



*Flying Operations*

**AIR FORCE AIRCRAFT DEMONSTRATIONS**  
**(A-10, F-15, F-16)**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction implements guidance in AFD 11-2, *Flight Rules and Procedures*; and AFI 11-209, *Air Force Participation in Aerial Events*. It provides guidance and procedures for Air Force performance of specific model, design, series (MDS) single-ship aircraft demonstrations and mission capabilities demonstrations. It designates Air Combat Command as lead command for the A-10, F-15, and F-16 aircraft demonstrations. For the purpose of this instruction the Air National Guard is functionally considered to be a major command (MAJCOM). MAJCOMs, field operating agencies (FOAs), and direct reporting units (DRUs) may supplement this instruction. MAJCOMs, FOAs, and DRUs will coordinate their supplements with HQ Air Combat Command, Director of Aerospace Operations, Scheduling and Aerial Events Division, (ACC/DOO) prior to publication and forward one copy to HQ USAF/XOOO after publication. See **Attachment 1** for a glossary of references and supporting information. Ensure that all records created by this AFI are maintained and disposed of IAW AFMAN 37-139, "Records Disposition Schedule."

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## Chapter 1

### OPERATIONAL PROCEDURES

**1.1. Introduction.** USAF uses single-ship aerial demonstration teams to exhibit the capabilities of modern high performance USAF aircraft and the degree of skill required to operate and maintain these aircraft. ACC is designated lead command and will establish standard criteria for single-ship aerial demonstrations of the A-10, F-15, and F-16 aircraft and the Heritage Flight program. MAJCOMs interested in developing future airshow programs involving these AF MDS aircraft will be governed by this instruction and approved MAJCOM supplements. This instruction provides specific maneuvers, sequences, and parameters governing the execution of these demonstrations. Other MAJCOMs flying single-ship aerial demonstrations of these MDS aircraft will comply with this instruction. Policy and procedures for team management, selection, training, and scheduling will be in accordance with (IAW) applicable MAJCOM supplements. The directives listed in **Attachment 1** provide further policy or procedural guidance in the conduct of these events.

**1.2. Terms Explained.** Unless otherwise indicated, terms and definitions used in AFI 11-209, *Air Force Participation in Aerial Events*; AFI 35-101, *Public Affairs Policies and Procedures*; and this instruction are the same.

**1.3. Waiver Authority.** HQ USAF/XOOO has delegated waiver authority for this instruction to HQ ACC/DO. MAJCOMs must submit waiver requests through appropriate MAJCOM channels.

#### **1.4. Responsibilities:**

##### **1.4.1. MAJCOM/CC:**

- 1.4.1.1. Provides policy for the MAJCOM's single-ship demonstration program IAW this publication.
- 1.4.1.2. Certifies first year single-ship demonstration pilots prior to the beginning of their first air show season.

##### **1.4.2. MAJCOM/DO:**

- 1.4.2.1. Provides supervisory direction over the single-ship demonstration program.
- 1.4.2.2. Approves the single-ship demonstration schedule(s) and changes or updates.
- 1.4.2.3. Approves syllabi for single-ship demonstration aircrew upgrade.

##### **1.4.3. MAJCOM Aerial Events Office or MAJCOM/DO designee:**

- 1.4.3.1. Coordinates all single-ship demonstrations. Analyzes event sites for operational suitability, safety, recruiting value, and availability of demonstration teams.
- 1.4.3.2. Develops the annual single-ship demonstration schedule and updates.
- 1.4.3.3. Performs annual review of the MAJCOM supplement to this AFI and unit single-ship demonstration training syllabi.
- 1.4.3.4. If applicable, develops OCONUS event schedule and provides Mission Aerial Support funding for deployments.

1.4.3.5. Prepares waiver recommendations for HQ ACC/DO approval.

1.4.3.6. Provides event sponsors with the Single-Ship Demonstration Team Support Manual to assist them with the necessary preparations.

1.4.3.7. If applicable, maintains the MAJCOM Air Demonstration Public web site to include: current single-ship demonstration schedules, Single-Ship Demonstration Team Support Manual, and the scheduling process.

1.4.3.8. Coordinates initial MAJCOM/CC certification of first year single-ship demonstration pilots IAW [Attachment 9](#).

1.4.3.9. Maintains demonstration team certification documentation.

1.4.4. **NAF commanders or equivalent will** approve single-ship demonstration prior to MAJCOM/CC's certification for first-year demonstration pilots.

**1.4.5. Wing commanders or equivalent:**

1.4.5.1. Select and train demonstration team personnel IAW this instruction.

1.4.5.2. Forward the upgrading demonstration pilot's grade book per MAJCOM supplement for approval.

1.4.5.3. Annotate pre-certification in demonstration pilot grade book and forward to NAF/CC or equivalent for endorsement.

1.4.5.4. Annotate re-certification in demonstration pilot grade book for second and subsequent year demonstration pilots.

1.4.5.5. Select narrators and rated ground safety observers.

1.4.5.6. Complete and submit an Annual Preseason Team Assessment to MAJCOM/CC NLT 1 March, or prior to first air show, IAW [Attachment 6](#).

1.4.5.7. Provide a ground video and HUD tape of a current performance for WG/CC re-certified pilots to MAJCOM/DO

1.4.5.8. Provide the demonstration team's annual budget per MAJCOM supplement to MAJCOM/DO.

1.4.5.9. Ensure senior leadership review of every practice and demonstration by reviewing the HUD tape and grade sheet IAW [paragraph 1.11](#) of this instruction. This duty may be delegated to the WG/CV or OG/CC. If one or more of these leaders are not current and qualified in the demo aircraft MDS, the WG/CC may delegate this to a SQ/CC who is current and qualified in the MDS.

**1.4.6. Operations group commanders or equivalent:**

1.4.6.1. Provide command oversight of the demonstration team.

1.4.6.2. Coordinate with HQ ACC/DOO or MAJCOM designee on single-ship demonstration schedule.

1.4.6.3. Request relief from HQ ACC/DOO or MAJCOM designee if it is determined that an event should not be supported (for safety, OPTEMPO, financial reasons, etc.).

1.4.6.4. Ensure the HUD tape of every practice and demonstration is reviewed IAW **paragraph 1.4.5.9.** of this instruction. E-mail the completed grade sheet to MAJCOM/DO, info MAJCOM Aerial Events, within 5 work days of each home training event/demonstration or within 5 work days after returning to home station after deployed demonstrations.

1.4.6.5. If applicable, attend at least one off-station show during the demonstration season.

1.4.6.6. Provide Stage 2 certification to demonstration pilot IAW **paragraph 2.5.12.** of this instruction.

#### 1.4.7. **Demonstration pilots:**

1.4.7.1. Coordinate demonstration team availability IAW MAJCOM supplement.

1.4.7.2. Coordinate demonstration team support requirements with event point of contact.

1.4.7.3. Coordinate with local Air Force recruiter team's availability and ability to support local Air Force recruiting efforts.

1.4.7.4. Cancel any demonstration when the assigned performance location compromises safety or exceeds aircraft performance capabilities.

1.4.7.5. For off-station sites, accomplish either a practice demonstration or aerial survey (IAW **Attachment 7**) at the air show site prior to air show demonstration.

1.4.7.6. Review and grade the HUD tape of every practice and demonstration using the grade sheets per **paragraph 1.11.**, obtain ground safety observer review, and forward to the reviewing officer IAW **paragraph 1.4.5.9.**

1.4.7.7. **Individual Responsibility.** Each member assigned to the MAJCOM Single-Ship Demonstration Team must fully understand the solemn trust and special obligation that accompanies a position on the demonstration team. Individual behavior, bearing and appearance shape not only the team image but also public image of the USAF. First among the team's many responsibilities is the safety of demonstration audiences. There can be no aspect of any team member's life style or daily conduct that would in any way impair the team's performance or jeopardize public safety. Each member must be at the peak of physical and mental capabilities for all demonstration team activities. In addition, given the continuous rigor of the demonstration team schedule, each member must be able to sustain this mental and physical capability level over an extended period of time. The key to this sustained performance is the establishment of a personal daily regimen to include regular eating, hydration, adequate sleeping, and proper exercise habits, which will minimize the adverse effects of continuous travel, cultural/dietary differences, and time zone changes.

1.4.7.7.1. In view of the special obligations incumbent whether performing in the air or providing ground support, each member of the team, will adhere to the following policies:

In no case will the provisions of AFI 11-401, *Flight Management*, concerning the consumption of alcoholic beverages be violated.

Additionally, alcoholic beverages will not be consumed later than 12 hours prior to reporting for duty when aerobatic maneuvers are scheduled for the following day.

For cross-country flights not involving aerobatic maneuvers, the provisions of AFI 11-401 apply.

Although the provisions of this policy do not quantify the maximum amount of alcohol permitted to be consumed, the intent, in concert with a daily regimen and peak daily mental and physical capability, mandates the highest individual responsibility and moderation with the fullest recognition of the next day's duties and obligations.

1.4.7.7.2. Lifestyle and daily activities, on and off duty, will be governed by the need to minimize personal risk and totally avoid any display of reckless behavior. Activities that could result in personal injury or jeopardize availability for team activities are inappropriate for team members. Although each demonstration team activity deserves special attention, those involving demanding flight operations unique to the air demonstration mission, specifically aerobatic maneuvers, whether for practice or official demonstration, are the most critical.

#### 1.4.8. **Demonstration team ground safety observers:**

1.4.8.1. Complete safety observer training and documentation per **paragraph 2.5.**

1.4.8.2. Monitor all practices and demonstrations with maneuvers conducted below 2,000 feet AGL.

1.4.8.3. Maintain two-way radio communication with the demonstration pilot, monitor demonstration pilot altitude and airspeed radio calls, and direct maneuver abort if outside prescribed parameters.

1.4.8.4. Monitor the demonstration for potential hazards (e.g., flocks of birds, unscheduled aircraft, weather).

1.4.8.5. Critique each maneuver and note needed improvements in the performance. However, in no case should critiquing maneuvers take precedence over monitoring the safe accomplishment of maneuvers.

1.4.8.6. Review the HUD tape of every practice and demonstration.

### 1.5. **Requests and Approval.**

1.5.1. CONUS (including Alaska and Hawaii) civilian locations requesting an aerial demonstration must submit the appropriate request to the Office of the Secretary of Air Force for Public Affairs (SAF/PA). SAF/PA notifies applicable MAJCOM of events that are eligible for consideration. In the PACOM AOR, civilian locations requesting an aerial demonstration must submit the appropriate request to the Office of Assistant Secretary of Defense for Public Affairs (OATSD/PA). OATSD/PA notifies PACAF of events that are eligible for consideration.

1.5.2. Air Force units may submit a request directly to HQ ACC/DOOA or other MAJCOM teams for consideration.

1.5.3. Requests from other services should be submitted, through command channels, to HQ ACC/DOO or other appropriate MAJCOM office in accordance with applicable directives.

### 1.6. **Scheduling and Policies.** Per MAJCOM supplement to this instruction

**1.7. Support Manual.** Detailed information on show site preshow coordination requirements is contained in the MAJCOM Single-Ship Demonstration Team Support Manual. This manual is reviewed annually and is sent to all aerial event coordinators hosting a single-ship demonstration by the supporting

demonstration team via their website, normal mail, or fax. HQ ACC/DOOA will also provide an Internet link to the individual demonstration team websites via the HQ ACC/DOOA website (<http://www2.acc.af.mil/airdemo>).

**1.8. Arresting Gear Support.** Show sites without arresting gear and with runways less than 8,000 feet (F-15) / 10,000 feet (F-16) must provide temporary arresting gear if:

1.8.1. **F-15.** An airfield with suitable arresting gear is not within 80 NM of the staged location.

1.8.2. **F-16.** The show site runway is less than 7,000 feet or an airfield with suitable arresting gear or runway length greater than 10,000 feet is not within 80 NM of the staged location.

### **1.9. Reporting.**

1.9.1. The pilot, narrator, ground safety observer or NCOIC will transmit via phone, fax, or email a post-demonstration report to the MAJCOM Aerial Events office after each day's scheduled demonstration. RCS: HAF-XOO(AR)0212, continue reporting during emergency conditions, delayed precedence. Submit data requirements as prescribe, but may be delayed to allow the submission of higher precedence reports. As a minimum, include:

Weather (if a factor)

Show profile

Estimated crowd count

Unusual occurrences/remarks

Any report with an unusual occurrence or area with an unsat from **Attachment 2** requires an immediate detailed e-mail/fax.

1.9.2. Submit End of Show Summaries and Critiques to MAJCOM Aerial Events NLT 2 work days after each show IAW the format at **Attachment 2**.

### **1.10. Recommended Changes.**

1.10.1. Recommendations for changes to this instruction should be submitted through appropriate MAJCOM channels to HQ ACC/DOO for final approval by COMACC.

1.10.2. Each demonstration team may supplement this instruction as necessary. Team organization, maintenance support, selection criteria, and training programs for new pilots are examples of items that may be supplemented. Submit supplements to HQ ACC/DOO for coordination prior to publication and forward one copy to HQ USAF/XOOO after publication.

### **1.11. Demonstration Performance Reviews / Grade Sheets.**

1.11.1. Every practice and demonstration will be recorded on the pilot's HUD tape. Every practice and demonstration involving aerobatics of any kind conducted below 2,000 feet AGL will be videotaped. Each demonstration will be debriefed using these videotapes. MAJCOM/CC or DO may request a videotape and HUD tape for review at any time during the air show season. Demonstration teams will maintain videotapes and HUD tapes for a minimum of one year. Demonstration pilots will use a Microsoft Excel grade sheet to evaluate each flight. Grade sheets will be provided by ACC/DOOA.

1.11.2. Each maneuver will be graded using a scale of 0 to 4 and averaged to compute an overall demonstration grade of 0 to 4. Wing reviewers must comment and make recommendations on any maneuver graded zero (0). A maneuver grade of 0 should not be automatically considered dangerous unless the manner in which the maneuver was performed created a safety of flight situation. However, if safety is compromised then the overall demonstration grade will be zero (0). Wing reviewers will recommend additional training for any overall demonstration graded zero (0). The average grade for a typical air show should be a two (2). The grade sheets will reflect altitude and airspeed to the greatest accuracy possible. The following grading criteria will be used to establish individual maneuver and overall demonstration grades.

1.11.2.1. To compute the maneuver grade, "X" equals the distance between the target and minimum altitudes. As an example, if the target altitude is 6,000 feet and the minimum altitude is 5,000 feet then "X" equals 1000 feet and  $1/2X$  equals 500 feet. Grade 0 would be given for all altitudes below 5,000 feet; Grade 1 for all altitudes from 5,000 to 5,499 feet; Grade 2 for all altitudes 5,500 to 5,999 feet and above 6,501 feet; Grade 3 for all altitudes from 6,001 to 6,500 feet; and Grade 4 if altitude equals 6,000 feet.

1.11.2.2. GRADE 0 -- Altitude below minimum, or airspeed out of limits

1.11.2.3. GRADE 1 -- Altitude  $>1/2X$  below target, and airspeed within limits

1.11.2.4. GRADE 2 -- Altitude  $\leq 1/2X$  below target or  $>1/2X$  above target, and airspeed within limits

1.11.2.5. GRADE 3 -- Altitude  $\leq 1/2X$  above target, and airspeed  $\pm 25$  knots of target

1.11.2.6. GRADE 4 -- Altitude on target, and airspeed  $\pm 10$  knots of target

1.11.2.7. Airspeed criteria do not apply to the A-10 unless airspeed is below minimum parameter; the maneuver grade is zero.

1.11.2.8. OVERALL GRADE = Computed average of the maneuver scores.

0 = Dangerous performance

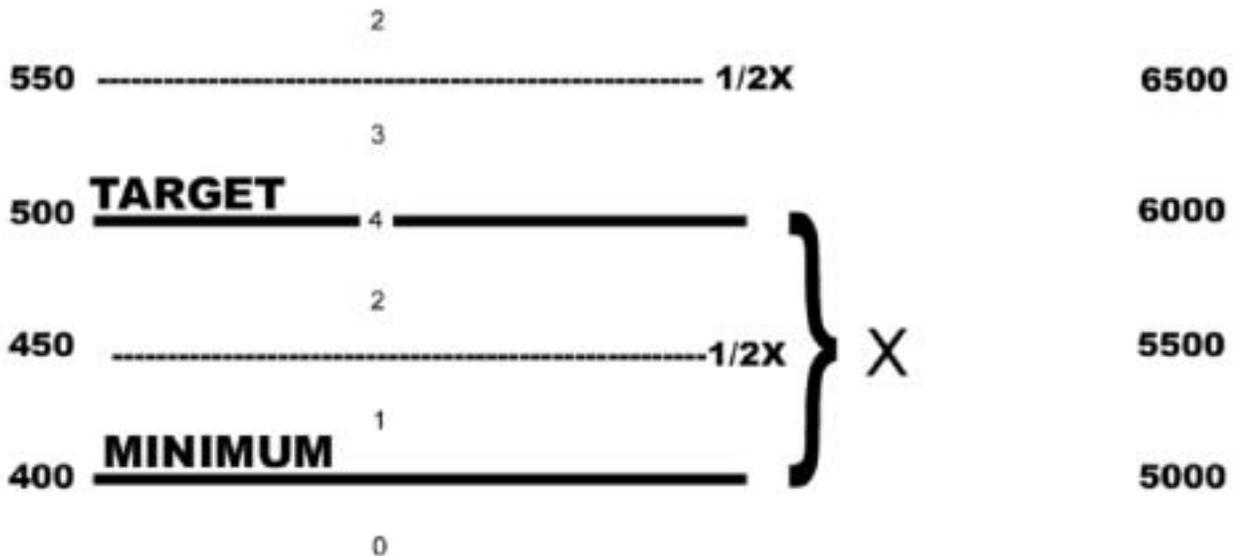
1 = Safe performance, but trend is low

2 = Average performance

3 = Outstanding performance

4 = Perfect performance; no deviations

Figure 1.1. Grading Ranges.



**1.12. Proficiency Requirements.** To maintain currency, each pilot will fly a minimum of one demonstration every 15-calendar days. A practice session or actual demonstration will be scheduled at least once per week during air show season. If the 15 calendar days currency is exceeded, the next demonstration will be limited to no-lower-than 1000 feet AGL target and 900 feet AGL minimum on all maneuvers, and the operations group commander, deputy operations group commander, or WG/CC designee must be present. MAJCOMs may determine additional procedures for pilots to regain currency.

**1.13. Termination Procedures.** Demonstrations involving aerobatics flown below 2,000 feet AGL will be terminated when:

- 1.13.1. The safety observer is unable to monitor the safe performance of maneuvers.
- 1.13.2. Two-way radio communication is lost between the demonstration pilot and safety observer.
- 1.13.3. Videotaping is lost.
- 1.13.4. Any time when in the judgment of the pilot or safety observer the safety of the pilot or spectators is compromised.

**1.14. Transition During Performance.** Each demonstration should be planned to fly a complete high or low show profile. However, conditions such as scattered clouds in the show area may require the demonstration pilot to transition between the high and low show profiles at certain transition points.

**1.15. Altimeter Procedures.** It is essential that each demonstration pilot be able to quickly and accurately assess actual altitude above the ground during any maneuver in the demonstration. To avoid the mental exercise required to subtract an odd-numbered field elevation from the MSL altimeter reading to get above ground altitude, one of the two procedures described below will be used to "zero the altimeters" (QFE). These procedures will be used for all practice and actual demonstrations whether flown from takeoff at the show site or takeoff from a deployed location.

1.15.1. **Zero Altimeter Method.** Dial aircraft altimeter until indicator reads "0."

1.15.2. **Nearest 1,000 Feet Method.** The ground safety observer is responsible for obtaining the current altimeter setting for the field elevation and the altimeter setting to zero the altimeter to the nearest 1,000 feet setting. Dial the altimeter to the most appropriate 1,000 feet corrected field elevation (500 round down, 501 round up).

**1.16. Use of Teams for Static Display.** The demonstration pilot and narrator/ground safety observer should normally arrive in two aircraft with one to be used as a spare for the demonstration. MAJCOMs may determine if second aircraft can be used as static if spare is not required.

**1.17. Disbursement of Demonstration Team Funds.** Per MAJCOM supplement.

## Chapter 2

### DEMONSTRATION TEAM PERSONNEL SELECTION AND TRAINING

**2.1. General.** MAJCOMs will provide team description and location via supplement. A standard team includes two aircraft, one demonstration pilot, a minimum of two narrators, and necessary support personnel. Team will deploy with a ground safety observer. Ground safety observers will not simultaneously perform narration duties. Team selection should consider factors affecting assignment stability such as vulnerability for schools or overseas assignment.

**2.2. Demonstration Pilot Selection.** New demonstration pilots will normally be selected by Wing Commanders in August and enter training no later than September prior to the new pilot's first air show season. Demonstration pilot duty is normally a two-year assignment.

#### **2.3. Narrator/Ground Safety Observer Selection.**

2.3.1. Narrator. The normal narrator tour of duty is one year. NCOs may perform narration duties.

2.3.2. Ground safety observers must be rated officers current and qualified in the MDS. Ground safety observers will not have specified tours of duty. Teams may have multiple ground safety observers, however the total number should be limited to a minimum (3 max recommended) to ensure sufficient currency for each one. Squadron operations officers or higher do not require prior approval to perform ground safety observer duties.

**2.4. Support Personnel Selection.** As new enlisted personnel are assigned to the demonstration teams, it is definitely appropriate to request assignment deferments. However, since AFPC's support/approval of the deferments is directly linked to overseas assignment vulnerability, it is strongly recommended that prospective local candidates be verified by the MAJCOM Airman Assignments Branch before they are firmly hired. A cursory check with AFPC can prevent the WG/CC from hiring people for the team who are extremely vulnerable for PCS.

**2.5. Training.** Training will be accomplished according to the guidelines of this instruction and as supplemented.

2.5.1. The Wing commander may alter the training sequence and individual sorties, as necessary, to ensure proficiency and progress. Additional training sorties (TS) may be added as required.

2.5.2. Maneuvers and maneuver sequences will be performed as described in this AFI. New demonstration pilots will demonstrate proficiency in the high and low show profiles.

2.5.3. New demonstration pilots will receive flight training from a currently qualified demonstration pilot. Each new demonstration pilot will receive extensive ground training from his or her predecessor or a currently qualified demonstration pilot.

2.5.4. New demonstration pilots will receive training in aircraft flight control limitations and performance characteristics affecting the demonstration profile. New demonstration pilots will receive training on common conditions leading to aborts for each maneuver. F-16 demonstration pilots will receive training on the flight control system, FLCs limiters and their effect on level flight, and sustaining inverted level flight at <165 KCAS.

2.5.5. New demonstration pilots and ground safety observers will receive academic and flight training for abort procedures. Demonstration pilots will conduct a minimum of one abort procedure during monthly recurrent practice demonstrations.

2.5.6. New demonstration pilots who will fly off-station demonstrations will attend a minimum of two air shows with the current demonstration pilot. If possible, the new pilot will fly with the current demonstration pilot in each air show practice demonstration (N/A for A-10).

2.5.7. A-10 will use a chase aircraft for TS-3 and TS-4. A-10 may use a chase aircraft for missions TS-5 through TS-11, or the instructor may observe from the ground with wing commander approval. The minimum altitude for chase aircraft is 1,500 feet AGL.

2.5.8. All training will be accomplished in VMC. Each practice, except TS-3 and TS-4, will be over a runway environment.

2.5.9. All training flights will be videotaped. Demonstration team film crews will be thoroughly trained. Training should emphasize equipment operation, sound techniques to capture demonstration narration, and techniques to capture the ground environment in the field of view during low altitude maneuvers.

2.5.10. Training performance will be documented in an official grade book and progress monitored by the wing commander. All training flights will be reviewed by the senior leadership IAW **paragraph 1.4.5.9**.

2.5.11. Final wing commander review, pre/re-certification of the demonstration pilot, ground safety observer, and certification of narrator(s) will be documented by the wing commander IAW **Attachment 6** and forwarded to MAJCOM/CC. First-year pilots who will fly demonstrations off-station must accomplish at least one practice flight off home station prior to MAJCOM/CC certification.

2.5.12. Stage 1 / Stage 2 Altitude Step-down Process:

2.5.12.1. Definitions: Stage 1: All maneuvers will be flown no lower than a target altitude of 500 feet with a minimum altitude of 400 feet (the F-16 Slow Speed Pass and the A-10 Gear Down Pass will use a minimum altitude of 450 feet). Stage 2: All maneuvers will be flown no lower than the target and minimum altitudes described in this AFI.

2.5.12.2. Upgrading pilots who will fly demonstrations off-station are required to practice at a minimum of three separate off-station sites at Stage 1 (higher) altitudes prior to the first official public demonstration. The intent of this requirement is for all upgrading pilots to gain experience at a minimum of three separate sites in a training environment before stepping down to Stage 2 (lower) altitudes off-station in an actual airshow environment. This requirement only affects off-station practices. All home station practices will adhere to the normal altitude step-down procedures set forth in the training syllabus. At overseas locations where this requirement is impractical, all practice demonstrations may be conducted at home station. However, every attempt will be made to satisfy the off-site training requirement before reverting to home field practices only to satisfy syllabus requirements.

2.5.12.3. These off-station practices require former demonstration pilot observation and/or supervisor observation (no less than OG/CD or WG/CC designee).

2.5.12.4. All tapes/grade sheets for off-station practices require former demonstration pilot and OG/CC or WG/CC designee review.

2.5.12.5. NAF / MAJCOM/CC certifications may be used for partial fulfillment of this requirement.

2.5.12.6. After the three off-station events are accomplished and with OG/CC concurrence, the upgrading pilot will perform a practice demonstration over home station at Stage 2 altitudes with OG/CC or WG/CC designee observation. The OG/CC may then certify the upgrading pilot to perform at Stage 2 altitudes for the remainder of the demonstration tour. This certification must be documented in the upgrading pilot's grade book.

## **2.6. Training Syllabus.**

### 2.6.1. GT-1 (Ground Training):

Standard Procedures

Fuel Requirements

Waivers

Aircraft Handling Characteristics

Safety Considerations

G-Awareness

Lessons Learned

Emergency/Abort Procedures

Team Management

Scheduling

### 2.6.2. GS-1 (Ground Simulator Training)

Crosschecking parameters during Maneuver Description

Abort Procedures

Abort Mechanics

High-speed Dive Recoveries

Slow-speed Maneuvering

Recognition and Prevention of Out-of-Control Situations

Emergency Procedures

### 2.6.3. TS-1 (Back seat of a two-seat model; N/A for A-10):

Standard ACC Demonstration Profile – High show

Minimum Run/Wet Runway Landing

### 2.6.4. TS-2 (Back seat of a two-seat model; N/A for A-10)

Standard ACC Demonstration Profile – Low show

### 2.6.5. TS-3 (Front seat of a two-seat model model; N/A for A-10):

Standard ACC Demonstration Profile – High show

Accomplish above 5,000 feet AGL

Emergency/Maneuver Abort Procedures

2.6.6. TS-4 (Front seat of a two seat model; N/A for A-10):

Standard ACC Demonstration Profile – Low show

Accomplish above 5,000 feet AGL

Emergency/Maneuver Abort Procedures

2.6.7. TS-5 through TS-11 (Front seat of a two-seat model model; N/A for A-10):

Standard ACC Demonstration Profile (must accomplish one low show practice)

Accomplished over a runway, initial minimum altitude is 2,000 feet AGL

Step down from 2,000 feet AGL determined by currently qualified demonstration pilot monitoring the training program

Minimum run/wet runway landing

2.6.8. TS-12 through TS-16 (Solo)

2.6.9. TS-17 (Solo)

## Chapter 3

### A-10 DEMONSTRATION MANEUVERS

#### *Section 3A—General Guidelines*

**3.1. General.** Maneuvers described in this chapter will be used for training and for A-10 aerial demonstrations. The demonstration sequence is designed so each maneuver is normally performed in the same direction with respect to the crowd line. As a result, the show is always oriented the same way from the spectators' point of view. The only exception to this is when wind direction and velocity make it advantageous to change the direction of the slow speed pass. In this case, the remaining maneuvers are flown in the opposite direction. Abnormal Procedures are written for each maneuver. If the entry conditions are not met for any maneuver, a wings-level pass will be flown and the pilot will transition to the next maneuver. Demonstration pilots will transmit parameters prior to initiating the descending portion of vertical pull-throughs and Vertical Reposition maneuvers. These calls will be made anytime between the point the pilot climbs through the minimum over-the-top (OTT) altitude designated in each maneuver description up to the point the pilot reaches apex altitude. Ground safety observer will monitor demonstration pilot altitude and airspeed radio calls and direct an abort when parameter limits are exceeded.

**3.2. Aircraft C onfiguration and Fuel Requirements.** Aircraft configuration for all demonstrations will be clean. Each demonstration uses approximately 1,000 pounds of fuel. Optimum performance is obtained when fuel load is 3,500 pounds; however, the demonstration can be safely accomplished with a higher fuel load as long as the wing tanks are empty. The minimum fuel to start the show is 2,500 pounds.

**3.3. Airspeed and G-Limits.** The A-10 demonstration is flown at max power except when slowing to configure for the slow speed pass or slowing to configure for the minimum run landing. The maximum Target G for this demonstration profile is 6.0 Gs. This does not preclude a momentary increase in G for safety considerations.

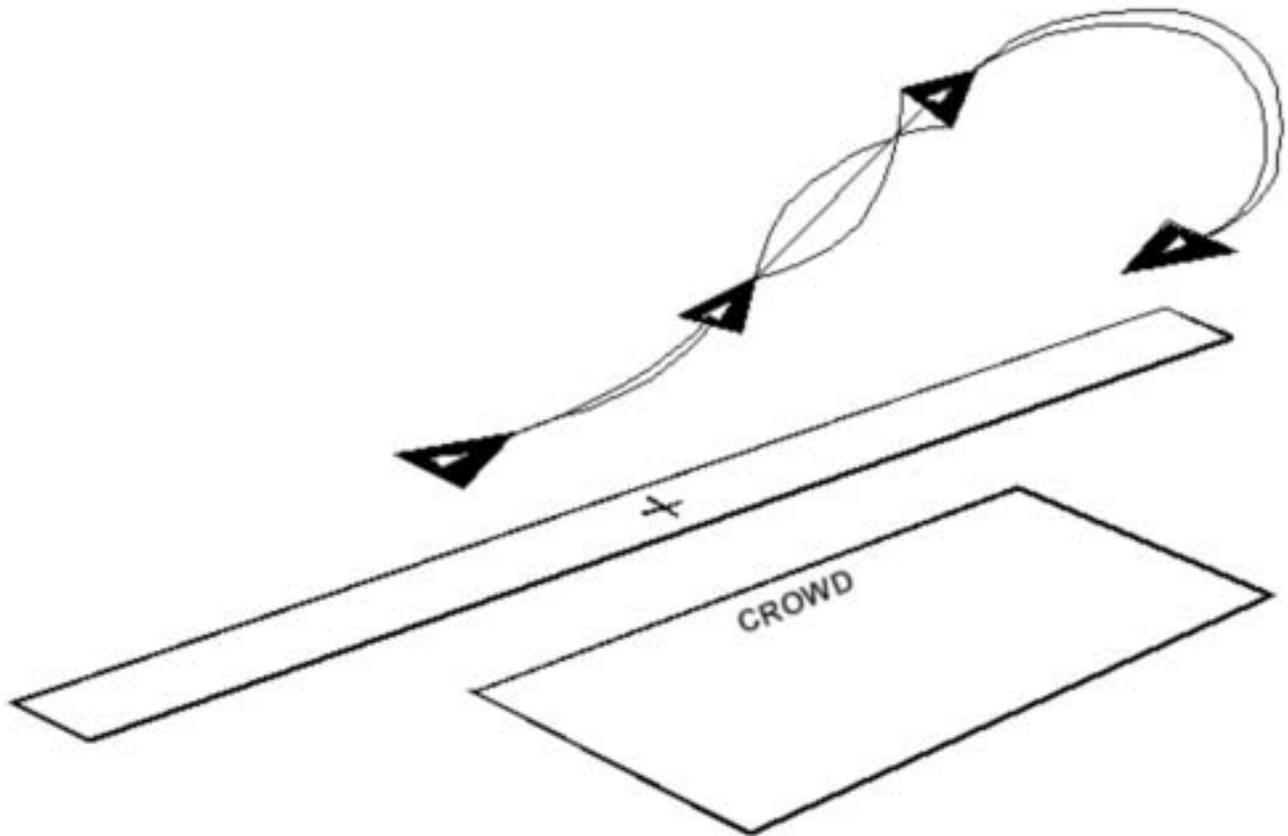
**3.4. Show line Restrictions.** The majority of the A-10 demonstration will be flown on the 1,500-foot show line in reference to the distance from the crowd. Non-aerobatic maneuvers (less than 90 degrees of bank) may be flown on the 500-foot show line.

**3.5. Airspace and Runway Requirements.** Required airspace for the A-10 is 7,000 feet AGL vertically and normally a five-mile radius from show center horizontally. The minimum dimensions of the aerobatic box are 2,700 feet wide, 4,000 feet long, and 7,000 feet AGL (high show). Minimum runway length is 5,000 feet x 75 feet. The runway, taxiway, and parking area must be stressed for a 35,000-pound aircraft with single wheel type landing gear.

**3.6. Weather Requirements.** Weather PARAMETER LIMITS for the high profile are a ceiling of at least 4,000 feet, 3 miles ground and 5 miles in-flight visibility with a discernible horizon. Ceiling required for the low profile is 2,500 feet. Maneuvers will be planned to maintain VMC throughout the show sequence.

**3.7. Repositioning Turn.**

Figure 3.1. A-10 Repositioning Turn.



# Repositioning Turn A-10

**Table 3.1. A-10 Repositioning Turn Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	300'	300		MAX	5-6
Exit	300'	N/A		N/A	N/A

PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry <b>min</b>	200'	120	N/A	MAX	7.33
Exit <b>min</b>	200'	N/A	N/A	N/A	N/A

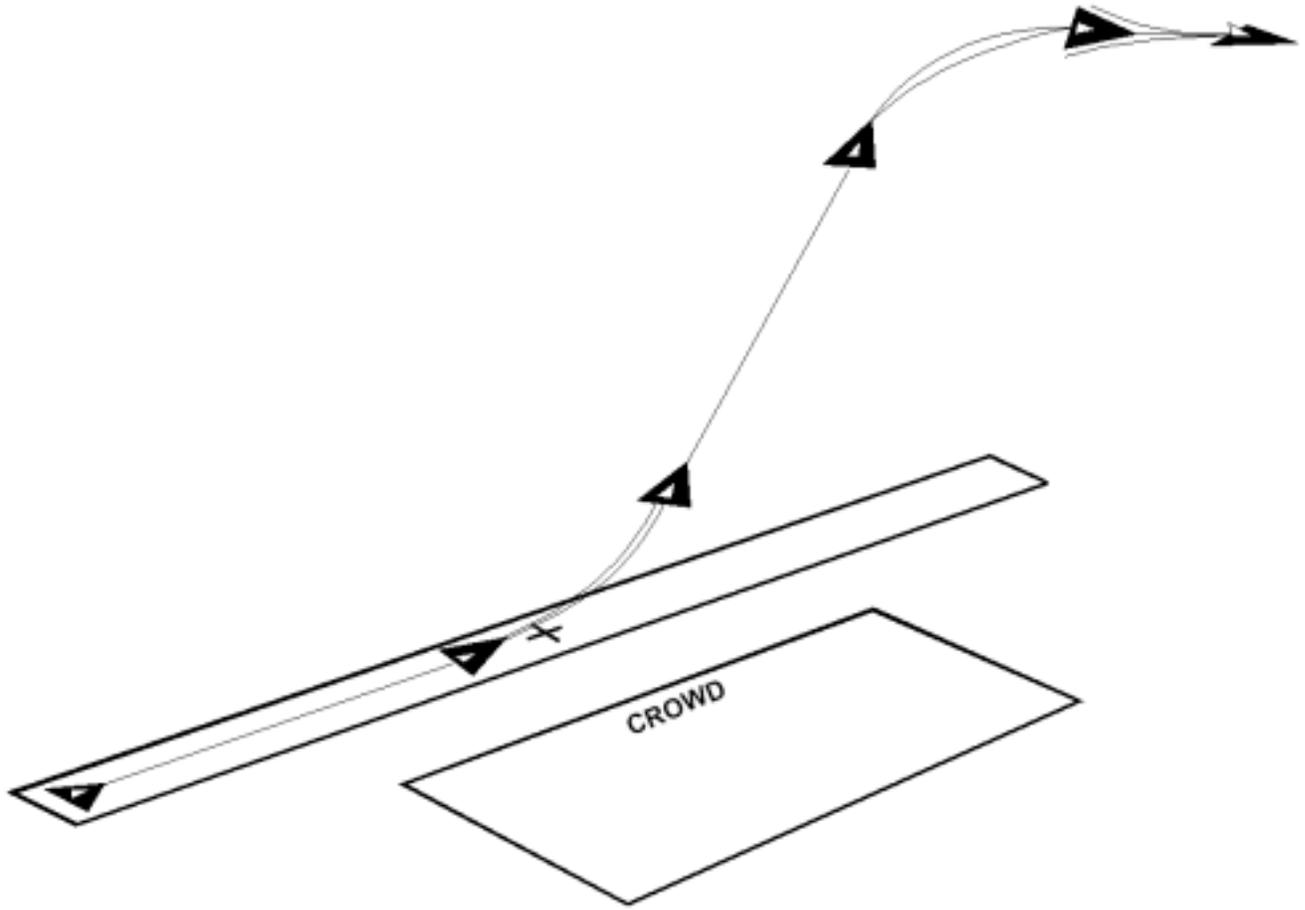
3.7.1. **Maneuver Description** . The Repositioning Turn uses both horizontal and vertical turning room to change direction at each end of the show line. The vertical plane is used to maintain necessary proximity to the demonstration area. Each turn may differ slightly in order to meet entry TARGET PARAMETERS for the next maneuver and attain the proper show line alignment. To begin the maneuver, turn 15 to 45 degrees away from the crowd (depending on environmental conditions), roll-out, and pull to 45 degrees nose high, and then unload. At 1,000 feet minimum, execute a 270-degree aileron roll opposite the show line. Visually acquire the show line and make a descending turn to meet the entry TARGET PARAMETERS for the next maneuver.

3.7.2. **Abnormal Procedure:** If at any time the minimum altitude, airspeed, or climb angles, cannot be achieved or maintained, roll the aircraft to the nearest horizon and recover to wings level flight.

### *Section 3B—High/Low Profile*

### **3.8. Takeoff.**

Figure 3.2. A-10 Takeoff.



