This completed form, and associated rack weight and balance information, is due to the AIC by Wednesday, October 10, 2012 for the SENEX project.

**I. General information:**

1. Mission name: **SONGNEX 2015**

2. Instrument name: CO2/CH4

3. What is measured: carbon dioxide (CO2) and methane (CH4)

4. Short description of measurement technique: wavelength scanned cavity ring down spectroscopy

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. Jeff Peischl
 | jeff.peischl@noaa.gov | 303-497-4849 | 303-246-6651 |
| 1. Tom Ryerson
 | thomas.b.ryerson@noaa.gov | 303-497-7531 |  |
| 3. |  |  |  |
| 4. |  |  |  |
| 5. |  |  |  |
| 6. |  |  |  |

**I. Specific information:**

**1. Total installed weight: 291.9 lbs**

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

|  |  |  |
| --- | --- | --- |
| **Rack weight and balance info** | **Allowed** | **Actual** |
| Weight, lbs.: | 350 | 291.9 |
| Overturning moment, in-lbs.: | 9800 | 6640 |

**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://www.esrl.noaa.gov/csd/tropchem/2010calnex/P3/integration.html). 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. Instrument
 | Sta5 | 60.0 |
| 1. Laptop/ethernet
 | Sta5 | 5.5 |
| 1. Gas deck, 1 cyl.
 | Sta5 | 49.5 |
| 1. Gas deck, 2 cyl.
 | Sta5 | 69.5 |
| 1. pump
 | Sta5 | 23.1 |
| 1. UPS
2. Dry ice dewar
3. Additional cabling
4. Additional plumbing
 | Sta5Sta5Sta5Sta5 | 31.33.05.010.0 |

**3. Component power consumption in Amps**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Component name** | **Location name** | **400 Hz****3Ø** | **400 Hz****1Ø** | **60 Hz** | **28VDC** | **28VDC****WOW** |
| 1. Instrument
 | Sta5 |  |  | 3.0 A |  |  |
| 1. Gas deck
 | Sta5 |  |  | 0.5 A |  |  |
| 1. Laptop
 | Sta5 |  |  | 1.5 A |  |  |
| 1. pump
 | Sta5 |  |  |  | 4.0 A |  |
| 5. |  |  |  |  |  |  |
| 6. |  |  |  |  |  |  |
| 7. |  |  |  |  |  |  |
| 8. |  |  |  |  |  |  |
| 9. |  |  |  |  |  |  |
| 10. |  |  |  |  |  |  |
| 11. |  |  |  |  |  |  |
| 12. |  |  |  |  |  |  |
|  | **Totals:** |  |  | 5 A | 4 A |  |
|  |  | **400 Hz****3Ø** | **400 Hz****1Ø** | **60 Hz** | **28VDC** | **28VDC****WOW** |

**4. Inlet and exhaust information:**

|  |  |  |
| --- | --- | --- |
| **Inlet/exhaust name** | **Location name and flight station** | **Hole size through hull, inches** |
| 1. CO2/CH4 | Sta5 | 3/8” inlet |
| 2. |  |  |
| 3. |  |  |
| 4. |  |  |
| 5. |  |  |
| 6. |  |  |

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

|  |  |
| --- | --- |
| **Pump name** | **Location name and flight station** |
| 1. CO2/CH4 pump | Sta5 |
| 2. |  |
| 3. |  |
| 4. |  |
| 5. |  |
| 6. |  |

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

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

**A. Lasers**

 Type: TBD

 Class: TBD

 Wavelength: 1.60 – 1.65um

 Output power: < 25 mW

 Eye-safe? yes

 Beam fully contained within instrument during normal operation? yes

*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**: (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:**

Isotope:

Half-life:

Type of emitter:

Generally licensed?

