Presentation Format:

1. Portable & Fixed Continuous Air Monitor Presentation
2. Hand-out CD W/power Pt. & GA-ESI Radiation Monitoring Capabilities Afterward
3. Individual Product Brochures

GENERAL ATOMICS
ELECTRONIC SYSTEMS, INC.

AMUG – AIR MONITORING USERS GROUP MEETING

March 23, 2005

Compact Continuous Air Monitor
Single and Multiple Filter (Alpha/Beta)
with or without Gamma dose-rate

CCAM-11
Compact Continuous Air Monitor (single filter)

Easy Commands, Large Color Display, Testing Routines

- Advanced Solutions (size, weight, technology, algorithms)
- Real-time, Natural (Radon & Thoron) & Artificial (Pu, Sr, U, etc.) Alpha/Beta Measurement
- World-wide Std. Compliance
- Portable or Fixed w/Separable monitoring head (for Networks)
- User-friendly
- 6.4” TFT Display
- Optional Gamma Detector
- RS485 Cable (monitor-detector) tested @ 3,000 ft. (and more !)

Compact: 6”× 7” × 8” – Lightweight: 10.6 lbs

CCAM-11 - External particulars

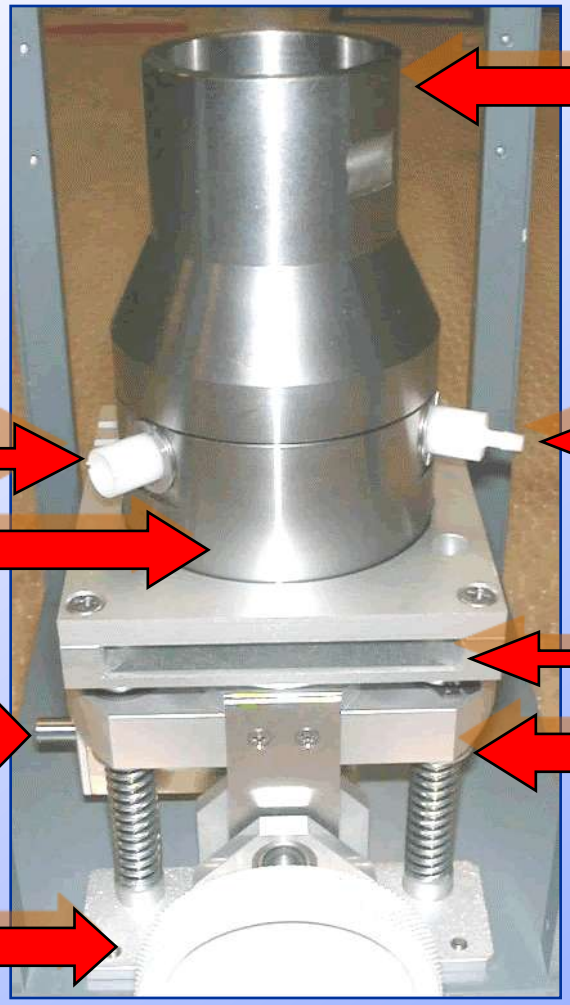
Air inlet
(ambient air in this case)

Gamma dose-rate
(optional detector)

Filter slide
(with filter)

Filter slide
(going to be inserted into its receptacle)

CCAM-11 - Internal Particulars



Air inlet
(to be coupled to the inlet pipe)

Sealed cableway
(for detector cable)

Delta pressure connection

Measuring section
(suited for laminar flow)