**Takeoff  
A-10**

**Table 3.2. A-10 Takeoff Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 30'	200	MAX	3-4
Exit N/A	N/A	N/A	N/A

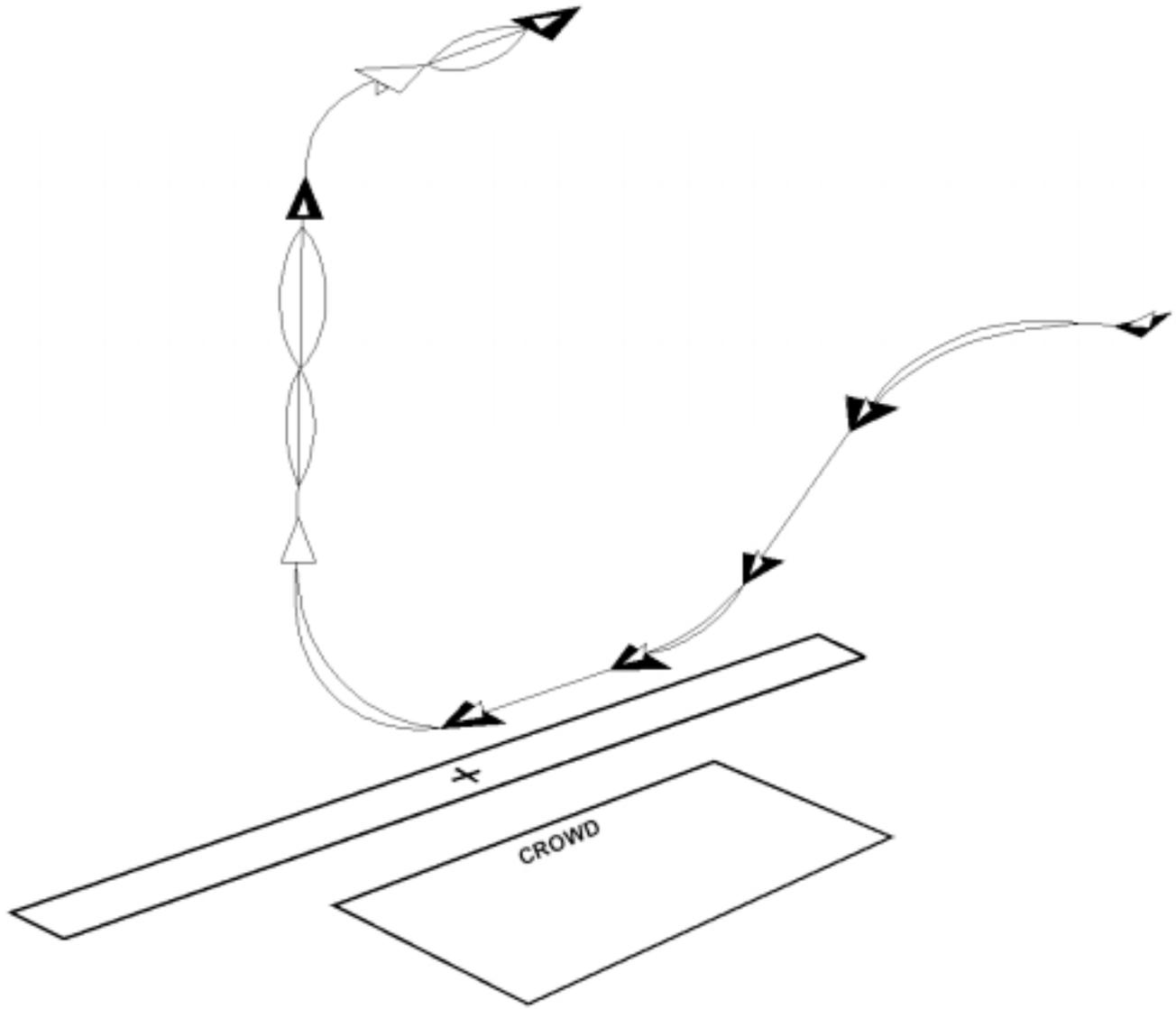
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry 20'	175	N/A	MAX	7.33
Exit N/A	N/A	N/A	N/A	N/A

3.8.1. **Maneuver Description.** Accomplish a normal takeoff with 7-degree flaps. The rotation airspeed is 120 knots and should be accomplished using a smooth, continuous pull to obtain the normal takeoff attitude. Raise the gear with a positive rate of climb and retract the flaps once the gear is up and the gear horn is out. After gear and flap retraction, level off at 30 feet and accelerate to a minimum of 175 knots. At show center with a minimum of 175 knots, pull up 30 to 45 degrees nose high using 3.0 to 4.0 Gs or the steady stall warning tone, and proceed to the designated holding airspace.

3.8.2. **Abnormal Procedures .** Use caution when taking off from short runways, runways at high density altitudes, or wet runways. TOLD data is critical and must be computed very carefully at each show site. Do not fly if refusal speed is less than continuation speed. During the climb out, if the aircraft stalls or the airspeed falls below 110 knots (whichever occurs first) unload and accelerate to break the stall and/or increase airspeed to a minimum of 110 knots. A climb to the holding airspace can then be continued.

### 3.9. Show Entry.

Figure 3.3. A-10 Show Entry.



**Show Entry  
A-10**

**Table 3.3. A-10 Show Entry Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	400	MAX	5 to 6
Exit $\geq 4,500'$	120	MAX	1

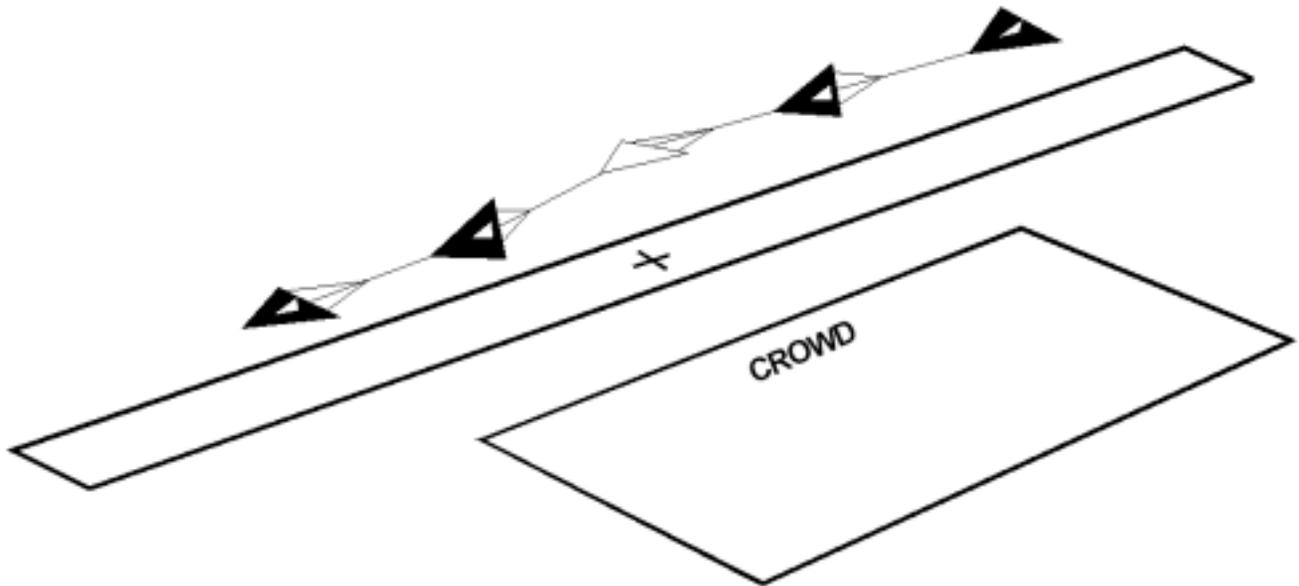
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry 200'	350	AC LMT	MAX	7.33
Exit 3,500'	110	AC LMT	MAX	N/A

3.9.1. **Maneuver Description.** The intent here is to sneak up on the crowd. Enter the show from the crowd's right and attain 400 knots and 300 feet AGL. Once established on the 1,500-foot show line and abeam show center, pull up to 90 degrees nose high using 5.0 to 6.0 Gs, unload, and execute a 720-degree roll. Once the roll is complete, pull the aircraft gently over onto its back and roll upright. Altitude must be at least 3,500 feet AGL. Minimum airspeed during this maneuver is 110 knots. Drive straight ahead and attain airspeed of at least 200 knots before repositioning for the Four-Point Roll.

3.9.2. **Abnormal Procedure:** If at anytime during the maneuver it appears the maneuver will not attain the prescribed altitude or airspeed over the top, the maneuver will be aborted by performing an unloaded roll to a wings-level position.

**3.10. Four-Point Roll (Right to Left).**

Figure 3.4. A-10 Four-Point Roll.



**Four - Point Roll  
A-10**

**Table 3.4. A-10 Four-Point Roll Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	350	MAX	+1 to -1
Exit 500'	350	MAX	1

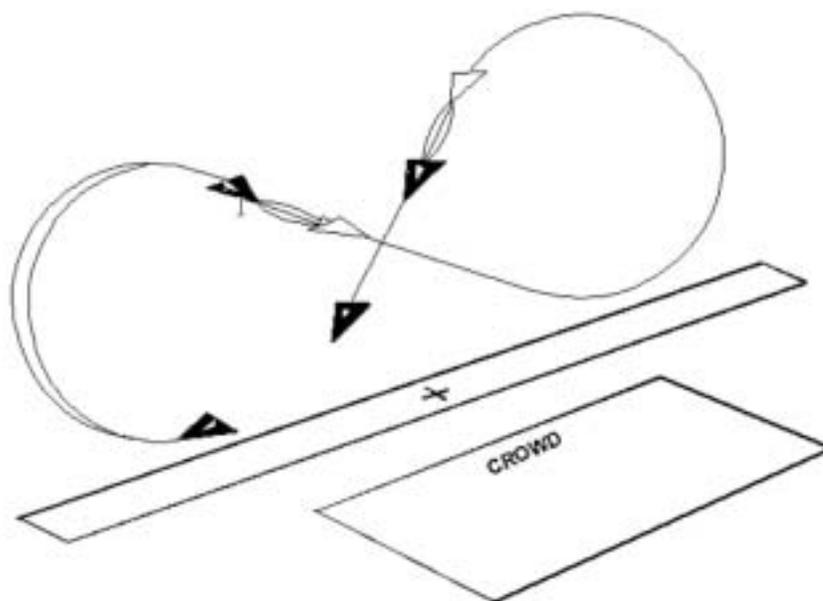
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	290	AC LMT	MAX	N/A
Exit <b>min</b> 400'	290	AC LMT	MAX	N/A

3.10.1. **Maneuver Description** . Entry to the Four-Point roll can either be initiated using a Split S or Sliceback maneuver from the perch point achieved from the Show entry maneuver. A pull up of 5.0 to 6.0 Gs is initiated from either maneuver at 1,200 feet AGL to arrive on the 1,500-foot show line at 500 feet AGL and 350 knots. 2,000 feet prior to show center, pull the nose 3 to 5 degrees nose high, establish a climb, and unload. A cadence four-point roll to the left is then performed by pausing momentarily at the 90-degree, 180-degree, 270-degree, and 360-degree points. The pace of the cadence should ensure the aircraft is at the 180-degree point over show center. In order to facilitate sharp transitions between each 90 degrees of roll, momentarily ifan the speed brakes and unload the aircraft to 0 Gs at the initiation of each roll. Be sure to close the speed brakes upon completion of the roll to avoid any unnecessary loss of airspeed. The 90-degree and 270-degree points require top rudder to maintain level flight and zero G to maintain the show line. The 180-degree point requires 1 negative G in order to maintain level flight. This is accomplished using the horizon, not the G meter. At the completion of the Four-Point Roll, begin the Cuban 8 (high show) or 360-degree level turn (low show).

3.10.2. **Abnormal Procedures:** If at anytime during the Four-Point Roll, the nose falls more than five degrees below the horizon, abort by rolling towards the nearest horizon and a wings-level position, then continue down the show line. This would most likely occur during the 3<sup>rd</sup> point (270 degrees) due to a decrease in airspeed, which results in less rudder effectiveness.

### 3.11. Cuban 8 (Right to Left--High Profile Only).

Figure 3.5. A-10 Cuban Eight.



**Cuban Eight**  
**A-10**

**Table 3.5. A-10 Cuban Eight Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	350	MAX	6
OTT $\geq 3,500'$	150	MAX	2-4
Exit 500'	300	MAX	6

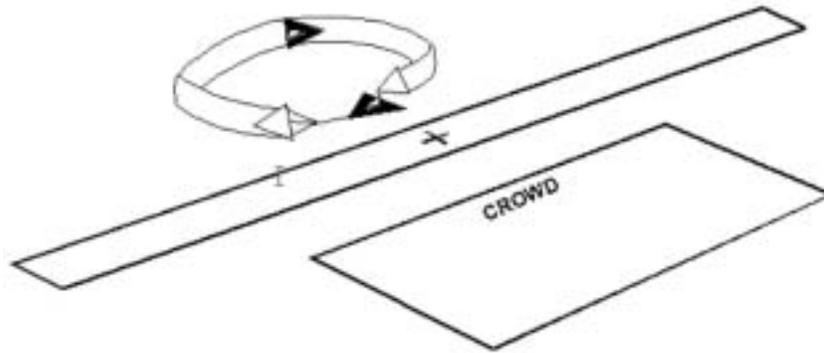
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	300	AC LMT	MAX	7.33
OTT <b>min</b> 3,000'	120	AC LMT	MAX	N/A
Exit <b>min</b> 400'	275	AC LMT	MAX	7.33

3.11.1. **Maneuver Description.** Following the Four-Point Roll, when wings level and 500 feet AGL attain sufficient airspeed (330 minimum) and begin a smooth wings-level 6.0 G pull not to exceed the steady stall warning tone. Minimum apex altitude is 3,000 feet AGL with a minimum of 120 knots. Continue the pull until the aircraft is 45 degrees nose low inverted (55 degrees maximum). Due to winds, it may be necessary to use more or less than 45 degrees nose low in order to maintain show center orientation. The typical range is between 30 to 55 degrees nose low. Do not exceed 55 degrees nose low. At 2,500 feet AGL, roll upright while maintaining 45 degrees nose low. At 1,200 feet AGL, begin a 6.0 G pull to level flight at 500 feet AGL. Normal apex altitude is 3,500 to 5,000 feet AGL depending upon environmental conditions. The second half is completed in the opposite direction.

3.11.2. **Abnormal Procedures:** If at anytime during the maneuver it appears you will not attain the prescribed altitude or airspeed over the top, abort the maneuver by performing an unloaded roll to a wings-level position. Furthermore, if more than 45 degrees nose low inverted is required due to winds, add 100 feet for every degree steep to roll out and pull out altitudes. If more than 55 degrees nose low, roll out immediately and recover to level flight using a max performance pull (steady to chopped tone).

### 3.12. Level 360 (Right to Left).

Figure 3.6. A-10 Level 360



Level 360  
A-10

**Table 3.6. A-10 Level 360 Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	500'	350		MAX	6
Exit	500'	300		MAX	6

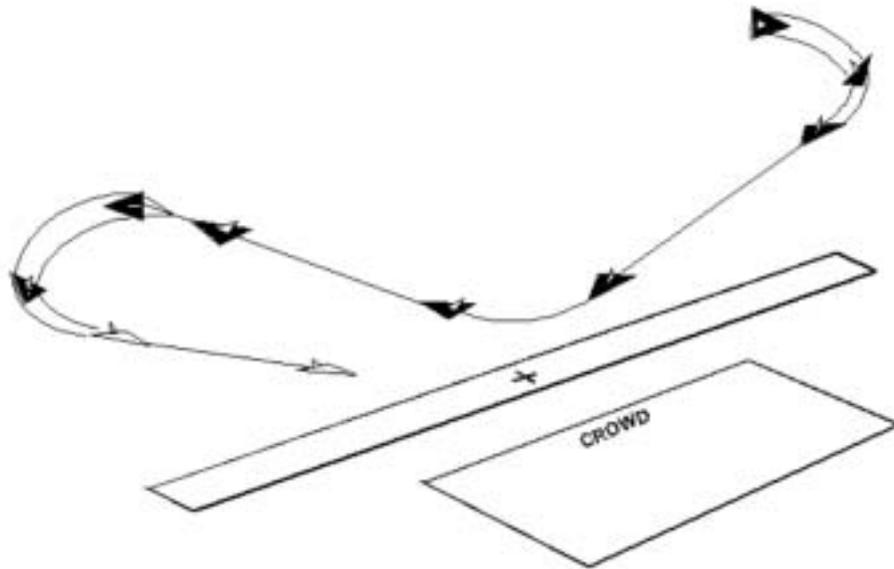
PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b> 400'	300	N/A	MAX	7.33
Exit	<b>min</b> 400'	240	N/A	MAX	7.33

3.12.1. **Maneuver Description** . After completing the Cuban 8 and approximately 1,500 feet past show center, turn away from the crowd using approximately 85 degrees of bank. Begin the turn with a smooth G onset rate to maintain 6.0 Gs or the steady stall warning horn whichever occurs first. G-loading and airspeed bleed-off rate will vary with density altitude. Maintain a minimum of 240 knots. The first 180 degrees of turn should be accomplished with a 1 ¾-degree nose-up attitude and the last 180 should be accomplished with a 1 ¾-degree nose-down attitude to make the turn appear level to the crowd. Vary the bank angle and pitch to arrive at level flight at the completion of 360 degrees of turn and to ensure the maneuver is finished above the entry altitude. Surface winds must be taken into consideration in order to center this maneuver and to avoid overshooting the show line. Continue the turn past 360 degrees as required (usually 30 to 45 additional degrees of turn depending on winds) in order to transition to the reposition maneuver used to set-up for the first low angle strafe pass.

3.12.2. **Abnormal Procedures** . If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. If during any portion of the maneuver it becomes apparent the aircraft will descend below 400 feet AGL or airspeed decay below 240 knots, abort the maneuver by rolling wings level and climbing to 500 feet AGL. If necessary, adjust G as required (no lower than 240 knots) to avoid overshooting the show line.

### 3.13. Three Low Angle Strafe Passes.

Figure 3.7. A-10 Three Low Angle Strafe Passes.



**Three Low Angle Strafe Passes  
A-10**

**Table 3.7. A-10 Three Low Angle Strafe Passes Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	2,000'	250		MAX	1
Exit	200'	300		MAX	6

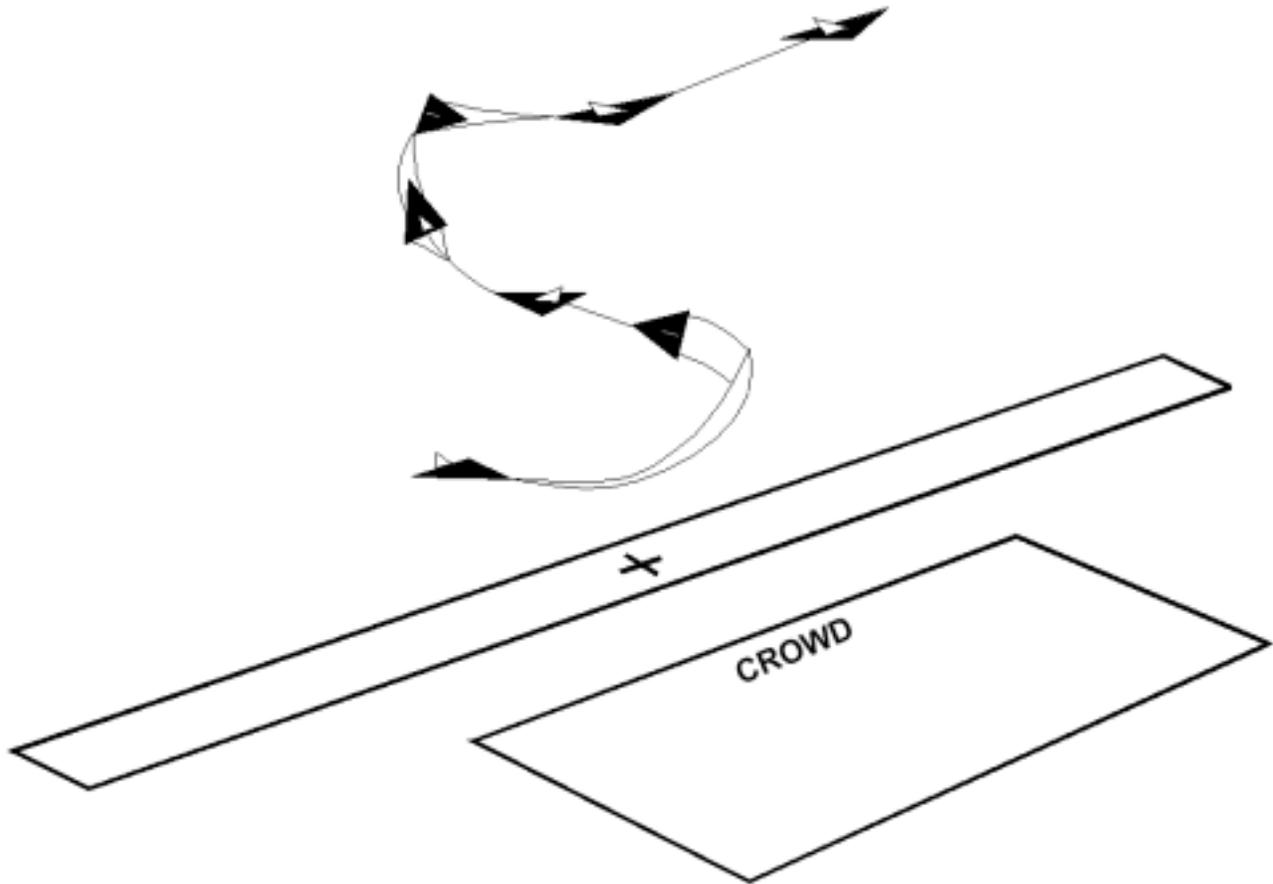
PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	1,000'	250	AC LMT	MAX	N/A
Exit	100'	250	AC LMT	MAX	7.33

3.13.1. **Maneuver Description** . After performing a reposition maneuver, align the aircraft to approach the preplanned strafe target/point from an appropriate angle. This angle will normally range from 10 – 30 degrees off the show line depending on the location of the crowd line and winds. Do not allow a vector towards the crowd! The aircraft vector, if extended to infinity, must not penetrate the crowd line. The dive angle will normally be 10 – 30 degrees nose low depending on winds. The optimum dive angle is 25 degrees. Do not exceed 30 degrees. Recovery should be initiated at 650 feet AGL using a max performance pull in order to bottom out at or above 200 feet AGL. Be very careful not to over-G the aircraft during this pull. In order to make this corner, a minimum of 250 knots must be obtained. After recovering to level flight, accomplish a reposition maneuver to set-up for the next strafe pass. Use the 500-foot show line at show center as a reference point for setting up each strafe pass. Do not cross the 500-foot show line. Depending on winds, this may require aiming 100 – 300 feet outside the 500-foot line away from the crowd. Following the last strafe pass, transition to the Jink-Out maneuver.

3.13.2. **Abnormal Procedures** . If at any time the dive angle exceeds 30 degrees, either abort the pass and fly through straight and level or shift the aim point longer and parallel to the show line until the dive angle is 30 degrees or less. Check airspeed at 1,000 feet AGL. If it is not at least 230 knots, abort the pass and fly through straight and level.

### 3.14. Jink-Out Maneuver.

Figure 3.8. A-10 Jink-Out.



# Jink-Out A-10

**Table 3.8. A-10 Jink-Out Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 200'	250	MAX	5 to 6
OTT $\geq$ 2,000'	150	MAX	4

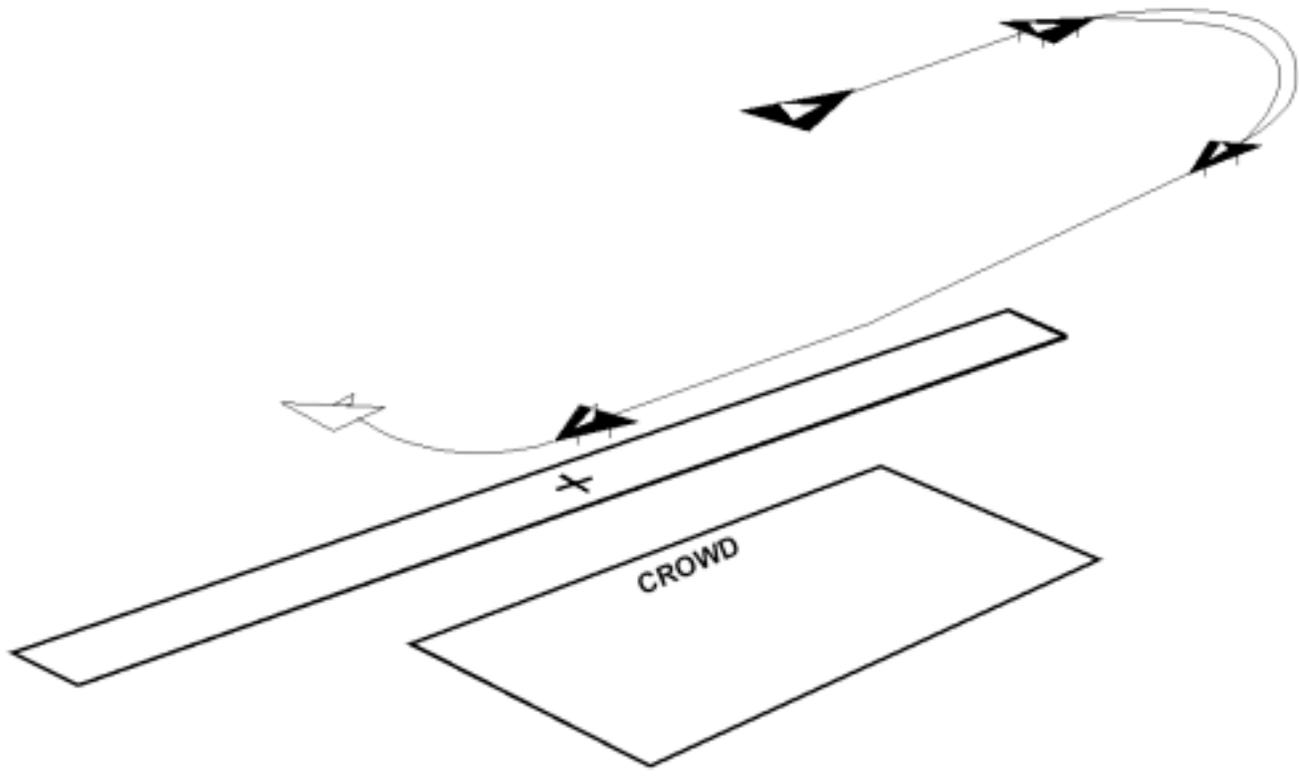
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry 100'	200	AC LMT	MAX	7.33
OTT 1,900'	130	AC LMT	MAX	N/A

3.14.1. **Maneuver Description** . Upon completion of the last strafe pass and level at the 200-foot target altitude, an 80 to 90-degree bank 5.0 to 6.0 G turn is initiated away from the crowd to complete a 100 to 135-degree turn to be at or beyond the 1,500-foot show line. At the completion of this 100 to 135-degree turn, pull 3.0 to 5.0 Gs up to 40 degrees (55 degrees maximum). Once pitch degree is achieved, maintain climb to 2,000 feet AGL, then roll inverted and pull to 30 degrees nose low (40 degrees maximum). Hold till 1,200 feet AGL, then roll to the nearest horizon and level off at 500 feet AGL. When level, commence a turn to the landing runway for the slow speed pass setup. The goal of this maneuver is to show the Jink-Out in front of show center and be at the 1,500-foot line. In order for this to occur, the 100 to 135 degrees of turn is accomplished at a target of 4.0 Gs.

3.14.2. **Abnormal Procedure:** If at any time during the maneuver any altitude or climb/dive angle will not be maintained, abort by rolling wings level and climbing away from the crowd line.

### 3.15. Gear-Down Pass (Flown into the wind).

Figure 3.9. A-10 Gear Down Pass.



**Gear Down Pass  
A-10**

**Table 3.9. A-10 Gear Down Pass Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	300'	120		A/R	1
Exit	300'	120		A/R	1

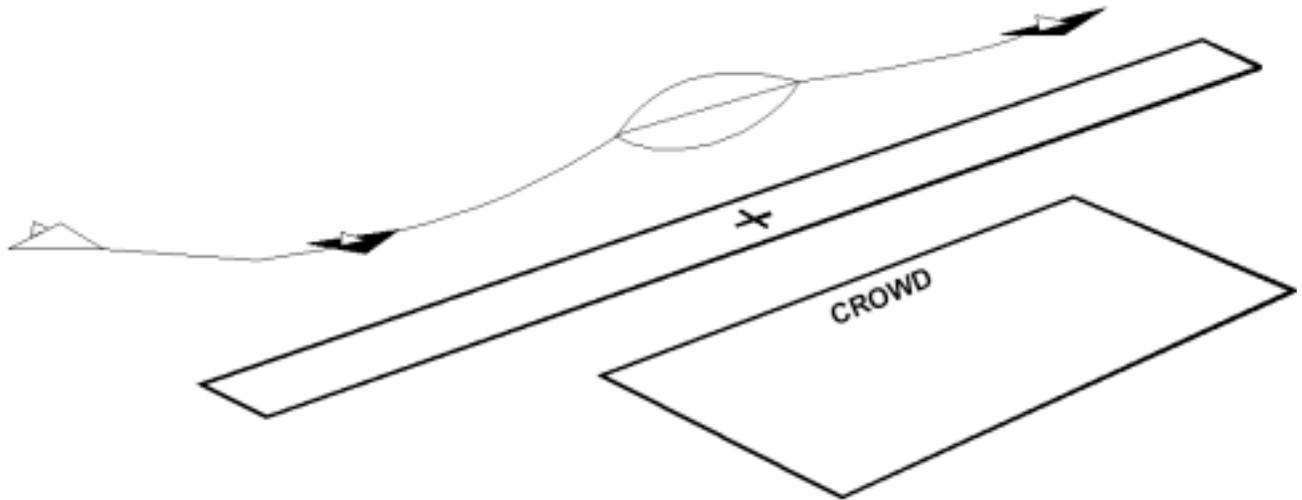
PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	200'	110	200	A/R	N/A
Exit	200'	110	200	A/R	N/A

3.15.1. **Maneuver Description.** After completion of the Jink-Out maneuver and level at 500 feet, initiate a turn toward the 500-foot show line and begin slowing the aircraft below 200 knots with full speed brakes. Upon reaching the base position for the 500-foot show line and below 200 knots, configure the aircraft with gear, full flaps, 40% speed brakes and begin a descent down to 300 feet AGL. Continue slowing the aircraft to 120 knots (110 knots minimum) while flying down the 500-foot show line. When passing the last of the crowd, select max power, close the speed brakes, and bring the flaps to seven degrees while smoothly raising the nose to a 25 to 35-degree climb. While climbing, turn 30 to 45 degrees away from the crowd using 30 degrees of bank (45 degrees maximum). During this climbing turn, raise the gear.

3.15.2. **Abnormal Procedures:** If the minimum altitude or airspeed cannot be maintained, or the aircraft stalls, abort the maneuver by selecting max power, closing the speed brakes, and setting the flaps to MVR. If still sinking, consider engaging the fuel flows to override.

### 3.16. Single Aileron Roll (Opposite direction of the Slow Speed Pass).

Figure 3.10. A-10 Single Aileron Roll.



# Single Aileron Roll A-10

**Table 3.10. A-10 Single Aileron Roll Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry $\geq 1,000'$	150	MAX	2-3
Exit 500'	330	MAX	1

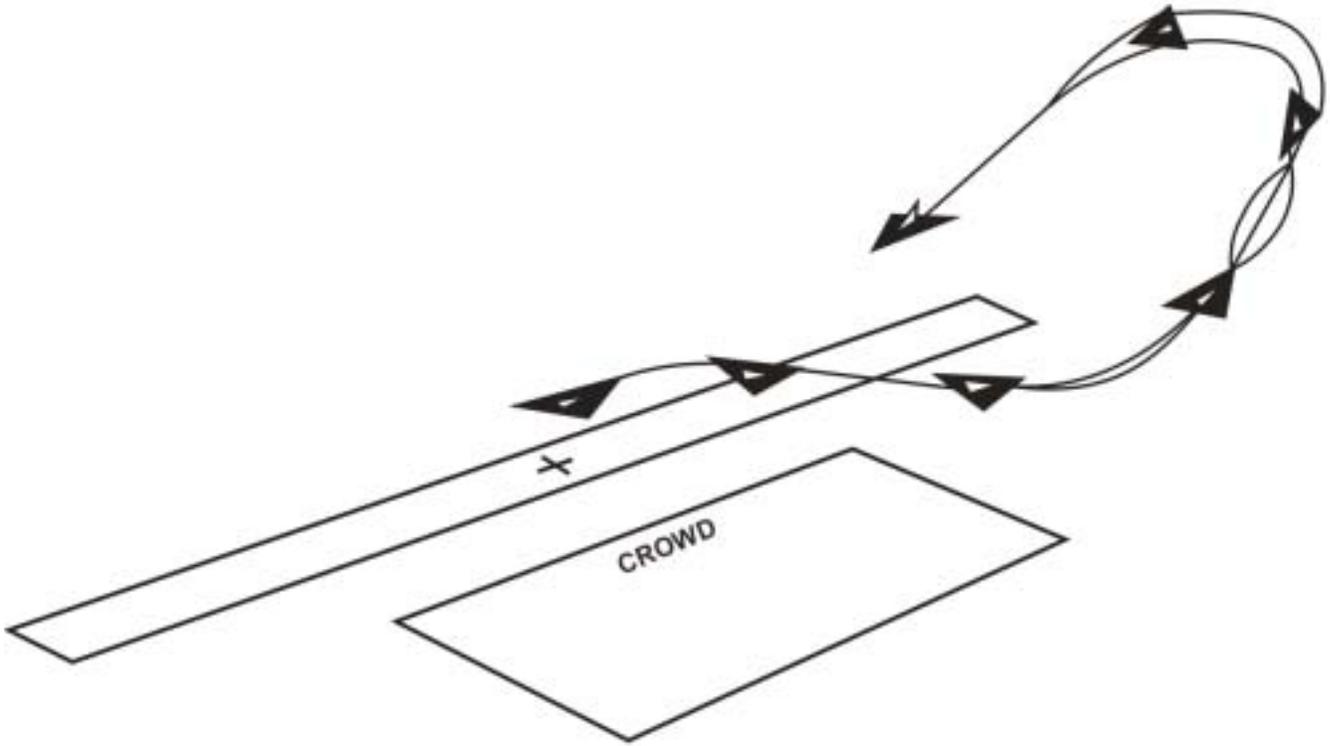
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 1,000'	120	N/A	MAX	N/A
Exit <b>min</b> 400'	290	N/A	MAX	N/A

3.16.1. **Maneuver Description.** Upon completion of the slow speed pass, turn 30 to 45 degrees away from the show line, and climb to 1,000 feet AGL minimum using a climb of 15 to 30 degrees. Airspeed should be maintained between 120 to 150 knots (120 knots minimum). Upon reaching 1,000 feet AGL minimum and approximately one mile from show center, accomplish a descending turn back to the 1,500-show line. This is a gentle, energy sustaining turn. At 2,000 feet prior to show center, initiate a smooth 3 to 5-degree climb. As show center approaches the canopy bow, unload the aircraft to 0 G and execute a 360-degree aileron roll in either direction.

3.16.2. **Abnormal Procedures** . Do not start this maneuver with the nose below the horizon.

### 3.17. High Speed Reposition Maneuver.

Figure 3.11. A-10 High Speed Reposition Maneuver.



**High Speed Reposition Maneuver  
A-10**

**Table 3.11. A-10 High Speed Reposition Maneuver.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	500'	330		MAX	5-6
Exit	300'	400		MAX	1

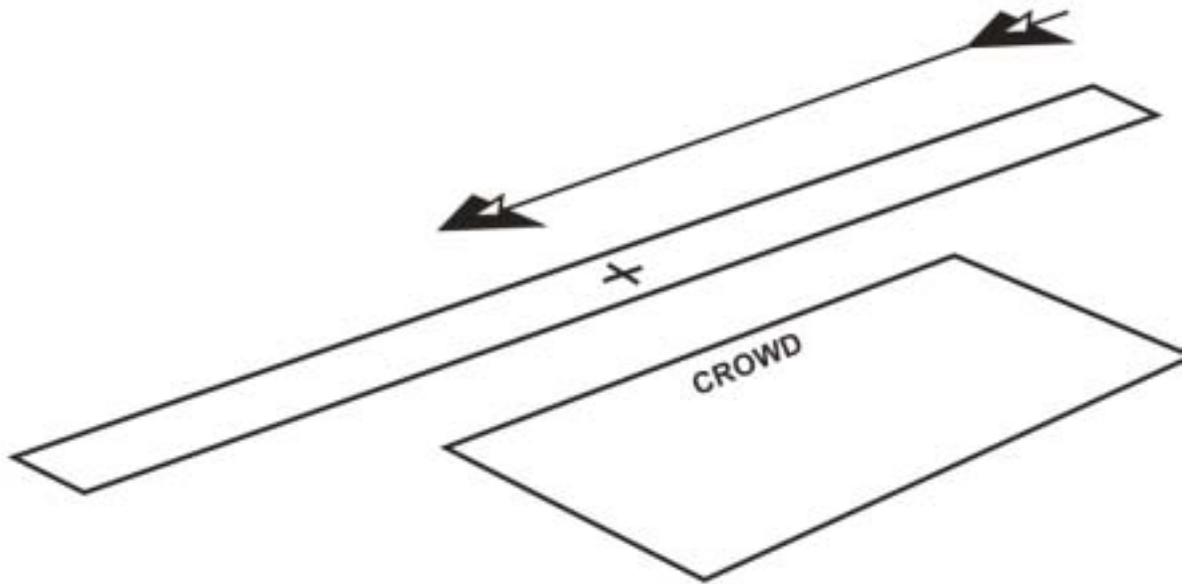
PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	400'	290	AC LMT	MAX	7.33
Exit	<b>min</b> 200'	300	AC LMT	MAX	7.33

3.17.1. **Maneuver Description.** Initiate an 80 to 90-degree bank turn 45 degrees past the outer edges of the crowd line to arrive behind the crowd (imperative not to come any closer than 500 feet to the crowd). Once at the 45-degree turn point, initiate a 5.0 to 6.0-G pull to 45 degrees of climb (55 degrees maximum) and climb out 120 to 150 knots (120 knots minimum). At 3,500 feet AGL (or 1,000 feet AGL minimum for the Low Show), initiate a 45-degree dive (55 degrees maximum) back to the appropriate show line for the next maneuver. Exit from the High Speed Reposition Maneuver by pulling at 1,200 feet using 5.0 to 6.0 Gs to level off at 300 feet AGL.

3.17.2. **Abnormal Procedures.** If at anytime the minimum altitude, airspeed, or climb angles cannot be achieved or maintained, roll the aircraft to the nearest horizon and recover to wings-level flight.

### 3.18. Photo/High Speed Pass (Opposite direction of the Aileron Roll).

Figure 3.12. A-10 Photo/High Speed Pass.



