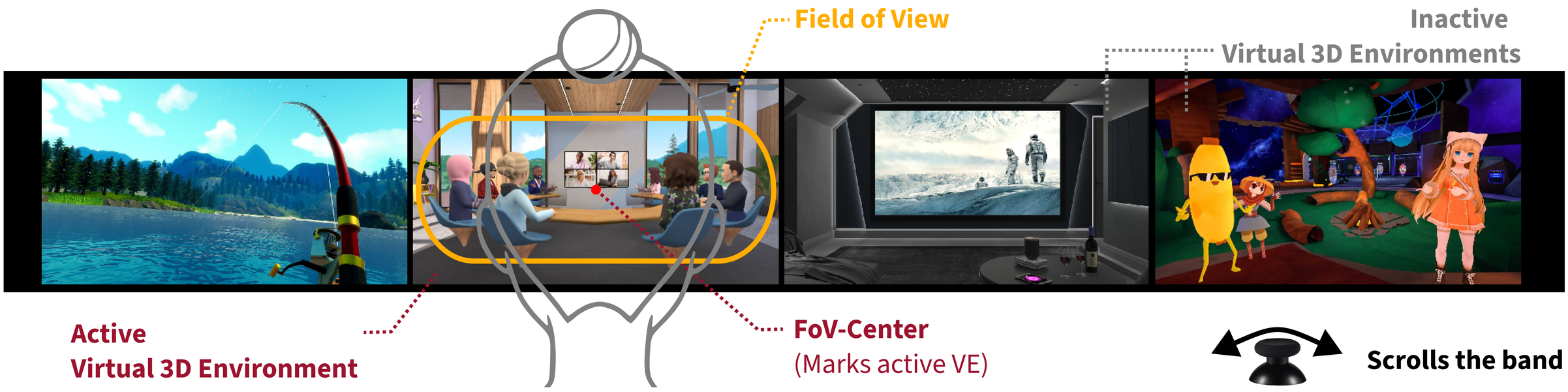
VilmReel

Scrollable Multi-Environment VR with Cross-VE Notifications

Martin Weigel and Stephen Brewster

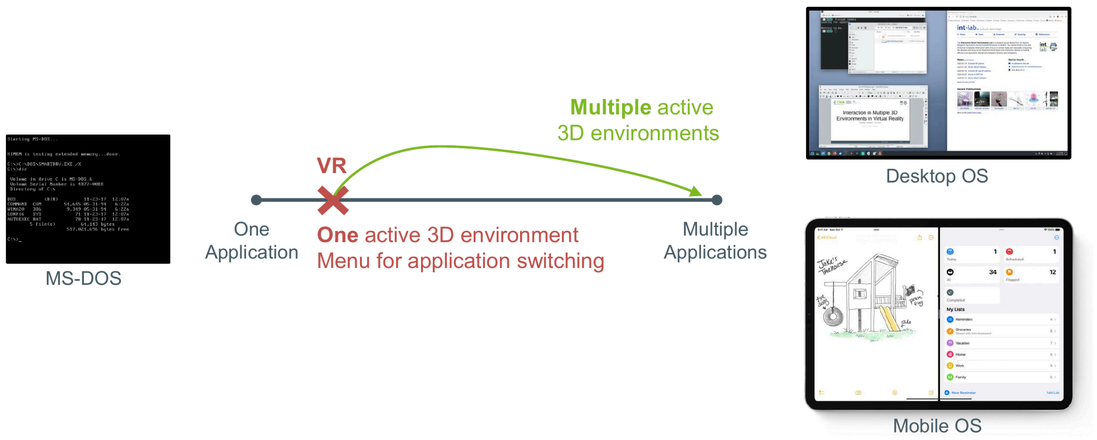
Project Page + Video



What if you could have multiple virtual worlds open at the same time and seamlessly move between them?
VilmReel reimagines the VR experience as a scrollable film reel, where each "frame" is an interactive 3D environment. Sounds and vibrations keep you aware of other worlds, even when you are not looking at them.

Motivation

Current VR interfaces impose a single-environment constraint, creating significant barriers to multitasking.



Research Question: *"How can users simultaneously explore and interact across multiple virtual 3D environments in VR?"*

VilmReel

Built in Unity 6.3 for the Meta Quest 3 with 4 diverse environments:

Scrollable Multi-Environment VR

VilmReel arranges multiple VEs side-by-side on a **horizontally scrollable band** — like a film strip where each frame is a fully immersive stereoscopic environment. Users scroll between environments using the **right thumbstick**, with each VE large enough to fill the complete field of view for full immersion. The band can also be stopped **between two VEs** to enable a split-screen configuration.

Cross-VE Notifications

VilmReel keeps users aware of events across all VEs:

Haptic Feedback: Controller vibrations signal *where an event is on the band*: left or right controller indicates direction, and pulse count encodes distance (e.g., two pulses on the right = two VEs to the right). No vibration plays for events in the active VE.

Spatial Audio: Event sounds play across all environments. In the active VE, audio renders from the true 3D location. In inactive VEs, a glitch effect is layered on top. This marks the sound as "elsewhere" while preserving its spatial position.

Together, haptics tell *which VE has an event* and how far away it is, while spatial audio tells *where within that VE* it occurred.

Lessons Learned

Several design directions were explored before the final design:

- **Horizontal beats vertical and circular:** vertical splits feel unnatural and a circular loop creates navigational ambiguity.
- **One audio effect per VE does not scale:** perceptibility varied across sound types and users couldn't reliably learn the mappings. A simple glitch vs. no glitch distinction works far better.

Conclusion

VilmReel demonstrates that scrollable multi-environment VR is a viable and intuitive paradigm for concurrent interaction and notifications across multiple virtual worlds.

The current proof-of-concept works best for 3–5 simultaneous environments and lays the groundwork for deeper OS-level integration that would enable true multi-application VR multitasking.

THM
TECHNISCHE HOCHSCHULE MITTELHESSEN

University of Glasgow
VIA VERITAS VITA