Marine safety technology for navy vessels

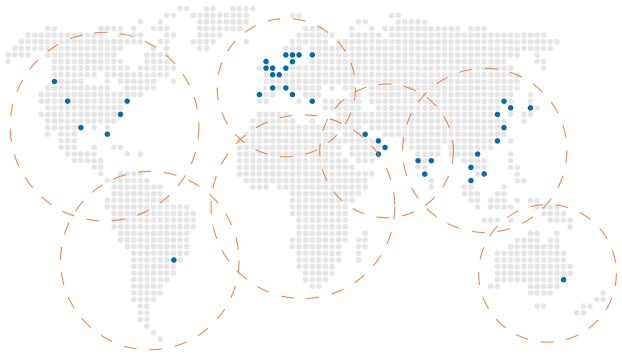
Demands at sea are tough

There are many global challenges
Local support is one of them

The naval sector requires 3rd line support and on-site training, preferably in the local language and for prompt availability. We are present in more than 55 countries with qualified and certified technicians.

A wide portfolio of solutions for Naval applications
Besides the commercial-standard offering, Consilium developed lines of products of commercial derivation but reengineered and designed for the specific high-demanding military applications. The rich portfolio includes:

- Fire Detection
- Gas Detection
- Flame Detection
- Environmental monitoring
- Explosion burst Detection
- Flammable and Moisture Detection
- Aerosol Firefighting
- Voyage Data Recorder
- Speed Log
- Safety Display and Management



The products are offered as stand-alone and, most often nowadays, as engineered safety solutions completely from Consilium and in partnership with primary naval expert suppliers of dedicated solutions.

● Local Consilium offices
◌ Service and support representatives

Talk safety with us

There are thousands of questions regarding safety onboard.
But there are also thousands of answers.
Talk safety with us – we are ready when you are.

> ***"We aim to make safer the missions that navies have to front every day for the security of their countries and populations."***

Giuseppe Borasi

Business Area Manager (BAM)
Consilium Safety Group

Consilium - **a trustworthy supplier**

Solid base and long experience
Consilium is a well-known name and a trustworthy supplier of solutions for fire protection equipment for naval applications world-wide.

Having its business started with the development and supply of equipment for the marine industry, Consilium consolidated a wide base of proven solutions for demanding applications.

The habit to cope with formal demands for type approvals and compliances with Rules and Regulations set forth by marine, transportation and offshore supervising Authorities Consilium to naturally approach the stringent naval requirements and performance standards.

Life time support
A basic point in Consilium philosophy is that newer products would be backwards compatible with existing ones, to grant lifetime support to all installations. Integrated Logistic Support data and documentation are available, to allow for the minimum life-cycle cost, planned maintenance, revitalization, and disposal of systems.

Designed for harsh environments
Our experience from installations in harsh environments, such as power plants, arctic explorers, rolling stock, oil rigs, cruise and merchant vessels, gives us the confidence to confront ourselves and our products with the naval applications with no doubts about compliances and functionalities.

Consilium values
At Consilium, we well know that for our Naval Customers the values to protect are:

· The mission
· The assets
· The human lives
· The environment

And we constantly focus on those, when thinking which solution could better fit their project.

We strive to put in place all means in our possibility to mitigate and minimize the effects of the "internal battle" that could arise at any time during a mission; and to maintain such conditions for the whole life of the ship.

Designed for retrofits
The levels of modularity of system components and field units will always allow for extension and modifications made necessary by changes in the vessel's setup. As well, it is not infrequent that existing systems becomes not supportable any longer by their original manufacturers, for different reasons. We always have solutions for these cases. The relatively smaller volumes taken by our modern products allow for easy mechanical integrations of extensions and of replacement systems, using the original interfaces. In all this, one of the main targets is to minimize or null the impact on the existing cabling: our systems use communication techniques, among the detectors and loop units, such that any existing cable with two conductors could be re-used with success to build new fire detection circuits out of older installations, thus considerably reducing the retrofit overall costs.

Integration with third-party systems
The naval product lines feature broad capacity of interfacing with external, third-party systems. Serial, LAN and contact interfaces can be set at any control station or at dumb nodes, to allow for connection to both sub-systems controlled by the fire detection system and superior control/monitoring systems that would integrate the fire detection system data into the IPMS, ship-to-shore communication, safety data logging, data and message broadcasting.

Serial and LAN protocols according to de-facto standards are available, custom protocols can be developed for specific applications. The system features handling of true redundancy of the communication channels.

Solutions to any demand

Offering Vs. Demand
Demands from Navies, Coastguard and other Governmental Agencies vary depending on the type of vessel and its mission profile.

Consilium has a full portfolio of solutions ranging from commercial to special procurement level, to satisfy all specifications with off-the-shelf products and tailored solutions' application.

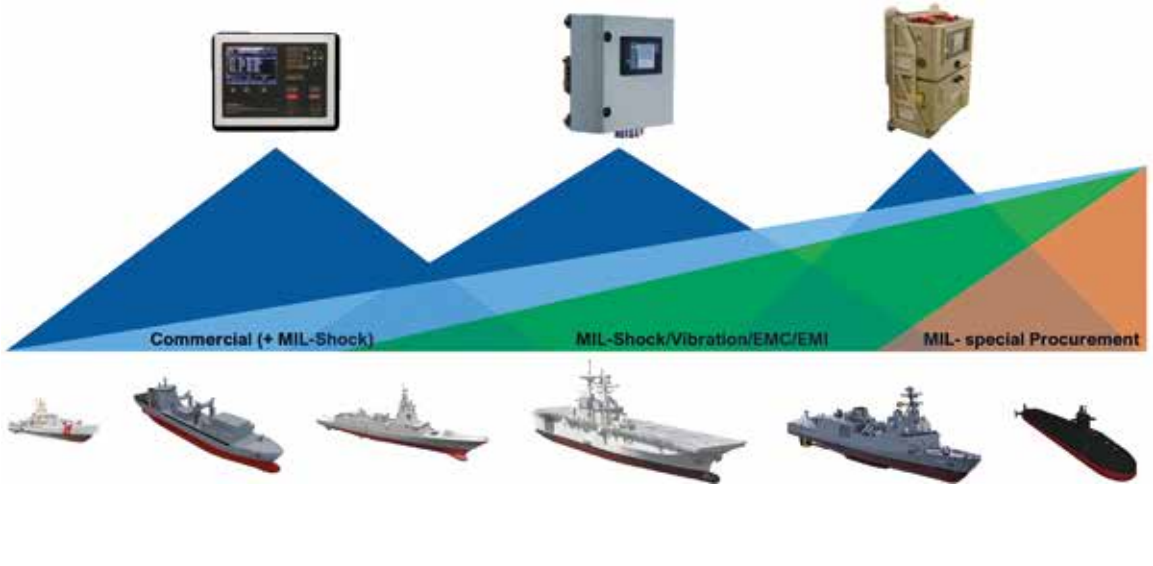
Products are designed to be modular and flexible, for building convenient configurations that will keep high maintainability and low ownership costs.

Naval segment application
Consilium has isolated from its marine product lines a set of products and components that have undergone qualifying tests for naval applications, to be able to deliver systems compliant with three levels of demands: nearly Commercial (MD), fully MIL-rated (CFD500N) and MIL- extended range (CFASS-2).

The Microdata Due platform
MD covers the demands for all those vessels that are built for naval and institutional applications (Support Fleet, Coast Guard, Police, Customs) where commercial systems are specified with, often, requirement for MIL-shock standing and – overall - with extensive documentation and optional Integrated Logistic Support (ILS).

The Consilium CCP platform covers the next demands steps:
CFD500N satisfies most needs of the general naval market, offering a broad range of variants at system and field units' level. The high level of standardization allows for flexible Military-Off-The-Shelf solutions, supported by a complete documentation library and Integrated Logistic Support (ILS).