Photo/High Speed Pass  
A-10

**Table 3.12. A-10 Photo/High Speed Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	400	MAX	5-6
Exit 300'	400	MAX	1

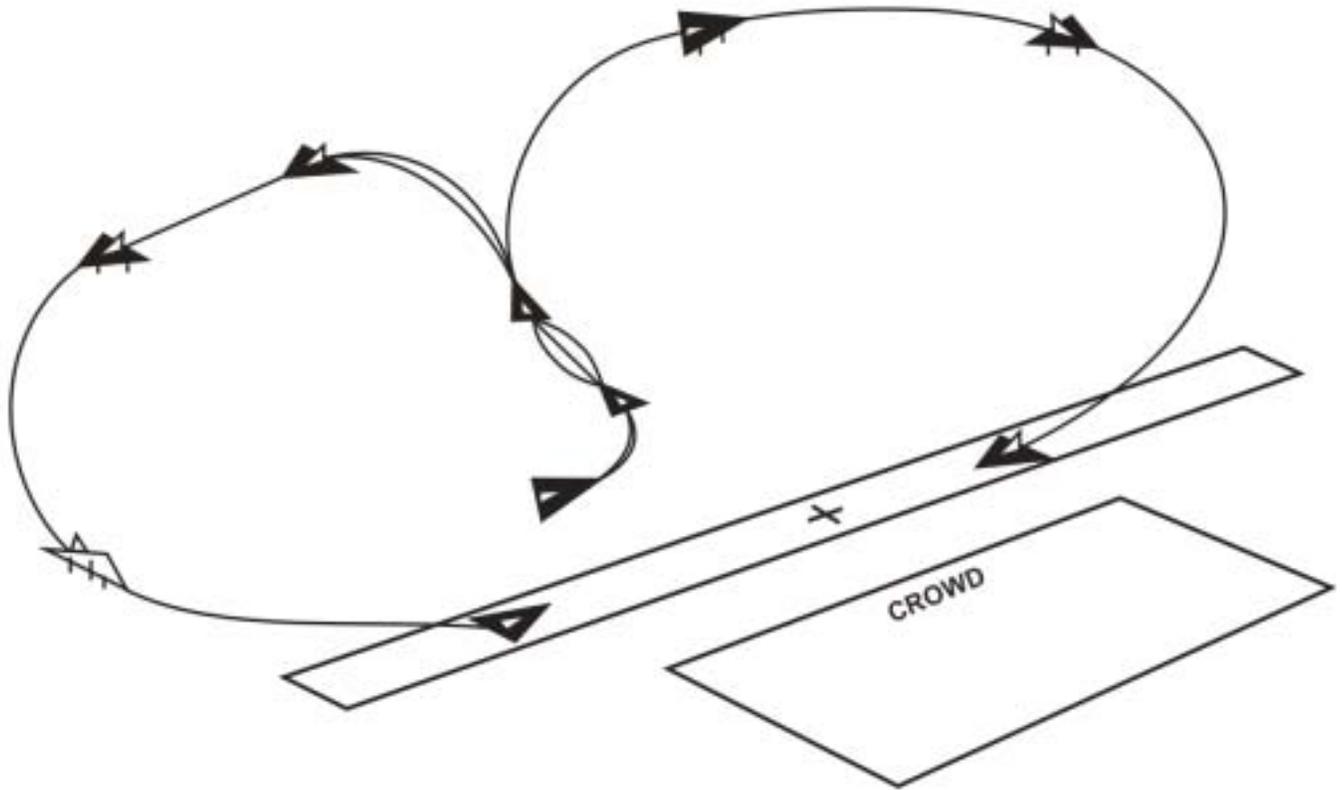
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry 200'	300	AC LMT	MAX	N/A
Exit <b>min</b> 200'	300	AC LMT	MAX	N/A

3.18.1. **Maneuver Description.** The intent of this maneuver is to give the crowd a chance to take a photo of the A-10. The maneuver is flown on the 500-foot show line and is non-aerobatic. After flying down the entire show line, execute another High Speed Reposition Maneuver to prepare for the pitch-up to land.

3.18.2. **Abnormal Procedures .** If any altitude/airspeed cannot be achieved or maintained, the aircraft will perform a loaded roll to level flight, wings-level climb and continue down the show line.

### 3.19. Tactical Pitch-up to Land.

Figure 3.13. A-10 Tactical Pitch-Up To Land.



**Tactical Pitch-Up To Land  
A-10**

**Table 3.13. A-10 Tactical Pitch-Up to Land Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	400	MAX	1
Pitch-up 500'	400	MAX	5-6
Exit $\geq 1,000'$	150	A/R	N/A

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	240	AC LMT	MAX	N/A
Pitch-up 400'	240	N/A	MAX	7.33
Exit 1,000'	135	N/A	A/R	N/A

3.19.1. **Maneuver Description.** Recover from the High Speed Reposition Maneuver by pulling at 1,200 feet AGL using 5.0 to 6.0 Gs to level off at 300 feet AGL, on the 500-foot show line at 400 knots (240 knots minimum). Roll into 80 to 90 degrees of bank to turn 90 degrees away from the crowd line. Once pointed away from the crowd, pull 5.0 to 6.0 Gs to 40 degrees nose high to achieve 1,000 feet AGL minimum. At 1,000 feet AGL minimum execute a non-acrobatic 270-degree roll and pull toward the perch point of the landing runway. Begin slowing the aircraft and configure for landing with gear, full flaps, and 40% speed brakes. Fly a normal base to final (no slower than 135 knots final turn). On final, continue slowing to 120 knots (110 minimum) to touchdown. After touchdown, perform a minimum run landing by lowering the nose, opening the speed brakes full, and initiating full anti-skid braking bringing the aircraft to a complete stop. Plan to do the minimum run landing to stop at show center. This is accomplished by planning your touchdown point 2,000 feet prior to show center. Do not land 2,000 feet prior to show center if, at the point of touchdown, there is less than 5,000 feet of useable runway remaining. In this case, plan your touchdown normally in the first 500 feet of runway.

**Option:** If a Heritage Flight is to be performed immediately following completion of the demonstration, conduct a low-approach or wings-level low approach or wings-level pass and proceed to rejoin with Heritage Flight aircraft using prebriefed procedures.

3.19.2. **Abnormal Procedures.** If airspeeds, altitudes, or stall warning indications are experienced with the stick shaker, a Go-Around must be executed to recover the aircraft. Once the Go-Around is completed, the pilot will then turn out to downwind (away from the crowd) and set up for a normal straight-in to full stop.

**3.20. Staged Show Sites.** When demonstration aircraft takeoff from other than the air show site, fuel planning must include the fuel required flying to and from the show site, and any holding time required. The pilot will enter the show via the Show Entry maneuver and complete the show as described in the

before-mentioned paragraphs. Upon completion of photo pass and clearing the crowd, turn out behind the crowd and return to the staging airport.

## Chapter 4

### F-15 DEMONSTRATION MANEUVERS

#### *Section 4A—General Information*

**4.1. General.** Maneuvers described in this chapter will be used for training and for F-15 aerial demonstrations. The demonstration sequence is designed so each maneuver is normally flown in the same direction with respect to the crowd line with the following exceptions: Flat Pass, Knife Edge, Photo Pass, and the aileron roll preceding the tactical pitch to landing. As a result, the show is always oriented the same way from the spectators' point of view. Abnormal procedures are written for each maneuver. If the entry conditions are not met for any maneuver, a wings-level pass will be flown and the pilot will transition to the next maneuver. Demonstration pilots will transmit parameters prior to initiating the descending portion of vertical pull-throughs for the Split-S and Vertical Reposition Maneuvers. Ground safety observer will monitor demonstration pilot altitude and airspeed radio calls and direct an abort when parameter limits are exceeded.

**4.2. Aircraft Configuration and Fuel Requirements.** Aircraft configuration for all demonstrations may be clean, clean with wing pylons, or clean with wing pylons and 1 or 2 smokewinders on stations 2A and/or 8B. Fuel considerations include: divert requirements, cable availability, temperature, and density altitude. Normal minimum fuel for takeoff is:

4.2.1. Staged Show: 13,500 pounds

4.2.2. High Show: 11,000 pounds

4.2.3. Low Show: 9,000 pounds

**4.3. Airspeed and G-Limits.** Demonstration pilots will not exceed 0.94 Mach. The maximum target G for this demonstration is 7.5 Gs. This does not preclude a momentary increase in G for safety considerations.

**4.4. Show line Restrictions.** The majority of the F-15 demonstration will be flown on the 1,500-foot show line in reference to the distance from the crowd. Non-aerobatic maneuvers (less than 90 degrees of bank) may be flown on the 500-foot show line.

**4.5. Airspace and Runway Requirements.** Required airspace for the F-15 is 15,000 feet AGL and normally a five-mile radius from show center horizontally. The minimum dimensions of the aerobatic box are 2,700 feet wide, 6,000 feet long, and 15,000 feet AGL (high show). Minimum runway length is 7,000 feet x 75 feet. The runway, taxiway, and parking area must be stressed for a 35,000-pound aircraft with single wheel type landing gear.

**4.6. Weather Requirements.** Weather PARAMETER LIMITS for the high profile are a ceiling of at least 7,000 feet, three miles ground and five miles in-flight visibility with a discernible horizon. Ceiling required for the low profile is 2,500 feet. Maneuvers will be planned to maintain VMC throughout the show sequence.

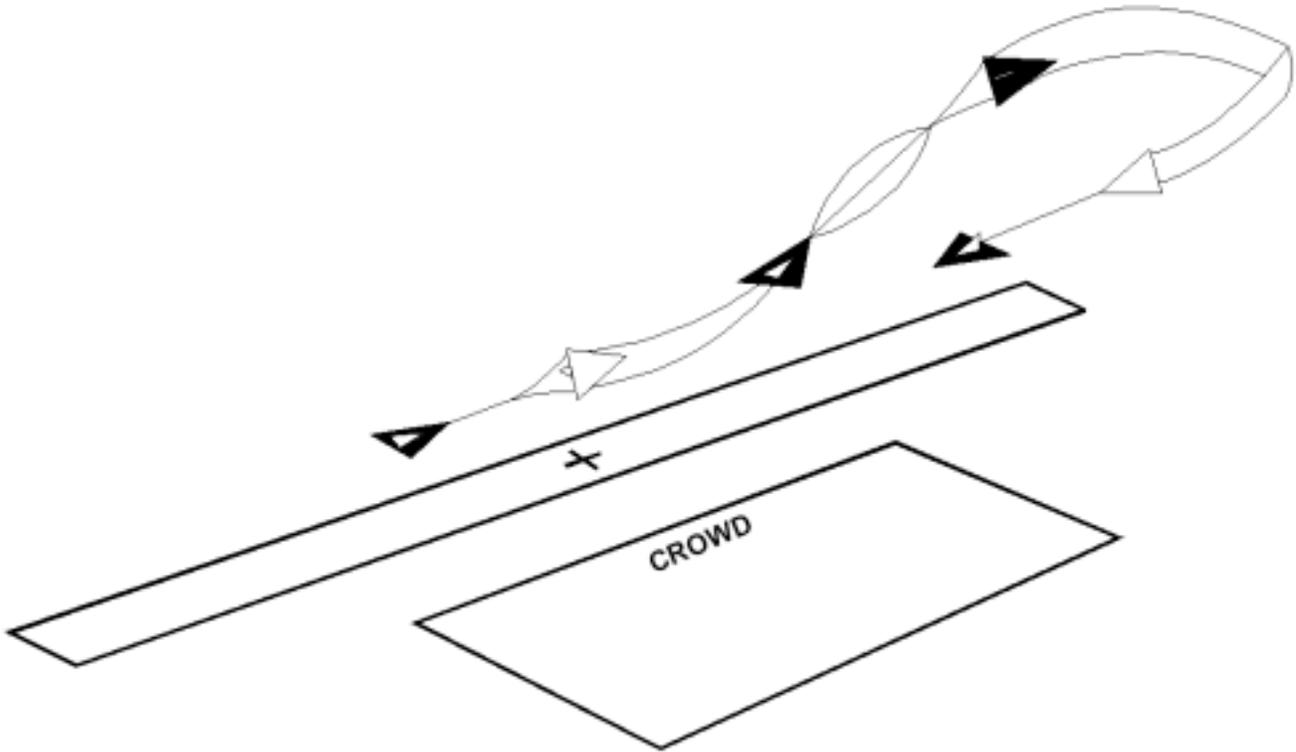
**4.7. High Density Altitude Demonstrations** . For high density altitude shows, adjust PARAMETER LIMITS in accordance with the following:

Add 500 feet to APEX altitudes for each 2,000 feet of altitude above 3,000 feet MSL and 10 knots to air-speeds. For Example:

SHOWSITE ALTITUDE	PARAMETER LIMITS
3,000 Feet	Baseline Targets/ PARAMETER LIMITS
5,000 Feet	BASELINE + 500 feet / 10 KNOTS
7,000 Feet	BASELINE +1,000 feet / 20 KNOTS

**4.8. Positioning Maneuvers.**

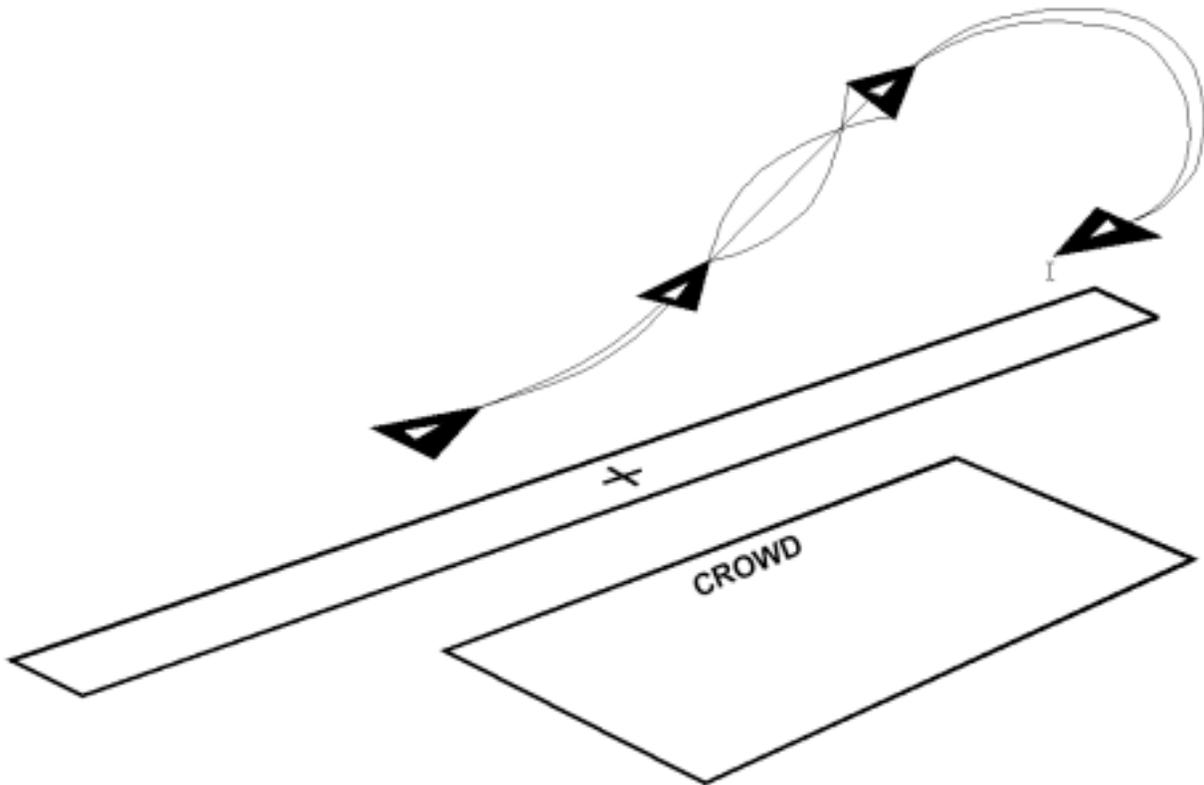
Figure 4.1. F-15 Flat Wifferdill.



**Flat Wifferdill**  
**F-15**

4.8.1. **Flat Wifferdill Maneuver.** The Flat Wifferdill Maneuver turn is a combination horizontal and shallow vertical turn used to change direction at each end of the show line when performing the low profile. The Flat Wifferdill Maneuver turn uses less altitude than a normal Wifferdill. It requires a larger cut and tends to be looser and flatter than a normal Wifferdill. A 270-degree turn reversal may be made while the aircraft is climbing. The target G for this maneuver is 6.5 to 7.0 Gs. Each turn may differ slightly so that airspeed/altitude parameters for the next maneuver are established in the flat Wifferdill. The entry "cut" turn for the flat Wifferdill is made to ensure no show line or crowd line penetration.

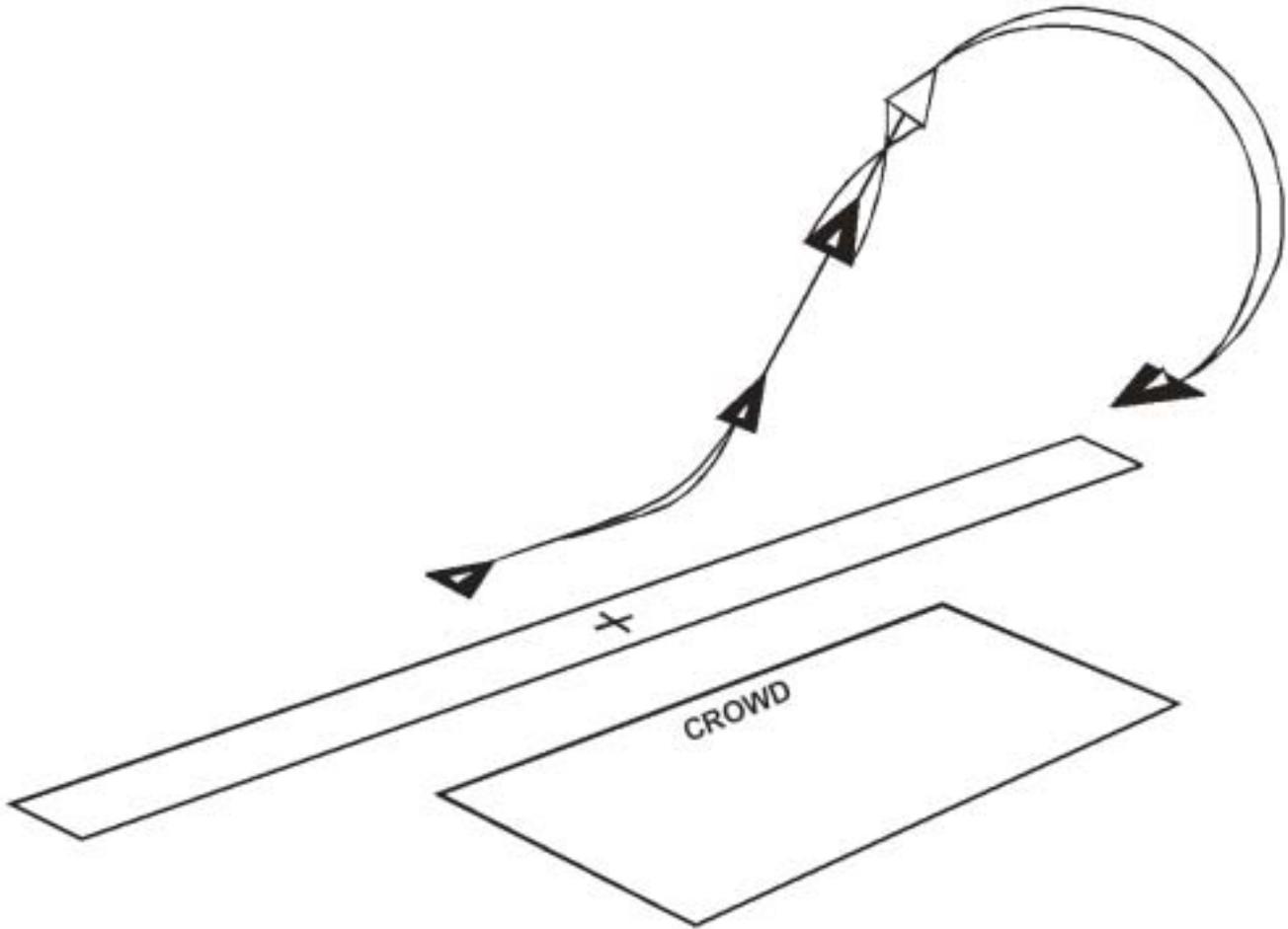
Figure 4.2. F-15 Wifferdill Repositioning Maneuver.



## Wifferdill Repositioning Maneuver F-15

4.8.2. **Wifferdill Repositioning Maneuver.** The Wifferdill turn is a combination horizontal and vertical turn used to change direction at each end of the show line. The vertical plane is used to maintain necessary proximity to the demonstration area. Each turn may differ slightly so that airspeed/altitude parameters for the next maneuver are established in the Wifferdill. As the aircraft departs the show line, maneuver in the horizontal and vertical plane to reposition for the next maneuver. The target G for this maneuver is 6.5 to 7.0 Gs. A 270-degree turn reversal is made while still climbing. During the last half of the Wifferdill, while descending, the turn is adjusted to establish the proper show line entry. The entry "cut" turn for the Wifferdill is made to ensure no show line or crowd line penetration.

Figure 4.3. F-15 Vertical Reposition.



# Vertical Reposition F-15

**Table 4.1. F-15 Vertical Reposition Parameters.**

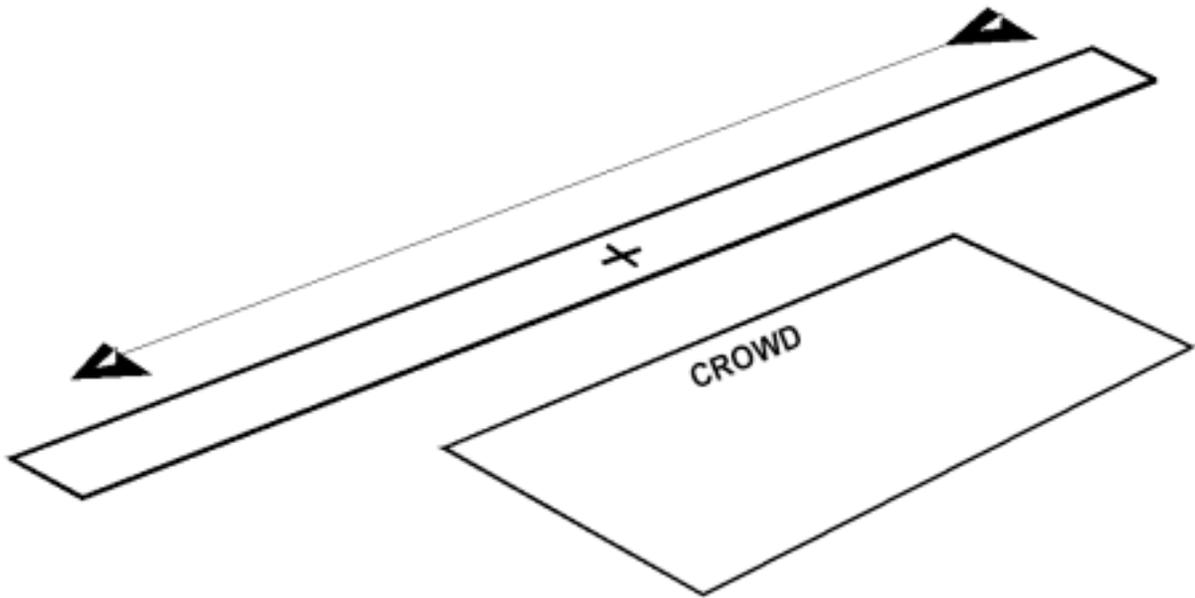
TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	A/R	350		MIL to MAX	6.5 to 7.0
Apex	≥5,000'	300		MIL to MAX	3 to 5
90 degrees nose low	≥4,000'	350		A/R	N/A
Exit	500'	A/R		A/R	1

PARAMETER LIMITS						
Altitude AGL			Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b>	500'	275	450	A/R	8
Apex		4,500'	200	400	A/R	8
90 degrees nose low		3,500'	220	400	A/R	N/A
Exit	<b>min</b>	400'	A/R	A/R	A/R	3-5

**4.8.3. Vertical Reposition Maneuver.** The Vertical Reposition Maneuver may be flown to change direction at each end of the show line. Upon passing show center or at the completion of the previous maneuver with a minimum of 275 knots, begin a straight-ahead climb using 6.5 to 7.0 Gs to put the aircraft in a 40 to 55-degree nose high attitude. At a minimum of 3,800 feet AGL, perform an unloaded 180-degree roll to achieve an inverted climbing attitude. Initiate a smooth pull to the horizon to achieve a wings-level inverted position at or above 4,500 feet AGL. Continue the pull in maximum power through the vertical, using 3.0-5.0 Gs to 135 degrees of turn (45 degrees nose low). As the nose drops below the horizon and the airfield environment is reacquired, correct as necessary to complete the Vertical Reposition Maneuver down the show line. On a standard day, at 90 degrees nose low, air-speed should be between 220 to 400 knots, and altitude greater than 3,500 feet AGL. At 135 degrees, backpressure is relaxed and the aircraft smoothly flown to be in level flight at 500 feet AGL for the next maneuver. Aircraft power should be modulated through the vertical to achieve the desired air-speed upon rollout for the next maneuver.

**4.8.3.1. Abnormal Procedures:** If not within the target airspeed window, adjust pitch attitude during climb to achieve desired airspeed. If below minimum apex altitude, maintain an inverted climb until reaching minimum apex altitude. If you will be below 3,500 feet AGL and over 400 knots prior to achieving 90 degrees nose low, execute emergency dive recovery procedures. If at anytime during the maneuver it appears that the aircraft will not attain the prescribed altitude/ air-speed parameter limits, the maneuver will be aborted. Reposition the aircraft for follow-on maneuvering.

Figure 4.4. F-15 Flat Pass.



**Flat Pass**  
**F-15**

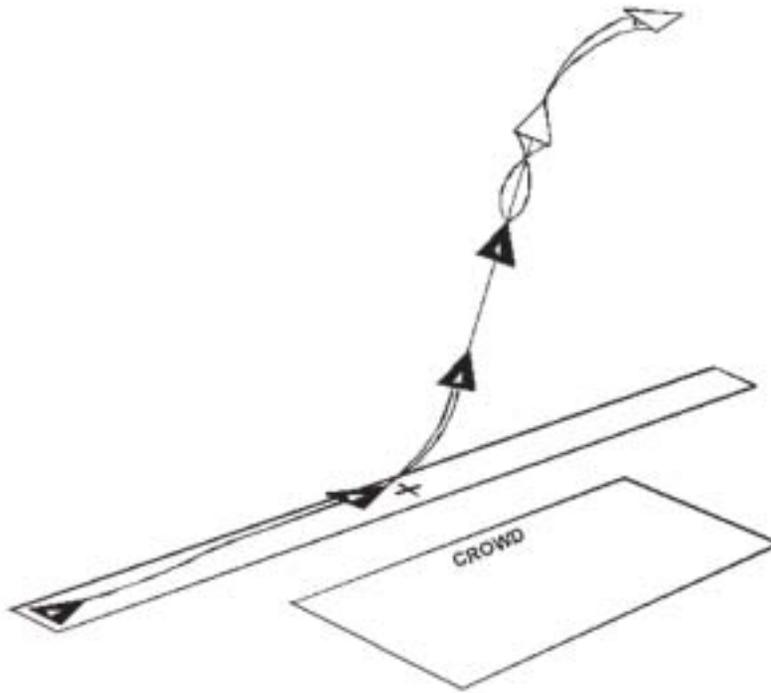
*NOTE:* May be flown either direction.

4.8.4. **Flat Pass.** The flat pass, described at **paragraph 4.11.**, is a repositioning maneuver used alone or in combination with a Wifferdill for the primary purpose of orienting the subsequent demonstration maneuver in the approved direction relative to the crowd line. It should be flown wings level down the show line, so as not to exceed 0.94 Mach, and at a minimum of 200 feet AGL.

*Section 4B—High Profile*

**4.9. Maximum Performance Takeoff and Climb (Left to Right).**

Figure 4.5. F-15 Maximum Performance Takeoff and Climb.



Max Performance Take Off and Climb  
F-15

**Table 4.2. F-15 Maximum Performance Takeoff and Climb Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 0'	180	MAX	2
Exit 5,000'	220	MAX	A/R

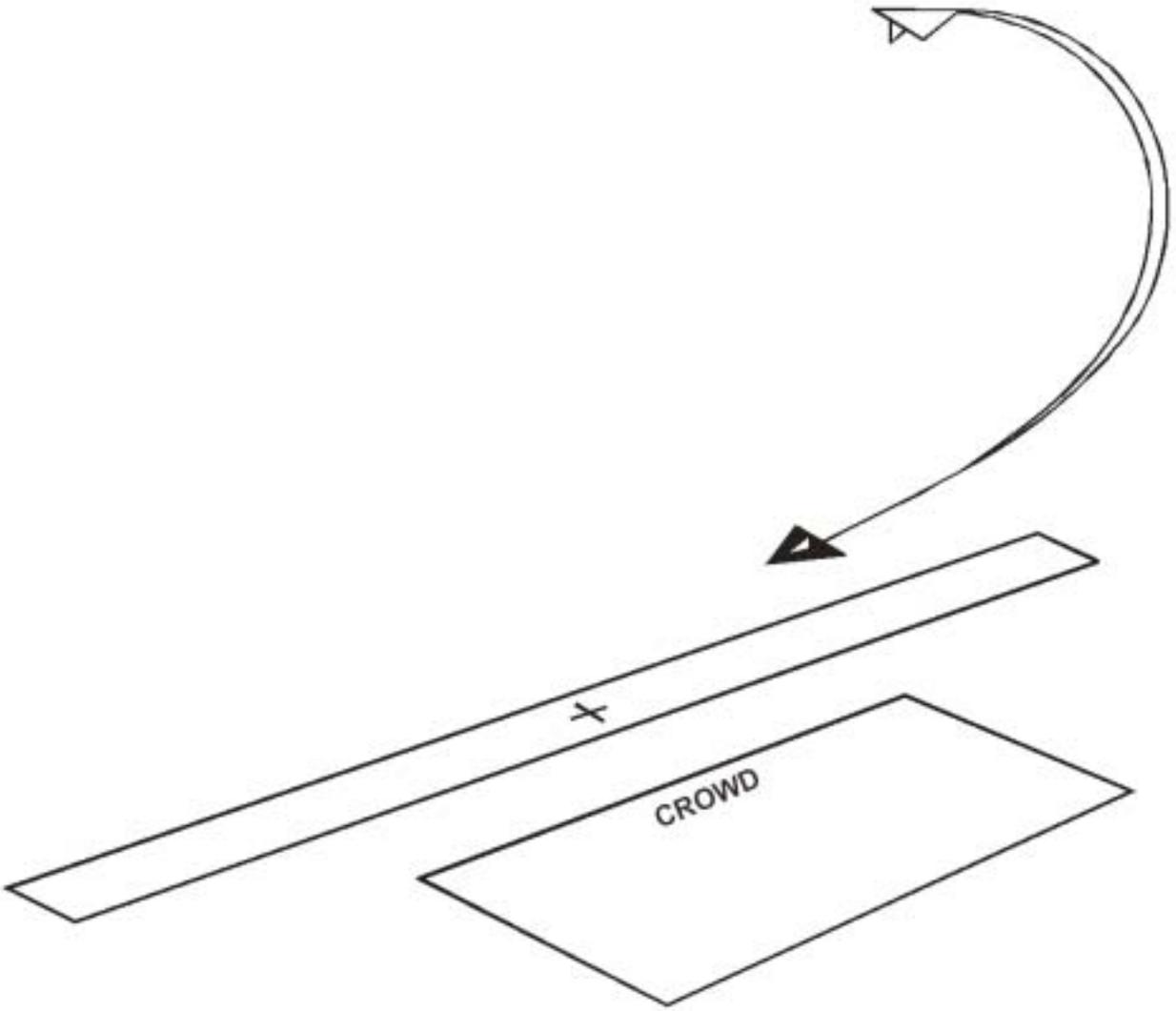
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry N/A	180	N/A	MAX	N/A
Exit 4,500'	200	250	MAX	N/A

4.9.1. **Maneuver Description:** The takeoff is performed without flaps and in afterburner. At 180 knots, execute a smooth, aft-pull of the stick to achieve takeoff rotation. After a positive rate of climb is established, retract the gear and set a pitch attitude of 40 to 70 degrees nose high. Adjust pitch angle to maintain climb airspeed of 220 knots. If airspeed decreases below 200 knots, decrease pitch attitude to achieve climb airspeed.

4.9.2. **Abnormal Procedures:** If the show profile takeoff is interrupted by an aircraft malfunction, make a normal takeoff or if conditions warrant, abort the takeoff. If the takeoff is continued in a thrust-limited situation or if takeoff distance is critical, consider lowering the flaps. If the takeoff is aborted, consider lowering the flaps. Max abort speed and SETOS calculations are based on a flap-down configuration.

#### **4.10. SPLIT-S (Right to Left from MAX Performance Takeoff).**

Figure 4.6. F-15 Split-S.



**Climb To Split-S**  
**F-15**

**Table 4.3. F-15 Split-S Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	5000'	220		MAX	2-4
90 degrees nose low	$\geq 4,000'$	350		MAX	A/R
Exit	500'	$\leq .92M$		MAX	3-5

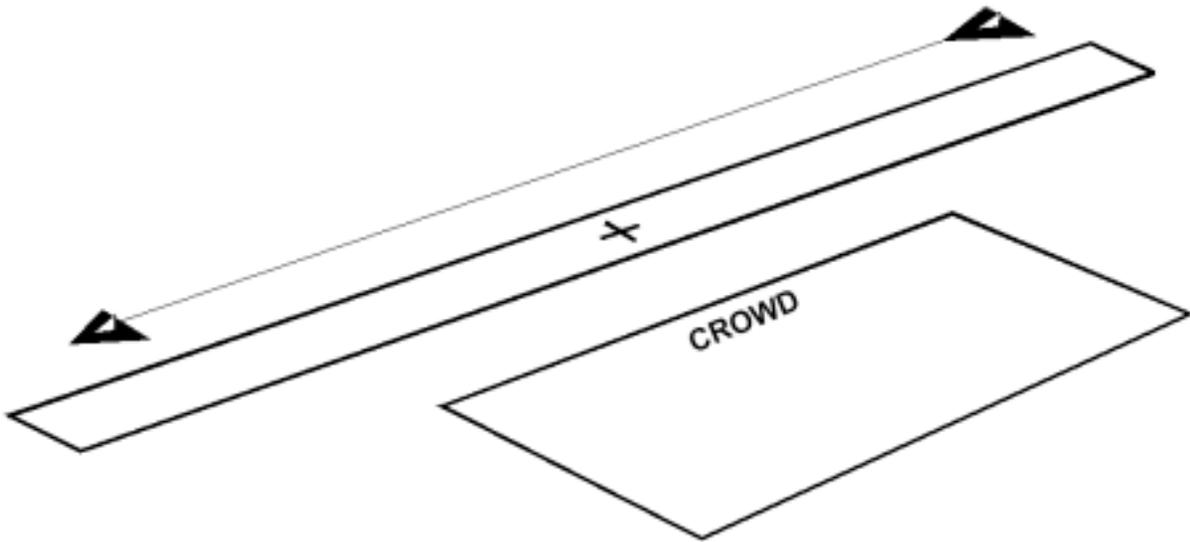
PARAMETER LIMITS						
Altitude AGL			Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b>	4,500'	200	250	MAX	6
90 degrees nose low		3,500'	220	400	MAX	N/A
Exit	<b>min</b>	400'	N/A	.94M	MAX	8

4.10.1. **Maneuver Description:** After takeoff and at a minimum of 3,800 feet AGL with an attitude of 40-70 degrees nose high, perform an unloaded 180-degree aileron roll to achieve an inverted climbing attitude. Initiate a smooth pull to the horizon to achieve a wings-level inverted position at 5,000 feet AGL. Continue the pull in maximum power through the vertical, using 2.0-4.0 Gs, to 135 degrees of turn (45 degrees nose low). As the nose drops below the horizon and the airfield environment is reacquired, correct as necessary to complete the Split-S down the show line. On a standard day, at 90 degrees nose low, airspeed should be between 250 to 400 knots, and altitude greater than 3,500 feet AGL. At 135 degrees, relax backpressure and smoothly transition to be in level flight at 500 feet AGL for the Flat Pass.

4.10.2. **Abnormal Procedures:** If not within the target airspeed window, adjust pitch attitude during climb to achieve desired airspeed. If below minimum apex altitude, maintain an inverted climb until reaching minimum apex altitude. If you will be below 3,500 feet AGL and over 400 knots prior to achieving 90 degrees nose low, execute emergency dive recovery procedures. If at anytime during the maneuver it appears that the aircraft will not attain the prescribed altitude/ airspeed parameter limits, the maneuver will be aborted. Reposition the aircraft for follow-on maneuvering.

#### 4.11. Flat Pass (Right to Left).

Figure 4.7. F-15 Flat Pass.



# Flat Pass F-15

*NOTE:* May be flown either direction.

**Table 4.4. F-15 Flat Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	≤.92M	Max	1
Exit 300'	≤.92M	IDLE to MAX	1

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	N/A	.94M	A/R	N/A
Exit <b>min</b> 200'	N/A	.94M	A/R	N/A

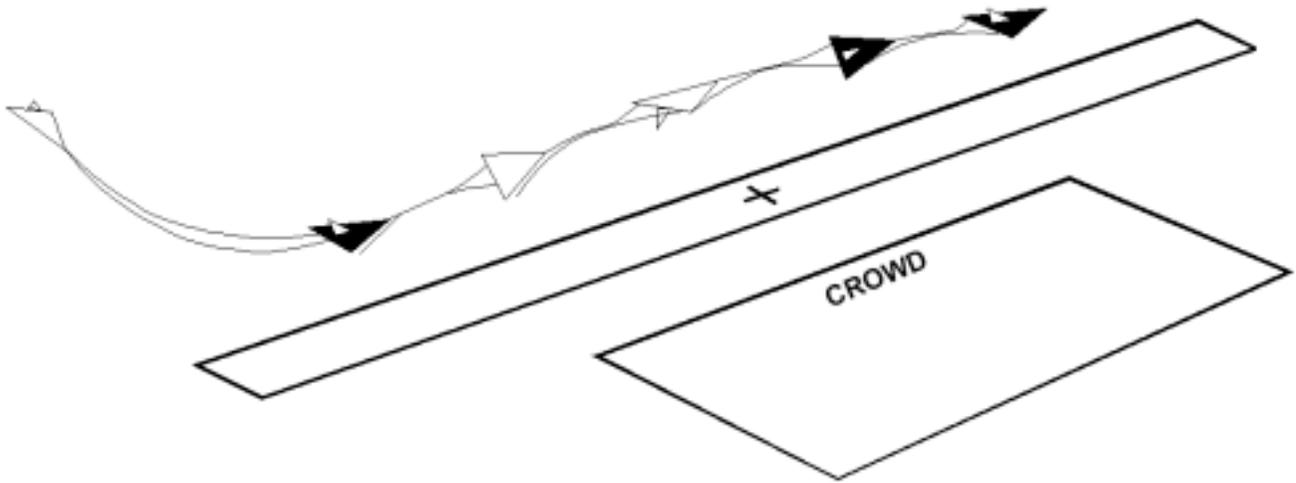
4.11.1. **Maneuver Description:** At 300 feet AGL in a wings-level attitude, fly down the show line in maximum power, so as to not exceed 0.94 Mach. At 2,000 past show center, a repositioning maneuver is performed.

4.11.2. **Abnormal Procedures:** If it becomes apparent 0.94 Mach will be exceeded, afterburner should be deselected.

**NOTE:** The flat pass is normally flown after the takeoff, but may be flown at any time during the show sequence if required.

#### **4.12. Four-Point Roll (Left to Right).**

Figure 4.8. F-15 Four-Point Roll.



# Four-Point Roll F-15

**Table 4.5. F-15 Four-Point Roll Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Nominal Power Setting	G
Entry 500'	400	80% to MIL	1 to 3
Exit 500'	400	80% to MIL	1

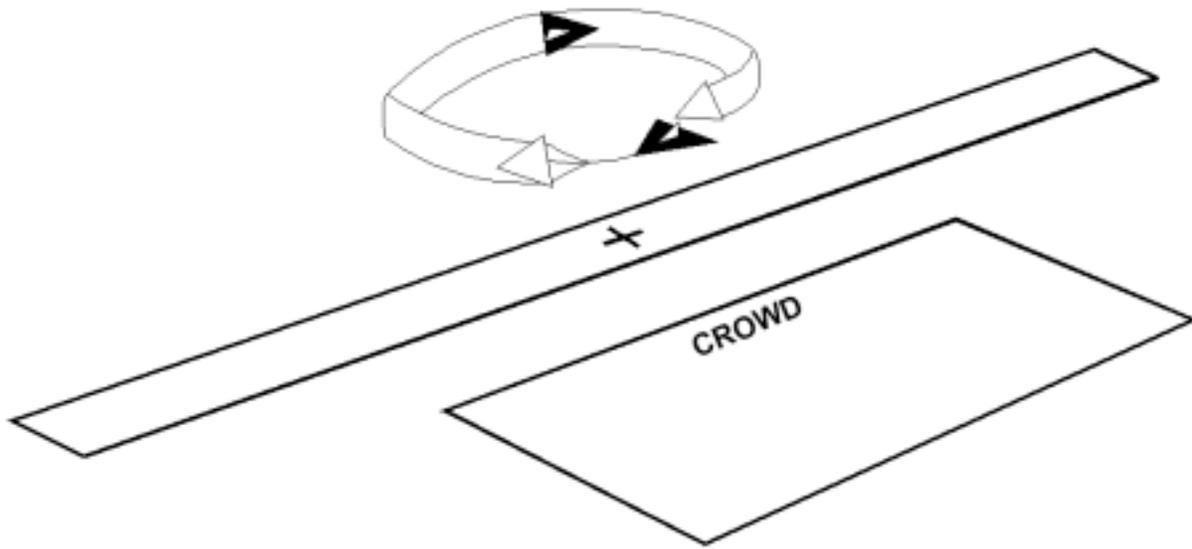
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	350	450	80% to MIL	N/A
Exit <b>min</b> 400'	350	450	80% to MIL	N/A

4.12.1. **Maneuver Description:** At 3,000 feet prior to show center, smoothly pull the nose to five degrees up, establish a climb and relax stick pressure. A cadenced four-point roll to the left is then performed by pausing momentarily at the 90-degree, 180-degree, 270-degree, and 360-degree points. Move the stick briskly, causing a left roll and an immediate stop at each point when pressure is released. The pace of the cadence should ensure the aircraft is at the 180-degree point over show center. At the completion of the pass and at the 360-degree point, a repositioning maneuver is performed to orient for a right to left initiation of the High G Turn.

4.12.2. **Abnormal Procedures:** If starting parameter limits are not achieved, abort maneuver and transition to a flat pass. During the maneuver, if the nose is below the horizon at the 180-degree inverted point, abort the maneuver by rolling to wings level.

#### 4.13. High G Turn (Right to Left).

Figure 4.9. F-15 High G Turn.



# High G Turn F-15

**Table 4.6. F-15 High G Turn Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	420	MAX	7.5
Exit 500'	375	MAX	2 to 4

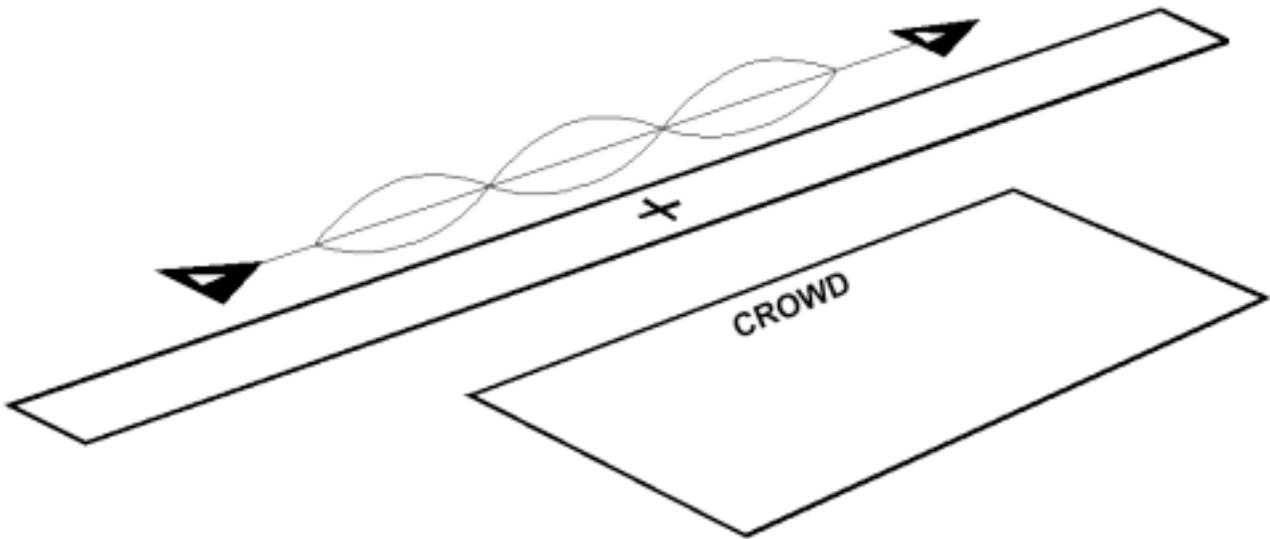
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	400	450	MAX	9
Exit <b>min</b> 400'	300	425	MAX	9

4.13.1. **Maneuver Description:** At approximately 3,000 feet prior to show center, select full AB and accelerate to approximately 420 knots. At show center, turn away from the crowd using approximately 85 degrees of bank. Begin the turn with a smooth G onset rate to maintain airspeed at approximately 400 knots and 7.5 Gs. G-loading and airspeed bleed-off rate will vary with density altitude. The first 180 degrees of turn should be accomplished with a 1 ¾ degree nose-up attitude and the last 180 degrees of turn should be accomplished with a 1 ¾ degree nose-down attitude to make the turn appear level to the crowd. Vary the bank angle and pitch to arrive at level flight at the completion of 360 degrees of turn and to ensure the maneuver is finished above the entry altitude. Surface winds must be taken into consideration in order to center this maneuver on show center and to avoid overshooting the show line. As you approach show center, smoothly but briskly roll out. Perform a repositioning maneuver to set up for the Triple Roll.

4.13.2. **Abnormal Procedures:** If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. If during any portion of the maneuver it becomes apparent the aircraft will descend below 400 feet AGL or airspeed decay below 300 knots, abort the maneuver by rolling wings level and climbing to 500 feet AGL. If necessary, adjust power and G as required (no lower than 300 knots) to avoid overshooting the show line.

#### 4.14. Triple Aileron Roll (Left to Right).

Figure 4.10. F-15 Triple Aileron Roll.



# Triple Aileron Roll

## F-15

**Table 4.7. F-15 Triple Aileron Roll Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	425	80% to MIL	2 to 4
Exit 500'	425	80% to MIL	1

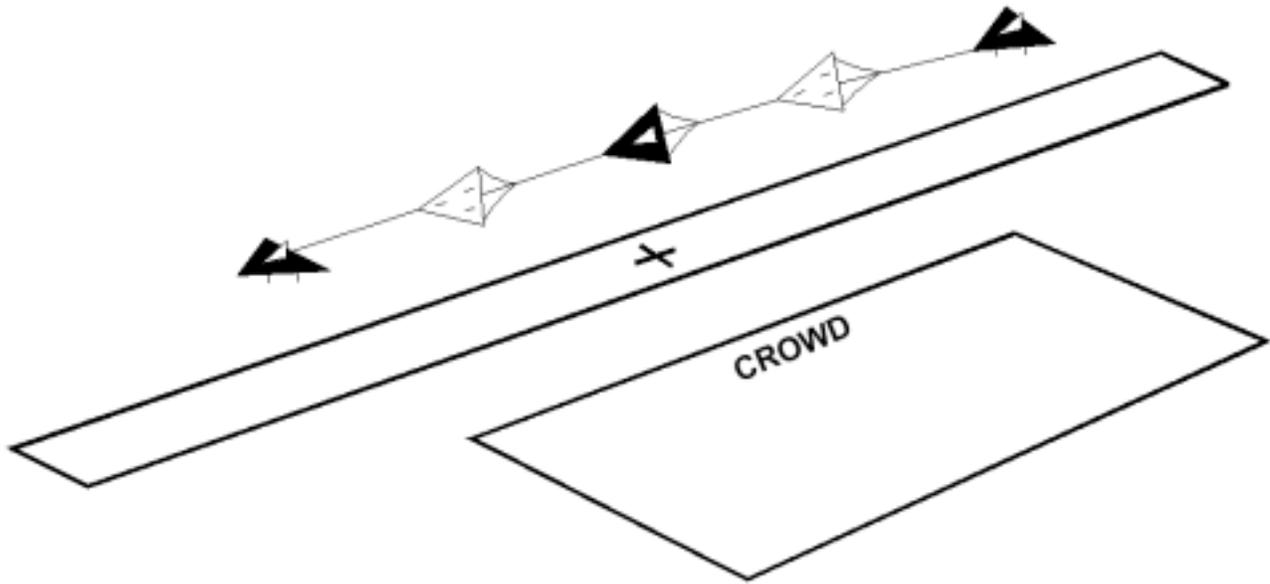
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	400	450	80% to MIL	N/A
Exit <b>min</b> 400'	400	450	80% to MIL	N/A

4.14.1. **Maneuver Description:** At 3,000 feet prior to show center with 425 knots and a minimum of 500 feet AGL, raise the nose eight degrees, establish a climb, and relax stick pressure. Apply full left stick pressure to perform a maximum of three consecutive unloaded aileron rolls. As the second roll is completed, it is important to ensure the aircraft has gained altitude and the nose is still above the horizon. At the completion of the third roll, roll out and reposition for the Wing Walk.

4.14.2. **Abnormal Procedures:** If starting parameters are not achieved, abort maneuver and transition to a flat pass. If the nose drops below level inverted on the second roll or roll coupling occurs (to exceed approximately 2.5 G) immediately roll wings level and climb to minimum altitude.

#### 4.15. Wing Walk (Right to Left).

Figure 4.11. F-15 Wing Walk.



# Wing Walk F-15

**Table 4.8. F-15 Wing Walk Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	190	80% to MIL	1 to 2
Exit 500'	220	80% to MIL	1 to 2

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	170	230		N/A
Exit <b>min</b> 400'	190	260		N/A

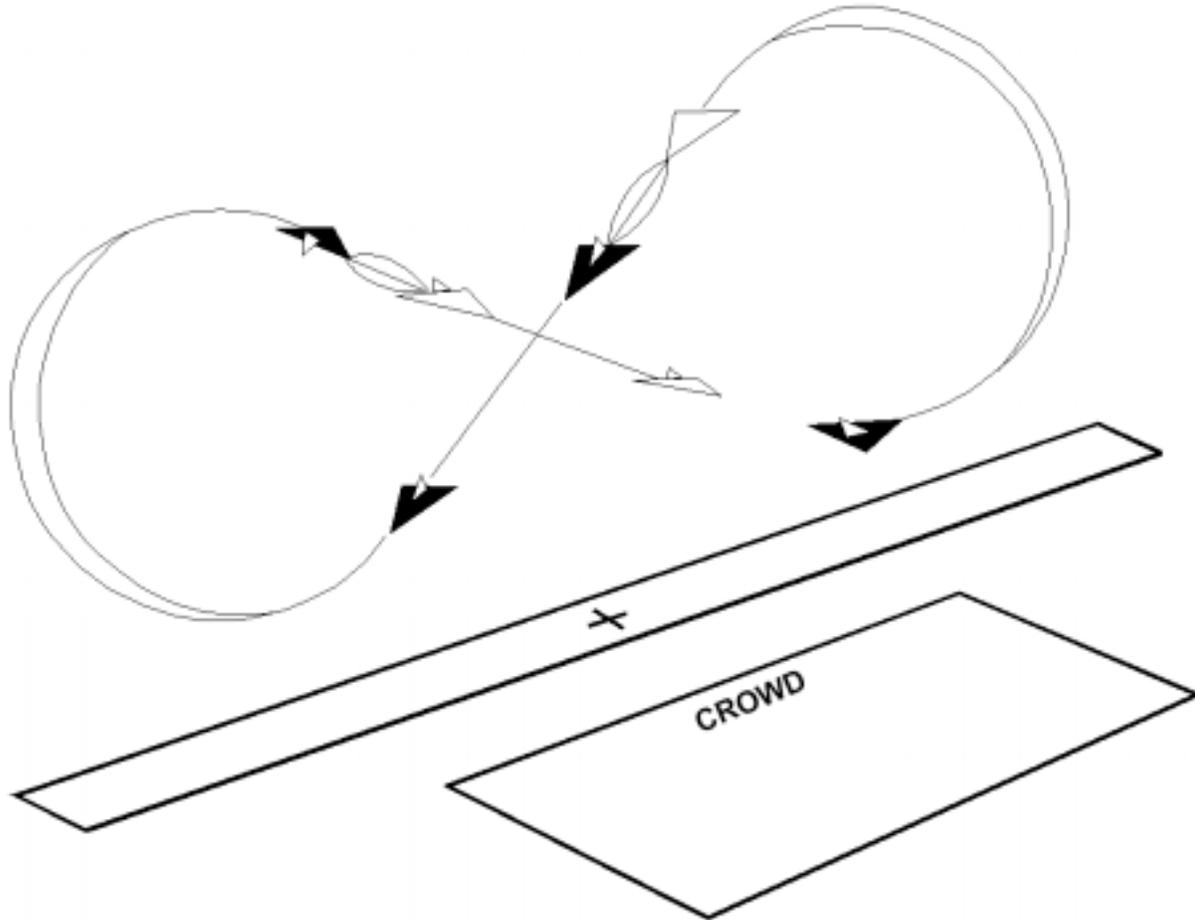
4.15.1. **Maneuver Description:** Configure the aircraft (gear down and flaps up) and roll out no lower than 500 feet AGL with 190 knots. At 2,000 feet prior to show center, raise the nose five to ten degrees, advance the power slightly, and blend full aileron away from the crowd and opposite rudder to achieve 85 to 90 degrees of bank. Level flight and track is maintained with top rudder. Pause momentarily and reverse the roll, pause then reverse again to achieve three separate steep bank positions. When performing at field elevations of 3,000 feet or greater, only two wing rocks should be accomplished.

4.15.2. **Abnormal Procedure:** If entry parameter limits are not met, abort the maneuver and perform a wings-level gear-down pass. 90 degrees of bank with the gear down is the maximum allowed in the Dash-1.

**NOTE:** The Wing walk is a transition point to the medium/low profile if required by changing weather conditions.

#### 4.16. Cuban 8 (Left to Right).

Figure 4.12. F-15 Cuban Eight.



# Cuban Eight

## F-15

**Table 4.9. F-15 Cuban Eight Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	300	MAX	25 AOA
Apex $\geq$ 3,500'	200	IDLE	1 to 2
Exit 500'	350	MAX	3 to 5

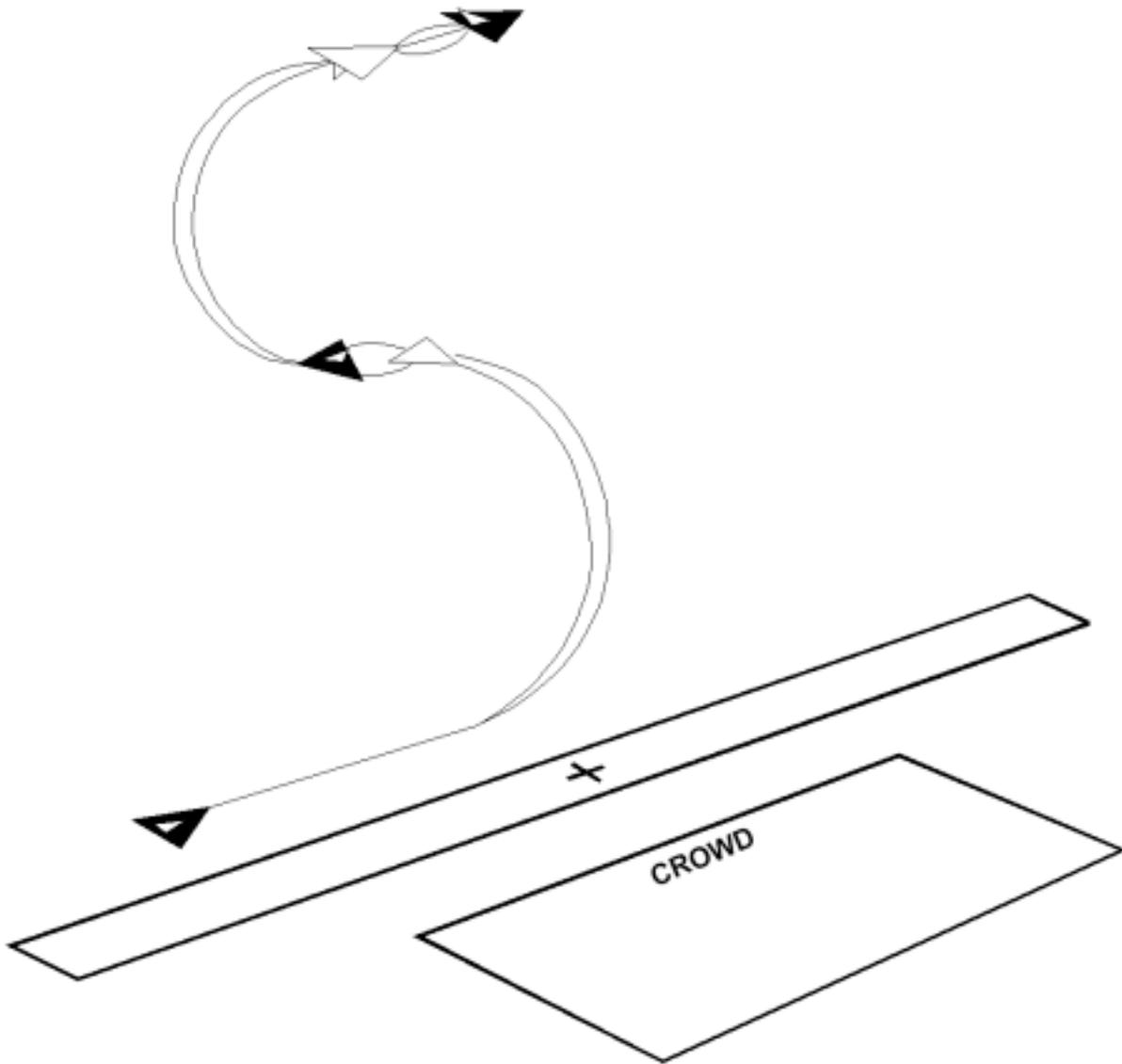
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	275	420	MAX	6
Apex <b>min</b> 3,300'	150	250	IDLE	4
Exit <b>min</b> 400'	300	400	MAX	6

4.16.1. **Maneuver Description:** When wings level following the Wing Walk, select full afterburner and raise the landing gear. Attain sufficient airspeed (300 knots) and begin a brisk but smooth wings-level pull to approximately 25-unit AOA. Normal apex altitude is above 3,500 feet AGL. At apex altitude, reduce to idle power. Airspeed should be 150-250 knots. The pull is held until the nose passes through 125-140 degrees of pitch where the backpressure is eased to maintain a constant nose track of 25-45 degrees nose low inverted. The 25 to 45-degree nose low inverted attitude is held until approximately 2,500 feet AGL. At 2,500 AGL, perform an unloaded roll to wings level upright and advance throttles to MIL. Roll the aircraft as necessary to maintain proper alignment along the show line (wind correction). Gradually increase backstick pressure to ensure aircraft will not descend below 500 AGL. At no later than 1,200 AGL initiate full afterburner and begin a brisk but smooth wings-level pull to approximately 25-unit AOA. The second half is completed in the opposite direction using the procedures described earlier. A repositioning maneuver is performed to setup for the next pass.

4.16.2. **Abnormal Procedures:** If either or both afterburners fail to light, or one or more gear remain extended, abort maneuver by decreasing pitch attitude to level flight and investigate malfunction. If apex airspeed is less than 150 knots, decrease backstick pressure and accelerate to target airspeed before reducing throttles and pulling nose through horizon. If desired pitch attitude is exceeded while inverted, roll upright and set desired pitch angle and continue maneuver. If less than 2,500 feet AGL while inverted, an immediate roll and pull to wings level will be initiated. If at any time it becomes apparent that the maneuver will be completed inside the show line (poor wind correction, improper alignment after the wing walk) abort the maneuver and setup for the next pass.

#### 4.17. Double Immelmann (Left to Right).

Figure 4.13. F-15 Double Immelmann.



# Double Immelmann

## F-15

**Table 4.10. F-15 Double Immelmann Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	420	MAX	6.5-7.5
Exit $\geq 6,500'$	250	A/R	1 to 2

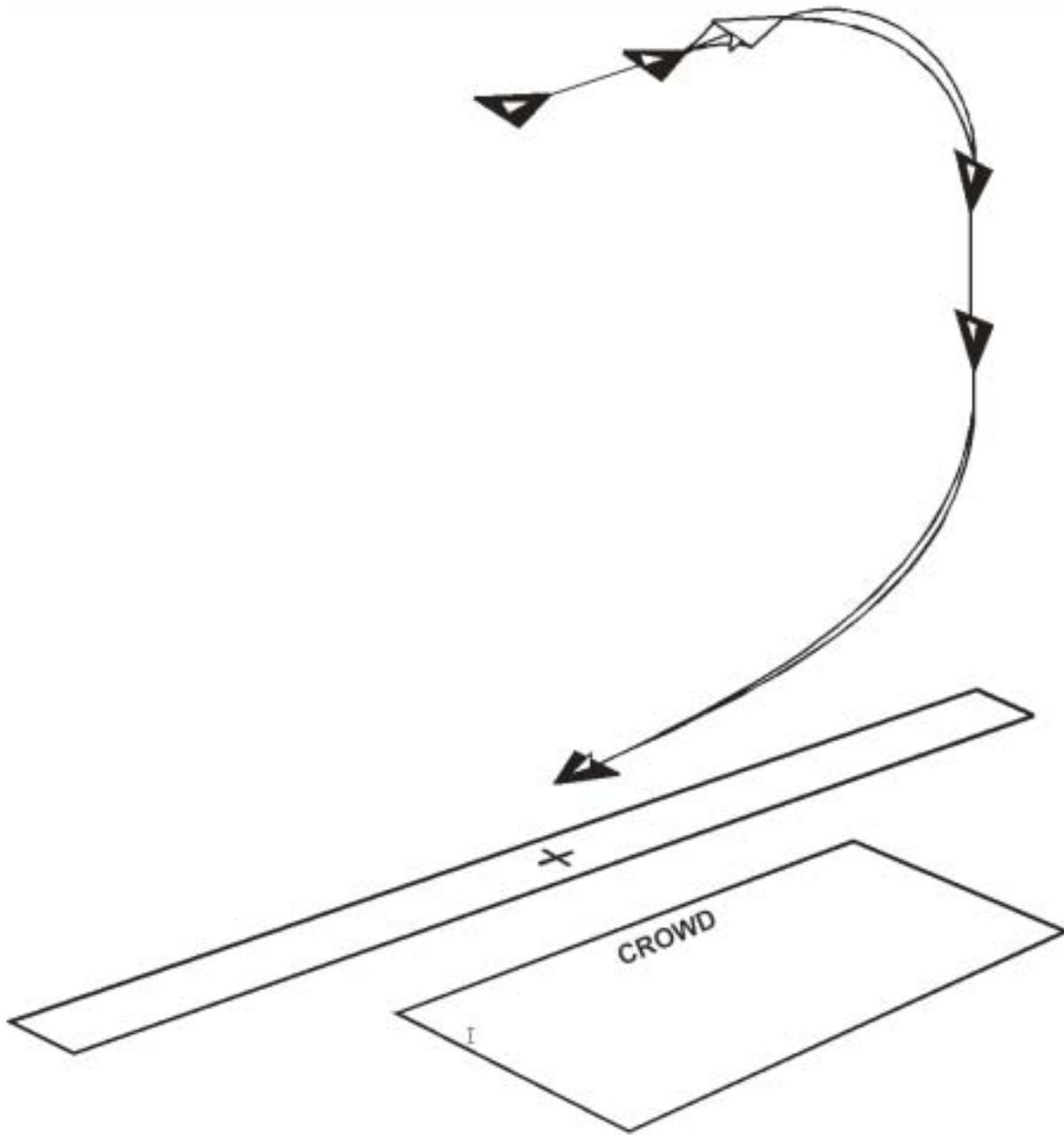
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	380	450	MAX	8
Exit 6000'	160	300	A/R	N/A

4.17.1. **Maneuver Description:** Arrive at show center wings level, at 420 knots and 500 feet AGL. Select full afterburner and begin a smooth 6.5 to 7.5 G wings-level pull to execute the first Immelmann. The pull is held until 10 degrees nose high, inverted, and wings level. Relax stick pressure and perform an unloaded 180-degree roll to a wings-level upright position. With greater than 250 knots perform a smooth wings-level pull to approximately 25 units AOA for the second Immelmann. The second pull is also held until 10 degrees nose high, inverted, and wings level. Relax stick pressure and perform an unloaded 180-degree roll to a wings-level upright position. Altitude at the top should be approximately 6,500 feet AGL. Accelerate to 275 knots, terminate afterburner and set up for the Split-S.

4.17.2. **Abnormal Procedures:** If entry parameters are not achieved by show center, delay initial pull until parameters are met. If not met by 2,000 feet past show center, reposition for next maneuver. If less than 250 knots after rollout on the first Immelmann, delay the second pull until parameters are met. If less than 6,000 feet AGL at the completion of the maneuver, start a gradual climb to be at a minimum of 6,000 feet AGL prior to the Split-S.

#### 4.18. SPLIT-S (Right to Left from Double Immelmann).

Figure 4.14. F-15 Split-S.



**Split - S**  
**F-15**

**Table 4.11. F-15 Split-S Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry $\geq 6,500'$	275	MIL or BELOW	2 to 4
90 degrees nose low $\geq 4,000'$	350	MIL or BELOW	1
Exit 500'	400	MIL or BELOW	3 to 5

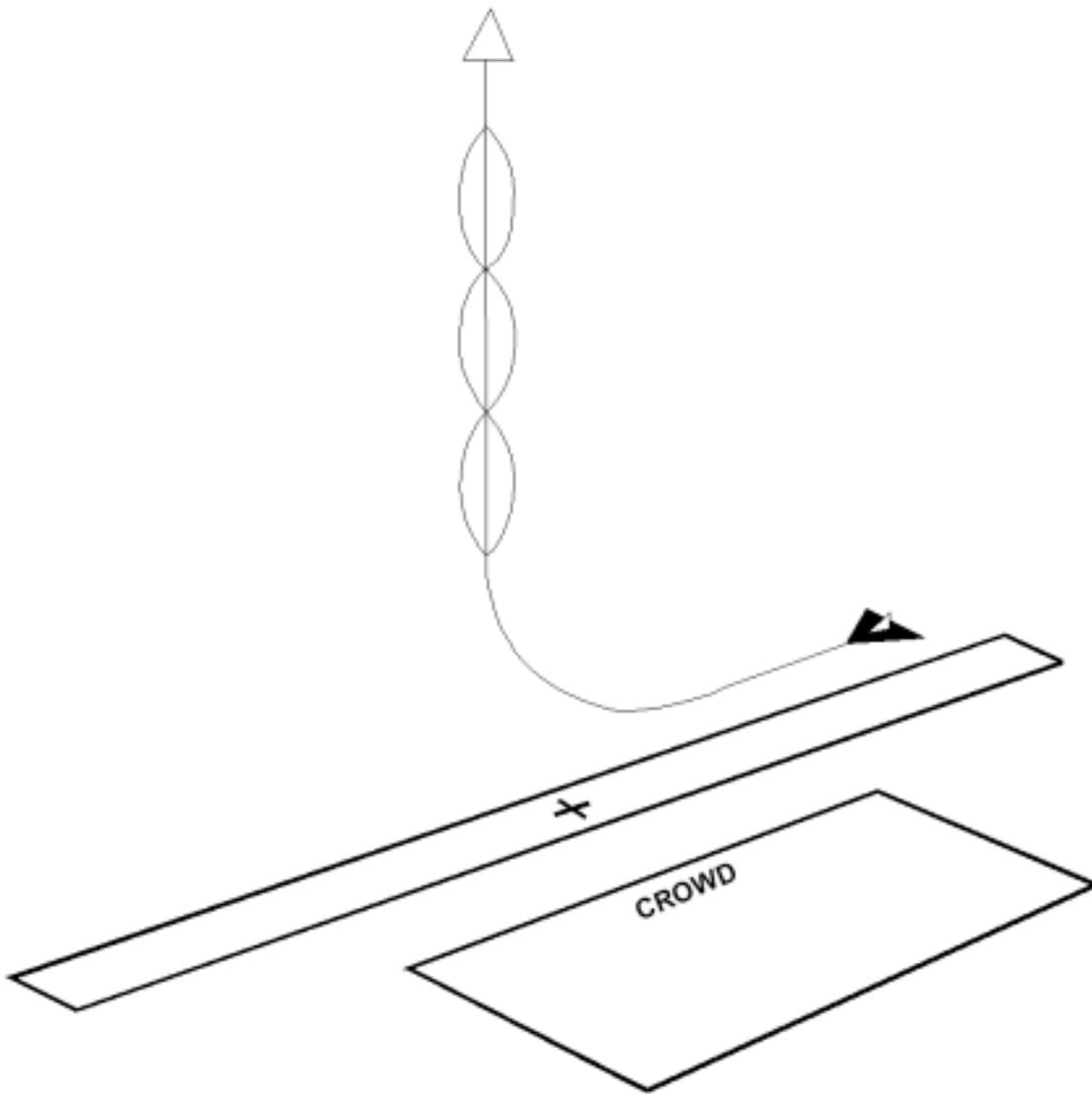
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 6,000'	200	300	MIL or BELOW	6
90 degrees nose low 3,500'	220	400	MIL or BELOW	N/A
Exit <b>min</b> 400'	350	450	MIL or BELOW	8

4.18.1. **Maneuver Description:** After completion of the Double Immelmann, with airspeed between 200 to 300 knots, and altitude  $\geq 6,500$  feet AGL, delay 15 seconds (no wind) while flying wings level on the extended show line. Adjust aircraft heading to maintain alignment on the extended show line (crosswind correction) and to setup for the Max Climb run-in. With the throttles in Mil or below, perform an unloaded roll to inverted flight and smoothly pull the nose of the aircraft down to achieve a pitch attitude of 90 degrees nose low. Hold this attitude until reaching 4,000 feet AGL, and then continue a smooth pull through the vertical, using 2 to 4 Gs to approximately 45 degrees nose low. On a standard day, at 90 degrees nose low, airspeed should be between 220 to 400 knots, and altitude greater than 3,500 AGL. At this point, backpressure is relaxed and smoothly flown to be in level flight at 500 feet for the Max Climb. Power should be modulated in the descent to maintain at or below 450 knots.

4.18.2. **Abnormal Procedures:** If not within the airspeed window, adjust pitch attitude and/or power to achieve desired airspeed. If below 6,000 feet AGL, climb as necessary before executing the Split-S. If you will be below 3,500 feet AGL and over 400 knots prior to achieving 90 degrees nose low, execute emergency dive recovery procedures. If at anytime during the maneuver it appears that the aircraft will not attain the prescribed altitude/airspeed parameters, the maneuver will be aborted. Roll out and/or pull to a wings-level position, initiate a descent and reposition the aircraft for follow-on maneuvering.

#### 4.19. Maximum Performance Climb with Rolls (Right to Left).

Figure 4.15. F-15 Maximum Performance Climb With Rolls.



# Maximum Performance Climb With Rolls F-15

**Table 4.12. F-15 Maximum Performance Climb With Rolls Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	420	MAX	6.5 to 7.5
Exit NTEWA	225	80% to MAX	2 to 5

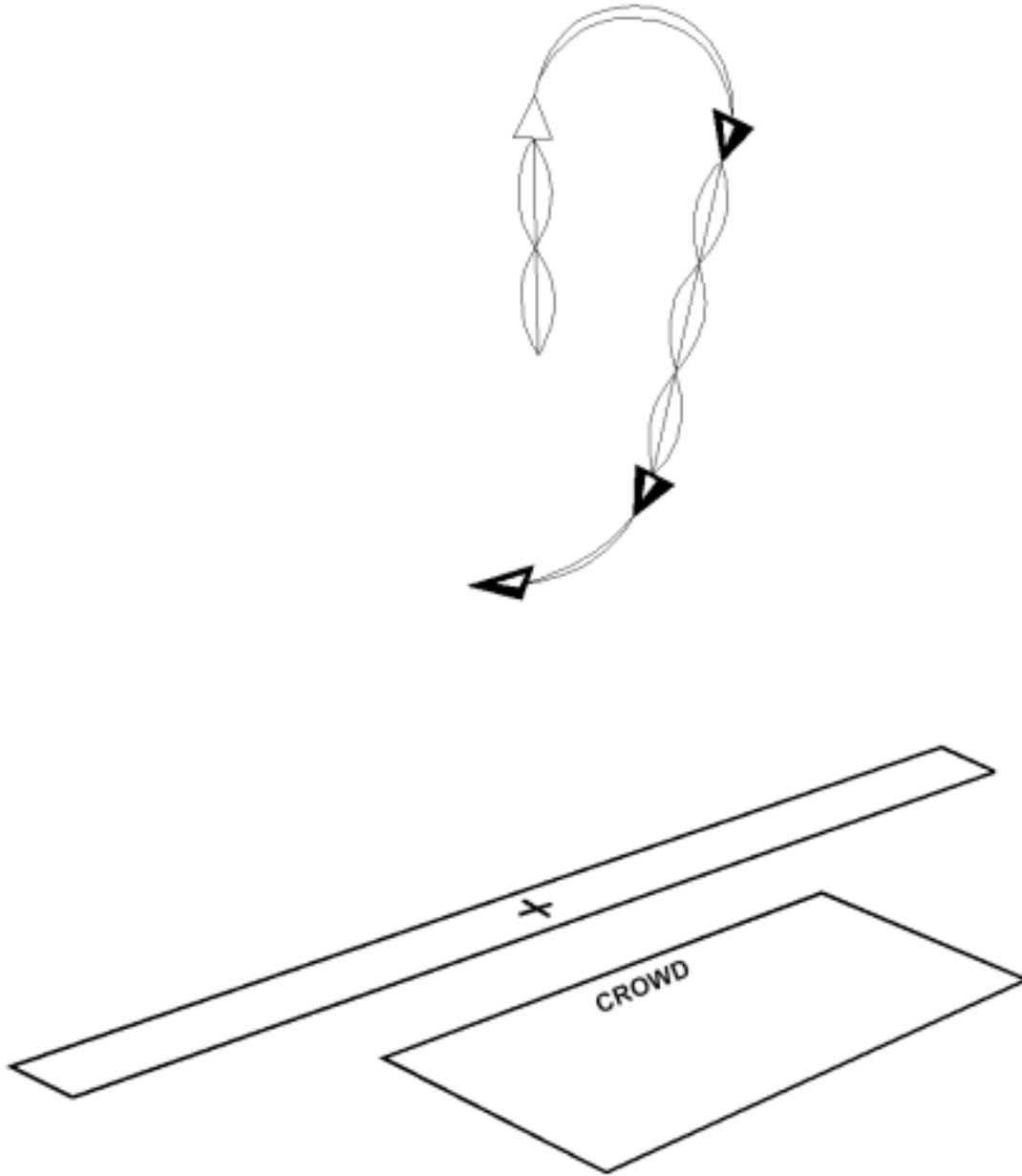
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	400	500	MAX	8
Exit <b>min</b> 10,000'	175	275	80% to MIL	6

4.19.1. **Maneuver Description:** Approach show center wings level, at an airspeed of 420 knots and 300 feet AGL. At 2,000 feet prior to show center select full afterburner and initiate a 6.5 to 7.5 G wings-level pull to arrive at show center with 90 degrees of pitch. The pull should be made so the aircraft is vertical at show center. When the aircraft is vertical, perform high-rate unloaded aileron rolls until reaching a minimum of 225 knots or 2,500 feet below waived airspace. Stop the aileron rolls and execute a vertical recovery by smoothly pulling the nose to the nearest horizon. Deselect afterburner and modulate power as necessary to setup for the spiral descent.

4.19.2. **Abnormal Procedures:** If entry parameters are not met at 2,000 feet prior to show center, delay until entry parameters are met. If entry parameters are not met prior to 2,000 feet past show center, abort the maneuver and reposition for the next pass. If it becomes apparent airspeed will decrease below 175 knots in the climb, initiate a vertical recovery.

#### 4.20. Spiral Descent.

Figure 4.16. F-15 Spiral Descent.



**Spiral Descent  
F-15**

**Table 4.13. F-15 Spiral Descent Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	NTEWA	200		IDLE	1 to 2
Exit	6,000'	400		IDLE	3 to 7

PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b> 10,000'	150	300	IDLE	N/A
Exit	5,000'	350	450	IDLE	8

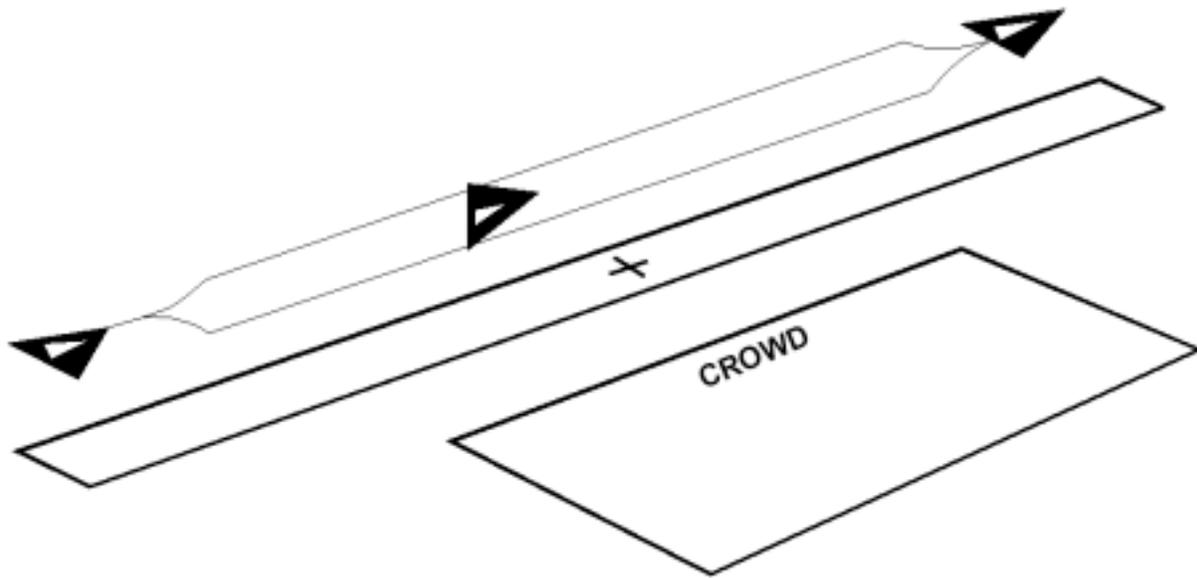
4.20.1. **Maneuver Description:** As the aircraft nose is brought through the horizon, reacquire the airshow environment. In idle power, perform a vertical spiraling descent oriented toward show center. Initiate dive recovery by 6,000 feet AGL. Do not exceed 450 knots in the descent. The direction of the dive recovery should be as necessary to set-up for a sneak attack from behind the crowd or to reposition for the next maneuver, however do not exit the maneuver over the crowd. The sneak attack should be flown by entering 90 degrees to the show line and directly behind the crowd. Descend no lower than 1,000 feet AGL over the crowd and do not exceed 0.94 Mach during the pass. The photo pass may be flown as the sneak attack.

