Introducing

Immersive Digital Experiences Alliance

A new Industry collaboration bringing immersive experiences to everyone

April 8, 2019

Light Field Technology can enable a new immersive future...

Image courtesy Light Field Labs

IDEA

IMMERSIVE DIGITAL EXPERIENCES

ALLIANCE

IDEA's Vision

o **A practical suite of interchange specifications**

o **Display-agnostic solution**

(Need image of light field of home entertainment)

o **Inclusive of immersive 6DoF Sound**

o **Practical bandwidth payload for commercial networks**

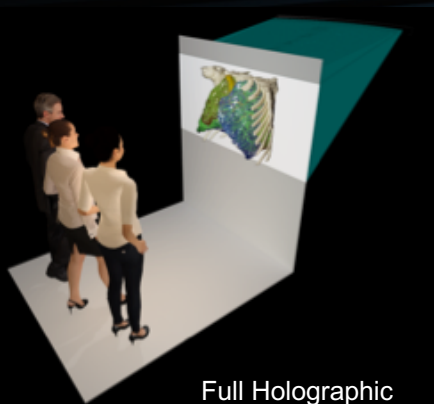o **Able to leverage emerging "media-aware networks" for efficiency**

Display-Agnostic Approach

IDEA

IMMERSIVE DIGITAL EXPERIENCES
A L L I A N C E

IDEA's vision:

*I*mmersive
*T*echnology
*M*edia *F*ormat

ITMF
Scene Graph
File or Stream
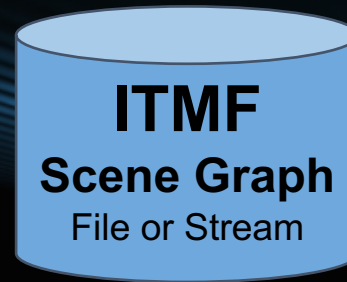
Media-Aware Network + Display-Specific Renderer

Full Holographic
Light Field Display

Multifocal head-mounted Display

VR head-mounted Display

3D Stereo Display
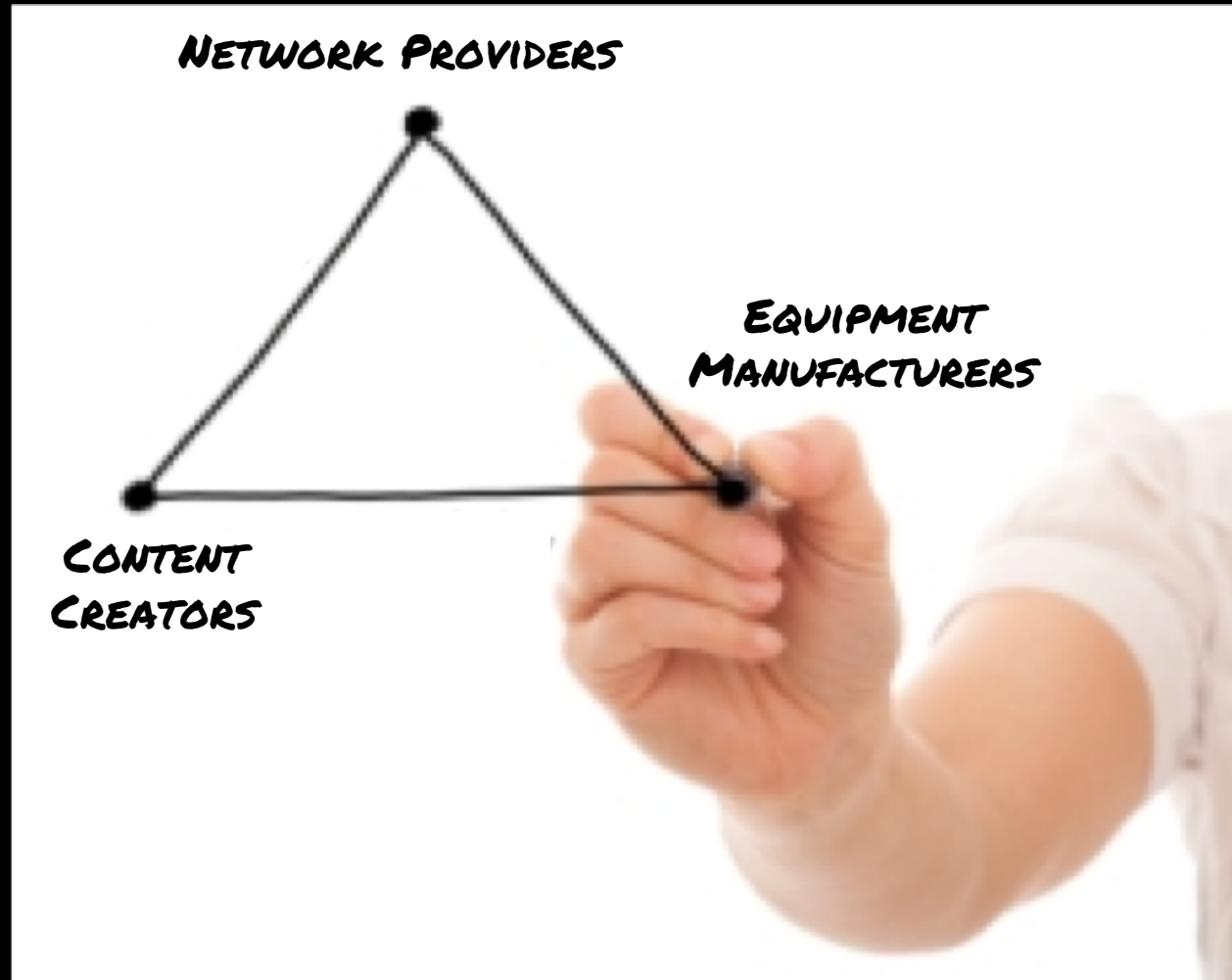
Legacy 2D Displays

Purpose of the Alliance

1) To develop a family of royalty-free technical specifications

that define interoperable interfaces and exchange formats

to support the end-to-end conveyance of immersive volumetric and/or light field media

Purpose of the Alliance

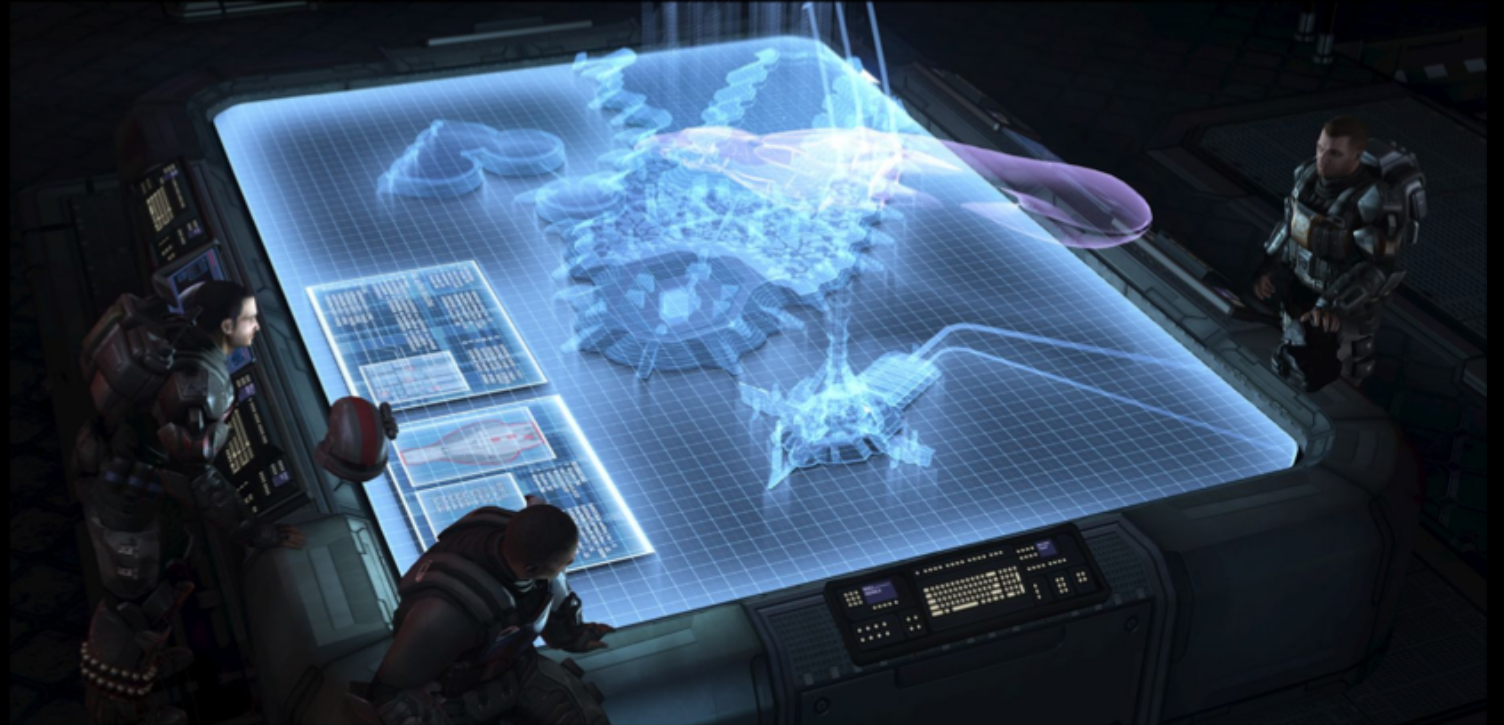2) To gather marketplace and technical requirements

to define and support the immersive media specifications

Purpose of the Alliance

3) To facilitate interoperability testing and demonstration

of immersive technologies

in order to gain feedback for the immersive media specifications and support from stakeholders

