

Select Project History

Making our customers successful: LocoLabs has delivered ruggedized IoT and IIoT solutions, wireless sensor networks, embedded Linux systems, lightning survival solutions, commercial robotics, LiDAR 3D spatial processing, LCD/OLED touch panel systems, and advanced Mil Spec gamma radiation imagers. With a proven design methodology we call Rev-Zero design, the majority of our product designs go into production without ever needing a spin. So take us for a spin!



DVDPlay, Inc. (NCR / RedBox) Movie Rental Kiosk

An automated movie rental system that allows customers to browse, select, and rent the latest DVD releases. It utilizes the internet to provide a transaction receipt via email and permits a rented movie to be returned at any kiosk in the system.

Key Highlights

 Led engineering team in development of first production kiosk model, providing project management, design engineering and manufacturing support; similarly instrumental in development of all subsequent models



 Requirements Analysis, System Architecture, Analog and Digital Hardware Design, Mechanical Design, Embedded and

Linux/Windows Software Development,

Prototyping, Design Validation and Compliance Testing, Production Support, and Project Management

- Developed all embedded electronics and software to exercise full control over a multitude of robotics and System elements, including servos, DC motors, optical sensors, solenoids, solid-state relays, LEDs, etc.
- Custom design of an extreme-small-footprint Virtual Machine and Robotics Control Programming Language and development tools
- Developed time-saving tools, procedures, diagnostics, and utility software to aid manufacturing and field service

SOLOSHOT.

SoloShot Video Selfie Tracking Solution

Two Entrepreneur kite board surfers wanted to be able to automatically video themselves from the shore while kite boarding

Key Highlights

- A prototype solution was needed to prove the concept
- We used an off-the-shelf Pan Tilt Zoom (PTZ) system and built a long-distance radio link capable of operation in high moisture environments linked to a highresolution GPS system.
- FLACE LASS HANNES RAL MINANS RAL
- The GPS Radio module was worn on the arm as an armband.

Developed complex

calibration software algorithm to learn the location of the Camera and its orientation

• Developed PTZ control software and successfully demonstrated on a surfer at Santa Cruz beach

• The company raised funds on Kickstarter based on the prototype and is now on their third-gen design



Department of Defense, Defense Threat Reduction Agency (DTRA) POLARIS 3D Gamma-Ray Imaging Spectrometer

LocoLabs' third generation the Polaris 3D CdZnTe (CZT)

gamma-ray imaging spectrometer system. CZT Technology allows for precise sensing and imaging of radiological threats at room temperature, a distinct advantage over other high-quality gamma-ray detectors, which typically must be cryogenically cooled to operate.







From left: SolidWorks concept drawing; 3-D printed plastic model for appearance and fit check; actual carbon-fiber and metal unit, with foam cover.

Key Highlights

- Requirements Analysis, System, Analog and Digital Hardware Design, Mechanical Design, Embedded and Linux/Windows Software Development, Prototyping, Design Validation and Compliance Testing, Unit Production, Field Trial support and Project Management
- The Polaris program sponsored by DTRA has enabled technology validation and maturation of CZT. DTRA trusted LocoLabs to bring it from the university laboratory to commercialization.
- This technology is currently being deployed by the US Army to help identify radiological threats and provide security for US troops.
- · Light-weight carbon fiber fabrication techniques
- · High-accuracy, Low drift dual antenna GPS/IRU integration



NVIDIA Corporation FPGA and ASIC Design

FPGA and ASIC design, development, and verification for the graphics industry's leading hardware innovator.

Key Highlights

- Design and Verification of a 2.5 GHz, full-width PCI Express Switch with one 16-lane upstream port and two 16-lane downstream ports
- Design and Verification of a PCI Express Switch compliant with Specification 2.0
- Partitioning and mapping of multiple ASICs-in-design to FPGAbased dev platforms for verification and early software development
- Creating a RAM generator program to produce FPGA-optimized versions of ASIC RAM libraries
- Developing replacement SDRAM, DDR interfaces for use in FPGA-based ASIC verification system
- Developing Time Domain Multiplexing interfaces to increase signal density between multiple 1000+ pin FPGA devices in large verification system





TiVo, Inc.

Digital Video Recorder and Transcoder

A revolutionary consumer electronics device that allows users to time shift their favorite TV shows.

