VM Global Leadership Summit
Imagination & Invention
Succeeding in a Culture of Change
DIGITAL VISION SYSTEMS

Bringing Innovations to the Patient

- *The Last ~~Mile~~ Ten Feet*

Keith P. Thompson MD

Doctor of Medicine	**1980-1984**
Southwestern Medical School, Dallas, TX	
Ophthalmology Resident	**1985-1988**
Bascom Palmer Eye Institute, Miami, FL	
Fellowship Refractive Surgery and Physiological Optics	**1988-1991**
Emory Eye Center, Atlanta GA	
Professor of Ophthalmology	**1991-2004**
Emory School of Medicine, Atlanta, GA	
Founder and CEO	**2004-Present**
DigitalVision Systems , Georgia Tech, Atlanta , GA	

DIGITAL VISION SYSTEMS

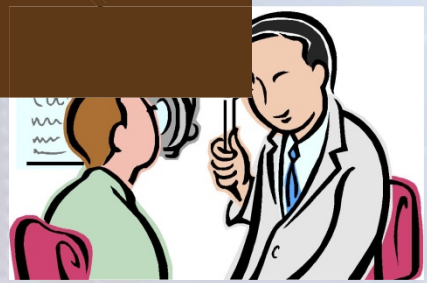
The VisionOptimizer™

SUPERIOR REFRACTION

NOVEL PATIENT EXPERIENCE

PROFIT GENERATING TOOL

Bringing Optical Innovations to Consumers



DIGITAL VISION SYSTEMS

The Phoroptosauris

Phoropter Limitations

Error Prone Steps Can Cause Inaccurate or Suboptimal Prescriptions

O.25D Phoropter Lenses Provide Less Resolution than Free Form Technology

No Product Demo Capability for PAL, Photochromic, or AR Lenses

<u>Not</u> a 21st Century Consumer Experience

DIGITAL VISION SYSTEMS

The VisionOptimizer™

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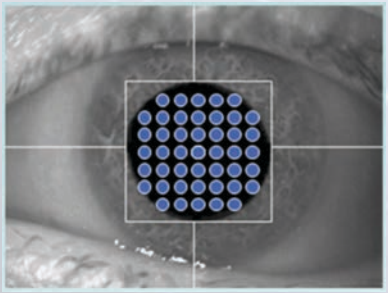
Phoropter Fails to Explain Postoperative Outcomes

Patient	Age	PreOp	PostOp	Distance	Near	CC
JK	52	-2.25	Plano	20/20	J1+	Happy!
RM	50	-1.75	+0.25	20/25-	J7	Can't Drive at Night

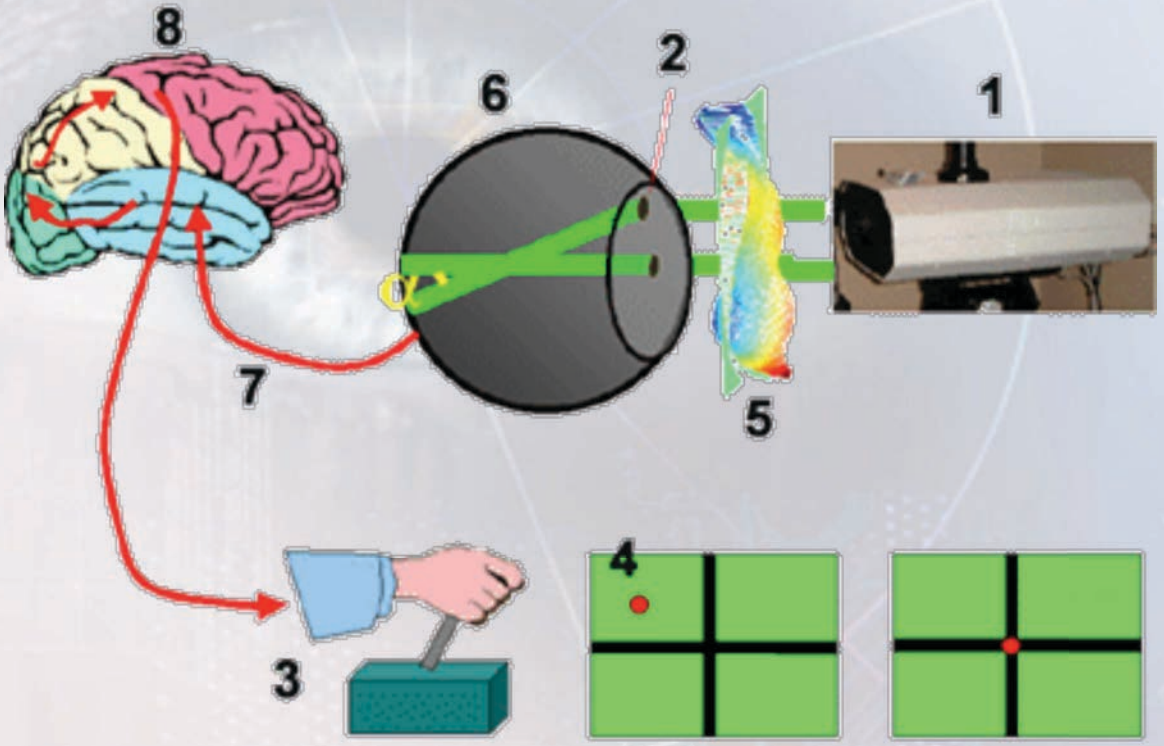
DIGITAL VISION SYSTEMS

Spatially Resolved Refractometry

SERI, Boston



- Harvard, MIT, Emory Team
- Patient Interactive – Multi-Point Refraction
- Entire Visual System
- Eye Tracking Enhanced Accuracy



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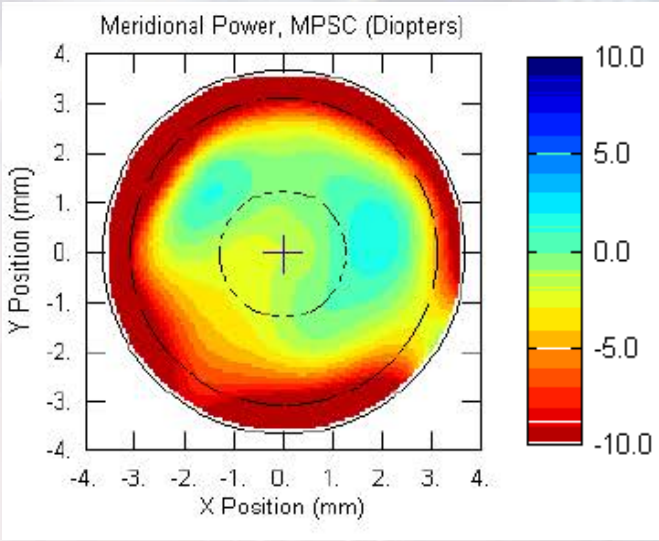
Spatially Resolved Refractometry

EmoryVision Center, Atlanta

- Explained Treatment Outcomes
- Devised new Ablation Profiles
- Improved LASIK/PRK Outcomes

