Our TEAM

• Founded in 2003 as a spin-off of Catalina Research, Inc. (CRI)
• Headquartered in Colorado Springs, CO
• Approx. 50 Employees – 30+ Engineers
• Boot Strapped – Self Funded
• Certified Women’s Business Enterprise (WBENC)
• 80% Commercial / 20% Military
Our LEADERSHIP

Nancy Scally
CEO

• BS Human Ecology (Kansas State University)
• Kansas State University 2012 Entrepreneur Of The Year
• Kansas State University Advisory Board Member

Dr. Larry Scally
President & CTO

• PhD in EE/Electromagnetics & Remote Sensing (University of Colorado at Boulder)
• BSEE, MSEE & MBA (Villanova University)
• Founded Catalina Research, Inc. in 1990 (merged with DRS in 2002)
Our Cross Training

**HARDWARE**
- ASICs/Boards - Systems
- EM/RF – Digital/DSP
- High Performance Computing

Commercial, Industrial, Automotive & Military Production

**SOFTWARE/FIRMWARE**
- Enterprise to Low-Level Drivers
- Embedded to Cloud
- VHDL, Verilog & OpenCL
- AI & Machine Learning

**SYSTEMS**
- Radar / EO / IR
- EW
- Communications
- SIGINT
- IoT
- Sensor Fusion
- MATLAB/STK

Cross-Trained Engineering Staff
Hardware DESIGN

Strategic Partnerships

• Over 50+ Board Designs Since 2003
• Digital, Analog & Mixed Signal Designs
• FPGAs, GPUs, X86, ARM & More
• Bleeding Edge Components & Technology

Markets

• Commercial
• Industrial
• Automotive
• Military
Next Generation Systems, Subsystems, Modules

**Strategic Partnerships**

- 110GHz test equipment (VNA, RSA, Sig Gen, VSG)
- Die Wire Bonding
- Frequency Agnostic
  - Currently UHF to 340 GHz, EO bands, IR
- Antennas, Signal Processing, HW & SW Design

**Markets**

- Commercial
- Industrial
- Automotive
- Military
Intelligent SENSOR FUSION

Frequency Agnostic
- Electro Optical (EO)
- LIDAR
- RADAR
- Time of Flight (ToF)

Advanced Fusion Algorithms
- Kalman Filters w/RPY
- Artificial & Virtual Intelligence
- Cognitive Computing
Cutting Edge SOFTWARE & FIRMWARE

Software
- Low-Level Drivers to Enterprise Applications
- Platform & Programming Language Agnostic
- Cognitive Computing, AI, ML & CV

Firmware
- Verilog & VHDL
- DSP Builder & Simulink
- OpenCL & BSPs
- 98% Utilization on Virtex 5 – Meets Timing
Modeling & SIMULATION

- MATLAB
- RF & EM –
  - CST
  - Microwave Office
  - Axiom
- Full Radar System Models
- Solidworks
  - Thermal Dynamics
- AGI STK - Mission Simulation
Strategic Partnerships

- 5G
- E band Full Duplex Radio
- UAV Remote Control
- Internet of Things (IoT)

Markets
- Commercial
- Automotive
- Industrial
- Military
Award Winning 3D R.A.R.E (3DR)

- Flexible & Modular – NO BACKPLANE
- 6.25” Square with 3D High Speed I/O
- Optimizes Cost, Size, Weight & Power
- HPC, Mixed Signal & More
- Successfully commercialized in 2010
- MDA, AF, Army, Navy Funded
Multi-Function Seeker - MFS

- Phase II SBIR
- Multi-Function / Multi-Mode
- Radar, IR, SAR, EO
- EW
- Communications
- Missiles and Small UASs
- 3DR Technology

Physical Layout

- Multi-Mode, Multi-Function Seeker
  (Semi-AR, AR (FMCW, PD), IIR, Lidar, EO, EW/DRFM)
- Conformal Antenna Array for Side-Looking SAR
- Conformal Antenna Array for Comm
- Wideband permeable radome
- Rocket Motor
- Fuze and Warhead
- Guidance, Control and Communications
- Seeker Processing