Receptacle for filter slide

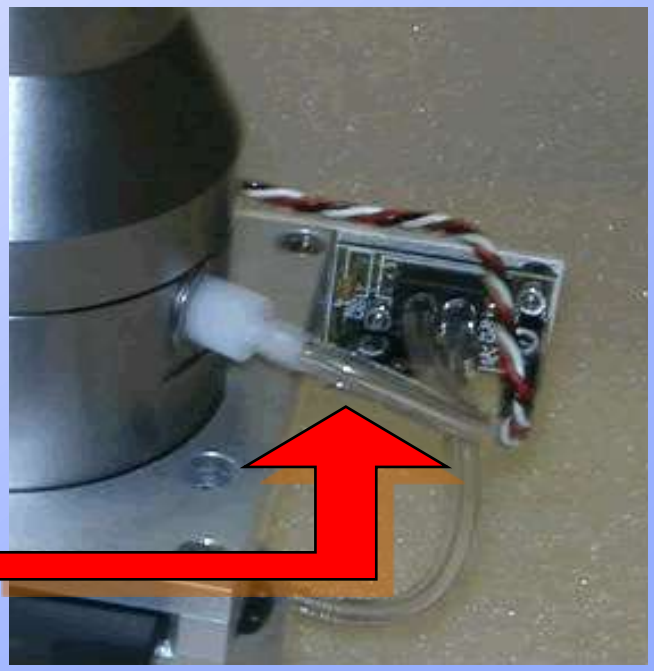
Flow regulator

Filter holder

Filter holder knob

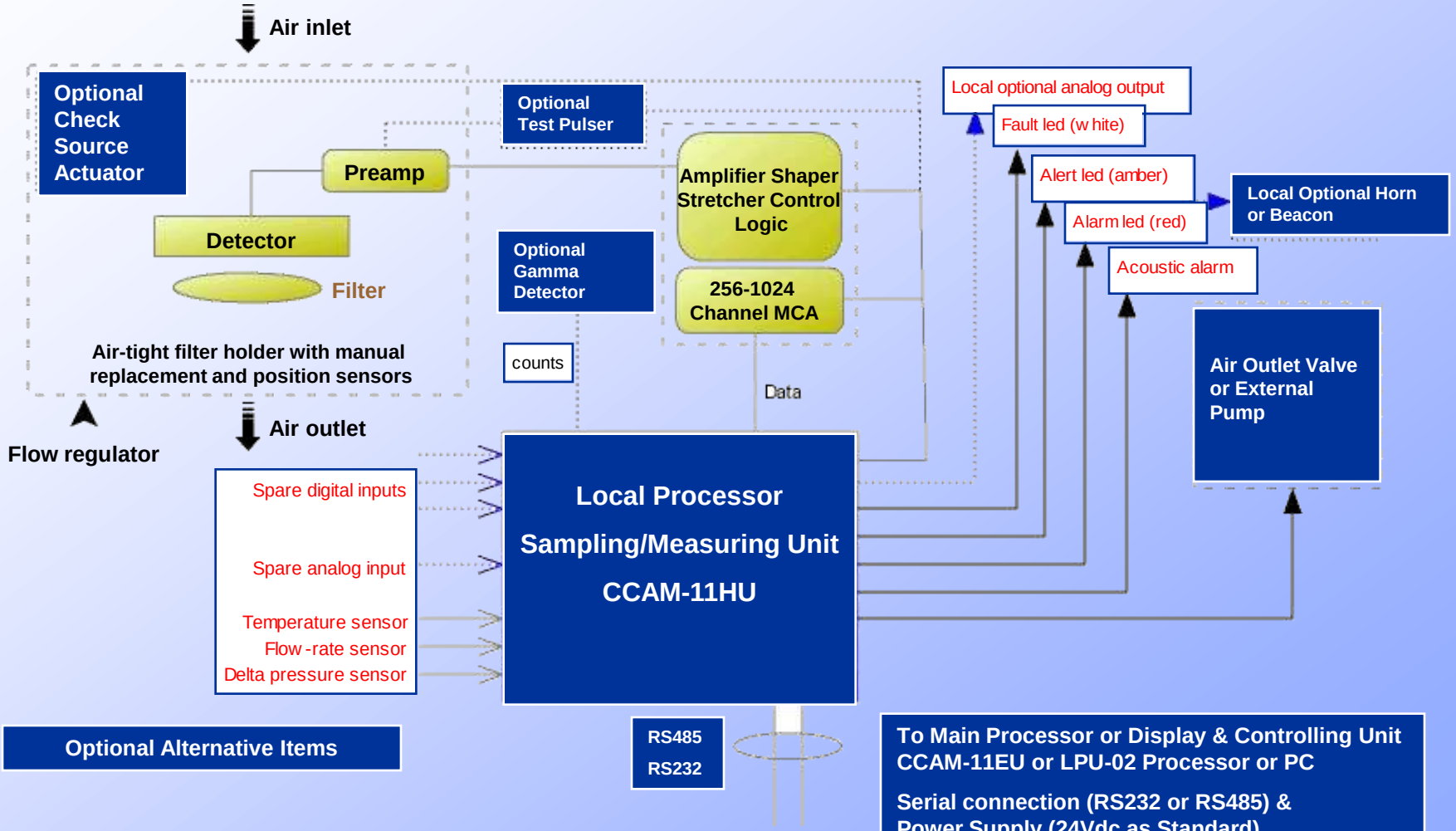
CCAM-11 - Internal particulars

Filter slide (with filter)
inserted into its receptacle



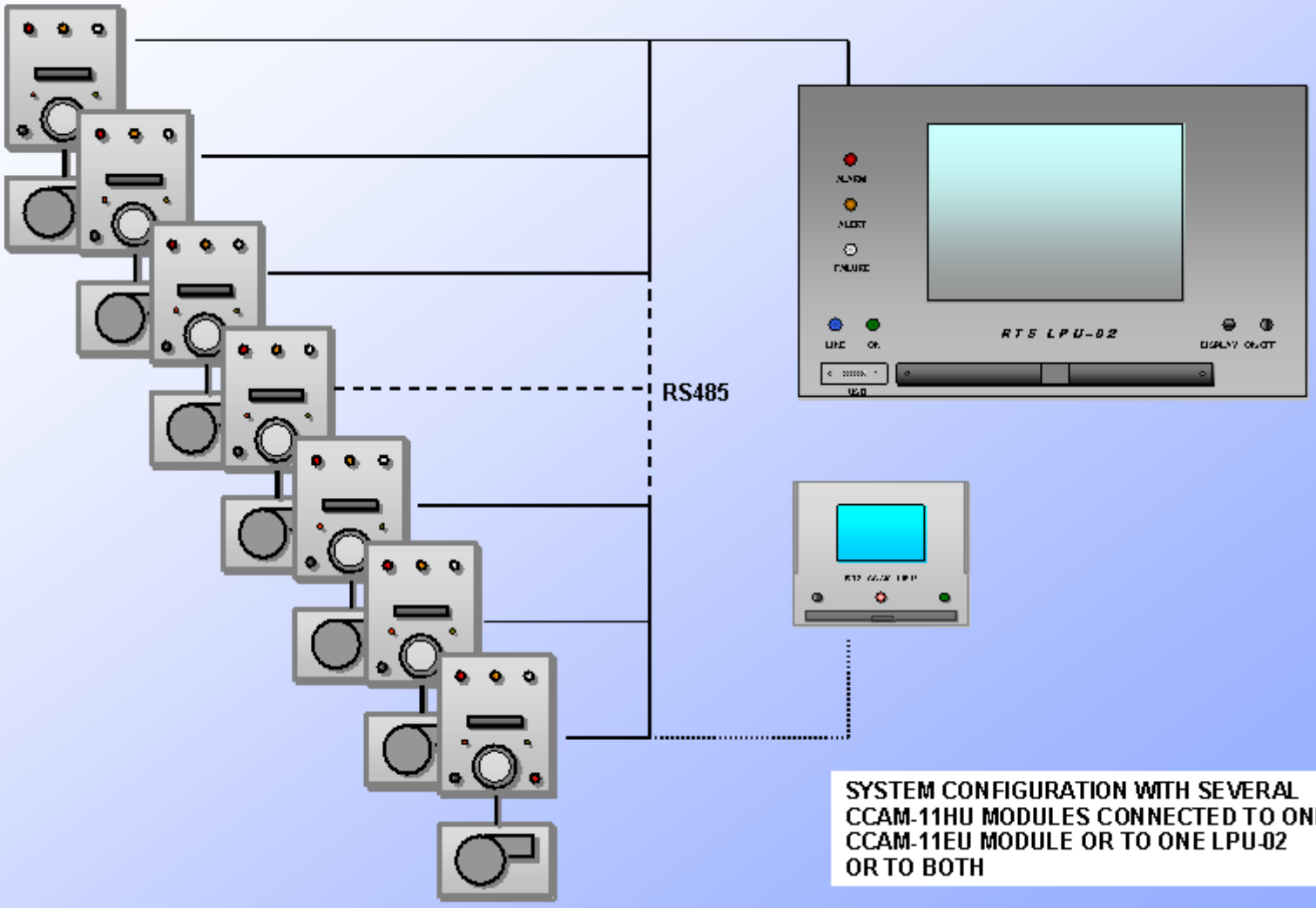
Pressure drop sensor with related pipes

CCAM-11HU
Sampling & Measuring Unit Block Diagram



CCAM-11 NETWORKING

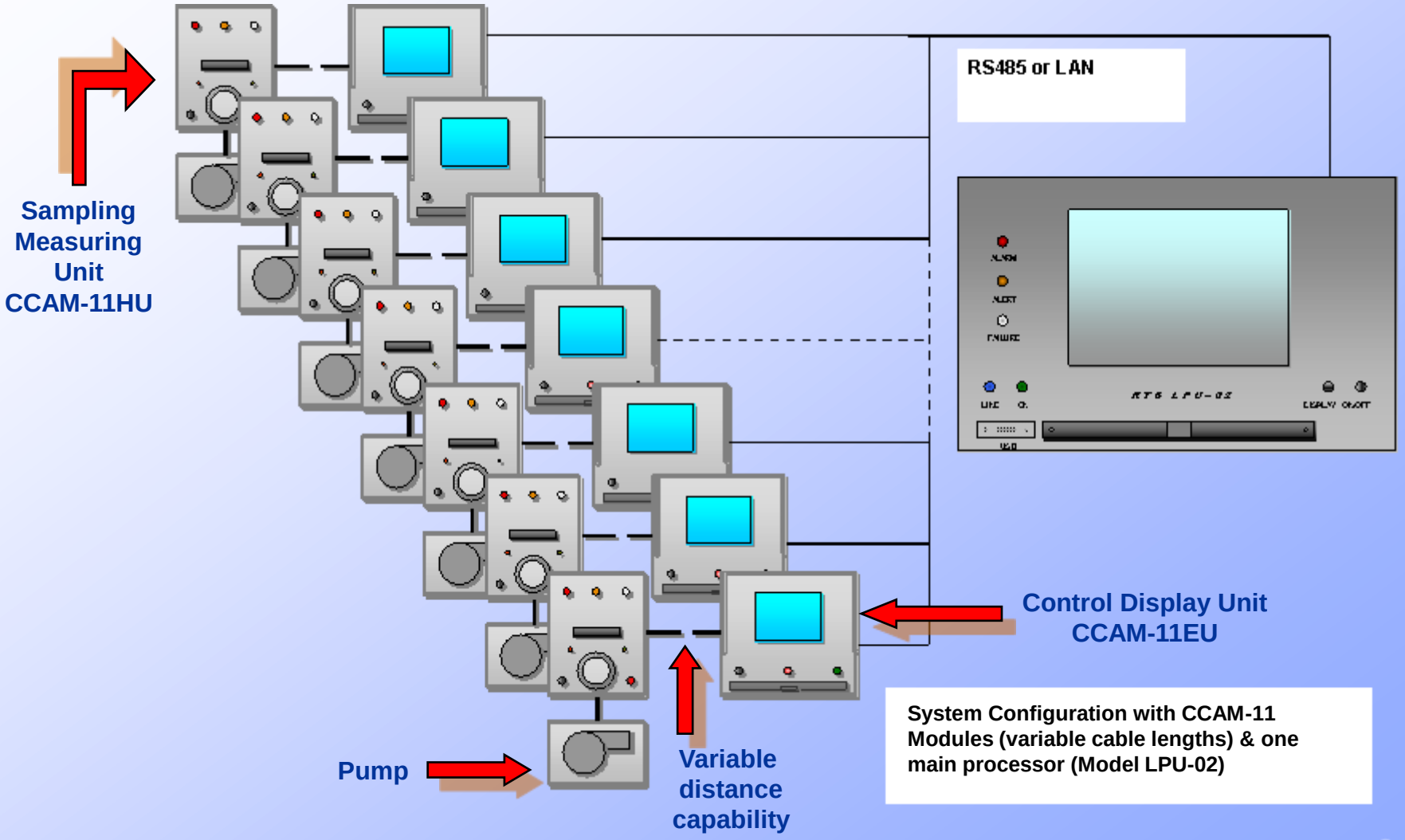
Simple configuration: several detectors to one processor



SYSTEM CONFIGURATION WITH SEVERAL CCAM-11HU MODULES CONNECTED TO ONE CCAM-11EU MODULE OR TO ONE LPU-02 OR TO BOTH

CCAM-11 NETWORKING

More complex configuration: several complete units to one processor



System Configuration with CCAM-11 Modules (variable cable lengths) & one main processor (Model LPU-02)

