

PCP THERMAL COURSE: PHOTOMETRICS / MEASUREMENTS

March 25-29, 2019

Sandia National Laboratories

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PHOTOS

New Flame
Facility



Burn Site



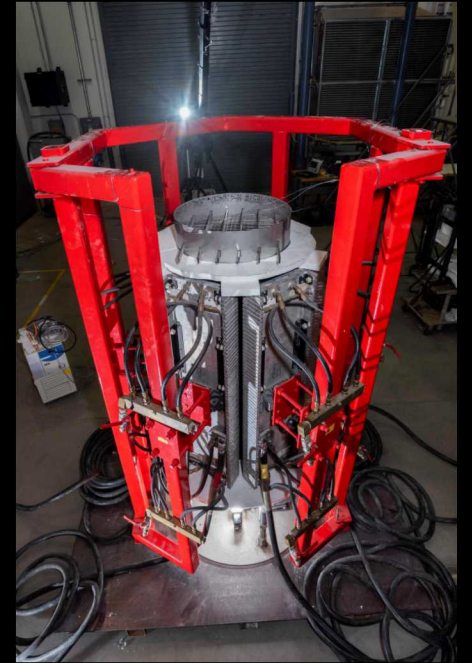
XTF



Facility



Radiant
Heat
&
ATE



MULTI-SPECTR

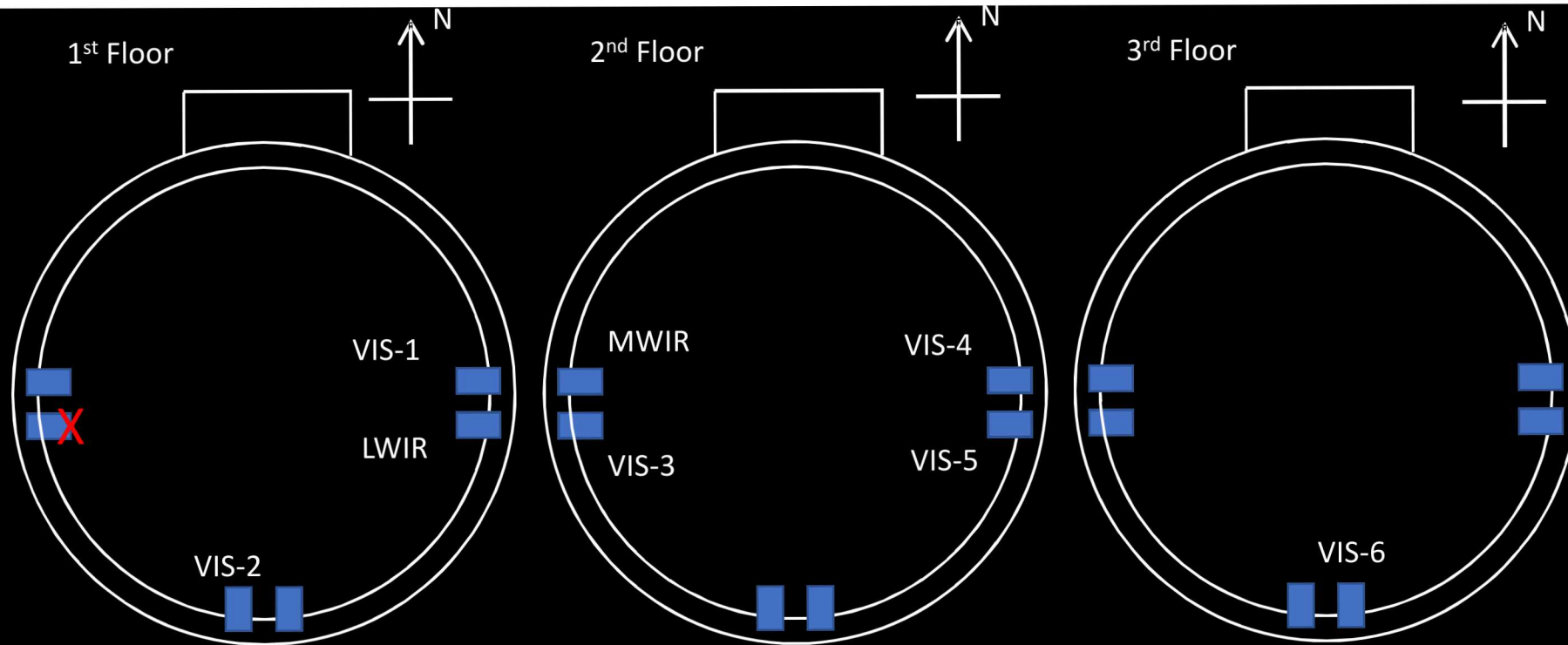
- Visual (0.4 to 0.75 μm) for external visualization
- Mid Wave IR (3-5 μm) for radiometric measurements
- Long Wave IR (7- 12 μm) for imaging inside the fire
- Spectral Detection as needed
 - Imaging at specific bands
 - Spectrometer detection (broad band)