4.20.2. **Abnormal Procedures:** If entry airspeed window is not met (too fast) adjust dive angle to minimize airspeed in the descent. If below 12,000 AGL at the apex of the climb (airspace restrictions, weather conditions), adjust dive angle to safely execute a recovery at 6,000 AGL. When initiating the spiral descent at altitudes above 15,000 AGL, adjust minimum dive recovery altitude accordingly. (If starting at 18,000 AGL, initiate dive recovery at 9,000 AGL.) Initiate an immediate dive recovery if airspeed is at/or above 450 knots. Show center orientation is a secondary consideration in the spiral descent. If at anytime during the maneuver it appears that the aircraft will not attain the prescribed altitude/airspeed parameters, the maneuver will be aborted. Roll out and/or pull to a wings-level position, initiate a descent and reposition the aircraft for follow-on maneuvering.

**OPTION:** Due to changing weather conditions, the vertical spiraling descent may not be possible after the Max Climb. Start a descent when able to maintain VMC conditions to either position the aircraft behind the crowd to set-up for the sneak attack, or to reposition for the next maneuver.

#### 4.21. Knife Edge Pass.

Figure 4.17. F-15 Knife Edge Pass.



## Knife Edge Pass F-15

*NOTE:* May be flown either direction.

**Table 4.14. F-15 Knife Edge Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	400	MAX	1 to 3
Exit 500'	500	80% to MAX	1 to 3

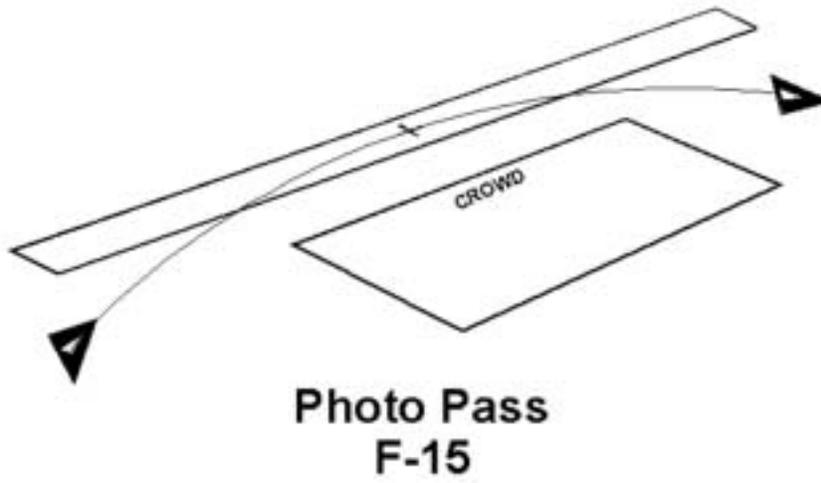
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	350	450	MAX	4
Exit <b>min</b> 400'	475	600	80% to MAX	4

4.21.1. **Maneuver Description:** Enter the show line at 500 feet AGL and 400 knots. At 4,000 feet prior to show center, raise the nose five to 10 degrees, establish a climb, and apply stick pressure to roll 90 degrees toward the crowd. The aircraft is held in this position until 4,000 feet past show center. Top rudder is applied to help hold the nose above the horizon so the full maneuver can be accomplished. Forward stick pressure is applied to keep the aircraft on the show line and to maintain level flight.

4.21.2. **Abnormal Procedures:** If entry parameters are not met, abort the maneuver, make a flat pass and reposition for the next maneuver. If the nose falls below level flight (zero degrees pitch in the HUD) or if the aircraft will descend below 400 feet AGL, abort the maneuver.

#### 4.22. Photo Pass.

Figure 4.18. F-15 Photo Pass.



**NOTE:** May be flown either direction.

**Table 4.15. F-15 Photo Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	≤.92M	MIL to MAX	1 to 3
Exit 300'	≤.92M	IDLE to MAX	4 to 6

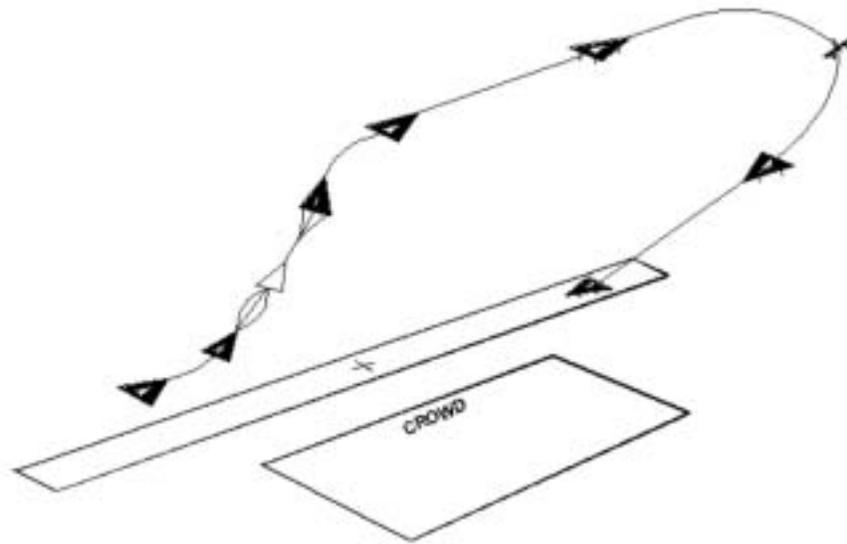
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	N/A	.94M	MIL to MAX	N/A
Exit <b>min</b> 200'	N/A	.94M	IDLE to MAX	9

4.22.1. **Maneuver Description:** At 300 feet AGL, enter the show line at a 45-degree angle (crowd side). Fly a level arcing pass so as to arrive at show center no lower than 300 feet AGL. Continue the turn with a max bank angle of 60 degrees to exit on a climbing 45-degree angle opposite of the entry side. Max airspeed during the pass is 0.94 Mach.

4.22.2. **Abnormal Procedures:** If entry parameters are not met, or the aircraft descends below 200 feet AGL, abort the maneuver, make a flat pass and reposition for the next maneuver.

#### 4.23. Tactical Pitch-Up to Landing (Direction of Landing).

Figure 4.19. F-15 Tactical Pitch-Up to Landing.



**Tactical Pitch-Up To Landing  
F-15**

**Table 4.16. F-15 Tactical Pitch-Up to Landing Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	325	MAX	4-6
Exit Downwind Alt	300	A/R	1 to 4

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	300	375	MAX	8
Exit Downwind Alt	250	400	A/R	N/A

4.23.1. **Maneuver Description:** At 2,000 feet prior to show center, 500 feet AGL, and 325 knots select afterburner. Smoothly pull the nose five degrees up, establish a climb and relax stick pressure. Perform an unloaded 405-degree aileron roll followed by an aggressive pull-up to downwind. During the pull to downwind, terminate afterburner and slow to below 300 knots. Configure for and execute a normal final turn and landing.

**Option 1:** On the pull-up to downwind, an additional 180-degree roll (reversal) may be performed to land from the opposite direction.

**Option 2:** If a Heritage Flight is to be performed immediately following completion of the demonstration, conduct a low approach or wings-level pass and proceed to rejoin with Heritage Flight aircraft using pre-briefed procedures.

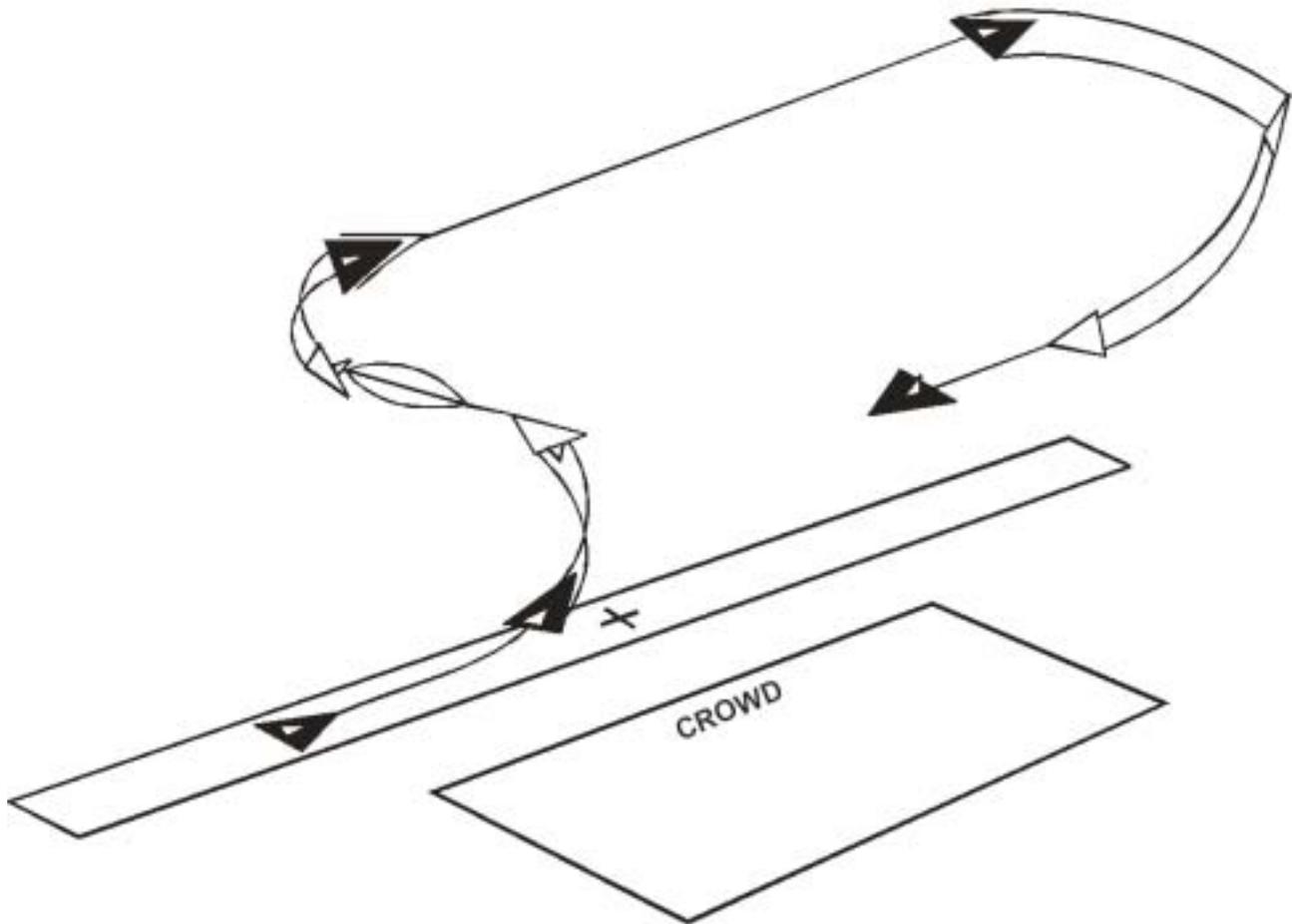
4.23.2. **Abnormal Procedure:** If entry parameters are not achieved by show center, pull-up to a normal closed pattern.

#### *Section 4C—Low Profile*

**4.24. Low Profile Abnormal Procedures:** Unless otherwise noted, **Abnormal Procedures** for the low profile are the same as the high profile.

**4.25. Maximum Performance Takeoff Inverted.**

Figure 4.20. F-15 Maximum Performance Takeoff Inverted.



## Maximum Performance T/O-Inverted F-15

*NOTE:* May be flown either direction.

**Table 4.17. F-15 Maximum Performance Takeoff Inverted Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 0'	180	MAX	23-25 AOA
Exit 1,200'	350	MAX	1

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry 0'	180	N/A	MAX	N/A
Exit 1,000'	300	400	MAX	N/A

4.25.1. **Maneuver Description:** The takeoff is performed without flaps and in full afterburner. At 180 knots, execute a smooth, but brisk aft pull of the stick to achieve takeoff rotation. After a positive rate of climb is established, retract the gear and rotate the nose to achieve a 23-25 unit AOA climb (max AOA 25 units). Smoothly roll and pull away from the crowd to a wings-level inverted position with afterburners pointing directly at the crowd. Hold inverted flight for approximately five seconds, accelerate to 300 to 400 knots, and then perform a 270-degree right turn to position for the Flat Pass. Minimum airspeed in the climb will be 180 knots; minimum altitude inverted will be 1,000 feet.

**Option:** From inverted flight, roll 180 degrees to a wings-level upright position. Delay for approximately 3-5 seconds, and then perform a left 270-degree roll to position for the Flat Pass.

4.25.2. **Abnormal Procedures:** If the show profile takeoff is interrupted by an aircraft malfunction, make a normal takeoff, or if conditions warrant, abort the takeoff. If the takeoff is continued in a thrust-limited situation or if takeoff distance is critical, consider lowering the flaps. If the takeoff is aborted, consider lowering the flaps. Max abort speed and SETOS calculations are based on a flap-down configuration.

**NOTE:** The Max Performance Takeoff/Inverted may be flown in either direction.

**NOTE:** The Inverted Takeoff may be substituted for the Vertical Climb Takeoff at any time. Reasons are not limited to, but may include: takeoff direction due to wind and show orientation, weather considerations, terrain, or to demonstrate a different aircraft capability. The Inverted Takeoff is described in the low section.

#### 4.26. Normal Takeoff.

**Table 4.18. F-15 Normal Takeoff Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	N/A	350		MAX	1
Exit	N/A	350		MAX	5-7

PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	N/A	150	N/A	MAX	N/A
Exit	N/A	300	400	MAX	8

4.26.1. **Maneuver Description:** The takeoff is made with flaps and in full afterburner. Ensure a positive rate of climb is established after takeoff. Retract the gear, and then initiate a 3 to 5-degree nose high climb accelerating to 350 knots. At this point, maintain afterburner and begin an energy sustaining pitch-up to 500 feet AGL, using 5 to 7 Gs. At the end of the runway, perform a repositioning maneuver to set up for the Flat Pass.

4.26.2. **Abnormal Procedure:** Normal Takeoff abort considerations apply.

**NOTE:** The normal takeoff may be flown in place of the Max Performance Takeoff (Climb and Inverted) if required. Reasons include, but are not limited to: weather (ceiling, visibility, winds) and field conditions (rising terrain, high density altitudes, etc.). If flying the normal takeoff to accomplish a weather check before starting the actual profile, start the show from a staged position.

**4.27. Four-Point Roll (Left to Right).** The Four-Point Roll will be performed as described in **paragraph 4.12**.

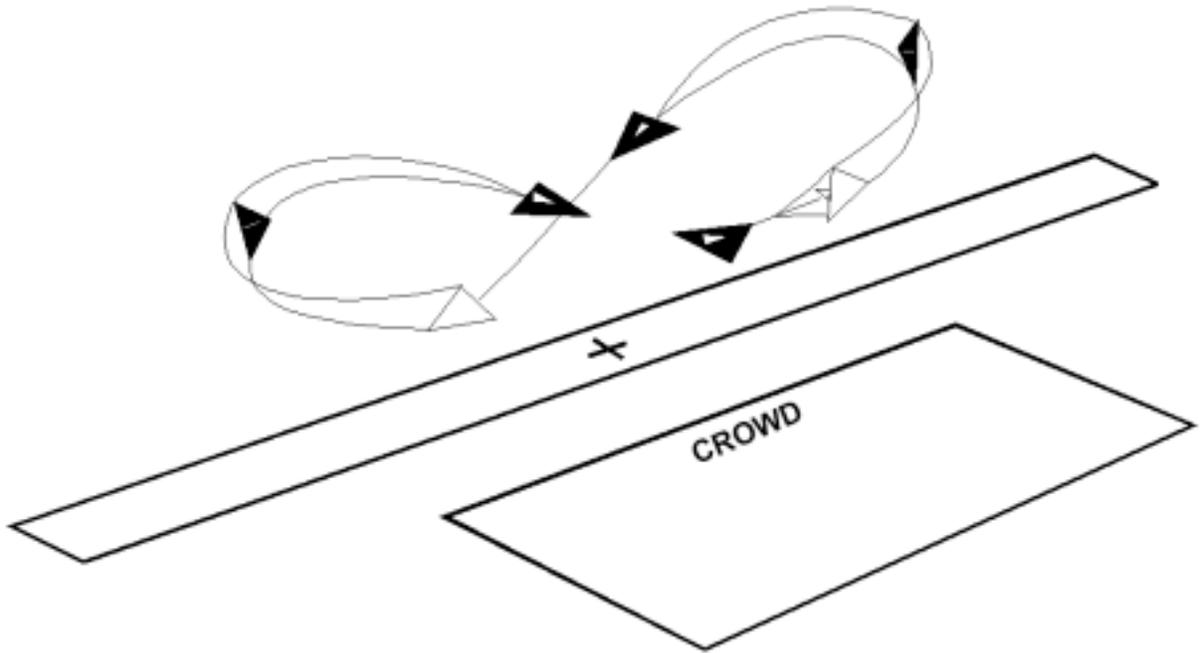
**4.28. High G Turn (Right to Left).** The high G turn will be performed as described in **paragraph 4.13**.

**4.29. Triple Aileron Roll (Left to Right).** The triple roll will be performed as described in **paragraph 4.14**.

**4.30. Wing Walk (Right to Left).** The wing walk will be performed as described in **paragraph 4.15**. At the completion of the wing walk, select full afterburner, raise gear, and perform a repositioning maneuver.

**4.31. Level 8 (Left to Right).**

Figure 4.21. F-15 Level 8.



**Level 8**  
**F-15**

**Table 4.19. F-15 Level 8 Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	500'	420		MAX	7.5
Exit	500'	375		MAX	2-4

PARAMETER LIMITS					
Altitude AGL		Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b> 400'	400	450	MAX	9
Exit	<b>min</b> 400'	300	425	MAX	9

4.31.1. **Maneuver Description:** At approximately 1,500 feet past show center, select full afterburner and accelerate to approximately 420 knots. Turn away from the crowd using approximately 85 degrees of bank. Begin the turn with a smooth G onset-rate to maintain airspeed at approximately 400 knots and 7.5 Gs. G-loading and airspeed bleed-off rate will vary with density altitude. Maintain a minimum of 300 knots. The first 180 degrees of turn should be accomplished with a 1¾-degree nose-up attitude to make the turn appear level to the crowd. After 225 degrees of turn, unload and briskly roll wings level. Approaching the show line, reverse direction of turn and accomplish a second level turn in the opposite direction. Adjust power to enter the second turn with the same entry parameters as the first. Fly the second turn using the same techniques as the first. After 270 degrees and with a 45-degree cut to the show line, reverse the turn again. Vary the bank angle and pitch to arrive at level flight at the completion of the maneuver and to ensure the maneuver is finished above the entry altitude. Surface winds must be taken into careful consideration to center the maneuver over show center and to avoid overshooting the show line. Complete the maneuver by turning as required to finish on the show line heading the same direction as entry. Perform a repositioning maneuver to set-up for the next maneuver.

4.31.2. **Abnormal Procedures:** Adjust power and G as required to avoid overshooting the show line. If the aircraft descends below 500 feet AGL, reorient lift vector to ensure a timely correction. If the aircraft descends below 400 feet AGL or the airspeed decays below 300 knots, abort the maneuver by rolling wings level, climbing to 500 feet AGL, and repositioning for the follow-on maneuver.

**4.32. Sneak Attack:** Depart the show line on a 45-degree cut (crowd side). Execute the sneak attack as described in [paragraph 4.20.1](#).

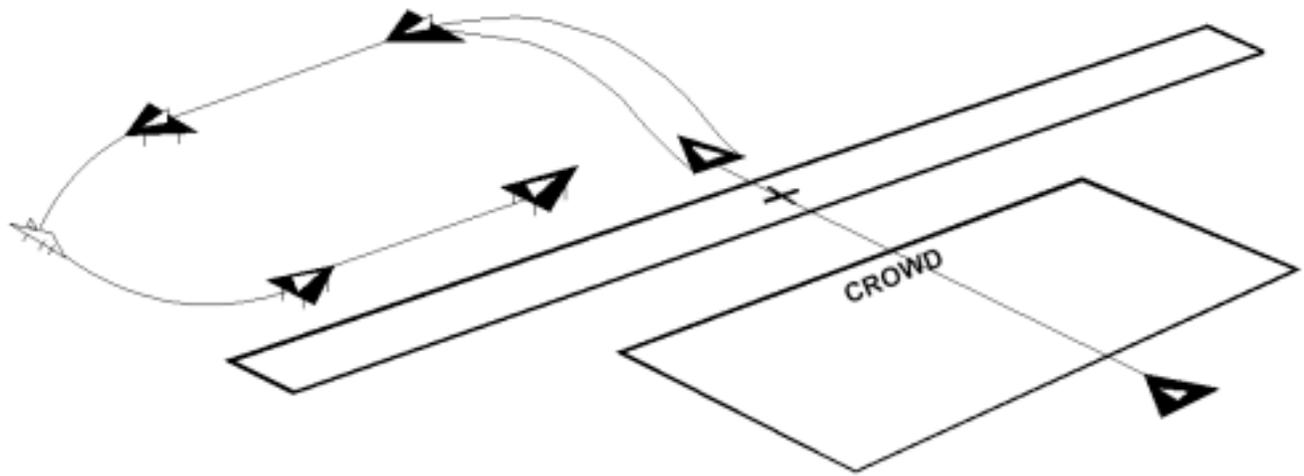
**4.33. Knife Edge Pass:** The Knife Edge Pass will be performed as discussed in [paragraph 4.21](#).

**4.34. Photo Pass:** The Photo Pass will be performed as discussed in [paragraph 4.22](#).

**4.35. Tactical Pitch-Up to Landing:** The Tactical Pitch-Up to Landing will be performed as described in [paragraph 4.23](#).

**4.36. Staged Show Sites.**

Figure 4.22. F-15 Staged Show Sites.



## Staged Show Sites F-15

4.36.1. When demonstration aircraft takeoff from other than the demonstration site, takeoff to arrive over show site with the fuel requirements prescribed in **paragraph 4.2.** plus enroute return fuel IAW AFI 11-2F-15 Vol 3. The pilot may enter the show line from either of the following entries: sneak attack from behind the crowd, photo pass down the show line, or a straight run-in down the extended show line for a tactical pitch-up to simulated landing. If the staged show is entered via a high-speed maneuver such as the photo pass or sneak attack, the reposition pull-up to the simulated takeoff is a high-G maneuver. This can easily lead to adverse G-induced physiological effects while close to the ground. Complete a G-awareness exercise while in the holding area. Complete the desired entry as described earlier and then continue to a left-hand climbing turn for the simulated takeoff left to right. Turn back to the show line and slow to 170 knots. Lower the gear and align with the show line at 300 feet AGL (200 feet AGL if flown over a landable surface). At show center, retract the gear, select full afterburner, and then replicate the Maximum Performance Climb on Takeoff Maneuver. The Maximum Performance Climb to Split-S or Maximum Performance Climb to Inverted Takeoff is performed as described previously in this chapter. The remaining show sequence is unchanged. The closing maneuver is usually the Knife Edge or Photo Pass.

**4.37. F-15 No-Flap TOLD.** The F-15 flying demonstration takeoff is performed in the flaps up configuration. The effect of flaps on TOLD was investigated in the Boeing F-15 Simulator, with the following (non-scientific) results.

4.37.1. **Effect of Flaps on Takeoff Distance.** Takeoff distance was measured for an afterburner takeoff with flaps up and flaps down. Flap position had a negligible effect on takeoff distance. *Conclusion:* the thrust from afterburner on a clean jet overcomes any drag induced by flaps, and acceleration to takeoff speed is not affected by flap position.

4.37.2. **Effect of Flaps on Stopping Distance.** Stopping distance was measured for a full AB acceleration to max abort speed followed by an abort with both engines in idle. For the acceleration portion, the distance was the same for flaps up and flaps down as discussed above. However, the stopping distance was significantly higher for the flaps-up configuration. The average increase in stopping distance was 1200 feet with the flaps up compared to flaps-down. *Conclusion:* Flaps have a considerable effect on stopping distance due to aerodynamic drag.

4.37.3. **Effect of Flaps on SETOS.** SETOS was measured by accelerating in AB to max abort speed, moving one throttle to cutoff, and noting the airspeed at which the aircraft can safely become airborne. For 70° F, flaps-down SETOS was 160 knots, while flaps-up SETOS was around 185 knots. This seems to correspond to the Dash-1 recommendation that, during a flaps-down single-engine takeoff with one engine windmilling, retract the gear when airborne, but delay flap retraction until 25 knots above SETOS. *Conclusion:* No-flap SETOS is approximately 25 knots greater than flaps-down SETOS.

4.37.4. **Effect of Flaps on Single-Engine Takeoff Distance.** Single engine takeoff distance was measured by accelerating to max abort speed in AB, moving one throttle to cutoff, accelerating to SETOS, and measuring the distance from brake release at that point. Again, flap configuration had little effect on the acceleration portion, but a significant effect on the takeoff distance. For flaps up, the acceleration to no-flap SETOS and liftoff occurred an average of 1200 feet further down the runway compared to flaps-down. *Conclusion:* The requirement to accelerate to a higher airspeed before taking off significantly increases the single engine takeoff distance in the no-flap configuration.

4.37.5. **Conclusions.** The F-15 demo is often performed on short runways with no arresting gear available. A serious engine malfunction near max abort speed requires timely and precise action to avoid a runway departure situation. Because the F-15 Dash-1 only provides TOLD for the flaps-down configuration, demo pilots should use this TOLD, but consider the following for takeoff phase engine malfunctions:

4.37.5.1. Max abort speed from the Dash-1 is only valid for flaps down. Flaps up may increase your stopping distance past the end of the runway. If performing a high-speed abort, consider lowering the flaps to minimize stopping distance.

4.37.5.2. SETOS from the Dash-1 is only valid with flaps down. Attempting to takeoff at flaps-down SETOS may significantly delay liftoff. Acceleration to flaps-up SETOS 25 knots higher will significantly increase takeoff distance. If you lose an engine, decide to continue the takeoff, and takeoff distance is critical, consider lowering the flaps to minimize the single-engine takeoff distance.

## Chapter 5

### F-16 DEMONSTRATION MANEUVERS

#### *Section 5A—General Information*

**5.1. General.** Maneuvers described in this chapter will be used for training and for F-16 aerial demonstrations. The demonstration sequence is designed so all of the maneuvers up to the Slow Speed Pass are performed in the same direction with respect to the crowd line. The Slow Speed Pass is designed to be flown against the wind. Abnormal procedures are written for each maneuver. If the entry conditions are not met for any maneuver, a wings-level pass will be flown and the pilot will transition to the next maneuver. Demonstration pilots will transmit parameters prior to initiating the descending portion of vertical pull-throughs for the Split-S, Shark's Tooth, and Vertical Reposition maneuvers. Ground safety observer will monitor demonstration pilot altitude and airspeed radio calls and direct an abort when parameter limits are exceeded.

**5.2. Aircraft Configuration and Fuel Requirements.** Aircraft configuration for all demonstrations will be clean (no wing pylons or missiles except wingtip smoke winders) and internal fuel. Fuel considerations include: divert requirements, cable availability, temperature, and density altitude. Normal minimum fuel for take-off is:

5.2.1. Staged Show: 6,000 pounds.

5.2.2. High Show: 5,000 pounds.

5.2.3. Low Show: 4,000 pounds.

**5.3. Airspeed and G-Limits.** Demonstration pilots will not exceed 0.94 Mach. The maximum target G for this demonstration profile is 7.5 Gs. This does not preclude a momentary increase in G for safety considerations.

**5.4. Show line Restrictions.** The majority of the F-16 demonstration will be flown on the 1,500-foot show line in reference to the distance from the crowd. Non-aerobatic maneuvers (less than 90 degrees of bank) may be flown on the 500-foot show line.

**5.5. Airspace and Runway Requirements.** Required airspace for the F-16 is 15,000 feet AGL and normally a five-mile radius from show center. The minimum dimensions of the aerobatic box are 2,700 feet wide, 6,000 feet long, and up to 15,000 feet AGL (high show). Minimum runway length is 7,000 feet and width is 75 feet. The runway, taxiway, and parking area must be stressed for a 30,000-pound aircraft with single wheel type landing gear.

**5.6. Weather Requirements.** Weather PARAMETER LIMITS for the high profile are a ceiling of at least 7,000 feet and three miles ground and five miles in-flight visibility with a discernible horizon. Ceiling required for the low profile is 2,500 feet. Maneuvers will be planned to maintain VMC throughout the show sequence.

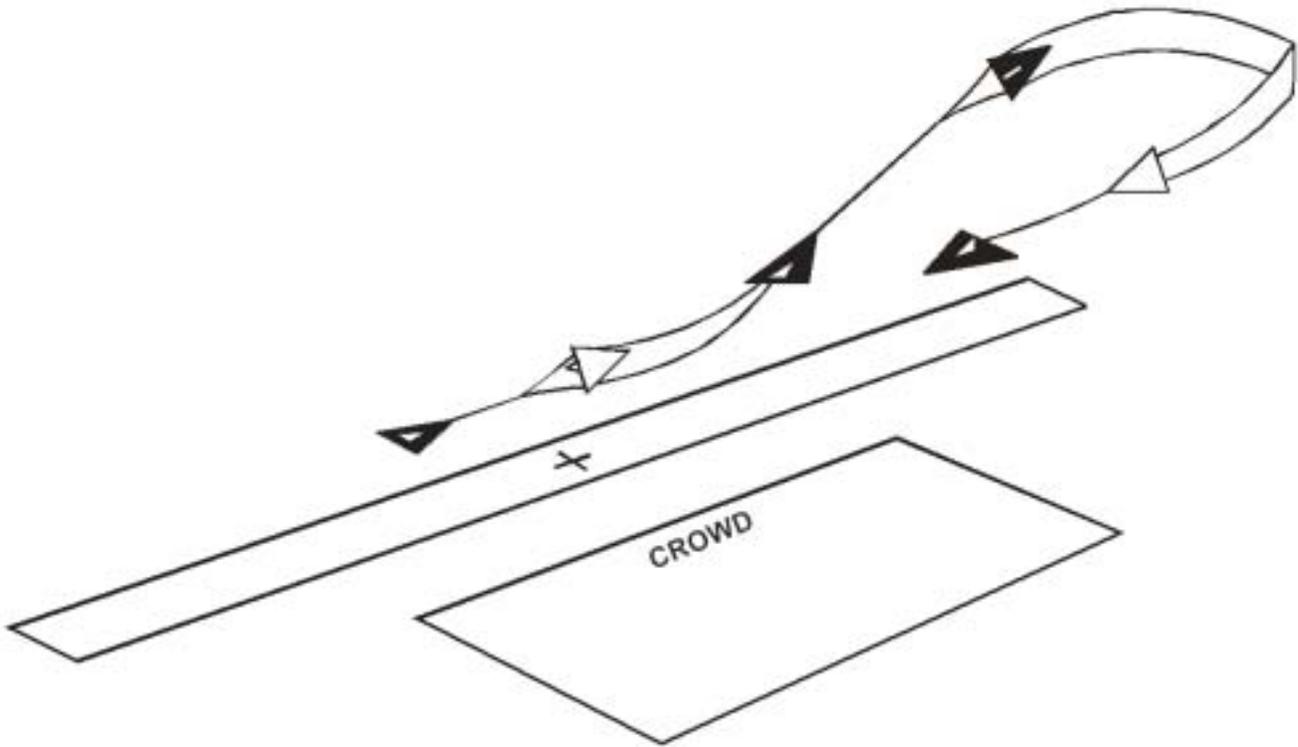
**5.7. High Density Altitude Demonstrations .** For high density altitude shows, adjust PARAMETER LIMITS in accordance with the following:

Add 500 feet to APEX altitudes for each 2,000 feet of altitude above 3,000 feet MSL and ten knots to air-speeds. For example:

SHOWSITE ALTITUDE 3,000 feet	Baseline Targets/ PARAMETER LIMITS
SHOWSITE ALTITUDE 5,000 feet	BASELINE + 500 feet / 10 KNOTS
SHOWSITE ALTITUDE 7,000 feet	BASELINE +1000 feet / 20 KNOTS

### 5.8. Positioning Maneuvers.

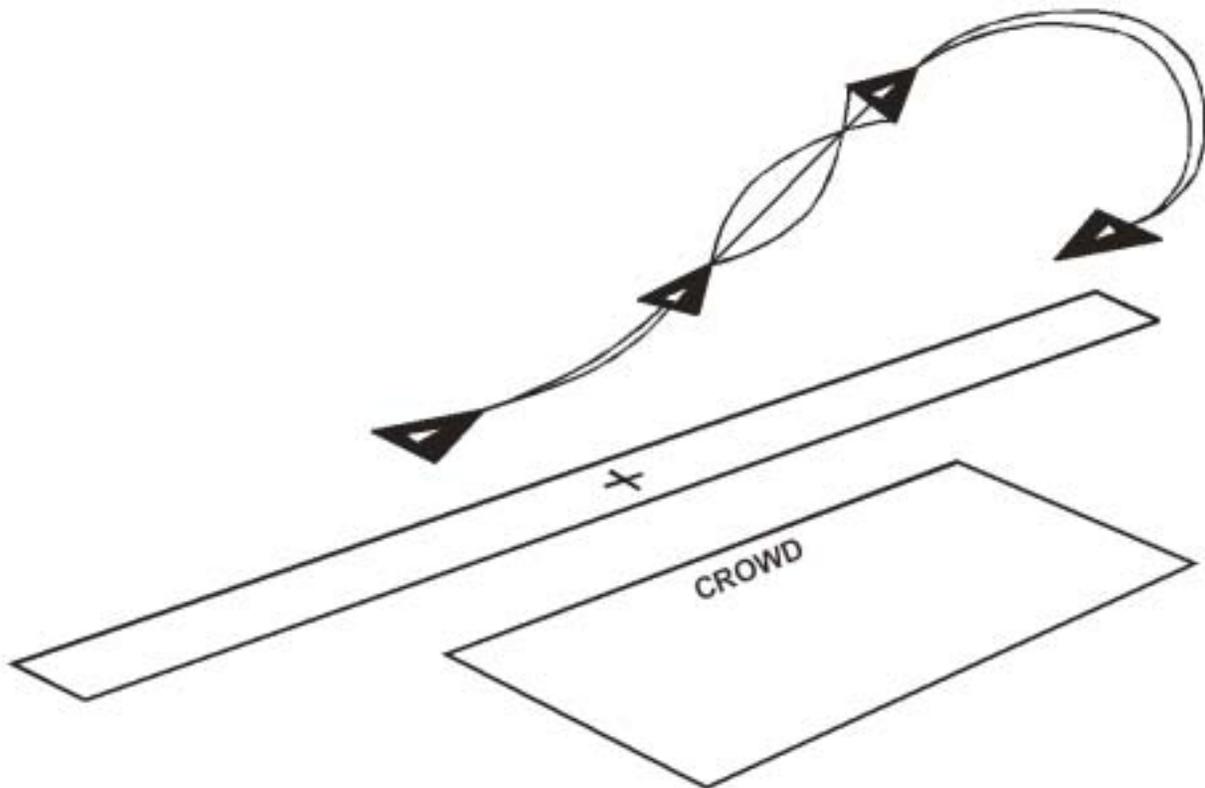
Figure 5.1. F-16 Flat Wifferdill.



**Flat Wifferdill**  
**F-16**

5.8.1. **Flat Wifferdill Maneuver.** The Flat Wifferdill Maneuver turn is a combination horizontal and shallow vertical turn used to change direction at each end of the show line when performing the low profile. The Flat Wifferdill Maneuver turn uses less altitude than a normal reposition. It requires a larger cut and tends to be looser and flatter than a normal turn. The target G for this maneuver is 6.5 to 7.0 Gs. A 270-degree turn reversal may be made while the aircraft is climbing. Each turn may differ slightly so that airspeed/altitude parameters for the next maneuver are established in the flat reposition. The entry "cut" turn for the flat reposition is made to ensure no show line or crowd line penetration.

Figure 5.2. F-16 Wifferdill Repositioning Maneuver.



# Wifferdill Repositioning Maneuver

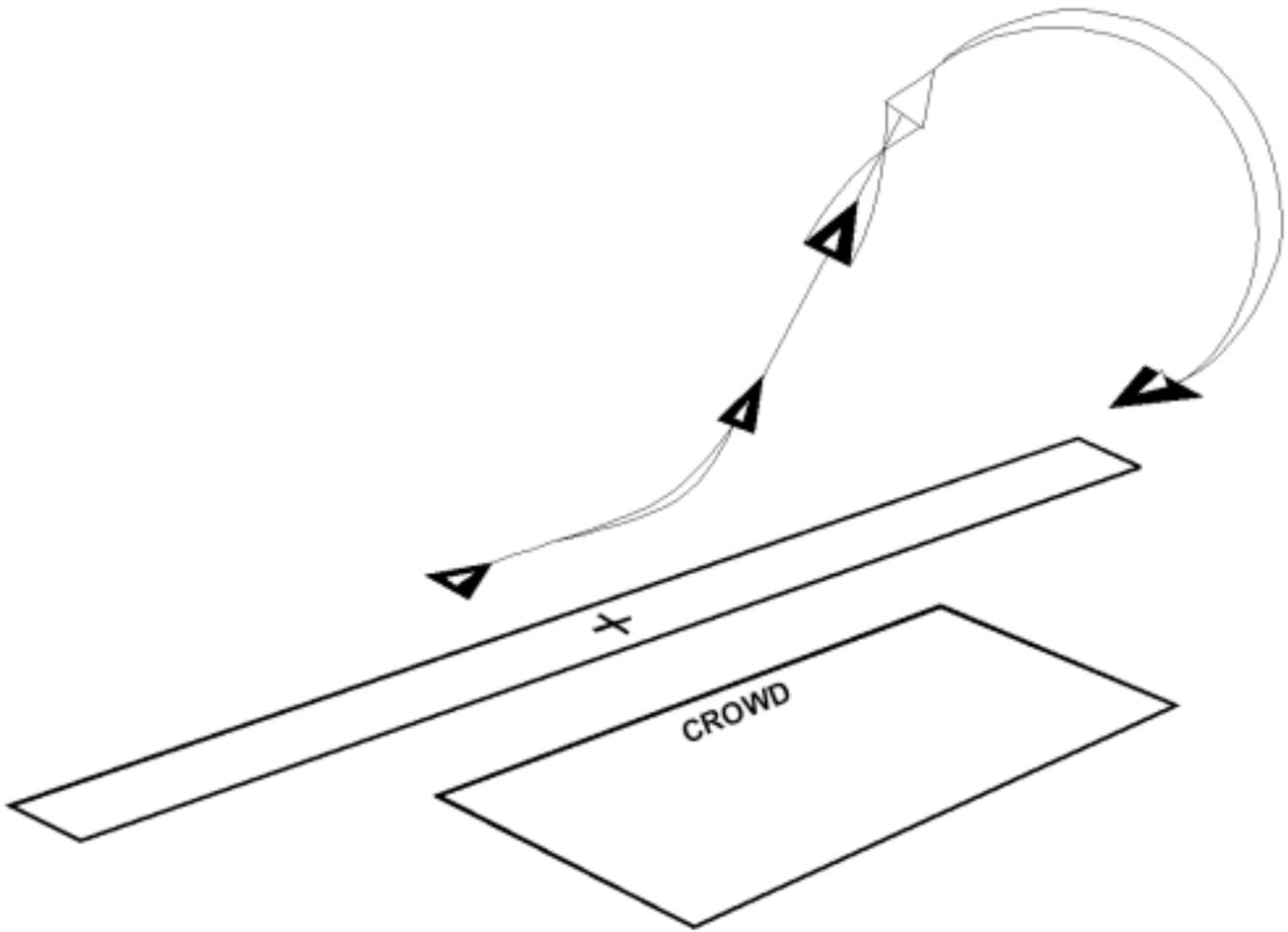
## F-16

5.8.2. **Wifferdill Repositioning Maneuver Turn.** The turn is a combination horizontal and vertical turn used to change direction at each end of the show line. The vertical plane is used to maintain proximity to the demonstration area. Each turn may differ slightly so that airspeed/ altitude parameters for the next maneuver are established in the turn. As the aircraft departs the show line, maneuver in the horizontal and vertical plane to reposition for the next maneuver. The Target G for this maneuver is 6.0 to 7.0 Gs. A 270-degree rolling turn reversal is made while still climbing. During the last half of the maneuver, while descending, the turn is adjusted to establish the proper show line entry. The entry "cut" turn for the reposition is made to ensure no show line or crowd line penetration.