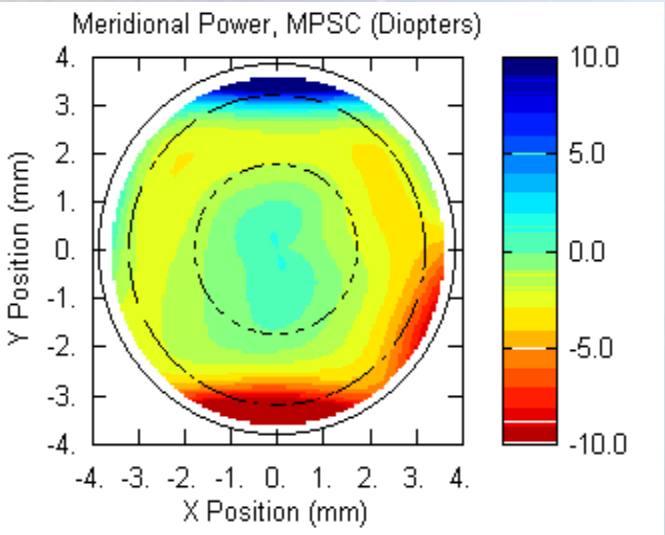
JK 52

Plano 20/20 J1+



RM 50

+0.25 20/25- J7



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Spatially Resolved Refractometry

EmoryVision Center, Atlanta

- **Simulate Outcomes**
- **Lacked Binocular Vision Testing**
- **Limited Commercial Potential**

Visualizer simulations	Day	Dusk	Night
Original Image			
Unaided			
With glasses			
HOA Corrected			

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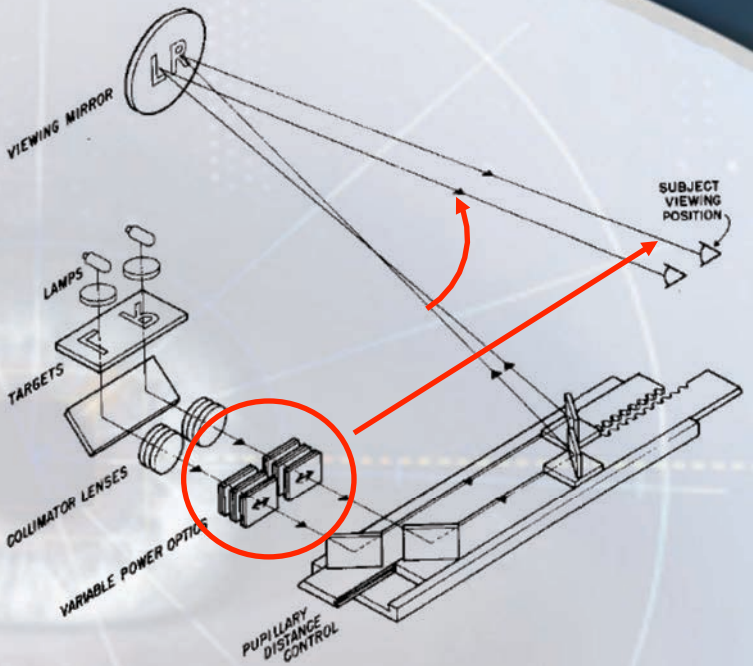
Humphrey Vision Analyzer

1970's



"If I have seen further, it is by standing on the shoulders of giants."

Isaac Newton

Luis Alvarez

William Humphrey

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Integrated SRR Into HVA Architecture VisionOptimizer Prototype

EmoryVision Center, Atlanta

- ✓ Outperformed Phoropter
- ✓ Improved Vision in ~90% Spectacle Wearers
- ✓ Novel Patient Experience
- ✓ Patients and ECPs Preferred DVO vs. Phoropter 20:1

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Engineering the VisionOptimizer

Georgia Tech Research Institute
Problem. Solved.

EOSL
Electro-Optical Systems Laboratory

Georgia Tech

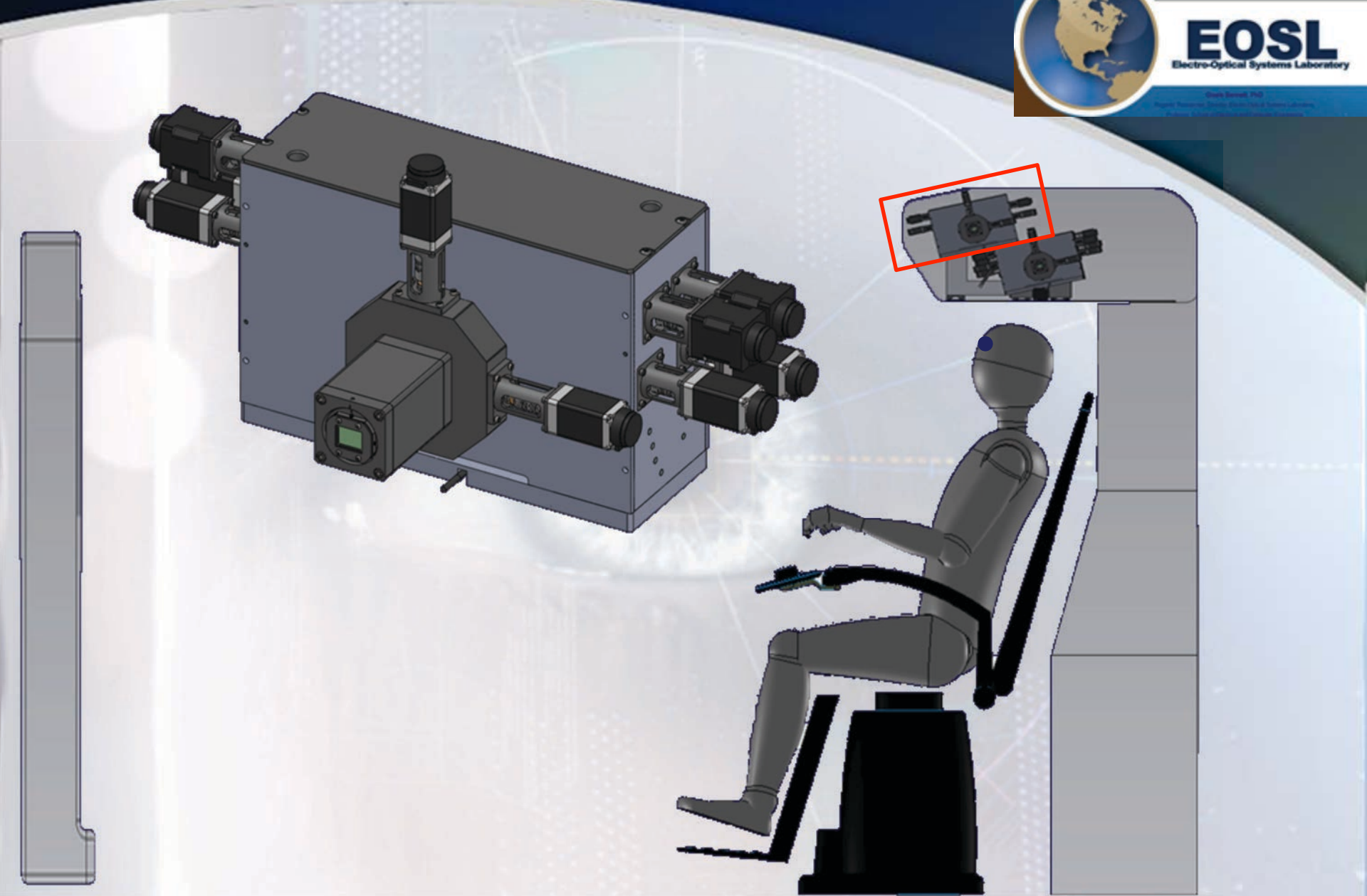
- ✓ Venture Lab Program
- ✓ Financial Support
- ✓ Electro-Optical Systems Lab
- ✓ Engineering Team

DIGITAL VISION SYSTEMS

Wavefront Generators

Georgia Tech Research Institute
Problem. Solved.