Purpose of the Alliance

4) To produce educational events and materials

   to maximize the understanding of immersive media

   for both technical and non-technical practitioners

Purpose of the Alliance

5) To provide a forum for the exchange of information

and news

relevant to the immersive media ecosystem

Opportunities

Display-Agnostic

- Immersive imaging provides a compelling, immersive entertainment experience
  - With future Light field displays
  - With head-mounted-display immediately
  - With ability to render to legacy displays: stereo 3D, 2D, VR

Ultra-realistic Imaging
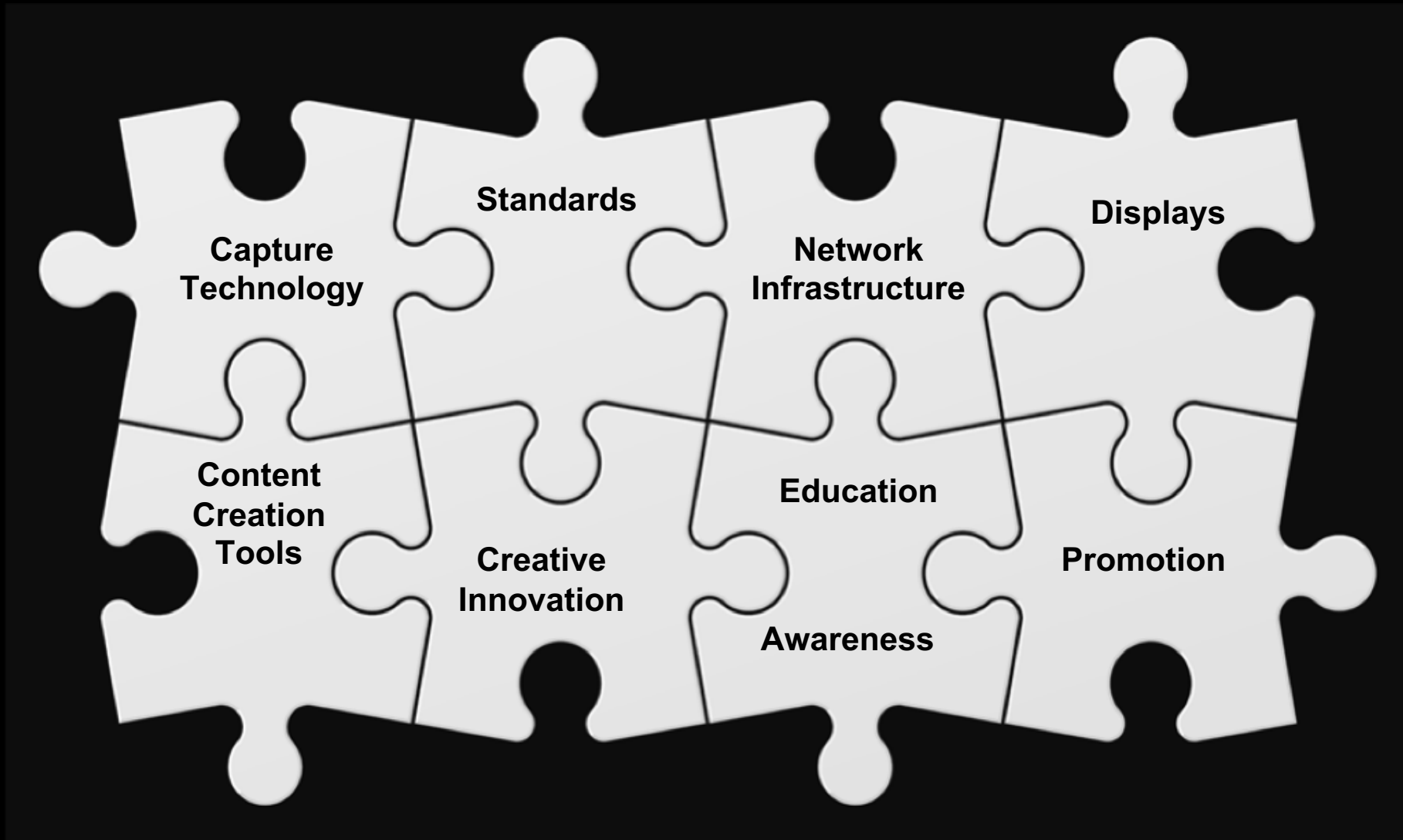Volumetric 3D from all viewing angles
- Surface reflection & lighting varies by viewpoint
- Realistic Parallax and Occlusion

Support for diverse content types
Scripted Drama, Sports, Music Performance, Education / Training, Documentary, Games

Success requires a complete ecosystem...

What is a light field?

- Modeled by plenoptic function: $P(x,y,z,\theta,\phi,\lambda,t)$
- A volume of light rays
- Flow of light: every direction, wavelength, across time
- Requires source of light
- Rays interact with surface of object
- Surface properties determine what happens to those rays
- **Motivates the need for a new media format**

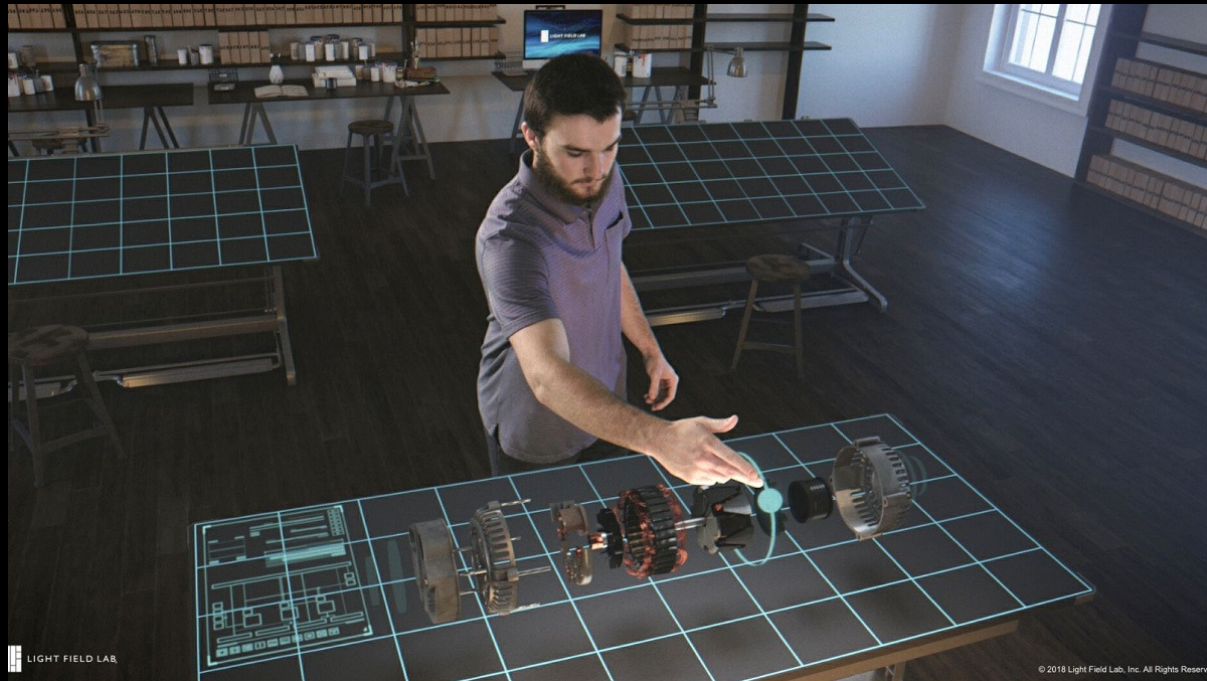# Light Field Lab: State of the Art Display

