

**Presco Engineering**

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New Haven, CT 06525  
[www.prescoinc.com](http://www.prescoinc.com)



Who are we?

# WE ARE PRESCO ENGINEERING

For over 45 years, we have been helping technology companies successfully bring new products to market.



INDUSTRY LEADER OVER 45 YEARS



PRODUCT DEVELOPMENT FIRM



ISO 9001: 2015 CERTIFIED  
MANUFACTURING FACILITY



STAFF OF 20+



15,000 SQ. FT. FACILITY

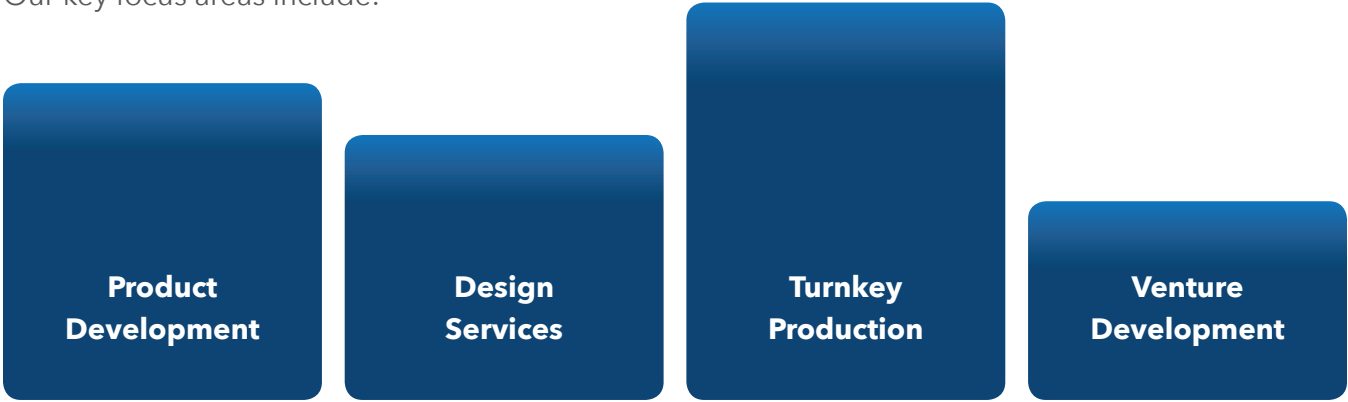


LOCATED IN NEW HAVEN, CT

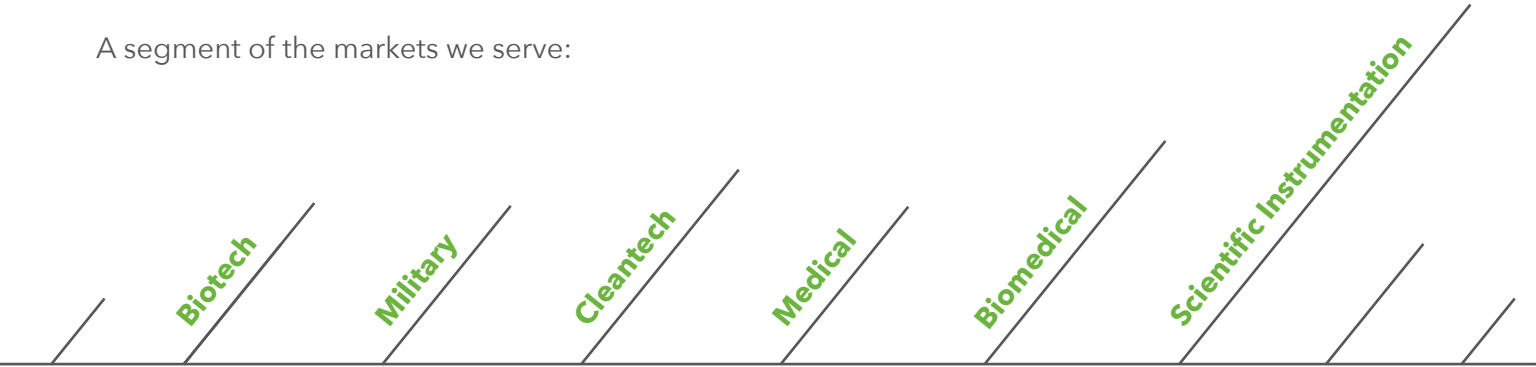
What do we do?

WE ENGINEER SOLUTIONS

Our key focus areas include:



A segment of the markets we serve:



Who do we serve?

SERVING ALL TYPES OF CLIENTS

Our growing list of clients is diverse in size and industry sector. From technology feasibility studies to full product development programs, we help our customers introduce new products and enhance their market position.

We love our clients

Agilent Technologies  
Analog Devices  
AstroNova  
Branson  
Defibtech  
GE  
General Foods  
Hamamatsu  
Hologic  
Life Technologies  
Memorial Sloan  
Kettering Cancer Clinic

Nikon  
Northrop Grumman  
NYNEX  
OFS  
PerkinElmer  
Philips  
ProteinSimple  
SAIC  
Scan-Optics  
Smiths Detection  
Sonics

The Lee Company  
Thermo Fisher Scientific  
Ward Leonard  
XiJet

WE ARE A TECHNOLOGY  
DEVELOPMENT PARTNER TO  
**OVER \$1 BILLION**  
IN EXITS

What makes us stand out?

# OUR FIRST PRINCIPLES DRIVEN APPROACH

In order to better understand – and therefore solve – a given problem, we utilize our first principles driven approach to break down that problem or idea to its core principles and basic knowledge.

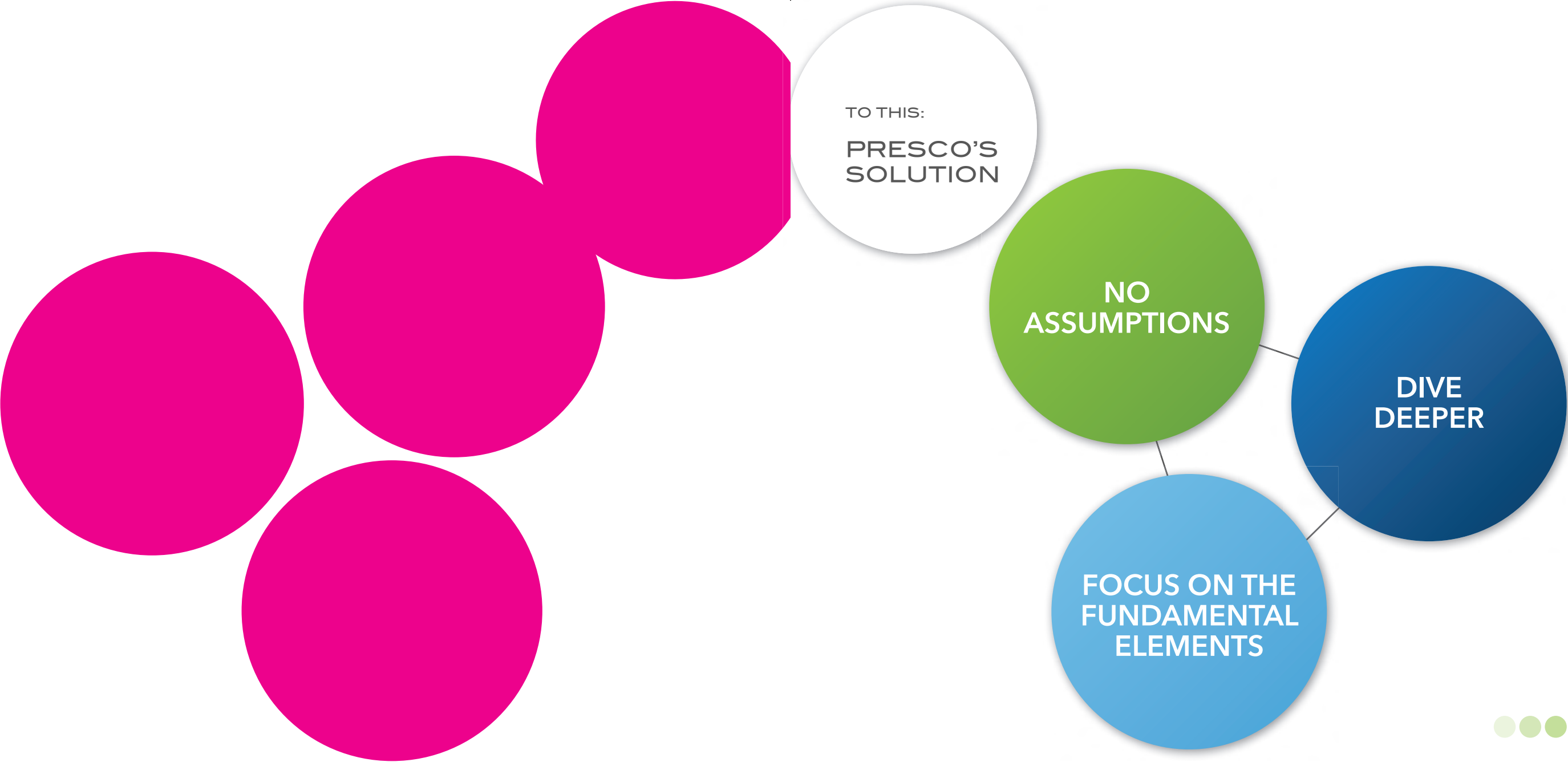
first prin-ci-ples  
plural noun

the fundamental concepts or assumptions on which a theory, system, or method is based.

The things best to know are first principles and causes, but these things are perhaps the most difficult for men to grasp, for they are farthest removed from the senses.

~Aristotle





**We are experts** at high-performance instruments for an array of applications.  
We help clients innovate and bring breakthrough products to market.

