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Qualcomm

# Making XR a reality for everyone

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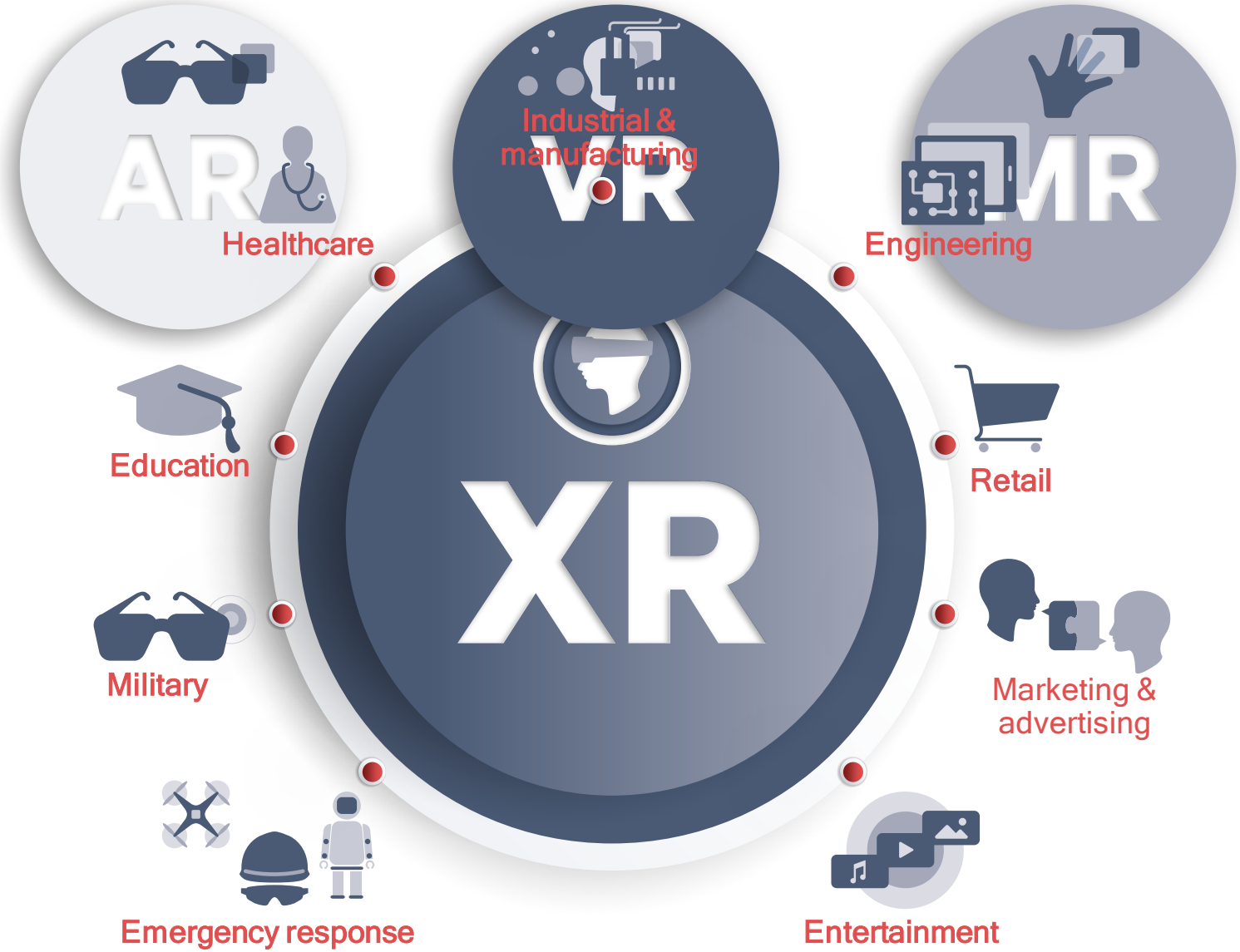
Qualcomm Technologies, Inc

# XR is the next mobile computing platform



## Children Learning

Children transported into Amazon jungle for virtual lesson

## Young Adults Exploring

A young man exploring Rome and seeing the Colosseum as originally built

## Families Socializing

Families virtually brought together with life-like communication

## Professionals Working

Architects collaborating on a shared design to improve efficiency

# XR will serve a broad spectrum of roles in daily life, reach critical mass and go mainstream

# Standalone devices are helping to make this happen

Oculus Go

HTC VIVE Focus

Lenovo Mirage Solo w/Daydream

ODG R9

Shadow Creator

# A new category of devices has arrived

# 186 Million

## Standalone AR + VR Install Base by 2023

Source: IDC, ABI Research, Qualcomm Technologies


## Too expensive

Top reason for not buying AR/VR device


## Prefer a standalone device

Higher-resolution screens are most desired feature

Source: The reality of AR and VR survey: Technalysis Research

# Consumers want convenience, comfort and affordability

**Cheap VR goggles**

$

Low quality experiences that give XR a bad name

$$

**Quality standalone XR experiences**
at an affordable price for mainstream users

High quality

Premium quality

**PC tethered**

$$$$

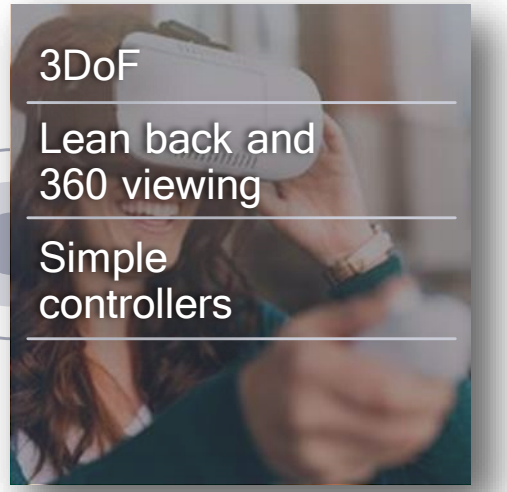
For tech aficionados at high price point and cumbersome setup

# The quality of XR experiences is key

Low quality experiences that give XR a bad name

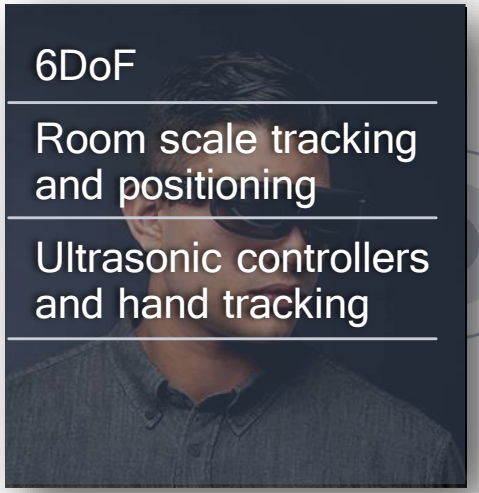


High quality




High quality

Premium quality




Premium quality

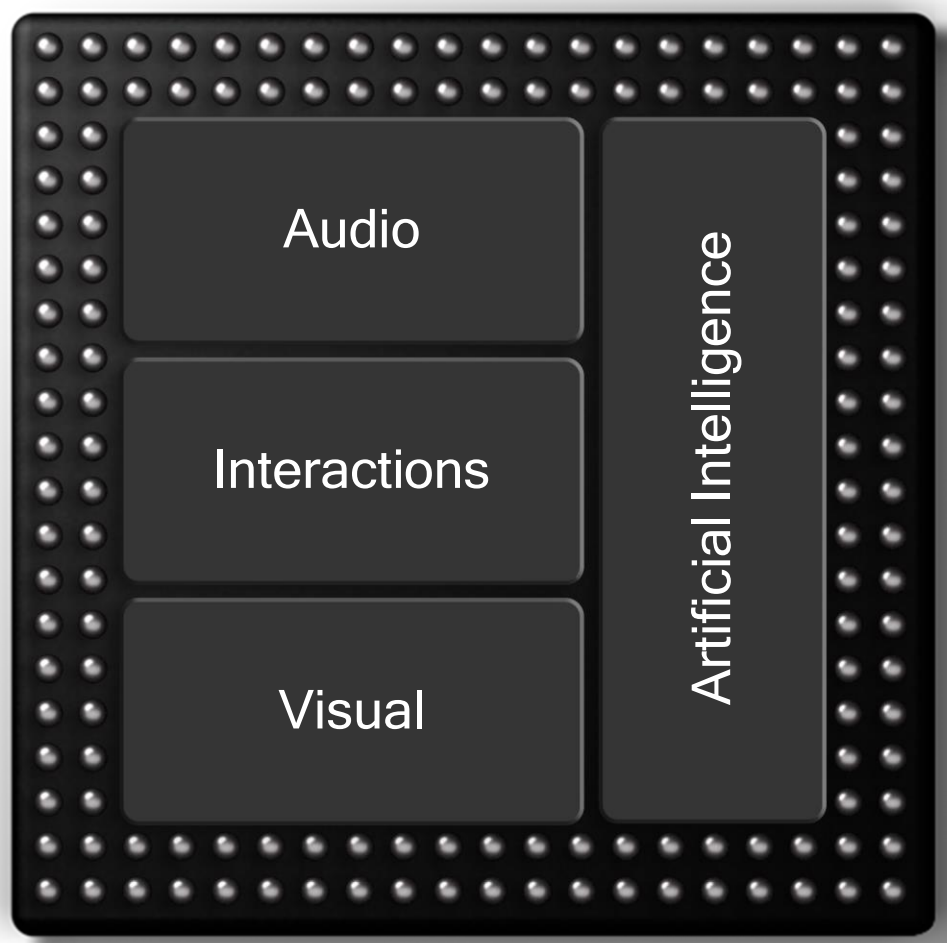
For tech aficionados at high price point and cumbersome setup