CFASS-2 covers the segment of those applications with extreme EMC, shock and vibration levels standing requirements, well above standardized ones. A selected range of products allows realizing custom solutions to be installed on submarines, aircraft carriers and other top combatant units. Documentation and support are tailored for each project, which is run in close synergy with the Customer.



Microdata Due - platform overview

Control panels

MD9800-LC

MD2010-CU

MD9860 – Repeater Panel

Interface modules

BCU- Branch Control Unit

LCU – Loop control unit

LCU – Loop Control unit

MD2208 – I/O module

MD9840 – I/O module

MD2010-PS Power Supply Unit

MD Fire Detection System

Control panels

The control panel is the main part of the system containing all central functionalities for detection, alarm, controls, and the main operator interface. The control panel communicates with the detector interface modules via redundant bus.
Control panels can be operated directly on their MMI (Man Machine Interface) with colour display and keyboard/function keys and/or be controlled by the platform management system (iPMS). Highspeed interfaces such as Ethernet 10/100 Mb/s, RS485, RS422 allow for integration with third party systems. A USB interface enables easy maintenance and service of the complete system.

The following parameters can be configured, as basic:
- Number of detectors and other loop units.
- Number of control panels.
- Number and description of decks and fire zones.
- Digital Input and Output.
- Explanatory text can be assigned to each detector together with the indication of the deck and the fire zone, for quick identification of the alarm area.

A system can run on multiple control panels, to form either a multi-central and/or a redundant CPU system, up to a Safe Return To Port (SRTP) configuration for improved fault tolerance, thus highest functional availability.

Control panel MD2010-CU
Large colour graphical display in full compliance with the European Fire Alarm standard EN 54.
The central unit is delivered either as stand-alone for wall/desk/ceiling mount or installed on the cabinet front door.
MD2010-CU can operate detectors in loop, branch, or mixed configuration. It manages up to 16 loops or 20 branches, or a mix of the both.

Control panel MD9800-LC
Large colour graphical display in full compliance with the European Fire Alarm standard EN 54.
Compact design fits in limited spaces and retrofit cases, where small size is a premium.
It handles loop configurations and can be used as well as repeater panel, featuring same MMI and control capabilities of the MD2010-CU main control panel.

Repeater **panel**

Repeater panel MD9860
It reports system and detectors statuses using a simplified MMI. Up to three panels are linked to the control panel with a multidrop serial link.

BCU – Branch Control Unit

The module is be used when a Safe Return to Port configuration is required. The concept of loop is replaced by the concept of branch, a line starting from a BCU in a control panel and ending at another BCU in a different control panel, located in another damage control area. The two BCUs control, alternatively, the entire field circuit and devices under normal circumstances. In case of a branch cable break the two BCUs at both ends will provide control for those devices within their respective reach. The BCU can handle up to 180 addressable devices. Module activities are monitored and displayed at the control panel. It can be used only together with the control panel MD2010-CU.

Interface **modules**

LCU – Loop Control Unit

The module is used when a loop configuration is required. It can handle up to 127 addressable devices. Module activities are monitored and displayed at the control panel. It is available in two versions: the bus one is dedicated to MD2010-CU, while the stackable is for the MD9800-LC. The LCU communicates with the loop units using MD proprietary protocol that allows loop cable lengths up to 2500 meters with no special cable properties. The cable and the loop devices are continuously monitored for possible faults and disturbances providing the highest degree of safety.

MD2010-PS Power Supply Unit
Power supply unit for both the MD2010-CU and MD9800-LC Control Panel. The unit manages two AC power feeders, Main and Emergency, and generates the 28Vdc to supply the Control Panel and the Control Units. An internal change over automatically switches from the main to the emergency line. The MD2010-PS contains a battery pack to ensure 30 minutes full functionality of the system in absence of both AC sources.

Navy Cabinet

MD2010-WB-MIL MD9800-LC-WB-MIL Cabinet

Unique design, mounted on shock absorbers to fulfil the shock requirements of the MIL-STD-901-D.

It can host different battery sizes: from the standard included in the MD2010-PS to much larger ones, for longer battery back-up time. Fire Fighting functions and commands, as well as other external controls, can be integrated.

MD Field Units

MD9900 Smoke Detector

Microdata Due MD9900 is an analogue addressable smoke detector with an optical chamber. It is designed to give early alarm for the presence of smoke in the supervised area. It offers a high rejection to false alarms. MD9900 is equipped with a temperature sensor, and it is able to give measurement of the area temperature.

MD9901 Combined Smoke and Heat Detector

Microdata Due MD9901 is an analogue addressable smoke and heat detector, designed to give early alarm for the presence of smoke in the supervised area. The heat sensing element is a thermistor with a fast response to the changes in ambient temperature. It is available in three different classes of alarm: 57°C, 75°C and 90°C. Alarm condition is indicated by an LED.

MD9902 Flame Detector

Microdata Due MD9902 is an analogue addressable flame detector. It is designed to give early alarm in case of flame presence. It is also able to monitor the temperature of the protected area. MD9902 is a triple IR detector that by an intelligent signal processing and custom algorithms achieves excellent detection reliability while maintaining the highest immunity to interferences from radiation and sunlight. It is suitable for harsh environments such as engine areas and open spaces.

MD9910 Combined Smoke and Heat Detector

Microdata Due MD9910 is an analogue addressable smoke and heat detector that defines a new standard in marine fire detection. Its features significantly increase the safety on board. Main feature is the TOD - Test On Demand - procedure. The TOD allows a full performance test of the of the detector via a software command. TOD is certified by Classes as comparable to the routine tests using the smoke and heat test tools. Another significant feature is the obstruction detection. MD9910 gives a fault message if something inhibits the functionality of the smoke chamber, thus revealing of smoke.

MD Field Units

MD2208 I/O module

Microdata Due MD2208 is an addressable I/O module featuring 4 digital inputs and 4 digital outputs. Inputs are to be potential free contact; line monitoring is provided. Outputs are SPDT contacts for control of external devices and apparatuses, such as fire doors and firefighting.

MD9907 – Heat Detector

Microdata Due MD9907 is an analogue addressable IP67 heat detector. It is mainly designed for galley, mooring and outdoor spaces. It is available in class A1, B, C thus 57°, 75° and 90° alarm threshold. Various configurations of the cable entries can be arranged, for side and back access via watertight glands.

MD9840 I/O module

Microdata Due MD9840 is an addressable I/O module able to manage 4 digital inputs and 4 digital outputs. featuring 4 digital inputs and 4 digital outputs. Inputs are to be potential free contact; line monitoring is provided. Outputs are SPDT contacts for control of external devices and apparatuses. An analogue version of the module is available as well, the MD9840-BA, that can acquire two 4-20mA analog inputs. The MD9840-B version is instead for connection of conventional detectors to the analog loop.

MD9820 and MD9831 Manual Call Point

Microdata Due MD9820 is an addressable manual call point for dry spaces with ingress protection IP42. MD9831 is an addressable manual call point for wet spaces with ingress protection IP65. An LED on the front of the call point indicates the fire alarm activation. Both call points are provided with loop short circuit isolator.

Hazardous area units

MD9850 Zener Barrier
Microdata Due MD9850 is the Zener barrier to be used with the I.S. smoke and heat detector MD9901-EX. The barrier must be installed in safe area. It can manage only addressable detectors for maximum 10 pcs. MD9901-EX on a single spur.

MD9901-EX Smoke and Heat detector
Microdata Due MD9901-Ex is an analogue addressable intrinsically safe smoke and heat detector for hazardous areas. It can be selected by configuration to act as only smoke, only heat or smoke and heat detector. The temperature alarm threshold is fixed at 57°C.

MD9902-Exd Flame Detector
Microdata Due MD9902-Exd is a flame detector suitable for use in explosive atmospheres. It is the EX-version of the standard MD9902 flame detector, and it maintains the same features in terms of flame sensitivity. It can be used as analogue addressable, connected to the loop, or as a conventional detector.

MD2207-Exd Baro-Thermo-Hygrometer
Microdata Due MD2207 measures pressure, temperature, and humidity of the monitored area. The values are transmitted to the control panel. Its typical application is the monitoring of the ammunition stores on naval units. The sensors used to do the measures are protected against dust, water and contamination.

CCP-platform overview

Control modules

Control-MX-NA

CTRL-RPT-4.3-NA

CFD500 N Repeater panel 4.3-NA

Interface modules

Bus Isolator M-NA

Bus Isolator M-NA

Relay M 8-NA

I/O M 70-NA and I/O M 700-NA

Charger M-NA

RM4-NA

Control **modules**

The control unit is the main part of the system containing all central functionality for detection, alarm, controls and the main operator interface. The control unit communicates with other modules on the redundant bus system.

Control units can be operated directly by an operator via color display or single MMI (Man Machine Interface) or connected and controlled directly by the platform managment system (iPMS). Highspeed interfaces such as Ethernet 10/100 Mb/s, RS485, RS422 allow for integration with third party systems. A USB interface enables easy maintenance and service of the complete system.

The following parameters can be configured, as basic:

- Number of detectors and other loop units
- Sensor sensitivity, alarm threshold, rate-of-rise and alarm delay
- Number of operator interfaces and indication units
- Digital output/input functionality
- Explanatory text, which can be assigned to each detector. The text is displayed on the operator interface at alarm or fault. It is also possible to define texts in association with digital inputs and outputs.

A system can run on multiple control units, to form either a multi-central and/or a redundant CPU system, up to a Safe Return To Port (SRTP) configuration for improved fault t olerance, thus highest availability.

Control panel CM 4.3

- Large colour graphical display with full compliance with the European Fire Alarm standard EN 54
- The central unit is delivered either as stand-alone for wall/desk/ceiling mount or installed in the cabinet front door

Control module MX-NA

- DIN-rail mounted control module, easily integrated with other modules
- Small design, perfect for installation in narrow spaces as well as in refurbishment projects
- Offers the same functions of a larger control panel, but without inbuilt display
- Ideal for embedded functions and for building redundancy

Repeater **module**

Repeater panel CTRL-RPT-4.3-NA
The CTRL-RPT-4.3-NA is a repeater panel with a 4.3" graphical colour display used to indicate system status. The unit is connected to the redundant backbone bus or via Ethernet and can therefore be independently mounted remotely from the central unit.

The CTRL-RPT-4.3-NA repeater panel can be run as a stand alone central unit.

Bus Isolator module M-NA
The Bus Isolator M-NA module divides the redundant system backbone bus into electrically isolated segments. Its dual functionality isolates communication and basic backup signals between the distributed system parts creating effective EMC isolation from the surrounding environment.

Bus Isolator M-NA is mandatory when extracting the system backbone bus using separate power sources for the different segments in order to prevent interference caused by ground currents or other equipment.

Interface **modules**

Loop module M X H-NA
The Loop M X H-NA module includes one addressable detector loop interface handling up to 254 addressable detectors or other loop units. Module activity can easily be monitored on the fault and alarm indicators on the front panel as well as on the display of the control unit. Up to 64 Loop Mx modules can be connected to one central unit. The loop interfaces use FSK modulation which is extremely robust making cable lengths up to 3000 meters possible, with no particular requirements on the cable properties.

The cable with its detectors and other loop units are continuously monitored for possible faults and disturbances providing the highest possible safety. A loop can be driven by one or two modules, depending on the redundancy requirements.

Relay module M 8-NA
The Relay M 8-NA module contains eight individually programmable relays. Each one of these relays provides a potential free change-over-contact capable of a 5A resistive load.

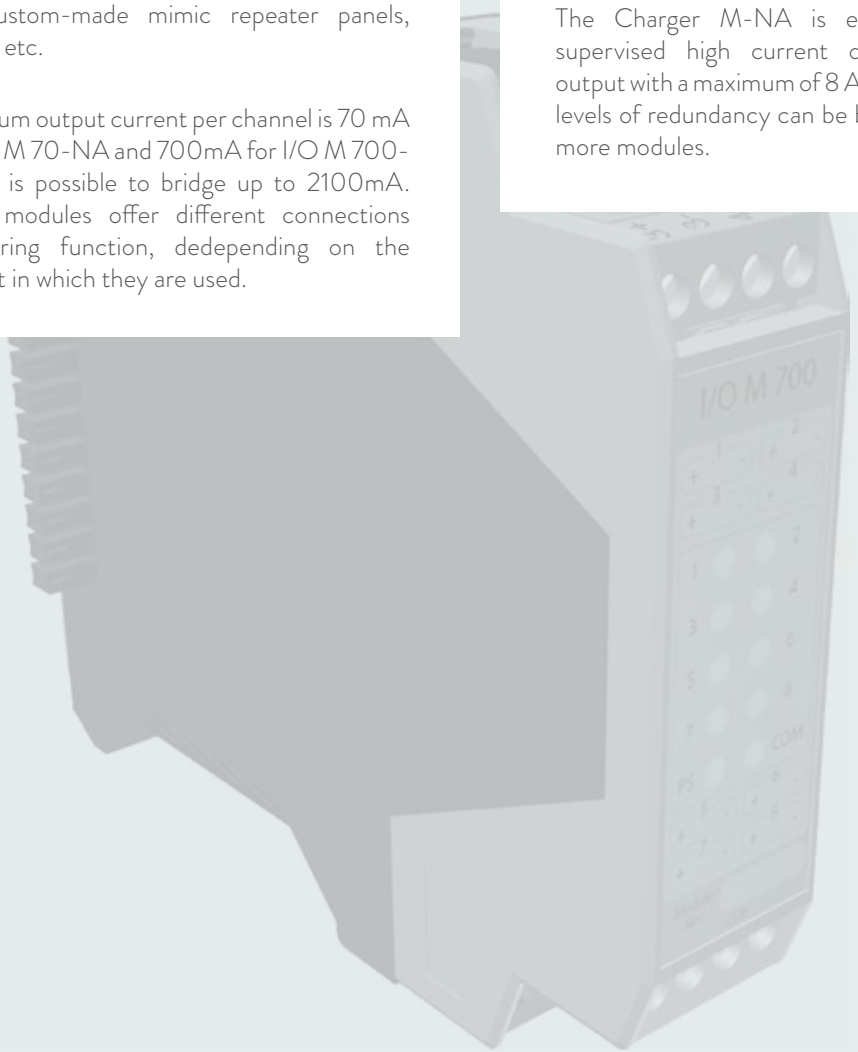
Use the Relay M 8-NA to control units such as sirens, doors, flash light, alarms and HVAC or where general dry contacts are required.

I/O module M 70-NA and M 700-NA
The I/O M 70-NA and I/O M 700-NA modules are two types of I/O modules with eight identical and individually programmable input/output channels. Use the I/O M 70 and I/O M 700 as digital input and output modules for monitoring and control of external devices such as alarm devices, fire barriers, extinguishing and suppression systems, doors and custom-made mimic repeater panels, HVAC etc.

Maximum output current per channel is 70 mA for I/O M 70-NA and 700mA for I/O M 700-NA. It is possible to bridge up to 2100mA. These modules offer different connections monitoring function, dedepending on the context in which they are used.

Charger module M-NA
The Charger M-NA module provides redundant power to the system through the redundant backbone bus and also supervises the external power sources. The Charger M-NA has a built in intelligent battery charger for the system backup battery power sourse handling.

The Charger M-NA is equipped with a supervised high current optically isolated output with a maximum of 8 Ampere. Different levels of redundancy can be built using one or more modules.



Salwico CFD500N Fire Detection System

Cabinet CFD500N
Unique design, reinforced construction, all-stainless steel, mounted on shock absorbers. It can house different battery sizes (5, 7, 17 Ah). Pre-drilled for cable glands fitting on top/bottom, easy to configure. Retainment system for all components, for shock standing. The door can house the control panel and optional controls and indicators (Fire Fighting and others).