## Electronics

- Miniaturized Designs
- High-Throughput Computational Engines
- Low-Noise Circuitry
- Battery Management
- FPGA Design
- Robotics and Motion Control



## Software

- Embedded Software
- Machine Learning / AI
- Desktop and Mobile Apps
- LabVIEW Development
- Edge and Cloud Computing



## Mechanical

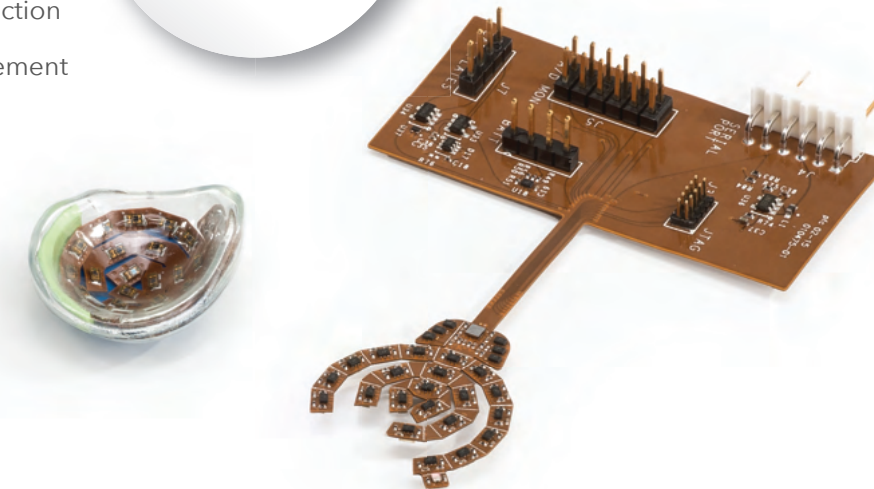
- SolidWorks and ProE 3D Design
- Chassis and Sheet Metal Design
- Thermal Analysis
- Plastics and Injection Molding
- Optics Design and Lasers

## Manufacturing

- ISO 9001:2015 Certified
- Dedicated Manufacturing Facility
- Highly-Technical Assembly Staff
- Rapid Prototyping to Volume Production
- MRP System with Inventory Management

## Medical

- FDA Documentation
- Verification and Validation
- Industrial Design
- Human Factors



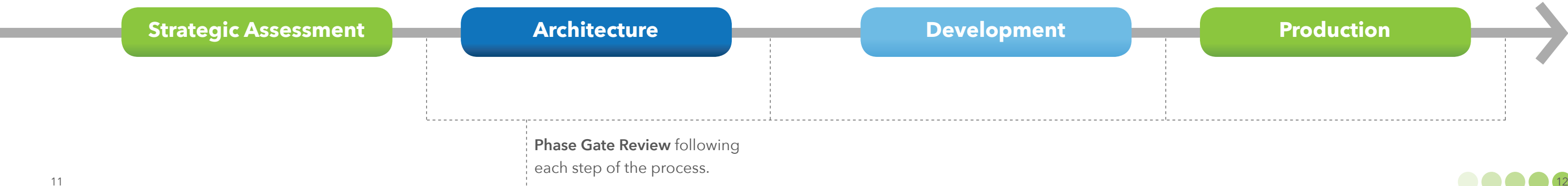


How do we do it?

# WE USE AN ESTABLISHED PROCESS

Our process is based on over 45 years of experience and client feedback, to best serve each individual project and client. It is adaptable to suit the specific needs and demands of project and client.

- Provides **predictability** of project cost and schedule
- Frequent **communication** with client through regular discussion and progress reports
- **Scalable** and **adaptable** to suit project needs and budget
- Promotes **early identification** of risks



Why work with us?

## WE ARE A PROVEN PARTNER

### Certifications and Partnerships

- ISO 9001:2015 Certified
- ISO 13485 Certified Manufacturing Partner
- ITAR (International Traffic In Arms) Regulations Compliant
- National Instruments Alliance Partner
- Analog Devices Development Partner

### Facilities

- 15,000 sq. ft.
- 5,500 sq. ft. Manufacturing Space
- Environmental Testing Lab
- Fully-Equipped Engineering Lab
- Cleantech Lab



### We are risk absorbers

#### Predictable R&D

We take the guesswork out of R&D by performing important and systematic work up front. Our process seeks to reduce the unknowns through early risk identification and design simulation.

#### Reliability

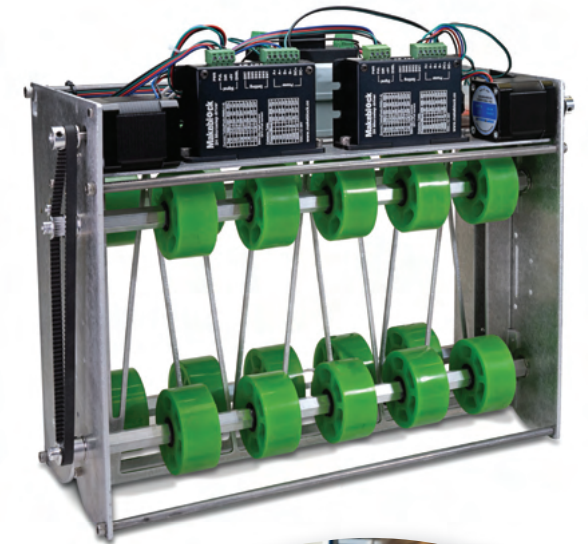
For over 45 years, we have developed reliable, dependable products for our clients. We stand behind our work, providing warranties and ongoing support throughout the life cycle of your product.

#### Transparency

Through periodic progress reports and status updates, clients receive a clear breakdown of hours and progress per task.

#### Team of Experts

Our multi-disciplinary team of electronics engineers, software developers, mechanical and industrial designers provide our clientele complete, seamless solutions to their most challenging projects.





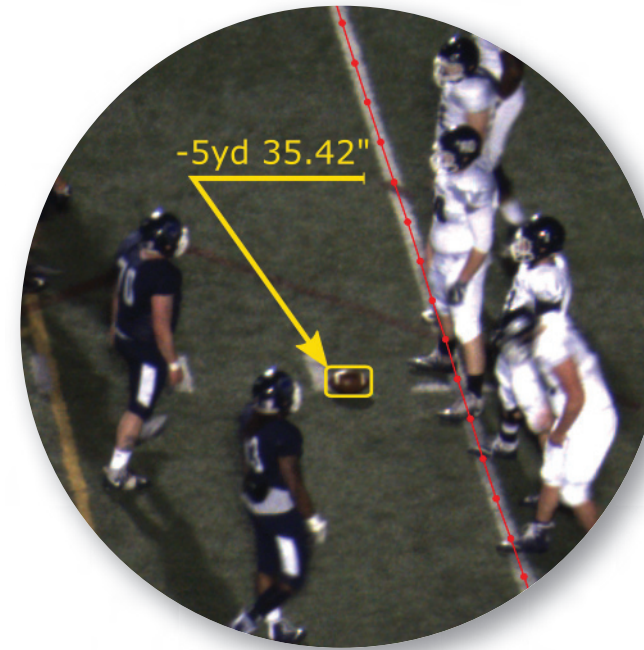
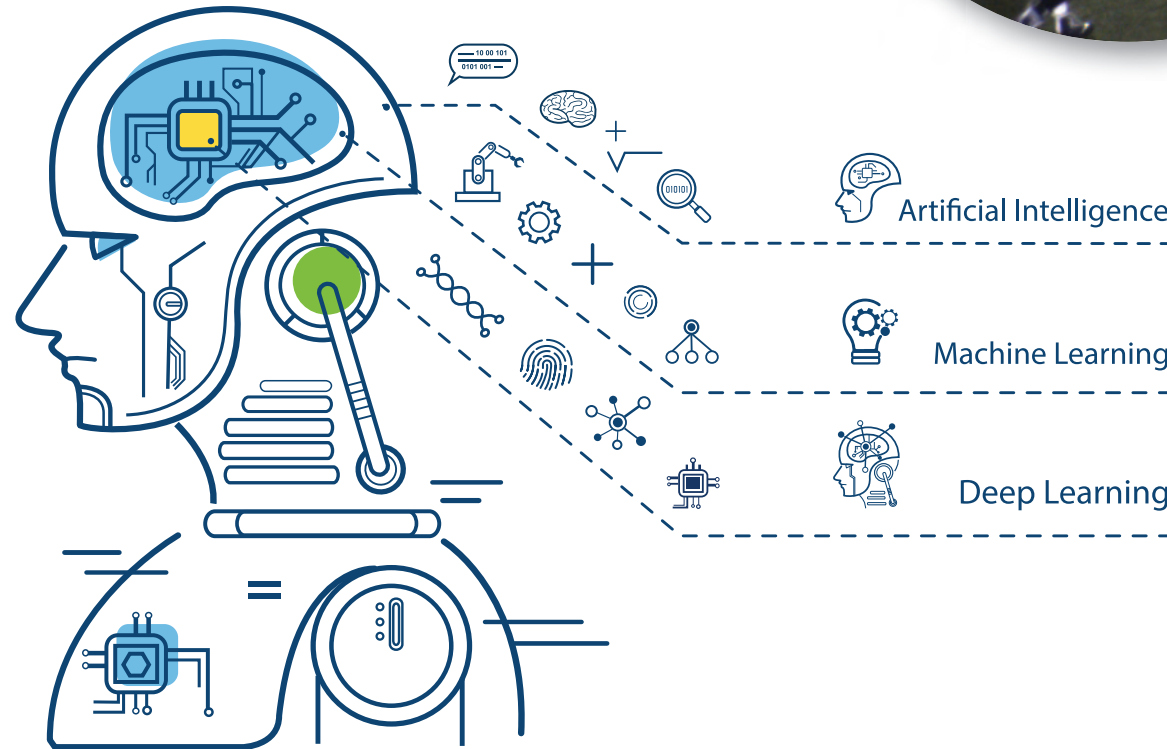
## Cutting Edge

# DATA PROCESSING & ANALYTICS

For decades, Presco Engineering has utilized advanced data processing techniques to help solve our clients' most difficult problems. Experienced with various machine learning and image processing frameworks, we are experts at designing, developing, and deploying advanced data processing solutions.

