CLUSTER IMAGING INC.

Management team

- **Semyon Nisenzon** (CEO & CTO); previously ARM, Sun, Pelican Imaging, NeoMagic, Equator

- **Andrew Rosman** (Hardware); previously Broadcom, Net-Logic, NeoMagic, Hughes Aircraft

- **Eisuke Tsuyuzaki** (Board Member); previously Panasonic, Sony, several startups

- **Peri Kasthuri** (COO); previously Eaton, Applied Materials, vTitan, Kinich Systems

Advisors

- **Paul Gallagher** Marketing Executive; ex Micron, LG, Samsung, Pelican Imaging, OmniVision

- **Dave Shreiner** Executive and author; formerly Apple, ARM, SGI, Chair ACM/SIGGRAPH '14 OpenGL & OpenCL books

- **Slava Kavsan** Executive; managed security for AZURE and Windows 7/8; CTO, RSA Security; Bell Labs

- **Jon Thomas** Quicksilver Capital

- **Jens Weitzel** Yabusame Partners previously SAP, Deloitte

- **Sven Beiker** Stanford, Silicon Valley Mobility, Ex-McKinsey, BMW

- **Ron Mueller** Founder Vision Markets, ex Executive B2B Sales

Pitch

Cluster Imaging solution generates Fast, Accurate and High-resolutions Depth Maps using Multi-Resolution Camera Clusters. Depth Maps are the next-generation foundation technology enabling accurate image element isolation and visual space identification. Depth information will enable new frontiers in automotive and industrial markets.

Problem

Autonomous Driving (AD) / Autonomous Driver Assist Systems (ADAS) - Requires Inexpensive Distance Measurements in All Weather Conditions. LiDAR has Low Resolution (typically VGA)/ Low Frame Rate (under 20fps) and Poor Reception in Rain or Fog. RADAR is All-Weather but very Low Resolution (typically under QVGA). A high-resolution cost-effective solution with accurate depth map has not existed until now

Cluster's Breakthrough Solution

Cluster Imaging's depth camera system produces full-color video plus an embedded high-resolution depth map suitable for accurate image recognition. The modules are manufactured using standard, automotive grade image sensors

Cluster's Solution Details

- Generates Real-time, Accurate 3D data for Every Pixel
- Lower cost over LIDAR working at the same distance range, and substantially lower power consumption
- Accurate Distance Measurements from 1m to 300m
- RGB Video at HD or 4K Resolution up to 60 fps
- Fundamental Patented Algorithms (3 Patents Granted + 1 Filed)

Business model

Cluster Imaging will develop and sell certified automotive depth measuring camera system (hardware/software). Sell Direct to automotive, Tier I / II and OEMs. It can be used as a standalone LIDAR replacement or as a complement to LIDAR/RADAR.

Go to Market Strategy

We will be developing prototypes and testing in 3rd party facilities of Automotive, Tier I/II and OEMs such as BMW, Lyft, Cruise etc. Once qualified, the product will be sold directly or through 3rd party to customers.

Markets

Low cost, accurate and high resolution depth measurement system for automotive and industrial applications such as delivery vehicles, warehouse robots, excavators etc.

Competition

Existing technologies use either LIDAR, active illumination (limited distance, and low depth resolution) or stereo methods (low depth accuracy)

Traction

Three Patents granted and one filed. Two hardware prototypes made and automotive prototype in development. Three leading automotive customers ready to test in the field.

Financials and Business Projections available upon request.

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Fast, Accurate and High-resolution Depth Data Using Multi-resolution Camera Clusters

System Overview

A high-resolution, high-sensitivity central camera is surrounded by multiple cameras with medium-resolutions image sensors. Distance information calculated from the peripheral sensors is integrated with the main image, providing high resolution in width, height, and depth.
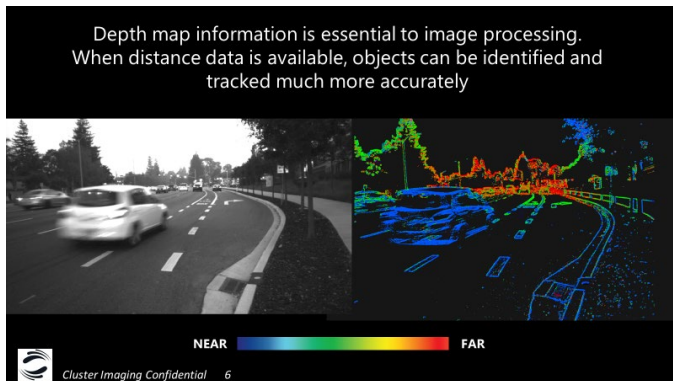
Real world test results using existing universal prototype

In addition, Multiple depth camera modules (D) could different Fields -Of-Views (FOV) for accurate depth computations at all distances. Cluster Imaging modules may replace or complement other ranging technologies such as LIDAR and RADAR (E).

Advantages

Depth-mapped video provides higher resolution than LIDAR/RADAR at lower cost. RGB + Depth for each pixel and high edge/feature sensitivity is superior for object isolation and identification.

Performance

Cluster Imaging's optimized hierarchical depth refinement software is substantially faster than existing solutions at 1/10th the power consumption. Scalable configurations produce images from HD to 4K megapixel and 10- to 16-bit depth range.

Example Configurations

The number and arrangement of peripheral cameras within a module may be optimized for different working depth ranges. For example, a three-sensor configuration could provide depth data over a range of 0.3m to 5m with an 120° FOV. A 5-sensor configuration could provide depth data from 0.4m to 150m with 80° FOV or 0.5m to 350m for 7or 8 sensor configuration 30° - 60°FOV
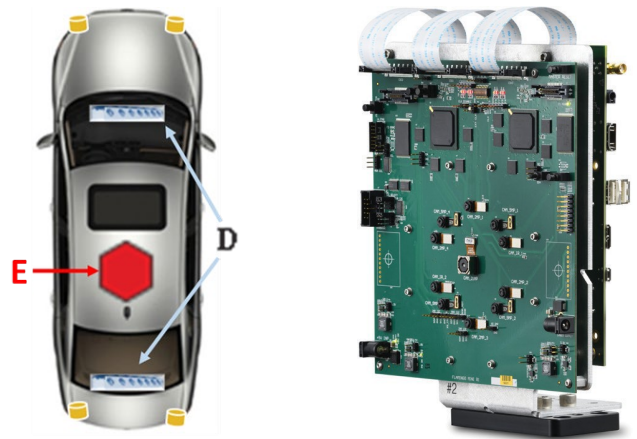
Mounting location of sensor modules (left), Cluster Imaging universal prototype camera system(right)