

LIGHTNING TALK



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SPATIAL COMPUTING MEETS POLICY



SPATIAL MAPPING

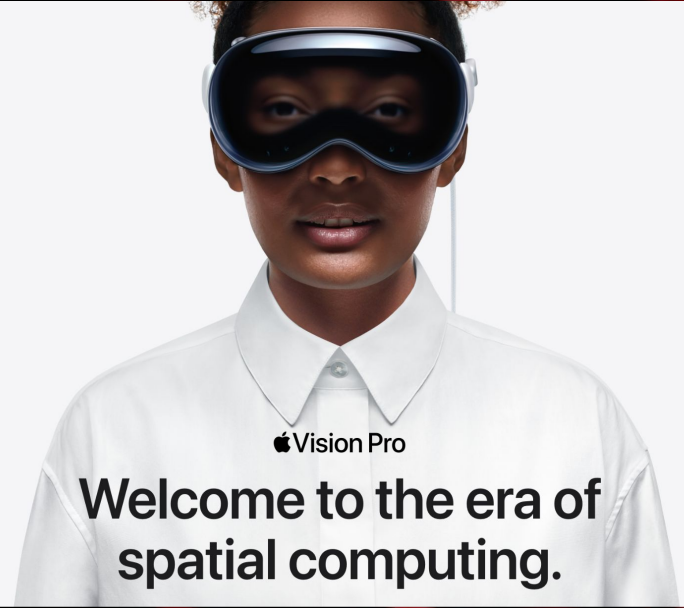
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SPATIAL COMPUTING

Spatial Computing™



– Avi Bar-Zeev, 1993 Screen Capture



– Apple.com, 2024

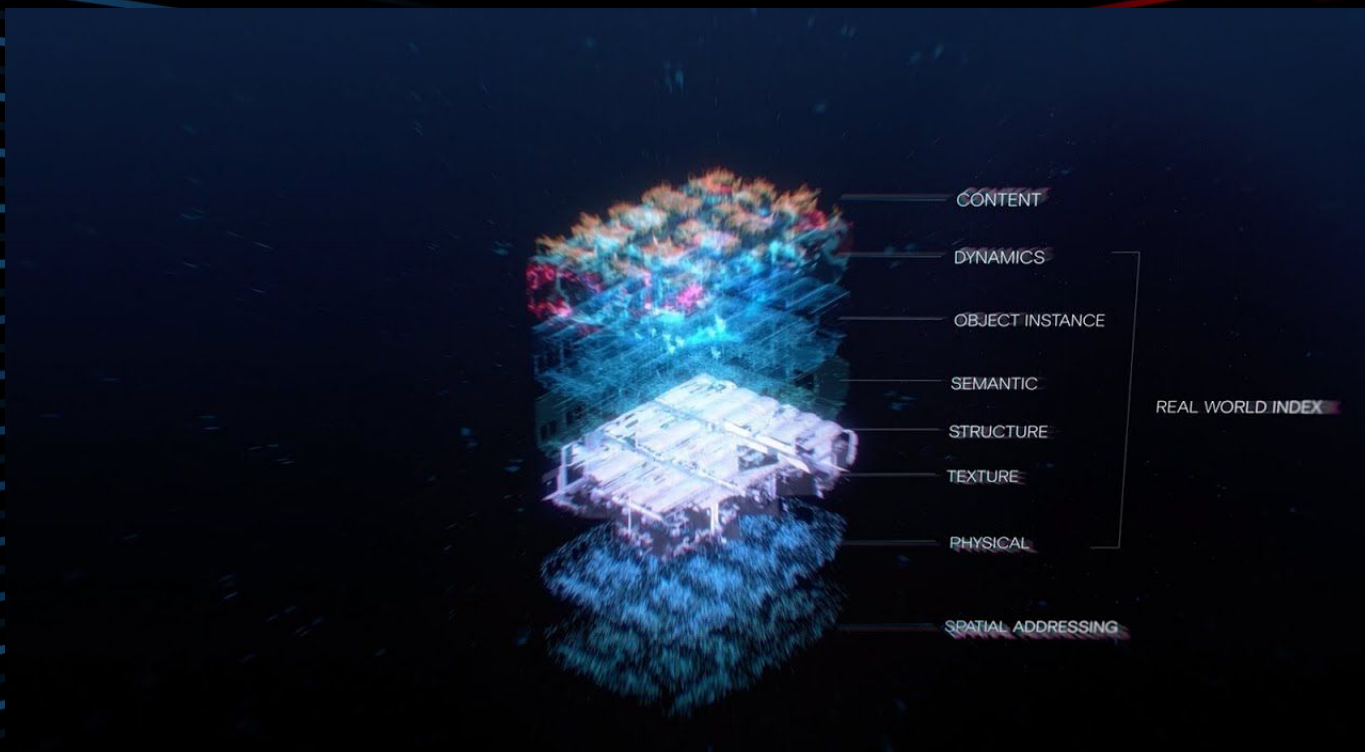
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SPATIAL COMPUTING