CFD500N **field units**

Consilium's detectors and I/O units from the well-established fire alarm product range for rail, marine and industrial applications in harsh environments can be connected to the CFD500 N loop. The communication interface of the loop units is based on Frequency Shift Keying (FSK) modulation, which has proven outstanding performance in harsh electrical environments. A pre-alarm can be generated, when the smoke detector readout is somewhere in a range of 80 and 100% of the alarm level, for all samples taken within a 25-second period.

Smoke detector EV-P-NA
Salwico EV-P-NA is an analogue addressable smoke detector with an optical chamber. Salwico EV-P-NA is designed to give early warning for the presence of smoke in the supervised area. At the same time the detector offers a high rejection to false alarms. Salwico EV-P is equipped with OMNIVIEW 360° LED indicator giving a clear, full 360° visibility of the red alarm indication.

Flame detector AC-IR-3FQ-NA
This IR detector is a triple-frequency infra-red flame detector using the latest manufacturing technology. The detector is made for the detection of smokeless combustible liquid and gas fires, as well as smoke-forming open fire involving carbonaceous materials as contained in wood, plastics, gases, oil products etc.The detector is using intelligent signal processing and custom algorithms, achieving excellent detection reliability while maintaining the highest immunity to interfering radiation and sunlight. AC-IR-3FQ-NA is suitable for harsh environments such as engine compartments and other areas with high ingress protection demands. The IR detector is used with an addressable base to connect it to the detector loop.

Dual smoke/heat detector EV-PH-NA
Salwico EV-PH-NA is an analogue addressable combined smoke and heat detector with an optical chamber and heat sensing element. Both smoke and heat alarms of EV-PH-NA can be individually generated. The function of the detector as combined, smoke or heat only, is selected during configuration and the heat alarm threshold, rateof-rise of temperature and smoke sensitivity can be associated with each individual detector address. At the same time the detector offers a high rejection to false alarms. Salwico EV-PH-NA is equipped with OMNIVIEW 360° LED indicator.

Heat detector EV-H-NA
Salwico EV-H-NA is an analogue addressable heat detector. Salwico EV-H is designed to give early warning for the presence of heat in the supervised area, and is available in two temperature classes: A1R (fixed 54°C + rate of rise function according to EN54-5) and CS (fixed 84°C). In these naval versions it is possible to adjust the heat alarm threshold and the rate-of-rise of temperature associated with each individual detector address. Salwico EV-PH-NA is equipped with OMNIVIEW 360° LED indicator.

Address unit IC10-WP-NA
The IC10-WP-NA is an address unit for fire detector loops. It has been designed for use in damp spaces. This unit allows for the connection of different types of devices with closing digital function to the fire alarm system, for example high temperature heat detector, heat sensing cables, third-party detectors and/or sprinkler indication. IC10-WP-NA includes one input.

Manual call point MCP-A-NA
MCP-A-NA is an addressable manual call point offering ingress protection. The unit provides the required system functionality for crew-activated emergency alert. An LED on the front of the call point indicates the fire alarm activation. The MCP-A-NAprovidesoptionalbuilt-indoublesided short-circuit isolator.

Heat detector HP100 IP67-NA
The HC100-A2-IP67-NA is a conventional heat detector for use with CFD500 N Fire Alarm Systems. It is delivered molded together with its connection adapter, filled with a compound that gives it high resistance against damp and vibrations. The detector cannot be separated from the adapter. The heat sensing element is a thermistor with a fast response to changes in the ambient temperature. Alarm is optically indicated by an LED.

Short circuit isolator connection adapter
SPB-ADAPT-SCI-NA is a double isolating short-circuit isolator and connection adapter for addressable detectors. A pair of short-circuit isolators electrically isolates a short circuit occurring on the loop giving full availability and function to the unaffected portions of the loop despite the short circuit. The reaction to the short circuit is indicated on the unit and on the control panel. Short-circuit isolators are mandatory for redundant loop configurations.

Hazardous **area units**

Isolator barrier
NS-ISOLATOR-A-NA and NS-ISOLATOR -C -NA. The NS-ISOLATOR-NA barrier is located in a non-hazardous area (safe area) and forms the interface to IS detectors and other IS line units. The NS-ISOLATOR-NA exists in two versions, to handle either analogue addressable or conventional IS units.
NS-ISOLATOR-NA does not need a separate power supply. It is powered directly from the fire alarm panel via the loop/section cables, no extra cables are needed to connect hazardous area sections.

Heat detector HC100-A2-IP67-NA-IS
The HC100-A2-IP67-NA-IS is a conventional heat detector for use with CFD500 N Fire Alarm Systems after an NS-ISOLATOR-C-NA barrier. It is delivered molded together with its connection adapter, filled with a compound that gives it high resistance against damp and vibrations. The detector cannot be separated from the adapter. The heat sensing element is a thermistor with a fast response to changes in the ambient temperature. Alarm is optically indicated by an LED.

Combined smoke/heat detector NS-AOHS-IS-NA
NS-AOHS-IS-NA is an intrinsically safe analogue addressable multi-sensor detector for CFD 500 N. It has two separate analogue sensor elements, one optical for smoke detection and one thermistor element for heat detection.
Alarm condition is indicated on the detector via a red LED. NS-AOHS-IS-NA is connected to the detector loop via the NS-ISOLATOR-A-NA.

Manual call point ACP-IS-NA
ACP-IS-NA is an intrinsically safe addressable manual call point that can be connected to the CFD500 N detector loop via NS-ISOLATOR-A-Na. By breaking the glass the fire aralm is activated. The call point can also be tested with a special key, included in the delivery. A red LED on the front of the call point indicates the fire alarm.

Accessories

Flash light FL-02-NA

The FL-02-NA has a unique lens design that distributes the light in a cylindrical shape that optimises light dispersal; it achieves the required illumination specified by EN 54-23 - 0.4lux/m^2 over the entire room area. High efficient LED technology gives extreme low current consumption, maximizing the number of devices on the alarm circuit.

Sounder ES-02-NA

The ES-02-NA is the CFD500 N conventional sounder, although it finds uses in much wider applications such as security, general signaling and process alarms. It features low power consumption along with wide operating voltage and selection of tones.

Cable glands

A selection of cable glands is available for the loop units and the cabinets, to adapt to existing standards. Available models are watertight to IP68 and screen-captive to grant screen continuity and EMC protection.

Salwico CFASS-2 Fire Detection System

Consilium is proud to present the new Navy CCP-based Fire Detection System developed to fulfil the requirements of the most demanding Navies, for the protection of their missions, assets and crew in the harshest environmental conditions.

This unit is the replacement of the CFASS so far supplied for submarines. The name of the unit is CFASS-2.

CFASS-2 is designed to be compliant with the highest naval standards, such as:

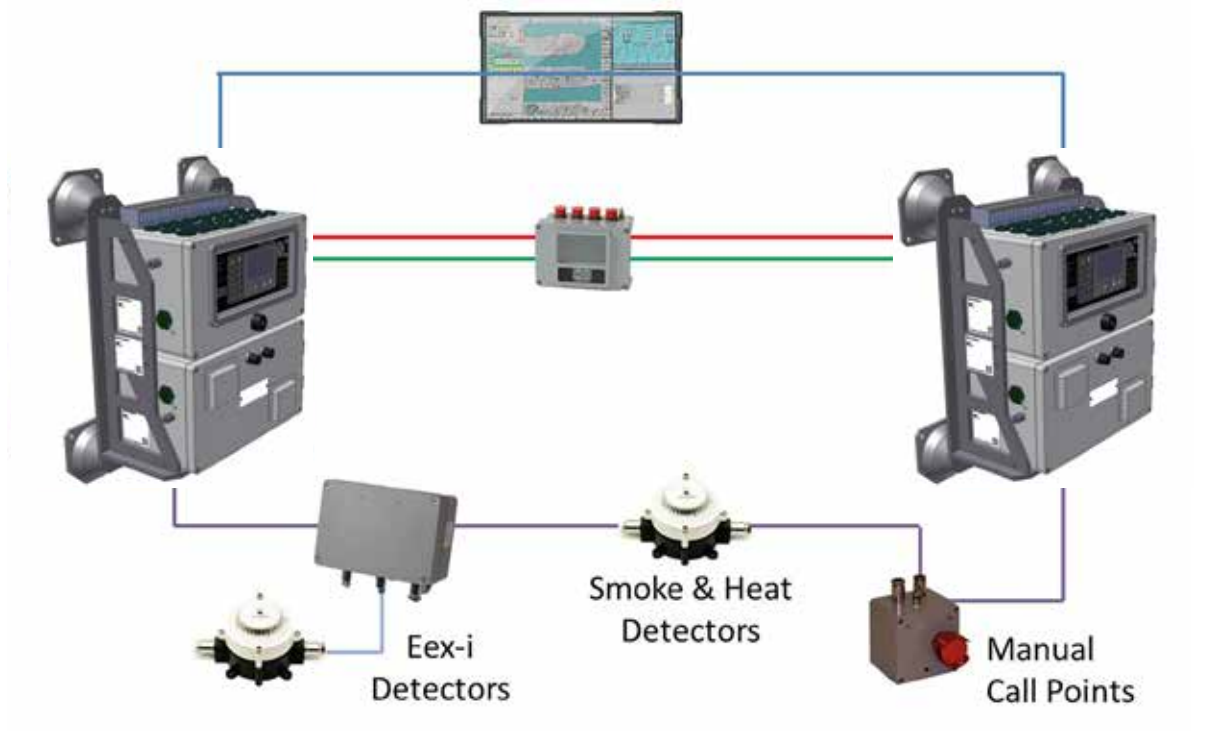
- Shock to MIL-S-901D Heavyweight and NATO STANAG 4141/4549
- Vibration to MIL-STD-167A
- EMC/EMI to VG95373 and MIL-STD-461F with RS103 increased by 2.5 times the ”normal” levels (*)
- Fully non-magnetic construction
- IP65 for the control cabinet
- Electrical interface by MIL-DTL-38999 Series III – IP 68 circular connectors

(*) both in frequency and amplitude

CFASS-2 Loop units and system configuration

Consilium CFASS-2 features a dedicated range of highly selected loop units, adapted to stand the exceptional environmental conditions specified for the particular applications where such system is required.

As every project is quite unique, Consilium invites interested customers to contact any Consilium office worldwide, to be introduced to the central naval project department for a joint analysis of the demands and a proposal that could exactly fit the customers' needs.



Ambient Oil and Gas detection

According to DNV statistics, two thirds of all fires onboard a vessel starts in the engine room. Crew and shipowners know how to fight fires. What they say they need is faster detection of a threat and they prefer not to have their fire fighting skills put to the test. That is where DASPOS leakage alarm system comes in.

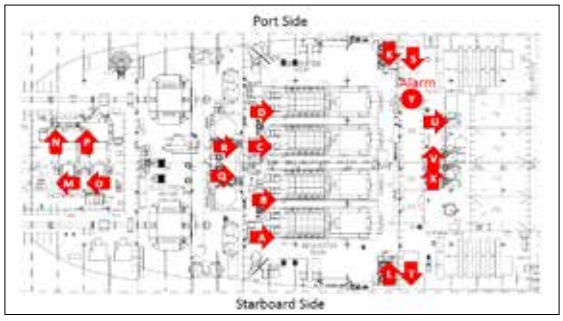
The Leakage Alarm System LAS-10 system is a fire prevention system for engine rooms, that actively detects potential fire hazards before they occur, by measuring the content of airborne oil droplets, by sensor technology. This solution is unique and the only of its kind on the market today.

The detection is based on a heavy amount of air flow (10,000 liters per minute) that is led through the chamber. An alarm can be set off as a result of either an analysis of the gasses, or if the differential pressure rises when the oil spray is caught in the specially designed filter.

A complete LAS-10 system consists of:

- Up to 12 detectors per control unit (depending on the vessel size and design)
- A control unit that collects information from each detector
- A monitor where data is collected and stored, where alarm limit settings can be adjusted.
- Data history is displayed in both numerical and graphical form.

To achieve an optimal protection it is necessary to verify air movements in relation to the application. On installation, a smoke test should be performed with all engines, ventilation and additional machinery fully in operation, to ensure that detectors are correctly positioned.



Fire extinguishing controls

All Consilium's Fire Detection Systems have the capacity to control and monitor the fire suppression and mitigation systems protecting the areas where fire detectors are installed. Manual and automatic activations can be handled with the same level of safety that the Fire Detection System features, with the advantage of a consistent and solid unique control and monitoring system, without needs to build dedicated interfaces and protocols among sub-systems from different sources. The Salwico technology offers the flexibility of PLC-based solutions for firefighting control, with all the benefits in terms of redundancy, I/O monitoring and software consistency that are typical of a safety system. The scope of supply from Consilium can include the firefighting subsystem or part of it, or be a joint-venture with Customer selected brands.

Aerosols

When activated, the aerosol fire extinguisher sets off a chemical reaction whereby nitrogen, water and potassium connections are build. The aerosol released from the extinguisher fights and extinguishes fire not by suffocation (depletion of oxygen) nor by cooling, but by stopping the chemical combustion reaction at molecular level (by binding free radicals) without depleting the oxygen content.

Benefits of aerosols

- They are more effective and more efficient than all other conventional agents.
- The extinguishing agent is in non-pressurized, stainless steel containers.
- The extinguishing agent is environment friendly.
- The extinguishing agent is non-corrosive; it does not damage other objects.
- Not harmful for people, animals or plants when used in the correct concentration.
- They require a negligible level of maintenance compared to any other conventional system.

Activated aerosol

High pressure sprinkler

The high pressure water mist system controls, suppresses and extinguishes fires by discharging a fine water mist at high speed. The water mist is created by the system when it activates: it pushes fresh water at high pressure through specially designed, patented sprinklers and spray heads. The water mist is discharged at high speed by high-pressure pumps or accumulators. Water mist uses three mechanisms to fight fire: cooling, radiant heat blocking and local oxygen inerting.

Traditional sprinkler systems use wetting as their main mechanism, and therefore they use very large amounts of water. A high pressure solution uses water much more efficiently: it uses up to 90% less water than traditional sprinkler systems for the same application with equivalent or better performance.

Gas extinguishing
Gas fire extinguishing suppresses a fire by inhibiting the chain reaction of combustible and combustive, typically by reducing the volumetric concentration of oxygen. Some gaseous agents have also a cooling effect, thus decreasing the overall energy of the reaction. The gas fire extinguishing works well in confined volumes, as the partial pressure of the extinguishing agent can be properly determined and maintained as long as needed to suppress the fire, without turning harmful to people who might be present in the affected space.

Deluge/low-pressure sprinkler
Low-pressure sprinklers have the capacity to wet surfaces, thus reducing surface temperature and suffocating the fire with the production of vapor. These systems use large amount of sea water, which would lead to stability, corrosion and out-of-service issues. Yet the most diffused solution, due to its initial economy.
Deluge systems could use water to create smoke barriers and for wall cooling or water-based foam for total flooding solutions.

Compressed Air Foam (CAF)
Compressed Air Foam (CAF) is an improved foam generating process where, water, foam concentrate and compressed air or nitrogen gas are appropriately mixed to generate highly efficient foam that is sprayed over and around flammable liquids fire.
Designed to meet and exceed the most stringent standards, CAF systems are suitable for a wide range of applications, including chemical and fuel hazards, power generation and machinery/pump areas, aircraft hangars and heliports, helipads, landing decks and oil storage tanks. Automatic CAF, pre-engineered fire suppression systems are available in both Self-Contained (SC) and Fixed Water Supply (FW) design.

High Fire Risk Areas
Helicopter landing pads have to be protected according to different requirements from the operators. In most of cases a fire suppression system is required. The design of such fire suppression can be done in several different ways.

