The Hazardous Gas Detection Lab

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Activities
- Quantification of Hazardous Gases in the Field
- Instrument Development
- Method Development
- Process Commercial Components

Hazardous Gases of Interest
- Explosives & Fuels
- Hydrogen & Oxygen
- Hydrazines
- TNT, RDX, HMX
- Xenon
- Hydrazines
- Volatile Organic Compounds (VOCs)

Gas Monitoring at KSC
- Shuttle Processing
- International Space Station (ISS) Processing
- ELV Processing
- Environmental Monitoring
- Worker Health

Applications for Gas Analysis Systems
- Air Quality
- Environmental
- Workplace
- Ventilation
- SRC Industry
- Refrigeration Industry
- Automotive Industry
- Food Industry
- Process Monitoring
- Semiconductor
- Petrochemical
- Core-Country Pipeline

What is Mass Spectrometry?
Chemical analysis by transferring a charge to the molecule, separating and detecting

- Source
- Ionizer
- High Voltage

- Field Mass Analyzer
- Low Mass Analyzer
- High Mass Analyzer
- Low Mass Analyser
- High Mass Analyser

Why Mass Spectrometry?
- Why Specific
- Why Variety
- Why Qualitative
- Why Quantitative
- Why Rapid Response
- Why Large Dynamic Range
- Why Portable
- Why Cost

Mass Spectrometer System
- Mass Analyzer
- Pumping System
- Power System
- Control System
- Sample Delivery
- Calibration System
- Structural Framework

Parameters of Importance to KSC
- Mass Accuracy
- Mass Resolution
- Mass Range
- Mass Detectivity
- Mass Reproducibility
- Mass Stability

Current Strengths at KSC
(for small & large systems)
- Mass Accuracy
- Mass Resolution
- Mass Range
- Mass Detectivity
- Mass Reproducibility
- Mass Stability

1-HUMS
- Fixed Sector - 5 Channel
- < 30 s Response Time
- Accuracy - 10%
- LOD < 25 ppm (100 ppm He)
- In-House LabVIEW Control

HUMS
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- < 30 s Response Time
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- In-House LabVIEW Control
- Local & Remote Control

HGDS 2000
- Linear Quadrupole
- < 30 s Response Time
- Accuracy - 10%
- LOD < 25 ppm
- Redundant Systems
- 1800 lbs (800 kg)

PAMS
- Fixed Sector - Single Channel (2.3 or 4)
- < 30 s Response Time
- Accuracy - 10%
- LOD < 0.1 ppm
- In-House LabVIEW Control
- 346 lbs (157 kg)
- Disassemble to 3 parts

AVEMS
- Linear Quadrupole
- 6 s Scan Time
- 30 s Response Time
- Rugged (25 to 60°C, 760 – 50 torr)
- 47 kg (105 lb)
- 90,000 cm³
- Autonomous
- 20 ppm LOD Monitor 16 Gases

Detection of Hydrocarbon Pollutant when flown over refinery at ~5000 ft.

SAMS - The Next Generation
- Linear Quadrupole
- Weight reduced; < 70 lbs
- Size reduced (Backpack Size)
- Helium LOD < 1 ppm
- Reduced Power Demand by 30%
- Improved Autonomy