EOSL
Electro-Optical Systems Laboratory



Wavefront Generators

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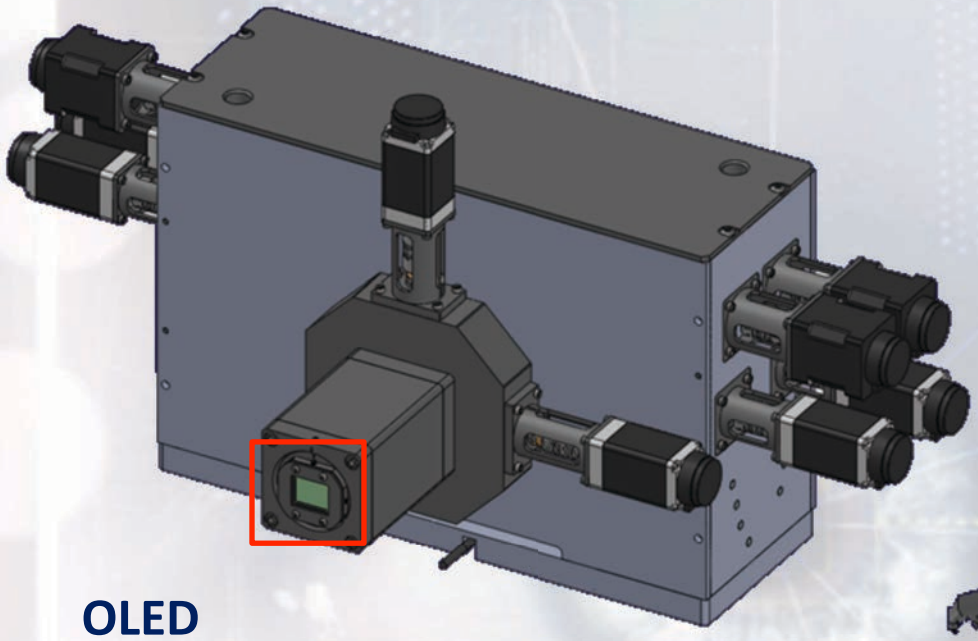
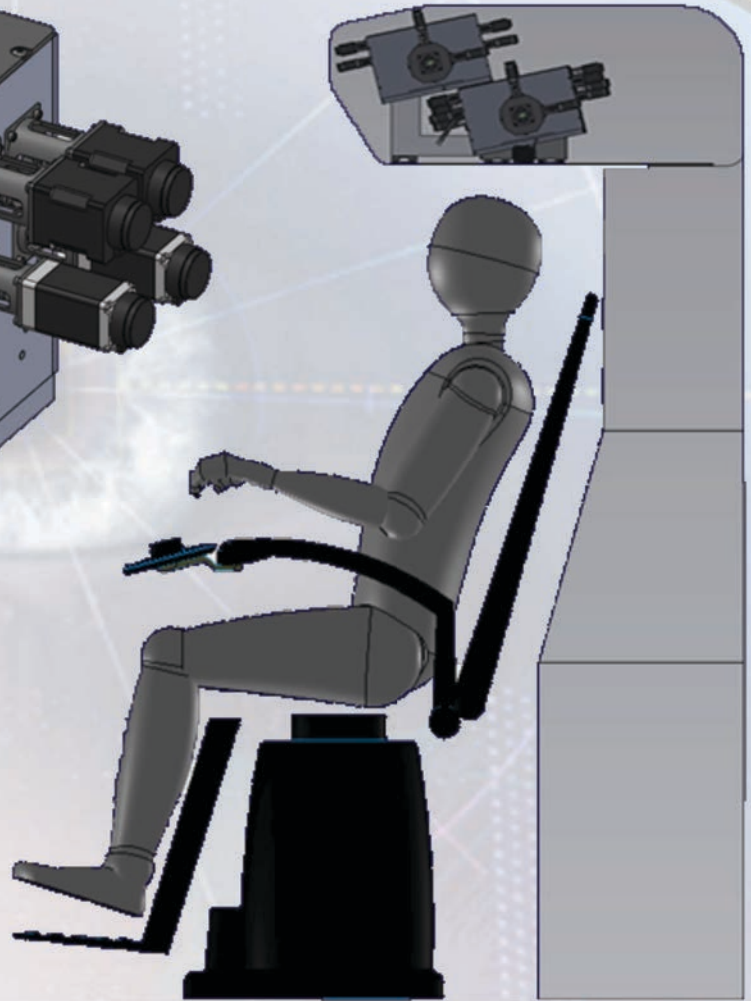




OLED

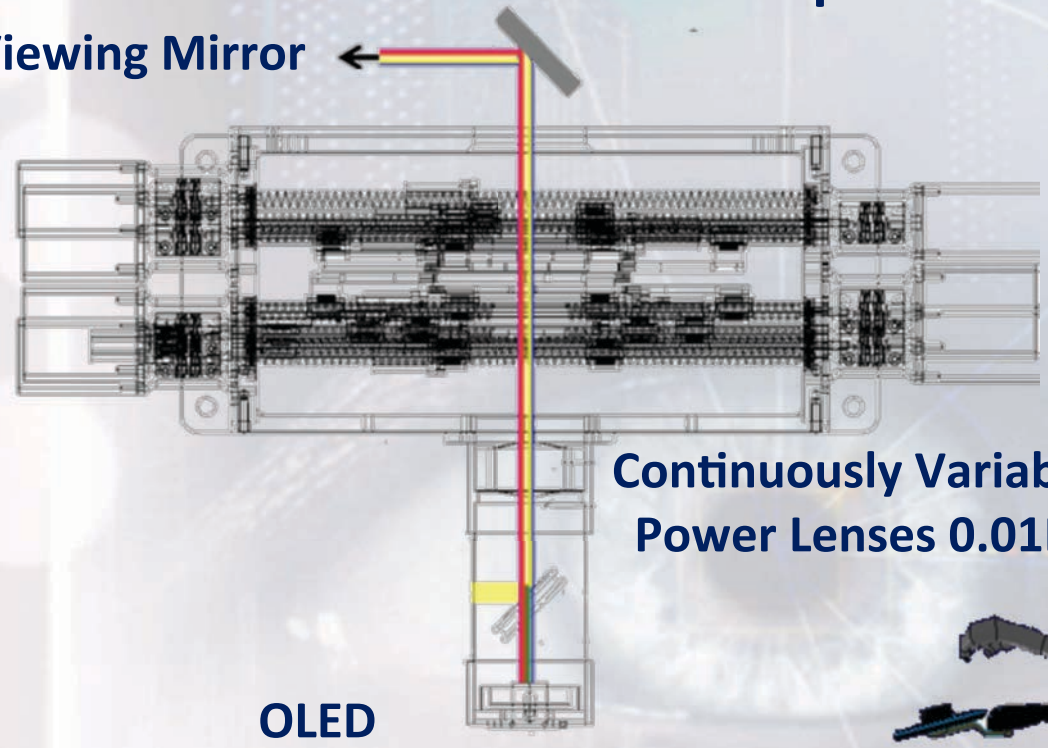
Wavefront Generators

Georgia Tech Research Institute
Problem. Solved.

EOSL
Electro-Optical Systems Laboratory

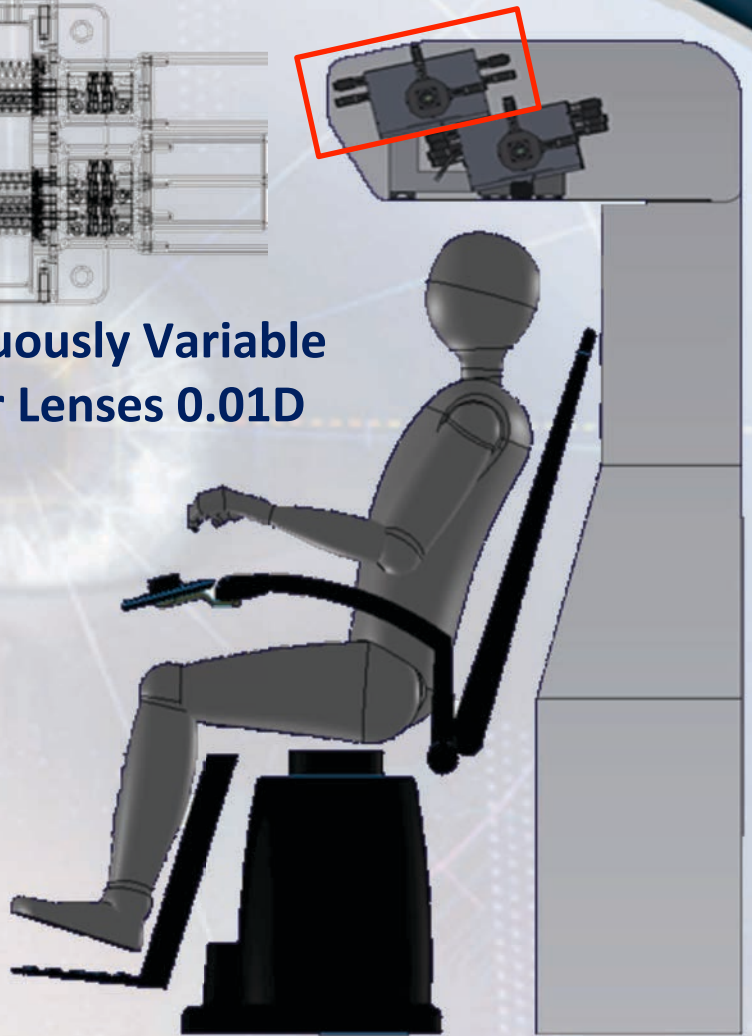
Wavefront Generator – Top View

To Viewing Mirror



Continuously Variable Power Lenses 0.01D

OLED



Wavefront Generators

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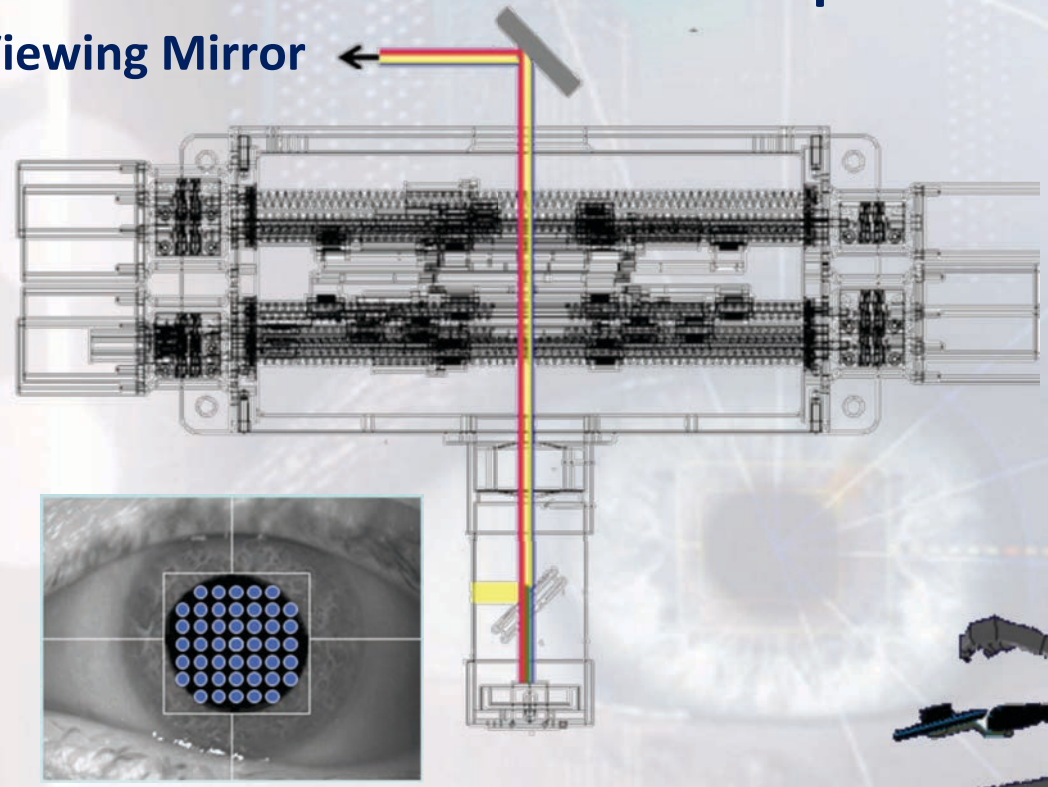
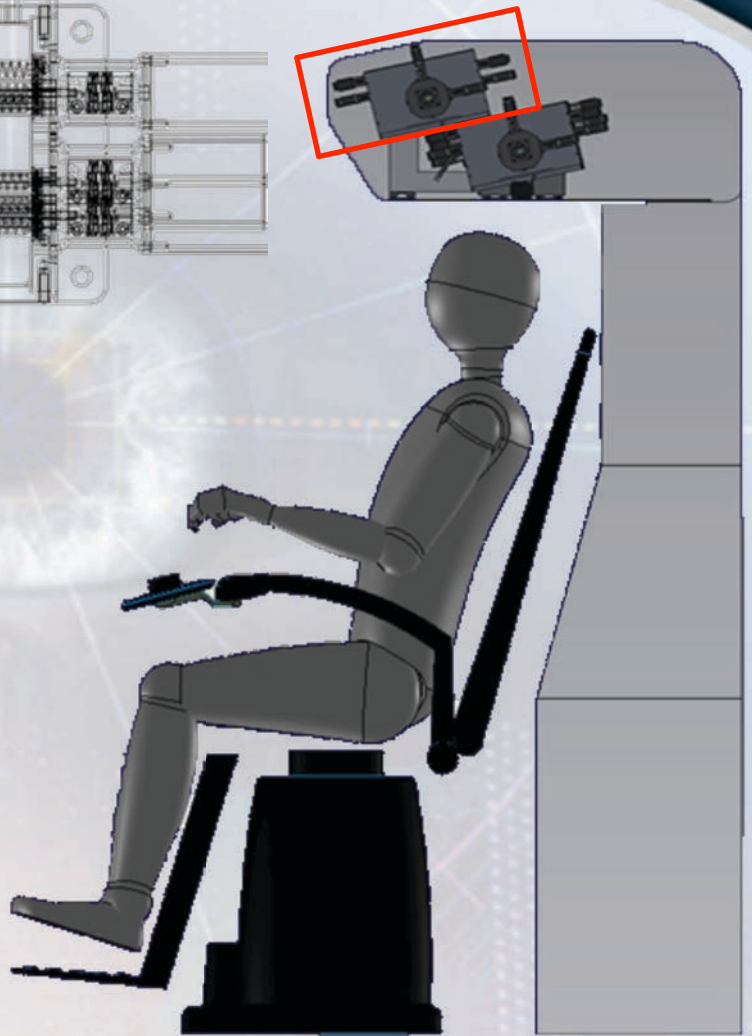
Wavefront Generator – Top View

To Viewing Mirror



HOA by Spatially Resolved Refraction



ViewPort Mirror

Georgia Tech Research Institute
Problem. Solved.