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B3 Digital Receiver/Exciter

- 5x Stratix 10 FPGAs
- 4-Ch DAC, 4-Ch ADC
- 36 Layers/10K Components
- PCIe Gen 3 (PLX Switch)
- QSFP+ 40/100GbE
- ~350 boards shipped in 2017
- Designed & Shipped 12 Boards in <6 Months
VPX x86 + GPU + FPGA HPC Processor

- Intel Stratix 10 FPGA
- Intel Xeon x86 Processor
- AMD GPU
- 16GB DDR4
- InfiniBand 10/40GbE
- Easily leveraged for S10 + Xeon PCIe design
- VPX Form Factor
Dual Intel® Stratix 10 FPGA – PCIe Card

- Dual Intel® Stratix 10 FPGAs
- Up to 520GB DDR4
- QSFP+ 40/100GbE
- PEX PCIe x16 Gen 3
- Freescale K61 Microcontroller
- GPU sized PCIe Form Factor
Unmanned Sense, Track & Avoid Radar (USTAR)

• USTAR is an advanced airborne, pulsed-Doppler radar
• C-Band AESA
• Modular Design
• Majority of radar processing in 3 FPGAs Programmed in Simulink
• Air to Air & Ground to Air Detection

“CEI is one of five companies in the world that can successfully make this type of Radar…” – Raytheon
Navigation Assist THz Interferometry Radar (NATIR)

- 210-215 GHz, 3-4 GHz Bandwidth
- 3D Landing Radar In Degraded Visual Environment (DVE)
- Leveraging experience gained from CEI / CU Boulder THz Modeling and Propagation “TAIPAS” Phase I & II STTR Program
Modular RADAR DEMONSTRATION & DEVELOPMENT PLATFORM

- Makes rapid prototyping of high performance radar quick and easy
- Processor, expansion and antenna modules can be mixed and matched to create a customized development platform.
- Antenna Modules include 24, 60 and 77GHz frequencies and multiple beam pattern options

01 iScan-P Processor Modules
Choose from state-of-the-art, commercial, industrial and automotive processors and microcontrollers that meet your application's needs.

02 iScan-E Expansion Modules
Expansion Modules provide enhanced capability such as FPGA processing, increased I/O, data recording, additional sensors and hardware.

03 iScan-A Antenna Modules
Select from a variety of antenna options including long, medium and short range, switchable, MIMO, and much more.
• Infineon XMC4700 Processor
• Onboard Sensors:
  • Temperature: Maxim Integrated
  • Humidity: Silicon Labs
  • Barometric Pressure: Measurement Specialties
  • Ambient Light/Proximity: Vishay
  • Smoke Detector: Analog Devices
  • Accelerometer & Gyroscope: ST Microelectronics
  • Microphone: TDK InvenSense
• Digi Xbee Socket: WiFi, LTE, Bluetooth & More
iScan™ 24 - 24GHz Radar Module

- Infineon BGT24MTR11 XCVR
- XMC4400/4500 Micro-Controller
- USB, WiFi & CAN Interface
- Switchable Beam Options
- Range and Doppler
- ~100° Field of View
iScan™ 77d - 77GHz Radar Module

- Infineon RXS8160PL Tranceiver
- Aurix 2G TriCore Processor
- Digital Beam Forming
- USB & CAN Interface
- Gigabit Ethernet
Communication Command & Control
AF TENCAP TALON SIPSA

- Maximize Available Radio Bandwidth Across Multiple Assets
- Lower Probability of Intercept (LPI)
- Designed for AFSOC Need
- Software Can Be Installed On COTS Systems
NVIDIA Tegra Products

- 256 GPUs
- 4 ARM Cores
- H.265 Encoding/Decoding
- Custom BOMs Available
- Compact Form Factor

- 192 GPU Cores
- 4 ARM Cores
- H.264 Encoding/Decoding
- Chip Level Access
- 2, 4 & 8GB RAM Available
- 2” Cube
Test Us!
Let Us Back Up What We’ve Said!

Join The Multitude of Multi-billion Dollar Companies That Rely On CEI For Their Toughest R&D Projects
Your Foundation For Excellence In Engineering Innovations

Thank You!

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