

LINES OF ACTIVITY

2026-2028










































CEDEX



CHALLENGE 1

Safety and Resilience
in Mobility

CHALLENGE 1. SAFETY AND RESILIENCE IN MOBILITY

Chall. 1 (C1)	Strategic themes (T) and lines of activity (L)	Areas of activity							Singular facility (SF)
C1.T1.	Adapting the transport system to climate change								
C1.T1.L1	Vulnerability and risk								
C1.T1.L2	Operational thresholds and indicators								
C1.T1.L3	Robust monitoring against external climatic factors								
C1.T1.L4	Adaptation of materials and structures to new climatic conditions								
C1.T1.L5	Studies on the evolution of the geotechnical behaviour of transport infrastructure								
C1.T2.	Improving safety in the transport system								
C1.T2.L1	Monitoring of road service indicators								
C1.T2.L2	Road safety studies								
C1.T2.L3	Studies on the strength of road pavements								IS.PISTA ¹
C1.T2.L4	Studies on the durability and strength of structures								IS.SISMIC ²
C1.T2.L5	Railway certification tests (ENAC accreditation)								IS.LIF ³
C1.T2.L6	Low-cost ERTMS deployment. Pilot tests								IS.LIF ³
C1.T2.L7	Port operation risks, emergency protocols, special maritime operations								IS.MARIT ⁴
C1.T2.L8	Maritime accident studies								
C1.T2.L9	Climate studies in port environments. Environmental conditions, access limits, operation and auxiliary resources								IS.MARIT ⁴
C1.T2.L10	Geotechnical support. Resolution of pathologies and evaluation of innovative techniques for ground reinforcement and improvement								IS.CAJON ⁵















¹ Full Scale Accelerated pavement Test Track.

² Seismic simulator with six degrees of freedom.

³ Railway Interoperability and ERTMS Laboratory : Eurocab and Traffic Simulator.







⁴ Maritime experimentation laboratory and ship maneuvering simulator.

⁵ CEDEX Track box. Large cell for testing railway sections.

C1.T3.	Design and operation of transport systems								
C1.T3.L1	Studies on the behaviour of road pavements								IS.PISTA ¹
C1.T3.L2	Studies on the behaviour of railway infrastructure and superstructure								IS.CAJON ⁵
C1.T3.L3	Methodological and regulatory development of transport system components								
C1.T3.L4	Studies on the behaviour of ships during manoeuvring and whilst berthed at quays								IS.MARIT ⁴
C1.T3.L5	Extending the service life and adapting port infrastructure to new uses								
C1.T3.L6	Design of port infrastructure. Access areas, channels, basins, quays and breakwaters								
C1.T3.L7	Simulation of manoeuvres, maritime and port traffic, and quay operations								IS.MARIT ⁴
C1.T3.L8	Applications for train positioning using satellite and 5G technology								

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





























Areas of activity			
	Climate change		Studies of structures and materials
	Roads, transport and mobility		Ports and navigation
	Railways		Geotechnical studies

CHALLENGE 2

Sustainable mobility

CHALLENGE 2. SUSTAINABLE MOBILITY

Chall. 2 (C2)	Strategic themes (T) and lines of activity (L)	Areas of activity							Singular facility (SF)
C2.T1.	Circular economy								
C2.T1.L1	Eco-design in transport infrastructure: LCA, durability, mechanical and environmental performance (RA, NFU, industrial by-products)								IS.PISTA ¹
C2.T1.L2	Eco-design in transport infrastructure: Durability, mechanical and environmental performance of concrete and steel (eco-efficient cements, polymers, construction and demolition waste, tendons)								IS.SISMIC ²
C2.T1.L3	Characterisation and proposed management of dredged material								
C2.T2.	Support for transport planning. Intermodality								
C2.T2.L1	Analysis and preliminary study for the development of strategic transport planning								
C2.T2.L2	Passenger and freight transport models								
C2.T3.	Conservation and maintenance of the transport system								
C2.T3.L1	Monitoring of performance indicators. Concession contracts								
C2.T3.L2	Winter Road maintenance. Impact of de-icing agents on road surfaces and infrastructure								
C2.T3.L3	Predictive maintenance of road surfaces								IS.PISTA ¹
C2.T3.L4	Optimisation of railway infrastructure								IS.LIF ³
C2.T4.	Noise abatement								
C2.T4.L1	Noise-reducing road surfaces								IS.PISTA ¹


































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






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³ Railway Interoperability and ERTMS Laboratory : Eurocab and Traffic Simulator.




