Light Field Lab Display: Prototype to Panel
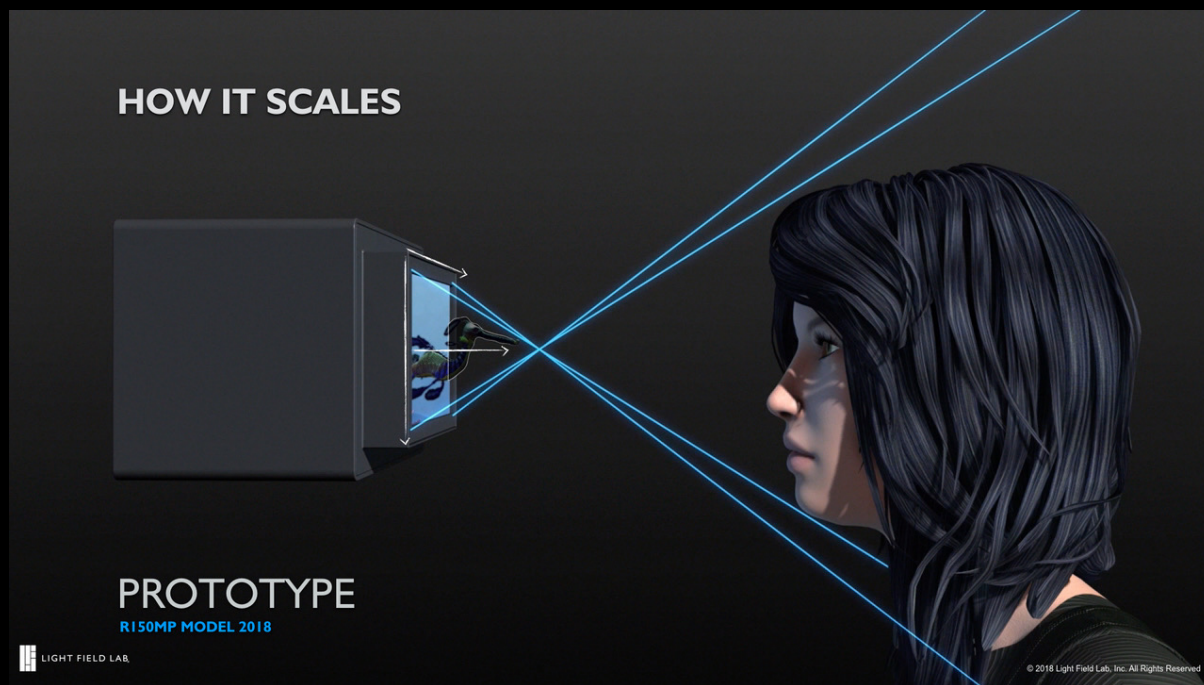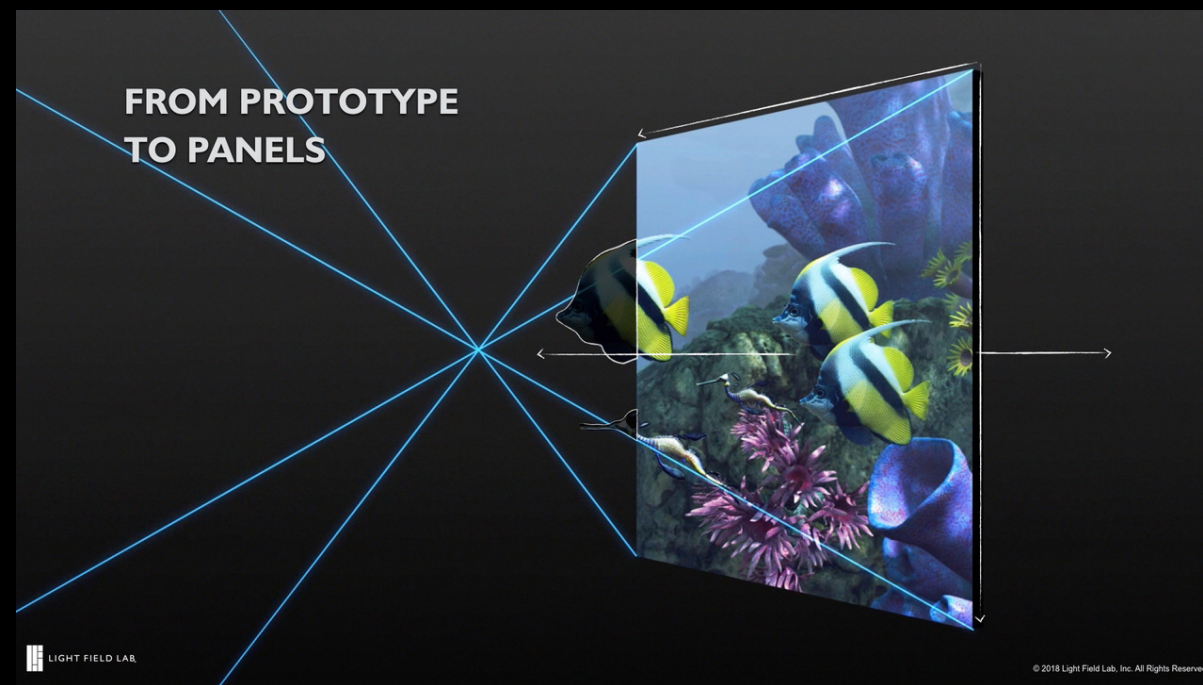
Light Field Lab Display: Panel to Wall
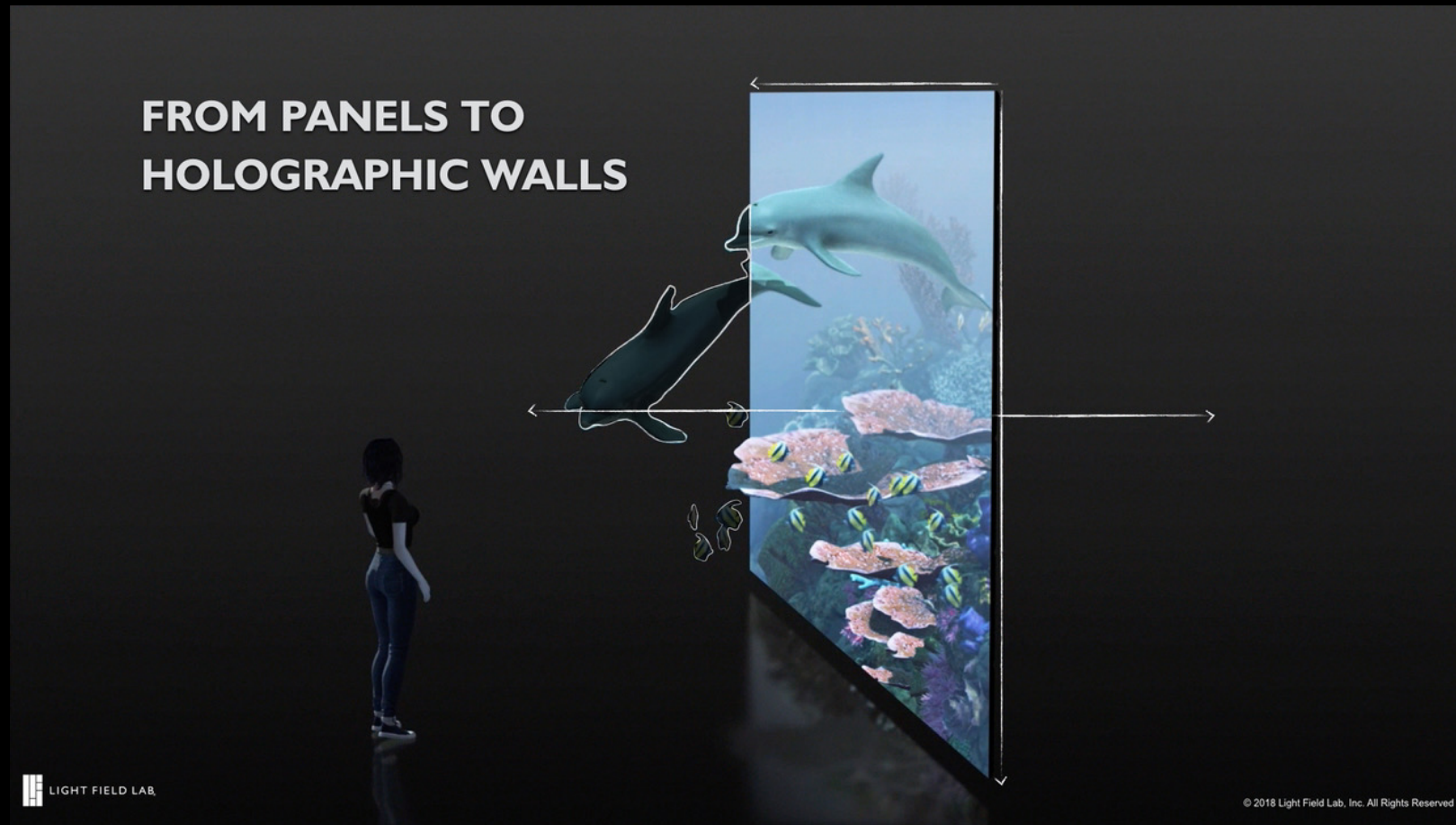
Light Field Lab Display: Wall to Holodeck

