**NSFC –TÜBİTAK 2023 JOINT CALL FOR PROPOSALS**

**CALL TOPICS**

1. **Post-Disaster Waste Management, Safe Demolition and Environmentally Friendly Disposal and Recycling Technologies for Construction Wastes（申请代码1请选择E0806、E0805、E0502、E1006）:** Developing methods, machinery and equipment and products for safe demolition and environmentally friendly recycling technologies of construction wastes

* **Safe demolition Technologies**
  + Technologies for separating the foreign and non-recoverable substances inside the buildings before or during the demolition and for the demolition to be carried out in a certain measures and in a controlled manner,
  + Technologies for the demolition activities of buildings, taking into account environmental risks and environmental management, in a way that will not harm the environment and human health and safety,
  + Innovative technologies for demolition methods; development of demolition technologies with the use of explosive substances (development of different types of explosive substances or igniter capsules, etc.), mechanical demolition technologies (such as innovative construction equipment, robotic-mechatronic systems, autonomous-semi-autonomous-intelligent systems) and similar innovative technologies.
* **Separation/Classification of Construction and Demolition Waste (CDW), CDW management and strategies**
  + Development of cost-effective advanced separation, classification, purification, processing and quality assessment technologies under real operating conditions for the production of high purity secondary raw materials from CDW,
  + Separation with selective sorting processes, classification by applications such as mobile prototype sorting line, quality control by systems such as laser-generated plasma spectroscopy, labeling with RFID and QR coding, and tracking strategies through cloud traceability platforms,
  + Remediation by methods such as alkali remediation and carbonation.
  + Determination and standardization of criteria required for the removal of CDW from waste material classification: End-of-waste criteria allowsthe point at which a material ceases to be classified as a waste to be brought forward to the point at which it is recovered.In order to use this material as a 'product' on an equal footing to non-waste derived products, the goal includes efficient production with high quality recyclable materials, promoting product standardization and quality and safety assurance, and harmonization in recyclables markets.
  + Innovative storage and recycling solutions for debris removal and disaster-related wastes of various nature (medical waste, biological wastes that threaten public health and the environment, etc.)
* Transformation of CDW into valuable building materials as secondary raw materials and developing pilot-level utilization techniques
* Performing lifecycle (LCA) and cost analysis (LCC) of CDW-based solutions on a pilot scale: Evaluating the environmental and cost benefits of different circularity strategies using lifecycle analysis and cost analysis tools for various scenarios; development of best practices based on the lowest potential environmental impact and cost.
* Integrating CDW into the value chain in the construction industry by recycling CDW as secondary raw materials into valuable products,
* Strategies in this context are the development of Lego-type demountable load-bearing elements, 3D-printable composites, roof and wall elements with high thermal and sound insulation at pilot level with the materials containing CDW

1. **Innovative Construction Models for Seismic Isolation, Engineering Solutions for Architectural Designs, Advanced EngineeringMaterial Technologies and Post-Disaster Reconstruction Studies（申请代码1请选择E0810、E0804、E0805、E0806）:** Developing innovative construction models for earthquake resistant, safe, prepared and sustainable new living environments and strengthening existing ones, and conducting research on innovative high performance material technologies; the below listed applied research oriented at the integration of these technologies into the developed models and others:
   * Studies to investigate the earthquake behavior and durability of the existing building stock
   * Domestic development of earthquake resistance and seismic isolation technologies for seismic reinforcement of existing structures (houses, buildings, infrastructures): seismic isolators and column reinforcement studies by using advanced material technologies (Continuous carbon fiber plates, steel cladding plates, etc.).
   * Innovative construction, architectural and material applications to accelerate the stronger rebuilding of infrastructures, buildings and homes (in line with the BBB – Build Back Better concept)
   * Basic and applied research on the earthquake performance of historical artifacts/structures and their restoration/conservation.
   * Development of engineering solutions/approaches for earthquake resistant and earthquake dampening architectural designs; for example, the development of artificial intelligence applications for earthquake resistant architectural design; applied research on the detection of disordered carrier systems with deep learning and image processing
2. **Socio-Economic, Social and Environmental Widespread Impacts of the Earthquake（申请代码1请选择G0401、G0409）:** Research on the socioeconomic, social and environmental effects of the earthquake in political science and public administration, economics, finance, insurance, city and regional planning, psychology, education-PDR, sociology and communication areas, environmental health and its effects on climate change; development of effective and sustainable application/solution proposals
3. **Digital Technologies for Earthquake Engineering: Development of National Radio Communication Network for Central Disaster Management and Development of Integrated Real-Time Disaster Information Management System (DIMS)** **（申请代码1请选择E0810、F0104、F0106）:**

* Connecting local and national organizations that have a critical role in disaster management and coordination with terrestrial micro wireless lines and developing portable satellite equipment to be used in these organizations
* Ensuring that Critical Institutions have an integrated disaster management information and data management system that will serve damage scaling, forecasting, information sharing and rapid decision-making in the coordination process
* Development of cloud-based “Disaster Information and Data Management System (DIMS – Disaster Information Management System)” at local and national levels, targeting during and after the disaster, in real time (which can provide instant and uninterrupted information / data flow)

1. **Comprehensive Scenario, Foresight and Analysis Studies（申请代码1请选择E0810、F0104、F0105、F0106）:**
   * Multi-faceted earthquake risk and scenario analysis, including solutions for critical services and infrastructures (electricity, water, communication, transportation, health, education, etc.) before, during and after the earthquake in the short, medium and long terms.
   * Seismic hazard and risk maps of cities in order to contribute to earthquake safe settlement, reduction of earthquake damages and urban transformation studies.
   * Considering projection, forecasting, modeling and analysis studies for city and regional planning, presenting technology-based solutions and application suggestions in line with the results of these studies.
   * Risk and Foresight Analysis of Consecutive Natural and Industrial Disasters That May Be Triggered: Developing technological solutions that will form the basis of emergency action plans by making risk and foresight analyzes of other natural and industrial disasters that may be triggered by disasters.
2. **Domestic Development of Advanced Technological Solutions and Systems that can Directly Contribute to Increasing the Speed and Efficiency of Search &Rescue Operations and Detection of Survivors Under the Rubble During and After a Disaster（申请代码1请选择E0501、F0106、F0309、F0504）**
   * **Fully Automatic and Intelligent 3rd Eye Drone Systems:** Fully automatic and intelligent drone systems with thermal infrared sensing/imaging feature in order to detect emergency situations in and around disaster areas, ensure uninterrupted communication, and accelerate emergency operations such as search and rescue in cases where critical infrastructures such as transportation and communication are disrupted (effective for emergencies because they can be dispatched faster than helicopters and can transfer audio and video from low altitudes).
   * **Robotic Systems for Search and Rescue Activities:** Development of semi-autonomous or autonomous collaborative and/or soft robots/robotic systems with modular structure and/or physical structure that can change scale, with advanced and sharp mobility, to be used in search and rescue operations.