“...human interaction with a machine in which the machine retains and manipulates referents to real objects and spaces. It [Spatial Computing] is an essential component for making our machines fuller partners in our work and play.”

– Simon Greenwold, 2003 MIT Masters Thesis

META LIVEMAPS – Oculus Connect 6 (2019)



REAL / VIRTUAL WORLD INTEGRATION

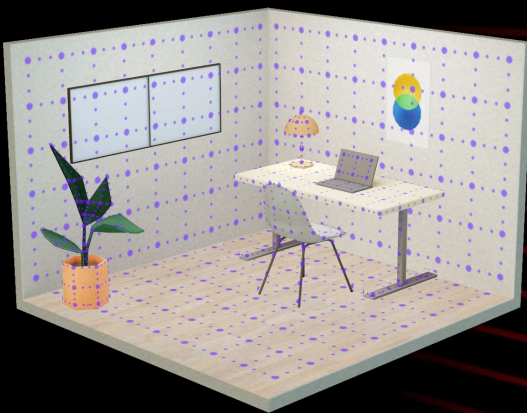
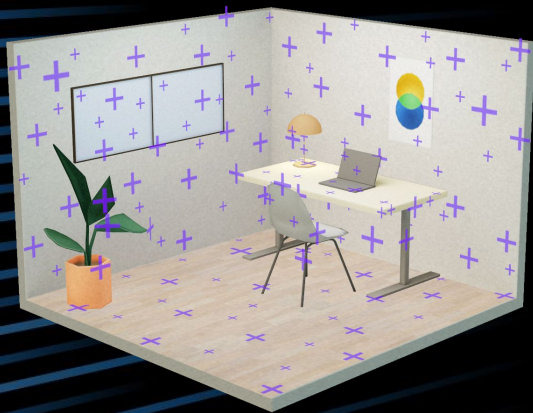
– Metaverse Standards Forum (2023)

“A person (the Rider), walking in an urban area asks via an intermediary for a car (the Ride Car) to provide a ride. If a Ride Car is available, it is sent to meet the Rider. When the Ride Car is close enough to the Rider for them to be mutually visible, virtual Signs appear to designate both the Rider and Ride Car to help them find each other. These Signs face each other, rotating and moving in synchronization with the Rider and Ride Car until rendezvous has been achieved at a safe location for a pickup. Arrival at a safe location for pickup is indicated by a change in the appearance of the Signs. At all times, the Signs appear visually as if embedded in three dimensions in the real world.”



