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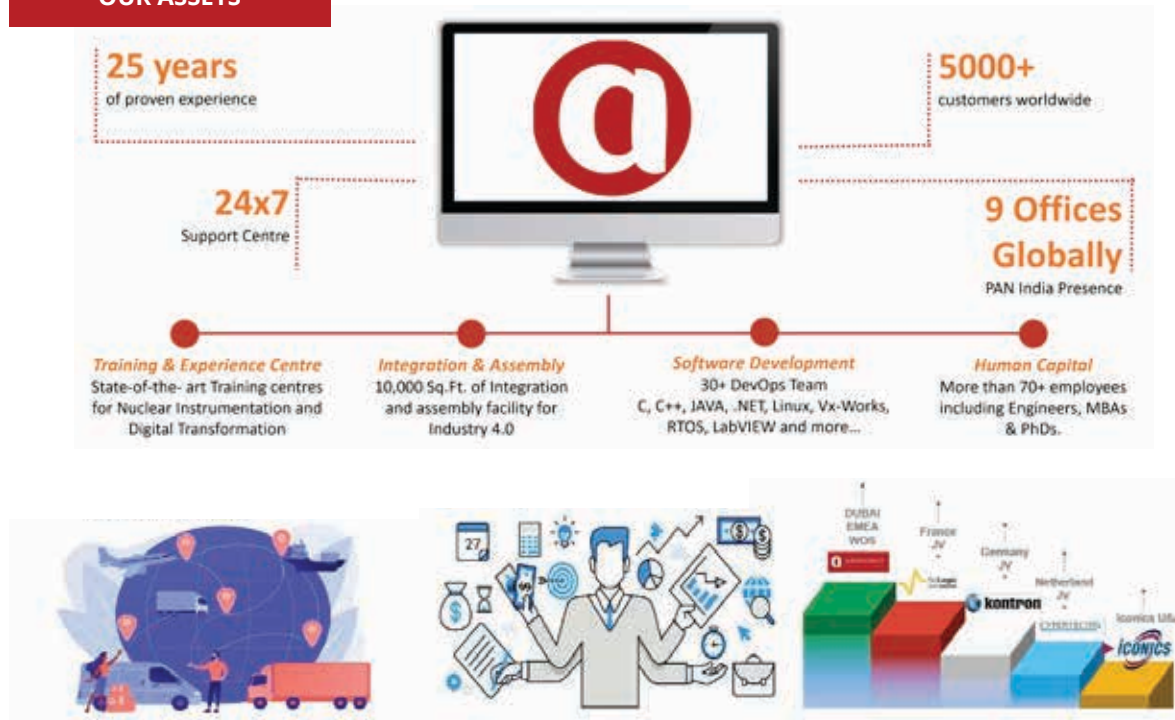
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AdvanceTech was established with aim to provide quality service, state-of-the-art products and solutions by leveraging the vast experience of the founders of the company in the field of technology. The company is a leading provider of technology products and services with 100 man-years of unmatched experience with more than 5000 satisfied customers. We are recognized as the pioneer in many technological products and have been involved in many application oriented support and solution programs. We attribute our success to our dedicated employees. They meet our esteemed customer's need to succeed in this technological race with time.

**OUR ASSETS**



**DISTRIBUTOR**

We are the authorised exclusive Distributors of World's leading Companies. We reach out all our Customers with Strong Sales & Marketing Teams.

**PROJECT MANAGEMENT**

Understanding customer System Requirements, Functional Specifications & Engineering Manufacturing specifications to provide these services within India and neighbouring countries' customers.

**JOINT VENTURES**

AdvanceTech & their founders have successfully established Joint venture companies

**VISION**

Be the world-leading provider of technologies and solutions helping our customers to succeed in their missions. Invent, Innovate and implement the technologies to help our partners and customers to be successful in achieve their goals. Provide the world with clean and green technologies to make the planet safer to live.

**MISSION**

Provide customers with the state-of-art technology, application support to help them achieve their goals provide a Health, Transparent, Enjoyable & Rewarding working environment. Enhance the value of the group and company through profitable ventures. Ensure good returns to investors.

*In line with Make in India Initiative announced by our Prime Minister, AdvanceTech has setup three Excellence centres in Bengaluru, Mumbai & Vadodara.*



## BENGALURU EXCELLENCE CENTRE



Bengaluru Excellence Centre will focus on Embedded Systems, Cloud Applications, IOT Solutions, Software Development and Support Services for our Indian customers and foreign collaborators. The centre has teams of software developers with diverse skill sets including .NET, Java, Python, c++ in embedded systems. Front end developers with experience in CSS, HTML, Bootstrap, Java Script and Angular JS. The skills in Cloud include AWS, Azure & Google. The Enterprise Solutions skills set include SAP, Oracle, SCADA, MES, MySQL. Expertise in IIOT Databases like MySQL Oracle, PostgreSQL, SQL, Mango Db , SQL etc.

The facility is equipped with State-of-the-art clean room with SMD workstations for prototyping, repairs, testing and calibration. The facility will also provide training and product demos to our customers in the Experience Centre.

Mixed Signal Design	Digital Designs	PCB Layout and Analysis	DFM/DFT	Development
<p>Precision analog and digital design with right isolation</p> <ul style="list-style-type: none"> <li>High precision serial ADCs upto 24 bits accuracy</li> <li>High speed ADXs parallel [40Mbps] serial (LVDS upto 3Gbps)</li> <li>FPGA/SoC based data acquisition and streaming</li> </ul>	<p>High speed digital designs</p> <ul style="list-style-type: none"> <li>DDR@, LPDDR2, DDR3 upto 1066Mbps</li> <li>PCIe upto 5Gbps/ lane, GigE – 1Gbps</li> <li>USB 3.0, SPI, SDIO, 12S etc</li> </ul>	<p>HDI multi layer PCBs Layouts with blind &amp; buried via</p> <ul style="list-style-type: none"> <li>Pre-Post SI simulation</li> <li>PI and Thermal simulation</li> <li>High Density Interconnect (HDI)</li> <li>Flex and Rigid Flex</li> </ul>	<p>Optimized designs that are manufacturable</p> <ul style="list-style-type: none"> <li>PCB Yield improvements</li> <li>Support for automated/ semi automated testability</li> <li>Test coverage improvement</li> <li>Cost Reduction</li> </ul>	<p>Circuit Boards</p> <p>VPX,VME,CPCI,XMC, PMC PowerPC/Incel/ SBC,FPGA, High Speed ADC/DAC Modules, GbE, 1553,Arinc429,AFDX Backplane, Power Supply</p> <p>Mil-Garde Displays, Ethernet Switches</p> <p>Mechanical</p> <p>Heat Exchangers</p> <p>ATR Chassis</p> <p>Compact Heat Exchangers</p> <p>Cold Plates</p> <p>Cooling Systems</p> <p>Heat Sinks</p> <p>Rugged AIR Chassis</p> <p>Mechanical Build to Print</p> <p>Services Control Automation</p> <p>Panels P&amp;I, SWAS,IIOT</p>



## VADODARA EXCELLENCE CENTRE

Vadodara Excellence Centre will focus on Smart Industrial Solutions involving SCADA, MIS, HMI etc ... This centre has expertise in Project Management, Design Engineering and Consultancy. A State-of-the-Art Training and Calibration facility has been established at this centre to support our customers. The centre will develop turnkey solutions for industries like Factory Automation, Automotive, Food & Beverage, Oil & Gas, Energy and Power Utilities, Wind and Solar, Building Automation.



## CONSULTANCY & TRAINING



Our Training center facility is well organized to conduct training for more than 20 engineers at same time.

Every successful implementation require "optimised engineering". Our experts provide training to partners and customers to enhance their skills. The training session covers Hardware interface protocol, Graphic experience, Analytics, Dashboards and Database management based on requirements.

Online - Web sessions customized on request OR Standard sessions

Effective SCADA planning requires Experience, Strategic Direction, Domain Expertise and Technology Correlation. We provide our expertise

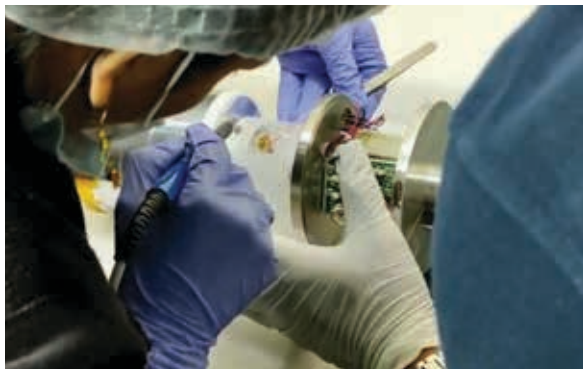
- Smart City
- Smart Factory
- Digital transformation
- Energy and Carbon Foot print
- Compliances in Pharma , 21 CFR
- Water and Wastewater management

## MUMBAI EXCELLENCE CENTRE

Mumbai Excellence Centre has a State of the Art, Repair, calibration and training facility for Nuclear instrumentation. The facility is equipped with turbomolecular, vacuum pump, MCA, NIM Modules. Factory trained engineers have years of experience for the necessary repairs of HPGe detectors. The training facility will enable Nuclear Power Plant engineers to have hands on experience to operate complex detection and monitoring systems.



### Equipped with world class HPGe repairs facility



# ADVANCETECH CONTROLS PVT. LTD.

## Industries we serve

Education & Research

Nuclear Power

Military & Aerospace

Industrial Automation

Banking & Public Safety

Software Development

Digital Transformation



**EDUCATION and  
RADIATION DETECTION  
& MEASUREMENT**



## RADIOLOGICAL COUNTING LABS

### GROSS ALPHA/BETA COUNTING

#### Automatic Gas Flow Counting Systems



##### Series 6LB™ Automatic Low Background Alpha/Beta Counting System

- New and innovative 50 or 100 sample automatic changer system
- High performance 5.7 cm (2.25 in.) gas flow detector
- Integrated 7 in. touch screen display for information and control
- Automatic gas monitoring and conservation system
- Integrated self-diagnostics and environmental monitoring for temperature, humidity and barometric pressure
- USB Communication protocol to Apex-Alpha/Beta computer



##### Series 5 LB5500™ Large Area Automatic Low Background Alpha/Beta Counting System

- Ultra-low background counting system (Alpha  $\leq 0.3$  cpm, Beta  $\leq 3.5$  cpm)
- High performance 12.7 cm gas flow detector with ultrathin window 80  $\mu\text{g}/\text{cm}^2$
- Fifty planchet sample changer
- Gas Stat digital gas conservation and monitoring system
- Coded positive sample carrier identification
- Optional external bar code reader



#### Manual Gas Flow Counting Systems

##### LB4200™ Multi-Detector Low Background Alpha/Beta Counting System

- Manual drawer-based system for counting up to 16 samples at the same time
- Designed for counting multiple samples with long count times that are not practical for single detector counters
- Gas Conservation and Monitoring System for maximum gas cylinder life
- Full front detector access without lifting lead shielding



#### Gaseless Counting Systems

##### iSeries™ Gasless Alpha/Beta Counting Systems

- Includes PIPS® silicon gasless detector
- Automatically identifies and compensates for radon, thoron and progeny interference in air filters
- Can be used for other types of samples without radon/ thoron compensation
- NiMH battery power for 6+ hours of continuous operation
- No computer required for operation – simple front panel controls
- Compatible with iLink™ iSeries Communications Software

## GAMMA SPECTROSCOPY

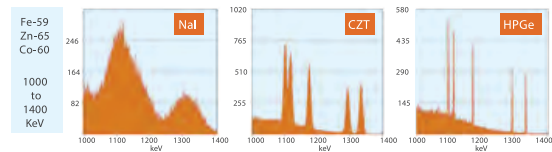
### High Purity Germanium (HPGe) Detector Overview

Wide variety of HPGe detector types and efficiencies are available:

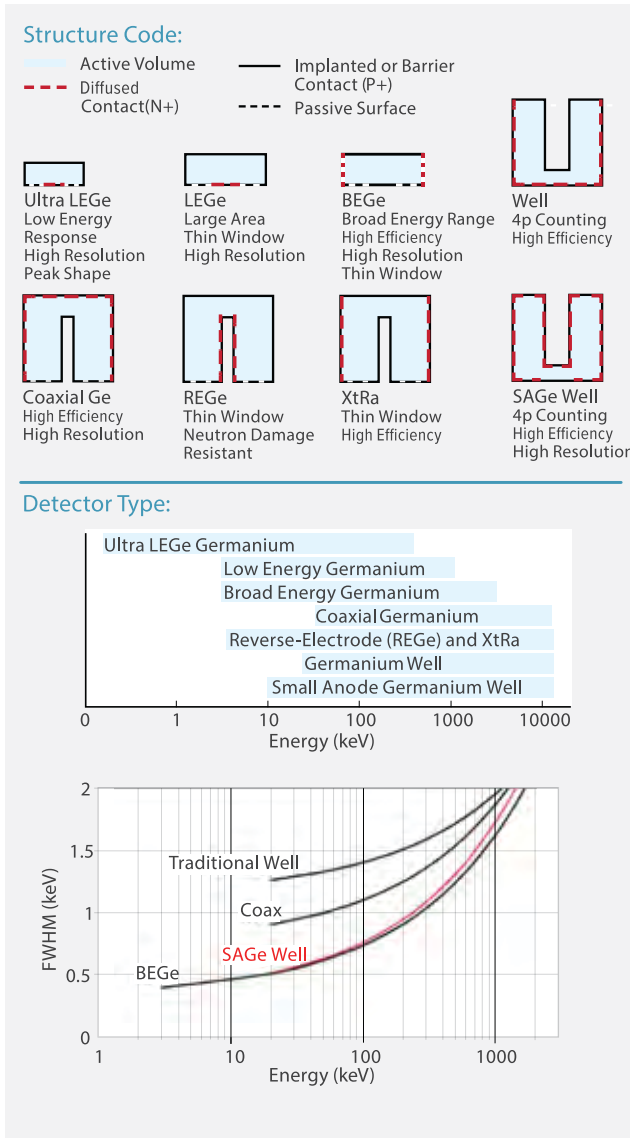
- SEGe™ Standard Electrode Coaxial – P-type
- REGe™ Reverse Electrode Coaxial – N-type
- XtRa™ Extended Range Coaxial
- BEGe™ Broad Energy
- LEGe™ Low Energy
- U-LEGe™ Ultra-Low Energy
- SAGe™ Well Small Anode Well
- Germanium (Well)

HPGe is the best available detector technology for analysis of complex gamma spectra

- Below are spectra from three common types of gamma detectors: NaI(Tl), Cadmium zinc telluride (CZT) and HPGe
- HPGe offers superior peak resolution performance compared to all other detector technologies
- Broader peaks are harder to segregate from each other



- Conventional liquid nitrogen (LN2) cryostats are available for all applications
  - **Laboratory** – Vertical or Horizontal with 30-liter or smaller Dewars
  - **Portable** – All-attitude MAC and Big MAC Cryostats
  - **Electrically - cooled** or hybrid electric/ LN2 cooled cryostats also available
- Ultra Low Background (ULB) for HPGe detectors is possible with special cryostat materials and a Remote Detector Chamber (RDC) to separate the preamplifier from detector crystal
  - Vertical configuration (shown)
  - U-Style configuration (see 737 Shield)

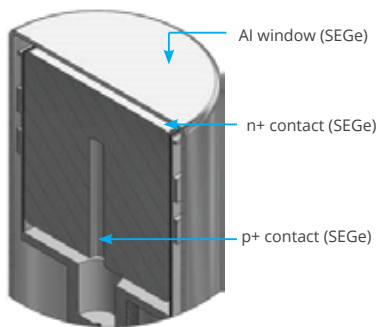


iPA for Slimline Cryostats

iPA for Flanged Cryostats

### The iPA™ Intelligent Preamplifier

Since April 2017, all HPGe detectors with RC-feedback have been shipping with the iPA Intelligent Preamplifier, making key detector parameter data available 24/7 through the built-in USB port.

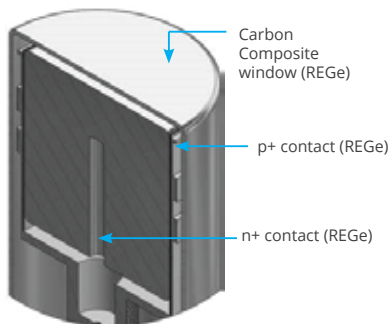


Coaxial Ge Detector Configuration



### Coaxial Germanium Detector (GC)

This detector uses a very pure germanium crystal as a detector in the form of a cylinder, and the best energy resolution can be obtained with a gamma-ray spectrometer. It is indispensable for qualitative quantitative analysis in environmental pollution, nuclear physics research, radio-pharmaceutical purity test, etc.



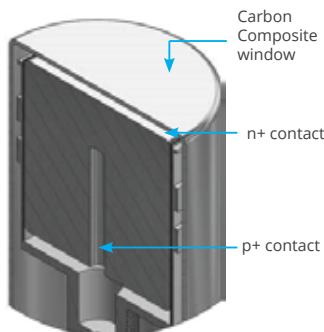
REGe Detector Configuration



### Wide Energy Band Germanium Detector - N type (GR)

The reverse electrode detector uses N-type germanium crystals manufactured under strict quality control by Mirion. This detector has the electrode arrangement reversed to that of a normal germanium detector, P + electrode.

(Boron) is arranged on the incident surface, and N + electrode (Li) is arranged on the back surface. As a result, the response at low energy is improved and the resistance to radiation damage caused by neutrons and charged particle beams is increasing.



Coaxial Ge Detector Configuration



### Wide Energy Band Germanium Detector - P type (GX)

The XtRa Ge detector has a very thin contact with a specially processed incident surface of a coaxial P-type Ge crystal. This thin contact provides a wide detection range with a detection range of about 3 keV to about 10 MeV.

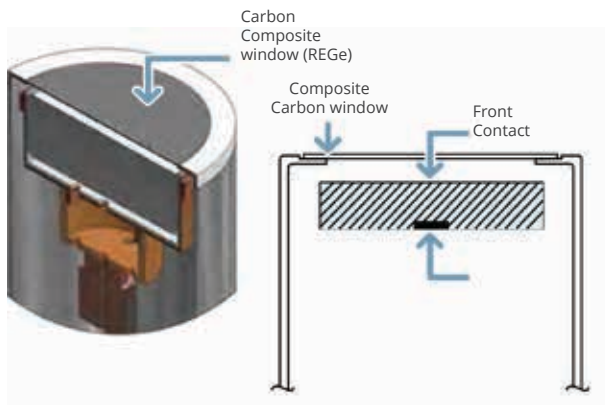


### Broad Energy Germanium Detector (BE)

BEGe Broad Energy Germanium detectors range from about 3 keV and can measure energy up to 3 MeV. The low-energy resolution realizes the same high resolution as the LEGe detector, and the high-energy resolution realizes the high resolution of the coaxial detector.

The BEGe detector is characterized by high efficiency for actual sample measurements in the energy range below about 1 MeV, which is most important for gamma ray analysis. Traditionally, the relative efficiency of coaxial Ge detectors has been measured and defined with a <sup>60</sup>Co point





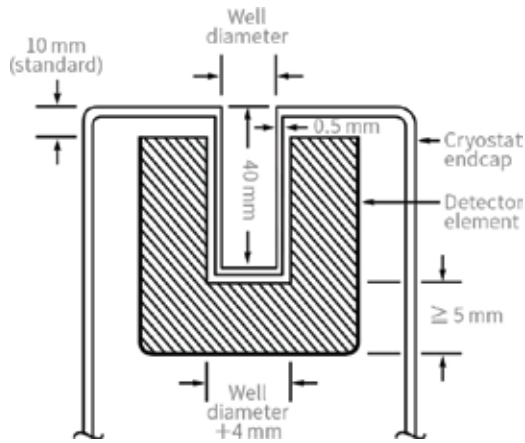
source. However, much of the efficiency in actual measurements is different from this definition of relative efficiency. The graph on the right is a comparison of a coaxial detector and a BEGe detector with the same relative efficiency of 60% or more. BEGe detectors are highly efficient in the critical energy range of actual measurements.

The BEGe detector also has high energy cosmic rays and since 40K, 208Tl of natural radiation is transmitted, a low background is achieved compared to a coaxial Ge detector.

### Well Type Germanium Detector (GCW)

Well Ge detectors can perform energy analysis with maximum efficiency on small samples. The detection part of the well-type Ge detector is formed in a well type (well/blind hole). The sample installed inside is counted in almost all directions ( $4\pi$ ), and extremely high counting efficiency is achieved. The Al thickness that protects the detector (well) is 0.5 mm, and the ion-implanted contact or surface barrier contact that forms the outside of the element (crystal) is negligibly thin compared to 0.5 mm Al, so well-type Ge detection has a good low energy response.

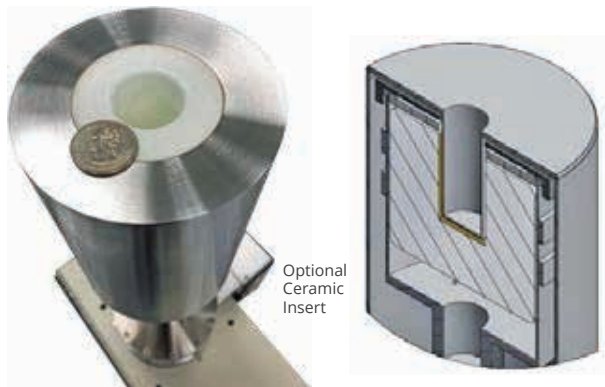
Standard well size is diameter: 10/16 mm, depth: 40 mm, but we can supply special Ge-type well detectors.



### Small Anode Well-Type Germanium Detector Plus (SAGe Well+)

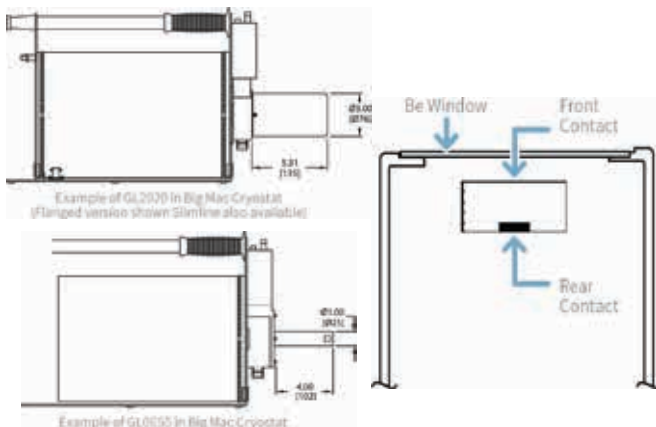
The SAGe Well Detector<sup>1</sup> combines excellent energy resolution at low and high energies with maximum efficiency for small samples. Like Traditional Well Detectors, the SAGe Well is fabricated with a blind hole, leaving at least 20 mm of active detector thickness at the bottom of the well. The counting geometry therefore approaches  $4\pi$ .

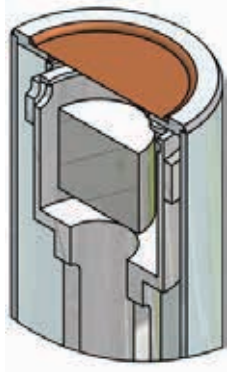
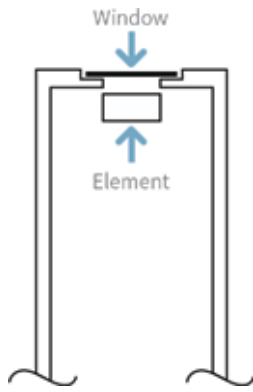
The low detector capacitance associated with the small anode technology (similar to what is used on the Mirion BEGe detectors) gives the SAGe Well superior low and medium-energy resolution performance compared to Traditional Well or Coaxial Detectors, as well as excellent resolution for higher energy gamma rays.



### Low Energy Germanium Detector (GL)

The LEGe type detector satisfies the highest energy resolution and detection efficiency in the middle range of the detection range of the Ultra LEGe type detector and the coaxial type detector. The detection area can be selected from the range of  $0.5 \text{ cm}^2$  to  $20 \text{ cm}^2$  and the detection thickness from 5 to 20 mm. The incident surface is a P (+) contact with a boron implant and has good low energy response, and Be is used for the incident window.





### Germanium Detector (Gul) For Ultra-Low Energy

The GUL series ultra-low energy germanium detectors have expanded the detection range to a low energy of about 300 eV while achieving the resolution and peak-to-background ratio that were considered impossible to achieve with semiconductor detectors. In addition, the high energy efficiency of the high atomic number germanium detector is maintained. Therefore, a polymer window is available to fully exploit the performance of a wider energy range than the single photon detectors on the market. The polymer window allows higher efficiency in the extremely low energy range.

### Lead Shield



**747 Top Opening Lead Shield**



**767 Top and Front Opening Lead Shield**

## MULTI CHANNEL ANALYZER

### DSA-LX® Digital Signal Analyzer

The DSA-LX analyzer is a full featured 16K channel integrated Multichannel Analyzer based on advanced digital signal processing techniques (DSP). When paired with a computer running Genie 2000 software the DSA-LX unit becomes a complete spectroscopy workstation, capable of the highest quality acquisition and analysis. The instrument interfaces to existing detector technologies such as HPGe, NaI, Si(Li), CdTe or Cd(Zn)Te.



Rear View

### Lynx® Advanced Digital Signal Analyzer

The Lynx DSA is the most advanced, full-featured Multichannel Analyzer ever offered. It is a 32k channel integrated signal analyzer based on advanced digital signal processing (DSP) techniques. When paired with the computer of choice, the Lynx unit becomes a complete spectroscopy workstation capable of the highest quality acquisition and analysis. The instrument supports a wide range of spectroscopy detector technologies such as HPGe, Si(Li), PIPS®, XPIPS™, CdTe, Cd(Zn)Te and virtually all scintillation detectors used for gamma spectroscopy. It also supports the unique energy ranges of all these detectors from 1 keV on up.



### Osprey® Digital MCA Tube Base for Scintillation Spectrometry

Features are

- All-in-one HVPS, preamplifier, and digital MCA
- Compatible with all standard 14-pin scintillation detectors, including NaI(Tl), CeBr<sub>3</sub> and LaBr<sub>3</sub>(Ce)
- Optional temperature stabilized\* detectors
- USB 2.0 connection and Ethernet 10/100T (PoE) connection
- Three programmable general purpose I/O connectors
- PHA, MCS, SCA, MSS, List, and Time-stamped List modes
- Supported by Genie 2000 software and a software development kit (SDK) with examples
- Diagnostic web GUI
- Compatible with Model 727, 7F7 and TRACS™ shields

\* US Patents 7,005,646 B1 and 7,049,508 B1



Osprey MCA with a LaBr<sub>3</sub> (Ce) Detector



Osprey MCA with a Stabilized NaI (Tl) Detector



Osprey MCA and NaI (Tl) Detector in a 727 Shield

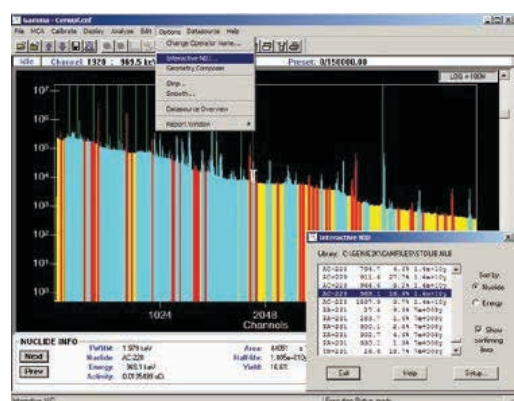
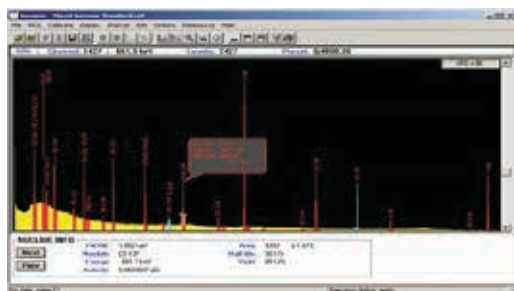
## Osprey-Compatible Scintillation Detectors

Including

- **802 Detector Family:** NaI(Tl) Scintillation Detectors
- **NAIS-2x2 Detector:** NaI(Tl) LED Temperature-Stabilized Scintillation Detector
- **NAIS-3x3 Detector:** NaI(Tl) LED Temperature-Stabilized Scintillation Detector
- **NAIS-3x5x16 Detector:** NaI(Tl) LED Temperature-Stabilized Scintillation Detector
- **LABR-1.5x1.5 Detector:** LaBr<sub>3</sub>(Ce) Scintillation Detector
- **CEBRS-1.5x1.5 Detector:** CeBr<sub>3</sub> LED Temperature-Stabilized Scintillation Detector
- **CEBRS-2x2 Detector:** CeBr<sub>3</sub> LED Temperature-Stabilized Scintillation Detector



LED-stabilized NAIS-3x3 Detector



### S502C Genie 2000 Software

- Single-input spectroscopy software
- Low-priced software dedicated to single input

### S500C Genie 2000 Software

- Multi-input spectroscopy software
- Measurement software that supports multiple inputs
- Multiple on the network
- Operator control of the MCA

## SOFTWARE

### S50XC Genie™ 2000 Spectroscopy Software Family

Genie 2000 software can easily build a network system at a low price with a personal computer and Ethernet. Genie 2000 software is fully multitasking. It is possible to count data from several detectors independently and simultaneously. The operation is completely independent. By using a network system, it is possible to manage several detectors away from the MCA main unit. Genie 2000 basic software includes single-user single-input software and multi-user multi-input software. Select MCA from the "MCA Lineup" table on the right.

### Genie 2000 Analysis Software Option

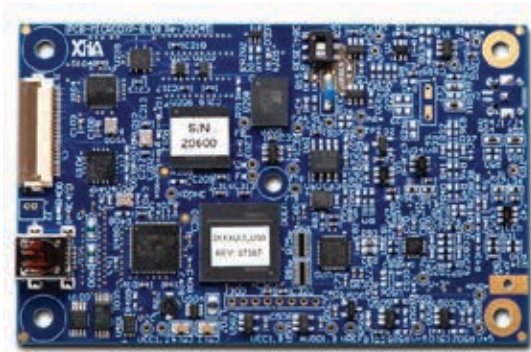
- S501C Genie 2000 Gamma Ray Analysis Software
- S503C Genie 2000 Pro Count Software
- S505C Genie 2000 Quality Control (QA) Software
- S506C Genie 2000 Interactive Peak Fit Software
- S507C Genie 2000 MGA-U Software
- S508C Genie 2000 MGA software
- S509C Genie 2000 Alpha Analysis Software
- S560C Genie 2000 C Programming Library
- S561C Genie 2000 Batch Programming Support
- $\gamma$  Explorer Environmental Radioactivity Analysis Program (Ministry of Education, Culture, Sports, Science and Technology 1992 version manual compliant)

## DIGITIZER

### Compact Digital Signal Processor for Gamma-ray Spectroscopy

#### micro D G F

The microDGF is a complete, low power digital pulse processor the size of a credit card. This variant of the microDXP is specifically designed for use with high resolution gamma-ray detectors, such as HPGe. It replaces both the spectroscopy amplifier and MCA functions, and as intended for both portable and embedded applications.



### Four channel 16-bit 250 MHz PXI Digital Processor

#### Pixie Hybrid

Designed for fast high-precision coincidence gamma-rayspectroscopy using HPGe detectors, scintillators, and silicon detectors, the Pixie Hybrid offers both high speed waveform acquisition, pulse height measurements and time stamping for event reconstruction. The digital stream is used for triggering, pileup inspection and filtering in real time. Pulse height reconstruction, accumulation of a 32K MCA spectrum for each channel, and optional pulse shape analysis is performed on an event-by-event basis.



### 4 channel 250 MHz Desktop Digital Spectrometer

#### Pixie-Net

The Pixie-Net is a multi-channel digital spectrometer for radiation detectors in desktop format with integrated networking and USB resources. Designed for high-precision coincidence gamma-ray spectroscopy using HPGe detectors, scintillators, or silicon detectors.



### 16-Channel 100/250/500 MHz PXI Digital Processor

#### Pixie-16

The Pixie-16 is a 16-channel all digital signal processor on a single 6U CompactPCI/PXI card. Designed for fast coincidence gamma-ray spectroscopy with segmented detectors or detector arrays, it offers both high speed waveform acquisition and MCA analysis at a low per-channel cost. Each channel of the Pixie-16 accepts signals from virtually any radiation detector that has an exponential decay output.



## THE NEW GENERATION SCINTILLATOR / SIPM DETECTORS

- Compact
- Low power (5 V , 5 mA)
- Built-in temperature compensated bias generator / preamplifier
- PMT readout comparable energy resolution
- Wide choice of scintillator



### Pen-Type Scintillation Detector

- Built-in spectroscopy amplifier
- Built-in single channel analyzer
- Built-in high voltage generator
- Small in size



### Fiddler Probes

NaI(Tl) crystal coupled via a quartz light guide to a low background photomultiplier tube in aluminum housing. The assembly is equipped with a solid  $\mu$ -metal shield around the PMT and end in a 14 pins connector. The assembly is designed for detection of low energy X-rays or gamma rays in small quantities.



### Miniature Photodiode Detectors For Medical Applications

Miniature photodiode detectors are ideal tools to monitor the local radioactivity in, for example, blood flow measurements. Nuclides like I-131 and Tc-99 emit 354 and 140 keV X-rays which are detected by a small CsI(Tl) scintillation crystal, read out with a PIN photodiode / preamplifier combination.

These devices are operated with a DC voltage of +6 and +35 Volts (120 mW) and are a few cm in diameter and height. Optionally, collimators can be mounted.

## RADON/THORON MONITOR

### Electronic Radon/Thoron Detector With Real-Time Monitoring And Spectral Analysis



RAD7 is a proven state-of-the-art continuous radon monitoring instrument with accessories for detection in water, soil gas, and air. Made in the USA and used worldwide by university, government and national laboratory scientists at the leading edge of research in oceanography, geology, radiochemistry, and dark matter, the RAD7 has established itself as the highest quality standard for radon measurement on the market. Professional radon testers in government, industry, and consulting companies in industrial/occupational hygiene and health physics, also choose the RAD7 to test radon and thoron concentrations in the environment (groundwater, indoor air, building materials, schools and professional buildings, and mines).

RAD7 matches, and often exceeds, the specifications of other real-time continuous radon monitors at a fraction of their price. RAD7 incorporates a number of exclusive features that are found in no other radon detector, regardless of price, such as immunity to  $^{210}\text{Pb}$  background build-up over the life of the device.

#### The RAD AQUA - Water at the Source



The RAD AQUA is a RAD7 accessory used for monitoring radon and thoron in a continuous water supply, such as running tap water, a flowing stream, or even sea water. The RAD AQUA contains a spray chamber which aerates the incoming water, bringing the radon concentration in the air into equilibrium with that of the water flowing through the instrument. DURRIDGE's CAPTURE software processes the RAD7 data, along with temperature data, to calculate the concentration of radon in the water.

#### The RAD H<sub>2</sub>O - Small Water Samples



The RAD H<sub>2</sub>O accessory is used to measure radon in small samples of ground water or tap water. The RAD H<sub>2</sub>O kit comes with a collection of 40ml and 250ml vials for collecting samples, which can be conveniently analyzed on site or later in the lab. When a sampling vial is connected to the system, the RAD7's internal pump moves air through the water sample, aerating it to bring the radon in the air loop and water sample into equilibrium. The RAD7 then analyzes the radon, automatically calculating the radon-in-water concentration based on the known ratio of air-to-water and well-understood air-water partition coefficient. This analysis takes approximately 30 minutes.

#### The Big Bottle System - Large Water Samples



This accessory enables users to accurately measure radon in large water samples of up to 2.5L in volume, collected in standard soda bottles or glass jugs. Large samples allow for greater precision and lower limits of detection. Radon concentrations of as low as 1 pCi/L (37 Bq/m<sub>3</sub>) can be detected with a sufficiently large sampling bottle. The upper operating limit of the Big Bottle System is 10,000 pCi/L (370,000 Bq/m<sub>3</sub>). Ranges higher than that are detectable with the RAD H<sub>2</sub>O accessory.

## ALPHA SPECTROSCOPY

### Alpha Analyst™ Integrated Alpha Spectrometer

Features are:

- Completely integrated alpha spectroscopy instrument
- 100% computer controlled electronics and vacuum
- Automatic recoil suppression control
- Clean vent port to reduce moisture and contamination buildup in chambers
- Modular for ease of expansion in floor or bench top cabinets
- Connects directly to Ethernet network

### Apex-Alpha™ Alpha Spectroscopy Software Suite

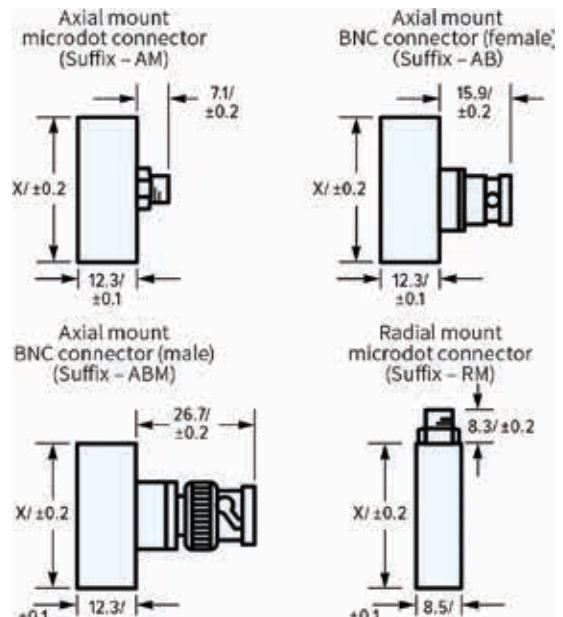
Features are:

- Comprehensive operation and management software for the production-oriented alpha spectroscopy lab
- Supports manual alpha spectrometers and provides complete computer control of Alpha Analyst Spectrometer
- Distributed multi-user functionality for access to system resources from any client workstation
- Includes sample database that tracks batches of samples through log-in, counting and final data review/approval processes
- Intuitive tools for easy creation of sample batches with associated counting and analysis



### PIPS® Passivated Implanted Planar Silicon Detectors

Planar Silicon Detector (PIPS-Passivated Implanted Planar Silicon Detector) is an innovative charged particle born from the latest semiconductor manufacturing technology.