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ViewPort Mirror

Georgia Tech Research Institute
Problem. Solved.

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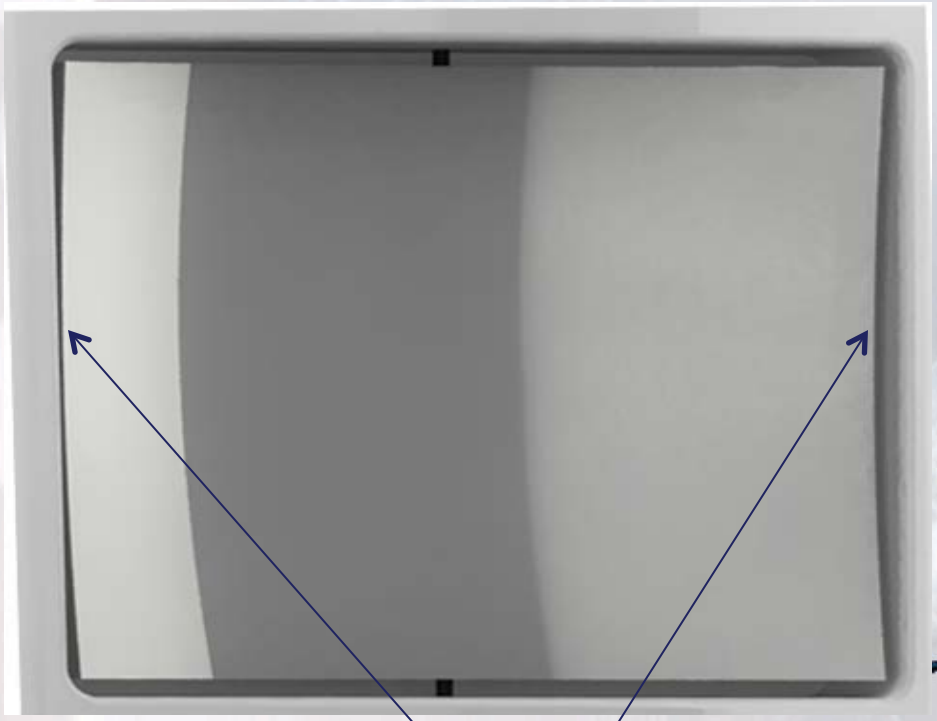
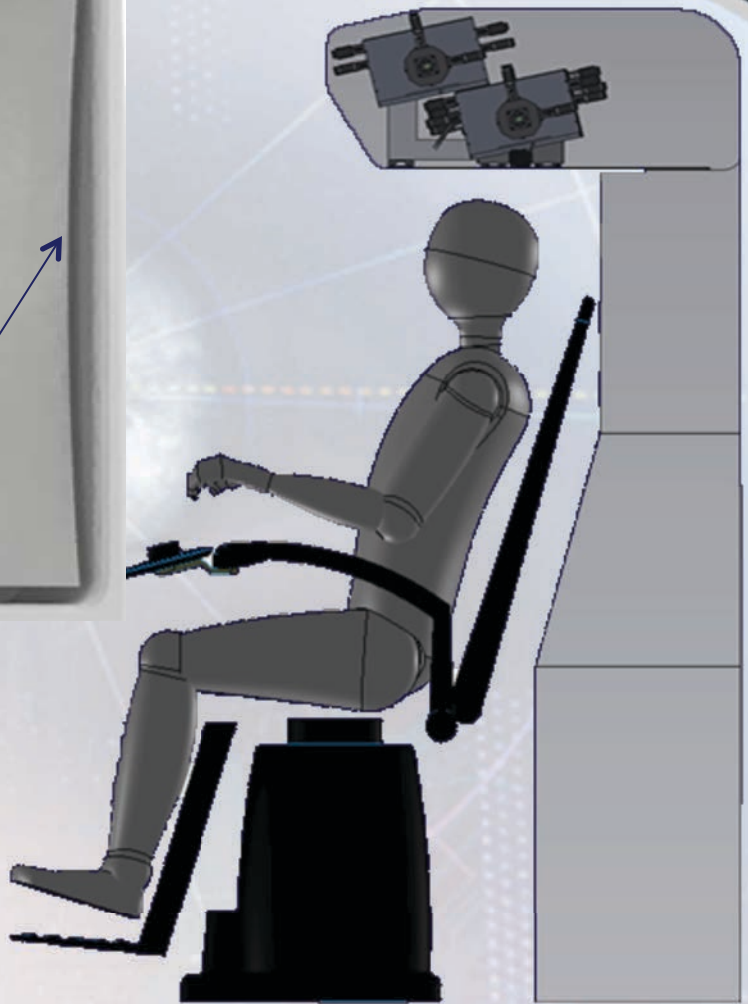
Electro-Optical Systems Laboratory





Wide Field of View

Relays Lenses to Spectacle Plane

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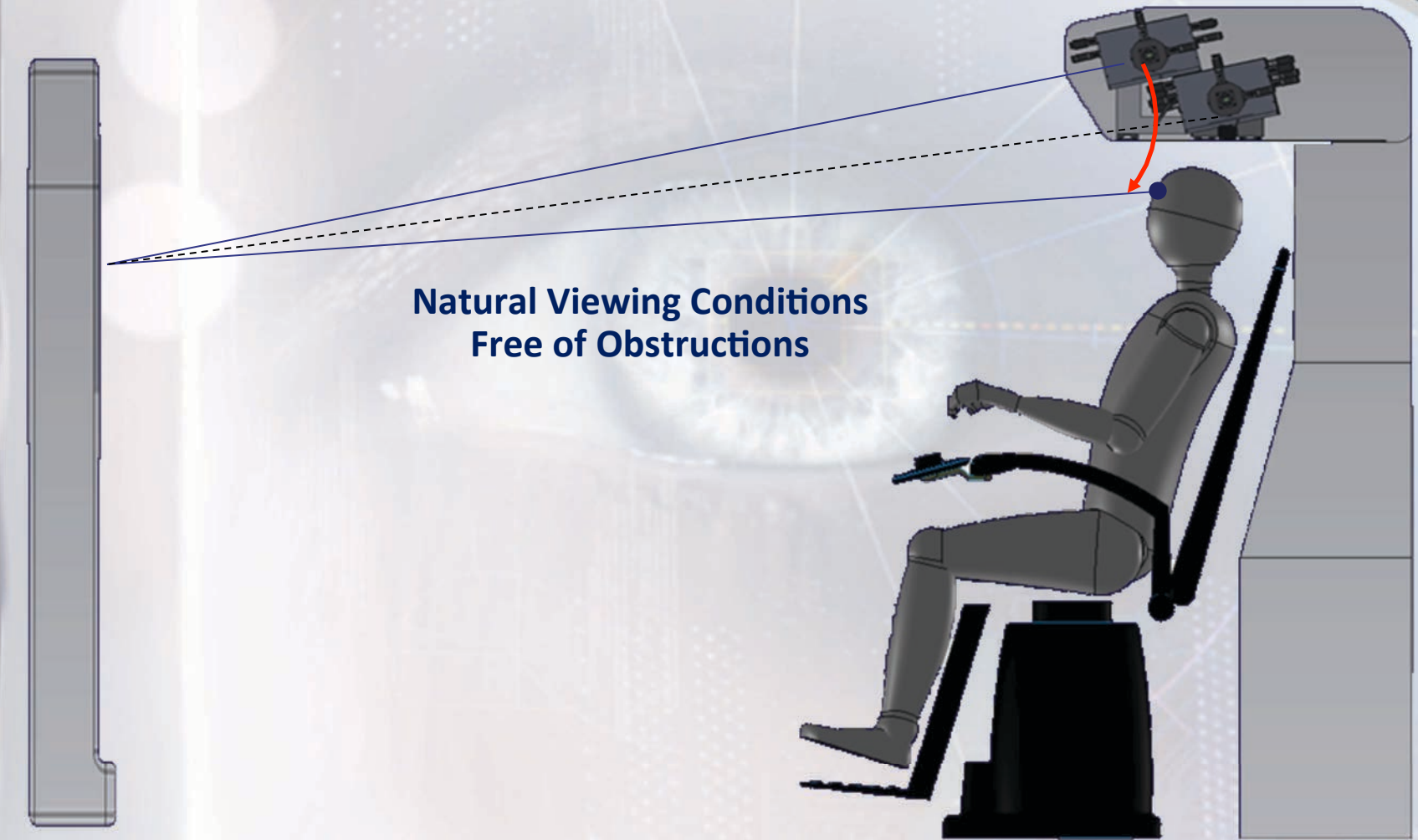

