



# **2025 Blue Angels Maneuvers Manual**



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# 2025 NFDS DEMONSTRATION PILOTS



DEPARTMENT OF THE NAVY  
NAVY FLIGHT DEMONSTRATION SQUADRON  
390 SAN CARLOS ROAD SUITE A  
PENSACOLA, FL 32508-5008

3700  
Code 00  
19 Nov 24

From: Commanding Officer, Navy Flight Demonstration Squadron  
To: Kevin Raymond, FAA NAES

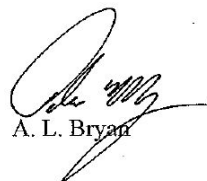
Subj: 2025 DEMONSTRATION PILOTS

1. The following pilots are authorized to conduct aerial flight demonstrations in Blue Angel F/A-18 and C-130 aircraft.

CDR Adam Bryan  
CDR John Keilty  
MAJ Robert Wilkins  
LCDR James Perkins  
CDR Thomas Zimmerman  
LT Connor O'Donnell  
MAJ Scott Laux  
MAJ Samuel Petko  
CAPT Isaac Becker  
MAJ Josh Horman

2. In addition to the above pilots, the following aviators are permitted to attend the daily air show briefing and sign the FAA waiver on behalf of the team.

CDR Bryce Aubuchon  
LCDR Lillian Montana

  
A. L. Bryan



# PRACTICE DEMONSTRATION GUEST RIDERS

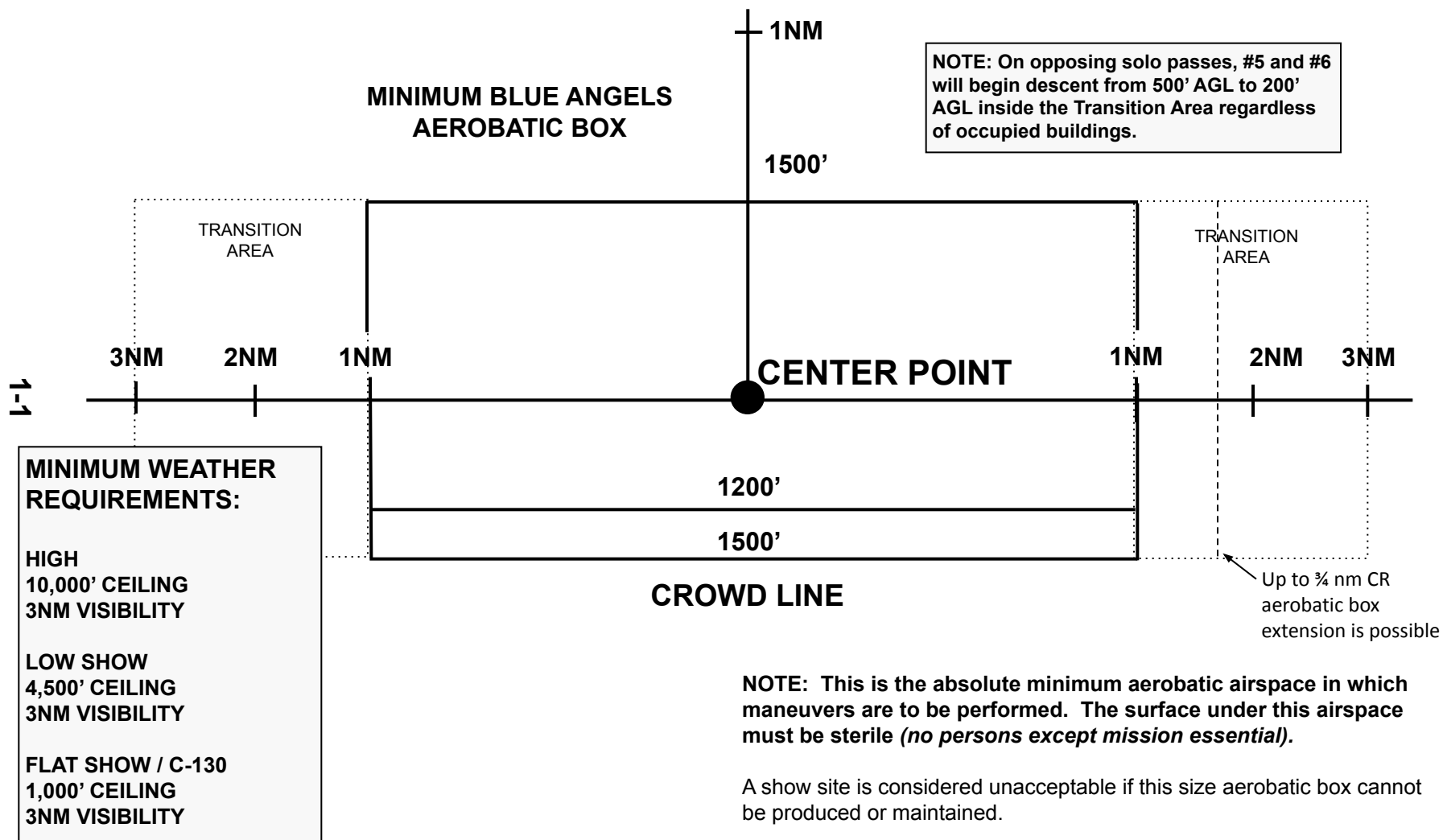
The mission of the Blue Angels is to showcase the teamwork and professionalism of the United States Navy and Marine Corps through flight demonstrations and community outreach while inspiring a culture of excellence and service to country.

In part to accomplish this mission, the Blue Angels will have guests present at the communications cart and fly guest riders in practice flight demonstrations as non-aircrew essential personnel, in accordance with Chief of Naval Air Training Instruction (CNATRAINST) 5357.1.

Guest riders in practice flight demonstrations will fall under the CNATRAINST 5357.1 “Military Orientation Flight” category as either Blue Angels squadron personnel or military personnel that are guests of current Blue Angels team members. All Military Orientation Flight riders will be medically screened for flight, receive thorough pre-flight training from a qualified Blue Angels Crew Chief, be briefed on all required risk mitigation procedures and contingency scenarios, and will attend the Blue Angels flight brief. All guests that will be present at the communications cart will attend the Blue Angels flight brief, communications cart brief, and will be under the Blue Angels supervision while at the communications cart. Military Orientation Flight riders and communication cart guests are approved by the Blue Angels Commanding Officer or CNATRA, as required.



# AEROBATIC BOX DIMENSIONS

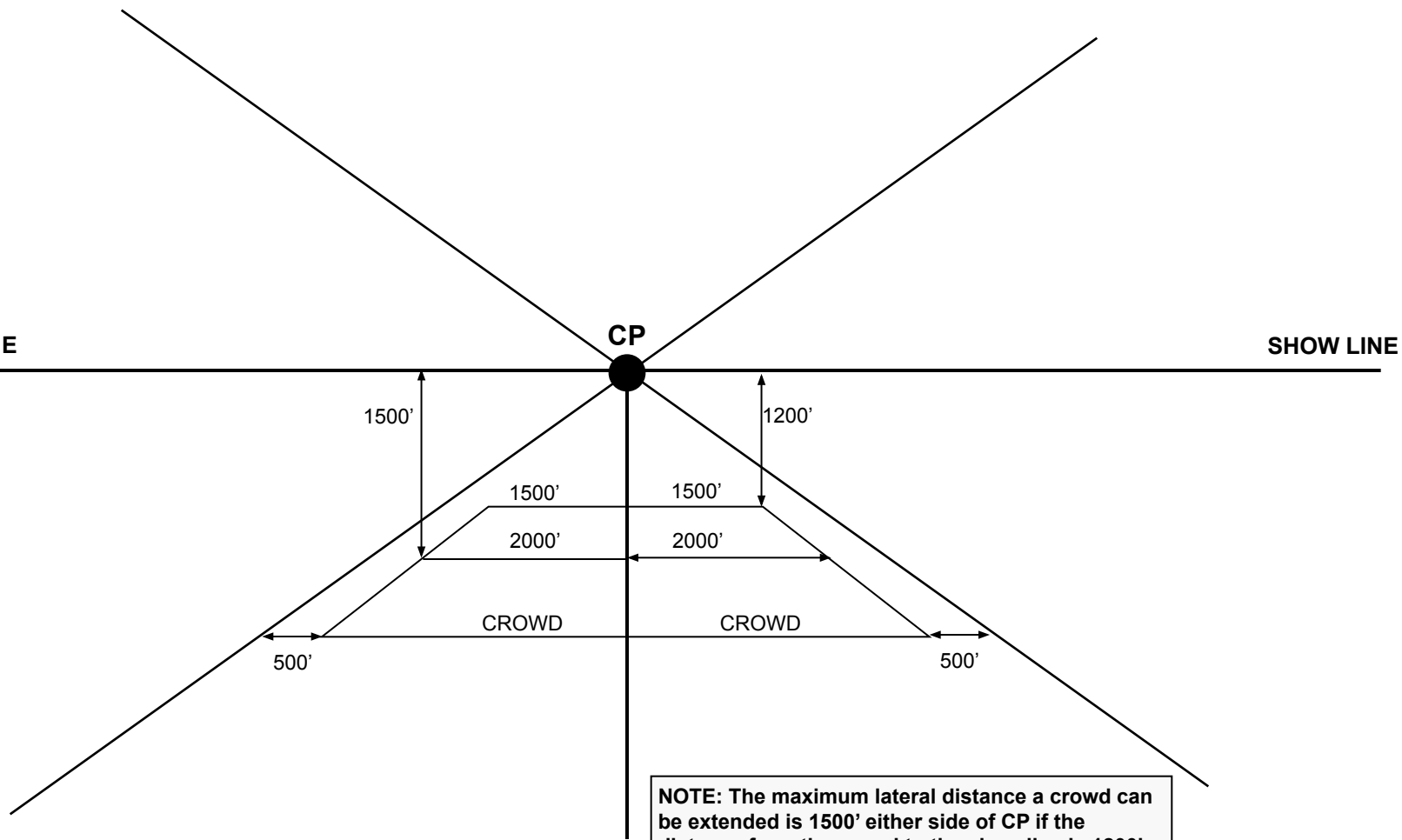






# MAXIMUM CROWD DIMENSIONS

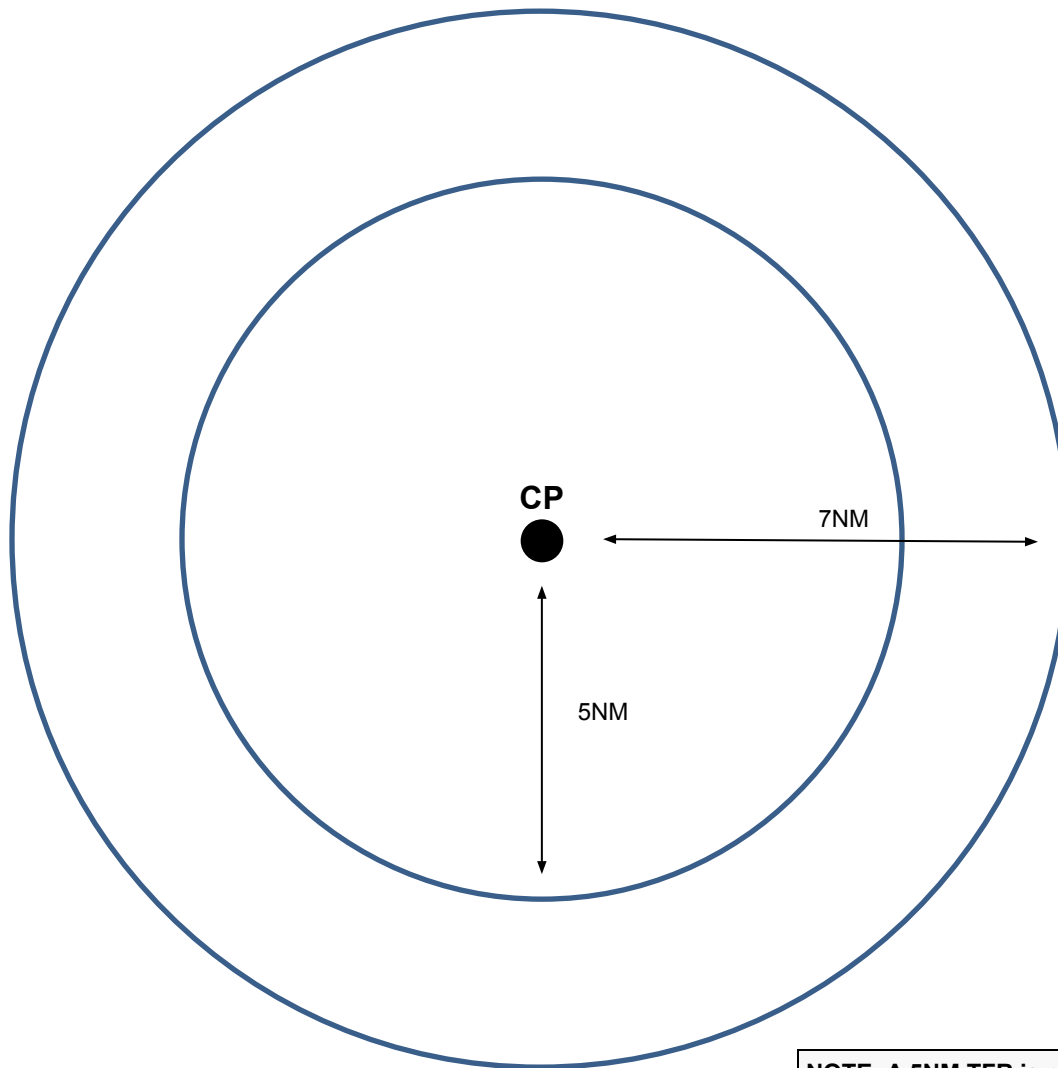
1-3



**NOTE:** The maximum lateral distance a crowd can be extended is 1500' either side of CP if the distance from the crowd to the show line is 1200', and 2000' if the distance from the crowd to the show line is 1500'. This provides a minimum of 500' lateral distance from the crowd on all ingress and egress routes.



# TFR DIMENSIONS



**NOTE: A 5NM TFR is required for all flight demonstrations. A 7NM TFR is required for all demonstrations where the density altitude is expected to be greater than 4,000FT at the time of the demonstration.**



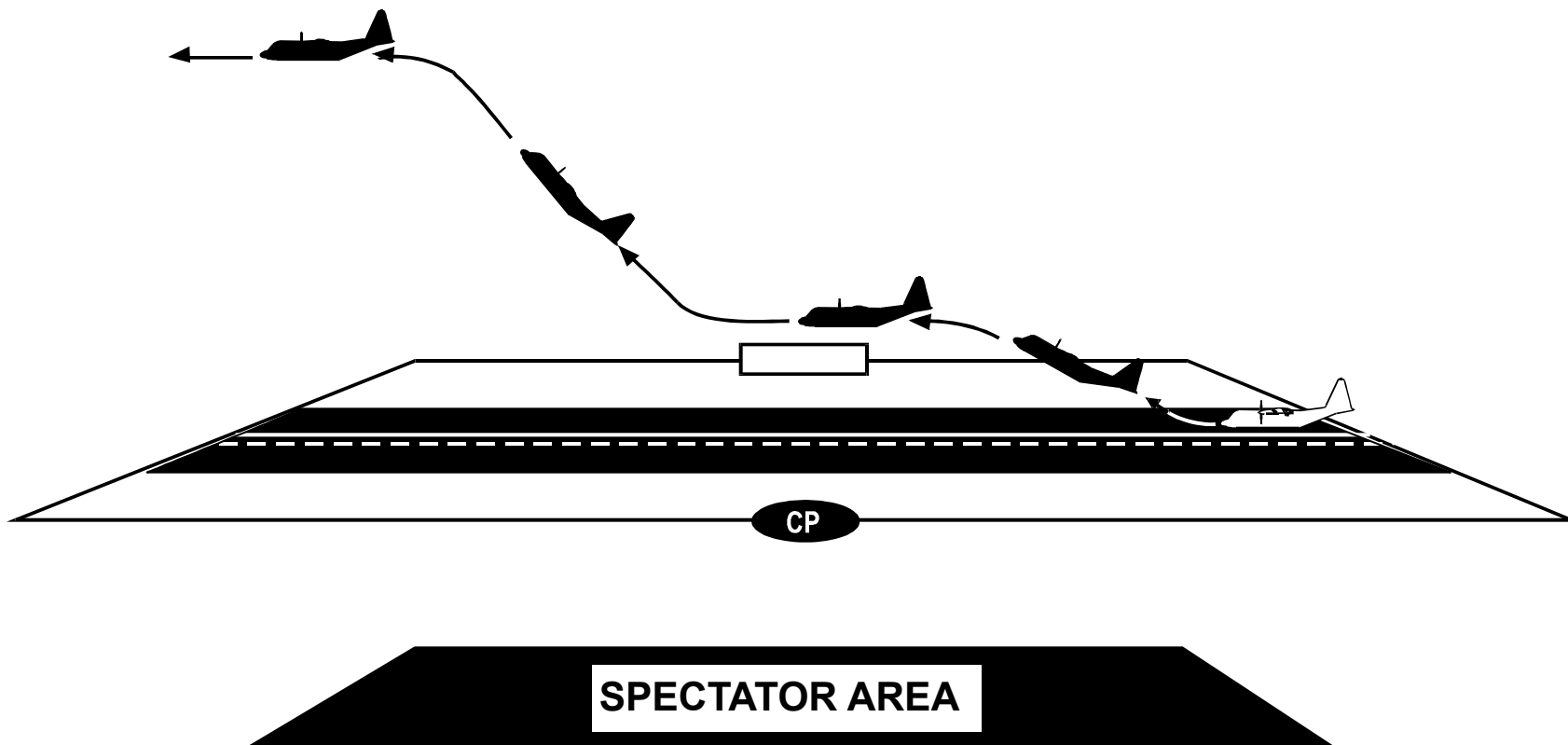
# MANEUVERS



## C-130 LOW TRANSITION TAKEOFF

Minimum Altitude: 0' AGL  
Maximum Altitude: 1000'-1500' AGL  
Entry Airspeed: 0 Knots  
Exit Airspeed: 110 Knots

2-1



**MANEUVER:** On takeoff the aircraft will execute a low-transition. At 150-170 KTS, the aircraft will rotate to 45° nose high. The aircraft will level off at 1000-1500' AGL.

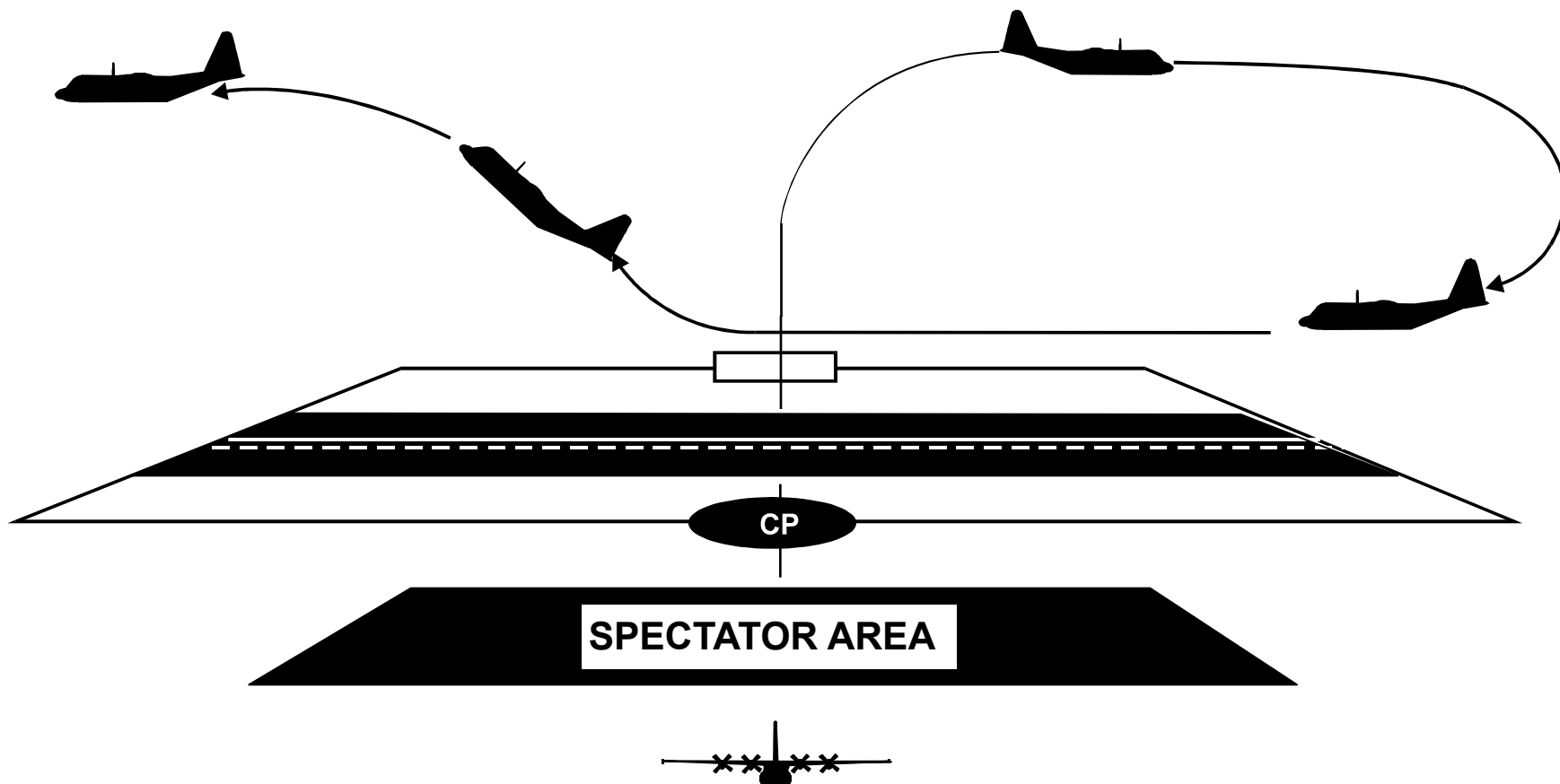




## C-130 REMOTE ENTRY

Minimum Altitude: 100' AGL  
Maximum Altitude: 1000'-1800' AGL  
Entry Airspeed: 240 Knots  
Exit Airspeed: 110 Knots

2-2

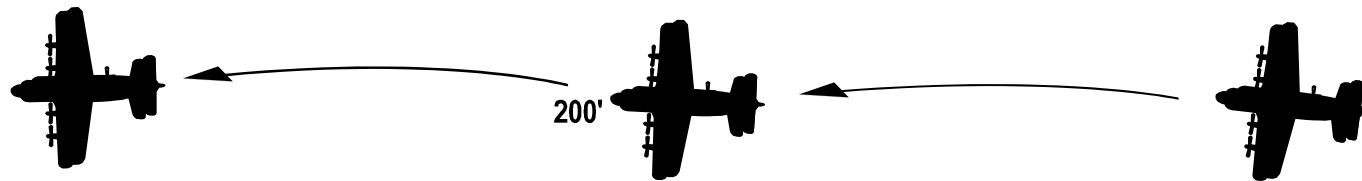


**MANEUVER:** Ingressing from behind the crowd, a turn will be commenced at CP to establish a 1000' AGL downwind position. The aircraft will then commence a descending turn back to the show line. Abeam CP on the 500' line at 100' AGL, the aircraft will commence a 45° nose-up climb to level off at 1000-1800' AGL.