### Outline of PIPS charged particle detector

Mount and dimensions:

- The detection surface is located 1.0 mm behind each mount.



## HPGe DETECTOR CONFIGURATIONS FOR NUCLEAR PHYSICS RESEARCH



Euroball Clover Detector 4x50x70 a great detector success designed by Mirion in early 90s with more than 130 identical detectors delivered worldwide.



New COMPLEX clover: the first electrical cooled Clover ever done with a special RDC cryostat designed for windowless operation. Four of these Clovers are currently in use at GSI in Germany as a decay box to study new exotic nuclides.

The GRETA detector consisting of 4 encapsulated HPGe crystals each segmented in 36.

Total number of channels per detector: 148

- 144 position  
- 4 full volume channels



The Euroball Cluster detector is consisting of 7 encapsulated HPGe crystals. Mirion delivered 180+ individual capsules for Euroball Cluster detectors and Miniball at CERN.

The photo shows a design for JAEA: only the center crystal is segmented in six the surrounding capsule are not segmented.

### Clover Detectors Array of Four HPGe Detectors

Features are:

- Clover Array-Detector design is consisting of four special shaped Ge crystals for a close array – with or without segmentation of the individual crystals
- Excellent energy and timing resolution due to dedicated crystal quality and low electrical noise electronics
- 130% relative efficiency in addback mode with a Clover 4x50x70. More is achievable with bigger crystals.
- Can address applications where highest efficiency or MDAs are required
- Low background configurations available with specifically selected materials for their radio-purity
- Thin entrance window for extended energy range to low energy photons available on request.
- Optional electrical cryocooling for LN<sub>2</sub>-free operation

### High efficiency HPGe Array Solutions

Features are:

- Up to seven HPGe crystals in one cryostat
- Encapsulation techniques for a modular design easy to handle in case of maintenance.
- At request segmentation of the outer contact of the individual crystals
- Embedded low power and low noise preamplifiers with fast rise time.
- Special irregular hexagonal shape to accommodate a complete 4 PI detection ball consisting of only HPGe material where Veto scintillator detectors such as BGO/CSI are no longer needed due to the close HPGe array detector system.



## Segmented Coaxial Ge Detectors For Position Information

Features are:

- For gamma tracking, polarimetry, Doppler effect correction,  $\beta$  decay suppression
- Longitudinal and transversal segmentation of the outer contact by photolithography (up to 36 segments), on various N-type crystal geometries
- No dead zone or absorbing material between segments
- Monolithic or multielement segmented detectors
- Reliable segmentation technology over three decades not sensitive to heat cycling nor neutron annealing operation in-situ.
- No measurable crosstalk effects



## NEW: Inverted & Segment Coaxial Type Ge Detector

Features are:

- Novel Germanium Detector technology for in-beam gamma-ray spectroscopy.
- Gamma-ray tracking for background suppression and multiple interaction analysis.
- Up to 20 segments including a central electrode (point contact) and surrounding segments as well inside the core.



## RUGGED GERMANIUM DETECTOR SOLUTIONS

### MicroGe™ Ultra-compact HPGe detector

Features are:

- High count measurement in extreme environments
- Compact and lightweight portable Ge
- Can be used almost anywhere
- Thermal cycle free

A novel, ultra-compact, gamma spectroscopy detector for high count rates in confined spaces.



MicroGe with Supply Station, DSA-LX® MCA and Genie™ 2000 Software for Windows PC computer



Pelicase to ease any storage/ transportation

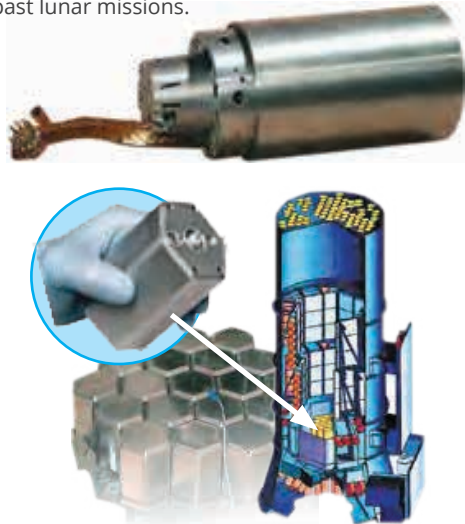
**AGATA Capsule:** Irregular-hexagonal shaped, encapsulated HPGe crystal with outer contact segmented in 36 segments for position information.



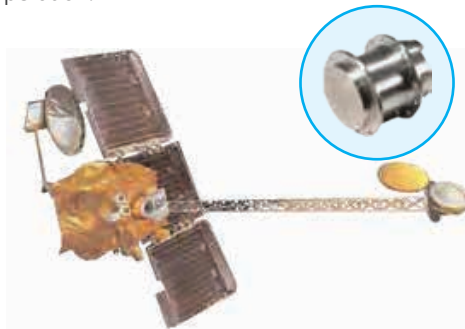
**EuroBall** cluster consisting of regular hexagonal shaped, encapsulated HPGe crystal. A segmented version: **MiniBall** at Isolde 'CERN' with 12 segments.



**Selene (JAXA)** Lunar orbiter mission "KAGUYA". Mission duration: one year. Encapsulated coaxial HPGe detector for the GRS. The GRS had an excellent energy resolution 20 times superior to those used in past lunar missions.



**Integral SPI Project:** Launched in 2002 to study the origin of gamma bursts in the universe. Compact array of 19 encapsulated coaxial HPGe detectors. Vibration level 50 g. Still in operation.



**The Mars Odyssey Mission:** Launched in 2002 to detect the presence of water (ice) on Mars by using (n, $\gamma$ ) reactions. Coaxial HPGe, N-type detector, titanium encapsulated. Vibration specifications 50 g. Still in operation.

## Encapsulated Ge Detectors

Features are:

- For compact construction of multi-element detectors for gamma-ray applications
- For very large efficiency and solid angle coverage
- For high sensitivity and low detection limit gamma-ray spectroscopy even in harsh environments
- Easy annealing in standard ovens, without pumping, in case of radiation damages
- In situ annealing in space applications
- Long detector life time
- Large choice of shapes (pentagonal, hexagonal) for compact matrix assemblies
- Essential for complex cryostat development, particularly with segmented detectors
- Total reliability Ultra High Vacuum technology
- Easy detector handling and exchange

## SPIR-Ace™ RID with the GenieXPort™ Application



Features are:

- SPIR-Ace Radionuclide Identification Device (RID) with GenieXPort application for Genie compatibility
- Ultra-fast and accurate compact identifier
- Simple operation with versatile alarm modes
- Automatic sourceless gain stabilization
- Radiological performance exceeds current standards for RIIDs and RIDs
- Live data transmission and reachback capability
- Optional alpha/beta probe and integrated neutron detection
- Battery life: 4.5 to 15 hours, depending on display use
- Onboard GPS for trajectory and mapping
- Remote display and control via web browser

## EFFLUENT RELEASE MONITORING



iCAM MF (Moving Filter) Monitor



Standard iCAM Monitor on trolley



Standard iCAM Monitor on bench



Standard iCAM Monitor on wallmount



### iCAM™ Alpha/Beta Particulate in Air Monitor

- For environmental monitoring or stack/duct discharge monitoring
- Simultaneous alpha and beta particulate monitoring in one instrument
- Alpha measurement range: 1E-3 to 9E3 Bq/m<sup>3</sup> (1 hour averaging)
- Beta measuring range: 1 to 3.6E5 Bq/m<sup>3</sup> (1 hour averaging)
- Lowest false alarm rates due to unique radon compensation algorithms
- Dynamic gamma compensation
- Rapid response to accidental releases – typical 5 DAC-hr alpha alarm in five minutes
- Rugged construction and high reliability
- Comprehensive I/O facilities (RS-232 and RS-485, 4–20 mA, 4 x relays, etc.)
- Card mounted changeable filter for ease of handling or filter roll with automatic filter advance for long term unattended operation (up to six months )
- Mobile/portable/wall mount systems available

### ABPM 2015™ Seismic Alpha Beta Particulate Monitor

The ABPM 2015 monitor has been developed to sample air extracted from ventilation ducts or stacks. A double silicon detector performs the gamma compensation and a radial fin grid limits the scattering of the alpha particles (static compensation) which facilitates the compensation of the radon and thoron solid progenies by the processing algorithms (dynamic compensation). Operating costs are minimized by the autonomous operation through automatic filter advance management.



### NGM 203S™ Seismic High Range Noble Gas Monitor

Designed for accident and post-accident conditions.

Features are:

- Durable detector without any electronic or radiation degraded component
- 1E qualification and embedded safety related software
- RG 1.97 and IEC60951 compliance
- Available under 10 CFR 50 App. B, ASME NQA-1 and IEC61226 programs for safety related application
- Detector: flow-through ionization chamber (CHMC01)
- Sensitive volume: 100 ml (100 cc)
- Energy range: 5 keV to 3 MeV
- Typical measurement range (for RG 1.97 applications)
  - 85Kr: 4 10+6 to 10+16 Bq/m<sup>3</sup>
  - 133Xe: 10+6 to 3.7 10+15 Bq/m<sup>3</sup>
- Typical measurement range (for IEC60951 applications):
  - 85Kr: 4 10+6 to 5.55 10+15 Bq/m<sup>3</sup>
  - 133Xe: 10+6 to 1.85 10+15 Bq/m<sup>3</sup>
- Standards
  - Nuclear: IEC60951, RG 1.97
  - Environmental: IEC60780, IEEE323
  - Seismic: IEC60980, IEEE344
  - EMC: 2014/30/EU and 2014/35/EU, EPRI102323, RG1.180, IEC61000-6-2 and IEC61000-6-4



### IM 201S™ and IM 201M™ Iodine Monitors

Continuously measuring the gamma volumetric activity of radioactive iodine sample, in both molecular and organic forms contained in air drawn from stacks, ventilation ducts or working areas. Can withstand seismic conditions for the 201S version. An NaI scintillation detector faces the activated charcoal cartridge in which radioactive iodine is trapped. The proximity of the detector and the cartridge, enclosed within a 4 π/5 cm (4 π/2 in.) lead shielding, serves to optimize detection efficiency.

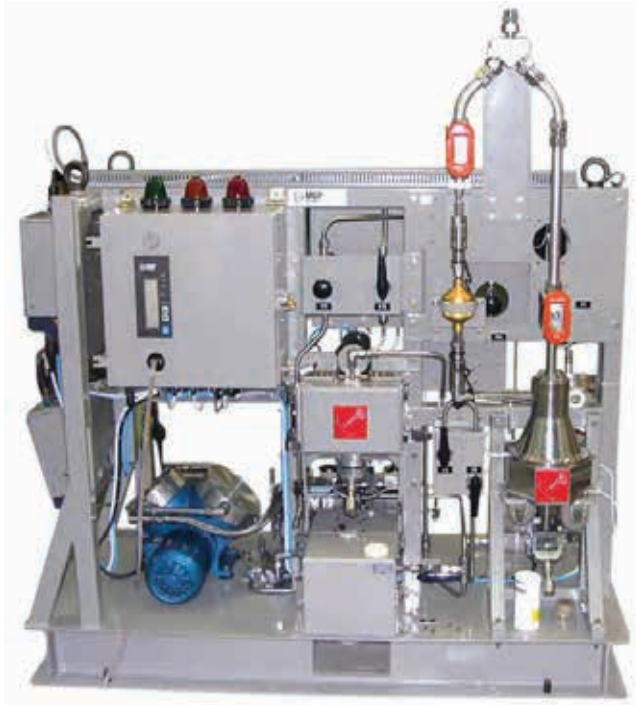
A radioactive 241Am source built into the NaI scintillator allows compensation of temperature and aging related drifts. The spectrometry capability, based on a 1024-channel spectrum analysis, allows radio iodine isotope localization.

### PING 206S™ Seismic Particulate, Iodine and Noble Gas Monitor

Continuously measuring the particulate, iodine and noble gas volumetric activities in stacks, ventilation ducts or working areas. Can withstand seismic conditions. Allows dynamic compensation of radon and thoron progenies.

Features are:

- Particulate (ABPM 201)
  - Radiation detected: alpha, beta and gamma
  - Detector: dual large area silicon (PIPS detector)
  - Filter type: FSLW
  - Typical energy windows:
    - Alpha: 2 MeV to 10 MeV
    - Beta: 80 keV to 2.5 MeV
    - Gamma: 80 keV to 2.5 MeV



- Typical measurement range:

- Alpha:  $10^{-2}$  to  $3.7 \cdot 10^{+6}$  Bq/m<sup>3</sup>  
( $2.7 \cdot 10^{-13}$  to  $10^{-4}$   $\mu$ Ci/cc)
- Beta: 1 to  $3.7 \cdot 10^{+6}$  Bq/m<sup>3</sup>  
( $2.7 \cdot 10^{-11}$  to  $10^{-4}$   $\mu$ Ci/cc)

- Iodine (IM 201):
  - Radiation detected: gamma
  - Detector: 1.25 x 1 in. NaI(Tl) scintillator + PMT (SG/NAI 1.25 x 1 in.)
  - Iodine cartridge: 57.7 mm (2.27 in.)
  - Energy range: 100 keV to 3 MeV
  - Typical energy window: 314 - 414 keV (<sup>131</sup>I, E<sub>y</sub> 364.5 keV) 1024-channel spectrum
  - Typical measurement range:  $3.7$  to  $3.7 \cdot 10^{+6}$  Bq/m<sup>3</sup> ( $10^{-10}$  to  $10^{-4}$   $\mu$ Ci/cc)
- Noble gas (NGM 204):
  - Radiation detected: beta and gamma
  - Detector: dual large area silicon (PIPS detector)
  - Sampling chamber: 300 ml (300 cc)
  - Typical energy windows: Beta: 80 keV to 2.5 MeV
  - Gamma: 80 keV to 2.5 MeV
  - Typical measurement range:
    - <sup>85</sup>Kr:  $3.7 \cdot 10^{+4}$  to  $3.7 \cdot 10^{+14}$  Bq/m<sup>3</sup>  
( $10^{-6}$  to  $10^{+4}$   $\mu$ Ci/cc)
    - <sup>133</sup>Xe:  $3.7 \cdot 10^{+4}$  to  $1.8 \cdot 10^{+13}$  Bq/m<sup>3</sup>  
( $10^{-6}$  to  $5 \cdot 10^{+2}$   $\mu$ Ci/cc)
- Standards :
  - Nuclear: IEC60761-1-2-3-4
  - Environmental: RG 1.97, IEC/IEEE 60780-323
  - Seismic: IEC60980, IEEE344
  - EMC: 2014/30/EU and 2014/35/EU, EPRI 102323, RG1.180, IEC61000-6-2 and IEC61000-6-4



### NGM 209M™ Mobile Low Range Noble Gas Monitor

Monitoring air in working areas, discharge stacks or ventilation ducts. The dual silicon diode detector integrated in a 4  $\pi$ /3 cm (4  $\pi$ /1.18 in.) lead shielded sample volume guarantees high reliability of the measurements. The first silicon diode detects the beta/ gamma radiation from sample volume and the gamma ambient radiation (background). The second one detects gamma radiation from the sample volume and the gamma ambient radiation. This allows noble gas beta measurement with dynamic gamma compensation by the processing algorithms.

## TRITIUM MONITORS

### **βionix™ Portable Tritium Monitor**

The portable β ionix monitor is intended for the real-time Tritium activity monitoring and other Beta emitters in ambient air. Due to its very high sensitivity, its ergonomics and its reliability, the β ionix portable monitor provides the radiation levels to your teams on decommissioning, construction, process controls, surveillance of premises, etc.

Ready for use, the portable monitor offers the most advanced features, such as: graphical presentation, archiving of data, the postponement of the alarms, etc.



### **Mionix™ Mobile Tritium Detector**

The mobile tritium Mionix detector is used for realtime monitoring of tritium levels and other ambient beta gases in the air. Mionix detector assures radioprotection for your teams continuously during decommissioning or as a temporary replacement of a fixed monitor.



### **HT ionix™ Tritium Bubblers**

The range of HT ionix bubblers consists of trappers intended for monitoring levels of concentration of atmospheric tritium HTO (vapor) form and HT (gas).

Features are:

- High trapping efficiency : HT & HTO  $\eta > 95\%$
- For stacks, ventilation systems, surveillance of premises or even environmental applications.
- Simple and robust :
  - Intuitive to use
  - Color touch screen
  - Fast and easy set up
  - No undesirable condensation
  - Leaks detected in real time
  - Limited liquid loss (dedicated technology to follow the dew point)
- Limit of detection of tritium: 5 kBq/m<sup>3</sup> (EXP)
- Response time: below 60 seconds
- Stability: 20 kBq/m<sup>3</sup>/an (BM8), 5 kBq/m<sup>3</sup> (EXP)
- Noise:  $\pm 15$  kBq/m<sup>3</sup> (BM8),  $\pm 5$  kBq/m<sup>3</sup> (EXP)
- Precision: 5% of the measured value  $\pm 15$  kBq/m<sup>3</sup> (BM8), 5% of the measured value  $\pm 5$  kBq/m<sup>3</sup> (EXP)



### **Cionix™ Installed Tritium Monitor**

Installed tritium monitor is used to measure continuous activity of Tritium and other β emitters in a gas for all applications of workplace monitoring, decommissioning, stack release or other applications.

## AREA MONITORING



### G64™ Area Gamma Monitor

- Wide range area gamma monitor 0.1  $\mu$  Sv/h to 100 m Sv/h (10  $\mu$ R/h –10 R/h)
- Options for remote detector, high range ion chamber detector to 100 Sv/h (10K R/h), NaI scintillator and ionization chamber.
- Interlock operation built in
- Compact, rugged industrial construction
- High reliability
- Comprehensive I/O facilities (RS-232 and RS-485, 4-20 mA, relays, etc.)



### GIM 204K™ Very Wide Range Gamma Area Monitor

Monitoring dose rate in nuclear facilities for personnel exposure or for process monitoring. It has been developed to monitor dose rate or equivalent dose rate in nuclear facilities for personnel exposure as well as for process monitoring. This monitor is available in many versions: with or without display, integral or remote detector, dose rate or equivalent dose rate, fixed or portable, etc.



### GIM 201K™ Low Range Gamma Area Monitor

Low range gamma area monitor is developed to monitor absorbed equivalent dose rate in nuclear facilities or laboratories for personnel exposure. The ionization chamber made of high density polyethylene allows the measure of short duration pulsed radiation fields when halogenated and/or material activation is an issue.



### GIM 203K™ Wide Range Gamma Area Monitor

Continuous monitoring of gamma dose rate under harsh or post-accident environmental conditions. Particularly useful for monitoring the dose rate inside containment and in the reactor building during and after mild and severe accidents under harsh operating conditions.





### **GIM 206K™ High Range Gamma Area Monitor**

Continuously monitoring dose rate under harsh or post-accident environmental conditions. This monitor is designed to meet the requirements set forth by the IEC 60951 standard and by the USA RG 1.97. It is typically used for monitoring high dose rate range during and after mild and severe accidents in nuclear facilities under harsh operating conditions.



### **NIM 201K™ Neutron Irradiation Dose Rate Monitor**

Monitoring in real time the neutron equivalent dose rate. It provides operational dose rate in units of H\*(10) derived from neutron fluence according to ICRU 57 recommendations. The helium-3 proportional counter (cylindrical tube) placed inside a polyethylene sphere detects thermal and fast neutrons. Its large energy range, associated with modular design makes it efficient, reliable and very sensitive. It is used effectively in nuclear reactors, subcritical stacks, neutron generators, irradiators and in accelerator facilities.

## **DOSE-RATE AND SURVEY METERS**

### **RDS-31™ Wearable and Robust Survey Meter**



Features are:

- Dose-rate equivalent up to 100 mSv/h (10 rem/h)
- Dual simultaneous Alpha/Beta display with Gamma dose rate
- Scaler/timer to improve MDA (compatible with Easy-Count™ instrument)
- Rugged and waterproof
- Clip and vibrator for hands-free use
- Very long battery life up to 1000 hours
- Connection to external CSP probes
- Contacts for external power with cradle for charging NIHM batteries

## ELECTRONIC DOSIMETRY

### DMC 3000™ Personal Electronic Dosimeter

The **DMC 3000** dosimeter features a unique, high contrast and back-lit LCD display, enhanced alarms (audible, visual, and vibration alerting), high EMI and RF Immunity and long battery life..

Features are:

#### NUCLEAR

- Display Units: mSv,  $\mu$ Sv, or mrem
- Measurement Range (Dose): 0.01 mrem (0.1  $\mu$ Sv) to 1000 rem (10 Sv)
- Measurement Range (Dose Rate): 0.01 mrem/h (0.1  $\mu$ Sv/h) to 1000 rem/h (10 Sv/h)
- Energy Range (X-ray and Gamma): 15 keV to 7 MeV
- Energy Response:  $\pm$  20% (typically 10% from 16 keV to 7 MeV)

#### ELECTRICAL

- Power Supply: Standard AAA (LR03) 1.5 V alkaline battery
- Battery Life: 2500 hr continuous run

#### OPERATIONAL

- Display: Large LCD with high quality white back-lighting eight alphanumeric digit display
- Audible Alarm: Loud speaker (>85 db)
- Visual: Super bright forward facing alarm LED along with alarm and information LEDs on top
- Shock, vibration and drop resistant (1.5 meters on concrete)

#### MECHANICAL

- Dimensions: 3.4 x 2.2 x 0.8 in. (86 x 56 x 21 mm) without clip
- Weight (alkaline battery and clip): < 2.9 oz (84 g)



### SOR-R™ Electronic Dosimeter

The **SOR/R Electronic Dosimeter** was specifically designed to meet the needs of various applications with one product. The SOR/R dosimeter is qualified in accordance with current military and civil standards. The SOR line exceeds some of the standards currently in use in order to account for harsh operational environments.

Features are:

- The SOR dosimeter line is built upon two basic versions:
- The SOR/T for tactical (gamma and neutron) and residual/ambient gamma measurements the SOR/R for residual/ ambient gamma measurements
- Assignable electronic dosimeters
- Waterproof, light and small
- Rugged for battlefield use
- Hand free communication, pass-by exchange
- Data communication through clothing layers





Diagram representation of the process. Contact us for details.



## CSP-Navi Handy Survey Meter

Features are:

- Easy operation by touch panel
- Shock-resistant SSD terminal
- Quick alarm setting
- One touch transition of Dose rate/Count rate
- Automatic acquisition of calibration for the dose rate conversion
- Photographs by web camera with corresponding white light/night vision
- Standard installation of data logging function

For the efficient decontamination!

- Area monitoring application: CSP-Navi system
- CSP-Navi system was developed for Japan
- CSP-Navi system displays the measurement data clearly, which is provided along the automatic recording data by barcode

## UltraRadiac™-Plus Personal Radiation Monitor

Features are:

- Easy to operate by personnel in firefighting or "HAZMAT" protective gear
- Extremely rugged, metal housing
- Accurate dose measurements with high dose rate protection
- Large, easy-to-read back-lit LCD display
- Audible, visual and vibrating alarms
- Unique "stay time" display shows time remaining for the highest level of individual health and safety
- Configuration by push button or integrated software
- Uses standard AAA batteries; optional rechargeable batteries

## BABYLINE 81 Ionization Chamber Survey Meter

Features are:

- Measurement of the absorbed dose rate in six ranges: from 10 µGy/h to 1000 mGy/h and of the absorbed dose in five ranges: from 10 µGy to 100 mGy
- Uniform response from 18 keV to 2 MeV
- 515 cm<sup>3</sup> air ionization chamber with 7 mg/cm<sup>2</sup> tissue equivalent wall and 300 mg/cm<sup>2</sup> removable cap
- Produced under CEA (French Atomic Energy Commission) license
- CTHIR 005 qualification



## iPIX™ Ultra Portable Gamma-Ray Imaging System

iPIX unit is a unique gamma imager that quickly locates and identifies low level radioactive sources from a distance while estimating the dose rate at the measurement point in real time.

Features are:

- Graphically shows dose rate estimate of hot spots on field-of-view image
- Real-time acquisition and display
- Sensitive for energies down to 30 keV
- Small size and weight for ultraportability
- Simple and intuitive user interface
- Improves worker safety while reducing dose/time budget
- Rugged industrial design for harsh environments - IP65
- Battery, Power over Ethernet (POE) or AC-powered
- Optional remote-controlled pan/ tilt kit



Optional remote-controlled pan/tilt kit



iPIX-NID full option shown



iPIX™ System



## AccuRad™ PRD Personal Radiation Detector

Features are:

- Sensitive detection for homeland security, law enforcement, and site protection
- Alarms at 0.5  $\mu\text{Sv/h}$  within two seconds
- VBS: Authenticates true alarms in variable backgrounds
- Energy range: 25 keV to 3 MeV; detects all radionuclides of concern
- Wide range of measurement and personal protection alarms for emergency response applications
- Energy compensated dose and dose equivalent rate measurements up to 10 Sv/h, accuracy +/-20%
- Compact, body worn device: 200 g, 108 x 61 x 36 mm, clip
- Two AA batteries for more than 900 hours of continuous operation
- Robust: -20 °C to 60 °C, Drop of 1.5 m on concrete, IP67 (dust and 1 m water immersion)
- Bluetooth Low Energy with Near Field Communications (NFC) pairing to smartphone
- Smartphone App available on Google Play Store and Apple Store
- USB type C



Top display enables hands-free visual alarm assessment





SN-D-2 on tripod

### SN-D-2™ Neutron Dose Probe

Features are:

- Neutron H\*(10) Dose Equivalent Rate
- Complies with public limits control
- Belongs to CSP family
- Calibration via PC
- Easy to carry
- Excellent fit of IEC 61005 and ICRP-74 starting from thermal energy



STTC

STTC - W

### STTC and STTC-W Wide Range Probe

Features are:

- Wide range Gamma dose rate from background up to 10 Sv/h (1000 R/h) with one detector only
- Time-to-Count technology delivers prolonged detector life
- STTC-W waterproof version with 20 m (65 ft) cable on a reel



STHF-R

### STHF-R™ Ultra High Flux Gamma Probe

Features are:

- Dose-rate equivalent up to 1000 Sv/h (100 000 rem/h)
- Waterproof with 50 meter cable on a reel
- High cumulative dose capability up to 5 kSv with remote electronics
- Compatible with Radiagem™ 2000 Personal Portable Dose Rate and Survey Meter only



Tele-STTC + Radiagem

### Tele-STTC™ Wide Range Gamma Telescopic Probe

Features are:

- Wide range Gamma dose rate from background up to 10 Sv/h (1000 R/h) with one detector only
- Time-to-Count technology delivers prolonged detector life
- All extension up to 4.09 meters with available cradles for Radiagem, RDS-31 or Colibri units
- Lightweight carbon fiber pole with variable segments locking mechanism



### Telepole II™ Telescopic Radiation Survey Meter

Features are:

- Color coded display featuring large easy to read digits
- Simultaneous display of external and internal detectors
- Simple multi-layered menu for quick selection of command
- WRM2 communication

- Integrated BT alarm communication:
  - Vibrating Bracelet
  - Earphone
- Aluminum 11 ft Pole with quarter turn positive locking mechanism
- Built-in LED for dark areas being surveyed
- Interchangeable “smart” detector capabilities
- Long battery life (85 hours)
- IP-65 rated meter

## WOUND CONTAMINATION MONITOR SOLUTIONS

Nuclear facilities need the ability to quickly and reliably assess radioactive contamination of wounds if a worker is injured in a contaminated area.

We offers solutions for both **local measurement** at the site of an injury and for more **detailed assays** in a medical or health physics laboratory.

### Tablet-based Portable Wound Counter

This portable, battery-powered counter is based on the Osprey® Multichannel Scaling (MCS) Locator Software developed for the localization of hotspots.

The system consists of a touchscreen **tablet computer** with **MCS Locator SW** and an **Osprey** Tubebase MCA with any of a variety of compatible **scintillation detectors**, including a model designed for low-energy nuclides such as Pu, Am and other transuranics.

As the user moves the detector closer to a contaminated area, the counter provides an increasing rate of audible clicks. It also displays a time vs. Counts Per-Second (CPS) histogram and warning on the tablet screen if a preset CPS level is exceeded. From this information, one can quickly determine if the wound (or any area) is contaminated and the exact location and extent of the contamination.

If it is desired to determine nuclide identification and/or activity of the contamination, Mirion’s Genie™ or Genie-FieldPro™ software can also be run from the tablet computer using the Osprey MCA and detector. Both the MCS Locator and Genie-FieldPro packages are designed for ease of use with minimal training.

### Articulating Arm Wound Counter

The 2290 Articulating Arm Wound Counter augments an Actinide Lung Counting Room or Health Physics Laboratory with the ability to place an electrically-cooled High Purity Germanium (HPGe) detector in virtually any position next to the wounded area of a subject’s body.

The counter consists of a HPGe detector (selectable) with a Cryo-Pulse® 5 Plus Cryostat on an Articulating Mounted Arm for use with a Genie™ or Apex-InVivo™ based assay system.

The combined system allows you to quantify the contamination activity and dose, as well as, monitor the effectiveness of decontamination activities.



Tablet, Osprey MCA, Detector and MCS Locator SW – All powered by the tablet



Weightless maneuvering and braking makes detector positioning easy and stable during the count.

## NUCLEAR SURVEILLANCE SYSTEMS

### *Cameras Hardened Against The Effects Of Radiation*

#### Nuclear Surveillance Cameras



Hyperion™ Camera



R981™ Compact



SC985™ HR



R981TR™

CCTV monitoring of nuclear reprocessing, waste management and storage plants is an important function in the operation and supervision of these facilities. Permanently located within the plant and designed to survive the hostile environment frequently encountered, IST-Rees surveillance cameras provide an essential component within the industry's process control infrastructure.

Major project experience and an in-depth knowledge of the latest CCTV technology are crucial in our ability to meet the rigorous specifications that the nuclear industry demands. We employ professionally qualified System Design Engineers and Project Managers experienced in configuring and managing CCTV projects from initial concept to final on-site commissioning.

## HIGH TEMPERATURE INDUSTRIAL

### *Cameras and imaging systems built to withstand extreme temperatures*

#### Cement

Rotary kilns are used extensively in the cement industry and a variety of other industries for processing other types of similar products. They can be used as pelletizers, calciners, dryers or can act as the reaction vessel for a host of specialized operations in the metals, chemical and mineral industries. Mirion provides camera systems for rotary kiln viewing and also for multiple temperature zone measurement, to allow kiln operations to be observed and optimized for production efficiency and fuel economy.

#### Incineration and Energy from Waste (EfW)

















Our Lynx® high temperature camera systems are extensively used for boiler and furnace viewing applications, owing to their robust construction and excellent picture quality. Operators can view conditions inside for boiler and furnace viewing from the safety of the control room, avoiding the need to go to the boiler face, furnace wall, or kiln hood to check on the process.



M555™ Spyrometer Camera



M535™ Camera

CAMERAS		M530™ Lynx Color Camera		Visible Light Color Camera; enables the flexibility to customize electronics, lenses, filters and other options to provide continuous monitoring. Straight, oblique, or right angle lens tube options available. Compatible with M721 Iris Controller. Additional water cooling available.
		M535™ Lynx Viewing Camera System		Visible Light Color Camera; enables the flexibility to customize electronics, lenses, filters and other options to provide continuous monitoring. Straight or oblique lens tube options available. Includes temperature sensors.
		M540™ Lynx Near IR Viewing Camera System		Near IR Black and White Camera with flexibility to customize electronics, lenses, filters and other options. Able to penetrate gaseous and fine particulate interferences. Straight, oblique, or right angle lens tube options available. Additional water cooling available.
		M555™ Spyrometer® Temperature Measurement		Patented combination of color video camera and scanning pyrometer*; monitors process conditions while measuring the temperature of any area in the field of view. Video image and temperature information are displayed on a VGA monitor. Additional water cooling available.
		M560™ IR Camera		Combines mid-wave imaging core technology with an optional calibrated optical pyrometer. Optimizes the clarity of monitoring slag build-up, smeltbed profile, or product distribution and burn efficiency.
PROCESSORS		M215 S™ Spyrometer® Processor		Supports one or two Mirion cameras, giving the ability to view processes from two locations. Application software provides up to 32 overlaid temperature measurement zones per camera, fully adjustable for size and measurement mode.
		M610 S™ Calico 3 Temperature Measurement System		Supports one or two Mirion cameras, providing precise temperature measurement across the screen, eliminating erroneous measurements at the edge of the image. Measures up to 32 'free form' temperature measurement zones.
		M704™ Viewing Pyrometer		Temperature data is multiplexed with the video signal and sent to the M704 unit. It separates them and displays the video on a monitor with a locator square on the screen, colorizing the image and providing contrast expansion.
		M721™ Auto Iris Controller		Allows adjustments to be made to the M530 camera auto-iris from the control room, retaining flame details and burner viewing quality. Connection is made via the same coax cable that is normally run from the camera to the control room.
COMMON ACCESSORIES		M356™ Retract		Retracts the camera from the most severe heat, protecting it from serious damage where the plant supply of air pressure, water or electricity has been interrupted. Includes ruggedized safety air reservoir and additional options.
		M408™ Air Filter System		Provides clean air in industrial environments where there is a higher air contaminate content level and where local control and regulation of the air supply to the camera is required.

\*USA Patent 6,667,761



	Cement, Lime and other Rotary Kilns	Clinker and other Grate Coolers	Chemical Recovery and Fluidized Bed Boilers	Steel and Aluminium Furnaces	Thermal Power and other Auxiliary Boilers	Waste to Energy Plants	Other
	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓
			✓		✓		
	✓	✓	✓	✓	✓	✓	✓
			✓		✓		
	✓	✓	✓	✓	✓	✓	✓
			✓		✓		
			✓		✓		
	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓

Each application category (i.e. 'Cement, Lime and other Rotary Kilns') comprises several individual types of application/operations. Certain products are suitable only for some applications/operations within their respective category.