Natural Viewing Conditions
Free of Obstructions

Eye/Head Tracking System

Georgia Tech Research Institute
Problem. Solved.

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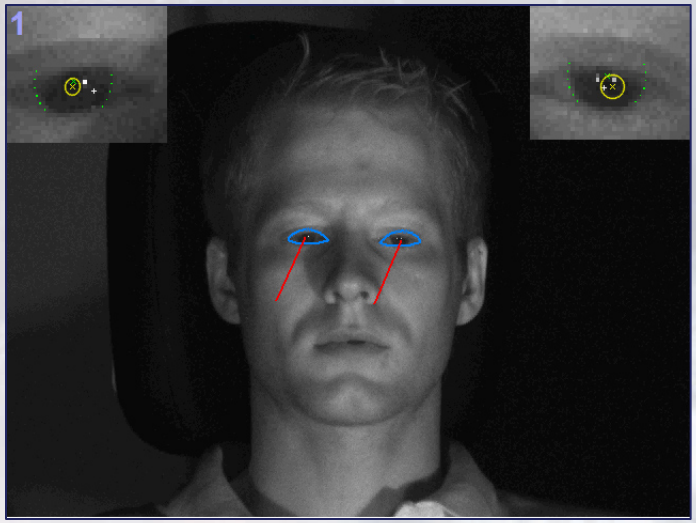
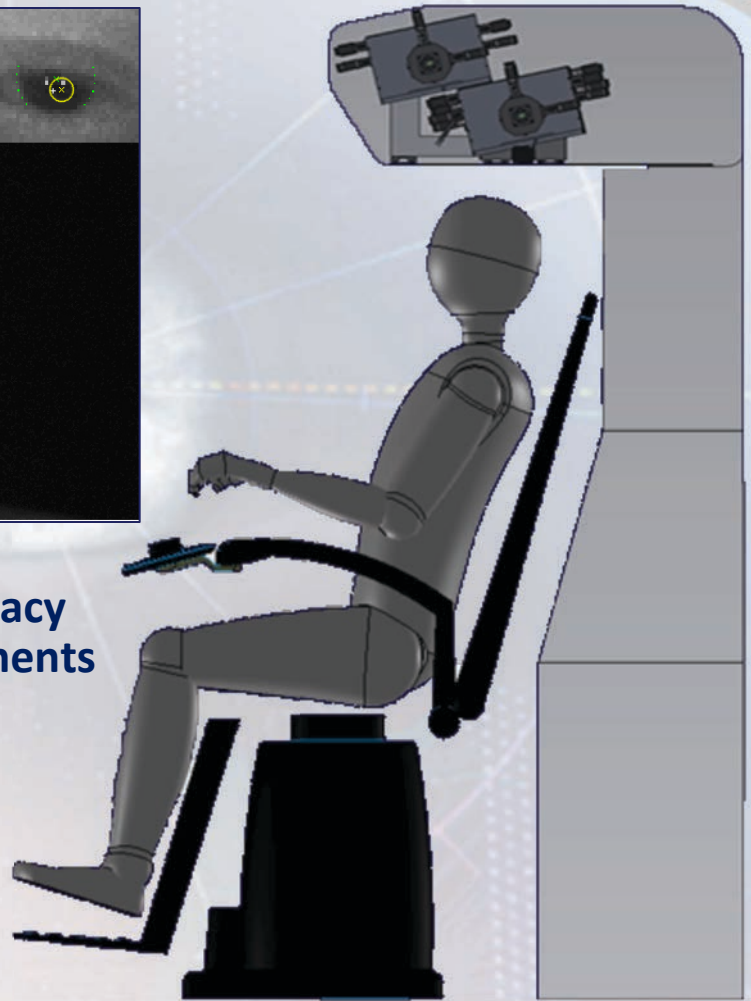


Increases Exam Accuracy
Normal Patient Movements



Near Vision Testing

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Problem. Solved.

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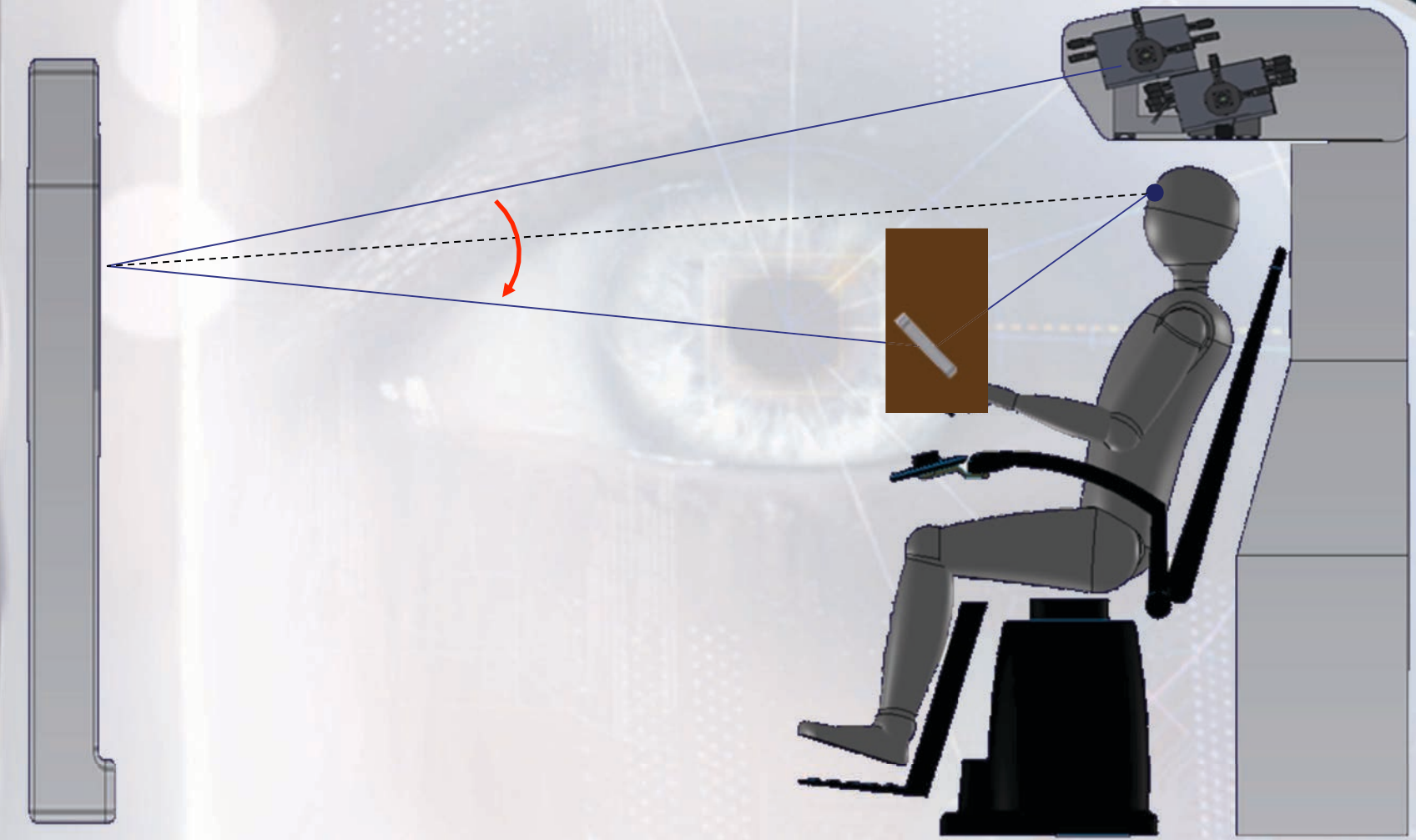