# PARADE PASS

Minimum Altitude: 200' AGL  
Maximum Altitude: 1000' AGL  
Entry Airspeed: 260 Knots  
Exit Airspeed: 260 Knots



CP

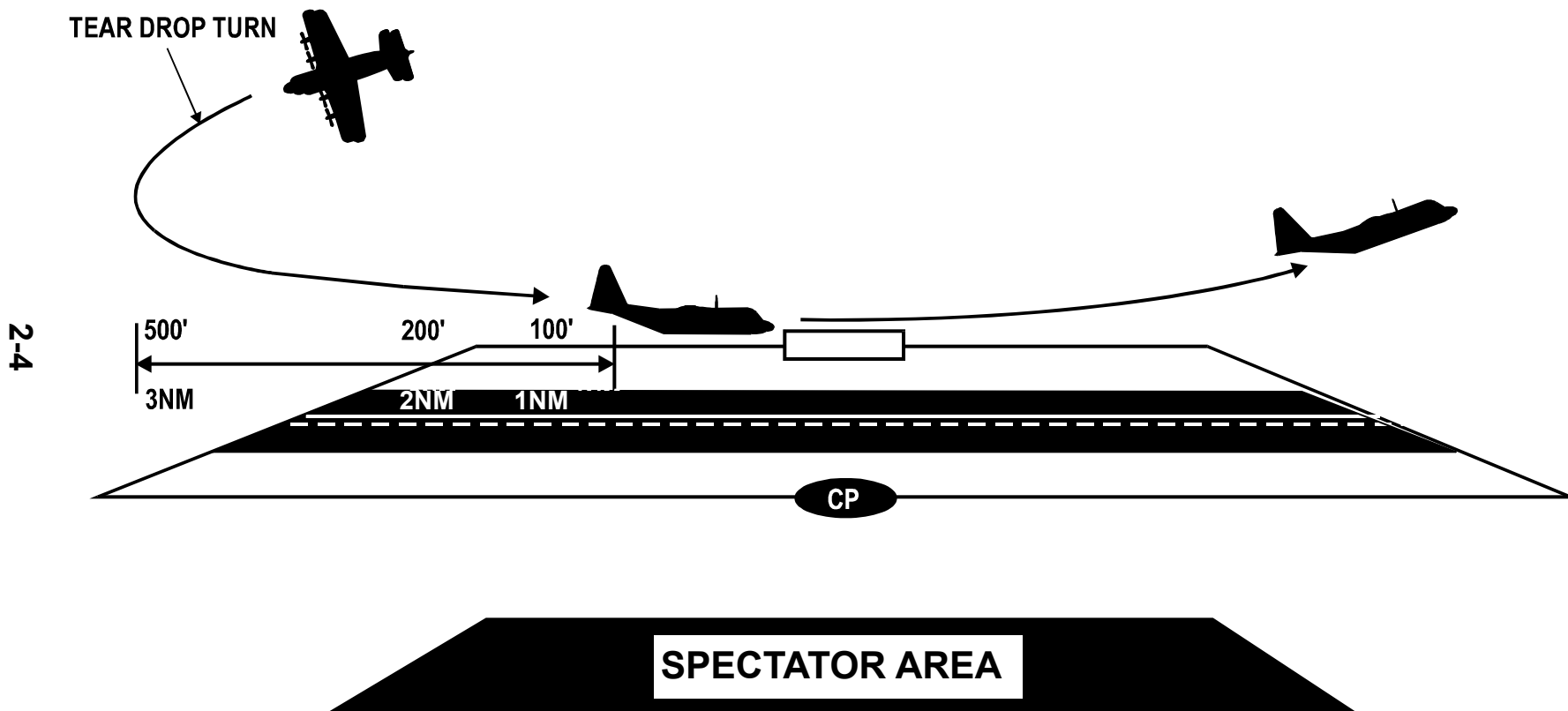
**SPECTATOR AREA**

**MANEUVER:** The aircraft will complete the teardrop turn towards CP using the 30° ingress line. Once established on the 30° ingress line, a descent from 500' AGL to 200' AGL will be made. Abeam the crowd line, a roll into a 60° AOB turn towards will be performed. The turn will be continued to depart on the 30° egress line. Abeam the crowd line on the 30° egress line, wings will be leveled and a 10° nose-up climb will be initiated to 1200' AGL.



## C-130 FLAT PASS

Minimum Altitude: 40' AGL  
Maximum Altitude: 1000' AGL  
Entry Airspeed: 210 Knots  
Exit Airspeed: 260 Knots



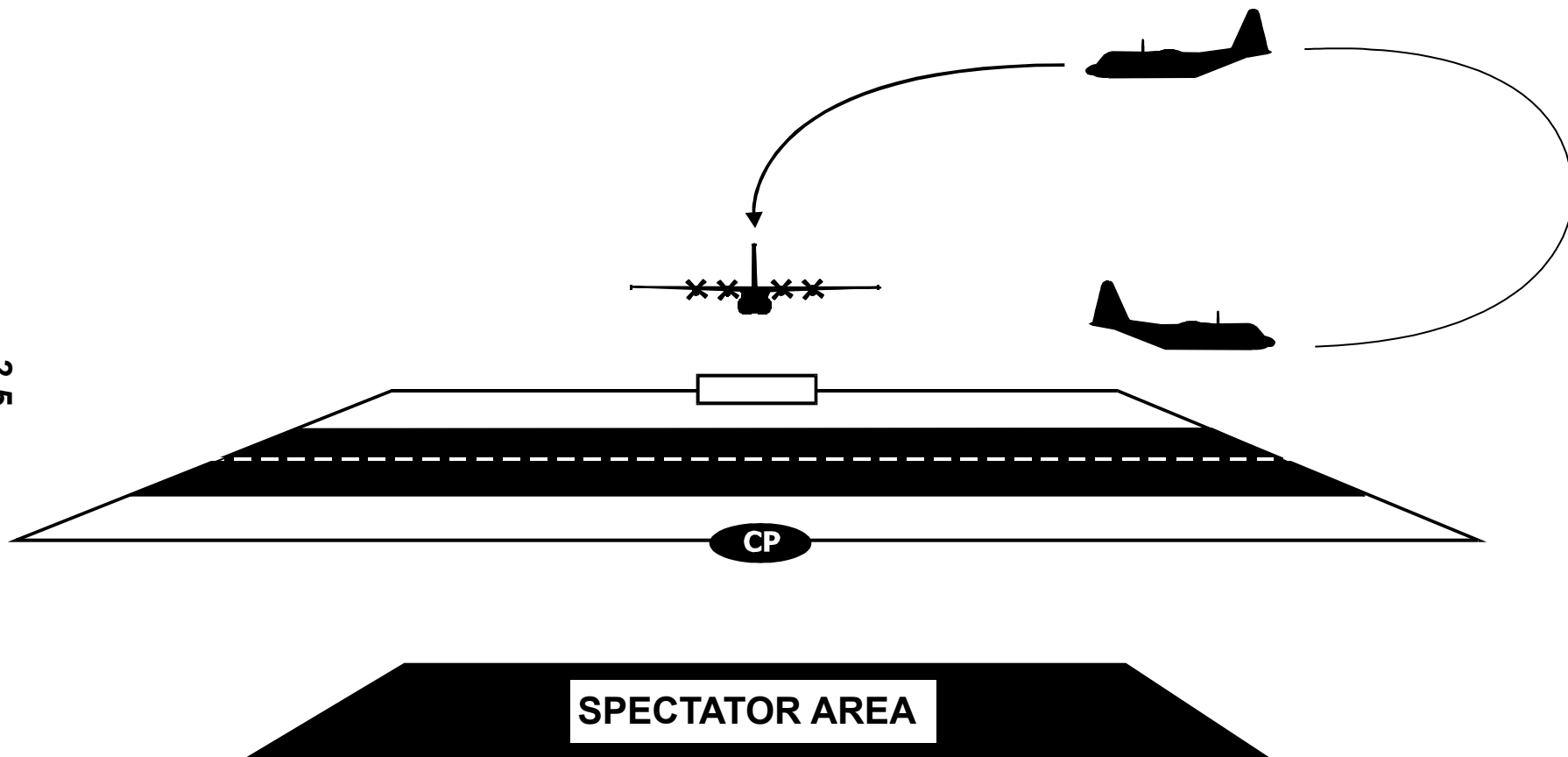
**MANEUVER:** The aircraft will make a teardrop turn back toward the show line to position itself on the 500' line. Abeam CP at 50' AGL, a climbing turn will be commenced away from the crowd to set up for the head on pass.



## C-130 HEAD ON PASS

Minimum Altitude: 200' AGL  
Maximum Altitude: 1150' AGL  
Entry Airspeed: 210 Knots  
Exit Airspeed: 260 Knots

2-5



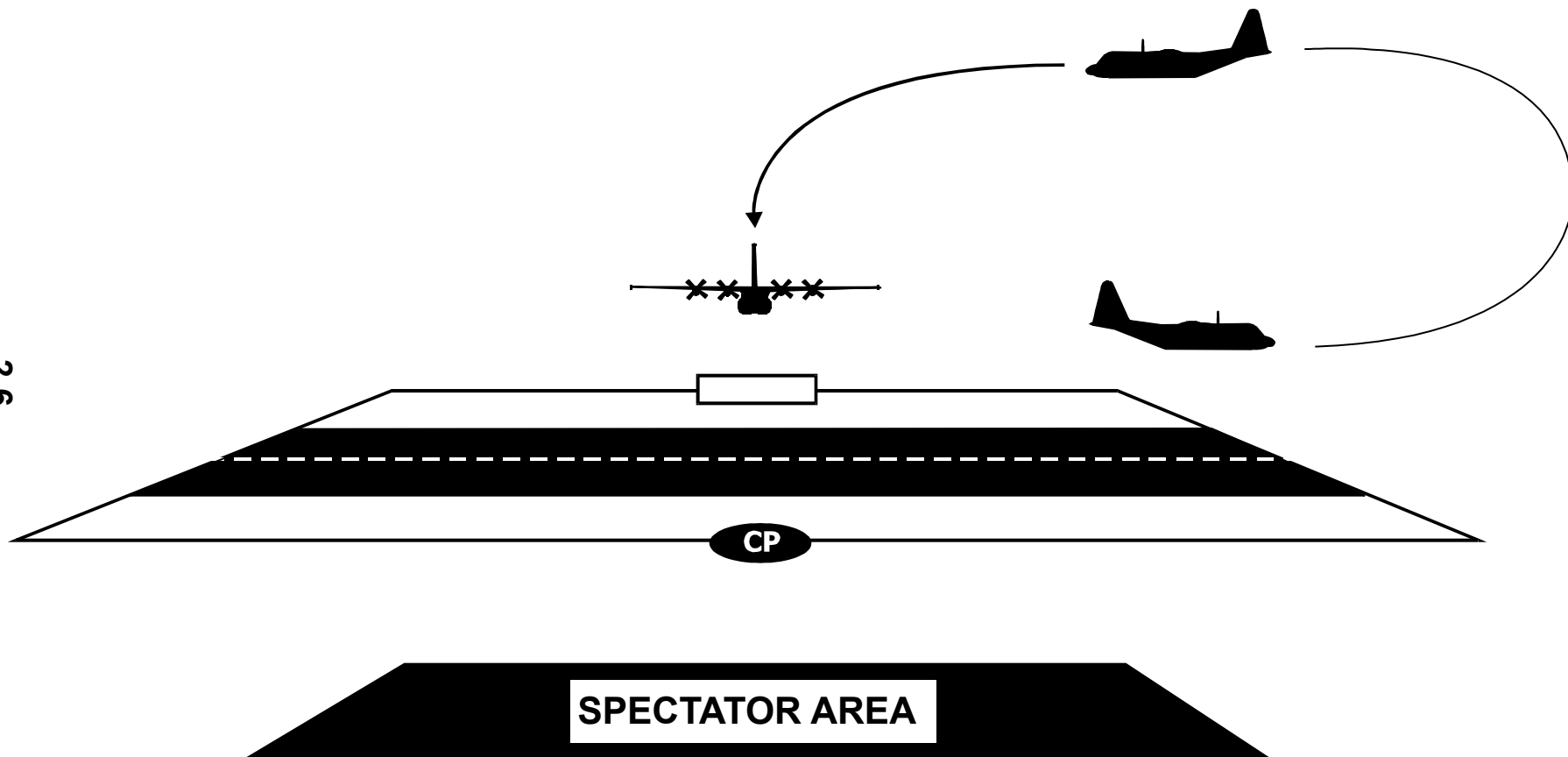
**MANEUVER:** The aircraft will rollout in a head-on profile towards CP at 200-500' AGL. The aircraft will enter the aerobatic box at 100' AGL. At ½ nm prior to CP, a 20 degree climb will be commenced followed by a turn to level at 1200' on downwind to set up for the assault landing.



## C-130 REMOTE HEAD ON PASS

Minimum Altitude: 200' AGL  
Maximum Altitude: 1150' AGL  
Entry Airspeed: 210 Knots  
Exit Airspeed: 260 Knots

2-6



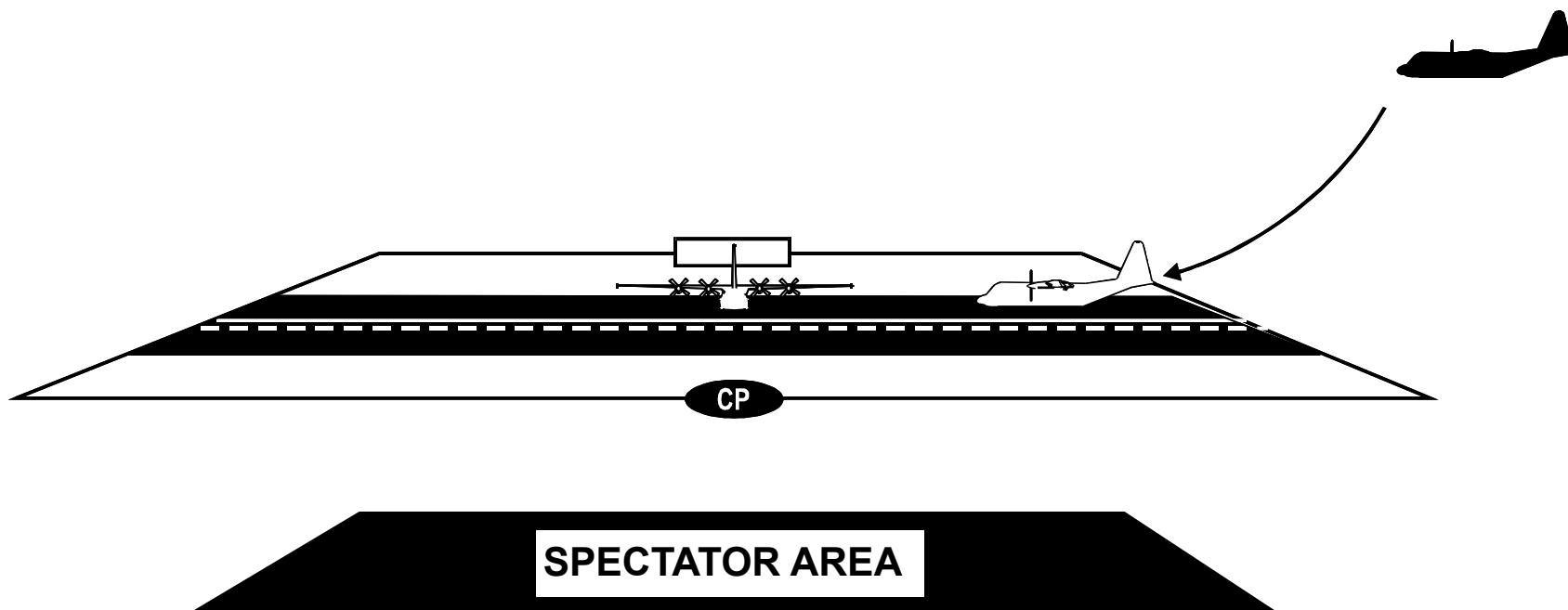
**MANEUVER:** The aircraft will commence a turn to remain within 3nm of CP and roll out in a head-on profile towards CP at 200-500' AGL. The aircraft will enter the aerobatic box at 100' AGL. At ½ nm from CP, a 45° climb will be commenced to exit behind the crowd.



## C-130 ASSAULT LANDING

Minimum Altitude: 0' AGL  
Maximum Altitude: 1200' AGL  
Entry Airspeed: 135 Knots  
Exit Airspeed: 0 Knots

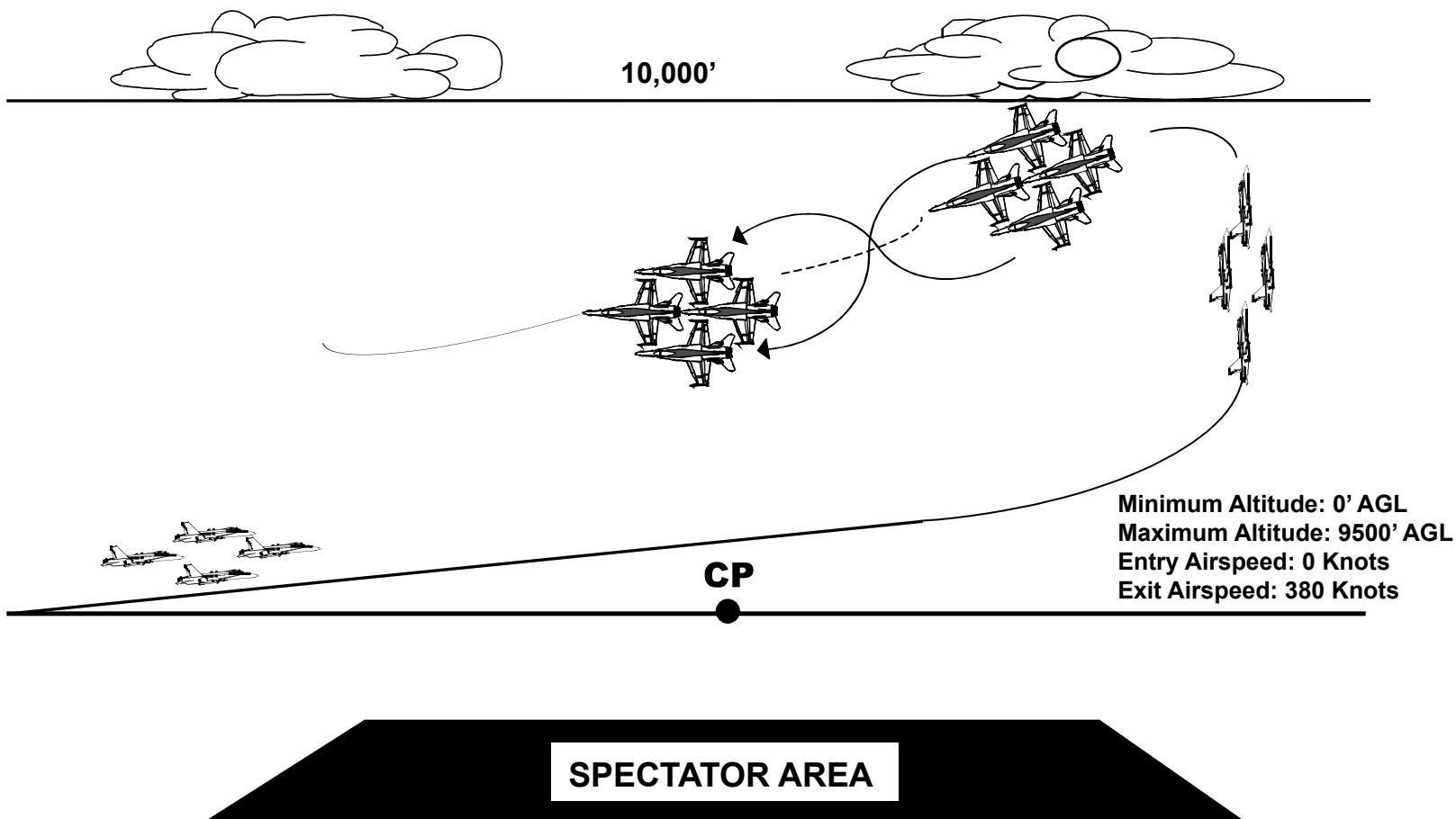
2-7



MANEUVER: Behind the crowd, the landing gear/flaps will be lowered and a turn back towards the show line will be commenced, rolling out on runway centerline at 1000-1200' AGL. As the intended point of landing is approached, a 20°-25° nose-down approach will be commenced. After landing, the aircraft will back up, face the crowd line, and exit the runway.



# DIAMOND HALF-CUBAN EIGHT ON TAKEOFF



2-10a

**Note:** Once requisite proficiency is gained in both the Diamond Burner Loop and Diamond Half Cuban Eight, these two maneuvers may be linked together for one continuous takeoff maneuver, with the Diamond Half-Cuban Eight being first.

**MANEUVER:** The Diamond Burner Go is a formation takeoff in fingertip. Immediately after takeoff, the four aircraft will transition to the diamond while accelerating in a low transition on show line. The Half-Cuban Eight commences from the low transition, and the show line clear is a turn behind the crowd.



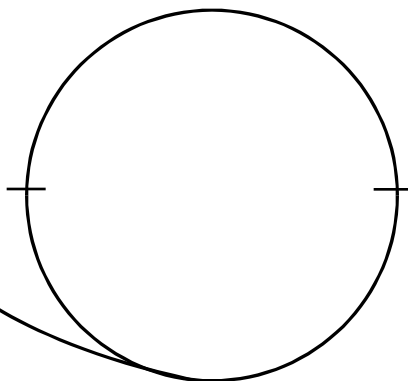
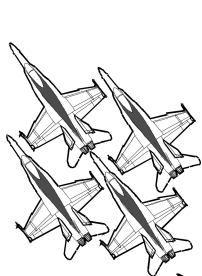
# DIAMOND BURNER GO / BURNER LOOP ON TAKEOFF



10,000'



Minimum Altitude: 0' AGL  
Maximum Altitude: 9400' AGL  
Entry Airspeed: 0 Knots  
Exit Airspeed: 380 Knots



AEROBATIC ALTITUDE 4000'

CP

SPECTATOR AREA

2-10b

Note: Once requisite proficiency is gained in both the Diamond Burner Loop and Diamond Half-Cuban Eight, these two maneuvers may be linked together for one continuous takeoff maneuver, with the Diamond Half-Cuban Eight being first. The F/A-18 portion of all remote shows will begin with the Delta Head-On maneuver.

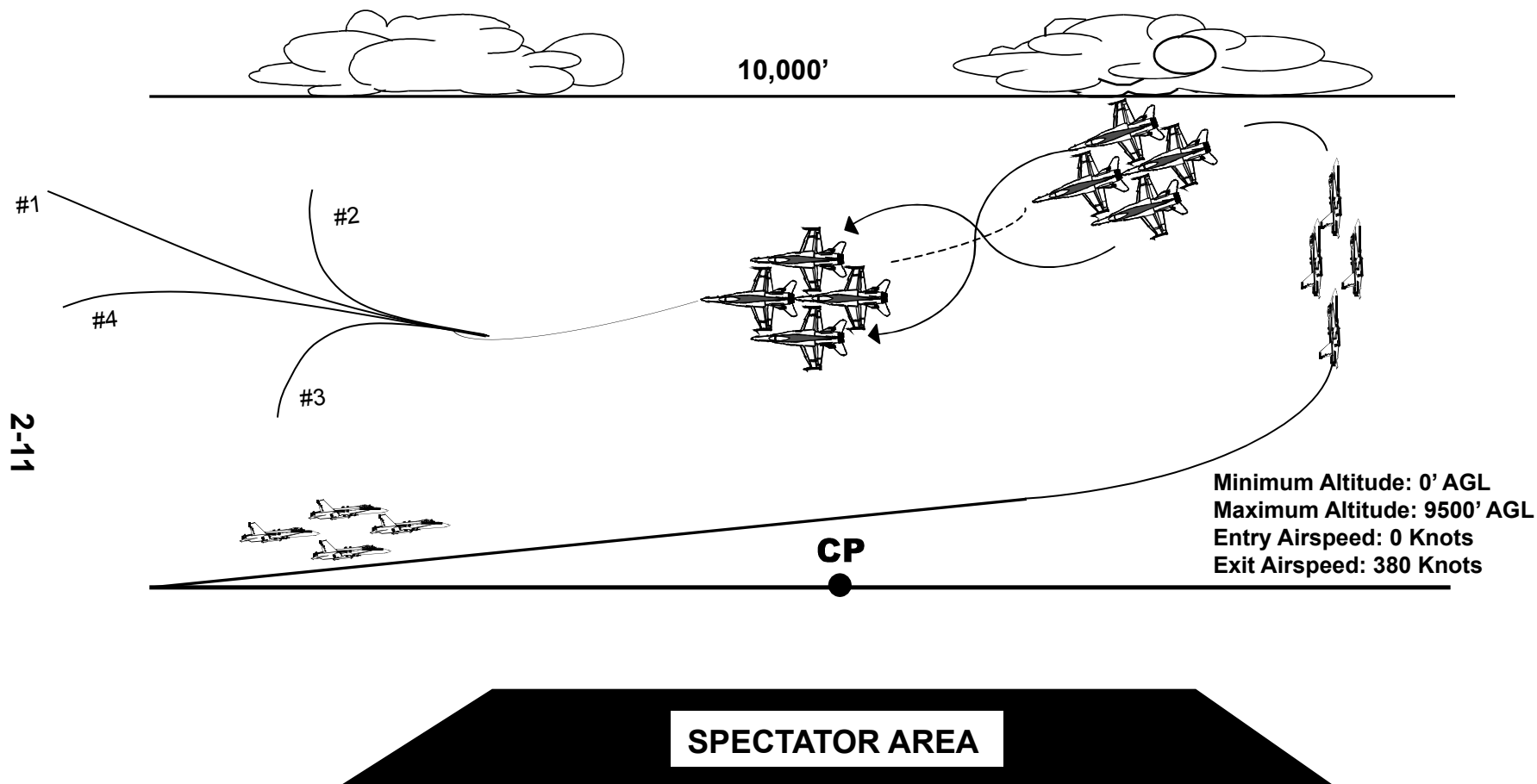
**MANEUVER:** The Diamond Burner Go is a formation takeoff in fingertip. Immediately after takeoff, the four aircraft will transition to the diamond while accelerating in a low transition on show line. The Loop commences from the low transition, and the show line clear is a turn behind the crowd.

**NOTE:** Aircraft are non-aerobatic below 4,000' when outside of designated aerobatic box.





# DIAMOND HALF-CUBAN EIGHT BREAK OUT



**MANEUVER:** If the clouds are biased to crowd left to the point that a Half-Cuban 8 can be accomplished but the backside loop cannot, then a Half-Cuban 8 Break Out can be done. As the formation passes through the horizon at approximately 500' AGL, they will split in three separate directions. 1 and 4 will exit out the show line while 2 and 3 egress 90° in front of and behind the crowd respectively. The rendezvous will be conducted crowd left..

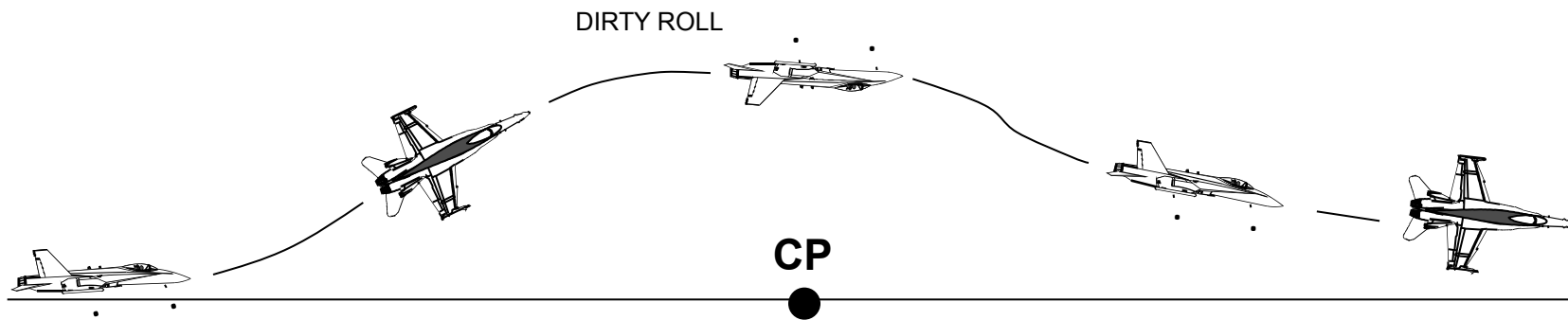


# DIRTY ROLL ON TAKEOFF BLUE ANGEL 5



Minimum Altitude: 0' AGL  
Maximum Altitude: 700' AGL  
Entry Airspeed: 0 Knots  
Exit Airspeed: 200 Knots

2-12



**SPECTATOR AREA**

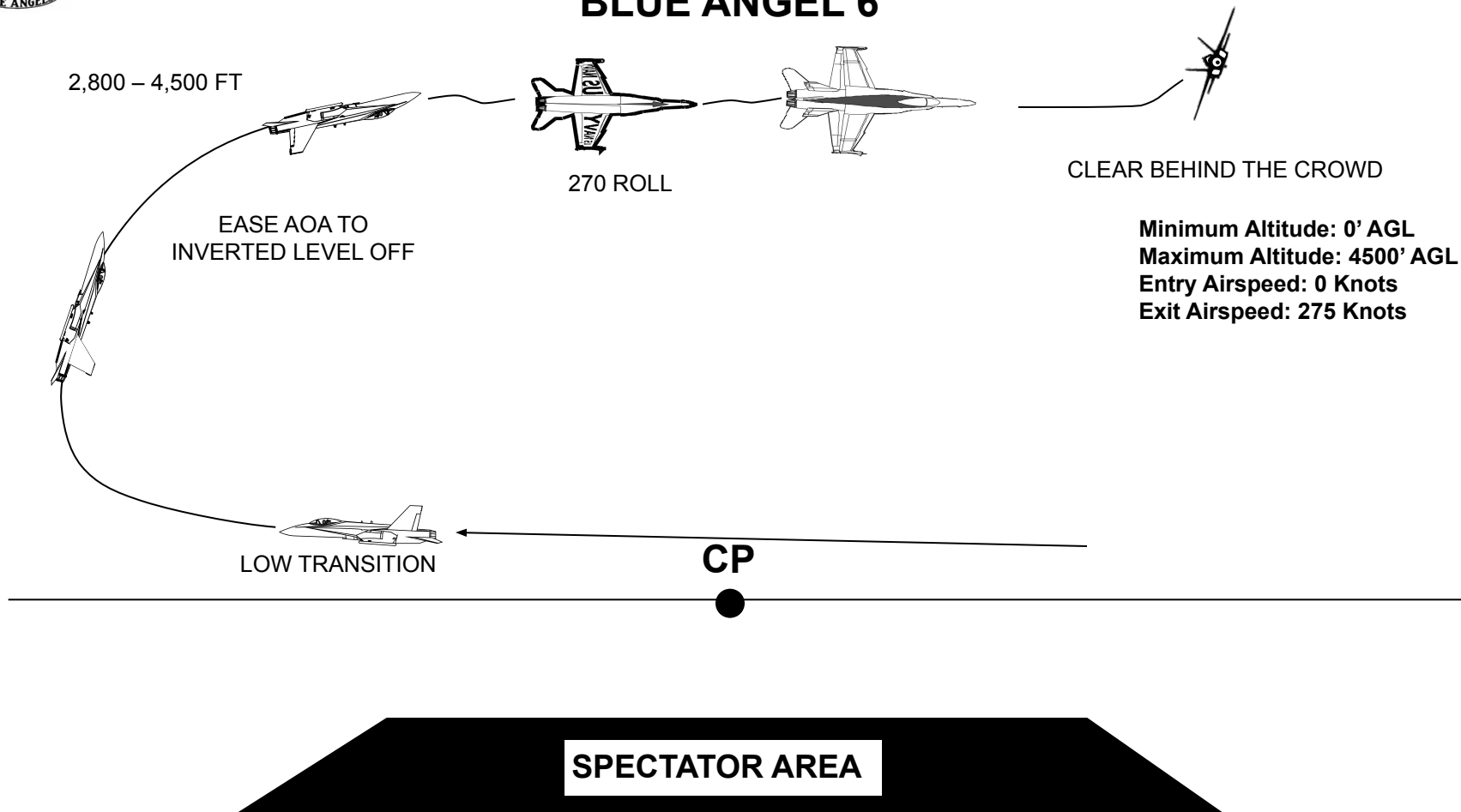
**NOTE:** When weather conditions are of concern, the lead solo will perform this maneuver prior to the diamond takeoff and complete an area weather observation.

**MANEUVER:** A left or right 360° roll away from the crowd with the landing gear extended. If this maneuver cannot be performed in the aerobatic box between 1200'-1500', it must be executed in the aerobatic box beyond the crowd line. It can be flown from either direction based on CP and prevailing wind. The show line clear is a climbing turn behind or in-front of the crowd.



## LOW TRANSITION / IMMELMANN ON TAKEOFF BLUE ANGEL 6

2-13

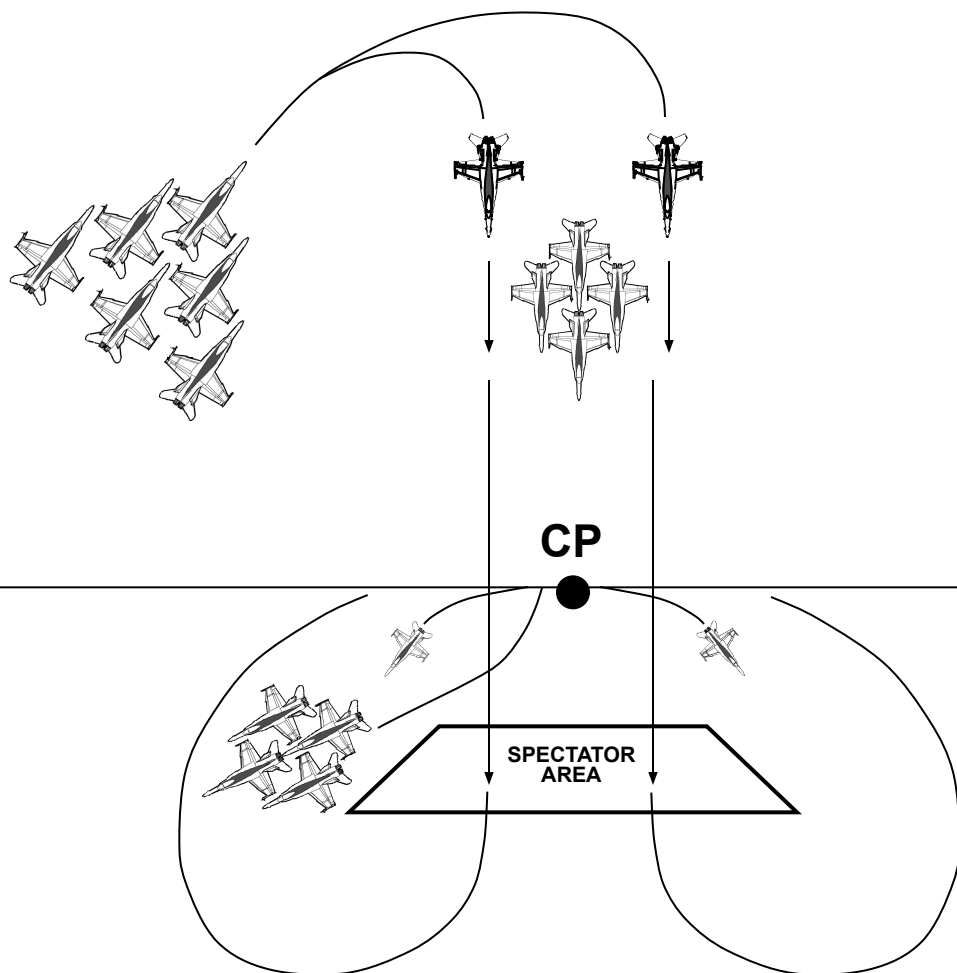


**NOTE:** Weather may preclude the Immelmann, and #6 will execute the roll to inverted. See Flat Show Takeoff.

**MANEUVER:** #6 will execute a low transition and at 330 KCAS will execute a vertical pull to complete an Immelmann maneuver. They will then track down show line from left to right and complete a 270° roll to clear behind the crowd at an altitude of > 2,000'.



## DELTA HEAD-ON / OPPOSING 360



Minimum Altitude: 500'/200' AGL  
Maximum Altitude: 5500' AGL  
Entry Airspeed: 360 Knots  
Exit Airspeed: 360 Knots

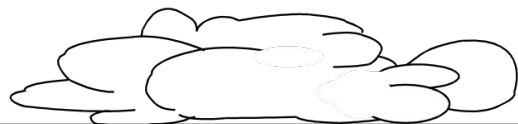
2-14

**NOTE:** This maneuver is done at remote / over water show sites and in Low / Flat Shows where Diamond Burner Loop on takeoff and Low Transition / Split S on takeoff are not conducted.

**MANEUVER:** The Delta will roll out in a head on set up and commence a climb. The solos are detached from the formation 1500' prior to CP. All aircraft are non-aerobatic and above 500' when crossing the spectator area. The Diamond continues the climb and exits the show line in a right turn. The solos then turn away from each other to cross back at CP.



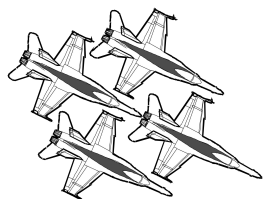
## DIAMOND 360



Minimum Altitude: 200' AGL  
Maximum Altitude: 800' AGL  
Entry Airspeed: 310 Knots  
Exit Airspeed: 290 Knots

2-15

CP



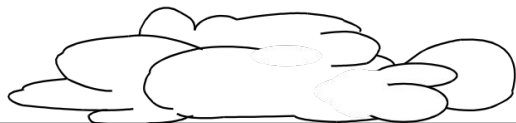
SPECTATOR AREA

1000FT

**MANEUVER:** In Diamond formation the Diamond executes a non-aerobatic right to left circular pass at less than 60° AOB crossing over CP at a minimum ALT of 200'.

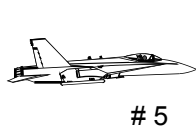


# OPPOSING KNIFE EDGE

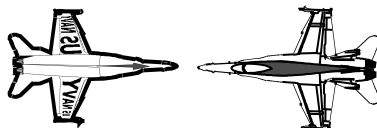


Minimum Altitude: 100' AGL  
Maximum Altitude: 1500' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 400 Knots

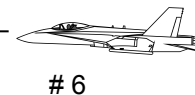
2-16



200FT



200FT



CP

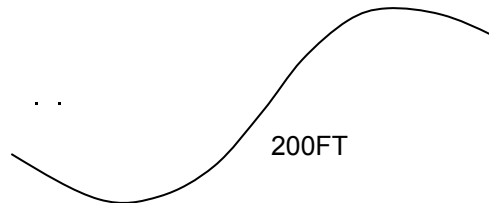
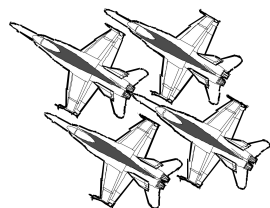
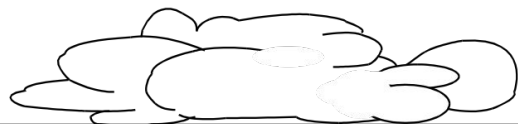


SPECTATOR AREA

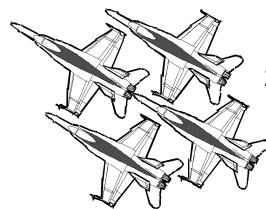
**MANEUVER:** At CP each pilot will roll his aircraft into a 90° angle of bank prior to the cross. After the cross, both aircraft will roll upright and clear in front of the crowd.



# DIAMOND ROLL



200FT



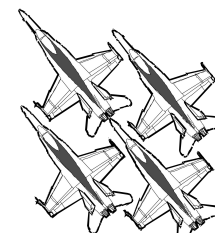
2MI

Minimum Altitude: 200' AGL  
Maximum Altitude: 2600' AGL  
Entry Airspeed: 365 Knots  
Exit Airspeed: 365 Knots

CP



200FT



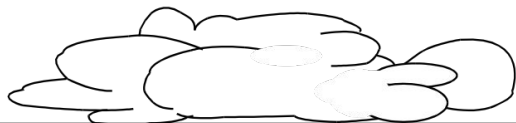
1500FT

SPECTATOR AREA

**MANEUVER:** Approaching CP in Diamond, all four aircraft roll 360° in formation, starting the roll at 1500' and topping at approximately 3200'. Minimum altitude on the ingress and egress roll line is 200'.

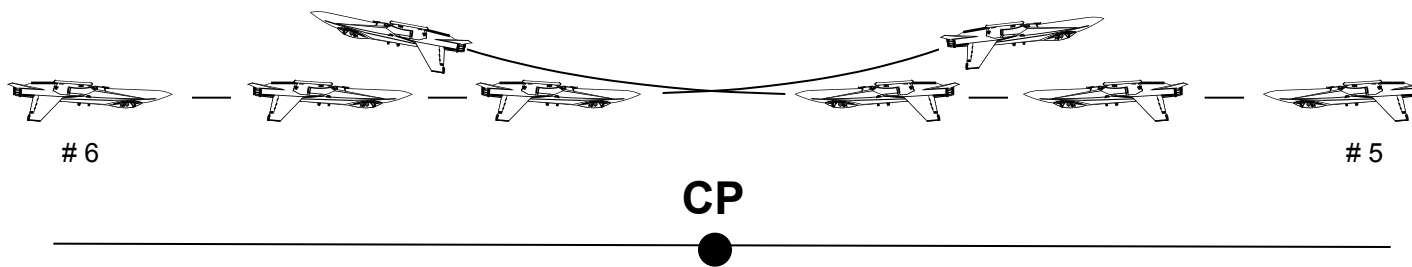


# INVERTED-TO-INVERTED ROLL



ROLL 360°

Minimum Altitude: 100' AGL  
Maximum Altitude: 1500' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 400 Knots



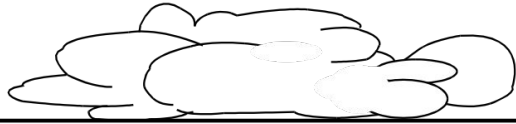
**SPECTATOR AREA**

**MANEUVER:** Each pilot will roll his aircraft inverted at the edge of the aerobatic box. Crossing CP, each pilot will execute a 360° roll back to inverted and continue away from center point with a very slight climb. Once .5NM from center point is reached, both aircraft will clear behind the crowd.

