ROYAL AUSTRALIAN AIR FORCE
No 2 Operational Conversion Unit

MINUTE

CATT:
2OCU 24/3/AIR PT 7 (XX)

OC (HQ 81WG)

For Information:
OC (HQ 78WG)

2OCU HORNET FLYING DISPLAY

Reference:
A. DI(G) OPS 05–2—*Flypasts and Flying Displays*
B. DI(AF) OPS 1–19—*Royal Australian Air Force Aviation Risk Management*

1. s47F has been selected to conduct the F/A-18 flying display on behalf of ACG for the Australian International Airshow at Avalon 2007, and for future events requiring Hornet displays. This minute details the 2OCU proposed Hornet flying display and training requirements.

2. Authorisation and conduct of the flying display will be in accordance with the guidance contained at Reference A.

3. s47F will practise a high and a low show display in work-up for the airshow. These displays have been designed to the limits specified by ref A. The work-up program and other requirements and procedures for the displays are listed in annex A. A description of the two displays is in annex B. RMP to follow as Annex C

4. For your information and concurrence. I request you approve the proposed displays and work-up program, Sir.

s47F
CO 2OCU

Tel: s47E(c)

31 Jan 07

Annexes:
A. AIA 2007 Hornet Flying Display Instructions
B. Description of Hornet Flying Display Manoeuvres

ANNEX A TO
2OCU 24/3/AIR PT 7 (XX)
DATED 31 JAN 07

AIA 2007 HORNET FLYING DISPLAY INSTRUCTION

1. **Background.** These instructions describe the training requirements and procedures to be implemented by 2OCU in the execution of the Hornet Flying Display for the Australian International Airshow 2007 (AIA 07).

2. **Display Pilot.** The F/A-18 pilot nominated to conduct the exercise is s47F s22

3. **Planning Considerations.** The flying routine has been designed to be simple, while adequately displaying the characteristics of the F/A-18. A work up period is required to ensure the exercise is conducted in a controlled and safe manner. The program for work up training to 500ft AGL will comprise a minimum of 11 simulator rides and 21 sorties. The progression of flights and simulator practices for the work up to 500ft AGL (confirm show will be flown to 250'AGL ?) is:

Week	Sortie	Comments
05-09 Feb 07	1 x SIM	Practice High Show
12-16 Feb 07	5 x SIM 3 x GF	SIM 1&2 - Practice High Show SIM 3&4 - Practice High Show + Emergs SIM 5 - Practice Low Show GF 1 – Aerobatics Practice – base 5000ft GF 2 – Practice High Show – base 5000ft GF 3 – Practice High Show – base 2000ft This flight to be dual, flown with s47F
19-23 Feb 07	4 x SIM 4 x GF	SIM 1- Practice High Show + Emergs SIM 2&3 - Practice Low Show SIM 4- Practice Low Show + Emergs GF 1,2&3 – Practice High Show – base 2000ft GF 4 – Practice High Show – base 1000ft This flight to be dual, flown with s47F
26-02 Mar 07	5 x GF	GF 1-5 – Practice High Show – base 1000ft
05-09 Mar 07	5 x GF	GF 1 – Practice High Show – base 1000ft GF 2 – Practice Low Show – base 1000ft GF 3&4 – Practice High Show – base 500ft First flight at 500ft to be dual, flown with s47F GF 5 – Practice High Show – base 500ft Overhead Williamtown
12-16 Mar 07	1 X SIM 4 x GF	SIM 1- Practice High & Low Show + Emergs GF 1&2 - Practice High Show – base 500ft Overhead Williamtown GF 3&4 - Practice High Show – base 500ft Overhead Williamtown

Hornet Display to 500ft training requirements

4. To maintain currency at 500ft, one High / Low show is required every two weeks. If currency cannot be maintained, then the following profiles must be flown:

1 x SIM	Full display sequence base 500ft
1 x GF	Practice full show base – 1,000ft
1 x GF	Practice full show base – 500ft

5. The area designated to conduct low altitude (<4,000ft) work up sorties is on the southern edge of the WLM low flying area (WLM035-055R, 20-30nm, up to F150, feet dry). These areas are well clear of any built up or noise sensitive areas. Practice overhead Williamtown will be required to gain experience at judging crowd line distances and effects for crosswind.

