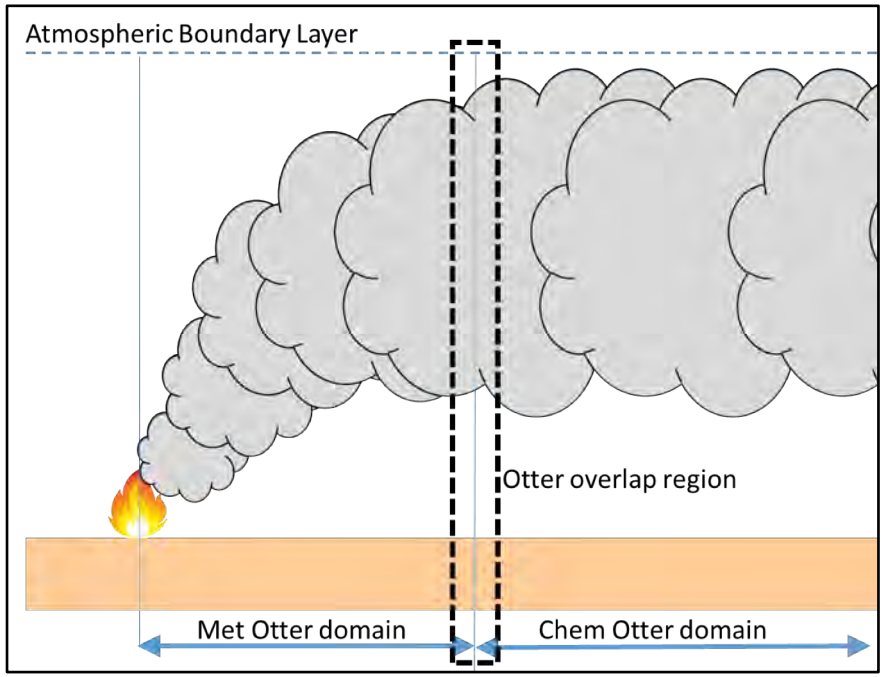
2019 FIREX-AQ Twin Otter & Ground Assets Teleconference
March 12, 2019

1. Met Otter / Modeling updates
2. Chem Otter instrument updates
3. Schedules, organization and a few (short) logistical updates
4. Location of the Otters in Boise
5. Summary of visit to NOAA Aircraft Operations, March 4 2019
6. Scientific topics for current and future discussion

Results from Met Otter Data Utilization Meeting 1

- Max flux extremely important
- Spatial scales on the order of 1 km
- Fire Radiative Power (FRP) is important, <20m at 1km and covers 1km swath of land
- Fumigation measurements if possible.
- Vertical velocity measurements are not as important as horizontal for any of the measurements
- The Chem Otter will fly at a variety of levels within the plume while the Met Otter will be above it
- Later afternoon flights desirable to see blow-up and cool down
- There will be satellites flying over the general Boise area during mid-day
- Met Otter gate lengths are between 30 and 60m
- The Met Otter footprint on the ground is about half of the its altitude

