



**CANBERRA**

# Canberra's Latest CAM Developments

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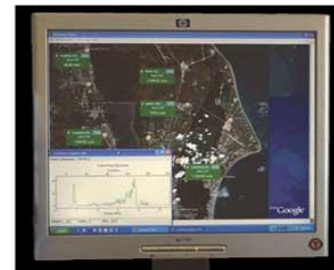
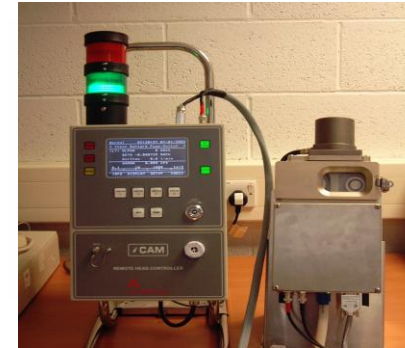
# Quick Refresh: CANBERRA's CAM Products

## ◆ iCAM Family

- Single & dual detector fixed & moving filter

## ◆ Alpha Sentry family

- AS450R, AS1700R heads, ASM1000 controller
- ECAM
- NetCAM



# CAM Portfolio Alpha Sentry

- ▶ **Multi-head Alpha in air monitor**
  - ◆ Up to 8 heads per control unit
  - ◆ CAM450 or CAM1700 detectors
  - ◆ Quick change filter cartridge
  - ◆ Patented radon reduction screen
  - ◆ Radial air entry
- ▶ **256 channel MCA**
  - ◆ Acute alarm processing in head
  - ◆ Chronic alarm processing in ASM1000
- ▶ **Radon stripping by simple exponential model of tail**
- ▶ **Contiguous spectrum collection**
- ▶ **Alpha only**



## ▶ Alpha Sentry Head with CodeTalker processor

- ◆ Provides WebServer interface
- ◆ RadNet/Ethernet output
  - Wireless option
  - optional FIPS140-2 compliant encryption and authentication
  - Optional data output format for compatibility with the LLNL HOTSPOT plume modelling code

## ▶ CodeTalker can run AS or LANL derived algorithms

- ◆ Full peak fitting
  - Combined gaussian plus LSq exponential & error correction
- ◆ Peak fitting in U/Pu/Am region to resolve isotopes



# CAM Portfolio

## ECAM

- ▶ **Combined Outdoor Alpha & Beta CAM**
  - ◆ NetCAM in box with 2 cfm pump
- ▶ **Unique “cyclo-shroud” inlet**
  - ◆ removes large particles (>20  $\mu\text{m}$  AMAD)
- ▶ **2048-channel DSP MCA for Alpha and Beta spectroscopy**
  - ◆ Compensation for temperature and altitude
- ▶ **RadNet compliant wireless communications**



# CAM Portfolio

## i CAM - The intelligent CAM

- ▶ **Simultaneous alpha & beta air monitor**
  - ◆ Optional gamma dose rate monitoring
- ▶ **Comprehensive facilities on board**
  - ◆ multiple relays, current loop outputs, alarms, data logging, network communications & setup
- ▶ **High Reliability**
  - ◆ IEC61508 SIL1
- ▶ **Sophisticated Rn compensation (patented)**
  - ◆ Long term low level measurements
  - ◆ Extended filter life
- ▶ **Qualifications:**
  - ◆ ANSI42.17B
  - ◆ IEC61172, IEC61578, IEC61508
  - ◆ CE



# i CAM - Main Benefits

- ▶ **Ease of use**
  - ◆ menu driven graphical display
  - ◆ automated calibration
- ▶ **High Sensitivity for both Alpha & Beta activity**
  - ◆ good statistics and low systematic errors for ultimate low level performance
- ▶ **Low False Alarm rates**
  - ◆ Rn/Th compensation algorithms monitor and adapt to changes in spectrum shape, resulting in
    - low false alarm rates
    - Lower alarm levels
    - less frequent filter changes



# Canberra's Latest CAM Developments



- ▶ **iCAM Remote Head Release**
- ▶ **iCAM Iodine Detector Head**
- ▶ **iSentry Intelligent  $\alpha/\beta$  CAM Head**

