Campaign: HIPPO3 Flight: RF01

NCAR/SCRIPPS MEDUSA Checklist V. 2009.03.15

Date: 20100316 **Campaign:** HIPPO3 **Flight:** RF01 **From-To:** KBJC-KBJC

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 10 03

✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane

✓ 2) Install new traps Upstream: D Downstream: B

✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings

✓ 4) Record Flask Box Numbers: Box #1 105 Box #2 113

✓ 5) Install flask box retaining pins

✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up

✓ 7) Replace cover shields and complete rack book → not needed - were installed for SAR

✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)

✓ 9) If necessary, download data from previous flight to laptop and pen drive

✓ 10) Check that flask table is clear. If not, "clear all"

11) Complete flask leak check procedure #1 Start UTC ___ : ___

12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC ___ : ___

13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed

14) Record Ps: Pup ____ Pdown ____ Pbypass ___ then all power off

Flask ID Table (View from Front of Box)

13 1408 ←	12 1204	5 1409 ←	4 1031
14 1417	11 1434	6 1429	3 1431
15 1404	10 1423	7 1416	2 1412
16 1424	9 1433 ←	8 1421	1 1426

17 1257	24 1341	25 1037 →	32 1336
18 1214	23 1241	26 1392	31 1267
19 1226	22 1177	27 1233	30 1038
20 1167	21 1061 →	28 1226	29 1004

B. 2-hours before take-off.: Dry ice and Sampler Set-up

✓ 1) Load dry ice into dewar 1.0" from lid UTC 17 : 00

✓ 2) Ensure that MEDUSA valve control key is in place

✓ 3) 28 V breaker on, Valve box on, Main breaker on

✓ 4) Record P / Δ: Pup 552 / 556 Pdown 529 / 447 Pbypass 528 / 412

SKIPPED 5) Sync MEDUSA clock with clock on laptop +/- 1 sec

MEDUSA time UTC 17 : 31 : 00 Laptop time UTC ___ : ___ : ___

Sync to Jonathans watch WATCH TIME

[the 1 had been pressurized day prior]

★ was MED lost internal battery?

★ REGREASE ORINGS ON SYNFLEX

★ consider replacing some flask synflex lines

Pump down 5:56 PC1 - 10

✓ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 7) Open all flask stopcocks 2 half turns Flasks opened by: JDB/~~SS~~
✓ 8) Re-install splinter shields and complete rack book
✓ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 30 flushT 150
✓ 10) Verify that no values are blinking on screen
✓ 11) Note trap temperature Trap T: 40
✓ 12) Complete bypass / system leak check
✓ 13) Ensure both controllers are to auto
✓ 14) Turn pumps on
✓ 15) Verify pressures are controlling and flow is as expected
Pup 129 Pdown 579 Pbypass 746 Flow 3040
✓ 16) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 17) Pump breaker off (PB and VB stay on)

3×60 = 180

II. In flight

A. Immediately after take-off Take-off time UTC 18 : 08 : 02

✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from II.C. ?
Pup 130 Pdown 580 Pbypass 753 Flow 3000
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 19 : 17 : 28 Close off & 1 LPM
✓ 5) Note trap temperature Trap T: 39.6

EDIT

B. Once pre-purge is finished, samples are ready to be taken. Wait until appropriate sampling time, 45 seconds after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

All rows 1 LPM after

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	9.6	442	130/580	19:37:08	5790	9	
2	9.6	442	Bo↓	1942	~5K	1	
3	9.5	422	low	19:47:22	7.5K	1	
4	9.8	440	low	19:53:18	10.5K	1	
5	9.8	444	Low	19:59:45	162	1	~1938 UTC
6	9.7	432	Low	20:07:48	21900	1	
7	9.7	438	Low	20:18:18	28K	1	
8	9.7	444	Low	20:30:41	37K	1	At 46K ft Low pressure
9	9.5	440	Low	21:07:42	17.7	1	
10	9.6	438	Low	21:50:00	13K	1	
11							
12							
13							
14				~21:15:00?			
15							
16							

X 1) After sampling flask 16, close flasks 1-16 UTC: ___ : ____
X 2) Note trap temperature Trap T: _____

@ 46 kft → 19:50:00 - 36 Breath on inlet fittings
@ 45 kft → 19:52:00 - 30 " " filter holder

Campaign: HIPPO3 Flight: TF01

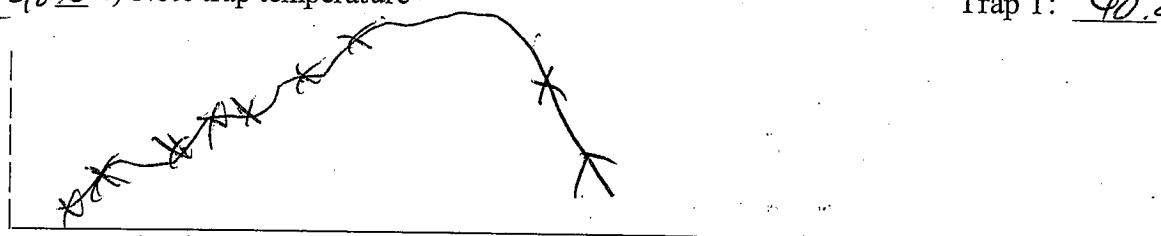
Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							

X 3) After sampling flask 32, close flasks 17-32

UTC: ___ : ___

X 40.0 4) Note trap temperature

Trap T: 40.0



_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

X 1) Turn valve box breaker off

X 2) Turn Pumps breaker off

No X 3) Ensure all flask valves closed

X 4) Turn Mains breaker off

X 5) Turn 28V breaker off

~UTC 20 : 15

IV. Post-flight

✓ 1) Remove traps

✓ 2) Plug holes in dewar lid

3) Download flask sampling data to laptop and pen drive

4) Empty beads from upstream trap into 'wet' bead container to dry

5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap

__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** _____

- ✓ 1) 28 V breaker on, Valve box on, Pump box on
- ✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
- ✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
- ✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
- ✓ 5) Adjust prepurge time to 20 seconds
- ✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
- ✓ 7) Run 20-second prepurge to evacuate all flask downstream tubes
- ✓ 8) Save PNG of AERO S Ps, Flows, and Stats to laptop
- ✓ 9) Close Pdn, turn pumps off (will leave in position 1)
- ✓ 10) Turn bypass on

→ ~~RTMP~~ sample => ~~141 150~~

Flask Leak Check Procedure #2: **File:** 100317_TF01_Leakcheck2.png

- ✓ 1) "Clear All"
- ✓ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
- ✓ 3) Adjust prepurge time to 20 seconds
- ✓ 4) Run 20-second prepurge to check all flask downstream tube Ps
- ✓ 5) Record times for AEROS matching: Start _____ Finish _____
- ✓ 6) Save PNG of AEROS Ps and Stats to laptop (YYMMDD_RF##_Leakcheck2.png)
- ✓ 7) Address any apparent leaks

Bypass / System Leak Check Procedure:

- ✓ 1) Ensure bypass on
- ✓ 2) Close PC1 and open PC2
- ✓ 3) Turn on pump breaker and let run for 1 minute
- ✓ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
- ✓ 5) Switch PC2 to closed and turn off pump
- ✓ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
- ✓ 7) After 1 minute, record values again.
- ✓ 8) After 5 minutes, record values again
- ✓ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
- ✓ 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
- ✓ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
002300	140	147	156	
~1730				
17:51:00	1	144	152	
17 53 00	10	144	152	
16:59:00	3	141	151	

Campaign: HIPPO Flight: TF02 delete EDIT

☆: Possibly add to MED code option to energize one bypass valve @ a time.

☆Run test tomorrow to determine whether gopro off valve is causing TF03

NCAR/SCRIPPS MEDUSA Checklist V. 2010.03.15

Date: 100318 **Campaign:** HIPPO3 **Flight:** TF03 **From-To:** BOU - BOU

I. Preflight

A. Day(s) before flight Date (YYMMDD) = previous day-week

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: ? Downstream: 8
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 105 Box #2 113
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- ✓ 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC ___ : ___
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC ___ : ___
- ✓ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup ____ Pdown____ Pbypass ___ then all power off

Flask ID Table (View from Front of Box)

13 1408 ←	12 1204	5 1409 ←	4 1031
14 1417	11 1434	6 1429	3 1431
15 1404	10 1423	7 1416	2 1412
16 1424 ↓	9 1433 ←	8 1421	1 1426
17 1257 ↓	24 1341 →	25 1037	32 1336
18 1214	23 1241	26 1392	31 1267
19 1226	22 1177	27 1233	30 1038
20 1167 →	21 1061	28 1126 →	29 1004

Scanned on 10-20

B. 2 hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 14 : 43
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ~~X 4) Record P / Δ: Pup 516 / ____ Pdown 528 / ____ Pbypass 528 / ____~~ → put traps in AM
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec

MEDUSA time UTC 15 : 08 : 00 Laptop time UTC 15 : 08 : 00

EDIT

✓ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 7) Open all flask stopcocks 2 half turns Flasks opened by: JDB
✓ 8) Re-install splinter shields and complete rack book
✓ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset ≤80 prepurgeT 30 flushT 150
Still have to be programmed in
✓ 10) Verify that no values are blinking on screen
✓ 11) Note trap temperature Trap T: 40.0
✓ 12) Complete bypass / system leak check
✓ 13) Ensure both controllers are to auto
✓ 14) Turn pumps on
✓ 15) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 579 Pbypass 762 Flow 3060
✓ 16) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 17 : 28 : 50

✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.C. ?
Pup 129 Pdown 580 Pbypass 760 Flow 2950
BOTH
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 17 : 32 : 00
✓ 5) Note trap temperature Trap T: 38.2

B. Once pre-purge is finished, samples are ready to be taken. Wait until appropriate sampling time, 45 seconds after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

18:41, manually to pos 11 @ ~ 18kft ASL 90/690

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1							
12	9.1	862	130/580	19:34:03	34		
13	8.9	862	"	19:40:45	34		
14	9.0	861	"	19:46:29	34		
15	8.9	874	"	19:52:12	34		
16	9.2	865	"	19:58:14	40		
7							
8							
9							
10							
11	9.4	847	130/580	18:38:40	2kft		PNC → got 5 sec of air
12	9.3	853	"	18:39:09	7.5k		
13	8.9	859	"	46:53	20k		
14	9.1	864	"	19:04:00	25k	maneuvers	CMS lung samples
15	8.7	864	"	19:17:31	29k		
16	8.9	865	"	19:23:25	34k		

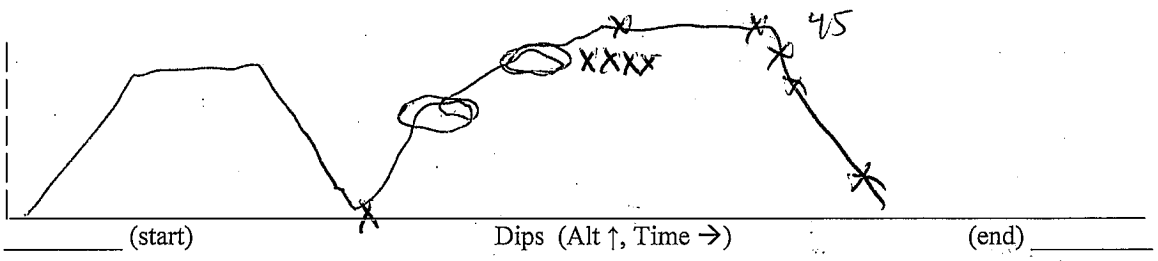
redid and recorded above

___ 1) After sampling flask 16, close flasks 1-16 UTC: ___ :
✓ 2) Note trap temperature Trap T: 40.0

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	8.33	786	90/690	20:10:06	45		to 90/690 @ 19:59
18	8.3	807	"	20:15:55	43		
19	8.3	814	"	20:29:53	41		
20	8.3	841	130/580	20:52:28	10		to 130/580 @ 20:45
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							

✓ 3) After sampling flask 32, close flasks 17-32 UTC: ___ : ___

✓ 4) Note trap temperature Trap T: 39.9



III. At the end of the sampling

✓ 1) Turn valve box breaker off UTC 20 : 54

✓ 2) Turn Pumps breaker off

✓ 3) Ensure all flask valves closed

✓ 4) Turn Mains breaker off

✓ 5) Turn 28V breaker off

IV. Post-flight

__ 1) Remove traps

__ 2) Plug holes in dewar lid

__ 3) Download flask sampling data to laptop and pen drive

__ 4) Empty beads from upstream trap into 'wet' bead container to dry

__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap

__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 100317 ~~MED~~ Maint Day

__ 1) 28 V breaker on, Valve box on, Pump box on
__ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
__ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
__ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
__ 5) Adjust prepurge time to 20 seconds
__ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
__ 7) Run 20-second prepurge to evacuate all flask downstream tubes
__ 8) Save PNG of AEROS Ps, Flows, and Stats to laptop
__ 9) Close Pdn, turn pumps off (will leave in position 1)
__ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** 100317_MaintDay

__ 1) "Clear All"
__ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
__ 3) Adjust prepurge time to 20 seconds
__ 4) Run 20-second prepurge to check all flask downstream tube Ps
__ 5) Record times for AEROS matching: Start _____ Finish _____
__ 6) Save PNG of AEROS Ps and Stats to laptop (YYMMDD_RF##_Leakcheck2.png)
__ 7) Address any apparent leaks

Bypass / System Leak Check Procedure:

✓ 1) Ensure bypass on
✓ 2) Close PC1 and open PC2
✓ 3) Turn on pump breaker and let run for 1 minute
✓ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
✓ 5) Switch PC2 to closed and turn off pump
✓ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
✓ 7) After 1 minute, record values again.
✓ 8) After 5 minutes, record values again
✓ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
✗ 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
✓ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
15:20:00	2	141	150	
15:22:00	5	142	150	
15:24:00	12	142	150	
15:26:00	19	142	150	

Campaign: HIPPO 3 Flight: RF01 Date EDIT Page 1 of 4

NCAR/SCRIPPS MEDUSA Checklist V. 2010.03.18

Date(YYMMDD): 100324 **From-To:** BJC-AWC

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 100323

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: ___ Downstream: B
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 B Box #2 ___ → some comb. of 105, 113, and leftoves from TF02
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- ✓ 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC ___:___
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC ___:___
- ✓ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup ___ Pdown ___ Pbypass ___ then all power off

Flask ID Table (View from Front of Box)

13 1064 ←	12 1107	5 1014 ←	4 1073
14 1393	11 1188	6 1281	3 1030
15 1008	10 1136	7 1336	2 1206
16 1156	9 1148 ←	8 1403	1 1208

17 1001	24 1341 →	25 1037	32 1316
18 1396	23 1241	26 1392	31 1267
19 1133	22 1177	27 1233	30 1038
20 1165 →	21 1061	28 1126 →	29 1004

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 16 : 10
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 558 / ___ Pdown 571 / ___ Pbypass 572 ___
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec

MEDUSA time UTC 16 : 31 : 06 Laptop time UTC 16 : 31 : 05

✓ 5b Connect Flasks Quick-connects

6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
7) Open all flask stopcocks 2 half turns Flasks opened by: JDB
8) Re-install splinter shields and complete rack book
9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
10) Verify that no values are blinking on screen
11) Note trap temperature Trap T: 40.0
12) Complete bypass / system leak check
13) Ensure both controllers are to auto
14) Turn pumps on
15) Verify pressures are controlling and flow is as expected
Pup 129 Pdown 580 Pbypass 758 Flow 3000
16) If necessary, "Clear All" (after being sure data from last flight copied)
17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 18 : 44 : 43

1) Turn pump breaker on
2) Verify pressures/flows agree with previous values from I.B.15.
Pup 130 Pdown 580 Pbypass 767 Flow 3000
3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
4) Start pre-purge UTC 18:45:36
5) Note trap temperature Trap T: 39.1
7) Record png of prepurge: (YYMMDD_rf##_prepurge) File:

Something is wrong w/ reading of Alt

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	9.6	870	130/580	193132	40		First high leg
2	9.6	873	"	193643	40		
3	9.6	869	"	19:49:34	"		
4	8.3	812	90/690	20:12:45	"		
5	8.3	813	"	202325	"		
6	8.3	813	"	202940	"		
7	8.3	868	130/580	203809	28	1	
8	7.6	868	"	204337	21	1	
9	7.7	866	"	204734	15	1	
10	8.0	863	"	205148	10	1	
11	7.7	868	"	210010	5	1	
12	8.8	868	"	210633	1	1/2	
13	7.7	869	"	210932	5	2	
14	?	?	"	211350	13	2	AERO> DEAD
15			"	211642		2	
16	9.6	868	"	211947	21	2	

1) After sampling flask 16, close flasks 1-16 UTC: ___ : ___
2) Note trap temperature Trap T: _____

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	9.6	868	130/580	21:23:37	27	2	
18	9.7	882	130/580	21:37:33	28	/	while steady @ 28
19	9.1	891	"	21 46 19	23	/	
20	8.3	873	"	21 53 17	23	3	sort of... ascent
21	9.8	891	"	56 57	28	3	
22	9.8	895	"	220301	32	3	
23	9.4	878	"	22:10:56	32	3/4	
24	7.6	871	"	22 29 45	21	4	
25	7.7	869	"	22 36 02	18	4	
26	7.9	867	"	22 38 54	15	4	
27	7.6	869	"	22 43 47	11	4	
28	8.3	870	"	22 51 40	5	4	
29	8.0	840	"	23 05 21	3	4	
30	9.8	877	"	23 44 22	38	/	
31	9.5	841	90/690	23 47 31	43	/	BAD SAMPLE (not controlling)
32	8.3	818	90/660	00:02:07	43	/	

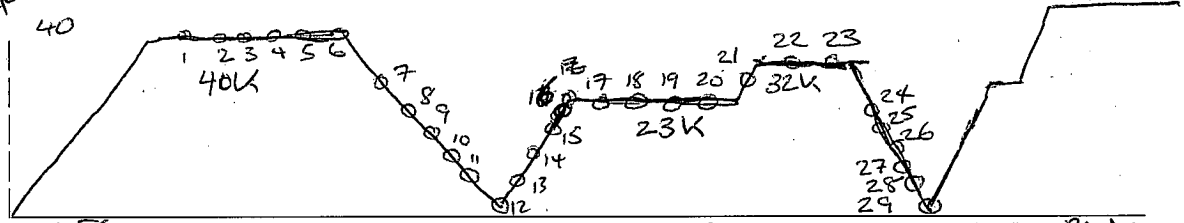
~3000 sccm

went back and resampled at proper settings

23:59:00
8.3 815
42

✓ 3) After sampling flask 32, close flasks 17-32 UTC: 00 : 05

__ 4) Note trap temperature Trap T: 40



KBJC (start) Dips (Alt ↑, Time →) (end) PANC

III. At the end of the sampling

✓ 1) ~~Turn valve box breaker off~~ UTC ___ : ___ ?

✓ 2) Turn Pumps breaker off

✓ 3) Ensure all flask valves closed

✓ 4) Turn Mains breaker off

✓ 5) Turn 28V breaker off

IV. Post-flight

✓ 1) Remove traps

✓ 2) Plug holes in dewar lid

✓ 3) Download flask sampling data to laptop and pen drive

✓ 4) Empty beads from upstream trap into 'wet' bead container to dry

✓ 5) Open downstream trap and set upright

V. ~~Day after~~ flight

✓ 1) Transfer beads from downstream trap into upstream trap

✓ 2) Unload flasks. Box #1: 107 Box #2 112

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** _____

✓ 1) 28 V breaker on, Valve box on, Pump box on
✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
X 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
✓ 7) Run 20-second prepurge to evacuate lines. Start: 21:01:15 Finish: _____
✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
✓ 9) Close Pdn, turn pumps off (will leave in position 1)
✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** 100323-MaintDayLeakcheck2ff.png

✓ 1) "Clear All"
✓ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
✓ 3) Turn pump on and evacuate bypass (~~toggle between sample and bypass 6 times~~).
✓ 4) Turn pump off.
✓ 5) Adjust prepurge time to ~~20~~ 10 seconds
✓ 6) Run 20-second prepurge to check all flask downstream tube Ps
✓ 7) Record times for AEROS matching. Start: 17:27 Finish: 17:37
✓ 8) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
✓ 9) Address any apparent leaks

Bypass / System Leak Check Procedure:

✓ 1) Ensure bypass on
✓ 2) Close PC1 and open PC2
✓ 3) Turn on pump breaker and let run for 1 minute
✓ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
✓ 5) Switch PC2 to closed and turn off pump
✓ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
✓ 7) After 1 minute, record values again.
✓ 8) After ~~3~~ minutes, record values again
✓ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
X 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
✓ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
16:59:45	0	140	149	
17:00:45	1	140	150	
17:01:45	3	140	150	

NCAR/SCRIPPS MEDUSA Checklist V. 2010.03.18

Date(YYMMDD): 100326 **From-To:** PANC - PANC

Volcanic Haze Sonoric Fuji // Monitor in Kulis

76 N low Trop sample

Ralph Cordova // ★ ★

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 100325

- 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- 2) Install new traps Upstream: ____ Downstream: ____
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 107 Box #2 112
- 5) Install flask box retaining pins
- 6) Connect plumbing. Confirm lines are correctly installed with red label up
- 7) Replace cover shields and complete rack book
- 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- ✓ 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC 19 : 37
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 20 : 27
- ✓ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup 162 Pdown 168 Pbypass 168 then all power off

Flask ID Table (View from Front of Box)

Broken dip tube

13 1247 ←	12 1304	5 1152 ←	4 1215
14 1092	11 1415	6 1265	3 1056
15 1437	10 1180	7 1319	2 1162
16 1117	9 1271 ←	8 1260	1 1332
17 1363	24 1354	25 1351 →	32 1078
18 1364	23 1361	26 1358	31 1365
19 1353	22 1382	27 ~~1350~~ 1115	30 1357
20 1164 →	21 1355	28 1360 →	29 1129

Broke

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 16 : 00
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 591 / +591 Pdown 604 / +442 Pbypass 606 / 438
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec

MEDUSA time UTC 16 : 41 : 01 Laptop time UTC 16 : 41 : 01

✓ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 7) Open all flask stopcocks 2 half turns Flasks opened by: JDB
✓ 8) Re-install splinter shields and complete rack book
✓ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 10) Verify that no values are blinking on screen
✓ 11) Note trap temperature Trap T: 40.0
✓ 12) Complete bypass / system leak check
✓ 13) Ensure both controllers are to auto
✓ 14) Turn pumps on
✓ 15) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 580 Pbypass 744 Flow 3000
✓ 16) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 17 : 59 : 50
✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.15.
Pup 130 Pdown 580 Pbypass ____ Flow 300
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 18 : 00 : 15
✓ 5) Note trap temperature Trap T: 39.1
✓ 7) Record png of prepurge: (YYMMDD_rf##_prepurge) File: 100326_rf02_Prepurge

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	9.8	866	130/580	184440	1000	1	
2	9.8	868	"	184726	5	~~1~~	
3	9.8	867	"	185055	10	1	
4	9.8	870	"	185527	17	1	
5	9.7	873	"	19:01:37	27	1	
6	9.1	875	"	19:15:20	28	~~2~~	
7	9.6	869	"	192324	21	2	
8	9.8	866	"	19:27:17	15	2	
9	9.9	866	"	19:32:04	10	2	
10	9.5	864	"	19:38:11	4	2	skipped 1000 layer Deadhorse
11	9.7	866	"	19:54:48	5	3	
12	9.9	865	"	19:58:24	10	3	
13	9.8	868	"	20:03:30	17	3	
14	9.7	868	"	20:06:29	21	3	
15	9.1	881	"	20:09:21	27	3	
16	9.5	874	"	20:13:43	28	3	

✓ 1) After sampling flask 16, close flasks 1-16 UTC: 20 : 16
✓ 2) Note trap temperature Trap T: 40.1

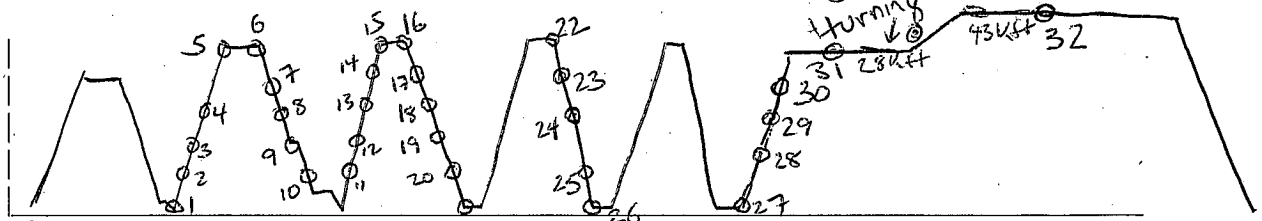
Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	9.8	867	130/580	20:20:33	21	4	
18	9.8	~~871~~	"	20:25:40	13	4	
19	9.8	883	"	20:28:33	9	4	
20	9.7	864	"	20:31:19	5	4	
21	9.7	885	"	20:36:14	500	4	
22	9.7	893	"	21:00:57	28	~~5~~	Strat
23	9.6	874	"	21:10:17	21	5	
24	9.7	867	"	21:14:24	15	5	
25	9.6	864	"	21:20:23	5	5	
26	9.8	862	"	21:26:00	500	5	
27	9.5	863	"	22:20:57	600	6	
28	9.8	865	"	22:25:57	6	6	
29	9.8	862	"	22:28:47	10	6	
30	9.8	871	"	22:32:25	15	6	
31	8.6	~~881~~	"	22:47:30	28	6	Strat
32	8.3	817	"	00:41:20	43	/	

closed 16-26-7

23:24:20 switched to 90/690

✓ 3) After sampling flask 32, close flasks 17-32
✓ 4) Note trap temperature

(84,840) @85N UTC: 00 : 43
Turning S Trap T: 40.0



PANC (start) 21 Dips (Alt ↑, Time →) (end) PANC

III. At the end of the sampling

✓ 1) ~~Turn valve box breaker off~~
✓ 2) Turn Pumps breaker off → UTC 0 : 44
✓ 3) Ensure all flask valves closed
✓ 4) Turn Mains breaker off
✓ 5) Turn 28V breaker off

IV. Post-flight

✓ 1) Remove traps
✓ 2) Plug holes in dewar lid
✓ 3) Download flask sampling data to laptop and pen drive
✓ 4) Empty beads from upstream trap into 'wet' bead container to dry
✓ 5) Open downstream trap and set upright

V. Day after flight

✓ 1) Transfer beads from downstream trap into upstream trap
2) Unload flasks. Box #1: 114 Box #2 110

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 100325_RF02_LeakCheck1

✓ 1) 28 V breaker on, Valve box on, Pump box on
✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
✓ 7) Run 20-second prepurge to evacuate lines. Start: 193745 Finish: 19:52
✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
✓ 9) Close Pdn, turn pumps off (will leave in position 1)
__ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** 100325_RF02_LeakCheck2

✓ 1) "Clear All"
✓ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
✓ 3) Turn pump on and evacuate bypass (toggle between sample and bypass 6 times).
✓ 4) Turn pump off.
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Run 20-second prepurge to check all flask downstream tube Ps
✓ 7) Record times for AEROS matching. Start: 202745 Finish: 2037
✓ 8) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
✓ 9) Address any apparent leaks

Bypass / System Leak Check Procedure:

✓ 1) Ensure bypass on
✓ 2) Close PC1 and open PC2
✓ 3) Turn on pump breaker and let run for 1 minute
✓ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
✓ 5) Switch PC2 to closed and turn off pump
✓ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
✓ 7) After 1 minute, record values again.
✓ 8) After 5 minutes, record values again
✓ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
✗ 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
✓ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
16:42	0	164	168	
16:55	14	166	169	

NCAR/SCRIPPS MEDUSA Checklist V. 2010.03.18

Date(YYMMDD): 100329 **From-To:** PANC → PHKO

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 100327

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: ( ) Downstream: ( )
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 114 Box #2 110
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- X 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC 17 : 34
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 18 : 59 ~
- ✓ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup 0 Pdown 160 Pbypass 167 then all power off

Pos 11 Brake when closing 0949:52

Flask ID Table (View from Front of Box)

13 1050 ←	12 ~~1053~~ 1077 ↑	5 1093 ←	4 1086
14 1111	11 ~~1174~~	6 1108	3 1230
15 1369	10 1081	7 1269	2 1106
16 1318 ↓	9 1284	8 1221 ←	1 1193
17 1210	24 1237	25 1110 →	32 1249
18 1005	23 1015	26 1003	31 1272
19 1248	22 1023	27 1245	30 1131
20 1310 →	21 1082	28 1224 →	29 1183

Brake when closing

B. ~~2~~ hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 16 : 37
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup ~~696~~ 716 / +696 Pdown ~~709~~ 715 / ~~549~~ +550 Pbypass ~~717~~ 715 / +550
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec

MEDUSA time UTC 16 : 46 : 01 Laptop time UTC 16 : 46 : 01

Install Jugs ✓

✓ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 7) Open all flask stopcocks 2 half turns Flasks opened by: JDB
✓ 8) Re-install splinter shields and complete rack book
✓ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 10) Verify that no values are blinking on screen
✓ 11) Note trap temperature Trap T: 40.2
✓ 12) Complete bypass / system leak check
✓ 13) Ensure both controllers are to auto
✓ 14) Turn pumps on
✓ 15) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 580 Pbypass 783 Flow 3000
✗ 16) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 18 : 00 : 37
✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.15.
Pup 130 Pdown 580 Pbypass 784 Flow 3000
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 18 : 02 : 57
✓ 5) Note trap temperature Trap T: 38.8
✓ 7) Record png of prepurge: (YYMMDD_rf##_prepurge) File: 100329_RF03_prepurge P/F

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	8.9	872	130/580	18:49:59	40	1	
2	8.6	871	"	18:58:35	35	1	
3	9.4	861	"	19:05 32	23	1	
4	9.4	862	"	19:10:18	17	1	Passing Volcanoes!!!
5	9.8	864	"	19:18 01	10	1	
6	9.3	863	"	19:25:33	5	1	Clouds
7	9.8	860	"	19:28:56	1	1	
8	9.8	861	"	19:31:39	1	~~1~~ 2	DUPLICATE
9	9.7	861	"	19:34:33	7	2	
10	9.7	860	"	19:38:43	13	2	
~~11~~	~~8.6~~	~~863~~	"	~~19:44:08~~	21	2	BROKEN
12	8.5	865	"	19:49:51	28	2	
13	9.0	868	"	20:35:10	28	3	
14	8.8	865	"	20:41:29	19	3	
15	8.3	873	"	20:47:53	13	3	
16	8.3	866	"	20:49:30	7	3	

all flows > 3 SLP

Stem heaters ✓ closed 1-12

✓ 1) After sampling flask 16, close flasks ~~1~~ 16 13 UTC 19:52
__ 2) Note trap temperature UTC: 20 : 52
Trap T: 39.8

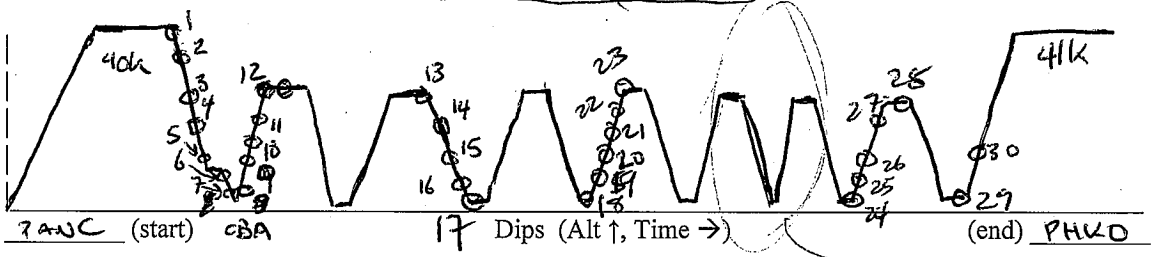
Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	9.5	837	130/580	20:55:32	1	3	
18	9.7	872	"	21:38:29	1	4	
19	9.7	882	"	21 41 42	5	4	
20	9.3	864	"	21 45 48	11	4	
21	9.7	884	"	21:49 58	17	4	
22	9.5	874	"	21:54 05	24	4	
23	9.4	873	"	220044	28	4	MEDUSA started, and lined issue
24	9.7	858	"	23:4652	1	5	
25	9.7	860	"	235355	10	5	
26	~8.6	~868	"	235736	16	5	
27	~8.6	~868	"	000403	25	5	ABROS CRASH
28	~8.6	~868	"	00 08 16	28	5	
29	?	~862?	"	00 30 04	1	6	
30	9.7	865	"	00 38 40	10	6	
31	8.9	872	"	0151	12	/	
32	?	?	"	020521	11	/	

sig dec died

✓ closed flasks → 17-23

__ 3) After sampling flask 32, close flasks ~~17~~-32 UTC: 02 03 : 06

__ 4) Note trap temperature closed 24-30 01:35 Trap T: 40



?ANC (start) CBA 17 Dips (Alt ↑, Time →) (end) PHKO

III. At the end of the sampling

__ 1) Turn valve box breaker off UTC 02 : 07

__ 2) Turn Pumps breaker off

__ 3) Ensure all flask valves closed

__ 4) Turn Mains breaker off

✓ 5) Turn 28V breaker off

meant to sample sooner, but lost ABROS, AND had MEDUSA reboot issue

IV. Post-flight

✓ 1) Remove traps

✓ 2) Plug holes in dewar lid

✓ 3) Download flask sampling data to laptop and pen drive

✓ 4) Empty beads from upstream trap into 'wet' bead container to dry

✓ 5) Open downstream trap and set upright

V. Day after flight

✓ 1) Transfer beads from downstream trap into upstream trap

✓ 2) Unload flasks. Box #1: ~~101~~ 103 Box #2 ~~103~~ 101

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 100327_RF03-LeakCheck1 p/f

- ✓ 1) 28 V breaker on, Valve box on, Pump box on
- ✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
- ✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
- ✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
- ✓ 5) Adjust prepurge time to 20 seconds
- ✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
- ✓ 7) Run 20-second prepurge to evacuate lines. Start: 17:34 Finish: 1749
- ✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
- ✓ 9) Close Pdn, turn pumps off (will leave in position 1)
- ✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** 100327_RF03-LeakCheck2 p/f

- ✓ 1) "Clear All"
- ✓ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
- ✓ 3) Turn pump on and evacuate bypass (toggle between sample and bypass 6 times).
- ✓ 4) Turn pump off.
- ✓ 5) Adjust prepurge time to 20 seconds
- ✓ 6) Run 20-second prepurge to check all flask downstream tube Ps
- ✓ 7) Record times for AEROS matching. Start: 185924 Finish: 1909 ~
- ✓ 8) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
- ✓ 9) Address any apparent leaks

Bypass / System Leak Check Procedure:

- ✓ 1) Ensure bypass on
- ✓ 2) Close PC1 and open PC2
- ✓ 3) Turn on pump breaker and let run for 1 minute
- ✓ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
- ✓ 5) Switch PC2 to closed and turn off pump
- ✓ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
- ✓ 7) After 1 minute, record values again.
- ✓ 8) After 5 minutes, record values again
- ✓ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
- X 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
- ✓ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
17:11:30	0	165	171	
17:12:30	0	166	171	
17:19:30	0	166	172	

NCAR/SCRIPPS MEDUSA Checklist V. 2010.03.18

Date(YYMMDD): 100331 **From-To:** PHKO → NFFN

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 100330

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: D Downstream: B
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 103 Box #2 101
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- X 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC 22 : 52
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 23 : 47
- ✓ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup 6 Pdown 161 Pbypass 164 then all power off

Flask ID Table (View from Front of Box)

13 1430 ←	12 1436	5 1440 ←	4 1438
14 1291	11 1420	6 1446	3 1413
15 ~~1401~~ 1112 ← Leave	10 1427	7 1449	2 1432
16 1397	9 1441 ←	8 1411	1 1418

17 1161 ↓	24 1209	25 1391 →	32 1279
18 1060	23 1311	26 1286	31 1398
19 1101	22 1218	27 1201	30 1191
20 1084	21 1250 →	28 1199	29 1268 →

B. 2 hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 18 : 24
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 644 / +644 Pdown 656 / +485 Pbypass 665/501
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 18 : 36 : 00 Laptop time UTC 18 : 36 : 00

5a) Connect Traps

✓ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 7) Open all flask stopcocks 2 half turns Flasks opened by: JDJ
✓ 8) Re-install splinter shields and complete rack book
✓ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 10) Verify that no values are blinking on screen
✓ 11) Note trap temperature Trap T: 40.1
✓ 12) Complete bypass / system leak check
✓ 13) Ensure both controllers are to auto
✓ 14) Turn pumps on
✓ 15) Verify pressures are controlling and flow is as expected
Pup 129 Pdown 580 Pbypass 743 Flow 3000
✓ 16) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 20 : 09 : 40

✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.15.
Pup 129 Pdown 580 Pbypass 743 Flow 2960
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 20 : 11 : 26
✓ 5) Note trap temperature Trap T: 38.9
✓ 7) Record png of prepurge: (YYMMDD_rf##_prepurge) File:

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	8.6	869	130/580	20 51 51	~27	1	
2	9.1	864	"	205557	21	1	
3	9.1	861	"	205953	15	1	
4	9.4	856	"	210425	8	1	clouds, noisy
5	9.6	853	"	21 07 17	4	1	
6	9.6	852	"	21:11:06	1	1	closed 1-6 @ 21:13
7	9.1	850	"	21:52 32	1	2	
8	9.6	850	"	21 59 13	5	2	
9	9.2	852	"	220233	10	2	
10	9.2	855	"	220653	15	2	
11	9.2	858	"	221014	21	2	
12	9.0	862	"	222417	28	2	22:27 - closed 7-12
13	9.7	865	"	223910	32	2	
14	8.7	860	"	224311	35	2	
15	8.4	848	"	225426	41	2/3	(stable, but not controlling @ 123 tour)
16	8.9	820	"	22:58 51	36	3	

__ 1) After sampling flask 16, close flasks 1-16 UTC: 23 : 00
__ 2) Note trap temperature Trap T: 40.2

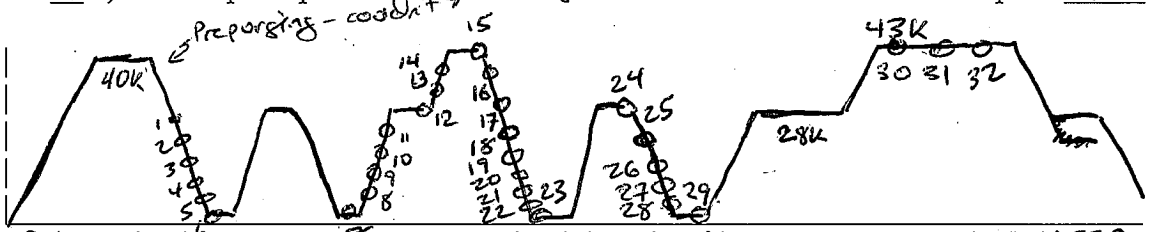
since this was only a very brief excursion to 41kft it was not possible to change to low flow (not enough equil time)

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	8.6	840	130/580	230310	29	3	clouds! ITCZ
18	9.3	871	"	230556	25	3	
19	9.3	876	"	230851	21	3	out of clouds @ 23:12
20	9.1	857	"	231246	15	3	
21	9.6	877	"	231610	10	3	
22	9.6	879	"	231928	5	3	
23	9.7	862	"	232236	1	3	→ closed 17-23 @ 23:23
24	9.2	866	"	234551	28	4	
25	9.7	866	"	235133	21	4	
26	9.7	857	"	235632	15	4	
27	9.6	856	"	235928	10	4	
28	9.7	860	"	000244	5	4	
29	9.7	853	"	00:0535	1	4	005447 - changed to 60/690
30	8.2	805	60/690	01:05:42	43	5	
31	8.2	812	"	01:16:30	43	5	→ closed 30,31 @ 01:17
32	8.3	814	"	01:22:11	43	5	

compare should be v. similar

✓ 3) After sampling flask 32, close flasks 17-32 UTC: 01 : 23

✓ 4) Note trap temperature Trap T: 40.1



III. At the end of the sampling

✓ 1) Turn valve box breaker off UTC 01 : 22

✓ 2) Turn Pumps breaker off

✓ 3) Ensure all flask valves closed

✓ 4) Turn Mains breaker off

✓ 5) Turn 28V breaker off

IV. Post-flight

$231 \frac{m}{s} \times \frac{1600 m}{3600 \frac{sec}{hr}}$

✓ 1) Remove traps

✓ 2) Plug holes in dewar lid

✓ 3) Download flask sampling data to laptop and pen drive

✓ 4) Empty beads from upstream trap into 'wet' bead container to dry

✓ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap

__ 2) Unload flasks. Box #1: _____ Box #2 _____

$231 \frac{m}{s} \times \frac{1 mil}{1600 m} \times \frac{3600 sec}{1 hr} =$

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 100330_RF04_LeakCheck1 p/f

✓ 1) 28 V breaker on, Valve box on, Pump box on
✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200 225217
✓ 7) Run 20-second prepurge to evacuate lines. Start: ~~224657~~ Finish: 2307
✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
✓ 9) Close Pdn, turn pumps off (will leave in position 1)
✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

✓ 1) "Clear All"
✓ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
✓ 3) Turn pump on and evacuate bypass (toggle between sample and bypass 6 times).
✓ 4) Turn pump off.
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Run 20-second prepurge to check all flask downstream tube Ps AEROS FAILED
__ 7) Record times for AEROS matching. Start: 234727 Finish: ____
__ 8) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
__ 9) Address any apparent leaks 000708→

Bypass / System Leak Check Procedure:

✓ 1) Ensure bypass on
✓ 2) Close PC1 and open PC2
✓ 3) Turn on pump breaker and let run for 1 minute
✓ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
✓ 5) Switch PC2 to closed and turn off pump
✓ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
✓ 7) After 1 minute, record values again.
X 8) After 5 minutes, record values again
✓ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
X 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
✓ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
18:55:00	0	163	169	
18:58:00	3	164	170	

NCAR/SCRIPPS MEDUSA Checklist *NSTU V. 2010.03.18
Date(YYMMDD): 100402 **From-To:** ~~NGEN~~ - NZCH

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 100401

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: C Downstream: C
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 24 Box #2 104
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- X 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC ~~23~~ 23 : ~~32~~ 59
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 00 : 30
- ✓ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup 6 Pdown 162 Pbypass 167 then all power off

Flask ID Table (View from Front of Box) Leaver; Has yellow foam inside — questionable??

13 1386 ✓	12 1029 ✓	5 1390 ✓	4 1385 ✓
14 1239 ✓	11 ~~1394~~ 1274 ✓	6 1047 ✓	3 1184 ✓
15 1207 ✓	10 1300 ✓	7 1059 ✓	2 1270 ✓
16 1298 ✓	9 1254 ✓	8 1302 ✓	1 1032 ✓
17 1405 ✓	24 1154 ✓	25 1275 ✓	32 1445 ✓
18 1252 ✓	23 1339 ✓	26 1439 ✓	31 1045 ✓
19 1147 ✓	22 1301 ✓	27 1149 ✓	30 1109 ✓
20 1305 ✓	21 1094 ✓	28 1292 ✓	29 1216 ✓

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 19 : 30
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 565 / +565 Pdown 629 / +467 Pbypass 638 / +481
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 19 : 55 : 05 Laptop time UTC 19 : 55 : 05
- 5a) Connect Traps

✓ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 7) Open all flask stopcocks 2 half turns Flasks opened by: JDB
✓ 8) Re-install splinter shields and complete rack book
✓ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 10) Verify that no values are blinking on screen
✓ 11) Note trap temperature Trap T: 40
✓ 12) Complete bypass / system leak check
✓ 13) Ensure both controllers are to auto
✓ 14) Turn pumps on
✓ 15) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 579 Pbypass 732 Flow 2800
X 16) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 21 : 07 : 03
✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.15.
Pup 129 Pdown 580 Pbypass 767 Flow 2800
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 21 : 07 : 53
✓ 5) Note trap temperature Trap T: 39.5
✓ 7) Record png of prepurge: (YYMMDD_rf##_prepurge) File: 100402-RF05_Prepurge p1f

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	9.4	872	130/580	215409	35	1	
2	9.5	862	"	220345	21	1	
3	9.6	859	"	220806	13	1	
4	9.6	859	"	221212	7	1	
5	9.7	861	"	221600	1	1	> closed flasks @ 2218
6	9.2	870	"	223902	28	2	
7	9.2	866	"	224501	21	2	
8	9.7	863	"	225130	11	2	
9	9.7	859	"	225501	6	2	
10	9.7	857	"	225810	1	2	> closed flask @ 23:00
11	9.1	868	"	232104	28	3	
12	9.2	865	"	232649	21	3	
13	9.2	862	"	233113	15	3	
14	9.7	860	"	233502	10	3	
15	9.7	870	"	233742	5	3	
16	9.7	860	"	234056	1	3	

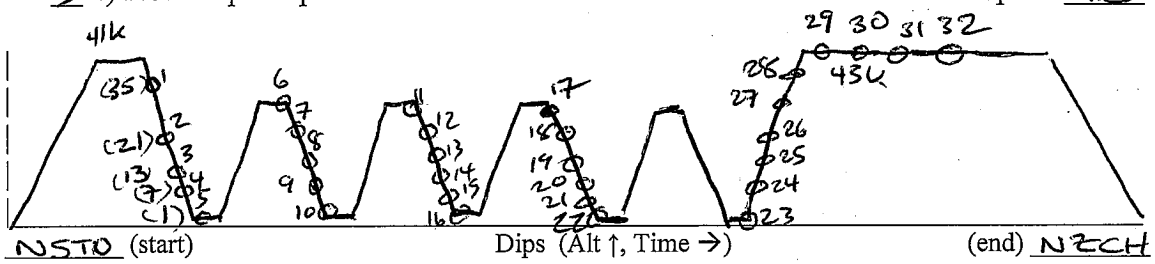
✓ 1) After sampling flask 16, close flasks 1-16 UTC: 23 : 42
✓ 2) Note trap temperature Trap T: 40

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	8.9	844	130/580	000629	28	4	
18	9.4	876	"	001132	21	4	
19	9.6	881	"	001652	13	4	
20	9.7	861	"	001946	8	4	closed @ 0027
21	9.7	875	"	002232	4	4	
22	9.7	876	"	002525	1	4	0045:23 changed to 60/690
23	8.1	~~794~~	60/690	010815	1	5	
24	8.0	794	"	011400	7	5	
25	8.0	794	"	011936	14	5	
26	8.1	796	"	012503	23	5	
27	8.1	798	"	013050	31	5	
28	8.1	800	"	013625	39	5	closed 23-28 @ 01:38
29	8.2	798	"	014410	43	5	closed 29 @ 01:45 ~~RF05~~
30	8.2	804	"	015118	43	5	closed 0152
31	8.2	808	"	020118	43	5	closed 2002
32	8.2	812	"	020920	43	5	closed 20:10

PROBABLY STRAT

__ 3) After sampling flask 32, close flasks 17-32 UTC: 20 : 10

__ 4) Note trap temperature Trap T: 40



III. At the end of the sampling

__ 1) Turn valve box breaker off UTC 20 : 15 ~

__ 2) Turn Pumps breaker off

__ 3) Ensure all flask valves closed

__ 4) Turn Mains breaker off

__ 5) Turn 28V breaker off

IV. Post-flight

__ 1) Remove traps

__ 2) Plug holes in dewar lid

__ 3) Download flask sampling data to laptop and pen drive

__ 4) Empty beads from upstream trap into 'wet' bead container to dry

__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap

__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 100402_RF05_Leakcheck1 P/F

__ 1) 28 V breaker on, Valve box on, Pump box on
__ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
__ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
__ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
__ 5) Adjust prepurge time to 20 seconds
__ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200 (Leaver on pos 11 replaced)
__ 7) Run 20-second prepurge to evacuate lines. Start: 233213 Finish: 235957
__ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
__ 9) Close Pdn, turn pumps off (will leave in position 1)
__ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** 100402_RF05_Leakcheck2 P/F

__ 1) "Clear All"
__ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
__ 3) Turn pump on and evacuate bypass (toggle between sample and bypass 6 times).
__ 4) Turn pump off.
__ 5) Adjust prepurge time to 20 seconds
__ 6) Run 20-second prepurge to check all flask downstream tube Ps
__ 7) Record times for AEROS matching. Start: 00 30 30 Finish: 00:38:54
__ 8) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
__ 9) Address any apparent leaks

Bypass / System Leak Check Procedure:

__ 1) Ensure bypass on
__ 2) Close PC1 and open PC2
__ 3) Turn on pump breaker and let run for 1 minute
__ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
__ 5) Switch PC2 to closed and turn off pump
__ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
__ 7) After 1 minute, record values again.
__ 8) After 5 minutes, record values again
__ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
__ 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
__ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
20 02 30	0	160	168	
20 03 45	0	160	168	
20 04 45	0	160	168	

Campaign: AIRPO 3 Flight: RF06

NCAR/SCRIPPS MEDUSA Checklist V. 2010.04.04
Date(YYMMDD): 100406 **From-To:** CHC-CHC

renamed A+B tops B+F (or vice versa, can't see scribed letter under tape)

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 100404

✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
✓ 2) Install new traps Upstream: E Downstream: D
✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
✓ 4) Record Flask Box Numbers: Box #1 106 Box #2 13
✓ 5) Install flask box retaining pins
✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
✓ 7) Replace cover shields and complete rack book
✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
✓ 9) If necessary, download data from previous flight to laptop and pen drive
✓ 10) Check that flask table is clear. If not, "clear all"
✓ 11) Complete flask leak check procedure #1 Start UTC 13 : 18
✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 15 : 09
✓ 13) Pull bypass pressure down (PC2 open), then pumps off and PC2 closed
✓ 14) Record Ps: Pup 0 Pdown 166 Pbypass 170 then all power off

Flask ID Table (View from Front of Box)

13 1027	12 1138	5 1185	4 1187
14 1178	11 1277	6 1075	3 1140
15 1160	10 1113	7 1342	2 1069
16 1054	9 1349	8 1276	1 1331
17 1028	24 1378	25 1376	32 1395
18 1375	23 1290	26 1381	31 1367
19 1370	22 1372	27 1377	30 1380
20 1368	21 1090	28 1379	29 1374

NF6 BROKEN!!

B. 2-hours before take-off.: Dry ice and Sampler Set-up 20:50 UTC ~~6:50~~

✓ 1) Load dry ice into dewar 0.5" from lid
✓ 2) Ensure that MEDUSA valve control key is in place
✓ 3) 28 V breaker on, Valve box on, Main breaker on
✓ 4) Record P / Δ: Pup ~~758~~ / ____ Pdown ~~771~~ / ____ Pbypass ~~785~~ / ____
✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
MEDUSA time UTC 20 : 52 : 59 Laptop time UTC 20 : 52 : 52

✓ 6) Connect traps
✓ 7) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 8) Open all flask stopcocks 2 half turns Flasks opened by: Shuttle
✓ 9) Re-install splinter shields and complete rack book
✓ 10) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 11) Verify that no values are blinking on screen
✓ 12) Note trap temperature ~~40.1~~ Trap T: 40.1
✓ 13) Complete bypass / system leak check
✓ 14) Ensure both controllers are to auto
✓ 15) Turn pumps on
✓ 16) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 580 Pbypass 726 Flow 2767 } Flow 2800 ~~3000~~ 3200
✓ 17) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 18) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 22 : 09 : 00

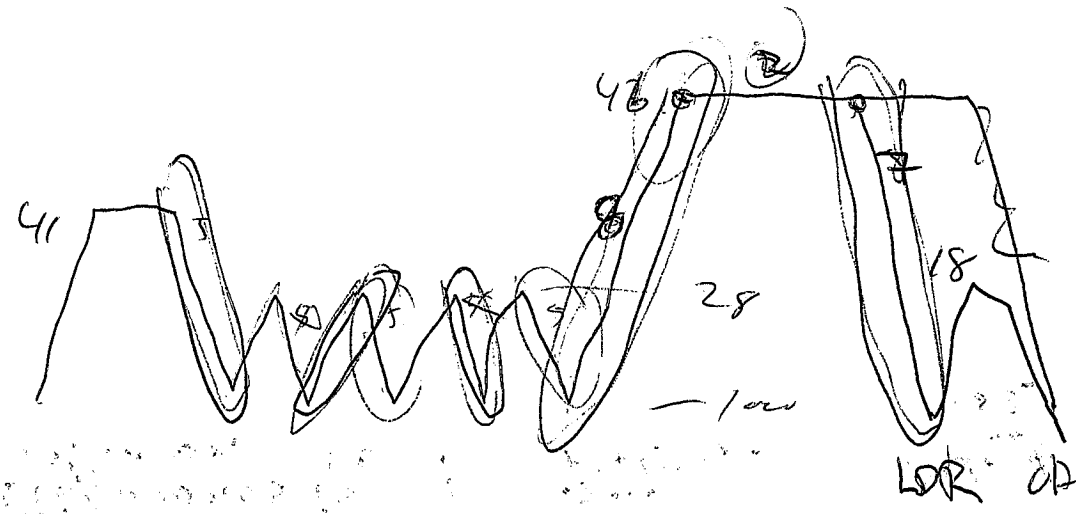
✓ 1) Turn pump breaker on
2) Verify pressures/flows agree with previous values from I.B.16.
Pup 129 Pdown 583 Pbypass 737 Flow 2974
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 22 : 11 : 57
✓ 5) Note trap temperature Trap T: 38.5
✓ 6) Record png of prepurge: (YYMMDD_rf##_prepurge) File: 20800406_RF06_prepurge.png

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

QA/T

	Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
28	1	9.37	744	130/580	23:16	8834	1	Palt final At Snyder 8400m
15	2	9.1	862	130/580	23:26	4545	1	4500
10	3	9.4	859	130/580	23:29:13	3000	1	3000
5	4	9.7	748	130/580	23:31:53	1500	1	1500m
1	5	9.5	863	131/582	23:34	1K	1	Palt Apex — collected case CB36
1	6	9.5	863	130/580	00:11:15	1K	2	
5	7	9.5	865	130/580	00:11:51	5K+	2	Sample on @ 6K
10	8	9.5	842	130/580	00:23:04	11K	2	Sample @ 11K
21	9	9.7	826	130/580	00:27:58	21K	2	
28	10	9.3	962	130/580	00:34:34	28K	2	
28	11	9.7	749	130/580	01:17:45	28K	3	
15	12	9.4	859	130/580	01:30:15	15K	3	
10	13	9.5	850	130/580	01:38:45	10K	3	Big Cloud below Sample
5	14	9.7	860	130/580	01:37:09	5K	3	
1	15	9.6	860	130/580	01:39:55	1K	3	
1	16	2	7		02:20:10	1K	4	

__ 1) After sampling flask 16, close flasks 1-16 UTC: ___ : ____



15
16
31

15
8
2
7
9

32

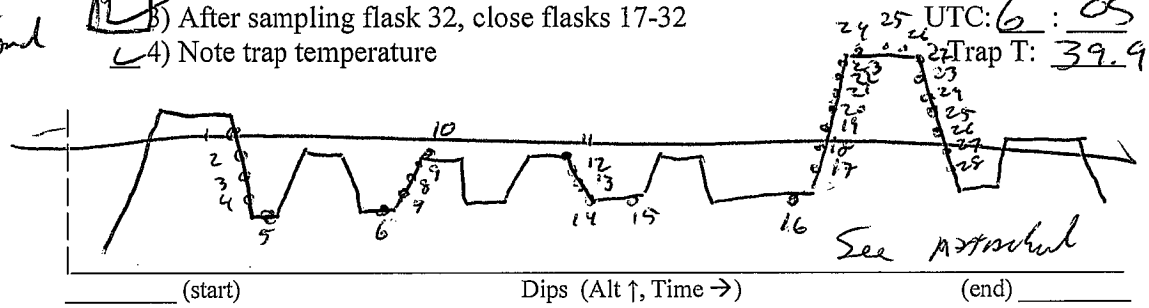
__ 2) Note trap temperature Trap T: _____

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	?	?	130/580	02:25:00	5K	4	In Cloud — Bumpy
18	9.8	860	130/580	02:28:38	10K	4	
19	9.7	760	130/580	02:32:30	16K	4	
20	9.6	860	130/580	02:35:43	21K	4	
21	?	?	130/580	02:41:00	29K	4	Come — Lucky AT Clouds
22	7.4	877	130/580	02:58:09	34K	4	Stopped Early when at level
23	8.3	880	90/690	3:46:35	43K	top	delays to Top & Atc.
24	8.2	758	90/690	4:00:00	43K	top	
25	8.2	791	90/690	04:30:00	43K	top	
26	8.1	755	90/690	04:58:35	43K	~~top~~ 5	455 for Dump
27	8.6	831	130/580	05:08:11	28K	5	5K/Rad 36→ Region Change ~03:00 to Flask #1
28	9.0	754	130/580	05:12:10	21K	5	
29	9.1	854	130/580	05:17:40	15K	5	
30	9.4	862	130/580	05:20:20	10K	5	
31	9.5	867	130/580	05:23:35	5K	5	
32				25:26	~2K	5	Could not See DATA

delayed until Land

☐ 3) After sampling flask 32, close flasks 17-32 UTC: 6 : 05 SRS

✓ 4) Note trap temperature Trap T: 39.9



_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

✓ 1) Turn Pumps breaker off UTC 05 : 32

✓ 2) Turn Mains breaker off

✓ 3) Turn valve box breaker off

✓ 4) Turn 28V breaker off

delayed until Good ☐ 5) Ensure all flask valves closed 6:05 — SRS

IV. Post-flight

✓ 1) Remove traps

✓ 2) Plug holes in dewar lid

✓ 3) Download flask sampling data to laptop and pen drive

__ 4) Empty beads from upstream trap into 'wet' bead container to dry

__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap

__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 100401 a = SRS test b = 2nd run

✓ 1) 28 V breaker on, Valve box on, Pump box on
✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
✗ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
✓ 7) Run 20-second prepurge to evacuate lines. Start:_____ Finish:_____
✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
✓ 9) Close Pdn, turn pumps off (will leave in position 1)
✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

__ 1) "Clear All"
__ 2) Valve box off, main breaker off then on to reset, then valve box back on
__ 3) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
__ 4) Open Pdn, turn pumps on and evacuate sample and bypass (toggle 6 times).
__ 5) Close Pdn and turn pumps off
__ 6) Adjust prepurge time to 20 seconds
__ 7) Run 20-second prepurge to check all flask downstream tube Ps
__ 8) Record times for AEROS matching. Start:_____ Finish:_____
__ 9) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
__ 10) Turn bypass on

Bypass / System Leak Check Procedure:

✓ 1) Ensure bypass on, close PC1 and open PC2
✓ 2) Turn on pump breaker and let run for 1 minute
✓ 3) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
✓ 4) Switch PC2 to closed and turn off pump
✓ 5) Wait 15 seconds and note Pu, Pd, Pb in table below
✓ 6) After 1 minute, record values again.
✓ 7) After 5 minutes, record values again
✓ 8) If Pdown and Pbypass <2 torr/5 mins, skip to 11
✗ 9) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
✓ 10) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
21015	1	161	165	
21115	3	162	165	
21720	17	163	166	

Abandoned Checksheet 1

Campaign: HIPPO III Flight: RF06 Date 10-04-06

NCAR/SCRIPPS MEDUSA Checklist V. 2010.03.18

Date(YYMMDD):_____ **From-To:**_____

I. Preflight

A. Day(s) before flight Date (YYMMDD) = _____

__ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane

__ 2) Install new traps Upstream: ____ Downstream: 0

__ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings

__ 4) Record Flask Box Numbers: Box #1 106 Box #2 13

__ 5) Install flask box retaining pins

__ 6) Connect plumbing. Confirm lines are correctly installed with red label up

__ 7) Replace cover shields and complete rack book

__ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)

__ 9) If necessary, download data from previous flight to laptop and pen drive

(EDIT) BP=0 need to insert

__ 10) Check that flask table is clear. If not, "clear all"

__ 11) Complete flask leak check procedure #1 Start UTC 13 ~~01~~ : 18

Six this until About 1701

__ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 PC2 open, Pump on Start UTC 15 : 09

__ 13) Pull bypass pressure down (PC1 closed), then pumps off and PC2 closed

__ 14) Record Ps: Pup 0 Pdown 166 Pbypass 170 then all power off

Flask ID Table (View from Front of Box)

13 1027	12 1138	5 1185	4 1187
14 1178	11 1277	6 1075	3 1140
15 1160	10 1113	7 1342	2 1069
16 1054	9 1349	8 1276	1 1331

17 1028	24 1378	25 1376	32 1395
18 1375	23 1290	26 1381	31 1367
19 1370	22 1372	27 1377	30 1380
20 1368	21 1090	28 1379	29 1374

B. 2-hours before take-off.: Dry ice and Sampler Set-up

__ 1) Load dry ice into dewar 0.5" from lid UTC ___ : ___

__ 2) Ensure that MEDUSA valve control key is in place

__ 3) 28 V breaker on, Valve box on, Main breaker on

__ 4) Record P / Δ: Pup ____ / ____ Pdown ____ / ____ Pbypass ___ / ____

__ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec

MEDUSA time UTC ___ : ___ : ___ Laptop time UTC ___ : ___ : ___

5c) Connect Traps

__ 6) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
__ 7) Open all flask stopcocks 2 half turns Flasks opened by: _____
__ 8) Re-install splinter shields and complete rack book
__ 9) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset ____ Pdownset ____ prepurgeT ____ flushT ____
__ 10) Verify that no values are blinking on screen
__ 11) Note trap temperature Trap T: _____
__ 12) Complete bypass / system leak check
__ 13) Ensure both controllers are to auto
__ 14) Turn pumps on
__ 15) Verify pressures are controlling and flow is as expected
Pup ____ Pdown ____ Pbypass ____ Flow ____
__ 16) If necessary, "Clear All" (after being sure data from last flight copied)
__ 17) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC ___ : ___ : ___
__ 1) Turn pump breaker on
__ 2) Verify pressures/flows agree with previous values from I.B.15.
Pup ____ Pdown ____ Pbypass ____ Flow ____
__ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
__ 4) Start pre-purge UTC ___ : ___ : ___
__ 5) Note trap temperature Trap T: _____
__ 7) Record png of prepurge: (YYMMDD_rf##_prepurge) File:_____

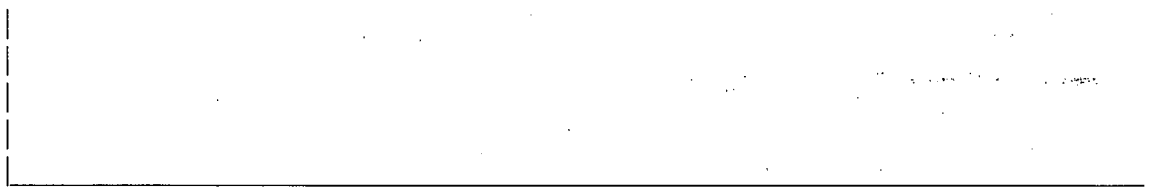
B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

__ 1) After sampling flask 16, close flasks 1-16 UTC: ___ : ____
__ 2) Note trap temperature Trap T: _____

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							

__ 3) After sampling flask 32, close flasks 17-32 UTC: ___ : ____
__ 4) Note trap temperature Trap T: _____



_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

__ 1) Turn valve box breaker off UTC ___ : ___
__ 2) Turn Pumps breaker off
__ 3) Ensure all flask valves closed
__ 4) Turn Mains breaker off
__ 5) Turn 28V breaker off

IV. Post-flight

__ 1) Remove traps
__ 2) Plug holes in dewar lid
__ 3) Download flask sampling data to laptop and pen drive
__ 4) Empty beads from upstream trap into 'wet' bead container to dry
__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap
__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** _____

- ✓ 1) 28 V breaker on, Valve box on, Pump box on
- ✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
- ✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
- ✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
- ✓ 5) Adjust prepurge time to 20 seconds
- ✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
- ✓ 7) Run 20-second prepurge to evacuate lines. Start: 23:30 Finish: _____
- ✓ 8) Save PNGs of AERos P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
- ✓ 9) Close Pdn, turn pumps off (will leave in position 1)
- ✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

- ✓ 1) "Clear All"
- ✓ 2) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
- ✓ 3) Turn pump on and evacuate bypass (toggle between sample and bypass 6 times).
- ✓ 4) Turn pump off. 10
- ✓ 5) Adjust prepurge time to ~~20~~ seconds
- ✓ 6) Run 20-second prepurge to check all flask downstream tube Ps
- ✓ 7) Record times for AEROS matching. Start: 21:09 Finish: ~15:20
- ✓ 8) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
- ✓ 9) Address any apparent leaks

Bypass / System Leak Check Procedure:

- __ 1) Ensure bypass on
- __ 2) Close PC1 and open PC2
- __ 3) Turn on pump breaker and let run for 1 minute
- __ 4) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
- __ 5) Switch PC2 to closed and turn off pump
- __ 6) Wait 15 seconds and note Pu, Pd, Pb in table below
- __ 7) After 1 minute, record values again.
- __ 8) After 5 minutes, record values again
- __ 9) If Pdown and Pbypass <2 torr/5 mins, skip to 11
- __ 10) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
- __ 11) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments

179.8 1:59:00

Check on FedEx.com that the two boxes (1 from SIO, 1 from Anchorage) have made it to Kona. Also check via Pavel w/ FBO

RF07

Campaign: HIPPO-3 Flight: ~~RF06~~ Page 1 of 4

NCAR/SCRIPPS MEDUSA Checklist V. 2010.04.04

Date(YYMMDD): ~~4-8-2010~~ 100408 **From-To:** WECH-PSTU

I. Preflight

A. Day(s) before flight 2 DAYS Date (YYMMDD) = 100407 ~~4-7-2010~~

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below-edge and bring to plane
- ✓ 2) Install new traps Upstream: E Downstream: O
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 111 Box #2 109
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- ✓ 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC 22:31
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 23:22
- ✓ 13) Pull bypass pressure down (PC2 open), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup ~~235~~ 0 Pdown 168 Pbypass 171 then all power off @ 23:50

Flask ID Table (View from Front of Box)

13 1033 ←	12 1170	5 1258 ←	4 1236
14 1087	11 1158	6 1297	3 1072
15 1278	10 1105	7 1006	2 1137
16 1317	9 1096 ←	8 1119	1 1168
17 1019	24 BAD 1139 →	25 1120	32 1253
18 1099	23 1238 ~~PSHL~~	26 1127	31 1067
19 1232	22 1181	27 1016	30 1198
20 ~~B~~ 1150	21 1242 →	28 1144 →	29 1227

1317 →

B. 2 hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 20:20
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 755 +755 Pdown 768/ +600 Pbypass 779 +605
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 20:36:03 Laptop time UTC 20:36:05

Pumps at 20:19

Ps reflect 3 restarts of MEDUSA due to power outage — P numbers not reliable

✓ 6) Connect traps
✓ 7) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 8) Open all flask stopcocks 2 half turns Flasks opened by: Shutz/Berry
✓ 9) Re-install splinter shields and complete rack book
✓ 10) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 11) Verify that no values are blinking on screen
✓ 12) Note trap temperature Trap T: 39.2
✓ 13) Complete bypass / system leak check
✓ 14) Ensure both controllers are to auto
✓ 15) Turn pumps on
✓ 16) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 580 Pbypass 671 Flow 3042
✓ 17) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 18) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 22 : 05 : 53
✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.16.
Pup 132 Pdown 582 Pbypass 736 Flow 2160
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 22 : 07 : 53
✓ 5) Note trap temperature Trap T: 38.7
✓ 6) Record png of prepurge: (YYMMDD_rf##_prepurge) File: _____

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

	Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
39	1	~~7.~~			224136	39K	TOP 1	first clear start inflow
39	2	7.8	870	130/580	225330	39K	Top 2	
39	3	8.8	868	130/580	235932	39K	TOP 3	
28	4	8.5	740	130/580	23:10:00	28K	1	
21	5	8.3	864	130/580	23:18 30	21K	1	
15	6	8.5	856	130/580	23:22:30	15K	1	
10	7	9.2	744	130/580	23:25:54	10K	1	Entering clouds
5	8	8.9	855	130/580	23 2901	5K	1	Clear Above
1	9	missed		130/580	233134	1K	1	
28	10	8.6	866	130/580	235220	28K	2	
15	11	9.1	859	130/580	00:04 34	15K	2	
10	12	7.1	857	130/580	00:08:48	10K	2	
5	13	9.6	747	130/580	00 11:16	5K	2	
1	14	9.6	780	130/580	00 13 57	1K	2	shut O_2 cal
21	15	9.1	874	130/580	00 42 44	21K	3	
15	16			130/580	48 01	213K	3	discontinued cast

missed

__ 1) After sampling flask 16, close flasks 1-16 UTC: ___ : ____

00:50:40

2) Note trap temperature Trap T: _____

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	7.8	868	130/580	~~5934~~	9K	3	
18	9.9	864	130/580	00:53:20	5K	3	~~Cruise~~ on Profile
19	9.6	755	130/580	00:56:05	1K	3	
20	9.2	862	130/580	01:18:54	28K	4	
21	8.9	880	130/580	01:25:04	21K	4	
22	9.1	875	130/580	01:32:11	10K	4	
23	9.2	856	130/580	01:35:36	5K	4	
24	9.5	928	130/580	01:38:35	1K	4	
25	9.4	946	130/580	2:22:04	1K	~~4~~ 5	
26	9.5	758	130/580	02:31:25	10K	5	
27	9.4	851	130/580	02:34:45	15K	5	
28	9.4	756	130/580	02:39:10	21K	5	
29	9.2	855	130/580	02:44:20	28K	5	
30	missed		130/580	02:49:00	36K	5	
31	missed		90/690	2:58:30	43K	5	
32	missed		90/620	03:04:20	45K	5	

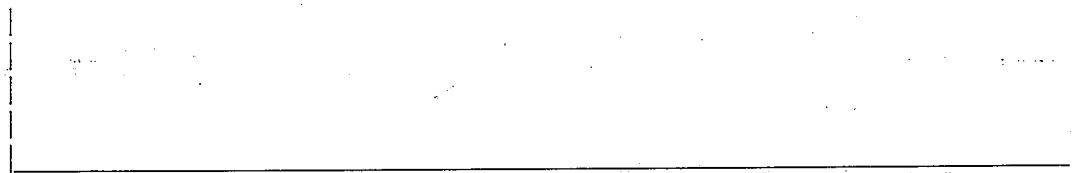
in Clouds

Rmn @ 8K

9 min

(✓) 3) After sampling flask 32, close flasks 17-32 UTC: 3 : 08

(✓) 4) Note trap temperature Trap T: 40.1



_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

(✓) 1) Turn Pumps breaker off UTC 3 : 09

(✓) 2) Turn Mains breaker off

(✓) 3) Turn valve box breaker off

(✓) 4) Turn 28V breaker off

(✓) 5) Ensure all flask valves closed

IV. Post-flight

(✓) 1) Remove traps

(✓) 2) Plug holes in dewar lid

(✓) 3) Download flask sampling data to laptop and pen drive

(✓) 4) Empty beads from upstream trap into 'wet' bead container to dry

(✓) 5) Open downstream trap and set upright

V. Day after flight

(X) 1) Transfer beads from downstream trap into upstream trap

(✓) 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** 10040_RF07_Leakcheck1

- 1) 28 V breaker on, Valve box on, Pump box on
- 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
- 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
- X 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
- 5) Adjust prepurge time to 20 seconds
- 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
- 7) Run 20-second prepurge to evacuate lines. Start: ~~221350~~ Finish: _____
- 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
- 9) Close Pdn, turn pumps off (will leave in position 1)
- 10) Turn bypass on

→ AEROS crashed. restarted Leakcheck1 @ 22:31:00

Flask Leak Check Procedure #2: **File:** 10040_RF07_Leakcheck2

- 1) "Clear All"
- 2) Valve box off, main breaker off then on to reset, then valve box back on
- 3) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
- [X] 4) Open Pdn, turn pumps on and evacuate sample and bypass (toggle 6 times).
- 5) Close Pdn and turn pumps off
- 6) Adjust prepurge time to 20 seconds
- 7) Run 20-second prepurge to check all flask downstream tube Ps
- 8) Record times for AEROS matching. Start: 23:22 Finish: 23:37
- 9) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
- [X] 10) Turn bypass on

No RV Jonathan only came up to 190T

No RV Jonathan - more PESS to follow

Bypass / System Leak Check Procedure:

- 1) Ensure bypass on, close PC1 and open PC2
- 2) Turn on pump breaker and let run for 1 minute
- 3) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
- 4) Switch PC2 to closed and turn off pump
- 5) Wait 15 seconds and note Pu, Pd, Pb in table below
- 6) After 1 minute, record values again.
- 7) After 5 minutes, record values again
- 8) If Pdown and Pbypass <2 torr/5 mins, skip to ~~11~~ 11
- X X 9) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
- X √ 10) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
20:59:45	1	165	169	
20:55:45	3	164	170	
20:59:45	11	166	170	

Campaign: HIPPO-3 Flight: RF08

NCAR/SCRIPPS MEDUSA Checklist V. 2010.04.04

Date(YYMMDD): 10 APR 10 **From-To:** NSTU

I. Preflight

A. Day(s) before flight Date (YYMMDD) = 20100409

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: E Downstream: D
- ✓ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- ✓ 4) Record Flask Box Numbers: Box #1 9 Box #2 7
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- ✓ 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all" multiple revs - OK
- ✓ 11) Complete flask leak check procedure #1 Start UTC 1 : 31 End
- ✓ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 2 : 04
- ✓ 13) Pull bypass pressure down (PC2 open), then pumps off and PC2 closed
- ✓ 14) Record Ps: Pup 3 Pdown 168 Pbypass 171 then all power off

lines for positions 6 and 11 swapped

Flask ID Table (View from Front of Box)

13 1058 ✓	12 1329 ✓	5 1065 ✓	4 1089 ✓
14 1142 ✓	11 1002 ✓	6 1022 ✓	3 1132 ✓
15 1212 ✓	10 1315 ✓	7 1231 ✓	2 1283 ✓
16 1229 ✓	9 1039 ✓	8 1299 ✓	1 1122 ✓
17 ~~1442~~ 1222 ✓	24 1263 ✓	25 1163 ✓	32 1025 ✓
18 1414 ✓	23 1407 ✓	26 ~~1222~~ 1443 ✓	31 1055 ✓
19 1103 ✓	22 1422 ✓	27 1287 ✓	30 1444 ✓
20 1157 ✓	21 1448 ✓	28 1366 ✓	29 1443 ✓

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 19 : 31
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 528 / ____ Pdown 595 / ____ Pbypass 610 / ____
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 19 : 51 : 38 Laptop time UTC 19 : 51 : 38

1 JOIN #A02MED
+556
+624
+ 0851

✓ 6) Connect traps
✓ 7) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 8) Open all flask stopcocks 2 half turns Flasks opened by: Shaw
✓ 9) Re-install splinter shields and complete rack book
✓ 10) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 550 prepurgeT 60 flushT 150
✓ 11) Verify that no values are blinking on screen
✓ 12) Note trap temperature Trap T: 39.2
✓ 13) Complete bypass / system leak check
✓ 14) Ensure both controllers are to auto
✓ 15) Turn pumps on
✓ 16) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 550 Pbypass 730 Flow 2.108
✓ 17) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 18) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 21 : 05 : ___

✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.16.
Pup 130 Pdown 550 Pbypass 729 Flow 2110
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 21 : 06 : ___
✓ 5) Note trap temperature Trap T: 39.8
✓ 6) Record png of prepurge: (YYMMDD_rf##_prepurge) File: _____

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

	Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	1	9.4	740	130/550	22:13:29	1K	1	30K from WAS
5	2	9.3	846	130/580	22 16 43	5K	1	
10	3	9.3	785	130/580	22 20 04	10K	1	
15	4	9.3	850	130/580	22 23 26	15K	1	
21	5	—	—	130/550	22 28 02	21K	1	
28	6	9.4	740	130/550	34 38	28K	1	Bumpy
1	7	9.4	843	130/580	22:55:51	1K	2	22:55:59 turn
5	8	9.3	737	130/550	22:59:22	6K	2	Ups Stopped
10	9	9.3	772	130/550	23:02:01	10K	2	
15	10	9.4	791	130/580	23:25:23	15K	2	
21	11	—	—	130/580	—	22K	2	missed 21 got on way down
28	12	9.4	848	130/550	23:29:51	21K	2	
1	13	9.3	840	130/550	23 36 45	1K	3	~~bad~~ whale on STBD 27K
5	14	9.3	838	130/580	23 41 13	5K	3	missing
10	15	9.3	851	130/550	23 44 38	10K	3	
15	16	9.3	787	130/550	23 48 05	15K	3	

✓ 1) After sampling flask 16, close flasks 1-16 UTC: 23 : 50

3 DIPS to 15K

Campaign: Hippo 3 Flight: RF08

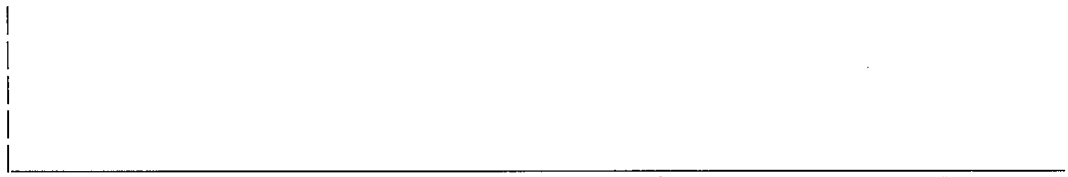
__ 2) Note trap temperature Trap T: 40.1

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	9.4	831	130/580	23 51 56	21K	3	
18	9.4	849	130/550	23:57:03	28K	3	
19	9.5	867	130/580	00:35:14	28K	4	Stable @ 28K by ATC
20	9.4	745	130/580	00:48:20	21K	4	Start descent
21	9.4	847	130/580	00:51:59	15K	4	
22	9.4	750	130/580	00:55:10	10K	4	
23	9.4	847	130/580	00:58:40	5K	4	
24	9.4	746	130/580	01:01:32	1K	4	
25	9.3	744	130/580	01:43:15	1K	5	
26	Too Spiky		130/580	1:46:30	5K	5	clouds
27	9.3	840	130/580	01:49:50	10K	5	
28	—		130/580	01:53:10	15K	5	
29	9.4	841	130/580	01:57:26	21K	5	
30	9.4	850	130/580	02:02:39	28K	5	
31	9.4	750	130/580	02 10 30	39.5K		
32	9.7	749	90/600	02 23 32			SW valve @ 2:12

28 min clear of CNST on

__ 3) After sampling flask 32, close flasks 17-32 UTC: 2:32

__ 4) Note trap temperature Trap T: 40.0



_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

__ 1) Turn Pumps breaker off UTC 2:32

__ 2) Turn Mains breaker off

__ 3) Turn valve box breaker off

__ 4) Turn 28V breaker off

__ 5) Ensure all flask valves closed

IV. Post-flight

__ 1) Remove traps

__ 2) Plug holes in dewar lid

__ 3) Download flask sampling data to laptop and pen drive

__ 4) Empty beads from upstream trap into 'wet' bead container to dry

__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap

__ 2) Unload flasks. Box #1: 163 Box #2 15

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** ~~for~~ 100410_RF08 Leakcheck1 P.png 1F.png

1) 28 V breaker on, Valve box on, Pump box on
2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
5) Adjust prepurge time to 20 seconds (25)~27 Leaked Rapid
6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
7) Run 20-second prepurge to evacuate lines. Start: ~~01:41~~ Finish: 01:
8) Save PNGs of AERos P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png) 1F.31 End
9) Close Pdn, turn pumps off (will leave in position 1)
10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

1) "Clear All"
2) Valve box off, main breaker off then on to reset, then valve box back on
3) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
4) Open Pdn, turn pumps on and evacuate sample and bypass (toggle 6 times).
5) Close Pdn and turn pumps off
6) Adjust prepurge time to 20 seconds
7) Run 20-second prepurge to check all flask downstream tube Ps
8) Record times for AEROS matching. Start: 22:04 Finish: _____
9) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
10) Turn bypass on

Bypass / System Leak Check Procedure:

1) Ensure bypass on, close PC1 and open PC2
2) Turn on pump breaker and let run for 1 minute
3) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
4) Switch PC2 to closed and turn off pump
5) Wait 15 seconds and note Pu, Pd, Pb in table below
6) After 1 minute, record values again.
7) After 5 minutes, record values again
8) If Pdown and Pbypass <2 torr/5 mins, skip to 11
9) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
10) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
20:08	7	159	169	
20:10	8	159	169	
20:13	12	160	170	Held 10 sec and 11 Last Sec

OK R
Jan Ahn
STD

Campaign: MIRAGE-3 Flight: RF09

NCAR/SCRIPPS MEDUSA Checklist V. 2010.04.04
Date(YYMMDD): 130410 **From-To:** PHKO/PMC

I. Preflight

A. Day(s) before flight Date (YYMMDD) = _____

- [x] 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- [x] 2) Install new traps Upstream: A Downstream: D
- [x] 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- [x] 4) Record Flask Box Numbers: Box #1 102 Box #2 15
- [x] 5) Install flask box retaining pins
- [x] 6) Connect plumbing. Confirm lines are correctly installed with red label up
- [x] 7) Replace cover shields and complete rack book
- [x] 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- [x] 9) If necessary, download data from previous flight to laptop and pen drive
- [x] 10) Check that flask table is clear. If not, "clear all"
- [x] 11) Complete flask leak check procedure #1 Start UTC 21 :43
- [x] 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC ___ : ___
- [x] 13) Pull bypass pressure down (PC2 open), then pumps off and PC2 closed
- [x] 14) Record Ps: Pup 6 Pdown 167 Pbypass 169 then all power off

lines for positions 6 and 11 swapped

Flask ID Table (View from Front of Box)

13 1431 ←	12 1423	5 1434 ←	4 1416
14 1433	11 1424	6 1408	3 1412
15 1204	10 1409	7 1226	2 1404
16 1197	9 1421 ✓ ←	8 1429	1 1417
↓			
17 1371	24 1288 →	25 1043	32 1041
18 1293	23 1155	26 1046	31 1070
19 1098	22 1362	27 1145	30 1088
20 1026 →	21 1383	28 1211 →	29 1280

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- [x] 1) Load dry ice into dewar 0.5" from lid UTC ___ : ___
- [x] 2) Ensure that MEDUSA valve control key is in place
- [x] 3) 28 V breaker on, Valve box on, Main breaker on
- [x] 4) Record P / Δ: Pup 594 / ____ Pdown 69 / ____ Pbypass 611 / ____
- [x] 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 19 : 05 : 12 Laptop time UTC 19 : 05 : 16

✓ 6) Connect traps
✓ 7) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
✓ 8) Open all flask stopcocks 2 half turns Flasks opened by: SMcG
✓ 9) Re-install splinter shields and complete rack book
✓ 10) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
✓ 11) Verify that no values are blinking on screen
✓ 12) Note trap temperature ? Trap T: 39.9
✓ 13) Complete bypass / system leak check
✓ 14) Ensure both controllers are to auto
✓ 15) Turn pumps on
✓ 16) Verify pressures are controlling and flow is as expected
✓ Pup 129 Pdown 580 Pbypass 734 Flow 2924
✓ 17) If necessary, "Clear All" (after being sure data from last flight copied)
✓ 18) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC ___ : ___ : ___

✓ 1) Turn pump breaker on
✓ 2) Verify pressures/flows agree with previous values from I.B.16.
Pup 130 Pdown 529 Pbypass 724 Flow 2700
✓ 3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
✓ 4) Start pre-purge UTC 20 : 11 : 55
✓ 5) Note trap temperature Trap T: 38.3
✓ 6) Record png of prepurge: (YYMMDD_rf##_prepurge) File:_____

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	9.3	8.47	130/580	21 18 59	1K	1	Accidental sample — will skip 15K on Down
2	9.4	844	130/580	21 30 00	28K	1	
3	9.4	846	130/580	21:37:1	21K	1	Visible Black Carbon Plume
4	9.3	844	130/580	21:44:14	10K	1	
5	9.8	844	130/580	21:47:01	5K	1	
6	9.4	843	130/580	21:50:37	1K	1	
7	9.8	938	130/580	22:32:03	1K	2	
8	9.4	841	130/580	22:36:00	5K	2	
9	9.4	842	130/580	22:39:42	10K	2	
10	9.4	843	130/580	22:42:38	15K	2	
11	missed		130/580	22:51:03	28K	2	Pre Sched → Start
12	8.5	830	130/580	23:36:28	28K	3	
13	8.9	850	130/580	23:45:08	21K	3	
14	9.2	846	130/580	23:48:34	15K	3	
15	9.3	856	130/580	23:52:00	10K	3	
16	9.4	851	130/580	23:55:11	5K	3	

✓ 19) After sampling flask 16, close flasks 1-16 UTC: 00 : 15

Campaign: HIPPO 3 Flight: RF09

__ 2) Note trap temperature Trap T: 40.1

	Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
1	17	9.5	745	130/580	23:57:55	1K	3	
1	18	missed	130/580		00:41:23	1K	4	
5	19	9.2	859	130/580	00:45:15	5K	4	
10	20	9.3	843	130/580	00:48:40	10K	4	
21	21	9.0	865	130/580	00:56:08	21K	4	
28	22	9.2	768	130/580	01:00:43	28K	4	
1	23	9.6	741	130/580	01:28:45	1K	5	
10	24	9.1	844	130/580	01:35:20	5K	5	
21 15	25	8.9	846	130/580	01:42:45	21K	5	
28	26	8.7	846	130/580	01:42:02	28K	5	
1	27	9.4	842	130/580	02:10:42	1K	5	Plans kept changing! Took 1K when it was offered
15	28	9.1	849	130/580	02:42:36	17K	6	
39.5	29	8.5	787	130/690	03:06:08	45K	BT	
T	30	8.05	792	90/690	03:17:33	45K	T	
T	31	8.0	797	90/690	03:27:29	45K	T	- Sampled just as same normal plane heading
T	32	8.0	799	90/690	03:39:10	45K	T	

In RMA

__ 3) After sampling flask 32, close flasks 17-32 UTC: 3 : 46
__ 4) Note trap temperature Trap T: _____

_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

__ 1) Turn Pumps breaker off UTC 3 : 46
__ 2) Turn Mains breaker off
__ 3) Turn valve box breaker off
__ 4) Turn 28V breaker off
__ 5) Ensure all flask valves closed

IV. Post-flight

__ 1) Remove traps
__ 2) Plug holes in dewar lid
__ 3) Download flask sampling data to laptop and pen drive
__ 4) Empty beads from upstream trap into 'wet' bead container to dry
__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap
__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** _____

1) 28 V breaker on, Valve box on, Pump box on
2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
5) Adjust prepurge time to 20 seconds
6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
7) Run 20-second prepurge to evacuate lines. Start: 21:43 Finish: 21:
8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
9) Close Pdn, turn pumps off (will leave in position 1)
10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

1) "Clear All"
2) Valve box off, main breaker off then on to reset, then valve box back on
3) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
4) Open Pdn, turn pumps on and evacuate sample and bypass (toggle 6 times).
5) Close Pdn and turn pumps off
6) Adjust prepurge time to 20 seconds
7) Run 20-second prepurge to check all flask downstream tube Ps
8) Record times for AEROS matching. Start: 22:56 Finish: _____
9) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
10) Turn bypass on

Bypass / System Leak Check Procedure:

1) Ensure bypass on, close PC1 and open PC2
2) Turn on pump breaker and let run for 1 minute
3) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
4) Switch PC2 to closed and turn off pump
5) Wait 15 seconds and note Pu, Pd, Pb in table below
6) After 1 minute, record values again.
7) After 5 minutes, record values again
8) If Pdown and Pbypass <2 torr/5 mins, skip to 11
9) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
10) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
~~22:54~~	~~9~~	~~168~~	~~171~~	
18:56:00	6	163	168	
18:59:00	8	164	168	
19:01:00	15	164	169	

Campaign: HIPPO 3 Flight: RF10

NCAR/SCRIPPS MEDUSA Checklist V. 2010.04.04

Date(YYMMDD): 15 APR 10 **From-To:** PMC/PMC

I. Preflight

A. Day(s) before flight Date (YYMMDD) = _____

- [x] 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- [x] 2) Install new traps Upstream: E Downstream: B
- [x] 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- [x] 4) Record Flask Box Numbers: Box #1 108 Box #2 18
- [x] 5) Install flask box retaining pins
- [x] 6) Connect plumbing. Confirm lines are correctly installed with red label up
- [x] 7) Replace cover shields and complete rack book
- [ ] 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- [x] 9) If necessary, download data from previous flight to laptop and pen drive
- [x] 10) Check that flask table is clear. If not, "clear all"
- [x] 11) Complete flask leak check procedure #1 Start UTC 21 : 04
- [x] 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC 22 : 06
- [x] 13) Pull bypass pressure down (PC2 open), then pumps off and PC2 closed
- [x] 14) Record Ps: Pup 5 Pdown 168 Pbypass 171 then all power off

lines for positions 6 and 11 swapped

Flask ID Table (View from Front of Box)

13 1194 ←	12 1097	5 1273 ←	4 1182
14 1196	11 1340	6 1085	3 1042
15 1130	10 1264	7 1051	2 1166
16 1159	9 1010 ←	8 1118	1 1052
↓			
17 1125	24 1121	25 1012 →	32 1146
18 1124	23 1234	26 1282	31 1225
19 1153	22 1007	27 1289	30 1217
20 1303 →	21 1400	28 1223	29 1169 →

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- [x] 1) Load dry ice into dewar 0.5" from lid UTC 16 : 10
- [x] 2) Ensure that MEDUSA valve control key is in place
- [x] 3) 28 V breaker on, Valve box on, Main breaker on
- [x] 4) Record P / Δ: Pup 5 34 / ____ Pdown 584 / ____ Pbypass 583 ____
- [x] 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 16 : 40 : 40 Laptop time UTC 16 : 40 : 41

6) Connect traps
7) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
8) Open all flask stopcocks 2 half turns Flasks opened by: Sweet
9) Re-install splinter shields and complete rack book
10) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
11) Verify that no values are blinking on screen
12) Note trap temperature Trap T: 39.7
13) Complete bypass / system leak check
14) Ensure both controllers are to auto
15) Turn pumps on
16) Verify pressures are controlling and flow is as expected
Pup 130 Pdown 580 Pbypass 726 Flow 2700
17) If necessary, "Clear All" (after being sure data from last flight copied)
18) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC 18 : 02 32

1) Turn pump breaker on
2) Verify pressures/flows agree with previous values from I.B.16.
Pup 130 Pdown 580 Pbypass 727 Flow 2960
3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
4) Start pre-purge UTC 18 : 09
5) Note trap temperature Trap T: 40.1
6) Record png of prepurge: (YYMMDD_rf##_prepurge) File:_____

Aborted and ADDS Crash on T/O

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

	Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
5	1	9.7	853	130/580	18:51:43	5K	1	climb out of FB
10	2	9.6	581	130/580	19:54:58	10K	1	
29	3	~~8.9~~	~~790~~	~~130/580~~	~~T:02:03~~	24K	1	dismissed missed 15 & 21K
28	4	8.9	790	130/580	19:08:10	28K	1	
15	5	9.8	855	130/580	19:29:53	15K	1	Took in wx Down on DH
28	6	9.7	737	130/580	20:10:50	28K	2	
21	7	9.6	752	130/580	20:17:57	21K	2	
15	8	9.6	784	130/580	20:21:54	15K	2	
10	9	9.7	832	130/580	20:25:03	10K	2	
5	10	9.6	848	130/580	20:28:21	5K	2	
5	11	9.4	936	130/580	20:32:46	500ft	2	Started just at 500ft -- missed
5	12	9.6	738	130/580	21:26:53	500ft	3	500 ft in Fog!
	13	9.8	849	130/580	21:36:49	9K	3	missed 5K Stayed one more RON
15K	14	9.5	848	130/580	21:40:12	15K	3	
21K	15	9.4	748	130/580	21:45:30	23K	3	
28K	16	9.6	747	130/580	21:51:16	28K	3	

1) After sampling flask 16, close flasks 1-16 UTC: ___ : ____

2) Note trap temperature Trap T: _____

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17	9.6	823	130/580	22:17:14	90ft	4	NO Beans !
18	9.7	857	130/580	22:24:08	51C	4	
19	9.7	865	130/580	22:27:33	10 1C	4	
20	9.5	848	130/580	22:30:48	15K	4	
21	n.s	sent	130/580	22:34:18	23K	4	Another Low Simple — Only to AO_2
22	9.5	876	130/580	22:42:13	28K	4	
23	8.5	862	130/580	23:06:30	35K	4	decided on 35 → 40 more 39.5
24	missed		130/580	23:10:04	39.5	4	Many
25	8.3	741	90/690	23:24:27	45K	5	
26	8.2	738	90/690	23:38:28	45K	5	
27	8.3	744	90/690	23:52:27	45K	5	
28	8.1	795	90/690	00:04:12	45K	5	Early to get AO_2 Base Cal
29	8.1	792	90/690	00:19:09	45K	5	AO_2 Cal in — oops
30	8.1	793	90/690	00:36:33	45K	5	
31	8.1	800	90/690	00:49:44	45K	5	First Flask ovr Cond
32	8.1	805	90/690	01:03:47	45K	5	

.5 5 10 15 21 28 35 39.5 +

__3) After sampling flask 32, close flasks 17-32 UTC: 01 : 05

__4) Note trap temperature Trap T: 40.1

1H-45 in TP

Next AO_2 Cal 01:11

_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

UTC 01 : 05

✓ 1) Turn Pumps breaker off
✓ 2) Turn Mains breaker off
✓ 3) Turn valve box breaker off
✓ 4) Turn 28V breaker off
✓ 5) Ensure all flask valves closed

IV. Post-flight

✓ 1) Remove traps
✓ 2) Plug holes in dewar lid
✓ 3) Download flask sampling data to laptop and pen drive
✓ 4) Empty beads from upstream trap into 'wet' bead container to dry
✓ 5) Open downstream trap and set upright

V. Day after flight

✓ 1) Transfer beads from downstream trap into upstream trap
__ 2) Unload flasks. Box #1: _____ Box #2 _____

Campaign: HIPPO3 Flight: RF-10

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** _____

- ✓ 1) 28 V breaker on, Valve box on, Pump box on
- ✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
- ✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
- ✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
- ✓ 5) Adjust prepurge time to 20 seconds
- ✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
- ✓ 7) Run 20-second prepurge to evacuate lines. Start: 21:04 Finish: _____
- ✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
- ✓ 9) Close Pdn, turn pumps off.(will leave in position 1)
- ✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

- ✓ 1) "Clear All"
- ✓ 2) Valve box off, main breaker off then on to reset, then valve box back on
- ✓ 3) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
- ✓ 4) Open Pdn, turn pumps on and evacuate sample and bypass (toggle 6 times).
- ✓ 5) Close Pdn and turn pumps off
- ✓ 6) Adjust prepurge time to 20 seconds
- ✓ 7) Run 20-second prepurge to check all flask downstream tube Ps
- ✓ 8) Record times for AEROS matching. Start: 22:06 Finish: _____
- ✓ 9) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
- 10) Turn bypass on

Bypass / System Leak Check Procedure:

- ✓ 1) Ensure bypass on, close PC1 and open PC2
- ✓ 2) Turn on pump breaker and let run for 1 minute
- ✓ 3) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
- ✓ 4) Switch PC2 to closed and turn off pump
- ✓ 5) Wait 15 seconds and note Pu, Pd, Pb in table below
- ✓ 6) After 1 minute, record values again.
- ✓ 7) After 5 minutes, record values again
- ✓ 8) If Pdown and Pbypass <2 torr/5 mins, skip to 11
- 9) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
- ✓ 10) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
16 46 35	5	169	170	
16 47 35	6	169	170	
16 52 35	11	168	169	

Campaign: 16 APR 10 Flight: HIPPO-3 RF-11

NCAR/SCRIPPS MEDUSA Checklist V. 2010.04.04
Date(YYMMDD): 16 APR 10 **From-To:** PANC / KBJC

I. Preflight

A. Day(s) before flight Date (YYMMDD) = _____

- ✓ 1) Prepare new traps w/ clean beads filled to 3" below edge and bring to plane
- ✓ 2) Install new traps Upstream: ____ Downstream: ___
- __ 3) Load flasks, confirm old and record new flask IDs, and inspect o-rings
- __ 4) Record Flask Box Numbers: Box #1 _____ Box #2 _____
- ✓ 5) Install flask box retaining pins
- ✓ 6) Connect plumbing. Confirm lines are correctly installed with red label up
- ✓ 7) Replace cover shields and complete rack book
- ✓ 8) Record flask IDs into an Excel file on laptop (MED_YYMMDD_RF##.xls)
- ✓ 9) If necessary, download data from previous flight to laptop and pen drive
- ✓ 10) Check that flask table is clear. If not, "clear all"
- ✓ 11) Complete flask leak check procedure #1 Start UTC ___ : ___
- __ 12) Wait as long as possible, 1-hour preferred, then complete flask leak check procedure #2 Start UTC ___ : ___
- __ 13) Pull bypass pressure down (PC2 open), then pumps off and PC2 closed
- __ 14) Record Ps: Pup ____ Pdown____ Pbypass ___ then all power off

lines for positions 6 and 11 swapped

Flask ID Table (View from Front of Box)

13 1048 ←	12 1036	5 1135 ←	4 ~~1042~~ 1447
14 1200	11 1334	6 1388	3 1425
15 1203	10 1095	7 1179	2 1333
16 MT ↓	9 1246 ←	8 1256	1 1139

17 ↓	24	25 →	32
18	23	26	31
19	22	27	30
20	21 →	28	29 →

B. 2-hours before take-off.: Dry ice and Sampler Set-up

- ✓ 1) Load dry ice into dewar 0.5" from lid UTC 16 : 32 EAK key
- ✓ 2) Ensure that MEDUSA valve control key is in place
- ✓ 3) 28 V breaker on, Valve box on, Main breaker on
- ✓ 4) Record P / Δ: Pup 8 / ____ Pdown 16 / ____ Pbypass 16 / ____
- ✓ 5) Sync MEDUSA clock with clock on laptop +/- 1 sec
  MEDUSA time UTC 16 : 32 : 59 Laptop time UTC 16 : 33 : 00

6) Connect traps
7) Ensure VLV1 = 1, VLV2 = 1, VLV3 = odd, bypass on, pumps off
8) Open all flask stopcocks 2 half turns Flasks opened by: Sherry
9) Re-install splinter shields and complete rack book
10) Confirm P upstream, P downstream, prepurge T, and min flush T settings
Pupset 130 Pdownset 580 prepurgeT 60 flushT 150
11) Verify that no values are blinking on screen
12) Note trap temperature Trap T: 54
13) Complete bypass / system leak check
14) Ensure both controllers are to auto
15) Turn pumps on
16) Verify pressures are controlling and flow is as expected
Pup 129 Pdown 580 Pbypass 730 Flow 2850
17) If necessary, "Clear All" (after being sure data from last flight copied)
18) Pump breaker off (PB and VB stay on)

II. In flight

A. Immediately after take-off Take-off time UTC ___ : ___ : ___

1) Turn pump breaker on
2) Verify pressures/flows agree with previous values from I.B.16.
Pup 129 Pdown 580 Pbypass 732 Flow 3100
3) Verify that Vstat2, CO_2, and H_2O are all reading correctly and no values blinking on screen. If sampling schedule allows, let CO_2 and H_2O stabilize
4) Start pre-purge UTC 17 : 57 : 25
5) Note trap temperature Trap T: 39.7
6) Record png of prepurge: (YYMMDD_rf##_prepurge) File:_____

restart at 18:25

B. Sample 45 secs after desired altitude at 3 SLPM (1:15 at 1.8 SLPM), and record values in chart below (nominal kft = 1, 5, 10, 15, 21, 28, 36, and 46)

9.7 830/580 80C 24

Pos	Flow (V)	Psa (torr)	PC Setpts	End Time	PALTF	Profile #	Notes
1	8.1	797		18:46:18	39.5		~~32~~ missed A_{02} # → next flask
2	8.1	797	90/690	20:16:58	41	N/A	A02 253
3	8.1	781	90/690	20:25:41	41		A02 252
4	8.1	741	90/690	20:36:04	41		A02 256
5	8.1	754	90/690	20:49:58	41		A02 263
6	8.1	801	90/690	20:59:12	41		~~746~~ CAC - oops
7	8.0	800	90/690	21:18:29	45		A02 262
8	8.0	800	90/690	21:28:06	45		A02 260
9	8.1	800	90/690	21:40:11	45		A02 264
10	8.1	799	90/690	21:52:06	45		A02 ~~274~~ missed
11	8.1	800	90/690	22:00:41	45		A02 264
12	8.0	800	90/690	22:09:21	45		A02 266
13	8.1	801	90/690	22:17:24	45		A02 261
14	8.1	801	90/690	22:26:41	45		A02 272
15	missed		90/690	22:34:48	39.6		—
16	—	LAST	FCAST	15	# 15-T		

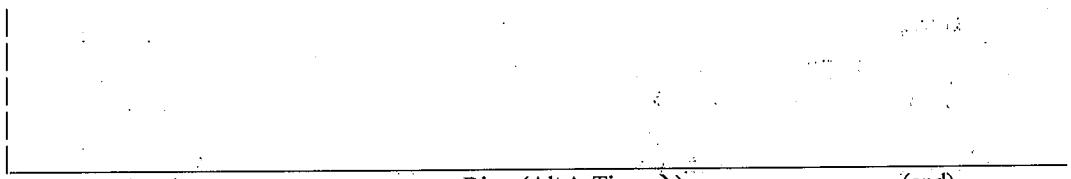
6 Last flow sensor

__ 1) After sampling flask 16, close flasks 1-16 UTC: 22 : 34

__ 2) Note trap temperature Trap T: _____

Pos	Flow (V)	Psa (torr)	P Setpts	End Time	PALTF	Profile #	Notes
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							

__ 3) After sampling flask 32, close flasks 17-32 UTC: ___ : ____
__ 4) Note trap temperature Trap T: _____



_____ (start) Dips (Alt ↑, Time →) (end) _____

III. At the end of the sampling

__ 1) Turn Pumps breaker off UTC 22 : 35
__ 2) Turn Mains breaker off
__ 3) Turn valve box breaker off
__ 4) Turn 28V breaker off
__ 5) Ensure all flask valves closed

IV. Post-flight

__ 1) Remove traps
__ 2) Plug holes in dewar lid
__ 3) Download flask sampling data to laptop and pen drive
__ 4) Empty beads from upstream trap into 'wet' bead container to dry
__ 5) Open downstream trap and set upright

V. Day after flight

__ 1) Transfer beads from downstream trap into upstream trap
__ 2) Unload flasks. Box #1: _____ Box #2 _____

MEDUSA leak check procedures

Flask Leak Check Procedure #1: **File:** _____

✓ 1) 28 V breaker on, Valve box on, Pump box on
✓ 2) Ensure Box #1 = 1, Box #2 = 1, 6-way = odd, Bypass on
✓ 3) Pup Ctrl Closed, Pdn Ctrl Open, Pump On - pull down bypass line for 1 minute
✓ 4) If necessary, "Clear All" (after being sure data from last flight secure on laptop)
✓ 5) Adjust prepurge time to 20 seconds
✓ 6) Toggle between bypass on/off 6 times over 1-min to pull PSA down to < 200
✓ 7) Run 20-second prepurge to evacuate lines. Start: 16:23 Finish: 16:30
✓ 8) Save PNGs of AEROS P,Flow/Stat to laptop (YYMMDD_RF##_Leakcheck1.png)
✓ 9) Close Pdn, turn pumps off (will leave in position 1)
✓ 10) Turn bypass on

Flask Leak Check Procedure #2: **File:** _____

__ 1) "Clear All"
__ 2) Valve box off, main breaker off then on to reset, then valve box back on
__ 3) Ensure AEROS is running with MEDP1,MEDP2, MED_Psa, MEDPBYP recording
__ 4) Open Pdn, turn pumps on and evacuate sample and bypass (toggle 6 times).
__ 5) Close Pdn and turn pumps off
__ 6) Adjust prepurge time to 20 seconds
__ 7) Run 20-second prepurge to check all flask downstream tube Ps
__ 8) Record times for AEROS matching. Start:_____ Finish:_____
__ 9) Save PNGs of AEROS P/Flow/Stat to laptop (YYMMDD_RF##_Leakcheck2.png)
__ 10) Turn bypass on

Bypass / System Leak Check Procedure:

✓ 1) Ensure bypass on, close PC1 and open PC2
✓ 2) Turn on pump breaker and let run for 1 minute
✓ 3) Verify Pup ~ 10, Pdown ~160, Pbypass ~160
✓ 4) Switch PC2 to closed and turn off pump
✓ 5) Wait 15 seconds and note Pu, Pd, Pb in table below
✓ 6) After 1 minute, record values again.
✓ 7) After 5 minutes, record values again
✓ 8) If Pdown and Pbypass <2 torr/5 mins, skip to 11
✓ 9) If values are not ok, turn PC1/PC2 to auto, run gas for 15 seconds, close PC2 for 1 second, and then shut off pump to pressurize system in bypass. Snoop trap fittings, and fittings between and to boxes, and fix/tighten as necessary
__ 10) Return PC1 and PC2 to auto

Time (UTC)	Pup	Pdn	Pbypass	Comments
16:48:50	5	166	168	
16:49:50	6	166	168	
16:54:50	13	166	168	