### Advanced Data Processing

- Digital Signal Processing Experts
- Advanced Algorithm Development
- Neural Networks and Deep Learning
- High-Performance Real-Time Analysis
- GPU and FPGA Acceleration



### Machine Learning / AI

- Multiple Frameworks (TensorFlow, Caffe, MxNet)
- Intelligent Dataset Annotations
- Model Optimization
- Deploy Models on Edge Devices
- Real-World Applications
  - High-Speed Optical Character Recognition (OCR)
  - Acoustic Recognition and Classification
  - Real-Time Object Detection and Segmentation

### Image & Video Analysis

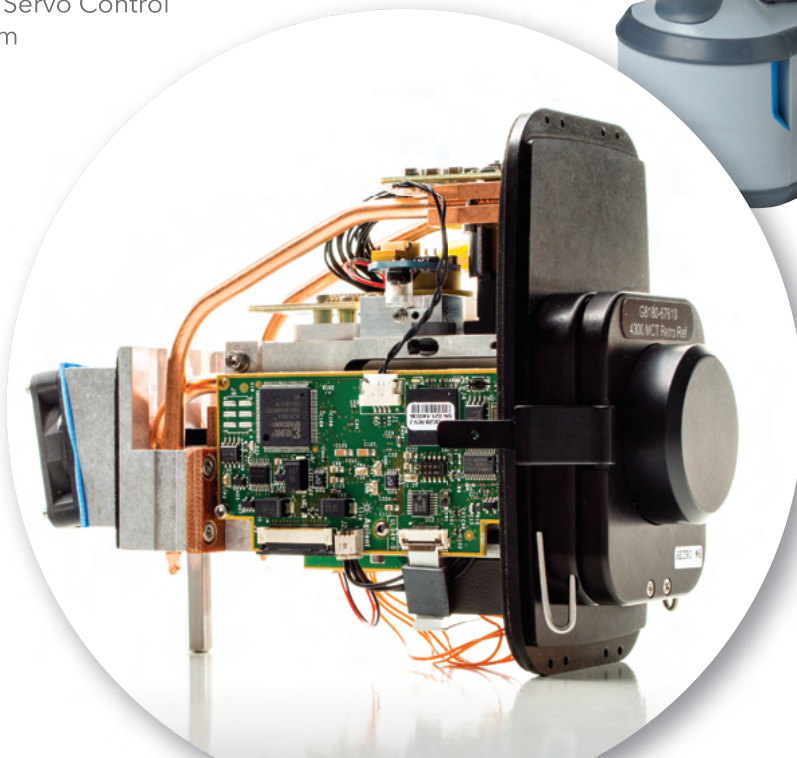
- Multiple Frameworks (OpenCV, MATLAB, AForge)
- High-Speed Data Acquisition
- Support for FPGAs and LabVIEW
- Specialized Algorithm Development
- Feature Extraction and Classification
- Object Detection and Segmentation

## Embedded System Design

# HANDHELD SPECTROMETER

A leading instrument manufacturer came to Presco to design their industry-leading handheld FTIR spectrometer. This instrument had a number of extremely challenging aspects, including:

- Michelson Interferometer Mirror Servo Control with Positional Accuracy of 0.3 nm
- Temperature Control Including TEC Control to 0.005 °C
- MCT Preamp with World-Class Noise Performance
- Battery Management
- 12-board Electronics System
- 4 Processors Employing System-Wide Synchronization



## Electro-Optical Engineering

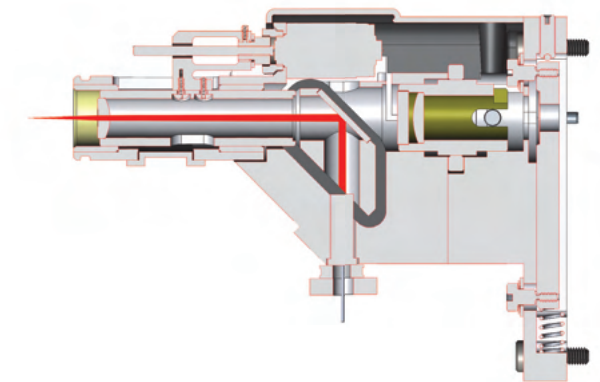
# LASERS

Presco has worked with lasers since the 1970s. We've designed laser drivers, thermal controllers, and optical systems ranging from single milliwatt up to multi-kilowatt arrays.