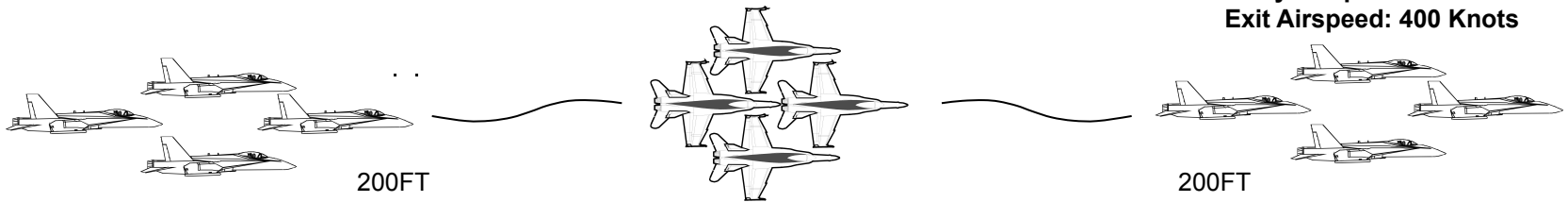




# DIAMOND AILERON ROLL



Minimum Altitude: 200' AGL  
Maximum Altitude: 400' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 400 Knots



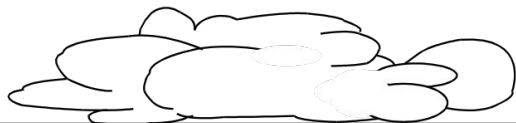
CP

SPECTATOR AREA

**MANEUVER:** All four aircraft perform simultaneous 360° rolls within the aerobatic box.

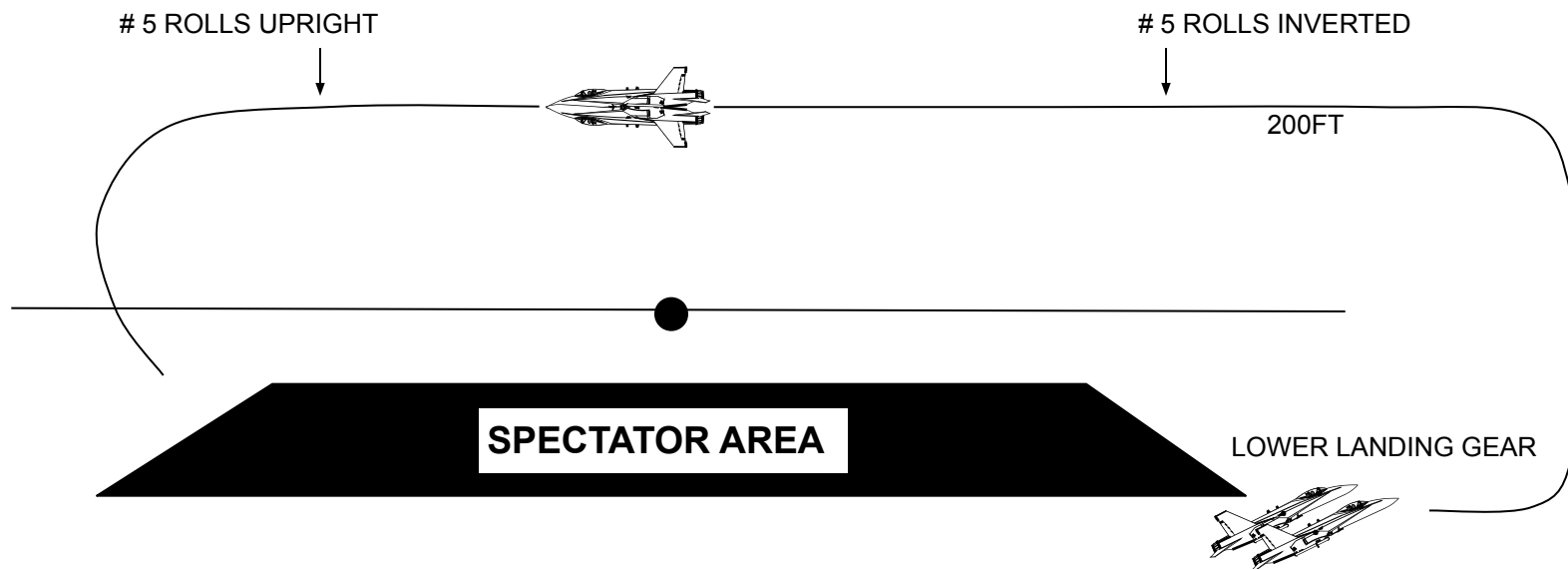


# FORTUS



Minimum Altitude: 200' AGL  
Maximum Altitude: 1000' AGL  
Entry Airspeed: 275 Knots  
Exit Airspeed: 275 Knots

2-20

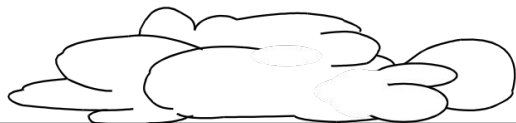


**NOTE:** In a single solo situation, #5 or #6 will perform an inverted dirty flat pass, rolling in at 1NM and rolling upright at 3/4nm.

**MANEUVER:** Both aircraft will approach from crowd right in the dirty configuration. #5 will roll inverted at the edge of the aerobatic box at a minimum of 200'. #6 will move to an abeam position upright, creating a mirror image effect. At CP both aircraft will climb. At 3/4nm, #5 will roll upright and both aircraft will clear crowd left behind the crowd.

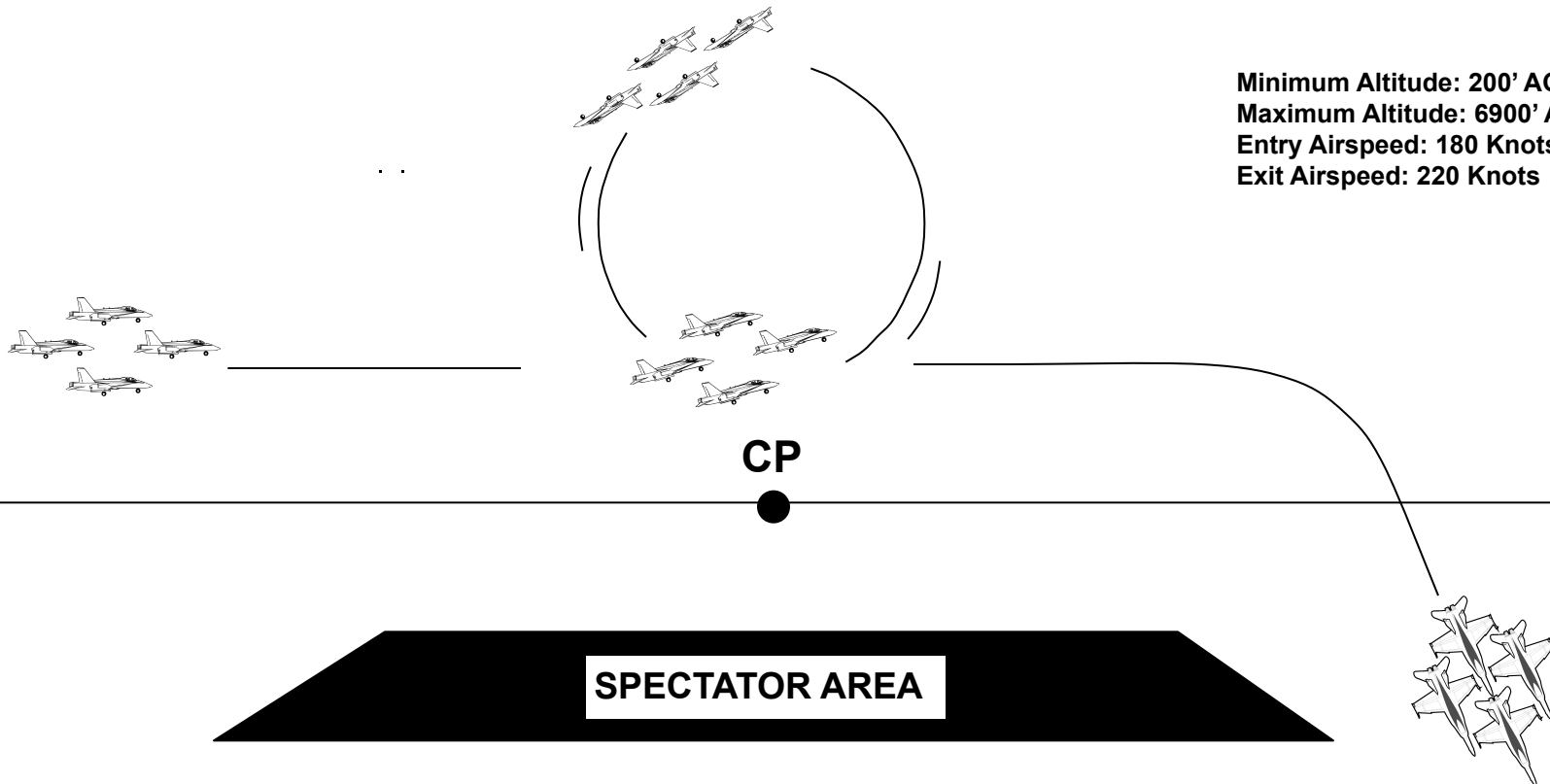


# DIAMOND DIRTY LOOP



Minimum Altitude: 200' AGL  
Maximum Altitude: 6900' AGL  
Entry Airspeed: 180 Knots  
Exit Airspeed: 220 Knots

2-21



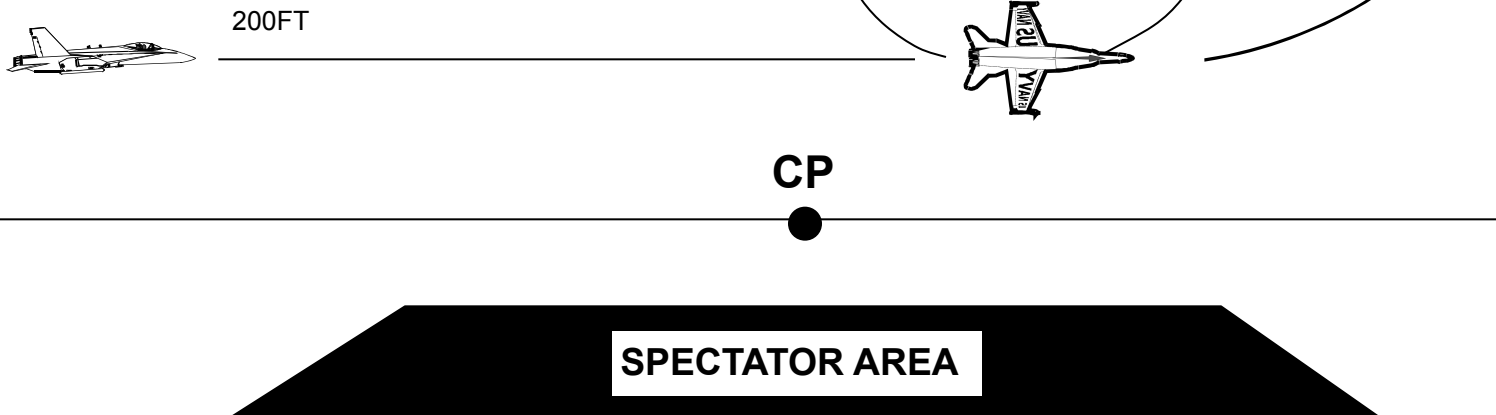
**MANEUVER:** In the Diamond formation all four aircraft will complete a loop over CP on the show line with the landing gear and hooks extended.



## SOLO MINIMUM-RADIUS TURN

Minimum Altitude: 150' AGL  
Maximum Altitude: 1000' AGL  
Entry Airspeed: 350 Knots  
Exit Airspeed: 200 Knots

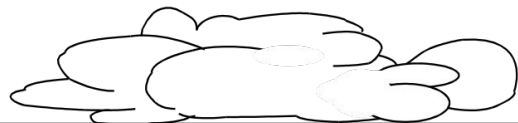
2-22



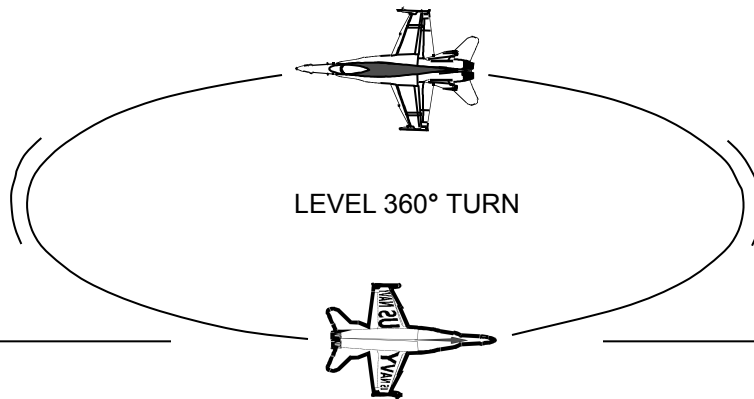
**MANEUVER:** This maneuver is a non-aerobatic level horizontal 390° turn at 150' AGL, away from the crowd. At the completion of the 390° turn, #5 will exit the flight line vertically outboard of the show line and level off above 1000' AGL. #6 will rendezvous from behind the crowd'.



# SOLO MINIMUM-RADIUS TURN



Minimum Altitude: 150' AGL  
Maximum Altitude: 500' AGL  
Entry Airspeed: 350 Knots  
Exit Airspeed: 200 Knots



CP

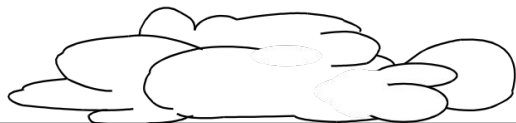
SPECTATOR AREA

**MANEUVER:** This maneuver is a non-aerobatic level horizontal 360° turn at 200' AGL, away from the crowd. At the completion of the 360° turn, #6 will rendezvous over the top of #5 at 500' AGL.

2-22a

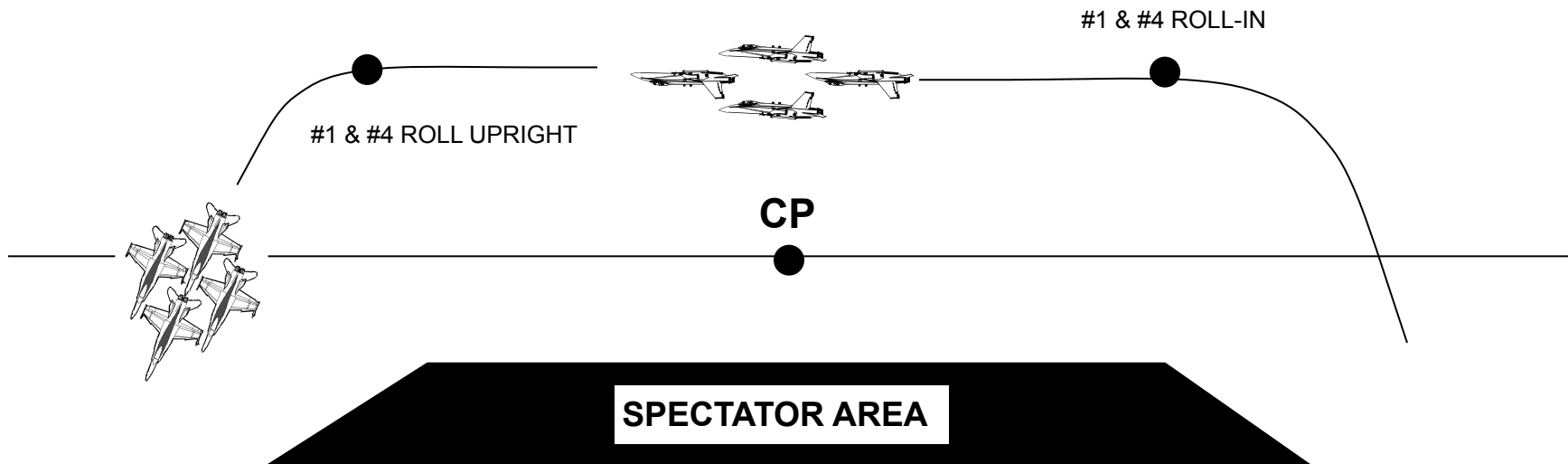


# DOUBLE FARVEL



Minimum Altitude: 200' AGL  
Maximum Altitude: 400' AGL  
Entry Airspeed: 385 Knots  
Exit Airspeed: 385 Knots

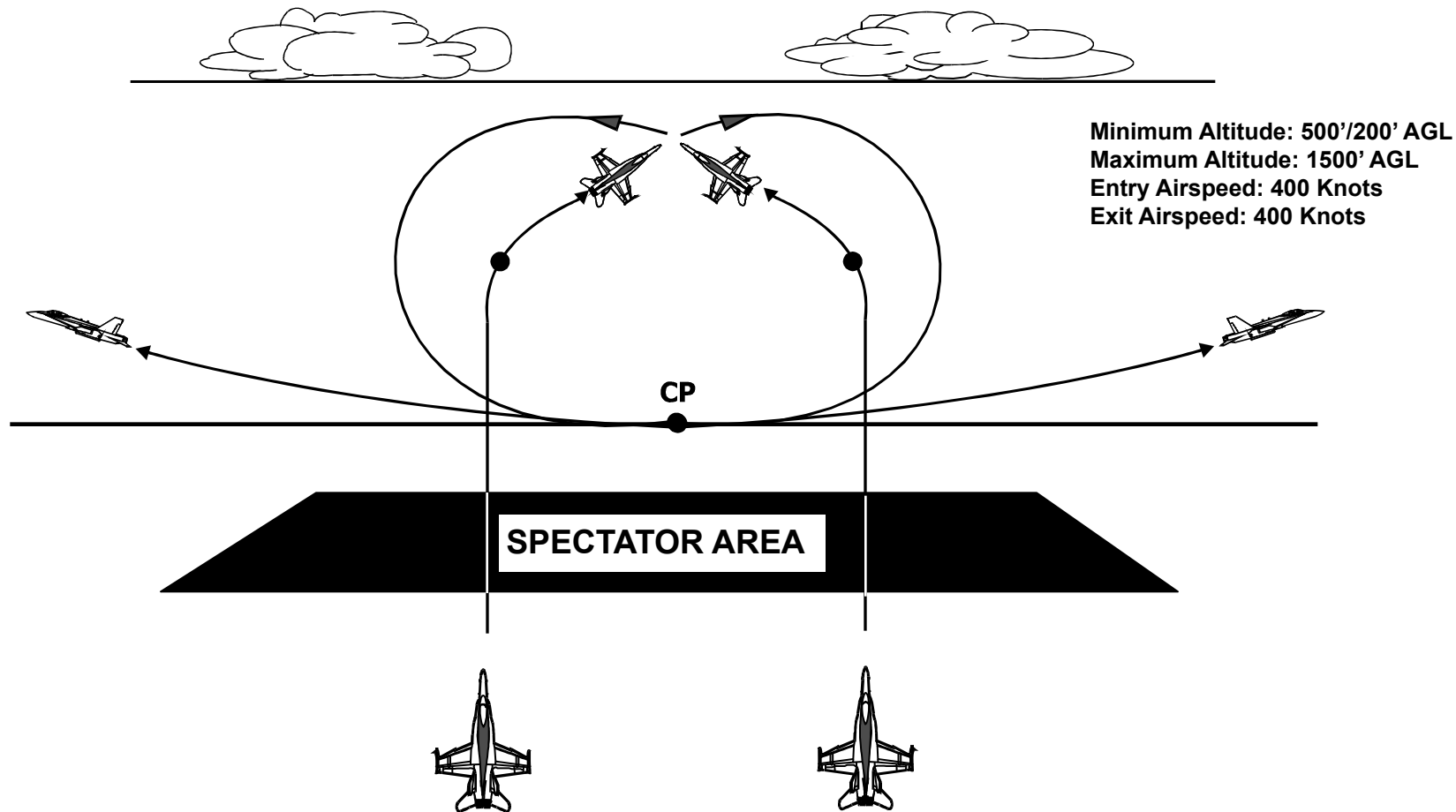
2-23



**MANEUVER:** #1 & #4 roll inverted simultaneously at the edge of the aerobatic box while #2 & #3 remain upright. Maintaining a diamond formation they commence a flat pass at 200'. No later than 1NM past CP #1 & #4 sequentially roll upright in a climb.



## OPPOSING MINIMUM-RADIUS TURN

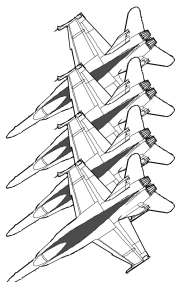
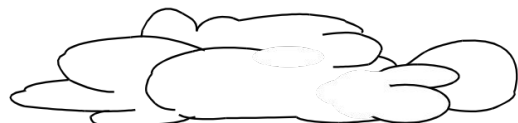


**NOTE:** Low show clear is 20° nose up and 2 1/2 rolls. Flat show clear is 10° nose up and 1 1/2 rolls.

**MANEUVER:** From behind the crowd, #5 & #6 will approach in an abeam formation at 400 KCAS and 500' AGL crossing over the spectator area. They will extend to approximately 1500' past the show line with #5 moving 50'-75' aft of #6. Each aircraft will roll 270° away from each other and commence a cross. They will cross again over CP at a minimum of 200' AGL. Both A/C will roll out in front of the show line, pull 40° nose up and execute 3 1/2 rolls.



