**I. General information:**

1. Mission name: **SENEX 2013**

2. Instrument name: PAN CIMS

3. What is measured: PANs (RC(O)OONO2), Nitryl Chloride, (ClNO2)

4. Short description of measurement technique: Short description of measurement technique: PANs (acyl peroxynitrates) are measured as the corresponding carboxylate anion, after thermal dissociation and reaction with iodide ion. Nitryl Chloride (ClNO2) is measured as the cluster ions {I•35ClNO2}- and {I•37ClNO2}- after reaction with iodide ion. All ions are measured by quadrupole mass spectrometry.

5. Contact information for all personnel going to the field with this instrument:

(*for multiple investigators,* *please list the PI or primary contact person first*)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Email** | **Office phone** | **Cell phone** |
| 1. Jim Roberts | James.M.Roberts@noaa.gov | 303-497-3982 | 720-352-2497 |
| 2. Patrick Veres | prveres@gmail.com |  |  |
| 2. Andy Neuman | Andy.Neuman@noaa.gov | 303-497-7872 |  |
| 4. |  |  |  |
| 5. |  |  |  |
| 6. |  |  |  |

**II. Specific information:**

**1. Total installed weight: 600.5 lbs**

(rack, gas cylinders, hoses, cabling, pumps, inlets, permeation tubes, etc.)

|  |  |  |
| --- | --- | --- |
| **Rack weight and balance info** | **Allowed** | **Actual** |
| Weight, lbs.: | 291.0 332.0 | 269.8 265.8 |
| Overturning moment, in-lbs.: | 9800 9800 | 6726 6816 |

**Pod weight and CG:**

**NOTE**: Please also provide weight-and-balance information for all installed equipment. Templates for standard electronics racks are available for download [here](http://esrl.noaa.gov/csd/groups/csd7/measurements/2013senex/P3/integration/). PIs with non-standard installations will need to provide relevant information in a similar format.

**2. Individual subassembly info** (weights should sum to total listed above)

|  |  |  |
| --- | --- | --- |
| **Component name** | **Location name and flight station** | **Weight, lbs** |
| 1. Sta 4 rack, floor-mounted pump | Sta 4 | 535.6 |
| 2. Inlet and valve plates | Window above AMS @ 565” | 14.9 |
| 3. Tubing and Cables | Between Sta4 and window | 25 |
| 4. Tubing and Cables | Pump power drop, N2 from PLiN | 25 |
| 5. |  |  |
| 6. |  |  |

**3. Component power consumption in Amps**

Please provide an electrical power diagram in Appendix A

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Component name** | **Location name** | | **400 Hz**  **3Ø** | | **400 Hz**  **1Ø** | | **60 Hz** | | | **28VDC** | | | **28VDC**  **WOW** | | |
| 1. Busch Pump | Floor of Sta4 | 5.0 (10.0) | | | |  | | |  | | |  | | |  | | |
| 2. Monitor | Sta 4 |  | | | | 0.5 (1.5) | | |  | | |  | | |  | | |
| 3. Photosource | Sta 4 |  | | | | 0.6 (2.2) | | |  | | |  | | |  | | |
| 4. Computer | Sta 4 |  | | | | 1.0 (6.9) | | |  | | |  | | |  | | |
| 5. Pressure and Flow Box | Sta 4 |  | | | | 4.0 (7.0) | | |  | | |  | | |  | | |
| 6. Voltage Box | Sta 4 |  | | | | 0.5 (4.7) | | |  | | |  | | |  | | |
| 7. Pump Control | Sta 4 |  | | | | 2.1 (9.0) | | |  | | |  | | |  | | |
| 8. RF Voltage Box | Sta 4 |  | | | | 4 (8) | | |  | | |  | | |  | | |
| 9. RF unit | Sta 4 |  | | | | - | | |  | | |  | | |  | | |
| 10. Fans | Sta 4 |  | | | |  | | |  | | | 0.5 | | |  | | |
| 11. |  |  | | | |  | | |  | | |  | | |  | | |
| 12. |  | |  |  | | | |  | | |  | | |  | | |
|  | **Totals:** | | 5.0 | | 12.7 | |  | | | 0.5 | | |  | | |
|  |  | | **400 Hz**  **3Ø** | | **400 Hz**  **1Ø** | | **60 Hz** | | | **28VDC** | | | **28VDC**  **WOW** | | |

**4. Inlet and exhaust information:**

Please provide an inlet/exhaust line diagram in Appendix B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Inlet/exhaust name** | **Location name and flight station** | | **Hole size through hull, inches** | |
| 1. PAN Inlet | | Window above AMS (565”) | | Standard Inlet Port | |
| 2. Busch Pump Exhaust | | Sta 4 | | Connection to Standard Exhaust | |
| 3. Diaphragm Pump | | Sta 4 | | Connected to Busch Pump Exh. | |
| 4. | |  | |  | |
| 5. | |  | |  | |
| 6. | |  | |  | |

**5. Source of flow** (name and location of pump or venturi)

|  |  |
| --- | --- |
| **Pump name** | **Location name and flight station** |
| 1. Busch Pump | Sta 4 |
| 2. Diaphragm Pump | Sta 4 |
| 3. |  |
| 4. |  |
| 5. |  |
| 6. |  |

**6. Installed hazardous materials or equipment:**

(only for items *installed* *in the aircraft for use during flight*)

**A. Lasers: N/A**

Type:

Class:

Wavelength:

Output power:

Eye-safe?

Beam fully contained within instrument during normal operation?

*For non-eye-safe lasers, please attach a description of safety measures taken (safety interlocks, beam fully enclosed within instrument, etc.) and a procedure for safe instrument operation during testing and laser alignment. Please contact the* [*AIC*](mailto:carsten.warneke@noaa.gov) *for an example of laser safety documentation from TexAQS 2006.*

**B. RF transmitters**: (note that mass spectrometer RF generators are not designed to transmit, and do not need to be included here)

Description: N/A

Transmitted RF power:

Frequency range:

**C. Radioactive materials:**

Isotope: Po-210

Half-life: 135 days

Type of emitter: Alpha

Generally licensed? Yes, by NRD

# installed and location: 1 on Vacuum Chamber Sta 4

# of spares and location: 1 in hangar

Activity: 20 mCi

**D. Compressed gases:** (1 ft3 = 28.32 liters; cabin volume = 4260 ft3 = 1.21 x 105 liters)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cylinder number:** | **1** | **2** | **3** | | **4** | **5** | | |
| Gas description | C13 Acetone/Air | CH3I/N2 | |  |  | |  |
| Mixing ratio | 20 ppm | 1000 ppm | |  |  | |  |
| Cylinder size (ft3) | 30 | 30 | |  |  | |  |
| Max pressure (psig) | 2200 | 2200 | |  |  | |  |
| # installed on aircraft | 1 | 1 | |  |  | |  |
| Location on aircraft | Sta 4 inboard | Sta 4 inboard | |  |  | |  |
| Service frequency | Every 2 to 3 flts | Not required | |  |  | |  |
| *toxic/flammable gases:* |  |  | |  |  | |  |
| In containment vessel? | no | no | |  |  | |  |
| Gas alarm provided? | no | no | |  |  | |  |
| MR if vented to cabin, ppmv | 0.14 | 7 | |  |  | |  |
| OSHA 8-hr PEL, ppmv | 250 | 5 | |  |  | |  |
| 30-min IDLH, ppmv | 20,000 |  | |  |  | |  |

**E. Chemicals (solids and liquids): N/A**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chemical number:** | **1** | **2** | **3** | **4** | **5** | **6** |
| Concentration |  |  |  |  |  |  |
| Amount |  |  |  |  |  |  |
| Container description |  |  |  |  |  |  |
| Purpose |  |  |  |  |  |  |
| Solution pH |  |  |  |  |  |  |
| Spill kit provided? |  |  |  |  |  |  |

**F. Cryogens: N/A**

Location:

Description:

Container description:

Quantity on board per flight:

Serviced on the aircraft?

**G. UPS and battery installation: N/A**

Location:

Description: (Manufacturer, model no., power)

Battery type:

Has an adjustable input voltage tolerance? (highly recommended)!