Interactive Haptic Control

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Problem. Solved.

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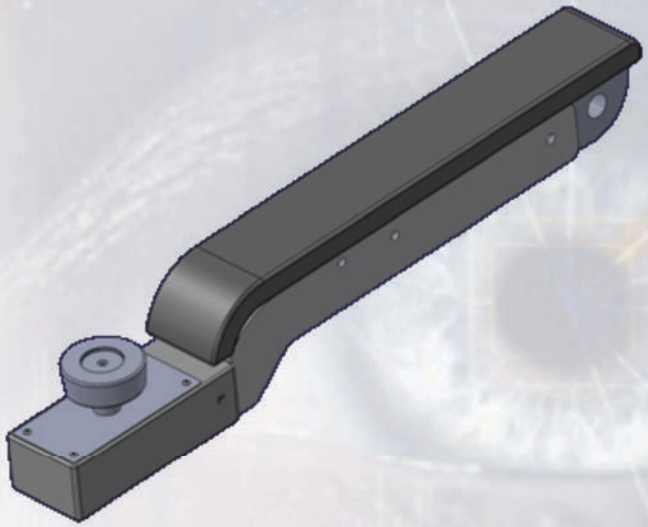

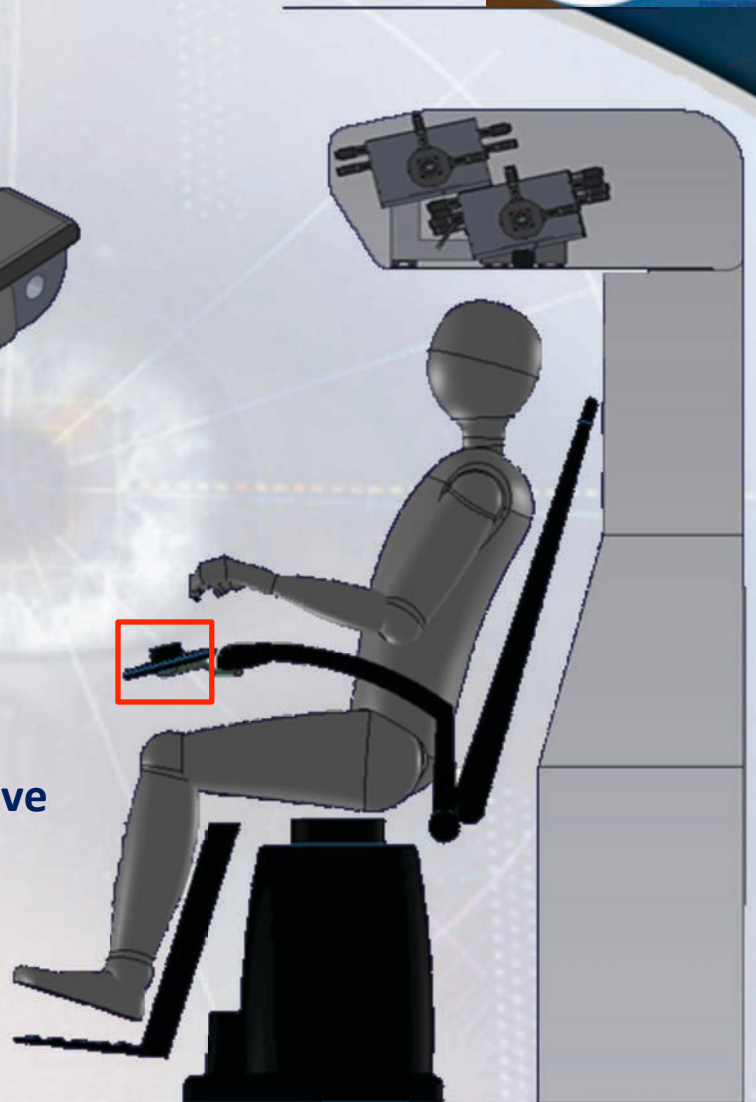

ECP Supervised/Patient Interactive
Reduce Chair Time

ViewPort Mirror

Georgia Tech Research Institute
Problem. Solved.

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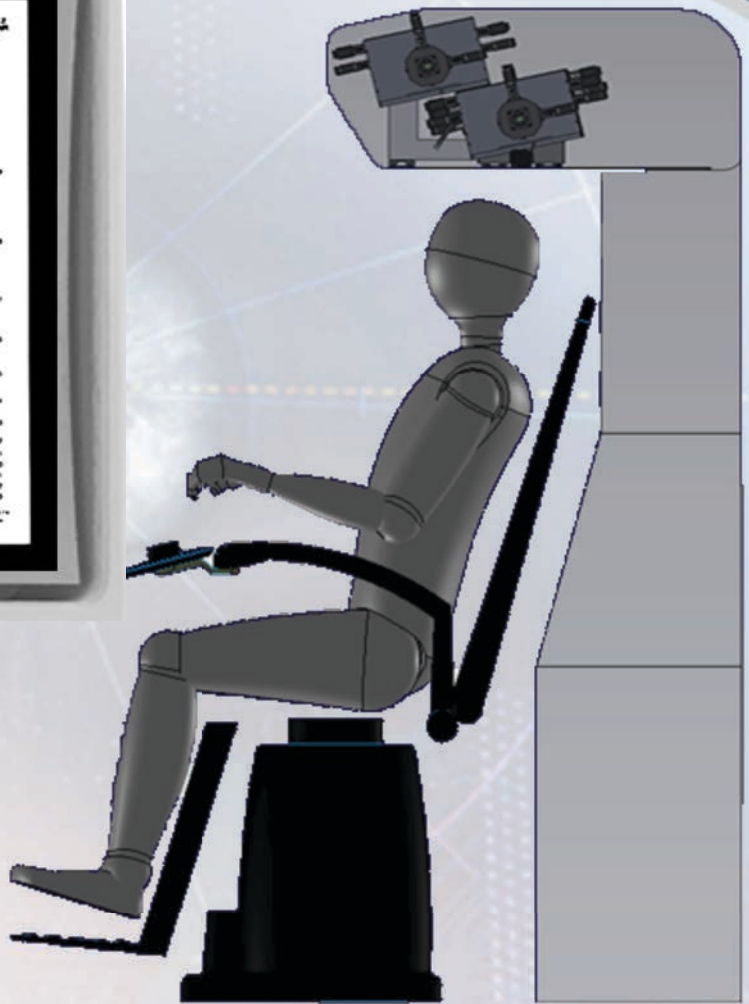
Electro-Optical Systems Laboratory



Preview, Compare, & Select

Georgia Tech Research Institute
Problem. Solved.

