OVERVIEW and TECHNICAL CAPABILITIES for EUROPEAN PROJECTS

OVER Holding is an Italian SME specializing in Augmented Reality (AR), Extended Reality (XR), and Digital Twins since 2018. The company has developed *Over the Reality*, an end-to-end platform that enables users to publish and browse geo-localized AR content, generate Digital Twins of the physical world using smartphones, and re-localize devices in space with a Visual Positioning System (VPS). To date, the platform has onboarded over 1 million users, with AR content published across more than 22,000 geographical locations by 4,000 independent publishers. Additionally, users worldwide have created over 100,000 3D maps of high-traffic indoor and outdoor locations, establishing the largest European database of 3D maps.

Below is a detailed breakdown of OVER Holding's current technical capabilities and resources in the broader fields of Spatial Computing and XR:

AR/XR Publishing

- **Web Builder**: A browser-based AR editor for publishing geo-localized AR content, supporting Gaussian Splatting and Point Cloud spatial reference systems for scene editing and object anchoring. It includes Marker, VPS, and GPS re-localization systems, as well as Generative AI for creating 3D assets from text prompts.
- **Unity SDK**: An advanced AR publishing tool featuring Visual Scripting and all functionalities of the Web Builder for enhanced development flexibility.
- **Live Editor**: An in-app AR publishing tool allowing users to anchor 3D content to physical locations directly from their smartphones, with cross-scene editing capabilities across the Live Editor, Web Builder, and Unity SDK.

AR/XR Browsing

AR content and Digital Twins (3D Maps) created on the *Over the Reality* platform can be accessed through multiple endpoints:

- Dedicated iOS and Android apps.
- QR code activations for app-less AR browsing via Instant App (Apple) and WebXR (Android).
- Mobile and desktop browsers.
- VR pass-through headsets, including Apple Vision Pro, Meta Quest 3, and Pico XR.

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Digital Twins and 3D Map Generation

OVER has developed a comprehensive pipeline to generate 3D maps and Digital Twins using basic smartphones (no LiDAR required). Leveraging a crowdsourced data acquisition approach, OVER has produced over 100,000 3D maps of key global locations. The pipeline includes:

- A dedicated user interface with AR overlays and guidance to capture high-quality, multi-angle images of target areas.
- Custom software to generate 3D maps and Gaussian Splats from raw images.
- In-house hardware infrastructure (GPUs) capable of processing up to 600 3D maps per day.

Visual Data AI Training Dataset

In the process of creating over 106,000 3D maps, OVER Holding has generated one of the largest proprietary geo-localized image and metadata datasets in the world. This dataset is significantly larger than currently available open-source datasets and is a valuable resource for training state-of-the-art visual AI models. It continues to grow at a rate of approximately 5 million pictures per month. Below are the current statistics:

- 106,000 3D maps
- 32 million square meters mapped
- 59 TB of raw imagery data, including:
  - Pictures
  - SLAM position tracking data

  - Timestamps
  - IMU (Inertial Measurement Unit) data
  - Intrinsics and extrinsics
  - GPS positioning
  - Compass
  - Light estimation
- 53 million pictures
- 400-1000 pictures range on 300 sqm area
- A mix of indoor and outdoor pedestrian viewpoints collected from smartphones

Visual Positioning System (VPS)

OVER offers a low-latency VPS active across all 3D-mapped locations, providing centimeter-level precision for AR applications and general device re-localization in space. Additionally, OVER is developing a patent-pending *Private VPS* pipeline to ensure that end-user positional and visual data remains inaccessible to OVER, enhancing privacy.

Body Tracking and Avatars

The *OVER Console* enables full-body teleportation into VR and AR scenes through advanced tracking and AI-assisted features. Key capabilities include:

- Full-body tracking via webcam using AI motion tracking.
- Full-body tracking with the Rokoko motion capture suit.
- Facial expression tracking with depth-camera-enabled iOS devices.
- Rigged 3D head reconstruction from a single selfie.
- An optimized WebSocket pipeline supporting up to 50 avatars per room with low latency for position and action state exchange.
- Avatar level-of-detail (LOD) system for performance optimization.
- LLM-powered avatars with integrated speech-to-text and text-to-speech pipelines, including lip-sync functionality.

Other Capabilities

OVER enables a shared state between local AR experiences and Digital Twins, ensuring coherent positioning between the physical world and its digital representation. This allows seamless interaction between users in physical locations and those accessing the Digital Twin. For example:

- **Remote Maintenance and Assistance**: A remote operator in the Digital Twin can interact with an on-site operator in the physical location, with both parties maintaining precise spatial awareness of each other's position in the 3D Space via avatars.