

Reflections on preparing for WE-CAN and TRANS²Am: Tasks, Timing and Helpful Tips

Emily Fischer and Ilana Pollack
FARE Workshop
Tuesday September 19, 2023



**COLORADO STATE
UNIVERSITY**

Thanks to NSF Award Numbers AGS-1650786 and 2020127

WE-CAN sampled wildfire smoke plumes during summer 2018.



WE-CAN PI Team was BIG:

Emily V. Fischer, Jeffrey Collett Jr. , Amy Sullivan, Paul DeMott, Susan van den Heever, Shane Murphy, Joel Thornton, Lu Hu, Frank Flocke, Darin Toohey, Sonia Kreidenweis, & Delphine Farmer

Photo from Alison Rockwell



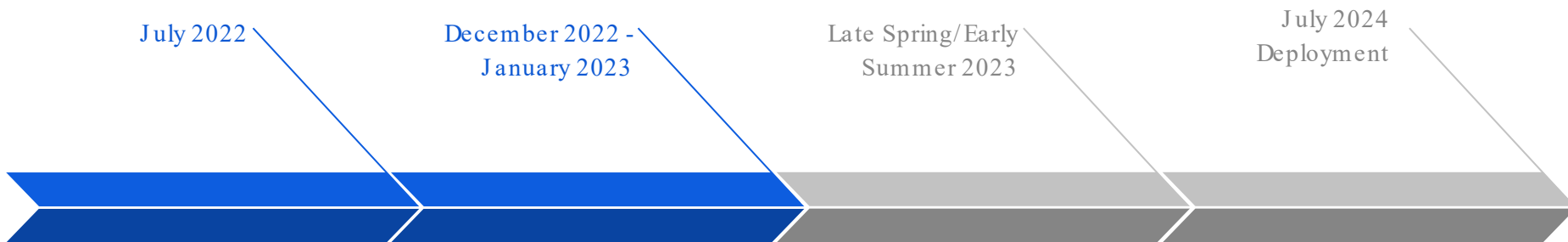
TRANS²Am sampled plumes from concentrated animal feeding operations in summers 2021/2022.



TRANS²Am PI Team was Smaller:
Emily V. Fischer, Ilana B. Pollack,
Amy Sullivan, and Dana Caulton



It takes >2 years of planning to organize a simple aircraft campaign. Example of upcoming campaign (SLC-SOS).



Ahead of LOI Submission:

Have initial conversations with facility engineers to identify instrument risks, with pilots to identify flight risks, and with team to ensure that proposed flight plans can meet all science goals

PRESTO forms and Proposal:

PRESTO now essentially requires you to write the full proposal. All instrument technical specifications will need to be submitted formally for feasibility determination. Need a decision tree too.

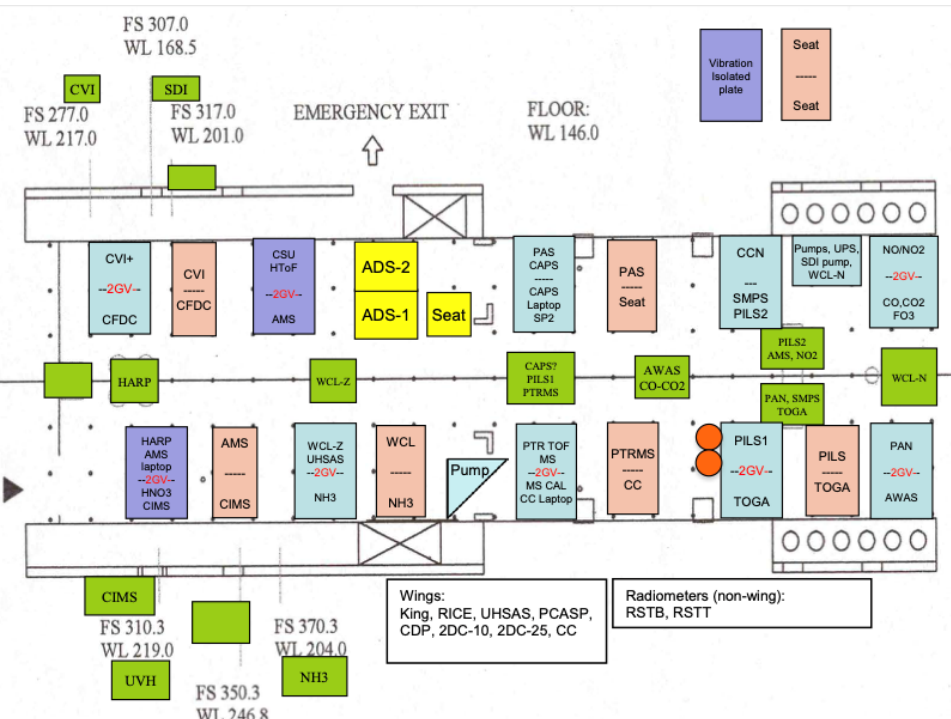
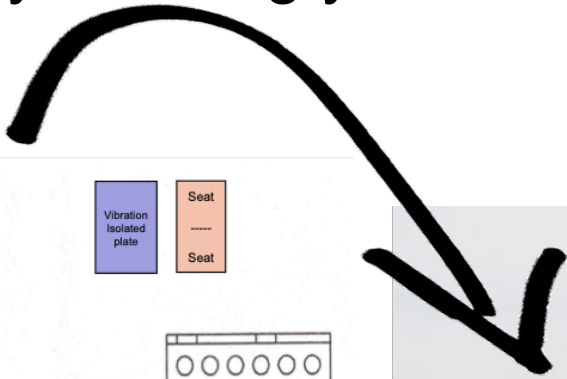
Funding Decision

Plan personnel, start regular team meetings, identify other collaboration opportunities. Take extra vacation because it is going to get crazy.

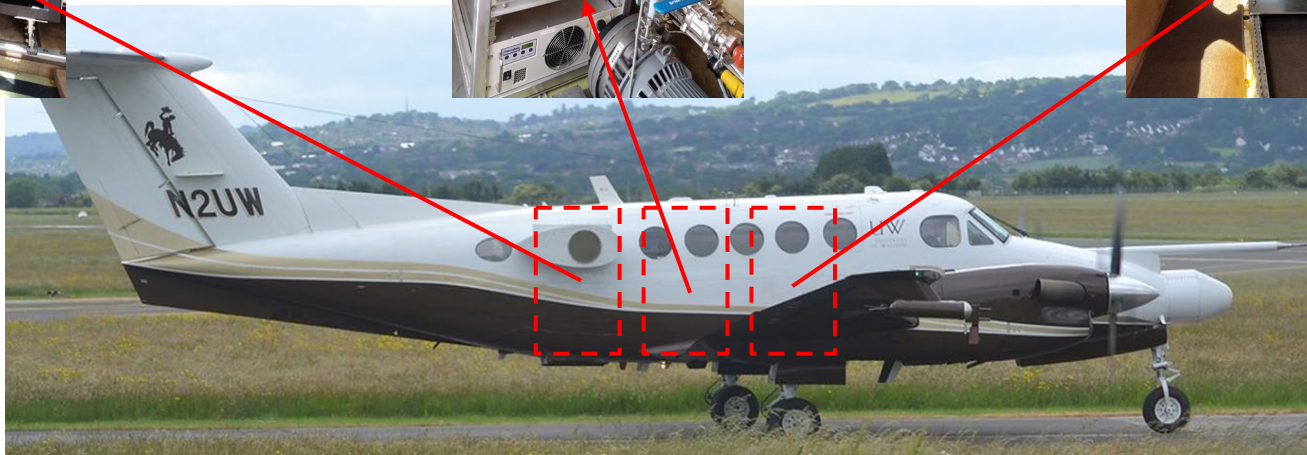
Weekly Planning Meetings

Finalize payload: October
Site Visit: October
Upload: April-May
Test Flights: May-June
Ferry: Late June

Be prepared to play a game of Tetris.
 Prepare for Tetris by knowing your team's needs & priorities.



Even smaller payloads require several back-and-forth discussions between science and engineering teams.



Planning week-by-week for ~1 year ahead of the campaign is helpful.