# Problem: Stack $\alpha/\beta$ Sampling

- ▶ **Stack sampling points frequently inaccessible**
  - ◆ Ideally 10 diameters from bends so often high up  $\gg$  10 m
  - ◆ Inconvenient for mounting iCAM
- ▶ **Long sampling pipes undesirable**
  - Loss of particulate in pipes
  - Reducing alarm levels means higher false alarm rate?
  - High loading on pump reduces flow rate
  - Increased response time
  - SS sampling lines expensive
- ◆ **Ideally sampling pipe should be  $< 2$  m, no bends etc**

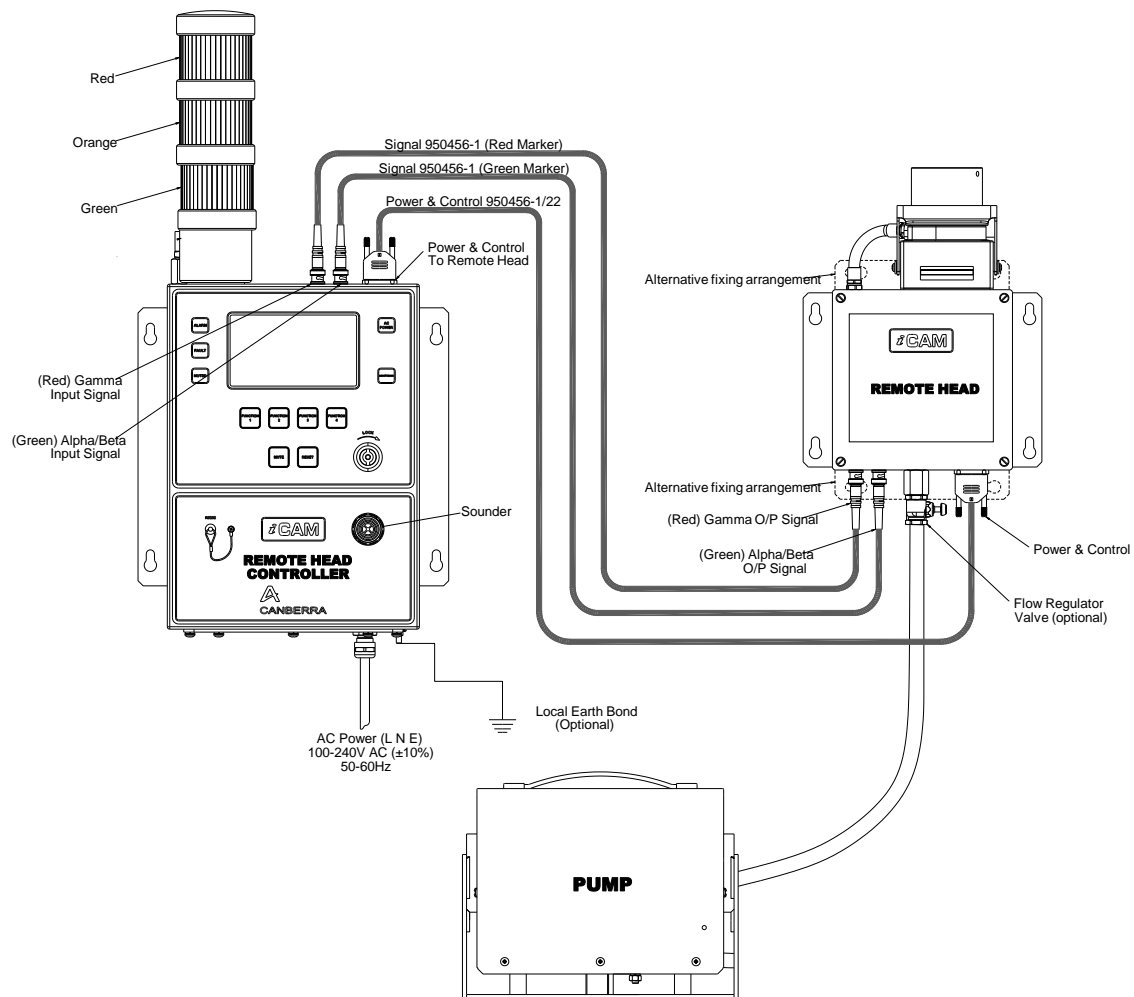


# Stack $\alpha/\beta$ Sampling: Solution

## ► Solution:

**Put the Sampling Head & Pump at the sampling point**

- ◆ **No sampling pipe losses – lower false alarm rate**
- ◆ **No increase in response time**
- ◆ **No loss of flow rate - lower power pump can be used**



