



PRIVATE AND CONFIDENTIAL

Ceres Holographics Ltd.  
www.ceresholographics.com  
St Andrews , Scotland  
Employees: 18  
Company No: SC330746

# Taking Digital Volume Holography TO THE NEXT LEVEL

With advanced hologram mastering and replication capability

### BUSINESS SUMMARY

Ceres Holographics has developed digital holographic mastering and hologram replication technology which is used to produce precision engineered **Holograms** and **Holographic Optical Elements (HOEs)** in photopolymer recording material for mass market display applications.

Ceres competitive advantage is its technology for the design and mastering of high performance precision engineered HOEs. The digital master printer enables precision mastering and its replication technology enables scalable mass production. The benefit for customers is design accuracy and reproducibility through a digital process.

### BUSINESS OPPORTUNITY

Automotive OEMs want **Head-Up-Display (HUD)** and **Transparent Display (TD)** systems in cars to improve safety and comfort. Conventional optics make HUDs too bulky and expensive. Photopolymer HOEs can solve this problem. Integrated into the windshield, they add optical power, enabling smaller footprint HUD projector systems enabling inclusion it in a wider range of cars. Ceres most mature HOE technology is for the **Transparent Display (TD)** system for front, side and rear window. These are very small, with lower cost projectors than HUD systems. The company has delivered multiple orders for both types of system.

Market research reports that automotive HUD market growth based on conventional technology growth is expected to run at 26.6% CAGR to reach 9-12M units and \$3.4Bn by 2021<sup>1</sup>. Customer feedback suggests that if breakthrough technology enabled more installations in medium to low end cars this would rise significantly.

Ceres is targeting a significant share of an estimated 150m units in passenger cars by 2025 for **£2.8Bn** revenues from the automotive sector alone. Ceres has a multi-sided business model and this estimate excludes revenue from design services, HOE mastering, and replication technology licencing which are significant and reduce risk.

### PRODUCT/SERVICES

- Holographic optical system design service
- HOE design, origination and mastering service
- Supply of prototype systems and low volume HOEs
- Production replication technology for manufacturing partners

### TARGET MARKETS

- Automotive , Transportation, construction
- Aerospace
- Wearable - Head Mounted Display

### LEADERSHIP TEAM



**Andy Travers, CEO**  
International C-level executive experienced in technology commercialization and business development across multiple sectors. Since 2014 he has been wholly focussed on maximising the potential of Ceres technology in high value mass-market applications.

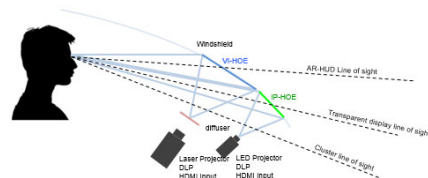


**Dr Ian Redmond, CTO and Founder** - 27 years experience in holography and development of photopolymer media. Creator of Ceres digital holographic master printer and replication capability, Ian leads the effort to develop cutting-edge new holographic technologies and applications.

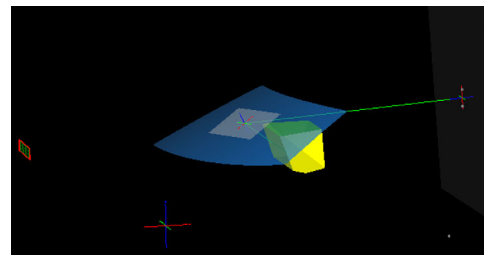
*Ceres Holographics stands at the forefront of a new commercial era for holography. They have delivered a number of ground-breaking advances in the way in which holograms are created in our Bayfol® HX photopolymer, and can be delivered for mass-market applications."*

**Dr. Thomas Fäcke, Covestro AG**

HOE based HUD and Transparent Display architecture



Simulation of HOE in windshield, projector and driver eyebox



CAD diagram of VI-HOE and AR-HUD projector design

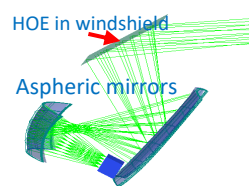


Photo 1: Holographic AR-HUD demonstration system and driver view

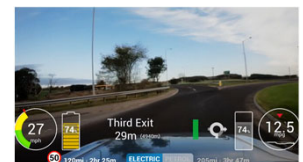


Photo 2. Transparent Display demo system on windshield