

Radiometric Solutions



SECURING YOUR ENVIRONMENT

- Radiometric expertise
- Flexible radiation instrumentation systems
- Network solutions

Lab Impex Systems takes pride in the flexible solutions we offer our customers in the Defence, Nuclear, Medical and Industrial sectors to secure a safe working environment.



PRODUCTS

positively supporting safety

CUSTOM
SOLUTIONS

SERVICES



PRODUCTS

With 30 years experience in the development and supply of radiation detection instrumentation, Lab Impex Systems offers a comprehensive range of standard and customised instrumentation. Unique and specialised solutions are continually being introduced. Our specialist Application Engineers will advise you on the most suitable measurement solution appropriate to your needs.



CUSTOM SOLUTIONS

Tailoring systems to meet the specific needs of the Defence, Nuclear and Medical sectors is a major part of Lab Impex's business. We will work with you to ensure your particular User Requirement Specification is met in full, sourcing from both our own and third party instrumentation and skill sets.



SERVICES

With 70% of our business coming from unique client needs, we have designed our products, systems and support services to address this demanding business.

For this niche area of knowledge you require a specialist. You also need the assurance that the project will be managed to budget and supplied and commissioned on schedule. We provide our customers that peace of mind with:

- Project Management
- Consultation for design
- Installation
- Commissioning
- Warranty and post warranty support

PRODUCTS

With 30 years experience in the development and supply of radiation detection instrumentation, Lab Impex Systems offers a comprehensive range of standard and customised instrumentation

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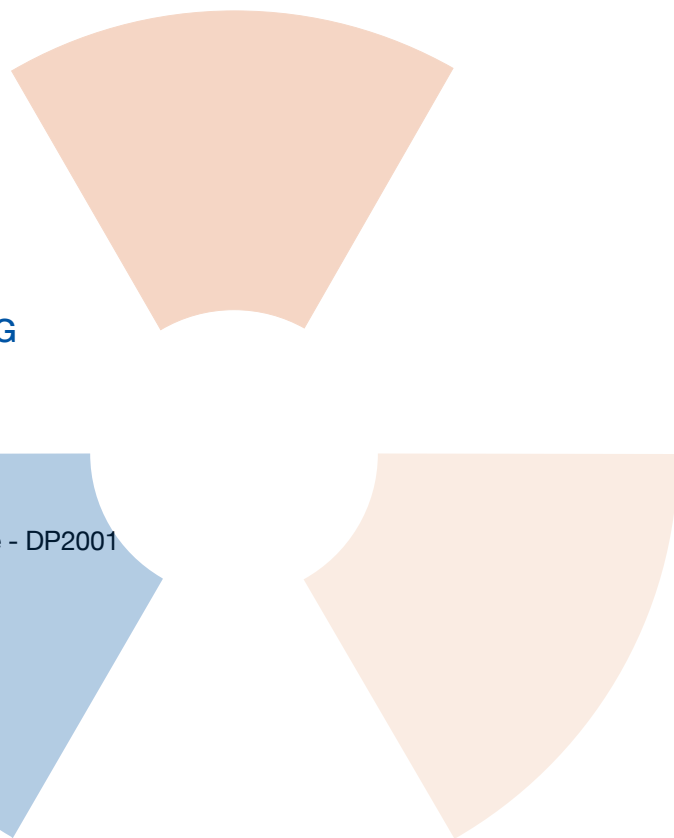
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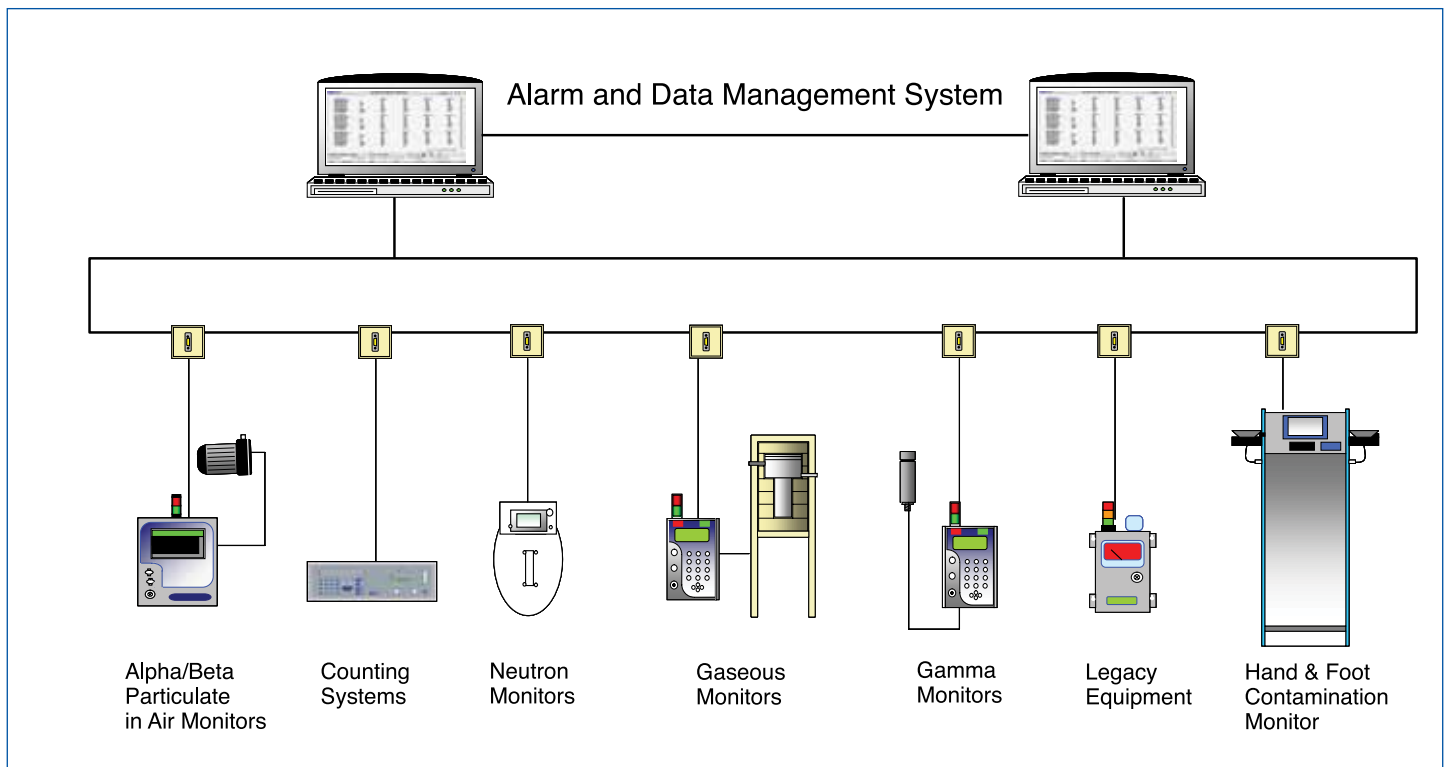
Radiation Monitoring System – RMS