# Solution: iCAM/RH: Long Distance Remote Head

- ▶ **Allows sampling up to 100m from the iCAM control unit**
  - Head contains amplifiers, flow & pressure measurement
  - ◆ **So no pipe required back to control unit**
    - 2 x coax cables & 1 serial data cable to iCAM CU
- ▶ **Any sampling head can be used**
  - ◆ **Fixed filter, MF or MFS**
    - Can be used in any orientation
- ▶ **No manual adjustments in head**
  - ◆ **All calibration adjustments made at the iCAM CU**



# iCAM/RH Remote Head

- ▶ Available from Q2 10
- ▶ Pricing: ~ \$3300 increase over std unit (for /D & /MF)
- ▶ Existing Mk2 iCAMs can be upgraded/converted



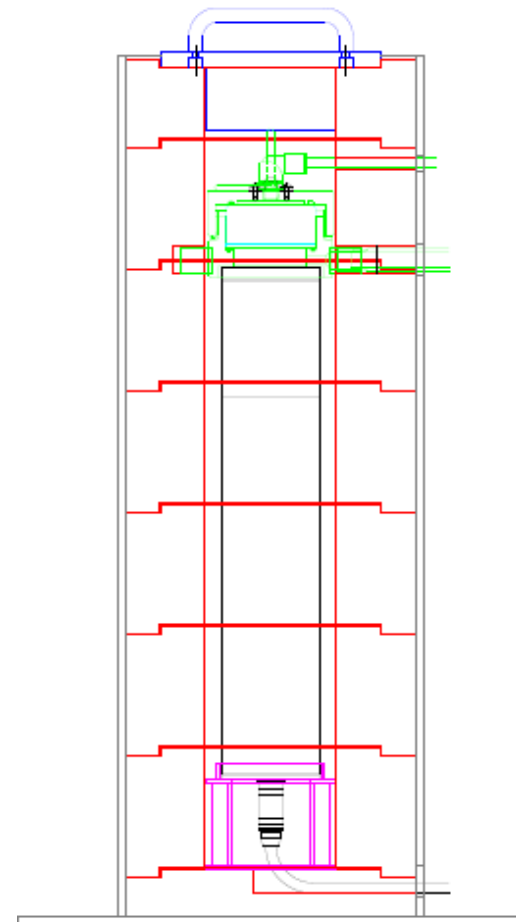
# iCAM Add-on Iodine Channel

- ▶ Add on detector allows iCAM to measure Iodine in addition to alpha & beta particulate
- ▶ Benefits
  - ◆ Add on channel to existing iCAMs - so don't have to buy a separate I monitor
  - ◆ Provides a lower cost, portable option for NPPS to replace old skid based CAMs
- ▶ Initial version for UKAEA Dounreay
  - ◆ Detector: 2" x 2" NaI with integral electronics
  - ◆ 2" lead shielding - weight ~ 100 kg
  - ◆ Cartridge: 2" dia x 1" thick plastic cartridge: F&J AGZC58 (silver zeolite) or TE2C58 (charcoal)
  - ◆ Can be plumbed between the iCAM and the pump or from a separate air inlet



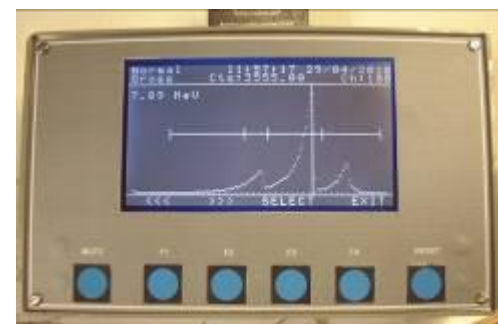
# Iodine Detector for iCAM

- ▶ Fully shielded (100 kg) or partially shielded version for portability
- ▶ Future upgraded version: Osprey digital MCA tube base and LED stabilized detector
  - ◆ to give fully stabilized spectrometry based system (single peak counting) Reduced Pb shielding for better portability
- ▶ Initial version availability: Q3 2010