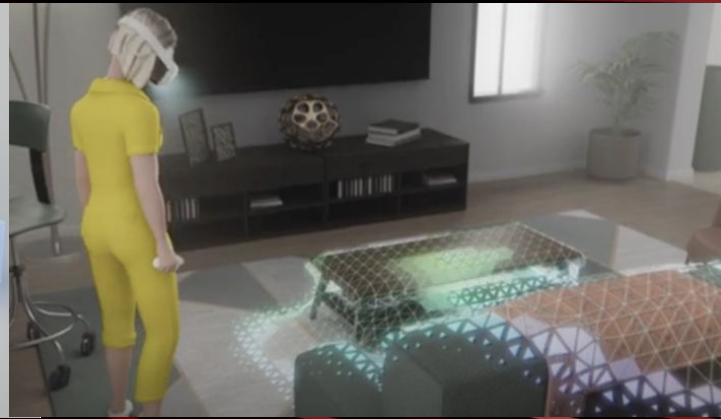
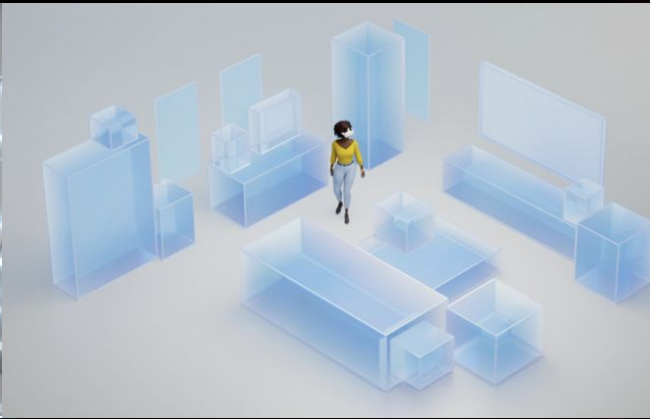
WHAT IS SPATIAL DATA?

- Point Clouds
- Models
- Geometric Meshes
- Object Recognition



WHAT IS SPATIAL DATA?

- “Point Clouds & Spatial Anchors”
- “Scene Data”
- “Mesh Data”





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SURVEILLANCE, PRIVACY & INTEGRITY! OH MY!

“To make this spatial realm work—to synchronize the virtual twins of all places and all things with the real places and things, while rendering it visible to millions—will require tracking people and things to a degree that can only be called a **total surveillance state.**”

– Kevin Kelly, Wired (2019)

MAJOR POLICY CHALLENGES

- Privacy Interests
- Property Interests
- Trust & Safety Considerations

MAJOR POLICY CHALLENGES



CNN travel

Destinations

Food & Drink

News

Stay

Video

Australia asks Google to remove images from top of sacred site Uluru

By [Rob Picheta](#), CNN

🕒 2 minute read · Updated 6:36 PM EDT, Fri September 25, 2020

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META'S "RESPONSIBLE INNOVATION PRINCIPLES" & SPATIAL DATA

- Engaging and meaningful user education – spatial data visualizations and primers
- User controls
- Bystander notifications

Responsibly Powering Mixed Reality Experiences on Meta Quest 3

Our next generation Meta Quest 3 headset will take mixed reality to the next level with cutting-edge features that seamlessly blend physical and virtual spaces. Leveraging data from a user's environment, Meta Quest 3 will enable immersive experiences that transform the way we play, work, and interact.

For mixed reality experiences to work, the device needs to understand the physical environment around the user. Below we outline how Meta Quest 3 understands the space around it, the experiences mixed reality enables, and how we're building these experiences in alignment with our [Responsible Innovation Principles](#).

01

What is mixed reality?

With personal computers and mobile devices, digital interactions are limited to screens, and users must choose between engaging with digital content on their devices and being present in their environment. Mixed reality bridges this gap and changes the way that users interact with digital content by enabling them to enhance their surroundings without having to leave their environment behind.

To accomplish this, the headset uses information about a user's environment (such as the size and location of objects, walls, and other surfaces) and creates a 3D model of the space. Mixed reality experiences can then use this 3D model and blend virtual and physical worlds seamlessly, enabling virtual experiences to move and interact with the space like physical objects would.

The advances in mixed reality will unlock a range of benefits on Meta Quest 3 including:

- **Enriched Experiences:** Mixed reality enables users to enhance their digital experiences by seamlessly blending them with the physical world. Users have control over where virtual content appears, how it is placed in their environment, and when/where they interact with it, creating a more immersive and engaging experience. This can be achieved by filling the user's room with virtual content that plays with the space around it—like images or colors that are synchronized with the beat, tone, and lyrics of a song.
- **Improved Presence:** Mixed reality allows users to stay connected with others while using their headset. Physical interaction is a crucial aspect of building

meaningful connections, but our earlier VR products do not fully support this. If VR users are not casting or playing together, feeling a sense of presence can be a challenge—even with people in the same physical environment. This improved feeling of presence can be achieved by interacting with and seeing friends in the physical room while playing in a mixed reality experience.

- **More Freedom:** Mixed reality allows users to navigate their physical environment confidently while wearing a headset and interact with their surroundings beyond the limitations of a virtual boundary. This enhanced freedom is achieved, for example, by providing a way for users to get a glass of water during breaks in their VR workouts without taking off their headset.

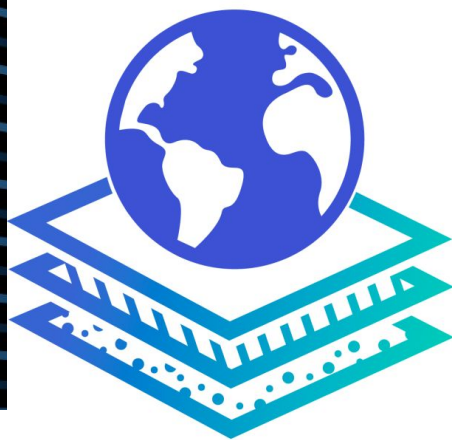
These improvements will make experiences on Meta Quest 3 more immersive and engaging. And while still in its infancy, mixed reality has the potential to help us realize innovative applications in a wide variety of industries beyond gaming. For example, teachers will have new ways to bring science to life through interactive and immersive classroom experiences. Architects and builders can see their designs at scale, providing them with a better understanding of how their work will appear in the physical world. Doctors can visualize a patient's recent scan in innovative ways, accelerating their decision-making in the ER. And one day, firefighters may get real-time information in a heads-up display that will help them navigate fires more efficiently, saving valuable time when lives are at stake.

Pokémon GO AS PRECEDENT



Homeowners brought a lawsuit against Niantic arguing that the company encouraged people to visit certain locations, inducing these users to commit trespass and nuisance once they arrived at these destinations. The lawsuit was settled; Niantic agreed to:

- Take steps to prevent placement of AR content within 40 meters of single family homes, and to promptly remove such AR effects upon receiving a complaint.
- Provide parks an opportunity to request that Niantec apply hours of operations to AR content located within the park and publicize these hours.
- Implement robust pre-approval and complaint handling mechanisms.



OVERTURE MAPS FOUNDATION

Map data today underlie thousands of applications for local search and discovery, routing and navigation, logistics, mobility, autonomous driving, and data visualization. In the future, map services will power augmented reality applications merging the digital and physical worlds to deliver rich social, gaming, education, and productivity experiences.

Steering Members



Achieving Congruence between New Tech and Old Norms: A Privacy Case Study of Spatial Mapping Tech in XR

By Joseph Jerome¹ and Cobun Zweifel-Keegan²

JOSEPH JEROME

IDEAS OCT 3, 2023 8:00 AM

Pretty Soon, Your VR Headset Will Know Exactly What Your Bedroom Looks Like

Meta and Apple have zeroed in on mixed reality headsets and augments as their next frontier. But allowing wearables to collect data about their surroundings is going to cause problems.

future @ tense

The Race to Map Reality so Silicon Valley Can Augment It Is On

BY JOSEPH JEROME

SEPT 18, 2020 • 2:02 PM

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