A range of solutions are available to provide both live and traceable monitoring data for your radiometric facility/site networks.

The 9205EMS is a SCADA system based on industry recognised platforms such as InTouch™ (Wonderware) and VTS (Trihedral).

The 9205EMS can be connected to a range of manufacturers radiation monitoring systems as well as criticality and meteorological sensors (wind speed/direction, temp, barometric pressure).

The 9205EMS can also be provided with safety compliant building evacuation systems.



LIS Network Solutions/Systems include:

- Stack Flow
- Area Gamma/Failsafe Gamma
- Alpha/Beta Particulate
- Noble Gas/Tritium
- Iodine
- Neutron
- Liquid Effluent
- Installed Personnel/Hand & Foot
- Other Third Party Systems

Radiometric Applications:

- Building Status/Control
- Perimeter Fence – Alarm/Early Warning
- Stack/Vent – Discharge
- Emergency Response – Deployable
- Muster Stations
- Country Wide – Alarm/Early Warning
- Laboratory Information
- Vehicle Management

Alarm and Data Management SCADA System - 9205EMS

The versatile 9205 range of SCADA systems typically incorporates:-

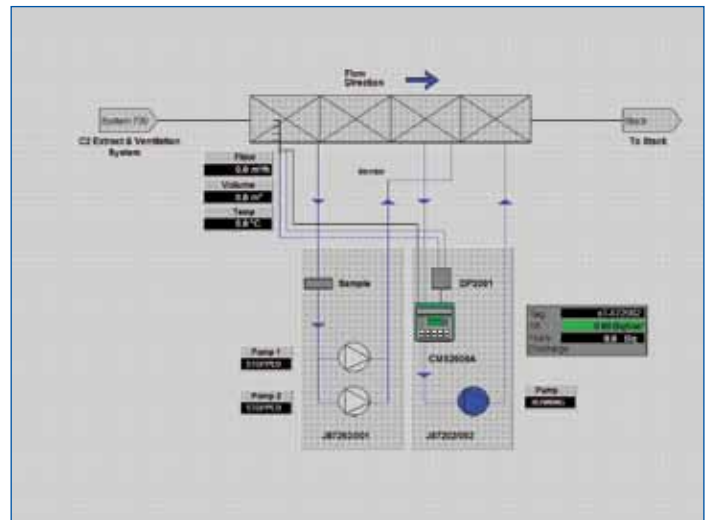
- Site layouts (floor plans and buildings with instrument locations)
- District maps (as applicable)
- Matrix displays (i.e. tabular views of the status of all monitors)
- Individual continuous monitor status
- Measured radiation levels and alarms
- Event logs, alarm lists and historic data (for traceability)
- Remote parameter download and configuration
- Using In Touch™, VTS or similar platforms.

Redundancy is a key element to our systems. They are designed to ensure that, in the event of a central PC failure, a second 'standby' system takes control. If all network communication fails, our continuous radiation monitoring stations operate and store data locally, ensuring that localised radiation safety is not compromised. When communications are restored, historical data can be transferred. These safeguards ensure minimum downtime of the system and no data loss with total traceability.

With all data collection systems, data quality is key. The LIS 9205 not only collects the engineered results from the networked instruments, but also the raw data. This enables review and confirmation of any results if they are in question.