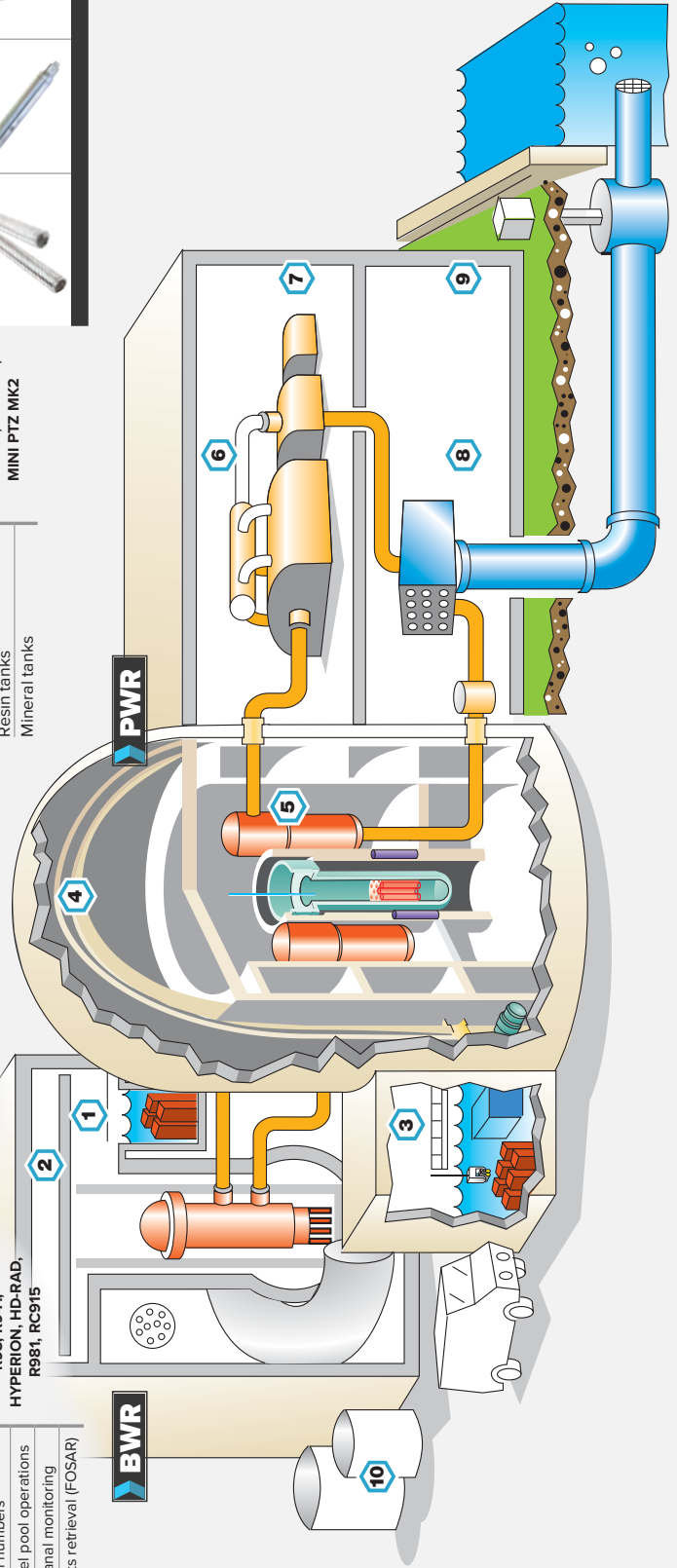






# Nuclear Plant Camera Uses

INSPECTION	EQUIPMENT	INSPECTION	EQUIPMENT	INSPECTION	EQUIPMENT	RADIATION TOLERANT CAMERAS
<b>1 BWR Fuel Pool Applications</b>	R93, R941, HYPERION, HD-RAD, R981, RC915	<b>4 PWR Containment</b>	R981TR, HYPERION HD-RAD, SC985	<b>6-7 Turbine Deck Applications</b>	DOTCAM, MINI PTZ MK2	DOTCAM, C981, HD-RAD, SC985, R981TR, R981 COMPACT, R941, R93, HYPERION
Inspect condition of fuel		Post Event Management		Inspect Turbine Blades		
View serial numbers		Polar Crane Surveillance		Loose Part Retrieval (FOSAR)		
Monitor fuel pool operations				Inspect Tubes & Piping		
				Leak Detection/Identification		
				Turbine Hall Surveillance		
<b>2 BWR</b>	R981TR, HYPERION	<b>5 PWR - In-Vessel Inspection</b>	R93, R941, HYPERION			
Drywell CRDM inspections		Internal Inspection		<b>8 Condenser</b>	DOTCAM	
Shroud cracking		Core barrel inspection		Tube inspections		
.0005 wire @ 6'		Monitor underwater maintenance activities		Boiler feedwater pump		
Torus inspection		CRDM reactor canopy seal welds				
Core shroud inspection		Loose parts retrieval (FOSAR)				
<b>2 BWR Containment</b>	R981TR, HYPERION SC985	<b>5 Steam Generator/RCP Applications</b>	HD-RAD, HYPERION, SC985, DOTCAM - HR			
Post-Event Management		Inspect tube weld/tube cut		<b>9 Service Water Lines</b>	DOTCAM	
Torus inspection		Monitor maintenance activities		Service water pump		
		Leak Detection/Identification		Service water line condition		
		Robotics/Remote Handling		Inlet condition		
<b>3 PWR Fuel Pool Applications</b>	R93, R941, HYPERION, HD-RAD, R981, RC915			<b>10 Tanks</b>	DOTCAM, HD-RAD, MINI PTZ MK2	
Inspect condition of fuel				Waste storage tanks		
View serial numbers				Resin tanks		
Monitor fuel pool operations				Mineral tanks		
Transfer canal monitoring						
Loose parts retrieval (FOSAR)						



## IN-PLANT AND SAFETY MONITORING SYSTEMS

*To provide the Nuclear Industry with the Highest Quality Instrumentation and Control Solutions*

### Area Monitoring

For on-site solutions, Mirion Technologies offers radiation monitoring systems (RMS) that can use different types of detectors to measure site-specific levels of alpha and beta particulates or gamma and neutron radiations (low, wide, high, dual/mixed) with variations of processors and displays, depending upon the location, human factors, and space requirements needed.



ABPM 203M



GIM 204M



NGM 209M



IM 201L



SAM 202K

### Effluent Release Monitoring

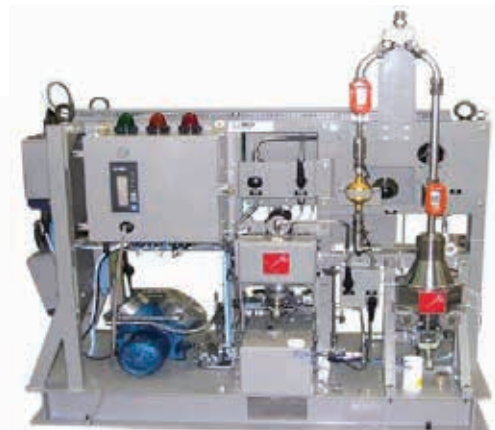
A full array of effluent air monitors is offered that can be comprised of safety/non-safety, fixed/mobile/portable, and/or seismically qualified instrumentation and can include particulate, iodine, and/or noble gas monitors. Various types of liquid monitoring systems are also provided that can be configured for in-line, off-line, or adjacent-to-line applications.



NGM 202L



LM 211S



PING 206S

## Post-accident Facility Management

- Ultimate management procedures require the use of postaccident monitors:
- Gamma high flux monitors (GIM 206K), aimed at avoiding or delaying core damage.
- Gamma monitors, further to damage to the 1st or 2nd barrier.
- So-called «sump» monitoring (GIM 205K), further to accidental loss of primary coolant.
- Containment pressure relief vent monitoring, further to damage to the 3rd barrier.



GIM 203K

NGM 203S

GIM 206K

PIS 203S

## Containment Systems

To avoid release into the environment of radioactive substances, nuclear power plants are designed with safety in mind and in some cases are built on the principle known as «triple containment barrier» in which the reactor is comprised.

- Monitoring steam generator tube breaks through N16 detection.
- Discovering primary leaks (thank cover, tank bottom) through the detection of N13.
- Determination of leaks in ductwork.
- Monitoring containment atmosphere through particulate and noble gas monitors.



SAM 202K



SGLM 201K



SGLM 202K



LM 212S

## Operational Process Monitoring

Determination of radioactive levels in nuclear operational processes may require the measurement of volumetric activity of radioactive gas containing particulates, iodine, and/or noble gas. we offers a broad range of solutions and configurations to meet site-specific requirements and variations can be fixed, mobile, or movable, as well as safety related or non safety.



GIM 201K



NIM 201K



ABPM 205L

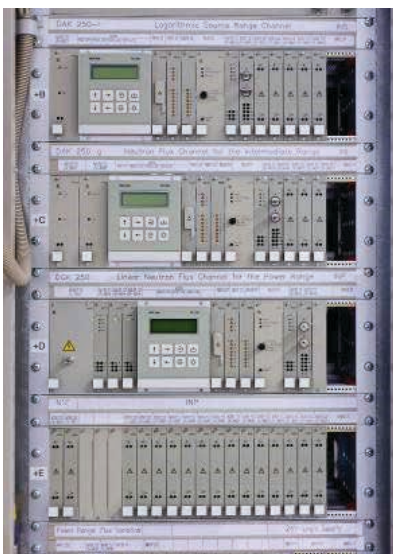


NGM 204L

GIM 204K

## Reactor Control and Protection

From Ultrasonic level measurements to safety critical control, protection and monitoring systems in operational nuclear power plants; we provides safety and non-safety-related monitoring systems that meet or exceed todays' regulatory requirements. When it comes to Reactor Control and Protection, it is essential to be confident in a reliable product of technical competence, experience and sustainability.



proTK



BM 501

## SPECIFICATIONS

### Combination Monitors

Model Number	Detector Type	Range	Application
PING 206S	Particulate Iodine Noble gas	See ABPM 201S See IM 201S See NGM 204S	Stand alone skid
PNG 206S	Particulate Noble gas	See ABPM 201S See NGM 204S	Stand alone skid
PIM 206S	Particulate Iodine	See ABPM 201S See IM 201S	Stand alone skid
PINGM 207S	Particulate Iodine Noble gas	See PM 205S See IM 201S See NGM 216S	Stand alone skid

### Steam Leak Monitors

SGLM 201K	Nal 3 x 2 in.	Leak rate: 0.1 to 5 000 l/h (0.6 to 31700 GPD)	Steam generator leak rate monitor (N <sup>16</sup> ) detector with thermal insulation
SGLM 202K	Nal 3 x 2 in.	Leak rate: 0.1 to 5000 l/h (0.6 to 31 700 GPD)	Steam generator leak rate monitor (N <sup>16</sup> ) detector with 2 in. lead shield

### Spectrum Analysis Monitors

SAM 201K	Nal 1.25 x 1 in.	6 decades between 3.7 10 <sup>+2</sup> and 3.7 10 <sup>+12</sup> Bq/m <sup>3</sup> (10 <sup>-8</sup> to 10 <sup>+2</sup> μCi/cc)	
SAM 202K	Nal 3 x 2 in.	6 decades between 3.7 10 <sup>+2</sup> and 3.7 10 <sup>+12</sup> Bq/m <sup>3</sup> (10 <sup>-8</sup> to 10 <sup>+2</sup> μCi/cc)	
SAM 203K	Nal 2 x 2 in.	6 decades between 3.7 10 <sup>+2</sup> and 3.7 10 <sup>+12</sup> Bq/m <sup>3</sup> (10 <sup>-8</sup> to 10 <sup>+2</sup> μCi/cc)	
SAM 204K	Nal 3 x 3 in.	6 decades between 3.7 10 <sup>+2</sup> and 3.7 10 <sup>+12</sup> Bq/m <sup>3</sup> (10 <sup>-8</sup> to 10 <sup>+2</sup> μCi/cc)	

### Area Monitors

GIM 201K	Ionization chamber	10 <sup>-6</sup> to 10 Sv/h (10 <sup>-4</sup> to 10 <sup>+3</sup> rem/h)	Low range
GIM 202K	Ionization chamber	10 <sup>-7</sup> to 10 <sup>+2</sup> Gy/h or Sv/h (10 <sup>-5</sup> to 10 <sup>+4</sup> rad/h or rem/h)	Wide range
GIM 203K	Ionization chamber	10 <sup>-6</sup> to 10 <sup>+3</sup> Sv/h (10 <sup>-4</sup> to 10 <sup>+5</sup> rem/h)	Wide range
GIM 204K	Silicon diode	10 <sup>-6</sup> to 100 Gy/h or Sv/h (10 <sup>-4</sup> to 10 <sup>+4</sup> rad/h or rem/h)	Very wide range
GIM 205K	Ionization chamber	10 <sup>-5</sup> to 10 <sup>+3</sup> Gy/h (10 <sup>-3</sup> to 10 <sup>+5</sup> rad/h)	Medium range, waterproof, high temperature
GIM 206K	Ionization chamber	10 <sup>-3</sup> to 10 <sup>+5</sup> Gy/h (10 <sup>-1</sup> to 10 <sup>+7</sup> rad/h)	Very high range for harsh environment
BIM 201K	Plastic scintillator	3.7 10 <sup>+3</sup> to 3.7 10 <sup>+9</sup> Bq/m <sup>3</sup> (10 <sup>-7</sup> to 10 <sup>-1</sup> μCi/cc)	Wide range (beta irradiation monitor)

### Neutron Monitors

NIM 201K	Helium	10 <sup>-6</sup> to 0.1 Sv/h (10 <sup>-4</sup> to 10 rem/h)	Neutron Irradiation Dose Rate Monitor
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### Particulate Monitors

ABPM 201S	Dual large area silicon	Alpha: 10 <sup>-2</sup> to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-13</sup> to 10 <sup>-4</sup> μCi/cc) Beta: 1 to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-11</sup> to 10 <sup>-4</sup> μCi/cc)	Duct or stack, off-line alpha beta monitor particulate or also work area
ABPM 203M	Dual large area silicon	Alpha: 10 <sup>-2</sup> to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-13</sup> to 10 <sup>-4</sup> μCi/cc) Beta: 1 to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-11</sup> to 10 <sup>-4</sup> μCi/cc)	Work area, mobile monitor, optimized for high energy (Pu <sub>238</sub> and Pu <sub>239</sub> )
ABPM 204M	Dual large area silicon	Alpha: 10 <sup>-2</sup> to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-13</sup> to 10 <sup>-4</sup> μCi/cc) Beta: 1 to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-11</sup> to 10 <sup>-4</sup> μCi/cc)	Work area, mobile or portable monitor, optimized for low energy (U <sup>233</sup> , U <sup>235</sup> , U <sup>238</sup> )
ABPM 205L,M	Dual large area silicon	Alpha: 10 <sup>-2</sup> to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-13</sup> to 10 <sup>-4</sup> μCi/cc) Beta: 1 to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-11</sup> to 10 <sup>-4</sup> μCi/cc)	Duct or stack, off-line monitor or also work area
PM 205S	Plastic scintillator	Beta: 3.7 10 <sup>-2</sup> to 3.7 10 <sup>+3</sup> Bq/m <sup>3</sup> (10 <sup>-12</sup> to 10 <sup>-7</sup> μCi/cc)	Duct or stack, off-line monitor or also work area



## SPECIFICATIONS

### Iodine Monitors

Model Number	Detector Type	Range	Application
IM 201L,S,M	Nal 1.25 x 1 in.	3.7 to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (10 <sup>-10</sup> to 10 <sup>-4</sup> μCi/cc)	Duct or stack, off-line iodine monitor or also work area
IM 203M	Nal 1.25 x 1 in.	3.7 to 3.7 10 <sup>+6</sup> Bq/m <sup>3</sup> (10 <sup>-10</sup> to 10 <sup>-4</sup> μCi/cc)	Duct or stack, off-line mobile iodine monitor or also work area

### Noble Gas Monitors

NGM 202L	Ionization chamber	10 <sup>+4</sup> to 3.7 10 <sup>+9</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-7</sup> to 10 <sup>-1</sup> μCi/cc)	Duct or stack, off-line monitor or also work area (low range)
NGM 203S	Ionization chamber	Kr <sup>85</sup> : 4 10 <sup>+6</sup> to 10 <sup>+16</sup> Bq/m <sup>3</sup> (1.08 10 <sup>-4</sup> to 2.7 10 <sup>+5</sup> μCi/cc) Xe <sup>133</sup> : 10 <sup>+6</sup> to 3.7 10 <sup>+13</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-5</sup> to 10 <sup>+5</sup> μCi/cc)	Accident range off-line monitor, harsh environment (high range)
NGM 204L,S	Dual large area silicon	Kr <sup>85</sup> : 3.7 10 <sup>+4</sup> to 3.7 10 <sup>+14</sup> Bq/m <sup>3</sup> (10 <sup>-6</sup> to 10 <sup>+4</sup> μCi/cc) Xe <sup>133</sup> : 3.7 10 <sup>+4</sup> to 1.8 10 <sup>+13</sup> Bq/m <sup>3</sup> (10 <sup>-6</sup> to 5 10 <sup>+2</sup> μCi/cc)	Duct or stack, off-line monitor or also work area (low range)
NGM 209M	Dual large area silicon	Kr <sup>85</sup> : 10 <sup>+3</sup> to 3.7 10 <sup>+9</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-8</sup> to 10 <sup>-1</sup> μCi/cc) Xe <sup>133</sup> : 10 <sup>+3</sup> to 10 <sup>+10</sup> Bq/m <sup>3</sup> (2.7 10 <sup>-8</sup> to 2.7 10 <sup>-1</sup> μCi/cc)	Work area mobile monitor, duct or stack (low range)
NGM 216S	Plastic scintillator	3.7 10 <sup>+3</sup> to 3.7 10 <sup>+9</sup> Bq/m <sup>3</sup> (10 <sup>-7</sup> to 10 <sup>-1</sup> μCi/cc)	Duct or stack, off-line monitor or also work area (low range)

### Liquid Monitors

LM 211S	Nal 1.25 x 1 in.	3.7 10 <sup>+3</sup> to 3.7 10 <sup>+9</sup> Bq/m <sup>3</sup> (10 <sup>-7</sup> to 10 <sup>-1</sup> μCi/cc)	Off-line gamma liquid monitor, 4 π/5 cm shielding
LM 212S	Nal 1.25 x 1 in.	3.7 10 <sup>+3</sup> to 3.7 10 <sup>+9</sup> Bq/m <sup>3</sup> (10 <sup>-7</sup> to 10 <sup>-1</sup> μCi/cc)	Off-line gamma liquid monitor, 4 π/10 cm shielding

### Samplers

PIS 203S		3.7 10 <sup>+7</sup> to 3.7 10 <sup>+12</sup> Bq/m <sup>3</sup> (10 <sup>-3</sup> to 10 <sup>+2</sup> μCi/cc)	Shielded aerosols and iodine sampler (RG 1.97 compliance)
PIS 204L			Low activity particulate and/or iodine sampler
PIS 205L			Low activity, with sampling flow rate control (particulate and/or iodine)

## CORROSION TESTING INSTRUMENTS

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### SSRT Autoclaves

Our stainless-steel loading units have been de-signed for autoclave applications. The PC controlled step-motor driven loading unit offers various loading modes and combinations. One can select the most suitable device from the wide product range. Due to the compact size of the actuators, Cormet can offer multi-head units as well as loading actuators for retrofitting to existing autoclaves and flow cells.



### PC-controlled Loading Device

Our PC-controlled electromechanical loading de-vice is capable of performing slow strain rate tests (SSRT, CERT), constant-load and cyclic-fatigue tests. The loading device can be equipped with various kinds of specimen holders as well as with accessories such as DC PD, LVDT and electrochemical tools. The SSRT instrument can be installed in various kinds of test cells, including an ambient temperature test cell, HT HP autoclave and high-temperature gas furnace. The load capacities 10 kN, 20 kN, 50 kN and 100 kN are available.



### Test Loops

Corrosion tests should be performed in a valid and reproducible environment. Our recirculation loops provide reliable and well designed instruments to control your test environment.



## EDUCATIONAL LABORATORY SYSTEMS

### STRUCTURAL LAB



#### HSM1 Deflection of Beams Apparatus

Experiments to show, Deflection of a simply supported beam with varying span. Deflection for an offset load on a simply supported beam. Distributed Loads on a simply supported beam



#### HSM1C Advanced Beam Testing Apparatus (Analogue Version)

Bench top apparatus for large number of beam tests. With three reaction piers with digital displays and a fixed pillar for cantilever work. A quick and easy adjustment of test span permits a large number of test setups and variations.



#### HSM1CD Advanced Beam Testing Apparatus, Digital Version (6 Beams supplied with different thickness) Optional Extras: HSM1f, HSM1g

An unlimited range of beam experiments can be performed to measure support reactions, deflections and rotations of simply supported, fixed and two span continuous beams, simple and propped cantilevers, and sinking supports.



#### HSM2 Torsion of Bars Apparatus

Apparatus to understand and investigate directly the relationship between the torsional load applied to a round bar and the angular twist produced and how this relationship varies with the beam material and its cross sectional polar moment of area.



#### HSM10 Curved Bar Apparatus

To experimentally determine the vertical and horizontal deflections of various curved bars whose cross sectional dimensions are small compared with the bar radius



### **HSM11 Combined Bending and Torsion Apparatus**

A self contained, bench mounted apparatus to determine elastic failure of a specimen subjected to several ratios of simultaneous bending and torsion : allowing comparison of results with the established theories of failure.



### **HSM51 Rockwell / Brinell Hardness Tester**

A combined hardness tester designed for measuring hardness of metals and alloys of all types (hard & soft)



### **HSM15 Critical condition of Struts**

To observe the behaviour of four struts of the same length, but with different end constraints, when subjected to buckling loads. Compare the results with theoretical predictions, such as Euler's formula.



### **HSM8 Compression of Springs**

To test the relationship between the load applied and the change in compressive length of a spring (Hooke's Law) Determines spring stiffness using measured experimental results and the formulae provided. Demonstrates the dependence of spring stiffness on the wire diameter, spring diameter, length, number of turns and material.



### **HSM35 Torsion and Deflection Testing Apparatus Includes 4 torsion specimens and 8 bending specimens as standard**

This bench top unit allows a variety of experiments to be undertaken to investigate test specimens under torsional loading and bending loading within their elastic limits.



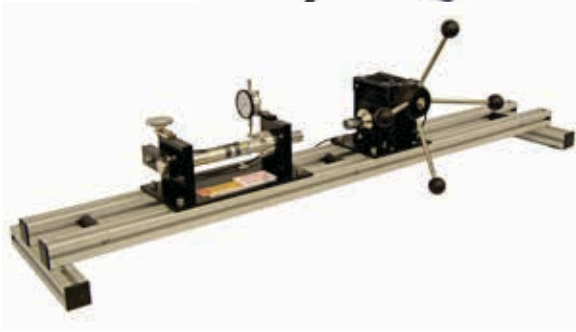
### **HSM41 Pendulum Impact Tester (25) Impact Energy)**

A sturdy bench top mounted unit for the study of notched bar (Charpy) impact strength tests.



### **HSM18 Electrical Resistance Strain Gauge**

The apparatus has been designed to illustrate the basic features of electrical resistance strain gauges and their application in measuring bending and torsion.



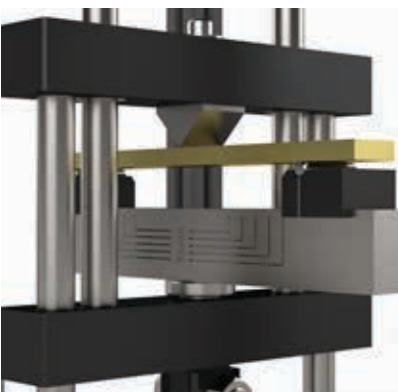
### **HSM31 Torsion Testing Machine (30Nm)**

Torsion testing machine for destructional testing of steel, brass and aluminium samples.



### **HSM58B Brinell Hardness Test Set, comprising Indentor and 16 specimens (4 Steel, 4 Aluminium, 4 Brass, 4 Copper)**

- Brinell type indenter attachment to the base unit to allow the testing of various samples for material hardness.
- The HSM58 is a modular, flexible, compact, safe, materials tester allowing students to conduct up to eight (8) experiments on seven (7) different material types.



### **HSM58C Bending Device Test Set including 5 specimens (2 Steel, 2 Aluminium, 1 Brass)**

- Elastic deformation of bending bars subject to a point force
- Test bars to be placed on two sliding bearings for span adjustment
- Test bars to be loaded with a point force generated by the tester



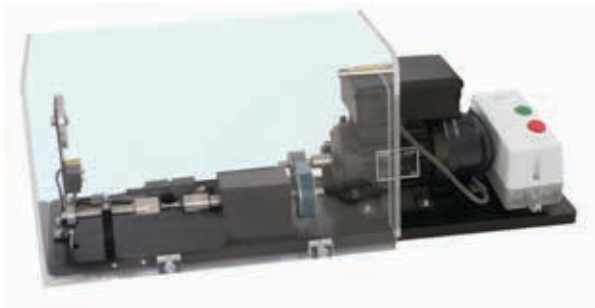
### HSM30 Unsymmetrical Cantilever Apparatus

This apparatus allows the vertical and horizontal deflections of the free end of a test specimen to be measured when loading occurs along a principle axis or at a known angle.



### HSM34 Creep Testing Machine

A sturdy bench top mounted unit for studying the affect of creep on different material test specimens and at different temperatures.



### HSM19 Rotating Fatigue Machine (Analogue Version)

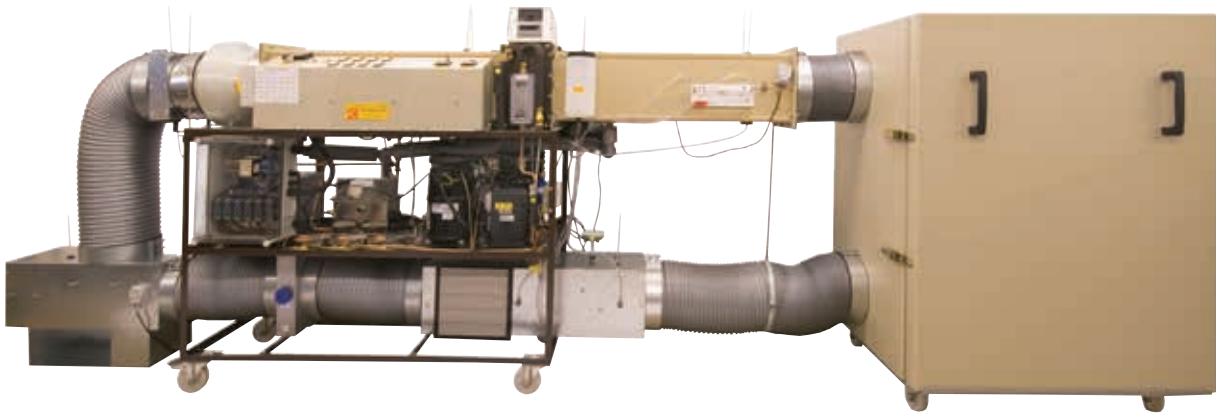
This unit has been designed to introduce students to the effects of material fatigue using a sinusoidal variation of bending stress.



### HSM58 Universal Materials Tester, 35kN

- Fully enclosed safety guard for operator safety
- Sturdy ground steel pillars – for durability and repeatability
- Utilises linear slide bearings – for ease of use
- Digital Extensometer accurate to 3 decimal places

## REFRIGERATION & AIR CONDITIONING LAB



### A660\*\* Air Conditioning Laboratory Unit

Air-cooling is provided by a vapour compression refrigeration system with pressure, temperature and refrigerant flow measurement. This allows students to construction of a full cycle diagram and the balancing of refrigerant system energy balance against the airside energy transfer.

Specification includes:

- Variable speed radial acting axial flow fan
- Steam humidifier
- Electrical pre-heaters
- Direct expansion cooling coil/de-humidifier
- Electrical re-heaters
- Orifice plate for airflow measurement.

### A661B Recirculating Duct Upgrade

Available as an option as additional cost Recirculating Duct Upgrade Allows the proportion of recirculated air to be varied and its effect upon the energy requirements for air conditioning to be investigated. Additional psychrometric measuring points supplied allow the enthalpy of two-mixed streams to be investigated.



### A661A Digital Temperature Upgrade

A standard feature of the A660 range. Allows all of the above experiments with all temperatures displayed on a single switched digital temperature indicator to 0.1°C resolution.

### A660C PID Control Upgrade

Available as an option as additional cost PID Control Upgrade. Allows the proportion of recirculated air to be varied and its effect upon the energy requirements for air conditioning to be investigated.

### A660D Environmental Chamber Upgrade

- Available as an option at additional cost. Environmental Chamber Upgrade
- Data Acquisition Available as an option at additional cost. Data acquisitioned A660 Air conditioning Laboratory Unit, with all the functionality of the A660 standard unit, but computer linked, recirculating duct and PID controller.

### R560\*\* Water to Water Heat Pump

The R560 Hilton Water to Water Heat Pump has been designed specifically to allow students to obtain an overall understanding and appreciation of the performance and characteristics of a heat pump working on the vapour compression cycle and having an electrically driven compressor.



### **R634\* Vapour Compression Refrigeration**

A bench mounted vapour compression refrigeration cycle demonstration unit using a hermetic compressor. The water cooled flooded glass condenser and evaporator allows both evaporation and condensation to be observed and understood. The unit operates on low-pressure non-toxic ozone friendly refrigerant. Internal electrical and mechanical safety devices allow for unsupervised operation by students.



### **R434 Vortex Tube Refrigerator**

The Vortex Tube refrigeration unit uses a compressed gas (usually air) divided into two streams at a lower pressure. One of these streams is about 50K colder, and the other is about 50K hotter than the compressed gas supplied. It is an unusual method for producing cooling air.



### **R515\*\* Mechanical Heat Pump**

The R515 Hilton Mechanical Heat Pump has been designed to allow students to obtain an overall understanding and appreciation of the performance and characteristics of a heat pump working on the vapour compression cycle and having an electrically driven compressor, and is suitable for all course levels, from vocational to undergraduate.



### **R833\*\* Air and Water Heat Pump**

Refrigerant vapour is compressed in an hermetic compressor and then flows to a water cooled condenser. Heat is transferred to cooling water and the refrigerant vapour is condensed to a high pressure liquid which passes through a thermostatic expansion valve. A switch allows the user to direct the flow of the expanding vapour to either an air or water source evaporator where heat is extracted and the cycle is repeated.



### **R853 Vapour Jet Refrigerator/Heat Pump**

This unit operates on a combined Rankine and vapour compression refrigeration cycle using a low pressure, non-toxic ozone friendly refrigerant. A simple ejector (or thermo-compressor) performs the expansion and compression processes involved in the combined cycles. A small electric motor drives the pump of the Rankine cycle. The heat source is electrically heated and produces high pressure vapour to drive the ejector.



## HEAT TRANSFER LAB



### **C100 Internal Combustion Engine Test Stand**

A regenerative engine test bed that allows the investigation of torque-speed, power-speed, specific fuel consumption, thermal and mechanical efficiency over a wide range of conditions on both petrol and diesel\* engines



### **C552 Flame Propagation and Stability Unit**

Allows investigation of the relationship between flame speed and air – fuel ratio for a variety of slow burning gaseous fuels. Numerous accessories are provided to explore how flames can be controlled and manipulated



### **RE510 Educational PEM Fuel Cell**

Demonstrates a High Watt Density PEM Fuel Cell, generating electrical power directly from hydrogen. Able to be electrically loaded both internally and externally by the operator.



### **C200 Bomb Calorimeter**

Allows measurement of the calorific value of liquid and solid fuels by a fundamental rate of rise method



### **S201 Steam Generator And Service Module**

A bench top unit which provides a gas fired steam generator for wet or superheated steam. A condensing unit with air ejector and a closed feed water system allow the Rankine cycle to be investigated. Exhaust emissions can be analysed via the provided instrumentation and the unit may also be connected to the S211 Turbine.



### **S211 Steam Turbine Module**

Bench top steam turbine module incorporating a single stage impulse steam turbine with water cooled friction brake, condenser, condensate measurement and all instruments and safety devices. Optional electric generator is also available.



### **801 Visual Refrigeration Training Unit**

This unit is designed to demonstrate the basic principles of heat transfer, the Vapour compression refrigeration cycle and the function and application of different flow controls.



### **802 Commercial Refrigeration Training Unit**

This unit quickly enables the student engineer to learn how the basic principles of the vapour compression cycle are applied in practical refrigeration. The unit provides valuable 'hands-on' experience in: fault diagnosis and correction, refrigerant recovery and recycling, evacuation and charging, changing components and electrical work.



### **810 Automotive Air Conditioning Trainer - 4 Faults**

This unit allows students to study a car based refrigeration system and to understand its layout, design and how to repair it should the occasion arise. The unit has four built in faults that can be activated to offer students different issues to resolve, these being blocked thermostatic expansion valve, blocked drier, compressor fault and poor condensing.



### **803 Basic Installation Training Package**

The 803 provides students with experience and practice in the correct location of components, cutting, flaring, bending and brazing of copper pipe, electrical wiring, evacuation, charging and leak testing, operation, temperature control and switch adjustment



### **804 Hermetic Refrigeration System Training Unit**

The Hermetic Refrigeration System Training Unit allows trainers to set various failure scenarios using its five system faults functions system. These faults include excess discharge pressure, faulty compressor valve, choked capillary, overcharged system and undercharged system.



### **811 Advanced Training Unit for Fault Location - 25 Faults**

Demonstrates multi evaporator system operating at different temperatures. Incorporates 25 typical system faults, each activated by a push-button switch.



### **805 Advanced Refrigeration Training Unit**

The Advanced Training Unit 805 is a fully operational, small scale coldroom, which enables the student to relate all test results, system faults and adjustments directly to situations encountered in service and maintenance. It is a multiple circuit unit, incorporating important secondary controls, is constructed entirely from standard commercial components and will give the student invaluable experience in fault diagnosis, system adjustment and replacement of faulty components. Using the push-button switches, 10 system faults can be introduced into the system.



### **808 Reverse Cycle Refrigeration and Air Conditioning Unit**

The 808 unit allows students to explore a more sophisticated refrigeration system incorporating reverse cycle operation, air cooled and water cooled condensers, forced air and static evaporators and dual temperature operation.



### **809 Refrigeration System - Domestic**

The 809 unit allows students to study the workings of domestic refrigeration systems and understanding key principles relating to evacuation, charging, fault finding, recovery and repair.

## FLUID MECHANICS LAB



### HB100C Flow Measurement Demonstrator

- The unit demonstrates the theory of flow through different types of meters.
- The relationship between the flow velocity and pressure can clearly be studied and understood through this practical demonstration.
- The unit allows students to look at the pressure/velocity distribution, whilst recognising the friction effects that exists within pipe flow.



### HB100D Pressure Losses in Bends and Fittings

- Comprises different diameter, roughness and material pipes, along with long and short radius bends, parallel sections and constrictions.
- The unit also has an expandable top section for looking at different options or students' own designs.
- Determination of Reynolds number in a variety of pipe sizes
- Calculation of theoretical pressure loss in a pipe using Bernoulli's equation – comparison with practical measured pressure drop.



### HB100E Stability of Floating Bodies

- The unit comes with 3 different hull designs for comparison testing. A calibrated weight set is supplied as well as an integral digital inclinometer.
- Determination of the metacentric height and the centre of buoyancy by analytical means.
- Calculating the righting moment for angles up to  $10^\circ$
- Experimental determination of the metacentric height



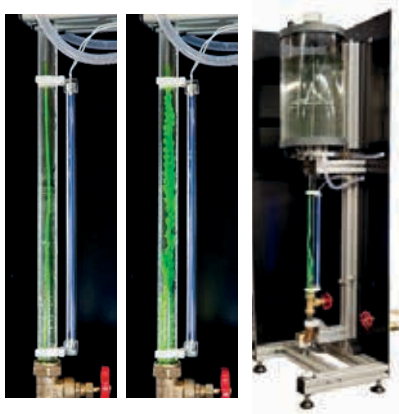
### HB100F Centre of Pressure Module

- A bench mounted unit with a graduated scale on the side of the float measuring in millimetres.
- A set of weights is supplied for testing as well as the counterbalance loading system and an Instruction manual for measuring the hydrostatic pressure in liquids.
- An important experiment for ship building, maritime structures, chemical engineering and tank design.



### HB100G Impact of a Jet

- The apparatus can be operated from HB100 Hydraulics Bench or independently from a local water source.
- It is used to investigate the forces applied on different designed deflectors being impacted by a constant jet of water



### HB100J Osborne Reynolds Apparatus

- The apparatus can be operated from HB100 Hydraulics Bench or independently from a local mains water source.
- The Apparatus is used for the illustration and investigation of Laminar and Turbulent flow with the active flow visible thanks to a dye injection system.



### HB100 Base Unit

- The HB100 Hydraulics Bench is the main source of water supply/flow for all the additional modules within the HB series.
- Mounted on lockable castor wheels and constructed around a sturdy framework onto which all elements of the hydraulics bench are mounted, including water storage tank.
- On/off control on the front of the frame, together with a safety cut out to control the pump.
- Closed system, which minimises the local water requirement but allows large flow rates and pressure ranges to be accommodated.
- Due to its size the unit may be stored under a suitably sized laboratory bench to save space.
- Space is provided for the inclusion of a second pump to boost the water flow rate and allow series/parallel pump experiments together with other optional items



### HB100A Free and Forced Vortices

- A benchtop unit designed to help students visualise and analyse key principles relating to free and forced vortices used as part of the following study areas:
  - Bernoulli's theorem
  - Irrational flow
  - Turbulent flow
  - Vector Analysis
  - Helmholtz's Theorem

### HB100B Bernoulli's Theorem Demonstrator



- Bernoulli's theorem concerns the conservation of mass and energy through a flowing system and the relationship between the flow velocity and pressure, such that as the velocity of the flow increases the pressure must decrease.
- The unit allows students to look at the conversion of energy in divergent/convergent pipe flow as well as the pressure/velocity distribution, whilst recognising the friction effects that exists within pipe flow.

### F110 Pressure Measurement Bench

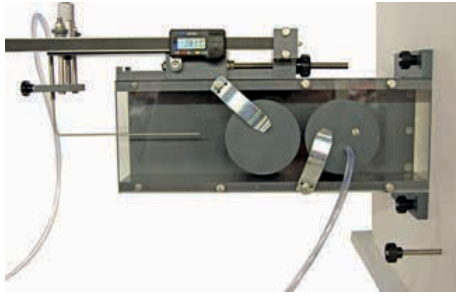


- The Hilton F110 Pressure Measurement Bench allows students to investigate measurement of one of the fundamental parameters that will be present in almost every branch of engineering and physics. The unit is bench mounted and self-contained having its own means of pressure generation.
- The unit allows the investigation of, manometer pressure measurement methods, pressures above and below atmospheric pressure and the investigation of manometer fluid density effect.
- A bench top, panel mounted U tube and inclined tube manometer together with a positive pressure Bourdon tube pressure gauge and compound (positive and negative) pressure gauge.
- A means of creating measurable pressures is also provided. The manometers allow investigation of the use of U and inclined tubes for pressure measurement and demonstrate the use of fluids of different density.

### F100H Flow Visualisation Investigation



- The Optional Flow Visualisation Investigation duct has been designed for operation with the Hilton Airflow System F100. The duct allows students to investigate simple flow visualisation techniques including smoke and cotton thread.
- A smoke generator generates a visual oil mist that is introduced into the airstream ahead of the test shape through a number of fine nozzles. The resulting smoke filaments clearly show streamlines around the test shapes.



### F100J Principles of Airflow, Pressure and Velocity Distribution (Pitot-Traverse)

A Pitot tube may be traversed across the air duct in both the free stream condition and behind a cylinder in cross flow allowing the velocity distribution to be measured. A cylinder with local static pressure tapping allows the pressure distribution around a cylinder in cross flow to be measured and compared with the theoretical distribution.

### F100 Airflow System

This flexible Air Flow System has an expandable range of optional experimental modules designed for student use. In conjunction with the F100 base unit, the optional modules allow the investigation of the fundamental aspects of air flow, aerodynamics and heat transfer.