- Zemax® Optical Modeling and Ray Tracing
- Power Supplies for CW, Pulsed, and Quantum Cascade Lasers
- Temperature Control Using Convection, Thermoelectric, and Liquid Cooling
- Single Module with Three Different Wavelengths with Coaxial, Shaped Output Beams
- Wavelength Stabilization for Raman Spectroscopy and FTIR Metrology
- Optical Systems for On-Axis or Grazing Angle Illumination
- Fiber-Coupled and Free-Space Designs



Multi-Wavelength Laser Module



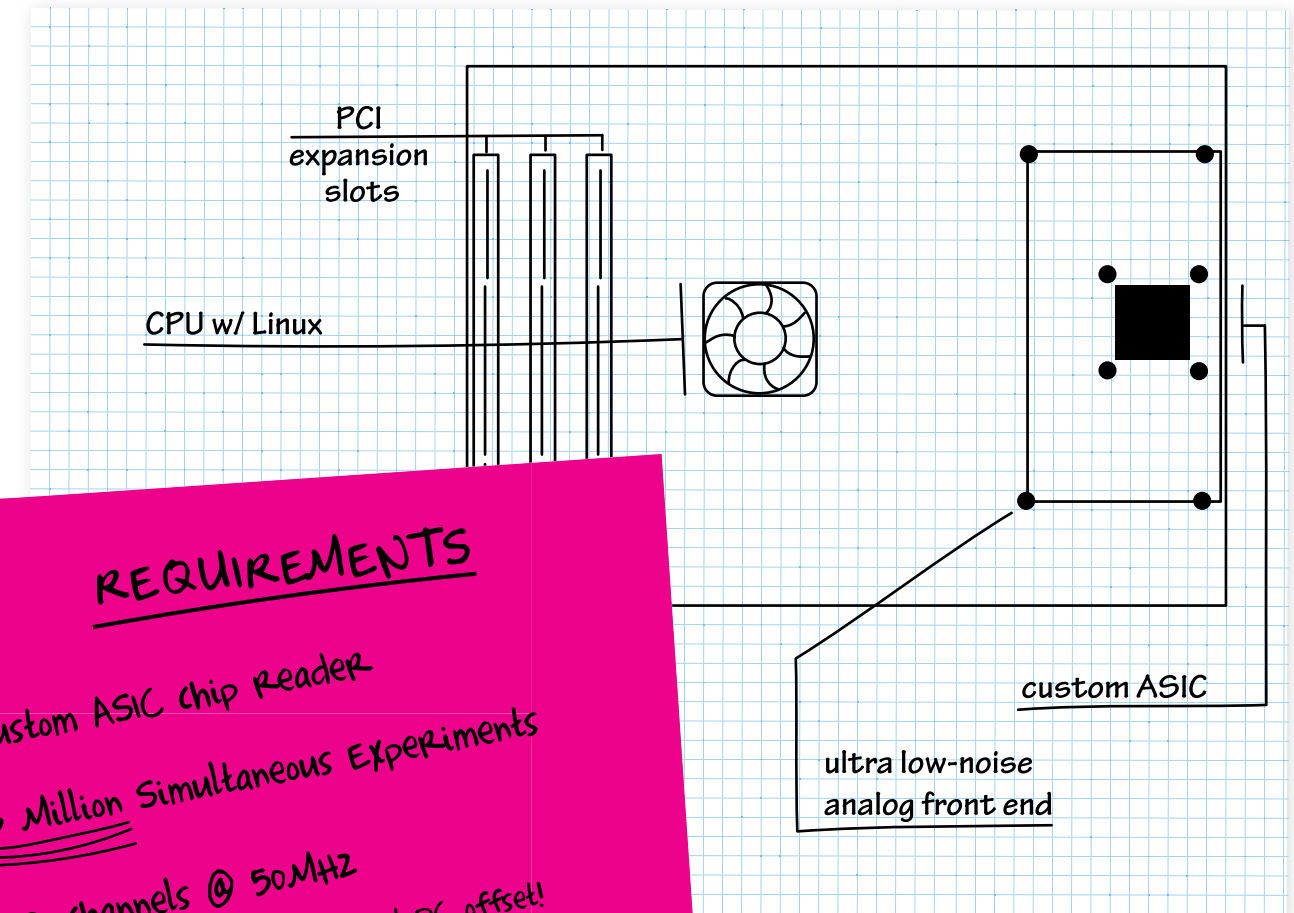
Cross Section of Raman Optical Design

## DNA Sequencer

REACHING THE  
THEORETICAL NOISE FLOOR

Presco was challenged to capture ultra-faint hydrogen ion signals generated during DNA nucleotide incorporation. The problem was high bandwidth (1 GHz x 16 bit aggregate sample rate) and a noise floor very near the theoretical limit. An unusual factor was that the long observation time of this experiment stressed 1/f noise performance in addition to the usual thermal noise limits.

Prototype circuitry was developed and tested in an astonishing four months.