Immersive Image Capture

Important Integration of Photographic Images

- Capture a volume of light rays
- Flow of light: every direction, wavelength, across time
- Surface properties determine what happens to those rays

Immersive Image Capture

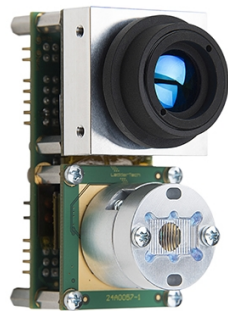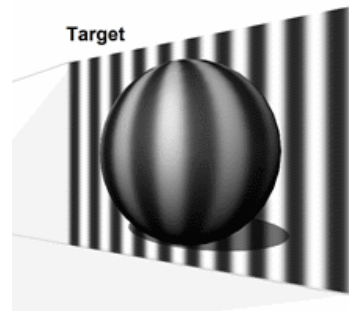*Multiple Technologies are available to capture live images*

Depth Camera
(e.g. Time of Flight)

LIDAR

Structured Light
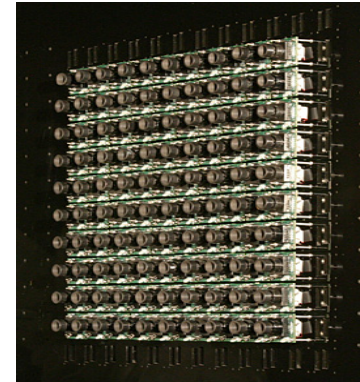
Camera Array
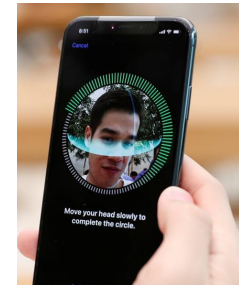
Cameras + AI

Immersive Image Capture

Sensor array outputs

RGB + Depth →

Volumetric →

Light Field →

Light Field Capture Systems already in use

Google

OTOY LightStage

Radiant Imaging / Visby

Facebook / RED

Challenges of Immersive Capture

ITMF aims to address these requirements

- **No ground truth**
  - Noise, potential depth inaccuracy
- **Lots of data**
- **Incomplete Sampling**
  - Occluded regions may not be fully sampled
- **Reflection, transparency, specularity**
- **Fine Structure**