# Standalone XR devices offer options for consumers

Qualcomm
snapdragon
XR1 platform

# The first dedicated XR platform




## High quality XR experiences for mainstream audiences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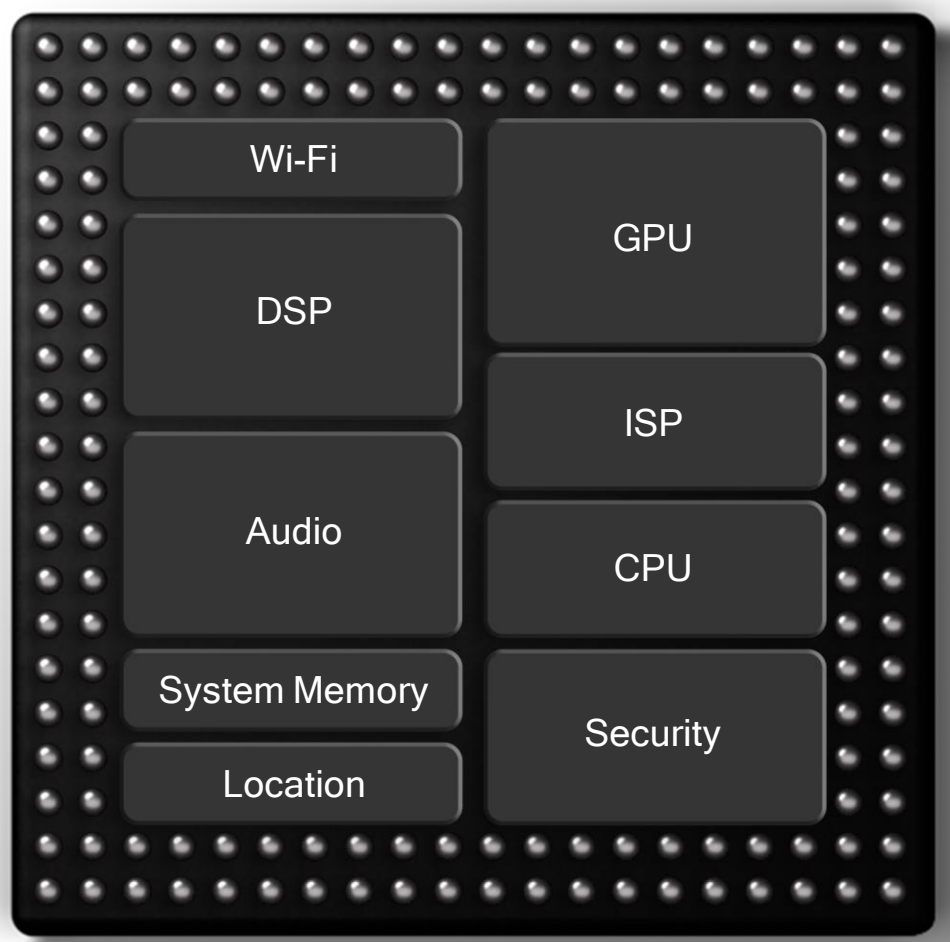
Qualcomm
snapdragon
XR1 platform