LIS has over 200 installed networked monitoring systems across the world of varying sizes and types using TCP/IP, RS485, RS422 and RS232 communications. Application areas include:-

- Site Perimeter Monitoring Systems
- Building Facility Systems
- Site Wide Facility Systems
- Countrywide Facility Systems
- Stack Emissions Facility Systems





Gamma Monitoring

CMS Gamma

The CMS Gamma is a compact, single or dual channel Area Gamma Monitor designed for building, area and process monitoring in nuclear facilities with a wide range capability providing measurements from ambient background up to 10 Sv/hr (1000 R/hr).

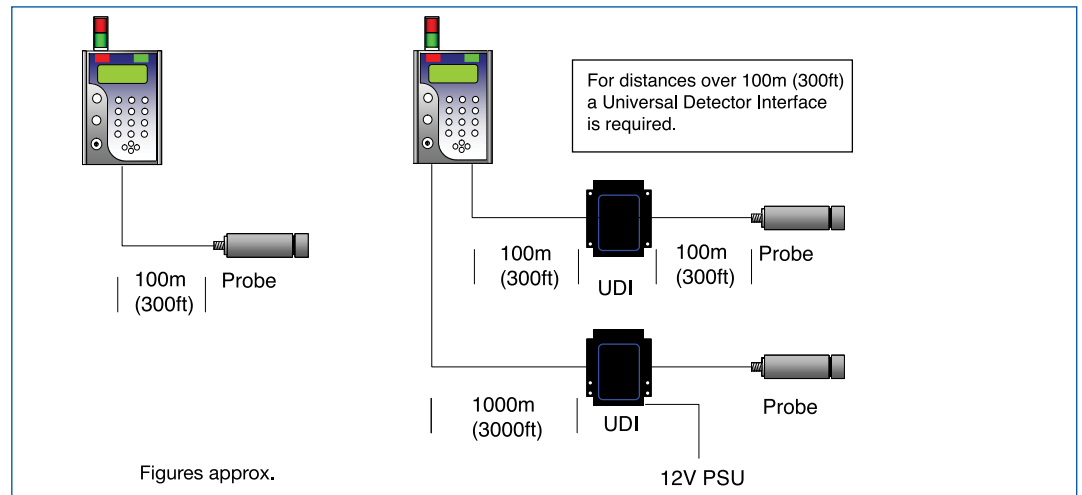
The CMS Gamma is intended for installed applications, but can also be used with a transportable frame or trolley to provide temporary monitoring or to supplement permanently installed monitors during site maintenance procedures.

An internal battery option for back up enables full operation for up to 30 minutes in the event of mains failure, and the detector arrangement can be installed at distances of up to 1000 metres (3,280 ft) from the CMS station.

The CMS Gamma is a two channel instrument which can be configured with a range of Gamma probes (GM, Ion Chamber and Scintillation).

- Configurations include:
- single channel
 - dual channel
 - wide range

Probe configuration options:



Detector Types

| Detector | Type | Measurement Range | |
|----------|--------------------|------------------------------|-------------------------|
| GM-1/202 | Energy Compensated | 0.1 μ Sv/hr - 40 mSv/hr | 10 μ R/hr - 4 R/hr |
| GM-1/324 | Energy Compensated | 0.1 μ Sv/hr - 100 mSv/hr | 10 μ R/hr - 10 R/hr |
| GM-1/314 | Energy Compensated | 10 μ Sv/hr - 3 Sv/hr | 1 mR/hr - 300 R/hr |
| GM-1/304 | Energy Compensated | 100 μ Sv/hr - 10 Sv/hr | 10 mR/hr - 1000 R/hr |

Other types available: Please contact Lab Impex Systems for details.

Fail-Safe Gamma Systems with SIL Rating.

What is SIL?

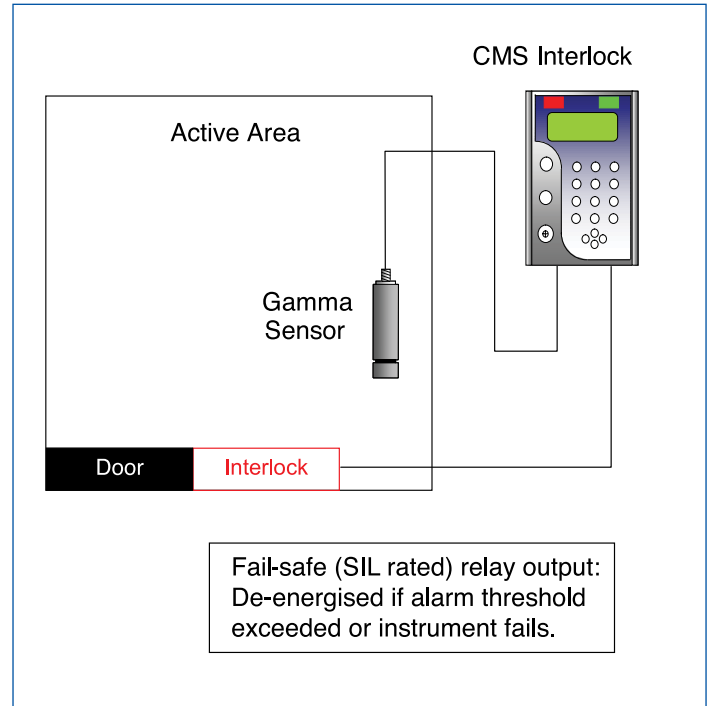
The ANSI/ISA S84 00.01 and IEC 61508 standards provide a platform for the specification, design and operation of electronic and electrical safety systems.