### F100 Base unit

The base unit consists of a small footprint, high volume high pressure centrifugal fan with adjustable flow control, inlet and outlet couplings. The Hilton Airflow System F100 is available with an extensive range of optional accessories that makes the unit a very flexible and economic investment

\*Note Base shown with F100B accessory which is sold separately



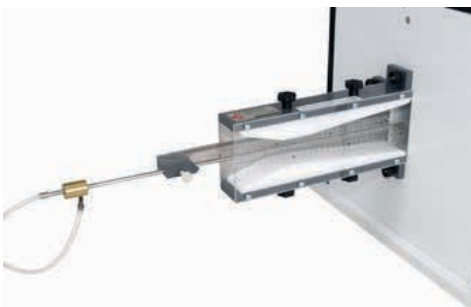
### F100A Multi Tube Manometer

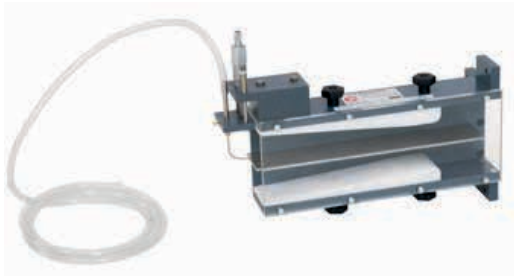
- Multi-tube manometer with a common reservoir that may be used to give a graphic display of pressure distribution on multi-point pressure tapings. The device allows up to 16 pressures to be monitored simultaneously either relative to atmospheric pressure or another pressure, via the common reservoir.
- This unit is a recommended accessory for all of the following optional items (except for the F100H) and is essential, if a similar unit is not available locally.



### F100B Bernoulli's Equation

- A convergent divergent duct section that connects to the Hilton Airflow System F100 using a flexible coupling. The device has a pitot-static tube that can be moved axially along the duct to allow total and static pressure due to the variation in duct cross section.
- The measured pressure changes may be compared with the Bernoulli equation predictions.





### F100C Boundary Layer investigation

- A reversible flat plate located inside a rectangular duct. The plate has one smooth and one artificially roughened face. The duct has removable profile plates that can establish an increasing or decreasing pressure gradient in the direction of flow.
- To investigate the growth of the boundary layer profile in a variety of conditions along the plate a micro-pitot tube is provided. This may be moved toward the plate in measured intervals using a micro meter adjustment allowing the growth of the boundary layer along the plate to be investigated.



### F110A Optional Extra Deadweight Tester

- An optional bench mounted deadweight tester (F110A) with weights and a Bourdon tube pressure gauge with clear front panel to allow viewing of the dial mechanism is also available to illustrate the calibration of a Bourdon tube pressure gauge.
- The deadweight calibrator F110A introduces students to the concept of  $\text{Pressure} = \text{Force} / \text{Area}$  by allowing calibration of a Bourdon tube pressure gauge. A set of precision weights allow discrete points of known pressure to be generated. To assist in student understanding the Bourdon gauge has a clear front, allowing viewing of the tube and pointer mechanism.



### F110B Optional Extra Pressure Transducer & Digital Display

The F110B when connected to the F110A allows students to calibrate an electronic transducer and relate the pressure points to the electronic signal



### F300 Compressible Flow Range

The phenomenon of compressible flow, sonic velocity and supersonic flow is possibly one of the most demanding areas of study for many students. The Hilton Compressible Flow range F300 and its collection of optional accessories enable students to safely and clearly investigate the fundamentals of compressible flow, air turbines and a variety of heat transfer experiments.

### F300 Base Unit

- The main unit consists of an instrumentation and control console that supplies a variable flow of compressed air to the range of optional modules. The unit provides common instrumentation for all of the options. Specialised instruments are included as required with the modules.
- Optional data acquisition is available for F300C, F300D, F300E, F300F





### F300A Nozzle Performance Test Module

- A series of convergent and convergent-divergent nozzles may be installed in one of two locations in a high-pressure measuring chamber. A pressure regulator, throttle valve and back pressure valve allow the air flow rate, inlet and discharge (or back) pressure to be varied.
- Standard unit includes convergent – divergent ducts designed to produce Mach 1.0 at the throat and supersonic velocities downstream.



### F300B Nozzle Pressure Distribution Module

- Two convergent-divergent nozzles of with the same throat diameter but different discharge area and a single convergent nozzle having the same diameter are supplied and fit in the common test section. All three nozzles have axial static pressure tapings allowing the approach, throat and divergent section pressures to be measured. The variation of pressure ratio and mass flow may be investigated for all three nozzles.
- Standard unit includes convergent – divergent ducts designed to produce Mach 1.0 at the throat and supersonic velocities downstream.



### F300C Experimental Impulse Turbine

- Application of the First law of Thermodynamics to a simple open system undergoing a steady flow process
- Features an impulse turbine with 4 separate nozzles and control valves, a throttle valve and belt brake dynamometer. Inlet and outlet air pressures, temperatures and air flow rate, turbine torque and speed are recorded by a combination of instrumentation on the Compressible Flow Range F300 base unit and the optional module.



### F300D Experimental Reaction Turbine Module

- Application of the First law of Thermodynamics to a simple open system undergoing a steady flow process.
- A single stage, radial flow, two jet reaction turbines with a throttle valve and belt brake dynamometer. Inlet and outlet air pressures, temperatures and air flow rate, turbine torque and speed are recorded by a combination of instrumentation on the Compressible Flow Range F300 base unit and the optional module.

### F300E Fluidisation / Fluid Bed Heat Transfer Module



- A glass cylindrical chamber with an air distribution plate at the bottom end allows the granular material supplied to be fluidised by a controlled and measured air flow. An adjustable cylindrical heater with surface thermocouple and power meter can be immersed at any level in, or out of the bed to allow measurement of the local heat transfer coefficient.
- A moveable pressure tapping and separate thermocouple allow the pressure and temperature within the bed at any depth to be measured. The pressures, temperatures and air flow rate are recorded by a combination of instrumentation on the Compressible Flow Range F300 base unit and the optional module.

### F300F Vortex Tube Refrigerator Module



- A compressed air vortex tube has two outlet ports that can be adjusted to vary the proportion of flow that leaves from the hot and cold exit points.
- Using a common compressed air source at ambient temperature, the cold stream can reach temperatures below  $-30^{\circ}\text{C}$  and the hot stream temperatures above  $50^{\circ}\text{C}$ .
- The effect of air supply pressure on the performance can be investigated together with the overall refrigerating effect. The pressures, temperatures and air flow rate are recorded by a combination of instrumentation on the Compressible Flow Range F300 base unit and the optional module

### F300G Pipe Friction Module



- A series of four straight tubes of different diameters with end pressure tapings allow pressure losses in a straight pipe to be investigated at a range of Reynolds numbers. Bends, sudden enlargements and contractions are included to allow investigation of pressure loss and recovery.
- The unit is driven by an ejector (jet pump) allowing investigation of entrainment ratio and ejector performance.
- The pressures, temperatures and air flow rate are recorded by a combination of instrumentation on the Compressible Flow Range F300 base unit and the optional module. A digital handheld manometer is also supplied.



### F865 Two Stage Compressor Test Unit

- Allows Investigation of a Single and Two Stage Compressor (with, or without intercooling) at a Range of Delivery Pressures.
- Safe and Suitable for Student Operation.
- Instrumentation Allows Detailed Analysis of Compressor Performance.
- Optional Computerised Data Acquisition Upgrade

Note that the F865 Two Stage Compressor Unit can be used as a suitable air supply for the entire Compressible Flow Range.

## AERODYNAMIC LAB

### Steam Turbine Power System



- A Complete Steam Turbine Power System
- National Instruments™ Data Acquisition System Configured With LabVIEW™
- Modern Steam Turbine Design
- Complete Thermodynamic Teaching Solution
- Shipped Ready to Operate

### Gas Turbine Power System



- Gas Turbine Engine Designed and Manufactured to Aerospace Standards
- Engine Operations Instrumented for Temperature and Pressure Measurement
- Gas Turbine Auto Start and Auto Shutdown System
- National Instruments™ Data Acquisition System Configured With LabVIEW™
- Includes Laboratory Procedures and Available Classroom and Lab Curriculum

### Gas Turbine Electrical Generation System



- Gas Turbine Engine Designed and Manufactured to Aerospace Standards
- Three Phase Electric Generator with Adjustable Rotor Excitation
- Engine Operations Instrumented for Temperature and Pressure Measurement
- Gas Turbine Auto Start and Auto Shutdown System
- National Instruments™ Data Acquisition System Configured With LabVIEW™
- Shipped Ready to Operate



### Wind Turbine Power System

- Programmable, Variable Speed Wind Source
- Adjustable Pitch Hub Accepts Custom Blades for Comparative Testing
- Three-Phase Electrical Generator with Adjustable Rotor Core Excitation
- National Instruments™ Data Acquisition System Configured With LabVIEW™
- Shipped Ready to Operate



### Process Automation System

- Mobile Test Platform for Comprehensive Exploration of Fluid Process Automation
- Purpose-Designed for Academic Education and Industrial Training
- Clear-View Centrifugal Pump with Easy Change Out Impeller Profiles
- Clear-View Fluid Flow Circuitry Reveals All Flow and Cavitation Phenomena
- Fully Instrumented for Fluid Flow, Pressure, Temperature, Level, Power, and Efficiency Analysis
- Industrial Programmable Automation Controller (PAC) for Program and Control of Pump Performance Characteristics, Flow Rates, Pressures, Temperatures, Multiple Tank Levels, Mixing, Alarms, Lock Out/Tag Out
- Industrial Human-Machine Interface (HMI) Touch Screen for Operator Process Automation Control
- Industrial Variable Frequency Drive (VFD) for Full PAC Control of Centrifugal Pump in System



### Cutaway Turbojet Engine

- Compressor and Turbine Stages Readily Viewable
- Ball Bearing Mounted Rotating Assembly Permitting Full Rotation
- Turbomachinery Components Reveal Actual Blade Geometries
- Reverse Flow Annular Combustor Can Clearly Visible
- Complete with Custom Storage and Transportation Case

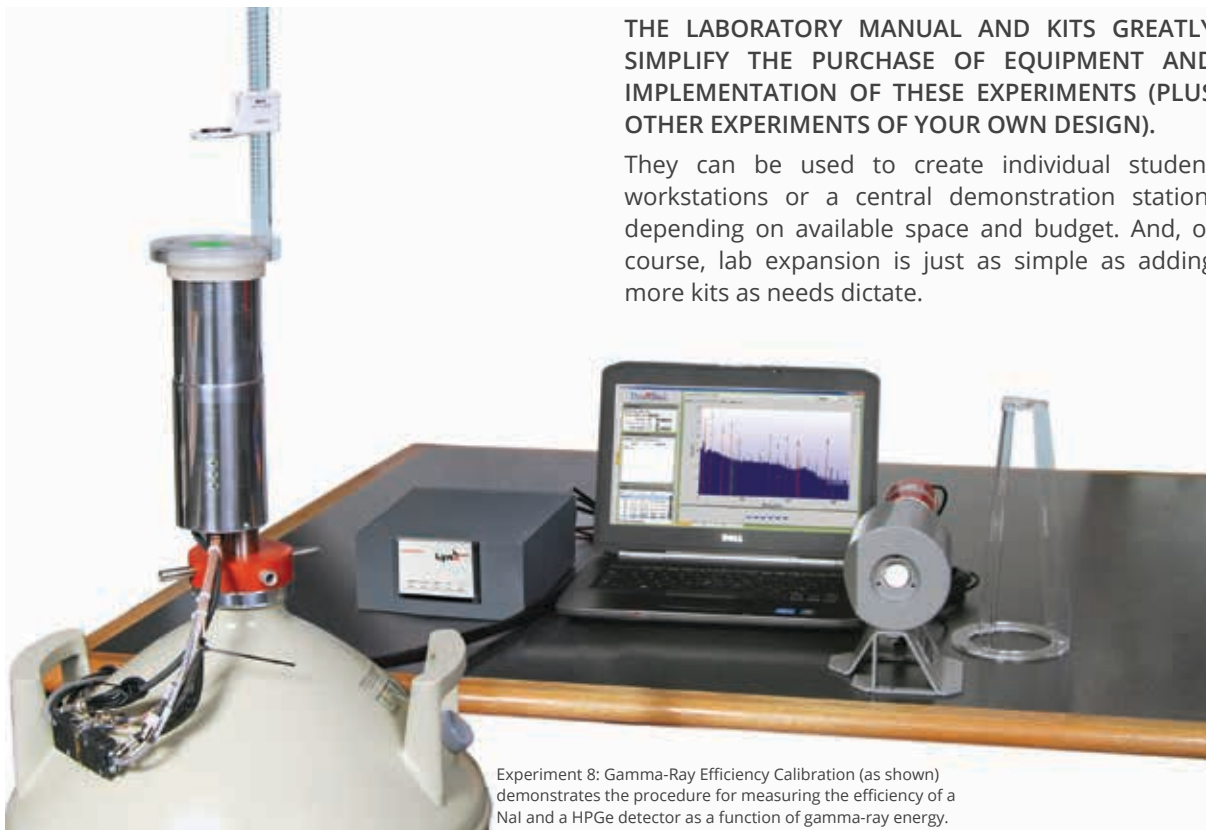
### Nuclear Science Experiments For Teaching Laboratories

With a half century of experience in the nuclear measurements industry, we is uniquely qualified to provide educational institutions with the tools for highly productive hands-on training in the fundamentals of nuclear physics through vocationally-relevant experiments.

We offers turn-key solutions to set up and/or refurbish physics teaching facilities with cutting-edge digital technology. A relatively modest investment yields a flexible equipment configuration that can serve undergraduate and postgraduate university training in addition to in-house training for industrial users.

**THE LABORATORY MANUAL AND KITS GREATLY SIMPLIFY THE PURCHASE OF EQUIPMENT AND IMPLEMENTATION OF THESE EXPERIMENTS (PLUS OTHER EXPERIMENTS OF YOUR OWN DESIGN).**

They can be used to create individual student workstations or a central demonstration station, depending on available space and budget. And, of course, lab expansion is just as simple as adding more kits as needs dictate.



Experiment 8: Gamma-Ray Efficiency Calibration (as shown) demonstrates the procedure for measuring the efficiency of a NaI and a HPGe detector as a function of gamma-ray energy.

### LABKIT-Basic

Starter kit for Experiments



- Osprey Digital MCA
- ProSpect Gamma Spectroscopy Software
- 802 2x2 NaI Detector
- LabKIT-Table: Apparatus for many of the experiments, including an angular scattering table and base plate, NaI 2"x2" detector shielding, source collimation for LABKIT-SR-CS137, scattering pillar, and absorber holder.
- LabKIT-Abs: Sets of four generic absorber materials, including aluminum, copper, lead, and polyethylene.
- LabKIT-SR-Cs137: 15 MBq (0.5 mCi) Cs-137 source capsule, for use with the LABKIT-Table assembly.

### LABKIT-Advanced

Supplement the starter kit to complete Experiments



- LYNX MCA
- BE2825 HPGe Detector System
- LabSOCS™ Software
- 802-2x2 NaI Detector
- 2007P Preamplifier
- LABKIT-SRCEHLD: Set of two HPGe Source Holders, including a fixed source holder for measurements at 25 cm and an adjustable source holder for measurements from 0 to 18 cm.
- LABKIT-NAICOLL: NaI 2" x 2" detector shielding for use with LABKIT-Table assembly.
- RCP-10-Cable: 10 ft cable bundle including preamp, SHV-SHV, and two BNC-BNC cables.



### C-V Plotters

We will tailor your CSM/Win Semiconductor Measurement System for your exact requirements. Choose the best capacitance meter, output device, and probe station for your needs. All CSM/Win C-V plotters feature the latest Dell Computers. The computer and capacitance meters are rackmounted in one compact enclosure. When ordered with a hot chuck or probe station, MDC can deliver a turnkey system of unparalleled performance. MDC offers the latest instruments from Agilent, Keithley, and Boonton to match every measurement need from routine production to advanced research. Most meters can be interfaced with a CSM/Win System.

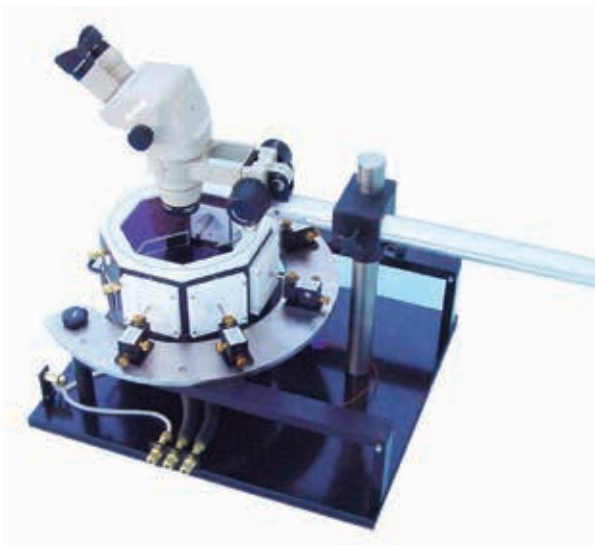


### Mercury Probes

Our MERCURY PROBES are precision instruments that enable rapid, convenient, and non-destructive measurements of semiconductor samples by probing wafers with mercury to form contacts of well-defined area.

MERCURY PROBES may be connected to C-V plotters, computerized semiconductor measurement systems, curve tracers, or doping profilers for a variety of measurements.

MERCURY PROBES eliminate time consuming metalization and their convenience make them ideal tools for production process monitoring applications. Their accuracy and reproducibility make them attractive for R&D applications.



### Cryogenic Probe Station

The MDC Model 441 Cryogenic Probe Station is a cost effective alternative to high-priced vacuum based cryogenic probe stations. With up to five probes available and sample diameters up to six inches, the MDC Cryogenic Probe Station allows for electrical measurements at temperatures near liquid nitrogen levels (77K).

Dry nitrogen or other inert gases can be delivered to the measurement dewar to reduce or eliminate condensation or contamination on the measurement sample. A simple access port allows for easy wafer placement and extraction. The Cryogenic Probe Station includes all needed probes, clear viewing window, opaque window, microscope or video system, and thermocouple.

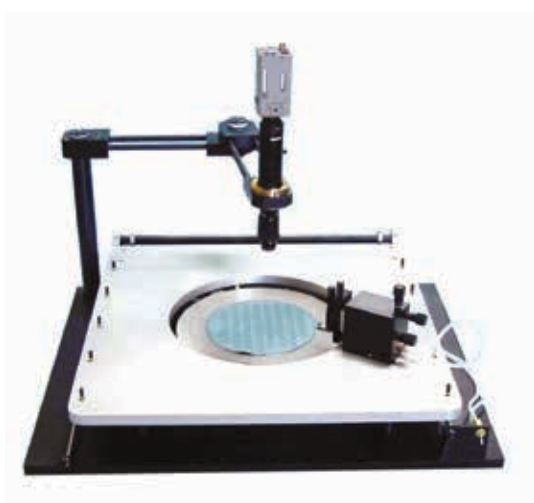
## HOT CHUCKS

### QuietCHUCK System



Basic Hot Chuck System: Complete set of components required for mobile ion measurements by conventional bias-temperature stress technique (CVBT) or triangular voltage sweep method (TVS) using the MDC QuietCHUCK DC Hot Chuck Controller. The CSM/WIN System can control and monitor all stress parameters. Multiplexing of up to 10 probes available. Available in 6", 8", and 12" diameter chucks.

### Wafer Area Prober



CSM/Win Systems from MDC are the ideal instruments to use with your Model 323 Wafer Area Probing System. CSM/Win Systems mate the most advanced C-V and I-V hardware with powerful Windows software to perform a wide variety of tests on semiconductors and MOS devices.

The Model 323, Wafer Area Prober System is designed to work with wafers up to 300 mm (12"). The system is available with integrated video microscope and specially designed dark box to make for easy access and small footprint.

### Automatic Mapping Four Point Probe System



Materials Development Corporation offers the complete line of Four Point Probe systems from AIT. Systems are available to measure up to 12" diameter (300 mm) wafers as well as specialty systems for Photovoltaic wafers and substrates. For more information on these systems, contact MDC.

The model CMT-SR2000N is by far the most popular of the AMT line. It is an easy-to-use, fully automatic, four-point probe system for measuring sheet resistance and resistivity of semiconductor wafers with diameters from 50 mm to 200 mm. The system can be used alone or fully automated under PC control.

## CNC MACHINE LAB

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### CO2 Laser Cutting & Engraving

Our range of non-metal laser cutting and engraving machines are built to our specifications, giving customers easy to use and fully integrated laser cutting capabilities, to produce work of the highest standards.

All machines in our BGL laser range include Lightburn laser software and a Lightburn ready 4K camera for design positioning, image tracing and monitoring



### Fibre Metal Cutting lasers

A range of metal cutting fibre laser systems built to our specifications. Our high precision cutting fibre lasers are ideally suited to all kinds of training, prototyping and low to medium volume manufacturing applications.

- Fully enclosed system for optimal fume and debris management
- Rigid construction and motion system incorporating high quality Taiwanese linear guide rails and racks, together with Japanese servo drives, allowing speeds of up to 40 meters per minute to be achieved
- Integrated PC control system



### CNC Lathes

A range of CNC lathes offer users unrivalled performance and ease of use. Within a matter of minutes, components incorporating external and internal profiles, including screw threads, can be designed, simulated and manufactured to close tolerances in a variety of materials.

Our lathes utilise industrial level programming codes and are ideal for vocational engineering training. Each machine can also be integrated into FMS/CIM systems, when fitted with optional factory fitted automated equipment.



## CNC Machining Centres

Our range of 3-axis CNC Machining centres offer unrivalled performance and ease of use. Within a matter of minutes 2½D components incorporating pockets, slots, holes and text can be designed, simulated and manufactured in a variety of materials. Amazing 3D hologram photos can also be produced using the included 'image relief' software wizard. Utilising the included '3DGeoCAM' software wizard, complex 3D solid models created in virtually any CAD package, can be imported and again, machined in a variety of materials.



## CNC Routers

A range of 3-axis CNC high performance routers are ideally suited to fulfil all levels of education and training requirements, as well as a host of design and commercial applications.

Manufactured in the UK, the rigid machine construction, incorporating high quality precision components, facilitates the use of high material removal strategies, giving a component throughput that lower quality machines of lighter construction cannot match.



## Fibre Marking Lasers

Our fibre marking lasers are ideal for a large variety of creative and industrial marking applications. The BFM110 is a compact, fully enclosed and easy to use bench top machine, giving customers the ability to permanently mark a wide range of materials, whilst maintaining a safe working environment.



## CHEMICAL LAB



### Distillation

- Study of the continuous distillation
  - Thermosiphon boiler
  - Bubble trays column
  - External reflux
- Study of column hydrodynamics
  - Determination of overflow conditions
- Study of main parameters
  - Mass Balance
  - Thermal Balance
  - Yield and hold-up



### Ebullimeter

- Study of liquid-vapour equilibria
- Atmospheric and reduced pressure functioning
- Theoretical study of binary mixtures
  - Ideal miscible mixtures: Dalton's equation, Raoult's equation
  - Non-ideal miscible mixtures (deviation, volatility, azeotropic mixtures)
- Partially-miscible and non-miscible mixtures
- Experimental study of binary mixtures
- At atmospheric pressure and under vacuum
  - Liquid- vapor phase diagram
- Application to rectification: calculating the number of theoretical plates
- Unit delivered with 10 sampling tubes of 20 mL.



### Liquid Extraction

- Liquid - Liquid extraction process in stirred column
- Study of the process of liquid- liquid extraction
- Identification of the operating conditions
- Determination of the interphase level
- Apply a ternary phase diagram
- Material balance
- Determination of the efficiency of the HUT / NUT column





### Chemical Reactor Computerized

- Provide a small volume reactor (1 liter) for studying chemical reactions with various parameters
- Perform a reaction
- Control the temperature of the reaction mixture
- Control the temperature of the heat transfer fluid
- Influence of stirring speed
- Add reagent at the beginning or at a later stage
- Reaction medium
- Homogeneous liquid
- Gas-liquid heterogeneous



### Gas-Liquid Absorption

- Mass transfer between gas - phase and liquid - phase
- Study the hydrodynamics of a packed column
  - Determine over flooding conditions
  - Determine packing factor
- Study the absorption of  $\text{CO}_2$ 
  - Materials balance on the gaseous solute
  - Determination the efficiency of the column by defining the HTU and NTU
  - Demonstrate the exothermic effect due to absorption



### Solid - Liquid Adsorption Desorption

- Study of the adsorption/desorption cycle in continuous operation
- Study of using 2 columns in series or in parallel
- Study of the adsorption process on activated carbon
  - Influence of parameters: temperature and liquid phase concentration, liquid and gas flow rates, adsorbent quantity
  - Materials balance and calculation of adsorption number
  - Demonstration of carbon saturation: column breakthrough graph
  - Calculation and drawing of the adsorption isotherms
- Study of the desorption process
  - Compare desorption in liquid phase and gaseous phase
  - Operation using a two column system: series and parallel operation



### Continuous Crystallisation

- Study crystallization process of a stirred mixture through controlled cooling
- Continuous process
- Parameters influence
- Temperature, stirring speed, concentration Feeding flow rate influence Dissolution of th solid to re-crystallize
- Crystals continuous draw-off



### Double Effect Evaporator

The purpose of evaporation is to vaporise the solvent in order to enrich the solute in the solution. At the end of the operation the substance recovered is known as the concentrate.

A conventional evaporator is heated by steam which condenses and transmits heat energy to the solution to be evaporated. As this solution boils it in turn releases vapour which may:

- Either be condensed in a condenser, in which case the process is known as "single effect" evaporation.
- Or be used to heat another evaporator, in which case it is known as "multiple effect". In theory an unlimited number of evaporators may be associated in series in this way.



### Liquid-Liquid Extraction

Liquid-liquid extraction is a fundamental material transfer operation based on the varying solubility of the components of a mixture. It entails extracting a compound from a solution (solute dissolved in a diluent) by selective transfer to a second liquid (solvent), non-miscible with the first and with different density.

A stirring device 9, allows to stir the liquid in the column, increasing the contact between the two phases and the mass transfer from one to another.



### Filtration

- Study of a filtration medium pressure and constant flow
- Study of plates assembly and disassembly
- Implement the filtration process
  - Filtration pressure
  - Filtration surface area
  - Filtration flow
- Define the bed filtration parameters
  - Bed and cake flow resistance
  - Determination of the dryness of the filtration cake obtained



## Controlled Distillation Unit

- OTP pilots allows to work on industrial scale in various fields: chemical engineering, maintenance, supervision
- Understand the continuous distillation process
- Study of the transitional phases
  - Start the unit
  - Put equilibrium conditions
  - Stop the unit
- Research of the optimum operating parameters
  - Feed rate, the preheating temperature, rate reflux, the pressure loss of column
- Study of the adjustments of the parameter's control
- Multivariable process implementation

### General specifications

- 1 glass tank 100 L.
- 3 gear pumps.
- Thermosiphon re-boiler made of a glass shell and a SS tube heat exchanger fed by steam.
- 2 product glass vessels, 10L.
- A SS pre-heat exchanger.
- ND150 Column with 6 SS bubble cap trays.
- Condenser, glass shell and SS tube.
- Distillate circuit.
- Pneumatic pump and centrifugal pump for feeding and transfer.
- Scale and SS welded frame.

Dim: 290 x 110 x 320cm - 1300 kg

## MULTI - EXCHANGERS

### Single-Tube Heat Exchanger

- Study a single-tube heat exchange
  - Thermal balance on hot and cold sides
  - Thermal efficiency
  - Overall heat exchange coefficient
- Characterize heat exchanges as a function of
  - The flow regime: laminar, intermediate or turbulent Co-current or counter- current circulation





## Thermal Heat Exchangers

- Compare three industrial heat exchangers having the same exchange surface area and different technologies
- Compare the three technologies
  - Single-tube glass/stainless steel heat exchanger
  - Shell-and-tube heat exchanger with glass shell and stainless steel tubes
  - SS plate-type heat exchanger
- Determine the influence of flow regimes on heat transfer
  - Turbulent and laminar regimes
  - Co-current and counter-current circulation
  - Study of temperature gradient (optional).
- Characterization of heat transfers
  - Thermal balance
  - Yield
  - Overall experimental and theoretical heat exchange coefficient  $K$

## THERMAL CONTROL

### Thermal Control Of A Reactor



- Study of the thermal behavior of a reactor
- Study of the parameters affecting the heating of a tank
  - Operating in batch or continuous with overflow
  - Influence of stirring and the forced cooling
  - Simulation of an exothermic and endothermic middle
- Thermal study
  - Thermal balance for reaction medium
  - Thermal balance for thermal fluids
  - Heat exchange efficiency
- Study of the regulation
  - Study of a single loop or cascade loop
  - Influence of response time



## Multi-Loop Control

- Unit designed for training technicians intervening on industrial control systems
- Hot water production system presentation
- Possible configuration of test rig parts
  - Pump, heat exchanger, control valve, sensors, safety components, etc
- Choice of different loops control & signals wiring
  - 4-20mA signals available on wiring terminals
- Study and set the parameters of the industrial sensors and actuators
- Study and adjust a number of single and cascade loops
  - Temperature control
  - Level control
  - Flow control
  - Temperature control using a cascade loop
  - Level control using a cascade loop
  - Pressure control (optional)

## SANITATION

### Automated Biological Treatment



- Demonstrate the various stages of wastewater treatment through the reproduction of the activated sludge process in an automated system
- Study of the sewage treatment process
  - Strictly aerobic
  - Aerobic and anoxic by aeration syncoating
  - Aerobic and anoxic in separated basins
- Conduct the process of wastewater treatment
  - Called activated sludge treatment
  - Process monitoring
  - Search for optimal treatment parameters
- Automation
  - Alarm management
  - pH and O2 control
  - Sludge recycling management



### Press Filter

- Sludge elimination by cake-mode filtration
- Define the bed filtration parameters
  - Bed and cake flow resistance
  - Determine the dryness of the filtration cake obtained
- Implement the filtration process
  - Choice of filtration surface area
  - Choice of filtration flow



### Desalination By Reverse Osmosis

- Reverse osmosis membrane filtration with operational pressure max 50 bars. Desalination process
- Study of essential parameters of the osmosis process
  - The osmotic pressure of the water
  - The permeability of the membrane
  - The rejection and conversion rate of the reverse osmosis module
- Optimization of a process of osmosis
  - Determination of the operational conditions ideal for attaching the amount and quality of the permeate

#### General specifications

- 100 L cylindrical feed tank in PE.
- Reverse osmosis module
  - High pressure carter 1000 psi.
  - Spiral type membrane
  - Area: 1,2 m<sup>2</sup>.
  - Applied pressure max: 55 bar.
- 2 beakers 1 L for sampling.

#### Instrumentation

- 2 flowmeters: 100 - 1000 L/h, 5- 60 L/h.
- 2 flowmeters: 60 - 600 L/h.
- 3 manometers, 0 - 60 bar.
- Level sensor.
- Combined probes (conductivity and temperature) with electronic indication





## Water Treatment By Dissolved Air Flotation

- Implementation of water treatment by dissolved air flotation
- Separation of suspended particles
- Agglomeration by using air bubbles dissolved
- Optimization of the process
  - Combination with chemical treatment (flocculation)
  - Feasibility study on different waters
- Study of the influence to flow rate and residence time

## INDUSTRIAL WASTE TREATMENT

### Mobile Chemical Waste Treatment



- Educational approach of the principles of waste disposal, treatment of chemical acidic, basic or containing metal ions pollution
- Characterization of the type of pollution and identification of treatment
  - Determination of acidic or basic solutions pH
  - Neutralization by addition of suitable reagent
  - Approach techniques of neutralization of a known metal ion (with optional O<sub>2</sub>)
- Unit for use in the program QEH of the establishment
  - Internal neutralization of chemical waste generated during the practical sessions
  - Mobile unit allowing movement of the device on the production site of pollution



## FOOD PROCESSING

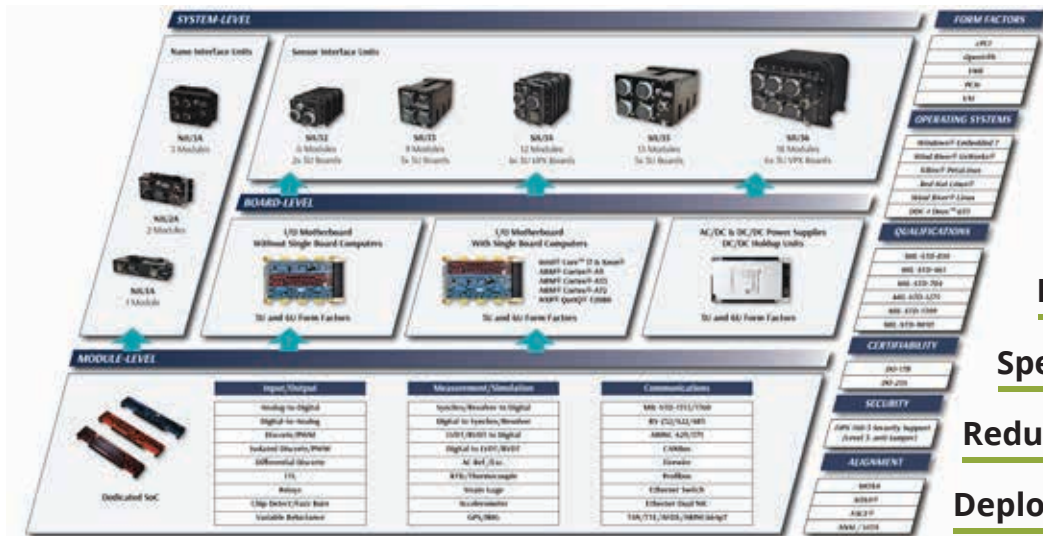
### Mini Cheese Factory

- Food process study: making cheese
- Use for fermentation, maturation, pasteurization
- Study of the manipulation heat of a tank
  - Temperature of the double jacket
  - Temperature of the mass reaction

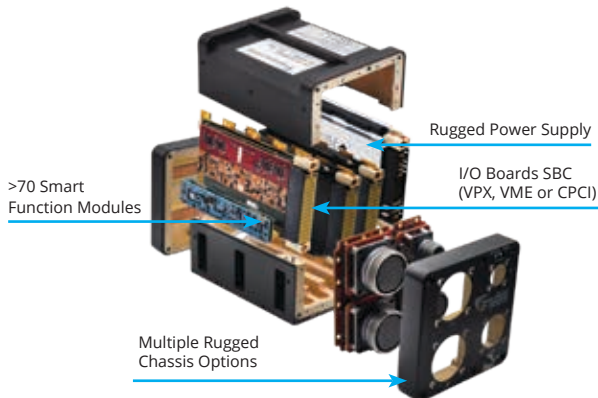
**MILITARY &  
AEROSPACE**



# COSA - CONFIGURABLE OPEN SYSTEM ARCHITECTURE



**Do More**  
**Spend Less**  
**Reduce Swap**  
**Deploy Faster**



- Dedicated FPGA
- Mix & Match Module
- Non-Multiplexed Channels
- Health Monitoring & continuous background BIT
- Proven Software Libraries +Source Code
- Jump Start Developments GUI Driven Soft Panel
- Distributed I/O & PID Loop Support

## Single / Multifunction I/O Boards

- Designed for rugged Defense, commercial aerospace and industrial applications.
- Intelligent I/O boards for most sense and response applications.
- Built upon our unique, highly adaptive, Configurable Open Systems Architecture™ (COSA).
- Choose from a comprehensive list of more than 70 smart I/O, communications, simulation and measurement and Ethernet switch functions.
- These highly intelligent I/O boards, can often operate as standalone systems, eliminating the need for a Single Board Computer (SBC), operating system and associated software royalty costs.
- SWaP-optimized systems in air, land, and sea systems.
- Reduce overall card count to save both space and cost. Eliminate man-months of integration, with a configured, field-proven, multifunction I/O board
- Access and manage data via cPCI, PCIe, Open VPX, VME or Ethernet.

Input / Output	Communications
A/D	MIL-STD-1553
D/A	MIL-STD-1760
Discrete	RS-232/422/485
Isolated Discrete	ARINC 429/575
TTU	CANBus
Differential Transceiver	*Ethernet Switch
Relay	Time-Triggered Ethernet®
Combination Module	AFDX® /ARINC664, Part7

Measurement
Synchro/Resolver to Digital
Digital to Synchro/Resolver
LVDT/RVDT to Digital
Digital to LVDT/RVDT
AC Reference
RTD
Thermocouple
Strain Gage

## SMART I/O BOARDS

### 3U cPCI Multifunction I/O Boards



**Model 75G5:** The 75G5, can be configured with up to three smart function modules. Ideally suited for rugged military, industrial and commercial applications, Preexisting, fully-tested functions can be combined quickly and easily in an unlimited number of ways.

- Support for 3 independent, smart function modules
- 70+ modules options
- Background Built-In-Test



**Model 75D4:** The 75D4 is a 3U cPCI High Density I/O and Communication Board with a single, high-density function module slot. In addition, the motherboard also includes an option for an integrated four-channel RS232/423/422/485 serial communication complement.

- Supports one high-density, function module
- Optional 4 serial ports
- Background Built-In-Test



**Model 75C3:** The 75C3 is a 3U cPCI Multifunction I/O and Communication Board with three independent function module slots. Two of the slots can be configured with a variety of I/O and communication functions; the third, with either a combination module or with a reference supply

- Support for 3 independent, intelligent function modules
- Automatic Background Built-In-Test (BIT)



**Model 75C5:** NAI's 75C5 is a 3U cPCI Multifunction I/O and Communication Board with three independent function module slots. Two of the slots can be configured with a variety of I/O and communication functions; the third, with either a combination module featuring four multiplexed Analog-to-Digital (A/D) channels and 28 Discrete I/O programmable channels, or with a reference power supply. Using multiple DSPs, the enhanced motherboard enables higher processing power and dedicated pre-processing control for each module.