5.8.2.1. **Abnormal Procedures:** Weather, terrain, obstacles, and winds into the show line must be considered when determining how much vertical and horizontal turning room is required for the reposition.

5.8.3. **Vertical Reposition Maneuver.**

Figure 5.3. F-16 Vertical Reposition Maneuver.



# Vertical Reposition F-16

**Table 5.1. F-16 Vertical Reposition Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	A/R	450		A/R	5.5-7.5
Apex	6,000'	275		A/R	Limiter
90 degrees nose low	≥3,500'	300		A/R	
Exit	500'	A/R		A/R	4-6

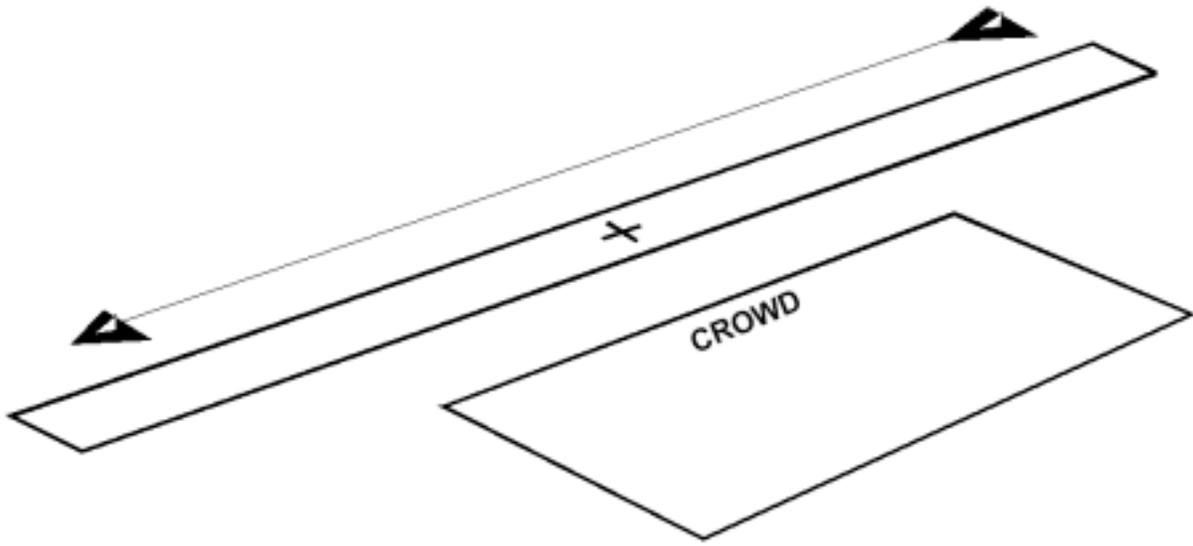
PARAMETER LIMITS						
Altitude AGL			Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b>	400'	150	N/A	A/R	9
Apex		5,000'	150	350	A/R	9
90 degrees nose low		3,000'	150	350		
Exit	<b>min</b>	400'	A/R	A/R	A/R	9

5.8.3.1. **Maneuver Description.** The vertical reposition will be flown to change direction at each end of the show line during a high show. Upon passing show center or at the completion of the previous maneuver, a straight-ahead climb is commenced using a 6.0 to 7.0 G pull to put the aircraft in a 55-degree nose high attitude. For slower entry parameters, use G as required to maintain a minimum of 150 KIAS. Power setting is based upon entry parameters to ensure a minimum airspeed of 150 KIAS in the climb. Pitch attitude may be reduced as well to hold airspeed. At a minimum of 3,000 feet AGL, the aircraft is rolled inverted and the demonstration pilot unloads the aircraft to attain or exceed the apex target altitude. Once apex parameters are assured, initiate an aggressive 135-degree pull through the vertical, to approximately 45 degrees nose low. The peak altitude reached will be a minimum of 5,000 feet AGL with a target of 6,000 feet AGL. The throttle will be modulated as required to initiate the pull down with a target airspeed of 275 KIAS. Once recovery above the minimum altitude for the follow on maneuver is assured, backpressure is relaxed and the aircraft is smoothly flown to be in level flight at the entry altitude for the next maneuver. In no circumstances should the demonstration pilot play the G during the 135-degree pull through the vertical.

5.8.3.2. **Abnormal Procedures:** If entry parameters are not attained, reposition in the oblique for follow-on maneuvers. If apex parameters are not achieved with regard to airspeed or altitude, immediately recover the aircraft to the nearest horizon and abort the split-S. If the airspeed exceeds 350 KIAS during any portion of the dive or is below 3,000 feet AGL at 90 degrees nose low, immediately initiate a dive recovery to the nearest horizon.

#### 5.8.4. Flat Pass.

Figure 5.4. F-16 Flat Pass.



# Flat Pass F-16

*NOTE:* May be flown either direction.

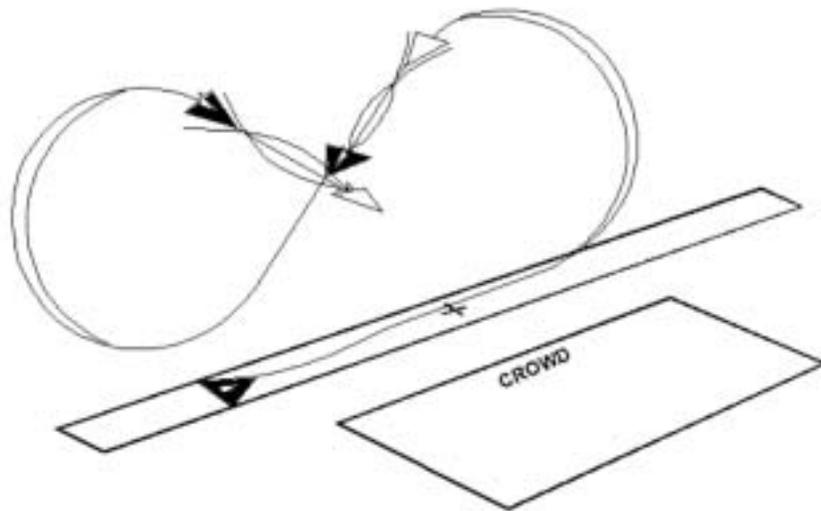
5.8.4.1. **Maneuver Description.** The flat pass described at **paragraph 5.10.** is a repositioning maneuver used alone or in combination with an oblique reposition for the primary purpose of orienting the subsequent demonstration maneuver in the approved direction relative to the crowd line. It will be flown wings level down the show line so as not to exceed 0.94 Mach and at a minimum of 200 feet AGL.

5.8.4.2. **Abnormal Procedure .** If it becomes apparent 0.94 Mach will be exceeded, afterburner should be deselected.

### *Section 5B—High Profile*

**5.9. Maximum Performance Takeoff and Climb to Cuban 8 or 1/2 Cuban 8 (depending on takeoff direction).**

Figure 5.5. F-16 Maximum Performance Takeoff and Climb to Cuban 8.



Maximum Performance  
Takeoff and Climb to Cuban 8  
F-16

**Table 5.2. F-16 Maximum Performance Takeoff and Climb to Cuban 8 Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 200'	400	MIL to MAX	4 to 6
Apex $\geq$ 3,500'	200	MIL to MAX	2-4
Exit 500'	400	A/R	4-6

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 100'	300	440	MIL to MAX	9
Apex <b>min</b> 3,000'	150	350	MIL to MAX	5
Exit <b>min</b> 400'	300	N/A	A/R	9

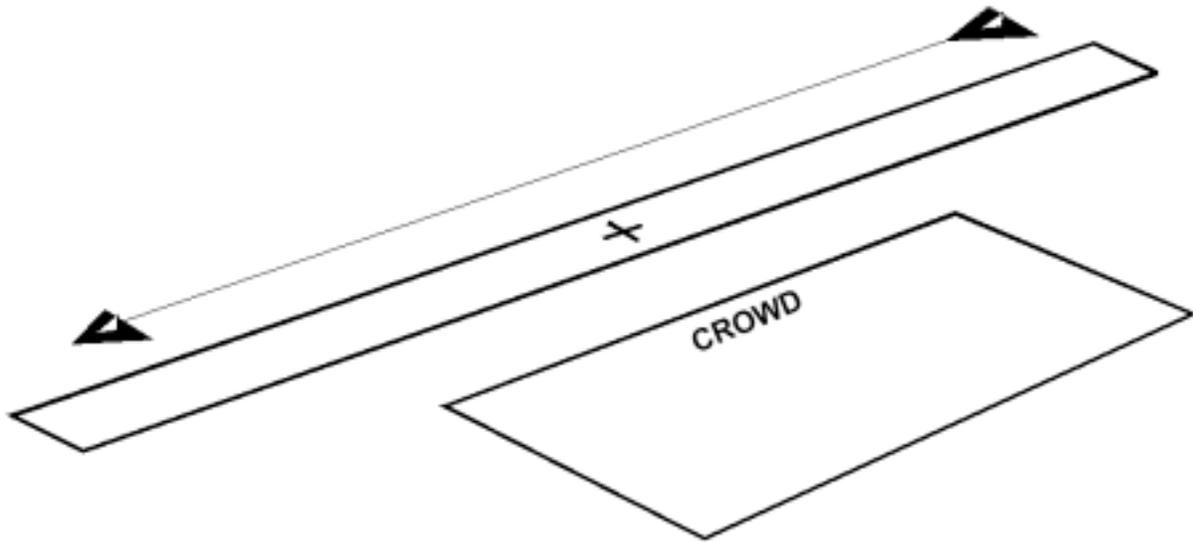
5.9.1. **Maneuver Description** . Takeoff will not be attempted when the takeoff roll exceeds 80 percent of available runway. The takeoff is made in full afterburner. After takeoff, establish a positive rate of climb and raise the gear, at a minimum of 300 knots begin a wings-level 4.0 to 6.0 G pull. Hold the pull until 90 degrees of pitch, then release the backpressure to approximately 2.5 G until 25 to 35 degrees nose high inverted. Play the backpressure to ensure the over-the-top airspeed and altitude are above 150 knots and 3,000 feet AGL. Continue the pull until 25 to 45 degrees nose low inverted. Unload to hold pitch, deselect afterburner, and perform an unloaded  $\frac{3}{4}$  roll to a wings-level upright. At 2,000 feet AGL, modulate power as required and begin a four to six-G wings-level pull to arrive on the show line at 500 feet AGL with 400 knots. If the direction of takeoff is left to right, accomplish the second half of a Cuban 8 using an entry airspeed of approximately 400 knots, an entry pull of 4.0 to 6.0 Gs and over-the-top minimum of 150 knots. The descending portion of the second half is accomplished exactly as the descending portion of the first half. If the direction of takeoff is right to left, accomplish the first half of the Cuban 8 only.

5.9.2. **Abnormal procedures**. If entry parameters are not attained, clear the show line in front of the crowd. If at any time during the maneuver it appears the minimum over-the-top altitude or airspeed parameters will not be met, the maneuver will be aborted by performing an unloaded roll to the wings-level upright position accelerating to 250 knots in afterburner and continuing down the show line. If desired pitch attitude is exceeded while inverted, roll upright and set desired pitch angle and continue maneuver. If less than 2,500 feet AGL while inverted, an immediate roll and pull to wings level will be initiated. If at any time it becomes apparent that the maneuver will be completed inside the show line (poor wind correction, improper alignment) abort the maneuver and setup for the next pass.

5.9.3. The Cuban 8 is a transition point to the low profile, if required by changing weather.

## 5.10. High Speed Flat Pass (Right to Left).

Figure 5.6. F-16 Flat Pass.



# Flat Pass F-16

*NOTE:* May be flown either direction

**Table 5.3. F-16 Flat Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	≤.92M	MAX	.5-1.5
Exit 300'	≤.92M	IDLE to MAX	.5-1.5

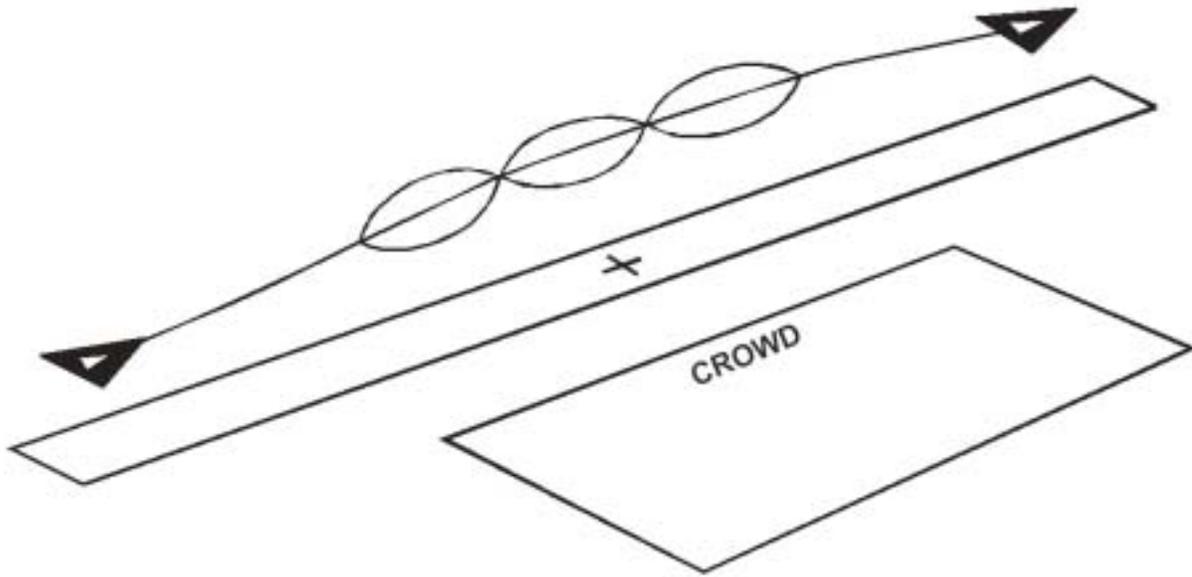
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	N/A	.94M	MAX	N/A
Exit <b>min</b> 200'	N/A	.94M	IDLE to MAX	N/A

5.10.1. This maneuver may be flown on the 500 foot show line at 300 feet AGL. After the repositioning maneuver, the pilot will perform a flat pass. Upon completion of the flat pass, a reposition maneuver is flown in preparation for the next maneuver.

5.10.2. **Abnormal Procedure:** If it becomes apparent 0.94 Mach will be exceeded, afterburner should be deselected.

### 5.11. Triple Aileron Roll (Left to Right).

Figure 5.7. F-16 Triple Aileron Roll.



# Triple Aileron Roll

## F-16

**Table 5.4. F-16 Triple Aileron Roll Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	425	80% to MIL	.8-1.2
Exit 500'	450	80% to MIL	.8-1.2

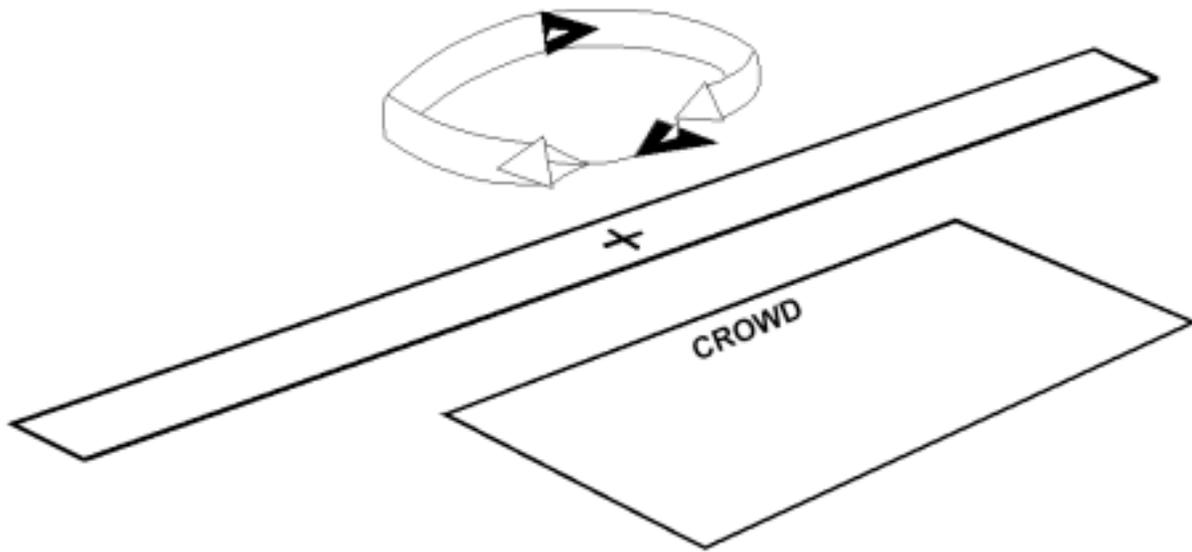
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	400	500	80% to MIL	2
Exit <b>min</b> 400'	400	500	80% to MIL	N/A

5.11.1. **Maneuver Description.** At 3,500 feet prior to show center with approximately 425 knots raise the nose to 5-7 degrees pitch attitude, establish a climb, and relax stick pressure to approximately 0.8 Gs. Apply left stick pressure to perform a maximum of three consecutive unloaded aileron rolls. Crosscheck the horizon and audibly count the rolls during the maneuver. As you complete the second roll, ensure the aircraft has gained altitude and that the flight path marker is above the horizon line in the HUD. If not, abort the maneuver and recover the aircraft above the minimum altitude. If you lose count of the number of rolls or experience roll-coupling immediately abort the maneuver. In all cases, the rolls will be completed at a higher altitude than entry. After rolling out wings level upon completion of the third roll, smoothly apply aft stick pressure as required to finish the maneuver at entry altitude (the objective of the maneuver is to make the pass look symmetrical to the crowd). Then perform a repositioning maneuver to prepare for the next maneuver.

5.11.2. **Abnormal Procedures:** If the minimum entry parameters are not met, transition to a wings-level flat pass. At wings level following the second roll, abort the maneuver if the flight path marker is not above the horizon line. Abort the maneuver if you lose count of the rolls during the sequence.

## 5.12. High G Turn (Right to Left).

Figure 5.8. F-16 High G Turn.



# High G Turn F-16

**Table 5.5. F-16 High G Turn Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	400	MIL to MAX	7.5
Exit 500'	350	MIL to MAX	6.5-7.5

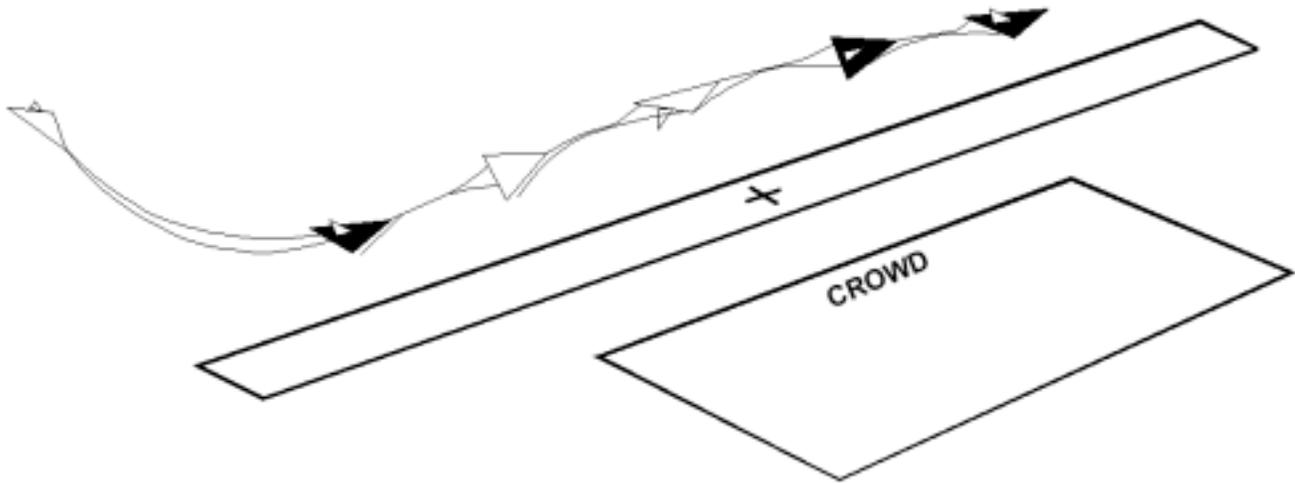
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	330	440	MIL to MAX	9
Exit <b>min</b> 400'	250	440	MIL to MAX	9

5.12.1. Just prior to show center select full AB and accelerate to 400 knots. At show center, turn away from the crowd using approximately 85 degrees of bank. Begin the turn with a smooth G onset-rate to approximately 7.5 Gs. G-loading and airspeed bleed-off rate will vary with density altitude. Maintain a minimum of 250 knots. The first 180 degrees of turn should be accomplished with a 1¾-degree nose-up attitude and the last 180 degrees should be accomplished with a 1¾-degree nose-down attitude to make the turn appear level to the crowd. Vary the bank angle and pitch to arrive at level flight at the completion of 360 degrees of turn and to ensure the maneuver is finished above the entry altitude. Surface winds must be taken into consideration in order to center this maneuver on show center and to avoid overshooting the show line. As you approach show center, smoothly but briskly roll out. Perform a repositioning maneuver to prepare for the next maneuver.

5.12.2. **Abnormal Procedures:** If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. If during any portion of the maneuver it becomes apparent the aircraft will descend below 400 feet AGL or airspeed decay below 250 knots, abort the maneuver by rolling wings level and climbing to 500 feet AGL. If necessary, adjust power and G as required (no lower than 250 knots) to avoid overshooting the show line.

### 5.13. Four-Point Roll (Left to Right).

Figure 5.9. F-16 Four-Point Roll.



# Four-Point Roll

## F-16

**Table 5.6. F-16 Four-Point Roll Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	425	80% to MIL	+ .8 to 1.2
Exit 500'	450	80% to MIL	+ .8 to 1.2

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	400	500	A/R	2
Exit <b>min</b> 400'	400	500	A/R	N/A

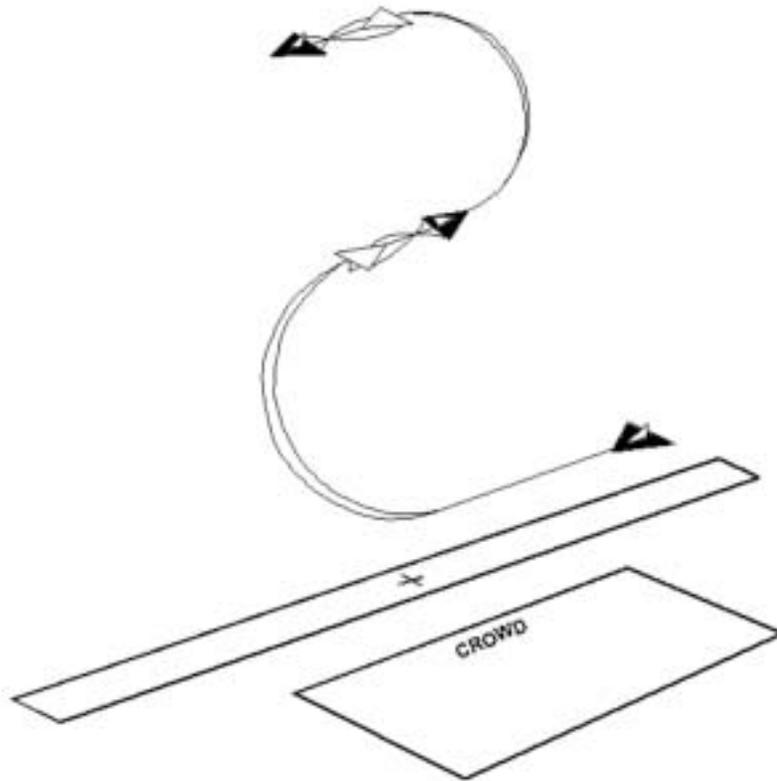
5.13.1. **Maneuver Description** . At 3,000 feet prior to show center, rotate the nose five to seven degrees nose up, establish a climb, and relax stick pressure. A cadence four-point roll to the left is then performed by pausing momentarily at the 90-degree, 180-degree, 270-degree, and 360-degree points. The pace of the cadence should ensure the aircraft is at the 180-degree point over show center. In all cases, the roll will be completed at a higher altitude than it starts. Move the stick briskly, initiating a left roll and an immediate stop at the proper 90-degree point when pressure is released. Upon returning to wings level, smoothly apply aft stick pressure as required to finish the maneuver at entry altitude (the objective of the maneuver is to make the pass look symmetrical to the crowd). At the completion of the pass, a repositioning maneuver is performed to set up for the next maneuver.

5.13.2. **Abnormal Procedures:** If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. If the flight path marker is below the horizon line at the wings-level inverted position, an immediate roll to the upright position will be made (abort), clearing the show line past the end of the crowd line.

**NOTE:** The Four-Point Roll is a transition point to the Low Show Profile if changing weather conditions require.

#### 5.14. Double Immelmann (Right to Left).

Figure 5.10. F-16 Double Immelmann.



Double Immelmann  
F-16

**Table 5.7. F-16 Double Immelmann Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	450	MAX	6.5 to 7.5
Mid Point $\geq 3,000'$	300	MAX	4 to 6
Apex $\geq 6,000'$	175	A/R	A/R

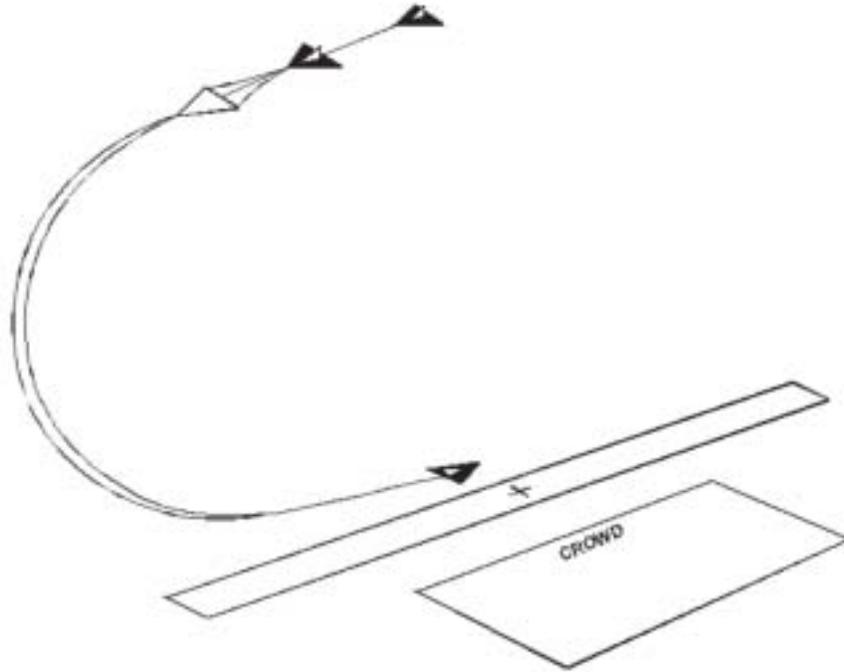
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	330	550	MAX	9
Mid Point <b>min</b> 2,500'	250	N/A	MAX	9
Apex 5,000'	150	350	A/R	N/A

5.14.1. **Maneuver Description** . Just prior to show center and wings level, select full afterburner and begin a smooth 6.5 to 7.5 G wings-level pull to execute the first Immelmann. The pull is held until inverted wings level. Relax stick pressure and perform an unloaded 180-degree roll to a wings-level upright position. Accelerate to 300 knots and initiate a 4 to 6 G pull to perform the second Immelmann. Roll out to a wings-level upright position from the second Immelmann at approximately 175 knots and proceed to the end of the show line (approx 6,000 feet).

5.14.2. **Abnormal Procedures:** If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. If minimum airspeeds cannot be maintained at any point during the maneuver, recover the aircraft to wings level and clear in front of the line.

### 5.15. Split-S (Left to Right).

Figure 5.11. F-16 Split-S.



**Split-S**  
**F-16**

**Table 5.8. F-16 Split-S Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Pull Down $\geq 6,000'$	250	MIL or Less	Limiter Pull
90 deg low $\geq 3,500'$	300	A/R	A/R
Exit 500'	A/R	A/R	4-6

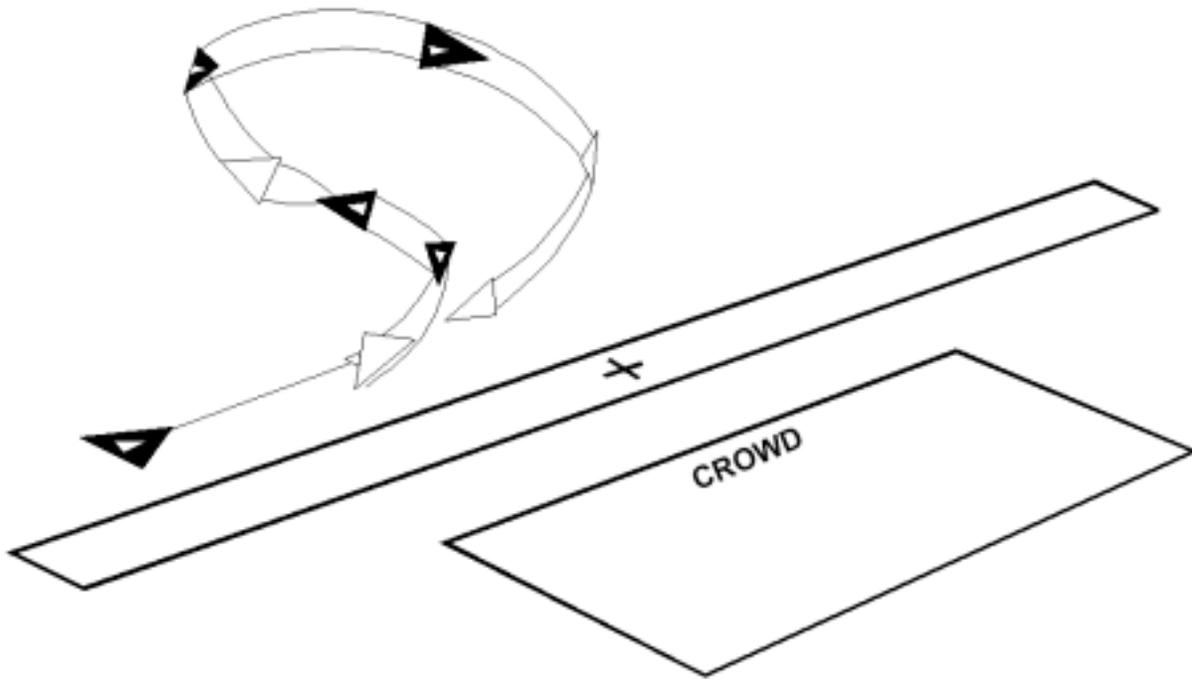
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Pull Down 5,000'	150	350	MIL or Less	N/A
90 deg low 3,000'	150	350	A/R	N/A
Exit <b>min</b> 400'	A/R	A/R	A/R	9

5.15.1. **Maneuver Description.** With Mil power or less, proceed to the end of the show line (approx 6,000 feet). At 250 knots and 6,000 feet AGL, roll inverted, perform an aggressive 135-degree pull through vertical, to approximately 45 degrees nose low, to reenter the show line from left to right at a minimum of 500 feet AGL. The throttle should be modulated as required to initiate the pull down with target airspeed of 250 KIAS. Once recovery above the minimum altitude for the follow-on maneuver is assured, backpressure is relaxed and the aircraft smoothly flown to be in level flight at the entry altitude for the next maneuver.

5.15.2. **Abnormal Procedures:** If the entry parameters are not met, the pilot will transition to a wings-level flat pass. If parameter limits cannot be maintained at any point during the maneuver, recover the aircraft to wings level and clear in front of the line. Do not attempt to pull down from the inverted apex below 5,000 feet AGL or with more than 350 KIAS. At 90 degrees nose low, max airspeed is 350 KIAS and minimum altitude is 3,000 feet AGL. If either is exceeded, execute a dive recovery IAW tech order procedures.

## 5.16. Falcon Turn (Left to Right).

Figure 5.12. F-16 Falcon Turn.



# Falcon Turn F-16

**Table 5.9. F-16 Falcon Turn Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	375	MAX	6.5 to 7.5
Turn Reversal 1500'	375	MIL to MAX	6.5 to 7.5
Exit 500'	350	MIL to MAX	6.6-7.5

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	330	440	MAX	9
Turn Reversal 800'	330	440	MIL to MAX	9
Exit <b>min</b> 400'	250	440	MIL to MAX	9

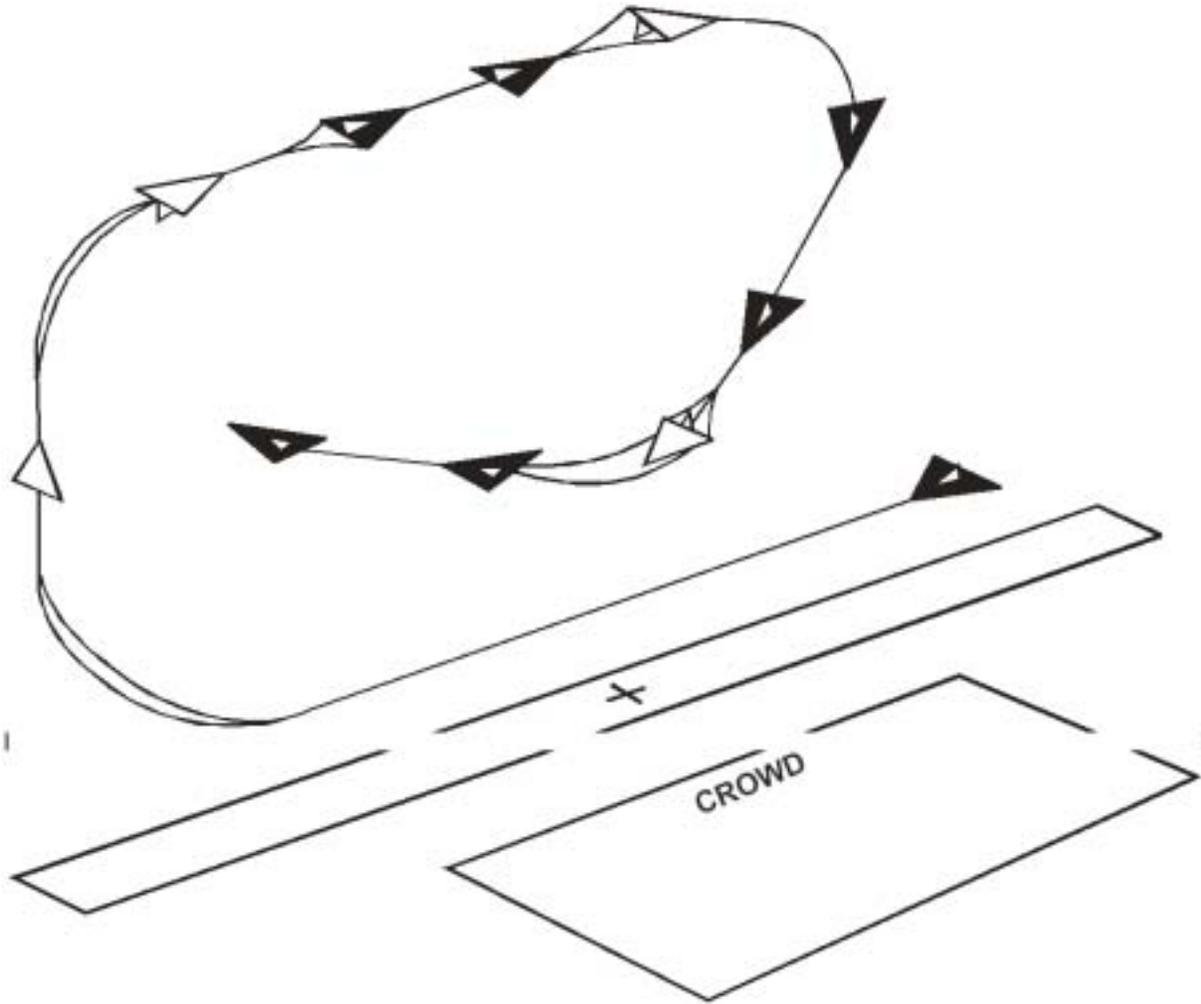
5.16.1. **Maneuver Description** . This maneuver may be initiated at the 500-foot show line. Enter the show line at 500 feet AGL and 375 knots. Just prior to show center select full afterburner and perform a 6.5 to 7.5 G slightly climbing turn (20 to 30 degrees pitch angle) left away from the crowd. After 90 degrees of turn, reverse the direction of the turn to the right by unloading and rolling under 180 degrees. Perform a 6.5 to 7.5 G right slightly descending turn (10 to 20 degrees nose low) for 270 degrees rolling out heading the opposite direction with a minimum of 250 knots. Accelerate down the show line at 500 feet AGL in preparation for the next maneuver.

5.16.2. **Abnormal Procedures:** If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. If during any portion of the maneuver it becomes apparent the aircraft will descend below 400 feet AGL or overshoot 30 degrees nose low, the maneuver will be aborted by rolling wings level and climbing to 500 feet AGL. If it becomes apparent the aircraft will overshoot the show line, use airspeed and G as required (no lower than 250 knots) to prevent the overshoot.