As part of these standards, all electrical, electronic and programmable electronic elements used in safety instrumented systems must be designed, operated and maintained such that they achieve a specified system integrity level, also known as a SIL rating.

The SIL rating is a statistical representation of the reliability of the safety instrumented system when demand for one of the processes occurs.

The SIL rating of a system is an integer between 1 and 4, where the higher SIL rating implies a more reliable and effective system.

Determination of a SIL rating is a function of risk associated with the application or probability of failure upon demand.



CMS Interlock SIL

The CMS Interlock SIL has been designed in accordance with IEC 61508 and is independently rated to SIL2.

It can be fitted with a range of Gamma sensors (single channel only) dependant on the application.

Visual indicators determine system status. High reliability relays provide output for application control.

(For detector options see pg 7)

CMS Process SIL

Similar to the Interlock SIL but has the addition of a 4 – 20 mA analogue output, used for the control of process plant e.g. valves, actuators etc..

Hot Cell Monitor

The HC833 is a single channel Gamma monitor with a logarithmic analogue display. Its primary design function is as an indicator of Gamma dose rate within a Hot Cell or Glove Box.

Provision of an interlock output (0 V relay contact) is available which is active when a user defined threshold is exceeded.

(For detector options see pg7)





Alpha/Beta Particulate in Air Monitoring - SmartCAM

The SmartCAM is a modern, latest generation Continuous Air Monitor (CAM) for Alpha and/or Beta particulate. The system is intended for use in tough environments where high or variable Radon/Thoron, high dust loading and low alarm set points give rise to significant measurement challenges.

Housed in a robust, stainless steel enclosure, the SmartCAM uses a large area touch screen display and internal flash computer running Windows CE. The compact detection head can be fixed to the side of the main enclosure, or positioned remotely, up to 10 m away.

For Alpha detection, the SmartCAM uses a peak fitting algorithm to determine count-rate for each Radon/Thoron daughter present in the Alpha spectrum.

Unlike conventional systems, the SmartCAM does not perform the peak fit analysis over the total acquired spectrum, but instead uses a fitting algorithm that calculates peak shape and peak count-rate over a recent time period. This novel approach, whereby the system analyses the 'differential spectrum', produces excellent sensitivity and fast response. To further improve performance, the SmartCAM also employs automatic gain stabilisation to minimise spectrum smear due to air density changes caused by temperature and pressure variation.

For Beta detection, real-time Gamma background subtraction, automatic dead-time compensation and Radon/Thoron Beta compensation are used to optimize performance in terms of sensitivity, stability and range.

The SmartCAM offers total flexibility. Configuration options include;

- Fixed Filter or Moving Filter
- Total Alpha or Isotope Specific Alpha Results
- Local or Remote Detector Head
- Wall, Desk or Trolley/Cart Mount
- Optional External Dose-rate Probe



CMS 2000 – MkVI

The CMS 2000 MkVI is a rugged continuous Alpha/Beta Particulate monitor that has a solid and proven track record as a reliable monitor. Utilising Lab Impex's well established Head design it provides unprecedented performance in terms of alarm response, detectable limits and result quality.

Using solid state detector technology, the MkVI provides optimised Radon/Thoron rejection via spectrometric techniques and Gamma rejection.

The stainless steel air inlet combined with continuous flow rate measurement ensures an exceptionally high particulate collection efficiency whilst maintaining representative sampling at all times.

- Radon compensation via fixed regions of interest
- RS422, 232, 485 communications
- Long established as a reliable monitor



Accident Incident Deployable Measurement in Emergency - AIDME

The AIDME is an advanced environmental monitoring system that can be deployed and be operational in the field within minutes. AIDME stations are normally used during emergency or accident situations, to assess the spread of contamination following a release, and to relay this information to a 9205EMS central computer alarm and data management system. Offering a range of tens of km, AIDME stations are deployed by vehicle to provide rapid assessment of conditions within towns and villages in the vicinity of a plume path.



Iodine Monitoring

The CMS Iodine is an advanced system for monitoring airborne concentration of radio-iodine in the workplace and other areas of interest (Stacks, Cells and Glove Boxes). The system utilises LIS' patented detector Continuous Gas Analysis and Detection Chamber (CGADC) that combines a sensitive scintillation detector with a stainless steel measurement chamber housing a Carbon loaded filtration cartridge.



Noble Gas Monitoring

The LIS CMS Gas Activity Monitor (CMS BG and CMS PET) continually measures the level of airborne concentration of radioactive Noble (Beta) and Positron gases. Suitable for process, stack and health physics applications.

The PG 10 detector used in the CMS Gas Activity Monitor is a plastic scintillator, offering unparalleled sensitivity to Noble and Positron gases. The PG 10 is specially designed to give a stable, accurate measurement of airborne concentration. In operation, gas is sampled through the PG 10 by a vacuum pump. Benefits include; high Gamma background rejection, high efficiency to Noble and Positron gases, offline for ease of installation and maintenance.