6. To adequately prepare for each display, specific requirements concerning the location of crowd lines, local hazards, restrictions and foul lines will be required prior to the display date. The Avalon display regulation is already published and has been read by the display pilot.

7. ATC liaison will be required to secure the airspace necessary to conduct the routine. As a guide, an area of 5nm from the crowd centre up to 20,000ft will be required for the High show.

8. **Squadron resources** A minimum of two aircraft will be required to deploy for the display venue at least two days prior to the first planned activity. This should allow suitable time for local orientation and practices. One aircraft will act as a spare / static while the other aircraft conducts the display.

9. **Aircraft configuration.** The display aircraft are to be clean and fitted with either no AIM 9M CATM's or two AIM 9M CATM's. Prior to the display, the aircraft will be refuelled to 8,000lbs internal fuel, supervised by the display pilot. This will ensure sufficient fuel for the routine and subsequent arrival at the display location. Where the display occurs at a position away from the landing point, the fuel will be specified accordingly.

10. **Display restrictions.** The minimum altitude for the routine will be 500ft above surrounding terrain and obstacles for aerobatic manoeuvres reducing to 200ft for level or non-aerobatic manoeuvres. All manoeuvres are planned to run parallel to the display line. No manoeuvres will be flown pointing at the crowd, over the crowd or from behind the crowd. Maximum speed for the display will be 550KCAS or M0.9.

11. **The Routine.** A High, Low and Handling display will be planned and practiced. The decision to execute a high or low show will be decided on the day of the display based on the prevailing weather conditions. A cloud base of 5,000ft is required to conduct the high show and 2000' AGL is required for the low show. V Low handling display

12. **High Show to Low Show transition.** A low show will essentially omit the looping manoeuvres, and have all vertical repositions replaced with lateral repositions. Where possible the high versus low show decision will be made prior to start in consultation with the authorising officer. Changing airborne?

13. **Authorisation and Sortie Briefing.** CO or XO 2OCU, or s47F will authorise all flying display sorties. A thorough brief before all sorties will include weather, ATC, area/ airspace, specific sortie objectives, minimum altitudes, check points/ altitudes, bug outs and

emergencies. All sorties are to be HUD taped and fully debriefed by the display pilot and CO 2OCU.

ANNEX B TO
2OCU 24/3/AIR PT 7 (15)
DATED 25 JUL 01

HORNET FLYING DISPLAY MANEOUVRES

RECOVERY POINTS

Planned	- From inverted	4000ft	200KCAS	25AOA
	- Dive recovery fm 90 ND	300KCAS	3000ft	4g
	- Dive recovery fm 90 ND	250KCAS	2500ft	4g
Emergency	- From inverted	3000ft	200KCAS	35AOA
	- Dive recovery fm 90 ND	2000ft	250KCAS	6.5g
LLAT	- 30 deg dive	2000ft		
	- 20 deg dive	1500ft		

MIN ALTITUDE FOR PULL THROUGH FROM INVERTED

RAAF 3500ft

Safety margin of 1000ft before impact @ 4g (ie.500ft buffer above 500ft display floor).

MIN AIRSPEEDS

In vertical	- 90 deg nose up	2500ft	150KCAS	12-15 AOA
Inverted		3500ft	130KCAS	

RADALT SETTING

Radalt - 400ft

WEATHER MINIMUM

High Show 5000ft cloud base

Low Show 2000ft cloud base

HIGH SHOW SEQUENCE

MAX PERFORMANCE T/O

Power – Full AB
12 Deg trim – stick forward to fair stabs.
125kts ¾ aft stick
+ve ROC & 50ft, LG UP – hold 1 deg NU

CUBAN REPOSITION

At end of runway (300kt min) smoothly pull 4.0g to 75deg NU,
Check 2500ft roll through 180deg,
Check 3000ft, select 35AoA,
Apex 4000'min,
Check 90 deg ND, 2500ft min, continue pull to 60deg ND,
Check 2000ft 6o deg ND,
Reduce power ¾ PLA,
Transition 25 AoA into 4g,
Exit speed 350-380kts.