**NOTE:** The Falcon Turn is a transition point to the Low Profile if required by changing weather conditions.

### 5.17. Shark's Tooth (Right to Left).

Figure 5.13. F-16 Shark's Tooth.



# Shark's Tooth F-16

**Table 5.10. F-16 Shark's Tooth Parameters.**

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	500'	400		MAX	6.5 to 7.5
Apex	≥6,000'	250		MIL to MAX	6.5 to 7.5
90 degrees nose low	≥3,500'	300		IDLE to MIL	A/R
Exit	500'	A/R		A/R	4-6

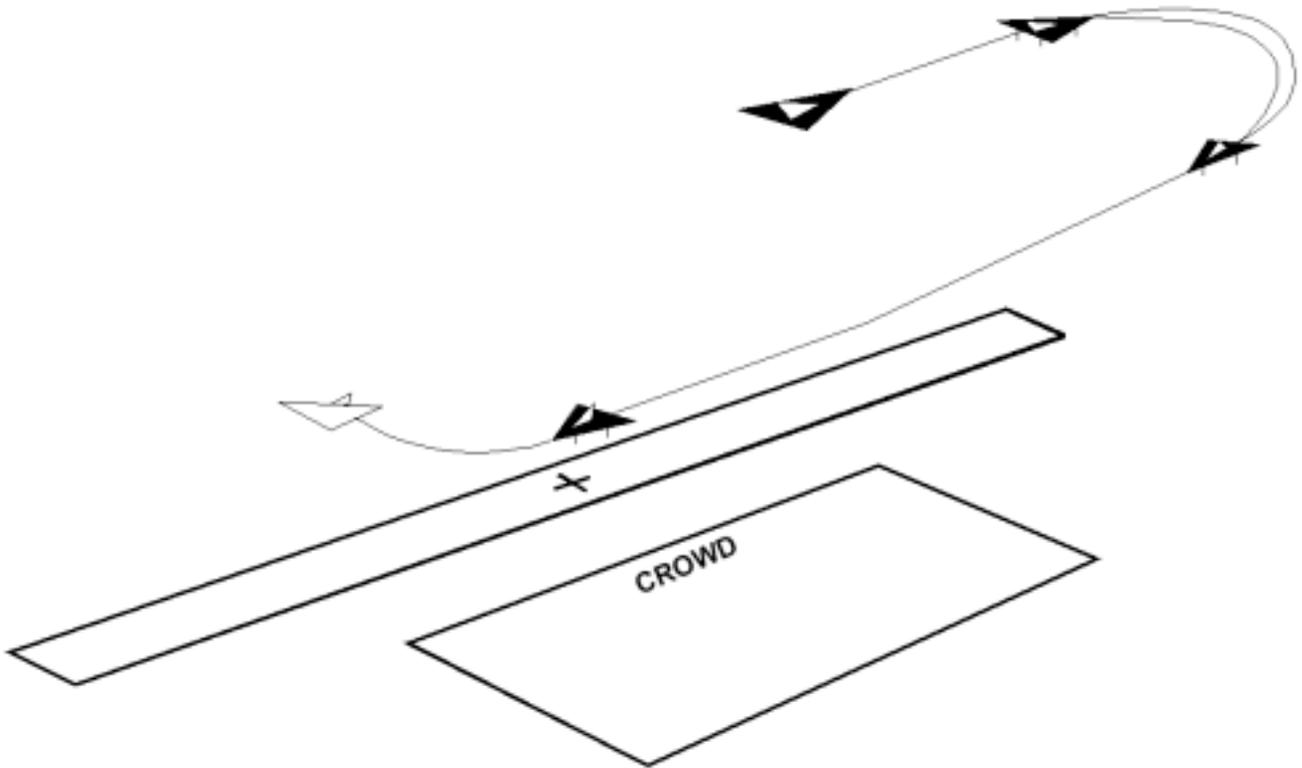
PARAMETER LIMITS						
Altitude AGL			Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b>	400'	330	N/A	MAX	9
Apex		5,000'	150	350	MIL to MAX	9
90 degrees nose low		3,000'	150	350	IDLE to MIL	9
Exit	<b>min</b>	400'	A/R	A/R	A/R	9

**5.17.1. Maneuver Description .** This maneuver is a three-sided square loop with the third corner at a 135-degree angle. It avoids the pure vertical recovery in the last corner of a normal square loop. At 2,000 feet past show center, select afterburner and perform a 6.5 to 7.5 G pull to 90 degrees nose high. Maintain full afterburner in the climb to 4,500 feet AGL, and then perform a 5.0 to 7.0 G pull of 90 degrees to inverted. Roll out to wings level upright and maintain 250 knots. At 2,000 feet past show center, roll inverted, select power as required and perform a 5.0 to 7.0 G pull to 90 degrees nose low. Approaching 4,500 feet to 3,500 feet AGL, at a maximum of 350 KIAS, continue to pull to 45 degrees nose low upright. Hold until reaching 2,000 feet AGL, and then perform a descending turn away from the crowd. Turn left or right to set up on the appropriate 1,000 feet downwind for the slow pass into the wind.

**5.17.2. Abnormal Procedures:** If the minimum entry parameters are not met, the pilot will transition to a wings-level flat pass. Do not attempt to pull down from the inverted apex below 5,000 feet AGL or with more than 350 KIAS. If out of the maneuver envelope, perform a roll to wings-level upright and make a descending turn away from the crowd to set up on a downwind position for the slow speed pass. At 90 degrees nose low, max airspeed is 350 KIAS and minimum altitude is 3,000 feet AGL. If either is exceeded, execute a dive recovery IAW tech order procedures.

### **5.18. Slow Speed Pass with Slow Speed Reposition (Into the wind).**

Figure 5.14. F-16 Slow Speed Pass.



**Slow Speed Pass  
F-16**

**Table 5.11. F-16 Slow Speed Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300' (over a runway) 200'	140	A/R	1-2
Exit 300' (over a runway) 200'	140	A/R	1-2

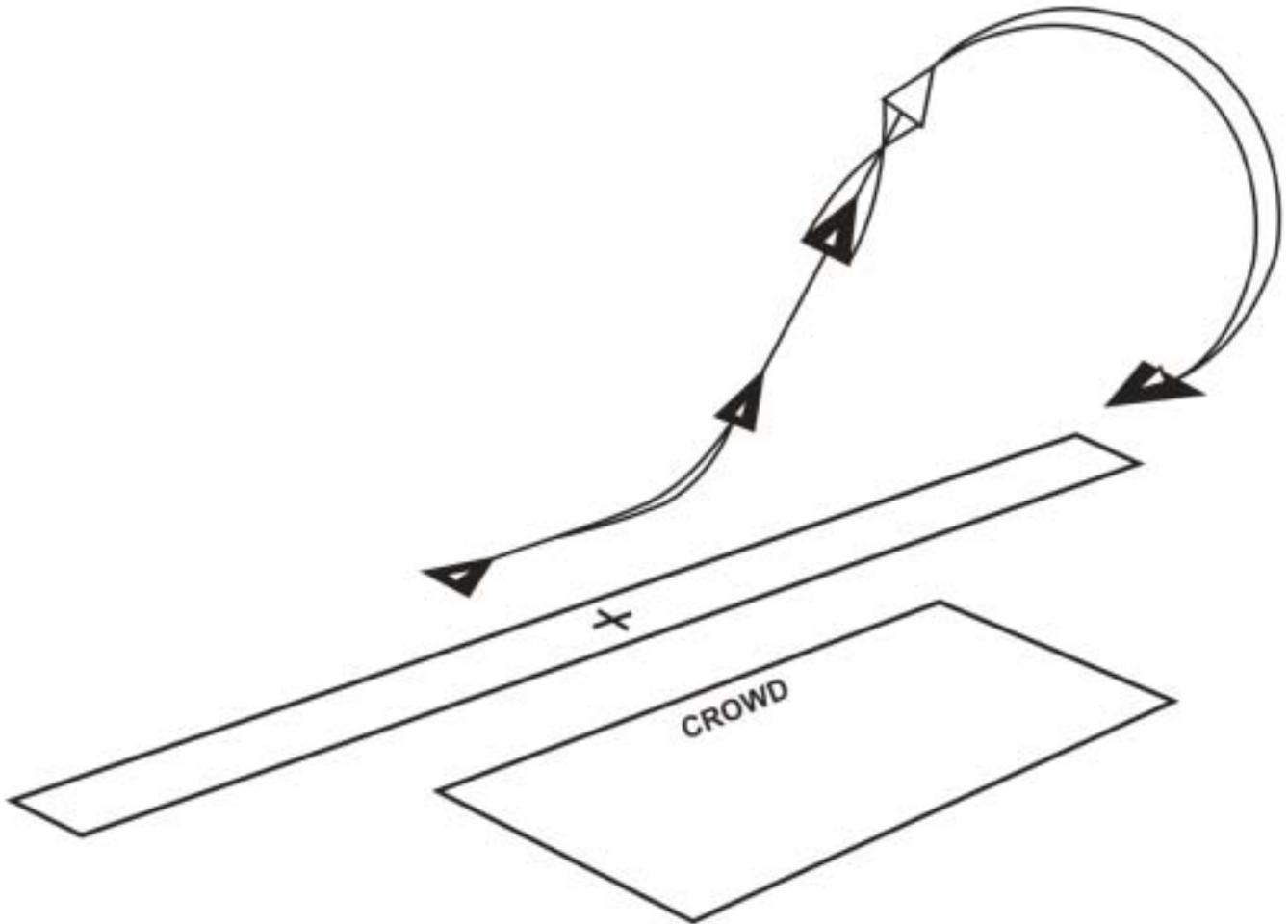
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200' (over a runway) 100'	125	N/A	A/R	N/A
Exit <b>min</b> 200' (over a runway) 100'	125	N/A	A/R	N/A

5.18.1. **Maneuver Description.** During the turn to the show line following the shark's tooth maneuver, extend the landing gear and speed brakes and attain 140 knots by 2,000 feet prior to the show center. Maintain 140 knots and descend to 300 feet AGL, 200 feet AGL over a prepared landing surface, on the 500-foot show line.

5.18.2. **Abnormal Procedures:** If the minimum entry parameters are not met, transition to a wings-level flat pass. If airspeed falls below 120 knots or a descent rate develops, select full afterburner and perform a normal go-around procedure.

### 5.19. Muscle Climb Maneuver.

Figure 5.15. F-16 Muscle Climb Maneuver.



# Muscle Climb Maneuver

## F-16

**Table 5.12. F-16 Muscle Climb Maneuver Parameters.**

TARGET PARAMETERS				
Altitude AGL	Airspeed KCAS	Power Setting	G	
Entry (over a runway)	300' 200'	140	MAX	1-1.8
Apex	≥6,000'	175	MIL – MAX	A/R
90 degrees nose low	≥3,500'	300	A/R	
Exit	500'	A/R	A/R	4-6

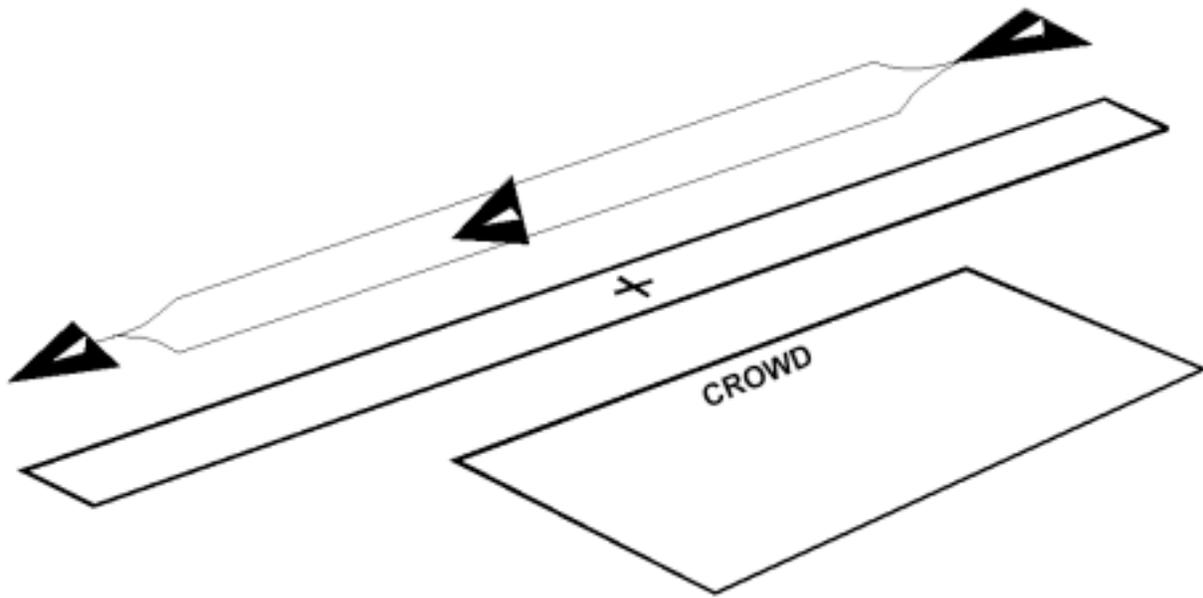
PARAMETER LIMITS					
Altitude AGL	Airspeed KCAS MIN/MAX	Power Setting	G		
Entry (over a runway)	<b>min</b> 200' 100'	125	N/A	MAX	2
Apex	<b>min</b> 5,000'	150	350	MIL – MAX	N/A
90 degrees nose low	3,000'	150	350	A/R	
Exit	<b>min</b> 400'	A/R	A/R	A/R	9

5.19.1. **Maneuver Description** . Approaching show center, simultaneously select full afterburner, raise the landing gear, and pull up to establish approximately 55-degree nose high attitude using 1.5 – 1.8 Gs. The afterburner must light in order to execute this maneuver and allow the aircraft to accelerate to maintain a minimum of 150 KIAS in the climb. Pitch attitude may be reduced to hold airspeed.. The demonstration pilot may then transition to a Wifferrill or Vertical Reposition Maneuver (VRM) as required when adjusting to the show line for subsequent maneuvers. If a VRM is flown, the demonstration pilot will adhere to the apex and 90-degree nose low parameters listed in [Table 5.12](#). above and the procedures for a VRM as described in [paragraph 5.8.3.1](#). Once recovery above the minimum altitude for the follow on maneuver is assured, backpressure is relaxed and power modulated to smoothly transition to level flight at the entry altitude for the next maneuver.

5.19.2. **Abnormal Procedures:** If the airspeed falls below the minimum of 150 knots, a nose high recovery should be accomplished. If the airspeed exceeds 350 KIAS during any portion of a follow-on VRM or is below 3,000 feet AGL at 90 degrees nose low, immediately initiate a dive recovery to the nearest horizon.

## 5.20. Knife Edge Pass (Opposite direction of Slow Speed Pass).

Figure 5.16. F-16 Knife Edge Pass.



# Knife Edge Pass F-16

**Table 5.13. F-16 Knife Edge Pass Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	425	MIL – MAX	.5-1.5
Exit 500'	475	MIL – MAX	.5-1.5

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	400	550	MIL – MAX	N/A
Exit <b>min</b> 400'	400	550	A/R	N/A

5.20.1. **Maneuver Description** . Enter the show line at 500 feet AGL and 425 knots. At 4,000 feet prior to show center, raise the nose to five to seven degrees, establish a climb, and apply stick pressure to roll 90 degrees toward the crowd. Hold this attitude until 4,000 feet past show center. Use top rudder to hold the nose above the horizon and forward stick pressure to keep the aircraft on the show line. To complete the maneuver, unload, roll wings level, and perform a repositioning maneuver.

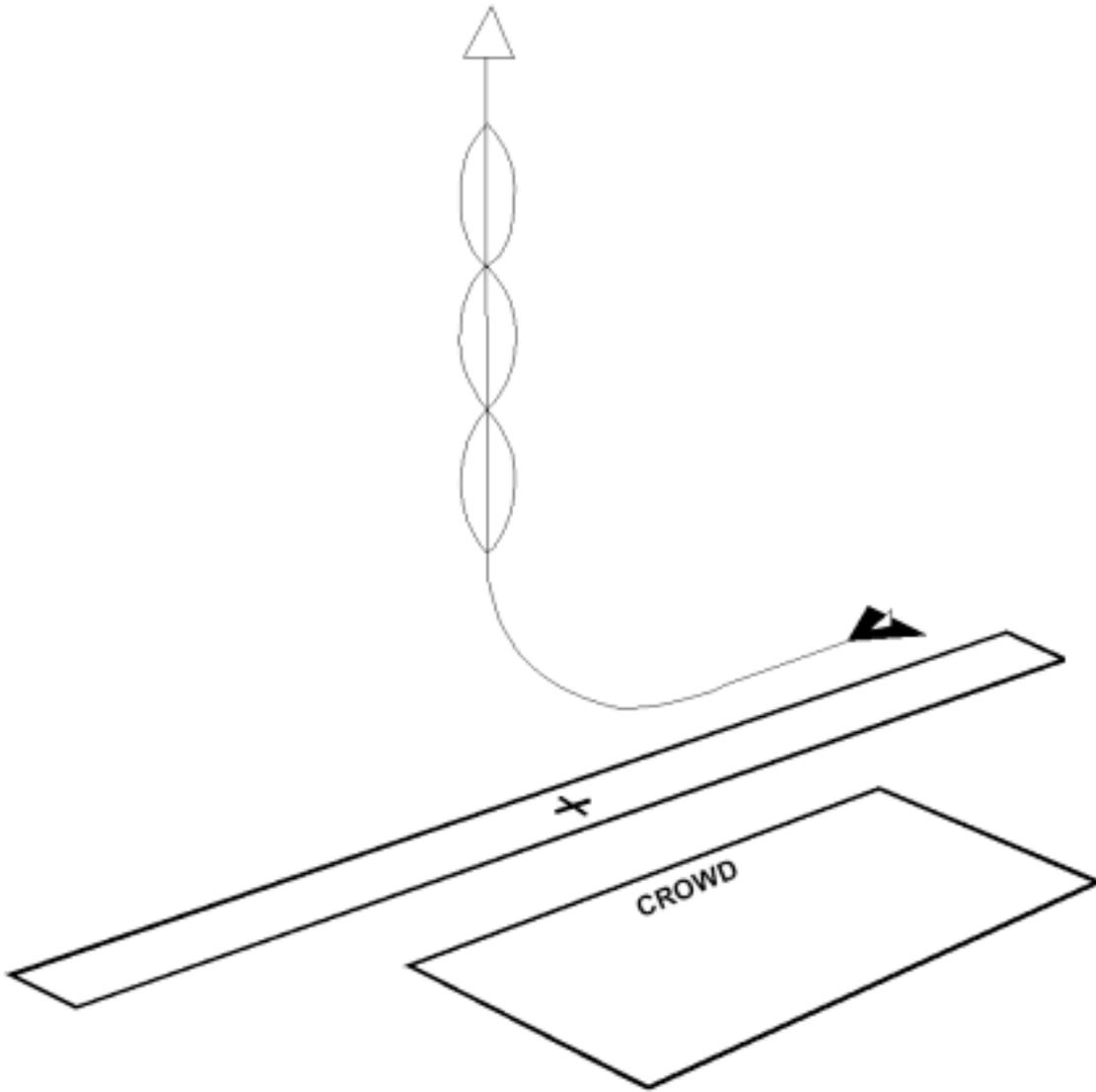
5.20.2. **Abnormal Procedures:** If the minimum entry parameters are not met, transition to a wings-level flat pass. If it becomes apparent the aircraft will descend below 400 feet AGL, roll out of the bank and clear the show line.

5.20.3. Transition point to the High Profile, if changing weather conditions permit.

**NOTE:** The Knife Edge Pass may be used as a repositioning maneuver for the purpose of orienting the subsequent demonstration maneuver in the approved direction relative to the crowd line.

### 5.21. Maximum Performance Climb with Rolls / Sneak Attack.

Figure 5.17. F-16 Maximum Performance Climb with Rolls.



# Maximum Performance Climb With Rolls F-16

**Table 5.14. F-16 Maximum Performance Climb with Rolls Parameters.**

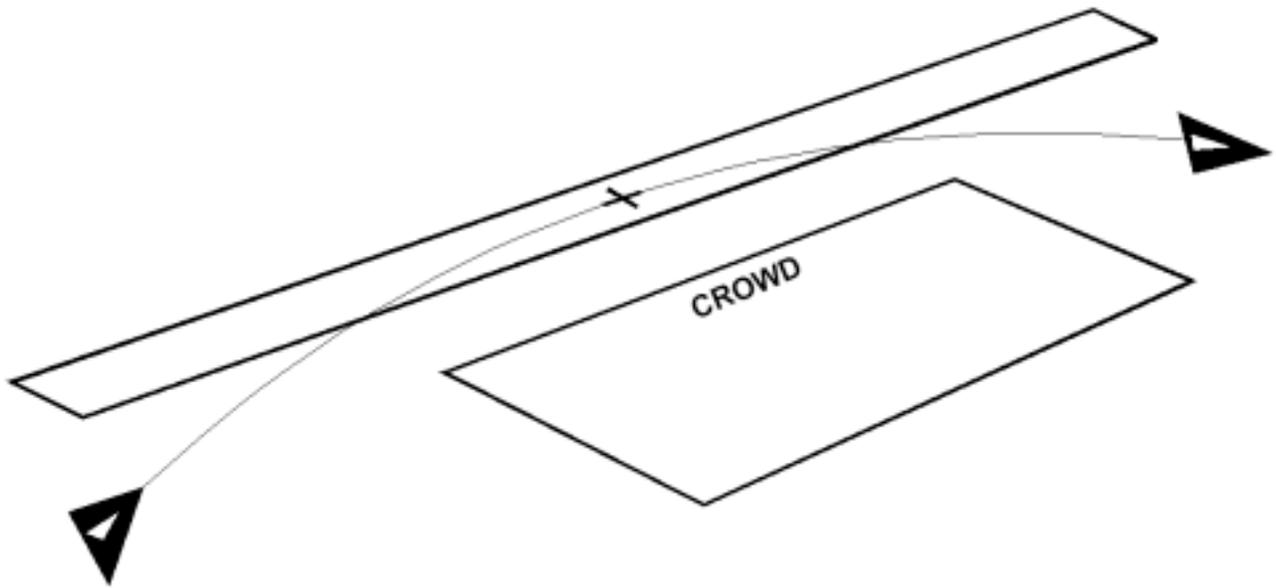
TARGET PARAMETERS				
Altitude AGL	Airspeed KCAS		Power Setting	G
Entry 300'	450		MIL - MAX	6 to 7.5
Recovery/Exit 2,500' prior to assigned altitude	250		A/R	4-6
PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	400	550	MIL - MAX	9
Apex NTEWA	150	N/A	A/R	9

5.21.1. **Maneuver Description** . Enter with a minimum of 400 knots at 300 feet AGL approaching show center 135 degrees to the crowd line, but with the flight path not directed toward the crowd. At 3,000 feet prior to show center select full afterburner and initiate a 6.5 to 7.5-G wings-level pull to arrive at show center with 90 degrees of pitch. The pull should be made so the aircraft is vertical at show center. When the aircraft is vertical, perform high rate unloaded aileron rolls until reaching a minimum of 250 knots or 2,500 feet below waived airspace. Every precaution must be taken to avoid slow airspeed in an exaggerated pitch attitude due to the potential of pitch hang-up. Stop the aileron rolls and execute a vertical recovery by smoothly pulling the nose to the nearest horizon to prevent exceeding waived airspace. Modulate power and speed brakes as required while performing the descending portion of a repositioning maneuver to enter the show line for an arcing sneak attack (banana pass) or staged entry on the 500 foot show line to demonstrate the aircraft's tactical surprise capability.

5.21.2. **Abnormal Procedures:** If the minimum entry parameters are not met, transition to a wings-level, flat pass. If roll coupling occurs during the climb (to exceed approximately 2.5 G), smoothly stop the roll, then pull to the nearest horizon, and roll upright. Initiate an immediate recovery to the nearest horizon if airspeed decays to 250 KIAS minimum or altitude reaches 2,500 feet below the top of waived airspace.

## 5.22. Sneak Attack.

Figure 5.18. F-16 Sneak Attack.



**Sneak Attack  
F-16**

**Table 5.15. F-16 Sneak Attack Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 300'	≤.92M	MAX	1-5
Exit 300'	≤.92M	IDLE to MAX	1-5

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 200'	A/R	.94M	MAX	9
Exit <b>min</b> 200'	A/R	.94M	IDLE to MAX	9

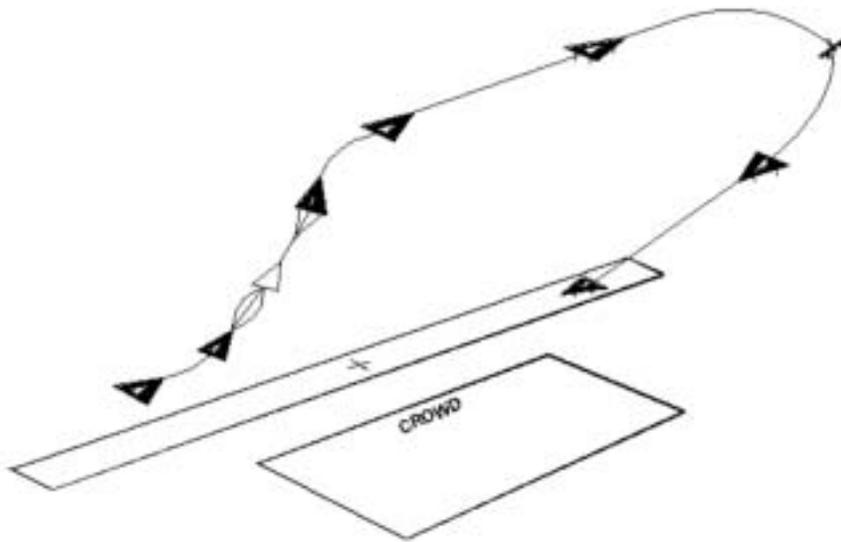
5.22.1. **Maneuver Description** . This maneuver will be flown on the 500-foot show line. The approach will be from behind the line with a 45-degree cut (max bank angle 90 degrees) toward show center remaining 500 feet from the crowd at all times. Upon reaching 500 feet past the crowd, clear the line and reposition for the next maneuver. Select full afterburner during the approach to allow acceleration to a maximum of 0.94 Mach at show center. Varying density altitudes will determine when to select AB to ensure maximum speed for the crowd. The intent is to pass the crowd with full AB to accentuate the shock effect. Ensure airspeed does not exceed 0.94 Mach.

5.22.2. **Abnormal Procedures:** Abort the maneuver and transition to a flat pass if minimum entry altitude is not attained. Deselect afterburner to ensure a maximum of 0.94 Mach. Abort the pass and immediately climb in front of the line if you lose orientation on the crowd line.

**NOTE:** A staged entry described in paragraph 5.36.1. may be flown as a sneak attack maneuver in place of the banana pass.

### 5.23. Tactical Pitch-Up to Landing (Direction of Landing).

Figure 5.19. F-16 Tactical Pitch-Up to Landing.



**Tactical Pitch-Up To Landing  
F-16**

**Table 5.16. F-16 Tactical Pitch-Up to Landing Parameters.**

TARGET PARAMETERS			
Altitude AGL	Airspeed KCAS	Power Setting	G
Entry 500'	350	MIL to MAX	5 to 7
Exit Downwind Alt	250	A/R	1

PARAMETER LIMITS				
Altitude AGL	Airspeed KCAS MIN/MAX		Power Setting	G
Entry <b>min</b> 400'	300	440	MIL to MAX	9
Exit Downwind Alt	200	N/A	A/R	N/A

5.23.1. **Maneuver Description** . Enter the show line at 500 feet AGL and 350 knots. At 2,000 feet prior to show center raise the nose to five to seven degrees pitch angle, unload, and perform a 405-degree aileron roll away from the crowd followed by a 5.0 to 7.5-G pull-up to downwind using afterburner. Configure for and execute a normal final turn and landing.

**Option:** If a Heritage Flight is to be performed immediately following completion of the demonstration, conduct a low approach or wings-level pass and proceed to rejoin with Heritage Flight aircraft using pre-briefed procedures.

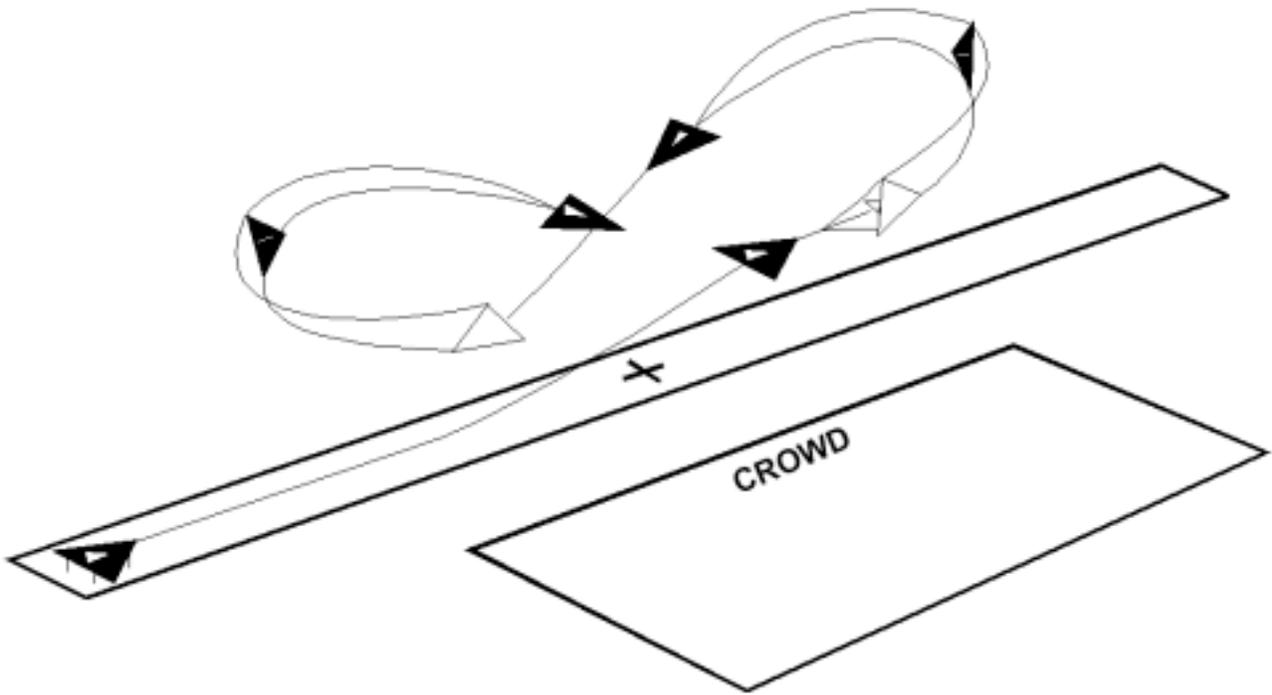
5.23.2. **Abnormal Procedures:** If entry parameter limits are not achieved by show center, the 405-degree aileron roll will not be performed and a simple pull-up to a normal closed pattern will be flown.

### ***Section 5C—Low/Flat Profile***

**5.24. Low/Flat Abnormal Procedures:** Unless otherwise noted, abnormal procedures for the low profile are the same as the high profile.

**5.25. Takeoff to Level 8.**

Figure 5.20. F-16 Level 8.



**Level 8**  
**F-16**

Table 5.17. F-16 Level 8 Parameters.

TARGET PARAMETERS					
Altitude AGL		Airspeed KCAS		Power Setting	G
Entry	500'	400		MAX	5 to 7
Turn Reversals	500'	350		MIL to MAX	5 to 7
Exit	500'	400		A/R	1

PARAMETER LIMITS						
Altitude AGL			Airspeed KCAS MIN/MAX		Power Setting	G
Entry	<b>min</b>	400'	330	440	MAX	9
Turn Reversals	<b>min</b>	400'	250	440	MIL to MAX	9
Exit	<b>min</b>	400'	330	440	A/R	1

5.25.1. **Maneuver Description.** Takeoff will not be attempted when the takeoff roll exceeds 80 percent of available runway length. If airfield conditions permit, a brake release point should be selected so takeoff occurs at show center. The show-center takeoff point is a secondary consideration to determining critical field length, abort criteria, etc. In no case will the takeoff be initiated with less than 6,000 feet of runway remaining. The takeoff is made in full afterburner. Ensure a positive rate of climb is established after takeoff. Once the gear is retracted, a three to five-degree nose high climb is made while accelerating to 400 knots. At this point, maintain afterburner and begin an energy sustaining pitch-up to 500 feet AGL, using 5.0 to 7.0 Gs, turning away from the crowd. After 225 degrees of turn, unload and reverse the direction of turn and perform a second level turn in the opposite direction. After 270 degrees with a 45-degree cut to the show line, the turn is again reversed. Vary the bank angle and pitch to arrive at level flight at the completion of the maneuver and to ensure the maneuver is finished above the entry altitude. Complete the maneuver by turning to finish on the show line heading in the same direction as takeoff. Surface winds must be taken into consideration in order to center this maneuver on show center and to avoid overshooting the show line. Once on the show line, execute a repositioning maneuver to prepare for either a Flat Pass (left to right takeoff) or the Triple Aileron Roll (right to left takeoff).

5.25.2. **Abnormal Procedures:** If, during any portion of the maneuver it becomes apparent the aircraft will descend below 400 feet AGL or airspeed will decay below 250 knots, abort the maneuver by rolling wings level, climbing to 500 feet AGL, and clearing the show line. Use power and G as required (no lower than 250 knots) to prevent the aircraft from overshooting the show line.

**5.26. Flat Pass (Right to Left).** If the direction of takeoff is left to right, the repositioning maneuver following the horizontal Cuban 8 will be used to prepare for a flat pass as described in **paragraph 5.10.1**. At 2,000 feet past show center, execute a repositioning maneuver to set up for the next maneuver.

**5.27. Triple Aileron Roll (Left to right).** The triple aileron roll will be performed as described in **paragraph 5.11.1**. When wings level following the last aileron roll, the pilot performs a repositioning maneuver to set up for the next maneuver.

**5.28. High G Turn (Right to Left).** The high G turn will be performed as described in **paragraph 5.12.1**. At 2,000 feet past show center, perform a repositioning maneuver to set up for the next maneuver.

**5.29. Four-Point Roll (Left to Right).** The four-point roll is performed as described in **paragraph 5.13.1**. At the completion of the pass, execute a repositioning maneuver to set up for the next maneuver.

*NOTE:* Transition to the High Profile if changing weather conditions permit.

**5.30. Knife Edge Pass (opposite direction of Slow Speed Pass).** The Knife Edge Pass will be performed as in **paragraph 5.20.1**. At the completion of the pass, execute a repositioning maneuver to set up for the next maneuver.

*NOTE:* Transition to the High Profile if changing weather conditions permit.

**5.31. Falcon Turn (Right to Left).** The Falcon Turn is performed as described in **paragraph 5.16.1**. At the completion of the maneuver, pull up to a downwind to prepare for the slow speed pass against the wind. If the wind favors a right to left final, a normal 180-degree pitch-up to downwind is performed.

*NOTE:* Transition to the high profile if changing weather conditions permit.

**5.32. Slow Speed Pass (against the wind).** This maneuver may be flown on the 500-foot show line. The slow speed pass is performed as described in **paragraph 5.18.1**. At 3,000 feet past show center, perform a repositioning maneuver to set up for the next maneuver.

*NOTE:* Transition to the High Profile if changing weather conditions permit.

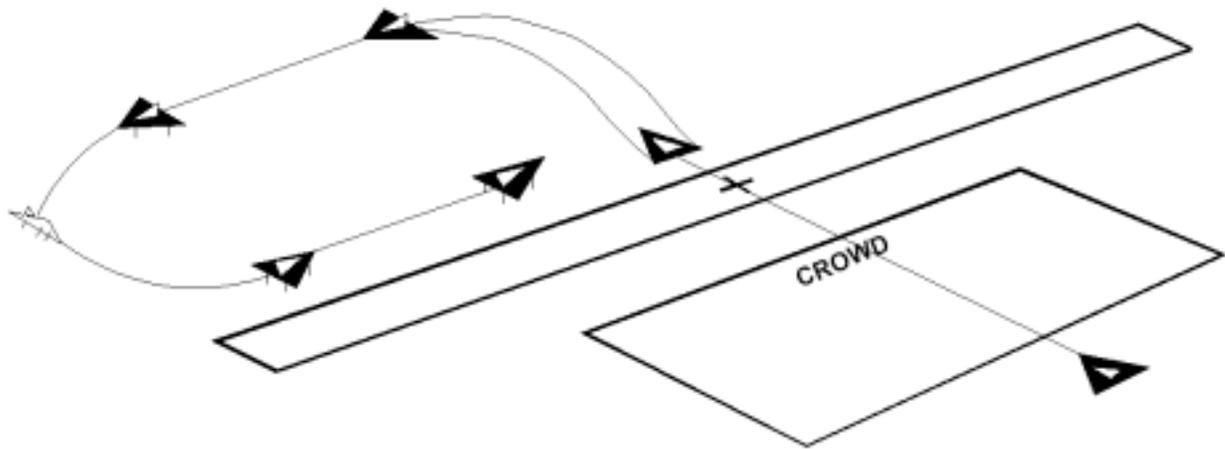
**5.33. Flat Pass.** The flat pass is performed as described in **paragraph 5.10.1**.

**5.34. Sneak Attack.** See **paragraph 5.22.1** for sneak attack entry.

**5.35. Tactical Pitch-Up to Landing.** The tactical pitch-up to landing is performed as described in **paragraph 5.23.1**.

**5.36. Staged Show Sites.**

Figure 5.21. F-16 Staged Show Sites.



**Staged Show Sites  
F-16**

5.36.1. When demonstration aircraft takeoff from other than the demonstration site, plan to arrive over the show site with the fuel requirements stated in **paragraph 5.2.** plus en route return fuel IAW AFI 11-2F-16 Vol 3. Enter the show with a sneak attack as described in **paragraph 5.22.** or 90 degrees to the show line and directly behind the crowd at 1,000 feet AGL and airspeeds not to exceed 0.94 Mach. Start a climbing turn to downwind in the appropriate direction to setup for a simulated takeoff. Turn back to the show line and slow to 140 knots. Lower the gear and align with the show line at 300 feet AGL (200 feet AGL if flown over a landable surface). At show center, retract the gear, select full afterburner, and replicate the appropriate high/low show takeoff maneuver. The remaining show sequence for the high or low profile is unchanged except the removal of the tactical pitch-up to landing. Pilots may cut the profile short as required to maintain suitable en route return fuel.

**OPTION:** After show entry, pilots may elect not to configure, and keep their speed up for setup to the Cuban 8 or Level 8 as appropriate.

5.36.2. If circumstances do not allow a sneak attack or 90-degree entrance to the show line, the pilot may fly down the show line from either direction IAW parameters described in **paragraph 5.10.** (High Speed Flat Pass). Past the end of the crowd line, perform a repositioning maneuver to setup for the next maneuver IAW **paragraph 3.36.1.** The remaining show sequence is unchanged.