ITMF approach

ITMF aims to address these requirements

Computer Graphics

Volumetric

Light Field Array

AI and Computational Photography
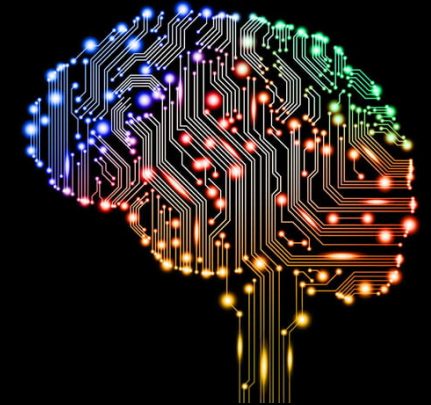
Immersive Technology Media Format

Immersive Technologies Media Format

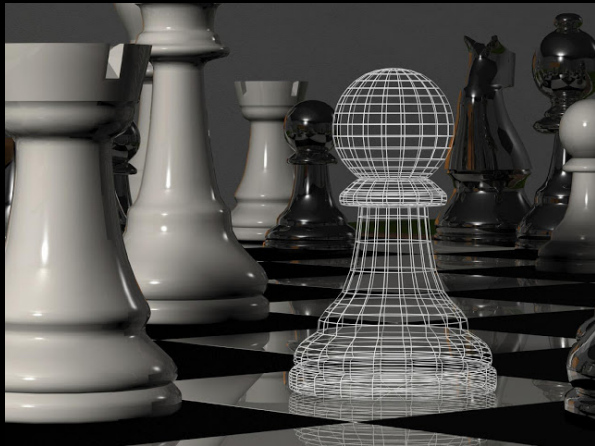Interchange standard that **can support immersive media** and is therefore **not constrained by Raster-based representation**

Based on OTOY ORBX format

  Already widely adopted by 25+ 3D authoring and rendering tools

  Content creators already familiar with ORBX format

Display agnostic vector-based (or scene graph) solutions

Enables interfaces to intelligent, media-aware and application-aware network APIs to support any application, including gaming

Practical bandwidth payload for commercial networks

Commercial network support of ITMF

Wireline and wireless IP distribution
   10G, FTTH, 5G, WiFi6

Enable distribution of media beyond 2D video

Flexible, media-aware, robust network APIs
   Distributed compute for variety of applications
   Rendering at the head-end, edge or at the terminal

Data model for Scene Graph
Immersive Technology Media Format (ITMF)
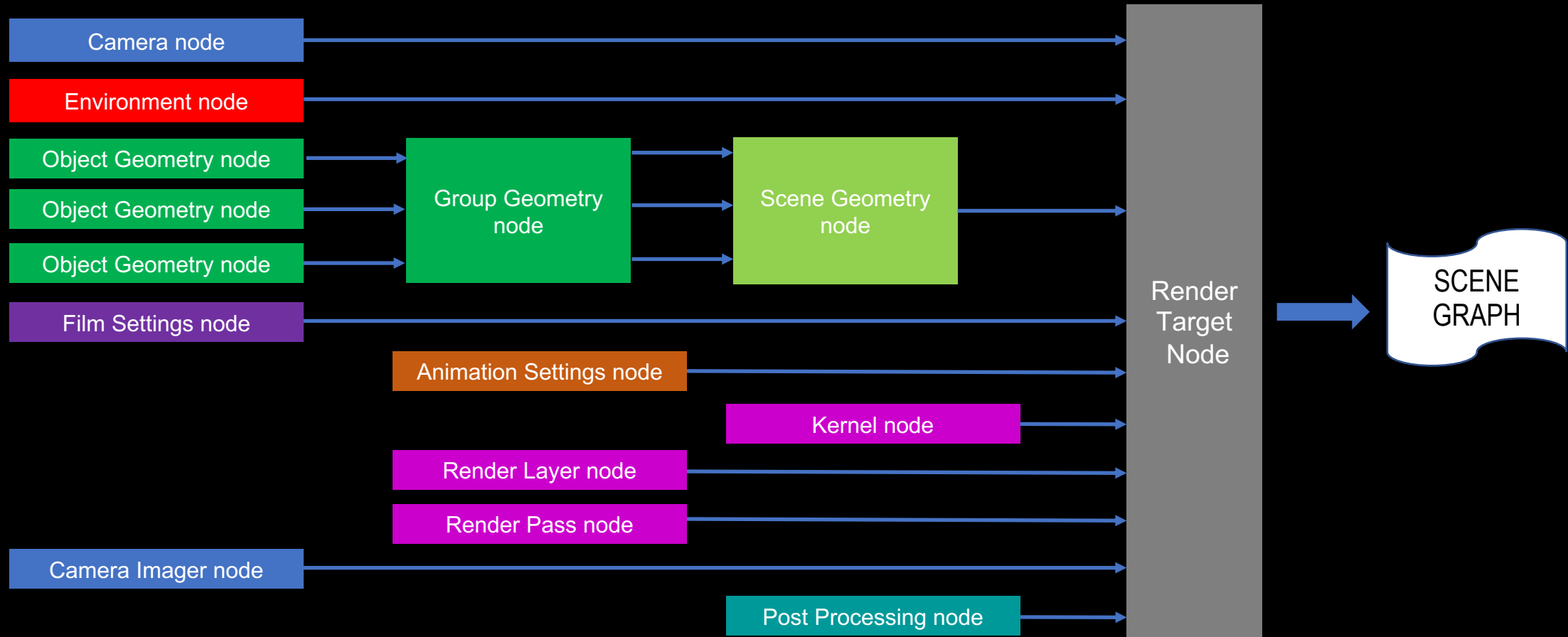
Considering interchange