CCAM11 Technical Specifications

✶ Standard ranges:	Natural emitters $2.7x10^{-12}$- $2.7x10^{-8}$ μCi/cc (10^{-1}-10^{3} Bq/m^3)
	Alpha artificial emitters: $2.7x10^{-13}$ - $2.7x10^{-6}$ μCi/cc (10^{-2}-10^{5} Bq/m^3)
	Beta artificial emitters: $2.7x10^{-12}$ - $2.7x10^{-6}$ μCi/cc (10^{-1}-10^{5} Bq/m^3)
✶ Alpha energy range:	> 2.7 MeV (to 9 MeV)
✶ Beta energy range:	> 80 keV
✶ Sensitivity:	Alpha (1h) 1.3 x 10^{-12} μCi/cc (< 0.05 Bq/m^3)
(MDL @ 95% confidence)	Beta (1h) 0.81 x 10^{-11} μCi/cc (< 0.3 Bq/m^3)
✶ Above MDL Conditions:	Rn ≤ $1.08x10^{-10}$ μCi/cc (4 Bq/m^3) – Tn ≤ $5.4x10^{-12}$ μCi/cc (0.2 Bq/m^3)
	Gamma background ≤ 20 μR/h (0.2 μSv/h)
	Flow rate ≥ 4 m^3/h- alpha/beta efficiencies = 18% ÷ 22%
✶ Measuring units:	Selectable (SI or English units)
✶ Calibration:	Programmable(coefficients/parameters remain stored in the HD)
✶ Alarm config. & logic:	Selectable (including short-term 'DAC' and long-term 'DACh')
✶ Accuracy:	better than ± 15%
✶ Stability:	≤ 10% over 500 h
✶ Silicon Detector:	Active area 450 mm^2 (600 mm^2 optional)
	Active depth 100 um (typical)
	Bias 24 Vdc
✶ Preamplifier (PA-03):	Low noise charge sensitive preamplifier
	Test pulse input capability

CCAM11 Technical Specifications (CONT.)

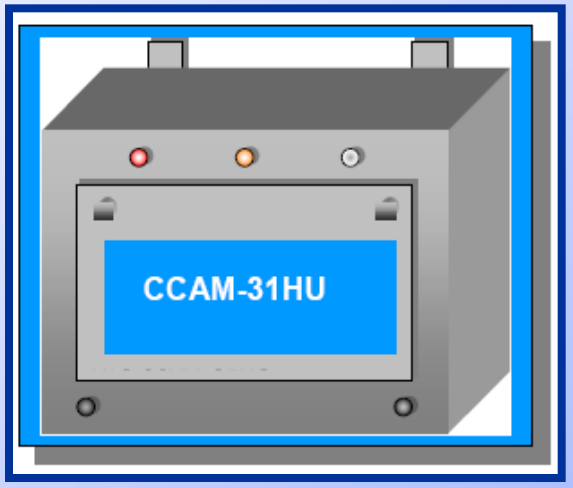
✶ Monitoring processor (MAB-03/04):	Amplifier/shaper/stretcher with test output capability 256-1024 channel MCA with separate counting input 29.5 MHz local uP with auxiliary analog/digital I/O Local alarm lights (alarm, alert, failure) RS232 & RS485 interfaces
✶ Filter (RW19 or equivalent):	Dimension Φ 1.85'' (47 mm) Material homogeneous cellulose polymer Collection efficiency > 99% (particles > 0.3 mm)
✶ Air Flow-rate range:	0.5 - 3.5 cfm (2 - 6 m^3/h) 'amb' or 'std' selectable
✶ Air flow-rate measurement:	± 2% (typical)
✶ Air inlet (others are available):	Radial and semi-radial for ambient air, 1"Gas for ducts/stacks
✶ Optional Gamma bkgd detector:	Energy compensated GM (40 keV- 3 MeV) 10 urem/h – 10 rem/h (0.01 uSv/h - 0.1 Sv/h)
✶ Alarm horn/beacon:	IP65 – 114 dB / 1 m – flashing red light
✶ Pump (external):	Rotative, oil-less (option 11LTP: 7m^3/h - option 11HTP: 14 m^3/h)
✶ Main processing unit (CCAM-11EU):	Pentium 266 MHz 128MB RAM - 40 GB 2"1/2 HD 6.4" TFT color display – user friendly mouse sealed thin complete keyboard RS232/485, USB, LAN interfaces

CCAM11 Technical Specifications (CONT.)

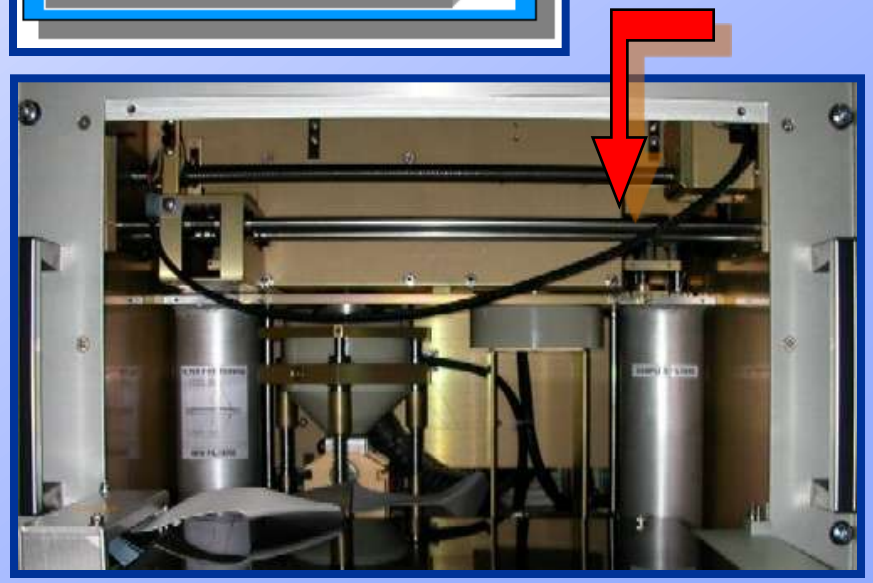
✶ Standard power supply:	CCAM-11HU +24 Vdc–12 W typical (options available) PUMP 110-220 Vac / 47-63 Hz – 250 W or 500 W CCAM-11EU 110-220 Vac / 47-63 Hz - 60 W typical CCAM-11STT Portable 110-220Vac/47-63 Hz - 330W
✶ Operating Temperature Range:	Electronics -13°F-131°F (-25 to +55°C) LCD 14°F-131°F (-10 to +55°C)
✶ Relative Humidity Range:	0 to 95 % (non-condensing) 0 to 100 % (optional)
✶ Ambient Pressure Range :	760 mm Hg +10% / - 35% (others on request)
✶ Dimensions:	CCAM-11HU 6''X 7''X 8'' (150x180x205 mm) CCAM-11EU 10''X 7'' X 8'' (260x180x205 mm) CCAM-11STT 21.7''X 29.5''X 55'' (550x750x1400 mm) Cart-portable unit
✶ Weight:	CCAM-11HU - 10.6 lbs. (4.8 kg) excluding pump CAM-11EU - 10 lbs (4.5 kg) CCAM-11STT – 99 lbs (45 kg) Cart-portable unit
✶ Protection:	NEMA 12 or IP55 as std. (NEMA 4 or IP65 available)
✶ EMC/EMI:	Latest EC directives, IEC & ANSI/IEEE standards
✶ IEC Specific Standards:	60579, 60761-1/2, 61172, 61578