HESITATION INVERTED PASS

Action 0.7nm, entry speed 350-380kts, ¾ PLA,
Select 5 deg NU, check,
¾ stick deflection roll to 90 deg AOB towards the crowd,
Simultaneously introduce full rudder to maintain nose above the horizon Pause 1 second,
¾ stick deflection roll to inverted attitude,
Hold inverted for 5 sec, when inverted push –1.2G to 4 deg NU,
¾ stick deflection roll to 90 deg AOB away from the crowd,
Simultaneously introduce full rudder to maintain nose above the horizon Pause 1 second
¾ stick deflection roll to wings level,
Pause 1 second prior to reposition,
Exit speed 350-380kts.

HIGH AOA REPOSITION

Action 0.7nm. Entry speed 350-380kts
Select Max Power,
Offset through 30 deg at 5g away from crowd,
Loaded roll at 5g to wings level, hold 5g until 60 deg NU,
Check 1500ft, 60 deg NU, 300kts min,
Full back stick to 35 AoA, Lift Vector on the end of runway,
Pull to 60 deg ND, select ½ PLA,
Roll to 45 deg AOB to line up with runway,
Check 2500ft 60 deg ND with bank,
Ease to 500ft, Exit speed 320kts

MAX PERFORMANCE SUSTAINED TURN
Action at crowd center. Entry speed 320kts,
Select Max Power,
Roll to 60 deg AOB away from crowd, pull to squat and sustain 280-300kts (12-15 AoA),
Climb 1-2 deg NU to 700ft on back half of turn,
Descend 1-2 deg ND to 500ft on front half of turn,
Positive roll out at entry point,
Power Mil, exit speed 280-300kts.

CORKSCREW DERRY REPOSITION
Action 0.6nm. Entry speed 320kts min,
Select Max Power,
Roll to 60 deg AOB way from crowd, select 5g,
Offset through 50 deg and achieve 20 deg NU, 220-260kts,
20 AoA loaded roll under with full rudder,
Check 1000ft 20deg ND max,
Ease to 500ft, exit speed 330kts.

SQUARE LOOP
Action 0.1nm, Entry 330kts
Select Max Power (check both burners light prior to pull),
Select full aft stick into 35-40AoA, positive check 90 Deg NU,
Check 2500ft 180kts (150 min),
Check 3,000ft 25AoA pull to 10 deg NU (canopy bow on horizon),
Check 4,000ft 10 deg NU, accelerate to 200kts,
At 200kts select 35AoA to 90 deg ND,
Positive unload in vertical to reduce AoA,
Select ¾ PLA,
Check 2500ft, 250KCAS, 12 AoA into 4g
Select Mil Power at 30ND / 1500ft,
Exit speed 330kts.

DERRY TURN LATERAL REPOSITION
Action 0.6nm, Entry speed 330kts
Select Idle power,
Roll to 60 deg AOB away from the crowd,
Pull 4g through 45 deg, 10 deg NU,
At 45 deg roll under, slicing turn to 700ft,
Check 300kts, SB if required,
Check 250kts 90 deg to run-in,
Play turn to roll out over run-in line, through 160kts select 82% RPM,
Roll out with 130kts, slow to 120kt/25AoA(Max).

SLOW SPEED PASS
Entry speed 25AoA max, 700 ft,
Maintain 700ft(min), 120/25AoA (Max)
Passing crowd center select Max power,
Maintain 25AoA to 60-75deg NU,

ROLL UNDER REPOSITION
Entry Speed 130kts, 60 deg NU, 2000ft,
Maintain Max Power,
Roll with rudder away from the crowd and set a departure angle of 45 deg,
Allow nose to fall to 30ND
Check 1500ft, 250kts 30deg ND,
Exit speed 450kts, 200ft min.