**Model 75D4-H2:** The 75D4-H2 is a Layer 2+ Gigabit Ethernet Switch built upon NAI's multifunction, 3U cPCI board technology. The 75D4 motherboard contains a high-density I/O module slot that supports an H2 switch function. The 75D4 with H2 consumes approximately 9.5 W of total power at 5 V.

- Supports 3 independent function modules
- Control via system Bus or Ethernet
- Automatic Built-In-Test
- Rear I/O support

## 6U cPCI Multifunction I/O Boards



**Model 78C2:** The 78C2 is a 6U cPCI Multifunction I/O and Communication Board with six independent function module slots that can be configured with a variety of I/O and communication functions.

Additional enhancements include FIFO data buffering for select modules. Using multiple DSPs, the enhanced motherboard enables higher processing power and dedicated pre-processing control for each.

- Support for 6 intelligent function modules independent,
- A variety of I/O and communication modules to choose from
- Control via either PCI Bus or Gigabit
- Ethernet (Gig-E) interface
- FIFO data buffering for A/D, D/A, 5/D, and LVDT



**Model 78CS2:** The 78CS2 is a 6U cPCI Multifunction I/O and Communication Board designed for applications requiring Digital-toSynchro/Resolver (D/S) stimulus output, as well as I/O and communication functions. This board contains five independent function module slots. The board can be configured for 10 D/S channels, or for D/S in combination with I/O and communication modules.

- Support for 5 independent intelligent function modules.
- Up to 10 D/S channels
- On/off output capability
- Individual reference inputs per channel
- Rotation with start and stop angles
- Automatic Background Built-In-Test

## 6U VME Multifunction I/O Boards



**Model 64G5:** The 64G5 can be configured with up to six smart function modules. Ideally suited for rugged military, industrial, and commercial applications, this low power/high performance, board accelerate deployment of SWaP-systems.

- 6U VME with Master VME Bus capability
- Support for 6 independent, smart function modules
- 70+ modules to choose



**Model 64C3:** The 64C3 is a 6U VME Multifunction I/O and Communication Master or Slave (user selectable) Control Board with six function module slots that can be configured with a variety of I/O functions.

- 6U VME with Master VME Bus capability
- Support for 6 independent, intelligent function modules
- Control via either VME or Gig-E



**Model 64CS4:** The 64CS4 is a 6U VME Multifunction I/O board designed for applications requiring Digital-to-Synchro/ Resolver (D/S) stimulus output, as well as I/O and communication functions. This board contains five intelligent, function module slots.

- Support for 5 independent, intelligent function modules
- A variety of I/O and communication modules
- Up to 10 D/S channels
- Control via VME/ Ethernet



**Model 64C2:** The 64C2 is a 6U VME Multifunction I/O and Communication Slave Board with six function module slots that can be configured with a variety of I/O and communication functions. Enhancements include FIFO data buffering for select modules.

- Support for 6 independent, intelligent function modules
- A variety of I/O and communication modules to choose from
- Control via VME/ Ethernet

### 3U Open VPX Multifunction I/O Boards



**Model 68G5:** The 68G5, can be configured with up to three smart function modules. Ideally suited for rugged military, industrial, and commercial applications, this lowpower/ high-performance board delivers off-the-shelf solutions that accelerate deployment of SWaP-C optimized systems.

- Support for three independent, smart function modules
- 70+ modules to choose from
- Independent XL SerDes interface to each function module slot



**Model 68C3:** The 68C3 is a 3U OpenVPX Multifunction I/O and Communication Board with three function module slots that can be configured with a variety of I/O and communication functions. Additional enhancements include FIFO data buffering for select modules.

- Support for three independent, intelligent function modules
- A variety of I/O and communication modules to choose from
- Control via GbE/PCIE

### 6U Open VPX Multifunction I/O Boards



**Model 67G6:** The 67G6, can be configured with up to six smart function modules. Ideally suited for rugged military, industrial, and commercial applications, this lowpower/high-performance board delivers off-the-shelf solutions that accelerate the deployment of SWaP-optimized systems.

- Up to 6 independent Intelligent I/O function modules supported
- 24 Channels programmable Discrete I/O
- 0 to 60 VDC; Sink, source, or push/pull
- Independent XL SerDes interface to each function module slot



**Model 68C3:** The 68C3 is a 6U OpenVPX Multifunction I/O and Communication Board with six function module slots that can be configured with a variety of I/O and communication functions. Additional enhancements include FIFO data buffering.

- Support for three independent, intelligent function modules
- A variety of I/O and communication modules to choose from
- VPX / OpenVPX (ANSI / VITA 46 & VITA 65) Slot Profile: SLT3- PER-1U-1 F2U-14. 3. 3

## PCI/PCIe Multifunction I/O Boards



**Model 76C2:** The 76C2 is a PCI/PCIe Multifunction I/O and Communication Board with three independent function module slots that can be configured with a variety of I/O and communication functions.

- Single-slot, half-size PCI board
- Support for three independent, intelligent function modules
- A variety of I/O and communication modules to choose from Control via PCIe Bus interface



**Model 76C3:** The 76C3 is a PCI/PCIe Multifunction I/O and Communication Board designed for applications requiring Digital-to-Synchro/Resolver (D/S) and Digital-to-LVDT/RVDT (DLV) stimulus output, as well as I/O and communication functions.

- Single-slot, full-size PCI board
- Support for 5 independent, intelligent function modules
- A variety of I/O and communication modules to choose from Up to 6 D/S channels.



**Model 79C3:** The 79C3 is a PCIe Multifunction I/O and Communication Board with three independent function module slots that can be configured with a variety of I/O and communication functions.

- Single-slot, half-size PCIe (XL) board
- Support for three independent, intelligent function modules
- A variety of I/O and communication modules to choose from Control via PCIe Bus interface



**Model 79G5:** The 79G5 can be configured with up to three NAI smart I/O and communication function modules. Ideally suited for high channel density and combined Multifunction I/O requirement.

- Supports up to 3 independent, smart function modules
- Front panel high density rugged Micro-D I/O receptacle connector
- Independent internal XL SerDes interface to each function module slot

## SINGLE BOARD COMPUTERS WITH I/O

### 3U cPCI SBC with I/O



**Model 75ARM1:** The 75ARM1 is a 3U cPCI ARM® Cortex®-A9-based, Single Board Computer (SBC) that can be configured with up to three smart function modules.

- ARM® Cortex®-A9 Dual Core 800 MHz Processor
- 512 MB DDR3L SDRAM
- Up to 32 GB SATAII NAND Flash
- 70+ modules to choose from
- Rear Ethernet option



**Model 75PPC1:** The 75PPC1 is a 3U cPCI NXP® QorIQ® P2041, PowerPC-based, Single Board Computer (SBC) that can be configured with up to two smart function modules.

- NXP QorIQ P2041 Quad-Core e500mcProcessor@ 1.2 GHz
- Up to 8 GB DDR3L SDRAM
- Up to 32 GB SATA II NAND Flash
- 70+ modules to choose





**Model 75INT2:** The 75INT2 is a 3U cPCI Intel® Core™ i7-based, Single Board Computer (SBC) that can be configured with up to two smart function modules.

- Intel® Core™ i7-3517UE @ 1.5 GHz Dual Core Processor
- Up to 8 GB DDR3L SDRAM
- Up to 32 GB SATA II NAND Flash
- 70+ modules to choose from

### 3U Open VPX SBC with I/O



**Model 68ARM1:** The 68ARM1 is a 3U VPX ARM® Cortex®-A9-based, Single Board Computer (SBC) that can be configured with up to three smart function modules. Ideally suited for rugged defense, commercial aerospace, and industrial applications, the 68ARM1 delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems.

- ARM® Cortex®-A9 Dual Core 800 MHz Processor
- 512 MB DDR3L SDRAM
- 32 GB On-Board SATA II NAND Flash
- Expansion SATA II Flash
- 70+ modules to choose from



**Model 68PPC2:** The 68PPC2 is a 3U OpenVPX, NXP®, QorIQ® T2080 quad-core processor, PowerPC-based, Single Board Computer (SBC) that can be configured with up to two intelligent function modules. Ideally suited for rugged defense, commercial aerospace, and industrial applications, the 68PPC2 delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems.

- NXP® QorIQ® T2080 Quad-Core e6500 Processor @1.5 GHz
- Up to 8 GB DDR3 SDRAM
- Up to 32 GB SATA II NAND Flash
- 70+ modules to choose

### 6U VME SBC with I/O



**Model 64ARM1:** NAI's 64ARM1 is a 6U VMEARM® Cortex®-A9-based, Single Board Computer (SBC) that can be configured with up to six smart function modules. Ideally suited for rugged defense, commercial aerospace, and industrial applications, the 64ARM1 delivers off-the-shelf solutions that accelerate deployment of SWaP-optimized systems.

- Compact 6U VME SBC with support for 6 independent, smart function modules
- 70+ modules to choose from
- Independent XL SerDes interface to each function module slot
- COSA® architecture
- ARM® Cortex®-A9 Dual Core 800 MHz Processor
- 512 MB DDR3L SDRAM
- Up to 32 GB SATAII NAND Flash (4 GB standard)
- < 5 W MB power dissipation
- Front and/or rear I/O
- 2x 10/100/1000 Base-T Ethernet; 2 to rear, or 1 to rear and 1 to front I/O

## SINGLE BOARD COMPUTERS WITH I/O



**Model 68INT5:** 3U OpenVPX™ Intel® Xeon® SBC with One Smart Function Module Slot and integrated output graphics/video & I/O expansion.

- Form Factor: 3U, 0.8" or 1.0" Pitch/ 4HP or SHP
- Processor: Intel® Xeon® six-core, E-2276ME up to 2.8\* GHz, 12 MB Cache
- Function Module Slots: 1 slot
- Maximum Memory: 32 GB DDR4 SDRAM w/ ECC
- Maximum Storage: 64 GB SATA II NAND Flash
- Video Option: HDMI / DVI output
- Available O/S: CentOS / Linux® and Microsoft®



**Model 67PPC2:** 6U OpenVPX NXP® PowerPC based Single Board Computer that can be configured with up to six smart I/O and communication function modules.

- Form Factor: 6U, 0.80" Pitch/ 4HP
- Processor: NXP QorIQ® T2080 Quad Core e6500 Processor at 1.5 GHz
- Function Module Slots: 6 slots
- Maximum Memory: 8 GB DDR SDRAM
- Maximum Storage: 32 GB SATAII NAND Flash
- Available O/S: Wind River® VxWorks® or Linux BSP/OS Support



**Model 68ARM2:** 3U OpenVPX™ Rugged, Cybersecure & Anti-Tamper Single Board Computer

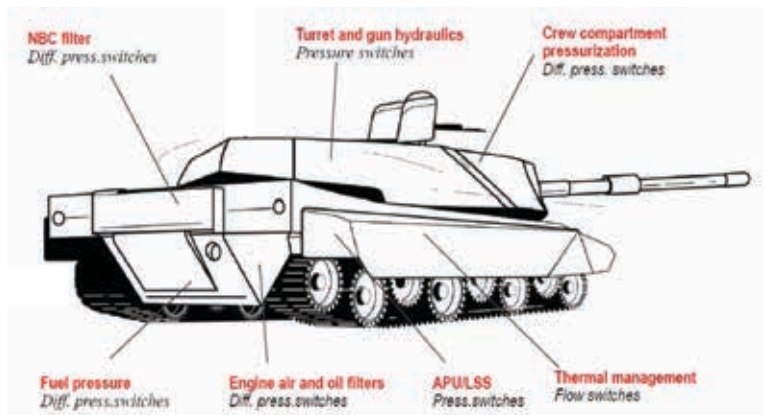
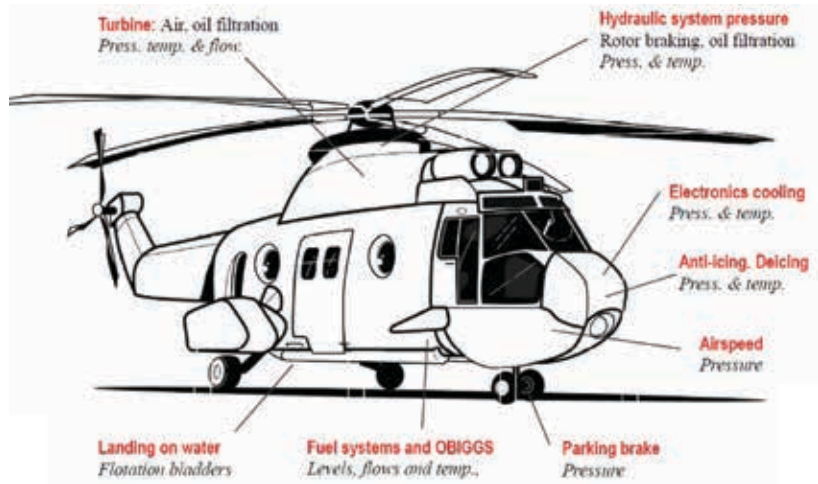
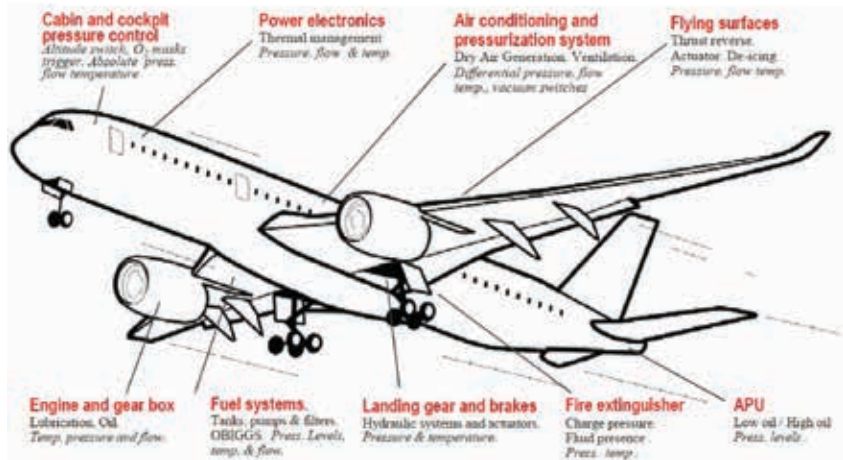
- Form Factor: 3U, 1.0" Pitch / SHP
- Processor: Zynq® UltraScale+™ QuadCore ARM® Cortex™ -A53 MPCore™
- Function Module Slots: 3 slots
- Maximum Memory: 8 GB DDR4 SDRAM w/ ECC
- Maximum Storage: 32 GB SATA II NAND Flash



**Model 68PW1:** 3U OpenVPX SOSA™ -aligned PWM Servo Motor Drive

- Form Factor 3U, 1.0" Pitch
- Max Channels 1 Channel
- Function PWM drive provides programmable PWM output drive (up to 65 V @ 10 A continuous) from a single +28 VDC input source
- Power Input: +12V, ±12V AUX, +3.3V AUX, ~10 W power dissipation (est./ typ.), ~96% efficient PWM Drive

# PRESSURE, TEMPERATURE, LEVEL-TRANSDUCERS



## RUGGED COTS SYSTEMS

### NIU3E



- Board Type: Module
- Dimensions w/ Connectors (w x h x d): 7.2" x 6.6" x 3.0" (est.)
- Volume w/ Connectors (in3): 120
- Weight/ lbs (fully populated): 6
- Est. Typ. Power Dissipation (W): 5 to 25
- # of Board Slots: N/A
- Function Module Slots: 1
- Ethernet: 16x 10/100/1000Base-T (GbE) 4x 10GBase-SR Fiber
- I/O & Communications: 24-CH programmable Discrete I/O, 8-CH ARIN C 429/575, 4-CH CAN Bus and 2-CH MIL-STD-1553

### SIU34



- Board Type: 3U OpenVPX
- Dimensions w/ Connectors (w x h x d): 5.7" X 5.9" X 9.4"
- Volume w/ Connectors (in3): 316 Weight/ lbs (fully populated): < 8.2 lbs. Chassis plus ~ 1.25 lbs. for PSU and each addl. board
- Est. Typ. Power Dissipation (W): 50 to 130 W
- # of Board Slots: 4
- Function Module Slots: 12
- Max I/O Pins: 604
- Ethernet: 2 x Gb

### SIU36



SIU36 Conduction Cooled

- Board Type: 3U OpenVPX
- Dimensions w/ Connectors (w x h x d): 7.13" X 4.78" X 9.31"
- Volume w/ Connectors (in3): 320
- Weight/ lbs (fully populated): < 6.85 lbs. Chassis plus ~ 1.25 lbs. for PSU and each addl. board Est. Typ. Power Dissipation (W): 50 to 150 W
- # of Board Slots: 6
- Function Module Slots: 18
- Max I/O Pins: 906
- Ethernet: 2 x Gb



SIU36 Convection Cooled



### SIU31

- Board Type: 3U cPCI
- Dimensions w/ Connectors (w x h x d): 4.71" X 2.35" X 8.71"
- Volume w/ Connectors (in3): 96.41 Weight/ lbs (fully populated): < 5.0
- Est. Typ. Power Dissipation (W): 7 to 35 W # of Board Slots: 1
- Function Module Slots: 3
- Max I/O Pins: 132
- Ethernet: 2 x Gb



### SIU33V

- Board Type: 3U OpenVPX
- Dimensions w/ Connectors (w x h x d): 4.71" X 4.78" X 8.71"
- Volume w/ Connectors (in3): 196.10 Weight/ lbs (fully populated): < 10.0
- Est. Typ. Power Dissipation (W): 14 to 75 W # of Board Slots: 3
- Function Module Slots: 9
- Max I/O Pins: 322
- Ethernet: 2 x Gb



### SIU33

- Board Type: 3U cPCI
- Dimensions w/ Connectors (w x h x d): 4.71" X 4.78" X 8.71"
- Volume w/ Connectors (in3): 196.10 Weight/ lbs (fully populated): < 10.0
- Est. Typ. Power Dissipation (W): 14 to 75 W # of Board Slots: 3
- Function Module Slots: 9
- Max I/O Pins: 322
- Ethernet: 2 x Gb



### SIU35

- Board Type: 3U cPCI
- Dimensions w/ Connectors (w x h x d): 7.13" X 4.78" X 8.71"
- Volume w/ Connectors (in3): 296.85 Weight/ lbs (fully populated): < 15.0 Est. Typ. Power Dissipation (W): 25 to 100 W
- # of Board Slots: 5
- Function Module Slots: 15
- Max I/O Pins: 512
- Ethernet: 2 x Gb



### NIU3A

- Board Type: Module
- Dimensions w/ Connectors (w x h x d): 7.2" x 5.65" x 3.25" (est.)
- Volume w/ Connectors (in3): 120 Weight/ lbs (fully populated): 5.4
- Est. Typ. Power Dissipation (W): 5 to 25 W # of Board Slots: N/A
- Function Module Slots: 3
- Max I/O Pins: 206
- Ethernet: 2 x Gb
- I/O & Communications: 24-CH programmable Discrete I/O, 8-CH ARINC 429/575, 4-CH CANBus and 2-CH MIL-STD-1553



### NIU1A

- Board Type: Module
- Dimensions w/ Connectors (w x h x d): 6.8" X 1.5" X 2.5"
- Volume w/ Connectors (in3): 28.90 Weight/ lbs (fully populated): < 1.2
- Est. Typ. Power Dissipation (W): 5 to 15 W # of Board Slots: N/A
- Max I/O Pins: 59
- Ethernet: 2 x Gb
- Function Module Slots: 1



### NIU2A

- Board Type: Module
- Dimensions w/ Connectors (w x h x d): 7 .0" X 3.0" X 2.5"
- Volume w/ Connectors (in3): 52.5 Weight/ lbs (fully populated): < 2. 75
- Est. Typ. Power Dissipation (W): 5 to 25 W # of Board Slots: N/A
- Function Module Slots: 2
- Max I/O Pins: 132
- Ethernet: 2 x Gb



### SIU6

- Board Type: 6U VME
- Dimensions w/ Connectors (w x h x d): 11.75" x 3.35" x 8.65"
- Volume w/ Connectors (in3): 340.49 Weight/ lbs (fully populated): < 14.0 Est. Typ. Power Dissipation (W): 12 to 60 W # of Board Slots: 2
- Function Module Slots: 12
- Max I/O Pins: 316
- Ethernet: 2 x Gb

## RUGGED ETHERNET SWITCH

### NIU2A-ES2



The NIU2A-ES2 is a small, lowpower, self-contained Rugged Ethernet Switch system that is ideally suited for military, commercial aerospace and industrial applications requiring a SWaP-optimized solution. Powered by an integrated MILSTD-70 4A (designed to meet) power supply, it is a Layer 3, fully managed switch providing sixteen (16) 10/100/1000Base-T Gigabit Ethernet ports and four (4) optional 10 Gigabit 850 nm multimode fiber-optic ports. Additionally, there is one GbE and one RS-232 port for maintenance/configuration interface.

- Supports ES2 Managed Switch Module
- 16 x 10/100/1000Base-T (Gigabit Ethernet) ports
- 4x Fiber Optic (10 Gb@ 850 nm) option
- 1x Gigabit Ethernet and 1x RS-232 for maintenance
- Minimized SWaP footprint
- ~7 .0" x 3.0" x 2.5" (including connectors)
- ~2. 75 lbs (1.25 kg)
- 28 VDC input@ ~1.0 A Operating

### RESIU31



NAI's RESIU31 subsystem is configured with NAI's 75D4-H2, a Layer 2+ Gigabit Ethernet (Gig-E) Switch. Ideally suited for rugged military, industrial, and commercial applications, the RESIU31 delivers an off-the-shelf Ethernet switching solution that accelerates deployment of SWaP-optimized systems. In addition, the 75D4 motherboard can integrate four channels of RS232/423/422/485 serial communications. Serial data is available on the cPCI bus or, optionally, via one of the Ethernet switch ports.

- Broadcom® 533125
- Non-blocking Gigabit Ethernet fully integrated switch fabric with 4Mb packet buffer memory
- Integrated MACs (IEEE 802.x compliant) with support for 9600-byte jumbo frames
- High-performance look-up engine with support for up to 5K unicast MAC address entries

### Synchro / Resolver / LVDT / RVDT Boards

- Synchro/Resolver Booster Amplifiers
- Synchro/Resolver Converters
- ARINC 429-to-Synchro Converters
- Second Harmonic Fuel Flow Converters

## AVIONICS INTERFACE SOLUTIONS

### Compact USB Solutions



**USB 1553:** USB 1553 family of pocket sized USB adapters enable computers to communicate with, simulate, test, and monitor MIL-STD-1553 equipment and systems.

- Upto 2 Dual Redundant 1553 Channels
- 8 Avionics Discrete I/O
- USB 2.0 Bus Powered
- 32MB Memory



**USB 429/717/708:** USB family of pocket sized USB adapters enable computers to communicate with, simulate, test, and monitor ARINC 429, 717, 708 equipment and systems.

- Up to 16 ARINC 429 Channels
- Up to 4 ARINC 717/ 708 Channels
- 8 Avionics Discrete I/O
- USB 2.0 Bus Powered
- 32MB Memory



**USB Multi:** USB MULTI family of pocket-sized USB adapters enable computers to communicate with, simulate, test, and monitor Avionics different protocols in a single device equipment and systems.

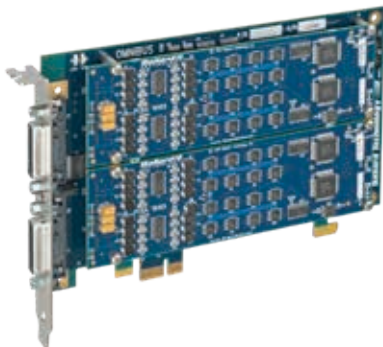
- 1 dual Redundant Channel 1553
- 6 Channel ARINC 429, 2 Channel ARINC 708, 4 Channel ARINC 717
- Upto 4 RS422/485/232/ Differential DIO

### EMBEDDED AVIONICS INTERFACES

#### PCI/ PCIe:

Enables computers and networks to interface with multiple avionics databuses for testing, validating, simulating for commercial and military avionics equipment and systems.

- MIL-STD-1553 - Upto 4 Channel
- ARINC 429 - Upto 32 Tx/Rx
- ARINC 717 - Upto 8R/8T
- ARINC 708 - Up to 4R/4T
- Serial Upto 8 ports
- 64 Avionics DIO







### PXIe/cPCI:

Used in multi-slot PXI Express and cPCI Express test systems, with multiple avionics databuses for testing, validating, simulating for commercial and military avionics equipments.

- MIL-STD-1553 - Upto 4 Channel
- ARINC 429 - Upto 32 Tx/Rx
- ARINC 717 - Upto 8R/8T
- ARINC 708 - Up to 4R/4T
- Serial Upto 8 ports
- 64 Avionics DIO

### OmniBus Box II:

These versatile units can be controlled through Ethernet or USB, or can be programmed to operate standalone. OBB2 is perfect for challenging simulation, test, interface, bridging, control, simulation and data recording applications.



- Dual Core PPC Embedded Processor
- Ethernet, serial and USB
- Supports multiple protocols in one device
- Up to 8 MIL-STD-1553 databuses
- Up to 64 ARINC 429 databuses
- Up to 32 ARINC 717 databuses
- Up to 16 ARINC 708 databuses
- Up to 16 RS-232/422/485 serial ports
- Up to 128 avionics discrete I/O
- PMC/XMC expansion site

### VME/VPX:

Multifunction I/O and Communications Board, can be configured with up to Six/ Three smart function modules. Ideally suited for rugged military, industrial, and commercial applications.



- MIL-STD-1553 - Upto 24 Channel
- ARINC 429 - Upto 72 Tx/Rx
- CAN Bus upto 8
- Serial Upto 8
- 2x Ethernet
- Connections via front, rear, or both

## SMALL FORM FACTOR BOARDS

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### Mini PCIe:

Me1000 family of mPCIe cards enable embedded computers to interface with MILSTD-1553 or ARINC 429/717 avionics data buses.

- MIL-STD-1553 - Upto 2 Channel
- Compact Size
- Flexible Mounting
- Reduced Cost
- Serial optional



### XMC/PMC:

Databus interface cards enable embedded systems to communicate with, simulate, test, and monitor avionics equipment and systems for MIL-STD-1553, ARINC 429, 717, 708.

- MIL-STD-1553 - Upto 8 Channel
- ARINC 429 - Upto 20
- ARINC 717 /708 upto 4



### PCIe/104:

Pe1000 family of PCIe/104™ and PCI/104-Express™ cards enable embedded computers to interface with a variety of avionics data buses.

- MIL-STD-1553 - Upto 2 Channel
- ARINC 429 - Upto 28
- ARINC 717/708 upto 4
- Serial Upto 4



## RUGGED DISPLAYS & PANEL PC

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### Military Grade Displays/Panel PCs - 10" to 65"

**10"&15"**: Military grade ground mobile displays designed for top performance in a variety of severe environments, including track and wheeled vehicles, fixed wing jets, propeller, helicopter, and all naval applications.

- 10.4"/15" TFT LCD
- Small & lightweight
- Configurable buttons
- Mounting - VESA, Ram Ball or Panel Mount
- Compliant with DO-160D, MIL-STD-810G, MIL-S-901D Grade B





**19" & 20":** Rugged Display is designed for top performance in a variety of multi-platform environments such as shipboard, airborne and ground mobile design against shock, vibration and extreme temperatures.

- 19" /20" LCD
- Sealed, Fanless Design
- Resistive or Capacitive Touchscreens
- Sunlight Readability
- Wide Temperature
- Anti-Reflective Viewing Window



**21" & 24":** Standard features including, an LED backlight, high brightness with full range dimming, wide viewing angle. Designed to meet the requirements of MIL-S-901D Grade A Shock, MIL-STD-167-1A Vibration and MIL-STD-461F EMI.

- High Resolution: 1600 x 1200
- 21.3"/24" AMLCD
- MIL-S-901D Grade A, MIL-STD-167-1A, MIL-STD-461F
- 5-BNCS (RGBHV) & DVI-I D Input Video
- Anti-Reflective Viewing Window



**32" & 42":** Large Format Military Display designed for use in severe environments. Designed to meet various of applications (shipboard, airborne and ground mobile), which require a solid mechanical design to protect the unit against shock, vibration and temperature extremes.

- 32"/42" Military Flat Panel Display
- Full HD 1920 x 1080 Resolution
- Wall, Ceiling or Desk Mounting
- Designed to MIL-S-901D Grade B



**65":** 65" Large Format Military Display designed for use in severe environments. Designed to meet various of applications (shipboard, airborne and ground mobile), which require a solid mechanical design to protect the unit against shock, vibration and temperature extremes.

- 65" AMLCD
- Convenient Front Controls/IR Remote Operation/RS-232 Remote
- MIL-S-901D Shock, MIL-STD-167-1A Vibration, MIL-STD-461E EMI



**Panel PC/ Smart Displays 10"-65":** COTS military panel PC workstation with 10"-65" Display. The integrated computer can support Windows or Linux operating systems. It was originally designed for a military shipboard application, but can be used in any rugged environment.

- All in One Panel PC
- Designed and Built to Military Standards
- High Resolution: 1920 x 1200
- Resistive or Capacitive Multi Touchscreen

## Marine Grade Displays/Panel PCs – 12" to 65"



**12"/15":** Sunlight Readable Display Glass Bridge Display. This Marine LED Glass Bridge unit boasts a picture that is crystal clear, brightness up to 1,500 Nits and comes standard with a PCAP Touchscreen, all at an affordable price.

- 1024 x 768 Resolution
- Standard PCAP Touchscreen
- 1,500 Nits (Cd/m2) High Brightness
- IEC 60945 Certified
- IP65 Sealed
- VGA, DVI, HDMI & Composite Video Inputs



**17"/19":** Sunlight Readable Display Glass Bridge Display. This LED Glass Bridge unit boasts a picture that is crystal clear, brightness up to 1,000 Nits and comes standard with a PCAP Touchscreen, all at an affordable price.

- 1280 x 1024 Resolution
- Standard PCAP Touchscreen
- 1,500 Nits (Cd/m2) High Brightness
- IEC 60945 Certified
- IP65 Sealed
- VGA, DVI, HDMI & Composite Video Inputs



**24"/26"/32":** ECDIS Marine Display comes fully equipped with PCAP multi-touchscreen provides the user greater control and flexibility, making this rugged monitor a reliable option where Human-Machine Interface is required.

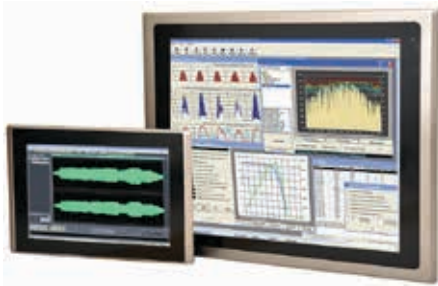
- 1920 x 1080 Resolution
- Color Calibrated for ECDIS Compliance
- Fanless Cooling
- IEC 60945 Certified
- Multiple Inputs (USB, RS232, 2x HDMI, VGA, DC)
- IP66 Sealed Front Panel

## INDUSTRIAL SOLUTIONS

### Displays

In the tough conditions of factories, machinery and field equipment, displays need to last. Aydin Displays' are designed with durability and long life cycles in mind. We test and retest each display to handle any number of situations and put up with almost any harsh condition.

- 8 to 21" Sizes
- Solid Aluminum Die-Casting Chassis
- Front Bezel IP65
- Multiple Inputs
- 9 ~ 36V DC Wide Range Power Input
- 1 Year Limited Warranty



### Panel PC

Industrial Series of Panel PCs in sizes ranging from 8" to 32" and are designed to support operator interface and HMI / SCADA applications. equipped with Projected Capacitive (PCAP) Touchscreen and an Anti-Scratch resistant surface, the same technology found in smart phones and tablets.

- 8 to 32" Sizes
- Fanless HDMI with Intel i3, 4GB RAM/32" is i5
- 128GB SSD
- Windows 10 IOT
- 9~36 VDC input
- Aluminum Chassis
- 1 Year Limited Warranty



### Rack Mount Drawer

The 10 GPM range of 19" Heavy Duty Industrial 1U Rack Mount Drawer Display. Offers a symmetrical viewing angle, keyboard, and mouse pad options are also available. The screen is protected with a glass window for harsh operating environments.

- 19" Rack Mount, Industrial Grade
- USB Keyboard & Mouse Pad
- Native Resolution: 1280 x 1024
- 8 & 16 Port KVM Available
- Front User Controls – On Screen Display (OSD)



## AIR TRAFFIC CONTROL DISPLAYS



### 21.3" Vesa mount Sunlight Readable Display

**Model CFP21W2:** Used for all applications of ATC, including EnRoute, Approach Control and Tower, as well as military ATC applications. Used in main radar console displays, sunlight readable tower displays and ruggedized mobile ATC, as well as large format displays for supervisory ATC.

- 21.3" 1600 x 1200 LCD (AMLCD) with LED Backlight
- 760 Nits Sunlight Readable
- Contrast Ratio is 24:1 @ 6000 fL with Bonded AR/AG Window
- Wide Viewing Angle  $\pm 88^\circ$  (All Directions)



### 28.1" 2K x 2K Air Traffic Control Display

**Model: 60281:** 2K x 2K Air Traffic Control Display products include main radar console displays, sunlight readable tower displays and ruggedized mobile ATC, as well as large format displays for supervisory ATC.

- 2K x 2K high resolution (2,048 x 2,048)
- Easily Replaceable LED Backlights
- Fan-Less & Eco Friendly
- High Bright Display, 300 Nits
- Low Power Consumption
- Video Input Connectors: (2) DVI, (2) Display Port, (1) RGB.

## MOTION SIMULATION SYSTEM

### Electric Single Axis Rate Tables

**Model 1270VS:** This test instrument is used for the testing and calibration of sensors and gyroscopic instruments which require a precise and accurate angular velocity. The rate table is an automated, variable speed table with a 21,600: 1 range.

- Variable Speed Design
- 0.1% Speed Accuracy
- 16 Line User Slip Ring
- 21,600:1 Overall Speed Range
- Front panel LCD
- MIL-S-901D Grade B





**Model 1281:** This table is designed to provide precise position, rate and acceleration motion for development or production testing of inertial sensors. Specifically designed for testing today's considerably smaller inertial sensors.

- Position Accuracy:  $\pm 50$  Arc Sec
- Position Repeatability:  $\pm 25$  Arc Sec
- Max Rate: 1,000 deg/sec
- 34 line slip ring



**Model 1291:** This table is designed to provide precise position, rate and acceleration motion for development or production testing of inertial sensors. Specifically designed for testing today's considerably smaller inertial sensors.

- Position Accuracy:  $\pm 15$  Arc Sec
- Rate Accuracy:  $\pm 0.001\%$
- Maximum Rate: 3,000 deg/sec
- Vacuum line



**Model 1571P:** This table is a servo-controlled system featuring a direct-drive DC brushless motor, precision optical encoder and a microprocessor that provides accurate and reliable motion control. A typical application is for missile or projectile programs.

- Position Accuracy:  $\pm 10$  arc sec
- Rate Accuracy:  $0.01\% \pm$  Resolution
- Maximum Rate: 18,000 deg/sec (50 Hz)



**Model 1621C:** This table is ideally suited for development and/or production testing of navigation sensor systems such as Fiber Optic Gyros (FOG), Ring Laser Gyros (RLG), Inertial Navigation Systems (INS) and accelerometers.

- Position Accuracy:  $\pm 15$  arc sec
- Rate Accuracy:  $\pm 0.001\%$
- Max Rate: 3000 deg/sec
- 2 kHz Servo update rate
- Fail-safe Brake

## Two Axis Motion Systems



**Model 2102C:** This Two Axis Position and Rate Table System is designed to provide precise position, rate and acceleration motion for the development and/or production testing of military and/or commercial rate and position sensors.

- Position Accuracy:  $\pm 15$  arc seconds (both axes)
- Rate Accuracy:  $\pm 0.001\%$
- Max Rate Inner Axis: 1080 deg/sec, Outer Axis: 300 deg/sec
- Fail-safe brakes
- 2 kHz servo update rate



**Model 1542C:** The 1542C-1 2-TL Series Automatic Positioning and Rate table System is designed to provide precise position, rate and acceleration motion for the development and/or production testing of inertial packages and their components.

- Position Accuracy:  $\pm 15$  arc sec
- Rate Accuracy:  $\pm 0.005\% \pm$  Resolution
- Max Rate: Inner Axis: 1080 deg/sec, Outer Axis: 360 deg/sec
- Thermal Chamber



**Model 1572PMO:** Table System is a lowcost, two-axis system designed to provide precise positioning for large payloads for the development and/or production testing of inertial packages and their components.

- Position accuracy:  $\pm 15$  arc sec
- Limited rotation for both axes
- Direct-drive, DC brushless servo system
- 36-inch diameter tabletop



**Model 1522P:** The 1522P Series Automatic Positioning and Rate Table System is a low cost two axis system designed to provide positioning for large payloads for the development and/or production testing of inertial packages.

- Position Accuracy:  $\pm 10$  arc sec
- Limited Rotation for both axes
- Direct-drive, DC brushless servo system
- 24-inch diameter

### Two/ Three Axis High Precision Motion Systems



**Model 1572P:** The 1572P Series Automatic Positioning and Rate Table Systems are designed to provide precise position, rate and acceleration motion for the development and/or production testing of inertial packages and their components.