C2.T5.		Environmental impact. Protection of biodiversity and ecosystems							
C2.T5.L1	Collisions between ships and cetaceans								
C2.T5.L2	Restoration of watercourses affected by linear infrastructure works								
C2.T5.L3	Protection of marine biodiversity. Management of ballast water, pollutants and particularly sensitive marine areas (PSMAs)								
C2.T5.L4	Conservation of ecosystem services. Maintenance and restoration of ecological connectivity (wildlife crossings, ecoducts, etc.)								
C2.T6		Environmental impact. Air quality and atmospheric emissions							
C2.T6.L1	Inventories and models for the study of air quality								
C2.T6.L2	Estimation of GHG emissions from maritime transport. Real-time emissions and spatially and temporally integrated values								
C2.T6.L3	Carbon footprint studies of transport modes and the transport system								
C2.T7.		Energy efficiency and decarbonisation							
C2.T7.L1	A.T.O. system and ERTMS Level 3 to contribute to the system's energy efficiency								IS.LIF ³
C2.T7.L2	Construction techniques for sustainable pavements: semi-hot, warm, cold mixes, ultra-thin mixes and others								IS.PISTA ¹
C2.T7.L3	Studies for the implementation of Low Emission Zones (LEZs)								
C2.T7.L4	Green public procurement for roads. Proposal for environmental criteria								

Areas of activity			
	Climate change		Studies of structures and materials
	Roads, transport and mobility		Ports and navigation
	Railways		Environment

CHALLENGE 3

Digitalisation
in mobility
















CHALLENGE 3. DIGITALISATION IN MOBILITY

Chall. 3 (C3)	Strategic themes (T) and lines of activity (L)	Areas of activity							Singular facility (SF)
C3.T1.	Adapting roads for autonomous and connected mobility								
C3.T1.L1	Road equipment, vertical signs and road markings								
C3.T1.L2	Vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V)								
C3.T1.L3	Regulatory support								
C3.T1.L4	Cooperative Intelligent Transport Systems (C-ITS)								
C3.T2.	Creation of digital models of transport infrastructure using drones and BIM								
C3.T2.L1	Inventory of geometric characteristics of road and railway elements, as a basis for the integration of monitoring and BIM implementation								
C3.T2.L2	Acquisition and development of tools and equipment to enable digitisation in a BIM environment								
C3.T2.L3	Digitisation using BIM for the study and dissemination of public works and urban planning heritage								
C3.T3.	Digital twin								
C3.T3.L1	Laboratory simulation of the ERTMS system and new functionalities: design validation or commissioning tests								IS.LIF ¹
C3.T4.	Development of geographic and cartographic information systems (GIS). Web viewers								
C3.T4.L1	Acoustic monitoring of the impact of transport-generated noise on the population (SICAWEB + IDE SICAWEB)								
C3.T4.L2	Decision support for ports, maritime transport and emergency management at sea								
C3.T4.L3	New technologies for instrumentation and processing of port geotechnical information (GIS port geotechnical information)								
C3.T4.L4	Geolocation for the study and dissemination of public works and urban planning heritage								

¹ Railway Interoperability and ERTMS Laboratory : Eurocab and Traffic Simulator.





² Full Scale Accelerated pavement Test Track.

³ CEDEX Track box. Large cell for testing railway sections.

C3.T5.		Real-time monitoring							
C3.T5	Implementation of sensor-based monitoring systems: road surfaces; structures; tunnels; slope and hillside movements; innovative developments in geotechnical characterisation								
C3.T6		Advanced numerical modelling							
C3.T6.L1	Geotechnical study of structural defects and design solutions								IS.CAJON ³
C3.T6.L2	Advanced computational fluid dynamics (CFD) applied to the interaction between waves and marine structures								
C3.T6.L3	Historical database of AIS messages for studies of maritime traffic and its environmental impacts								
C3.T6.L4	Data processing and machine learning for terrain characterisation and profiling								
C3.T6.L5	Development of AI tools for the digitisation of infrastructure and the improvement of processes at CEDEX								
C3.T6.L6	Development of AI algorithms for the prediction of maritime accidents								