Particulate Iodine and Noble Gas (PING) Monitor or Particulate Iodine Monitor (PI)

The LIS PING monitor is a combined monitoring solution that enables a single monitoring station solution for looking at Alpha/Beta Particulate, Iodine and Noble Gases. The system is used for continuous measurement of radioactive effluent in stacks, ducts and process lines. It is compact and easily installed, with detectors, amplifiers, lead work and sample lines mounted on a series of framework assemblies that can be fixed together, or positioned separately. The PING combines proven detection techniques with advanced design, giving nuclear facilities a cost-effective means to replace existing older systems facing obsolescence.

This system is also available without noble gas measurement as the LIS Particulate and Iodine (PI) monitoring system.





Gaseous Tritium Monitoring

The CMS H3 range are used to measure airborne Tritium as well as other gaseous radionuclides. Suitable for stack, duct and workplace applications, the CMS H3 combines CMS fast rate-meter routines with ion chamber sensor technology.

The system uses two matched ion chambers. The second of which is sealed to allow measurement for Gamma background in order to compensate the main sampling chamber. It can be operated as a stand-alone monitor or as part of a CMS area network. It is possible to operate the CMS H3 unit using either a vacuum pump or a distributed vacuum main.



By-pass Effluent Monitoring

The LIS By-Pass Liquid Effluent Monitor (OFLEM) has been developed to continuously measure the concentration of radioactive Gamma isotopes in liquid media. The system can be used for various applications from monitoring extremely low radiation levels, to the detection of abnormal activity levels during accident scenarios. The OFLEM is a loop system, with a constant stream of sample taken from the process line, through the system and then returned back to the process line.



On-Line Effluent Monitoring

The LIS On-line Liquid Effluent Monitor (OLEM) has been developed to continuously measure radioactive Gamma emitting isotopes in process lines.

The OLEM system includes lead shielding, a detector and associated electronics. The detector and shield assembly is totally non-invasive to the process line, and there is no need for a pumping system or tap-off points for sample removal and return. The 'clamp-on' arrangement of the OLEM system also makes it easy to install. The shielding can be mounted horizontally or vertically to accommodate process pipe runs, and a mounting plinth may be supplied to raise the OLEM above the floor line if necessary.

Rack Mounted Multi Channel Monitoring System

The EuroNIM Modular 8000 is a versatile, 19" rack mounted (or desktop) modular unit accommodating standard Eurocard modules for a variety of radiometric counting, monitoring and control applications. Each EuroNIM rack can accept up to 10 standard LIS eurocard NIM modules, and can be used in a variety of applications.

- Area Gamma
- Fail-safe Gamma (SIL 2)
- Scalar or Ratemeter Counters
- Alpha/Beta Swab Counter
- Bespoke process monitors/measurement systems
- Drum monitor



Accessories

AVS Remote Alarm

Modules Relay Driven Alarm Modules that provide any combination of FAIL, ALERT and ALARM strobe indicators and audible output.



Door Warning Signs

A range of door warning signs are available. (Available with SIL rating)

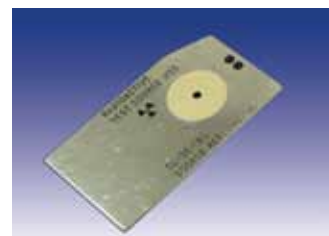


Filter Media

TEDA impregnated charcoal and Silver Zeolite (in cartridge or loose form) are available.



Sources Customised sources are available for all CMS Monitoring Systems for system alarm checks and routine calibration

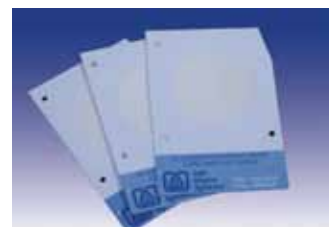


DFC Digital Flow

Calibrator Advanced Flow Calibrator for all types of air sampler/monitor. The DFC uses Venturi device that is corrected for the flow measurement to standard temperature and pressure.



Particulate Filters Aerosol filters in GFA or Millipore type are available for both CAM and sampling systems. Options include 25 mm card-mounted CAM filters and 40 mm sampling filters.





Philosophy

LIS has the capability to survey, design, supply, install and commission complete gaseous stack flow and/or Isokinetic (particulate) sampling/measurement systems.

Within any stack monitoring installation, accurate flow measurement is an important consideration. Depending upon the geometry and the length of straight duct, either an averaging insertable Pitot or a Pitot array can be used.

LIS advocates through its experience, that involvement with a knowledgeable supplier when either designing new or remediating existing facility ventilation systems, will achieve significant cost reduction for the project.



Consultancy

LIS provide support at any level with respect to flow measurement and sampling/monitoring. We have an in house wind tunnel that enables both development and testing of equipment.

