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SMART CITY CHALLENGE 2025

City Challenge

Max 3 pages

send to smartcity@taltech.ee by Sept 30, 2025

Challenge Title – Data-Driven Resilient Urban Flood Management

City/county and country – Istanbul Metropolitan Municipality (IMM) – ISBAK, Turkey

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1. What is the future urban challenge that would need a solution to?

Due to climate change, extreme rainfall events and flash floods have become more frequent and severe, threatening urban safety, infrastructure, and quality of life. In Istanbul, heavy rainfall often overwhelms outdated drainage systems, causing water to flood streets, disrupt transportation, damage homes, and endanger lives. Cities across Northern Europe, including Helsinki, Tallinn, and Stockholm, face similar issues as climate change alters precipitation patterns. Urban areas must evolve from reactive flood response to predictive, data-driven, and resilient flood management.

- **Please describe the challenge of your city / county neighboring a city?**

  Istanbul's mixed topography, rapid urbanization, and dense impervious surfaces reduce natural water absorption and accelerate runoff during storms. The city's drainage networks were not designed for the current intensity of rainfall, leading to frequent flooding in low-lying neighborhoods. Moreover, floodwater often carries pollutants into rivers and coastal waters, worsening environmental conditions and creating public health risks. Neighboring municipalities share the same watershed, making coordinated flood management essential.

- **Which category your challenge is primarily in: safe city, happy city, and climate resilient city?**

  Safe City

- **Why is it important for your city to solve it? How big priority it is for you and why?**

  Floods in Istanbul cause serious damage to infrastructure, disrupt daily transport, and put people at risk. By 2050, rainfall is expected to become 40% more intense, so building flood resilience is a must. Solving this challenge will significantly improve the city's resilience, protect human lives, reduce economic losses, and enhance public confidence in urban infrastructure.

- **Is this a unique challenge/problem of your city, why or is this by your knowledge a challenge/problem that many cities have – which kind of other cities?**

This is a global problem shared by cities across Europe and beyond. Helsinki and Tallinn, for example, are implementing nature-based solutions and smart sensor networks to address flash flood risks. A scalable, integrated solution developed in Istanbul could benefit many cities facing similar climate threats.

2. Innovation.

- **How have you solved that issue so far? Why aren't the present solutions good enough? Are there legal obstacles, which ones?**

  Current approaches rely on reactive emergency responses, manual inspections, and basic stormwater infrastructure. These measures fail to anticipate flood events and cannot cope with increasing climate pressures.

- **What should be the main features, characteristics of the future solution to be potentially best for that challenge or problem?**

  - Real-time rainfall and water level monitoring with IoT sensor networks
  - AI-driven predictive flood modeling based on weather, land use, and topography
  - Dynamic GIS-based flood risk maps updated in real time
  - Nature-based solutions (permeable surfaces, retention basins, green infrastructure)
  - Early warning and citizen alert systems with evacuation guidance

3. Expected impact of your pilot solution.

- **What is the expected impact to your city environment you expect to see if the challenge gets solved?**

  City Environment: Reduced flood damage, improved water quality, enhanced climate resilience.

- **What is the expected impact to your citizens you expect to see if the challenge gets solved?**

  Citizens: Increased safety, early warnings, reduced disruption to daily life.

- **What is the expected impact to your city governance you expect to see if the challenge gets solved?**

  City Governance: Data-driven flood response, better infrastructure planning, cross-municipal coordination.

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4. Piloting

- **Why would you be interested to become a piloting partner of a proposed solution to the challenge you are describing here? Describe shortly your capability to participate.**

  Istanbul's rapid urbanization, complex topography, and the fact that existing stormwater infrastructure can become insufficient during intense rainfall events — even if such events are not frequent — make the city an ideal pilot environment for testing innovative flood prediction and management solutions.

  ISBAK's expertise in GIS, IoT integration, and real-time data analytics will enable the development and deployment of advanced flood resilience systems that can later be adapted globally.

CHECKLIST AND FAQ

Are you a city, municipality or a campus / private real estate developer?

Yes – you are warmly welcome to propose 1-3 challenges, one challenge per one template

No – do not send us any challenges but wait until we have gathered urban challenges and you are welcome to propose solution ideas by November 30

Are you describing challenge or problem? – Yes, then great.

Does a city need to propose a solution idea as well? – No, the researchers and companies will propose their solution ideas to the challenges proposal by the cities.

Can only Estonian cities propose challenges? Can only EU cities propose challenges? – No, cities* from whatever country are warmly welcome.

*A **City** is a local administrative unit where the majority of the population lives in an urban centre of at least 50 000 inhabitants and cities from countries with less than 5 cities of more than 100 000 inhabitants if they have more than 10 000 inhabitants. Those countries are: Croatia (HR), Cyprus (CY), Estonia (EE), Ireland (IE), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Slovenia (SI) and Slovakia (SK).

Can our city participate without proposing a challenge? – Yes, that is also possible but then you need to vote for challenges proposed by other cities. This can be done between Oct 2-30.

How will the challenges be evaluated? – We will not evaluate the proposed challenges but other cities/municipalities/campuses/private real estate developers can vote for the proposed challenges. In Round 5 researchers will start to propose solution ideas only to the challenges that have minimum one Estonian city/county and one city/county from another country.

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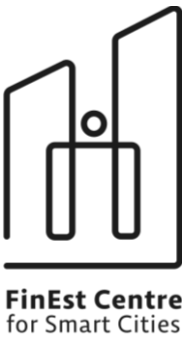
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