Contribution to Agenda 2030 SDG






























Areas of activity			
	Ports and navigation		Railways
	Roads, transport and mobility		Geotechnical studies

CHALLENGE 4

Safety and Resilience in
the Natural Environment

CHALLENGE 4 . SAFETY AND RESILIENCE IN THE NATURAL ENVIRONMENT






















Chall. 4 (C4)	Strategic themes (T) and lines of activity (L)	Areas of activity							Singular facility (SF)	
C4.T1.	Adaptation to climate change									
C4.T1.L1	Characterisation of the impact of climate change on the hydrological cycle and the aquatic environment									
C4.T1.L2	Analysis of coastal and river dynamics, and forecasting their evolution under climate change scenarios									IS.MARIT ¹
C4.T1.L3	Management of the coastal zone and development of strategies for adaptation to climate change									IS.MARIT ¹
C4.T2.	Improving the safety of hydraulic infrastructures									
C4.T2.L1	Studies to improve hydrological and hydraulic safety using physical and mathematical models and the application of isotopic techniques									IS.HIDRO ²
C4.T2.L2	Development of methodologies for conducting hydrological studies of dams. Support for regulatory development									IS.HIDRO ²
C4.T2.L3	Study of material pathologies. Concrete. Waterproofing systems									
C4.T2.L4	Geotechnical support for the design and operation of dams and reservoirs. Pathologies									
C4.T3.	Structural and functional integrity of the environment									
C4.T3.L1	Stability studies of waste tip and spoil heap sites									
C4.T3.L2	Stability of geological structures within the Network of Natural Parks									
C4.T3.L3	Stability of geological structures affecting the public maritime-terrestrial domain. Environmental geotechnics									
C4.T3.L4	Environmental design of marine discharge facilities									IS.MARIT ¹
C4.T3.L5	Coastal protection structures against erosion									IS.MARIT ¹









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¹ Maritime experimentation laboratory and ship maneuvering simulator.

² Hydraulics laboratory.


































C4.T4. Extreme events. Floods and droughts										
C4.T4.L1	Support for adaptive flood risk management through physical and numerical modelling studies									
C4.T4.L2	Basic, methodological and regulatory studies for the characterisation of flood hazard and risk									
C4.T4.L3	Adaptation to flooding in urban and peri-urban areas									IS.MARIT ¹ IS.HIDRO ²
C4.T4.L4	Identification and hydrological characterisation of droughts									
C4.T4.L5	Studies of flood protection infrastructure									IS.HIDRO ²
C4.T5. Environmental restoration and biodiversity protection										
C4.T5.L1	Methodologies for the study and monitoring of the good ecological status and conservation of aquatic ecosystems									
C4.T5.L2	Environmental restoration of the coast, the river network and areas adjacent to infrastructure									
C4.T5.L3	Nature-based solutions for environmental restoration, infrastructure integration and the mitigation of their impacts									
C4.T5.L4	Impact of contaminated soils (contaminant retention barriers)									
C4.T6. Built heritage: landscape and territory										
C4.T6.L1	Research into the integration of public works and urban planning with the landscape									
C4.T6.L2	Conservation and promotion of the heritage of public works in rural areas									
















Areas of activity					
	Climate change		Studies of structures and materials		Environment
	Water		Sea and coasts		Landscape and the countryside
	Hydraulic infrastructures		Geotechnical studies		