- Position Accuracy:  $\pm 8$  arc sec
- Rate Accuracy:  $\pm 0.001\% \pm$  Resolution
- Direct-drive, DC brushless servo system
- Fail-safe System



**Model 2002P:** Designed for development, production and/or qualification testing of inertial sensors (MEMS, FOG, RLG, HRG, quartz, spinning mass, etc.) or IMU, INS, AHRS or seeker/tracker/stabilization devices for military and aerospace application.

- Position Accuracy:  $\pm 1$  arcsec
- Position Repeatability:  $\pm 1$  arcsec
- Rate Accuracy: 0.0001 %
- Direct-drive, DC brush less servo system





**Model 2003P:** The 154 2C-1 2-TL Series Automatic Positioning and Rate table System is designed to provide precise position, rate and acceleration motion for the development and/or production testing of inertial packages and their components.

- Position Accuracy:  $\pm 1$  Arc Sec
- Position Repeatability:  $\pm 1$  Arc Sec
- Rate Accuracy: 0.0001 %
- High-precision, pre-loaded ball bearings



**Model 2103C:** The Model 2103C Three-Axis Positioning and Rate Table System is designed to provide precise position, rate, and acceleration motion for the development/ production testing of military and/or commercial antenna stabilization systems and/or heading sensors.

- Position Accuracy:  $\pm 15$  arc sec (all axes)
- Rate Accuracy:  $\pm 0.001$  %
- Direct-drive, brushless servo system
- Fail-safe System
- Various sliping package



**Model 1553P:** The Ideal Aerosmith Trip Guardian™ 2203-TH-NM Automated Three-Axis, NonMagnetic Positioning Table System is intended for use in calibration and verification of MWD down hole directional instruments, including magnetometers, gyroscopes, and accelerometers.

- Position Accuracy:  $\pm 36$  arc sec
- Direct-drive, DC brushless servo system
- Large, unobstructed field of view perfect for antenna testing
- Various sliping package

## Non-Magnetic Rate And Positioning Systems



**Model 2203-TH-NM:** Trip Guardian™ 2203-TH-NM Automated Three-Axis, NonMagnetic Positioning Table System is intended for use in calibration and verification of MWD downhole directional instruments, including magnetometers, gyroscopes, and accelerometers.

- Limited rotation on all three axes  $\pm 30$  arc second position accuracy
- Thermal chamber and controller
- AERO 3500 Commander controller
- Air amplifier for cooling the DUT
- Temperature range ambient to 225°C

IDEAL  
AEROSMITH



**Model 1503-TSNM-A:** The 1503-TSNM-A Series test table is a three-axis, nonmagnetic manual positioning table. This table can be used for the calibration of downhole directional instruments including magnetometers, gyroscopes, and accelerometers. The tables are constructed of aluminum, brass, and phenolic.

- Payloads up to 4 inches in diameter and 54 inches in length
- Temperature Range: Ambient to 175° C or 210°c
- Air Amplifier Kit for faster cooling of UUT and chamber
- 10° C High Temperature Option



**Model 1503-TS-SPL:** The Model 1503-TS-SPL test table is a three-axis non-magnetic manual positioning table. This table can be used for testing magnetometers, gyroscopes and accelerometers as well as complete down-hole directional instruments. Table is uses "Total Field Calibration" method.

- Heating Capacity: 1800 watts
- Temperature Range: Ambient to 392° F (200° C)
- Table Test Load Capacity: 50 lbs. centered
- Overall Table Dimensions: 30.5W x 82.9D x58.9H inches
- Various mounting kits

## SCORSBY MOTION TABLES



**Model 1421:** The Model 1421 Scorsby Motion Test Table is designed to simulate the roll, pitch, and yaw motions of an aircraft during flight. Primarily used for shop, production, qualification testing, and exercising of gyroscopic aircraft instruments, the Ideal Aerosmith Scorsby table is a standard in the aircraft industry.

- Variable speed from 1 to 10 Cycles/Minute
- RS-232 Interface
- Automatic homing
- Easy-to-adjust tilting head with engraved markings
- Easy-to-adjust tilting head with engraved markings
- Positive stop allows quick setting of the tilt head to frequently used positions
- Motor and drive train designed for reliability and long life



**Model 9790-BVR:** The Model 9790-BVR Scorsby Motion Test Table from Ideal Aerosmith is designed to simulate the three motions of flight: roll, pitch and yaw. Originally designed for shop, production, qualification testing and exercising of gyroscopic aircraft instruments, the Scorsby table became a standard in the aircraft industry.

- Heavy-duty table frame designed for heavy load capabilities
- Approved for many aircraft gyroscopic instrument tests
- Anodized aluminum mounting platform for durability and corrosion resistance
- Designed with ball bearings for smooth motion and long life
- Flat, precision-ground table top mounting surface

## FLIGHT MOTION SIMULATOR HWIL

### Electric FMS/HWIL Systems

**Model 1573P:** The 1573P Series Three-Axis Automatic Positioning and Rate Table Systems are designed to provide precise position, rate and acceleration motion for the development and/or production testing of inertial packages and their components.

- Position Accuracy:  $\pm 8$  arc sec
- Rate Accuracy:  $\pm 0.001$  %  $\pm$  Resolution
- Direct-drive, DC brushless servo system
- 24-inch diameter tabletop



**Model 2003P:** This 3 Axis table is designed for development, production and/or qualification testing of inertial sensors (MEMS, FOG, RLG, HRG, quartz, spinning mass, etc.) or IMU, INS, AHRS or seeker/tracker/stabilization devices for military and aerospace application.

- Position Accuracy:  $\pm 1$  Arc Sec
- Position Repeatability:  $\pm 1$  Arc Sec
- Rate Accuracy: 0.0001 %
- High-precision, pre-loaded ball bearings



## HYDRAULIC FMS/HWIL SYSTEMS



**Model 2443HV-HR-1:** The 2443HV-HR-1 is one of Ideal Aerosmith's standard Three-Axis Flight Motion Simulator models designed for Hardware-In-The-Loop (HWIL) Seeker Guidance Testing. This system is configured for interfacing to an RF chamber.

- Position Accuracy:  $\pm 10$  arc sec
- Middle and Outer Axis Rates: 600 deg/sec
- Rate Accuracy:  $\pm 0.1\%$
- Inner axis rate: 1000 deg/sec



**Model 2453H-ER:** The 2453H-ER is Ideal Aerosmith's base model Three-Axis Flight Motion Simulator for Hardware-In-The-Loop (HWIL) Seeker Guidance Testing. Extremely efficient hydraulic actuators allow high system utilization.

- Position Accuracy:  $\pm 10$  arc sec
- Inter-axis Orthogonality: 30 arc sec
- Axes intersection:  $\pm 0.02''$  ( $\pm 0.5\text{mm}$ )

## FLIGHT MOTION SIMULATORS FMS & TMS



**Model 2455H-ER:** The 2455H-ER extends the capabilities of Ideal's three-axis FMS systems for hardware-in-the-loop (HWIL) seeker/guidance testing, to include target motion simulation. The inner target axis accommodate an infra-red scene projector.

- Position Accuracy:  $\pm 15$  arc sec
- Rate Accuracy:  $\pm 0.001\%$
- Roll axis rates up to 50 Hz (3000 RPM)
- Direct-drive, DC brush less servo
- Axis Orthogonality: 30 arc sec system
- Rate Accuracy:  $\pm 0.02\%$



**Model 2452H:** HWIL testing typically requires the implementation of a two axis target motion simulator such as the Ideal Aerosmith Model 2452H. This system is configured with hydraulic actuator drives to ensure operational and performance.

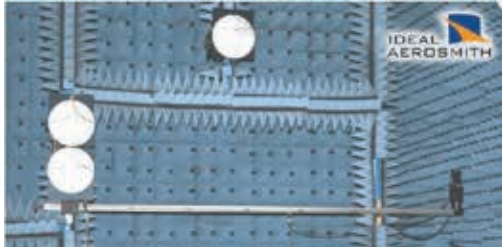
- Position Accuracy:  $\pm 10$  arc sec
- Target Scene Payload :68 Kg
- Local/remote operation

## X-Y Target Motion Simulator



**Model 244E-10:** This is a Curvilinear X-Y Dual Target Motion Simulator System. The Target Motion Simulator (TMS) is housed in an anechoic RF chamber and anchored to a rigid wall or equivalent structure. An Ideal Aerosmith Three-Axis FMS is mounted on a track assembly at the opposite end of the chamber so that FMS may be withdrawn from the chamber port for missile seeker installation, setup and servicing

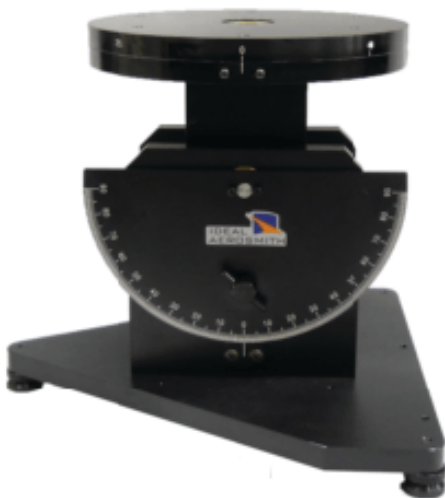
- Front and Rear Payload: 40 Kg each
- Pointing Accuracy: 0.05 deg
- Maximum Velocity: 20 deg/sec
- Track Radius: Front 10M; Rear 11.6M
- Axis Travel: Front  $\pm 30$ deg; Rear  $\pm 25$  deg
- Axis Acceleration:  $40^\circ / s^2$



**Model 245H-ER:** This is a Linear X-Y Single Horn Target Motion Simulator. Ideal Aerosmith will design, fabricate and deliver a new Single Horn X-Y Target Motion Simulator (TMS) System and install, integrate and demonstrate performance by testing at the customers' facility. The TMS is based on off-the-shelf components and it is controlled by a field proven Ideal Aerosmith Aero 4000 controller.

- Position Accuracy:  $\pm 0.5$  inch
- Maximum Velocity: 20 inch/sec
- Axis Displacement:  $\pm 60$  inch
- Rack-mounted AERO 4000 Digital Controller

## AIRCRAFT TESTING INSTRUMENTS



**Model 1300:** The 1300 series Manual Tilt & Turn Tables from Ideal Aerosmith are designed for precision calibration of gyroscopic instruments or any devices requiring a tilt input in one or two axes. The table provides a portable, stable and precise positioning platform with lasting durability.

- Small and light weight for easy bench mounting and manual operation
- Two degrees of freedom for tilting and rotating test instruments
- Knurled mounting screws on the table top



**Model 1501:** The Model 1501 Test Table is a single-axis manual positioning table used to provide positioning indexes for inertial guidance systems for the purposes of calibration and acceptance testing. The table is moved by hand to the desired position and a shot pin is engaged to hold the table's position.

- Manually-operated horizontal tilt and azimuth axis
- Position Accuracy:  $\pm 6$  arc minutes
- Position Repeatability:  $\pm 30$  arc sec
- 32-inch table top



**Model 1503-24-EN:** The Model 1503-24-EN Three-Axis Manual Positioning Table is designed to provide precise position feedback via the optical encoder for the development and/or production testing of navigation sensor systems such as tilt sensors and turn and bank indicators.

- Manually operated
- Optical encoders for precise feedback
- Position Accuracy:  $\pm 1$  arc minute
- Position Repeatability:  $\pm 30$  arc sec



**Model 1501 T:** Ideal Aerosmith's Model 1501 T is a single-axis manual tilt table. Designed for testing an IMU (Inertial Measurement Unit), this system supports the IMU on the upper mounting surface and additional electronics on the lower mounting surface with minimal counterweights.

- Manually operated horizontal tilt axis
- Position Accuracy:  $\pm 10$  Arc-Sec
- Position Repeatability:  $\pm 5$  Arc-Sec
- 35 line user signal

## TACHOMETER TESTERS



**Model 1921:** The Model 1921 Tachometer Tester is used for the testing and calibration of electrical and mechanical tachometer generators and indicators, specifically handheld models. Two variable speed brushless motors eliminate the need for gears while providing for a testing range of 10 to 50,000 RPM.

- 10-50,000 RPM Actual Drive Speed
- High accuracy
- 0.01 Display Resolution
- Direct Drive
- Bi-directional



**Model 1790:** This test instrument is used for testing and calibration of electrical and mechanical tachometer generators and indicators. A high quality DC motor is coupled directly to a 1/4 inch square hole drive (AN Pad). This tachometer tester output can be converted to a wide variety of adapters and different tachometer interfaces.

- 250-10,000 RPM Tachometer Testing Range
- 250-5,000 RPM Actual Drive Speed
- Maximum Torque: 60 oz-in

## CENTRIFUGES



**Model 1068-2:** 1068-2 is designed to apply a large centrifugal force to a payload. A centrifuge is typically required for applications with larger payloads, and/or higher G requirements. The 1068-2 tests from 0 to 1000 G's at a 10.5-inch (267 mm) radius. Payload capacity is a 24 inch cube at an 8 inch height at 50 lbs.

- Range 0-250 G's at a 25-inch radius
- Maximum G-Lbs 20000 G-lbs
- Rate Range 0-600 RPM
- Slip Rings 108 lines at 3A



**Model 1221:** The 1221 is designed to apply a large centrifugal force to a payload. A centrifuge is typically required for applications with larger payloads, and/or higher G requirements. The 1221 tests from 0 to 250 G's at a 25-inch radius. Payload capacity is an 18 inch cube (457 mm) at 200 lbs. (91 Kg) per arm.

- G-Range 0 to 250 G's at a 25-inch radius
- Maximum G-lbs 20000 G-lbs
- Payload Capacity 18 inch cube, (457 mm); 200 lbs.



**Model 1068-1:** The 1068-1 is designed to apply a large centrifugal force to a payload. A centrifuge is typically required for applications with larger payloads, and/or higher G requirements. The 1068-1 tests from 0 to 100 G's at a 22-inch (559 mm) radius. Payload capacity is a 12 inch cube (305 mm) at 50 lbs.

- G-Range 0 to 100 G's at 22-inch (559 mm) radius
- Maximum G-lbs 5000 G-lbs
- Rate Range 0-400 RPM

## TEST & MEASUREMENTS

### Angle Position Indicator

**Model 8810A:** Angle Position Indicator (API) is a rack mount or benchtop measurement instrument featuring two fully independent inputs that can be used to read two separate input signals simultaneously, or can be combined to measure multi-speed Synchros or Resolvers. Improved flexibility is provided by front panel controls and input terminals.

- Resolution: 0.0001°
- Accuracy: Up to  $\pm 0.0015^\circ$
- Two Isolated Input Channels
- Single or Two-Speed Measurements: Programmable Ratio from 2 to 255
- Three display modes: 0-360°,  $\pm 180^\circ$  or degrees, minutes & seconds
- Ethernet, USB, IEEE-488, and parallel ports
- Optional 6 VA Internal Reference



### Phase Angle Voltmeters

**Model 2250A:** Phase Angle Voltmeter is the most accurate AC measurement tool in the Synchro/Resolver and LVDT/RVDT. This precision instrument measures total, fundamental, harmonics, in-phase, quadrature, frequency, THD, ratio, and phase angle, and displays all of these measurements at the same time. The isolated inputs enable null, ratio, and gain measurements.

- Two Galvanic Isolated Input Channels (Signal and Reference)
- High Accuracy:  $\mu\text{V}$  Nulling Sensitivity
- Frequency: Up to 1MHz
- Voltage: Up to 500 Vrms
- Resolution: 0.00001 °
- Harmonic Rejection: Up to 80 dB
- Ethernet, USB, and IEEE-488 ports
- Optional 6VA Internal Reference





## SYNCHRO/RESOLVER SIMULATOR



**Model 5330A:** Synchro/Resolver Simulator is a rack mount or benchtop instrument featuring two fully independent outputs that can be used to simulate two separate Synchro or Resolver signals simultaneously, or can be combined to operate as two-speed outputs. Improved flexibility is provided by integrated touch screen controls and input terminals.

- Resolution: 0.001°
- Accuracy: up to  $\pm 0.003^\circ$
- One or Two Output Channels (Up to 6 VA per channel)
- Two display modes: 0-360° and  $\pm 180^\circ$
- Ethernet, USB, IEEE-488, and Parallel ports
- Optional 6 VA Internal Reference



**High Accuracy Model 5300:** This model can be used as a true Synchro/Resolver standard for calibrating and testing Automatic Test Equipment (ATE) for Calibration/Metrology Labs, and for Engineering Design and Production Test environments. It can also be used to measure Angle Position Indicators (API) and Synchro-to-Digital converters for static or dynamic characteristics.

- 0.0001 ° Resolution
- 2 arc second accuracy
- Continuous CW or CCW rotation to 100,000°/sec
- Frequency: 47 Hz to 20 kHz
- Static or continuous Synchro/Resolver rotation simulation, from slow roll to fast slew rates
- Built-in reference generator
- Rack-mount or benchtop installation

## JTAG BOUNDARY SCAN SOLUTIONS

### Hardware - JTAG Boundary-Scan Controllers



**NetUSB II:** High-performance, multifeature boundary-scan controller for multi-TAP and concurrent JTAG test and in-system programming. Featuring dualinterface USB and LAN support with four or eight independent and configurable Test Access Ports (TAPs), direct serial programming capability and voltage sense support, the NetUSB II fits a multitude of boundary-scan applications.

- 4 or 8 TAP connections
- Userprogrammable JTAG TCK rate up to 100 MHz
- Independently configurable output voltage and input voltage threshold



**NetUSB-1149.1/E:** High performance, multi-feature boundary-scan controller for multi-TAP and concurrent JTAG test and insystem programming. Featuring dualinterface USB and LAN support with four independent Test Access Ports (TAPs), direct serial programming capability and voltage sense support, the NetUSB-1149.1/E fits a multitude of boundaryscan applications.

- 4 or 8 TAP connections
- Concurrent (gang) testing and In- System Programming (ISP) on up to four UUTs for high volume test.



**USB-1149.1/IE:** USB-1149.1/IE HighSpeed single-TAP boundary-scan controller is a powerful, portable USB JTAG instrument for all JTAG applications and life cycle phases. Works with the complete Corelis ScanExpress™ family of software, enabling comprehensive test coverage at a fraction of the cost of traditional bed-of-nails testers and without the inconvenience of fixtures.

- 1 or 4 TAP connections
- User programmable JTAG TCK rate up to 100 MHz, SPI SCK rate up to 50 MHz, and I2C SCL rate up to 5 MHz.



**SCANIO:** SCANIO modules turn any IEEE standard 1149.1 boundary-scan controller into a powerful digital boundary-scan tester. The SCANIO family of products use boundary-scan gate arrays to add control and visibility to connectors, traces, and logic that can not be tested using traditional boundary-scan techniques.

- Digital I/O Module. Upto 300 single-ended or 150 differential individually controlled
- Voltage leve are configurable
- DIMM Socket Tester
- Tests for opens on power and ground pins



**JTAG Starter Kit:** Debug and visualize prototype hardware faults, even on component pins with no physical access. JTAG Starter Kit provides everything necessary to get started using JTAG, yet still provides a flexible upgrade path to higher performance controllers and integration with high-end Corelis applications.

- Speed up hardware development
- Modular JTAG toolkit
- Reduce debug and Help to eliminating the need to write
- Teradyne Di-Series and HSSub instruments functional tests.



**JTAG 3rd Party Controller Support:** Corelis offers support for a variety of devices and instruments from third-parties in an effort to provide existing test platforms comprehensive JTAG test execution with Corelis Scan Express software products

- ScanExpress supports for third part controllers national Instruments and Teradyne Di Series.
- National Instruments: PXI/PCI-6551/6552, PXIe-6556



#### **PCIe-1149.1/ PCI-1149.1/Turbo:**

PCIe/ PCI based Boundary-scan controller for multi-TAP (Test Access Port) and concurrent JTAG test and in-system programming. Combined with a ScanTAP™ intelligent pod, the PCIe-1149.1 offers up to 80 MHz clock rates on 4 or 8 TAPs with features such as external write strobe, direct programming, and analog voltage measurement.

**ScanTAP 4 & 8:** ScanTAP pods are designed for use with PCI-1149.1/ Turbo and PCIe-1149.1 high-speed JTAG controllers. Featuring 4 & 8 independent Test Access Ports (TAPs), up to 80 MHz clock rates, and advanced TAP capabilities for high performance environments.



**CPXI-1149.1/Turbo:** PXI/cPCI based Boundary-scan controller for multi-TAP (Test Access Port) and concurrent JTAG test and insystem programming. Combined with a ScanTAP™ intelligent pod, the CPXI-1149.1/ Turbo offers up to 80 MHz clock rates on 4 or 8 TAPs with features such as external write strobe, direct programming, and analog voltage measurement.

- Save time at test stations
- Reduce costs associated with fixtures
- Save time at test stations
- Increase programming rate
- Reduce costs associated with fixtures

## JTAG TEST & PROGRAMMING – SOFTWARE SOLUTIONS

### Test Development System



**ScanExpress TPG - Test Pattern Generation:** ScanExpress TPG is a next generation intelligent test pattern generator that takes the process of boundary-scan automation to a new level in both performance and ease of use.

- Automatically generates test patterns for components using proven, boundaryscan test algorithms
- Detects and supports all netlist
- Finds and classifies all resistors



**ScanExpress JET - JTAG Embedded Test:** Used to automatic circuit board testing by extending boundary-scan structural test coverage to virtually every signal on the bo

- Assists in prototype debug before test firmware or test fixtures
- Save coding time through automatic test
- Increase board test coverage.
- Field validate a customer board or upgrade firmware on-siteard that is accessible by an on-board CPU.



**Scan Express DFT Analyzer - Design for Testability Metrics:** Automatic test coverage analysis tool for printed circuit boards and systems for boundary and nonbou ndary-scan devices. Increase fault coverage and reduce boundary-scan test procedure.

- Validate board test coverage before committing to layout
- Reduce the number of PCB test points
- Find test holes and deficiencies
- Reduce test procedure development time



**Scan Express Runner -Test Program Execution :** Fully featured JTAG test executive; a modern software application that provides the capabilities and options necessary to ensure a smooth and complete testing process.

- Enables boundary-scan test, in-system programming, and JET functional test
- Simplifies boundary-scan test execution
- Increases yields and decreases test time
- Speeds test, diagnosis, and repair of faulty circuit boards



**ScanExpress Runner Gang - High Volume Test Program Execution:** Workhorse software piece to perform parallel gang testing and In-System Programming of CPLDs and Flash devices.

- Save time by testing up to 8 units simultaneously.
- Increase in-system-programming.
- Provides persistent, concurrent scan vector output and extraction, ensuring that effective throughput remains high.



**Scan Express Viewer -Visual Fault Identification System:** Powerful graphical fault identification system that helps to isolate source and location of faults encountered during boundary-scan test of PCB.

- Save time and effort at the repair station by visually identifying probable fault.
- Decrease expertise requirements with easy-to-read, graphical fault indicators based on ad vanced boundary-scan diagnostics.



#### **ScanExpress ADO - Advanced Diagnostics:**

Fully automated analysis option quickly parses test vectors and identifies faults down to the net and pin level.

- More detailed fault diagnostics than truthtable display
- Non-technical users can quickly assess faultcauses
- Spend less time on debug
- Release prototypes more quickly
- Engineers can quickly isolate manufacturing defects from real design problems



#### **ScanExpress JT AG Debugger - Interactive Debugging:**

Provides complete pin control over any boundary-scan device. overcomes these limitations to provide the control and visibility.

- Debug hardware faults in systems with JTAG, even on comp
- Integrate boundary-scan control and test scripts into automated test routines.
- Troubleshoot hard-to-find faults even on BGA and fine-pitch components



#### **ScanExpress Flash Generator - Flash Programming File Generation Tool:**

Creates a Board File, which is used to provide ScanExpress Programmer with the necessary information to program a target board configuration.

- Can quickly develop in-system programming files for system debug and verification
- Combine boundary-scan test and programming to increase throughput
- Technicians can reprogram Flash devices in system to restore corrupted data or upgrade firmware
- Allows Flash memory to be locked after programming or unlocked for reprogramming



#### **ScanExpress Merge - System-Level Interconnect Solution:**

Designed to import and join test files for multiple independent assemblies and assist in configuration of a combined test procedure .

- Test multiple sub-assemblies with a single test plan
- Increase overall test coverage
- Painless integration of additional boundary-scan IO modules for expanded test coverage.
- Photographic visual failure analysis



#### **Boundary-Scan In-System Programming (ISP) Tools**

##### **ScanExpress ITAG Programmer - InCircuit Programming Tool:**

Universal incircuit programming tool that can program and verify Flash memories, serial EEPROMs, CPLDs, FPGAs, and other programmable logic devices.

- Programmer - Direct SPI and I2C, Target Assisted Flash (TAF)
- Quickly erase, program, verify, and read code stored in memory devices
- Allows memory devices to remain on the shelf in a blank state until ready-to-ship, easing inventory management
- Reprogram Flash and troubleshoot firmware problems in the field

## BUS ANALYZERS AND EXERCISERS

Corelis bus analyzers and exercisers offer analysis, test, debug, and validation capabilities for product development, system integration, and manufacturing of digital boards and systems with I2C and Serial Peripheral Interface (SPI) bus. All of our bus analyzers are PC-based and come with software that runs on Microsoft Windows 7, Windows 8/8.1 and Windows 10.



**BusPro-I: Bus Analyzer, Monitor, Debugger and Programmer-** Monitor and log I2C bus traffic in real-time, generate I2C transactions to communicate with components on the bus, and perform in-system programming of I2C EEPROMs.

- Monitor displays high-level view of I2C bus traffic
- Allows to Read/write access to peek and poke device registers



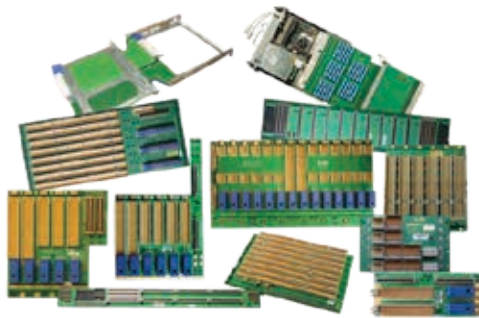
**BusPro-S SPI Bus Host Adapter: High Speed Multi-IO SPI Host, Debugger, and Programmer** -Featuring 60 MHz upto 200 Mb/s throughput and supports standard, dual, quad, and 3-wire modes, BusPro-S is right tool for all SPI debugging applications.

- Generate SPI bus traffic and interface with peripheral components.
- Read, erase, program, and verify SPI Flash Memories.

## BACKPLANES



High-performance backplanes – product portfolio includes AdvancedTCA, CompactPCI/2.16, MicroTCA, OpenVPX, VME, VME64x, VXI, VPX, and VXS architectures. We also develop custom backplanes to meet your specifications, from initial concept to finished product. We provide the best in backplane technology serving the communications, military/aerospace, computer, instrumentation, industrial automation, and medical industries. Our leadership and experience in VPX backplanes keeps us on the cutting edge of technology. VPX presents design challenges with higher layer-count backplanes, and more demanding power and cooling requirements and these problems are tackled with comprehensive signal integrity analysis and testing. We offer a complete range of VME, VME64X, Open VPX backplanes



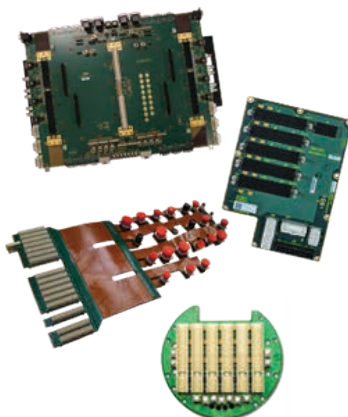
### PICMG Backplanes

- AdvancedTCA
- CompactPCI
- CompactPCI Serial
- MicroTCA
- Other Architectures



### VITA Backplanes

- VME
- VME64x
- OpenVPX / VPX



### Other Architectures

- AXIe
- Dual Star Topology
- PXI & PXIe
- Starfabric 2.17
- VME320

## CHASSIS PLATFORMS

Chassis Platforms based on proven, modular design concepts that provide ideal solutions for applications ranging from: 19" Rack, Test & Development, to Deployed environments. Offering includes Comprehensive range of standard, modified standard and custom packaging solutions with integrated backplane, power and cooling for; 19" rackmount, Test/Development, and Field deployable use. Supporting the full range of VITA, PICMG and Small Form Factor Architectures Elma has configurations based on: VME, VPX, VXS, ATCA, AXIE, MicroTCA, CPCI and SFF.



### 19" RackMount

- Economy – Type 11 & 39 Card Cages & Chassis
- Industrial Rugged, 19" Rackmount Chassis
- Universal 19" Rackmount / Desktop Chassis
- Elegant, 19" Rackmount / Desktop Chassis
- 19" Mil Rugged Card Cages



### Rugged Field Deployable

- 19" Mil Rugged
- ATR
- Small Form Factor
- Test Frame
- Desktop
- Portable
- D-Frame-Chassis
- VITA48.4 Liquid Flow Through Development Chassis





## POWER SUPPLIES

### VPX Power Supply



**Model VPX55H-3:** The VPX55H-3 is NAI's latest high power 500 Watt DC/DC converter that accepts a +28 VDC Input and plugs directly into a standard 3U VPX chassis with a VITA 62 0.8" power supply slot.

- DC/DC 500 Watts
- +28 VDC input +16 VDC to +36 DC Continuous
- Six outputs



**Model VPX57-31:** NAI's VPX57-31 is the industry's first 500-Watt DC/DC Converter that accepts a +270 VDC Input and plugs directly into a standard 3U VPX chassis with a VITA 62 1.0" power supply slot.

- DC/DC 500 Watts
- +270 VDC input
- Provides six outputs
- VITA 62
- VITA 46.11



**Model VPX55-3HU:** The VPX55-3HU is a 400-Watt DC/DC Power Line Conditioner which plugs directly into a standard 3U VPX chassis with a VITA 62 0.8" or 1.0" power slot. Wedgelock, Plug-in Design

- DC/DC 400 Watts
- +28 VDC input
- VITA 62
- VITA 46.11
- Holdup design



**Model VPX68-3:** NAI's VPX68-3 is a high efficiency 400-Watt DC/DC Converter that plugs directly into a standard 3U VPX chassis with a VITA 62, 1.0" pitch power supply slot. Wedgelock, Plug-in Design

- DC/DC 400 Watts
- +28 VDC input (+16VDC to +60VDC continuous)
- Six outputs



**Model VPX56H-6:** The VPX56H-6 is NAI's latest high power, 1000 Watt AC/DC converter which accepts either a 3Ø 115VAC L-N inputs or a +270 VDC input. It plugs directly into a standard 6U VPX chassis with a (VITA 62) 1.0" power supply slot.

- AC/DC1000 Watts
- Accepts 3Ø AC or +270 VDC input
- Provides five outputs and I/O
- Continuous Background Built-In-Test (BIT)

### AC/DC Brick Type Power Supplies



**Model 56GS1:** NAI's 56GS1 is a 25 Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides a single full-power output at a baseplate temperature of +85° C.

- 25 Watts
- Standard output voltages: 5 V, 12 V, 15 V, 28 V
- MIL-STD-704D
- MIL-STD-461C



**Model 56J1:** NAI's 56J1 is a 50 Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides full-power output at a baseplate temperature of +85°C. Designed with NAVMAT component derating.

- 50 Watts
- Standard output voltages: 3.3 V, 5 V, 12 V, 15 V, 24 V, 28 V
- MIL-STD-704D
- MIL-STD-461C



**Model 56K1:** NAI's 56K1 is a 75 Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides full-power output, single or triple, at a baseplate temperature of +85° C.

- 75 Watts
- Standard output voltages: 5 V, 12 V, 15 V, 24 V, 28 V
- MIL-STD-704D
- MIL-STD-461C



**Model 56M1:** NAI's 56M1 is a 150 Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This COTS unit provides full-power output, either single or dual, at a baseplate temperature of +85° C.

- 150 Watts
- Standard output voltages: 12 V, 15 V, 24 V, 28 V
- MIL-STD-704D
- MIL-STD-461C



**Model 56RS1 :** NAI's 56RS1 is a 300 Watt AC/DC Power Supply that accepts multiple AC inputs plus a +270 VDC input. This rugged COTS unit provides a single full-power output at a baseplate temperature of +85° C.

- 300 Watt
- Standard output voltages: 12 V, 24 V, 28 V
- Current Share
- MIL-STD-704D
- MIL-STD-461C



**Model 56RS3:** NAI's 56RS3 is a 300 Watt AC/DC Power Supply that accepts a three-phase, AC input plus a +270 VDC input. This COTS unit provides a single full-power output (300 Watts) at a baseplate temperature of +85° C or a single 350 Watt output at a baseplate temperature of +70° C.

- 300 Watt
- Standard output voltages: 24 V, 28 V
- Current Share
- MIL-STD-704D
- MIL-STD-461C



**Model 56TS1:** NAI's 56TS1 is a 500 Watt AC/DC Power Supply that accepts a 3Ø AC input or a +270 VDC input. This COTS unit provides full-power output power at a baseplate temperature of +85° C. Standard features include remote error sensing, Current Share, ON/OFF control; and protection against transients, overvoltage, overcurrent, and short-circuits. Additional options and special units can be ordered. This conduction-cooled power supply is specifically designed with NAVMAT component derating for rugged defense and industrial applications. It is also designed to meet the many harsh environmental requirements of military applications. All units are 100% temperature cycled.

- Ideal for rugged, conduction-cooled, military applications
- Standard output voltages: +12 VDC, +24

VDC, +28 VDC and +48 VDC

- Current Share
- Integrated EMI filtering per MIL-STD-461F
- Input transient protection per MIL-STD-704F
- High Efficiency
- Low profile packaging
- 3 Phase or +270 VDC input

## AC/DC Brick Type Power Supplies



**Model 55GS1:** NAI's 55GS1 is a COTS, 25-Watt DC/DC Converter that accepts a +28 VDC input and provides a single full-power output at a baseplate temperature of +100°C.

- DC/DC 25 Watts
- 28V input
- Standard output voltages: 5 V, 12 V, 15 V
- MIL-STD-704D
- MIL-STD-461C



**Model 55J1:** NAI's 55J1 is a 50-Watt DC/DC Converter that accepts a +28 VDC input. This COTS unit provides full-power output, either single or dual, at a baseplate temperature of +100° C.

- DC/DC 50 Watts
- 28V input
- Standard output 5 V, 12 V, 15 V, 28 V
- MIL-STD-704D
- MIL-STD-461C



**Model 55K1:** NAI's 55K1 is a 75-Watt DC/DC Converter that accepts a +28 VDC input. This COTS unit provides full-power output, either single or triple, at a baseplate temperature of +100° C.

- DC/DC 75 Watts
- 28V input
- 3.3 V, 5 V, 12 V, 15 V, 24 V, 28 V
- MIL-STD-704D
- MIL-STD-461C



**Model 55LS1:** NAI's 55LS1 is a 100-Watt DC/DC Converter that accepts a +28 VDC input. This COTS unit provides full-power output, either single or triple, at a baseplate temperature of +100° C.

- DC/DC 100 Watts
- 28V input
- 3.3 V, 5 V, 6.5 V, 12 V, 15 V, 24 V, 28 V
- MIL-STD-704D
- MIL-STD-461C

### DC Power Line Conditioners with Holdup Time



**Model 44LS1:** NAI's 44LS1 is a 100-Watt Power Line Conditioner with holdup time that protects downstream DC/DC converters from transients, low voltage conditions, and power interruptions. This unit accepts +28 VDC input and provides 22.5 to 30 VDC at 100 Watts to all downstream

- Perfect companion for all DC/DC converters
- Protects downstream converters from input transients per MIL-STD-704A through F
- MIL-STD-461F
- Up to 50 ms holdup time



**Model 44KS3-02:** NAI's 44KS3-02 is a 72.5-Watt Power Line Conditioner with holdup time that protects downstream DC/DC converters from transients, low voltage conditions, and power interruptions. This unit accepts +28 VDC input and provides a single output at 72.5 Watts – either 22.5 to 30 VDC with holdup time or +16 VDC without holdup

- Perfect companion for all DC/DC converters
- Protects downstream converters from input transients per MIL-STD-704A through F
- Up to 160 ms holdup time



**Model VPX55-3HU:** The VPX55-3HU is a 400-Watt DC/DC Power Line Conditioner which plugs directly into a standard 3U VPX chassis with a VITA 62 0.8" or 1.0" power slot. Designed to meet standard 3U VPX (VITA62) mechanical requirements, the VPX55-3HU, is a perfect companion unit for all NAI VPX55 series +28 VDC

- DC/DC 400 Watts
- +28 VDC input
- VITA 46.11
- Reverse Polarity Protection
- Holdup
- Standby Output
- Designed to work with the NAI VPX55-3 family of DC/DC Converters

## CHASSIS COMPONENTS



Elma's accessories for rackmount enclosures address virtually every configuration imaginable: From the horizontal card adapter kits to fan and keyboard trays, subrack handles, aluminum front panels and telescoping rails. Furthermore Elma supplies also 19" cassettes, ventilation solutions as well as a wide range of ejector handles, feet and extrusions according to IEC, IEEE or AdvancedTCA.

- Extrusions and profiles for any kind of application
- Card slots for Euro cards according IEC, IEEE or uTCA
- EMC / HF contact springs and strips, gaskets and sealings
- Chassis Mounting and assembly material for plug-in units, subracks and enclosures
- Cassettes and modules for plug-in units
- Front panels according to IEEE 1386 | zinc die-cast or aluminum extrusion
- PMC Mezzanine front panel
- Fan front panels with vertical / horizontal ventilation or for direct fan mounting.
- Front Panels for Plug-In-Units | VPXEMC front panel for VPX plug-in-units | 3 and 6 U
- Hinged front panels
- Front Panels for Plug-In-Units | IEEEEMC front panel for IEEE plug-in-units | 3 and 6 U | up to 14 HP
- EMC front panels with an immunity from interference and limited emission of interference | front anodized, | rear passivated...
- Handles and feet Ejector handles, card handles according to IEC, IEEE and AdvancedTCA, carrying handles and enclosure feet.