A4A Field Deployment Prep

File Edit View Insert Format Data Tools Extensions Help

75%

A1:B1 Activities

1	Activities	Dependencies and Dates	Responsible, Accountable, Consulted, Informed	Notes:											
2	Activity description	Expected Duration (days)	Preceding Activity	Succeeding Activity	Start Date	End Date	R	A	C	I	started?	In progress	In review	Done	Notes:
3	Deployment Logistics														
4	Book hotel or Airbnb in Dayton, OH						AS	IBP	AS, EL	All			<input checked="" type="checkbox"/>		Amy is confirming
5	Flights to Dayton						EL	IBP	AS, EL	All	<input type="checkbox"/>				Ilana is flying to Palmdale for the transit on the DC-8
6	Rental car in Dayton						AS	IBP	AS, EL	All	<input type="checkbox"/>				
7	Flights to Palmdale for deployment						IBP	IBP	AS, EL	All				<input checked="" type="checkbox"/>	
8	Rental car from Burbank for deployment						IBP	IBP	AS, EL	All				<input checked="" type="checkbox"/>	1 pm pickup, June 4 to July 1
9	Flights to Palmdale for install						IBP	IBP	AS, EL	All				<input checked="" type="checkbox"/>	
10	Rental car from Burbank for install						IBP	IBP	AS, EL	All				<input checked="" type="checkbox"/>	
11	Check with Rob and Mike about ARI in field participation						IBP/JRR	IBP/JRR	JRR/MA	All				<input checked="" type="checkbox"/>	
12	Create in-lab personnel schedule						EL, JJC, IBP	IBP	EVF	EVF				<input checked="" type="checkbox"/>	
13	Set up weekly meetings with CSU team members						IBP	IBP		All				<input checked="" type="checkbox"/>	
14	Create in-field personnel schedule				2/28		IBP	IBP	JRR/MA	All				<input checked="" type="checkbox"/>	Finalize schedule with ESPO registry
15	Set up biweekly engineering meetings with Rob and Mike						IBP	IBP	JRR/MA	All				<input checked="" type="checkbox"/>	biweekly on Monday at 1 pm starting on Feb 20.
16	Book Airbnb in Palmdale (4 people; May7-June30)						IBP	IBP	AS, EL	All				<input checked="" type="checkbox"/>	reimbursements submitted
17	get TILDAS crate from bay; label all other fischer lab items in bay				2/3	2/3	EL, JJC, IBP	IBP						<input checked="" type="checkbox"/>	Done! thanks, Team!
18	NASA ESPO forms														
19	Registration in ESPO database				2/28		all							<input checked="" type="checkbox"/>	Please register no later than Feb 28
20	Travel dates						all							<input checked="" type="checkbox"/>	Ilana completed on 2/14
21	Medical clearance						all							<input checked="" type="checkbox"/>	Ilana completed on 2/23
22	Laser permit form						IBP	IBP	JRR/MA					<input checked="" type="checkbox"/>	Ilana completed on 2/21
23	Laser safety training						all	all	all	all				<input checked="" type="checkbox"/>	Scheduled for March 24 at 11 am MT
24	overturning moment sheet						IBP	IBP	JRR/MA					<input checked="" type="checkbox"/>	update for plan A
25	Logistics survey (ESPO gases and cargo)						IBP	IBP						<input checked="" type="checkbox"/>	update cargo

NH3 instrument prep

Detailed Lab Experiments

CSU-NH3_Logistics_Dates

Personnel Schedule

Good management helps everyone understand their roles, builds trust, reduces conflict, and maximizes learning.

A4A Field Deployment Prep

File Edit View Insert Format Data Tools Extensions Help

75% 123 Defaul... 10 B I A

A1 Week

	A	B	C	D	E	F	G	H
1	Week	Estimated time	in-lab or remote	Activities	Helpful Links	Date/time	Date Completed	Notes
2				Getting started				(Tuesday's are busy for Ilana)
3	1/30-2/3	1 day	R	Explore TILDAS documentation	https://drive.google.com/drive/folders/1QOEfy3uGOLqbHnqLanHBUjSFUjIPFG?usp=share_link	EL (Feb 8-14)		
4		1 hour	L or R	Install Igor Pro 7, load ipts.	https://docs.google.com/document/d/1vM09iOzDFAYsSbYRbrkq7TH6MN9OT3hw6J6UMQYLA/edit?usp=sharing	EL and IP (Jan 31)	2/1	Igor 3-10, academic seat license
5		2 hours	L	Get familiar with the startup and shutdown procedures for the TILDAS	https://docs.google.com/document/d/1XuWstk1POEHp8wWVvp_4g-Z_sE9fZ274vW74bMnhd8/edit?usp=share_link	EL and IP (Jan 31)	2/1	
6		4 hours	L	Learn TDLWintel operation software (contol valves, etc.); teamviewer	https://drive.google.com/file/d/1jtdHmkBLdRtLQXb-ufuWGHazY1jRVQzq/view?usp=share_link	EL and IP (Jan 31)	2/1	
7		2 hours	L	Learn how to check the ref cell pressure and etalon alignment	https://docs.google.com/document/d/1Qby2f1Mnse6Em-bNxbixRBtrZvqmTh9n8c731shs0/edit?usp=sharing	EL and IP (Feb 1)	2/1	
8		2 hours	L	Fittings review	https://www.youtube.com/watch?v=FdtHSDH8gk	EL and IP (Feb 1)	2/1	
9		2 day	L	Trace the plumbing and Create flow diagrams	https://drive.google.com/file/d/1XJzH1K1kCv2xC2xUHQj67JS88oNx0EPU/view?usp=share_link	EL and JJC	2/3	go through path flow and sketch it in paper
10				Experiment 1				
11	2/6-2/10	1 hour	L	Learn how to measure flows (sample, cal, suckback) with DryCal flow standards; know how to measure and how to convert between standard and volumetric flows	https://mesalabs.com/occupational-health-safety/videoc	EL and JJC	2/3	we have the 'defender' model / also practicing turning the instru
12				Connect and do cals		EL and JJC	2/7	done
13		1 hour	L or R	Learn how to set schedules to perform cal/zeros		EL and JJC	2/7	done
14		1 day	L or R	Learn how to work in Igor	https://drive.google.com/drive/folders/1YlQl_1tMKT4Q42y9Bpn9mfY191hpTvz7?usp=share_link	EL and JJC	2/7	The post-proessing of data might take longer if Emily is not fami
15		1 day	L or R	Learn how to download data and post-process data in Igor		EL and JJC	2/7	done
16		2 hours	R	calculate time response from cal/zero data; compare with Ilana's 2019 AMT paper	https://amt.copernicus.org/articles/12/3717/2019/	EL and JJC	2/7	done
17		2 hours	L and R	verify that zeros with the ZAG match zeros using a UZA cylinder		EL and JJC	2/14	done
18		1 day	R	Analyze exp 1 data		EL and JJC	2/14	This one can be use for learning to process the data
19				Experiment 2				
20	2/13-2/17	2 hours	L	Clean inertial inlet glass			2/3	To Ilana: JJC does not feel confident enough to take apart aircre
21		1 day	R	set schedule to do cals and zeros; look for difference in time response			2/7	done

NH3 instrument prep 2 Detailed Lab Experiments CSU-NH3_Logistics_Dates Personnel Schedule

The logistics of aircraft work are complex. Start ASAP. Consult with the experts early and often.



Do you need compressed gases? Keep in mind:
1) specific cylinder sizes allowed, 2) don't assume these will be purchased for you, 3) place orders early.

Do you need chemicals on the aircraft, on the ground, and in the lab?

What are your lead times for supplies?

Smaller aircraft may have trouble accommodating large power hungry equipment.

Have you accounted for everything?

What inlet is best for your needs?

Is the sample line length between inlets and instruments OK?

Will connections be accessible for maintenance and troubleshooting?

Are your weights, spaces, moments possible? Is the hardware all aircraft-approved?

Does everything fit inside the footprint of the rack?

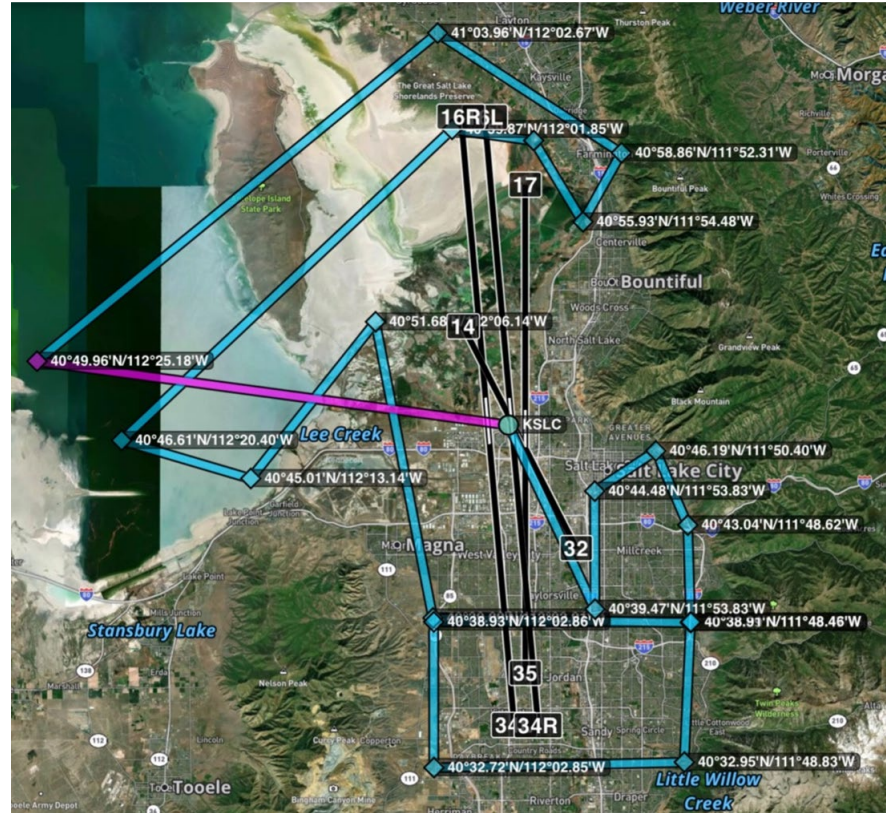
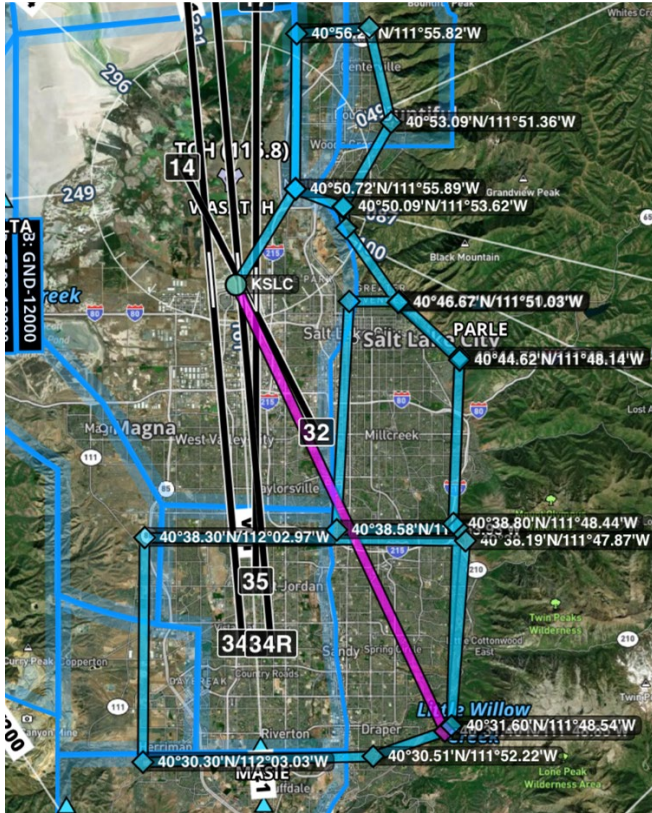
If possible, place switches and valves where you can reach them during flight.

Do you need a laptop or network connection?

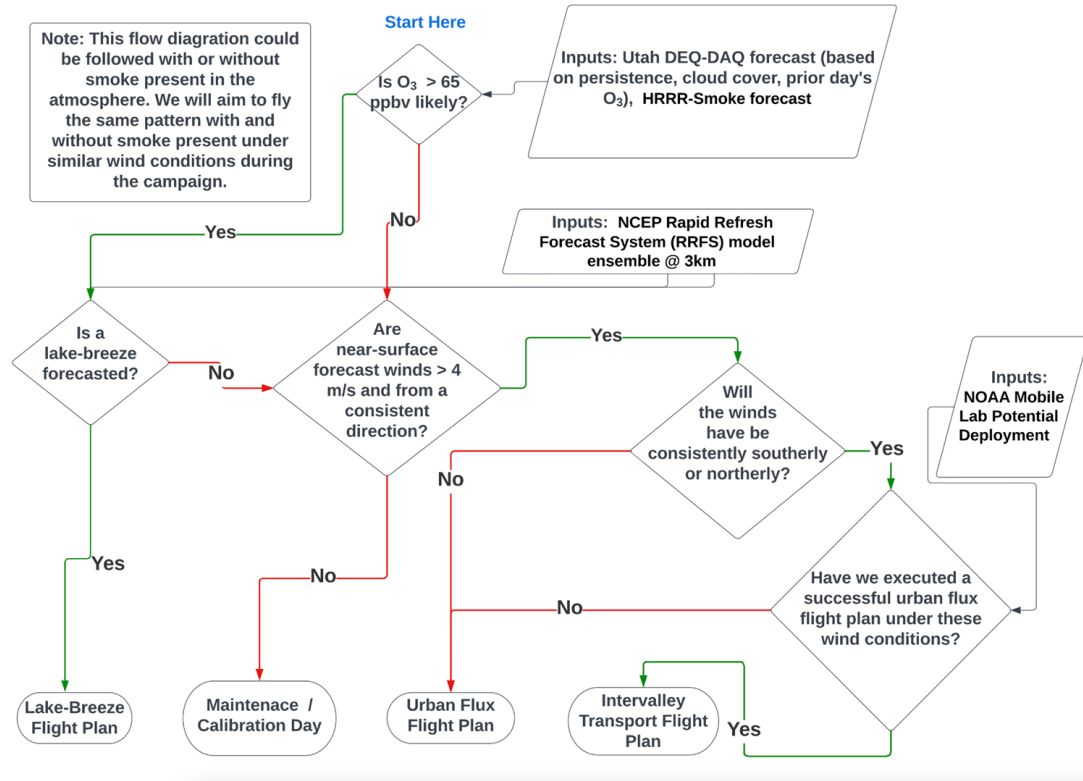
Are your instrument materials aircraft approved?

Does your instrument need a UPS?

Ask the pilots how to meet your objectives. Brainstorm options with them. Do your flight planning in ForeFlight.



Agree on a decision tree with your team if the campaign has multiple objectives or flight pattern possibilities.



Request & use field catalog. Execute inclusive forecasting meetings. Double check everyone's data management.

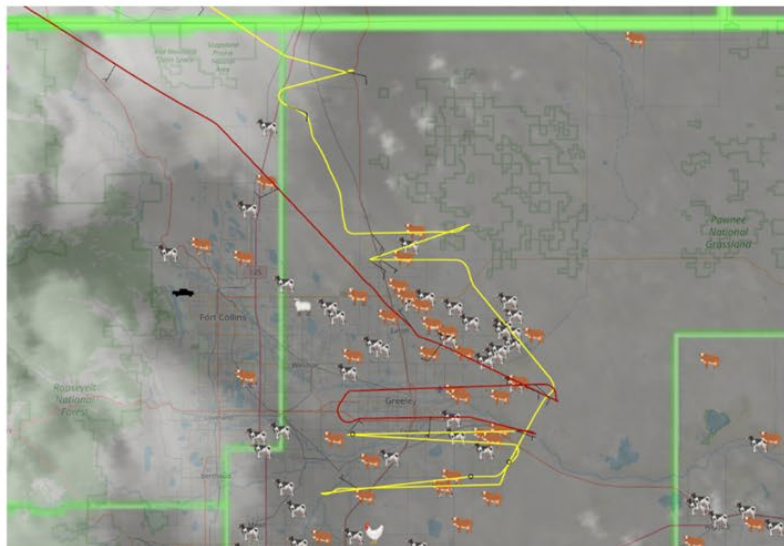


TRANS2AM Field Catalog

Transport and Transformation of Ammonia

[Home](#) [Maps](#) [Reports](#) [Status](#) [Products](#) [Missions](#) [Tools & Links](#) [Data Access](#) [Help](#)

[Contact Us](#)



Status

The TRANS2AM campaign took place in two phases across 2021 and 2022. The first phase of operations took place August 1st - August 25th, 2021 after needing to end the operations early due to a bird strike of the King Air. The second phase of operations took place August 15th - September 3rd, 2022 after needing to once again end early due to King Air engine issues. Still, the University of Wyoming King Air equipped with NH₃, HNO₃, PILs, and various other atmospheric sensors provided an excellent dataset to understand the amount of ammonia present in the atmosphere downwind of large sources in northeast Colorado.

