

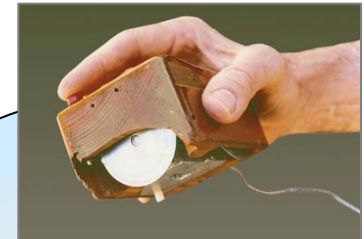
SRI International *Breakthrough ideas...real-world solutions*

Panoptic Analysis of Chemical Traces (PACT) Program

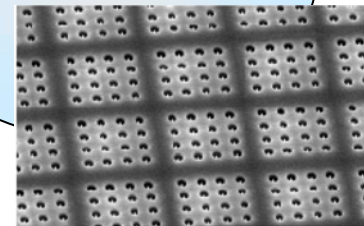
- SRI is planning to lead a team to pursue DARPA's PACT program
- We are seeking partners with expertise in
 - Sample introduction, handling, queing, transport and tracking
- SRI's relevant capabilities include
 - Mass spectrometry using novel ionization techniques (PI, LIMS, FIMS)
 - Advanced robotics and automation
 - System Engineering (requirements → functions → designs → risks → plans)
 - Atmospheric chemistry and diagnostics
 - Advanced materials and coatings
 - Microfabrication facility (MEMs, Field emission, microsensors/fluidics)
 - Plasma generation and characterization
 - Chemical demilitarization
 - Explosives development, testing, detection, characterization, transport and fate



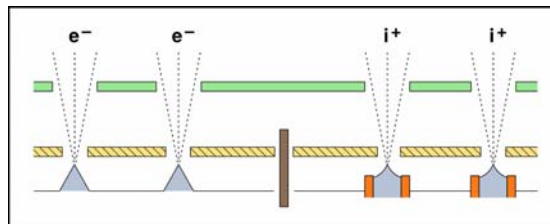
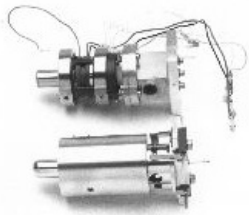
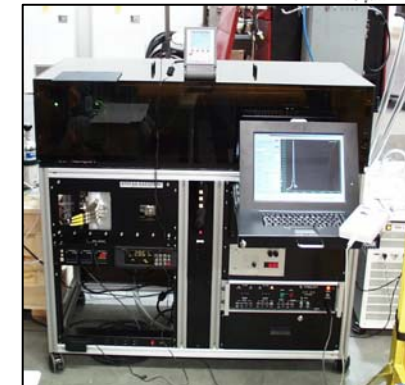
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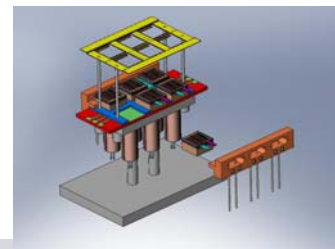
"SRI Firsts"



10 μm



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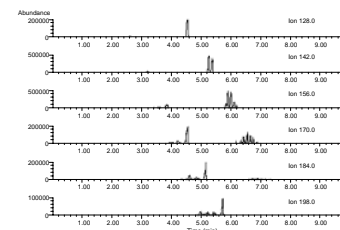
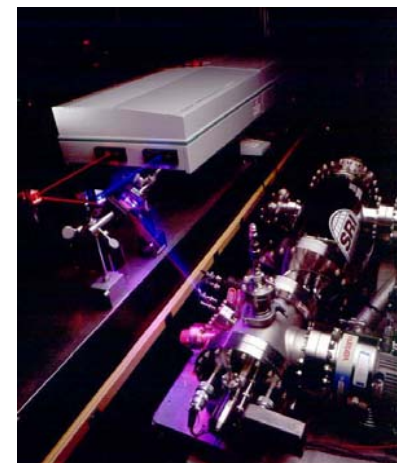
Mass Spectrometry System Development

Approach and Results

- Employ a variety of MS approaches: TOF, linear quadrupole, CIT
- Combine with novel, high efficiency ionization source: photoionization, field ionization, liquid metal ion sources, resonant and non-resonant laser MPI
- Designed and delivered rapid characterization systems to government (US EPA, DoD) and commercial clients (oil producers, tobacco laboratories, medical laboratories, etc.)

Application areas

- Isomer-specific chlorinated hydrocarbon detection at ppt levels in waste incinerator off gas streams measured in the field
- Liquid sample analysis using membrane or direct liquid injection in combination with photoionization TOF for trace organics (sub-ppt) in water and trace (ppb) levels of pharmaceuticals in blood plasma
- Rapid analysis of expired breath as a presymptomatic medical diagnostic (DARPA seedling)
- TGA combined with photoionization TOF for characterization of thermal protective space shuttle tiles
- Surface Analysis by Laser Ionization (SALI™) developed and commercialized using laser desorption combined with non-resonant MPI and TOF
- Developed and delivered several complete systems for the rapid (<20 minutes), automated, characterization of complex organic vapor mixtures using GC-FIMS



Systems Automation Development

- Robotic surgery developed for DARPA (trauma pod) and commercialized (da Vinci Intuitive Surgical)
- Highly automated, high-throughput prototype systems delivered to commercial clients



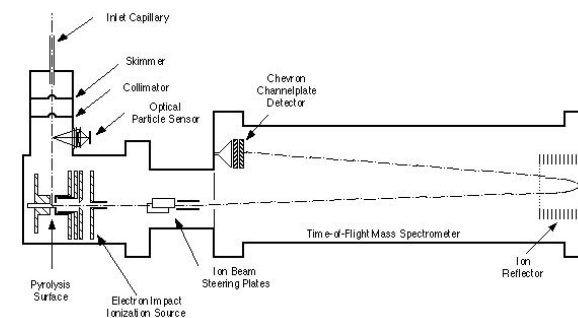
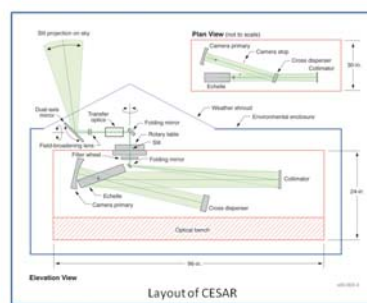
Microfabrication Systems Capabilities

- Silicon processing 100 and 150 mm
- Wire bonding, device encapsulation, assembly
- Characterization and microscopy
- 950 ft² class 100 clean room
- 2000 ft² class 1,000
- 2400 ft² class 10,000
- 16,000 ft² building



Atmospheric Chemistry

- Trace species detection by LIF, REMPI
- State-resolved energy transfer measurements
- Radical reactions relevant to the atmosphere
- Relocatable field instruments for atmospheric monitoring (AMISR, CESAR)
- Single particle aerosol mass spectrometric characterization in the upper atmosphere/lower troposphere



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