



Smart Applications Using the CSP™ Family of Probes



Application

The Mirion CSP Smart Probe family not only elevates the standard for radioprotection, its flexible platform also easily enables new user-designed applications to be developed. In combination with specifically developed software, you can achieve innovative solutions for your specific measurement needs. Small system development also becomes possible with a smaller financial investment.

Each CSP Probe contains all components and parameters inside the probe itself:

- Detector
- HV power supply
- Signal electronics, like (pre)amplifier and discriminator
- Count-rate analyzer, for each channel (two for alpha beta probes)
- and EEPROM for storage of the calibration parameters, alarm setpoints, and data storage

Apart from power, CSP probes are completely “stand-alone”. This means that CSP probes may be used with any Mirion read-out unit, including Avior®, MIP 10 *Digital*, Radiagem™ or Colibri® units: The CSP philosophy defines the probe as “independent” and does not need a “matched pairs” readout unit. In addition, using the CSPS™ software, a CSP probe can be directly connected to a PC for calibration purposes, or just to test the response of the probe, or set its alarm setpoints. This connection to a PC can be made via a wired USB cable, or even wireless via any of the CSP-COM accessories that fit on the back of the probe. Several models of CSP-COM exist:

- CSP-COM-BT – Bluetooth® connection, for up to 10 meters, that can be used with the Colibri unit as well as computers.
- CSP-COM-Wi-Fi – for Wi-Fi connection via a router, for up to 50 meters (open air).
- CSP-COM-RF – Radio Frequency ISM band, with specific Transmitter and Receiver for harsh environments (where Wi-Fi can’t be used).
- CSP-COM-RS485 – for RS-485 wired networks.
- CSP-COM-Ethernet – for Ethernet wired networks.

This versatility of independent probes, and direct connectivity to a PC via wired or wireless allows you, as user, to think out of the box. Specific programs, where the user can use the CSP-PL Programming Libraries (previously available as CSP-DLL) can be made to find solutions for your measurement applications. The following pages describe some examples covering various applications.

Area Monitoring Application:

“CSP NAVI” tool to provide simple readout of measurement data along with automated data storage of picture or barcode.

- CSP probe – single doserate or contamination probe, depending on CSP probe connected
- CSP-COM interface – CSP-COM-BT Bluetooth (wireless)
- CSP programming – based on CSP-PL v1.2, on a Tablet PC running Windows XP
- Specific hardware – camera or barcode



CSPNavi – Created for Japanese Users

This program allows various operation modes, using a single CSP probe connected via wireless connection with the CSP-COM-BT Bluetooth interface.



1. First mode is to log the data continuously, whereby the values can be transferred into Excel.
2. Second mode allows a measurement to be stored with a picture taken with an external camera, along with a report that can be printed for later documentation of the event. In this case, the user can set up the system such that the picture is taken automatically when the alarm turns off.
3. Third mode supports the storage of measurement data together with a barcode ID of the sample, which are preloaded in a database.

During measurement the measured instantaneous value is clearly indicated in digital characters, and the operator can select either a bargraph display (with changing colors depending on low or high alarm) or a trend graph for source finding or histogram purposes. The scale as well as the alarm threshold can be adapted, and readout values can be defined in doserate or counts per second (for non-dose-rate probes).



Customers for this can be radiation safety professionals, government officials (police, emergency response, etc.). This type of solution can also meet the needs of industrial or medical facilities requiring a simple area monitoring solution.

Benefits of this Solution:

- Traceability of the measurements, by integration of picture, or barcode.
- Automatic data storage for monitoring purpose in trend mode. Data is stored on PC with no user intervention and transferable to Excel.

Area Monitoring Application:

Readout of multiple probes with picture and alarm capability via "CSP Manager".