**H. Motors**

Description: Busch Pump

Motor current draw; 3Ø, 400Hz, 10A startup, 5A running

(e.g., 3Ø, 400Hz, 8A startup, 4A running)

Thermal interlock enabled? Don’t know

**I. Operator seat requests -**

Test flights: 1 for 1 flight

Transit flights: Rotate w/ CIMS operators

Science flights: Rotate w/ CIMS operators

**7. Data and plumbing drops**

Network (Cat. 5/6 ethernet) drops requested: N/A

Serial drops requested: N/A

IRIG-B drops (BNC coax connector) requested: N/A

Vacuum/exhaust/ emergency dump lines:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Flow rate, slpm** | **Line pressure, Torr** | **Pump type** | **Trace gas concentration(s)** |
| 1. |  |  |  |  |
| 2. |  |  |  |  |
| 3. |  |  |  |  |
| 4. |  |  |  |  |

Ground gas service lines (number, location, type of service):

Other gas lines (number, location, type of service): 1/16” SS line from C3X to Sta 4 for the NO/N2 calibration standard.

Will you be sending data to the AOC data station? If so, please provide the following information:

|  |  |  |
| --- | --- | --- |
| **Parameter name** | **Voltage range** | **Unit conversion** |
| 1. |  |  |
| 2. |  |  |
| 3. |  |  |

**8. Aircraft access**

**a. flight days:**

Pre-flight time requested at aircraft (hours): Standard 3 hrs.

Routine pre-flight ground support required? Ladder to uncap inlet

(stands, ladders, forklifts, covers, external equipment, etc.)

Routine post-flight time requested at aircraft (hours): 30 min

Routine post-flight ground support required? Ladder to cap inlet

(stands, ladders, forklifts, covers, external equipment, etc.)

**b. non-flight days: No**

Routine external access to inlets or zenith mounts required?

(please describe location, how often, for how long, type of ground support equipment needed, weather constraints, etc.)

*Please note there is zero access and zero power to the aircraft (including pods) on hard-down days. These occur at least once every seven calendar days while in the field.*

**9. Aircraft maneuvers**

Briefly describe in-flight calibration frequency, duration, altitudes desired:

This instrument has an internal calibration that is on all the time. The zero mode is 1 minutes long, every 20 minutes, and the Cal Off mode is1 minutes long, every 20 minutes, (staggered with the zero). It would be nice (but not essential) to get at least one cycle at each flight level.

Briefly describe instrument sensitivity to flight conditions:

(issues during roll/pitch, ascent/descent, sampling in cloud, icing etc.)

It is insensitive to flight conditions except for a pressure sensitivity that is calibrated for.

**10. Miscellaneous N/A**

*1. Hazmat for preflight/postflight calibrations*: Please describe fully any additional hazardous materials - compressed gases, solvents, radioactive ion sources – that you anticipate *temporarily* bringing onto the aircraft for periodic instrument calibration purposes (e.g., *n*-butanol in a CN counter, 210Po in a DMA, a UPS for power, compressed gas cylinders for calibrations, etc.)

*2. Fabrication and sheet metal support:* Please describe fully any anticipated requests for fabrication or sheet-metal support during installation in Tampa. This list should be kept to an absolute minimum; please recognize that this superb AOC resource is quite limited. To ease the strain on the AOC shop, we will work with each PI to ensure they arrive in Tampa with as much in hand as possible.

*3. Ferry flight/check flight procedures.* On occasion, AOC will perform an aircraft check flight, during which the instruments may be flown without power. Aircraft maintenance needs may also dictate a ferry flight without science crew or SED techs on board. Instruments should be designed with these eventualities in mind. However, if your instrument requires standby power during this kind of flight, this may be provided at the discretion of AOC personnel.

If so, the flight crew will need to be briefed well ahead of time to ensure proper instrument operation. Please provide with this document a bare-minimum checklist of instrument startup and shutdown procedures requested for these flights.

**III. Ground laboratory space**

**1. Tampa space requests**: 1 Table, 2 chairs

Power requirements: 15A 115VAC 60Hz

Special requests:

**2. Field space requests**:

Workspace, ft2: 60

Number of tables/chairs: 2 tables, 2 chairs

Power requirements: 20A 115VAC, 60hz

Storage space, ft2: 120

Other requests: