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SMART CITY CHALLENGE 2025

City Challenge

Max 3 pages

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

Challenge Title – City Resilience to Natural Hazards

City/county and country: Porto Alegre, Rio Grande do Sul, Brazil

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

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

Our core challenge lies in the lack of resilience to natural hazards, specifically the escalating risk of flooding in Porto Alegre, Brazil. This threat was dramatically highlighted by the over 5-meter flood in May-June 2024, which overwhelmed the city and impacted 46 out of 96 neighbourhoods, affecting roughly 157,000 people, which corresponds to 11% of residents. Porto Alegre is the capital and the largest city of the state of Rio Grande do Sul. The city was isolated for days due to transportation infrastructure collapse, causing risks of shortages of potable water, food, and medication for hospitals. The central problem is a profound communication and engagement failure, leading to thousands needing rescue by helicopters, boats or water motorbikes because they didn't heed civil defence warnings, often due to the difficulty in interpreting simple data and the absence of smart community mechanisms. This challenge extends to operations: the lack of real-time, two-way, and unified situational awareness severely hinders the ability to dynamically map danger zones, locate people in need, and coordinate official agents and volunteers during the critical logistics of rescue and resource management.

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

The challenge is primarily in the Climate Resilient City category, as it focuses on adaptation to climate-induced hazards like flooding. However, solving it has a direct impact on the Safe City objective by reducing risks to human life and property, and on the Happy City objective by fostering trust and community cohesion.

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

It is a major priority because it directly addresses the municipality's critical role in crisis management and mitigation when disaster strikes. Delayed or incomplete data slows down response times, leads to inefficient resource allocation, and increases risk to human life.

- *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?*

No, this is a challenge shared by many cities globally. For example, 450 cities out of 497 in the Rio Grande do Sul state were affected in 2024. Several cities around the world, including Venice (Italy), Jakarta (Indonesia), Miami (USA), Dhaka (Bangladesh), Valencia (Spain), La Plata (Argentina), and Vienna (Austria), faced severe flooding during 2024–2025, underscoring the growing impact of climate change and the urgency of resilient urban governance.

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2. Innovation.

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

Current solutions are fragmented, based on manual checks, so, are slow and inefficient. They fail primarily because they rely on top-down approaches. Alerting citizens is usually one-way and delayed, relying on various tools. Conversely, any existing bottom-up communication relies on informal sources like social media and WhatsApp, which are unverified and not formally utilized by authorities. Critically, present solutions lack a unified and resilient system that can maintain function during blackouts. Finally, there's a significant gap in coordinating the overwhelming efforts of volunteers and agents on the ground during a rapidly evolving crisis. We are unaware of legal obstacles, but rather issues related to governance and lack of formal community participation are a challenge.

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

An ideal solution should have online and offline operational capability; should allow multi-source data integration; allow top-down and bottom-up communication; and be community-centric design, including non-technical elements like awareness campaigns, simulations and citizen training to ensure people know what to do when a crisis arrives.

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?*

The primary impact on the city environment will be a more resilient urban landscape across the entire civil defence cycle: prevention, mitigation, response, and reconstruction. We expect to see a reduction in damage and long-term costs, as timely warnings will lead to less property and infrastructure disruption, lowering post-disaster recovery expenses. This improved information will also guide smarter urban development and planning, helping to steer growth away from high-risk areas. Ultimately, improved communication and coordination will facilitate quicker and more efficient recovery efforts when crises strike.

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

Citizens will experience a profound increase in safety, security, and preparedness. We anticipate a direct reduction in the overall negative impact of climate change and natural disasters, minimizing property damage and the risk of injury or death. The solution will result in empowered citizens through increased engagement and community preparedness. Critically, citizens will receive better, more trustworthy alerts and clearer guidance, allowing them to know "what to do" before, during, and after an event. This is all enabled by integrated, two-way communication, which will provide a constant flow of verified information and feedback between the city and its residents.

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

A major improvement in operational efficiency, coordination, and legitimacy. Including better management of official agents and volunteers acting in rescues and logistics, improving critical tasks like organizing shelters and supplying essential needs. By moving away from a top-down approach and establishing a formal, two-way flow of communication, the solution will enhance transparency and build public trust in governance.

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.*

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We are highly interested in becoming a piloting partner to contribute to Porto Alegre and other cities becoming more resilient and experiencing a lower negative impact of natural disasters on citizens. Our capability to participate is strong as we are the Information Technology company of the city, which can provide technical expertise necessary for piloting the solution and for facilitating the coordination between the pilot team and various municipal departments as the civil defence and social centres. This capacity combined with the academic support from PUCRS brings scientific reputation and experience and a foundation for a successful pilot.

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