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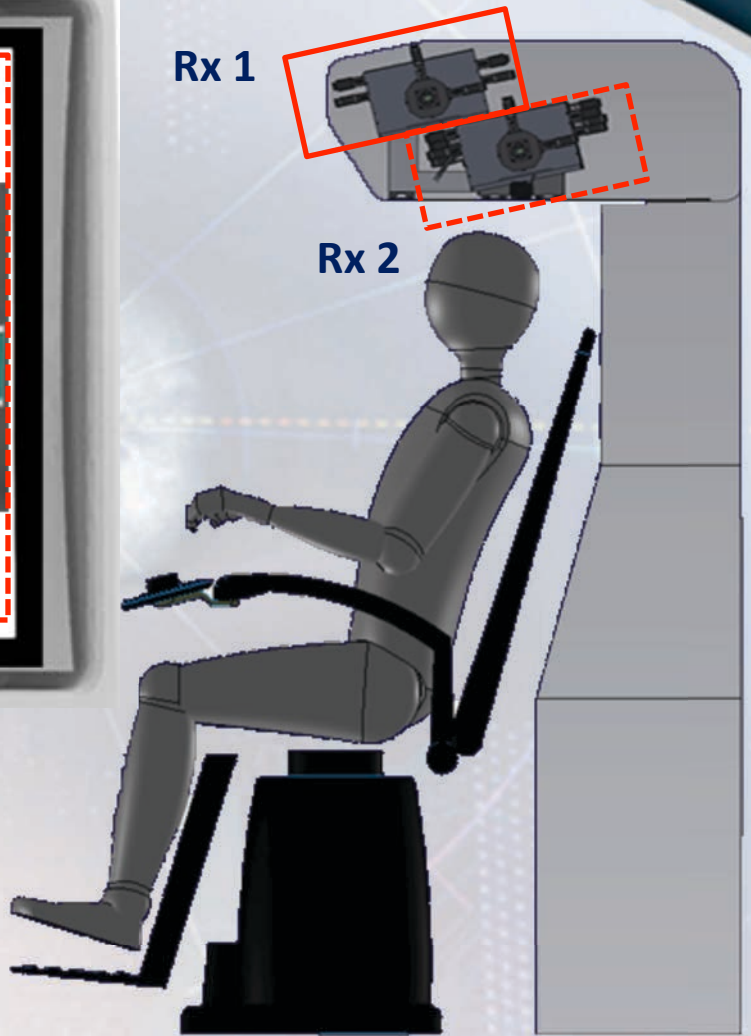

Provide Proprietary Prescriptions

Preview, Compare, & Select

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Problem. Solved.

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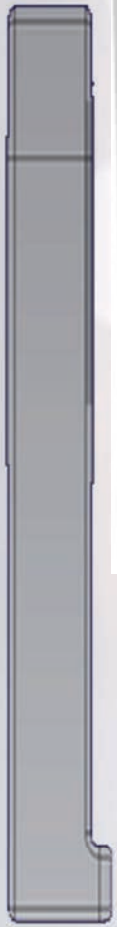

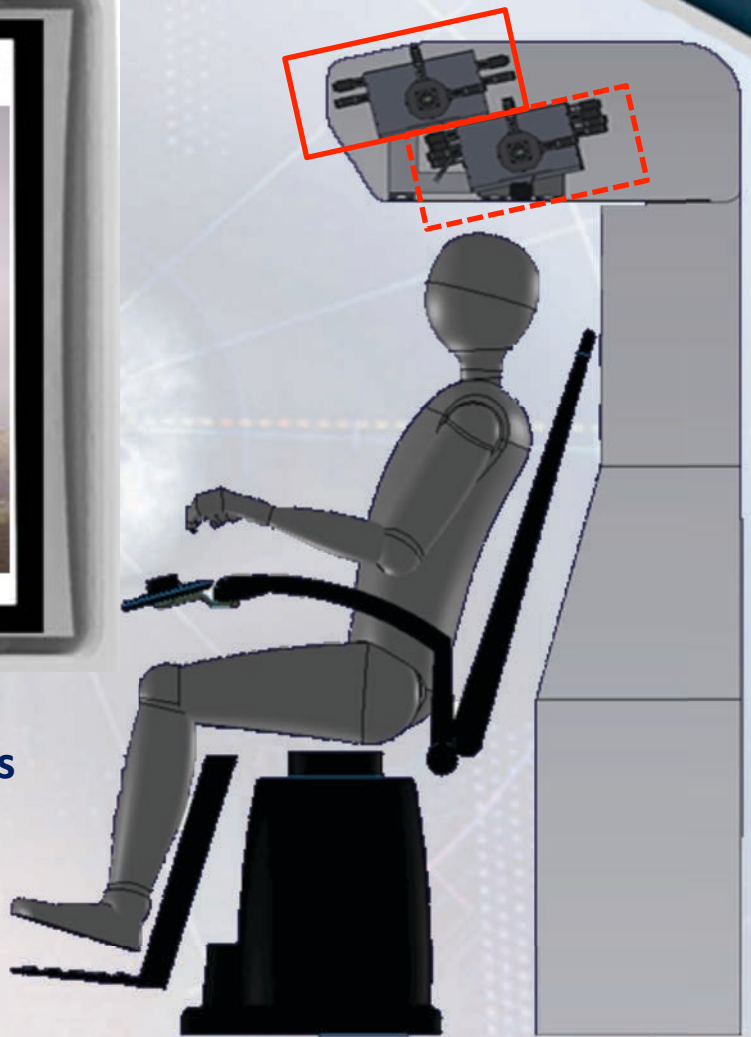

Upsell Premium Product Features

VisionOptimizer Status & Timeline

2012 ✓

Generation 3 Prototype

- ✓ Outperformed Phoropter
- ✓ Improve Vision in ~90% Spectacle Wearers
- ✓ Novel Patient Experience
- ✓ Focus Groups: Patients and ECPs prefer DVO vs. Phoropter

Spring 2013 Georgia Tech

Alpha Trial Unit

- Dynamic Eye Tracking
- Near Vision Testing
- Interactive Haptic *"Vision Dial"*
- Free-form SV and PAL Spectacles vs. Conventional

Fall 2013

Beta Trial Units

- Field Testing in ECPs & Research Partners
- Complete Industrial Engineering

2014

Production Units

- Market Entry with Production Units

DIGITAL VISION SYSTEMS

Bringing Innovations to the Patient™

The VisionOptimizer™ - *The Ten Feet*

SUPERIOR REFRACTION
- Accurate, 0.01D Rx
- HOA by Spatially Resolved Refraction
- Dynamic Binocular Measurements
- Highly Reproducible

NOVEL PATIENT EXPERIENCE
- Natural Viewing Conditions
- Free of Obstructions
- Normal Patient Movements
- ECP Supervised/Patient Interactive

PROFIT GENERATING TOOL
- Upsell Premium Product Features
- Preview, Compare, & Select
- Provide Proprietary Prescriptions
- Reduce Chair Time

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