CCAM-31HU
Compact Continuous Air Monitor (multiple filter)

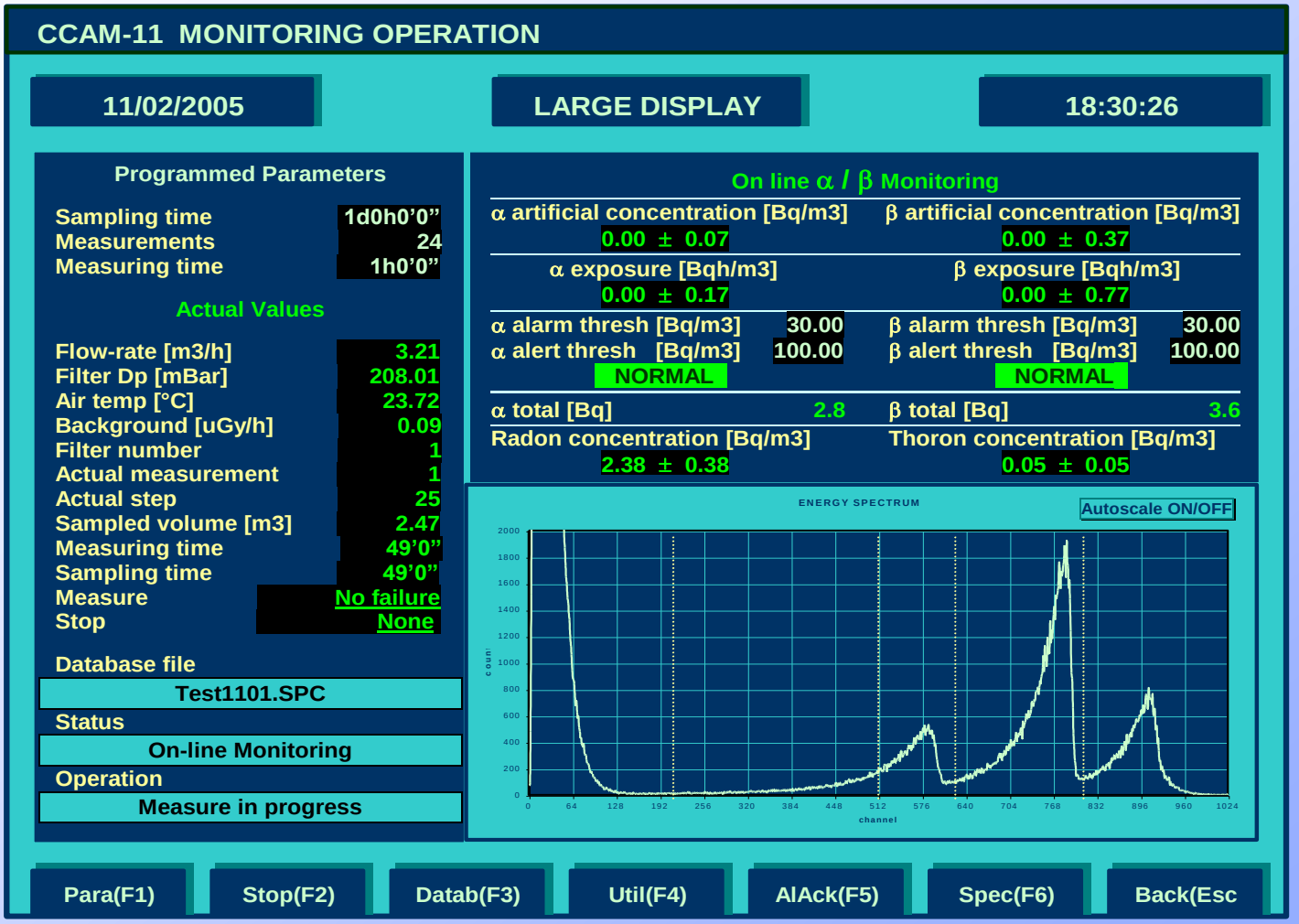
- Extends capacity of CCAM-11
- Offers multiple filter capability (up to 31 filters!)
- Two Modules:
  Sampling/Measuring Unit (CCAM-31HU) and,
  Control/Display unit
  (CCAM-11EU) same as CCAM-11
- Real-time Natural & Artificial Alpha and Beta Measurement
- Fully Compliant to Word-wide Standards
- Portable or Fixed w/ Separable monitoring head (for Networks)
- Optional Gamma Detector
- Compact 15 ¾" X 14" X 12 ½ "
- Weight 33 lbs.



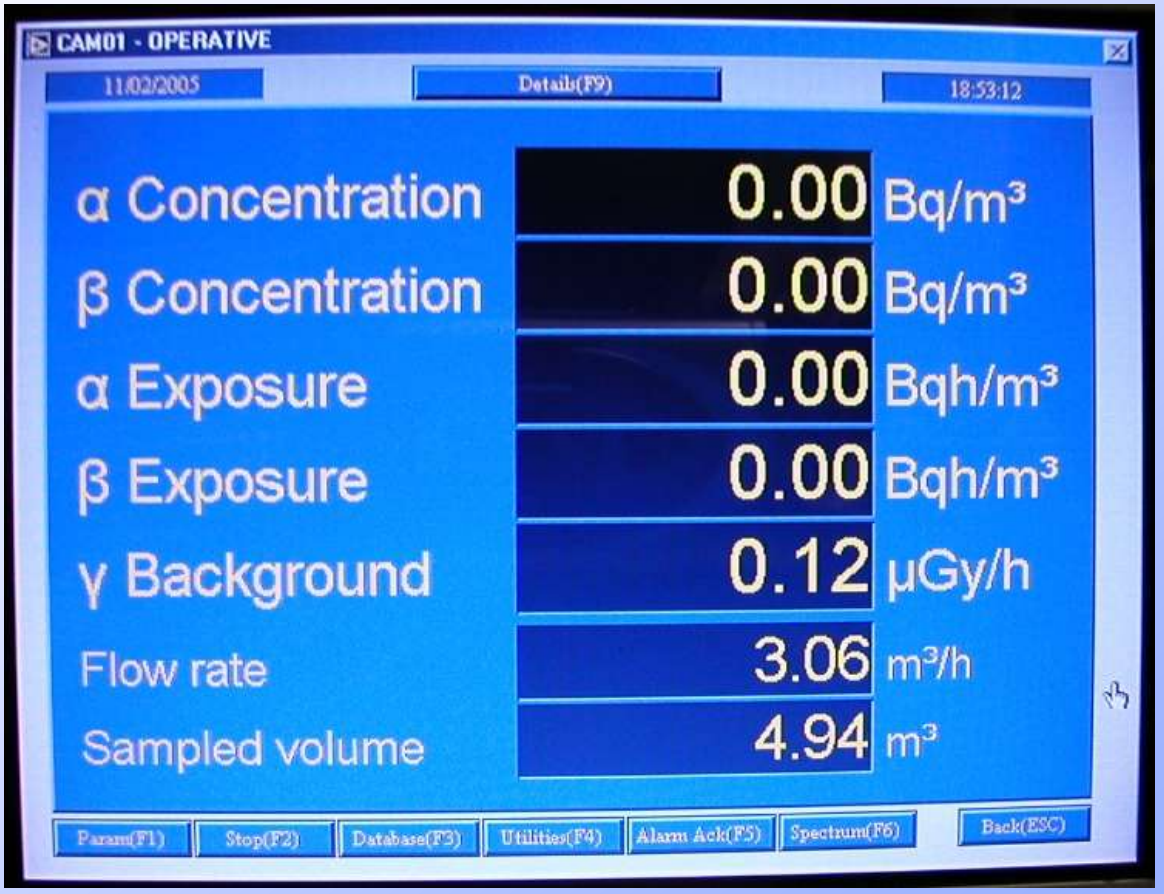
Multiple filter Automatic changing



Typical CCAM-11/31 & CAM-01/31 Alpha/Beta Display Screen (detailed)