For example:
· Electric fire water monitors with foam
· Water oscillating monitors
· Pop-up foam sprinklers
· Surrounding pipe with mounted foam sprinklers

In almost every scenario, the size of the largest berthing helicopter determines the capacity of the extinguishing system.

Fire protection concept for retrofit

Refurbishment of naval vessels is a big industry challenge. The life length of the ships can be extended by implementing the right level of upgrade using equipment and solutions that meet the new and coming operation requirements.

New directives, standards and experience, define requirements that in some cases lead to new design solutions as well as the use of new technical equipment that fulfils the required performances integration and maintainability solutions.

The MD, CFD500N and CFASS-2 with their modular system concept offer the flexibility needed when refitting an existing fire detection system. In many cases it can e.g. be possible to use existing cabling in the ship while adding or upgrading the fire detection and suppression solutions on-board. The small dimensions of the central unit as well as that of the detectors make it possible to fit the equipment in small voids as there is normally very limited space available onboard.

The possibility to add distributed I/O interfaces allows for an optimal usage of existing cabling, minimizing any new installation work.

One platform for all your needs
Consilium Common Platform is modular-based and backward compatible, making it easy to install what you need today, change devices tomorrow and integrate with external systems.

Gas detection marine

Consilium offers two types of gas detection systems, sampling- and point detection systems, which can be found on commercial, offshore naval and other specialized vessels as well as onboard LNG's, often in combined set up's incorporating our fire detection systems as well.

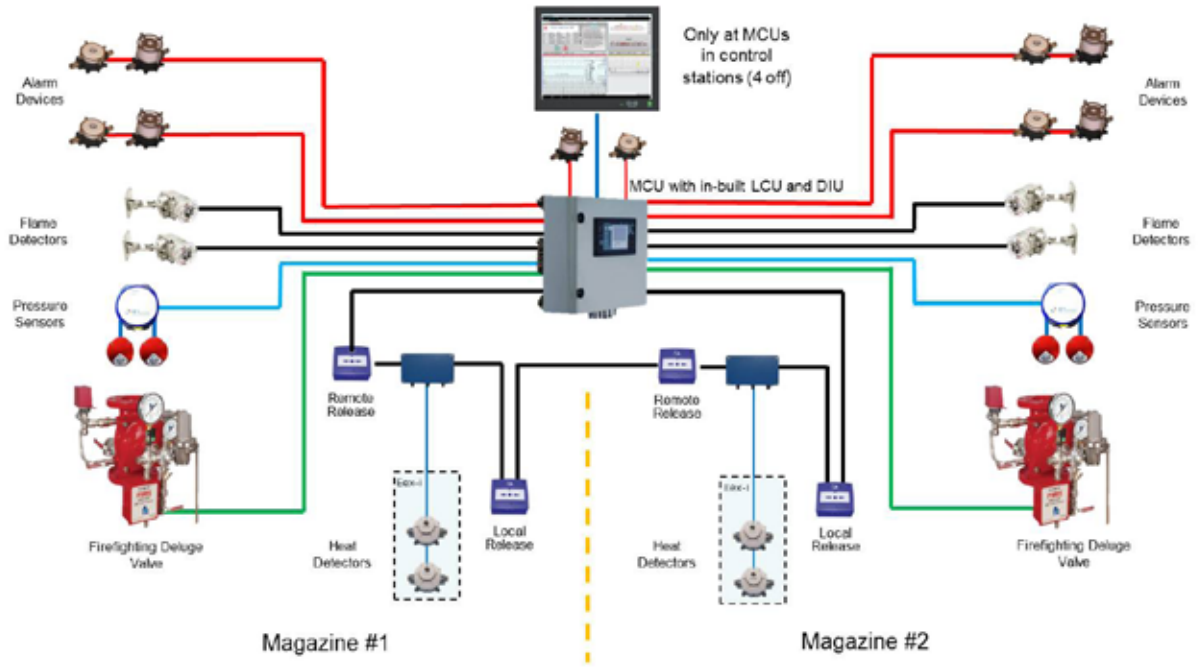
Since the first Salwico gas detector was released in 1959, the Salwico range has developed and is now considered to be top of the line, having all the qualities and features that can be expected from the user as well as the installer.

Application examples

Block diagram

The following pages show block diagrams for different configurations fulfilling the various application demands of different ships for both Fire and Gas detection.

Consilium´s platforms and products shown in the examples might be interchanged among them, to cope with the procurement requirements. Communication with the ship control and monitoring system can be done over RS485, RS422, digital I/O or Ethernet in all examples. Please note that the setups below are just examples as the concept promotes customer specified system design. The modules can be used in several other ways to control and monitor other systems onboard.



Example 1

Standard - one control station

The example shows a system solution with one central. The system is composed by two loops, using the MD9800-LC central unit, powered by the MD2010-PS. The repeater panel is MD9860, connected to the MD9800-LC by a RS422 serial bus.

Example 2

Standard - two control stations

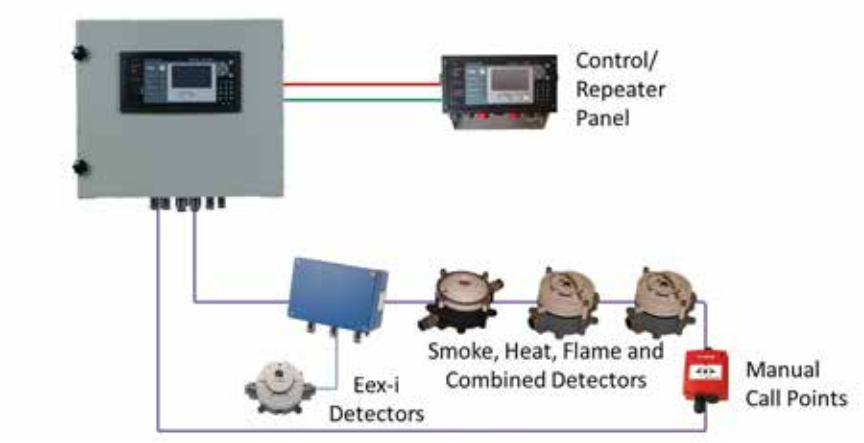
The example shows a system solution with one central unit. The system is composed by two loops. We can use the model MD9800-LC as for the previous example, but in this case, a MD9800-LC works as repeater panel. In this way the system can be fully operated by each central unit.

Example 3

Standard

The example shows a solution with one central unit covering the entire ship and located in the wheelhouse.

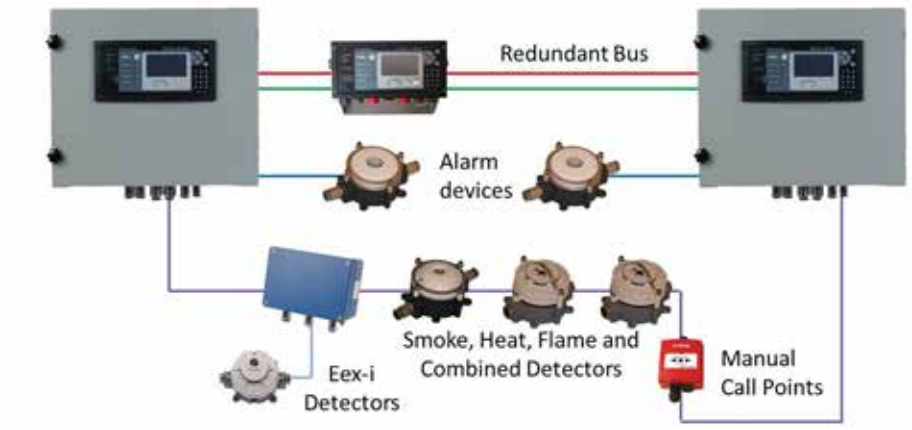
The closed detectors' loop ensures all detectors can be accessed even in case of a cable damage.



Example 4

Redundancy / Safe Return to Port

This redundant system consists of two central units sharing each loop's ends and exchanging data. panels are synchronized and the control transfers from one to the other in case of failure of one panel. Damage to a loop cable will determine each remaining segment of it to be driven from the panel it will remain connected to.