And a real-time stream decoder to enable mobile devices to watch recorded content in their native format in real-time

Key Highlights

 Provided technical direction in areas of system architecture, design methodologies, compression engine selection, MPEG timing models, audio/video synchronization



- Developed Audio DSP software that integrated MPEG encode algorithms and provided audio and bit-stream buffering and system interface communications
- Developed the TiVoStream Transcoder hardware and Linux platform porting drivers and streaming software to enable mobile devices to stream from the main TiVo box in the proper format for each device



TICOM GEOMATICS, INC.

Ticom Geomatics, Inc. Enclosure and Power Supply

An advanced enclosure design with integrated power supply and thermal management features for a desk-side, broad-spectrum, highsensitivity RF signal acquisition system for use in RF signal source triangulation.

Key Highlights

 Requirements Analysis and Refinement, 3D Modeling and Mechanical Design, Electrical Power Distribution Design, Power Supply Selection, Prototyping and Validation



- Sturdy, full-custom cabinet design made from strong metal components with integrated handles and recessed I/O areas and protective front access panel for rugged environments
- Rear-panel houses several RF antennae connectors and many other communications interfaces, all well labeled and recessed for protection
- Thermal Management Features include multiple fans, internal card orientation, air flow pathways, and exterior gratings
- Produced documentation set for hardware and mechanical components, prototyped and delivered systems for deployment





Defense Threat Reduction Agency (DTRA) Merlin-I Sensor Imaging System

A visual imaging system for a radiological-nuclear sensor that is mounted on the outside of the US Army's Nuclear, Biological, and Chemical Reconnaissance

Vehicles (NBCRV). Provides source location and imaging of radioactive hot spots.

Key Highlights

- Architected, designed, prototyped, and validated Hardware, Software and Mechanical enclosure to integrate LiDAR, 360-degree day/night Cameras IR Illumination, and Nvidia GPU overlay algorithms to deliver a qualified Mil-Spec Vision system in under 18 months
- Included Circuit design, Software and Firmware design, Multiprocessor CPU/GPU fail-over system design, Mechanical and enclosure design, and

Thermal modeling and validation

 Provided project management and engineering activities including development, testing, deployment, and support for the Merlin-I sensor



- · Successfully delivered systems to the Army for validation and
- characterization in real world environments on Stryker NBCRV vehicles designed to withstand harsh, contaminated military environments with minimal maintenance needs



Ascentry Technologies Wireless Mesh Sensor Router



Freedom 2100 wireless mesh router units are designed for rapid deployment at disaster sites and to aid first responders to instantly and securely share voice, video, sensor readings, and data over a reliable WiFi network. Sensor options can safely report hazardous conditions in remote locations.

Key Highlights

- Highly Ruggedized System for deployment in challenging conditions
- System Architecture, Hardware Design, Industrial, and Mechanical Design Support, Protocol Development, Embedded Software Development, Prototyping, Testing, Release to and Coordinate Off Shore Manufacturing
- Advanced battery charging and monitoring system for optimal operation and recharge times



Bright Things

Bright Things plc Games Console Platform

The Bubble games console connects wirelessly to a DVD player and allows children to interact with characters from their favorite television shows. It can also be used as a standalone games console without a television or DVD player.



- · Developed proof-of-concept prototype in three days
- System Architecture, Components Selection, Hardware Design, Embedded Software Development, Prototyping, Compliance and Safety Testing, ASIC Cost-Reduction
- Designed innovative Virtual Machine, Programming Language and Development tools as the foundation of an optimized, hardwareindependent Game Platform
- Developed RF remote control system using low-cost transmitter/receiver pair
- Brought up volume manufacturing in China, developed test fixtures and procedures and software
- Deployed production Test and Tracking system, including development of Web-based UI, Linux SW/Drivers, SQL Database with data mirroring in USA
- Defined Architecture and Requirements for highly-integrated and enhanced ASIC version of Platform; designed validation board, ported software

ChargeltSpot ChargeltSpot, LLC Cell Phone Charging Kiosk

Developed a cost- and complexity-reduced solution for charging customer cell phones. System controls door locks, lighting, watch-dog timer, system reset, and charging control; optimizes and monitors cell phone charging.

Key Highlights

• Reduced from 24 to 2 boards and eliminated 30 cables to improve



• Produced a single board, replicated twice, to control all charging and locker functions

yield and reduce cost and complexity

Requirements Analysis, System
Architecture, Analog and Digital
Hardware Design, Mechanical Design,
Embedded and Linux/Windows
Software Development, Prototyping,
Design Validation, Production, Test
fixtures and Project Management

- Delivered thousands of control boards with high reliability and yield
- Extensive embedded logging system used to monitor and verify charging sequence and states
- Linux deamon design with API for control and status

AmberWatch

AmberWatch Child Safety Alarm

The AmberWatch is a digital wristwatch that includes an alarm circuit. When activated, it immediately calls attention to the child at risk with a piercing audible alert and bright, flashing LEDs. The parent must reset the alarm using a customizable button press sequence.

