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**6G**SNS



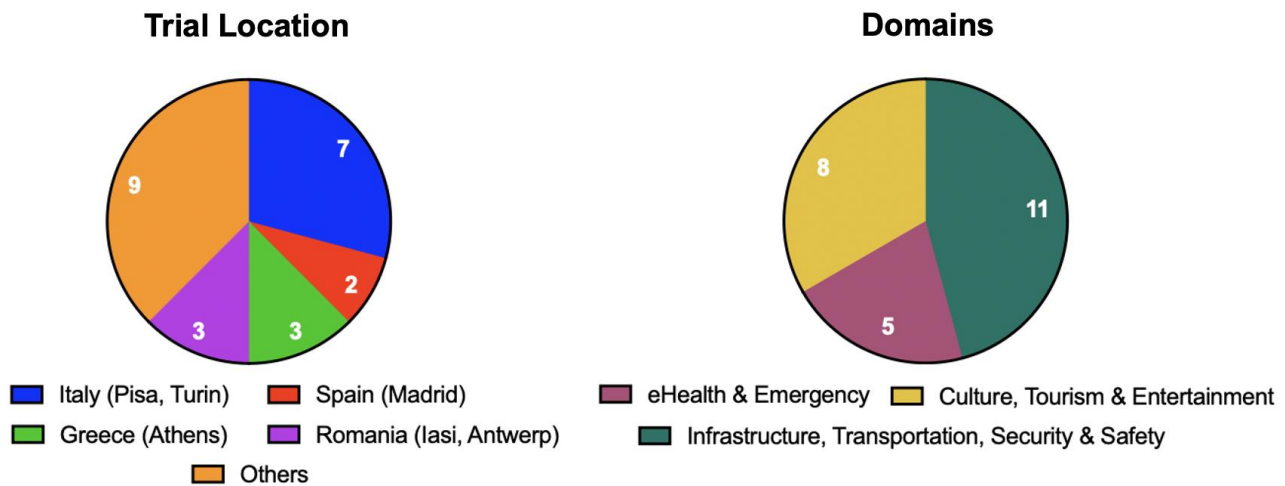
**TrialsNet: TRials supported by Smart Networks beyond 5G**

**Six Months Digest #3  
June 2024**

[www.trialsnet.eu](http://www.trialsnet.eu)

## OPEN CALL PARTIES ONBOARDING

This third semester came for TrialsNet with the onboarding of 24 new Use Cases coming from the Open Call. The selected third parties are mostly split between single applicants and consortia, while the vast majority of them are SMEs. The Open-Call Use Cases will be trialed in 12 different sites in Europe, covering all the three domains defined in our project, i.e., Infrastructure, Transportation, Security & Safety, eHealth & Emergency, and Culture, Tourism & Entertainment, being the first one the most represented. A kick-off meeting has been held with all the selected third parties, and a physical meeting has been held in conjunction with the plenary meeting #5 in Turin, on June 21<sup>st</sup>, allowing all the third parties to know the project partners, who to interact with for their project needs, and the project tools and methodologies they will adopt. Further info on the use cases coming from the open call is on the project [webpage](#), while the following figure reports some statistics on the distribution of use cases from the Open Call, with respect to the domain of application and of the trial location.



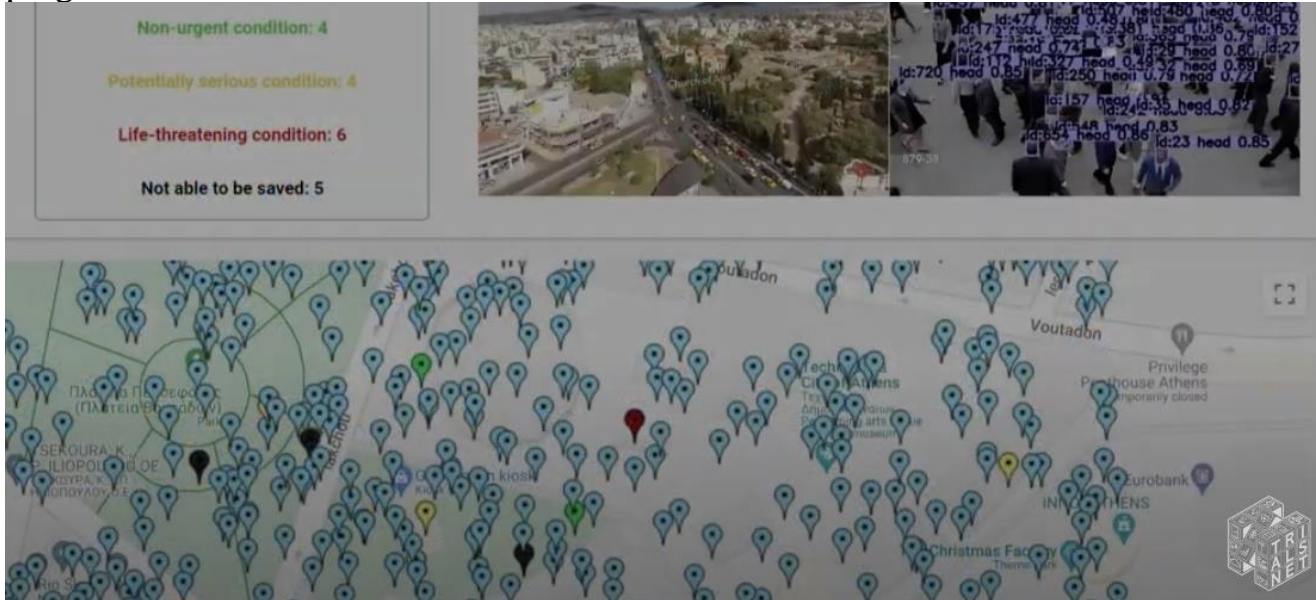
## TRIALSNET ACTIVITIES ARE PROGRESSING

Besides the integration of the Use Cases from the Open Call, TrialsNet's partners kept working on the implementation of the core Use Cases, as well as on the activities related to the infrastructure and platform.

In particular, [Use Case 2](#) "Proactive Public Infrastructure Assets Management" offers a cutting-edge solution for managing infrastructure by leveraging data from various sources—security cameras, drones, municipal vehicles, and AMRs—transmitted over 5G and processed with AI algorithms to assess asset conditions and generate maintenance alerts. The Use Case advanced the integration of IP cameras and devices like the Jackal Clearpath AMR and Qualcomm flight RB5 into the WINGSPARK Plus platform, enhancing the AI model for road damage detection. Initial results and KPIs from lab tests were collected, and the AI model evaluation began. Progress was also made on dashboard redesign, and back-end integration. An example of the infrastructure analysis interface is shown in the following image.

[Use Case 3](#) "Autonomous APRON" showcases a solution for optimizing airport operations at AIA using 5G communications, featuring autonomous baggage and cargo handling with AMRs. The APRON Digital Twin provides a real-time virtual depiction of the physical world, with sensor data from the AMRs analyzed using AI for accurate predictions and alerts, enhancing airport efficiency. Currently, the application design has

been finalized, the Jackal platform (AMR) has been adapted to support luggage carrying. The AMR has been integrated with the WINGSChariot platform, enabling initial KPI collection from lab tests using the WINGS campus 5G network. MQTT communication with the platform has been developed to enable seamless interaction with the back-end system, the robotic platform has transitioned from ROS1 to ROS2, and integrated a 360 camera into ROS2. Development activities enhanced the robotic platform's capabilities, including video streaming from AGV to WINGSChariot, using WebRTC. The digital twin development is ongoing, with two primary navigation approaches under evaluation. Initial results and KPIs from the lab tests have been collected, marking significant progress in UC3.