HIGH SPEED PASS
Offset to allow 60 deg AOB pass to be flown,
Check 450kts, descend to 200ft,
Select Max AB and Accel to 550kts/M0.9 (Max)
At 0.6nm select 2 deg NU and roll to 60 deg AOB,
1 second past crowd, roll wings level and select idle.
Exit speed 550kts/M0.9 (Max)

HIGH AOA REPOSITION
Action 0.7nm. Entry speed 450-550kts
Check idle power,
Pull 5g to 60 deg NU,
Check 1500ft, 60 deg NU, 300kts min,
Full back stick to 35 AoA, Lift Vector on the end of runway,
Max power when nose through 90 deg NU,
Check 4000ft when inverted,
Pull to 60 deg ND, select ¾ PLA
Check 2000ft 60 deg ND,
25 AoA to 4g
Ease to 500ft, Exit speed 350-380kts

LOOP
Entry speed 350-380kts,
Select Max power, at crowd center, pull 5g wings level into 20 AoA,
Check 2500ft, 90 deg NU,
Check 3500ft 20 deg NU,
Check 4000ft inverted, Min is 3500ft,
Maintain 20 AoA pull down,
Check 2500ft min 90 deg ND,
Continue 20 AoA into 4g, select Mil power 60 deg ND,
Exit 350-380kts, 500ft.

OBLIQUE REPOSITION
Action 0.7nm, entry speed 350-380kts,
Offset through 30 deg at 5g, unload, roll out,
Select Max power,
Pull max g to 60deg NU,
Check 3000ft, unloaded roll to 135 deg AOB toward crowd,
Check 3500ft, pull 35 AoA,
Check 3000ft 70 deg ND, 250-280kts, ¾ PLA
Exit 380-400kts, 200ft

HIGH SPEED VERTICAL DEPARTURE
Action 0.5nm, Entry speed 450kts
Select Max power 3sec prior to the pull,
Pull 6-7g to 90 deg NU,
Check to clean up wings, very slow roll through 360deg,
Pull down at 180kts/20000ft.

LOW INITIAL AND PITCH
Entry 450kts, 200ft
Action 0.1nm, pull 10deg NU,
Through 500, Derry turn to pitch out,
Select 6-7g, idle power and S/B,
Overbank passing 1300ft to level at 1500' for SOP circuit.

LOW SHOW SEQUENCE

MAX PERFORMANCE TAKE-OFF
Power – Full AB
12 Deg trim – stick forward to fair stabs.
125kts ¾ aft stick
+ve ROC & 50ft, LG UP – hold 3-4 deg NU climb to 500ft

DERRY TURN LATERAL REPOSITION
Action 0.6nm, Entry speed 330kts
Roll to 60 deg AOB away from the crowd,
Pull 4g through 45 deg, 10 deg NU,
At 45 deg roll under, slicing turn to 500ft,
Play turn to roll out over run-in line,
Exit speed 350-380kts

HESITATION INVERTED PASS
DERRY TURN LATERAL REPOSITION
MAX PERFORMANCE SUSTAINED TURN

CORKSCREW DERRY REPOSITION
Action 0.6nm. Entry speed 320kts min,
Select Max Power,
Roll to 60 deg AOB way from crowd, select 5g,
Offset through 50 deg and achieve 20 deg NU, 220-260kts,
20 AoA loaded roll under with full rudder,
Check 1000ft 20deg ND max,
Ease to 500ft, exit speed 380kts.

OPPOSITE DIRECTION AILERON ROLLS
Entry speed 380kts,
First roll 5 deg NU roll towards crowd (full stick deflection),
Second roll, wings level roll away
Third roll pick nose up to 3deg NU roll towards crowd
Exit airspeed - 380KCAS

DERRY TURN LATERAL REPOSITION
SLOW SPEED PASS
ROLL UNDER REPOSITION (Max 30NU/ 15ND)
HIGH SPEED PASS
DERRY TURN LATERAL REPOSITION

DIRTY PASS
Slow to below 250kts during the Derry Reposition
Configure less 250kts/2.0g,
Select Gear, Flap, Probe, Hook, Speedbrake, out,
Fly on-speed at 200ft past crowd,
Select Max power and retract, Speedbrake, gear, flap, probe, hook,
Ease to 30 deg NU, 220-240kts.

ROLL UNDER REPOSITION

- SCT/ BKN Cloud Permitting

HIGH SPEED VERTICAL DEPARTURE
LOW INITIAL AND PITCH

- Else

INVERTED PASS
Entry speed 350kts,
Pull 5 deg NU roll inverted,
Maintain inverted level flight for max of 10 secs,
Roll back to level.

DERRY TURN LATERAL REPOSITION
LOW INITIAL AND PITCH