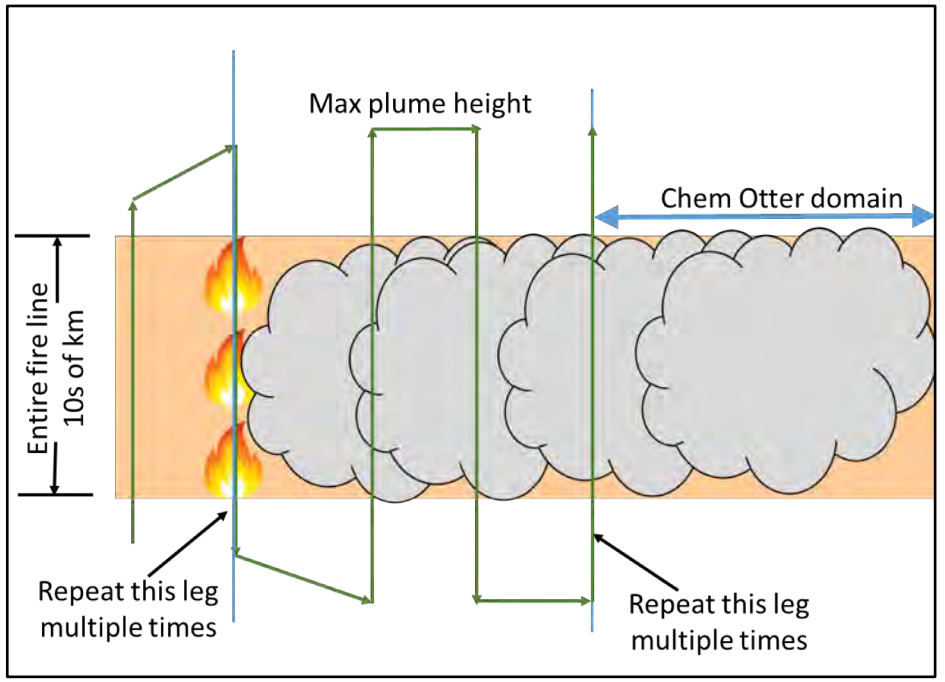
Science Goal: Mass flux



Side view

- Use 30 min to 1 hour time steps (repeat cycles) to cover evolution of fire
- 1-2 repeat cycles
- Need to cover entire fire length

Top view



Instrument	Position	Species Measured	Investigators	Institution
Picarro CRDS	1	CO, CO_2, CH_4, H_2O	Colm Sweeney	NOAA ESRL GMD
AIMSS Met Probe / Differential GPS	1	RH, Temp, Pres, Winds, GPS, flight data	Mike Robinson, Steve Brown	NOAA ESRL CSD
Tenax cartridge autosampler	1	Speciated VOC	Kelley Barsanti, Lindsey Hatch, Avi Lavi	UC Riverside
I^- ToF CIMS	2	Acids (HNO_3, HONO, Organics), acid gases (N_2O_5, $ClNO_2$), Oxygenated organics, Organic nitrates, Halogens	Joel Thornton, Brett Palm, Carley Fredrickson, Zach Decker	University of Washington / NOAA
Aerosol mass spectrometer, UHSAS	3	Aerosol composition + size distributions	Ann Middlebrook, Ale Franchin, Kathy Hayden, Shao-Meng Li	NOAA ESRL CSD Environment Canada
Brown carbon PiLS	4a	Spectrally resolved aerosol absorption	Rebecca Washenfelder, Jakob Lindass	NOAA ESRL CSD
Chemiluminescence	4b Floor	NO, NO_2, O_3	Andy Weinheimer, Denise Montzka, Geoff Tyndall, Frank Flocke	NCAR
TRAC Sampler	1 ?	Particle composition, mixing state, morphology	Alex Laskin	Purdue University
Offline WSOC analysis	4a	Particle composition	Cora Young, Lisa Azzarallo	York University

Instrument	Power (kVA)	Weight (lbs)	Deployed ? (1 = yes)	Deployed Weight (lbs)	Deployed Power (kVA)	Position	Notes
AMS	1.1	415	1	415	1.1	3	From Environment Canada, Jan 2018
Iodide ToF CIMS	1.1	380	1	380	1.1	2	UWFPS Weight
NCAR NO, NO2	1.1	369	1	369	1.1	4b	Current estimate from re-racking effort
CL O3		65	1	65	0	Floormount	Weight not inlcuded above, electrical included
BrC PiLS	0.42	192	1	192	0.42	4a	Includes rack weight for station 4
CO, CO2, CH4, H2O	0.2	52	1	52	0.2	1	Confirmed loan from Colm Sweeney, weight confirmed w/mini pu
Met Probe	0.1	7	1	7	0.1	1	
Data Acquisition	0.1	10	1	10	0.1	1	
UPS	0	33	1	33	0	1	33 lbs = 770 W / 1000 VA / 1U Li Ion UPS, 87 lbs to go to 2700 W
UCR VOC Sampler	0.2	30	1	30	0.2	1	Weight remains an estimate
TRAC Sampler	0.03	10	1	10	0.03	1 ?	From Alex Laskin, Nov 2018
POPS	0.2	10	0	0	0		Estimate
UHSAS	0.1	49	0	0	0		UWFPS Weight
UV O3		20	0	0	0		NOAA 2B Instrument
CRD-PAS	0.5	120	0	0	0		
Equipment Subtotal	**5.15**	**1762**	**11**	**1563**	**4.35**		
Pilots		360	1	360			2 pilots
Scientists		360	1	360			2 operators
Life raft		70	0	0			
Crew Subtotal		**790**		**720**			
Total	**5.15**	**2552**		**2283**	**4.35**		
Available	4 kVA 115 VAC	**2200**		**2200**			From Lindsey Norman, September 2016, Allows 2.75 hr (actual 3
	~3 kVA 28 VDC						Bill Dubé suggests actual power limit closer to 5 kVA total, rather
	up to 7 kVA						

https://docs.google.com/spreadsheets/d/1O0Tij-AY93KaB43RfqNDitCjnBwwj8q2P09koMyS8J0/edit#gid=660888805

No change since last teleconference

Deployment Schedule

July 15: Project Start Date

July 17 – 26: Integration at Research Aviation Facility (RAF), Broomfield CO

July 29 – 31: Test flights and transit to Boise

Will move transit earlier if possible – discuss later

August 2 – September 7: Research flights

September 9-11: Transit to and de-installation at RAF

September 12: Project End Date (Last possible date, may end sooner)

Probably end project earlier than Sept 12 – discuss later

180 flight hours on the schedule (!)

Probably cannot use all hours

Twin Otter / Mobile / Ground Organization Sheet

https://docs.google.com/spreadsheets/d/1UsNUt1p01yPSqkqvTFKMWMBGM4sFbagnt5WP8EsZUUs/edit#gid=0

- Contact me if you need access to this sheet
- If you have not done so, *please* update your information ASAP. This will be used for access to RAF in Broomfield

Person	Organization	Cell Phone	e-mail
Steve Brown	NOAA CSD	303 261 2265	steven.s.brown@noaa.gov
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Colm Sweeney			
Tim Newberger			
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Joel Thornton			
Brett Palm	UW	920 627 5430	bbpalm@uw.edu
Carley Fredrickson	UW	661 476 2098	cdfred@uw.edu
Zach Decker	NOAA CSD	850 529 8945	Zachary.Decker@noaa.gov
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Shao-Meng Li			
Rebecca Washenfelder	NOAA	619-507-2510	rebecca.washenfelder@noaa.gov
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Lisa Azzarello	York University		lisa96@my.yorku.ca
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Kevin Jankowski	Purdue		jankows0@purdue.edu
Jake Blaauboer	AOC		jacob.h.blaauboer@noaa.gov
Joe Greene	AOC	863-500-3972	joe.greene@noaa.gov

July 2019 | August 2019 | September 2019

Integration - RAF Broomfield | Research Flights - Boise | Deinstall - RAF

field participation pending during this period

CHEM Otter | MET Otter | Ground / Mobile

Integration at RAF & Shipping to Boise

Integration will take place at the NCAR Research Aviation Facility (RAF) in Broomfield, Colorado

Point of contact: Pavel Romashkin, 303 497 1027
Shipping Address:
NCAR/EOL Research Aviation Facility
10802 Airport Court
Broomfield, CO 80021-2561

Pavel will use the organization google sheet (previous page) to make arrangements for badges to RAF.
Please be sure your name and contact information are on that google sheet, *and* that you have indicated if you will be present for integration and de-installation

Shipping from Colorado to Boise:

- There will be a dedicated truck from RAF to Boise at the time of the transit flight (nominally July 31)
- I will need to know how much equipment you plan to ship
- More details to follow, but will probably use the google organization sheet for this

Location of Twin Otter in Boise

NASA DC-8 and its operations will be at the National Guard Base at the Boise Airport

NOAA Aircraft Operations has expressed a preference to base out of Jackson Jet Center, on the other side of the airfield

I have requested either that we base at the Guard base, or alternatively at one of the FBOs on the same side of the airfield (Jetstream or Western) to facilitate interactions with the NASA project

No word currently on that plan, but I will update this group at future teleconferences or as I know more

Current Twin Otter Mechanical Layout

Picarro
VOC Sampler
Met probe & Flight
Scientist Computer
TRAC ?

I^- CIMS

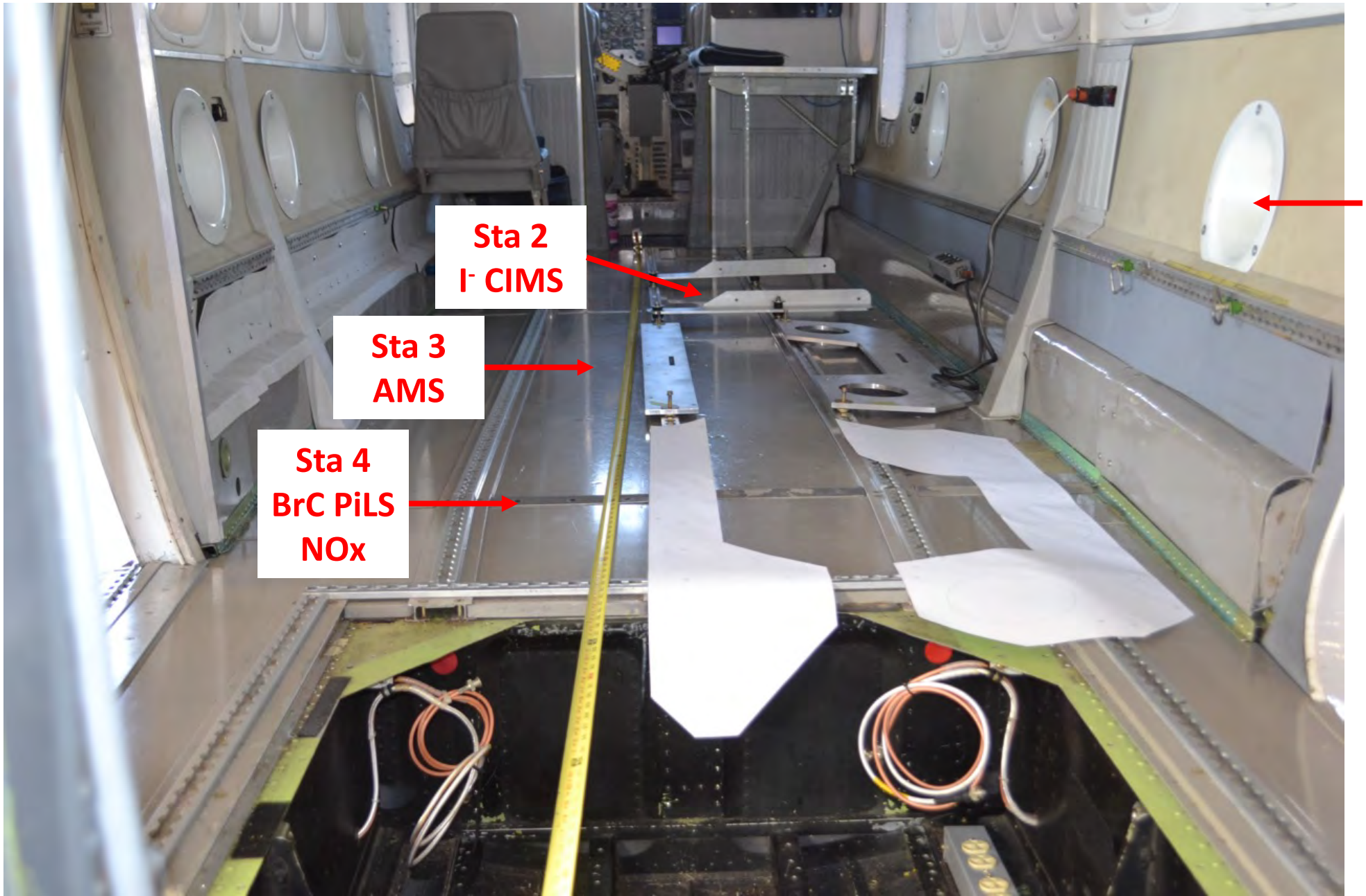
AMS
UHSAS

BrC PiLS
NO, NO2

O3

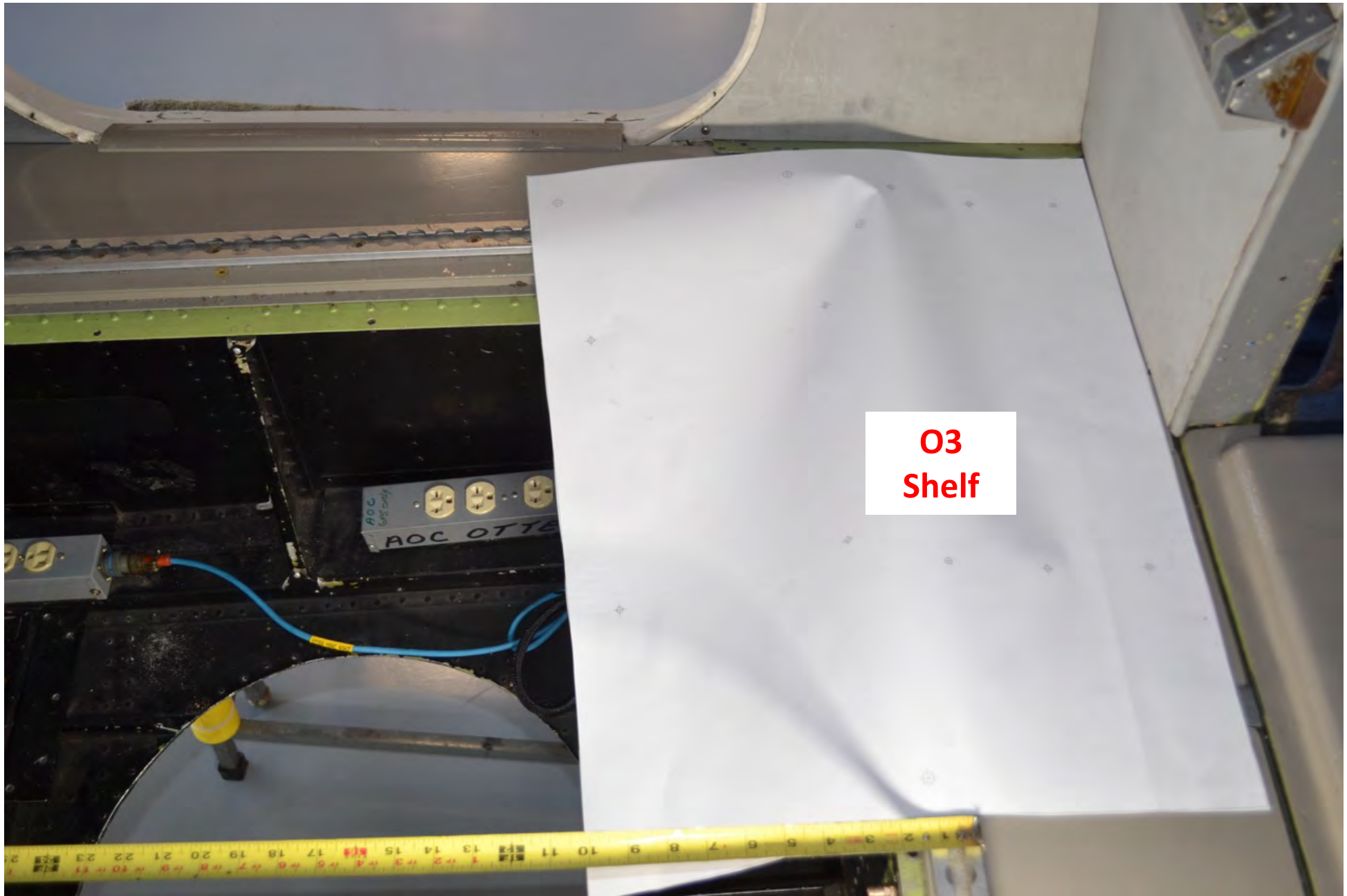
- Floor mount of ozone instrument tentatively OK'd by AOC - awaiting approval from Mark Lord
- Pumps for NO, NO2, O3 to be located aft of this drawing
- Working on lining up I- CIMS with inlet on window port
- Bottle locations still TBD