OPEN (no walled gardens)

Well specified

Well adopted

Extensible

Future proof

Display agnostic

Support for digital rights management

Mezzanine format for media-aware network

IDEA Membership

New Members Now Welcome To Join:

- Content Producers
- Movie Studios
- Sports Network

- Technology Suppliers
- Consumer Electronics
- Cable and Broadband

IDEA Membership

- **One tier** of membership
  - All members have some benefits / responsibilities
- Membership fee: **$10,000 per year**
  - $2,500 per year for small entities (<$10mil revenue)
- **Initial board** consists of founding members
  - With additional board members appointed
- Subsequent board nominations / elections
  - After first term
  - Staggered odd/even years
- **Multiple individuals** from Member Companies
  - Are encouraged to participate in Working Groups

IDEA Organization Structure

IDEA
Board of Directors

- Initially 5 members appointed
- May grow to 9 members
- Staggered terms

WORKING GROUP
Container Spec Drafting Group

WORKING GROUP
Scene Graph Drafting Group

AD HOC GROUP
Interop Demo Planning AdHoc Group

OTHER GROUPS
as Required
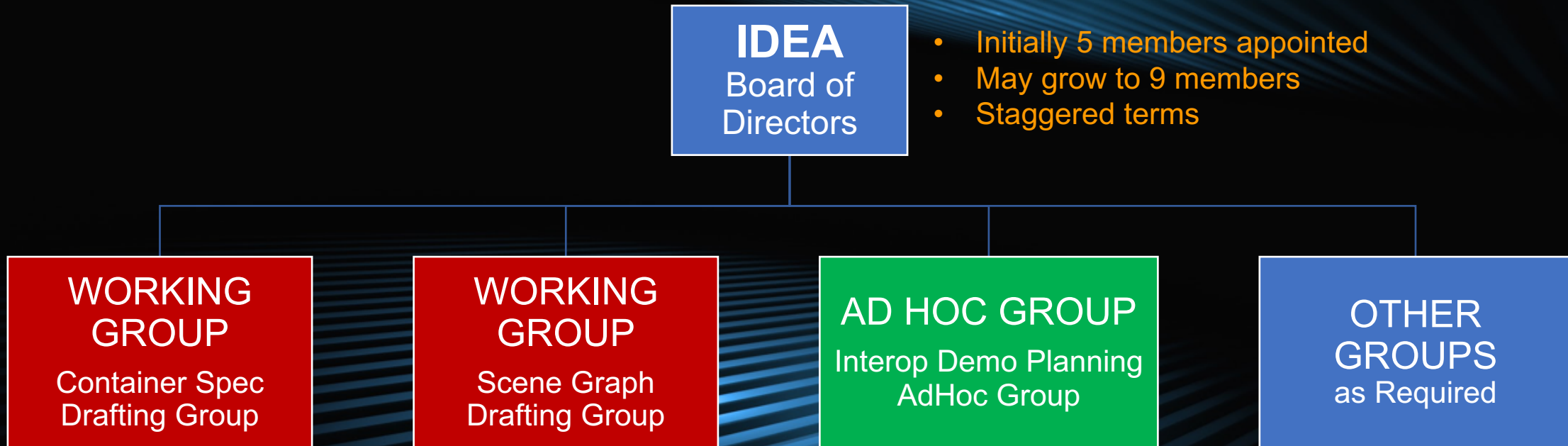
Example only -- Working Groups being defined by the board

2019 – Potential Activities / Goals

- April   - Public Launch at NAB
- Summer   - Instructional Seminar in LA
- Summer   - Release of First Version of Spec
- Aug   - Presence at SIGGRAPH
- Sept   - Presentation at IBC
- Fall   - Industry Inter-op Demo

2020
- Jan   - CES
- April   - NAB

IDEA Membership Benefits

- Regular communication & updates
- Eligible to participate in Working Groups
- Eligible for Board nomination
- Discounts on IDEA Seminars
- Participate in all IDEA demos and activities
- Ability to Contribute Technology
- *Members will have an active role in shaping the future of immersive technologies.*

IDEA Participation (estimated)

- Opportunities to participate in various working groups

- Time commitment varies by number of working groups

- Each working group likely to have bi-weekly calls (60 min)
- Skills desired (any of these)
  - Network architecture and protocols
  - Project management
  - Content creation and content creation workflows,
  - Familiarity with immersive applications
  - Drafting of specifications
  - Requirements gathering and analysis

Immersive Digital Experiences Alliance

www.ImmersiveAlliance.org

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