Example 5

Stretched system

This set up takes advantage of the Salwico backbone bus, enabling stretching the system through the vessel and using communication modules locally in each compartment. In the example one I/O 700 module is used in each compartment.

These modules are used to control and monitor external functions such as fire doors, exit lights, extinguishing systems, shut down HVAC system, interface to payloads.

Example 6

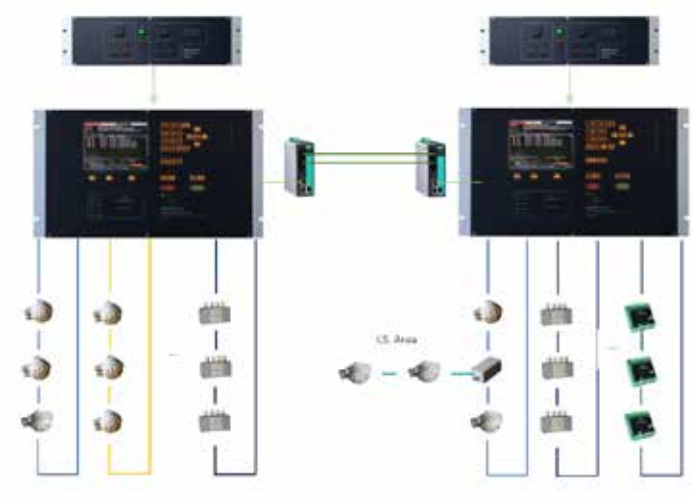
Fire & Gas combined

This set up shows a small system composed of only one central unit. The central unit is the model MD2010-CU. I/O modules are used to acquire the 4-20mA signals coming from some GAS detectors. Other I/O modules are used to drive some sounders. The sounders are activated when an alarm from the GAS detector is detected. The system is composed of 10 loops maximum.

Example 7

One system - multiple subsystems

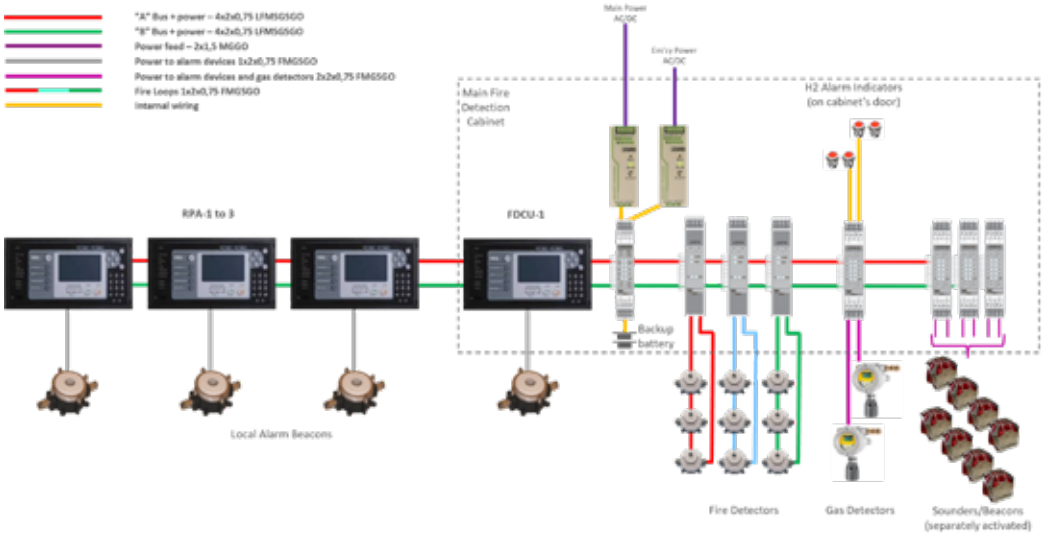
The example shows a system with two central units, in loop configuration. The number of the loops is 12 for each central unit. The central unit is MD2010-CU.



Example 8

Submarine system

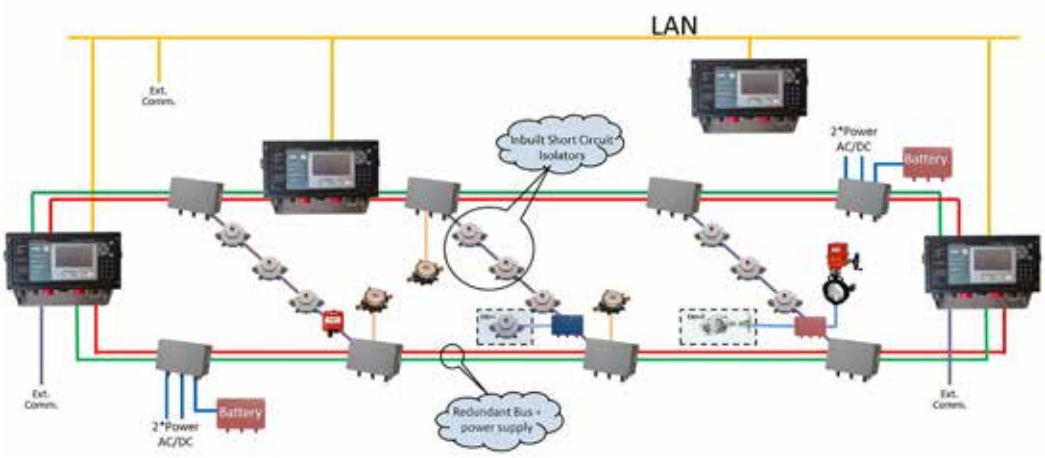
A slim configuration for an application on a submarine, where the system handles all detection and alarm functions, including also some gas detection for particular spaces.



Example 9

Multi system / Safe Return to Port (SRTP)

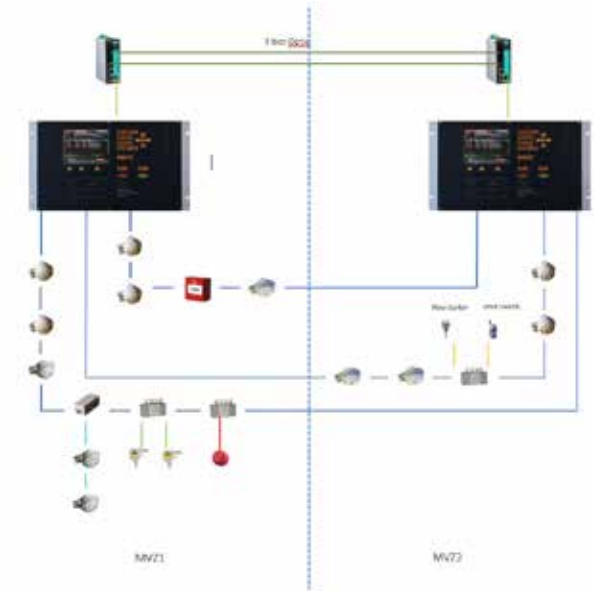
Each compartment has its own independent fire detection system and all systems communicate to each other via the system buses and/or the LAN, as automatic communication routing is native within the system.



Example 10

Multi system / Safe Return to Port (SRTP)

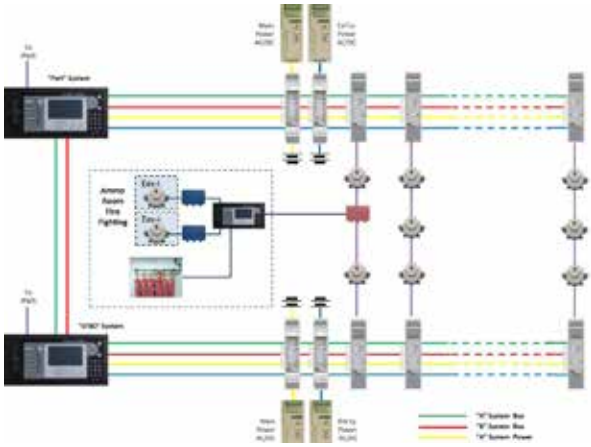
The setup shows a system in Safe Return to Port configuration. The system is divided in two fire zones, each one equipped with a Fire Detection System cabinet, named MVZ1 and MVZ2. The central unit located in MVZ1 works as master for the detectors of this area and as reserve for the detectors located in MVZ2. The central unit located in MVZ2 works as master for the detectors of this area and as reserve for the detectors located in MVZ1. The requirement is to have 8 branches for each fire zone.



