

VR/AR with ArcGIS

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Agenda

- Introduction & Terminology – Pascal
- Application & Market Potential – Rex
- Mobile VR with ArcGIS 360VR – Eric
- Desktop VR with CityEngine & Unity – Pascal
- Developing VR/AR Apps with ArcGIS Runtime – Adrien



Introduction & Terminology

Pascal

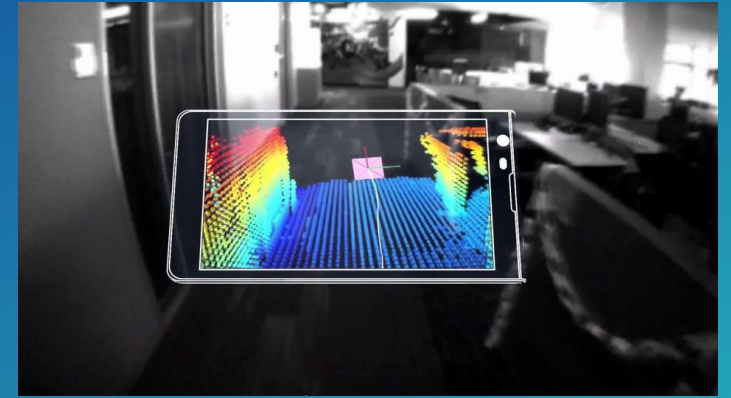
VR vs AR

VR - Virtual Reality

Being there

AR - Augmented Reality

Interacting with outside world



MR - Mixed Reality

Mixed presence

→ Immersive Computing

- Fundamental computer human interaction that is better than anything else
- AR got breakthrough with Pokemon GO
- Passive content / 360 experiences
lowest barrier entry for VR
- Terminologies not set yet
(...poor marketing people)

We are at the baby beginnings only!

Terminology

“Experience”

The term “experience” is used for apps or the actual content. Means it is common industry jargon, e.g. Oculus uses the term to list the apps. As a consequence, people refer to a VR Experience not only as user experience but also as an asset.

Mobile VR vs Console VR vs Desktop VR

- Low price
- Broad reach
- Graphics limited
- Bandwidth limited
- Only 3 DoF



- Easy to use
- Entertainment content
- Walled garden business model



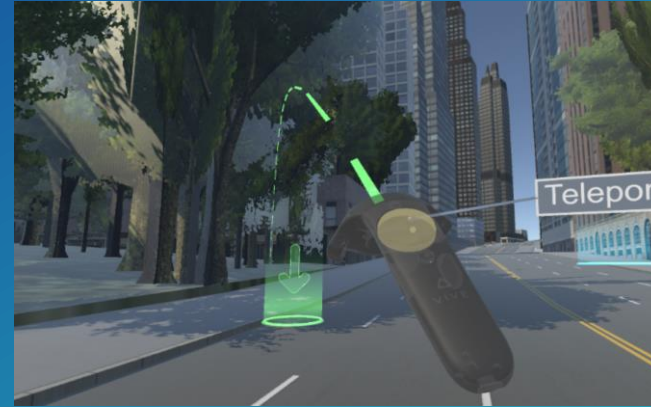
- High cost
- Complex setup
- Free movement
- Advanced input capabilities



Seated vs Standing vs Room-scale



Locomotion & Teleportation



Teleportation & Artificial Locomotion

- 45% of experiences avoid locomotion at all due to motion sickness
- 42% use teleportation / portals (= de-facto standard)
- 5% use artificial locomotion (game pads)
- 8% use other techniques