CHARLES F. WALD, Lt Gen, USAF  
DCS/Air and Space Operations

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

DoD Directive 5410.18, *Community Relations*

DoD Instruction 5410.19, *Armed Forces Community Relations*

AFI 11-206, *General Flight Rules*

AFI 11-209, *Air Force Participation in Aerial Events*

AFI 31-101, *Aircraft Systems Security Standards*

AFI 35-101, *Public Affairs Policies and Procedures*

Part 91, Federal Aviation Regulations

FAA Order 8700.1, Chapter 49

Sponsor Support Manual/Document via ACC/DOOA Website (<http://www2.acc.af.mil/airdemo>)

***Abbreviations and Acronyms***

**AGL**—Above Ground Level

**EAA** —Experimental Aircraft Association

**FAA**—Federal Aviation Administration

**FLCS**—Flight Control System

**G** —Gravity

**HUD**—Heads-Up-Display

**ICAS**—International Council of Air Shows

**KCAS**—Knots Calibrated Air Speed

**KIAS** —Knots Indicated Air Speed

**MIA**—Missing In Action

**MDS**—Mission Design Series

**MSL**—Mean Sea Level

**POW**—Prisoner Of War

**VMC**—Visual Meteorological Conditions

***Terms***

**Abnormal Procedure**—Specific abort procedure for maneuver

Attachment 2

{PER MAJCOM SUPPLEMENT}
EXAMPLE SHOW SUMMARY AND CRITIQUE

A2.1. Example Show Summary and Critique. Single-Ship demonstration teams will use the following example to critique air shows:

F-15 EAST DEMONSTRATION TEAM AIR SHOW SUMMARY AND CRITIQUE

Show Location: \_\_\_\_\_ Dates(s): \_\_\_\_\_

Estimated Cost: Travel: \_\_\_\_\_ Per Diem: \_\_\_\_\_ Lodging: \_\_\_\_\_

Demos Time/Type: \_\_\_\_\_/\_\_\_\_\_; \_\_\_\_\_/\_\_\_\_\_; \_\_\_\_\_/\_\_\_\_\_
Time (H/L/Canx) Time (H/L/Canx) Time (H/L/Canx)

Total Sorties Required to Support Event: \_\_\_\_\_

Estimated Attendance Each Day: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

1. Recruiting support/value:

Was recruiter contacted: Yes / No Was recruiter present at airshow? Yes / No

What were the off-show recruiting activities? \_\_\_\_\_

Table with 3 columns: Issue, UNSAT, SAT. Rows include FAA issues, Preshow issues, Airshow support and operations, Overall recommendation to attend this event again.

Heritage Flight: Yes / No Heritage Pilot(s) Name(s) and Acft Type: \_\_\_\_\_/\_\_\_\_\_

Heritage Pilot(s) added at show site: Yes / No

Heritage Pilot(s) Name(s) and Acft Type added: \_\_\_\_\_

Other Demonstration Pilot(s) in Heritage Flight: \_\_\_\_\_

REMARKS (explain above responses; unsat or no answers require comments):

Four horizontal lines for writing remarks.

### Attachment 3

## A-10 DEMONSTRATION NARRATION

### Introduction

Good morning/afternoon, ladies and gentlemen and welcome once again to  (event name) . I'm Air Force  (rank/name)  from Air Combat Command's  (23 FG / 347 WG) , located at  (Pope / Davis-Montham)  Air Force Base in  (Fayetteville, NC / Tucson, AZ) . It's my pleasure today to describe for you a flight demonstration by one of the world's most heavily armed, and armored, close air support aircraft -- the rugged and dependable A-10 Thunderbolt Two. (As the A-10 climbs into position for today's demonstration, allow me to tell you a few details about our jet.) Because of its toughness, tenacity, and devastating good looks, the people who know it best -- the pilots who fly it, and mechanics who maintain it -- have unofficially dubbed the A-10, the "Warthog." Built into the A-10's big airframe are responsiveness, allowing the pilot to turn the jet quickly; simplicity, for ease of maintenance; survivability, to take the best the enemy has to offer and return to fight another day; and lethality, to give friendly ground forces the support they need. Today, these battle-tested aircraft are assigned to Air Force units around the world, including Europe and the Pacific. Here at home, Air Combat Command, the Air National Guard and Air Force Reserves all fly the A-10. The pilot for today's demonstration is  (rank/name)  from  (City/State) .  (rank/name)  is a veteran fighter pilot with more than   hours in jet aircraft, and   combat missions over  . Launching  (rank/name)  are  (rank/name)  from  (City/State)  and  (rank/name)  from  (City/State) .

The A-10 is capable of operating from much shorter runways than conventional fighter/attack aircraft.  (rank/name)  demonstrated that capability today when he lifted off in 15-hundred feet. In fact, even with a 16-thousand pound bomb load, A-10s can still take off in less than 4-thousand feet.

The A-10's two General Electric turbofan engines add more than just power to the its' performance -- they're also smokeless and much quieter than comparable engines. This makes the airplane much harder to see and hear, and aids immensely in achieving tactical surprise when attacking from all altitudes. The A-10's engines are also extremely fuel efficient, enabling it to fly more than 2-thousand miles without refueling, and with in-flight refueling, the Warthog can fly nonstop to Europe and the Middle East.

### Show Entry

A key feature of the aircraft I noted earlier is survivability. The A-10 was designed to absorb a great deal of punishment and still keep flying. To do this, both the pilot and vital flight controls are enclosed in what we call a titanium bathtub -- a tough armor barrier that can stop virtually everything up to a 37mm anti-aircraft shell. Backup systems, located in widely separated sections

### Four Point Roll

Now, look high and to the right as \_\_\_\_\_ (rank/name) \_\_\_\_\_ positions the A-10 for a high-speed pass and four-point roll at show center.

### Entering Cuban Eight (High Profile Only)

(rank/name) is now performing a classic aerobatic maneuver, the Cuban-8. It's the A-10's remarkable maneuverability which enables it to perform its close air support mission. Twisting and turning low over the battlefield, the Warthog can deliver devastating firepower; destroying targets close to friendly ground forces. In its arsenal are a wide variety of modern weapons, including Maverick missiles, laser guided bombs, rockets, 30mm bullets, and AIM-9 air-to-air missiles. All of these weapons have been used to attack enemy forces in Iraq, Bosnia and Kosovo.

### Top Of Second Half Of Cuban Eight (High Profile Only)

After \_\_\_\_\_ (rank/name) \_\_\_\_\_ completes this half of the Cuban eight, he'll perform a level 360 degree high G turn. It's the A-10's quick turn rate, and small turn radius, which enables it to work effectively over the battlefield, even under marginal weather conditions.

### Level 360 (Low Profile Only)

As \_\_\_\_\_ (rank/name) \_\_\_\_\_ completes the 4-point roll, he'll immediately transition to a level 360 degree high G turn. It's the A-10's quick turn rate and small turn radius, which enables it to work effectively over the battlefield, even under marginal weather conditions.

### Turn Away During Level 360

\_\_\_\_\_ (rank/name) \_\_\_\_\_ just completed that turn in only 14 hundred feet. On the battlefield, this capability allows the pilot to employ his weapons and then quickly turn-around to stay outside of enemy air defenses.

### Positioning For First Strafe Pass

\_\_\_\_\_ (rank/name) \_\_\_\_\_ is now positioning the aircraft for a simulated strafe pass using the A-10's weapon of choice --- the awesome 30mm gatlin gun. Firing bullets the size of coke-bottles, at over 4000 rounds per minute, the A-10's gatlin gun has a devastating effect on enemy tanks.

### Second Attack

It will now take \_\_\_\_\_ (rank/name) \_\_\_\_\_ less than 30 seconds to get back into firing position for a second strafe attack. With that kind of response, and two A-10s working together, as we normally do, enemy tanks can expect to be under U.S. guns once every 10 to 15 seconds.

### Third Attack

\_\_\_\_\_(rank/name)\_\_\_\_\_ is now repositioning for his final attack, where he will simulate dropping 500 pound, MK-82, general purpose bombs.

### Jink-Out

\_\_\_\_\_(rank/name)\_\_\_\_\_ is now performing a jink-out maneuver that's designed to make life very difficult for enemy anti-aircraft gunners. Because we frequently change direction and altitude, the A-10 is a difficult target to shoot.

### Gear Down Pass

\_\_\_\_\_(rank/name)\_\_\_\_\_ is now positioning his aircraft to demonstrate the A-10's normal landing configuration at its final approach airspeed of 120 knots. This slow speed approach will give you a good chance to see the A-10's gray paint scheme, one that's designed to make it more difficult to pick up visually. This design also reduces infrared radiation, which helps the A-10 defeat enemy heat seeking missiles. And now from the right/left, \_\_\_\_\_(rank/name)\_\_\_\_\_ and the slow speed pass.

### Pull-Up for Single Aileron Roll

\_\_\_\_\_(rank/name)\_\_\_\_\_ is now repositioning the A-10 for a pass down the runway where he'll perform an aileron roll at show center.

The A-10 has a well-earned reputation for strength and striking power -- a reputation earned in Kosovo and earlier in Desert Storm, where A-10s destroyed thousands of enemy armored vehicles, artillery sites and Scud missiles, and even registered two air-to-air kills. Today, A-10s continue to fly missions in support of American and NATO peacekeeping efforts all over the world.

The A-10's maintainability is proven every time it flies in every imaginable climate. It has flown in arctic, desert, tropical, and temperate conditions. During deployments, including DESERT SHIELD and DESERT STORM, the A-10 has consistently demonstrated its ability to fly more than four sorties per day.

### Aileron Roll

And now from the right/left, \_\_\_\_\_(rank/name)\_\_\_\_\_ and the aileron roll at show center.

### Pull-Up to Photo Pass

\_\_\_\_\_(rank/name)\_\_\_\_\_ is now repositioning the A-10 for a photo pass. Folks, if you don't have your camera's ready, you'd better get them out now. \_\_\_\_\_(rank/name)\_\_\_\_\_ will be bringing the warthog in low and banked approximately 45 degrees, giving you the opportunity for a picture of a lifetime.

23 FG only: During WWII, General Claire Chanault painted teeth on the noses of his P-40 Warhawks to strike fear into the hearts of the enemy. Today, the 23 FG, comprised of 2 A-10 squadrons, keeps this proud tradition alive.

### Photo Pass

Ladies and gentlemen, \_\_\_\_\_(rank/name)\_\_\_\_\_ on the A-10 photo pass.

### Tactical Pitch-Up to Landing

\_\_\_\_\_(rank/name)\_\_\_\_\_ is now positioning the A-10 for final approach and landing.

The A-10's large wing area and very effective speed brakes enable it to stop within 1500' after touch-down. Because of this, A-10s can operate out of small airstrips never before available to jet aircraft.

### Conclusion

We hope today's demonstration has given you some insight into the capabilities of the A-10. This airplane was designed to be, and is, the close air support weapon of choice. Responsiveness, simplicity, survivability, and lethality enable it to do its job effectively, giving our forces on the ground the air power they need, where they need it, and when they need it.

We hope our performance has sparked an interest in the opportunities you can have as a member of the United States Air Force. \_\_\_\_\_(rank/name)\_\_\_\_\_, our crew chiefs and I will be happy to answer any questions you might have about the A-10, Air Combat Command, or about your United States Air Force.

On behalf of the ACC commander, \_\_\_\_\_(rank/name)\_\_\_\_\_, I hope you have enjoyed this brief look at the A-10 Thunderbolt II.

NOTE: In the event the pilot aborts a maneuver for any reason, the narrator will point out to the crowd that the maneuver has been aborted and that the pilot is setting up for the next maneuver by flying a wings level pass.

## Attachment 4

### F-15 DEMONSTRATION NARRATION

**A4.1. F-15 Demonstration Narration.** The F-15 narrator will use the following script during the F-15 demonstration.

#### Introduction

Good morning/afternoon, ladies and gentlemen and welcome once again to (event). I'm Air Force (rank/name) from (hometown), an F-15 pilot from (applicable command)'s (wing designator) Wing at (base) Air Force Base in (city, state)...and it's my pleasure to describe for you today's flight demonstration by America's premier air superiority fighter, the Boeing F-15 Eagle...an aircraft whose combat role is to take control of the skies...and to keep it. It's a mission our Eagles and their pilots have accomplished with dash and dedication over the last decade.

At the controls this morning/afternoon is (rank/name) from (hometown), a veteran fighter pilot with more than (number) hours in jet aircraft and (number) missions in (operation). Launching (rank/name) is (rank/name) from (hometown) and (rank/name) from (hometown).

**For Nonstaged Profiles:** As he runs up his engines, the noise you'll hear will be the sound of two Pratt and Whitney engines which together provide more than 50-thousand pounds of thrust.

**For Staged Profiles:** The Eagle is powered by two Pratt and Whitney engines, which together provide more than 50-thousand pounds of thrust.

That's more than twice the horsepower of the entire starting line-up at the Indianapolis 500. The F-15 is designed and built for air superiority...and it carries the newest and most advanced air-to-air ordnance in the Air Force inventory to accomplish that mission. In addition to an internal 20mm cannon, it can also fire eight radar-guided and heat-seeking air-to-air missiles. During the 42-day Gulf War, our F-15s shot down 31-world class fighters without receiving a scratch.

**For Low Profiles:** Because of this afternoon's/morning's low cloud cover, we can't show you those maneuvers which involve high altitude climbs. However, I can assure you our low show will be just as impressive as America's F-15 shows you what it can do.

#### Takeoff (High, Nonstaged Profile Only)

And now...it's time to begin today's demonstration. (Rank/name) will start by showing you just how fast the F-15 can get off the ground and climb. He'll lift off in less than 2-thousand feet, immediately pull up into a vertical climb, and then roll 180 degrees to position for the split-s maneuver.

#### Takeoff (Low, Nonstaged Profile Only)

And now...it's time to begin today's demonstration. (Rank/name) will start by showing you just how fast the F-15 can get off the ground and climb. He'll lift off in less than 2-thousand feet, immediately pull up into a vertical climb, and then reposition for his first maneuver.

#### Simulated Takeoff (High, Staged Profile Only)

And now... It's time to begin today's demonstration. Ladies and gentlemen, as required: [look low and to your (left/right),] the United States Air Force F-15 Eagle.

Had (rank/name) been able to takeoff for you here today, he would have lit the afterburners and immediately pulled into a vertical climb. He will now simulate that maneuver by flying down the (show line/runway) at takeoff speed, raising his landing gear and exploding into the vertical. In his climb, (rank/name) will roll the aircraft 180 degrees to position for the split-s maneuver.

#### Simulated Takeoff (Low, Staged Profile Only)

And now...it's time to begin today's demonstration. Ladies and gentlemen, as required: [look low and to your (left/right),] the United States Air Force F-15 Eagle.

Had (rank/name) been able to takeoff for you here today, he would have lit the afterburners and immediately pulled into a vertical climb. He will now simulate that maneuver by flying down the (show line/runway) at takeoff speed, raising his landing gear and immediately pull up into a vertical climb, then reposition for his first maneuver.

#### Split-S and High Speed Pass (High Profile Only)

(Rank/name) is now going over the top inverted as he enters the split-s. He'll finish the maneuver just 500 feet above the ground... traveling at more than 650 miles per hour in the opposite direction of takeoff for a high-speed pass.

#### Reposition and High Speed Pass (Low Profile Only)

(Rank/name) is now repositioning his aircraft and he'll finish just 500 feet above the ground... traveling at more than 650 miles per hour in the opposite direction of takeoff for a high- speed pass.

#### Four Point Roll

As required: [(Rank/name) is now repositioning for his next maneuver.] As he approaches show center from the left, he'll demonstrate the Eagle's crisp handling characteristics by performing the exacting four-point roll.

#### High G Turn

In air-to-air combat, if you can't turn tight, you can't fight. Now from the right, (rank/name) returns to show center to demonstrate the F-15's exceptional turn capability...in this turn, the pilot will be pressed deep into the seat by a force greater than nine times his normal weight.

### Triple Aileron Roll

From the left, (rank/name) will now turn his aircraft back toward show center, accelerate up through 450 miles an hour...and smartly snap the Eagle through three rapid rolls.

### Wing Walk - Gear Down

These past few maneuvers have demonstrated the F-15's awesome capability in a High-speed and high G environment, but slow-speed controllability is just as important to those who fly fighter aircraft. To demonstrate the Eagle's slow speed handling characteristics, (rank/name) is now decelerating for a low and slow pass from the right in the landing configuration. While the F-15 is a top performer at more than twice the speed of sound, watch how precisely it maneuvers as it's rolled from side to side during this low speed pass.

### Slow Speed Pass

These past few maneuvers have demonstrated the F-15's awesome capability in a High-speed and high G environment, but slow-speed controllability is just as important to those who fly fighter aircraft. To demonstrate the Eagle's slow speed handling characteristics, (rank/name) is now decelerating for a low and slow pass from the right in the landing configuration. While the F-15 is a top performer at more than twice the speed of sound, watch how precisely it maneuvers during this low speed pass.

### Cuban Eight (High Profile Only)

From slow flight, (rank/name) will raise the landing gear and immediately pull into the vertical to perform a Cuban Eight...demonstrating the F-15's ability to rapidly transition from slow to high-speed flight.

### Level Eight (Low Profile Only)

From slow flight, (rank/name) will raise the landing gear and reposition to prepare for the next maneuver. (Rank/name) is once again approaching show center from the left to demonstrate the Eagle's excellent turn capability in a maneuver called the Level Eight. It requires a hard turn in one direction followed by another hard turn in the opposite direction tracing a figure eight over the ground.

### Double Immelmann (High Profile Only)

And now, from the left, a classic World War One tactical maneuver called the Immelmann. We'll modify it today to demonstrate the F-15's exceptional power and maneuverability. This one is called the double Immelmann...and (rank/name) will use the Eagle's thrust to weight advantage by performing it in only 6-thousand feet of vertical airspace.

### Vertical Climb With Rolls (High Profile Only)

Back in 1975 the Eagle established a world time-to-climb record by soaring up beyond 12 miles in just two minutes and three seconds. That record was set almost 25 years ago and still stands today. That's American quality in aviation; quality that is unmatched anywhere in the world. This next maneuver will show you just what a high-speed climb looks and sounds like. (Rank/name) is now inbound from the right at 500 feet, flying at less than one third of the F-15's top speed. When he reaches show center, he'll begin a climb made possible by the two superb engines that power the world's premier fighter.

(DELAY UNTIL ON TOP)

The Eagle's cockpit gives the pilot exceptional visibility from all quarters...and it is built around a radar which extends the eyes of the pilot well beyond visual range, helping him see small, high speed targets down to tree top level.

### Knife Edge Pass

(Rank/name) is now repositioning his aircraft for a return to show center. (Rank/name) will pass by in his final saluteÖa Knife Edge Pass. We'd like to dedicate this pass to you...Ladies and Gentlemen; from your right/left is the Knife Edge Pass

### Tactical Pitch-Up (Nonstaged Profile Only)

(Rank/name) is now approaching the field for his final maneuver, a tactical pitch-up prior to landing. He'll pass by at 500 feet, then perform a rolling pitch up as he reverses his direction and prepares to land.

### Departure (Staged Profile Only)

(Rank/name) is now returning to show center to pass by in final salute. He is now departing and will land at location. The distance mile trip will take him only number minutes. During his approach there he will hold approximately 150 miles per hour and touch down at 130

### Downwind and Final Approach (Nonstaged Profile Only)

(Rank/name) is now decelerating through 300 miles an hour and lowering the landing gear and flaps. He'll hold approximately 150 miles an hour on final and touch down at 130.

### Landing Roll (Nonstaged Profile Only)

As he lands, notice how rank/name uses the F-15's large wings to dramatically slow down on roll out. By holding the nose high and keeping the wings exposed to the air stream, the Eagle doesn't need the drag chute used by earlier supersonic fighters...and it can usually stop in less than 4-thousand feet. Add its ability to take off from short runways, and you have a fighter that can safely operate from thousands of air-fields around the world.



## Attachment 5

### F-16 DEMONSTRATION NARRATION

**A5.1. F-16 Demonstration Narration.** The F-16 narrator will use the following script during the F-16 demonstration.

#### Introduction

Good morning/afternoon, ladies and gentlemen and welcome once again to (event). I'm Air Force (rank/name), a native of (hometown). As a member of (applicable command)'s (wing designator) Wing at (base) Air Force Base in (city, state), it's my pleasure to describe for you today's flight demonstration by the world's premier multi-role fighter, the F-16 Fighting Falcon, affectionately known as the Viper. An aircraft that serves with great distinction and has proven itself in multiple operations over the last decade.

The F-16 has been a part of the United States Air Force since 1979, assigned to Air Combat Command and other Air Force units in Europe, the Pacific, our Air Guard and Reserve forces, as well as the air forces of many allied nations. Today's demonstration will be performed by (rank/name) from (hometown), a veteran fighter pilot with more than (number) hours in jet aircraft, and (number) missions in (operation). Launching (rank/name) is (rank/name) from (hometown) and (rank/name) from (hometown).

The F-16 is a dual role fighter, which means it's equally adept at shooting down enemy aircraft and attacking targets on the ground. Today's aircraft is configured for air-to-air combat and weighs in at 25-thousand pounds. That's approximately 12-thousand pounds less than its ground attack weight...which usually includes bombs, missiles and extra fuel. Any way it's configured, the F-16 is one of the world's most maneuverable, versatile, and lethal fighter aircraft.

Helping give it that winning edge is...a fly-by-wire flight control system, similar to the one used in the space shuttle...a side-stick controller unique to the F-16 which responds to gentle hand pressure...a 30-degree reclined seat so the pilot can better withstand the massive G-forces sustained in air combat... and a high-visibility canopy which gives the pilot a virtually unrestricted view of the aerial battlefield. The F-16's powerful General Electric (type) engine produces (number) thousand pounds of thrust, translating into more horsepower than the entire starting lineup at the Indianapolis 500.

### LOW PROFILE NARRATION

**For Low Profiles:** Because of this afternoon's/morning's low cloud cover, we can't show you those maneuvers involving high altitude climbs. However, I can assure you our low show will be just as impressive as America's Fighting Falcon shows you what it can do.

#### Simulated Takeoff (Low, Staged Profile Only)

Ladies and gentlemen, the F-16 Fighting Falcon. (F-16 ARRIVES) (rank/name) took off this morning/afternoon from (location). He is now setting up to simulate a takeoff and then he will pull the Fighting Falcon's nose up into a classic aerobatic maneuver...the horizontal Cuban eight. Watch as (rank/name) traces a figure eight over the field/demonstration area.

### Takeoff (Low, Nonstaged Profile Only)

Today (rank/name) will demonstrate the F-16's remarkable acceleration and turning capability by pulling up into a Level eight after only a 1-thousand foot takeoff roll. In this maneuver, (rank/name) will inscribe a horizontal figure eight above the field. Ladies and gentlemen, from your left/right... (rank/name) and the F-16 Fighting Falcon!

### Flat Pass

(Rank/name) is now repositioning his aircraft to the right as he prepares to demonstrate the low altitude, high-speed capability of the F-16 Fighting Falcon. As he passes show center he will be traveling over 700 miles per hour, less than half the Falcon's top speed.

### TRIPLE Aileron Rolls

As (rank/name) returns to show center from the left, he will accelerate rapidly and snap the fighting Falcon through three aileron rolls. Ladies and gentlemen, from your left, (rank/name) and the TRIPLE roll.

### High G Turn

In a dogfight the ability to turn tight is crucial. Watch now as (rank/name) shows you just how exceptional the F-16 is in a nine G turn. From the right and at show center, he will bank sharply into a tight turn capable of pressing the pilot into the seat with a force of up to nine times his normal weight. In the full 360-degree turn the F-16 has a turn radius of less than 14-hundred feet. (PAUSE) It's this kind of performance which gives the F-16 its reputation as the most maneuverable fighter in the world today.

### Four Point Roll

(Rank/name) will now demonstrate the F-16's crisp handling characteristics as he performs a four point roll at show center, (PAUSE) Ladies and gentlemen....from your left....the F-16 Fighting Falcon and the four point roll.

### Knife Edge Pass

Ladies and Gentlemen, get your cameras ready as (rank/name) prepares to show you the sleek lines of the F-16, (PAUSE) from your (left/right), the F-16 and the knife edge pass.

### Falcon Turn (Low Profile Only)

(Rank/name) is now setting up to demonstrate the Falcon's ability to maneuver tight and stay unpredictable, a trait which helps the Falcon survive against low altitude threats. Ladies and gentlemen, from the right, the Falcon turn.

### Slow-Speed Pass

(Rank/name) is now slowing the Fighting Falcon to prepare for a slow speed pass. While the F-16 can fly at more than twice the speed of sound, low speed controllability is just as important to those who fly it. (PAUSE) As he approaches show center, notice the gray paint scheme of the Fighting Falcon...one that's designed to make it more difficult to pick up visually in conditions ranging from bright sky to dull overcast. As (rank/name) passes show center he will apply full afterburner and accelerate his aircraft into a nearly vertical climb, demonstrating the F-16's massive thrust capability.

### Flat Pass

(Rank/name) is now repositioning his aircraft to the right as he prepares to demonstrate the low altitude, high-speed capability of the F-16 Fighting Falcon. As he passes show center he will be traveling over 700 miles per hour, less than half the Falcon's top speed.

### Departure (Staged Profile Only)

(Rank/name) is now returning to (location) for landing. As he approaches the runway he will decelerate to about 150 miles per hour. Unlike the supersonic fighters of the 50s and 60s, the F-16 doesn't need a drag chute to slow down...and it can stop in less than 3-thousand feet if necessary. Add its ability to take off from relatively short runways and you have a fighter that can operate from thousands of airfields in virtually every country in the world.

### Tactical Pitch-Up (Nonstaged Profile Only)

(Rank/name) is now approaching from your left/right for his last maneuver -- a tactical pitch-up to landing. He will cross the runway at 500 feet and perform a rolling pitch-up as he turns to the downwind leg of the landing pattern.

### Downwind and Final Approach (Nonstaged Show Only)

(Rank/name) has lowered his landing gear and as he approaches the runway he will decelerate to about 150 miles per hour. Unlike the supersonic fighters of the 50s and 60s, the F-16 does not need a drag chute to slow down...and it can stop in less than 3-thousand feet if necessary. Add its ability to take off from relatively short runways and you have a fighter that can operate from thousands of airfields in virtually every country in the world.

### Conclusion

Ladies and gentlemen...the F-16 Fighting Falcon played a vital role in the defense of this nation during the past decade. It has greatly increased Air Combat Command's ability to meet its commitments as the Air Force's quick reaction force, helping to give the Air Force its global reach, global power...and ensuring its ability to meet any challenge, anywhere, under any circumstances.

We hope our performance has sparked an interest in the opportunities you can have as a member of the United States Air Force. If interested in joining today's premier aerospace team, please stop by and talk with \_\_\_\_\_ at the Air Force recruiting booth located \_\_\_\_\_."

**(NOTE:** If no recruiter is available identify a location where the demonstration team will hand out information)

On behalf of the commander of the (applicable command), General (full name), I hope you have enjoyed this brief look at the F-16 Fighting Falcon. If you have any questions about this remarkable jet, about (applicable command), or about your United States Air Force, please feel free to ask myself, (rank/name), or any of our maintenance professionals. We will be happy to talk to you. Thank you and good day.

## HIGH PROFILE NARRATION

### Simulated Takeoff (High, Staged Profile Only)

Ladies and gentlemen...the F-16 Fighting Falcon. (F-16 ARRIVES) (Rank/name) took off this morning/afternoon from (location). He is now setting up to simulate a takeoff and then he will pull the Fighting Falcon's nose up into a classic aerobatic maneuver...the Cuban eight. Watch as (rank/name) traces a figure eight over the field/demonstration area.

### Takeoff (High, Nonstaged Profile Only)

Today, (rank/name) will demonstrate the F-16's remarkable power by pulling up into a (half) Cuban eight after only a 1-thousand foot takeoff roll. In this maneuver, (rank/name) will inscribe (the first half of) a figure eight above the field and demonstrate the aircraft's low speed rolling capability by completing a roll and a half in the maneuver. Ladies and gentlemen, from your left/right.... (rank/name) and the F-16 Fighting Falcon!

### Flat Pass

(Rank/name) is now repositioning his aircraft to the right as he prepares to demonstrate the low altitude, high-speed capability of the F-16 Fighting Falcon. As he passes show center he will be traveling over 700 miles per hour, less than half the Falcon's top speed.

### TRIPLE Aileron Rolls

As (rank/name) returns to show center from the left, he will accelerate rapidly and snap the fighting Falcon through four aileron rolls. Ladies and gentlemen, from your left, (rank/name) and the TRIPLE roll.

### High G Turn

In a dogfight the ability to turn tight is crucial. Watch now as (rank/name) shows you just how exceptional the F-16 is in a nine G turn. From the right and at show center, he will bank sharply into a tight turn capable of pressing the pilot into the seat with a force of up to nine times his normal weight. In the full 360-degree turn the F-16 has a turn radius of less than 14-hundred feet. (PAUSE) It's this kind of performance which gives the F-16 its reputation as the most maneuverable fighter in the world today.

### Three Point Roll

(Rank/name) will now demonstrate the F-16's crisp handling characteristics as he performs a three point roll at show center, (PAUSE) Ladies and gentlemen....from your left....the F-16 Fighting Falcon and the three point roll.

### Double Immelmann (High Profile Only)

After he returns to show center from the right, (rank/name) will perform a classic World War I maneuver...the Immelmann. (PAUSE) To further demonstrate how powerful and maneuverable the Fighting Falcon is, (rank/name) will perform a double Immelmann, and complete it in less than 6-thousand feet.

### Falcon turn/Sharks Tooth (High Profile Only)

As (rank/name) approaches the end of the runway, he will perform a split-S and set up for a series of maneuvers which will demonstrate the Falcon's ability to maneuver tight and stay unpredictable, a trait which helps the Falcon survive against low altitude threats then quickly transition from a horizontal fight into the vertical. Ladies and gentlemen, from your right, the Falcon turn followed by the shark's tooth. (PAUSE - ON TOP OF LOOP) It's the F-16's fly-by-wire flight control system that allows the jet to draw such precise corners.

### Slow-Speed Pass

(Rank/name) is now slowing the Fighting Falcon to prepare for a slow speed pass. While the F-16 can fly at more than twice the speed of sound, low speed controllability is just as important to those who fly it. (PAUSE) As he approaches show center, notice the gray paint scheme of the Fighting Falcon...one that's designed to make it more difficult to pick up visually in conditions ranging from bright sky to dull overcast. As (rank/name) passes show center he will apply full afterburner and accelerate his aircraft into a nearly vertical climb, demonstrating the F-16's massive thrust capability.

### Knife Edge Pass

Ladies and Gentlemen, get your cameras ready as (rank/name) prepares to show you the sleek lines of the F-16, (PAUSE) from your (left/right), the F-16 and the knife edge pass.

### Max Climb With Rolls (High Profile Only)

(Rank/name) is now setting up from your (right/left) for a maximum performance climb with a series of aileron rolls. As he pulls back on the stick you will see the Falcon's exceptional power and rolling capability as he climbs from 500 feet to more than 15 thousand feet.

### Descent (High Profile Only)

(Rank/name) has begun a descending turn in preparation for his last maneuver. While today's demonstration shows you how well the F-16 can maneuver in combat, what it cannot show is its striking power or the accuracy and lethality of the weapons it carries. The Falcon can hit targets well outside of visual range...while flying faster than the speed of sound. Add the superb view provided by its bubble canopy, and you have the world's best multi-role fighter.

### Departure (Staged Profile Only)

(Rank/name) is now returning to (location) for landing. As he approaches the runway he will decelerate to about 150 miles per hour. Unlike the supersonic fighters of the 50s and 60s, the F-16 doesn't need a drag chute to slow down...and it can stop in less than 3-thousand feet if necessary. Add its ability to take off from relatively short runways and you have a fighter that can operate from thousands of airfields in virtually every country in the world.

### Tactical Pitch-Up (Nonstaged Profile Only)

(Rank/name) is now approaching from your left/right for his last maneuver -- a tactical pitch-up to landing. He will cross the runway at 500 feet and perform a rolling pitch-up as he turns to the downwind leg of the landing pattern.

### Downwind and Final Approach (Nonstaged Show Only)

(Rank/name) has lowered his landing gear and as he approaches the runway he will decelerate to about 150 miles per hour. Unlike the supersonic fighters of the 50s and 60s, the F-16 does not need a drag chute to slow down...and it can stop in less than 3-thousand feet if necessary. Add its ability to take off from relatively short runways and you have a fighter that can operate from thousands of airfields in virtually every country in the world.





Maintainers

Experience

2. Please call me at (DSN) if you need further information.

Wing Commander  
Signature Block

cc: MAJCOM/DO  
MAJCOM/DOO or A/R

**Attachment 7****AERIAL SITE SURVEY**

**A7.1. Aerial Site Survey.** Pilots will accomplish following site survey actions in preparation for aerial demonstration.

A7.1.1. Preflight:

A7.1.1.1. Review airfield diagram (photo if possible) to include runways, taxiways, barriers, show line, crowd line, field elevation, and obstacles (such as towers, mountains, rising terrain, buildings, etc.)

A7.1.1.2. Analyze weather patterns, sun angle/elevation, mountain shadows, for impact on flight profile

A7.1.1.3. Obtain local no-fly restrictions, noise abatement, and bird avoidance procedures

A7.1.1.4. Review FAA waiver for applicable details, airspace (up to 5 NM/15,000 feet)

A7.1.1.5. Identify control agencies such as on-site tower/local radar (TRACON) traffic control

A7.1.2. Survey Flight:

A7.1.2.1. Circle show site, fly show line, look for maneuver reference points, and obstacles

A7.1.2.2. If practical, accomplish aerial survey flight at same time of day as planned aerial demo

A7.1.2.3. Observe holding points (for staged shows and Heritage Flights)

**Attachment 8****DEMONSTRATION FLIGHT BRIEFING**

**A8.1. Demonstration Flight Briefing.** Pilots will accomplish the following flight briefing actions in preparation for aerial demonstrations:

- A8.1.1. Demonstration pilot will attend FAA mass briefing
- A8.1.2. As a minimum, review the following with ground safety observer:
  - A8.1.2.1. Time hack
  - A8.1.2.2. EP of the Day
  - A8.1.2.3. WX/NOTAMS
  - A8.1.2.4. Mission overview
  - A8.1.2.5. Mission data card
  - A8.1.2.6. Airfield diagram and show layout
  - A8.1.2.7. Review site survey data
  - A8.1.2.8. Accomplish any non-briefing items prior to flight
- A8.1.3. Ground procedures:
  - A8.1.3.1. Start, taxi, marshalling
  - A8.1.3.2. Spare procedures
- A8.1.4. Takeoff:
  - A8.1.4.1. Runway lineup
  - A8.1.4.2. Minimum fuel
  - A8.1.4.3. Abort procedures
  - A8.1.4.4. Low altitude ejection
  - A8.1.4.5. Land immediately after T/O
- A8.1.5. Aerial Demonstration:
  - A8.1.5.1. Staged vs. local
  - A8.1.5.2. Primary show (HI):
    - A8.1.5.2.1. Maneuvers
    - A8.1.5.2.2. Individual maneuver parameters
    - A8.1.5.2.3. Mandatory parameter radio calls
    - A8.1.5.2.4. WX transition (HI/LO) points
  - A8.1.5.3. Alternate show (LO):
    - A8.1.5.3.1. Maneuvers

A8.1.5.3.2. Individual maneuver parameters

A8.1.5.3.3. Mandatory parameter radio calls

A8.1.5.3.4. WX transition (HI/LO) points

A8.1.5.4. Abnormals:

A8.1.5.4.1. Maneuver abort and reposition

A8.1.5.4.2. Emergencies

A8.1.5.4.3. Ground safety observer termination procedure calls/procedures

A8.1.6. Recovery:

A8.1.6.1. Pattern and Landing

A8.1.6.2. After landing/de-arm

A8.1.6.3. Emergency/alternate airfields

A8.1.7. Debrief

A8.1.7.1. When/where?

A8.1.8. Set aside time to mentally prepare for demo

## Attachment 9

**SAMPLE FIRST YEAR DEMONSTRATION PILOT CERTIFICATION CHECKLIST  
{PER MAJCOM SUPPLEMENT}**

**A9.1. First Year Demonstration Pilot Certification Checklist.** The following actions will be taken prior to MAJCOM/CC certification: (NLT times provide guidance and are not mandatory)

- \_\_\_\_\_ 1. Aug: WG/CC will:
    - \_\_\_\_\_ a. Designate new demonstration pilot
    - \_\_\_\_\_ b. Inform MAJCOM Aerial Events of selection
  - \_\_\_\_\_ 2. Sept: OG/CC will:
    - \_\_\_\_\_ a. Ensure demonstration pilot has entered training
    - \_\_\_\_\_ b. NLT 30 Oct - Inform MAJCOM Aerial Events of planned NAF/CC and WG/CC certification dates
  - \_\_\_\_\_ 3. 15 Nov. MAJCOM Aerial Events forward SSS to MAJCOM/CC to obtain approval of certification schedule
    - \_\_\_\_\_ a. Names of pilot that will need certification
    - \_\_\_\_\_ b. General method of certification (individually, two at a time, etc)
    - \_\_\_\_\_ c. Dates for certification
- NOTE:** MAJCOM/CC certification date initiates certification countdown for individual pilot
- \_\_\_\_\_ 4. MAJCOM Aerial Events inform WG/CC of planned certification dates
  - \_\_\_\_\_ 5. NLT Cert – 30 days: WG/CC pre-certify demonstration pilot and forward grade book to NAF/CC
  - \_\_\_\_\_ 6. NLT Cert – 15 days: NAF/CC approve demonstration pilot and WG/CC forward grade book to MAJCOM Aerial Events
  - \_\_\_\_\_ 7. NLT Cert – 14 days: applicable OG submits airspace waiver
  - \_\_\_\_\_ 8. NLT Cert – 7 days: protocol coordinates:
    - \_\_\_\_\_ a. With airfield manager for MAJCOM/CC observation location
    - \_\_\_\_\_ b. With local communications squadron for PA system at MAJCOM/CC observation location
    - \_\_\_\_\_ c. With local transportation for demonstration team and unit leadership if required
  - \_\_\_\_\_ 9. NLT Cert – 2 days:
    - \_\_\_\_\_ a. MAJCOM Aerial Events prepare IOI for MAJCOM/DO to include: Demonstration team arrival and departure times; unit leadership arrival and departure times; practice, certification, and backup times; demonstration pilot meeting time with MAJCOM/CC; other significant information
    - \_\_\_\_\_ b. MAJCOM Aerial Events forward demonstration pilot grade book to MAJCOM/DO
    - \_\_\_\_\_ c. MAJCOM Aerial Events checks with protocol to ensure support arranged
  - \_\_\_\_\_ 10. Demonstration team arrival: MAJCOM Aerial Events representative meets team at Base Ops

\_\_\_\_\_ 11. Cert – 2 hrs: protocol ensures setup of MAJCOM/CC observation location

\_\_\_\_\_ 12. Cert + 1 day: MAJCOM Aerial Events prepares letter to FAA (AFS 800) to inform them of additional MAJCOM pilot approved to perform single-ship demonstrations

**NOTE FOR ACC:** ACC/DOOA will update letter to FAA to inform them of pilots approved to fly Heritage Flight profiles if training is accomplished WELL AFTER COMACC certification.