CALM WIND FIRE EXPERIMENTS



OPTIONAL PHOTOMETRIC LOCATIONS



LWIR: IR Counts / Imaging through flames

MWIR: Radiometric IR

VIS-1: Close Drum View

VIS-2: Wide View / Floor Level / Audio / Inside Flame / IP Camera

VIS-3: Internal Survey / IP Camera / Mid View

VIS-4: Wide View

VIS-5: Down View / Zoom

VIS-6: Hi- Angle lookdown zoom

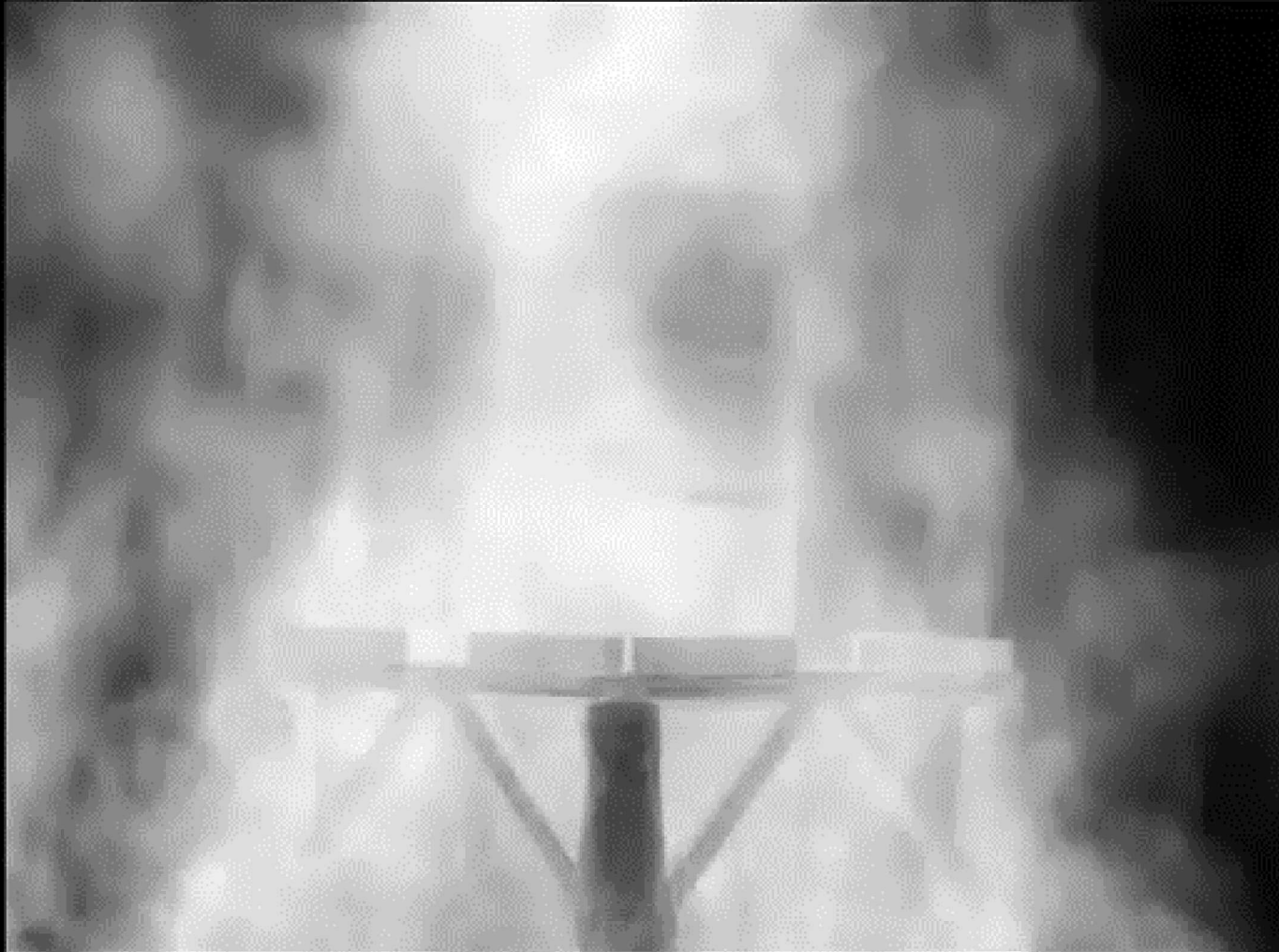