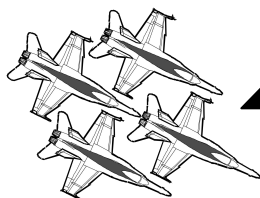
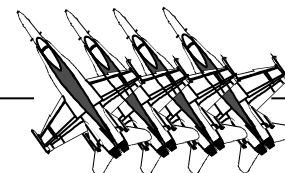
# ECHELON PARADE



Minimum Altitude: 200' AGL  
Maximum Altitude: 800' AGL  
Entry Airspeed: 310 Knots  
Exit Airspeed: 290 Knots

2-25

CP



1000FT

SPECTATOR AREA

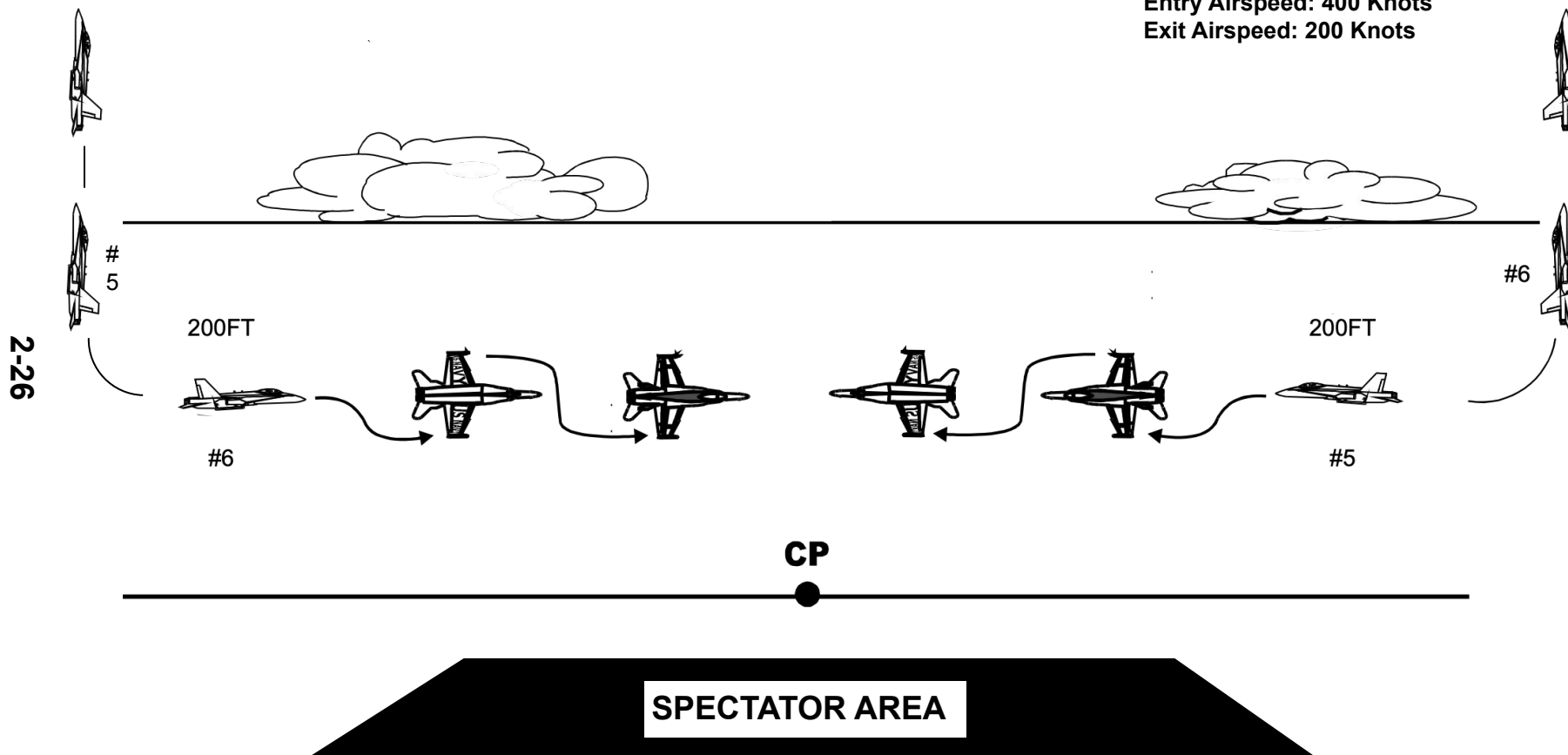
**MANEUVER:** In right Echelon the Diamond executes a right to left non-aerobatic circular pass at approximately 60° AOB crossing over CP at a minimum altitude of 200'.





# OPPOSING HORIZONTAL ROLLS

Minimum Altitude: 100' AGL  
Maximum Altitude: 7500' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 200 Knots



**MANEUVER:** Approaching CP, each pilot will commence a 3-4° climb and then roll the aircraft 720°. After rolling wings level, both pilots will pull 90° nose up, then roll 90° and pull to level flight. Once upright the pilots clear heading behind the crowd.



# LEFT ECHELON ROLL

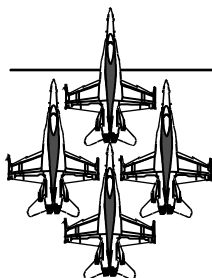


TRANSITION TO LEFT ECHELON

Minimum Altitude: 300' AGL  
Maximum Altitude: 5300' AGL  
Entry Airspeed: 365 Knots  
Exit Airspeed: 350 Knots

TRANSITION BACK  
TO DIAMOND

2-27



CP

SPECTATOR AREA

**MANEUVER:** Ingressing from crowd left in front of the crowd, the Diamond transitions to left echelon. Approaching CP they commence a climb and then roll the formation 360° to the left and egress to the right as they transition back to Diamond.



# CHANGEOVER ROLL

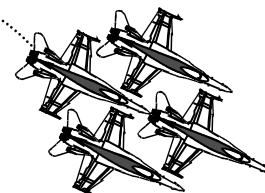
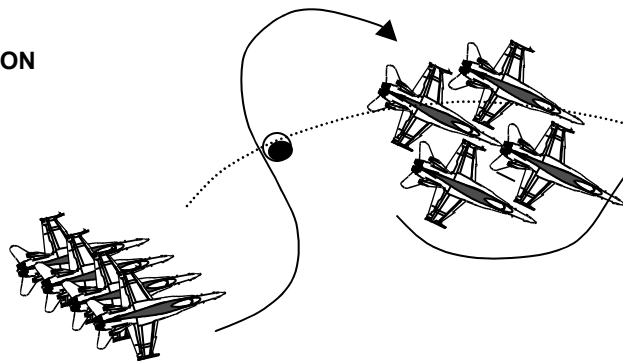
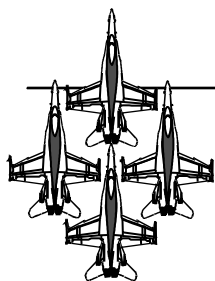


TRANSITION TO LEFT ECHELON

TRANSITION BACK  
TO DIAMOND

Minimum Altitude: 300' AGL  
Maximum Altitude: 5300' AGL  
Entry Airspeed: 365 Knots  
Exit Airspeed: 350 Knots

2-27a



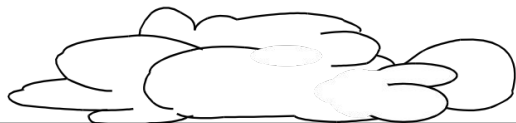
CP

SPECTATOR AREA

**MANEUVER:** Ingressing from crowd left in front of the crowd, the Diamond transitions to left echelon. Approaching CP they commence a climb and then roll the formation 360° to the left, shifting to Diamond 90° through the roll and egress behind the crowd, crowd right.



## SNEAK PASS, BLUE ANGEL 5



Minimum Altitude: 50' AGL  
Maximum Altitude: 500' AGL  
Entry Airspeed: 600 Knots  
Exit Airspeed: 600 Knots

50FT



# 5



CP

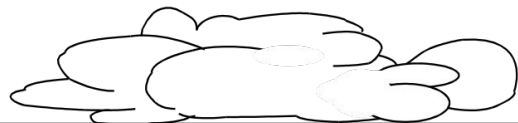
SPECTATOR AREA

**MANEUVER:** A flat pass on the 500' show line at 50' AGL . Once past the spectator area, a clear to crowd right behind the crowd is executed.

2-28



# SNEAK TO VERTICAL ROLLS, BLUE ANGELS 6

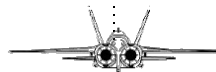


Minimum Altitude: 500' AGL  
Maximum Altitude: 15000' AGL  
Entry Airspeed: 600 Knots  
Exit Airspeed: 200 Knots

CP

SPECTATOR AREA

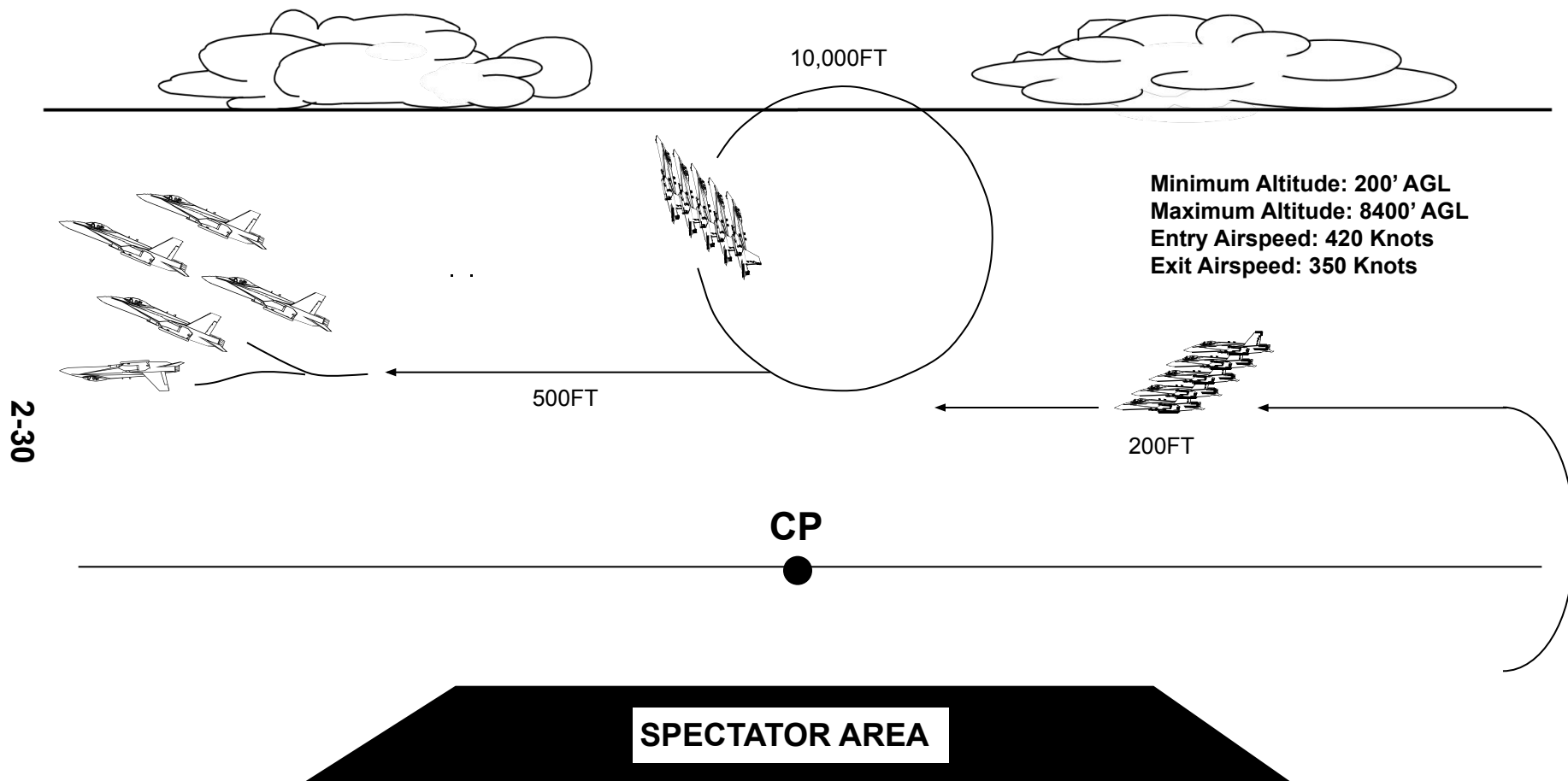
500FT MIN.



**MANEUVER:** From behind the spectator area, Blue Angel #6 approaches CP straight and level at 500' AGL. Passing CP, #6 pulls to 85° nose high and executes a series of vertical rolls with a clear behind the crowd.



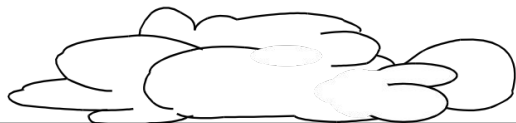
# LINE ABREAST LOOP



**MANEUVER:** At approximately 3-1/2NM, aircraft #1,2,3,4 and 5 transition to a Line Abreast formation. Approaching CP, they complete a loop. Egressing crowd left, aircraft #1-4 shift back to Diamond and detach #5.

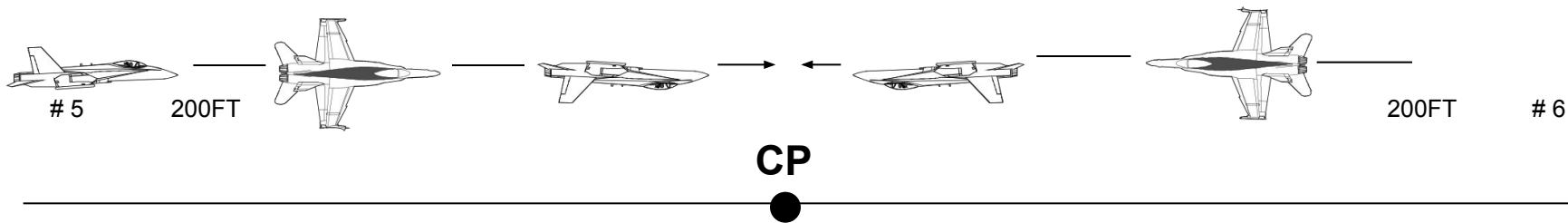


## OPPOSING FOUR-POINT ROLL



Minimum Altitude: 200' AGL  
Maximum Altitude: 1500' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 400 Knots

2-31

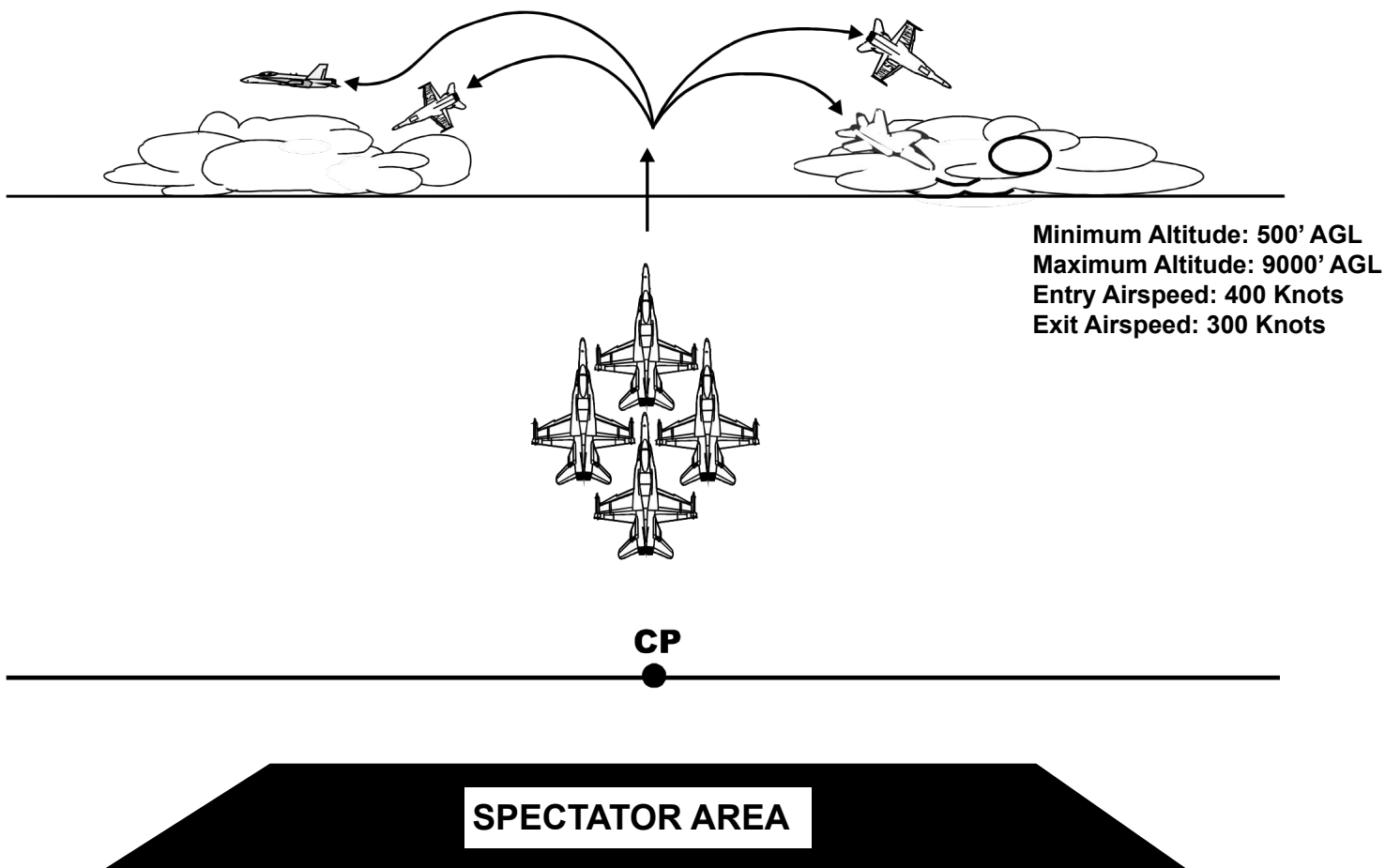


**SPECTATOR AREA**

**MANEUVER:** Approaching CP at 200' AGL, each aircraft executes a left four point roll crossing over CP in the inverted position. High show clears will be executed in front of the crowd. Low and flat show clears will be executed behind the crowd.



# DIAMOND VERTICAL BREAK

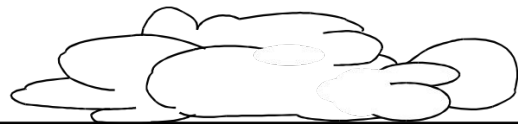


**MANEUVER:** Approaching from directly behind the crowd in a trail formation, the four diamond aircraft will commence a climb approaching CP. At 30° nose up they will transition back to the diamond formation. Reaching 60° nose up, they will split in four separate directions. At this point the maneuver is complete and they will rendezvous crowd left in front of the crowd.



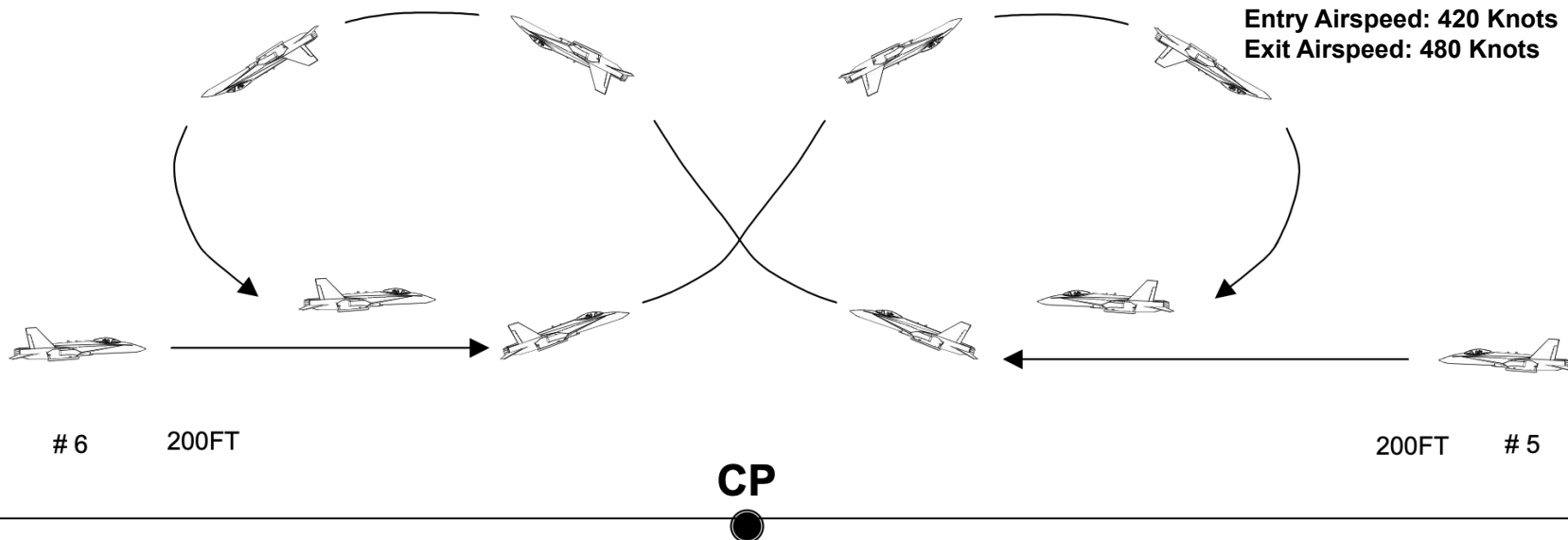


# VERTICAL PITCH



Minimum Altitude: 50'/100' AGL  
Maximum Altitude: 9000' AGL  
Entry Airspeed: 420 Knots  
Exit Airspeed: 480 Knots

2-33



**SPECTATOR AREA**

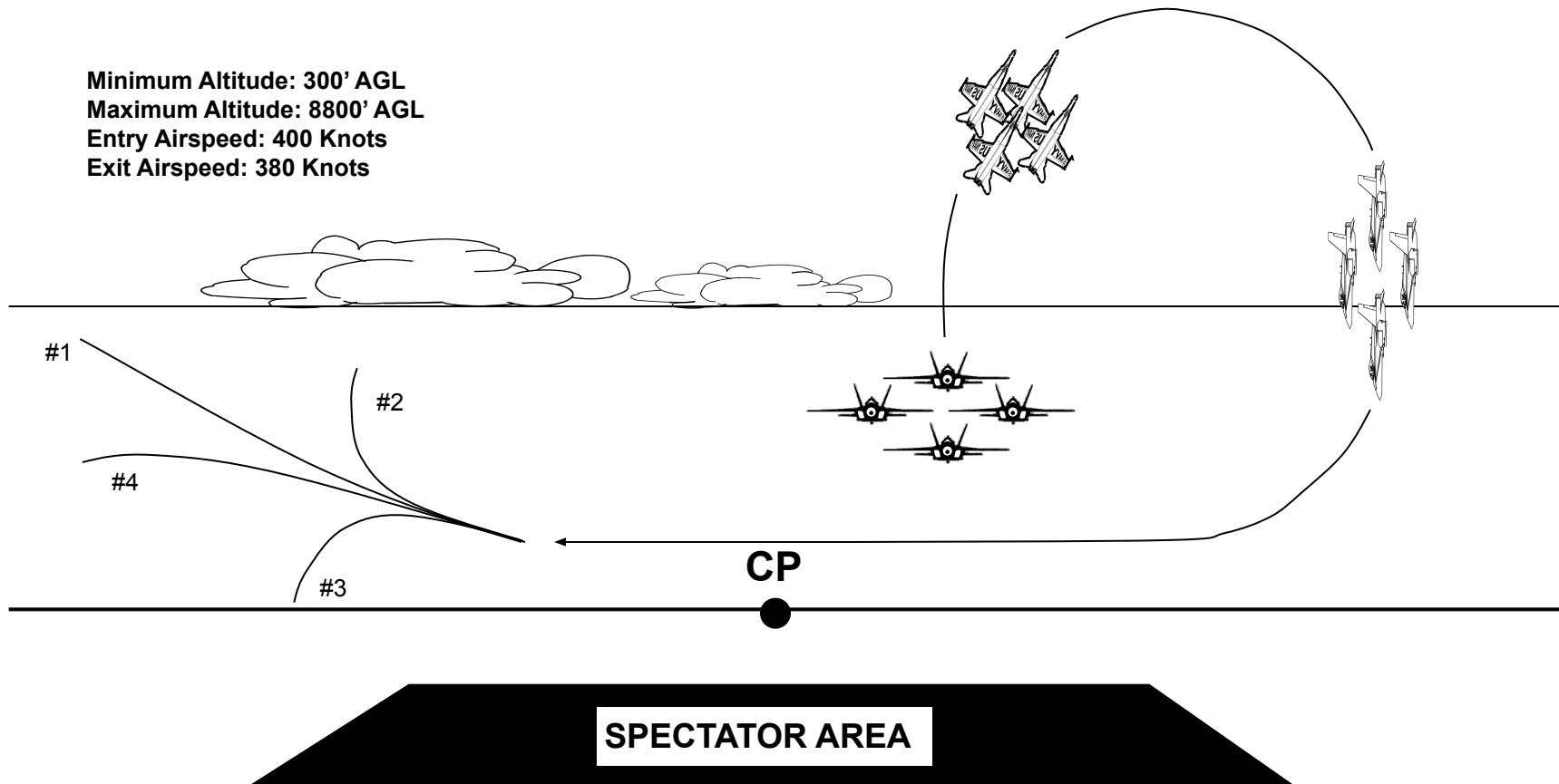
MANEUVER: Approaching CP at a minimum of 50', each aircraft pulls 65°-70° nose up and then rolls to inverted. Both aircraft complete a split "S" and cross over CP. At CP each pilot performs a right 360° roll, then clears behind the crowd.