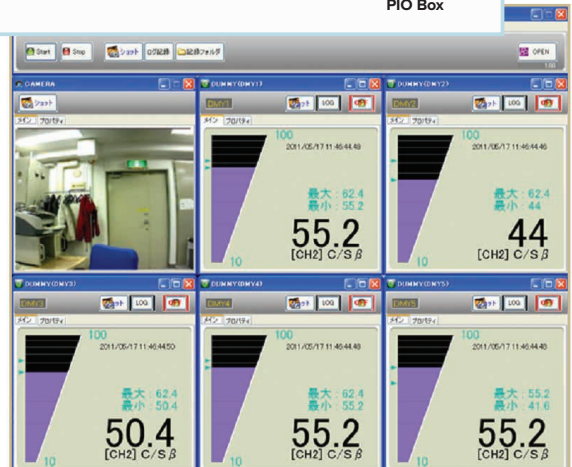
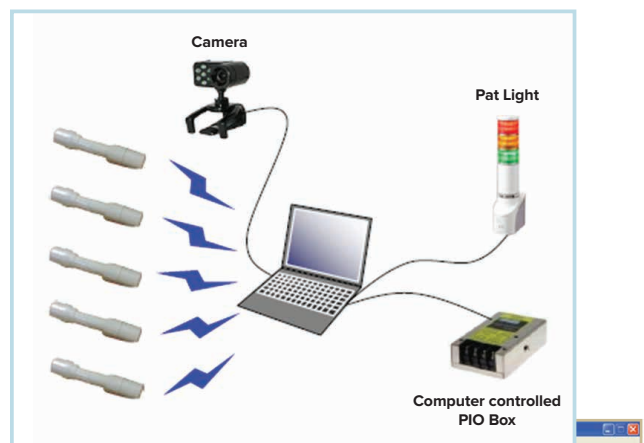
- CSP probe – up to five, typically doserate
- CSP-COM interface – CSP-COM-BT Bluetooth (wireless)
- CSP programming – based on CSP-PL v1.2 on a PC using Windows XP or Windows 7
- Specific additional hardware – camera, and light beacon, interlock interface box

CSPManager

This monitoring program was written in addition to the "CSP-Navi", and allows multiple CSP probes to be used as a small area monitoring system. Multiple probes can be connected via wireless connection using the CSP-COM-BT Bluetooth interface.

The individual CSP monitor screen supports all functions of the CSPNavi program. Alarm Level can be set for each MSP monitor screen. When either CSP monitor screen generates alarm, information is handed to a CSP manager, and the patrol light turns on and the door is locked by the computer.

Applications are simple area monitoring systems in small facilities, universities or medical (radiotherapy) applications, or even as access control to check entry of goods/people, or at exit of source storage room or waste control in hospitals.



D&D Application:

“Team Survey Software” for large area decontamination.

- CSP probe – up to six x SAB(G)100
- CSP COM interface – CSP-COM-BT Bluetooth (wireless)
- CSP programming – based on CSP-DLL, using C++ programming code, on a Portable Windows XP PC
- Specific additional hardware – Bluetooth headset

In D&D environments, each single remaining alpha and/or beta activity coming from past operations must be checked. Here we talk about 100% precise contamination check that is still performed manually by operators wearing specific protection (masks, overalls, gloves).

Worker uses a handy probe and scan the surface to control with combined alpha – beta (gamma) detectors of 100 cm² (or even larger detection area). Based on the low statistic in the alpha channel and to ensure no activity is left, the operators will perform a 10 second acquisition to define if the area is clean or not.

Large wall or ceiling surfaces are divided into small areas, and measurement results are written in a logbook, indicated via a spot on the wall, or other manual ways.



This application supports the operator with this task, setup scanning campaigns, and allows direct inventory of the measured values. A PC, that is positioned within Bluetooth communication range, allows setup for up to six simultaneous operators, a scan protocol (protocol name, number of measurement points), to set the probe parameters (the count time and separate alpha and beta alarm levels).

The scan setup, allows, in addition to the probe connection (CSP-Probe and CSP-COM-BT combination), each operator to be linked to a Bluetooth headset. The software then guides the operator via messages through his headset in order to control his measurements. At the start of the campaign, the operator will hear the voice-message “scan initiated”, where he confirms the start of his first position by pushing the probe button. Then the measurement will take about 10 seconds (or as defined in the setup), during which the operator will hear separate chirping sounds for alpha and beta events, as well as separate alpha and beta alarm messages in his headset. At the end the software informs the operator the count time is over and data are transferred and stored, after which the operator goes to the next position, starts the count again by pushing the button, and so on.