[Use Case 6](#), “Mass Casualty Incident (MCI) and Emergency Rescue in Populated Area”, aims to highlight how B5G/6G technologies can contribute to more efficient and digitally traceable triage procedures and pre-hospital treatment by first responders in case of MCI, as well as facilitate a more coordinated response in a densely crowded location. Innovative technologies will be demonstrated in large-scale field exercises for more efficient communication between first responders. The scenario evolves as follows. An incident is identified, and drones capture images and video from the scene, which are transmitted over B5G network to the WINGS STARLIT++ platform. A crowd estimation model is utilized to derive a rough calculation of the number of casualties involved (crowd counting) as well as their status (moving or still/immobile), as shown in the image above. This provides the first information for the first responders before they arrive at the scene. Once the first responders arrive on the scene, they perform an initial triage assessment and fit wearable devices on the victims. This allows a semi-automated triaging process to take place, based on user vital signs, position and movement data derived via the wearable devices. This consists of derivation of the respiratory rate from Electrocardiogram (ECG), derivation of current triaging status and derivation of future triaging status. The derivation of the respiratory rate from ECG is necessary as the respiratory rate is a crucial parameter for triaging protocols but is not directly obtainable from the wearable devices. The derived respiratory rate is then used along with other vital signs derived from the wearable devices for updating the triaging status of each casualty. Finally, the (near) future triaging status is derived (forecasting of the status of victims for the next 5 minutes). Initial results and KPIs from lab have been collected. The goal of [Use Case 9](#), "Adaptive Control of Hannes Prosthetic Device", is to improve the integration of wearable prosthetic arms with sensor-driven autonomous behavior to reduce the need of explicit control from the user during object grasping. For this, the

Hannes prosthesis is used and equipped with a video-camera providing images of the environment (e.g., the object to be grasped), Electromyography (EMG) sensors measuring the muscle activation of the user and an Inertial Measurement Unit (IMU). The task is to interpret the user's grasp intention, through AI methods, exploiting this sensory information, and control some of the available prosthesis' DoFs accordingly. However, all these sensors require high and stable data rates. For this reason, the computation is de-localized at the edge of the network, with ultra-reliable low latency connection to allow the continuous interaction between the sensors, the device and the AI machine located outside the prosthesis. After the different components' development and refinement, the applications' units have been successfully integrated with the aim to perform initial tests to find the best configuration for each component, to collect the first connection performance, and to detect possible bottlenecks. Major focus has been addressed to the development and testing of an additional software module dedicated to transmitting images from prosthesis' camera to the AI machine with optimal trade-off between compression effect on AI algorithm's performance, throughput, latency, and computational resources needed on the embedded board. Initial results and KPIs from lab tests have been collected. These activities have been carried out both in the IIT and Ericsson laboratories.

[Use Case 11](#), "Service Robots for Enhanced Passenger Experience" aims to create a connected airport ecosystem to optimize passenger flows and improve the overall experience. A solution has been developed to analyze passenger concentration using thermal cameras throughout the terminal. Insights from the WINGSPARK Plus platform enable AI-powered robots to provide passengers with relevant information and services, balancing check-in demand, optimizing waiting times, and enhancing the overall service. These robots also offer additional services, such as guiding passengers to boarding gates and providing personalized retail offers. During the last period different devices have been integrated in the WINGSPARK Plus platform, thermal cameras have been installed at AIA, video feeds have been collected and annotated, and an AI model for human detection through thermal cameras has been developed. Initial results and KPIs from lab tests were gathered. An ideation workshop has been organized for UC11 with active participation from all partners involved in the UC. An assessment questionnaire on replicability and applicability was also completed, marking significant advancements in UC11.



[Use Case 13](#), "Extended XR Museum Experience - Athens" aims to enhance visitors' experiences and expand their knowledge of cultural and historical sites through AR and VR technologies. As part of the project, WINGS developed applications serving as digital museum guides, offering immersive experiences and access to a wealth of audiovisual information, 3D environments, virtual exhibits, and 360 panoramic images, providing visitors with a captivating journey through ancient Parthenon and the famous Corinth

Canal. An example is shown in the previous picture. UC13 application design has been concluded, a server dedicated to transmitting AR and VR content has been set up, and the AR/VR has been packaged as Asset Bundles for on-demand download. The applications have been deployed on a server at WINGS premises connected to the WINGS 5G campus network. Initial results and KPIs from lab have been collected.

During this semester, milestone M3 ‘Use cases progress and Platforms and Network solutions intermediate phase’ was achieved: as reported in the 4 deliverables that have been published in this semester, namely D3.2, D4.2, and D5.2 for the UC development and D2.2 for the network solutions deployment, TrialsNet concluded the first half of the project activities and it is ready to start the large scale experimentation as planned in the second half. All the deliverables are available in the corresponding [section](#) of the project webpage.

Different videos have been produced to explain how various core Use Cases work and the latest developments they went through. They are available in the TrialsNet’s [YouTube channel](#).



