

U.S. Dep't. of Commerce / NMAO / NOAA / Aircraft Operations Center

FLT ID: 20110721N1	From: KMCF	To: KMCF
FLT #: 11-	Blk In: 1937 Z	Lnd Time(on): 1937 Z
ETD: 1430 Z	Blk Out: 1441 Z	T/O Time (off): 1420 Z
ETE: 5	Total Blk: 5.5	Total Flt: 5.3
Sponsoring Org: AOC	Program: PRX	Purpose: Wind Cal

AOC Flight Crew

Aircraft Commander: Glover	Data System: Defeo
Co-Pilot: Totn /	Avaps: Mascaro
Navigator: /	System Engineer: Miller
Flight Eng: /	AA: Peek
Flt Director: Williams / Damiano	AA: Newman
Avionics:	Crew Chief:

Participating Scientists, Visitors, & Add'l Aircrew on back.

of people listed on back:

	A/C - Takeoff	Wx Station - Takeoff	A/C - Land	Wx Station - Land
Pressure			1011.7	

ATIS - Takeoff	1359	VRBOS	10	8KC	31/26	3001
ATIS - Land	1855	26005H	10SM	CLR	34/25	2999

Data Source	Number	Data Disposition / Date / Quality / File Name(s)
Flight Level Tapes		
Radar Tapes		
Dropsondes		Good: Bad: Sent:
AXBT		

List other data sources on back in Remarks section.

Remarks (Storm Name, Mission ID, Recco Times, Fix Times)	Recco		
	Times:	Fix #	Fix Time
Storm Name: _____			
Mission ID: _____			

YOKOTA WX
3740ss.weather@yokota.af.mil
PMSV 344.6

Iwakuni - RJOI

Misawa - RJSM

Wake Is - PWRK

N49RF Wind Calibration Flight

A wind calibration flight for N49RF has been tentatively scheduled for 20 July 2011 with a fall back to 21 July 2011. This flight is weather dependent and is subject to change.

NOAA49 will fly at 4 altitudes over open water in clear air. The aircraft will fly to and operate in the vicinity of buoy 42003, located at 26°03'N 85°37'W. Depending on weather conditions and airspace, we could operate over another nearby buoy.

The aircraft will perform the following maneuvers in VFR (cloud free) conditions:

30,000 ft PA: Racetracks tracking into and out of the wind at .72, .77, and .82 mach. After the .82 mach legs are completed climb to 35000 feet.

35,000 ft PA: Racetracks tracking into and out of the wind at .72, .77 and .82 mach. During a leg of the .77 mach racetrack a dropsonde will be deployed. Climb to 45,000.

40,000 ft PA: Racetracks tracking into and out of the wind at .72, .77 and .82 mach. After the .77 mach legs fly 3 left turn circles then 3 right turn circles at 20° of roll/bank angle. After the .77 mach circles are completed perform a yaw maneuver to $\pm 5^\circ$ for five complete cycles°. **For the yaw maneuver fly .77mach and roll angle must be kept less than 3°.** After completion of the yaw maneuver return to straight and level flight for one minute then perform the .82 mach racetrack.

45000 ft PA: Racetracks tracking into and out of the wind at .72, .77 and .82 mach. After the .77 mach legs are completed perform the pitch maneuver to $\pm 5^\circ$ of pitch for five complete cycles. Five cycles will be enough. After completion of the pitch maneuver perform the .82 mach racetrack. During the .82 mach racetrack a sonde will be deployed.

NOTE!!! Each racetrack leg will be three (3) minutes in duration. This allows for adjustments to airspeed as the leg is flown. Also once a leg is started **DO NOT** change aircraft track or heading until the leg is completed. If the wind speed is greater than 13 knots **AND** wind direction changes by more than 10 degrees over the course of the leg, that leg is no good and must be repeated. There **will be** 90/270 turns for at least one complete mach leg per airspeed for each altitude.

After all calibration maneuvers have been completed ferry back to MacDill AFB. If any problems occur during the flight, they will be dealt with accordingly.

Total flight time will be about 5.0 hours.

:

Yaw - PDBeta, PDBeta

175139 - 175757 4 cycles

~~659~~

175259 - ~~175758~~ 175639 3 cycles
SA.1 Slope 7.6939 - 218pts 
SA.2 7.8551 218pts

4 cycles SA.1 7.7732 378pts 4 cycles
SA.2 7.9164 378pts

Circles

165126 - 171209 (L)

$\gamma_{uwz} = .17$

171218 - 1735 (R)

SA.1 7.7732

SA.2 7.9164

AA.1 ^{int} 4.9399 ^{slp} 5.4481

AA.2 4.9765 5.5893

AA.1

Altitudes

35 + 40k legs

Points 1440

Slope

Int

Corr

5.4934

4.9624

0.994

Altitudes 35, 40, 45 legs + Mach Run

Slope

Int

Corr

5.4481

4.9399

0.995

Alt

35

Slope

Int

Corr

Points 720

5.5887

5.0091

0.990

Alt

40

Slope

Int

Corr

5.5061

4.9568

0.994

Alt

45

Slope

Int

Corr

5.6288

4.9537

0.983

POST - Legs

G4 Wind Calibration Exercises

 σ σ^2

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
35,000	INTO	.72	.015	.02	145215	145415	new ~ same
35,000	WITH	.72	.012	.014	150725	150925	new ~ same
35,000	INTO	.77	.21	.044	152002	152202	new much better UWZ
35,000	WITH	.77	.11 / .09	.01	153243	153443	new much better
35,000	INTO	.82	.16	.028	154720	154920	new much better
35,000	WITH	.82	.099	.0009	160022	160222	new much better

 σ σ^2

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
40,000	INTO	.72	.09	.007	161312	161512	new ~ same
40,000	WITH	.72	.07 / .07	.004	162326	162426	162500 - 162600
40,000	INTO	.77	.18	.03	163545	163745	new = much better
40,000	WITH	.77	.14	.019	164818	165018	better ~
40,000	INTO	.82	.06 /	.003 /	180340	180440	new ~ better
40,000	WITH	.82	.2	.04	181535	181735	new ~ better

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
45,000	INTO	.72	.1	.03	182345	182545	new ~ better much
45,000	WITH	.72	.11	.06	183552	183752	new ~ better
45,000	WITH						
45,000							
45,000							
45,000							

Legs
WD WS UWZ

least variance
PRApha1/2
POApha1/2
roll
pitch

45k with - wst ✓
.72 ↑ .82 ↓ .72 ↑ .77

start 183753
end 184818

WIN RAR

G4 Wind Calibration Exercises

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
30,000							
30,000							
30,000							
30,000							
30,000							
30,000							

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
35,000	into	.72	040/9	040	1452	1456	
35,000	with	.72	060/9	220	1505	151036	
35,000	into	.77		040	151936	152430	
35,000	with	.77		220	1533	1537	
35,000	into	.82		040	1546	1550	
35,000	with	.82			1608	160313	

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
40,000	into	.72		065	161230	161615	Sonde
40,000	with	.72		245	1624	162730	
40,000	into	.77		065	1635	163830	
40,000	with	.77					circles - 230
40,000		.82		1803	1806		
40,000	w	.82		1814	1817		

Level	Into/with Wind	IAS	wdir/wspd	Track	Start Time	Stop Time	Notes:
45,000	±			065	1822	1827	
45,000	w			18	1833	1839	
45,000							
45,000							
45,000							
45,000							

upto .82
 < .72
 .77

AA.2

Alt 35

Slope	Int	Corr	Pts
5.7055	5.0594	0.990	720

S	T	Cor
5.6679	5.0186	

138

Alt 40

Slope	Int	Corr	Pts
5.9345	5.0641	0.994	720

Alt 45

Slope	Int	Corr	Pts
5.8454	4.9938	0.983	866

ALL Altitudes

5.5893	4.9765	0.994	2306
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w/o Mach Run

5.68277	5.0204	1.019	
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L circles
R circles

16:51 36 → 17:11:55
all
1735 37

~~less~~ 352

90/270 . R → L 14:55 47 - 50315
1510 1518

at 17:10

~~new WS~~ ~~new WS~~ ~~new WS~~
New WS lower ~~new WS~~
with wind

6.659
6.35
5.07

with
4.8 ~.3

higher into

New WS lower in left turn
higher in R turn

- new better in L circles less signs in unit - better in C circle
Grandpa WS varies in L C circle
↳ no varies less in R circles

Slip Angle Slope Derivation:
Derived from the Yaw Maneuvers.

Instructions:

Use each Yaw maneuver (at 1,500ft and 15,000ft)

In NCPLLOT generate plots of:

Dynamic slip pressure - pqsf
Differential slip pressure - pdsf

140003 - 140031
140335 - 140427
145547 - 145643
153512 - 153732

From the above plots you want to select as many yaw cycles as you can to use in the derivation.

A cycle starts at a midpoint goes down to a valley up to a crest and back down to the midpoint (or similarly a midpoint to crest to valley to midpoint whichever gives you the greatest number of cycles and can depend on which way the pilots turned to first).

Key notes:

- The pilots should have taken the same amount of time to do each cycle. Thus each cycle should look closely like the next. You want each slope between each midpoint, valley, and crest to be as smooth and straight as possible. Select as many of the cycles that you can with this smooth slope. If one cycle looks more rounded (or flat etc) than another it means they took more time to do that cycle and it shouldn't be used in your calculation.
- Also note if they took longer on one level over the other level and if you use the same number of cycles then be aware that the level with more data points (1sec=1data point) is going to skew the calculations more to that level than the other.
- You should also have an equal number of beginning and end points where the plane was straight and level (not yawing) before and after the maneuvers began.
 - The end of your beginning points should transition evenly into the beginning of your first cycle so that the end of the beginning has the same (or close to it) numerical value of the beginning of your first cycle. The same is true for the midpoint ending your last cycle should transition into the beginning of your end section. The beginning and end sections should have the same number of data points (e.g. 30 beginning = 30 end etc).

140003 - 140031 643 mb 12000 ~~15~~ FT
 BP1 -2 ; BP2 +2 Roll 15° - $(-3)^{\circ}$
 BP1 34 ; BP2 41 mb
 -42 ; -43

140385 - 140427 17000 FT
 BP1: -1.53 BP2: 1.58 Roll 2° - 4.2°
 48 BP2: 56
 -39 -40 Roll $\sim 2^{\circ}$
 46 54 Roll $\sim 2^{\circ}$
 -40 -40 $\sim 2^{\circ}$
 45 53 $\sim 2^{\circ}$
 -40 -40

145547 - 145643 9100 FT
 BP1: -1.0 BP2: 1.70 Roll $\sim 1^{\circ}$
 45 ; 53
 -41 -41 Roll $< 1^{\circ}$
 47 55 $2^{\circ} < \text{Roll} < 3^{\circ}$
 -42 -43 Roll $< 1^{\circ}$

153512 - 153732 5100 FT
 BP1: -2 BP2: +3
 48 56 Roll < 2
 -43 -44 Roll < 2
 50 58 Roll < 2
 -41 -42 Roll < 1
 -43 -44 Roll < 1
 49 57 Roll < 2
 -41 -42 Roll < 2

35K

.72 mach = 58 DAP

.77 mach = 66 DAP

.82 mach = 74 DAP

110721N (G-4)

90/270 roll 20

~~15~~ 152355 start

153115

7.5 min

155020 start 90/270

155830

8.2 min

1452 > 1 hr 1 min
1603

40K

.72 mach 44.5 DAP

.77 mach 51.5 DAP

.82 mach 56.0 DAP

FMS 65 HD

Hamas 63.1

7 (42)

165130 -
165815

6:45 one
complete
circle

45K .72 mach 33 DAP
.82 mach 43 DAP

183750 .72

184210 .82

184835

and ~~run~~
speed run

173620 start yours

30 - 32.48

30 - 30

175140

roll
-7.5 30

7.5 30

-30 175900

30 - 30

PD Beta F.1

17408

push 040
Asas