# iSentry Intelligent $\alpha/\beta$ CAM Head

- ▶ **Puts all iCAM intelligence in the AS head**
  - ◆ **Algorithms, chronic & acute alarms, RS485 networking of results**
    - Everything except relays, 4 – 20 mA I/O etc
    - AS relays retained & driven by iCAM firmware
  - ◆ **External iCAM display & keypad (optional in future)**
- ▶ **Full local display for readout and calibration**
  - ◆ **Currently v short distance only - in future will be serialized so can go 10s meters**
    - Local display currently required – in future optional/hot pluggable
- ▶ **External G64 gamma head option is available on this version**
  - ◆ **Area gamma alarm functionality**

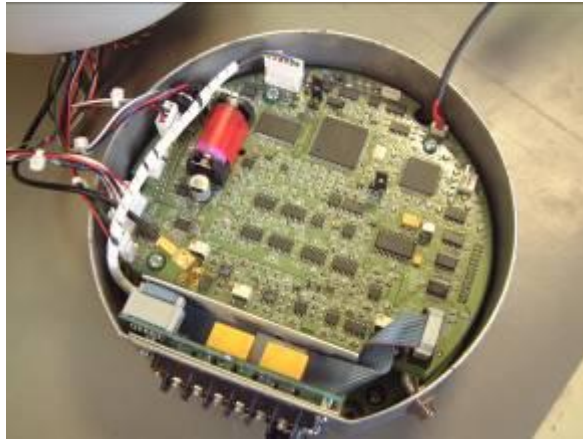
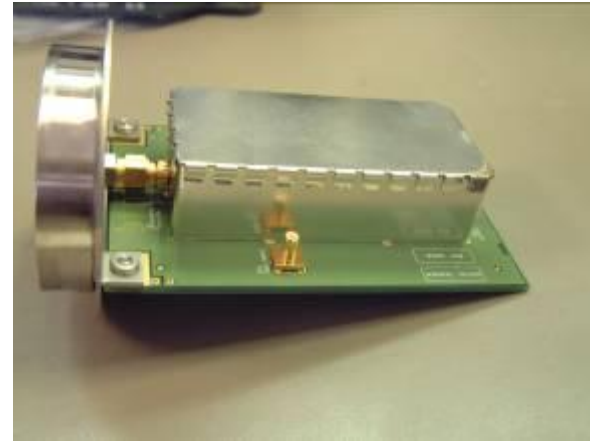
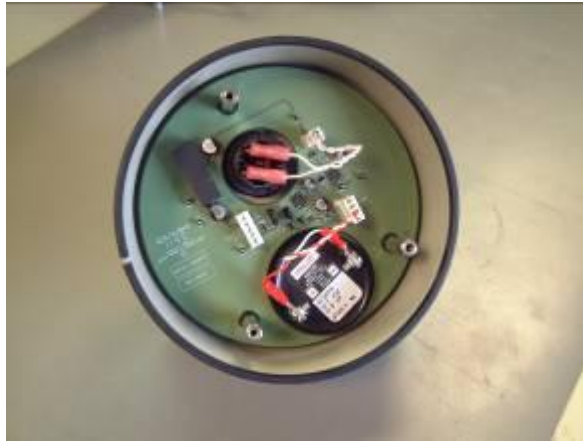


# iSentry Intelligent $\alpha/\beta$ CAM Head

- ▶ Upgrade adds beta measurement down to 50 keV with Rn compensation
  - ◆ (initially fixed gamma compensation only)
- ▶ Existing AS heads are upgradeable
  - ◆ Head, screen filter mechanism & detector retained
  - ◆ all electronics except relay board replaced
  - ◆ new LED beacon & new PSU
- ▶ External G64 gamma head option is available on this version



# iSentry Intelligent $\alpha/\beta$ CAM Component Features



# iSentry Forthcoming Options

- ▶ **Alternative algorithms**
  - ◆ **Currently: iCAM algorithms (V2 or V3)**
  - ◆ **In future: Current AS algorithm (for backward compatibility) and ASPECT peak fitting algorithms**
- ▶ **Currently: local display is needed for calibration - in future could all be done with iConfig on PDA or Laptop**
- ▶ **Ethernet (& WiFi) with web server/browser interface**
  - ◆ **Eliminates separate Config software**
  - ◆ **Future implementation: RadNet**