Apart from this automated procedure a simpler mode can also be used for frisking over a surface while just listening to the separate alpha and beta chirp rates.



Benefits of this solution:

- Operators focus on the measurement – one hand, no cables, and all actions are controlled via headset audible information
- Strong QA covering the entire process
- Reproducible procedures definitions similar between campaigns, as well as between operators
- Automated data storage on PC, avoiding manual transfer
- Traceability of the measurements, as all data (who, how, when, where) are centralized

D&D Application:

Custom designed Floor Monitor “FM2010” for fast contamination screening of floor surfaces.

- CSP probe – six x SAB100 100 cm²
- CSP COM interface – none, direct USB cable (EM78466) connection to probes
- CSP programming – based on CSP-PL v1.2, using programming code, on a Windows XPe based industrial PC (SSD, passive cooling)
- Specific hardware – Speedometer (and full assembly)

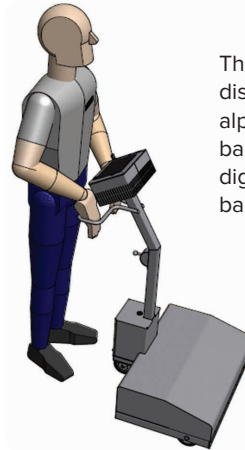


Floor contamination monitors will become more in demand. The bigger the size of the total detection area, the faster an operator can scan a floor surface. More and more users are therefore looking to use large surface area detectors, even up to 600 cm². However the detector size dramatically impacts the background and therefore the Signal to Background ratio. Then, only longer integration time can mitigate the MDA (Minimum Detectable Activity) that, reduces the scan speed. Also hotspot localization becomes more difficult with larger detection area based on one detector only.

Ideally, a system would be composed of hundreds of 1 cm² detectors, but such a solution is too expensive. In the current design, a true optimized solution was created by using six x 100 cm² SAB100 detectors, placed in a straight line. In addition, “interzones” were created to solve the insensitivity in the dead areas between detectors (similar is used in our Argos™ personnel contamination monitors). A speedometer is implemented into the floor monitor that provides the user with audible and visual signal when he attempts to exceed the preset speed limit that guarantees the MDA result.

Two operational modes, that are “scan” and “count” mode, allow the user to obtain optimum performance. The display is very intuitive with clear independent alpha and beta bar graph indication during scan mode, for each detector, with units in count-rate or contamination level (Bq). In addition the user can wear a headset for audible indication of alarms, contamination or speed.

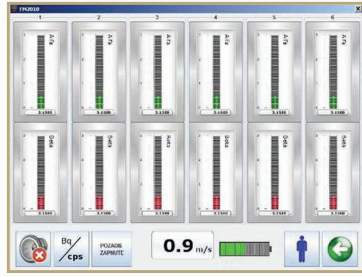
Mechanically, the unit is very convenient to drive, and a mechanical lever can set the measurement position at different heights. The 12 V rechargeable battery allows 6-8 hours battery life.



The measurement mode screen displays the readings from six alpha and six beta channels in a bar graph format (in motion) or digital readout (stationary and background).



Dynamic
"scan" mode



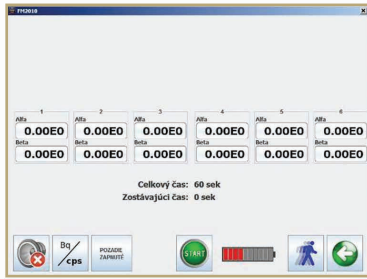
Display during scan mode

Benefits of this new development:

- Total detector area 600 cm², segmented in 100 cm² with "interzones" to obtain best MDA (0.03 Bq/cm² alpha and 0.3 Bq/cm² beta at 10 cm/s)
- Speedometer (as MDAs depend critically on scanning speed) with speed alarm
- Variable detector-to-floor distance
- Robust construction



Static
"count" mode



Display during static or background mode