# BARREL ROLL BREAK

Minimum Altitude: 300' AGL  
Maximum Altitude: 8800' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 380 Knots

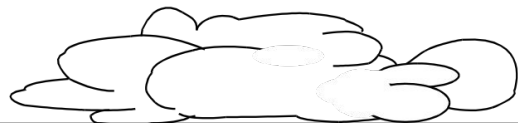
2-34



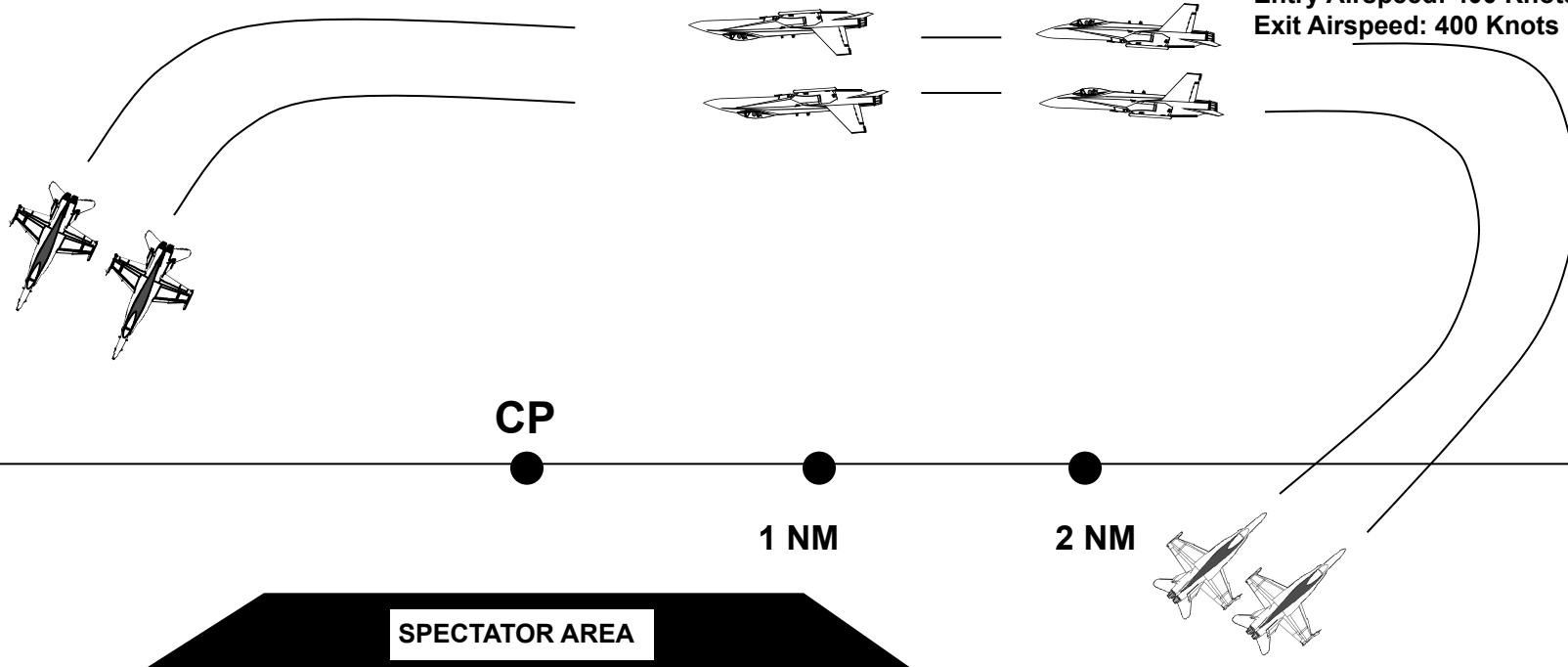
MANEUVER: Ingressing from in front of the crowd 2000' crowd right, the diamond formation will commence a vertical climb. Approaching 1.7 NM from CP, they will roll the formation 90° to the left and complete the back side of the looping maneuver. As the formation passes through the horizon at approximately 500' AGL, they will split in three separate directions. 1 and 4 will exit out the show line while 2 and 3 egress 90° in front of and behind the crowd respectively. The rendezvous will be conducted behind the crowd.



# TUCK-OVER ROLL



Minimum Altitude: 200' AGL  
Maximum Altitude: 1500' AGL  
Entry Airspeed: 400 Knots  
Exit Airspeed: 400 Knots



2-35

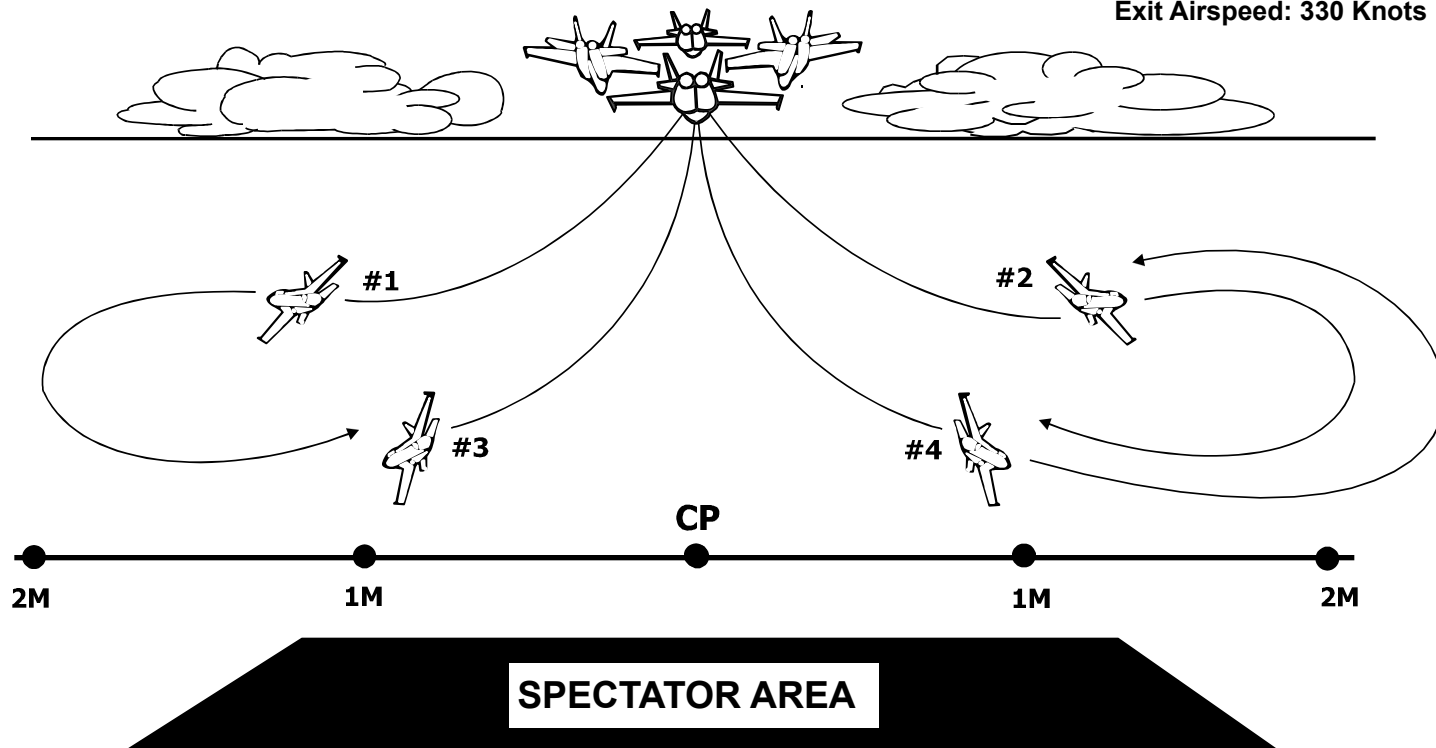
MANEUVER (UPRIGHT TOR): At CP, both aircraft will perform simultaneous left 450° rolls and clear behind the crowd.

MANEUVER (INVERTED TOR): At the edge of the aerobatic box, both aircraft will perform a left roll to inverted. At CP, both aircraft will perform simultaneous left 240° rolls and clear behind the crowd.



# DIAMOND LOW-BREAK CROSS

Minimum Altitude: 500' AGL  
Maximum Altitude: 700' AGL  
Entry Airspeed: 360 Knots  
Exit Airspeed: 330 Knots



## INBOUND ALTITUDES:

# 1, #4 AT 150' AGL

# 2 AT 300' AGL

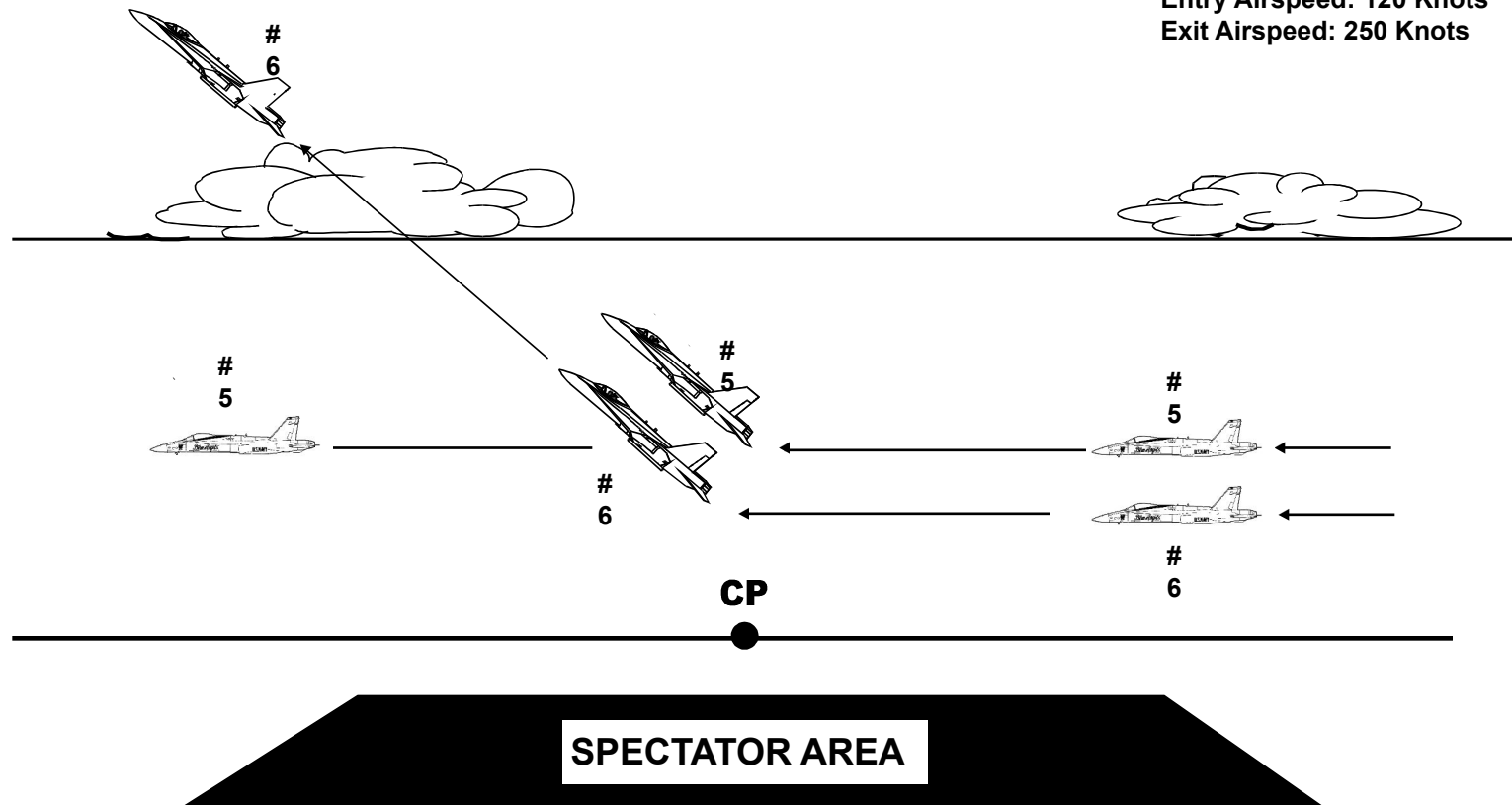
# 3 AT 450' AGL

**MANEUVER:** Approaching from directly behind the crowd in diamond formation at 500' AGL, all four aircraft will separate in 4 different directions. All four aircraft will fly the outbound leg at 700' AGL, then execute a reversal turn to the show line and simultaneously cross over CP. The rendezvous is executed behind the crowd.



## SECTION HIGH-ALPHA PASS

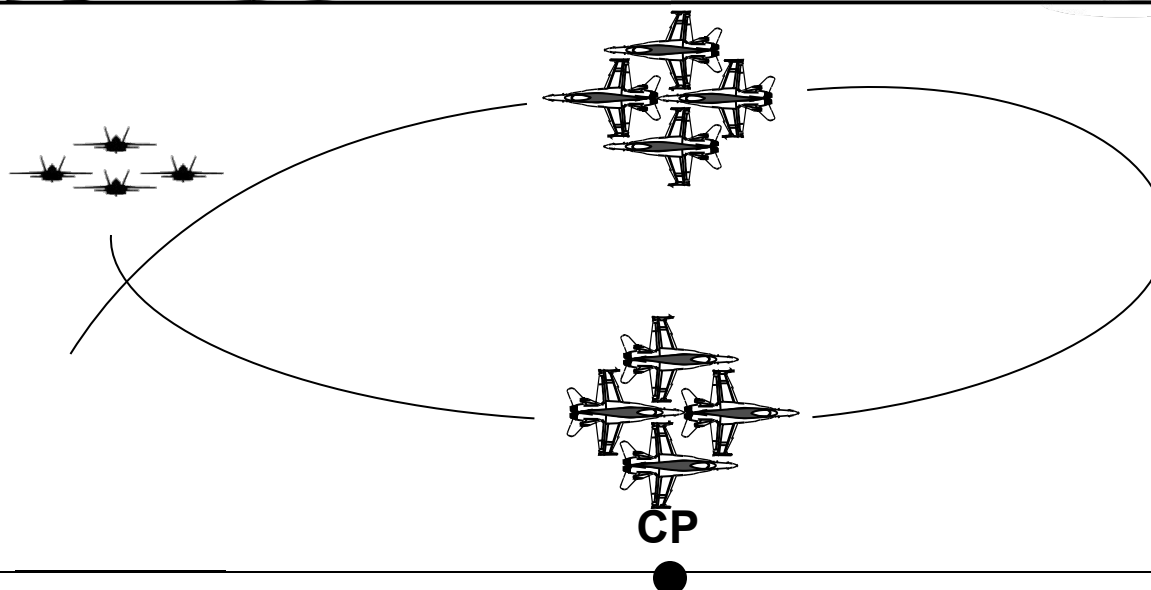
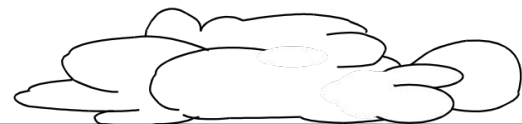
Minimum Altitude: 500' AGL  
Maximum Altitude: 1500' AGL  
Entry Airspeed: 120 Knots  
Exit Airspeed: 250 Knots



MANEUVER: Both aircraft slow to approximately 120 KCAS abeam each other. At approximately the center point position, both aircraft will clear simultaneously. #6 will clear with a slow pitch up to 60° nose high, then a left roll to inverted, followed by a right 90° roll then clear behind the crowd above 1000' AGL. #5 will clear straight ahead and level. This maneuver can be flown from either direction, depending on prevailing wind.



## DIAMOND BURNER 270



Minimum Altitude: 200' AGL  
Maximum Altitude: 500' AGL  
Entry Airspeed: 220 Knots  
Exit Airspeed: 400 Knots

**SPECTATOR AREA**

**MANEUVER:** Ingressing from crowd left in front of the crowd, the formation approaches in Diamond. Approaching CP at minimum altitude of 200' AGL they commence a slightly climbing left turn, selecting afterburner as they execute a 270° turn in front of the crowd and egress to crowd left behind the crowd.



# DELTA ROLL

Minimum Altitude: 200' AGL  
Maximum Altitude: 4300' AGL  
Entry Airspeed: 365 Knots  
Exit Airspeed: 365 Knots



200FT

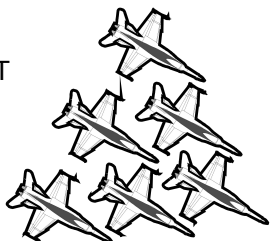


360° ROLL AT APPROX. 4000FT

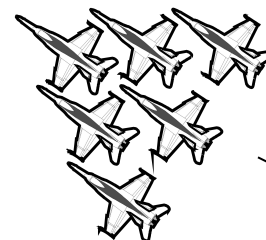
CP

SPECTATOR AREA

2000FT



200FT



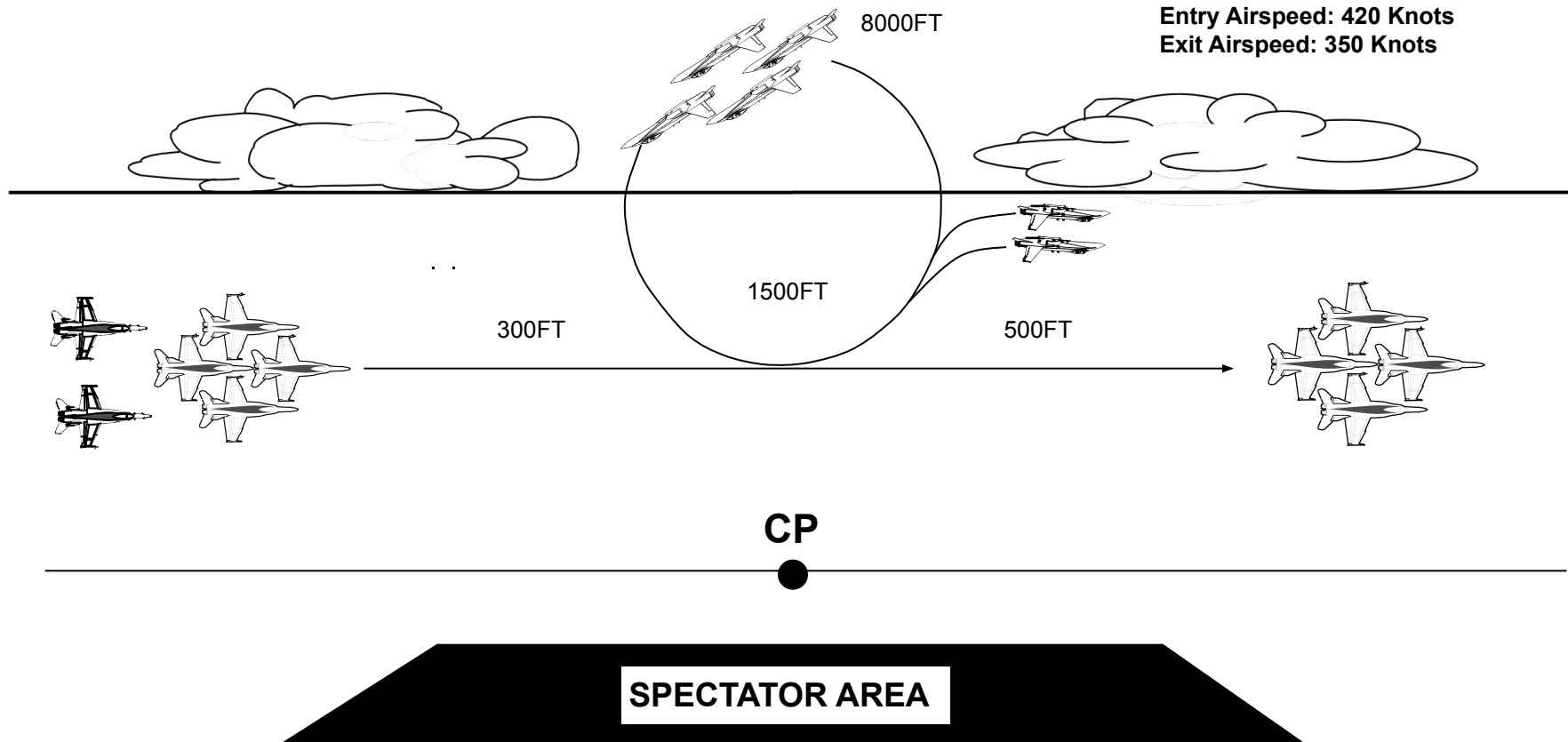
**MANEUVER:** From crowd right behind the crowd, all six aircraft will commence a climb approaching CP and roll 360° in formation at approximately 4000' AGL. The egress will be crowd left in front of the crowd.



# FLEUR DE LIS

Minimum Altitude: 200' AGL  
Maximum Altitude: 1000' AGL  
Entry Airspeed: 420 Knots  
Exit Airspeed: 350 Knots

2-40



**MANEUVER:** Approaching the show line in a Double “V” formation, the six aircraft will commence a climb. At approximately 2000’ prior to CP, all six aircraft will split simultaneously. The two solos will execute 1-1/2 rolls and exit crowd right initially, then turn behind the crowd. The four Diamond aircraft will rendezvous during their looping maneuver over CP and egress in Diamond crowd right to crowd right in front of the crowd.



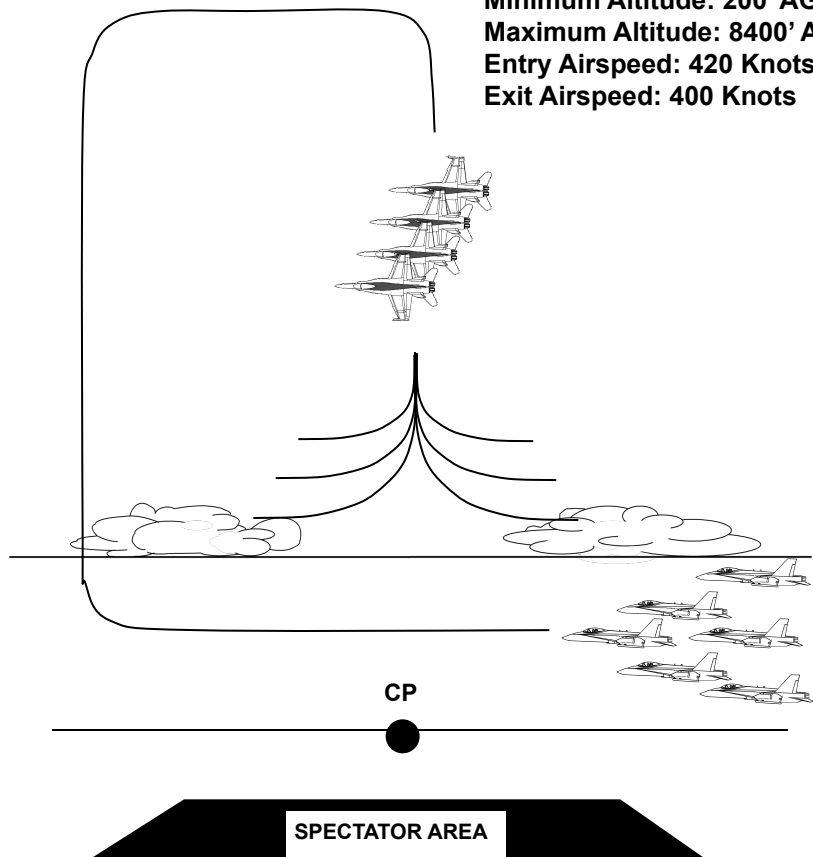


## LOOP BREAK

8000FT

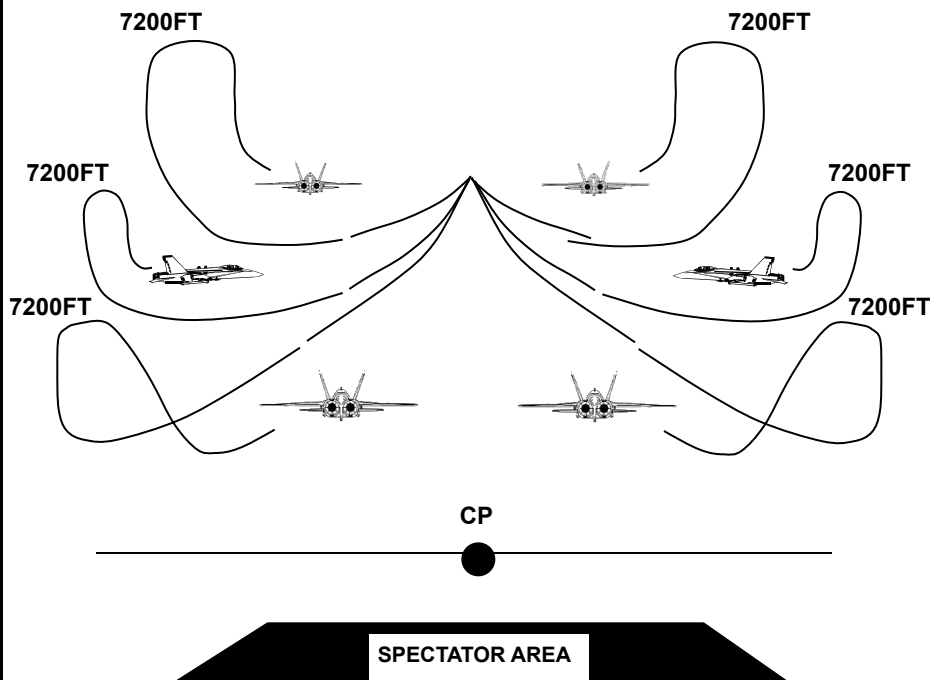
Minimum Altitude: 200' AGL  
Maximum Altitude: 8400' AGL  
Entry Airspeed: 420 Knots  
Exit Airspeed: 400 Knots

2-41



**MANEUVER:** From crowd right on the show line, all six aircraft will commence a loop in formation approaching CP. At the vertical down above CP, the six aircraft will slowly separate and exit in six different directions leveling at 1000' AGL, heading outbound on ingress / egress lines. At 3NM each pilot will perform a Half-Cuban Eight Reversal turn towards CP, descend to his respective altitude and cross CP.

## 6-PLANE CROSS



**NOTE:** All outbound aircraft are at 1000' AGL to 3NM. Inbound altitudes are routinely flown higher during the first half of the season.

### MIN INBOUND ALTITUDES:

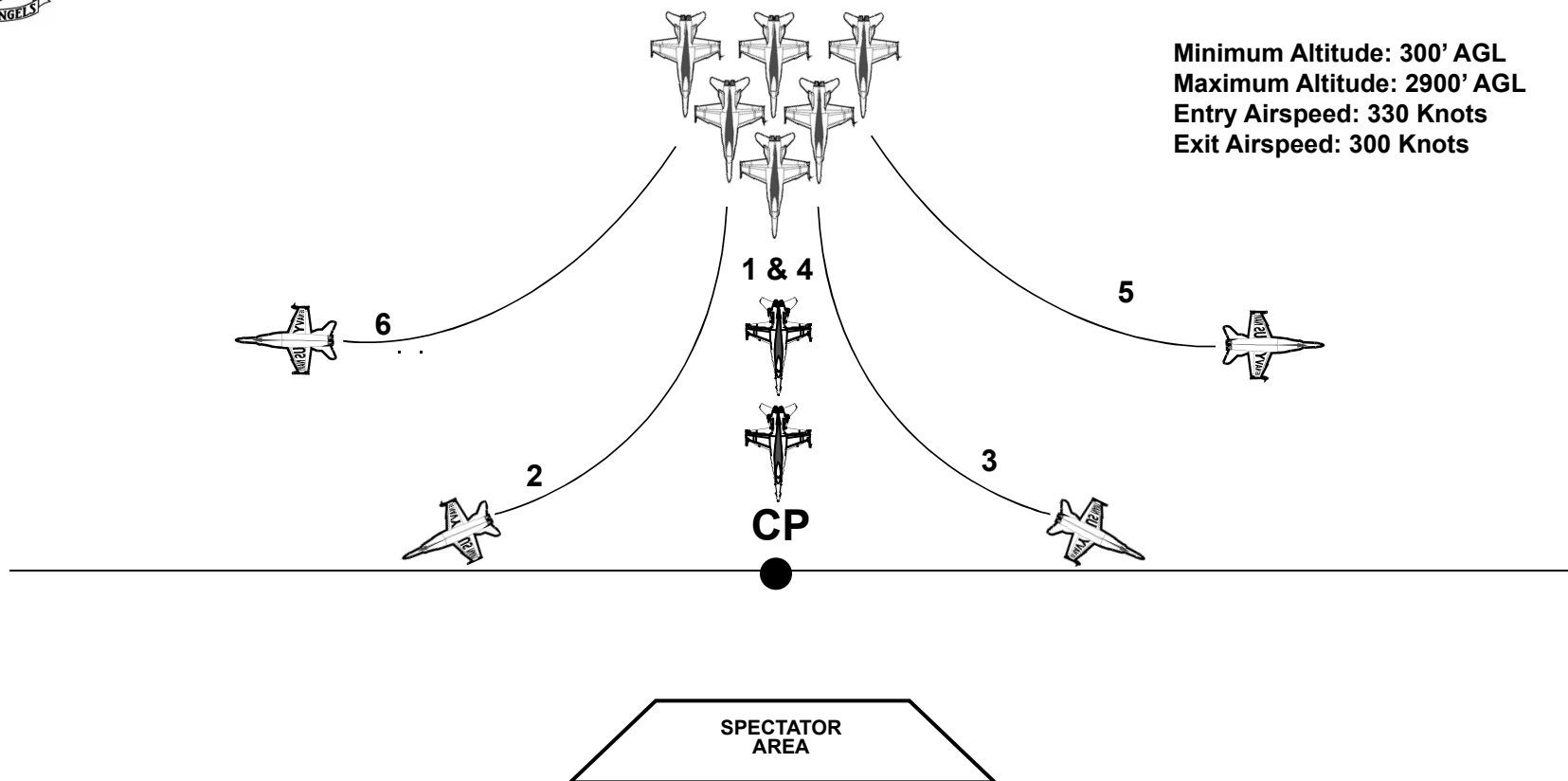
#1, #4: 150' AGL  
#2, #5: 300' AGL  
#3, #6: 450' AGL



## DELTA BREAK OUT / HEAD-ON

2-42

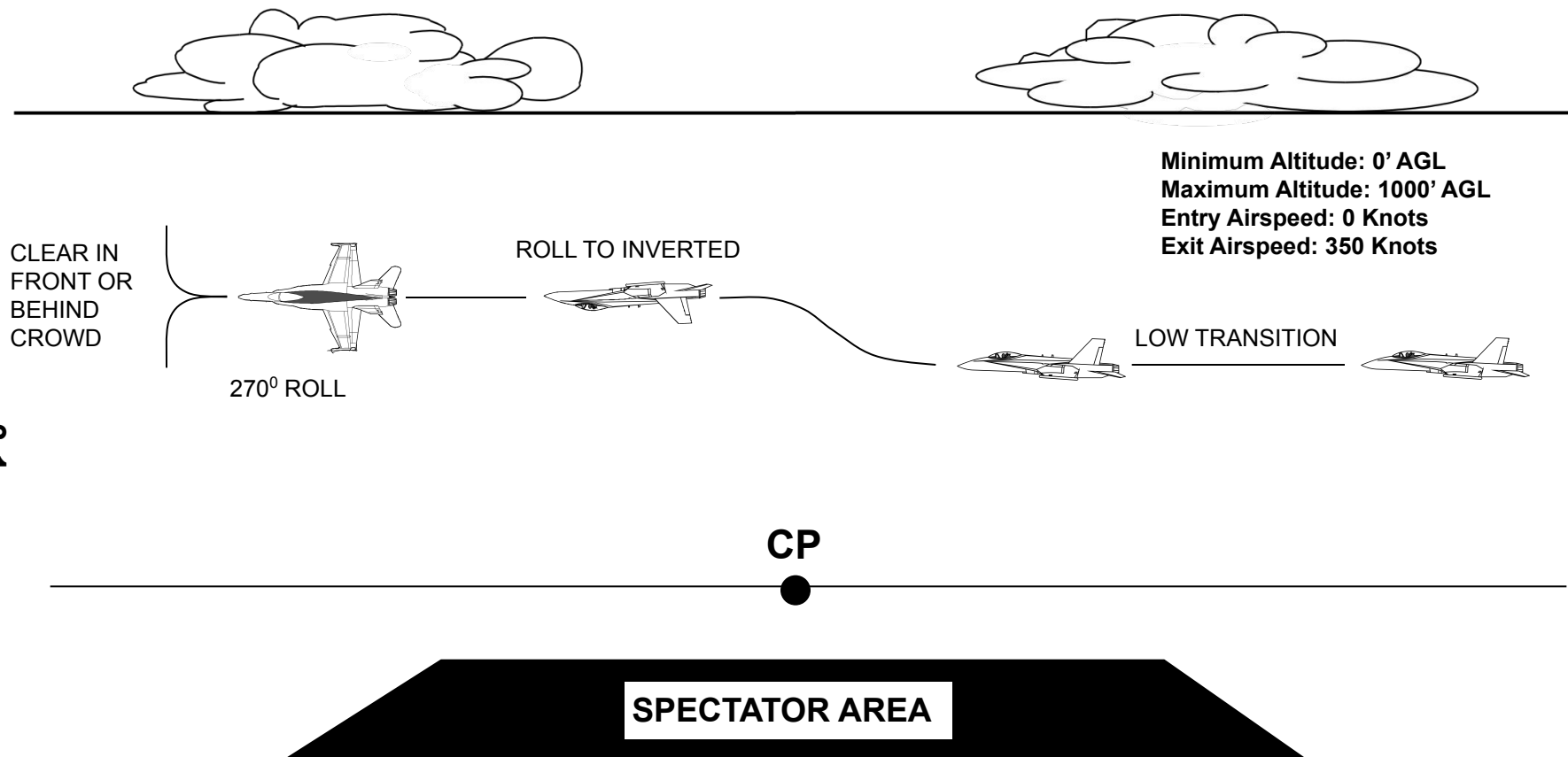
Minimum Altitude: 300' AGL  
Maximum Altitude: 2900' AGL  
Entry Airspeed: 330 Knots  
Exit Airspeed: 300 Knots



**MANEUVER:** The Delta will roll out in a head on set up and commence a climb. One nautical mile in front of the crowd, Boss in the #1 jet will call "Ready, Break!" and the Delta will split. The Lead (#1) will pull up into a steady 2G climb straight ahead. The solos (#5 & #6) will pull outboard in a steady, 2G, 60° angle of bank, and offset by 90°. The wingmen (#2 & #3) will pull outboard in a steady 2G, 45° angle of bank, and offset by 45°. The lead and slot (#1 & #4) will continue straight ahead and exit behind the crowd. The solos and wingmen will rendezvous with the lead and slot behind the crowd. If weather precludes the break out, the maneuver becomes a Head-On Pass. Boss will keep the Delta Formation and climb to a minimum of 500' AGL prior to crossing show line.



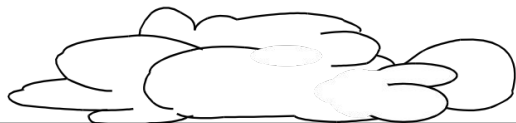
# LOW TRANSITION / ROLL TO INVERTED BLUE ANGEL 6



**MANEUVER:** #6 will execute a low transition and at 300KTS pull to 15°-45° nose up. At 200-500' AGL, roll the aircraft 180° to the inverted position. At 350KTS roll the aircraft 270° and clear in front of or behind the crowd.

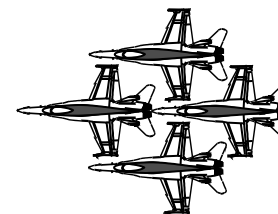
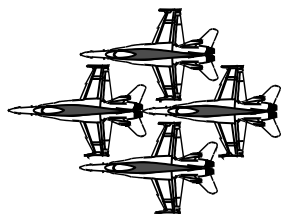


# DIAMOND FLAT PASS



Minimum Altitude: 200' AGL  
Maximum Altitude: 200' AGL  
Entry Airspeed: 335 Knots  
Exit Airspeed: 335 Knots

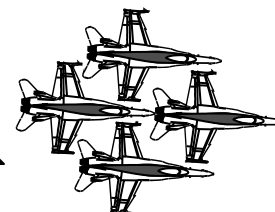
3-2



CP



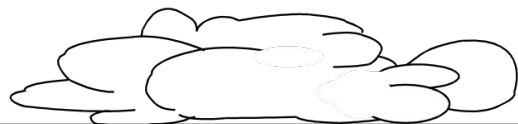
SPECTATOR AREA



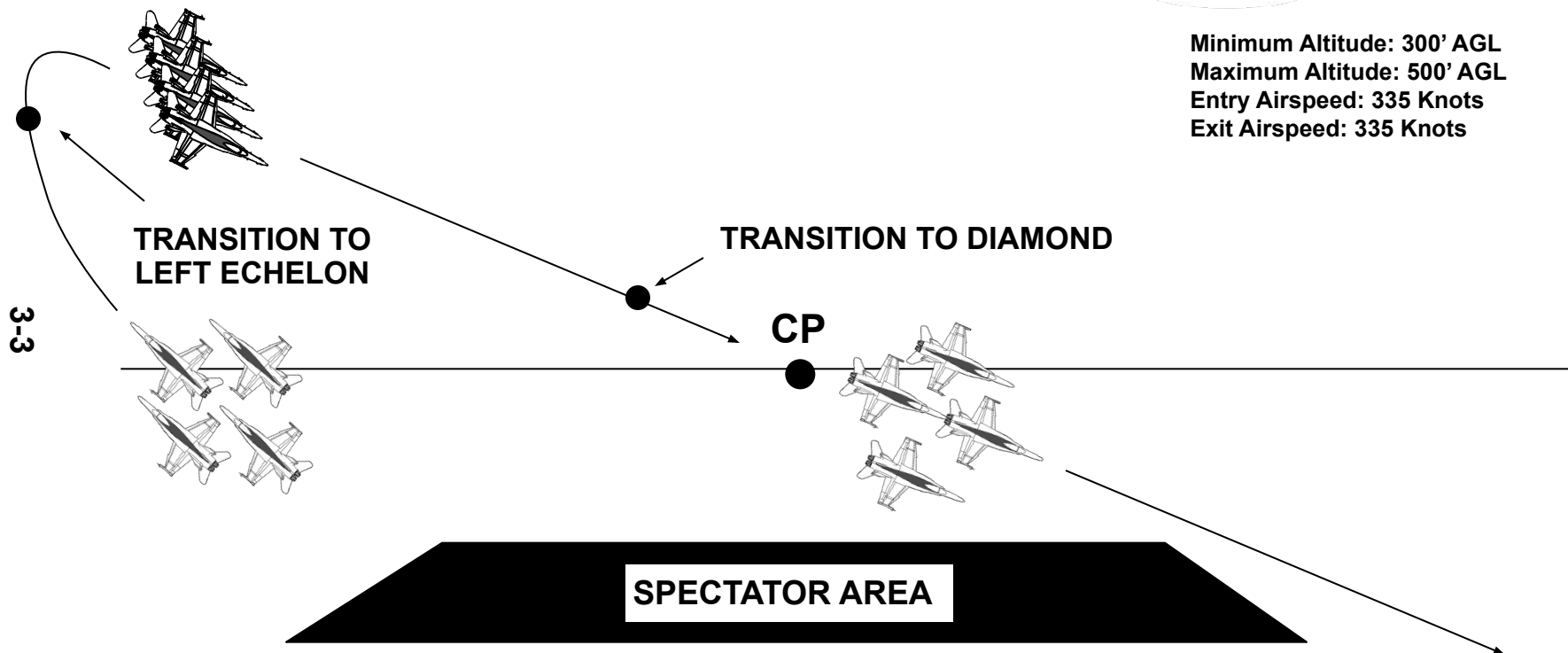
**MANEUVER:** The Diamond will perform a flat pass at 200' AGL on the 500' show line from crowd right to crowd left.



## LEFT ECHELON FLAT PASS



Minimum Altitude: 300' AGL  
Maximum Altitude: 500' AGL  
Entry Airspeed: 335 Knots  
Exit Airspeed: 335 Knots



**MANEUVER:** Ingressing from in front of the crowd crowd left, the Diamond transitions to a left echelon formation on the turn in and conducts a flat pass at 300' – 500' AGL on the crowd left in front of the crowd line. The formation transitions back to diamond approximately 1 nautical mile in front of the crowd, crossing center point at or above 500' AGL and egresses climbing on the crowd right behind the crowd line in diamond formation.