[TRANS2AM Mission Table](#): Summary of TRANS2AM operations and related products

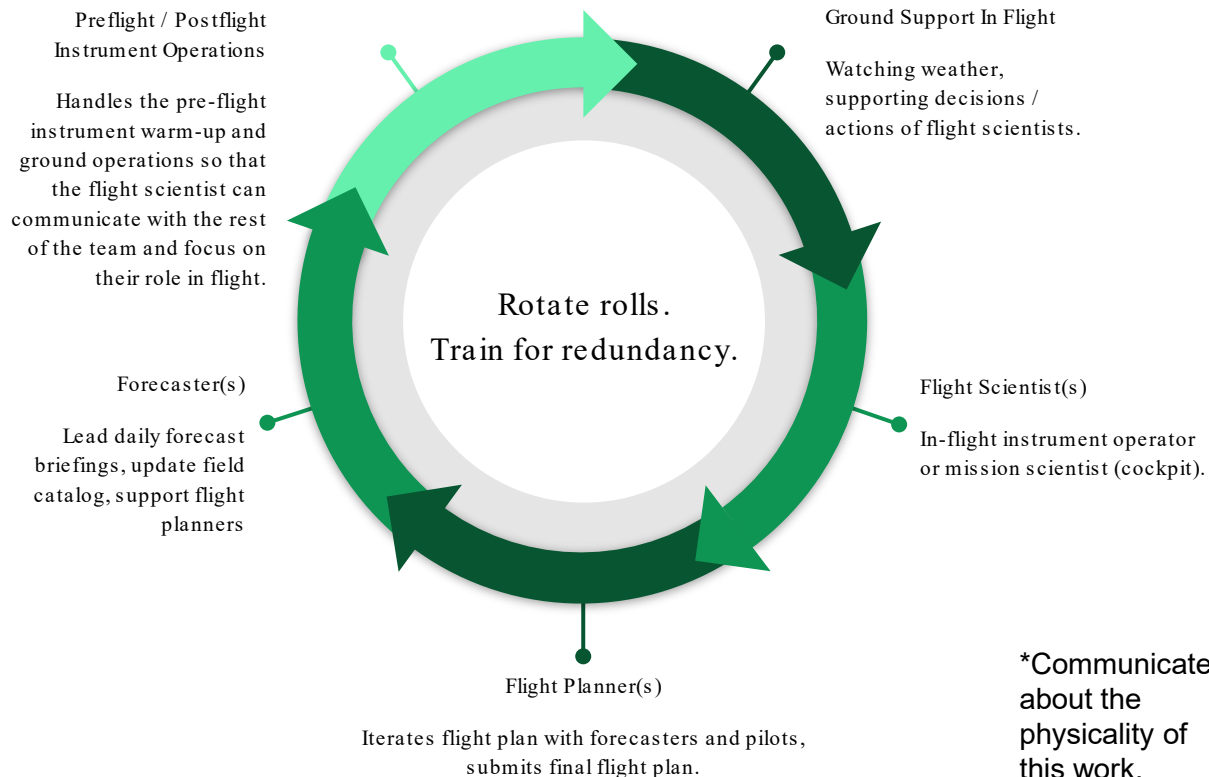
[TRANS2AM Reports](#): List of reports related to project operations

[TRANS2AM Maps](#): Replay missions in a GIS environment

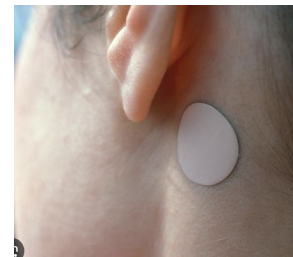
[Data Access](#): Datasets for this project can be found in the Long Term Data Archive at NCAR/EOL for TRANS2AM

[TRANS2AM Web Page at NCAR/EOL](#): All other Data Management related questions

Minimize fatigue* with enough personnel to fill each role. Here's what works well for us:



*Communicate about the physicality of this work.



Find a good mentor who already knows the ropes.



Set up support systems to ensure the success of all trainees.
Students can step into leadership roles with mentoring.