## ROTARY SWITCHES/ ENCODERS

Reliability and ruggedness are just two of Elma's core competencies for rotary switches. Panel and shaft sealing up to IP68 against dust and water are standard for all rotary switches. The shaft material for all switches is stainless brass or stainless steel – this is suitable for rugged environments.

- Rotary Switching Products – Coded Switches, Rotary Encoders, Rotary Selector Switches.
- Audio Solutions – Remote Audio Plus and Relay Attenuator
- Knobs – Vintage Knobs, Soft Touch Collet Knobs, Classic Collet Knobs
- Light guides, LEDs, and Arrays
- Other Components – 10mm Universal Terminals



### Multi Rotary Switches

Our multi-functional switches with Hall-effect or mechanical contact system are ready to provide a reliable long-lasting output. These switches can also fit evolving technical requirements.



### Coded Switches

Elma's coded switches provide a high quality tactile feedback. The standard 10, 16 and 24 position as well the concentric designs are used extensively as frequency selectors, medical device interfaces, audio attenuators and industrial controls. Elma can also customize shafts, bushings and switching schemes to meet special applications.



### Selector Switches

Elma offers a wide range of dimensions, number of switching positions and contact arrangements. Our selector switches continue to be the foundation of Elma's longstanding reputation for quality, feel and reliability.



### Encoders

Our famous "Swiss Click Indexing System" featured on all our encoders epitomizes great switching feel. Elma's engineering services can also customize our standard offerings to suite your individual requirements, even in small quantities.



### Audio Solutions

With innovative products like the Remote Audio Plus and Relay Attenuator, Elma's wide range of products contains hybrid electronic / mechanical products and fully switch-free solutions. Elma's Audio Solutions products are driven by customer input to address an ever-evolving market.



### Knobs & Caps

Knobs have a major impact to aesthetics and usability of your product. Our variety of collet knobs and aluminium knobs work with all industry standard switches and controls.



### LEDs

Several applications need an optical indication to show a specific situation. Our LED array assortment covers the most demanding requirements on a cost effective way. The robust and standardized design can be soldered easy and save to any standard PCB. From THT LED devices to innovative IP68 sealed light guides, Elma can provide a quick off-the-shelf solution or customize a product to fit your needs.

# **INDUSTRIAL INSTRUMENTATION & AUTOMATION**







We are leading automation products and service provider across the industry domain and offer a comprehensive solution from sensing to industry 4.0

We firm partnerships and strategic alliances with world-class manufacturers to expand our product and service offerings and deliver comprehensive solutions to clients. We are also actively delivering solutions under the make in India initiative.

Our turnkey automation solutions include Sensing & Measuring Instruments, Control & Data Acquisition System, Asset Monitoring, SCADA and Historian, Visualization, Analytics, IoT solutions, and enterprise- solutions.

Our dedicated project management team are capable of delivering customized, optimized, and futuristic systems across various domains, which empowers our partner customers to be future-ready with a clear ROI roadmap.

## FLOW MEASUREMENT INSTRUMENTS

### Mass Flowmeter / Controller for Gas

- Flow ranges starting from 0 to 1000 SLPM
- LCD display and Serial Communication
- Temp. sensor and Totalizer option
- Rugged metallic body (Aluminum/SS)
- Maximum pressure of 1000 PSIG (70 Bars)
- Leak integrity 1 x 10<sup>-9</sup> SCCS of helium
- Analog output, Totalizer, Communication
- Store multiple gas calibration
- ±0.5% and ± 1% FS accuracy with NIST traceability
- Thermal capillary tube type (model GFC, DFC) with 1%FS accuracy and ability to operate up to 1000 PSIG common mode pressure. These controllers can be used with corrosive gases as well.
- Differential pressure multi-parameter mass flow controller (DPC) series with improved (0.5RD + 0.2%FS) accuracy and ability to operate up to 120 PSIG common mode pressure. These controllers can be used only with not corrosive gases.





## Turbine Flow Meter – Liquid & Gas

- Robust, compact design
- Accuracy of less than +/- 0.05% typical
- Excellent speed of response time 3-4mS
- High turn-down capability, up to 100: 1.
- Standard pressure capabilities up to 5000 PSIG.
- Linearity <0.10% with linearizing electronics
- Excellent repeatability, less than +/- 0.05%.
- Extensive primary standard NIST trace calibration capability
- High shock and vibration proof



## Process, and Test & Measurement Applications

Turbine flow meters are used in a wide variety of applications. Some examples are automotive and aerospace and test stands; subsea control systems; feedback and control systems on aero-derivative turbine generators; as well as general purpose industrial flow measurements. A selectable range of bearings, end connections, calibrations, and electronics are available for this series making it the most versatile and capable of meeting a wide range of applications.



## High Shock Load Applications

HS Series “high shock” turbine flowmeters are specifically designed to withstand pressure spikes that create hydraulic shock waves in fluids when actuators or rams are activated. This water hammer effect can dislodge the internals or shear rotor blades off other turbine designs. The HS Series is based on providing a high level of accuracy, with added benefits of a ruggedized housing and reinforced rotor to eliminate potential damage from fluid shock.



## Sanitary Applications

Sanitary turbine flow meters provide accuracy, versatility, and economy in measuring a wide variety of dairy, food & beverage and pharmaceutical products. Durable sanitary turbine flow meter with a 316L SS smooth finish is designed to eliminate cracks and crevices where bacteria can breed.



## Low Flow Applications

The Omniflo® turbine flowmeters utilize a low frictional drag bearing in a tangential design, with a very low pressure drop (20mbar) allowing the measurement of very low flow rates in either liquid or gas. These high-resolution, low-flow sensing instruments are capable of measuring flow rates as low as 0.001 GPM in liquids and 0.0015 ACFM in gasses.



### Positive Displacement Flow Meter

- Line Size: 1/16 to 2"
- Very High Viscosities Range: Up to 1,000,000 cP+
- Repeatability:  $\pm 0.05\%$  to  $\pm 0.1\%$  of rate
- Housing, cover and bolts are 316 SS



### Test Grade Rotameter / Variable Area Flow Meter

- Flow ranges: 0 to 1000 LPM
- Calibrated accuracy:  $\pm 1\%$  FS
- Brass, Stainless steel, and PTFE meters
- Rigid compact construction
- Multitube configuration for mixing or separation



### Paddlewheel Flowmeters

- Supports up to 23 Engineering Units (including one User Defined)
- Two programmable Totalizers (main and pilot) indicate total liquid volume
- Programmable High and low Flow Alarm & Temp. limits with a preset delay interval
- User selectable (via jumpers) analog 0-5 Vdc or 4-20mA flow and temperature (optional) outputs
- Flow Pulse output (3.3Vdc CMOS) and Digital Interface (RS-232 or RS-485)
- Multi-Drop Capability of up to 256 units (RS-485 option)
- Enclosure weather tight to IP65 standards
- Minimum flow control from 150ml



### Peristaltic Pumps

- 4 roller aluminum pump head
- Cast bronze self-lubricating rollers
- Continuous duty 24 VDC brush style gear motor with internal permanent magnet CW-OFF-CCW switch
- Safety shield to prevent finger contact with moving parts
- Compact 5" x 4" footprint
- Tubing Loops of different materials and sizes including fittings are available
- Ideal for chemical dosing, life-sciences, R&D and others.
- Ultra-low flow control from 1.9ml/min

## PRESSURE & TEMPERATURE TRANSDUCER - TEST & MEASUREMENT SYSTEMS

### Pressure Sensor/Transducer

- Absolute / Gauge / Vacuum / Differential Pressure Transducer
- Rugged and Durable High and very low-level pressure sensor
- Accuracy up to  $\pm 0.05\%$  and 4 to 20 mA or 0 to 5 VDC output
- Suitable for temperature from -196 to 200 Deg C.
- Variable reluctance pressure sensor capable of range change
- Ultra-low & Ultra High line type pressure transducer
- FM, CSA, ATEX & IEC, SIL, Intrinsically Safe, Hazardous, and
- Explosion-proof approvals
- USB interface, HART, CANbus interface and RS 485 communication
- Airworthy / Marine / Transportation / Railway / Rugged application / Cryogenic



### Temperature Transducer

- Reliable and accurate process temperature measurement transducer
- Temperature range -40 to +260°C
- Low and extremely high-temperature transmitter
- ATEX/IEC Intrinsically Safe, Hazardous location, ATEX/IEC Flameproof
- Marine grade approval
- Digital line of Pressure, Level, and Temperature transmitters

**Application: Aerospace, Military, Automotive, Maritime, Medical Research, Oil & Gas Laboratory, Cryogenic, Subsea, and Industrial**

### General Purpose Pressure Transducer and Transmitter

- Rugged DP transmitter
- For liquid or gas service
- 4-20 mA Two-wire, VDC
- Full Scale Ranges from 2.22 inH<sub>2</sub>O to 10 KPSI
- Excellent temperature characteristics
- NEMA 4 Housing
- 0.25%, 0.1% or better accuracy
- Now available in 316SS and Inconel
- Transducer ideal for flight testing, vehicle testing, hydraulic system, and process control testing

### Pressure Transducers With USB Interface

- USB Interface for Digital Operation with PC
- Excellent Stability Over Wide Thermal Range
- 0.25% FS Accuracy, 0.5% Max Temperature Error
- For Liquid or Gas Service
- FS Ranges from 3.50 In H<sub>2</sub>O
- USB Drivers and Post Calibration, Logging Software Included
- Now available in 316SS and Inconel
- Transducer ideal for laboratory pressure measurement, level measurement, hydraulic pressures, and flow measurement



### Test and Measurement Pressure Transducer



- 0.1% FS Accuracy
- Gage, Differential and Absolute Versions
- Low Temperature Error
- For Liquid or Gas Service
- FS Ranges from 2.22 In H<sub>2</sub>O
- +/-5 Vdc and 4-20 mA Output Signals
- Transducer ideal for laboratory pressure measurement, automotive test cells and any high accuracy applications

### High Line Differential Pressure Transmitter



- Low dP Range, High Line Pressure
- Ranges From 0 to 10,000 psi FS
- Wet-Wet Capability
- Line Pressure to 10,000 psig
- 5Vdc or 4-20mA Output
- Stainless Steel Pressure Cavities
- Fully Sealed Housing
- Transducer ideal for core testing application, hydraulic system and high line pressures and low DP

### Low Range Differential Pressure Transducer



- 0.1 In H<sub>2</sub>O FS
- ±5 Vdc Output
- 0.5% Accuracy
- 1/8" NPT Ports
- 0 to 16° F
- Transducer ideal for high sensitivity to very low pressures applications.

### Variable Reluctance Pressure Sensor Capable of Range Changes



- Economical – Replaceable pressure sensing diaphragm for easy re-rangeability
- Wide Range – Provides pressure measurement from ±2.22" H<sub>2</sub>O to ±3200 psi in 23 full-scale ranges
- Flexible – Wet – Wet capability accepts liquids and gasses on both sides of the diaphragm
- Fast Response – Small internal pressure cavity volume for fast response to pressure variations
- Rugged – Withstands extreme shock and vibration
- Durable – Heavy-duty stainless construction stands up to abuse



### Low Pressure Variable Reluctance Sensor

- Low range:  $\pm 0.6$  to 90 in.H<sub>2</sub>O FS
- Low internal volume
- Symmetrical construction
- Small volumetric displacement
- High natural frequency



### Explosion Proof & Zone 2/Div 2 Pressure Transmitter

- Available ranges from 0 to 30" WC thru 0 to 15K PSI (75 MBAR to 1,034 BAR)
- Choice of mV/V, Vdc & 4-20 mA output
- Rugged, welded, stainless steel construction
- High proof pressure
- Economically priced
- Transducers ideal for Hydraulic & pneumatic controls, Die casting, Rolling & steel mills, Compression skids, Irrigation pumps pressure, Oilfield truck pressures, Skidded process systems



### Cryogenic Pressure Transducer

- Reliable cryogenic performance to -320 °F (-196 °C)
- Hydrogen and LOX compatible options available
- Isolated remote electronics via stainless steel armored flex tubing
- Standard accuracy to +0.3% FSO
- Lightweight, all stainless-steel construction (<10 oz.; 0.2 kg)
- Choice of 4-20 mA, 0-5 Vdc, 0-10 Vdc or optional digital output
- Transducers ideal for LNG pressures, Aerospace propulsion systems, Military and defense programs, Liquid gas custody transfer



### High-Accuracy Can-Bus Transducer

- CAN Bus protocol - J1939 or CAN Open
- High accuracy  $\pm 0.05\%$  FSO
- High thermal stability  $\pm 0.25\%$  FSO/100 °F
- -40 to +250 °F compensation
- Compact, lightweight, all stainless-steel design
- Adjustable Response Time (1Hz to 200Hz)
- Temperature output
- Transducers ideal for Dynamometer testing, Transmission testing, Brake testing, Hydraulic & Pneumatic valve testing, Jet engine testing, Emission test stands



### Flight Heritage Digitally Corrected Pressure Transducer

- 10X overload option
- 0 to 5 Vdc, or 0 to 10 Vdc or 4-20mA output
- 4 wire Isolated output option
- Secondary containment rated at 4,500 PSI (310 BAR) for ranges  $\geq 300$  PSI
- Transducers ideal for Aviation and suborbital spacecraft, unmanned aerial vehicles, Helicopter and rotorcraft, Commercial and military satellites, Launch vehicles, Ground and engine testings



### Flight Heritage Differential Pressure Transducer

- Accuracy to 0.1% FSO
- Extremely lightweight, <8 oz (0.2 kg)
- 0 to 5 Vdc, 0 to 10 Vdc, or 4-20mA output
- Line pressure shift <1% FSO/100 PSI
- 1000 PSI line pressure rating
- Ranges from 0-1 thru 0-500 PSID
- Transducers ideal for Aviation and suborbital spacecraft, unmanned aerial vehicles, Helicopter and rotorcraft, Commercial and military satellites, Launch vehicles, Ground and engine testings

## INDUSTRIAL SENSORS & TRANSMITTERS

### Temperature Transmitter

#### Head-Mounted Universal Temperature Transmitter

- HART protocol & 4-20 mA output
- Dual universal input
- ATEX and S.I.L. certification
- Mathematical functions
- User calibration & Custom linearization
- Sensor burnout detection
- Output current presetting

#### DIN Rail Universal Transmitter

- Universal input and power supply
- SMART, programmable
- Burnout, scale ranges and units of measure ( $^{\circ}\text{C}$  -  $^{\circ}\text{F}$ ) programmable
- Programmability with dedicated software and USB interface
- Interface and instrument powered by USB port
- Input - Output isolated from each other

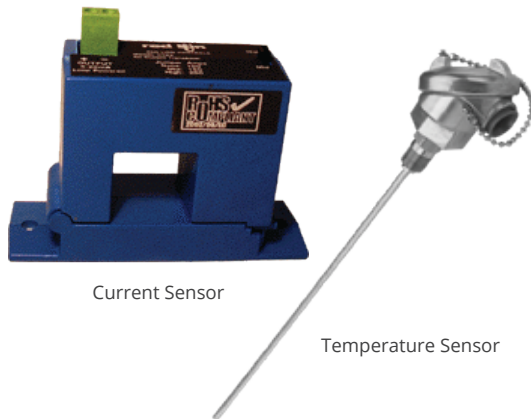






## Combined Humidity and Temperature Transmitter

- With capacitive sensor module and interchangeable filters,
- Voltage and current outputs selectable
- Dew point calculation and serial communication
- Possibility to calculate: the dew point, the difference between the measured temperature and the dew point
- 5 alarms configurable by user to 1 relay output SPST 1A at 30 V
- Local Storage of data and events
- 3-wire isolated RS485 serial communication, with Modbus RTU Slave protocol



Current Sensor

Temperature Sensor

## Analog Sensor

- **Current Sensor:** Our sensors include current transducers, current transformers, and current shunts in various inputs. Our product offering includes fixed or split-core models for easy installation.
- **Temperature Sensors:** RTD and thermocouples sensors are available in various mounting configurations to satisfy your application requirements. They are available with quick disconnect ends and field-cutable cables, with optional amplifiers.



## Signal Conditioners

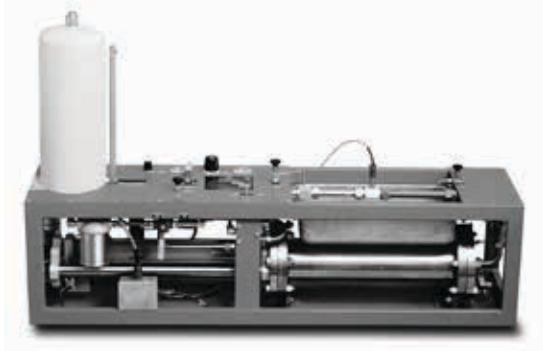
- **Frequency Input:** Voltage and Current input value from 0.1 Hz to 25 KHz with 0.1% accuracy. Two separate input, external push button. Easily configured using a seven position DIP switch, rotary switch and/or push-button Temperature Input Process Input
- **Temperature Input:** RTD or Resistance input or universal input types converts into a voltage and current output. Microprocessor based design available for field scaling. Factory calibrated and recalibrated in the field.
- **Process Input:** Programmable process calibration, signal simulation, password protection, error diagnostics. Generates frequencies from 0.001 to 25000 Hz. Universal AC or DC supply.

## FLOW CALIBRATOR

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Primary Standard Calibration Systems  
Traceable to NIST, Provides Performance,  
Reliability, and Benefits of Ownership.

### Liquid Primary Standard Calibrator – Microtrak and Omnitrak



- Premium flow meter accuracy with Dual Chronometry data acquisition
- Real-time temperature compensation
- Complete calibration in minutes with printed records
- Small volume fluid calibration, Compact size, easy to install
- Intuitive, reliable low maintenance system
- Calibration fluid is changed quickly and easily
- Flow ranges from 0.004 LPM to 1,500 LPM
- $\pm 0.05\%$  uncertainty of volumetric flow rate measurement
- Coriolis, Turbine, Orifice, PD, Variable Area, Venturi, and Vortex and all types of flow meter calibration
- PC-based user interface automatically merges data, performs calculations, saves data, displays data and prints data sheets

### Gas Primary Standard Calibrator – Bell Prover



- Simplified calibration system
- Stainless steel construction
- Accuracy-  $\pm 0.005\%$  of Reading
- Flow range of 2.83 to 3540 ALPM
- Automatic level compensation for liquid seal volume
- $\pm 0.2\%$  uncertainty of volumetric flow rate measurement
- Automatic data acquisition through PC and interface
- Displays, prints and analyzes data in desired units of measure
- Calibrates all principal types of flow meters turbine, variable area and thermal flow meters.



## Secondary Flow Calibration System For Gas & Liquid

- Precision uncertainty measurement system for various types of flow meter
- Simplified calibration and user-friendly system
- Proven CFlow+ LabView/Windows-based data acquisition operating software ensures optimal man-machine interface and ease of operation
- Traceability to National and International Standards (NIST/NABL) is easily maintained using appropriately calibrated master meters
- Wide flow range 1 to 6000 LPM

## ONLINE CORROSION AND ASSET MONITORING SYSTEMS

### Intrusive Probe / Er Probe

- 316 Bodies Supplied as Standard
- Cylindrical, Flush & Wire Loop Versions
- Variety of Materials and Element Thicknesses



### Corrosion Coupons

- 3" Strip, Disc, Ladder and Scale Varie3es
- Superior Finish Designed for O&G Applications
- Pre-weighed, Stamped & Sealed in VCI Bags
- Weight Loss & Pi\_ng Analysis Reporting Provided
- Microbial Assessment

### Non-Intrusive Wall Thickness Monitors

- Ultrasonic Measurement
- Up to 550°C
- Single Element Transducer
- Silver Foil Interface
- No Welding – No Epoxy – No Maintenance
- Minutes to Install





### Chemical Injection Hardware

- Side NPT or Flanged
- Swivel Flange Option for High Alloy's
- Direct (Non-Tee) Method Available
- Integral Non-Return Valves
- 1" LP Retractable
- Flanged 'spade' Type



### Nozzles & Tubes

- Selected Based on GPH & Pressure Differential
- Range of Spraying Patterns
- Quills and Sampling Tubes
- Wake Frequency and Drag Calculations



### Hydraulic and Mechanical – Pasteurized Tools

- Flanged or Welded
- Up to 10k psi
- A105/LF2, 316/316L, F51/F55 as a standard material option



### Retractable – Non-Pasteurized Tools

- Flanged or Threaded
- Up to 10k psi
- 1" and 1.5" connections as standard



### Strip, Flush, Ladder, Multi Disc Holders, & Bio-Film Probe

- 316 Supplied as Standard
- Flush Adjustable Op3on
- Welded or Non-welded
- Wake Frequency and Drag Calcula3ons Supplied



## Chemical Injection Valve & Metering

- Side NPT or Flanged
- Swivel Flange Option for High Alloy's
- Direct (Non-Tee) Method Available
- Integral Non-Return Valves
- 1" LP Retractable
- Flanged 'spade' Type



## Software's for Analysis and Asset Management

- Coupon analysis and Probe data reporting
- PFD's & Tag ID's (Pictures, GPS)
- Historical Data and Vital Information

## PANEL METERS / UNIVERSAL INDICATORS & PID CONTROLLER

- Wide range of models, sizes, and capabilities
- Display count, rate, time, voltage, current, process, strain gauge, and temperature
- Field-upgrade-able plugin modules
- Indication, Control, and Advance Control options
- Upto 9 digits Red and Green LED display
- Upto 6 digits Large LED Display
- Powerful, configuration software across all types of meters (Crimson®)
- Product customization available
- 1/4, 1/8, and 1/16 DIN Sizes available
- Universal Analog or Digital Input and Dual or Quad outputs
- Suitable for Indoor and Outdoor applications
- Sunlight Readable Display



## Types of Panel Meter

- Universal Input Indicator / Controller
- Battery Powered & Loop Power Indicator
- Thermostats & ON /OFF Controller
- PID Controller & Dual Loop Controller
- Multiloop / Multifunction Controller – 8 PID
- Advanced Programmed Controller
- Servo Motor Controller
- Modular Controller
- Large LED Displays
- Touch Screen Control Indicator (New Feature)

## MULTILOOP PROCESS CONTROLLER



- Multiple Analog Input/output and Digital Input/output combination
- Ideal for direct replacement for Siemens 353,353, Bailey SLC and CLS, ABB Kent-Taylor Mod 30 series controllers
- IO Configuration - Basic or Extended I/O Configuration with Analog & Digital
- Standard DIN size 144 X 72 mm
- Multiple PID loops, Math, Logic, and sequence
- Robust, highly visible display resistant to temperature & power surge
- Peer-to-peer and Modbus RS-485 or Modbus TCP over Ethernet
- User-Friendly Function-block style configuration software. Over 200 blocks in library and customizable Block for various functions
- Standard programs available for applications like Boiler, Heat Treatment, Pressure control and several others

## PROGRAMMABLE AUTOMATION CONTROLLER



- Programmable control unit according to IEC61131-3 standard
- High performing ARM Cortex M7 32-bit, 216 MHz processor
- Memory 16 MB Flash, 32 MB SDRAM, 128 KB MRAM
- Panel Cutout: 68 x 138 mm
- 1x 10/100 MB Ethernet port
- 0/1/2 serial: RS232 / 485 + 1 RS485 (optional, isolated)
- USB port: Micro USB type AB
- Protocols: Modbus TCP (Server), Modbus RTU, ASCII
- 8 AI/AO and 16 DI/DO inbuilt with Expandable Modules
- Front touchscreen panels
- Multiloop / Multifunction process controller
- LCD TFT display with touch screen
- Compact, split, or remote installation modes
- PID with auto-tuning and advanced algorithm
- Real-time Trend functions and Customized logic functions
- Customize graphics with no limit on pages

## DATA ACQUISITION AND CONTROL SYSTEM

Support For 300+ Protocols And Conversions Including MQTT – Industry 4.0 Ready



### Rugged Controller

- Scalable Modules & Expansion with Front Display up to 15 inches
- IO's and Communication options
- Rugged Construction for Extreme Protection
- -20 to 60° C Wide Operating Temperature Range
- Industry-Standard Control Language Support
- Web Server for Data Visualization
- Real-Time Data Logging on local SD Card and/or share via FTP
- Suitable for outdoor application with sunlight-readable display



### Modular Controller

- DIN rail mounted modules with selectable IO configuration
- Data Acquisition or Multi-zone PID Control
- Support for up to 16 hot-swappable modules
- Web server that provides access for data logs and Virtual HMI over any browser
- Alarm notifications via Email/Text Msg.

### Flexedge -

***Anything In. Anything Out. Anywhere***

### Protocol Converter + Visualization + Cellular Gateway + Micro PLC



- Highly scalable IIoT platform with communication technology
- Industry-leading protocol conversion, visualization, and IIoT cloud connectivity,
- Makes deployment, management, and upgrading simple and straightforward.
- Hot-swappable I/O module's configuration with Hazardous certification
- A multitude of communication options: Ethernet, Wi-Fi, serial, USB, and cellular.
- Features a rugged enclosure, wide operating temperature range -40° to 75°C
- Hazardous Location (HazLoc) Certifications including UL Class1, Division 2, and ATEX/IECEX.

## High-Performance Protocol Converter and Data Acquisition System With Data Logger, Web Server and Virtual Hmi



- Built-in MQTT connectors accelerate IIoT projects with point-and-click simplicity
- Embedded OPC UA server functionality eliminates need for separate system hardware
- OPC UA Client Driver & OPC UA Historical Access
- Store and Forward Buffering for Cloud Connectors
- SQL queries feature simplifies batch and recipe management
- Built-in data, event and security logging with cryptographic signature support enhances troubleshooting and helps meet regulatory requirements
- Advance web server and multiple connectivity

## Visual Management-Productivity Station



- Dedicated Interface Box to connect multiple devices/protocol
- Provides Increased profitability through insight & Continuous improvement driven by real-time information
- Built-in communications drivers and protocol conversion interface for most PLCs, drives, motion controllers, and other automation equipment
- Requires no dedicated PCs, SCADA, or OPC server
- Automatically page between multiple screens of KPI, trends, Andon, messaging, and more
- Powerful programming capabilities with software that helps customize solutions based on to requirements and needs
- Compatible with any brand or size of modern TV, monitor, or projector for visualization
- Easily duplicate information on multiple TVs with common signal splitters
- Internet-ready with built-in Web and FTP servers for remote access and control
- Create a versatile industrial dashboard by connecting legacy and latest systems



## TEST & MEASUREMENT SYSTEM



### Universal Data Acquisition System (UDAS/USB2250)

- Direct Sensor Input to PC via USB
- 16-bit Resolution, 100 KHZ Conversion Rate
- 16 Input Channels, Sensor Excitation Provided
- Auto-Zero Capability for Better Accuracy
- Mix or Combination of Inputs - Thermocouples, RTDs Strain Gages, LVDTs, VR Sensors Potentiometers, DC Volts
- Data Acquisition Software Included
- .NET API and LabVIEW vi's available

### Vehicle Data Acquisition System (VDAS)

- Ideal for Vehicle HVAC Testing, Radiator/A.C. Condenser Testing, Aircraft Flight Testing
- Withstands the elements – moisture and temperatures up to 185 °F (+85 °C)
- Up to 300 high-density channels of vehicle sensor inputs in 0.8 cubic ft.
- Rugged to take abuse in the field or 1000 V Isolation on all Channels
- Cold-cranking operation with supply voltages down to 5 VDC
- Low Power Dissipation – Minimizes Thermal Distortion in Vehicle
- Test configuration files can be created and edited remotely
- Low power dissipation - minimizes thermal distortion in vehicle
- 1000 V isolation on all channels
- CAN bus interface card
- Stand-alone data storage module



### Vehicle Pressure Acquisition System (VPAS)

- Low-Pressure Vehicle HVAC Measurements
- FS Ranges as Low as 0.1 In H2O
- Up to 8 Pressure Channels and Operates on Vehicle Power
- For Passenger Cabin HVAC Measurements
- Ideal for Vent and Duct Pressures
- USB Drivers and Interface Included
- Computer Interface and Software Included
- Operates On Vehicle Power



## HMI OPERATOR PANEL



- Various Display Size - 4.3" to 15"
- Rugged Cast Aluminum or Polycarbonate Housing
- Sunlight readable display for outdoor-rated models
- Up to 4 Serial Port (RS232 / RS485) and 2 Ethernet Port
- Up to 2 USB Host Port for upload/download and 1 USB Device Port
- Industry 4.0 Support Device
- SQL Queries and Conversion & Import
- Supports email and/or SMS notifications on alarm conditions
- Convert up to 20 protocols simultaneously from over 300 supported drivers
- Expansion port to select add-on modules like Cellular / Wi-Fi / CANbus/ Profibus / Devivenet
- Rugged display with on board I/O
- Powerful ARM9 CPU, Up to 1024x768 resolution & supports 16 M colours
- IP66 NEMA 4X front panel standard
- -20° to 60°C operating temperature
- New Primitives, Gauges & Symbols library
- SD Card support for data backup / storage
- Real Time Clock with battery back up
- Web server – Browse from any device
- UL, UL Haz, ABS, ATEX, IECEX Certification

## RTU & PROTOCOL CONVERTER

### PLC & Fieldbus Gateway



- Web-based IoT utility - Linux (Yacto)
- IoT Studio: Drag-and-drop UI for IoT/Field Devices
- Dashboard: Visualization for IoT Studio
- NexUA: Interface supports OPC UA Server
- Publish Data Source & Dashboard to remote service: One-click to Cloud (One Click Deploy)
- Container management software by portioner



## Industrial RTU'S

IIoT gateways and routers offer reliable connectivity to deployed assets. Ideal for harsh environments, these rugged devices offer secure communication between SCADA servers, RTUs, PLCs, remote I/O and other connected devices such as security cameras or industrial sensors.

- Variety of connectivity, I/O, and programmability
- Open Linux operating system for a scalable RTU
- RTUs can address up to 16,000 Sixnet nodes or 247 Modbus nodes per controller.
- Supporting Modbus, Modbus TCP, DNP3, SNMP, IEC60870-5, and Sixnet UDR protocols
- UL Class I, Division 2 listing, CSA, CE and ABS Marine ratings, our IPm RTUs will operate reliably. Temp. -40° to 70°C



## CNC Gateway – Connect Up To 10 Machines

- 1 to 5 CNC controller and 1 to 10 CNC
- Controller via TCP/IP
- Controller Connectivity & CNC Data Collection
- Controller status & Uptime analysis
- Alarm & history and Servo spindle load
- Maintenance management
- Internal SQL Interface & Cloud Service
- Fanuc, Mitsubishi, Siemens and Heidenhain Controller Connectivity



## Industrial RTU's With 5 Years Battery Backup

- Easy Installation, Easy to Monitor, Easy to Maintain
- Real time remote monitoring of up to 5 sensors
- Lithium battery with an expected life of 5+ years
- ATEX and IECEx (Ex II 1G Ex ia IIB T4 Ga)
- Built-in quad band 3G/GPRS modem with auto switching internal/external antenna
- Patented submersion sensor
- Remote configuration & firmware upgrade



### Cellular RTU's

- RTUs feature 4G LTE connectivity with software selectable multi-carrier support
- Natively supporting Modbus, DNP3 and MQTT protocols
- IIOT Cloud Connectivity
- RTUs support robust security features such as VPN tunnels, port forwarding, stateful firewall, packet filtering, data encryption and an Access Control List
- Web-based console and customized dashboard



## NETWORKING SOLUTION

### Ethernet Switches

- Unmanaged and Managed Ethernet Switches
- Ideal for light to moderate industrial applications
- Up to 26 Ethernet port
- Copper and Fiber port combination
- Operating temperature -40° to 85° C
- DIN Rail mounting and up to IP 40 protection
- Hazardous approved and designed for harsh environment



### Communication Converters

- Protocol Converter : Support 300 protocol optional web server and data, event and security logging
- Media Converter: DIN-rail mountable include copper, fiber, Fast Ethernet and Gigabit options
- Serial Converter: Serial converters to dragand- drop configurable



### POE Solutions

- Switches features plug-and-play installation
- IGMP auto-configuration
- Port and PoE auto-detection and simple ring configuration
- DIN Rail mounting and up to IP 67 protection
- Up to 16 Ports available



## Router

- Available with five 10/100Base-T(X)
- Ethernet ports and one RS-232 port, these industrial routers support AT commands and Serial-to-IP Com.
- Generic HSPA+ with fallback to GSM/GPRS/EDGE CE,
- EMC:FCC, part 15 and Industry Canada, ICES-003
- Hazardous Locations: Class I, Div. 2, Groups A,B,C,D, ISA 12.12.01
- Electrical Safety: UL508/CSA22.2/14 (CUL)



## IP67 and OEM Embedded Networking Products

- LAN-to-LAN or LAN-to-WAN connectivity
- Built in security and routing protects against unwanted intrusion
- Flexible all-in-one platform reduces system complexity
- Redundant Power Input
- Rugged IP67 dustproof and water-resistant metal enclosure
- ISA 12.12.01-2015 Class I and II, Div. 2, and Class II, Div. 1 and 2, Groups A, B, C, D Hazardous locations
- ABS type approval for shipboard applications, EMC Directive 2014/30/EU
- IEEE 1613 (Electric Utility Substations)

## FANLESS PC & IPC

### Fanless Box PC

- Robust housing metal enclosure
- Intel® Celeron® J1900 and Intel® Core™ Processors
- Support Industrial I/O port and DVI I/O port
- Support Linux kernel 3.0 / Windows7 / Windows10
- Internal mini-PCIe socket support optional variety of Wi-Fi / 3G connectivity
- Customize for WIFI/GSM connectivity
- Select from combination of USB, Audio, LAN, Com Port, DVI Port and POE Ports
- Extended operating temperature – 40 to 75°C and Humidity 95% @ 40°C Non-Condensing
- Shock protection SSD: 20G, half sine, 11ms, IEC60068-2-27
- Vibration protection Random: 0.5Grms @ 5~500 Hz, IEC60068-2-64, Sinusoidal: 0.5Grms @ 5~500 Hz, IEC60068-2-6





## Rugged Panel PC / IPC / Displays

- 8" to 21.5" Display
- NEMA Panel Mount, Industrial Grade
- Solid Aluminum Die-Casting Chassis
- Front Bezel IP65
- Multiple Inputs
- 9 ~ 36V DC Wide Range Power Input
- Operating Temperature: 0° to 50°C
- Front User Controls – On Screen Display (OSD)
- UL and RoHS Compliant

## SCADA & ENTERPRISE SOLUTION

### SCADA System

- OPC to Core, 64 Bit SCADA
- Self-service dashboard
- Advanced Graphics in 3D visualization
- GEO Mapping with Real Time Data
- Asset Management and Analytics
- Trend Charting, Alarms & Events
- Customized Reports
- Connects SAP, Oracle, SQL, Flat Files, Databases and ERP
- Frameworks can be Installed on Premise, VM or Cloud



### Analytics

- Energy Management
- Building and Facility Management
- Fault Detection and Diagnostics
- Predictive Maintenance
- Manufacturing Productivity (OEE)
- Alarm Analytics
- Reporting and Analytics



### Historian

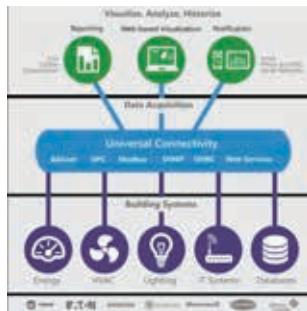
- High-Capacity 100,000 Samples/Sec
- Mission Critical Redundancy
- Advanced Visualization
- Advanced Archival
- Distributable Architecture with Remote collector
- Real-Time Statistical Calculation
- OPC to Core





## Mobility & Wearable Devices

- Any Glass Runs on: Phone, Table, PC
- VR and Augmented Reality
- Video Streams Integration
- Alarms to Video Position
- Integrate QR Codes, Near Field (NFC) and Bar Codes
- Work Force Management – Mobile Device



## Building Monitoring and Management System

Monitor & Control complete building environment directly from the CCR (Central Control Room). Create Dashboards and Alerts from multiple building assets for live data and take the necessary decisions from the CCR. Advance analytics to enhance efficiency and safety and for regulatory purpose. Supports digital twin integration.



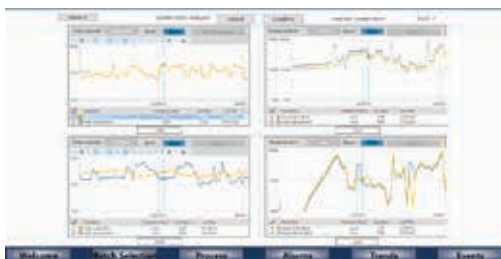
## Energy Monitoring and Management

Visualize the complete distribution of energy across multiple or single plant/asset and Create Energy Dashboards for Performance, Prediction and Carbon Footprint. Create energy dashboards across different assets and predict energy losses to enhance efficiency and reduce downtime.



## Productivity Visualization

Monitor all the running processes and assets on single platform with the user access control. Create Dashboards on the Fly to compare Live data with Historical and/or Design data to evaluate performance. Customize roll-based dashboards for the management, production, supervisor, and auditors.