■ : Port

X: Port occluded by obstruction inside Flame

SEEING EFFECTS OUTSIDE THE ENVELOPING FLAME



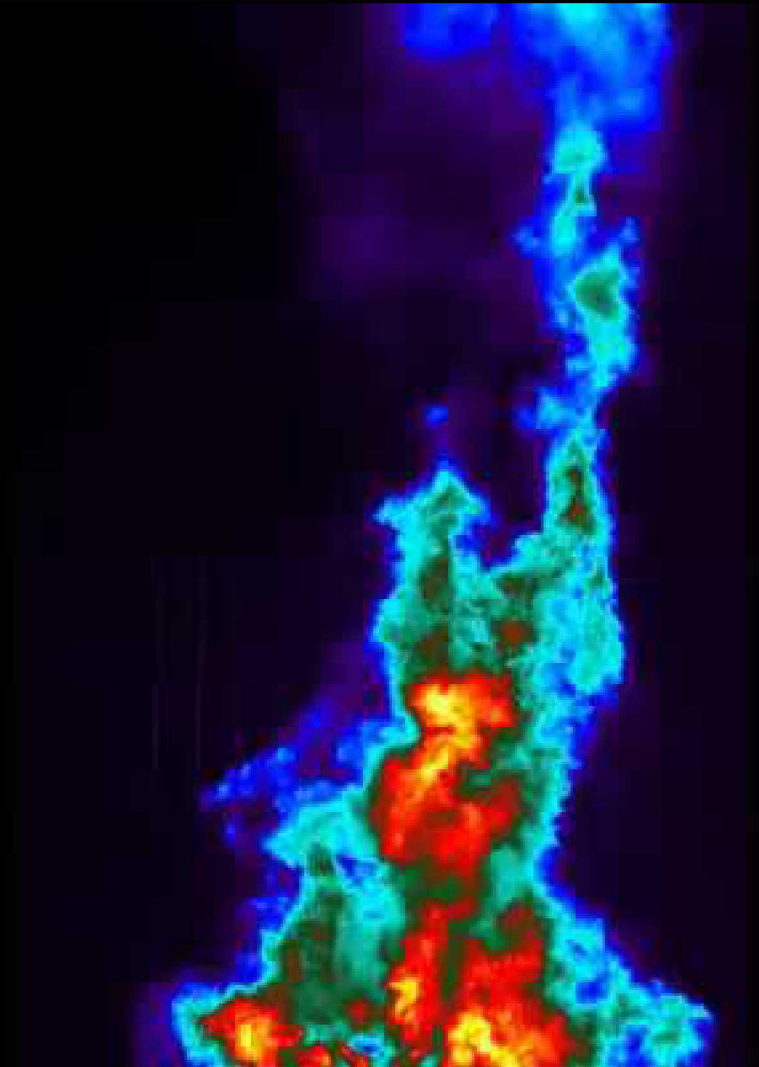
SEEING THROUGH THE FLAMES



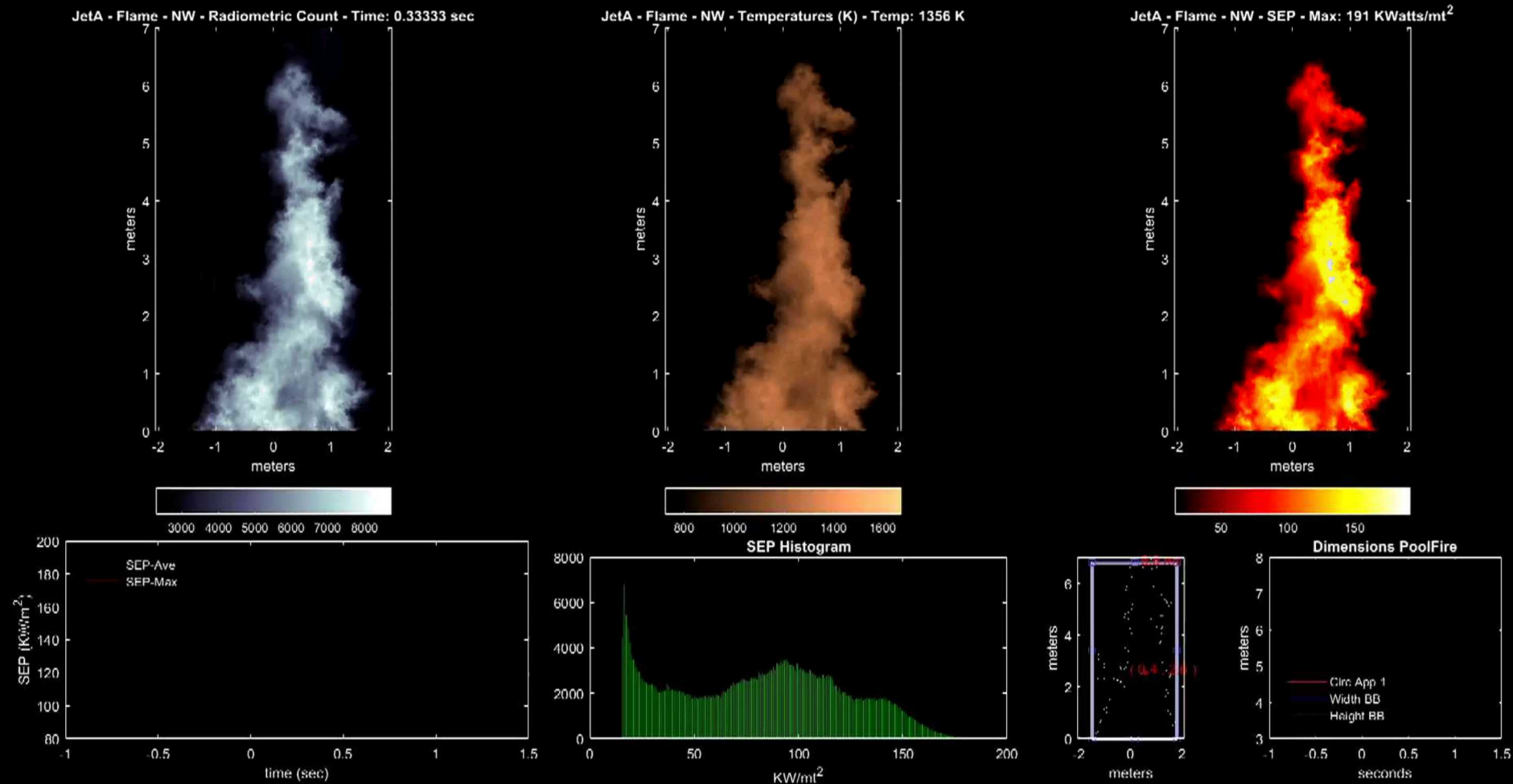
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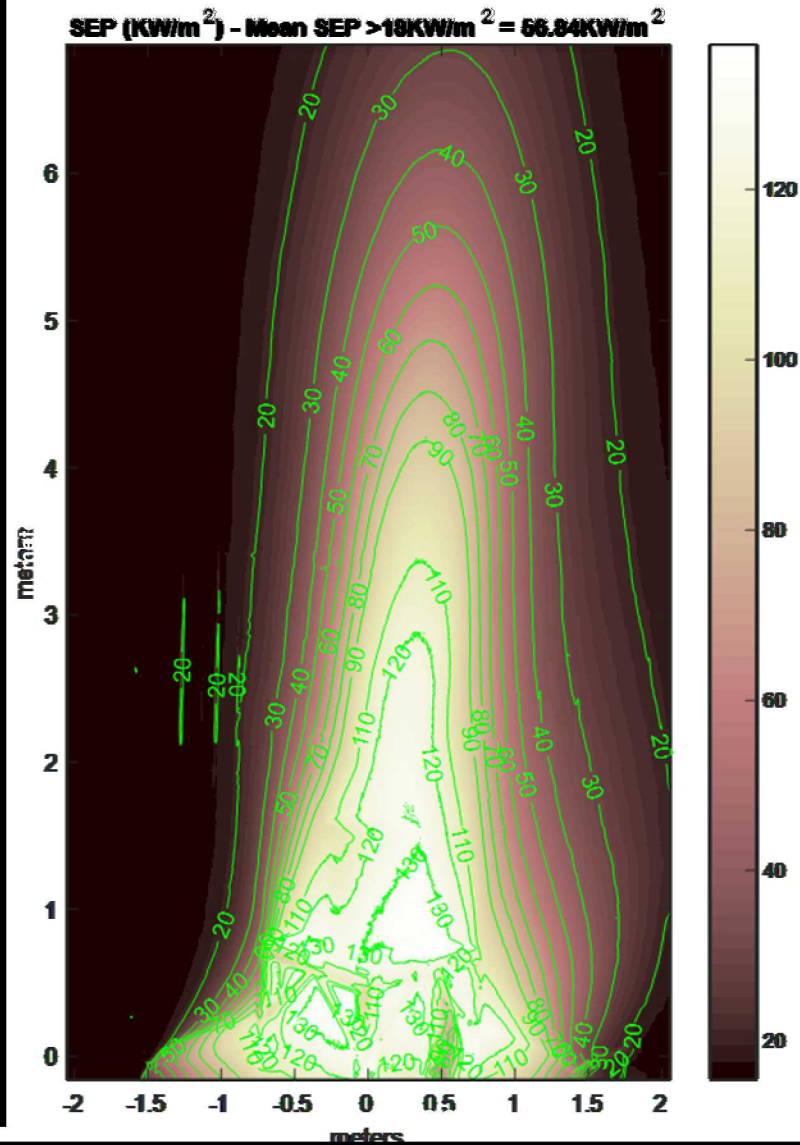
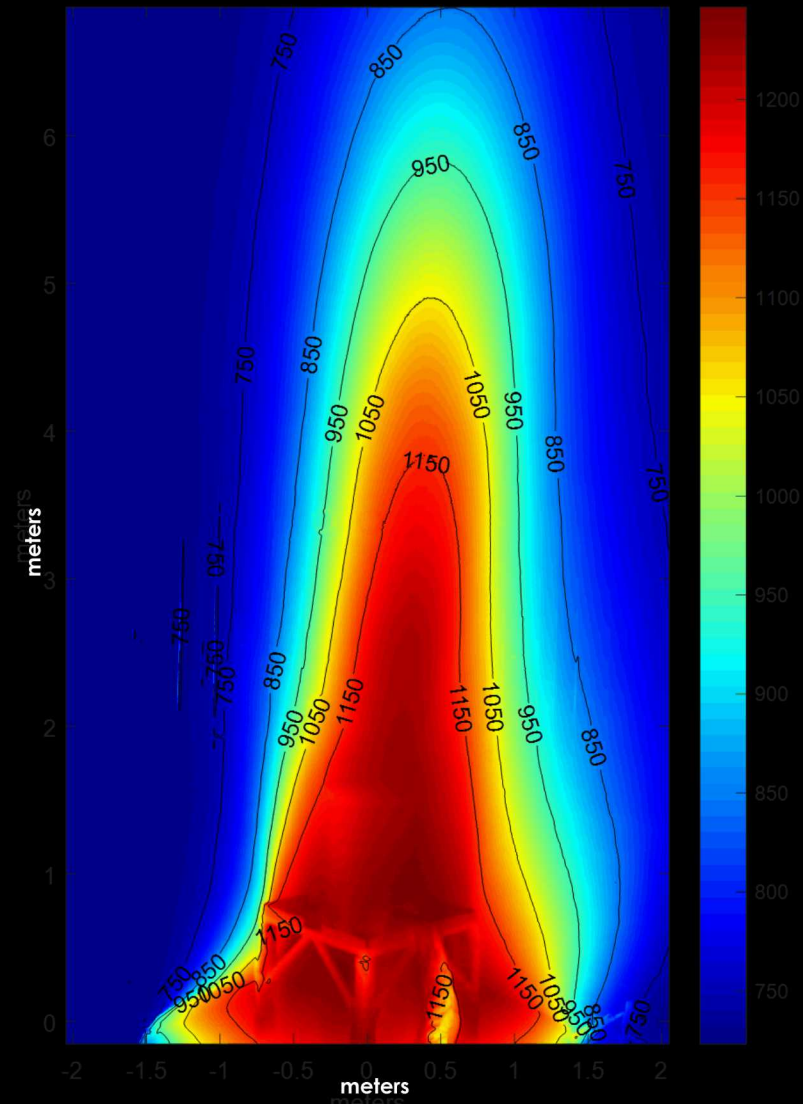
RADIOMETRIC DATA