# DIAMOND DIRTY ROLL



3000FT

Minimum Altitude: 200' AGL  
Maximum Altitude: 3000' AGL  
Entry Airspeed: 275 Knots  
Exit Airspeed: 275 Knots

2000FT

200FT

1.5MI

200FT

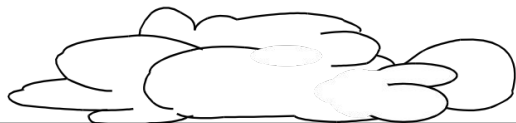
CP

SPECTATOR AREA

**MANEUVER:** Approaching CP in Diamond with Landing Gear extended, all four aircraft roll 360° in formation, starting the roll at 1200' to apex at approximately 2000'. Minimum altitude on the ingress and egress roll line is 200'.

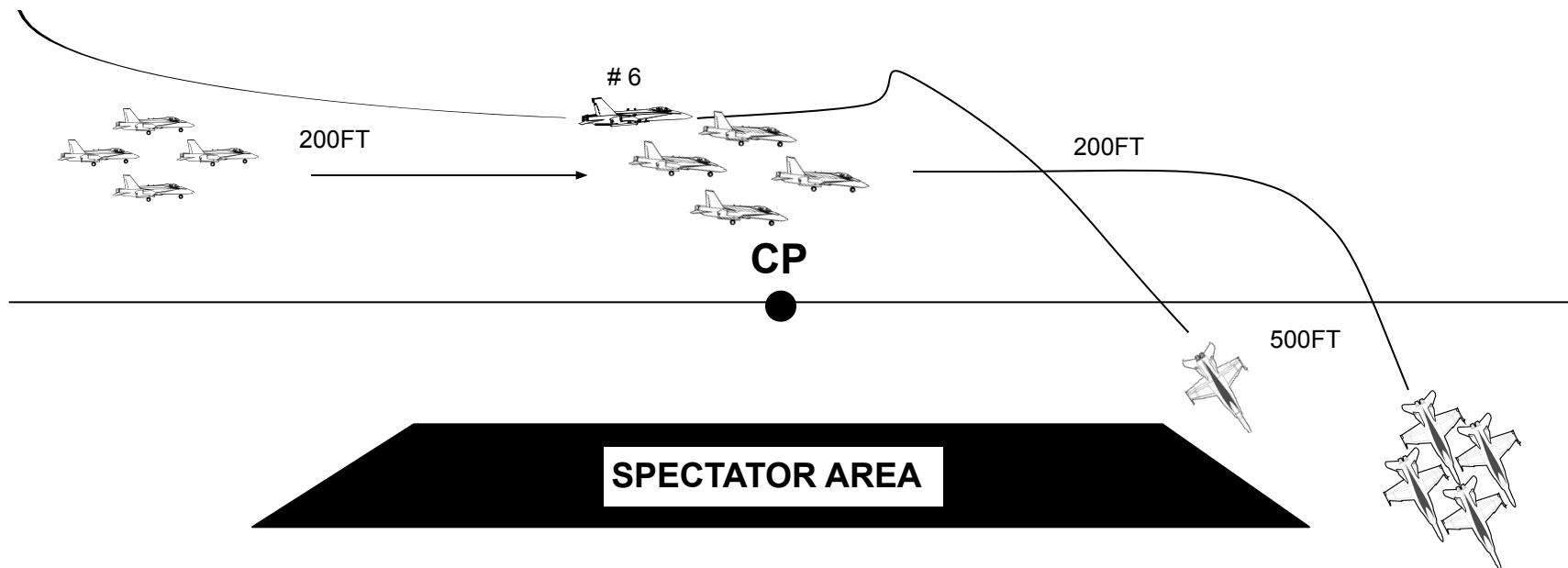


# DIRTY CLEAN FLAT PASS



Minimum Altitude: 200' AGL  
Maximum Altitude: 200' AGL  
Entry Airspeed: 240/500 Knots  
Exit Airspeed: 240/500 Knots

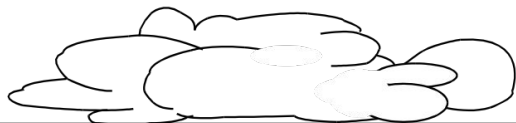
3-5



**MANEUVER:** In the Diamond formation all four aircraft will execute a flat pass down show line with the landing gear and hooks extended. Meanwhile, #6 will overtake the diamond while the diamond is approaching center point. #6 will then climb to 1000' AGL and execute a right hand turn to clear behind the crowd.

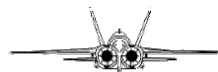


## SNEAK TO LEFT TURN OUT, BLUE ANGEL 6



Minimum Altitude: 500' AGL  
Maximum Altitude: 1500' AGL  
Entry Airspeed: 600 Knots  
Exit Airspeed: 400 Knots

3-6



# 6 500 FT

CP



**SPECTATOR AREA**

**MANEUVER:** A flat from behind the crowd to in front of the crowd 500' AGL . Once past the spectator area, a clear to crowd left in front of the crowd is executed.

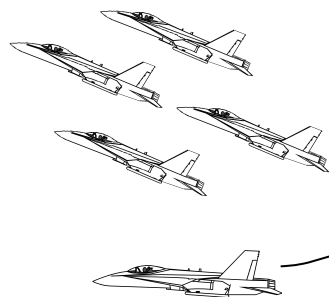




# LINE ABREAST FLAT PASS



Minimum Altitude: 200' AGL  
Maximum Altitude: 500' AGL  
Entry Airspeed: 335 Knots  
Exit Airspeed: 335 Knots



200FT

CP

SPECTATOR AREA

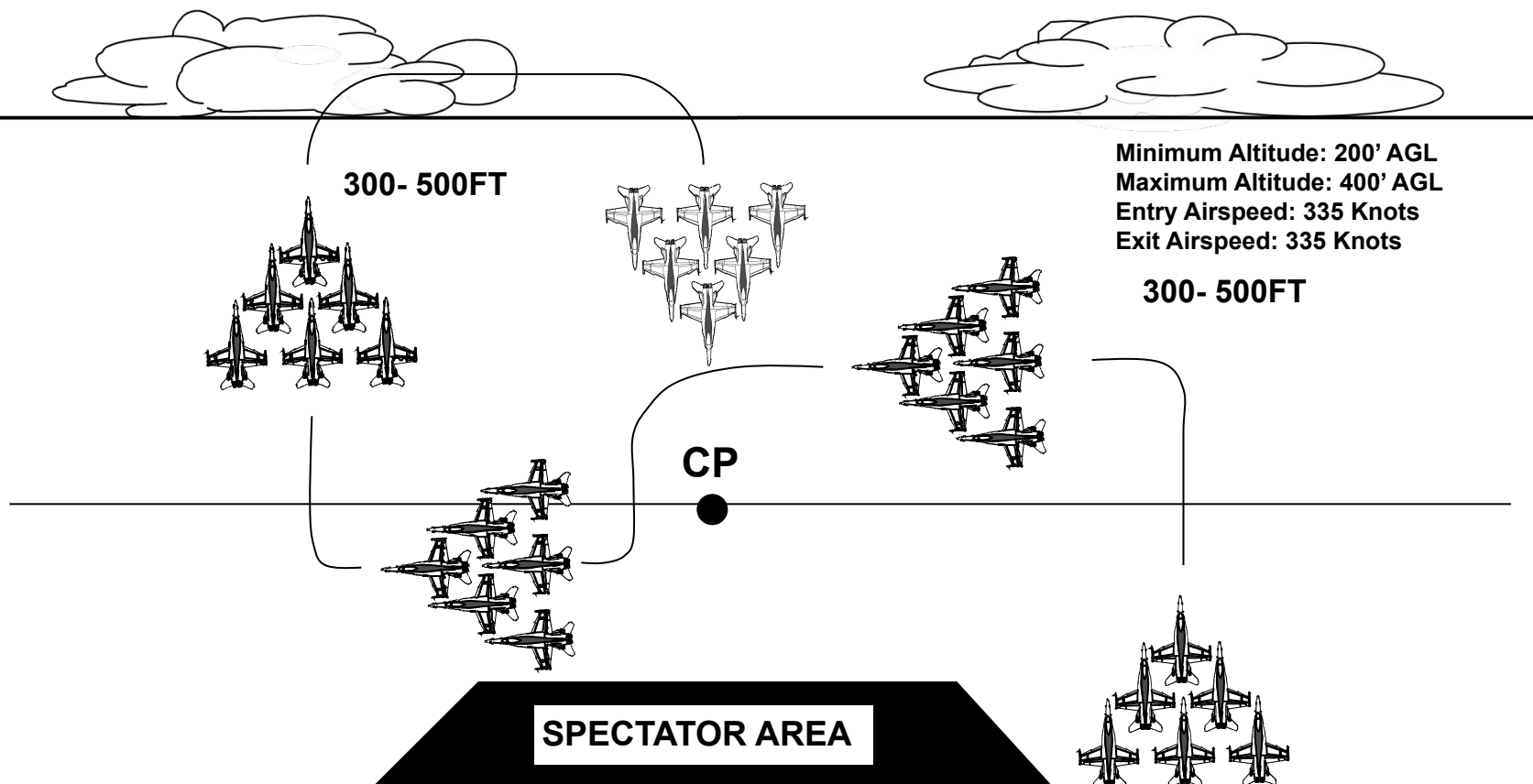
**MANEUVER:** At approximately 3 NM, aircraft #1,2,3,4 and 5 transition to a Line Abreast formation leveling off at 200' AGL on the 500' Show Line. Egressing crowd left, aircraft #1-4 shift back to Diamond and detach #5.

3-7



# MANEUVERING DELTA

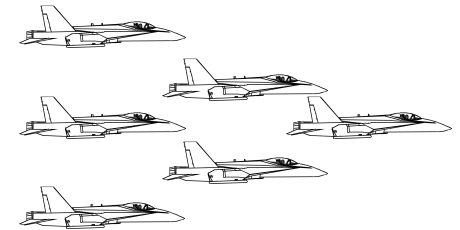
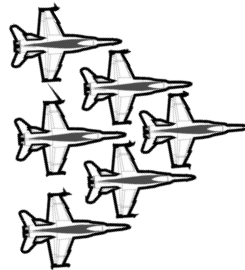
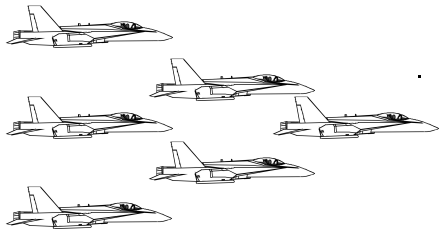
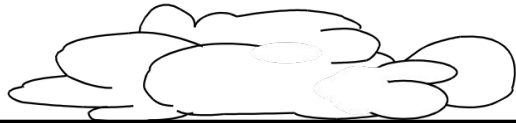
3-8



**MANEUVER:** In Delta formation, all six aircraft will approach from crowd left in front of the crowd. Approaching CP, the formation will commence a left turn to exit the flight line heading crowd right in front of the crowd to set up the Delta Flat Pass. This maneuver can be flown in mirror image from crowd right.



# DELTA AILERON ROLL



3-9

Minimum Altitude: 200'  
Maximum Altitude: 500'  
Entry Airspeed: 400 Knots  
Exit Airspeed: 400 Knots

CP

SPECTATOR AREA

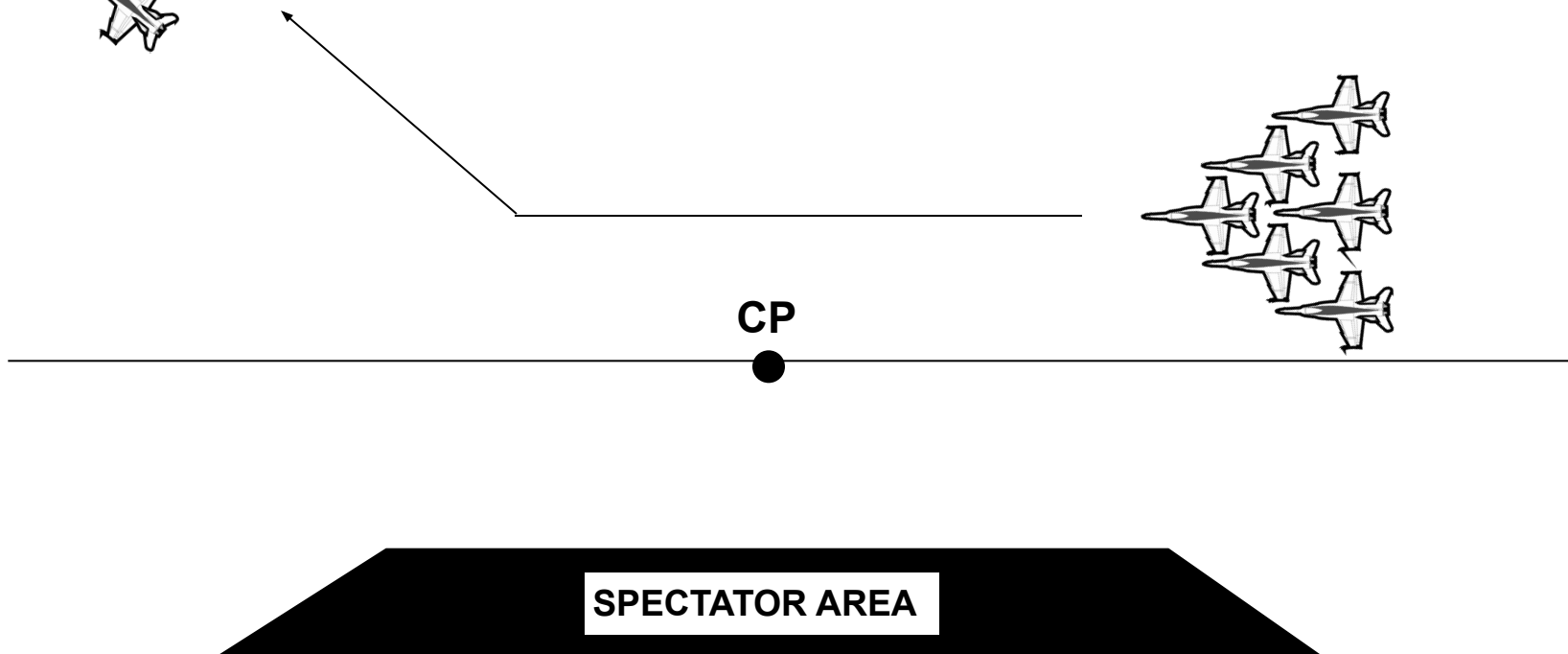
**MANEUVER:** Ingressing from crowd right or crowd left, all six aircraft will perform simultaneous 360° rolls within the aerobatic box. The Delta will exit in front of the crowd to set up for the Delta Break Out / Head-On or Maneuvering Delta.



## DELTA FLAT PASS

Minimum Altitude: 200' AGL  
Maximum Altitude: 200' AGL  
Entry Airspeed: 335 Knots  
Exit Airspeed: 335 Knots

3-10



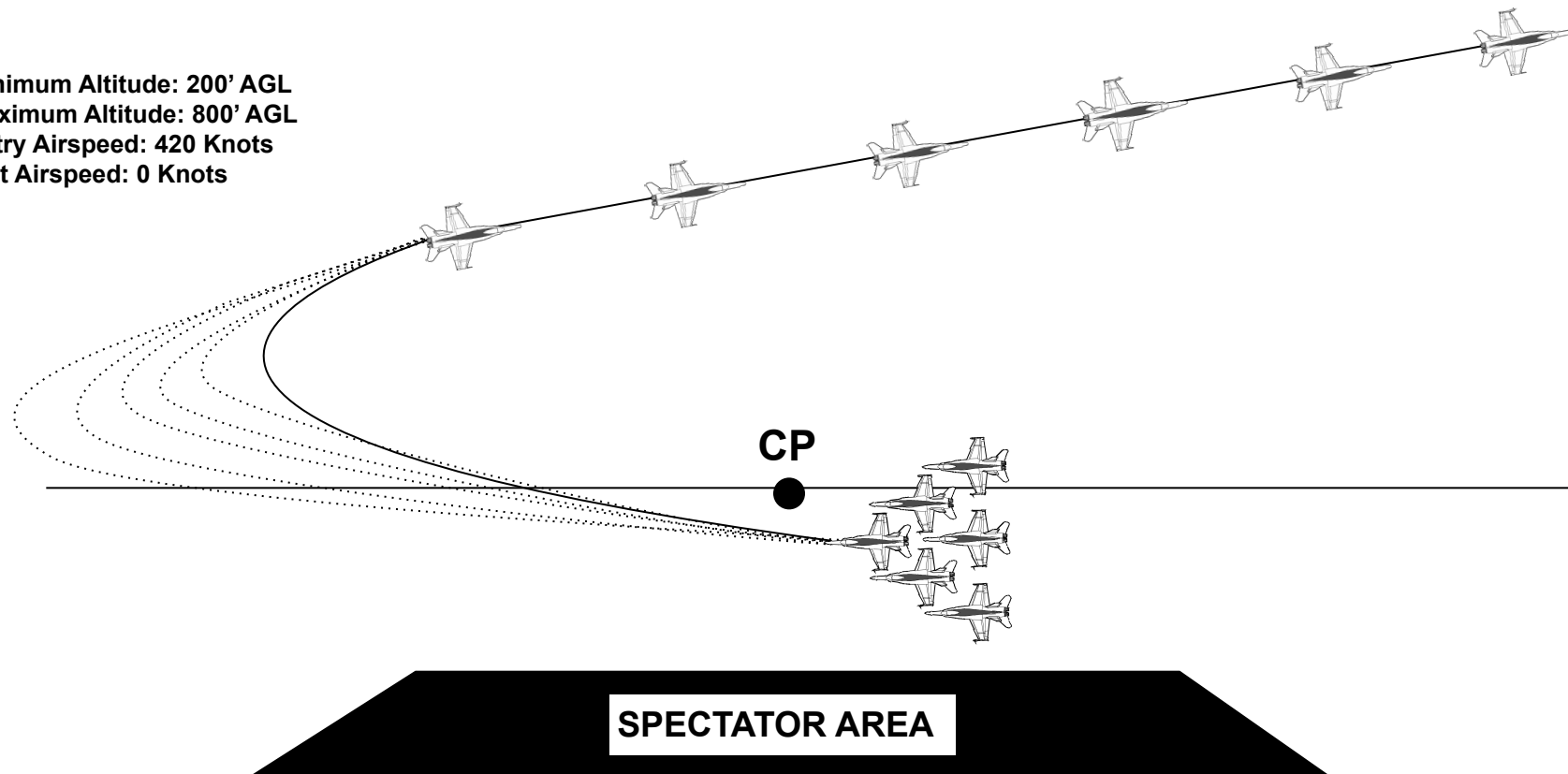
**MANEUVER:** Ingressing straight and level at 200' AGL from crowd right or crowd left, all six aircraft will perform a flat pass on the 500' show line and exit in front of the crowd to set up for the Delta Break Out / Head On.



## DELTA PITCH-UP BREAK

Minimum Altitude: 200' AGL  
Maximum Altitude: 800' AGL  
Entry Airspeed: 420 Knots  
Exit Airspeed: 0 Knots

3-11



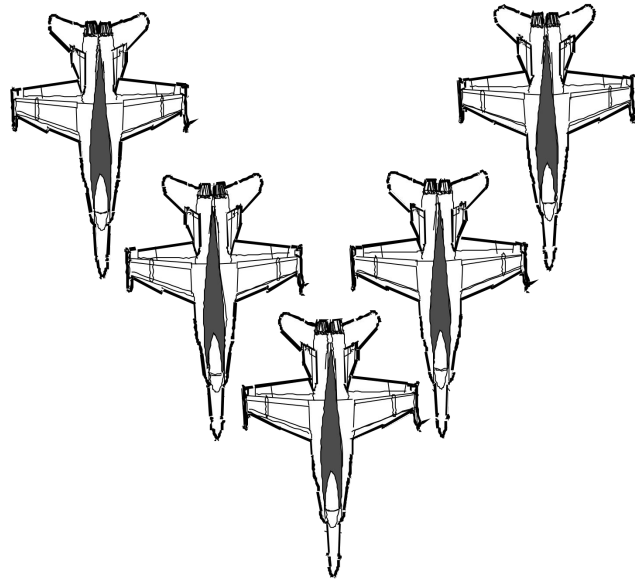
**MANEUVER:** Ingressing at 200' on the 500' line from crowd left or right. Each aircraft pitches out of the formation with approximately 2 second spacing, and turns away from the crowd to downwind, and configures for landing at 15-18' intervals.



# CONTINGENCIES



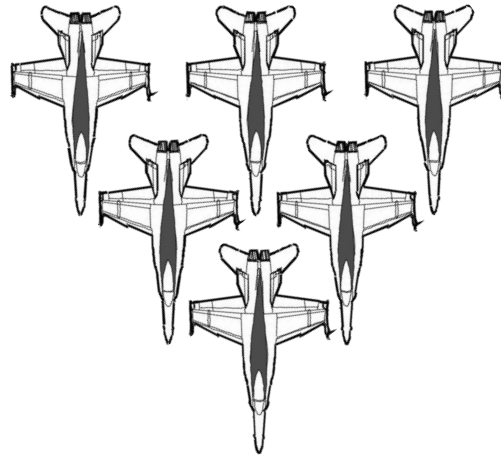
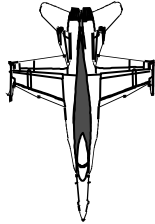
## 5-PLANE CONTINGENCY



Should any wingman fall out, #4 will fill that position to balance the formation. If a solo falls out, the other solo pilot will fly single solo using the same maneuvers with the exception of the following. If #5 is single solo, a MRT followed by sneak to vertical rolls will be flown. If #5 or #6 are single solo, a parade pass will be flown in lieu of the TOR. For timing reasons a parade pass may be flown single solo in either direction to facilitate deconfliction from the diamond. If the Boss falls out, all aircraft will orbit overhead until he can resume.



## COORDINATED PHOTO PLATFORM



3-13

Should the opportunity present itself, where a qualified crew is present at a show site, there is the possibility of a 7th jet flying in coordination with the Diamond, Solos, or Delta formations. While not part of the overall formation, they will be well versed with the procedures and profiles in order to capture footage of a practice demonstration under the confines of the waiver and TFR. The photo platform will maintain deconfliction between the elements and will be specifically briefed prior to the flight.