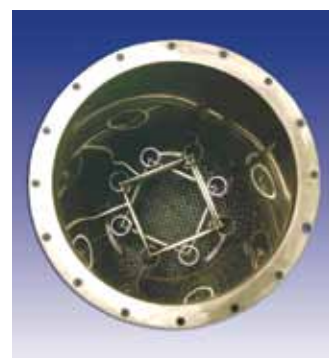
Capabilities:

- New build
- Review and remediation of existing plants
- Support to satisfy regulatory requirements
- Training Courses to educate users on basic principles or specific areas of interest
- Stack/Duct characterisation
- Overall initial design consultancy for complete radiometric sampling/monitoring systems
- Compliance surveys of existing measurement systems

Flow Measurement

Flow measurement can be performed by numerous types of flow devices, however, LIS are advocates of Pitot Tube flow measurement systems. Key benefits for the Pitot based design are that it uses basic well tried and tested flow measurement techniques. A Pitot array assembly can contain a section of flow straightener to maximise flow monitoring accuracy by minimising the effects of turbulence and cross flow.

LIS can advise at an early stage in the life of a project the best type of flow meter, together with the optimum location for the equipment.



DP2001

The LIS DP2001 Differential Pressure Transmitter has been designed for use on extract and ventilation monitoring systems. The DP2001 electronics package incorporates the latest digital technology and can be used in conjunction with a differential pressure generating device to produce accurate and traceable flow measurements.

When the DP2001 is installed close to the primary flow element, which could be a Pitot Tube, Orifice Plate, Venturi or any other DP generating device, the DP2001 can be connected to additional temperature and stack pressure devices to provide compensated flow signals.

The instrument offers a two wire 4-20 mA output, together with alarm relay contacts and totaliser pulsed outputs. In addition to flow readings the DP2001 can be used to measure the differential pressure in glove boxes, operating and clean rooms.



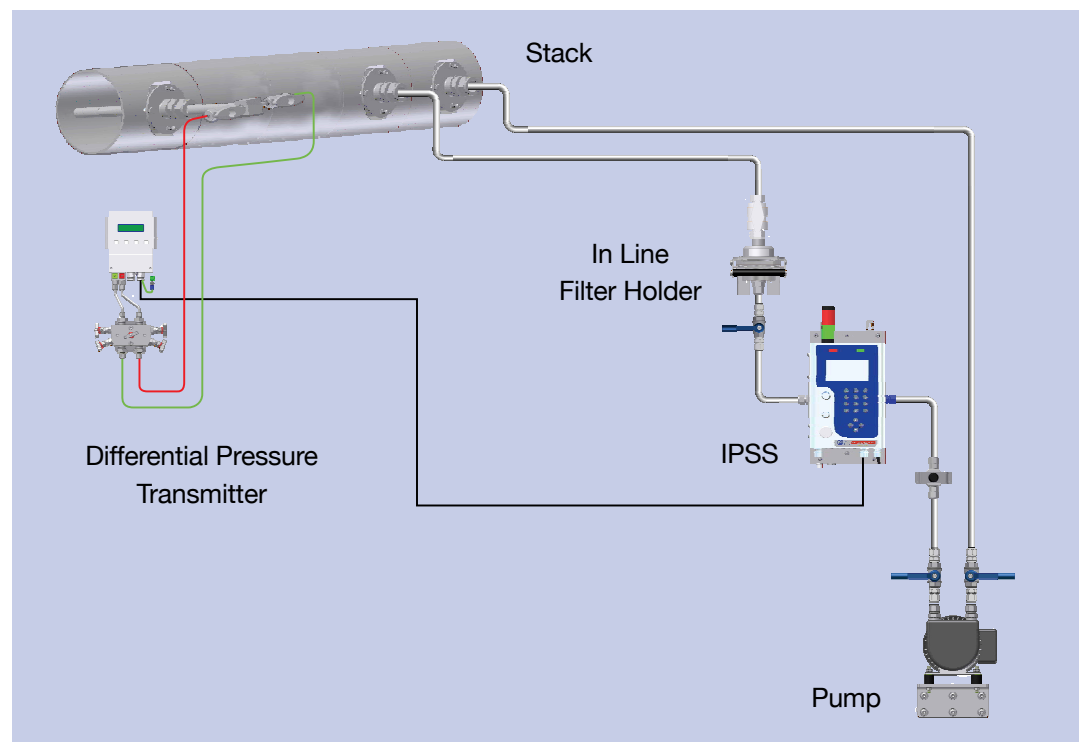
Integrated Proportional Sampling System (IPSS)

LIS have designed the Integrated Proportional Sampling Probe, providing a revolutionary new system for controlling accurate Isokinetic stack sampling/monitoring systems.

Stack sample probes can only be designed with a nozzle bore suitable for one particular stack flow, and therefore any stack flow rate variation will cause inaccuracies in sampling rate calculations. How can this problem be solved?

LIS have designed a new system, known as the Integrated Proportional Sampling System, to effectively solve this problematic sampling inaccuracy. This has been achieved by continually logging both the stack flow rate and the sample line flow rate. Keeping the sampling fraction of the two flow rates constant ensures Isokinetic sampling conditions are maintained.

- Reduces sampling inaccuracy
- Ensures Isokinetic sampling with varied flow
- Enables operators to reduce ventilation, while maintaining Isokinetic sampling flow rates therefore leading to significant energy savings for plants not in use



STACK SAMPLING

LIS supply many options for effluent sampling and real time monitoring.

With all sampling systems, accurate collection of the sample is required, otherwise the measurement is meaningless as it will not be representative and not meet the applicable standards and guidance notes. LIS design, manufacture and supply gaseous sample probes and, for particulate sampling, Isokinetic or Shrouded sample probes.