Key Highlights

- Ultra-Low Power and Ultra-Miniature alarm circuit design
- Emits distinctive tone at over 110 decibels, generated by custom circuit and software algorithm, all running from two button-cell batteries
- Benchmarked many batteries and specified only those capable of performing well in this unusual, highdrain-rate application
- System Architecture, Hardware and Mechanical Design, Software Development, Transfer to and Monitoring of Volume Manufacturing in China
- Optimized mechanical design, electronics circuit, and tone generation software for desired acoustic characteristics







Touch Revolution Touch Tablet Design

Touch Revolution is a Capacitive Touch Panel manufacturer. They needed a series of tablet designs including a manufacturing reference design kit to help sell their product.

Key Highlights

- Leveraged the LocoLabs Marvell Green Calliope platform to rapidly build multiple generations of Cap Touch sensor tablets for demonstration
- Requirements Analysis, System Architecture, Analog and Digital Hardware Design, Mechanical Design, Linux Software Development, Prototyping, Design Validation and Project Management
- · Built a manufacturing test fixture for volume production
- Built a developer kit to ease integration of touch technology into client projects



Linux Motion Sensor Evaluation System

Test platform for Mems Gyro, accelerometer and compass.

Key Highlights

- · Requirements Analysis, System Architecture, Analog and Digital Hardware Design, Mechanical Design, Linux Software Development, Prototyping, Design Validation, Production, Project Management
- · OLED display
- · Utilized ultra-miniaturization techniques of Package On Package (POP) for CPU, NAND and DDR
- Expandable to a 4.3" LCD Touch panel
- Included Bluetooth, WiFi, two gyros, accelerometer, magnetometer, Li-ion Battery charger





IDEO

Conference Room A/V Switch Controller and VOIP Video Conferencing System

A table-top user interface pod for a high-end video conferencing system. Allows convenient connection of portable A/V inputs and offers intuitive LED backlit capacitive touch interface for selection of conference views.

A combination of tablet and phone to enable video conferencing sessions for families.

Key Highlights

IDEO

· Designed the table-top user interface with capacitive touch control



- Produced multiple versions with different shapes and sizes to obtain user feedback and finalize the design
- Delivered design package for volume manufacturing
- Developed software to enable video • conferencing via Linux computers and phones to integrate them into a family friendly solution
- Included VIOP audio and A/V Synchronization solution to provide a high-quality experience that was easy to use for all family members



People are talking about LocoLabs...

$\star \star \star \star \star$ Brad Beatty, Principal Scientist, Alion Science and Technology Corporation says:

With mechanical, electrical, and software expertise, LocoLabs is our go-to resource to provide robust solutions to our customers' complex, mission-critical challenges. LocoLabs delivered on several Countering Weapons of Mass Destruction (CWMD) contracts involving imaging and sensor technologies that are crucial to keeping first responders and soldiers safe. And equally as important as all of that: those "Loconians" are fun to work with!

★★★★★ James Gardner, VP, Operations/Program Manager DTRA Arms Control Contract, Alion Science and Technology **Corporation says:**

We added LocoLabs to the Polaris team because of their sophisticated prototyping and testing labs, reputation for high-quality rapid prototyping, and experience launching products into manufacturing. We were confident they could take this design out of the lab and make it manufacturable.

★★★★★ Jens Horstman, former CEO of DVDPlay, which partnered with McDonald's to create Redbox, a multibillion-dollar retail automation company, says:

DVDPlay turned to LocoLabs to solve some vexing calibration problems with our early kiosk prototypes. LocoLabs quickly diagnosed the issues and delivered a solution. Impressed, we brought on the Loco team to add features and improve the overall robustness of the systems. LocoLabs delivered all embedded robotics control firmware, electronics, sensors and power systems design, and a solid manufacturing platform - this allowed us to focus on customer interface, billing systems, and field deployment.

★★★★★ Gopal Solanki, President & CEO, Magnum Semiconductor says:

We chose LocoLabs because of its long history of working with the Magnum CODEC architecture and its reputation for delivering designs and products of the highest quality.