Chem Twin Otter Interior Layout

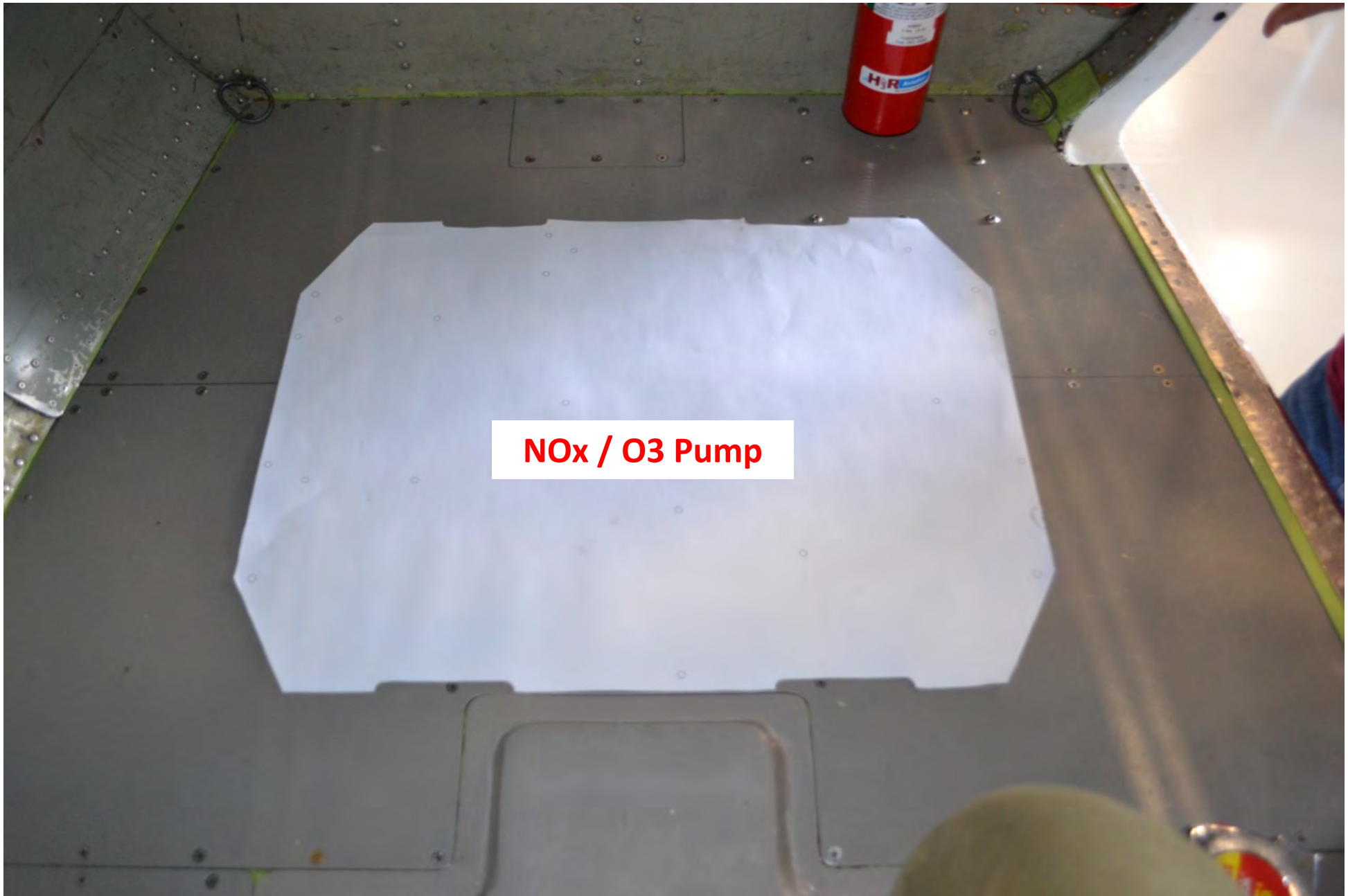


Chem Twin Otter Rear Layout

Chem Twin Otter O_3 Shelf



NOx / O3 Pump Location



Inlets


Exhaust Port
I- CIMS NOx / O3
Aerosol Inlet Picarro / VOC Sampler

Science Topics

A	B
Science Topics	Interested investigators
Insane logicstics and flight planning	Steve Brown
VOC emissions	
Aerosol emissions	
NOx Emissions	
BrC emissions	
Radical sources & oxidaiton chemistry	
O3 formation efficiency and potential	
Organic (and inorganic) nitrogen in BB - emissions and chemistry	
Photochemical SOA formation	
Photochemical BrC production and / or bleaching	
Nightitme BBVOC oxidaiton chemistry	
Nighttime heterogeneous chemistry (N2O5, ClNO2, HONO)	
Nightime SOA and BrC formation	
Vertical distributions in smoke filled valleys - day and night	

CHEM Otter | MET Otter | Ground / Mobile | Science Topics

- I have created and populated this tab in the org. spreadsheet with a few ideas for scientific analysis
- These are intended as seeds. Please add your ideas. Need topics that tie together the two aircraft, DC-8 and ground assets
- Indicate your interest now if possible. OK to have more than one investigator interested in a specific topic. This will help to facilitate collaboration and negotiation about scientific directions going forward, as well as specific flight plans