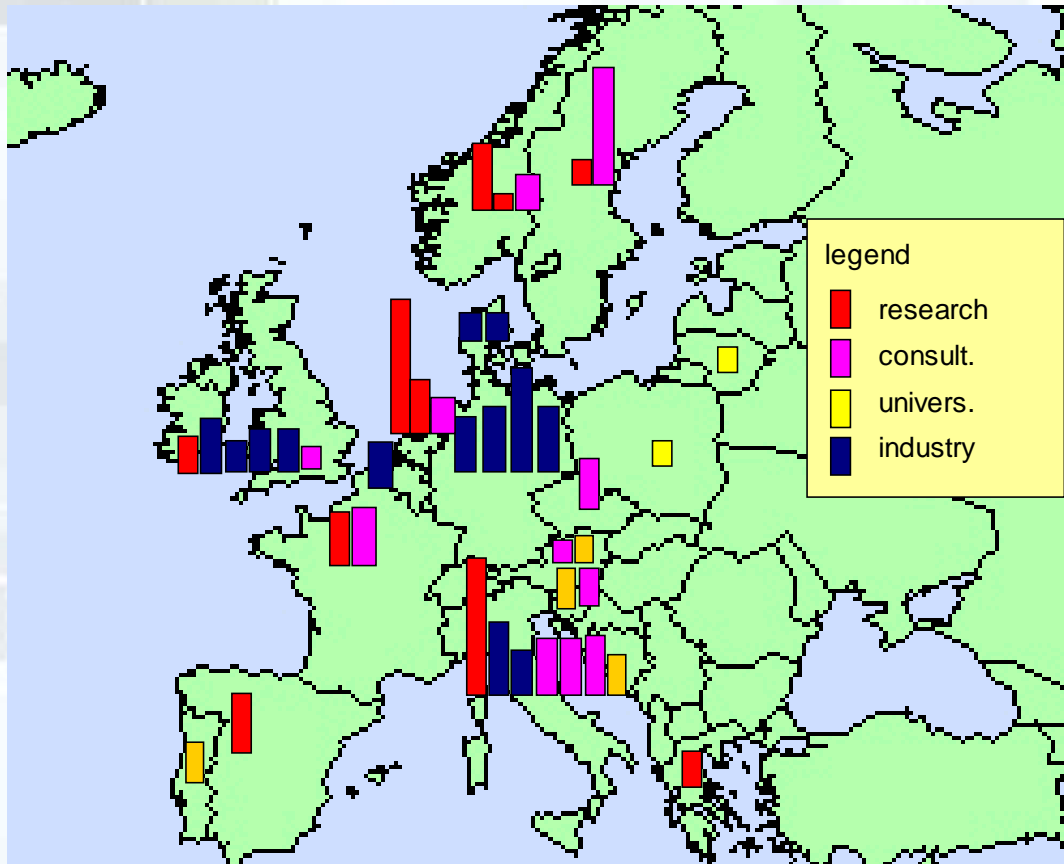
The scope





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Partnership





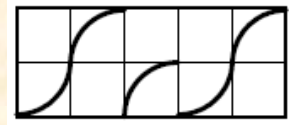


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HELLENIC INSTITUTE OF TRANSPORT (H.I.T.)
ΕΛΛΗΝΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΜΕΤΑΦΟΡΩΝ (Ι.ΜΕΤ.)



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CERVENKA CONSULTING



INSTITUTO SUPERIOR TÉCNICO
Universidade Técnica de Lisboa



UPTUN – Cost-effective, sustainable and innovative upgrading methods for fire safety in existing tunnels
Project funded by the European Community under the 'Competitive and Sustainable Growth' Programme
(1998-2002), Contract G1RD-CT-2002-0766, Project GRD1-2001-40739.





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- Description
- Partners
- Organisation
- Workpackages
- Links

- 2nd Tunnel Symposium
- Members Only
- Download area



Search

UPTUN stands for a major European RTD-project on cost effective, sustainable and innovative Upgrading methods for fire safety in existing TUNNELS. The project was carried out within the fifth framework programme of the European Union, by a consortium in which 41 partners from 19 European countries worked together, in the period 2002 - 2006.

The various parts of this website provide information on UPTUN's goals, work programme, partners and the UPTUN-deliverables.

All formal deliverables have been made available and can be downloaded from this website, provided the downloader identifies himself and accepts the disclaimer to the reports.

[Click here](#) to go to the download area.



www.uptun.net

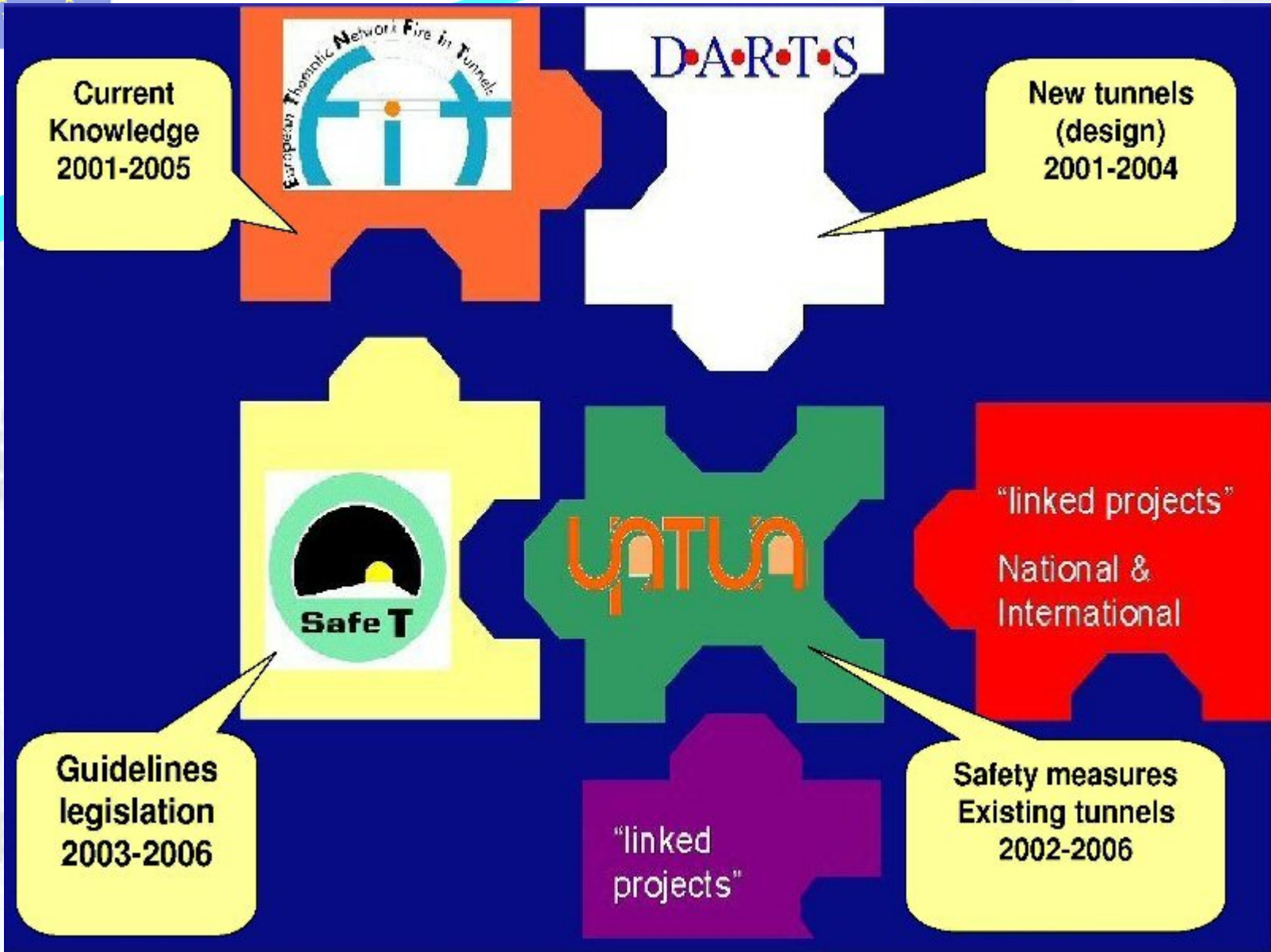




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Safety in Tunnels: SafeT

- Launched in April 2003, for 3 years
- EC funding 1.0 M€
- Harmonised European guidelines
- Focus on management and cross-border issues
- http://ec.europa.eu/transport/roadsafety/publications/projectfiles/safe-t_en.htm





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Large Scale Underground Research Facility; L-SURF

- Started March 2005 for 3 years
- Networking of infrastructure
- Feasibility for new infrastructure
- EC funding 3.3 M€
- <http://www.l-surf.org>



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TUNCONSTRUCT

- Technological innovation in underground construction
- 41 partners, from 11 European countries
- 26 million Euro 4-year budget, EC funding 54%
- integrate the on-the-field engineering experience and technical know-how of the industry
- integrate research capabilities and conceptual innovation
- Started in 2005
- <http://www.tunconstruct.org>



Legislative aspects

- Mandate after severe fire accidents in tunnels
- Prevention and mitigation
- Subsidiarity: limited to Trans-European Road Network
- Longer than 500 m
- Alternative strategies for old tunnels possible
- Member States may specify stricter requirements

- **Research on new technology and networking going hand-in-hand with legislation**



Key concepts

- Single administrative authority
 - Tunnel manager
 - Safety officer
 - Inspection Entity
-
- ▲ Periodic inspection
 - ▲ Risk analysis
 - ▲ Innovation
 - ▲ Reporting
 - ▲ Adapting to technical progress



The future

- Progress in line with technology evolution
- Responding to future needs
- System approach, infrastructure, vehicles
- Risk based? Learning from accidents?
- Human Factors, Organisation, Culture
- Benchmarking
- International cooperation
- Training technology, simulators
- Infrastructure for research and training
- Mitigation technology, fire-fighting protective equipment



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Thank you for your attention!

<http://www.cordis.lu>

<http://europa.eu.int/comm/research>

georgios.katalagarianakis@ec.europa.eu