## PLENARIES IN MADRID AND TURIN

During the past semester, TrialsNet Partners physically met twice. On February 19-21, we met in Madrid, for the 4<sup>th</sup> project plenary, in Prosegur premises, for the usual activities to progress with the project, fostering proactivity and focus as physical meeting allow, and with a big focus on the finalization of the Open Call results, including the

communication with the new 3<sup>rd</sup> parties. Later, on June 19-21, the project partners met in Turin, for the 5<sup>th</sup> project plenary, in the CTE NEXT premises provided by COTO. This time, the integrants of the Use Cases from the Open Call were invited to participate, to present themselves and their plan to the consortium. Apart from the 3<sup>rd</sup> parties integration, the plenary focused on the Ethics considerations of the foreseen trials, involving real end-users, as well as on the usual project progress, work package alignment and use case development. The following plenary meeting will be in October in Iași, Romania.

## TRIALSNET DISSEMINATION AT INTERNATIONAL LEVEL

During the past semester, TrialsNet organized and participated in various international events. During these events, 14 demos of TrialsNet Use Cases were performed, representing 8 different Use Cases, and having more than 150 attendants. Some of them were registered in videos, which are available in the project [YouTube channel](#).

For what concerns the specific events TrialsNet participated in, on May 15<sup>th</sup>, the project organized and hosted [SNS Stream B/D Projects Workshop](#) on KPIs and KVIs: a webinar to identify synergies and opportunities between Stream B and Stream D projects of the SNS JU. The session includes participants and presentations from both Stream D projects (TrialsNet, FIDAL, TARGET-X, and IMAGINE-B5G) and Stream B projects (8ORIGAMI, PRIVATEER, Deterministic6G, Hexa-X-II, SAFE-6G, 6GTandem, and PREDICT-6G). The focus of the workshop was on the use case's requirements in terms of KPIs and their validation methodology, as well as on identifying matches, gaps, and possible next steps.

Then, on June 3-6, TrialsNet was present at the European Conference on Networks and Communications & 6G Summit 2024 ([EuCNC](#)), held at the Flanders Meeting and Convention Center Antwerp. Throughout the event, the TrialsNet team showcased their cutting-edge use cases and participated in insightful discussions about the future of 6G.

The booth was a hub of activity as attendees visited to learn about the project's innovative developments. The team was honored by the visit of Erzsébet Fitori, the Executive Director of the Smart Networks and Services Joint Undertaking (SNS JU), and Programme Officer Chiara Mazzone. Visitors to the booth were treated to interactive demonstrations of three of the 13 project use cases, offering a glimpse into the future of 6G network applications. Discussions focused on the upcoming trial phase, setting the stage for future advancements.



In addition to the booth activities, the TrialsNet team participated in [Special Session 9: “Large Scale Trials and Pilots: Challenges and Opportunities”](#), moderated by Andreas Georgakopoulos. This session featured insights from members of TrialsNet, TARGET-X, Imagine-B5G, and the FIDAL projects. The panel shared their perspectives on the work done so far and the path

ahead for the SNS JU STREAM D projects that started last year. Also, Silvia Provvedi, TrialsNet’s Project Manager, delivered a compelling presentation at the WITAR convened session.

Finally, on June 19<sup>th</sup>, TrialsNet was present at the 2024 edition of the [5G towards 6G for CitiVerse Conference & B2B](#), in Turin, where the project experts participated in round tables about Extended Reality for Culture, Entertainment and Gaming, as well as about 5to6G and AI to support future mobility solutions in Cities. They presented a keynote about “6G Positioning and Sensing Through the Lens of Sustainability, Inclusiveness, and Trustworthiness: which Key Value Indicators?”, and presented demos for two use cases: UC5 - Control Room in Metaverse and UC12 - City Parks in Metaverse. This event represented a useful time for discussion with shareholders and potential end users.

Details about TrialsNet participation in other events during this period could be found in the “Events” [section](#) of the project webpage.

## PROJECT'S INFORMATION


If you are looking for further info about the project structure, consortium, the different use cases, as well as news and contacts, the [project website](#) is the place to go. The project deliverables, publications, together with other dissemination and communication material, are available on the corresponding [website section](#).

## FOLLOW US!

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