# installed and location:

# of spares and location:

**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 | Compressed air | Compressed air | Compressed air |  |  |
| Mixing ratio | ~360 ppm CO2, ~1700 ppb CH4 | ~390 ppm CO2, ~1900 ppb CH4 | ~490 ppm CO2, ~2400 ppb CH4 |  |  |
| Cylinder size (ft3) | 50 | 50 | 50 |  |  |
| Max pressure (psig) | 2200 | 2200 | 2200 |  |  |
| # installed on aircraft | 1 | 1 | 1 |  |  |
| Location on aircraft | Sta5 | Sta5 | Sta5 |  |  |
| Service frequency | ~5 wks. | ~5 wks. | ~5 wks. |  |  |
| *toxic/flammable gases:* |  |  |  |  |  |
| In containment vessel? | no | no | no |  |  |
| Gas alarm provided? | no | no | no |  |  |
| MR if vented to cabin, ppmv | same | same | same |  |  |
| OSHA 8-hr PEL, ppmv | CO2: 5000CH4: simple asphyxi-ant | CO2: 5000CH4: simple asphyxi‑ant | CO2: 5000CH4: simple asphyxi-ant |  |  |
| 30-min IDLH, ppmv | CO2: 50000CH4: simple asphyxi-ant | CO2: 50000CH4: simple asphyxi-ant | CO2: 50000CH4: simple asphyxi-ant |  |  |

**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: dry ice**

 Location: Sta5

Description: dry ice pellets

Container description: dewar

Quantity on board per flight: 500 g

Serviced on the aircraft? yes

**G. UPS and battery installation: yes**

 Location: Sta5

 Description: (Manufacturer, model no., power) Tripp Lite Smart1000, 1000 VA

 Battery type: sealed lead-acid

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

**H. Motors**

 Description: CO2/CH4 pump

 Motor current draw

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

28vDC, 4A startup, 4A running

 Thermal interlock enabled?

Operator seat requests -

Test flights:

Transit flights:

Science flights:

**7. Data and plumbing drops**

 Network (Cat. 5/6 ethernet) drops requested: 1 (shared with ethane)

 Serial drops requested: 0

 IRIG-B drops (BNC coax connector) requested: 0

 Vacuum/exhaust/ emergency dump lines: 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Flow rate, slpm** | **Line pressure, Torr** | **Pump type** | **Trace gas concentration(s)** |
| 1. CO2/CH4 | ~1.25 | ambient | diaphragm | ambient |
| 2. |  |  |  |  |
| 3. |  |  |  |  |
| 4. |  |  |  |  |

 Ground gas service lines (number, location, type of service): 0

 Other gas lines (number, location, type of service): 0

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

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

**8. Aircraft access**

 **a. flight days:**

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

 Routine pre-flight ground support required? N/A

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

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

Routine post-flight ground support required? N/A

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

**b. non-flight days:**

 Routine external access to inlets or zenith mounts required? N/A

(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: calibration every hour or so for approximately 6 minutes at level altitude

 Briefly describe instrument sensitivity to flight conditions: unknown

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

**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.

N/A

**II. Ground laboratory space**

**1. Tampa space requests**: None

 Power requirements:

 Special requests:

**2. Field space requests**:

 Workspace, ft2: 10, only in case of emergency

 Number of tables/chairs: 0/1

 Power requirements:

 Storage space, ft2:

 Other requests:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Station** | **Max weight (lbs)** | **Mounting location** | **CG location** | **Overturning moment (in-lbs)** |
| *Inboard* | *Outboard* | *Total* | *Forward* | *Aft* | *Delta* | *Flight station* | *W.L.* | *Height* | *Max inboard* | *Max outboard* | *Total* |
| FD | 312.5 | 312.5 | **625.0** | 300.1 | 319.1 | 19.0 | 311.85 | 155.5 | 32 | 10000 | 10000 | 20000 |
| C3X | 350.0 | 350.0 | **700.0** | 429.0 | 465.0 | 27.0 | 453.9 | 151.5 | 28.0 | 9800 | 9800 | 19600 |
| Sta. 2 | 250.0 | 250.0 | **500.0** | 459.0 | 486.0 | 27.0 | 477.19 | 150.3 | 26.8 | 6700 | 6700 | 13400 |
| Sta. 3 | 272.0 | 385.0 | **657.0** | 526.0 | 553.0 | 27.0 | 541.2 (±) | 154.4 | 30.9 | 8405 | 11396 | 19801 |
|  |  |  |  |  |  |  | 543.0 (0) | 153.1 | 29.6 |  |  |  |
| Sta. 4 | 332.0 | 291.0 | **623.0** | 604.9 | 628.1 | 23.2 | 619.9 (±) | 151.8 | 28.3 | 9396 | 8264 | 17660 |
|  |  |  |  |  |  |  | 620.0 (0) | 151.9 | 28.4 |  |  |  |
| N1/N2 | 504.0 | 430.0 | **934.0** | 675.0 | 700.0 | 25.0 | 685.8 (±) | 161.1 | 37.6 | 18950 | 13287 | 32237 |
|  |  |  |  |  |  |  | 686.1 (0) | 154.4 | 30.9 |  |  |  |
| Sta. 5 | 350.0 | 350.0 | **700.0** | 710.6 | 737.6 | 27.0 | 727.1 | 151.5 | 28.0 | 9800 | 9800 | 19600 |
| Sta. 6 | 262.5 | 262.5 | **525.0** | 776.1 | 799.9 | 23.8 | 792.7 | 153.5 | 30.0 | 7875 | 7875 | 15750 |
| Sta. 7 | 262.5 | 262.5 | **525.0** | 841.1 | 864.9 | 23.8 | 857.6 | 153.5 | 30.0 | 7875 | 7875 | 15750 |
| Sta. 8\* |  |  |  |  |  |  |  |  |  |  |  |  |
| Dual pass.\* |  |  |  |  |  |  |  |  |  |  |  |  |
| J cab\* |  |  |  |  |  |  |  |  |  |  |  |  |

From a document signed by J. Zysko, 27 April 81

\* These stations are approved for specific CSD installations only. Please contact the AIC for details.

Sta. 16

Sta. C3X

FD

Sta. 2

Sta. 3

Sta. 12

Dual pass.

Sta. 8

J cab

Sta. 7

Sta. 6

Sta. 5

Sta. 15

NAV

Sta. 4

LIPF

**(Example only) This form is to be filled out by AOC personnel, and is included here for informational purposes only.**

*AOC instrument teams will be given copies of your completed P-3 Installation Worksheets (Appendix 1) which are designed to greatly facilitate the CCT process by including much of the information required here.*

**Ozone CalNex ‘10**

**I. General Information** **Reviewing Engineer: Date:**

1. Instrument Name

2. What it Measures

3. Description of Operation

4. Instrument Location(s)

 Component Name Location (Name) Flight Station Weight (lbs)

1.

 2.

 3.

 4.

5. Component Power Consumption by Location and Power type in amps

 Name Loc. 28 28WOW 115 400HZ 60 HZ bus 1 60 Hz bus 2

1.

2.

3.

4.

6. Inlet/Exhaust Location Description Flight Station

 Inlet

 Exhaust

7. Source of Flow (Name of pump or venturi)

8. Hazardous Materials Installed on aircraft

Name quantity location

1.

 2.

9. Hull Penetrations

 Location size of opening (inches)

10. Significant transmitters (power and frequency)

**Verifications**

1. Compressed Gases

 Inspection date is current (5 years for Al and C-composite, 3 years for Kevlar)

 Bottles are secured with appropriate locking hardware. Yes / No.

 Name of gas, size and type of bottle, Pressure rating, Inspect. Date

Gas cylinder 1

Gas cylinder 2

2. Over-turning worksheets (for pods list total weight and pod CG):

 Allowed Actual

 Rack name Moment (in-lbs) Weight (lbs) Moment (in-lbs) Weight (lbs)

 1.

 2.

3. Inspect plumbing connections 1” or larger, list type of plumbing and connections

4. Electrical loading

 Verify actual loads

 Check power cord wire size

 Protecting Breaker Name Location rating power wiring size

 1

 2

 3

 Check user built equipment for appropriate fuses/breakers Yes / No

5. Check for other safety hazards (describe hazard and mitigation or write none, if no hazard exists.

• Rotating machinery

• Laser

 • Access to exits

 • Access to emergency equipment

 • Fire Hazards

• Other Hazards