# Heterogenous Compute




## Specially designed just for XR

# Watch

## Lean back and enjoy movies, videos and sports

# Play

## Interact in game environments

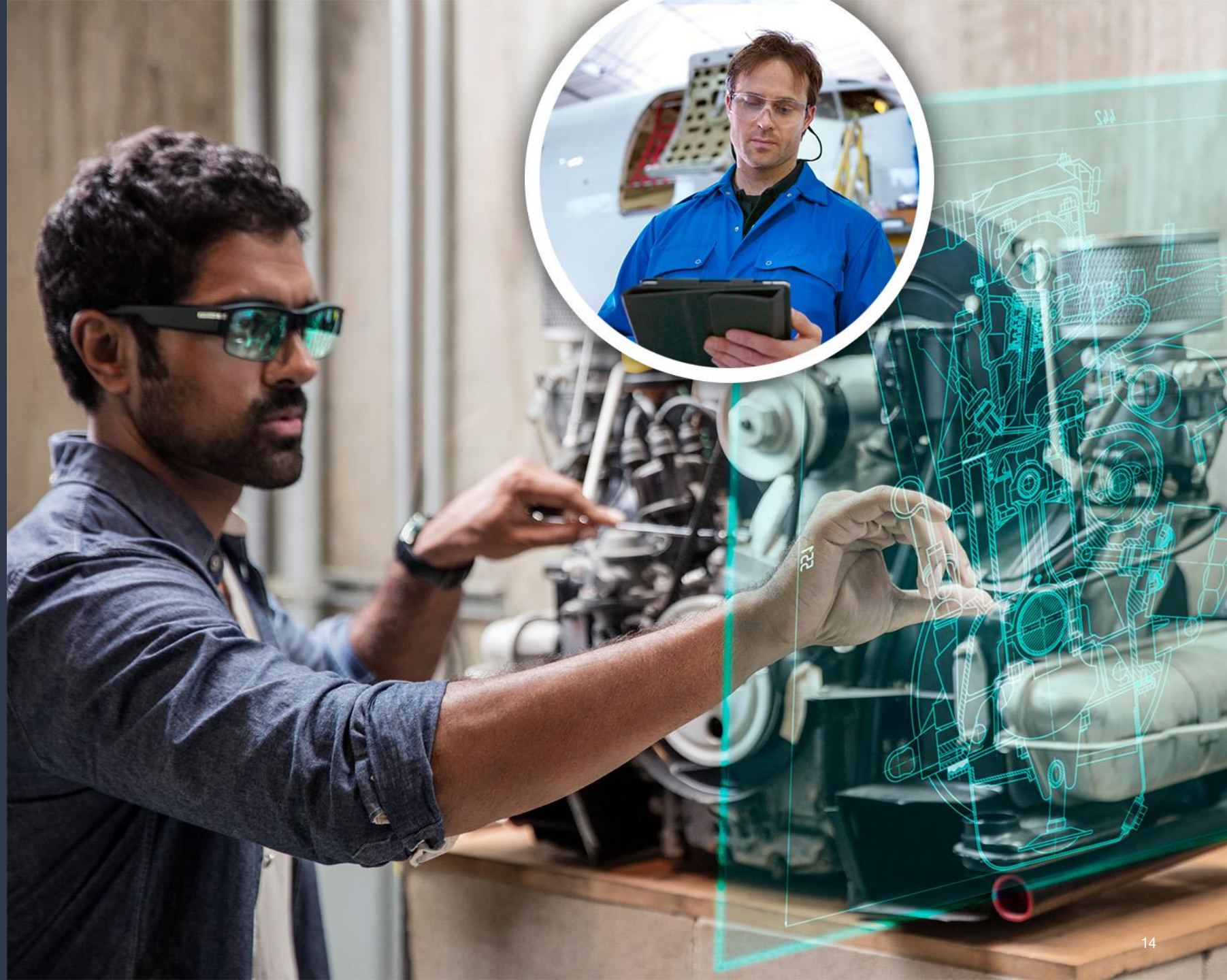
# Capture

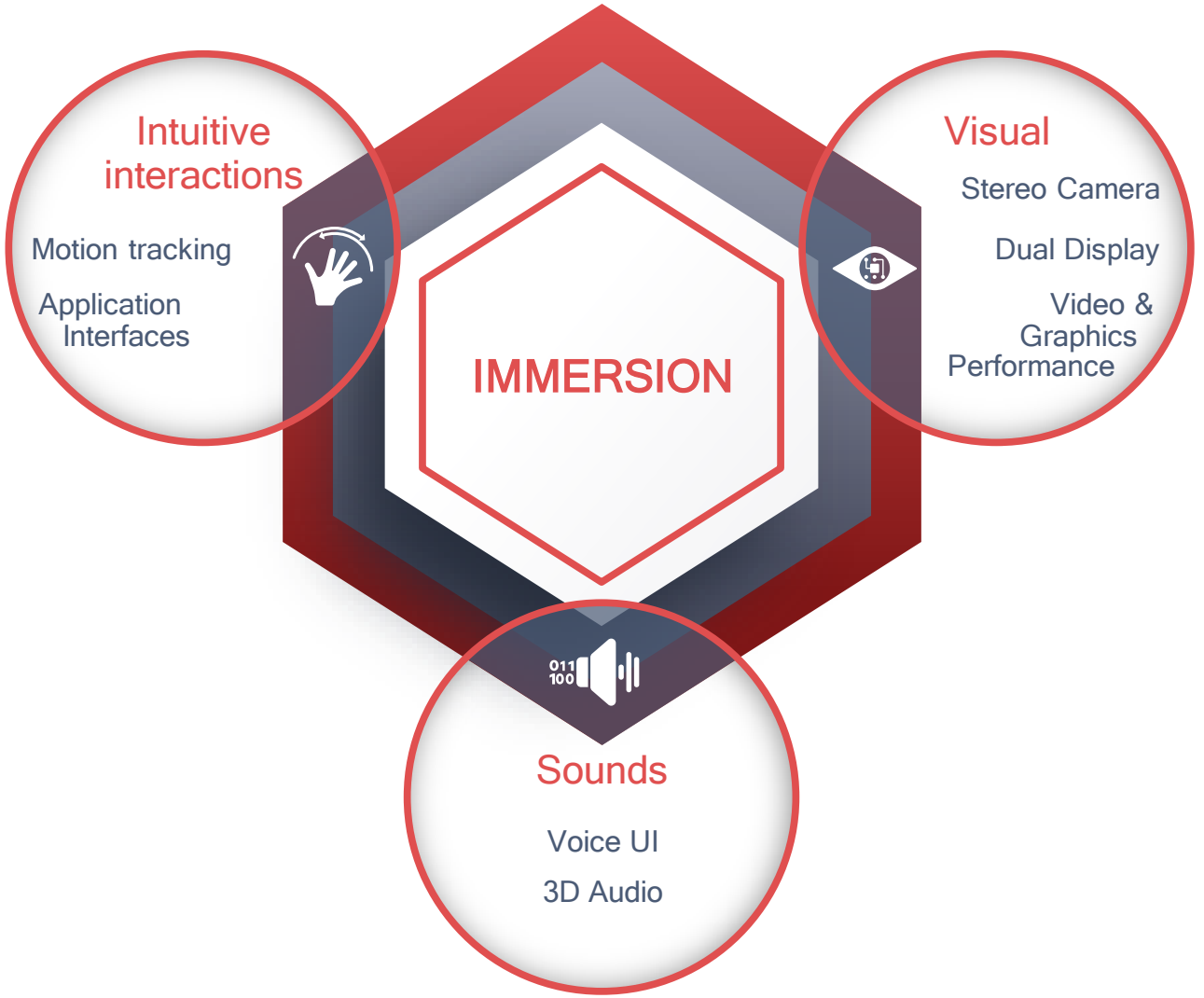
## Capture moments worth saving

# Share

## Share your experience as it's happening

- "See what I see"






# An XR platform needs to address technology demands to enable high quality XR experiences

# Immersion highlights

Get full immersion with low power and thermals that allow for sleek, lightweight and stylish headworn designs

- **UltraHD Premium video playback**
- **Qualcomm Aqstic and Qualcomm aptX audio**
- **Adreno GPU**
  Fast graphics rendering at low power
- **Qualcomm Aqstic voice UI**
- **Kryo CPU**
- **QHD+ (2K) display**
- **6DoF head tracking**
- **3DoF / 6DoF controllers**

#SnapdragonXR1

Qualcomm aptX and Aqstic are products of Qualcomm Technologies, Inc. and/or its subsidiaries.

# Visuals

# Pixels so realistic they are indistinguishable from the real world

- Ultra HD premium video and display (up to 4K60 video w/ audio)
- Jitter reduction
- Fast graphics rendering at lower power and reduced memory bandwidth
- OLED support for wide color gamut, and amazing contrast

# Audio

Audio input/voice input

# True-to-life sound is critical to immersive experiences

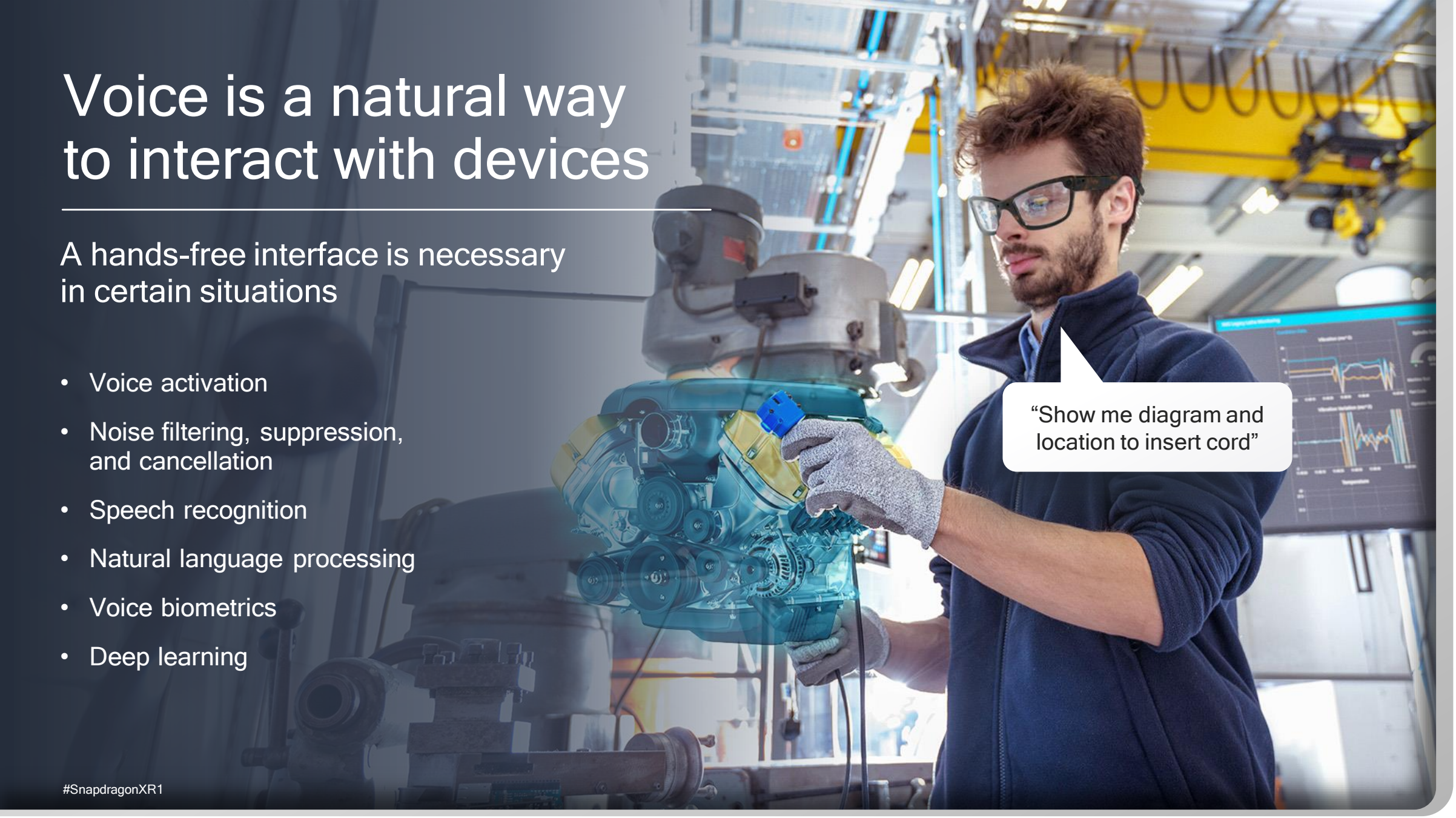
The sounds and visuals must match –depth, direction, and magnitude of sound sources

- Support Object and Scene based audio as well as Audiophile-grade DSD audio
- Improved quality high fidelity sound w/ Qualcomm Aqstic and pre-integrated aptX & aptX HD audio
- Low latency Immersive Audio supported using a 3D Audio SDK (Object-based audio, Ambisonics (HOA), HRTF and Reverb)
- Active noise cancellation

# Voice is a natural way to interact with devices

## A hands-free interface is necessary in certain situations

- Voice activation
- Noise filtering, suppression, and cancellation
- Speech recognition
- Natural language processing
- Voice biometrics
- Deep learning

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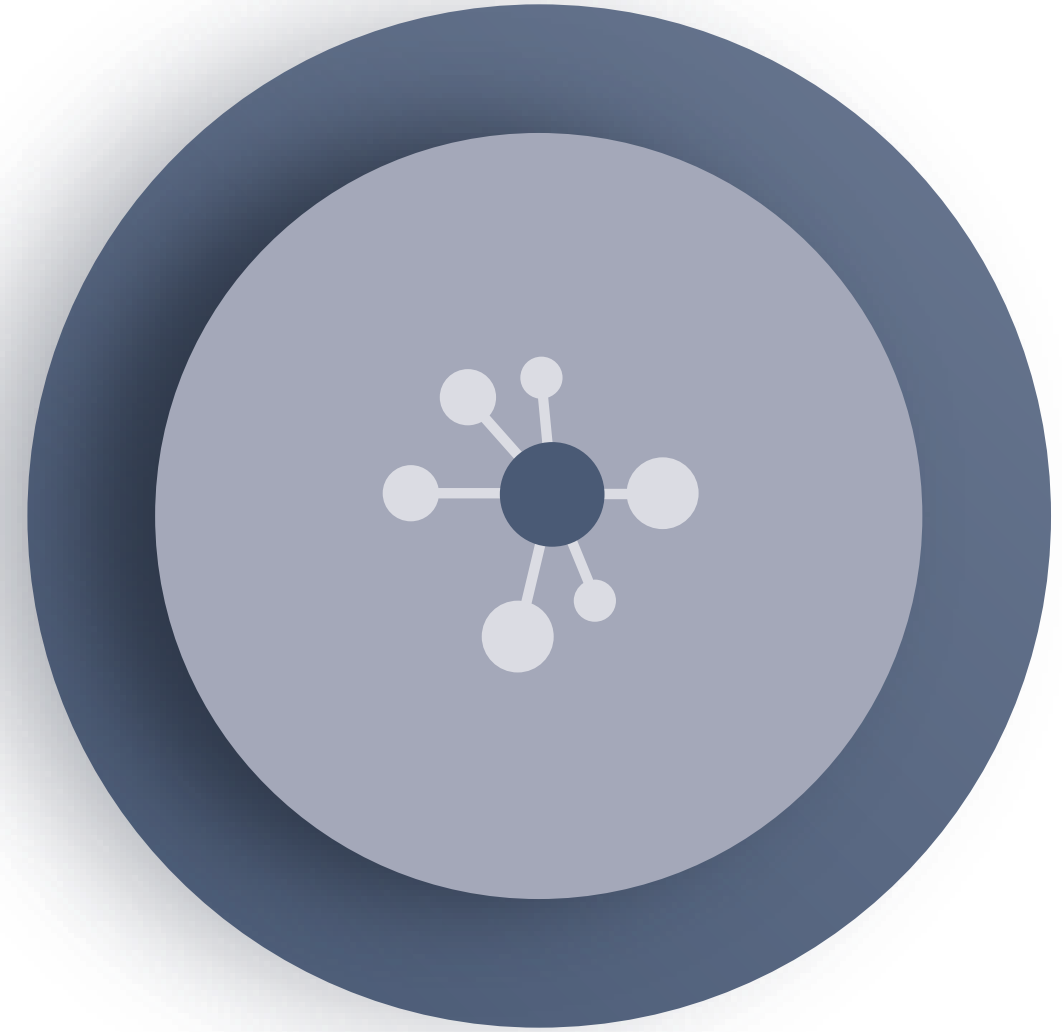
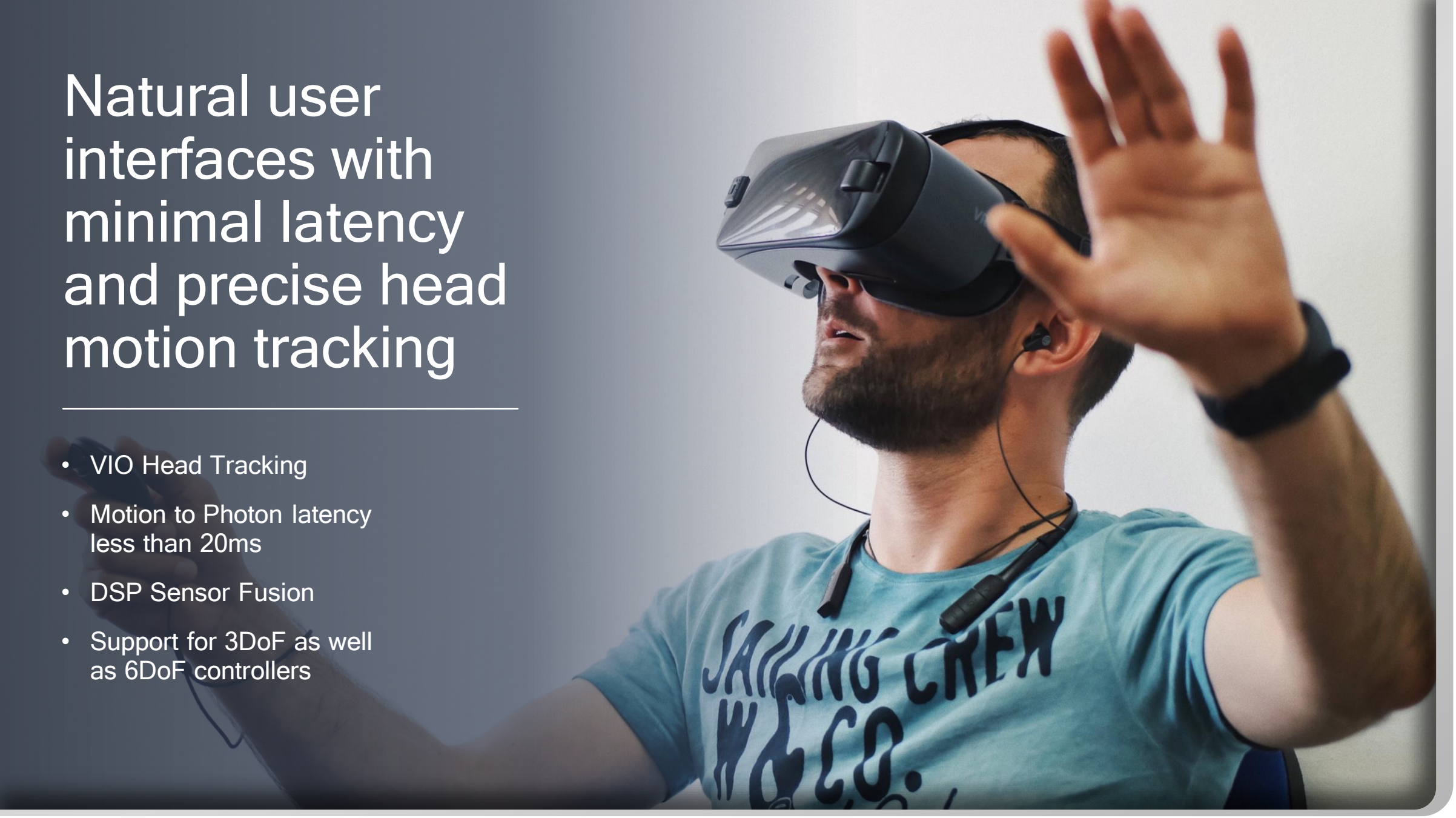
# Intuitive Interactions