CHALLENGE 5

Sustainability in the
natural environment








CHALLENGE 5. SUSTAINABILITY IN THE NATURAL ENVIRONMENT

Chall. 5 (C5)	Strategic themes (T) and lines of activity (L)	Areas of activity							Singular facility (SF)
C5.T1.	Support for hydrological and sectoral planning in the field of water								
C5.T1.L1	Inventory of water resources in their natural state								
C5.T1.L2	Basic studies and methodological developments								
C4.T1.L3	Water resource systems (availability and ecological flows)								
C5.T2.	Support for coastal and marine planning								
C5.T2.L1	Regulation of marine activities. Technical guidelines for dredging, beach regeneration, artificial reefs and discharges								
C5.T2.L2	Coastal and marine environment directives. Support for their implementation								
C4.T2.L3	Support for maritime spatial planning								
C5.T3.	Treatment, sanitation, efficiency, saving and reuse								
C5.T3.L1	Methodological development for risk management								
C5.T3.L2	Methodological and regulatory development for efficient management								
C5.T3.L3	Innovative technologies and monitoring								
C5.T4	Conservation, monitoring and environmental management								
C5.T4.L1	Characterisation of the hydrological cycle using tracers and environmental isotopes								IS.ISOTOPIC ¹
C5.T4.L2	Coastal protection structures against erosion								IS.ISOTOPIC ¹
C5.T4.L3	Studies of the climate, atmosphere and sea using isotopic techniques								IS.ISOTOPIC ¹
C5.T4.L4	Achieving and maintaining the good status of water bodies (study of specific problems, modelling of physical and biological processes, methodologies)								
C5.T4.L5	Characterisation and monitoring of environmental variables and pollutants in water bodies								

C5.T4.L6	Studies for sediment management in rivers and reservoirs								
C5.T4.L7	Characterisation and monitoring of marine litter, beach sand and microplastics								
C5.T4.L8	Protection against accidental pollution. Risk analysis and pollution control products								
C5.T4.L9	Radiological characterisation of construction materials and protection against radon								IS.ISOTOPIC ¹
C5.T5.	Energy efficiency and decarbonisation								
C5.T5.L1	Studies on the behaviour of fixed and floating structures for the generation of marine renewable energy								IS.MARIT ²
C5.T5.L2	Studies on the behaviour of foundations used for geothermal energy generation. Impact on bearing capacity								

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


















Areas of activity			
	Climate change		Studies of structures and materials
	Water		Sea and coasts
	Hydraulic infrastructures		Geotechnical studies
			
			Environment

CHALLENGE 6





Digitalisation in the
natural environment

CHALLENGE 6. DIGITALISATION IN THE NATURAL ENVIRONMENT

Chall. 6 (C6)	Strategic themes (T) and lines of activity (L)	Areas of activity								Singular facility (SF)
C6.T1.	Development of geographic information systems (GIS). Web viewers									
C6.T1.L1	Updating and development of hydrological databases									
C6.T1.L2	Isotopic databases on precipitation, surface water and groundwater									
C6.T1.L3	Interactive visual guide									
C6.T1.L4	Marine environment information portal (InfoMAR)									
C6.T1.L5	Real-time access to external data. Oceanographic and meteorological information									
C6.T1.L6	Generation, processing and analysis of data relating to geographical information and the production of maps relating to the coastal and marine environment									
C6.T1.L7	Environmental viewer for state-owned ports									
C6.T2.	Environmental monitoring and instrumentation									
C6.T2.L1	Monitoring of the coastline using satellite and drone sensors									
C6.T2.L2	Technologies for the systematic monitoring of the coastal and marine environment and related activities									
C6.T2.L3	Isotopic data network									
C6.T3.	Advanced numerical modelling									
C6.T3.L1	Development of 3D numerical models for the study of hydraulic structures									
C6.T3.L2	Advanced computational fluid dynamics (CFD)									
C6.T4	Big Data									
C6.T4.L1	Hydrological data hub: collection, processing, review and exploitation of information									
C6.T5	Open data									
C6.T5.L1	Hydrological data and models: gauging yearbook, CAUMAX, CHAC, CAMREC, IBER model collaboration									

Contribution to Agenda 2030 SDG









Areas of activity			
	Water		Sea and coasts
	Hydraulic infraestructures		Environment

CHALLENGE 7

Heritage

CHALLENGE 7. HERITAGE

Chall. 7 (C7)	Strategic themes (T) and lines of activity (L)	Areas of activity							Singular facility (SF)
C7.T1.	Public works and urban planning								
C7.T1.L1	Conservation of documentary and built heritage								
C7.T1.L2	Research and knowledge generation relating to heritage								
C7.T1.L3	Dissemination and promotion of documentary and built heritage								

Contribution to Agenda 2030 SDG



Areas of activity



Roads, transport and mobility



Landscape and the countryside



GOBIERNO
DE ESPAÑA

MINISTERIO
DE TRANSPORTES
Y MOVILIDAD SOSTENIBLE

VICEPRESIDENCIA
TERCERA DEL GOBIERNO

MINISTERIO
PARA LA TRANSICIÓN ECOLÓGICA
Y EL RETO DEMOGRÁFICO

CEDEX