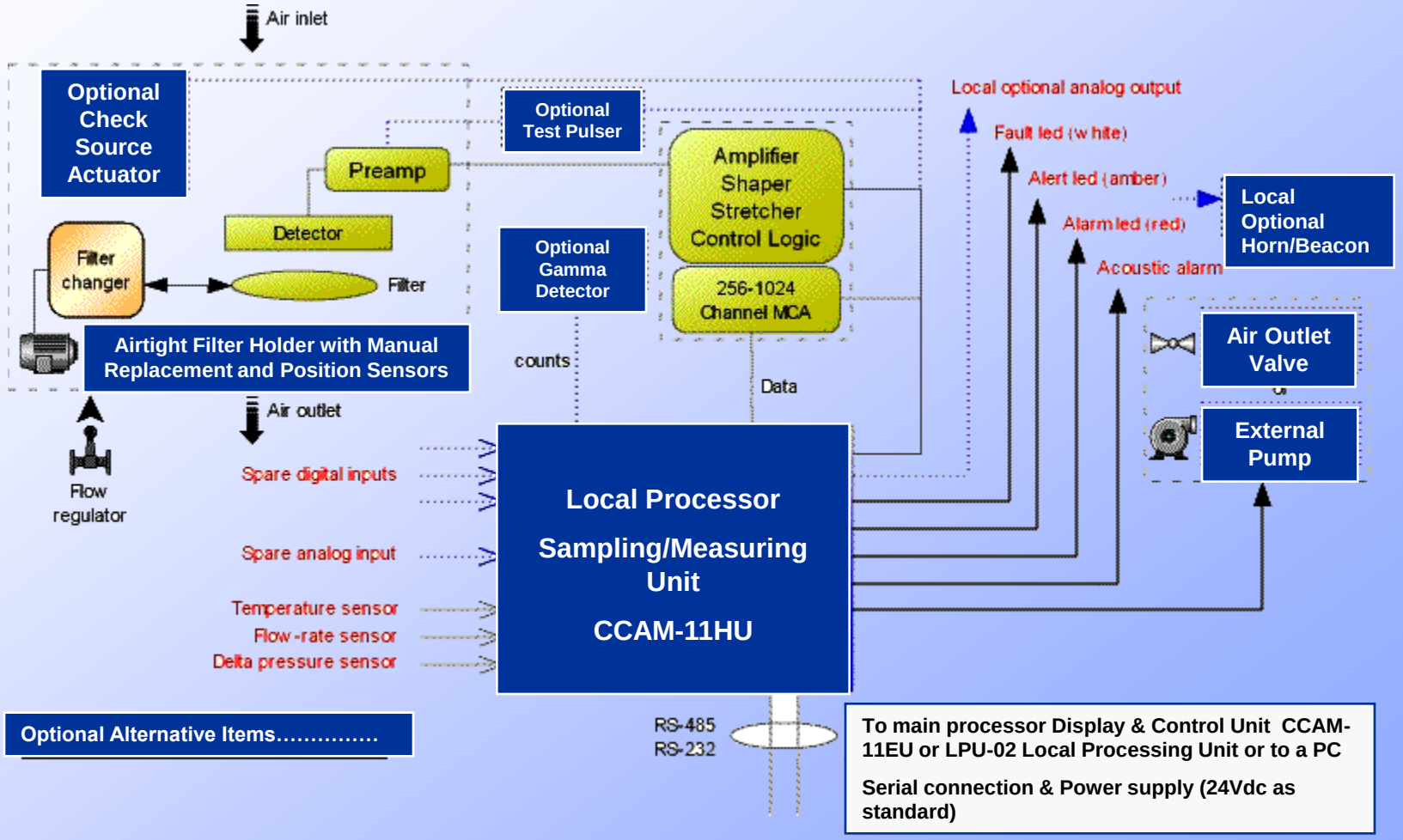


Typical CCAM-11/31 & CAM-01/31 Large Display Screen

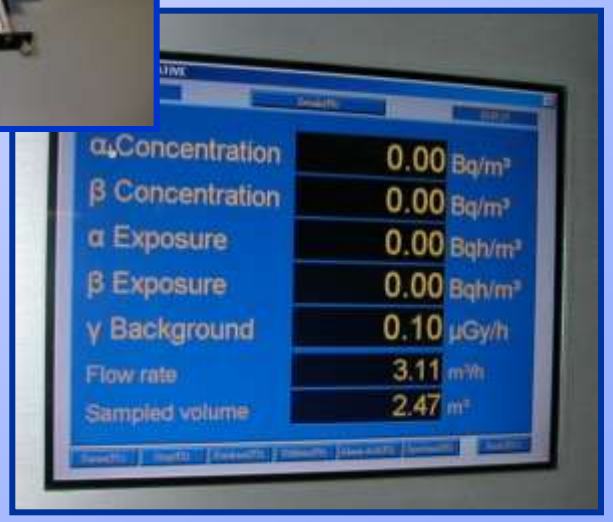


CCAM-31HU

Compact Continuous Air Monitor (multiple filter) Block Diagram



CAM-01 Continuous Air Monitor – Single Filter



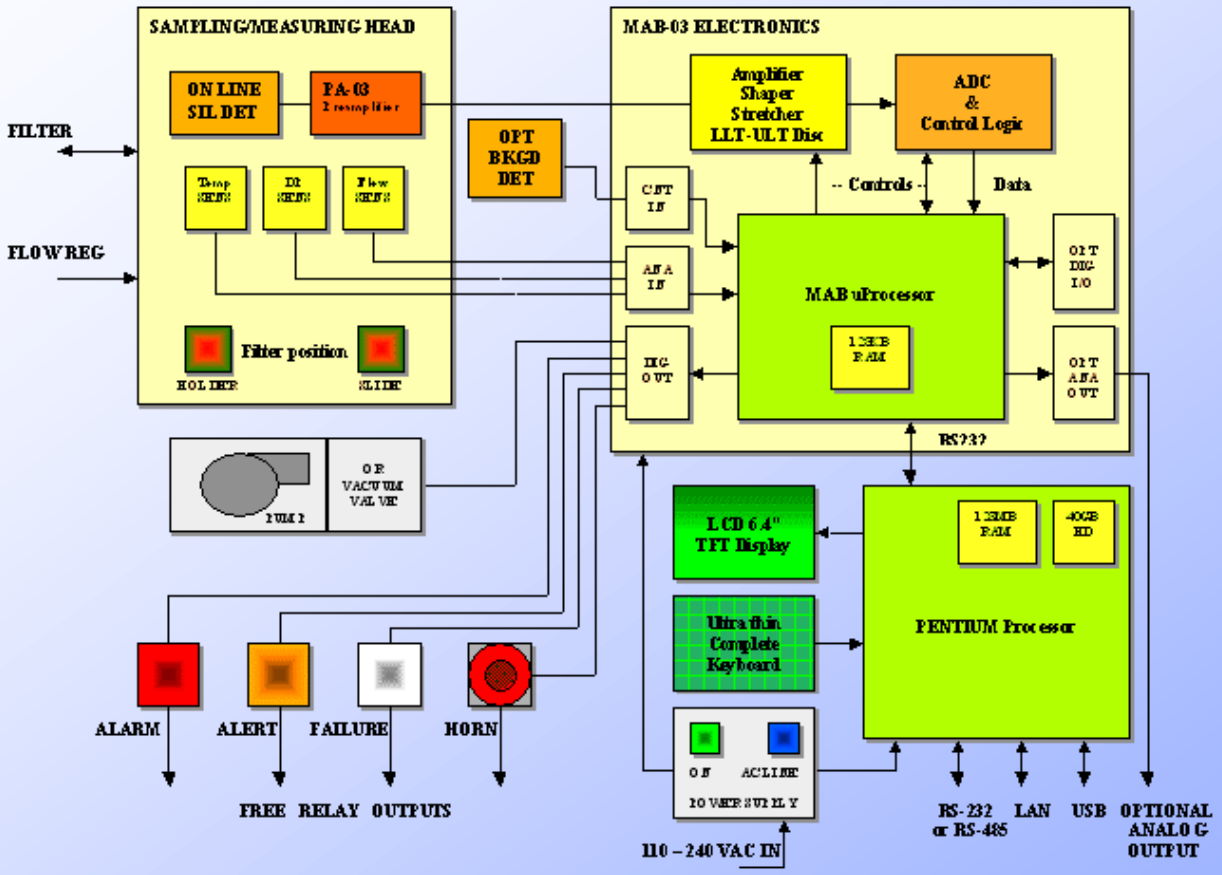
Variety of applications and configurations: portable or fixed, stand-alone monitor or peripheral measuring head in a monitoring network.

Model CAM-01 Single Filter Continuous Air Monitor

FEATURES:

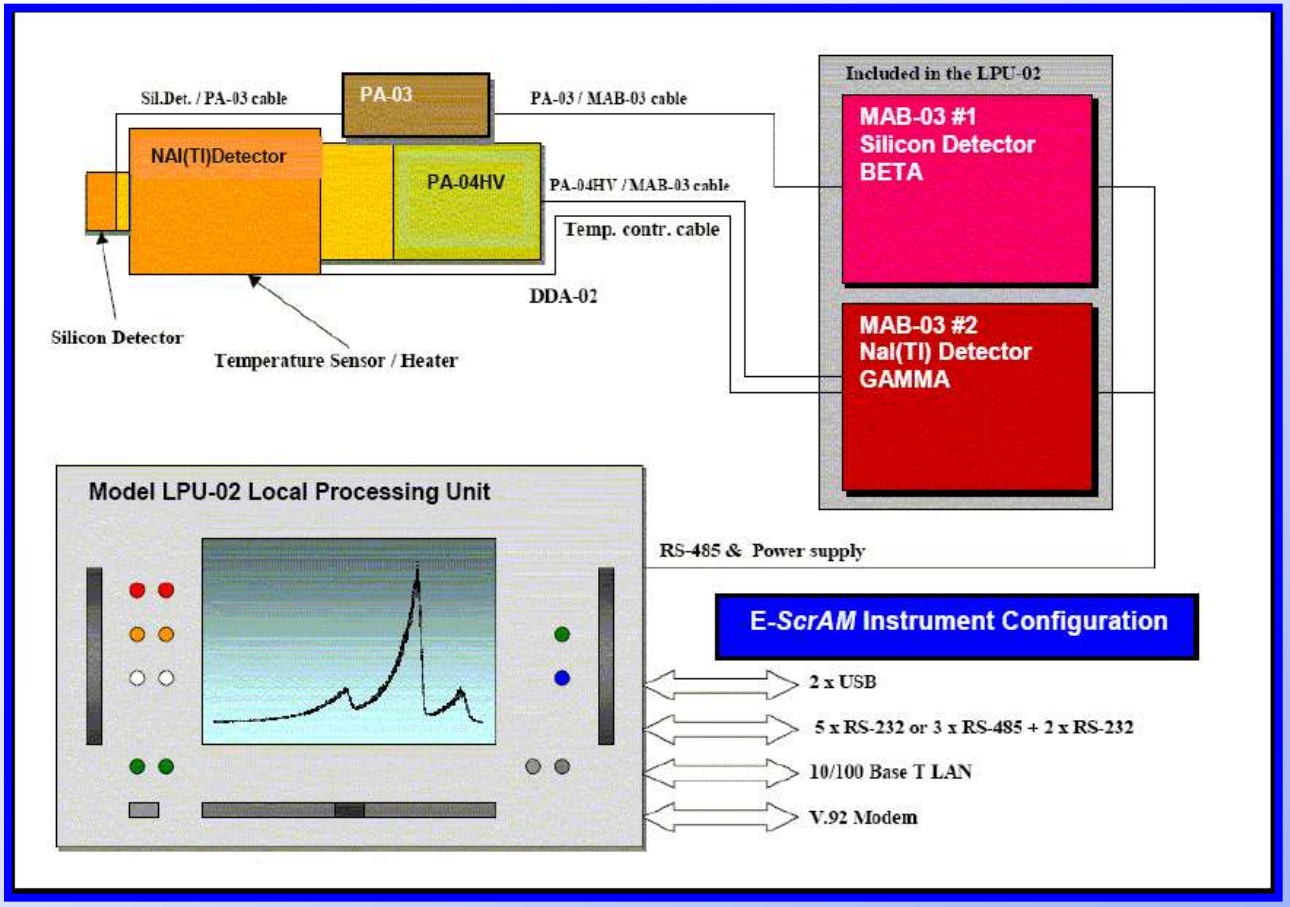
- ✶ Wall, Shelf, or Portable Configurations
- ✶ RADNET Compliant (Network Ready)
- ✶ RADON Measurement/Compensation
- ✶ Comprehensive Operator Interface
- ✶ Algorithms for Alpha/Beta Monitoring
- ✶ Multiple Units may be Networked
- ✶ Single enclosure version of CCAM-11

CAM-01 Continuous Air Monitor Block Diagram



- Offers multiple filter capability option (CAM-31 up to 31 filters!)
- MCA capability as standard
- Algorithm for alpha/ beta monitoring
- Comprehensive operator interface
- Radon measurement/ compensation
- RADNET compliant (network ready)
- Wall, Shelf, or portable configurations

Epa Contract Award



- EPA Contract Award valued at $11.5 million
- Beta/Gamma Air Monitoring Instrumentation Systems
- Part of ERAMS Environmental Radiation Ambient Monitoring System for NARL
- Team:
  - GA-ESI San Diego, CA
  - RTS-Rome, Italy
  - Hi-Q Environmental Services San Diego, CA
- Stations throughout U.S. Radiation & Meteorological data transfer via multiple, redundant paths (wireless and wired, including satellite)

Waste Isolation Pilot Project (WIPP)

- ALARA: Remote Filter Changing Ability
- Passed the Type-testing at WIPP
- Remotely Controls Maximum Filter Loading for High Alpha Peak Resolution
- Continuous Spectrum Readout (Remotely not just Locally)
- Flow Controllers:
  - -Delta pressure/low flow set-points
  - -Better aerosol distribution on filter

GENERAL ATOMICS
ELECTRONIC SYSTEMS, INC.

CORPORATE COMMITMENT

We believe that our products are only as good as our customer service. At General Atomics Electronic Systems, Inc. (GA-ESI), excellent service is as vital to our growth as accuracy is to manufacturing, as testing is to our quality control. To assure the high standards of our equipment, we have created the most comprehensive customer support program in the industry. Service is a motivation and commitment reflected in our working philosophy of unwavering precision, superior quality, and responsiveness to customer needs.

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