## Pharma Batch Application With Golden Batch Analysis Reports

Fully integrated solution with advance visualization and OPC universal connector to integrate legacy and current equipment's, laboratory systems, ERP, Database, and third-party systems. Create customized reports for compliances – 21 CFR, GMP etc. Manage recipe and batch controls with minimum scripts. Redundant data archival with store and forward capability, and compare archived, ideal batch data (Golden batch) with real time data to ensure quality and productivity.



### IOT Device

- NXP ARM Cortex™-A5 Or Cortex™-A7 SoC
- Onboard RAM and Flash
- Ethernet 10/100 X 2
- Isolated RS485X1 & RS232X1
- Digital IO and Analog IO
- Fan less Cooling
- 2G/3G (optional)
- Wi-Fi (optional)
- Modbus RTU

### IOT Sensor

- IIOT sensor device to easily transfer data from field devices to cloud platform.
- Protocol: Modbus RTU/TCP, CANbus,
- Connectivity: RS232, RS485, Ethernet
- Protocol: MQTT, COAP, HTTP, SNMP,
- Wi-Fi and GPRS Interface
- Analog & Digital IO, Temperature, GPS, Gateway

### IOT Environmental Sensor

IOT Environmental monitor for temperature and humidity measurement.

- Temperature, Humidity and Location sensors
- Battery backup
- Protocols: MQTT, COAP, HTTP, SNMP
- Wi-Fi and GPRS Interface
- Analog & Digital IO, Temperature, GPS

IOT Gateway software designed to run on a Linux based microcomputer.

- Simple yet powerful mapping of incoming data and messages to unified format.
- MQTT connector, OPC-UA connector, Modbus connector
- BLE connector, request connector, CAN connector, BACnet connector, ODBC connector, REST connector, SNMP connector, FTP connector, Custom connector.

### Cloud Platform

The Crystal ball IOT cloud platform provides the best, most cost effective and easiest to deploy solution to meet today's demands for cloud based IOT platforms. Our cloud platform supports both cloud and on-premises deployments.

- Collect and store telemetry data reliably
- Support multi-tenant installation
- Configurable widgets for data visualization
- Supports transport encryption for both MQTT and HTTP(s) protocols.
- Ability to register and manage devices
- Generate cloud based notification via SMS and Email





## PROJECT MANAGEMENT / SERVICES



### Training

- Our Training center facility is well organized to conduct training for more than 20 engineers at a time.
- Every successful implementation require "optimized engineering". Our experts provide training to partners and customers to enhance their skills.
- Training session covers Hardware interface protocol, Graphic experience, Analytics, Reports, Dashboards and Database management, Networking, VM and Industry 4.0
- Online – Web sessions customized on request OR Standard sessions
- Onsite – Training at customer location



### Project Management

- PMP – System Architecture, Block diagram, and Gantt Charts.
- System Requirements, Functional Specification and Engineering Manufacturing Specification
- P&I, General Arrangement Drawing, Cabinet/Panel Drawing – Wiring, Mounting & Installation documents, Operating Manuals, Installation Manuals etc.
- Acceptance Test Built and Final Site documents
- Schedule based review of milestones at various stages of projects



### Design Engineering

- Design Documents for Instrumentation, SCADA and MIS.
- Embedded & Control System Design
- Control Logics, Flow Charts & Software Development
- Graphics Design for SCADA and GUI Tools
- MIS reports documents, KPI and Analysis Tools engineering
- Hardware and Networking engineering services for Integration
- Communication Protocol and Interfaces



### Customer Support

- Our Global Support and Services programs are supported by our offices around the globe along with our network of sales channel distributors and representatives, with local and regional locations for frontline service
- Pre-installation, Pre-Check of Site and Site visits
- Field Acceptance Test & Installation Reports
- Local First level Service Diagnostics, Preliminary repair and Second level RMA/ Repair/Replacement
- Online ERP based Support & Services - Ticket no & Tracking of support tickets for Global customers
- Local Repair /RMA depot with RMA services for Warranty & Non-Warranty supply



## Our Project Application Strength

- Digital Transformation / Industry 4.0 Migration
- EMS & BMS
- Smart City & Smart Factory
- Energy Monitoring Dashboard, and Carbon Footprint
- Asset Monitoring and Alerts
- Pharmaceuticals, API & Process Systems, 21 CFR, GMP and other compliance
- Water and Wastewater management
- Boiler and Reactor Control System
- Data Acquisition & Controls System for Glass, Ceramic, Pharma and Chemical Industry
- Tunnel Kiln, Vacuum Control and Furnace Control Automation
- Environmental Monitoring Systems
- Online Corrosion & Asset Monitoring for Oil & Gas, Skids and Corrosive Application
- Assembly Line Automation in Automotive and Manufacturing
- Utility Monitoring & Centralized Dashboards

## DIGITAL TRANSFORMATION AND ENTERPRISE BUSINESS

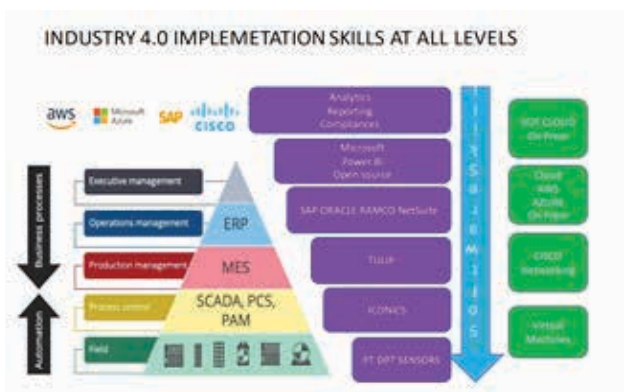
### OT to IT Convergence

We provide Complete OT to IT convergence in Manufacturing, Infrastructure and other domains.

One stop solution for OT interfaces by communicating with one or several devices / systems, using standard communication protocols / OPC, thus ensuring meaningful data are integrated to a common platform using IoT edge gateways and provide On premises, Hybrid or Cloud hosted platform services.

Integrate Realtime / Design / Historical Data, compare and collaborate with advanced calculations to Predict failures and enhance performance.

Provide seamless IT interface by ensuring 360 Deg Flow of Real Time data /Historical Data / Design Data with ERP, WorkFlow and Third party applications.





## Alerts & Alarm Management

Manage 24 X 7 alert notifications from Plant Floor, Assets , Building , Infrastructure , Moving Assets or any system . Customise alert notification based on Priority and share notifications via email, SMS/texting or browser on Wearable devices .

Configure alarms on several different types of media agents to notify anyone, anywhere, of an occurring alarm. Configure alarms, alarm action sets, multimedia agents, and alarm acknowledgement codes.

Opportunity to create subscriptions to OPC Alarm and Event (AE) servers and configure schedules and destinations for alarm notification messages.

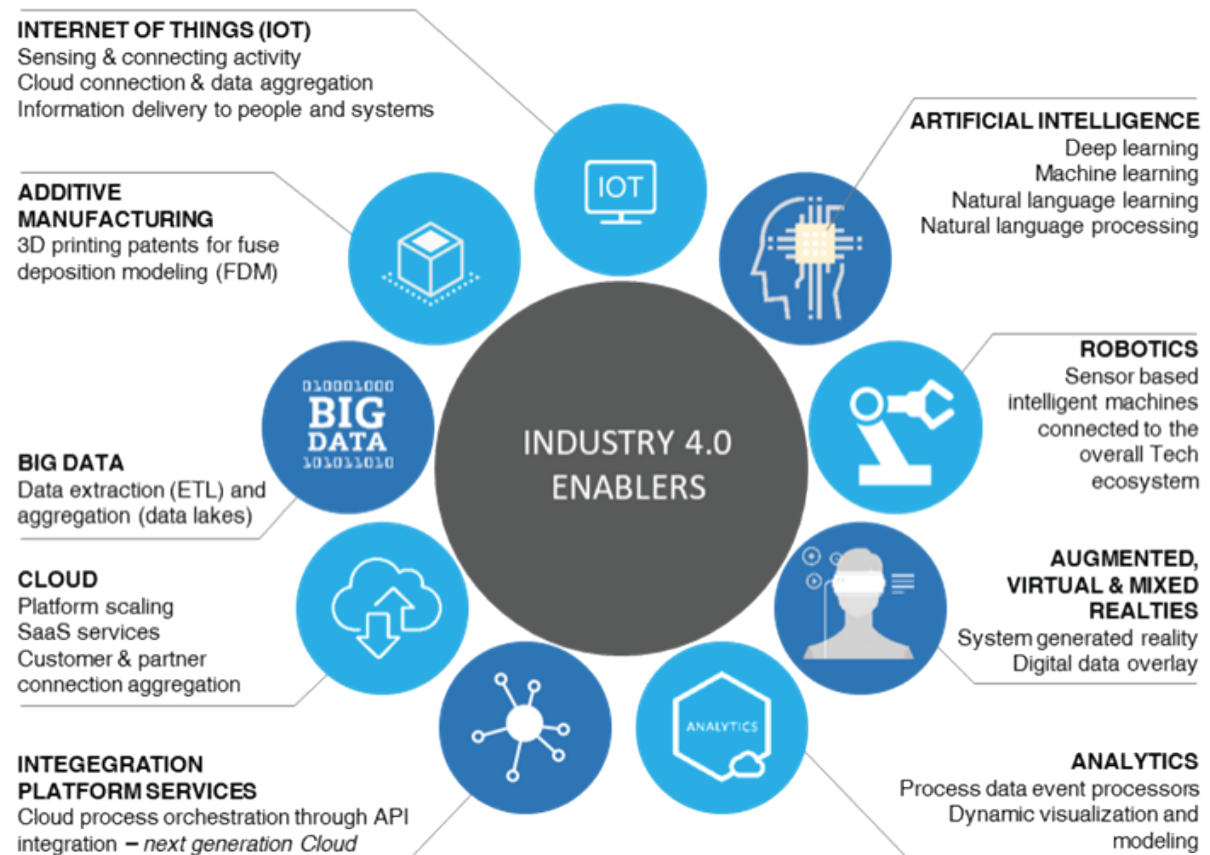


## Dashboards and KPI

Customise your own Dashboard based on different Roles and responsibilities.

Advanced Tools for creating Dashboards “on the fly” by simple “pick and drag” action and KPI

## Complete Integrated services



**BANKING &  
PUBLIC SAFETY**



## DEALING & TRADING



### Trading Floor Communications

For any financial organization Trading floor is mission critical operation. Quality assurance in communication setup is crucial to meet this requirement.



### Trading Floor Compliance

Satisfying regulators requires the ability to respond immediately to audits or investigations and to provide guaranteed recording and retention evidence.



### Soft Clients

Soft Client provides traders with the same functionality, consistency and flexibility, regardless of location, device, or application. The application can be rapidly deployed and delivers powerful features with the same intuitive look and feel as the end user interface.



### Mobile Client

Mobile Client provides traders with the same functionality, consistency and flexibility, regardless of location, device or application. The application can be rapidly deployed and delivers powerful features with the same intuitive look and feel as the end user interface.



### Turnkey Deployment

The traditional methods of procuring, building and deploying critical voice communications platforms are expensive and increase time to market. Whether you work in finance or command & control sectors, you need your critical voice collaboration solution to be up and running as soon as possible.

- Reach markets quicker
- Decrease IT operational costs
- Streamlined support service
- Add new features



## Hoot and Holler

Pulse delivers hoot, intercom, TV audio and customizable speaker channel integration-eliminating the need for PBX phones or other intercom vendor equipment.



## Unified Communications

Integrated systems deliver easier management, free up IT staff time and reduce costs created by traditional IT siloes. We help you to maximise your existing trading floor environment. Our solutions are certified interoperability with unified communications (UC) platforms, to provide a seamless experience.



## Virtual Dealer Board

In response to the rising demand for cloud based technologies, we present a solution that enables greater workforce mobility and enhanced disaster recovery, with reduced total cost of ownership. Our soft client is clouddelivered virtual endpoint, providing the same global hoot, advanced telephony and private line capabilities.

- Cloud-delivered virtual endpoint
- Workforce mobility
- Enhanced disaster recovery
- Reduced TCO



## VOICE RECORDING & ANALYTICS

### VoIP/SIP Recording Solution

Every minute, thousands of interactions from multiple channels take place between your customers and your organization. We have is a scalable, secure and robust platform that make it easy to record and manage interaction data.



### Compliance Recording

Need to address the stringent requirements of industry regulations, such as PCI D55 3.2, GDPR, HIPAA, Dodd-Frank, SOX, and MiFID II, organizations need to implement a compliant-bydesign approach and we provide the same.



## Contact Center

Customer contact centers are dynamic. Agents need to perform and upsell. Managers need to be empowered. Relationships are key. We deliver solutions unparalleled to ensure long-term relationships with your call center customers.



## Workforce Management

Workforce Management and has been implemented in thousands of contact centers around the world. Its suite of tools powered by embedded AI and ML make smarter decision-making easy and intuitive. WFM's



## Interaction Analytics

Analytics lives in the core of every business. it requires the right approach, knowledge, and organizational alignment in order to succeed. Customer experience has overtaken price and product as the key brand differentiator for consumers and to achieve best in class.



## Voice Biometrics

We each have a unique fingerprint, Voice biometrics uses voice patterns to produce unique identification for every individual, using more than 100 physical and behavioral factors. These include pronunciation, emphasis, speed of speech, accent, as well as physical characteristics of your vocal tract, mouth and nasal passages.



## DATA CENTER MANAGEMENT

### DCMS Go

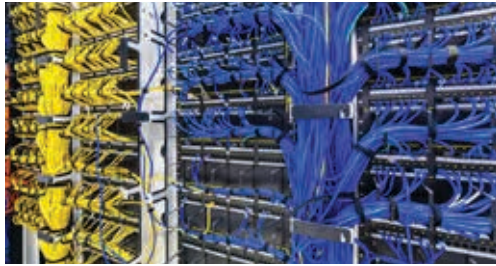
Our vast experience in datacenter management software is appreciated by PDU manufacturers. As an independent software house we can work with any brand to add functionality and ease-of-use.



### DCMS Pro

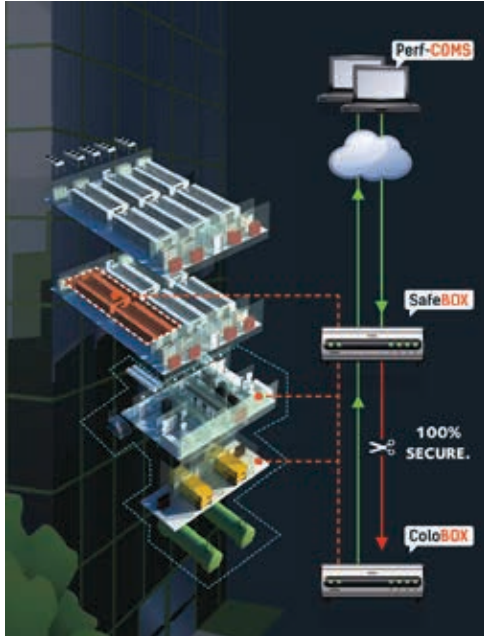
Datacenter Control and Management System (DCMS) is a set of modules (or 'products' if you like) that are designed to help you manage your on site datacenter. 'products' if you





## DCMS Expert

DCMSExpert allows you to digitise your datacenter right down to the smallest components. When you want to have total control of your datacenter, DCMS Expert is your choice. Think of the time and money you can save by eliminating inefficiencies in your workflows.



## COMS

COMS is a set of products that create a single dashboard on all sites, owned and leased. It's the ideal solution for anyone who needs to monitor multiple sites from a single location.

## COMMAND CONTROL

### Air Traffic Control

Bringing together multiple communications methods for instant and secure voice collaboration across dispersed land, sea & air based assets. Voice collaboration platform that brings together landline, radio and mobile users simultaneously.

Need to broadcast critical information to remotely dispersed individuals in an instant over a secure private network.



### Transportation

Transportation companies - rail, bus and mass Transportation transit - incur a high level of liability and scrutiny. They strive to maintain a standard of regulatory compliance, ability to assure that protocols and procedures are being followed. It is critical, to identify, reward, and retain employees. This requires exceptional quality monitoring and training on an ongoing basis.





## Disaster Management

Bridge private and public communications networks, to disseminate information for effective response co-ordination. Organisations responding to emergency situations and disasters require independent conferencing capability in 24-hour operation to connect decision makers, field workers and subject matter experts at any time.



## Military & Defence

Organisations conducting mission critical operations in areas with restricted radio service availability (often in "harsh" terrains), need robust and reliable voice collaboration solutions. The Control Room (Command Post or Network Operations Centre) serve as the "nerve centre" gathering information, directing people and resources.



## Enterprise IP KVM Matrix

A flexible, scalable and reliable range of IP KVM Matrix Solutions that have been designed to maximize the IT infrastructure investment of large-scale enterprises operating across all industries.



## SME IP KVM Matrix

For smaller businesses looking to improve the scalability, reliability and flexibility of their IT Infrastructure, Our range of SME IP KVM Matrix solutions bring large-enterprise KVM to the smaller business.



## Direct-connect KVM Matrix

Direct-connect KVM matrix solutions allow IT managers to improve desktop ergonomics, security and flexibility by relocating computers away the workstation while still delivering an at the-PC' user experience.

## PUBLIC SAFETY

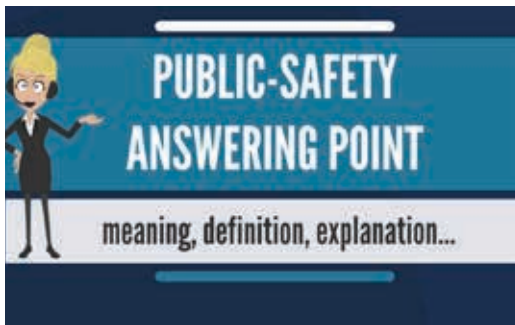


### Emergency Medical Services

The heart of every strong, high-performing EMS operation is an outstanding contact center staffed with a team of dedicated communications specialists. Proper employee selection, training and quality control, coupled with the development and enforcement of policies and procedures are all essential to mitigating risk and liability, promoting compliance and assuring success and accountability. The recordings of critical communications between physicians and EMS personnel also protect your EMS teams from unwarranted complaints or lawsuits.

### Public Safety Answering Points

Say goodbye to waiting days or weeks for manual reports and make smarter decisions faster using Incident Intelligence Dashboards. We have a suite of modular applications for incident information management that can run over traditional and IP-based networks. It records multimedia interactions between the public, emergency centers and first responders. All captured incident information is then synchronized and put into context to help you improve investigations, policy compliance and employee performance.



### Public Utilities

Utilities organizations bear the critical responsibility to power the country and the economy 24/7 /365. They strive to reliably deliver power, water, gas and other musthaves to a demanding and expanding consumer base, also need to keep field personnel safe and compliant with regulations each day without fail. Utility dispatchers and the timeliness, accuracy, and compliance of their communications play a crucial role in the coordination.

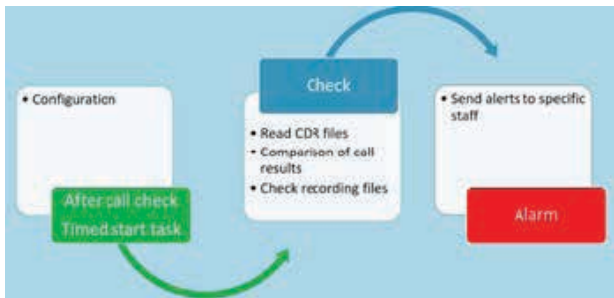


### Security Alarm Monitoring

Companies that provide security services and monitoring of burglar, fire, commercial and residential alarm systems are subject to strict regulations, certification requirements and periodic audits. To maintain high quality, reliability, and service levels, you must continuously meet the requirements for comprehensive, secure data collection and storage, including recorded contact center communications.

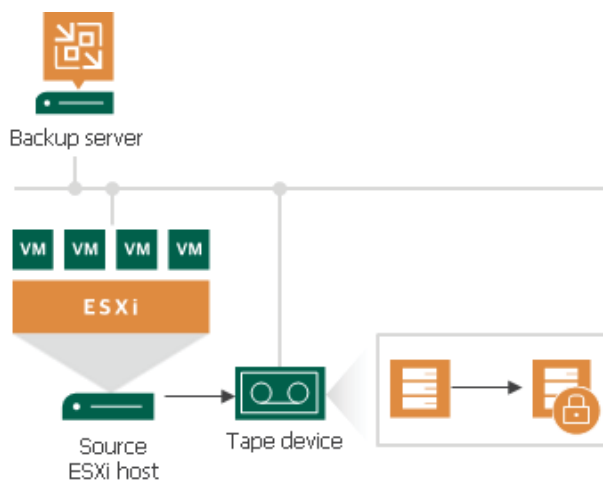


## SOFTWARE



### Record Check and Call Match

Perform automated Recording checks and ensure all recorded extension before the start of an organization operation. To ensure periodic task assigned to ensure that recording system has been recording normally. Capability to generate daily reports.



### Tape Replication

ACE provides voice recording media extraction, digitization and conversion into modern long term storage. He has the capability to read and extract media records from voice logger tapes and archive to your preferred long term storage



### Call Accounting

Call detail record analysis of your Trader Voice platform (private lines, turrets and traders) with your internal and external telephony platform. It monitors calls for cost analysis and cost allocation, security, compliance and asset tracking, and interfaces with all trading platforms and over 100 PBX

## SERVICES

### Annual Maintenance Contract:

We provide Annual Maintenance Contract to our customer for the Hardware deployed at their premises. The AMC has different service levels based upon the customer requirements. The AMC can be Comprehensive or Non-Comprehensive



### 24 x 7 Support

Our support team USP is to assist customers right from the pre-sales, post-sales, installation, commissioning, training. The most important part is to provide 24 x 7 x 365 days support to the customers for their equipment's as well as the operational requirements



### Consulting Services

We offer independent technology consulting services to help you to leverage your voice communications infrastructure, optimise efficiency and lower costs. We employ a structured approach to integration which includes scoping and estimating, requirements gathering, development, testing, implementation and long-term solution management.



### Managed Services

We provide managed services offering for the comprehensive monitoring, management, administration, maintenance and reporting on a day today basis. The managed services offered can be either an on-site resident engineer or can be from our service desk centres which have qualified system engineers to monitor the endpoints and connectivity assets.



## VIDEO MANAGEMENT

### Video Cloud

Store and protect your organization's video library in the cloud, while still making it easy for the right people to access internal videos.

The video cloud keeps working even when other systems fail.

With mirrored storage and fail-safe recording, Panopto's reliable cloud-based video platform protects you from data loss and service interruptions due to power outages, hardware failures, and other potentially catastrophic events.

Want proof? When a campus server malfunctioned during midterms at Thomas Jefferson University, Panopto kept recording and students still had access to study materials, despite the outage.



### Video Players

Interactive HTML5 Video Players

Video should be more than a box on a web page. Panopto's interactive HTML5 video players make watching a video feel just like being in the live audience.

No two devices are exactly the same, which is why Panopto automatically detects each viewer's device, browser, and video capabilities to deliver an optimized playback experience using HTML5. Watching on a Mac or PC? You'll see our full interactive player. On a smartphone? You get a video podcast. On a tablet? Custom iOS and Android players. Web connection a little spotty? Not to worry. Every video uploaded to your Panopto video CMS is also transcoded for adaptive bitrate streaming, ensuring fast startup and minimal buffering, regardless of connection speed.



### Video Analytics and Reporting

Get detailed reports on audience engagement and comprehensive insights into viewing behavior for every video on your Panopto portal.

Troubleshoot on the fly and analyze the overall performance of your live streamed events as they're happening.

With Panopto's Hive Insights integration, you can monitor the quality of experience, quality of service, video startup time, total viewers, and more.



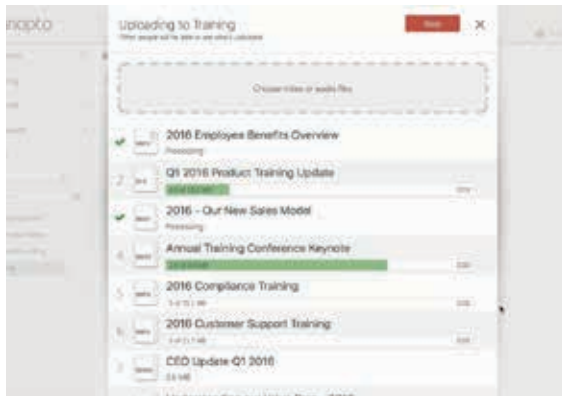
## Video Uploader

It makes it easy to centralize and manage all of your video files. With a simple drag and drop, you can upload videos one by one or hundreds at a time.

Automatic video transcoding and processing.

Ensure that your audience can play your videos on any device. With Panopto, the videos you upload are automatically transcoded for optimal playback on any desktop, laptop, smartphone, or tablet.

Panopto supports the broadest range of video file formats, including AVI, MP4, MPG, WMV, MOV, QT, ASF, 3GP, WMA, MP3, M4V, and more.



## Video Branding

Add your logo and your colors to customize the look and feel of your videos, everywhere they appear.

Video branding, from your portal to your players.

Custom video branding should include more than just adding your logo to your homepage.

With Panopto, brand customization extends to your entire video library, from your portal page, interactive video player, and embedded video player, right down to the controls, tabs, and buttons. Additional customization can be done at the folder level, allowing organizations to apply unique branding specifically for academic departments, child brands, and individual business units.



## Mobile Video

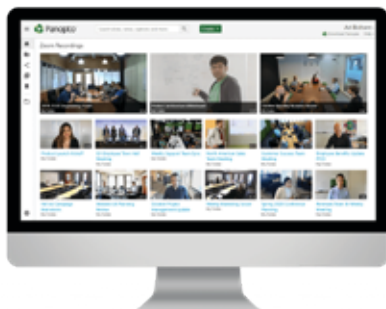
With automatic device detection and mobile apps for iOS and Android, Panopto puts your entire video platform in your pocket.

"Support mobile video" should mean more than just offering picture-in-picture playback. With Panopto's mobile video platform, you can record videos, schedule new recordings, approve new videos, search your entire video library, and share videos all from your smartphone or tablet.



## Meeting recordings

Most video conferencing solutions provide basic recording functionality that allows you to capture the audio, video, and screen shares from your video meetings. But what happens to those videos once you finish recording? Most of the time, you're left with a large file dropped onto your desktop, with no easy means to share that recording securely with the rest of the team. At best, you may have access to a limited amount of cloud storage, where your recordings will expire unless you also make expensive upgrades to your video conferencing solution.



## Real Benefits of Cisco IP Telephony

### Cost savings

#### Single Network

- Maintenance, Cabling, Administration, Support, Power, Moves/Adds/Changes (MAC's), Staff

#### Voice Business Continuity

- Integral component to an effective voice business continuity plan
- Can be compared against other less effective plans
- Voice message backup/restore

#### Real Estate

- Space Utilisation, Reduced Operational Costs, Flexibility

#### Reduced Call Costs

- Reduced mobile phone usage
- Extension Portability Campus Roaming, Home Office, Other Location
- Outbound Call Management
- Unified Messaging
- Audio Conferencing

#### Small Branch Office

- Centralised Call Processing
- Elimination of voice trunks
- IP Toll Bypass
- No on-site PBX

#### Reporting, Billing, Cost Management

- Cross-Enterprise telecom reporting
- Cross-Enterprise call cost management
- Predictability of telecom bills

#### Reduced PC Costs

- IP phone can replace a web-enabled PC or laptop in certain environments

## Productivity increases that can be safely quantified

### Employee Productivity

#### End User Applications

- Audio Conferencing
- Unified Messaging
- Personal Assistant
- Web Access
- Computer Telephony Integration
- Voice Business Continuity

#### IT Operations

#### Facilities Management Operations

## CISCO IP TELEPHONY

### Benefits that are very real, but difficult to quantify

#### Cultural Enhancement

- Customer Satisfaction
- Employee Retention
- Geographic Flexibility
- Competitive Positioning
- Faster Application Deployment
- Voice Business Continuity
- Difficult-to-Quantify Productivity via Converged Applications

### Strategic Business Benefits

#### Productivity

- XML apps on the phone
- Foundation for end-user applications
  - Conference Connection
  - Personal Assistant
  - Unified Messaging
  - Hoot 'n' Holler
  - CTI

#### Mobility

- Enhanced space utilization via enablement of hoteling environment
- Phone number portability
  - Device identity
  - Mobility applications
  - Unified Messaging
  - Personal Assistant
  - Softphone

#### Business Resilience

- Distributed nature of IP can improve voice network continuity
- Faster application deployment
- Faster set-up of new facilities







Figure Shows : Cisco IP Phone 8811, Cisco IP Phone 8831, Cisco IP Phone 8832, Cisco IP Phone 8841, Cisco IP Phone 8845, Cisco IP Phone 8851, Cisco IP Phone 8861, Cisco IP Phone 8865

## Cisco IP Phone 8800 Series

Easy-to-use voice and video collaboration

The Cisco IP Phone 8800 Series is a great fit for businesses of all sizes seeking secure, high quality, full-featured VoIP. Select models provide affordable entry to HD video and support for highly-active, in-campus mobile workers. This advanced series provides flexible deployment options: on premises, cloud and Cisco pre-approved third-party UCaaS providers.



### IP Phones for a variety of needs

- The 8800 Series is ideal for knowledge workers, administrative and executive staff. It works well in open workspaces, large conference rooms and executive offices and with actively mobile workers within a campus. Choice of two user experiences add flexibility.

### Featured products & services

#### CISCO Webex Hardware as a service

- Get the latest technology and increase collaboration adoption with a simple, affordable subscription.



#### CISCO Headsets

- A range of wired and wireless headsets that meet any business need.



# REGISTRATION CERTIFICATES



## CERTIFICATE OF REGISTRATION

ICI UK

This is to certify that the management system of

### ADVANCE-TECH CONTROLS PVT. LTD.

has been formally assessed by

INTERNATIONAL CERTIFICATION & INSPECTION UK LTD.

and found to comply with the requirements of

## ISO 9001:2015

(Quality Management Systems)

**Scope of Registration:**  
Procurement, Sales & Services of Automation Systems, Equipment's and Control System For Industrial Automation, Aerospace & Embedded Industry, Dosing Room Automation For Banking, Nuclear Detectors and Instrumentation, Education Training Kits, Project Management Services and Software Development.

**Registered Site (s):**  
Plot No-83/A, SIDC Estate, Por, Ramangamdi, District Baroda-391243, (Gujarat), India.

**ICI Certificate No.:** ICI/2392473/21

**Date of initial registration:** 01 March 2021

**First Surveillance Audit on or before:** 10 February 2022

**Second Surveillance Audit on or before:** 10 February 2023

**Re-certification Due:** 28 February 2024

This Certificate is property of ICI UK Ltd. and remains valid subject to satisfactory surveillance audits.

Peter Collins  
Executive Director  
International Certification & Inspection UK Limited,  
27 Old Gloucester Street, London, WC1N 3AX, United Kingdom.



To check validity of the certificate please visit at [www.ici-uk.co](http://www.ici-uk.co)



DISTRICT INDUSTRIES CENTER VADODARA  
(Government of Gujarat)  
FIRST FLOOR, RAMANGADI BORGAR, C BLOCK, JLN. ROAD, VADODARA,  
PIN-390002, GUJARAT, INDIA. TEL: 022-23342200 FAX: 022-23342201

MEMORANDUM NO: 2392473/21/21 DATE: 01/03/2021 FORM NO: 239  
ENTREPRENEUR: ADVANCE TECH CONTROLS PVT. LTD. (Small or Medium Enterprise)

**ACKNOWLEDGEMENT FOR PART-B**

We, ADVANCE TECH CONTROLS PVT. LTD. HAS FILED MEMORANDUM FOR A SERVICE ENTERPRISE AT THE ADDRESS 83A SIDC RAMANGADI A VENG. / POR. A1 TARA. VADODARA, IN DISTRICT VADODARA PIN - 391243 FOR THE ITEMS/ITEMS INDICATED BELOW AS STATED IN FORM NO. 239 AND ALLOCATED ENTREPRENEUR'S MEMORANDUM NO. AS BELOW:

**NATURE OF SERVICE REQUIRED:**  
OTHER BUSINESS ACTIVITIES N.E.C.

DETAILS OF THE TYPE OF SERVICE REQUIRED			
Sr. No.	Type of service required	Capacity per annum Qty. Unit	WBSI code of production/development of service
1	REPAIR & MAINTENANCE OF ELECTRONIC INSTRUMENTS, DETECTION & INSTALLATION OF ELECTRONIC INSTRUMENTS		24101199

DETAILS OF PLANT AND MACHINERY AS PER PART-B (AS INVESTED/IN USE)		
Sr. No.	Investment in Plant and Machinery/Equipments	Date of investment
1	IN USE	21/03/2021

NOTE: THE GOAL OF THIS ACKNOWLEDGEMENT DOES NOT EXCEED ANY LEGAL RIGHT THE ENTERPRISE IS REQUIRED TO SEEK. REQUEST CLEARANCE/ACKNOWLEDGEMENT REQUIRED UNDER REGULATORY FRAMEWORK, BEFORE ANY OTHER UNDER THE LAW OF GUJARAT, INDIA/IN RESPECT OF GOVERNMENT OF GUJARAT/STATE GOVT. OFFICE.

**DATE OF ISSUE:** 20/03/2021

**NATURE OF ACTIVITY (MANUFACTURING SERVICES-2):** 3

**CATEGORY OF ENTERPRISE (SMALL, MEDIUM, LARGE):** 2

**ENTREPRENEUR'S MEMORANDUM NUMBER (EMET - 1):** 24-219-23-23A2


(First two digit = State, Next three digit = District code, sixth digit = Nature of Activity, seventh digit = category of enterprise and last two digit are for Entrepreneur Memorandum)

**DATE:** 20/03/21  
**PLACE:** VADODARA

**To:**  
M/S. ADVANCE TECH CONTROLS PVT. LTD.  
ADVANCE TECH CONTROLS PVT. LTD.  
83A SIDC RAMANGADI  
POR, VADODARA, VADODARA, PIN - 391243

**Copy to:**  
1) Director, Small Industries Services Division,  
Mahatma Chamber, 45-Flour, Nirma House, 2nd, 3rd, Acharya Road, Ahmedabad-380014

GENERAL MANAGER  
DISTRICT INDUSTRIES CENTER,  
VADODARA.



THE NATIONAL SMALL INDUSTRIES CORPORATION LIMITED  
(A Government of India Enterprise)

Sr. No. 105586  
S.No. NTO-0001120

Branch Office : NSIC Technical Services Centre, Bhambhagar Road, Aji Industrial Area, Rajkot  
Ph : 8281-238730 Fax : 8281-238721  
Email : [nsic@nsic.co.in](mailto:nsic@nsic.co.in) Website : [www.nsic.co.in](http://www.nsic.co.in)

## GOVERNMENT PURCHASE ENLISTMENT CERTIFICATE

Ref.No: NSIGP/NTD/201759261 Date: 02/02/2022

Name of the Enterprise: ADVANCE TECH CONTROLS PVT. LTD.  
Factory Address: 83A, SIDC, Ramangamdi, Por, VADODARA, GUJARAT-391243

Name of the Directors:  
1. Shri. Pradip J. Kulkarni  
2. Shri. Arunesh D. Gupta  
3. Shri. Nagesh J. Parmar  
Designation: Partner

Udyam Registration Number: UD/M-43-24-0017707 Enterprise Social Class: GENERAL Special Category: GENERAL

GOVERNMENT PURCHASE REGISTRATION NO: NSIGP/NTD/2016009968  
Monetary Limit: ₹ 078 Lakhs & ₹ 819 Hundred Seventy Eight Lakh Only  
TURNOVER (Rupees in Lakhs)

Financial Year	Annual Turnover
2017-18	771.51
2018-19	8420.3
2019-20	1756.77
<b>Monetary Limit</b>	<b>878</b>

MSEs registered with NSIC are exempted from deposit of Earnest Money irrespective of value of Monetary Limit.

Your enterprise has been registered as a MSE Unit eligible for participation in the Central Government Store Purchase Programme as per the Single Point Registration Scheme for the following Item(s)/Service(s):

Name of the Store(s)/Service(s)	Specifications(s)	Qualitative Capacity	Quantitative Capacity P.A.
*As per List Attached (21 Item only)			

Disclaimer - The purchasing agencies are advised to satisfy themselves with the store details in the certificate while doing the Technical Evaluation stage before placing the tender/order on the units, certified by NSIC.

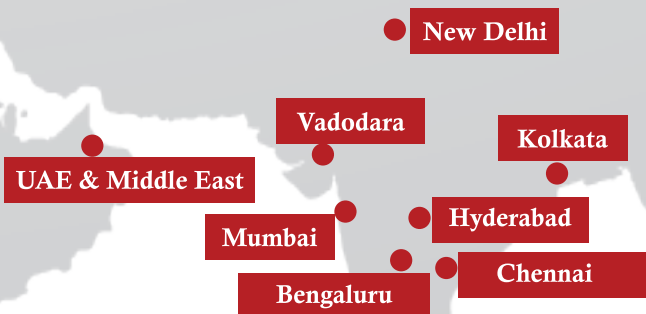
Authorized Signatory

Mse Registration Form on CA/Preregistration.aspx



Mse Registration Form on CA/Preregistration.aspx





## **ADVANCETECH CONTROLS PVT. LTD.**

### **Corporate Office**

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✉ [mum@advancetech.in](mailto:mum@advancetech.in)

### **Regd. Office**

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Development Corp.)  
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Vadodara 391243  
☎ +91 265 2831216  
✉ [sales@advancetech.in](mailto:sales@advancetech.in)

### **Software Development Centre**

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Bengaluru 560043.  
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✉ [info@advancetech.in](mailto:info@advancetech.in)