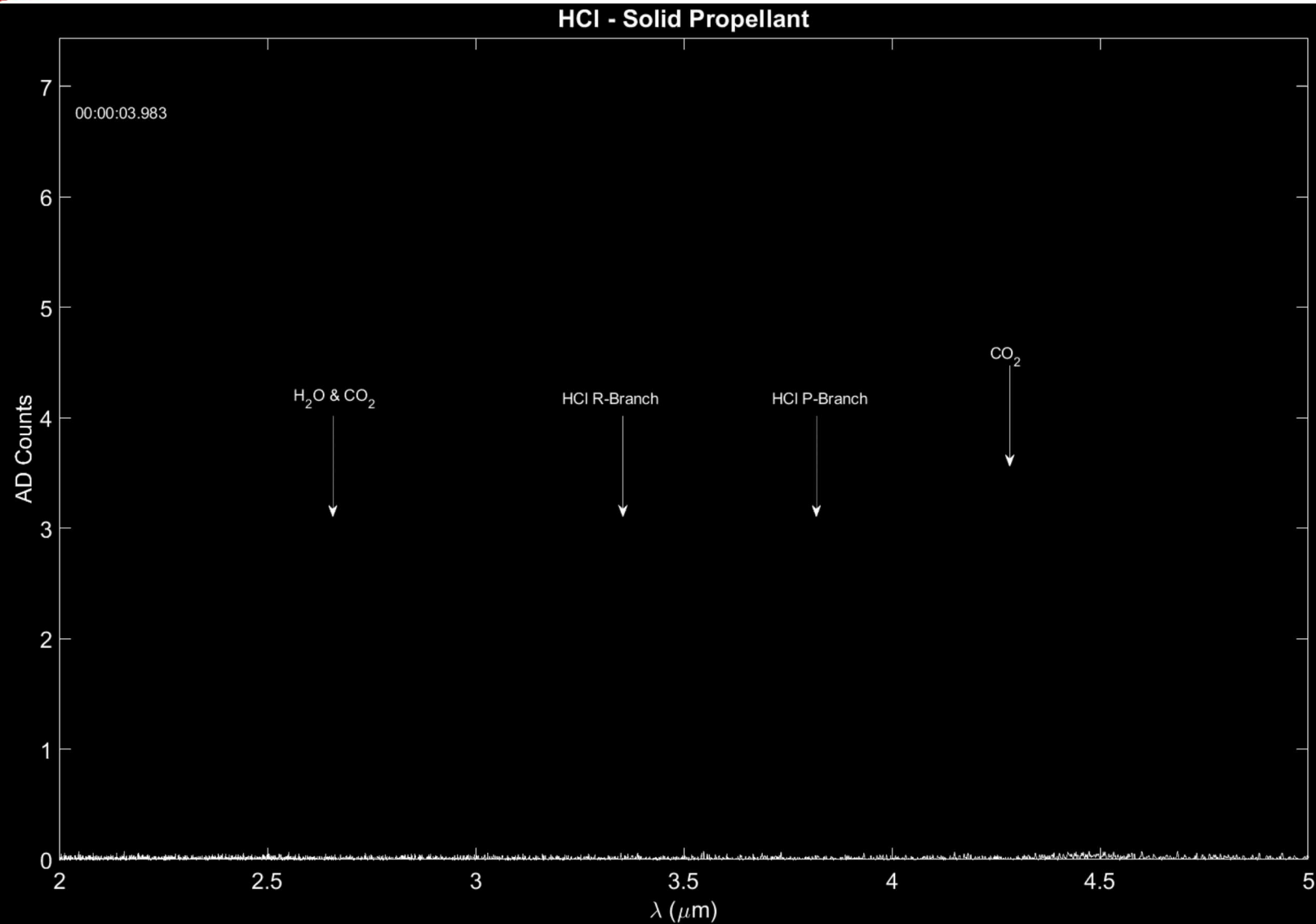
ACTUAL MEASUREMENTS (TEMPERATURE, SEP, SIZE)



TEMPORAL EXTERNAL TEMPERATURE & SURFACE EMISSIVE POWER AVERAGES



DETECTION



In some cases, container will release gases and there is interest in determining the gas nature

- Qualitative and quantitative data can be obtained from imaging:

- Visible: to view outside of the flame and guarantee that the container is inside the flame
- LWIR: to view the container
- MWIR: for radiometric measurements of:
 - Temperature
 - Surface Emissive Power

- Spectral capabilities for some species detection