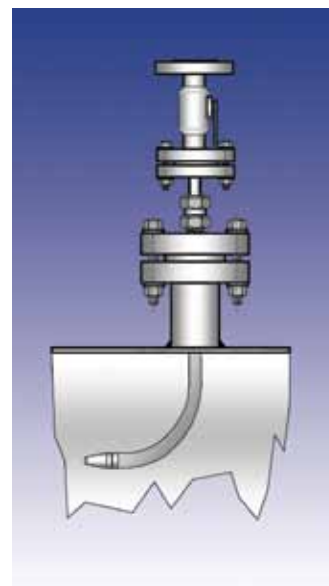
Isokinetic Sample Probe

LIS use a variety of Isokinetic Sample Probes to draw off representative air samples from ventilation discharge systems. Used in conjunction with LIS flow measuring equipment, the Isokinetic Probe gives a clear indication of the amount of emissions expelled into the atmosphere per given volume of extract flow. Each sampling system is designed to suit the requirements of the individual site, and therefore any special requests can easily be incorporated into the design.

The size of the Isokinetic Sample Nozzle bore is dependant upon two factors:

1. The velocity of the air flow within the stack/duct
2. The sample draw off rate that is required

Isokinetic sample probes can also be included as part of the pitot array assembly if required, or installed directly into the stack/duct as individual items.



Shrouded Probe

The Shrouded Sampling Probe is an alternative to standard Isokinetic Sample Probes for sampling particulate matter from stacks and ducts. This probe has several advantages over non shrouded probes, including lower internal wall losses, better off-angle performance, lower sensitivity to flow stream turbulence and the ability to operate in either a fixed flow or variable flow rate mode.

A shrouded probe is used to extract the sample from the flow stream in the stack; with an optimally designed transport system used to convey this sample to the sampling or monitoring equipment. LIS can assist with the best possible technical and economic design of this system, with the use of DEPOSITION software to determine transport line efficiency. The Shrouded Probe and the DEPOSITION code are acceptable methodology for continuous sampling of aerosols from stacks and duct by the U.S. Department of Energy (DOE), non-DOE governmental facilities, and U.S. Nuclear Regulatory Commission licensees.

LIS have now developed, under licence, a range of shrouded probes for use in Europe.





Collection of the sample is dependent on the type and form of the sample, for gaseous samples we offer a wide range of solutions.

LIS sampling/monitoring panels are designed to meet the stringent requirements in accordance with international standards and specific site needs.

Gaseous Sampling System (GSS)

The LIS GSS systems are configured to be suitable for Tritium (HT, HTO), Carbon 14 and Sulphur 35. If required, the bubbler samplers are available as single or dual stage sampling bottles. The dual stage systems are fitted with a high temperature furnace to oxidise the gaseous sample for collection in the second stage of sample bottles, for example to convert HT to HTO. Enclosures to suit are provided to ensure both safe and secure operation. Variants of the basic design can be supplied.



Static Air Sampling

LIS have developed a range of In Line Filter (INF) holders suitable for the industry recognised mounted filters used in most nuclear facilities for particulate sampling collection.

The filter card can be removed from the LIS INF without disconnecting the duct/stack, ensuring minimum disruption and accurate location of the filter medium. Analysis of the filter card is then carried out within an analytical laboratory.



Vent/Stack Sampling

LIS design and supply stack sampling solutions, inclusive of static particulate sample filters and stack flow measurement (typically Pitot and DP2001).

Real Time Vent/Stack Monitoring

LIS design and supply stack monitoring solutions inclusive of Alpha/Beta particulate, Iodine, Tritium and Noble gases.

Stack Flow can also be accommodated.



Lung Dose Assessment System Multi Detector PAS/SAS Auto Counter



The AutoSAS is a ten detector automatic personnel air sampler/static air sample counter. With a capacity of 200 samples in a single loading the system has an extremely high throughput potential.

Available with a complete software/hardware package using barcode technology to control the generation, issue and counting of filter samples, the AutoSAS is used in many nuclear facilities to assist in compiling worker lung dose records.

A barcode label applicator is also available with the system to offer complete sample control.



LaB Cube - Low Background Counters (Alpha/Beta/Gamma)

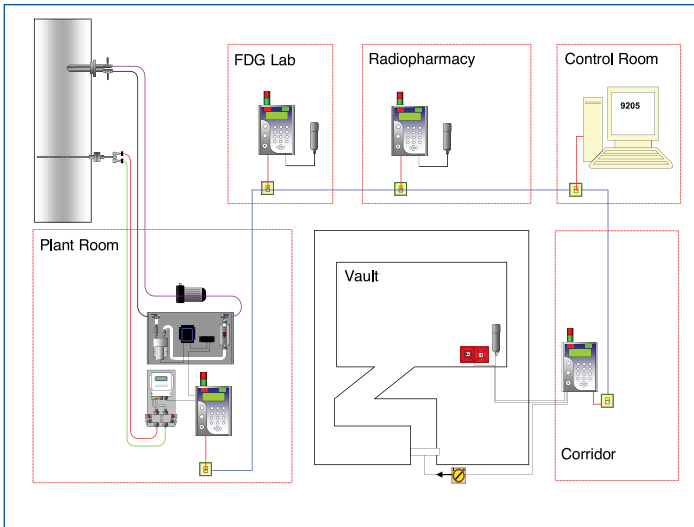
The LaB Cube range is a high performance range of low background sample counter systems offering high efficiency ultra low background detection of Alpha, Beta and Gamma.