# Natural user interfaces with minimal latency and precise head motion tracking




- VIO Head Tracking
- Motion to Photon latency less than 20ms
- DSP Sensor Fusion
- Support for 3DoF as well as 6DoF controllers

# Artificial Intelligence

# On-device intelligence for XR

## XR1 heterogeneous computing key for on-device intelligence

### Hardware

- Hexagon Vector Processor — INT8 precision networks
- Adreno GPU — FP32 and FP16 precision networks
- Kryo CPU — FP32 and INT8 8bit precision networks

### Tools

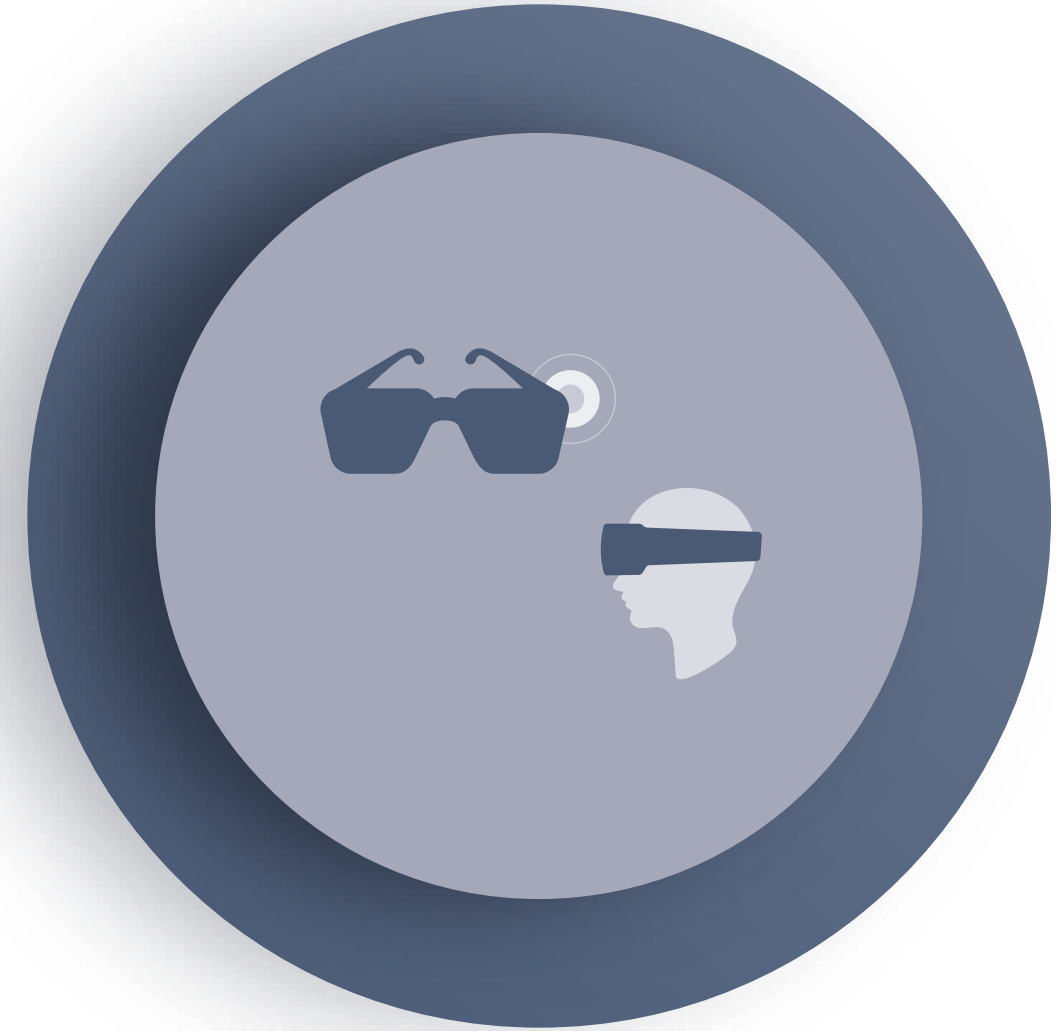
- Snapdragon Neural Processing SDK
- Android NN
- Hexagon NN

### Frameworks

- Caffe/Caffe2
- TensorFlow/TensorFlow Lite
- ONNX


- Object classification
- Pose prediction
- Natural language understanding
- Speaker recognition

# Coming Soon



Qualcomm
snapdragon

# XR1 platform

Meta

Pico

VIVE

VUZIX

# Making XR a reality for everyone





# Qualcomm® Snapdragon™ XR1 platform

#SnapdragonXR1

Qualcomm

# Thank you!

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