REQUIREMENTS

Custom ASIC chip reader

3 Million Simultaneous Experiments

32-channels @ 50MHz

↳ WARNING : inconsistent DC offset!

Ultra-low noise floor

Fluidics control

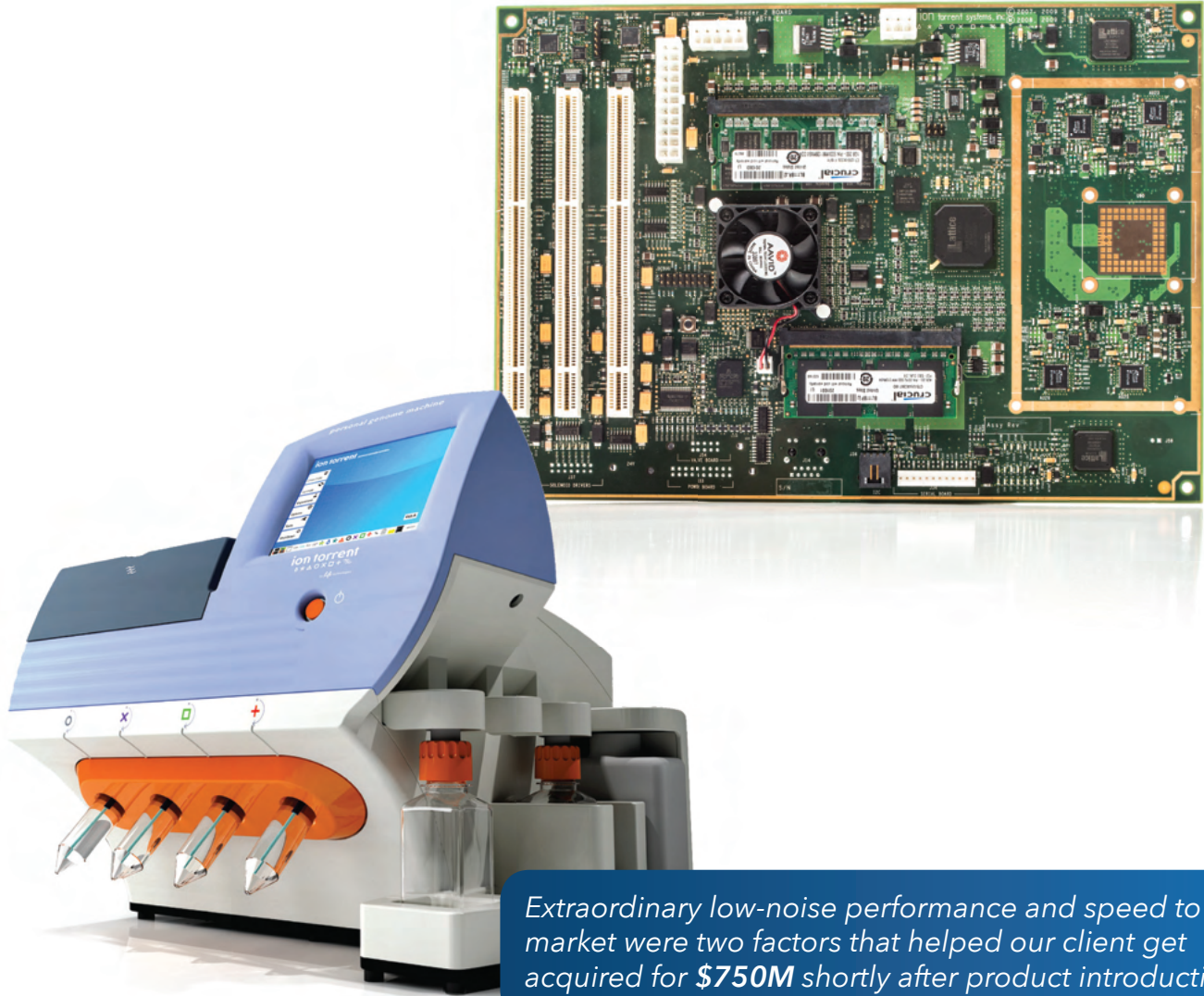
Our client approached us with a rudimentary list of design requirements and required a functional prototype **within four months**.





IMPLEMENTATION

- Electronic and Firmware Development
- 640Msps by 16-bit ADC
- 1uV Noise Floor
- FPGA-Based Lossless Data Compression
- PowerQUICC III Processor with DDR
- Linux Operating System
- Custom Device Drivers
- Gigabit Ethernet
- Touchscreen



Extraordinary low-noise performance and speed to market were two factors that helped our client get acquired for **\$750M** shortly after product introduction.

## Micro-Robotics

# OPTICAL INSPECTION DESIGN AND MANUFACTURING

Presco Engineering developed a miniature robot for an optical inspection and cleaning system. Presco's work included design, prototyping, and manufacturing of pre-production units.

- Automated Functions for:
  - Inspection
  - Cleaning of Ganged Fiber Optic Connectors
- Five Axes of Motion
- 50 Micron Positional Accuracy
- Small Size for Installation in Tight Locations

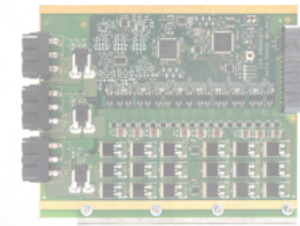


Actual Size

## Mil-Spec Power Electronics

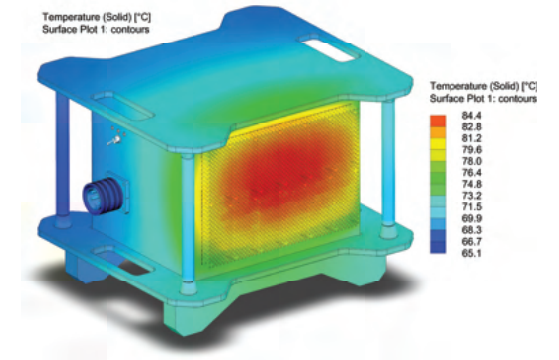
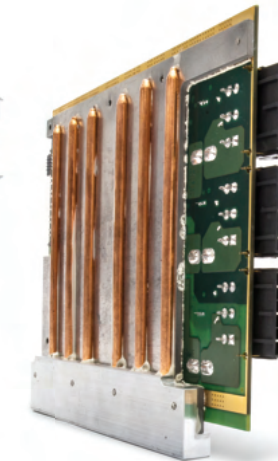
# 3-PHASE AC LOAD BALANCING SYSTEM

Designed for military use, the requirements for this system posed many challenges: seamless phase switching for all types of loads, passive thermal management, and zero single-point failures. Presco developed a complete electronics and software package, including an innovative phase switching technique, and a patent-pending thermal management solution.



## Electronic Design

- 40A 3-Phase Generator Input
- 12, 20A Single Phase User Outputs
- Innovative Zero-Switch-Time Phase Rotation



## Firmware Development

- Multiple ARM Processors with CAN Bus Communications
- Embedded Web Server for Configuration and Status
- Custom Lightweight, Thread-Safe Database

## Thermal Management Solution

- -40 to 60°C Ambient Plus Sun Loading
- Metal Backing Plates with Integrated Heat Pipes
- Patent-Pending Design



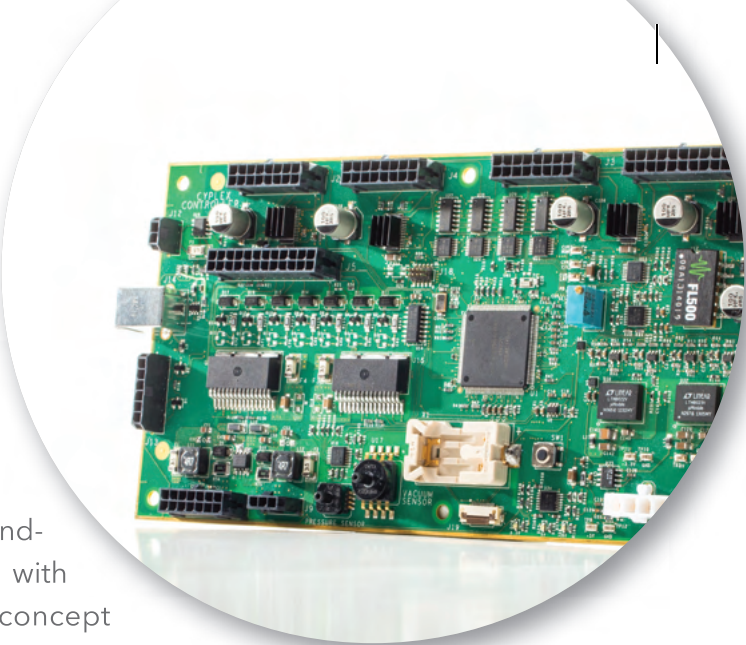
Embedded Controls

# MULTI-ANALYTE IMMUNOASSAY INSTRUMENT

CyVek Inc. selected Presco as their design partner for a ground-breaking high-speed immunoassay instrument. Starting with off-the-shelf components, CyVek developed a proof-of-concept prototype to confirm their methodology. Then they challenged Presco to design all-new electronics with a much smaller footprint and lower cost.

- Electronic and Firmware Development
- USB Communications
- Dual Temperature Control
- Hardware-Regulated Laser Power Control
- Three-Axis Motion Control
- Valve and Vacuum Control
- Precision Valve Timing Through Software Scripting

*This startup was acquired by Bio-Techne for \$60M with a potential total earn-out of \$195M.*



When do we get started?

## LET’S TALK TODAY

Have a project waiting in the wings? Need to outsource a project immediately? We’re here and ready to talk when you are!

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Come visit our renovated office if you’re in the area:

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Are you a CLEANTECH company looking for engineering support?  
Learn more about our cleantech division here!



www.partecle.com