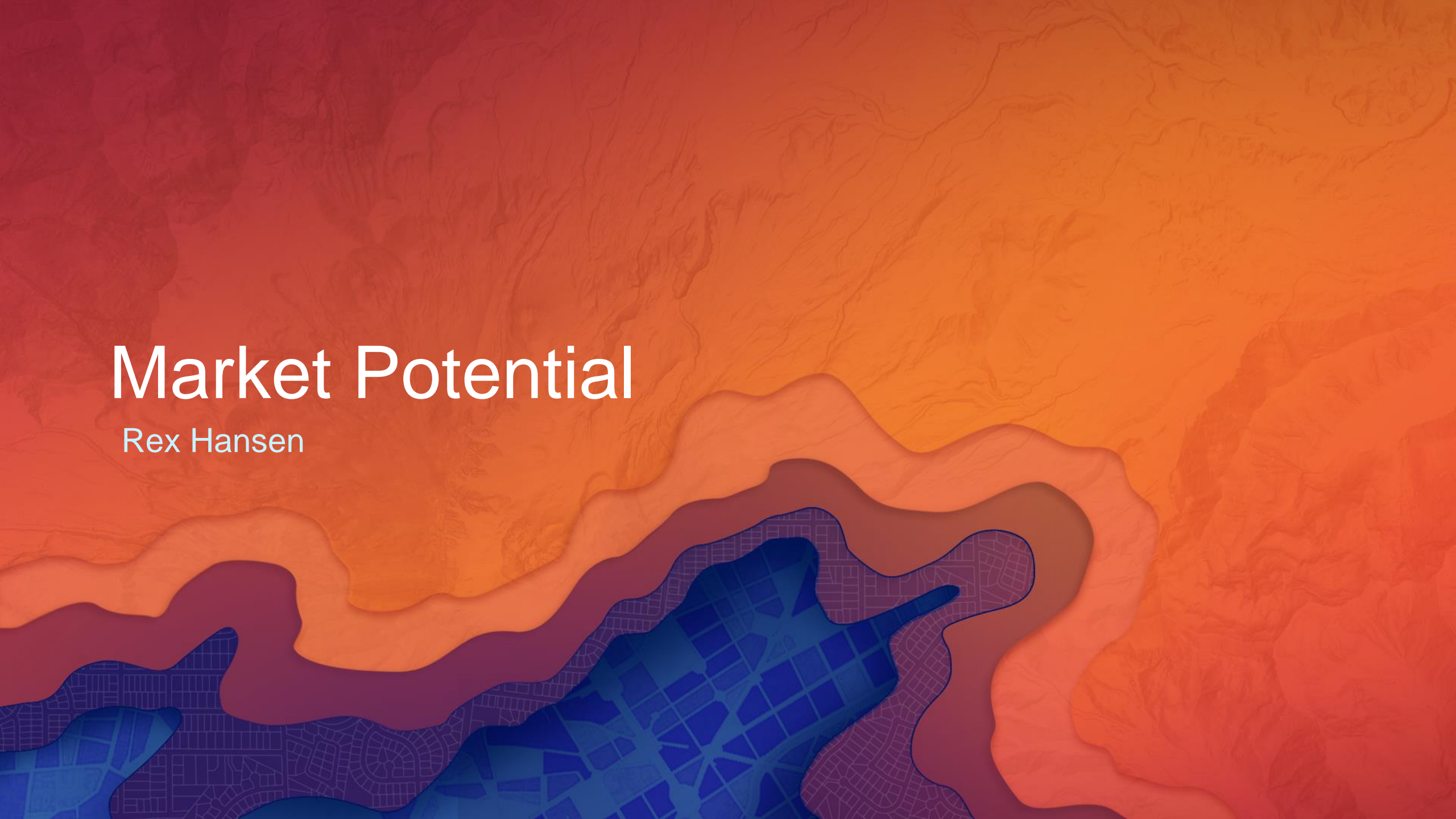
Source:
Teleportation and Locomotion from the Trenches: What Movement is Right for You. By Ram Ramakrishnan & Janet Brown. GDC 2017.

Input Devices



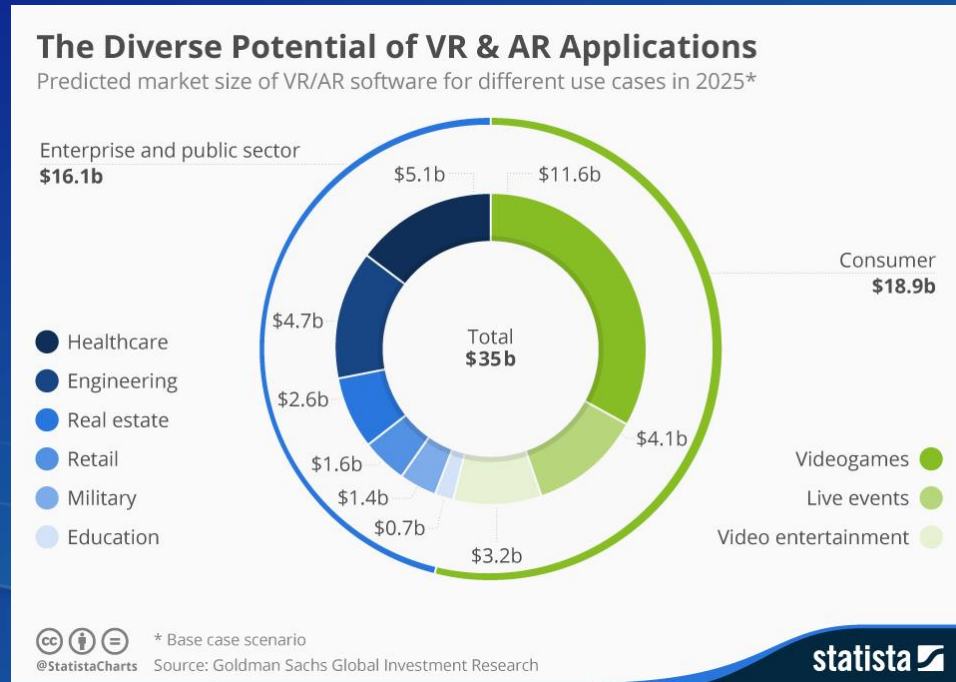
Market Potential

Rex Hansen

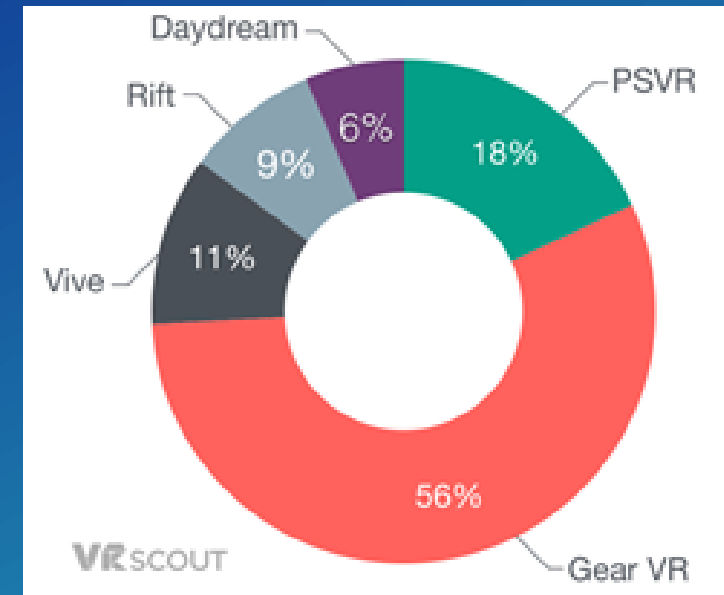


VR/AR Market Trends

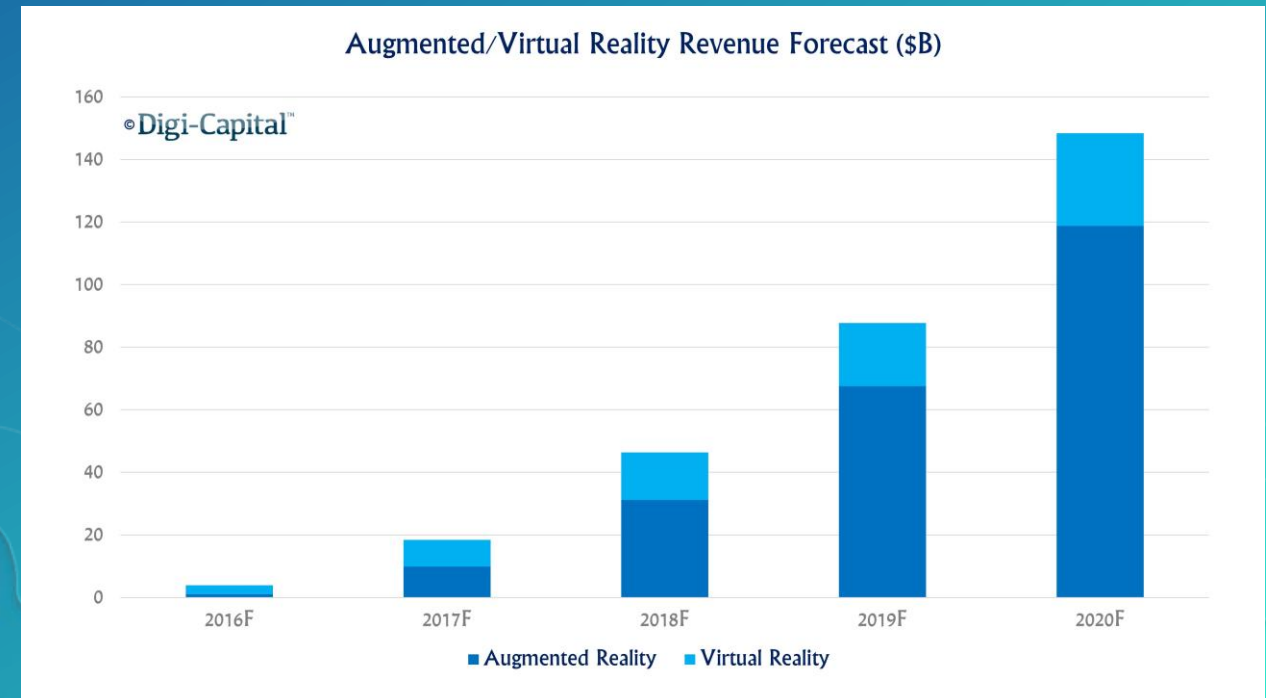
Applications/Industries



VR Headset Market Share



Revenue



VR/AR Market Trends in GIS

VR

- Education, planning, training
 - Mobile
 - Easy, cheap to distribute
 - Desktop
 - Cheaper than travelling to a site
 - Best VR experience possible

AR/MR

- Field operations, resource management, planning
 - Handheld
 - Use existing mobile devices
 - Head-mounted
 - In the field, full scale; In the office, small scale
 - Hands-free for rapid response
 - Most immersive, collaborative 3D experience possible



Customer Specific Scenarios

- Education

- [VR] Show compelling time series data for natural phenomena affected by climate change
- [VR] Communicate electric infrastructure changes to affected communities
- [AR/MR] Enable visitors to augment their view of park resources, infrastructure, and history

- Planning

- [VR] Show new development plans for transportation networks to stakeholders
- [VR] Show new construction plans for energy plants
- [MR] Visualize and compare building designs, small and full scale

- Training

- [VR] Prepare agents for VIP visits
- [VR/AR] Prepare firefighters to fight wildfires
- [VR/MR] Share/collaborate around 3D landscapes with staff without needing to travel to destination

- Field Operations

- [AR] Visualize security infrastructure, report threats in the field, and collaborate
- [AR] Visualize electrical utility infrastructure, manage assets, evaluate damage, etc.

Customer Trends

- Many do not know what they need until they understand the options
- Most are existing Esri customers
- All are positive and excited about the potential for VR/AR/MR solutions from Esri
- Some have volunteered development staff and funding to work on anything we provide
- Some have started looking outside Esri for solutions

Product and Implementations

Eric, Pascal, and Adrien



esri

THE
SCIENCE
OF
WHERE