Example 11

SRTP with independent fire suppression

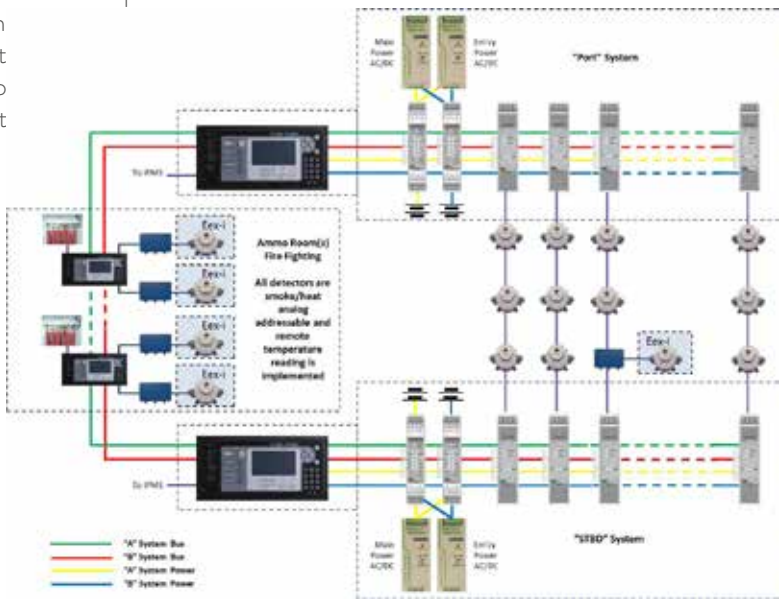
Each compartment has its own independent fire detection system. Each control panel communicates with the IPMS directly. Ammunition rooms system(s) work as independent clusters, providing local monitoring and activation, whilst remote alarming to the main Fire Detection System is via I/O modules. Ammunition room(s) does not benefit from the SRTP implementation due to reduced interface level. The system will also monitor the status of water, gas, pressure etc.



Example 12

SRTP with fully integrated fire suppression

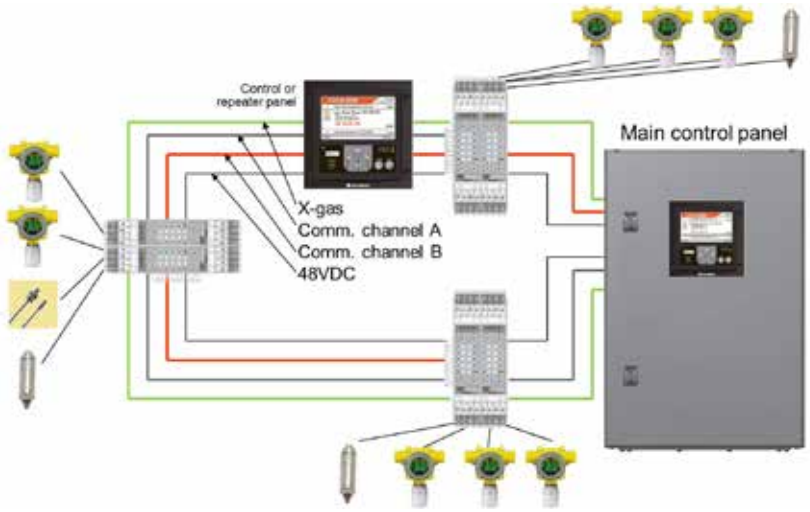
This example is the same as example 6, but here all ammunition room(s) and other dedicated detection and suppression systems are fully integrated within detection system. All functions are integrat panels and control modules are redundant to in groups. no detection function nor activat in single-CPU mode.



Example 13

Flexible system

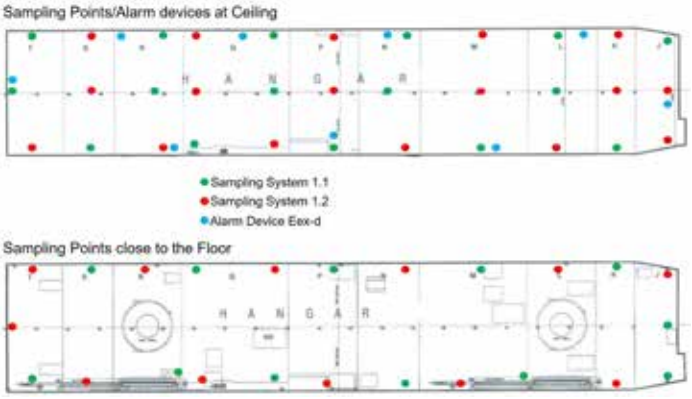
Each group of detectors is connected locally to relevant I/O modules for reading of measured values and for local alarming, transfering the values and statuses to the variuos control panels.
Every compartment can have an own CPU (built into the compartment control panel) to process values and alarms; same processing can take place at the main control panel. All CPUs within a system are redundant to each other



Example 14

Large spaces monitoring

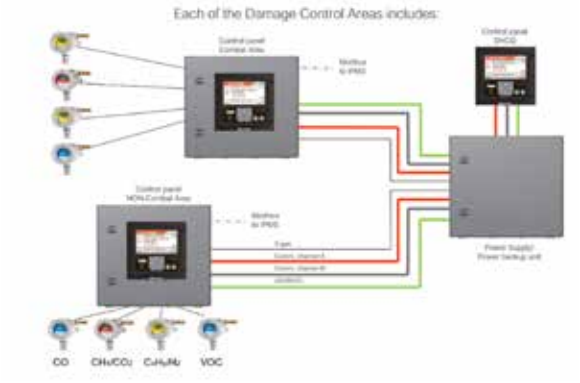
The AVCAT Fuel vapours detection system for an aircraft carrier hangar needs to have many sampling (aspiration) points, as the hangar surface is large and the huge air movements might cause the vapours to be moving and diluting; further, being the density of the mixture close to that of air, samples shall be taken both at floor and ceiling levels. The quantity of sampling points, the length of the sampling lines and the aim to grant acceptable redundancy and fallback demand two analysers to be installed, alternating their sampling points in a strategical placement. High-performance detectors installed in the analysers ensure high sensitivity and quick response.



Example 15

Atmospheric Air Quality Monitoring

The atmosphere monitoring system has been designed to constantly monitor the Oxygen content of the ship's internal air and to promptly alarm in case of depletion of that, or presence of hazardous or contaminant gases and vapors.



Main features are:

- A scalable system to accommodate as many detectors as needed.
- Simple handling of detectors using standardized interface, for future-proof maintenance and upgrades.
- Interface to IPMS
- Modular construction
- Cost-effective solution with minimization of cabinets
- Systems, independent from each other, shall each serve one Damage Control Area of the ship.
- Within one Damage Control Area, two functional cabinets are be installed, one for the Combat Area and one for the Non-Combat Area, sharing a common power system.
- The system is capable to survive during a blackout, running on own backup batteries.

Example 16

Lithium Energy Storage

Energy Storage Systems (ESS) are becoming popular on naval applications; as well, storage of Lithium-based accumulators for powering mission material is required. Gases representing a substantial difference from normal operation to outgassing conditions are detected promptly in both the venting ducts of the ESS and in the space where the ESS is located, to ensure the quickest response upon a failure

For all those moments
when safety matters

Consilium is a producer of safety technologies for the marine, oil and gas, transport and building sectors. Our commitment goes beyond the products: We protect the lives of mothers and fathers, sisters and brothers, colleagues and friends. With representation in more than 55 countries in all time zones, we are always close to you.

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