| Series | Typical Count Time | | Manual | Automatic | Number of Samples | | Computer Controlled | Gamma Option | mca Based |
|----------|--------------------|-------|--------|-----------|-------------------|------|---------------------|--------------|-----------|
| | Long | Short | | | Few | Many | | | |
| LaB C 1M | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| LaB C 4M | ✓ | | ✓ | | ✓ | | ✓ | | ✓ |
| LaB C 1A | | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| LaB C 4A | | ✓ | | ✓ | | ✓ | ✓ | | |

Options include:

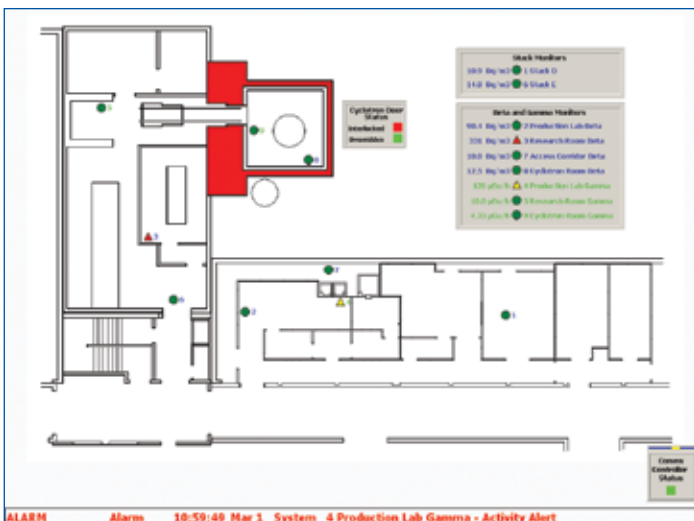
- Manual operation
 - Single or multiple draws
 - Single or multiple detectors
- Automatic operation
 - Single or multiple detectors
 - Software configurable counting protocols
- Single and four sample detector arrangement
- High performance detector options include
 - 57 mm (2.25") diameter, 32 mm (1.125"), 127 mm (5") Gas flow detectors
 - 25 mm (1") and 50 mm (2") Solid State or ZnS/Plastic detectors
- Guard Detectors
- Windows based software providing
 - Source library
 - Sample identification
 - Printed reports
 - LIMS communication interface



CycloGuard

The LIS 'CycloGuard' provides cyclotron facilities with a total monitoring solution for personnel protection and radioactive emissions individual facility as well as to adhere with the regulatory guidelines.

CycloGuard generally consists of a stack monitoring system to accurately measure the amount of activity that is being discharged; area monitoring for detection of both Positron and Gamma radiation in areas such as the cyclotron room, radio-pharmacy, QC lab, dispensing area, patient waiting area, scanner room, public areas near the facility etc.



The monitors are networked back to a central control system, the 9205PET (an alarm and data management system), data is presented typically by way of a floor plan of the facility with icons defining the location of each of the radiation detectors.

All data is archived and can be retrieved for historical review. The system will also calculate and display in real time the status, the activity discharged from the facility and report daily, weekly, monthly and annual results.

High reliability, flexibility and versatility have been key to the development of LIS CycloGuard, thus allowing clients to expand or upgrade their systems with the minimum of disruption or expense.



A transportable PET isotope gas monitoring system is available; this is ideal for either using as a deployable system for temporary monitoring or for assessing the radiological needs for new or existing facilities. Already proven to discover facility ventilation leaks this system provides users and regulators with high confidence that the facilities are operating correctly.

LIS constantly strive to run a programme of improvements to our systems, CycloGuard is no exception, to ensure that our customers not only have the best PET monitoring systems in the world but additionally can see the benefit on their balance sheets.

SERVICE AND SUPPORT

We are committed to providing high quality after-sales service to our customers for all of our products. We pride ourselves in knowing that when supplying our products we will provide the customer with an unrivalled level of reliability, quality and first-class service and support.

LIS has a dedicated team of engineers with the expertise to ensure that you fully benefit from our service, calibration and repair facilities. With offices geographically located to minimise response time, LIS are able to provide fast, effective response regardless of your location.

Our Service & Support activities include installation, commissioning and maintenance/operator training. We offer tailored service, maintenance contracts and extended warranties. Our Quality Management System applicable to all these activities is approved to the BS EN ISO 9001:2008.

All standard components in systems manufactured or supplied by LIS (including the computer, memory and disk drives) can be maintained by our company. Elimination of any third party responsibility allows LIS to deal directly with our customers. This relationship has historically allowed LIS to be better informed and to respond quickly to customer requirements associated with either equipment capability or system reliability.

LIS can tailor support to your needs with a variety of contract levels.

The contracts can be designed around your own specific needs.

- Warranty support
- Post warranty support
- Continued support contracts to suit users needs
- Training Courses
 - User/Operator
 - First Line
 - Full Maintenance



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