**I. General information:**

1. Mission name: **SONGNEX 2015**

2. Instrument name: Yale Adsorbent Sampler (YAS)

3. What is measured: un-oxidized hydrocarbons from C7 to ~C25 with characterization by chemical class and carbon number (e.g. alkane, cyclic alkane, aromatic, PAH) and other biogenic compounds. Some 1st/2nd generation oxidation products (second priority, as feasible). Focus is predominantly on gases, but partitioning particle-phase organics will be sampled too.

4. Short description of measurement technique:

VOCs, IVOCs, and SVOCs will be sampled onto adsorbents traps for ~15 minutes each (19 tubes per flight). Tubes will be transported back to New Haven, CT where they will be analyzed via thermal desorption on GC/MS with soft ionization techniques to speciate hydrocarbons by carbon number and compounds class (similar to Gentner et al. PNAS 2012) with prominent isomers identified.

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. Drew Gentner
 | Drew.gentner@yale.edu | 203-432-4382 | 480-282-2372 |
| 2. Roger Sheu | Roger.sheu@yale.edu | N/A | 626-808-8912` |
| 3. |  |  |  |
| 4. |  |  |  |
| 5. |  |  |  |
| 6. |  |  |  |

**II. Specific information:**

**1. Total installed weight: 0.0 lbs**

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

|  |  |  |
| --- | --- | --- |
| **Rack weight and balance info** | **Allowed** | **Actual** |
| Weight, lbs.: |  |  |
| Overturning moment, in-lbs.: |  |  |

**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. |  |  |
| 2. |  |  |
| 3. |  |  |
| 4. |  |  |
| 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. 24 VDC power supply converter |  |  | 3.2 |  | 4.5 |  |
| 2. 24 VDC power supply converter |  |  |  |  |  |  |
| 3. Laptop Power |  |  |  |  |  |  |
| 4. |  |  |  |  |  |  |
| 5. |  |  |  |  |  |  |
| 6. |  |  |  |  |  |  |
| 7. |  |  |  |  |  |  |
| 8. |  |  |  |  |  |  |
| 9. |  |  |  |  |  |  |
| 10. |  |  |  |  |  |  |
| 11. |  |  |  |  |  |  |
| 12. |  |  |  |  |  |  |
|  | **Totals:** | 7.1 A |  |  |  |  |
|  |  | **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. Inlet pipe  |  | 1/4 |
| 2. Exhaust pipe |  | 1/8 |
| 3. |  |  |
| 4. |  |  |
| 5. |  |  |
| 6. |  |  |

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

|  |  |
| --- | --- |
| **Pump name** | **Location name and flight station** |
| 1. Pfeiffer Diaphragm pump MVP 006  |  |
| 2. |  |
| 3. |  |
| 4. |  |
| 5. |  |
| 6. |  |

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

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

**A. Lasers (NONE)**

 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* *for an example of laser safety documentation from TexAQS 2006.*

**B. RF transmitters (NONE)**: (note that mass spectrometer RF generators are not designed to transmit, and do not need to be included here)

 Description:

 Transmitted RF power:

 Frequency range:

**C. Radioactive materials (NONE):**

Isotope:

Half-life:

Type of emitter:

Generally licensed?

# installed and location:

# of spares and location:

**D. Compressed gases (NONE):** (1 ft3 = 28.32 liters; cabin volume = 4260 ft3 = 1.21 x 105 liters)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cylinder number:** | **1** | **2** | **3** | **4** | **5** |
| Gas description |  |  |  |  |  |
| Mixing ratio |  |  |  |  |  |
| Cylinder size (ft3) |  |  |  |  |  |
| Max pressure (psig) |  |  |  |  |  |
| # installed on aircraft |  |  |  |  |  |
| Location on aircraft |  |  |  |  |  |
| Service frequency |  |  |  |  |  |
| *toxic/flammable gases:* |  |  |  |  |  |
| In containment vessel? |  |  |  |  |  |
| Gas alarm provided? |  |  |  |  |  |
| MR if vented to cabin, ppmv |  |  |  |  |  |
| OSHA 8-hr PEL, ppmv |  |  |  |  |  |
| 30-min IDLH, ppmv |  |  |  |  |  |

**E. Chemicals (solids and liquids):**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chemical number:** | **1** | **2** | **3** | **4** | **5** | **6** |
| Concentration | Tenax TA | Glass beads & wool |  |  |  |  |
| Amount | <0.04 g | <200 g (beads) and <250 g (wool) |  |  |  |  |
| Container description | Markes tubes | Markes tubes |  |  |  |  |
| Purpose | I/SVOC adsorbent | I/SVOC adsorbents |  |  |  |  |
| Solution pH | Solid | solid |  |  |  |  |
| Spill kit provided? | No | No |  |  |  |  |

**F. Cryogens (NONE):**

 Location:

Description:

Container description:

Quantity on board per flight:

Serviced on the aircraft?

**G. UPS and battery installation (NONE):**

 Location:

 Description: (Manufacturer, model no., power)

 Battery type:

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

**H. Motors (NONE)**

 Description:

 Motor current draw

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

 Thermal interlock enabled?

**I. Operator seat requests -**

Test flights:

Transit flights:

Science flights:

**7. Data and plumbing drops**

 Network (Cat. 5/6 ethernet) drops requested: 1 drop for laptop

 Serial drops requested:

 IRIG-B drops (BNC coax connector) requested:

 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) : (NONE)

 Other gas lines (number, location, type of service): (NONE)

Will you be sending data to the AOC data station? If so, please provide the following information (NO) :

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

**8. Aircraft access**

 **a. flight days:**

 Pre-flight time requested at aircraft (hours): 1

 Routine pre-flight ground support required?

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

 Routine post-flight time requested at aircraft (hours): 1

Routine post-flight ground support required?

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

**b. non-flight days:**

 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:

Altitude of 4 km above sea level desired

 Briefly describe instrument sensitivity to flight conditions:

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

Sensitivity to ascent/descent and aircraft exhaust accounted for. Sampling in cloud not preferred, but permissible.

**10. Miscellaneous**

 *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.)

None

 *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.

 None

 *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.

Lack of power is acceptable.

**III. Ground laboratory space**

**1. Tampa space requests**:

 Power requirements: 115 V/400 Hz AC

 Special requests: NONE

**2. Field space requests**:

 Workspace, ft2:

 Number of tables/chairs:

 Power requirements:

 Storage space, ft2:

 Other requests: