

IFS LOCAL FLYING PROCEDURES



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CHAPTER 1: GENERAL

1.1 SAFETY

(a) Ground Safety

- (1) The flight line is a “heads-up” environment that requires constant watch for aircraft, vehicles, and pedestrians all moving in close proximity to one another.
- (2) Pedestrians will yield to aircraft and vehicles operating on the ramp. When walking east/west on the Doss Ramp, walk along the tail end of aircraft parked on the flight line.
- (3) Secure all loose items (publications, ID badges, etc.) prior to walking on the flight line and before opening the canopy after flying. Loose items can create FOD hazards if they are dropped or blown away by wind or propeller blast.

(b) Flying Safety

- (1) Stay focused on the mission. In a dynamic flying training environment, you must maintain a heightened state of situational awareness in order to recognize and avoid potential safety hazards.
- (2) Adherence to standard procedures and regulations will ensure that common safety hazards are avoided. Exercise extreme caution when conditions require deviations from standard procedure.

(c) Reporting Safety Hazards

- (1) **Notify the SOF.** Notify the SOF as soon as practical when you observe actual or potential safety hazards during ground or flight operations.
- (2) **Notify the Safety Office.** Report all safety-related events to the Safety Office using the Safety Gram form as soon as practical after flight. Reportable events include, but are not limited to, the following:
 - (i) Emergencies.
 - (ii) Early return due to aircraft damage/malfunction.
 - (iii) Diversion; or unscheduled full-stop landing at any airfield.
 - (iv) NMAC or other traffic conflicts.
 - (v) Bird/wildlife strike; FOD damage; or any other collision.

1.2 FLIGHT DUTY PERIOD, CREW REST, AND ALCOHOL

- (a) **Flight Duty Period.** The maximum flight duty period (FDP) for all pilots is 12 hours. The FDP is defined as the period from a pilot’s first official duty of the day until the end of that pilot’s last scheduled activity.
- (b) **Crew Rest.** All pilots must have the opportunity for at least 8 hours of continuous, uninterrupted rest during the 12 hours immediately prior to the beginning of the FDP, in accordance with AETCI 36-2205 and AFI 11-202V3.
- (c) **Alcohol.** Alcohol and its after effects can adversely affect flight duties that impact safety of flight. Aircrew shall not consume alcoholic beverages within the 12 hours preceding takeoff. Aircrew shall not operate a Doss aircraft when under the influence of alcohol or its after-effects.

1.3 CLOTHING

- (a) Students and MFIs will wear flight gloves during ground operations, but will remove a glove when taking the fuel sample. They will also wear gloves during all departures, arrivals, and during critical phases of flight.
- (b) Students and MFIs may wear hats in accordance with current 1 FTS/CC guidance.
- (c) Doss instructors will wear flight gloves from engine start to engine shutdown, but gloves may be temporarily removed when they hinder required tasks.
- (d) Doss instructors may wear official Doss ball caps or solid, dark-colored watch caps on the flight line and in the aircraft.
- (e) Students and MFIs will adhere to any additional 1 FTS dress and grooming policies (reference AETC OI - IFS).
- (f) ID badges will not be worn on the flight line.
- (g) Sunglasses will not be worn on top of the head or hanging from any part of the flight suit.

1.4 PERSONAL ELECTRONIC DEVICES

- (a) The use of personal electronic devices (e.g., cell phones, cameras, video recorders, music players, etc.) *in the aircraft* is prohibited without prior permission from the Chief Pilot.

EXCEPTION: a call can be made to the SOC to request that the Doss Ramp gate be opened.

- (b) Do not use cell phones on the Doss Ramp except communications directly related to the mission (e.g., calls to the SOF, SOC, MX, etc.).
- (c) Cell phones may be used in the aircraft during emergencies.
- (d) When DOJ/DOC is conducting prison transport operations near the Pueblo solo ramp, do not take photos that include their aircraft, personnel, or any aspect of their operation.

1.5 AIRSICKNESS

- (a) Students must learn how to properly use an airsick bag, and must always have one readily available during flight.
- (b) If you vomit in the aircraft, you are responsible for ensuring that the cockpit is decontaminated in a timely manner. Check with Doss Maintenance for cleaning materials and instructions.
- (c) All cases of airsickness must be reported to the Flight Commander and properly documented in accordance with AETCI 36-2205.
- (d) Students who experience airsickness must be cleared to fly by the IDMT prior to the next sortie.
- (e) Dispose of used airsick bags in the dumpster near the loading dock.

1.6 MISSION BRIEFING AND DEBRIEFING

- (a) **Efficient Use of Briefing Period.** The PIC will ensure that the designated briefing period is used efficiently and that all topics listed in the applicable briefing guides are discussed in sufficient detail.
- (b) **Student Participation.** Refer to the applicable playbook for a description of student briefing responsibilities for each lesson.
- (c) **Pre-Briefing Checklist.** The student and instructor will each complete any applicable administrative tasks in the Pre-Briefing Checklist *prior to the mission briefing*. Instructors must ensure completion of the checklist for both the student and themselves.
- (d) **Mission Timing.** Aircrew will strive for precise mission timing in accordance with the published flight schedule, or according to specific amendments to the schedule approved by the SOF.
- (e) **In-Flight Simulated Emergencies.** Any simulated emergency to be accomplished during the sortie must be briefed prior to flight.
- (f) **TOLD.** During the mission briefing, the PIC will ensure that takeoff and landing distance calculations are accurate for expected conditions. For any runway of intended use, *the calculated sum of takeoff distance and landing roll distance must not exceed the available runway length*.
- (g) **Debriefing.** Instructors will ensure that the mission debriefing is concluded before exceeding student duty day or crew rest requirements.

1.7 MISSION PREPARATION

- (a) **General Knowledge.** Review the general knowledge topics listed in the playbook for each sortie. Then prepare for every detail of the mission using approved publications as your primary reference material.
- (b) **Chair Flying.** Rehearse all elements of the mission in a CPT, in front of a cockpit photo, or in a parked aircraft if available.

NOTE: chair flying is most effectively practiced with a partner.

NOTE: chair flying in an aircraft is permitted if coordinated with the Chief of Maintenance, but students are NOT allowed to turn on electrical power or pull any circuit breakers.

- (1) Focus on building habit patterns through repetition. Emphasize visual clearing outside the cockpit, establishing known pitch/power settings, trim, composite cross-check, and proper division of attention.
- (2) Simulate the entire sortie chronologically. Practice aircraft procedures, proper use of checklists, maneuver setup/execution, departure/arrival/pattern procedures, navigation, radio/GPS operation, radio calls, callouts, and challenge-and-response items. Practice using the approved in-flight publications as they would be used during flight.
- (c) **Mission Briefing Preparation.** *Students will accomplish or prepare the following items prior to the mission briefing:*
 - (1) **Gradebook.** Review previous IP comments and recommendations. **Initial all 4293s.** Check your gradebook against syllabus and playbook requirements, including maneuver and IP continuity requirements. **Verify that you are not scheduled to fly with more than 3 different instructors and one supervisor prior to C306, N305, or R306.**
 - (2) **Playbook.** Review the Playbook entry for the current lesson to ensure that all required items are thoroughly prepared.

- (3) **Mission Objectives.** Be familiar with the overall mission objectives stated in the Playbook. The instructor will review this during the mission briefing.
- (4) **Status Board.** Review the Status Board (on the Doss Ops intranet page) for current flying status and other pertinent information.
- (5) **Ops Notes.** Review the daily Ops Notes (posted on the bulletin board at the north end of the ops hallway).
- (6) **Mission Data Cards.** Fill out the top section of two Mission Data Cards. (Use the online example as a guide.)
- (7) **ORM.** Complete an ORM assessment for weather/environment, mission, and human factors. During the briefing, the instructor will add additional points to your total as required.
- (8) **Early Step Time.** Plan to step and begin taxi 5 minutes ahead of schedule when Runways 26L, 26R, or 17 are in use.
- (9) **Area and Pattern Times.** Estimate the time windows for area work and pattern work. These figures should be based on profile/area assignment and planned maneuvers. The effect of significant headwind or tailwind on ground speed should also be considered when planning departure and arrival transit times.
- (10) **Training Objectives.** Set **three training objectives** for the sortie based on your previous performance and instructor feedback. Training objectives must be *attainable, relevant, and measurable*.
- (11) **Weather.** Students are expected to check the METAR and TAF for KPUB and all airfields along the route of flight. Write applicable information from the METAR and TAF on the Mission Data Card. For VNAV and XC profiles, forecasted winds aloft will also be required to generate the Form 70.
- (12) **NOTAMS.** Check current NOTAMS for KPUB and all airfields along the route of flight. Write applicable NOTAM information on the Mission Data Cards.
- (13) **FCIF.** Read and sign all active FCIFs in GTIMS by the deadline specified in each FCIF.
- (14) **Weight & Balance.** Calculate total crew weight. If greater than 420 lbs, ask an instructor to notify the dispatcher (x8689) that you will need an aircraft with 1/2 tank of fuel. **Final weight and balance calculation for the sortie must be accomplished after the aircraft assignment and fuel state are known (after stepping to the aircraft), using the graph in the aircraft forms binder.**
- (15) **TOLD.** Calculate TOLD for **all runways** of intended use and write this data on the Mission Data Card. Use performance charts in the IFG for TOLD calculations. Use maximum gross takeoff weight (1764 lbs) for takeoff calculations if aircraft assignment and fuel state are unknown. Maximum gross takeoff weight is assumed in the Landing Distance table.
- (16) **Mission Flow.** List all pattern and area maneuvers to be accomplished on the Mission Data Card.
- (17) **Flying Schedule and Sortie Profile and Area.** Check the flying schedule the evening prior to flight to learn your assigned profile and area. When you arrive at the duty desk for your step briefing, **verify all information again on the sign-out log.** If changes are made to the schedule on the day of flight, confirm these changes in GTIMS (Schedule Viewer) with your flight scheduler or an instructor. **Do not interrupt the SOF or Dispatcher to ask about schedule changes.**
- (18) **Flight Publications.** Ensure that your flight publications are updated and complete before the mission briefing.

1.8 COCKPIT/CREW RESOURCE MANAGEMENT

- (a) CRM is designed to focus aircrew attention on agencies, procedures, and resources available to enhance mission success. IFS syllabi contain specific Course Training Standards (CTS) for each of these concepts. Reference AFI 11-290 *Cockpit/Crew Resource Management Training Program* for additional information.
- (b) **CRM Topics.** During each mission briefing, students will discuss one of the following CRM topics, including at least one specific application for the planned sortie:
 - (1) **Mission Planning, Briefing, and Debriefing:** Includes pre-mission analysis and planning, briefing, ongoing mission evaluation, and post-mission debrief.
 - (2) **Communication:** Sharing of information with others to cause action. Communications may direct, inform, question, or persuade. Proper communication is concise, effective, and properly timed to enhance SA. Listening is just as important to SA as talking.
 - (3) **Risk Management and Decision Making:** Logic-based, common sense approach to decision making based on human, material, and environmental factors. The goal is to match risk to the mission, not to completely eliminate risk. Includes risk assessment/management, tools, breakdowns in judgment, breakdowns in flight discipline, problem-solving, evaluation of hazards, and control measures.
 - (4) **Situational Awareness (SA):** Continuous perception of self and aircraft in relation to the dynamic environment of flight, threats, and mission, and the ability to forecast and then execute tasks based upon that perception.
 - (5) **Task Management:** Ability to establish priorities and alter a course of action based on new information. Includes establishing priorities, overload, underload, complacency, effective use of available resources, checklist discipline, and compliance with standard operating procedures.
 - (6) **Crew Coordination:** Coordination between members of the crew to accomplish the tasks of the mission. Includes the impact on aircrew performance of command authority, leadership, responsibility, assertiveness, conflict resolution, hazardous attitudes, behavioral styles, and team-building.

1.9 OPERATIONAL RISK MANAGEMENT

- (a) ORM is the process used to identify and reduce the risks of flying to an acceptable level. A thorough ORM assessment attempts to weigh training benefit against known risks. Risk can often be minimized through minor changes to the mission that do not negatively impact training.
- (b) **ORM Assessment.** Students will discuss ORM during academic training and will learn how to calculate ORM values for each sortie using the ORM Assessment Guide. **Prior to each mission briefing**, students will use the ORM Assessment Guide to total the known risk factors (excluding factors that will be added by the IP during the briefing).

1.10 TRANSFER OF AIRCRAFT AND SYSTEMS CONTROL

- (a) **Transfer of Aircraft Control.** One and only one pilot can be in control of the aircraft at any given time. It is vital to flight safety that crewmembers clearly establish who is the PF and who is the PNF. Fatal accidents have occurred when two pilots have attempted to fly the aircraft simultaneously, or when neither pilot was in control of the aircraft. The following rules apply to transfer of aircraft control:
 - (1) The PF relinquishing control says, “You have the aircraft.”

- (2) The PNF assuming control says, “I have the aircraft,” and noticeably shakes the control stick.
 - (3) The order may be reversed because the PIC/IP always retains the authority to take aircraft control when required. The order of transfer is less important than each crewmember executing his/her role in accordance with the standard procedure.
 - (4) If the PIC/IP (as the PNF) says “I have the aircraft” and noticeably shakes the control stick, the PF must immediately relinquish control of the aircraft, and say “You have the aircraft.” This is an example of how the order is reversed but the roles continue to be executed.
 - (5) Using the exact words is critical to establish proper habit patterns that enhance swift, unambiguous transfer of aircraft control. Do not use other words such as “it” or “jet” in lieu of the term “aircraft” because they can be misunderstood, misheard, and create confusion.
 - (6) Never relinquish control of the aircraft until the other pilot has positively assumed control of the aircraft (i.e., shaken the control stick).
 - (7) Do not hesitate to relinquish control when directed by the PIC/IP.
 - (8) Immediately query the other crewmember in case of confusion.
 - (9) Transfer of aircraft control is not required when the PNF checks the brakes during taxi.
 - (10) Transfer of aircraft control is required for the PNF to check flight control movement during runup.
- (b) **Transferring Control of Individual Aircraft Systems.** The PF is responsible for checklist completion and operation of all aircraft systems. When the PIC/IP (as the PNF) needs to take control of an individual aircraft system (e.g., radios, navigation equipment, throttle for an SFL, etc.), any inputs by the PNF will be verbally coordinated/announced. **EXCEPTION:** no coordination is expected when correcting a student’s radio call, or when aircrew adjust their own sliding window, air vent, safety belts, or intercom volume/squelch.

1.11 CLEARING AND COLLISION AVOIDANCE

(a) Eyes, Ears, and TAS

- (1) **Eyes.** Focus the majority of your visual attention outside the cockpit. Scan for traffic conflicts throughout the flight using a series of short, regularly-spaced eye movements that bring successive areas of the sky into the central visual field. Each movement should focus for at least one second on a 10° sector of the horizon. Focus your eyes on a distant point and use various search patterns that include both the vertical and horizontal dimensions. Be aware of blind spots created by your own aircraft.
- (2) **Ears.** Listen for potential conflicts on the radio, and communicate as required to resolve conflicts.
- (3) **TAS.** The TAS should be used as required throughout the sortie to assist in visual identification of potential conflicts. Periodically check during flight that the TAS is not stuck in “GND” mode. The TAS page must be set on 1 or 2 mile range during traffic pattern operations.

CAUTION: radar service does not relieve you of your responsibility to “see and avoid” other aircraft while operating in VMC. ATC will issue traffic advisories on a workload-permitting basis only.

NOTE: when ATC issues traffic advisories, *report traffic in sight as soon as possible* to avoid unnecessary vectors or delays.

NOTE: a “traffic in sight” reply to ATC must be based on seeing the issued traffic out the window with your eyes, not merely on the TAS display.

(b) **Visual Clearing in the Traffic Pattern**

- (1) Students are expected to verbally identify potential traffic conflicts at critical points in the traffic pattern (e.g., entry leg; prior to the break; prior to turning closed; prior to the perch). If the radio frequency is congested at the moment, it is also acceptable to point outside the cockpit at the potential conflict. The following examples illustrate possible situations, but exact phraseology is not required:

Entry Leg	“Downwind traffic to follow, 1 O’clock” “Upwind traffic, 2 O’clock”
Prior to turning closed	“Traffic closed downwind in sight” “Entry leg traffic in sight”
Prior to the break	“Downwind is clear, traffic to follow at the perch” “Traffic midfield downwind in sight”
Prior to the perch	“Traffic turning base ahead in sight” “Traffic short final in sight”

- (2) In order to earn a Fair or better grade on Clearing/Collision Avoidance, students must demonstrate a safe level of proficiency in maintaining awareness of their position relative to other aircraft in the pattern. This includes visual clearing, as well as effective use of the radios and TAS.

- (c) **Sterile Cockpit in the Traffic Pattern.** Avoid all non-essential communications while operating in the airport traffic pattern. Unnecessary chatter over the intercom or on the radios will not be tolerated. Attentively listen to all radio calls on the tower frequency or CTAF in order to build a mental picture of all potential conflicts. *When a transmission is being received on the Tower frequency or CTAF, stop talking over the intercom immediately (mid-sentence) and carefully listen to the transmission.*

- (d) **Terrain Inhibit for Pattern Work.** In order to allow uninterrupted use of the TAS during pattern work, temporarily disable the terrain/obstacle warning system in accordance with the following rules:

- (1) Inhibit the terrain/obstacle warning system when accomplishing the Descent/Approach check inbound to Fowler, Bullseye, or any non-towered airfield that is *not* listed in the GPS database.
- (2) Inhibit the terrain/obstacle warning system when accomplishing the Runup checklist at non-towered airfields that are not listed in the GPS database if planning a pattern delay or pattern-only sortie (e.g., pattern solos at Bullseye).
- (3) After departing the pattern, re-enable the terrain/obstacle warning system when accomplishing the Cruise/Leveloff checklist.

- (e) **Non-Doss Aircraft.** Be alert for non-Doss aircraft that may be transiting the local flying area. Report their position and direction of flight to Tiger Traffic on 123.3 to help others avoid potential conflicts. Non-Doss aircraft are generally not aware of IFS training areas or procedures

- (f) **Vertical separation minimums.** Maintain at least 500 feet of vertical separation with other airborne aircraft. Failure to maintain at least 500 feet of vertical separation will be considered a NMAC, and the PIC must report the incident on a Safety Gram.

- (g) **Lateral Spacing in the Traffic Pattern.** Minimum lateral spacing between Doss aircraft and with other small aircraft is **3000 feet**. You must remain **3 minutes** behind large and heavy aircraft for wake turbulence avoidance.

(h) **Lateral Deconfliction and Right-of-Way Rules**

- (1) When two aircraft converge on a single point at the same altitude (e.g., an arrival control point, or a traffic pattern entry point), the aircraft on the right has the right-of-way.
- (2) When two aircraft intend to join a corridor simultaneously from training areas located on opposite sides of the corridor, the aircraft on the right has the right-of-way.
- (3) Aircraft established in the corridors have the right-of-way over aircraft intending to join the corridor from an adjacent training area.

(i) **Collision Avoidance in the Training Areas**

- (1) **Clearing Turns.** Perform at least 180° of clearing turns when first entering the training area. The recommended technique is to turn 90° in one direction, and then 90° in the opposite direction. Scan the entire training area for conflicts before commencing area work.

NOTE: the clearing turns may be accomplished while climbing or descending into the area.

NOTE: clearing turns do not need to be accomplished prior to each maneuver, but aircrew must exercise continuous vigilance for potential collision hazards during area work.

- (2) **One Doss Aircraft Inside or Below a Training Area at a Time.** Only one Doss aircraft at a time is allowed to operate inside a given training area (7000' – 8000' MSL) or in the airspace directly below a training area (500' AGL – 7000' MSL).
- (3) **Scheduling Conflicts.** Pay attention to radio calls from company aircraft announcing their intentions to enter or depart your assigned training area. Consult the SOF for airborne resolution of potential scheduling conflicts for training area assignments.
- (4) Report “entering” a training area, or the airspace “below” a training area, **just prior** to crossing a vertical or lateral boundary of that airspace.

(j) **Vertical Deconfliction Outbound in the Corridors.** The following restrictions apply to operations between sunrise and sunset when the local training areas and corridors are in use.

- (1) **Flying Outbound in a Corridor Below 7,000' MSL.** Do not fly outbound in a corridor below 7,000' MSL unless specifically approved by the SOF, who must confirm that no aircraft will be flying inbound simultaneously via that corridor at the normal Pueblo Arrival altitude (6,500' MSL). Flying outbound in a corridor below 6,500' MSL requires additional confirmation from the SOF that C-130 aircraft will not be using that corridor (C-130s operate in the corridors at or below 6000' MSL).
- (2) **B Corridor.** The minimum altitude outbound in the B corridor is **8,000' MSL**. Lower altitudes outbound must be specifically approved by the SOF, who must confirm that the requested altitude will not generate conflicts with opposite-direction traffic on a Pueblo South Arrival or with traffic crossing the corridor to enter/exit the YAK VNAV route.
- (3) **C Corridor.** The minimum altitude outbound in the C corridor is **8,000' MSL**. Lower altitudes outbound must be specifically approved by the SOF, who must confirm that the requested altitude will not generate conflicts with opposite-direction traffic on a Fowler Departure or Pueblo South Arrival, or with traffic crossing the corridor on a Fowler Departure.
- (4) **D Corridor.** The minimum altitude outbound in the D corridor is **7,500' MSL**. Lower altitudes outbound must be specifically approved by the SOF, who must confirm that the requested altitude will not generate conflicts with traffic entering/exiting the La Junta or Check VNAV routes, or opposite-direction traffic on a Pueblo East Arrival, or Fowler Arrival traffic crossing the corridor.

- (5) **E Corridor.** The minimum altitude outbound in the E corridor is **7,000' MSL**. Lower altitudes outbound must be specifically approved by the SOF, who must confirm that the requested altitude will not generate conflicts with opposite-direction traffic on a Pueblo North Arrival or with traffic entering/exiting the Daygo VNAV route.
- (6) **F Corridor.** The minimum altitude outbound in the F corridor is **9,000' MSL**. Lower altitudes outbound must be specifically approved by the SOF, who must confirm that the requested altitude will not generate conflicts with opposite direction traffic on a Pueblo North Arrival or with traffic crossing the corridor between 7,000' and 8,500' MSL on a Bullseye Departure to areas 9, 10, 19, or 20.

1.12 SINGLE-ENGINE MENTALITY

- (a) Visually identify suitable forced landing areas within power-off gliding distance during all phases of flight.
- (b) Terminate training missions at the onset of abnormal engine indications and land as soon as conditions permit at the nearest suitable airfield.
- (c) When recovering with abnormal engine indications, conserve altitude (or climb) until you are in a position to glide to High Key at the recovery airfield. Plan to intercept the traffic pattern at High Key to prepare for the worst-case scenario: engine failure.
- (d) When recovering to the airfield after experiencing abnormal engine indications (or any other emergency), declare an emergency and add the word "emergency" to your call sign during radio calls to ensure that you receive priority handling by ATC and to alert other aircraft to your situation.

1.13 FLIGHT PUBLICATIONS

- (a) **Approved Flight Publications.** Students are not allowed to use unapproved publications, "cheat sheets," or modified versions of any approved publication during the sortie. Check your publications against the master copy maintained on the Doss Ops intranet page. The following publications are approved for use during IFS training missions:
 - (1) **Mission Data Card.** The mission data card may contain any hand-written information except aircraft checklist items.

NOTE: avoid the temptation to write excessive amounts of information on the mission data card, which could become a distraction during flight.
 - (2) **Navigation Log.** A navigation log is required for VNAV and XC missions.
 - (3) **DA20-C1 Abbreviated Checklists.** Use the abbreviated Normal and Emergency procedures checklists for all normal procedures and simulated emergencies. In those cases where it is required to reference the checklist, you must actually reference the checklist visually using the Read-Do or Do-Verify method as appropriate. Do not write on the aircraft checklists. The checklists may be separated from the IFG.
 - (4) **Doss Aviation In-Flight Guide.** All FCIF changes must be incorporated and properly logged on page ii of the IFG. All pages of the IFG must be present and bound in the correct order.
 - (5) **IFS Local Area Map.** All FCIF changes must be incorporated and properly logged in the "Posted Changes Log" on side 1 of the map.
 - (6) **Doss VNAV Charts.** All FCIF changes must be incorporated and properly logged in the "Posted Changes Log" on the chart. The print date on the chart must be the current edition.

- (7) **Doss XC Charts.** All FCIF changes must be incorporated and properly logged in the “Posted Changes Log” on the chart. The print date on the chart must be the current edition.
 - (8) **Denver Terminal Area Chart.** A Denver TAC chart is maintained in each aircraft. Stow it in the left side pocket after flight.
 - (9) **FAA Sectional Aeronautical Charts.** As required by the XC profile.
 - (10) **Airport/Facility Directories.** As required by the XC profile.
 - (11) **DA20-C1 Aircraft Flight Manual.** Federal regulations require the aircraft flight manual to be readily accessible during flight.
- (b) **Flight Publications Organization and Accessories.** Organize flight publications in a manner that allows quick reference to required information without cluttering the cockpit. Common techniques include attaching publications to a kneeboard; placing publications on the seat tucked under either leg; or stowing publications in the side pocket next to your shin.
- (1) **Kneeboards.** Kneeboards are recommended to help organize flight publications and to provide a suitable writing surface. Kneeboards can be worn on either leg but must be positioned so that they do not interfere with movement of the control stick through its full range of motion.
 - (2) **Removable Sticky Tabs.** Removable sticky tabs may be attached sparingly to flight publications. Write on the sticky tab *before* placing it on the publication to avoid leaving an impression or damaging the publication. Take inventory of each tab prior to flight and account for each one after flight.

NOTE: avoid the temptation to write excessive amounts of information on multiple sticky tabs, which could become a distraction during flight.

- (3) **Clips.** Clips may be used to help organize publications (e.g., marking pages in the IFG), but only if each clip is tethered securely to a kneeboard or checklist/IFG so that it does not become a FOD hazard.
- (4) **Elastic Bands.** Publications may be attached to the leg with elastic bands. However, elastic bands shall not be worn outside the aircraft, except when putting on the band immediately prior to entering the aircraft, or removing it immediately upon exiting the aircraft.

1.14 CHECKLIST USAGE

- (a) The approved aircraft checklists must be readily available and referenced appropriately during all ground and flight operations. Proper use of aircraft checklists will help ensure that required actions are accomplished at the appropriate time and in the correct order.

NOTE: only the approved checklist may be used in the aircraft. It is prohibited to use hand-written, modified, or amplified checklists in the aircraft.

- (b) **Read-Do and Do-Verify Methods.** “Read-Do” means to read one or more lines on the checklist, and then to accomplish those lines. “Do-Verify” means to accomplish one or more lines of the procedure by memory, and then to verify these actions with the checklist. In both of these methods, *each line of the checklist is referenced visually* to ensure accurate and complete execution of the procedure.

TECHNIQUE: move your thumb down the page as each line is checked.

TECHNIQUE: if interrupted while running a checklist, re-scan the entire checklist from the beginning to avoid skipping lines.

TECHNIQUE: announce running a checklist by stating its title (e.g., “cruise checklist”), and announce its completion (e.g., “cruise checklist complete”).

NOTE: there is no general requirement to verbalize normal procedures other than required callouts and challenge-and-response items. However, CSOs have additional requirements detailed in Chapter 6.

- (c) **Flows.** “Flows” are published on the Doss Ops intranet page for memorization of selected procedures. After the flow is completed for that procedure, use the checklist to verify that all actions have been accomplished.
- (d) **Memory Items.** There are situations where diverting attention to reference checklists or other in-flight publications would not be practical or safe during flight, and in these cases the applicable procedures should be accomplished as “memory items.” In order to avoid detracting from the pilot’s primary duty of maintaining aircraft control during critical phases of flight, DA20-C1 normal and emergency procedures conducted at or below 800’ AGL (or TPA if higher) should be accomplished as “memory items.” For example, the CLIMB, BEFORE LANDING, and GO-AROUND procedures should be accomplished without referencing the checklist. The *DA20-C1 Emergency Procedures Training Guide* identifies specific emergency procedures that will be considered memory items for training purposes. However, virtually any emergency procedure could fall into this category given the right situation. During forced landings, all procedures below High Key altitude are memory items.
- (e) **Challenge and Response Items.** Checklist items highlighted in yellow on the aircraft checklists must be accomplished or confirmed by both pilots using a challenge-and-response method. Appendix D of this manual describes required challenge-and-response items.
- (f) **Emergency Procedures Training.** The *DA20-C1 Emergency Procedures Training Guide* describes EP training methodology. Chapter 5 of this manual gives detailed information on conducting simulated EPs.
 - (1) **Boldface Actions.** Boldface actions (also called “critical actions”) must be accomplished immediately from memory, without taking the time to reference the checklist. After accomplishing any applicable boldface actions, refer to the checklist to verify correct accomplishment of boldface items and then to complete remaining non-boldface items in the procedure using a Read-Do method if time and conditions permit.
 - (2) **Simulating Boldface Actions During Flight.** Boldface actions must always be verbalized by memory and in the correct sequence, but exact phraseology is not required during in-flight simulated emergencies.

CAUTION: you may point to the switches or levers in question as you verbalize boldface actions, but do not touch them.
 - (3) **Writing/Reciting Boldface During Ground Training.** During ground emergency procedures training or evaluation, boldface actions must be stated *by memory, in the correct sequence, without error.* In order to standardize the way boldface items are recited, the following rules apply. Recite KIAS as “knots,” LDG as “landing,” and GEN/BAT as “gen bat.” Recite 60 KIAS as “sixty knots.” Do not verbalize punctuation marks, and do not add words to the boldface. For example, say “flaps landing” (correct), rather than “flaps dash landing” (incorrect) or “flaps to landing” (also incorrect).
 - (4) **Realistic Use of Publications.** Aircraft checklists and other in-flight publications must be referenced in a realistic manner during EP training on the ground and during in-flight simulated EPs.

1.15 GPS SETUP AND USAGE

- (a) Set PUB as the active waypoint for all local area work. Training area boundaries, corridors, and departure/arrival procedures are based on radial/DME from the Pueblo VORTAC.

CAUTION: *do not* set KPUB as the active waypoint for local area navigation.

- (b) Use GPS mode (not VLOC mode) on the Garmin 430 for navigation in the local flying area (e.g., departure/arrival procedures, corridors, etc.), except in the case of GPS failure.
- (c) Do not change any of the default GPS settings, data fields, waypoints, or internal volume levels for alerts. If any settings or data seem incorrect, report the discrepancy to the SOF after flight.

1.16 DOSS RADIO FREQUENCIES

(a) 123.30 Area Frequency (Tiger Traffic)

- (1) Set 123.30 in the Comm2 radio as the active frequency (left side) and monitor this frequency continuously at an audible volume. (See exceptions to this rule in paragraph b below).

NOTE: a second frequency can be simultaneously monitored on the Comm2 radio using the MON function

- (2) The SOF will continuously monitor 123.30 but may temporarily leave this frequency to communicate on 122.77.

(b) Exceptions to Monitoring 123.3. You may temporarily stop monitoring 123.3 in the following situations. However, avoid missing required position reports on 123.3.

- (1) When communicating with the SOF on 122.77.
- (2) When getting ATIS, AWOS, ASOS, or runway information on the Comm2 radio.
- (3) During pattern work if radio chatter on 123.3 becomes a distraction. The volume of the second radio should always be lower than the primary radio during pattern work, but the secondary radio volume can be turned all the way down if required during pattern work.
- (4) Pattern solos do not monitor 123.3.

(c) 122.77 SOF Frequency (Fur Ball)

- (1) Use 122.77 for all lengthy communications with the SOF (e.g., abnormal or emergency situations) in order to avoid congesting the area frequency. You will need to ask the SOF to meet you on 122.77 because the SOF does not continuously monitor 122.77.
- (2) KPUB pattern solos will use 122.77 to receive communications from the instructor supervising the solo.

1.17 APPROVED SOLO MANEUVERS

(a) Solo Pattern Work. The following maneuvers may be accomplished during the initial pattern solo, and during any VNAV/area solo, or XC solo:

- (1) Takeoff.
- (2) Traffic patterns.
- (3) Normal approach and landing.
- (4) Touch-and-go.
- (5) Go-around. (Not planned, but accomplished if required)
- (6) Forward slip. (Not planned, but accomplished if required)
- (7) Breakout. (Not planned, but accomplished if required)

- (b) **Solo Area Work and Solo VNAV Routes.** The following additional maneuvers may be accomplished during VNAV/area solos within the lateral boundaries of a numbered training area:
 - (1) Steep turns (inside the training area).
 - (2) Slow flight (inside the training area).
 - (3) VOR/GPS orientation (inside the training area).
 - (4) Ground reference maneuvers (below the training area between 800' – 1000' AGL).
- (c) **Solo XC.** Students should plan a pattern and low approach at each XC airfield on the profile, and one landing (full-stop) at KPUB.

1.18 PROHIBITED MANEUVERS

- (a) General, Enroute, and Area Work Prohibited Maneuvers:
 - (1) Maneuvers not specifically required or optioned for the sortie in the student syllabus or CT profile.
 - (2) Slow flight, stall recovery practice, or unusual attitude recovery practice below 1500' AGL.
 - (3) Aerobatic maneuvers (defined here as pitch attitudes deviating more than 30° from level or bank angles exceeding 60°).
 - (4) Spins.
 - (5) Maneuvers that impose negative G loads with flaps extended to LDG or T/O (AFM 2.2).
 - (6) Simultaneous full deflection of more than one control surface (AFM 2.10).
 - (7) Maneuvers that require abrupt or full deflection of any control surface above VA (AFM 2.2).
 - (8) Solo ground reference maneuvers below 800' AGL.
 - (9) Exceeding 30° of bank during solo ground reference maneuvers.
- (b) Pattern Work Prohibited Maneuvers:
 - (1) Beginning a takeoff run with available runway length less than the sum of calculated takeoff distance (using AFM 5-7) and calculated landing roll distance (using AFM 5-13).
 - (2) Stop-and-go landings. EXCEPTION: stop-and-gos are approved for RPA soft field takeoff training and for instructor night landing currency requirements.
 - (3) Touchdown behind another aircraft still on the landing runway at any non-towered airfield regardless of your distance behind that aircraft.
 - (4) Touchdown behind another aircraft still on the landing runway at a tower-controlled airfield with less than 3000 feet of separation behind that aircraft.
 - (5) Touchdown on any runway with less than 1500 feet of useable runway remaining.
 - (6) Touchdown beyond the intersection of runways at Fowler.
 - (7) Pattern SFLs from High Key when any aircraft conducting student training is in the traffic pattern.
 - (8) Practice breakouts at any public-use non-towered airfields (Fremont County, La Junta, etc.).
 - (9) Practice breakouts from any position in the traffic pattern other than the entry leg or post-midfield downwind leg.
 - (10) LAHSO for IFS student solos, regardless of prior experience or FAA certification.

1.19 MINIMUM ALTITUDES

- (a) All operations must adhere to the minimum safe altitude requirements of 14 CFR § 91.119.
- (b) All operations (other than takeoff or landing at an approved airfield) must remain at least 500' above any terrain, obstacle, or obstruction within a horizontal radius of 2000 feet from the flight path.
- (c) Most of the maneuvers normally accomplished inside the training area between 7000' – 8000' MSL may be accomplished below the training area if required. However, it is prohibited to practice slow flight, stall recovery, or unusual attitude recovery below 1500' AGL.

- (d) Doss aircraft working in areas 3 or 12 may be advised by the SOF, or by C-130 aircraft using a “Summit” callsign, that C-130 aircraft will be transiting below those areas. Upon receiving this notification, aircrew working in areas 3 or 12 must maintain at or above 1000’ AGL until the C-130 aircraft have cleared the lateral boundaries of the training areas.
- (e) Due to C-130 aircraft using the Doss corridors at or below 6000’ MSL, Doss aircraft will remain at or above 6500’ MSL in the corridors. If exceptions are required for abnormal conditions (e.g., weather), aircrew must coordinate with the SOF prior to operating in any Doss corridor below 6500’ MSL.

1.20 ADVERSE WEATHER

- (a) **FAA Restrictions.** Comply with Basic VFR Weather Minimums listed in 14 CFR §91.155.
- (b) **Doss WX Restrictions.** Comply with weather restrictions listed in the IFG and any special restrictions issued by the SOF.
- (c) **SOF Announcements.** The SOF will relay important weather-related information and instructions to aircraft on the area frequency (123.30), including flying status changes, weather recalls, profile/area re-assignments, and weather diversion instructions.
- (d) **PIREPs.** Aircrew are expected to give timely PIREPs to the SOF when they observe weather that may become a threat to the safety of operations in the local flying area or that may require a change in flying status.
- (e) **Gusty Winds.** Add 1/2 of reported gust spread to the normal final approach speed. Take reported gust minus steady state wind, and then divide this number in half to determine the amount to increase standard approach speed. For example, if winds at Pueblo are reported “260 at 10, gusts 20,” the gust spread is 10 knots, and final approach speed should be increased by 5 KIAS.
- (f) **Approaches With Flaps T/O or CRUISE.** Instructors may conduct full-stop landings with flaps set in the T/O or CRUISE position when required by adverse conditions (e.g., strong winds, wind shear, gusty winds, strong crosswind, or any situation that requires increased approach speed).

NOTE: the SOF may recommend modified approach speeds and flap settings on the area frequency (123.30). However, the PIC is responsible for ensuring that an appropriate approach speed and flap setting are used for the current conditions.

- (g) **Higher Rotation Speed.** For takeoff in gusty winds, strong crosswinds, or high density altitudes, rotation may be delayed up to 52 KIAS. Do not use a rotation speed higher than 52 KIAS.
- (h) **Cold Weather Operations**
 - (1) After starting a cold engine, do not exceed 1000 RPM until an oil temperature indication registers (AFM 4.4.3).
 - (2) Do not apply full power until the oil temperature has risen to 100° F (AFM 2.4.1). The location of 100° F on the oil temperature gauge is approximately midway between the red line (75° F) and the first white line on the gauge.
 - (3) The SOF will be directive regarding the use of inlet/outlet baffles during cold weather. Keep the SOF updated on temperatures aloft and baffle recommendations.

NOTE: if baffles are installed, cruise climbs may be required for engine cooling even in very cold ambient temperatures.

- (4) Instructors will ensure that the oil temperature is at or above 170° F before commencing an area SFL, and will clear the engine at least every 500 feet of vertical descent. The oil temperature may fall below 170° F during the area SFL in very cold ambient temperatures.

(i) **Hot Weather Operations**

- (1) When OAT at the airfield exceeds 80°F, leave the sliding windows open after parking. However, close the windows if precipitation is expected at the airfield.
- (2) Aircrew will not step when surface temperature exceeds 38° C (as reported by the Pueblo ASOS). However, aircrew who have already stepped may continue and complete the sortie.
- (3) Aircraft will not launch on student training missions when density altitude at the airfield exceeds 10,000 ft.

1.21 NO-FLY ZONES AND NOISE ABATEMENT PROCEDURES

- (a) **No-fly zones above state and federal prisons.** No-fly zones are designated from the surface to 1000' AGL within 1/2 nm of state and federal prisons in the local flying area, as depicted on the Local Area Map.
- (b) **No-fly zone north of Area 11.** A no-fly zone is designated below 1500' AGL within 1/2 nm of a farm house located 2 nm northeast of point T, as depicted on the Local Area Map.
- (c) **No-fly zone below Area 3.** A no-fly zone is designated from the surface to 1000' AGL within 1/2 nm of a farm house near the center of Area 3, as depicted on the Local Area Map.
- (d) **Fowler noise abatement.** A noise-sensitive area is designated below 1500' AGL within 1/2 nm of a farm house located at the end of Co Rd JJ (N 38° 5.5467' W 104° 3.4254'). Use the following procedures to reduce noise while operating in the vicinity of the farm house:
 - (1) **Runway 30 Upwind Leg:** do not drift right of the extended runway centerline. **TECHNIQUE:** track toward Pikes Peak.
 - (2) **Runway 30 Leveloff at 5200' MSL:** during leveloff, reduce power to maintain 85 KIAS maximum inside the noise-sensitive area.
 - (3) **Runway 30 Closed Turn:** do not turn closed until the house is visible behind your right wing.
 - (4) **Runway 12 Base Turn:** start the base turn NLT the 45° line from the runway landing threshold.
 - (5) **Runway 4 Departures:** if unable to climb above the noise sensitive area, pass 1/2 nm south of the house.

1.22 FUEL PLANNING

- (a) **Minimum Departure Fuel Quantity.** For all profiles, departure fuel quantity must be sufficient to fly the planned profile to the final destination, plus an additional 30 minutes of reserve fuel at cruise power during the day, or 45 minutes of reserve fuel at night.
- (b) **Departure Fuel Minimums for Specific Sortie Profiles**
 - (1) For local sorties with planned durations up to 1.5 hrs, depart with at least **1/2 tank**.

EXCEPTION: KPUB pattern-only sorties may launch with less than 1/2 tank.

- (2) For VNAV dual sorties planning a route abort procedure, and for VNAV solos, depart with at least **3/4 tank**.
- (3) For XC sorties, depart with a **full tank**, or the maximum quantity permitted by aircraft weight and performance limitations.

CHAPTER 2: GROUND OPERATIONS

2.1 MOVING THE AIRCRAFT BY HAND

- (a) **Hangar Door Operation.** You must be trained and authorized by the Safety Office before operating the hangar doors (i.e., students will not operate hangar doors).

CAUTION: ensure that all personnel and equipment are clear when operating the hangar doors.

- (b) **Two Persons Required.** Two persons are required to safely move the DA20-C1 by hand, *except when using a tow-bar*. Solo students must request the help of another pilot or ground personnel when moving the airplane by hand. A Doss instructor or maintenance personnel must be present to supervise any movement of aircraft into or out of the hangars.

- (c) **Moving the Airplane Backward.** One person pushes down on the tail to hold the nosewheel in the air, while the other pushes backward on the leading edge of the wing at the root. When pushing back along the curved taxi line, keep the tail slightly outside the curve to ensure that the main gear remain centered on the line.

NOTE: when you first egress the aircraft, roll the airplane forward approximately two feet to check the tires before pushing back into a parking spot.

CAUTION: when backing an aircraft into a parking spot, use caution to maintain adequate spacing with the empennage of an aircraft parked in an opposing spot.

CAUTION: avoid striking the tail skid on the ground because this may damage it.

TECHNIQUE: to hold down the tail, put one hand on the center of the horizontal stabilizer if you can reach it, and one hand on the fuselage near the vertical stabilizer.

- (d) **Moving the Airplane Forward.** Push on the trailing edge of each wingtip to move the aircraft longer distances. For short distances and while inspecting the tires for damage, pull forward using the canopy rails or the steps. The aircraft needs to move forward approximately *two feet* in order to inspect the entire wheel for tire damage.

CAUTION: do not pull on the instrument panel to move the aircraft.

CAUTION: when taxiing straight ahead into a south-facing spot, stop short of an aircraft in an adjacent parking space and roll your aircraft the remaining distance by hand. Stop before the leading edge of your wing is abeam any part of the adjacent aircraft's wing (its leading edge or trailing edge).

- (e) **Pushing/Pulling on the Spinner or Propeller.** Do not move the aircraft by pushing or pulling on the propeller or spinner.

2.2 PREFLIGHT AND POSTFLIGHT PROCEDURES

- (a) **Expected Student Performance.** During early stages of training, instructors may need to assist students with preflight and postflight actions in order to stay on schedule. However, by the end of the 300 block of training, students should be able to accomplish all actions without assistance inside the scheduled time window.

NOTE: Students are expected to memorize and practice the published checklist flows in order to accomplish preflight ground ops in a timely manner.

- (b) **Adding Motor Oil.** Only instructors or qualified maintenance personnel will add oil. Add a quart of oil if the dipstick reads below 4.5 quarts. Properly dispose of the **empty** oil can in the yellow trash cans with the top securely fastened.
- (c) **Inlet & Outlet Baffle Storage.** Store the inlet baffles in the baggage compartment behind the AFM. Store the outlet baffles in the plastic bag, which should be kept inside the chock/tie-down bag.
- (d) **Fuel Samples.** Pour fuel samples taken during the preflight inspection into the designated red fuel cans.

NOTE: do not pour fuel samples back into the aircraft fuel tank. There is a risk of dropping the fuel tester into the tank, and a risk of re-introducing contaminants into the fuel tank.

NOTE: students and MFIs will remove a flight glove to take the fuel sample.

NOTE: red fuel cans are staged at the end of the center parking rows on the Doss Ramp next to the fire bottles, or at various locations inside the hangars.

- (e) **Dripping Fuel Drains.** When the fuel tank sump drain or gascolator drain do not properly seal, attempt to flush out contaminants by fully opening the drain. Do not pull down on the drain or twist it, as this may cause damage to the seal. If unable to flush out contaminants, advise Maintenance. Compressed air can be used to quickly clear the contaminants and restore proper seal.
- (f) **Cleaning the Canopy.** The canopy must be cleaned in accordance with AFM 8.5.2. Wipe in a single direction only, and never in circles. Use only those cleaning agents approved by Doss Maintenance.

NOTE: canopy cleaning materials are stored in the tool boxes stages on the Doss Ramp next to the fire bottles.

- (g) **Aircraft Wings.** Do not sit, kneel, stand, or rest on the aircraft wing. Do not set any object on the wing .
- (h) **FOD Prevention.** Take inventory of personal items (e.g., pens, pencils, in-flight publications) before and after flight to ensure that all trash and personal items are removed during the Postflight Inspection. Do not set objects on the ramp (except chocks when required by the checklist) because these objects might be left there inadvertently, or they might be blown across the ramp by wind or propeller blast. Remain alert during ground operations for FOD on airport surfaces, and report these when appropriate.

CAUTION: never leave tie-downs lying on the ramp because severe propeller damage may result if an aircraft taxis over a tie-down.

- (i) **Aircraft Damage/Discrepancies.** Carefully check for aircraft damage and discrepancies during the preflight and postflight inspections.

NOTE: the most probable areas of damage will be the tires, landing gear, propeller, tail skid, and the underside of the wingtips (trailing edge next to the ailerons). You may not be aware of aircraft damage until the postflight inspection.

NOTE: report any damage or discrepancy to Doss Maintenance using Form 781A in the aircraft forms. Also report the damage or discrepancy to the SOF.

- (j) **Securing the Aircraft.** Do not leave the aircraft unattended unless it is properly secured with chocks and tie-downs.

NOTE: install both wheel chocks and both wing tie-downs before leaving the aircraft on the Doss Ramp or other parking ramps. Pre-installed chains or cables may be used in lieu of tie-downs at other airfields.

NOTE: if current or forecasted winds exceed 25 knots, secure the tail as well.

NOTE: one wheel chock is sufficient when leaving the aircraft inside a hangar.

- (k) **Deferred Maintenance Items.** Do not fly an aircraft with an open writeup on the Form 781A unless Doss Maintenance has indicated on the form that the discrepancy is “deferred” to a future inspection, or that the aircraft is “flyable” with the open writeup.

NOTE: refer to the Deferrable Maintenance Items table in the IFG for information on restrictions associated with specific deferred items. Operating the aircraft with discrepancies not listed on the table must receive approval on a case-by-case basis from the Chief Pilot.

- (l) **Fuel Quantity Check.** Measure fuel quantity with the fuel dipstick prior to flight. To get an accurate reading, hold the stick vertically in the filler neck and lower it slowly until it first touches bottom. Do not let the stick slide horizontally across the bottom of the tank because this will yield a measurement greater than actual fuel quantity.
- (m) **Moving the Propeller by Hand.** Avoid moving the propeller by hand except when necessary to install or remove inlet baffles, or when moving the aircraft out of the hangar (e.g., to ensure that the propeller does not hit the wing of the adjacent aircraft). Attaching a tow bar to the nosewheel will also require the propeller to be moved by hand to the horizontal position.
- (n) **Baggage.** Ensure that all items in the baggage area are properly stowed and the net is secured prior to operating the aircraft.

CAUTION: arrange items in the baggage area so that the net will catch them in the event of a sudden stop.

CAUTION: arrange baggage so that it does not obstruct the view out the rear windows for either crew member.

CAUTION: when removing items from or placing items in the baggage compartment, only the side hooks of the cargo net will be unfastened. If the item is large or heavy and the center hooks need to be unfastened, disconnect the headphone jacks first.

- (o) **Student Headsets.** Pay attention to the headset jacks and consciously avoid bumping them with objects or your hands/elbows. Do not set the headset on the headrest or around the headset jacks. Students: when getting into/out of the cockpit, put the headset in the empty seat or ask the IP to hold the headset while you get in or out of the aircraft. If you do not need the headset, it can be stowed behind the baggage net during flight and then reconnected after flight. After flying, leave the headset on the seat.

2.3 SITTING HEIGHT & RUDDER PEDAL ADJUSTMENT

- (a) **Sitting Height.** Students must determine no later than the first sortie whether their natural sitting height will provide adequate forward visibility. If the white of the cowling is not visible while seated in the cockpit, a seat cushion or other booster should be used.
- (b) **Rudder Pedal Adjustment.** Do not position the pedals so far aft that your knees are raised too high to comfortably grip the control stick. Move the pedals forward until your hamstrings rest on the seat. You should be able to activate the toe-brake pedals without straining.

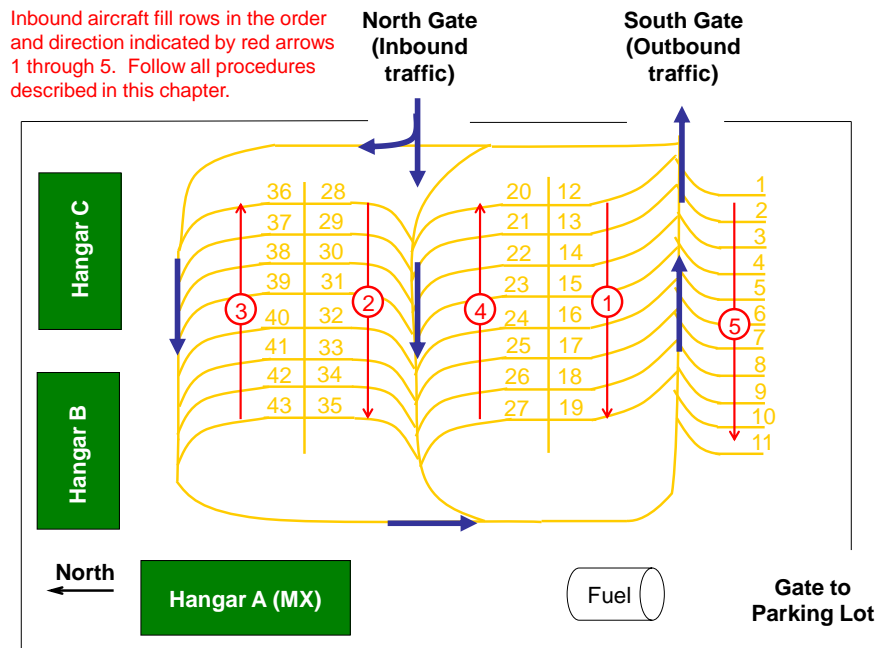
CAUTION: pull the T-grip straight back when adjusting the rudder pedals to avoid damaging the cable.

NOTE: the pedals can be pushed forward with less effort if pressure is applied to the lower bars that protrude horizontally from the rudder pedals.

NOTE: boot sizes 12 or greater may need to pull the pedals a few inches aft from the full-forward position to avoid boot contact with the upper wall; and the heel of the boot may need to be moved slightly aft to angle the foot so as not to inadvertently contact the toe-brake pedals.

2.4 DOSS RAMP TAXI AND PARKING FLOW

- (a) **Doss Ramp General Taxi Flow.** Use a counterclockwise taxi flow on the Doss Ramp, as depicted by the blue arrows in the diagram below. Use the South Gate to exit the ramp and the North Gate to taxi inbound, unless only one gate is open.



- (b) **Parking Flow.** The red arrows on the diagram above indicate the order and direction that inbound aircraft should fill available parking spots. Pay attention to aircraft operating on the ramp and to aircraft following you inbound. Use the following guidelines to avoid obstructing traffic flow on the ramp and to facilitate refueling:

- (1) Fill available south-facing parking spots first by taxiing straight ahead into these spots. Fill the south line (12-19) and then the north line (28-35). Fill south-facing spots east to west to facilitate refueling.
- (2) If unable to taxi straight through to an available spot, back into the north-facing spots. Fill the north line (43-36) and then the south line (27-20). When all other available spots are full, park along the fence (1-11).
- (3) Follow any special parking instructions issued by the SOF (e.g., park in front of hangar A for maintenance; park along the fence for OCF/FCF aircraft; park in front of hangar B or C for impending severe weather; etc.).

- (c) **Marshalling on the Ramp.** Follow instructions from Doss personnel who marshal you on the ramp. Expect to be marshaled to shut down directly in front of a hangar during periods of impending severe weather.

CAUTION: never operate the engine inside a hangar.

2.5 TAXI OPERATIONS

- (a) **Taxiway Centerline Control.** Maintain taxiway centerlines, except when deviations are required for safety or specific operational requirements (e.g., passing opposite-direction traffic on the same taxiway at KPUB when approved).

CAUTION: do not deviate from the taxiway centerline when passing through the Doss Ramp gates.

TECHNIQUE: to maintain the taxiway centerline, put the line on your inside leg.

- (b) **Taxi Speed.** Maximum taxi speed is **20 knots**. In congested areas, maximum taxi speed is **5 knots** to allow immediate stopping if required. Always use a taxi speed appropriate for the specific situation and weather conditions.

CAUTION: reduce speed as required when passing opposite-direction aircraft on the same taxiway at KPUB.

NOTE: to slow down during taxi, bring the throttle to IDLE before applying brakes.

NOTE: use a minimum taxi speed of 3 knots to enable taxi turns using normal rudder and brake inputs.

NOTE: congested areas include any taxi operation in close proximity to other aircraft, vehicles, pedestrians, obstacles, or other potential hazards (e.g., parking ramps, runup areas, etc.).

- (c) **Power Setting.** Taxi with minimum power needed for forward movement. The taxi speed limit (20 knots) can generally be maintained on level pavement with the throttle at or near idle power (1000 RPM). Power settings up to 1500 RPM may be needed to start moving from a full-stop, to make tight turns, or to taxi uphill.

CAUTION: high engine RPM during taxi may lead to propeller damage from loose rocks, ice, and other debris.

- (d) **Braking.** Excessive braking may result in overheated or damaged brakes. Do not ride the brakes. Consciously remove pressure from the toe-brake pedals while taxiing. Failure to do so may result in excessive heat buildup, premature brake wear, and potential brake failure or fire.
- (e) **Turning.** At normal taxi speeds, most turns can be accomplished by using rudder deflection without braking. Tight turns at slow taxi speeds may require light braking on the inside wheel in order to turn the nosewheel sufficiently for the turn. Add power to avoid decelerating to a stop in slow, tight turns.
- (f) **Taxi Collision Avoidance.** Maximize your attention outside the cockpit and minimize heads-down time during taxi. To the extent practical, set avionics and flight instruments before taxi or when stopped in the runup area.

CAUTION: do not accomplish the gyroscopic flight instrument checks before taxiing clear of the parking ramp; or when crossing a runway (e.g., Runway 35 outside the Doss Ramp gate); or when operating in close proximity to other aircraft, vehicles, pedestrians, obstacles, or other potential collision hazards.

- (g) **Wingtip Clearance.** Do not taxi with less than **25 feet** of wingtip clearance from any aircraft, vehicle, or obstacle.

EXCEPTION: reduced wingtip clearance is allowed on the Doss Ramp and in the runup areas due to taxi speed restrictions (5 knots maximum) in those locations.

NOTE: aircraft on the taxiway centerline on the Doss Ramp will have adequate clearance from ground vehicles and aircraft that remain behind the adjacent white safety line.

NOTE: when passing an opposite-direction DA20-C1 on approved taxiways at KPUB, slow down and keep the outside wheel 3 feet from the taxiway edge to ensure adequate wingtip clearance.

- (h) **Taxi Interval.** Maintain at least **50 feet** of separation (two ship lengths) when taxiing behind another aircraft. This separation may be reduced to **25 feet** (one ship length) when holding in sequence for the active runway, or when operating under a 5 knot speed limit (e.g., parking ramp and runup areas).
- (i) **Wind Controls.** Use appropriate wind controls during taxi when surface winds exceed 10 knots. To properly position the control stick for winds *during taxi*, remember to “dive away” from a quartering tailwind, and “bank into” a quartering headwind.

CAUTION: these control inputs apply to *taxi operations* on the ground, but they *do not* apply to control inputs during crosswind takeoffs and landings.

- (j) **Exiting KPUB Runway 26L/8R onto Taxiway A.** To avoid obstructing the runway exit points for aircraft landing Runway 26L/8R behind you, do not stop immediately after clearing the runway. Instead, pull onto Taxiway A and keep moving as you accomplish the After Landing Checklist items.

NOTE: if you need to stop to accomplish checklist items or for other reasons, advise ATC and pull into the OFA, or as directed, to avoid obstructing Taxiway A.

- (k) **KPUB Apron Location Points.** ATC may use 1W and 1E as temporary holding locations during ground ops. The most common use of 1E for Doss aircraft will be temporary relocation of the Runway 26L runup area to 1E in order to remain clear of the OFA for large aircraft passing by on Taxiway A.
- (l) **The Blue Line (KPUB).** Doss aircraft taxiing eastbound on the Pueblo Main Ramp will normally taxi via the Blue Line, which extends from ALP 1W to ALP 1E. It is permissible to cut the 90-degree bend at the northwest corner of the ramp slightly as required to maintain normal taxi speed.

2.6 ENGINE RUNUP

- (a) **KPUB Runway 8R Runup.** The 8R runup area is located in the non-movement area at the northwest corner of the Pueblo main ramp, south of Taxiway F. Aircraft line up side-by-side, facing north, one shiplength south of the non-movement area boundary marking. When runup is complete, move forward one shiplength to hold south of the non-movement area boundary marking, and change to Tower frequency. The order that aircraft move forward after runup determines takeoff sequence. Doss aircraft will re-enter the movement area *one at a time* to taxi up to and hold short of Runway 8R as soon as the preceding aircraft holding short of the runway is cleared to enter the runway (i.e., cleared for takeoff or cleared to line up and wait). Holding short of the runway, call “ready for takeoff.”

CAUTION: before re-entering the movement area, visually clear Taxiway A in both directions, and yield to aircraft passing by on the taxiway.

NOTE: the ground controller may temporarily hold you in the runup area in order to allow aircraft to taxi by on Taxiway A in either direction. After pulling forward one shiplength, any holding instructions will be issued by the Tower controller.

NOTE: Tower may proactively request multiple aircraft holding short of the non-movement area boundary marking to taxi up to and hold short of the runway.

- (b) **KPUB Runway 26L/26R Runup.** The 26L/26R runup area is located inside the OFA near the approach end of Runway 26L (south of the dashed Taxiway A edge markings and north of the continuous edge markings). Aircraft line up side-by-side, facing north, behind the Taxiway A dashed edge marking to

perform the runup procedure. When runup is complete, change to Tower frequency, visually clear Taxiway A in both directions, and taxi up to and hold short of Runway 26L. Call “ready for takeoff” when you are number one holding short of the runway.

NOTE: the ground controller may temporarily hold you in the runup area in order to allow aircraft to taxi by on Taxiway A in either direction.

NOTE: the ground controller may temporarily relocate the 26L/26R runup area to ALP 1E in order to ensure proper wingtip clearance for large aircraft using Taxiway A. If instructed to runup at 1E, you must receive further taxi clearance from the GROUND controller prior to re-entering the movement area.

CAUTION: maintain adequate spacing between the right main wheel and the drop-off along the south edge of the ramp when entering the runup area.

CAUTION: do not attempt to taxi around an aircraft holding short of the runway in front of you. If ATC clears you for takeoff and you are not number one holding short of the runway, reject the clearance and clarify your position in the takeoff sequence for the controller.

- (c) **KPUB Runway 8L Runup.** The 8L runup area is located in the non-movement area at the west end of Taxiway A, south of Taxiway A1. Aircraft line up side-by-side, facing north, one shiplength south of the non-movement area boundary marking. When runup is complete, move forward one shiplength to hold south of the non-movement area boundary marking, and change to Tower frequency. The order that aircraft move forward after runup determines takeoff sequence. Doss aircraft will re-enter the movement area *one at a time* to taxi up to and hold short of Runway 8L as soon as the preceding aircraft holding short of the runway is cleared to enter the runway (i.e., cleared for takeoff or cleared to line up and wait). Holding short of the runway, call “ready for takeoff.”

CAUTION: before re-entering the movement area, visually clear Taxiway A, and yield to aircraft passing by on the taxiway.

NOTE: the ground controller may temporarily hold you in the runup area in order to allow aircraft to taxi by on Taxiway A. After pulling forward one shiplength, any holding instructions will be issued by the Tower controller.

NOTE: Tower may proactively request multiple aircraft holding short of the non-movement area boundary marking to taxi up to and hold short of the runway.

- (d) **Pattern Solo Runup.** Students accomplish the initial pattern solo runup on a parking ramp where the instructor can provide direct supervision. At KPUB, this is normally accomplished on the “Solo Ramp” in order to reduce taxi time between the dual and solo parts of the sortie.
- (e) Engine runup for other runways should be accomplished on parking ramps, designated aprons, or taxiways as required by the situation or as directed by ATC.

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CHAPTER 3: TRAFFIC PATTERNS, TAKEOFFS, AND LANDINGS

3.1 TRAFFIC PATTERNS

- (a) **Overhead Maneuver (KPUB only).** At KPUB, the transition from arrival to traffic pattern occurs as the aircraft intercepts initial approach, which generally occurs via published 90-to-initial and 45-to-initial tracks.

- (1) **Initial Approach.** Initial approach at KPUB is flown on the extended runway centerline at 6,000' MSL. Report "initial" for the assigned runway 1 nm from the landing threshold and "request descent" (unless Tower has already approved an early descent to TPA).

NOTE: any delay making this call and getting approval for the descent may make it impossible to descend to TPA by the standard break point. (See note below in paragraph c.)

NOTE: make the turns from 90- and 45-to-initial with at least 30-45 degrees of bank to maximize visibility to other aircraft.

NOTE: entering 45-to-initial too early may cause you to incorrectly intercept initial inside the one-mile initial point.

CAUTION: the parallel runways at Pueblo are very close together, so it is imperative that you do not overshoot initial (i.e., use caution to avoid overshooting the extended runway centerline).

- (2) **Break Zone.** At KPUB, the standard break zone is the first 2000 feet of the assigned runway. However, ATC may direct non-standard break points (e.g., "break midfield," "break to follow aircraft on upwind/crosswind/downwind," "break departure end," "I'll call your break," etc.). Descend expeditiously (i.e., throttle idle) on initial as soon as Tower approves descent in order to level off at TPA prior to the break.

NOTE: if unable to descend to TPA prior to the desired break point (e.g., due to late approval for descent, ATC instruction to break at the approach end, strong tailwind at altitude, etc.), the descent to TPA may be completed in the turn.

- (b) **Upwind Deconfliction at KPUB**

- (1) **Potential Conflict Between Upwind and Initial.** The upwind climb at KPUB is *restricted to 5100' MSL until beyond the departure end of the runway* in order to deconflict with aircraft descending above the runway on initial.

NOTE: if early closed or departure turnout is approved, you may continue climbing above 5100' MSL as soon as you turn.

- (2) **Climb Check at 5100' MSL.** When leveling at 5100' MSL on upwind climb at KPUB, *immediately* perform the climb check and accelerate to at least 70 KIAS. Resume the climb after crossing the departure end of the runway.

CAUTION: delaying the climb checklist actions may lead to flap overspeed.

- (c) **Entry Leg (45° to Midfield Downwind).** At non-towered airfields, the transition from arrival to traffic pattern entry occurs as the aircraft is maneuvered to establish the entry leg track. Intercept the extended entry leg track prior to crossing the pattern entry point, or at least 2 nm from the airfield if a visual pattern entry point is not defined. The standard pattern entry leg begins at the entry point and intercepts midfield downwind at a 45° angle.

- (d) **Departure Turnout.** Like the closed turn, the departure turnout from the upwind leg of the traffic pattern is normally initiated when 300' below TPA *and* past the departure end of the runway. However, some departure turnouts are delayed for specific deconfliction procedures (e.g., Pueblo 8L/26R South and East Departures, and Pueblo 26L/8R North Departures). An *early* departure turnout may also be requested or directed by ATC for traffic conflicts or wake turbulence separation.

CAUTION: at KPUB, delay your departure turnout as required to deconflict with a preceding aircraft in closed traffic that extended its upwind leg.

CAUTION: do not delay Fowler Rwy 4 departure turnout, as this may generate conflicts with Fowler Arrivals inbound from HUNTR or Area 16.

NOTE: departure turnout for Butts Rwy 13 Departure is at 500' AGL regardless of TPA in use.

- (e) **Breakout.** A pattern breakout at a non-towered airfield is a **level turn away from the traffic pattern** to re-join the arrival traffic flow inbound to the pattern entry point. Standard breakout airspeed is 100 KIAS to facilitate merging with arrival traffic. Breakouts are typically accomplished by aircraft on the pattern entry leg that are unable to properly sequence into the downwind traffic flow. Aircraft on downwind occasionally break out when unable to maintain proper lateral spacing with preceding aircraft, or when the perch or base turn is excessively delayed.

NOTE: traffic on the entry leg can generally avoid a breakout by slightly adjusting the entry leg track and/or airspeed to follow an aircraft on closed downwind.

CAUTION: during a breakout procedure, aggressively scan for arrival traffic inbound to the entry point, and respect right-of-way rules in the event of potential conflicts.

NOTE: refer to the airport diagram in the IFG for additional breakout procedures or restrictions at the specific airfield.

- (f) **Right-of Way Rules in the Traffic Pattern.** 14 CFR § 91.113 right-of-way rules apply to all traffic pattern operations.

EXCEPTION: traffic established in the pattern has the right of way over traffic inbound on the entry leg, even when this traffic is converging from the right.

EXCEPTION: crop duster traffic departing or arriving Fowler also has the right of way over Doss traffic established in the Fowler traffic pattern.

- (g) **Maximum Aircraft in the Pattern.** The IFG lists a maximum number of aircraft permitted in the pattern for each airfield approved for pattern training in the local flying area. When the pattern is full, it is the **responsibility of the aircraft that has been in the pattern longest** to depart (or full stop) before the next inbound aircraft enters the pattern.

- (h) **Wind Drift Correction.** Apply the drift correction strategies learned in ground reference maneuvers when operating in the airport traffic pattern. Crab as required to ensure that the downwind leg track parallels the runway. Vary the bank angle as required during the closed and base turns to achieve a **symmetrical** ground track and to avoid overshooting or undershooting downwind or final.

CAUTION: at KPUB, avoid overshooting final, or drifting from the extended runway centerline toward the parallel runway (i.e., on initial, upwind, or final approach).

- (i) **Closed Turn.** The 180° turn from the upwind leg to the downwind leg will normally be a continuous and symmetrical turn, rather than a square crosswind leg. The closed turn is normally initiated when 300' below TPA *and* past the departure end of the runway. ATC may direct *extended upwind* for various reasons, and the pilot may also choose to extend upwind slightly to increase spacing with a preceding

aircraft in the pattern. At KPUB, an *early* closed turn may be approved or directed by ATC for traffic conflicts or wake turbulence separation.

NOTE: ATC may refer to the closed turn as “crosswind.”

NOTE: To maintain a symmetrical ground track during the turn and avoid overshooting or undershooting the desired downwind track, vary the bank angle as required as you transition from upwind to downwind.

NOTE: a tower controller may direct you to “square the base turn” in order to build spacing ahead of you in the pattern.

- (j) **Inside Downwind Leg.** The inside downwind leg is flown parallel to the runway at TPA. Lateral displacement from the runway is 1/2 nm, or slightly greater than 1/2 nm in overshooting wind conditions. **Do not fly the inside downwind leg closer than 1/2 nm from the runway.** To correct for undershooting wind condition in the base turn, a variable bank angle should be used. The inside downwind leg is flown at 85 KIAS until it is time to decelerate to the appropriate approach or glide speed. Speed adjustments on the downwind leg are acceptable when required to ensure adequate spacing, but do not decelerate below 60 KIAS on the downwind leg.

TECHNIQUE: to maintain 1/2 mile lateral displacement from the runway, the runway will generally appear to cross beneath the stall strip on the aircraft wing (perspective varies slightly with sitting height and cross-cockpit view).

- (k) **Extended Downwind.** Avoid extending the downwind leg except for safety reasons (e.g., traffic conflicts, wake turbulence avoidance, etc.), or as directed by ATC. When ATC directs an extended downwind, decelerate to approach speed as normal (prior to passing abeam the approach end of the runway) in order to decrease the horizontal distance travelled from the runway in the extended downwind.

NOTE: a planned pattern SFL may need to be replaced by another type of approach after ATC directs an extended downwind.

NOTE: if you have already descended on the downwind for a pattern SFL or no-flap approach when ATC directs an extended downwind, climb and maintain TPA as required..

CAUTION: extending downwind puts your aircraft in an unexpected position, which increases the potential for aircraft following you in the pattern to lose sight of you and incorrectly turn base in front of you. Use the phrase “extended base” when reporting the perch or base turn.

3.2 WAKE TURBULENCE AVOIDANCE

- (a) Maintain at least **three minutes of time separation** when operating behind any large or heavy aircraft. At KPUB, this separation is required behind large or heavy aircraft operating on the same runway *AND the parallel runway*. This separation also applies to aircraft operating on the parallel runway that will pass abeam your aircraft on final or upwind at or above your altitude.
- (b) When following a large or heavy aircraft on final approach, remain at or above that aircraft’s actual flight path during your approach. Your touchdown point must be **AFTER** that aircraft’s touchdown point. If you decide to continue the approach to touchdown and runway length permits, consider using a point after the large or heavy aircraft’s touchdown point as a “simulated” runway landing threshold.
- (c) If non-standard maneuvering (e.g., offset, early closed turn, etc.) is required to avoid wake turbulence, advise ATC immediately.

3.3 NORMAL TAKEOFF AND CLIMB

- (a) Accomplish the Before Takeoff checklist items when cleared onto the takeoff runway (i.e., when cleared for takeoff or instructed to “line up and wait”). At non-towered airfields, accomplish the Before Takeoff items prior to the “takeoff” radio call and before entering the runway. At all airfields, if back-taxi on the runway is required, accomplish the Before Takeoff items before entering the runway for back-taxi.
- (b) Prior to crossing the hold line, ensure that final is clear. Taxi into takeoff position on the runway centerline, using all available runway (actual or simulated). Initially deflect the control stick fully into the crosswind.
- (c) Smoothly apply full throttle. Apply right rudder pressure to counter left yawing tendency as takeoff power is applied. Cross-check engine instruments early in the takeoff roll. Use rudder pressure to maintain runway centerline. Gradually decrease the crosswind stick deflection as the airplane accelerates and control surfaces become more effective.

CAUTION: inadvertently pressing on the toe-brake pedals will significantly increase takeoff distance. The technique “heels on the floor” can help you avoid inadvertent braking during takeoff run.

- (d) At V_R (44 KIAS), call out “FORTY FOUR KNOTS” and smoothly apply aft-stick pressure to begin rotation. The airplane should continue to accelerate on the ground until first the nose and then the main wheels smoothly lift off at 52 KIAS. **Establish proper takeoff attitude.** In crosswind conditions, lower the upwind wing slightly to prevent side drift, and use downwind rudder to keep the airplane’s longitudinal axis aligned with the runway centerline.

NOTE: stall warning horn during takeoff or initial climbout may be an indication of abrupt rotation, early liftoff, or excessively steep initial climb.

NOTE: for takeoff in gusty winds, strong crosswinds, or high density altitudes, rotation may be delayed up to 52 KIAS. Do not use a rotation speed higher than 52 KIAS.

- (e) In crosswind conditions, maintain this sideslip (wing-low) condition after liftoff until a positive climb is established. Then exit the sideslip and establish a wings-level crab into the wind in order to track the runway centerline.
- (f) Gradually relax back-stick pressure as the airplane accelerates to V_Y (66 KIAS) in a **shallow initial climb**. The aircraft should *not* be held in level flight over the runway, nor should it be allowed to descend while accelerating to V_Y . Establish V_Y and use trim to relieve stick pressure. Offset P-factor during the climb by maintaining proper right rudder pressure.
- (g) At 400’ AGL, perform the Climb Checklist actions. If remaining in closed traffic, accelerate to 70 KIAS. If departing, accelerate to desired departure climb speed.

3.4 NORMAL APPROACH AND LANDING

- (a) **Setup.** As early as practical on the downwind leg, make the Before Landing callout, “**Fuel Pump On, Mixture Full Rich.**” After making this callout, reduce the throttle to idle at an appropriate location to begin deceleration to 60 KIAS. Extend flaps T/O below 100 KIAS and flaps LDG below 78 KIAS. As you decelerate with IDLE power, apply aft-stick pressure and trim in order to maintain level flight. Increase power as required to capture 60 KIAS in level flight at TPA. Once airspeed is within +10/-0 of 60 KIAS, the PF initiates the Before Landing challenge-and-response, “**Airspeed 60 knots, flaps landing, confirm, to which the PNF replies, “Confirm.**” Ensure that the aircraft is trimmed for 60 KIAS.

NOTE: the initial reduction in power to decelerate to approach speed must occur prior to passing abeam the approach end of the runway.

NOTE: if using a non-standard approach speed, state *desired* approach speed instead.

NOTE: if the challenge-and-response cannot be verbalized prior to the perch (e.g., due to a radio transmission being received), the PF can point to the required items and receive a thumbs-up signal from the PNF for confirmation.

- (b) **Perch and Base Call.** At the desired perch point, reduce power to IDLE, enter a descending base turn, and report base. The perch point is normally located 30° - 45° from the approach end of the runway, which is abeam the desired final approach intercept 1/4 to 1/2 mile from the runway landing threshold.

TECHNIQUE: use the memory jogger “pitch, power, roll, confirm, call” to recall key actions at the perch. However, do not misinterpret this technique to mean that the Before Landing challenge-and-response should be accomplished after rolling off the perch.

- (c) **Base Turn.** The ground track of the base turn should be a continuous and symmetrical 180° turn, rather than a square base leg. Bank angle during the base turn will normally vary between 10° and 30° when winds are within dual training limits. To maintain a symmetrical ground track and avoid overshooting/undershooting final, vary the bank angle as required as you transition from downwind to upwind during the turn.

EXCEPTION: ATC may direct aircraft to “square” the base turn, which requires a square base leg and a steeper bank angle in the base-to-final turn.

- (d) **Crosswind Correction on Final.** Establish a sideslip (wing-low) crosswind correction as early as practical on final approach. If a crab is used during final approach, transition from crab to sideslip prior to beginning the roundout. Enter the sideslip by simultaneously lowering the upwind wing to counter drift and applying sufficient downwind rudder to align the nose with the runway. Add additional power as required.

- (e) **Aim Point.** The standard aim point for normal approaches (daytime) is the **runway landing threshold**. This means that the flight path during a stable approach would intersect the ground at the runway landing threshold were it not for the roundout and flare. Do not aim short of the runway landing threshold with the exception of a temporary shift in aim point during a forward slip.

EXCEPTIONS: At Fowler and Bullseye, the standard aim point for normal approaches is the runway numbers.

- (f) **Roundout.** Begin the roundout at approximately 10-20' AGL. Reduce power to IDLE as required when landing is assured. Factors such as airspeed, sink rate, descent angle, and wind condition will determine the point at which landing is assured and power may be reduced. Use increasing aft-stick pressure to control the airplane's descent to the runway as it decelerates to touchdown airspeed.
- (g) **Touchdown.** Touch down smoothly within the first 1,000 feet of the runway at approximately 45 KIAS without any side drift. Touch down on the main landing gear in the proper touchdown attitude with the airplane's longitudinal axis aligned with and over the runway centerline.
- (h) **Landing Roll and Runway Exit.** Gradually increase crosswind stick deflection as the airplane decelerates. Use braking as required to slow to taxi speed before turning to exit the runway.

NOTE: flaps may be raised to CRUISE during the landing roll during strong or gusty wind conditions. However, do not accomplish the rest of the After Landing checklist items until clear of the runway.

CAUTION: to help prevent engine stoppage during landing roll and runway exit, avoid abrupt or high-speed taxi turns, especially during rapid deceleration.

3.5 FORWARD SLIP APPROACH AND LANDING

- (a) All details pertaining to normal approach and landing apply to the planned forward slip approach and landing, except that the approach is higher than normal so that a forward slip is required. To induce a high energy state during the approach, perch early or carry power as required.

NOTE: the instructor may take the aircraft or the throttle to ensure that a proper high-energy approach is established. Also note that airspeed is not increased above normal approach speed. The ideal setup is an energy state high enough to require a forward slip after the throttle is reduced to IDLE, but not so high that desired glidepath cannot be intercepted prior to roundout.

- (b) To accomplish a forward slip on final approach in crosswind conditions, smoothly apply full downwind rudder and bank upwind to the extent required to track the extended runway centerline. In significant crosswind conditions, a forward slip that banks into the wind can be transitioned more easily into a “wing-low” sideslip than a forward slip that banks in the opposite direction. In calm or light winds, the direction of bank during the forward slip is less important, and banking downwind in the forward slip is acceptable. The *ground track* during a forward slip on final approach must remain aligned with the extended runway centerline, even though the airplane’s heading will be angled to one side during the forward slip.
- (c) Adjust pitch attitude as required to **maintain desired approach airspeed** during a forward slip.

CAUTION: airspeed control is critical during a forward slip to landing, and this will require more rapid crosscheck of the airspeed indicator and timely adjustments in pitch attitude.

- (d) Smoothly discontinue the forward slip when intercepting desired glidepath. Forward slips should not continue beyond the point of beginning the roundout. During crosswind conditions, smoothly **transition to a sideslip** into the wind prior to roundout.

NOTE: aim point may *temporarily* shift short of the landing threshold during a forward slip before the desired glide path is intercepted.

- (e) Do not attempt to change the direction of rudder input in the forward slip *during* the base turn.

CAUTION: if bottom rudder is applied before the turn is complete, this will induce a skidding turn to final. Skidding turns may result in a low-altitude stall and spin.

3.6 SHORT FIELD TAKEOFF AND LANDING (RPA ONLY)

- (a) **Similarity to normal takeoff and climb.** All LFP details pertaining to normal takeoff and climb apply to the simulated short field takeoff and climb, unless superseded by instructions in this section.
- (b) **Use (or simulate use of) full runway length.** Roll onto the runway and align the aircraft with centerline as close to the runway threshold as practical, and apply takeoff power *without stopping*. However, if stopping is required (e.g., instructed to “line up and wait”), *apply full throttle before releasing the brakes*.

NOTE: you may need to simulate the use of all available runway on training missions (e.g., to avoid FOD near the runway threshold; for intersection departures; or for takeoff from a touch-and-go). No callout is required when simulating full length.

- (c) **Delayed rotation.** Delay short field takeoff rotation until reaching 52 KIAS in order to keep the aircraft in a low-drag attitude as long as practical during the takeoff run. Reaching 52 KIAS, call out “52 knots” and apply back-stick pressure to rotate and lift off. The aircraft will generally lift off immediately as back-stick pressure is applied at 52 KIAS with a neutral trim setting.

CAUTION: ensure that the trim is neutral prior to commencing takeoff run, and do not apply forward stick pressure at any time during the takeoff run.

CAUTION: the risk of wheelbarrowing is increased by delaying rotation above 44 KIAS.

NOTE: the “44 knots” callout is not required during a simulated short field takeoff.

- (d) **V_X climb.** Establish a V_X (60 KIAS) climb until climbing above 100’ AGL, and then adjust pitch and trim to establish a normal climb at V_Y (66 KIAS).

NOTE: V_X climbs are prohibited on student solo sorties.

- (e) **Similarity to normal approach and landing.** All LFP details pertaining to normal approach and landing apply to the simulated short field approach and landing, unless superseded by instructions in this section.
- (f) **Desired Touchdown Point.** The standard touchdown point for short field landings is the beginning of the 3rd runway centerline stripe. The desired touchdown zone extends from this point to the beginning of the 4th stripe (200 ft).
- (g) **Approach Speed.** Maintain 60 KIAS during the short field approach.

CAUTION: do not decelerate below 60 KIAS until the throttle is reduced to IDLE at the standard roundout point (10-20 ft AGL).

- (h) **Selected Aim Point.** Select and maintain a final approach aim point appropriate for the conditions. The distance between aim point and desired touchdown point should allow deceleration from 60 KIAS to 45 KIAS at idle power.

TECHNIQUE: aim 400 ft prior to desired touchdown point at standard approach speed, calm winds, and 5000 ft DA. Adjust the aim point appropriately for non-standard approach speed, headwind/tailwind component, and higher/lower DA.

- (i) **No Simulated Obstacles.** Approaches over simulated obstacles will not be practiced. Instead, the simulated short field approach will be a stable, constant-airspeed approach.
- (j) **Roundout, Flare and Touchdown.** Ideally, the entire roundout and flare will be accomplished with IDLE power, and the airplane will float the expected distance from the roundout point to the desired touchdown point. However, it may be necessary to make a small and temporary power input during the flare to avoid touching down short of the desired touchdown zone.

CAUTION: do not attempt to touch down before decelerating to a safe touchdown speed. Continue the landing flare until reaching a proper touchdown attitude, and then let the wheels settle to the runway.

NOTE: improper aim point selection, or excess energy at the roundout point, may make it impossible to decelerate to a safe touchdown speed inside the desired touchdown zone.

- (k) **After Touchdown.** After touchdown, call out, “*Simulated max braking.*” However, *do not apply any abnormal brake pressure.* This means that for normal touch-and-go, do not touch the brakes. For a full-stop landing or stop-and-go, normal brake pressure should be applied.

3.7 SOFT FIELD TAKEOFF AND LANDING (RPA ONLY)

- (a) **Similarity to normal takeoff and climb.** All LFP details pertaining to normal takeoff and climb apply to the simulated soft field takeoff and climb, unless superseded by instructions in this section.
- (b) **Full aft-stick deflection and no stopping.** Apply full aft-stick deflection when cleared for takeoff at towered airfields, or when self-announcing takeoff at non-towered airfields. Taxi onto the runway and begin takeoff run without stopping.

CAUTION: do not attempt a simulated soft field takeoff from a touch-and-go. Do not apply full aft-stick deflection above 20 KIAS.

NOTE: the simulated soft-field takeoff should be accomplished on the initial takeoff of the sortie. Additional attempts must be preceded by a stop-and-go or a full-stop-taxi-back.

NOTE: if you receive a “line up and wait” ATC instruction, wait for takeoff clearance to begin the soft field takeoff simulation with full aft-stick.

NOTE: consciously avoid depressing the microphone while holding full-aft stick deflection.

NOTE: on an actual soft surface, aft-stick deflection during taxi and takeoff run helps reduce the tendency for the nose wheel to dig into the soft surface, and the “no stopping” rule helps prevent the airplane from getting stuck in the soft surface.

- (c) **Gradual release of aft-stick deflection.** As the aircraft accelerates through 20 KIAS, call out “20 knots” and begin reducing aft-stick deflection. As the nose wheel starts to come off the ground, carefully manage the release of back-stick pressure to establish an appropriate takeoff attitude without over-rotating. Liftoff should occur between 48-52 KIAS.

TECHNIQUE: release 1/2 of back stick deflection at 20 KIAS and hold that stick position. When the nose begins to lift off, continue releasing aft-stick deflection as required.

CAUTION: failure to release aft-stick deflection appropriately during the soft-field takeoff may result in over-rotation and tail strike.

CAUTION: be prepared to control any increased rate of rotation in strong or gusty wind conditions.

CAUTION: ensure that the trim is neutral prior to commencing takeoff run, and *do not apply forward stick pressure at any time during the takeoff run.*

NOTE: the “44 knots” callout is not required during a simulated soft field takeoff.

- (d) **Accelerate to V_Y .** Maintain a shallow initial climb in order to expedite acceleration to V_Y .

CAUTION: do not “level off” just above the runway to achieve maximum acceleration in ground effect. Instead, use a shallow climb to accelerate normally to V_Y .

TECHNIQUE: a shallow climb may be defined as one where V_Y is reached approximately one wingspan above the ground.

- (e) **Similarity to normal approach and landing.** All LFP details pertaining to normal approach and landing apply to the simulated soft field approach and landing, unless superseded by instructions in this section.

- (f) **Touchdown.** The main wheels should touch down softly and smoothly at normal touchdown speed.

NOTE: exact touchdown speed is not as important as the smoothness of the touchdown. Avoid early roundout, high rate of sink toward the runway, and firm touchdown.

- (g) **After Touchdown.** After touchdown, call out, “*Simulated aft stick, power as required.*” However, *do not apply any abnormal aft-stick deflection or add power.*

NOTE: this callout refers to the aft stick deflection and power that needs to be added after touchdown on a soft field to counter forward-pitching tendency and to prevent the nose wheel from digging into the soft surface.

3.8 STOP-AND-GO (RPA ONLY)

- (a) **Stop-and-go Restrictions.** Instructors may use stop-and-gos during dual student training under the following conditions:
- (1) Stop-and-gos may be used to enable full aft-stick deflection in a simulated soft field takeoff, which would otherwise require a full-stop-taxi-back. Instructors may also perform stop-and-gos at night to maintain night landing currency.
 - (2) Do not perform a stop-and-go if it will obstruct the normal flow or spacing of traffic in the pattern. Pay attention to spacing with aircraft following you in the pattern and aircraft on the ground holding short of the runway.
 - (3) The runway distance remaining from the point where takeoff power is applied must be a *known quantity* that is greater than the sum of calculated takeoff distance and landing roll distance for the current conditions. Use runway distance remaining markers if available.
 - (4) The instructor (not the student) will make all required calculations and the final decision whether to proceed with a stop-and-go in each specific situation.
 - (5) Announce the stop-and-go when reporting “base,” or when reporting final on a straight-in approach.
 - (6) As a general rule, avoid stop-and-gos on runways less than 5,000 ft in length.
- (b) **Similarity to a touch-and-go.** The stop-and-go is similar to a touch-and-go, except that the aircraft is stopped on the runway before accomplishing actions related to the takeoff procedure.
- (c) **After touchdown.** Use *normal braking* to bring the aircraft to a stop or “rolling stop” on the runway centerline. Use the following sequence of actions after touchdown to transition from the stop-and-go to the applicable takeoff procedure:
- (1) Decelerate with normal braking to a full stop or desired speed for a “rolling stop.”
 - (2) Set flaps T/O.
 - (3) Apply full aft-stick deflection (simulated soft field takeoff only).
 - (4) Apply full throttle.

TECHNIQUE: bring the aircraft to a “rolling stop” for a stop-and-go rather than a full stop. This will reduce the impact on traffic flow and spacing.

CAUTION: when using a “rolling stop” prior to commencing a simulated soft field takeoff, decelerate safely below 20 KIAS before applying full aft-stick deflection.

NOTE: do not raise flaps to CRUISE or practice maximum braking during stop-and-gos. If the runway is too short to accomplish a stop-and-go with normal braking, the runway is too short for a stop-and-go.

NOTE: do not practice a stop-and-go from a no-flap landing.

3.9 TOUCH-AND-GO

- (a) Maintain appropriate aft-stick pressure after touchdown to avoid weight transfer to the nosewheel.

CAUTION: failure to maintain adequate aft-stick pressure at speeds above 52 KIAS may lead to wheelbarrowing or uncontrollable nosewheel shimmy.

- (b) Use proper rudder input to maintain runway centerline.
- (c) Set flaps T/O, and then smoothly apply full throttle for takeoff. Apply appropriate right rudder pressure to counter left yawing tendency as power is increased.
- (d) Adjust aft-stick pressure for lift-off. (Airspeed may already be above V_R .)

3.10 GO-AROUND/LOW APPROACH

- (a) Smoothly apply full throttle. Apply appropriate right rudder pressure to counter left yawing tendency as power is increased.
- (b) Adjust pitch attitude as required to stop your descent.
- (c) After the descent is arrested, retract flaps to T/O.

CAUTION: During all flap setting changes, **grab the flap lever** between your thumb and index finger, and then carefully move the switch to the desired position. Inadvertently flipping the switch upward into the CRUISE position may induce a sudden loss of lift and could lead to a low-altitude stall.

- (d) Establish proper climb attitude. Accelerate to and maintain 66 KIAS (V_Y) until 400' AGL.

NOTE: for go-around with flaps CRUISE (e.g., no-flap, or pattern SFL prior to flap extension), it is not necessary to extend flaps T/O as long as airspeed is at least 70 KIAS when the go-around is commenced. In these situations, maintain 70 KIAS during the climb (V_Y with flaps CRUISE).

- (e) At 400' AGL, perform the Climb Checklist.
- (f) During a go-around, you may need to "offset" slightly to one side of the runway to avoid conflicting aircraft, or to avoid directly overflying aircraft on the runway. At KPUB, an offset go-around should be specifically requested and approved by the tower controller prior to deviating from the runway centerline, unless immediate action is required to maintain safety of flight. Never offset toward the parallel runway at KPUB.

CHAPTER 4: DEPARTURES, ARRIVALS, AND AREA WORK

4.1 GENERAL

- (a) **Cruise Climb.** Climb speeds higher than V_Y may be used during departure to increase ground speed and to increase engine cooling. Plan your climb to reach any minimum or mandatory crossing altitudes specified in the IFG. If unable to meet required crossing altitudes on the departure procedure, notify ATC as soon as practical.

TECHNIQUE: use the fastest forward speed during cruise climb that still yields an acceptable rate of climb.

CAUTION: monitor the tachometer during full-power cruise climb to ensure that maximum continuous engine speed does not exceed 2700 RPM.

CAUTION: ensure that the Climb Checklist has been properly accomplished at 400' AGL and flaps set to CRUISE prior to accelerating above V_Y in a cruise climb.

- (b) **Departure/Arrival Airspeed.** Standard level-flight airspeed for all departures is 100 KIAS. Standard airspeed (level or descending) for all arrivals is 100 KIAS until reaching one of the following points: 1) the standard non-towered pattern entry point; 2) the break point at Pueblo; 3) intercepting inside downwind if direct downwind, as in the Butts Rwy 13 Arrival; or 4) two-mile final if flying a straight-in approach.

NOTE: cruise airspeeds higher than 100 KIAS may be used as long as published limitations are not exceeded (e.g., 2700 maximum continuous rpm).

NOTE: for abnormal or emergency situations, use the speed required by the conditions.

- (c) **Departure/Arrival Groundtrack.** For each procedure, fly the ground track depicted in the IFG. Adherence to published routing will aid in collision avoidance.

EXCEPTION: ground track is variable when departure/arrival procedures include altitude-dependent turns, magnetic headings, or direct routing from an undefined point.

- (d) **Non-standard Altitudes or Routing.** If you are unable to comply with published routing or altitudes, notify ATC immediately, or advise company traffic on the appropriate advisory frequency, of the planned deviation as soon as possible. Acceptable deviations include the following:

- (1) Deviations required to maintain safety of flight (e.g., traffic conflicts, etc.).
- (2) Deviations required for abnormal/emergency situations (e.g., direct High Key, etc.).
- (3) Deviations for weather (e.g., clouds, thunderstorms, microbursts, virga, precipitation, etc.).
- (4) Deviations due to aircraft performance (e.g., unable to meet minimum crossing altitudes).

- (e) **Cruise/Leveloff Checklist.** On departure, perform the Cruise/Leveloff checklist items when reaching the **final** leveloff altitude for that specific departure procedure. Do not perform the Cruise/Leveloff checklist at an intermediate leveloff on the departure. Prior to commencing an arrival from the training areas, level off at the specified recovery altitude and complete the Cruise/Leveloff items.

NOTE: if the Before Maneuvering or the Descent/Approach checklist immediately follows the Cruise/Leveloff checklist, the mixture does not need to be leaned for cruise.

- (f) **Before Maneuvering Checklist.** Complete the Before Maneuvering checklist items *before commencing maneuvers in the training area.*
- (g) **Descent/Approach Checklist.** Complete the Descent/Approach checklist items no later than **5 nm prior to the airfield.**

NOTE: before departing the lateral boundaries of areas 1-11 inbound KPUB, or areas 7/16/24/17/25 inbound Fowler, complete the Descent/Approach checklist, with the possible exception of "MIXTURE - FULL RICH" which may be delayed as required until NLT 5 nm prior to the airfield.

- (h) **Clearing the Engine.** During all low-throttle descents other than normal pattern work, the PF will clear the engine by momentarily increasing engine RPM above 2000 RPM every 500 feet of descent to warm up the engine and ensure smooth throttle response.

EXCEPTION: the instructor (not the student) clears the engine during an Area SFL.

4.2 STEEP TURNS

- (a) Establish straight-and-level unaccelerated flight at the desired altitude and 90 KIAS.
- (b) Note the entry heading using a visual reference point.
- (c) Enter a level turn with 45° of bank. As you roll into the turn, increase aft-stick pressure and power (add approximately 200-300 RPM) in order to maintain entry altitude and airspeed.
- (d) Control pitch and bank by reference to the natural horizon.

NOTE: include the attitude indicator, tachometer, and performance instruments (airspeed, altimeter, and VSI) in your cross-check, but your primary focus should be outside the aircraft on the natural horizon.

NOTE: if your focus during the turn is straight ahead on the natural horizon, you will tend to instinctively balance pitch attitude, bank angle, and G load to hold a level turn.

- (e) Roll out on the entry heading after 360° of turn, decreasing power and relaxing aft-stick pressure to re-establish straight-and-level unaccelerated flight at the desired altitude and 90 KIAS.

NOTE: it is permissible but not required to roll from one steep turn immediately into an opposite-direction steep turn at the entry heading.

- (f) Repeat lines (b) through (c) above in the opposite direction.

4.3 SLOW FLIGHT (FLAPS CRUISE)

- (a) Reduce power to decelerate in level flight to slow flight airspeed. Use increasing aft-stick pressure to maintain altitude during deceleration. Trim to relieve this pressure.

NOTE: maintain at or above 1400 RPM throughout the maneuver.

NOTE: initial deceleration may be accomplished in a shallow climb if required.

- (b) Approaching target airspeed (50 KIAS), increase power (to approximately 1800 RPM) to stop deceleration and establish straight-and-level unaccelerated flight at 50 KIAS.

TECHNIQUE: start advancing power at 55 KIAS.

NOTE: as power is increased, apply right rudder pressure to counter P-factor.

- (c) Begin in straight-and-level flight, and then select a visual reference approximately 30 degrees in either direction. Perform a level turn to that point, roll wings level, and then turn in the opposite direction back to the original heading.

NOTE: recommended bank angle is 10° and maximum bank angle is 30° in slow flight.

- (d) Apply full throttle to recover to desired airspeed. Use increasing forward-stick pressure to **maintain altitude** during acceleration. **Trim** to relieve stick pressure.

4.4 SLOW FLIGHT (FLAPS LDG)

- (a) Reduce power to decelerate in level flight to slow flight airspeed. Use increasing aft-stick pressure to maintain altitude during deceleration. Trim to relieve this pressure. Extend flaps to T/O and LDG when decelerating below 100 and 78 KIAS, respectively.

NOTE: maintain at or above 1400 RPM throughout the maneuver.

NOTE: initial deceleration may be accomplished in a shallow climb if required.

- (b) Approaching target airspeed (40 KIAS), increase power (to approximately 2100 RPM) to stop deceleration and establish straight-and-level unaccelerated flight at 40 KIAS.

TECHNIQUE: start advancing power at 45 KIAS.

NOTE: as power is increased, apply right rudder pressure to counter P-factor.

- (c) Perform straight-and-level flight using visual references.
- (d) Begin in straight-and-level flight, and then select a visual reference approximately 30 degrees in either direction. Perform a level turn to that point, roll wings level, and then turn in the opposite direction back to the original heading.

NOTE: recommended bank angle is 10° and maximum bank angle is 30° in slow flight.

- (e) Apply full throttle to recover to desired airspeed. Use increasing forward-stick pressure to **maintain altitude** during acceleration. **Trim** to relieve stick pressure.

- (f) Retract flaps to T/O immediately in level flight, and then to CRUISE as appropriate.

TECHNIQUE: retract flaps from T/O to cruise accelerating through 66 KIAS.

4.5 POWER-OFF STALL RECOVERY

- (a) Establish level flight at 60 KIAS with flaps LDG to simulate a normal approach setup prior to the perch. Verbalize the Before Landing callouts and challenge-and-response items for a normal approach.

NOTE: maintain at or above 1400 RPM throughout the maneuver.

CAUTION: performing a power-off stall with the fuel pump OFF or mixture leaned may result in engine stoppage.

- (b) Establish a descent at 60 KIAS straight ahead or in a turn (not to exceed 20° of bank).

- (c) **Gradually** increase pitch attitude (not to exceed 10° nose-high) as the aircraft decelerates in shallow descent.

NOTE: the deceleration to imminent stall speed must be gradual in order to avoid excessive pitch attitudes or a climbing flight path, which is not a realistic simulation of the approach/landing stall.

TECHNIQUE: initially bring the nose up to cut the 60 KIAS pitch picture in half, and then gradually increase back stick pressure appropriately as airspeed decreases.

- (d) Maintain heading or entry bank angle (20° maximum bank).
- (e) Recognize and announce indications of the impending stall by calling out “*horn*” and “*buffet*” when the stall warning horn sounds, and at the onset of significant aerodynamic buffeting.
- (f) Recover from the imminent power-off stall at the onset of significant aerodynamic buffeting. Use the memory jogger “max, relax, roll” to remember the following recovery steps (to be accomplished simultaneously):
- (1) Apply full throttle.
 - (2) Relax back-stick pressure to reduce angle of attack.
 - (3) Roll the wings level.

NOTE: as power is increased, apply right rudder pressure to counter P-factor.

- (g) Establish an appropriate nose-high pitch attitude to prevent further loss of altitude during the recovery.
- (h) Confirm that the aircraft is not descending by checking the VSI and altimeter, followed by the callout, “*altimeter and VSI check.*” The altimeter must indicate level flight or a climb prior to making this callout.
- (i) After the callout, set flaps T/O in order to reduce drag and increase acceleration.
- (j) Accelerate to or through V_Y (66 KIAS) and accomplish the Climb Checklist items. Continue accelerating through 70 KIAS to desired airspeed.

NOTE: when accomplishing a series of consecutive power-off stall recoveries, the Climb Checklist is required only after the last stall in the series.

4.6 POWER-ON STALL RECOVERY

- (a) Decelerate in level flight or a shallow climb to 52 KIAS (lift-off airspeed) with flaps T/O.

NOTE: maintain at or above 1400 RPM throughout the maneuver.

- (b) Apply full throttle and establish a nose-high pitch attitude between 15° and 20°.

NOTE: as power is increased, apply right rudder pressure to counter P-factor.

TECHNIQUE: for shorter sitting heights, place “toes on the horizon” to set the power-on stall pitch attitude. For taller sitting heights, use the upper row of flight instruments.

- (c) Maintain constant heading, or maintain a shallow bank angle (not to exceed 20° of bank).
- (d) Recognize and announce indications of the impending stall by calling out “*horn*” and “*buffet*” when the stall warning horn sounds, and at the onset of significant aerodynamic buffeting. Then recognize the full stall at loss of control effectiveness with the word “*stalling.*”

NOTE: loss of control effectiveness is defined as uncommanded pitch and/or roll.

- (e) Recover from the power-on stall at the loss of control effectiveness. Use the memory jogger “max, relax, roll” to remember the following recovery steps (to be accomplished simultaneously):
 - (1) Verify full throttle.
 - (2) Relax back-stick pressure to reduce angle of attack.
 - (3) Roll the wings level.
- (f) Establish an appropriate nose-high pitch attitude to prevent further loss of altitude.
- (g) Confirm that the aircraft is not descending by checking the VSI and altimeter, followed by the callout, “*altimeter and VSI check.*” The altimeter must indicate level flight or a climb prior to making this callout.
- (h) After the callout, accelerate to or through V_Y (66 KIAS) and accomplish the Climb Checklist items. Continue accelerating through 70 KIAS to desired airspeed.

NOTE: when accomplishing a series of consecutive power-on stall recoveries, the Climb Checklist is required only after the last stall in the series.

4.7 TURNS AROUND A POINT

- (a) Establish straight-and-level unaccelerated flight at an altitude between 600’ and 1000’ AGL, tracking downwind. Maintain 90 KIAS (approximately 2300 RPM).

TECHNIQUE: use 800’ AGL (or calculated low key altitude).

NOTE: student solos will not accomplish ground reference maneuvers below 800’ AGL.

- (b) Select a ground reference point downwind of your current position.
- (c) Establish a ground track that will pass approximately 1/4 – 1/2 mile abeam the reference point.
- (d) Abeam the point, roll into a level turn toward the reference point. Use an initial bank angle appropriate for your groundspeed. The goal is to maintain a perfectly circular ground track around the reference point.

NOTE: student solos will not use bank angles exceeding 30° during ground reference maneuvers.

- (e) As groundspeed changes throughout the maneuver (except in calm winds), adjust bank angle to maintain a constant distance from the reference point.
- (f) Adjust pitch and power as required throughout the maneuver to maintain desired altitude and airspeed.
- (g) Exit the maneuver on the entry heading after 720° of turn.

4.8 S-TURNS ACROSS A ROAD

- (a) Establish straight-and-level unaccelerated flight at an altitude between 600’ and 1000’ AGL, tracking downwind. Maintain 90 KIAS (approximately 2300 RPM).

TECHNIQUE: use 800’ AGL (or calculated low key altitude).

NOTE: student solos will not accomplish ground reference maneuvers below 800’ AGL.

- (b) Select a straight road or other straight reference line downwind of your current position.

- (c) Establish a ground track that will cross the reference line at a 90° angle, approximately 1/4 – 1/2 mile from a selected reference point on the line.
- (d) When directly over the reference line, roll into a level turn toward the selected reference point. Use an initial bank angle appropriate for your groundspeed at that point. The goal is to maintain a perfect half-circle ground track around the reference point.

NOTE: student solos will not use bank angles exceeding 30° during ground reference maneuvers.

TECHNIQUE: it is acceptable to select the reference point when the initial bank angle is established rather than prior to crossing the reference line. This technique will help prevent the need for excessive bank angles that may be required to maintain a preselected ground track radius when entering the maneuver in strong downwind conditions.

- (e) As groundspeed changes throughout the maneuver (except in calm winds), adjust bank angle to maintain a constant radius from the selected reference points.
- (f) Adjust pitch and power as required throughout the maneuver to maintain desired altitude and airspeed.
- (g) Exit the maneuver on the downwind entry heading after accomplishing two opposite-direction turns of equal radius across the reference line.

4.9 BASIC INSTRUMENT MANEUVERS (RPA ONLY)

- (a) **General restriction.** Instructors can ask students to wear a vision restriction device (e.g., Foggles) during any phase of flight, but not within 5 miles laterally of any airport traffic pattern included in the sortie profile.
- (b) **Approved Basic Instrument Maneuvers.** The following maneuvers will be practiced:
 - (1) Straight-and-level flight.
 - (2) Constant-airspeed climb.
 - (3) Constant-airspeed descent.
 - (4) Standard-rate turns to headings.
- (c) **Control and Performance Method.** An aircraft is flown in instrument flight by making attitude and power control inputs as required to produce the desired performance. This is known as the "control and performance concept" of attitude instrument flying and can be applied to any basic instrument maneuver using the following steps:
 - (1) **Establish.** Establish an attitude and power setting by reference to the control instruments that will result in the desired performance.
 - (2) **Trim.** Trim until control pressures are neutralized. Trimming for "hands-off" flight is essential for maintaining stable, coordinated flight while diverting attention to other required tasks.
 - (3) **Crosscheck.** Crosscheck the performance instruments (altimeter, airspeed indicator, vertical speed indicator, heading indicator, and turn coordinator) to determine whether desired performance is being achieved. Move your eyes from the attitude indicator to a performance instrument, back to the attitude indicator, then to another performance instrument, back to the attitude indicator, and so on.

NOTE: the attitude indicator is the only instrument that should be observed for any appreciable length of time.

- (4) **Adjust.** Adjust the attitude and/or power setting by reference to the control instruments.

4.10 UNUSUAL ATTITUDE RECOVERIES (RPA ONLY)

(a) Setup

- (1) Aircraft control is transferred to the IP.
- (2) The IP asks the student to put on the Foggles and close their eyes.
- (3) The IP establishes desired pitch (+15 to -10), bank (up to 45 deg), and a mid-range throttle setting.
- (4) The IP says, "Recover. You have the aircraft," after which the student opens his or her eyes, replies "I have the aircraft," and shakes the stick.
- (5) The student immediately recovers the aircraft to straight-and-level flight using one of the methods below.

- (b) **Nose-high recovery to straight-and-level flight.** Use the method "Recognize, Confirm, Recover." Recognize the unusual attitude using the attitude indicator. Confirm the nose-high unusual attitude with performance instruments. Recover with the following actions:

- (1) **Throttle full.**
- (2) **Bank as required** (up to 60 deg). Bank appropriately to avoid zero-G flight, but use only as much bank as is required to recover. Most recoveries can be accomplished with 45 degrees of bank or less.
- (3) **Pitch level.** Nose may drop below horizon to gain airspeed.

NOTE: follow through by setting power as required to maintain desired airspeed in level flight.

NOTE: use the attitude indicator as the primary recovery instrument.

- (c) **Nose-low recovery to straight-and-level flight.** Use the method "Recognize, Confirm, Recover." Recognize the unusual attitude using the attitude indicator. Confirm the nose-low unusual attitude with performance instruments. Recover with the following actions:

- (1) **Throttle idle.**
- (2) **Roll toward wings level and start pullup to level pitch attitude.** Start pullup before reaching wings level.

NOTE: follow through by setting power as required to maintain desired airspeed in level flight.

NOTE: use the attitude indicator as the primary recovery instrument.

4.11 AREA ORIENTATION AND IN-FLIGHT PLANNING

(a) Area Orientation and Efficient Area Work

- (1) Use visual ground references to identify and maintain awareness of lateral training area boundaries (see Before Maneuvering Checklist).

TECHNIQUE: identify at least 3 ground references on or near opposing lateral boundaries of the training area, and remain between these references during area work.

- (2) Use the GPS as a secondary method to maintain awareness of lateral training area boundaries. Display a reference radial in OBS mode (e.g., the center radial or one of the side radials), and cross-check the GPS distance from PUB.
- (3) Maintain awareness of wind drift during area work.

TECHNIQUE: begin a series of maneuvers near the upwind border of the training area in strong wind conditions. However, it may be appropriate to begin a maneuver on the downwind side of the area and track upwind.

TECHNIQUE: when descending below the area for a ground reference maneuver, consider descending to maneuver entry altitude near the upwind border of the area in order to expedite maneuver setup and entry.

- (4) Modify the order in which maneuvers are performed, if required.
 - (5) Minimize delay between maneuvers.
- (b) In-Flight Planning
- (1) Remain aware of changing weather conditions, mission timing, fuel limitations.
 - (2) Be prepared to change your profile, including adding or deleting maneuvers.

CHAPTER 5: SIMULATED EMERGENCIES

5.1 GENERAL

- (a) Student solos shall not accomplish any simulate emergencies during flight.
- (b) In-flight simulated emergencies must be thoroughly briefed prior to flight.
- (c) If the two crew members are certain that both clearly understand all items outlined in this chapter, the briefing requirement can be satisfied by simply naming the planned simulated emergency and the word “standard.”

5.2 NO-FLAP APPROACH AND LANDING

- (a) **Scenario.** The scenario is a flap failure in the CRUISE position. The situation is fast-forwarded to the downwind leg of the traffic pattern. The Flap Malfunction procedure has already been completed. The emergency condition has already been communicated over the radio.
- (b) **Checklists and Callouts.** As early as practical on the downwind leg, the student (PF) makes the Before Landing callout, “*Fuel Pump On, Mixture Full Rich.*” After making this callout, the PF reduces the throttle to idle at an appropriate location to begin deceleration to approach speed. Once the airspeed is within +10/-0 of 65 KIAS, the PF initiates the Before Landing challenge-and-response, “*Airspeed 65 knots, flaps cruise, confirm,*” to which the PNF replies, “*Confirm.*”
- (c) **The Power Pull.** On the downwind leg, *at least 2000 feet prior to passing abeam the approach end of the runway*, reduce power to IDLE. Decelerate in level flight to 65 KIAS, and then establish a 65 KIAS descent on the downwind leg. Ensure that the aircraft is trimmed for 65 KIAS.

NOTE: attempt to time the power pull so that you lose 300 feet of altitude on the downwind leg prior to turning base at a normal perch location (between 30° - 45° from the approach end of the runway).

- (d) **Base Turn and Base Call.** The base turn is normally started between 30° - 45° from the approach end of the runway, which is abeam the desired final approach intercept 1/4 to 1/2 mile from the runway landing threshold. Report base entering the base turn or as soon as possible after entering the turn. The ground track of the base turn should be a continuous and symmetrical 180° turn, rather than a square base leg. Bank angle during the base turn will normally vary between 10° and 30° when operating within dual wind limits. To maintain a symmetrical ground track and avoid overshooting/undershooting final, vary the bank angle as required as you transition from downwind to upwind during the turn.
- (e) **Glidepath.** Glide angle during a 65 KIAS no-flap approach will be slightly shallower than a normal approach.
- (f) **Crosswind Correction on Final.** Establish a sideslip (wing-low) crosswind correction as early as practical on final approach. If a crab is used during final approach, transition from crab to sideslip prior to beginning the roundout. Enter the sideslip by simultaneously lowering the upwind wing to counter drift and applying sufficient downwind rudder to align the nose with the runway. Add additional power as required.
- (g) **Roundout.** Begin the roundout at approximately 10-20' AGL. Reduce power to IDLE as required when landing is assured. Factors such as airspeed, sink rate, descent angle, and wind condition will determine the point at which landing is assured and power may be reduced. Use increasing back-stick pressure to control the airplane's descent to the runway as it decelerates to touchdown airspeed.

- (h) **Touchdown.** Touch down smoothly within the first 1,500 feet of the runway at approximately 55 KIAS without any side drift. Touch down on the main landing gear in the proper touchdown attitude with the airplane's longitudinal axis aligned with and over the runway centerline.

NOTE: perform a touch-and-go. Except during adverse wind conditions, planned no-flap landings to a full stop are prohibited.

CAUTION: go around if your glidepath is too high or your airspeed is too fast to safely touch down with sufficient runway remaining.

CAUTION: do not attempt to force the aircraft onto the runway prior to reaching a safe touchdown speed.

5.3 PATTERN SFL

- (a) **Scenario.** The scenario is an engine stoppage. The situation is fast-forwarded to the Low Key position in a standard ELP. The Engine Stoppage procedure and attempted Engine Restart procedures have already been completed. The engine will not restart. Lines 1 and 2 of the Forced Landing procedure have already been completed. The emergency condition has already been communicated over the radio.
- (b) **Checklists and Callouts.** As early as practical on the downwind leg, the student (PF) makes the Before Landing callout, "*Fuel Pump On, Mixture Full Rich.*" After the student makes this callout, the IP (PNF) will say "*I have the throttle*" and take control of the throttle. At the desired location on downwind, the IP reduces the throttle to idle and says "*Simulated engine failure.*" The student then automatically resumes control of the throttle. The student (PF) then verbalizes the following items in order at the appropriate time during the SFL approach:
- (1) "FUEL SHUTOFF VALVE – OFF"
 - (2) "MIXTURE – IDLE CUTOFF"
 - (3) "IGNITION SWITCH – OFF"
 - (4) "BELOW 100 KNOTS" (only if flaps are lowered incrementally)
 - (5) "BELOW 78 KNOTS"
 - (6) "AIRSPEED 60 KNOTS, FLAPS LANDING, CONFIRM" (the PNF replies, "Confirm")
 - (7) "GEN/BAT MASTER SWITCH – OFF"
- (c) **Airspeeds and Flap Settings.** The pattern SFL begins in a flaps CRUISE glide at 73 KIAS. The final approach speed after flaps are extended to LDG is 60 KIAS during student training. In order to ensure minimum touchdown speed, all pattern SFLs should extend flaps LDG prior to touchdown.
- (d) **Knock-it-off.** Plan to continue all pattern SFLs to a touchdown. However, the student is expected to make a timely decision to go around if required during a poorly executed pattern SFL approach.
- (e) **Pattern SFL from High Key.** When conducting a Pattern SFL from High Key (instructor CT only), the engine must be cleared every 500 feet of descent. Pattern SFLs from High Key are prohibited when student training is being conducted in the traffic pattern.

5.4 AREA SFL

- (a) **Scenario.** The Area SFL scenario will be either an Engine Stoppage or an Engine Fire During Flight. The exact scenario will be discussed during the mission briefing. During flight, clear indications of the emergency will be given by the instructor (e.g., "black smoke pouring out of the engine and trailing the aircraft", or "complete loss of engine power"). No analysis is required during flight, and the student can proceed directly to the applicable emergency procedure.

- (b) **Throttle Control.** When the IP says “*I have the throttle*,” the student relinquishes control of the throttle only. The IP then takes control of the throttle, reduces power to 1400 RPM, and says, “*Simulated engine failure*.” The instructor maintains 1400 RPM throughout the simulated glide and clears the engine every 500 feet of descent. To clear the engine, the engine RPM is increased momentarily above 2000 RPM. After the last engine clearing cycle, the instructor says “*You have the throttle*,” and the student takes control of the throttle without any response.

CAUTION: when clearing the engine during the descent, and when advancing power to terminate the Area SFL, **advance the throttle smoothly and slowly.**

- (c) **Minimum Engine Temperature.** Oil temperature must be at least 170° to commence an Area SFL. However, oil temperature may decrease below 170° during the Area SFL even with normal engine clearing cycles.
- (d) **Suitable Emergency Landing Area.** The following desirable characteristics should be considered when selecting a suitable emergency landing area:
- (1) A landing surface that is smooth, even, dry, and upsloping.
 - (2) A landing area that is straight and sufficiently long to avoid overrun.
 - (3) An approach and landing area free of obstacles and other safety hazards.
 - (4) A landing area that allows an upwind approach and landing.
- (e) **Declaring an Emergency.** Simulate squawking 7700 and declaring an emergency with Denver Approach, but do not actually touch the transponder, radios, or microphone.
- (f) **Airspeed and Flap Setting.** The ELP is flown in a glide at 73 KIAS with flaps CRUISE (best glide speed and configuration).

NOTE: flaps are not normally extended during an Area SFL. However, this technique is permitted as one method to correct a high energy condition.

- (g) **Termination of the Area SFL.** The area SFL must not descend below 500' AGL.

TECHNIQUE: begin advancing power at 600' AGL.

- (h) **Engine Fire During Flight Script.** The student (PF) first verbalizes the two boldface actions in the Engine Fire During Flight procedure by memory and in the correct sequence. The IP (PNF) then takes the throttle and simulates a dead engine. The PF then refers to the Engine Fire During Flight checklist and simulates/verbalizes the non-boldface actions using a Read-Do method. The student asks whether the fire is extinguished, and the IP replies that it is (i.e., airspeed does not need to be increased above 73 KIAS). The student simulates squawking 7700 and declaring an emergency. The first two lines of the Forced Landing checklist are then accomplished using a Read-Do method.

NOTE: below High Key altitude, all procedures during Area SFL training are considered memory items in order to devote full attention to maintaining a proper ELP profile.

- (1) “FUEL SHUTOFF VALVE - OFF” (point, but do not touch)
- (2) “CABIN HEAT - OFF” (point, but do not touch)
- (3) “FUEL PUMP - OFF” (point, but do not touch)
- (4) “AIRSPEED – 73 KIAS”
- (5) “IS THE FIRE EXTINGUISHED?” (IP replies “affirmative”)
- (6) “MAYDAY MAYDAY MAYDAY, DENVER APPROACH, TIGER__, AREA__, ENGINE FIRE, FORCED LANDING, TWO PERSONS ON BOARD” (do not key the microphone)
- (7) “EMERGENCY LANDING PATTERN - INTERCEPTED”
- (8) “SAFETY BELTS – FASTENED, HOW ABOUT YOU?” (the PNF replies “Safety belts fastened”)

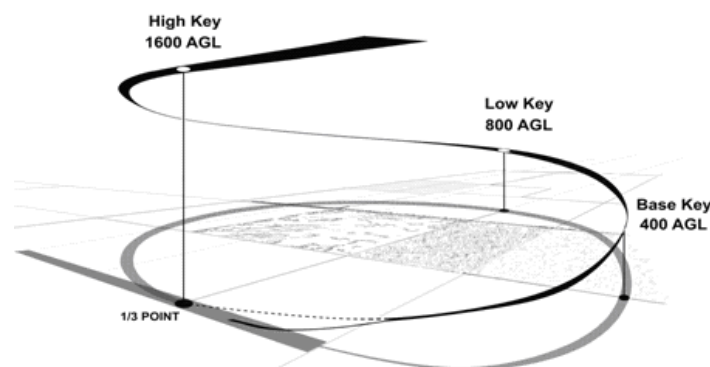
- (i) **Engine Stoppage Script.** The IP takes the throttle and simulates an engine failure. The student opens the Engine Stoppage procedure, which is simulated/verbalized using a Read-Do method. The student asks whether any of the “F’s” apply (see *DA20-C1 Emergency Procedures Training Guide* for additional information). The instructor replies that they do not (i.e., an engine restart attempt is warranted). The student asks whether the propeller is stopped or windmilling, and the instructor replies that it is windmilling. The student then simulates/verbalizes the Engine Restart (Propeller Windmilling) procedure through line 8 using a Read-Do method and asks whether the engine restarts. The IP replies that it does not restart. The student simulates squawking 7700 and declaring an emergency. The first two lines of the Forced Landing checklist are then accomplished using a Read-Do method.

NOTE: below High Key altitude, all procedures during Area SFL training are considered memory items in order to devote full attention to maintaining a proper ELP profile.

- (1) “AIRSPEED – 73 KIAS”
- (2) “LANDING SITE – SELECT, TURN FOR ELP INTERCEPT”
- (3) “DO ANY OF THE F’S APPLY – FIRE, FOD, FROZEN, FUMES?” (Do not ask about the 5th F because you know that you are not in the “final” turn. The IP replies “negative.”)
- (4) “IS THE PROPELLER STOPPED OR WINDMILLING?” (IP replies “windmilling”)
- (5) “AIRSPEED – 73 KIAS”
- (6) “MIXTURE – FULL RICH” (point, but do not touch)
- (7) “FUEL SHUTOFF VALVE – ON” (point, but do not touch)
- (8) “IGNITION SWITCH – BOTH” (point, but do not touch)
- (9) “FUEL PUMP – ON” (point, but do not touch)
- (10) “FUEL PRIME – ON” (point, but do not touch)
- (11) “THROTTLE – 3/4 INCH FORWARD” (point, but do not touch)
- (12) “ALTERNATE AIR – ON” (point, but do not touch)
- (13) “DID THE ENGINE RESTART?” (IP replies “negative”)
- (14) “MAYDAY MAYDAY MAYDAY, DENVER APPROACH, TIGER __, AREA __, ENGINE STOPPAGE, FORCED LANDING, TWO PERSONS ON BOARD” (do not key the microphone)
- (15) “EMERGENCY LANDING PATTERN – INTERCEPTED”
- (16) “SAFETY BELTS – FASTENED, HOW ABOUT YOU?” (IP replies “Safety belts fastened”)

5.5 EMERGENCY LANDING PATTERN

- (a) **ILLUSTRATION: Standard ELP Profile**



- (b) **Purpose of the ELP.** Flying a proper ELP helps ensure that an aircraft with an engine failure is able to complete the approach and landing without overshooting or undershooting the desired touchdown zone. Overshooting/overrun accidents are by far the most common error in power-off landings, but undershooting accidents tend to be more serious or fatal. Precautionary Emergency Landings (where engine failure is

likely) and Forced Landings (where engine failure has already occurred) both require the use of an ELP to ensure proper energy management during the approach.

(c) **Standard ELP Profile**

- (1) **Horizontal Profile.** A full ELP includes a 360° turn between the High Key position and final approach. Ground track during the ELP must be carefully controlled to ensure that exactly 1600 feet (or actual starting altitude) are lost by the time your ground track reaches the desired touchdown point. “Energy state” in the pattern is a function of the total length of ground track and the average descent angle throughout the approach. To understand energy state, imagine looking at the ELP from the side and unwrapping it so that it looks like a triangle. The hypotenuse of the triangle is your flight path, the horizontal leg of the triangle is your ground track, and the angle between them is your descent angle. The descent angle at the best glide speed and configuration *in calm winds* is roughly constant. Therefore, in a 73 KIAS glide with flaps CRUISE *in calm winds*, the only factor significantly affecting energy state in the ELP is the **total length of the ground track covered during the descent**. Unlike a straight-in approach, a 360° pattern gives the pilot complete control over the length of this ground track. (Turns could be accomplished during a straight-in glide to lengthen the ground track, but there is no way to shorten the horizontal distance during a straight-in glide.) Changing wind conditions will change descent angle relative to the ground, so the pilot must actively modify the horizontal component of the flight path in order to maintain the desired energy state. Actual ground track does not have to be a perfect circle.
- (2) **Vertical Profile.** The ELP is a descending pattern that begins over the landing area at 1600’ AGL (High Key) and ends at the desired touchdown point. The 180° point (Low Key) is abeam the touchdown zone at 800’ AGL. The 270° point (Base Key) is midway through the final turn at approximately 400’ AGL. The descent angle (relative to the surface of the earth) at a given point in the ELP depends on the wind velocity at that point. In a typical ELP, the aircraft crosses High Key flying upwind, so that final approach and landing are also upwind. The upwind parts of the pattern have a steeper descent angle than the downwind parts of the pattern, and it is critical that you anticipate how wind affects descent angle as you fly the ELP. You can do only one thing to ensure that the shallowest descent angle (relative to the airmass) is maintained: fly the best glide speed and configuration to achieve the best lift-to-drag ratio. However, you can do three things to increase drag and therefore descent angle: 1) fly a speed faster or slower than best glide speed; 2) extend flaps; or 3) use a forward slip.
- (3) **Airspeed.** The ELP is flown at 73 KIAS with flaps CRUISE until a point where it is clear that “landing is assured.” You will know that landing is assured when, visualizing a normal descent angle at 60 KIAS with flaps LDG from your current position on final approach, it is clear that decelerating to final approach speed with flaps LDG will not cause the aircraft to undershoot the desired touchdown zone.

NOTE: in headwind or tailwind conditions, you can achieve a shallower descent angle *relative to the ground* (i.e., you can increase your “energy state” as defined above) by adding 1/2 of a headwind component to your glide speed, or by subtracting 1/4 of a tailwind component from your glide speed.

- (d) **Aim at the 1/3 Point Until Landing Assured.** The final 180° of the ELP is flown intentionally in a slightly high energy state so that the flight path intersects the 1/3 point of the available landing distance. This procedure helps prevent undershooting due to misjudging energy state or wind condition in the base turn and final approach. Once it becomes clear that landing is assured, the aircraft is slowed to final approach speed with flaps LDG, which causes the aim point to shift to a location prior to the 1/3 point but not short of the landing threshold.
- (e) **Wind Drift Correction.** Do not underestimate the significance of wind drift in the ELP. Failure to recognize wind drift (motion relative to the ground) and adjust the pattern accordingly can quickly lead to significant deviations from the standard ELP profile.

NOTE: wind velocity tends to decrease the closer you descend to the ground, so wind drift is generally more significant at High Key altitude than on final approach.

NOTE: wind direction may also change significantly during the descent, especially when descending through an atmospheric boundary layer.

- (f) **Wind Drift Between High and Low Key.** The most common error in energy management occurs during the turn from High Key. A constant-bank turn that begins in a headwind condition at High Key will result in an asymmetrical ground track similar to the one illustrated below. Wind speed is also generally greater at High Key altitude, which increases wind drift error. Failure to use appropriate drift correction (see paragraph g below) will result in undershooting Low Key and arriving abeam the touchdown zone in a high energy state (red X in the illustration below).

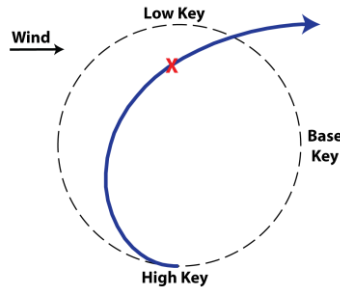


ILLUSTRATION: Example of constant-bank 180° turn at High Key without wind drift correction, resulting in failure to dissipate sufficient altitude to cross Low Key on the standard ELP profile.

- (g) **Wind Drift Correction Techniques.** Three wind drift correction techniques may be used to ensure that a proper energy state is maintained during the turn from High Key to Low Key. Remember that, regardless of the specific technique used, energy state in a 360° ELP can be quickly adjusted by modifying the horizontal component of your flight path (i.e., by increasing/decreasing the pattern diameter, or by increasing/decreasing the total length of ground track covered en route to the touchdown zone).
- (1) **TECHNIQUE 1:** Use the same variable bank angle technique for wind drift correction that is practiced during ground reference maneuvers. Consciously maintain a symmetrical ground track by *gradually* increasing bank angle from High Key to Low Key. The upwind position at High Key will require the shallowest bank angle, and the exact bank angle required at any point in the turn will depend on current ground speed. The focus in this technique is to maintain a *symmetrical* 180° ground track between High Key and Low Key. The descent angle will gradually decrease as ground speed increases, and this will yield an *average descent angle appropriate for the length of ground track covered*. This technique requires patience during the upwind half of the turn, where most of the time is spent and most of the altitude is lost in strong wind conditions.
 - (2) **TECHNIQUE 2:** Move the location of High Key approximately 1000 feet upwind of the touchdown zone for every 10 knots of headwind at High Key. Use estimated winds at High Key altitude rather than surface winds. Fly a constant-bank turn from this adjusted High Key position at a bank angle that will result in the aircraft achieving a 1/2-mile lateral displacement from the selected touchdown zone as it crosses the Low Key position at 800' AGL. This technique is the equivalent of flying the “uncorrected,” constant-bank track illustrated above in Figure 5.4(f) from an adjusted High Key position farther upwind.
 - (3) **TECHNIQUE 3:** Cross High Key and continue descending straight ahead approximately 200-300 feet below High Key altitude before turning. Turn to intercept a downwind track with 1/2-mile lateral displacement from the touchdown zone. Like technique 1 above, this technique increases the time spent flying upwind, which increases the average descent angle between High Key and Low Key.

- (h) **Adjusted ELP Profile Due to High Idle Speed.** The 1400 RPM idle speed maintained during the Area SFL results in glide performance that significantly exceeds glide performance with a dead engine. Use one of the following methods to compensate for this difference:

- (1) Reduce the vertical ELP profile.

TECHNIQUE: fly a normal ELP ground track, but change High Key altitude to 1400' AGL and Low Key altitude to 700' AGL.

- (2) Increase the horizontal ELP profile.

TECHNIQUE: use standard 1600' AGL High Key and 800' AGL Low Key, but increase ELP diameter as required. In average conditions, a 3/4 nm diameter is sufficient.

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CHAPTER 6: VNAV PROCEDURES

6.1 OVERVIEW (CSO ONLY)

- (a) CSO students will complete training flights similar to student pilots through N203. All subsequent training flights will be unique for the CSO student. The information contained in this chapter is relevant to the VNAV (Visual Navigation) training flights beginning with N301. The objective for the N3xx block is for the student, whether flying or directing/monitoring, to take complete responsibility for the planning and execution of the entire VNAV sortie. This includes all normal sortie and VNAV route planning, preflight, ground operations, takeoff and climb to cruise altitude, navigation through the assigned profile, and monitoring all training area maneuvers and pattern work. Primary expectations of the student are checklist discipline, situational awareness and task management; as well as directing actions on the VNAV routes with respect to pilotage and dead reckoning.
- (b) During the N3xx block of flights, the student will normally complete all ground operations, takeoff and departure. After this, the IP will fly and the student will direct/monitor all remaining flight maneuvers (VNAV route, area work, and pattern work/landings). The student and IP will work as a team in a crew concept philosophy. Essentially, except when conducting pattern work, the IP will act as a voice activated autopilot. The student is still responsible for the sortie flow and timing, checklist accomplishment, challenge and response, radio communications (with a few exceptions), clearing/collision avoidance, area boundary monitoring, altitude callouts, etc.
- (c) When the student is the Pilot Flying (PF), he/she has full control of the aircraft and does not need to “standby” to run checklists or actuate switches/flight controls (i.e. fuel pump, landing light, flaps, etc.). When the student is acting as the CSO and the IP is the Pilot Flying (PF), the student will request and wait for approval prior to running checklists or actuating switches. This crew concept will ensure that the IP as the PF is aware of all checklist accomplishment and switch actuation. Additionally, when acting as the CSO, the student may only actuate avionics/navigation equipment (transponder, radios, GPS, clocks), flight instruments (heading indicator, attitude indicator, altimeter) and white switches (fuel pump & lights). The IP, as the PF, will actuate all flight controls (including flaps), the GEN/BAT master switch (when required), and primary engine controls (throttle, mixture, ignition, fuel shutoff valve, alternate air, etc.).
- (d) Although not the PF during most of the sortie, it is imperative that the student be knowledgeable and procedurally proficient with all area maneuvers and pattern work. During area maneuvers, the student is expected to monitor each maneuver and therefore must know the proper maneuver setup/recovery procedures, aircraft configuration, airspeeds/power settings, and required callouts - just as if he/she were performing the maneuver themselves. In addition to monitoring the maneuver, the student must also direct the IP to remain within the lateral and vertical area boundaries. Beginning with the N3xx block, the IP will perform all abnormal pattern work (no-flap approach, Pattern SFL, forward slips, go-around, etc.). The student will continue to fly “normal” approach and landings to the maximum extent possible. In the interest of safety, the IP will not intentionally induce errors during pattern work, but the student is still responsible for monitoring all pattern work, checklist accomplishment, callouts, and challenge and response.

6.2 GENERAL VNAV PROCEDURES

- (a) **(CSO ONLY)** As mentioned in the overview, the student must take complete responsibility for the planning and execution of the entire VNAV sortie. Except during pattern work, the student is expected to monitor and direct all actions required to operate the aircraft in accordance with local flying procedures. During pattern work, the IP will initiate all actions to operate the aircraft, and the student will monitor and accomplish checklist items when called for by the IP. It is imperative that the student be task-oriented and maintain situational awareness at all times. The student will normally perform the takeoff, climb to the cruise/level-off altitude, complete the cruise/level-off checklist, and perform the required tasks at the auto-termination point. After the student completes the cruise/level-off checklist and reaches the auto-termination point (whichever occurs later), the aircraft control will be transferred to the IP. From this point

on, the student will direct the IP in all aspects of the flight, monitor the aircraft (configuration, altitude, engine gauges, etc.), and perform all callouts and radio communications as normally required. If the student needs to transfer aircraft control to the IP earlier than normal in order to prepare for VNAV route entry, he/she will discuss this with the IP prior to the flight (e.g., Kramer CCW and YAK CCW).

- (b) **Tower communications.** The PF, whether the IP or the student, is responsible for radio communications with the tower. Therefore, on the arrival when the radio frequency is switched to Tower (one mile prior to UKLID, DALE, SULFR, etc.), the IP (as the PF) will assume all radio communications. **EXCEPTION:** in the event that the IP conducts the takeoff and departure, the student may be directed to work the radios.
- (c) **(CSO ONLY) Checklist Accomplishment.** As previously discussed, when acting as the CSO (not the PF), the student will request and wait for approval prior to running checklists. See the section in this chapter titled **CALLOUTS** for the standard phraseology for requesting and completing a checklist. When actually accomplishing the items on the checklist, the student will verbally state the checklist item, then accomplish the action or actuate the switch (Read-Do). If the item on the checklist is controlled by the IP as the PF (throttle, flaps, etc.), the student will verbally state the checklist item, wait for a response from the IP (by actuating the switch, pointing to the item, or a verbal response), then continue to the next checklist item. All required checklists are requested and completed by the student except for the “Before Landing” and “Forced Landing” checklists when conducting pattern work. See the section in this chapter titled **MONITORING THE ARRIVAL AND PATTERN WORK** for the normal sequence of events and callouts for each type of landing/checklist.
- (d) **(CSO ONLY) Sterile Cockpit.** Due to the need for ‘sterile cockpit’ during pattern work, all non-essential communications will be kept to a minimum. The student does not need to “overcorrect” for IP imprecision during pattern work. However, as an essential member of the crew, the student is expected to clear for traffic, monitor the approach and landing, and make required callouts (below 100 knots, below 78 knots, Before Landing checklist, etc.).
- (e) **Weather Minimums.** Weather minimums for the VNAV route require a ceiling that will allow flight along the route at or above published altitudes with required VFR cloud clearance and visibility. Minimum enroute altitudes are the same as for all IFS operations (500’ above any terrain, obstacle, or obstruction within a horizontal radius of 2000 feet). However, due to the extended low altitudes necessary for the VNAV routes, particular attention must be placed on broader weather patterns to avoid excessive turbulence, mountain wave activity, flight into icing conditions and microburst activity. Continuing VFR flight under a low overcast with rising terrain (scud running) is dangerous and is prohibited. As in normal operations, aircrew are expected to give timely PIREPs to the SOF when they observe weather that may become a threat to safety.
- (f) **Clearing.** Many of the VNAV routes cross or track near areas with frequent (non-Doss) VFR traffic (I-25, Pueblo Reservoir, the Arkansas River valley, KLHX, etc.). Particular attention must be placed on clearing when flying in these areas since standard VFR cruising altitudes do not apply at low altitudes (below 3000’ AGL). Periodic cross-checks of the TAS page should be made to identify any conflicting traffic.
- (g) **Single-Engine Mentality.** Aircrew must be acutely aware of suitable landing sites at all times while navigating on the low-altitude VNAV route.
- (h) **Terrain and Obstacle Avoidance.** Particular attention should be given to terrain/obstacle identification and avoidance while navigating on low-altitude VNAV routes. The GPS Terrain feature will NOT be disabled while navigating on these routes. Avoiding excessive descent rates may minimize terrain/obstacle alerts.
- (i) **Altitude Changes.** All altitudes depicted on the VNAV charts have been de-conflicted to ensure a minimum of 500’ separation from terrain/obstacle/obstruction and other known traffic. For altitude changes enroute, begin the climb or descent at the waypoint which defines the beginning of that particular leg. For all altitude changes, the student will direct the climb or descent, and will callout 200’ prior to and level-off at the required altitude.

- (j) **VNAV Direction.** VNAV routes are de-conflicted according to the direction of the route. All routes will be flown in a Clockwise (CW) direction on Monday, Wednesday and Friday. All routes will be flown in a Counter-Clockwise (CCW) direction on Tuesday, Thursday, and Saturday. Pay particular attention during the SOF briefing to ensure you have planned for and are flying the correct direction for the day.
- (k) **VNAV Entry Timing.** VNAV routes are also de-conflicted by entry time. Plan your entry time (local time) and note this on the checkout sheet at the SOF desk when stepping for your flight. Individual flights are allowed to deviate ± 5 minutes from their planned entry time without SOF approval. The minimum separation between planned entry times for any two aircraft on the same route is 20 minutes – this will ensure a minimum of 10 minutes between actual entry times if deviations occur.
- (l) **Obtaining ATIS.** Several VNAV routes exit near the back of a corridor and require flying inbound on the corridor to return to KPUB. Due to the need to monitor Tiger Traffic frequency while flying inbound on the corridor, and the need to obtain ATIS prior to contacting approach, the student must plan for the appropriate use of the radios to accomplish this goal. The student can utilize COM1 to obtain ATIS, or use the monitor function (MON) on COM2. Additionally, some VNAV routes require contacting Denver Approach immediately upon exiting the VNAV route. In these cases, the student must plan ahead to complete all required actions (VNAV Exit Announcement, obtain ATIS, and squawk discrete, etc.) in an efficient manner to avoid unnecessary delay.

6.3 VNAV ROUTE PLANNING

- (a) In order to conduct a successful sortie, it is imperative that the student study the route chart very carefully. Identify as many visual references as possible (roads, rivers, towers, bridges, rising terrain, canyons, etc.) to aid in course/timing corrections and help determine the location of each turnpoint. Ensure you clearly understand all “dog house” information (course, distance, and altitude), enroute obstructions, and abort procedures for each leg of the route.
- (b) Students will utilize all available tools to determine weather conditions for the time of flight, complete the mission data card (MDC) and the IFS Flight Plan and Flight Log (IFS Form 70). Completing the IFS Form 70 will require calculating the Wind Correction Angles (WCA) and ground speeds for each leg of the route. The student will complete the MDC and IFS Form 70 prior to the sortie brief time. Additionally, the student should be prepared to brief 15 minutes earlier than normal (dependent on IP availability), to allow additional time for the VNAV Route Briefing.
- (c) For standardization purposes, two ground speed options are available for planning – 90 and 120 knots. The winds aloft forecast must be used to determine the groundspeed selection and the wind correction angles for each leg. Generally, a leg with a tailwind should plan 120 knots groundspeed. Likewise, a leg with a headwind or significant wind correction angle (crab) should plan 90 knots groundspeed. These options will work most of the time. In the interest of safety, legs requiring very low indicated airspeeds (<65 KIAS) or very high indicated airspeeds (>115 KIAS), especially in turbulent conditions, should be avoided on the route. Additionally, the student should take into account a climb/descent when planning the ground speed for those specific legs.

6.4 VNAV ROUTE NAVIGATION

- (a) **Pilotage** – Pilotage is defined as the use of fixed visual references on the ground by means of sight to guide oneself to a destination. Pilotage depends on the student being able to recognize the visual references in order to use them.
- (b) **Dead Reckoning** – Dead Reckoning is defined as the process of estimating one’s current position based upon a previously determined position, and advancing that position based upon the course and speed over elapsed time.

- (c) **Radio Navigation** – Radio Navigation is the application of radio frequencies to determine a position on the Earth. The most common radio frequency aid is the VHF Omni-directional Radio Range (VOR). VORs can provide a reliable line of position (radial) from the station which can be selected and followed by the pilot. Additionally, the aircraft position can be determined by obtaining and plotting two or more VOR lines of position (triangulation), or by plotting a single VOR radial and DME arc.
- (d) **GPS** – The Global Positioning System (GPS) is the generic term for satellite navigation systems that provide autonomous geo-spatial positioning with global coverage. A GPS receiver determines its location (longitude, latitude, and sometimes altitude) by triangulating its position in relation to three or more GPS satellites. By determining changes to its position over several seconds, the GPS receiver can determine not only its location, but its ground track and groundspeed.
- (e) The student will use most of the aforementioned methods of navigation during the VNAV sorties. The following examples identify typical use of navigation types during a VNAV sortie:
- (1) If navigating to or from a VNAV route via a corridor, the GPS OBS function will be used to maintain the corridor centerline. Additionally, the student will use Pilotage to determine the location of and navigate to visual waypoints on the departure and arrival.
 - (2) On the VNAV route, the student will use Dead Reckoning, based upon their preflight planning, to assign an initial heading and groundspeed for each leg. These initial headings and groundspeeds will chart the course of the aircraft along the estimated ground track of each leg. Additionally, during each leg the student will need to apply Pilotage skills to ensure the aircraft is indeed tracking the proper course along the ground. The student will need to identify roads, bridges, railroad tracks, rivers, gullies, lakes, dams, towers, smokestacks, buildings, power-lines, electrical substations, tree-lines, airports, and any other ground features to aid in identifying turnpoints and properly navigate along the route.
 - (3) **Clock-to-Map-to-Ground.** During each leg of the route the student will utilize the Clock-to-Map-to-Ground method to ensure the aircraft is navigating properly along the route and correctly tracking (time wise) according to the selected groundspeed. On the sides of the course line defining each leg of the charted route are two graduated guides with tick marks indicating one minute increments. One side is based on a 90 knot groundspeed (the higher numbers) and one side is based on a 120 knot groundspeed (the lower numbers). These tick marks should be used to verify the aircraft is properly tracking along the route. When a distinct ground feature (i.e. road, tower, river, etc.) is identified along the leg, the approximate time abeam this feature should be noted. At the proper time, the aircraft track can be verified by crosschecking the clock, verifying the time predicted on the chart, and validating the aircraft position abeam the ground feature (Clock-to-Map-to-Ground).
 - (4) **GPS ground track function (TRK).** During the course of navigating along each leg of the route, the student may utilize the ground track function (TRK) of the GPS. This function displays the actual ground track of the aircraft and should match the magnetic course (MAG CRS or “dog house” course) required to keep the aircraft on course. If a significant difference exists between the GPS TRK and the MAG CRS, the student should first try to determine why this difference exists. Is the IP accurately flying the MAG HDG you requested? Is the Heading Indicator significantly in error from the Magnetic Compass? Are the winds aloft significantly different from the forecasted winds aloft, requiring a smaller/larger WCA than originally planned? If the student makes the determination that a heading change is required to resolve an error, the GPS TRK function may be used to assist in that determination.
 - (5) **(CSO ONLY) Heading Changes.** When the student determines a simple heading change is required to ensure the aircraft remains along the specified route, the student will direct the IP to make this change. The student cannot request to have the IP fly a certain GPS TRK or “a little bit to the right”, but must be more directive in nature by requesting the IP to correct left (or right) a specific number of degrees (5, 10, 15, etc.). For example, if the aircraft is on the route but drifting to the right (by noting visual aids or the GPS TRK function), the student may instruct the IP to “turn left 5 degrees”.

- (6) **(CSO ONLY) Jungle Rules.** Since the primary focus of this training is visual navigation, ‘jungle rules’ are perfectly acceptable and will be utilized at IP discretion, when requested by the student. This means that if the student determines the aircraft is not tracking along the route correctly, he/she should use basic directives to get the pilot back on track. The student can use large geographical features (“head towards that mountain peak”, or “track just left of that lake”), ground features (“follow this creek”, “parallel this highway” or “go to that bend in the road”), or direct a change in the ground trajectory (“turn right,” then “stop the turn”). The student cannot, however, request to have the IP fly to the route waypoint itself prior to the 2-Minute Call (see next paragraph).
- (7) **(CSO ONLY) Identifying the Turnpoint.** When the student has identified the turnpoint through the use of visual ground references, the student may request to have the IP fly to that point. This will not normally be requested prior to the 2-Minute Call. Note: the IP is not required to “see” the turnpoint and therefore the student should be prepared to continue with directional input to the IP until over the turnpoint.

6.5 LA JUNTA (KLHX) ROUTE ABORT

- (a) The student will accomplish one Special Syllabus sortie with an arrival and traffic pattern at an alternate/auxiliary airfield. This will normally be accomplished during a simulated route abort on the La Junta VNAV route, with an emergency divert to KLHX. Due to inadequate monitoring and emergency services at KLHX, landings will be restricted to a low approach only. **CAUTION:** *due to similar route waypoints and altitudes, the La Junta VNAV and Check VNAV routes should not be scheduled within the same block/go. Both the student and IP should verify this with SOF prior to stepping for the flight.*
- (b) The student will plan the entire VNAV route as normal and apply all normal procedures during the flight. Additionally, the VNAV route portion of this sortie will be flown without assistance from the GPS TRK function. Except when used to define an entry/exit waypoint (radial/DME), the student will only utilize pilotage and dead reckoning navigation methods to stay on (or get back on) course. Due to the extended time required to complete the VNAV Route Abort, the sortie will not have an area assigned and will not conduct any area maneuvers or additional patterns upon return to Pueblo. Maneuver continuity does not apply to this Special Syllabus sortie. **CAUTION:** due to the extended sortie length and distance traveled from Pueblo, aircrew will ensure that the measured fuel quantity is at least $\frac{3}{4}$ tank for this sortie.
- (c) **(CSO ONLY)** Pattern entry into KLHX will be accomplished using a normal 45° entry into the left downwind for the active runway, based on current weather conditions. La Junta ASOS and CTAF should be monitored during the VNAV route to aid in situational awareness and traffic/collision avoidance, and to ensure the proper navigation (at the appropriate time) into the correct traffic pattern. After completion of the emergency diversion, the student will direct the IP to re-enter the VNAV route. See the section in this chapter titled RADIO COMMUNICATIONS for the standard phraseology of calls departing/re-entering the VNAV route. The IP will make all radio calls on CTAF while in the pattern at KLHX. Due to the extended time required to complete the VNAV Route Abort, the IP may elect to eliminate selected legs of the VNAV route.
- (d) Due to the simulated nature of this special syllabus requirement, the actual sortie will not accomplish a High Key intercept over the La Junta airport (due to potential conflicts with general aviation aircraft flying FAA patterns). Students are reminded, however, that when completing a stand-up or table-top EP with this type of scenario, the proper action for some scenarios may be a Precautionary Emergency Landing, beginning at a High Key position over the airport.

6.6 VNAV CHECKLISTS

- (a) In addition to all normal checklists, there are a few additional checklists required for the VNAV route. These include the VNAV Entry Checklist and the VNAV Exit Checklist.

- (1) **VNAV Entry Checklist** – Complete the VNAV Entry Checklist (except line 11) *at least 2 minutes prior* to VNAV route entry. Complete line 11 (entry announcement radio call) within one minute (before or after) of crossing the VNAV entry point. Many of these items are similar to other checklists and are self explanatory. The following descriptions expand on a few unique items and describe the elements involved:
- **Clocks** –
 - (1) The transponder clock is used to keep track of the total enroute time. Press the transponder FUNC button twice until “COUNT UP” is displayed. Start the timer at the VNAV entry point by pressing the START/STOP button.
 - (2) The aircraft clock is used to keep track of each individual leg time. On the clock (above the attitude indicator), press the SELECT button until the cursor is below ET (Elapsed Time). Start the timer by pressing the CONTROL button. When resetting this timer you must note the time on the clock prior to pressing the CONTROL button, as this does not stop the timer (as a normal stopwatch does), but resets the time to 00:00. Therefore, after noting the time for the leg, restart this timer by pressing the CONTROL button twice.
 - **VNAV Entry Point** – This brief is essentially the “2 Minute Call” for the VNAV Entry Point.
 - **Entry Announcement** – See the section in this chapter titled RADIO COMMUNICATIONS for the standard phraseology.
- (2) **VNAV Exit Checklist** – Complete the VNAV Exit Checklist as soon as practical *after* exiting the VNAV route. Many of these items are similar to other checklists and are self explanatory. The following descriptions expand on a few unique items and describe the elements involved:
- **Exit Announcement** – See the section in this chapter titled RADIO COMMUNICATIONS for the standard phraseology.
 - **Climb/Descend** – See the section in this chapter titled SPECIAL ENTRY/EXIT INSTRUCTIONS for required altitudes when exiting the VNAV route.
 - **Cruise/Level-off Checklist** – There is no need to “standby” for approval to run this checklist since it is an integral part of the VNAV Exit Checklist. When reaching this point in the checklist, refer to the normal Cruise/Level-off Checklist and accomplish all items in a timely manner.

6.7 VNAV TURN POINT BRIEFS

- (a) The required VNAV turnpoint briefs are summarized at the bottom of IFS Form 70 and the In-Flight Guide. See the section in this chapter titled CALLOUTS for the standard phraseology of calls on the VNAV route. The following descriptions expand on these briefs and describe the elements involved:
- (1) **2 Minute Call** – This callout is accomplished two minutes prior to each turnpoint on the route and includes the following:
- **Heading** – the magnetic heading (MAG HDG) to be flown on the next leg.
 - **Groundspeed** – the selected groundspeed (90 or 120) to be maintained on the next leg.
 - **Altitude** – the altitude to be maintained on the next leg (*note if a climb or descent is required*).
 - **TP Desc./Hazards** – provide a brief description of the turnpoint at the end of the next leg and any hazards/obstacles associated with the next leg. *Reminder: after this call you may identify the upcoming turnpoint, ask the IP if he/she sees it, and request they fly to that point.*
- (2) **Mark-On-Top Call** – This callout is accomplished when the aircraft is over the turnpoint. On legs with very large heading changes, the student should assess the groundspeed and flight path of the aircraft and call Mark-On-Top early enough to allow the aircraft to become established on the new leg without overshooting the turnpoint. When this occurs, the leg time/aircraft clock should be reset half way through the turn to ensure timing accuracy of both the previous and next legs.
- **Clear!** – ensure the flight path in the new direction (right/left) is clear of traffic/terrain/obstacles.
 - **Turn** – call for the turn to the new heading.
 - **Time** – state the leg time on the aircraft clock and note the total enroute time on the transponder (record these later on the IFS Form 70). Reset the aircraft clock (push CONTROL button twice). The transponder clock does not need to be reset at each turnpoint. Ensure both clocks are running.

- Groundspeed – callout the new groundspeed for this leg.
- (3) **Wings Level** – This brief is accomplished after completion of the turn. Due to magnetic compass errors while accelerating/decelerating and while turning, do not complete this brief until the aircraft has stabilized on the new heading and groundspeed.
- Heading – check that the aircraft is established on the new heading (MAG HDG). Additionally, the heading indicator should be checked and/or reset to match the magnetic compass.
 - Groundspeed – check that the aircraft is established on the new groundspeed.
 - Altitude – check that the aircraft is established at the proper altitude. If a change in altitude was required, ensure the aircraft is climbing/descending to the new altitude. *Reminder: don't forget to callout 200' prior to and level-off at the required altitude.*
 - Fuel/Eng. Gauges – check the fuel quantity and engine gauges.
- (4) **Analyze** – This brief is accomplished when time permits on each leg.
- Turnpoint – Did you properly identify the turnpoint? Did you direct the aircraft over the turnpoint? Did the aircraft track over the turnpoint? If you missed the turnpoint (left/right), how did this affect the timing of the previous leg and how will it affect the timing of the current leg? If there was a very large heading change, did you properly call for the turn so the aircraft became established on the new leg without overshooting the turnpoint?
 - Time – Did your actual time enroute (ATE) for the last leg match the estimated time enroute (ETE)? If not, why? Did your actual total enroute time match the estimated total enroute time? If not, why?
 - Wind – How do the actual winds aloft compare with the forecasted winds aloft you used to plan your route? How will this affect the wind correction angle (WCA) and the required MAG HDG for future legs on the route? Do you need to make any changes to the groundspeed of future legs on the route to compensate for the change in winds aloft?
 - Update ETA – Do you need to make a change to the groundspeed of a future leg to correct for your total enroute time? Is this feasible with the actual winds aloft and the capabilities of the aircraft?

6.8 CALLOUTS

- (a) In addition to the standard callouts listed in Appendix C, aircrew will use the following callouts to the maximum extent practical when operating on the VNAV route:
- (1) When two minutes prior to the turnpoint, the student will make the following 2 Minute callout: **“IN TWO MINUTES THE HEADING WILL BE ____ DEGREES, GROUNDSPED WILL BE ____ KNOTS, AND ALTITUDE WILL BE ____ FEET.”** Then give a brief description of the turnpoint at the end of the next leg and any hazards/obstacles associated with the next leg. For example, **“THE NEXT TURNPOINT IS AN ABANDONED AIRFIELD, AND THERE ARE TWO TOWERS AT APPROXIMATELY THE 5 MINUTE MARK.”** *Reminder: after this call you may identify the upcoming turnpoint, ask the IP if he/she sees it, and request they fly to that point.*
 - (2) When over the turnpoint, the student will make the following Mark-On-Top callout: **“MARK ON TOP, READY, NOW. CLEAR LEFT (or RIGHT), TURN LEFT (or RIGHT), HEADING ____, TIME IS ____, CLOCKS RUNNING, GROUNDSPED ____ KNOTS.”**
 - (3) **(CSO ONLY)** When the student is ready to complete a checklist (if the IP is flying):
The student will callout – **“STANDING BY FOR THE ____ CHECKLIST.”**
When the IP is ready for the checklist, he/she will reply – **“RUN IT”**
When the checklist is complete, the student will callout – **“____ CHECKLIST COMPLETE.”**
 - (4) **(CSO ONLY)** When 200 feet prior to leveling off from a climb or descent, the student will callout: **“200 FEET PRIOR.”**
When at the level-off altitude, the student will callout: **“LEVEL-OFF, ____ FEET.”**

- (5) **(CSO ONLY)** When a deviation of 100 feet from the desired altitude occurs, the student will callout:
“100 FEET HIGH (or LOW).”
 When a deviation of 200 feet (or more) from the desired altitude occurs, the student will callout:
“200 FEET HIGH (or LOW), DESCEND (or CLIMB) TO ____ FEET.”
- (6) **(CSO ONLY)** When a deviation of 5 knots from the desired airspeed/groundspeed occurs, the student will callout:
“AIRSPEED SLOW (or FAST).”
“GROUNDSPEED SLOW (or FAST).”
 When a deviation of 10 knots (or more) from the desired airspeed/groundspeed occurs, the student will callout:
“INCREASE (or DECREASE) AIRSPEED TO ____ KNOTS.”
“INCREASE (or DECREASE) GROUNDSPEED TO ____ KNOTS.”
- (7) **(CSO ONLY)** When approaching 1 NM of the perimeter/boundary of an assigned area, the student will callout:
“APPROACHING AREA BOUNDARY”
 When approaching ½ NM of the perimeter/boundary of an assigned area, the student will callout:
“TURN LEFT (or RIGHT) ____ DEGREES.”
 Specify 90°/180° (or another amount), or use ‘Jungle Rules’ to remain in assigned area.
- (8) **(CSO ONLY)** When a heading change is required, the student will callout:
“TURN LEFT (or RIGHT) ____ DEGREES.”
- (9) **(CSO ONLY)** After describing the turnpoint in the 2 Minute Call, the student will callout:
CSO – “SEE THE TURNPOINT?”
 If the IP replies in the affirmative, then:
CSO – “FLY TO IT.”

6.9 RADIO COMMUNICATIONS

- (a) Tiger traffic frequency will be monitored throughout the VNAV route, and students will utilize the procedures and techniques listed in Appendix F. In addition to the standard terminology and radio calls listed in Appendix F, aircrew will use the following standard radio procedures and phraseology to the maximum extent practical when operating on the VNAV route. As always, additional radio calls and non-standard phraseology may be used when required for effective communication or safety.

TIGER TRAFFIC (DEPARTURE)

Initial Call	Nav	Tiger Trfc	When navigating directly to the VNAV route, after terminating with Denver Departure, the student will call “Tiger ____, ____ Departure for the ____ VNAV route, ____ (feet).” The student will state the name of the VNAV route (“Yak”, “Kramer”, “Daygo”, “Check”, “La Junta”, etc.) and the direction of the route (“Clockwise” or “Counterclockwise”).
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VNAV ENTRY/EXIT

VNAV Entry	Nav	Tiger Trfc	Within one minute (before/after) of crossing the VNAV entry point, the student will call “Tiger ____, entering the ____ VNAV route at ____ (feet).” The student will state the name of the VNAV route (“Yak”, “Kramer”, “Daygo”, “Check”, “La Junta”, etc.) and the direction of the route (“Clockwise” or “Counterclockwise”).
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Exiting Area for VNAV	Nav	Tiger Trfc	When exiting a training area and navigating to a VNAV route, the student will call “Tiger ____, departing area ____ for the ____ VNAV route at ____ (feet).”
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VNAV Exit	Nav	Tiger Trfc	Within one minute (before/after) of crossing the VNAV exit point and navigating to a training area, the student will call <i>“Tiger ____, exiting the ____ VNAV route for area ____ at ____ (feet).”</i> The student will state the name of the VNAV route (“Yak”, “Kramer”, “Daygo”, “Check”, “La Junta”, etc.) and the direction of the route (“Clockwise” or “Counterclockwise”).
	Nav	Tiger Trfc	When exiting the VNAV route and flying inbound on a corridor, the student will call <i>“Tiger ____, exiting the ____ VNAV route, inbound on the ____ corridor, ____ DME at ____ (feet).”</i>
	Nav	Tiger Trfc	When exiting the VNAV route and returning to Pueblo via an unpublished or alternate routing, the student will call <i>“Tiger ____, exiting the ____ VNAV route at ____ (feet), inbound Pueblo.”</i>

LA JUNTA ROUTE ABORT

VNAV Departure	Nav	Tiger Trfc	When departing the VNAV route for KLHX, the student will call <i>“Tiger ____, departing the La Junta ____ VNAV route, ____ (feet), inbound La Junta.”</i> The student will state the direction of the route (i.e. “Clockwise” or “Counterclockwise”).
Departing La Junta	Nav	Tiger Trfc	When departing KLHX after the emergency diversion, the student will call <i>“Tiger ____, departing La Junta to the _____, to rejoin the La Junta ____ VNAV route, ____ (feet).”</i> The student will state the direction of the departure from La Junta (Northwest, West, Southwest, etc.), and will state the direction of the route (i.e. “Clockwise” or “Counterclockwise”).
VNAV Re-entry	Nav	Tiger Trfc	When re-entering the VNAV route from KLHX, the student will call <i>“Tiger ____, reestablished on the La Junta ____ VNAV route, ____ (feet).”</i> The student will state the direction of the route (i.e. “Clockwise” or “Counterclockwise”).

DENVER APPROACH

Initial Contact	Nav	Appch	After exiting the VNAV route, and when returning to Pueblo via an unpublished or alternate routing (from the southwest), the student will call <i>“Denver Approach, Tiger ____, ____ miles southwest, ____ [altitude], information ____ [ATIS code], request direct UKLID, inbound, ____ [full stop/patterns].”</i>
	Nav	Appch	After exiting the VNAV route, and when returning to Pueblo via an unpublished or alternate routing (from the north), the student will call <i>“Denver Approach, Tiger ____, ____ miles north, ____ [altitude], information ____ [ATIS code], request direct SULFR, inbound, ____ [full stop/patterns].”</i>

6.10 MONITORING AREA MANEUVERS (CSO ONLY)

- (a) As discussed earlier, when conducting area maneuvers the IP will fly the aircraft, and the student will monitor the maneuvers. The student is still responsible for all checklist accomplishment, callouts, challenge and response, and directing the IP to remain within the lateral and vertical area boundaries. When the IP announces which maneuver he/she is accomplishing, the student is expected to remain engaged and announce the callouts, challenge and response, etc., required for the maneuver without prompting from the IP. For example, during a power-off stall, when the IP reduces the throttle, the student is expected to callout “Below 100 knots” and “Below 78 knots”; and when the IP requests “Before Landing Checks”, the student responds “Airspeed 60 knots, flaps landing, confirm”. Additionally, the student

should recognize and announce the indications of the stall (i.e. stall warning horn and aerodynamic buffeting), and callout “Altimeter and VSI check” when appropriate. Finally, the student should call “Standing by for the climb checklist” (when at 66 KIAS) and run it when directed. Essentially, the student is completing all procedures for the maneuver with the exception of actuating the controls. **TECHNIQUE:** don’t focus solely on the instruments, look outside for the appropriate pitch picture/attitude for the particular maneuver and periodically crosscheck the instruments.

- (b) When monitoring area maneuvers, the student needs to pay particular attention to area boundaries (both lateral and vertical) and direct the IP to turn (or climb/descend) when appropriate to remain with the perimeter/boundary of the assigned area. **TECHNIQUE:** check the GPS and/or visual references before and after every maneuver. When descending below the training area block altitude, the student is expected to make the appropriate radio calls without prompting. During maneuvers, the student should monitor flap configuration, altitude, airspeed and RPM settings at a minimum. If deviations exist with any of these, the student should direct the IP to correct the problem. If you notice a descent during the maneuver, don’t wait to descend 100 feet before making a correction – take the proper action immediately (taking into account minor instrument fluctuations).

6.11 MONITORING THE ARRIVAL AND PATTERN WORK (CSO ONLY)

- (a) On the arrival, the student must remain engaged in directing the IP throughout the arrival. **TECHNIQUE:** treat this as similar to the VNAV route and use ‘Jungle Rules’ to direct the IP over the appropriate visual navigation points. For example, approximately 2 minutes prior to an arrival point (UKLID, DALE, SULFR, etc.), direct the IP what you want him/her to do at that point, where the next point on the arrival is and how to get there. Also, direct the descent when required (don’t forget 200 foot prior and level-off calls). Continue to remain engaged throughout the arrival. Once inside the last arrival point (LOT, VINE, YARD, etc.), unnecessary internal communications should be kept to a minimum. Therefore, the student does not need to direct the IP when to conduct wing flashes, when to turn initial, when to break, etc. However, the student should squawk 1200 when required, and make standard altitude callouts (200 foot prior and level-off) when descending to pattern altitude. Additionally, the student should clear for traffic and callout position and sequence of potential conflicts in the pattern.
- (b) When conducting pattern work and the IP is the PF, the student is responsible for monitoring all pattern work, checklist accomplishment and callouts. Prior to each pattern, the IP will discuss with the student the type of landing that will be accomplished (normal, no-flap, or SFL), so the student is prepared for the proper airspeed and configuration for that landing. Unless the student is the PF, all pattern work will be initiated by the IP. As the CSO, the student is only responsible for completing the checklist listed in the following paragraphs, and it is acceptable to use the aircraft checklist (and/or emergency checklist) to read the required checklist items. All other CSO callouts (altitude calls, headings, turns, etc.) are not required while in the pattern. For example, the student is not required to callout normal procedures during a touch-and-go, nor callout when to turn closed/base, nor callout “200 foot prior” and “level-off” when reaching pattern altitude. The following paragraphs describe the normal sequence of events and callouts for each type of landing/checklist when the IP is the PF and the student is the CSO. When the student is the PF, callouts and procedures will be the same as the normal pilot syllabus.
- (c) **Normal Approach/Landing.**

As early as practical on the downwind leg, the IP will initiate the Before Landing checklist:

IP – **“BEFORE LANDING CHECKLIST”**

CSO will perform Before Landing callout

CSO – **“FUEL PUMP ON, MIXTURE FULL RICH”**

IP – will ensure fuel pump on and mixture is full rich

After making this callout, the IP will reduce the throttle to idle at an appropriate location to begin deceleration to 60 KIAS then:

CSO – **“BELOW ONE HUNDRED KNOTS”**

IP – will move flap selector to T/O position.

CSO – **“BELOW SEVENTY EIGHT KNOTS”**

IP – will move flap selector to LDG position.

When the airspeed is within +10/-0 of desired airspeed and the flaps are in the LDG configuration,

CSO – **“AIRSPEED SIXTY KNOTS, FLAPS LANDING, CONFIRM”**

IP – **“CONFIRM”**

(d) **Pattern SFL.**

As early as practical on the downwind leg, the IP will initiate the Before Landing checklist:

IP – **“BEFORE LANDING CHECKLIST”**

CSO will perform Before Landing callout

CSO – **“FUEL PUMP ON, MIXTURE FULL RICH”**

IP – will ensure fuel pump on and mixture is full rich

The IP will then reduce power to IDLE at an appropriate location on the downwind leg and will establish a glide at 73 KIAS with flaps CRUISE. This is an engine stoppage scenario that has been fast-forwarded to the Low Key position. Any attempted engine restart procedures have already been accomplished, and the first two lines of the Forced Landing procedure have been accomplished. The IP announces the simulated engine failure and then calls for the Forced Landing checklist,

IP – **“SIMULATED ENGINE FAILURE”**

“FORCED LANDING CHECKLIST”

CSO – **“FUEL SHUTOFF VALVE OFF”**

IP will point to the fuel shutoff valve and reply – **“OFF”**

CSO – **“MIXTURE IDLE CUTOFF”**

IP will point to the mixture control and reply – **“IDLE CUTOFF”**

CSO – **“IGNITION SWITCH OFF”**

IP will point to the ignition switch and reply – **“OFF”**

When the IP determines that flaps T/O are required,

IP – **“OK FOR FLAPS TAKEOFF”**

CSO – **“BELOW 100 KNOTS”**

(The IP moves the flap selector to T/O position)

When the IP determines that flaps LDG are required,

IP – **“OK FOR FLAPS LANDING”**

CSO – **“BELOW 78 KNOTS”**

(The IP moves the flap selector to LDG position)

When the airspeed is within +10/-0 of desired airspeed and the flaps are in the LDG configuration,

CSO – **“AIRSPEED SIXTY KNOTS, FLAPS LANDING, CONFIRM”**

IP – **“CONFIRM”**

The CSO then calls for the last item of the Forced Landing procedure,

CSO – **“GEN/BAT MASTER SWITCH OFF”**

IP will point to the GEN/BAT Master Switch and reply – **“OFF”**

(e) **No Flap Approach/Landing.**

As early as practical on the downwind leg, the IP will initiate the Before Landing checklist:

IP – **“BEFORE LANDING CHECKLIST”**

CSO will perform Before Landing callout

CSO – **“FUEL PUMP ON, MIXTURE FULL RICH”**

IP – will ensure fuel pump on and mixture is full rich

After making this callout, the IP will reduce the throttle to idle at an appropriate location to begin deceleration to 65 KIAS then:

When the airspeed is within +10/-0 of desired airspeed:

CSO – **“AIRSPEED SIXTY-FIVE KNOTS, FLAPS CRUISE, CONFIRM”**

IP – **“CONFIRM”**

(f) **Go-Around.**

When a go-around is desired or required:

ATC, IP or CSO – **“GO-AROUND”**

The IP will smoothly apply full throttle and adjust the pitch attitude to stop the descent.

After the descent is stopped, the IP will select flaps T/O (when required). Once the aircraft is safely climbing away from the runway:

CSO – **“STANDING BY FOR THE GO-AROUND CHECKLIST”**

IP – “**RUN IT**”
 CSO – “**THROTTLE... FULL**”
 IP – will ensure throttle is full.
 CSO – “**FLAPS... TAKEOFF**”
 IP – will ensure flaps are selected to T/O position (check indicator light)
 CSO – “**AIRSPEED... SIXTY-SIX KNOTS**”
 IP – will ensure airspeed is 66 KIAS.

(g) **Climb Checks.**

When conducting pattern work and the IP is the PF, at the appropriate altitude:

CSO – “**STANDING BY FOR THE CLIMB CHECKLIST**”
 IP – “**RUN IT**”
 CSO – “**THROTTLE... FULL**”
 IP – will ensure throttle is full.
 CSO – “**FLAPS... CRUISE**”
 IP – will move flap selector to CRUISE position.
 CSO – “**AIRSPEED... 70 KNOTS**”
 IP – will ensure airspeed is 70 KIAS.
 CSO – “**ENGINE GAUGES... CHECK**”
 CSO and IP – will check engine gauges.

Note: When a temporary level off due to an upwind climb restriction (5100 MSL at KPUB) is required, the student shall notify the IP (prior to reaching the altitude) of this requirement. Likewise, the student will notify the IP when the climb may be continued (once crossing the departure end of the runway).

6.12 SPECIAL ENTRY/EXIT INSTRUCTIONS

- (a) Students will utilize the departure and arrival procedures as depicted in the IFG for navigation and altitude deconfliction to/from the training areas and VNAV routes. However, the following special entry/exit procedures supplement these normal departure and arrival procedures. Deviations from normal procedures are **highlighted in BOLD**.

(1) LA JUNTA CW

Entry: Fly a normal East Departure to 8500 MSL, outbound on the Delta corridor for the entry point.
 After **18 DME**, begin a descent to **7000 MSL** (entry altitude).

Exit: After exiting the route, continue at 6500 MSL for a normal South Arrival on the Charlie corridor.

(2) LA JUNTA CCW

Entry: Fly a normal South Departure to 8500 MSL, outbound on the Charlie corridor for the entry point.
 Begin a descent to cross **24 DME** at or above **8000 MSL** (to deconflict with Fowler traffic).
 After 24 DME, begin an unrestricted descent to **6500 MSL** (entry altitude).

Exit: After exiting the route, continue at **7000 MSL** (to deconflict with Fowler traffic).
 At **Point L (18 DME)**, begin a descent to cross point D at 6500 MSL.
 Continue inbound on the Delta corridor for a normal East Arrival.

(3) DAYGO CW

Entry: Fly a normal North Departure to 8500 MSL, outbound on the Echo corridor for the entry point.
 After **18 DME**, begin a descent to **7000 MSL** (entry altitude).

Exit: After exiting the route, fly direct to area 18 and enter the area at **7500 MSL** (last leg’s altitude).
 After area work, return via a normal North Arrival.

Note: Occasionally, due to weather/reroutes, SOF may direct the use of area 26 for area work instead of area 18. In these instances, announce “entering area 26” on the last leg of the VNAV route **prior to** entry into area 26. When using area 18, no additional radio calls are required while transiting through area 26 because area 26 is only used in conjunction with the DAYGO VNAV route (when in use).

(4) DAYGO CCW

- Entry: Fly a normal North Departure to 8500 MSL, outbound on the Echo corridor for area 18.
After area work, fly direct to the entry point at **6000 MSL** (entry altitude) to begin the route.
Note: Occasionally, due to weather/reroutes, SOF may direct the use of area 26 for area work instead of area 18. In these instances, announce “departing area 26” in conjunction with the VNAV Entry radio call when beginning the route. When using area 18, no additional radio calls are required while transiting through area 26 because area 26 is only used in conjunction with the DAYGO VNAV route (when in use).
- Exit: After exiting the route, continue at 6500 MSL for a normal North Arrival on the Echo corridor.

(5) YAK CW

- Entry: Fly a normal South Departure to 8500 MSL, outbound on the Bravo corridor for the area.
After area work, join the corridor outbound at **7500 MSL** (entry altitude) to begin the route.
- Exit: As soon as possible after exiting the route contact Denver Approach. Remain at **7000 MSL** and orbit south of St. Charles Reservoir and west of I-25 (left turns) until cleared to proceed inbound by Denver Approach. Once cleared to proceed inbound, fly direct to UKLID (remain north of the cement plant in Area 1). Once inside **12 DME** (inbound), descend to 6500 MSL for a normal South Arrival.

(6) YAK CCW

- Entry: Fly a normal South Departure but level off at **7500 MSL**.
After BEND or PLANT, fly direct to the entry point.
After **12 DME**, begin an unrestricted descent to **7000 MSL** (entry altitude).
- Exit: After exiting the route, enter the area at **7500 MSL** (the last leg’s altitude).
After area work, return via a normal South Arrival.

(7) KRAMER CW

- Entry: Fly a normal South Departure to 8500 MSL for the area.
After area work, depart the area at **6500 MSL** (entry altitude) to begin the route.
- Exit: As soon as possible after exiting the route contact Denver Approach. Remain at **7000 MSL** and orbit southwest (right turns) of the exit waypoint until cleared to proceed inbound by Denver Approach. Once **cleared to proceed inbound**, descend to 6500 MSL and fly direct to SULFR for a normal North arrival.

(8) KRAMER CCW

- Entry: Fly a normal North Departure but level off at **7000 MSL**.
When at 7000 MSL, turn direct to the entry point.
- Exit: After exiting the route, enter the area at **6500 MSL** (the last leg’s altitude).
After area work, return via a normal South Arrival.

(9) CHECK CW

- Entry: Fly a normal East Departure to 8500 MSL, outbound on the Delta corridor for the entry point.
After **18 DME**, begin a descent to **7000 MSL** (entry altitude).
- Exit: After exiting the route, the student should navigate the aircraft to remain well clear of area 23 while navigating to the area. Climb or descent is unrestricted at student’s discretion.

(10) CHECK CCW

- Entry: Fly a normal South Departure to 8500 MSL for the area.
After area work, depart the area at **6500 MSL** (entry altitude) to begin the route. The student should navigate the aircraft to remain well clear of area 23 while navigating to the entry point.

Exit: After exiting the route, continue at **7000 MSL** (to deconflict with Fowler traffic).
At **Point L (18 DME)**, begin a descent to cross point D at 6500 MSL.
Continue inbound on the Delta corridor for a normal East Arrival.

APPENDIX B: ABBREVIATIONS

The following definitions apply to abbreviations as they are used in the IFS Local Flying Procedures. Some of these terms will have additional or different meanings when used in other contexts outside of this publication.

AETC. Air Education and Training Command.
AETCI. AETC Instruction.
AFD. Airport/facility directory.
AFM. Airplane Flight Manual.
AGL. Height above the ground (absolute altitude) measured here in feet.
ALP. Apron Location Point. At KPUB, a blue rectangle with white alphanumeric markings.
AMM. Aircraft Maintenance Manual.
ARTCC. Air Route Traffic Control Center.
ATC. Air traffic control.
ATCT. Air traffic control tower.
ATIS. Automated terminal information service.
BWC. Bird/wildlife condition.
C. Course.
CCW. Counterclockwise direction.
CH. Compass heading.
CRM. Cockpit/Crew Resource Management.
CSO. Combat systems officer. Here, a candidate for CSO training that is enrolled in IFS.
CPT. Cockpit Procedures Trainer.
CT. Continuation training.
CTS. IFS syllabus course training standards.
CW. Clockwise direction.
DA. Density altitude.
DA20-C1. Model of aircraft flown at IFS. The name may be shortened to DA20.
DC. Drift correction.
DME. Distance measuring equipment.
DR. Dead reckoning.
DV20/U. IFS aircraft type designator and equipment code for use by FSS and ATC.
DME. Distance measuring equipment. Here “DME” refers to a roughly equivalent GPS-based distance.
EGT. Exhaust gas temperature.
ELP. Emergency landing pattern.
EP. Emergency procedure.
ETA. Estimated time of arrival.
ETE. Estimated time enroute.
FAA. Federal Aviation Administration.
FOD. Foreign Object Debris/Damage.
FSS. Flight service station.
GEN/BAT. Generator/Battery (used in the DA20-C1 checklists in reference to the Gen/Bat Master Switch).
GPS. Global Positioning System, specifically referring to the Garmin GNS 430 installed in IFS aircraft.
GS. Ground speed.
GTIMS. Graduate Training Integration Management System.
H. Heading.
IAW. In accordance with.
ICE-T. Indicated, calibrated, equivalent, true (airspeed conversion).
IFG. Doss Aviation In-Flight Guide.
IFS. Initial Flight Screening.
IP. Instructor pilot.
JOG. Joint operations graphic.
KIAS. Knots indicated airspeed.
LAT/LONG. Geographic latitude and longitude.
LDA. Landing distance available.
LDG. Landing.

LOA. Letter of Agreement.
LFP. IFS Local Flying Procedures.
MC. Magnetic course.
MEF. Maximum elevation figure.
METAR. Aviation routine weather report.
MH. Magnetic heading.
MIF. Maneuver item file.
MFI. Military flight instructor.
MSL. Approximate height above mean sea level (indicated altitude) measured here in feet.
MX. Maintenance.
NM. Nautical miles.
NMAC. Near midair collision.
NOTAM. Notice to airmen.
NSA. National security area.
OFA. Object-Free Area. At KPUB, the area between Twy A dashed edge markings and the non-movement area.
OPS LIMITS. Operating Limitations for the aircraft.
PA. Pressure altitude.
PIC. Pilot in command.
PIREP. Pilot report.
PF. Pilot flying the aircraft (also applies during ground ops).
PNF. Pilot not flying the aircraft (also applies during ground ops).
RPA. Remote piloted aircraft. Here, a candidate for RPA training that is enrolled in IFS.
RPM. Revolutions per minute. Used in reference to engine crankshaft or propeller rotational speed.
RWY. Runway.
SA. Situational Awareness.
SFL. Simulated forced landing.
SII. Special interest item.
SOF. Supervisor of flying.
SR. Sunrise.
SS. Sunset.
TACAN. Tactical air navigation facility.
TAF. Terminal aerodrome forecast.
TAS. Traffic Advisory System.
TC. True course.
T/O. Takeoff.
TODA. Takeoff distance available.
TOLD. Takeoff and landing data.
TPA. Traffic pattern altitude (designated MSL altitude for the inside downwind leg).
TRACON. Terminal Radar Approach Control.
TWY. Taxiway.
USAFA. United States Air Force Academy.
VFR. Visual flight rules.
VHF. Very high frequency.
VOR. Variable omnidirectional radio.
VOR/DME. Combined VOR and DME facility.
VORTAC. Combined VOR and TACAN facility.
VMC. Visual meteorological conditions.
VNAV. Visual navigation.
VSI. Vertical speed indicator.
WCA. Wind correction angle.
WX. Weather.
XC. Cross-country.

APPENDIX C: CALLOUTS

- (a) Before closing the canopy, visually check that both canopy rails are clear and say, “**RAIL CLEAR.**” The other pilot is not required to repeat this callout.
- (b) Before accomplishing line 6 of the Engine Start procedure, visually identify the nearest fire bottle and confirm that the propeller area is clear. Say, “**FIRE BOTTLE, PROP CLEAR**” before turning the key.

NOTE: this callout is separate from yelling “clear” out the window a few seconds earlier (Before Engine Start procedure) as a warning to ground personnel who may be near the aircraft or walking toward it.

- (c) Check the Pitot-static instruments before taxi: “**AIRSPEED, ALTIMETER, VSI - CHECK.**” The airspeed indicator should read zero. The altimeter should read within 75 feet of known elevation. The VSI should read zero, but may read slightly off zero, in which case reference that reading as “zero” during flight.
- (d) The turn coordinator, inclinometer, heading indicator, magnetic compass, and attitude indicator should be checked during one left taxi turn and one right taxi turn. No more than 5° of pitch or bank should be indicated on the attitude indicator.
 - (1) “**LEFT TURN, RIGHT BALL, HEADING DECREASING ON TWO, ATTITUDE INDICATOR CHECK.**”
 - (2) “**RIGHT TURN, LEFT BALL, HEADING INCREASING ON TWO, ATTITUDE INDICATOR CHECK.**”
- (e) Before advancing the throttle during the Runup: “**CLEAR FORWARD AND AFT.**”
- (f) Use the following script for the takeoff briefing, but discuss any additional information and considerations as required: “**RUNWAY___, ___ FEET AVAILABLE, __ FEET REQUIRED, WINDS ___.**” State the runway designator. State takeoff distance available from the point where takeoff power is applied. State runway required as the sum of calculated takeoff distance plus stopping distance. State approximate wind speed and direction based on observed windsock, and verbally note any right/left crosswind component or tailwind component.

NOTE: this callout is not required for takeoffs that follow a touch-and-go or stop-and-go.

- (g) During a normal takeoff run, call out “**FORTY FOUR KNOTS**” when reaching normal rotation speed. If a non-standard rotation speed is used (e.g., up to 52 KIAS in gusty wind conditions), call out that number instead. This callout is not required during a touch-and-go.

NOTE: this callout is not required during short field and soft field takeoffs.

- (h) During a simulated short field takeoff run, call out “**FIFTY TWO KNOTS**” when reaching short field rotation speed. Make this callout for all short field takeoffs, including those performed from a touch-and-go.

NOTE: the “forty four knots” callout is not required during short field takeoffs.

- (i) During a simulated soft field takeoff run, call out “**TWENTY KNOTS**” to announce the speed where you will start reducing aft-stick deflection.

NOTE: the “forty four knots” callout is not required during soft field takeoffs.

- (j) After a simulated short field touchdown, call out “**SIMULATED MAX BRAKING.**” Do not apply any abnormal braking.
- (k) After a simulated soft field touchdown, call out “**SIMULATED AFT STICK, POWER AS REQUIRED.**” Do not apply any abnormal aft-stick deflection or add power.
- (l) Call out “**CLEAR RIGHT**” and/or “**CLEAR LEFT**” in situations that present potential conflicts, including the following specific situations:
 - (1) Before entering a turning maneuver during flight.
 - (2) Prior to entering or crossing a runway/taxiway.
- (m) When transferring control of the aircraft from one pilot to the other, the pilot relinquishing control will say, “**YOU HAVE THE AIRCRAFT.**” The pilot assuming control will say, “**I HAVE THE AIRCRAFT**” and shake the control stick.
- (n) During stall recovery training, recognize and announce indications of the impending stall by verbally identifying the “**HORN**” when the stall warning horn sounds, and the “**BUFFET**” at the onset of significant aerodynamic buffeting. If the maneuver is continued to a full stall, announce “**STALLING**” at loss of control effectiveness.
- (o) Confirm that you have arrested the descent during stall recovery training by cross-checking the altimeter and VSI: “**ALTIMETER AND VSI - CHECK**”

NOTE: this callout is not required during a go-around procedure.
- (p) After cross-checking the airspeed indicator, immediately before extending flaps T/O during flight: “**BELOW ONE HUNDRED KNOTS.**”

NOTE: do not reach for the flap lever until the airspeed is within the limits stated in the callout.
- (q) After cross-checking the airspeed indicator, immediately before extending flaps LDG during flight: “**BELOW SEVENTY EIGHT KNOTS.**”

NOTE: do not reach for the flap lever until the airspeed is within the limits stated in the callout.
- (r) Use the following script for the approach briefing, but discuss any additional information and considerations as required: “**RUNWAY__ VIA __, [LEFT/RIGHT] PATTERN, ___ FEET.**” State the planned/assigned runway. After the word “via” summarize arrival routing and pattern entry method (initial, entry leg, base leg, direct downwind leg, straight-in, High Key, etc.). The “left/right” pattern direction refers to the direction of turn in the break, base turn, and closed turn. Before the word “feet,” state the TPA.
- (s) Accomplishing the first two items on the Before Landing Checklist, call out, “**FUEL PUMP ON, MIXTURE FULL RICH.**” These two items are normally checked on the downwind leg of the traffic pattern before reducing throttle to decelerate to approach speed (normal or no-flap approach) or glide speed (pattern SFL), or they are checked when descending through TPA on a straight-in approach.
- (t) Before opening the canopy after flying: “**LOOSE ITEMS SECURE, RAIL CLEAR.**” On windy days, carefully stow and secure all loose items before opening the canopy.

APPENDIX D: CHALLENGE AND RESPONSE

Verbalize the challenge-and-response items highlighted in the DA20-C1 abbreviated checklists whenever there are two crew members on board. The PF will initiate the “challenge,” and the PNF will give the appropriate “response.” (Exceptions for CSO training are detailed in chapter 6.)

(a) Before Engine Start

- (1) CHALLENGE: *“Rudder pedals adjusted, safety belts fastened and adjusted. How about you?”*
- (2) RESPONSE: *“Rudder pedals adjusted, safety belts fastened and adjusted.”*

(b) Before Engine Start

- (1) CHALLENGE: *“Canopy closed and locked.”*
- (2) RESPONSE: *“Closed and locked.”*

(c) Taxi

- (1) CHALLENGE: *“Brakes check. How about you?”*
- (2) RESPONSE: *“Brakes check.”*

NOTE: do not transfer aircraft control for the brake check.

(d) Runup

- (1) CHALLENGE: *“Feet and knees clear. [checks control stick and rudder pedals for freedom of movement] Flight controls check free. You have the aircraft.”*
- (2) RESPONSE: *“I have the aircraft. [shakes the control stick] [checks control stick and rudder pedals for freedom of movement] Flight controls check free. You have the aircraft.”*

NOTE: the pilot who initiated the challenge then takes control of the aircraft again by saying “I have the aircraft” and shaking the control stick.

(e) Descent/Approach

- (1) CHALLENGE: *“Safety belts fastened. How about you?”*
- (2) RESPONSE: *“Safety belts fastened.”*

(f) Before Landing (Normal Approach)

- (1) CHALLENGE: *“Airspeed sixty knots, flaps landing, confirm.”*
- (2) RESPONSE: *“Confirm.”*

NOTE: accomplish this challenge-and-response on the downwind leg prior to the perch, when airspeed is within +10/-0 of final approach speed and the flap indicator light is visually confirmed in LDG position. If using a non-standard approach speed, state that approach speed instead.

NOTE: for patterns entered via base leg or straight-in approach, accomplish this challenge-and-response when airspeed is within +10/-0 of final approach speed and the flap indicator light is visually confirmed in LDG position.

NOTE: if unable to accomplish this challenge-and-response verbally due to radio frequency congestion, it is acceptable for the PF to point to the airspeed indicator and flap lever in lieu of a verbal challenge, to which the PNF can give a thumbs-up response.

NOTE: this challenge-and-response is also required during a power-off stall setup.

(g) Before Landing (No-Flap Approach)

- (1) CHALLENGE: *“Airspeed sixty-five knots, flaps cruise, confirm.”*
- (2) RESPONSE: *“Confirm.”*

NOTE: accomplish this challenge-and-response on the downwind leg prior to the base turn, when airspeed is within +10/-0 of final approach speed and the flap indicator light is visually confirmed in CRUISE position. If using a non-standard approach speed, state that approach speed instead.

NOTE: for patterns entered via base leg or straight-in approach, accomplish this challenge-and-response when airspeed is within +10/-0 of final approach speed and the flap indicator light is visually confirmed in CRUISE position.

NOTE: if unable to accomplish this challenge-and-response verbally due to radio frequency congestion, it is acceptable for the PF to point to the airspeed indicator and flap lever in lieu of a verbal challenge, to which the PNF can give a thumbs-up response.

(h) Before Landing (Pattern SFL)

- (1) CHALLENGE: *“Airspeed sixty knots, flaps landing, confirm.”*
- (2) RESPONSE: *“Confirm.”*

NOTE: during a pattern SFL, accomplish this challenge-and-response after flaps are extended to LDG (as visually confirmed with the flap indicator light) and when airspeed is within +10/-0 of final approach speed (60 KIAS). If using a non-standard approach speed, state that approach speed instead.

NOTE: if unable to accomplish this challenge-and-response verbally due to radio frequency congestion, it is acceptable for the PF to point to the airspeed indicator and flap lever in lieu of a verbal challenge, to which the PNF can give a thumbs-up response.

NOTE: this challenge-and-response item is not required during an Area SFL.

(i) Precautionary Emergency Landing

- (1) CHALLENGE: *“Safety belts fastened. How about you?”*
- (2) RESPONSE: *“Safety belts fastened.”*

(j) Forced Landing

- (1) CHALLENGE: *“Safety belts fastened. How about you?”*
- (2) RESPONSE: *“Safety belts fastened.”*

APPENDIX E: WAYPOINTS

Introduction. Use the Google Earth tool on the Ops intranet page in conjunction with your in-flight publications to study the waypoints associated with your mission profile. Consult the definitions in this appendix for additional information.

Visual Waypoints. *Waypoints that are based on ground references should be identified visually during flight.* IFG procedures depict visual waypoints with a green circle. The **arrival control points** and many of the waypoints that define departure/arrival routing fall in this category.

GPS Waypoints. *GPS waypoints are defined by LAT/LONG or radial/DME rather than ground references and should be identified using the GPS equipment.* IFG procedures depict GPS waypoints with a green triangle. GPS waypoints include the 18 DME **corridor call points** (J, K, L, M, N); the 12 DME **corridor entry/exit points** (B, C, D, E, F); the **DME arc reporting points** (T, U, V, W, X, Y, Z); and the **corridor recovery points** (02623, 05628, 08628, 13428, 16424, 16428).

02623. [PUB 026° radial at 23 DME]

05628. [PUB 056° radial at 28 DME]

08628. [PUB 086° radial at 28 DME]

13428. [PUB 134° radial at 28 DME]

16424. [PUB 164° radial at 24 DME]

16428. [PUB 164° radial at 28 DME]

A. [N 38° 06.836' W 104° 32.412'] The PUB 193° radial at 12 DME. (Pronounced “point Alpha.”)

B. [N 38° 05.666' W 104° 24.936'] The **corridor entry/exit point** for the Bravo Corridor, located on the PUB 164° radial at 12 DME. (Pronounced “point Bravo.”)

BEND. [N 38° 14.350' W 104° 23.340'] The intersection of Business 50 and Grant Road, located 1.9 nm west of DALE and 2.1 nm south of YARD. BEND is located near the middle of a prominent jog in Business 50 near the confluence of Sixmile Creek and the Arkansas River.

BLSTR. [N 38° 15.188' W 104° 20.583'] The tip of a sharp bend in the Arkansas River directly north of DALE. (Pronounced “blister.”)

BRIDG. [N 38° 22.51' W 104° 37.18'] The Interstate 25 bridges that cross Porter Creek. BRIDG is 7.6 nm northwest of KPUB and 2.9 nm west of the 960-ft TV antenna. **BRIDG is an arrival control point.** (Pronounced "bridge.")

C. [N 38° 07.592' W 104° 17.469'] The **corridor entry/exit point** for the Charlie Corridor, located on the PUB 134° radial at 12 DME. (Pronounced “point Charlie.”)

CALHN. [N 38° 38.1912' W 104° 39.1229'] The Calhan Reservoir, located 5.5 nm east of Butts Army Airfield. CALHN is located outside the KFCS Class D airspace and outside the 10 nm shelf of the Colorado Springs Class C airspace.

CHEEK. [N 38° 24.9711' W 104° 30.4988'] Located on the PUB 320° radial at 8.2 DME, CHEEK defines the 320° radial intercept point to ensure that Pueblo North Departures to Butts have adequate lateral separation from the 960-ft TV antenna.

CO80. [N 38° 4.3490' W 104° 2.7392'] Fowler Airport, located 25 nm east of KPUB, and 3.9 nm south of Highway 50.

CO90. [N 38° 45.5162' W 104° 18.0369'] Bullseye Auxiliary Airfield, located 29.6 nm north of KPUB.

COVE. [N 38° 14.807' W 104° 45.910'] The southern tip of Rock Creek Cove (skier's cove), which is the southernmost arm of the Pueblo Reservoir, located directly across the reservoir from the north shore marina.

CREEK. [N 38° 07.270' W 104° 06.810'] The intersection of Chicosa Creek and the Rocky Ford Highline Canal, located 4.5 nm west of CO80 (Fowler Airport). CREEK is located at the southern tip of a prominent peninsula of agricultural land bounded on the south side by this canal.

CRWFT. [N 38° 43.08' W 104° 46.66'] A bridge 2.5 miles northwest of KFCS and 1.5 miles east of the Fort Carson golf course where several roads converge from the south. Butts tower may use the crow's foot as a visual reference point. (Pronounced "crow's foot.")

D. [N 38° 15.793' W 104° 10.714'] The *corridor entry/exit point* for the Delta Corridor, located on the PUB 086° radial at 12 DME. (Pronounced "point Delta.")

DALE. [N 38° 14.190' W 104° 20.990'] The intersection of Business 50 and Avondale Blvd, near the Avondale town center. DALE is located directly south of the Chemical Depot south gate. DALE is 7.6 nm east of KPUB. *DALE is an arrival control point.*

DRAKE. [N 38° 36.4009' W 104° 24.8530'] A reporting point for Bullseye arrivals, DRAKE is located 10 miles southwest of CO90 on the PUB 349° radial at 18.7 DME.

E. [N 38° 21.970' W 104° 11.563'] The *corridor entry/exit point* for the Echo Corridor, located on the PUB 056° radial at 12 DME. (Pronounced "point Echo.")

E04. [N 38° 03.943' W 104° 00.083'] The pattern entry point for Runway 4 at CO80 (Fowler Airport). E04 is the tip of a talon-shaped bend in the Rocky Ford Highline Canal located 1/2 mile east of the Arnold and Harriman Ranch. E04 is located approximately 2 miles east of CO80 (Fowler Airport). (Pronounced "Entry Runway Four.")

E08J. [N 38° 4.446' W 103° 29.325'] The pattern entry point for Runway 8 at KLHX (La Junta Municipal airport). E08J is located two miles from the airfield and begins the 45° entry leg to midfield downwind.

E11. [N 38° 26.562' W 105° 04.340'] The pattern entry point for Runway 11 at 1V6 (Fremont County Airport). E11 is located just south of CR-123 and begins the 45° entry leg to midfield downwind.

E12. [N 38° 04.685' W 104° 00.193'] The pattern entry point for Runway 12 at CO80 (Fowler Airport). E12 is a large pole barn located 2 miles east of CO80, near a bend in County Road 4, north of the Apishapa River. (Do not confuse this with a smaller barn south of the river.) E12 is located 1 nm north-northeast of the Arnold and Harriman Ranch stockyards. (Pronounced "Entry Runway One-Two.")

E12J. [N 38° 3.477' W 103° 28.097'] The pattern entry point for Runway 12 at KLHX (La Junta Municipal airport). E12J is located two miles from the airfield and begins the 45° entry leg to midfield downwind.

E17. [N 38° 44.54' W 104° 20.14'] The pattern entry point for Rwy 17 at CO90 (Bullseye Auxiliary Airfield). E17 lies in a direct line between SQURL and midfield downwind in the CO90 traffic pattern. E17 is located 2 miles from the airfield and 1.5 miles from midfield downwind. (Pronounced "Entry Runway One-Seven.")

E22. [N 38° 02.311' W 104° 02.473'] The pattern entry point for Runway 22 at CO80 (Fowler Airport). E22 is the intersection of County Road 2 and a dirt road that leads to the Arnold and Harriman Ranch Stockyards. (Pronounced "Entry Runway Two-Two.")

E26J. [N 38° 1.319' W 103° 31.999'] The pattern entry point for Runway 26 at KLHX (La Junta Municipal airport). E26J is located two miles from the airfield and begins the 45° entry leg to midfield downwind.

E29. [N 38° 24.851' W 105° 08.330'] The pattern entry point for Runway 29 at 1V6 (Fremont County Airport). E29 is located just north of the Arkansas River and east of the bluff. E29 begins the 45° entry leg to midfield downwind.

E30. [N 38° 06.320' W 104° 02.465'] The pattern entry point for Runway 30 at CO80 (Fowler Airport). E30 is the intersection of County Road 2 and County Road JJ.5, located approximately 2 miles north of CO80 (Fowler Airport). (Pronounced "Entry Runway Three-Zero.")

E30J. [N 38° 2.719' W 103° 32.795'] The pattern entry point for Runway 30 at KLHX (La Junta Municipal airport). E30J is located two miles from the airfield and begins the 45° entry leg to midfield downwind.

E35. [N 38° 46.6796' W 104° 19.9689'] The pattern entry point for Rwy 35 at C090 (Bullseye Auxiliary Airfield). E35 is a cattle watering hole located 2 miles northwest of the airfield and 1.5 miles from midfield downwind. (Pronounced "Entry Runway Three Five.")

F. [N 38° 26.998' W 104° 16.189'] The *corridor entry/exit point* for the Foxtrot Corridor, located on the PUB 026° radial at 12 DME. (Pronounced "point Foxtrot.")

G. [N 38° 29.2486' W 104° 21.7564'] The PUB 002° radial at 12 DME. (Pronounced "point Golf.")

GLFCS. [N 38° 43.35' W 104° 48.50'] The Fort Carson golf course, located 3.5 miles northwest of KFCS. Butts Tower may use this golf course as a holding point or reporting point. (Pronounced "golf course.")

GULLY. [N 38° 20.001' W 104° 32.087'] A fan-shaped gully located 3.2 nm northwest of KPUB. GULLY lies along the Rwy 8L/R 90-to-initial track, but .6 nm north of the T in the powerlines. GULLY is 2.2 nm directly west of SILO and .6 nm east of the Baculite Mesa.

HUNTR. [N 38° 08.934' W 104° 04.317'] A point on the ATSF railroad tracks 2.5 nm west of the town of Fowler, and 4.8 miles northwest of the Fowler Airport, where the railroad tracks converge with the Arkansas River on the north, and Highway 50 on the south. HUNTR is also abeam CREEK and is located at the confluence of Chicosa Creek and the Arkansas River. The short (1 mile long) east-west segment of Highway 50 that lies between HUNTR and the town of Fowler can be seen from a distance when flying a Pueblo East Departure. (Pronounced "hunter.")

J. [N 37° 59.661' W 104° 24.515'] The PUB 164° radial at 18 DME. *J is a corridor call point.* (Pronounced "point Juliette.")

K. [N 38° 02.544' W 104° 13.325'] The PUB 134° radial at 18 DME. *K is a corridor call point.* (Pronounced "point Kilo.")

KAYAK. [N 38° 11.820' W 104° 11.230'] A point on the Arkansas River 10 nm northwest of Fowler Airport, abeam the crop circle in area 7.

KAYLR. [N 38° 33.15' W 104° 38.87'] The intersection of I-25 and Boca Raton Blvd, the continuation of Peacepipe Heights Road, which runs along the north edge of the landfill just west of I-25.

KTANA. [N 38° 31.9444' W 104° 34.9869'] The PUB 320° radial at 16 DME, KTANA is the intersection of the PUB 320° radial and the KFCS Rwy 13/31 extended runway centerline. (Pronounced "katana.")

L. [N 38° 14.849' W 104° 03.193'] The PUB 086° radial at 18 DME. *L is a corridor call point.* (Pronounced "point Lima.")

LOT. [N 38° 14.710' W 104° 32.020'] The intersection of Business 50 and 27th Lane. There is a large parking lot adjacent to and southeast of this intersection. The location of LOT can be approximated from a distance by tracing a line from the powerlines directly south to Business 50.

M. [N 38° 24.113' W 104° 04.403'] The PUB 056° radial at 18 DME. *M is a corridor call point.* (Pronounced "point Mike.")

MUVI. [N 38° 14.5877' W 104° 33.8692'] The Mesa Drive-In Movie Theater, located just south of Business 50 on 20th Lane. MUVI is 1.5 miles west of LOT. (Pronounced "movie.")

N. [N 38° 31.671' W 104° 11.368'] The PUB 026° radial at 18 DME. *N is a corridor call point.* (Pronounced “point November.”)

O. [N 38° 35.5269' W 104° 19.5807'] The PUB 002° radial at 18.5 DME. (Pronounced “point Oscar.”)

PIPE. [N 38° 16.440' W 104° 27.040'] A point on Highway 50 aligned with 37th Lane. The groundtrack from VINE through PIPE passes just west of the semi-circular fence line that borders the Colorado Interstate Gas Company’s Devine Station.

PLANT. [N 38° 12.470' W 104° 34.530'] The Comanche Power Plant, located 8.6 miles southwest of KPUB.

POND. [N 38° 19.083' W 105° 04.393'] A small reservoir located between Mineral Creek and Hardscrabble Creek, 2.5 miles southeast of the Federal Correctional Complex.

PUBXO. [N 38° 23.2541' W 104° 30.4313'] PUBXO is a GPS waypoint located on the Pueblo Rwy 35 extended runway centerline, 5 nm north of the departure end of Rwy 35. (Pronounced “Pub-Koh.”)

PWRPL. [N 38° 38.01' W 104° 42.47'] A power plant located 3.5 miles southeast of KFCS, inside the Class D airspace. Butts Tower may use this power plant as a holding point or reporting point. (Referred to by ATC as “the power plant.”)

PYRO. [N 38° 18.826' W 104° 21.003'] PYRO is the southwest corner of a square U-shaped road that lies along the west edge of the railroad tracks in the Pueblo Chemical Depot, near the center of NSA0015. PYRO is located immediately northwest of the southernmost loading dock on the tracks.

RANCH. [N 38° 28.520' W 104° 36.900'] A point on I-25 located 12 nm northwest of KPUB, and PUB 14 DME. RANCH is just south of Young Hollow Rd and can be visually identified by the ranch house on the east edge of the freeway.

SILO. [N 38° 20.0287' W 104° 29.2313'] A large silo located 2.5 miles north of KPUB and 2.2 nm directly east of GULLY.

SLIDR. [N 38° 39.53' W 104° 41.98'] A point on I-25 located between the KFCS and the Calhan Reservoir.

SLUDG. [N 38° 18.822' W 104° 40.600'] A waste treatment facility that lies just south of Highway 50 and directly north of the Pueblo Motorsports Park drag racing strip. SLUDG is 8.6 nm directly west of KPUB. From COVE track toward the mushroom-shaped water tank north of Dillon Drive until crossing SLUDG. *SLUDG is an arrival control point.* (Pronounced “sludge.”)

SQURL. [N 38° 41.6395' W 104° 24.5961'] The PUB 349° radial at 24 DME, SQURL is the intersection of V389 and Squirrel Creek Road. (Pronounced “squirrel.”)

STANO. [N 38° 19.3387' W 104° 49.8215'] STANO is located on the PUB 262° radial at 19 DME. STANO is a turn point that begins the Fremont Arrival procedures. (Pronounced “Stan-Oh.”)

SULFR. [N 38° 22.187' W 104° 22.282'] SULFR is the intersection of the D.O.T. Road and a ridgeline that runs along the western border of the Chemical Depot. Approaching SULFR inbound, look for two large deciduous trees on each side of the road near the ridgeline. SULFR is 7.6nm from KPUB. *SULFR is an arrival control point.* (Pronounced “sulfur.”)

T. [N 38° 34.4464' W 104° 15.8411'] The PUB 012° radial at 18.5 DME. *T is a DME arc reporting point.* (Pronounced “point Tango.”)

U. [N 38° 32.4558' W 104° 11.6210'] The PUB 024° radial at 18.5 DME. *U is a DME arc reporting point.* (Pronounced “point Uniform.”)

UKLID. [N 38° 10.265' W 104° 27.597'] The intersection of 36th Lane and Fields Road (CR-320). A ranch access road also joins this intersection from the southeast. The groundtrack from C direct UKLID approximately follows Fields Road along the north shore of Huerfano Lake. UKLID is 7.3nm from KPUB. *UKLID is an arrival control point.*

V. [N 38° 28.8094' W 104° 6.9893'] The PUB 040° radial at 18.5 DME. *V is a DME arc reporting point.* (Pronounced “point Victor.”)

VAPR. [N 38° 36.78' W 104° 42.90'] The southern tip of a grid of 9 sewage disposal ponds located at the edge of the KFCS Class D airspace. VAPR is located 1.3 nm south of PWRPL. (Pronounced “vapor.”)

VENOM. [N 38° 37.5121' W 104° 19.1965'] The PUB 002° radial at 20.5 DME. Venom is located just west of the USAFA Love Corridor and 2 nm prior to point O on the Bullseye Departure.

VINE. [N 38° 14.710' W 104° 27.010'] The intersection of Business 50 and 37th Lane. VINE is 1.7 nm south of PIPE. The location of VINE can be approximated from a distance by tracing a line from PIPE directly south to Business 50.

W. [N 38° 13.151' W 103° 56.488'] The PUB 088° radial at 23.5 DME. *W is a DME arc reporting point.* (Pronounced “point Whiskey.”)

WELL. [N 38° 44.1881' W 104° 16.9311'] Located on the PUB 002° radial at 27.4 DME, WELL is a cattle watering hole located 1.5 miles southeast of CO90. WELL controls the departure track and 002° radial intercept to ensure adequate lateral separation from Rwy 35 final approach.

X. [N 38° 08.444' W 103° 58.331'] The PUB 100° radial at 23.5 DME. *X is a DME arc reporting point.* (Pronounced “point X-ray.”)

Y. [N 38° 01.606' W 104° 03.989'] The PUB 120° radial at 23.5 DME. *Y is a DME arc reporting point.* (Pronounced “point Yankee.”)

YARD. [N 38° 16.450' W 104° 23.350'] A bend in a dike that lies approximately 1/2 mile north of Highway 50, midway between Highway 50 and a large T-shaped cattle stockyard. YARD is 2.1 nm directly north of BEND, and 2.1 nm directly west of the south entrance to the Pueblo Chemical Depot.

Z. [N 37° 58.398' W 104° 08.652'] The PUB 132° radial at 23.5 DME. *Z is a DME arc reporting point.* (Pronounced “point Zulu.”)

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APPENDIX F: RADIO COMMUNICATIONS

SECTION 1: GENERAL

1.1 PHRASEOLOGY

- (a) **Standard and Non-standard Phraseology.** In order to ensure compliance with FAA regulations and letters of agreement with ATC facilities, IFS aircraft will use the communications procedures and standard phraseology for situations defined in this appendix. For undefined situations, reduce the chance of miscommunication by using common terminology from this appendix, the AIM, and the FAA Pilot/Controller Glossary. Or, use plain English if necessary. The following general structure can be used to form a proper radio call:
- (1) Address who you are calling
 - (2) State who you are
 - (3) State what you are doing and/or what you want
- (b) **Concise Communications.** Use the radio for *required* communications only, and be as concise as possible while still providing enough information to avoid misunderstanding. Pilot and controller situational awareness can be degraded by radio frequency congestion, which can lead to excessive delays or omissions in required communications. The following guidelines can help you avoid unnecessarily tying up the frequency:
- (1) When practical and permitted, respond to informational radio calls with your *callsign only*.
 - (2) When practical and permitted, respond to simple ATC instructions with your *callsign + wilco*.
 - (3) If you need to speak to the SOF for more than a few seconds, request a frequency change to 122.77.
 - (4) Avoid all non-essential dialogue on the radio with other pilots or controllers.
 - (5) Include all required information in your radio call so the controller does not need to request additional information from you.
 - (6) Avoid behaviors that force a controller to repeat transmissions (e.g., delaying your response to a radio call; stepping on a dialogue in progress between the controller and another aircraft; releasing the microphone before your call is complete and then re-keying it to step on the controller's response).
 - (7) Instructors can help ATC avoid time-consuming repetition and corrections by keying the microphone just as the student releases it with the word "Correction" followed by the correct information.
- (c) **Reading Back ATC Clearances and Instructions.** To "read back" an ATC clearance or instruction means to *state your full callsign and then repeat the information in the same sequence it was received*. However, *readback does not have to be verbatim* unless specifically required (e.g., ATIS may direct verbatim readback of certain items.) Your read back provides an opportunity for mutual verification with the controller. Always read back the following items:
- (1) Items specifically designated for readback in this appendix.
 - (2) Taxi clearances, including the assigned runway, taxi routing, and runway crossings.
 - (3) Hold short instructions, including runway designator.
 - (4) Takeoff and landing clearances, including runway designator.
 - (5) Heading assignments.
 - (6) Altitude assignments or restrictions.
 - (7) Altimeter settings, if issued to you specifically
 - (8) Any additional items that you believe require verification (e.g., suspicion that you may have misunderstood the clearance or instruction, or that the controller may have misspoken or omitted information). It is common practice to use the words "Understand," "Confirm," or "Verify" followed by the suspect information when you want to highlight or specifically request confirmation of that information with the controller.
 - (9) Use the word "**blocked**" to advise a controller that a transmission was unintelligible due to a simultaneous transmission on the same frequency.

(10) Use the phrase “*say again*” to request repetition of the entire transmission or a specific part of the transmission.

- (d) **Responding to Traffic Advisories.** Use the phrase “*negative contact*” to indicate that you are not in visual contact with the traffic in question. Use the phrase “*traffic in sight*” to indicate that you see the issued traffic and will maintain visual separation.

NOTE: a “traffic in sight” reply to ATC must be based on seeing an aircraft with your eyes (not merely on the TAS).

CAUTION: never use the non-standard phrase “traffic not in sight” (incorrect), because the controller can easily mistake this for the standard phrase that has exactly the opposite meaning.

- (e) **Callsigns.** *Verify your callsign on the sign-out sheet at the Duty Desk immediately prior to flight.* Always use a callsign that is appropriate for your sortie profile. NOTE: the letter “X” in the following examples represents a number 0-9. Pronounce the leading zero in a callsign (e.g., “Tiger-Zero-Three”).

- (1) **Tiger XX.** All aircraft with an instructor on board will use the “Tiger” callsign for all local profiles, VNAV routes, and standard XC routes. Use the corresponding 45XX series beacon code only as specified in the IFG departure/arrival procedures.
- (2) **Kitty XX.** Student solos will generally use a “Kitty” callsign for all pattern solos, Area solos, VNAV solos, and XC solos. Use the corresponding 45XX series beacon code only as specified in the IFG departure/arrival procedures.
- (3) **Tiger XX solo.** Student pattern solos at KFCS will use a “Tiger XX solo” callsign and the corresponding 45XX series beacon code, or as directed by ATC. A “Tiger XX solo” callsign may also be used by solo aircraft on a contingency basis for other profiles if all available Kitty callsigns are currently being used.
- (4) **Katana 9XXDA.** When operating outside the local flying area (i.e., not on a local profile, VNAV route, or standard XC route), IFS aircraft should identify themselves as “Katana” followed by the registration N-number (e.g., “Katana 948DA”). Use your full callsign with each controller until that specific controller abbreviates it (e.g., “8DA”). State aircraft type and equipment as “DV20/U” if requested by ATC or FSS.

- (f) **Radar Beacon Codes at Pueblo**

- (1) If departing Pueblo, squawk the assigned 45XX code once cleared onto the active runway (Before Takeoff checklist item).
- (2) If doing pattern work prior to departure, squawk 1200 once cleared onto the active runway (Before Takeoff checklist item). On the downwind leg of the final pattern, squawk the assigned 45XX code and add departure intentions to your radio call reporting base.
- (3) Pueblo arrivals to a full stop remain on 45XX code until after landing.
- (4) Pueblo arrivals continuing with pattern work squawk 1200 on upwind after first touch-and-go, low approach, or stop-and-go.

1.2 RADIO FREQUENCIES AND VOLUMES

- (a) **Radio Frequency Management**

- (1) **GNS 430.** Comm1 is generally used for communications with ATC, CTAF, FSS, and Flight Watch. The GNS 430 is also used for monitoring the voice channel of a VOR frequency.

- (2) Comm2 is generally used for required monitoring company frequencies (123.3 and 122.77), and also for receiving ATIS/ASOS/AWOS broadcasts.

NOTE: the “MON” function on the Comm 2 radio allows you to monitor the standby frequency, which will automatically cut out while a transmission is being received on the active frequency.

TECHNIQUE: monitoring the Denver Approach frequency is not specifically required during area work (until communicating with Approach for a Pueblo Arrival procedure inbound). However, the PIC may choose to monitor the Approach frequency if desired.

- (b) **Volume and Squelch Control.** Several common communications errors can be avoided through proper use of the volume and squelch controls:

- (1) Set the Comm1 volume to the 2 O’clock position (as you listen to that frequency) as a baseline to then set up your intercom and headset volumes.
- (2) Learn how to properly adjust the ICS VOX intercom squelch on your side of the audio panel.
- (3) Do not transmit on a frequency until the volume is set loud enough to hear an immediate response.
- (4) If receiving transmissions over a VOR frequency, remember to set the VLOC volume and select the NAV 1 button on the audio panel.
- (5) When monitoring a frequency on a second radio, set the volume of the monitored frequency significantly lower than the active frequency to avoid missing essential transmissions on the active frequency.
- (6) During traffic pattern operations, the volume of a monitored frequency should be turned down sufficiently (all the way if necessary) to avoid distraction.
- (7) The Comm2 volume knob has no markings, so you need to deactivate the squelch while setting the volume (unless a transmission is currently being received on that frequency).

CAUTION: turning down the Comm2 volume without actually hearing the change may result in setting the volume below audible levels, and this can result in missing essential communications.

SECTION 2: RADIO COMMUNICATIONS GLOSSARY

This section defines common terminology used by IFS aircraft when communicating with ATC, other aircraft, and the SOF.

ABEAM. An aircraft is “abeam” something when it is approximately 90 degrees to the right or left of the aircraft *track*.

ACKNOWLEDGE. Let me know that you have received my message.

AFFIRMATIVE. Yes.

APRON LOCATION POINT. At KPUB, designated points inside the non-movement area marked with a blue rectangle with a white alphanumeric designator (e.g., 1E and 1W).

ARRIVAL CONTROL POINT. A point in the Doss local flying procedures (e.g., UKLID) prior to which the approach controller will provide basic radar service before inbound aircraft terminate with Denver and contact Pueblo Tower.

ASSIGNED (BEACON) CODE. A pre-assigned (45XX series) radar beacon code as determined by Denver TRACON in a Letter of Agreement with Doss for local area use only. The complete list of assigned codes is included in the IFG. An instruction to squawk the “assigned code” refers to the assigned 45XX series code.

ATC CLEARANCE/INSTRUCTION. An authorization or directive issued by air traffic control for an aircraft to proceed under specified traffic conditions within controlled airspace (e.g., “cleared to land,” “east departure approved,” “descent approved,” etc.), or for the purpose of requiring a pilot to take specific actions (e.g., “Turn left heading two five zero,” “Go around,” or “Clear the runway”). The pilot-in-command of an aircraft may not deviate from the provisions of an air traffic clearance except in an emergency or unless an amended clearance has been obtained. Pilots are responsible to request clarification or amendment, as appropriate, any time an ATC clearance/instruction is not fully understood or is considered unacceptable for safety reasons. “The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft” (14 CFR § 91.3a).

AUTO-TERMINATION POINT. A point designated in a Letter of Agreement and in the IFS Local Flying Procedures where radar service is automatically terminated with the current radar control facility (i.e., Denver TRACON or Colorado Springs TRACON). In some cases auto-termination may require changing the transponder code, and in other cases the aircraft remains on the same code. Some auto-terminate points involve an automated handoff from one ATC facility to the next facility, but some do not. Auto-termination always involves a frequency change to contact the next controller or advisory frequency. Advise ATC if unable to follow the published auto-termination procedure at the designated point (e.g., due to weather/non-standard routing).

BACK-TAXI. A term used by air traffic controllers to taxi an aircraft on the runway opposite to the traffic flow. The aircraft may be instructed to back-taxi to the beginning of the runway or at some point before reaching the runway end for the purpose of departure or to exit the runway.

BASE. When used concerning the traffic pattern, the word refers to the 180° “base turn” that connects the inside downwind leg and final approach (e.g., “Tiger 25, extend downwind, I’ll call your base” or “Tiger 25, square your base turn for spacing”).

BLOCKED. Phraseology used to indicate that a radio transmission has been distorted or interrupted due to multiple simultaneous radio transmissions.

BLUE LINE. At KPUB, the taxi lane on the Pueblo main ramp extending between Apron Location Points 1W and 1E.

BREAK. When used concerning the traffic pattern, the word refers to the 180° “break turn” that connects initial and the inside downwind leg. ATC will specify a break point if non-standard. Pilots may also be instructed to “report the break” in some cases (non-standard).

CLASS D AIRSPACE. Controlled airspace surrounding a Class D airport with an operational control tower (e.g., Pueblo and Butts). Class D airspace is charted on the TAC, IFG, and local area map. The Pueblo Class D airspace extends upward from the surface to and including 7,200 feet MSL within a 5.6 mile radius of the Pueblo Memorial Airport. Unless otherwise authorized, each person must establish two-way radio communication with the ATC facility providing air traffic services prior to entering the Class D airspace and thereafter maintain those communications while in the airspace.

CLEAR OF THE RUNWAY. A pilot or controller may consider an aircraft that is exiting or crossing a runway to be clear of the runway when all parts of the aircraft are beyond the runway edge and there are no restrictions to its continued movement beyond the applicable runway holding position marking.

CLEARED FOR TAKEOFF. ATC authorization for an aircraft to depart.

CLEARED FOR THE OPTION. ATC authorization for an aircraft to make a touch-and-go, low approach, missed approach, stop-and-go, or full stop landing at the discretion of the pilot. (Stop-and-go prohibited for Doss aircraft.)

CLEARED STOP-AND-GO. ATC authorization for an aircraft to make a stop-and-go landing (i.e., to bring the aircraft to a stop on the runway, and then perform a takeoff run beginning from that location on the runway).

CLEARED TO LAND. ATC authorization for an aircraft to land (i.e., full-stop landing only).

CLEARED TOUCH-AND-GO. ATC authorization for an aircraft to make a touch-and-go landing (i.e., to land and take off on the designated runway without stopping or exiting the runway).

CLOSED TRAFFIC. Successive operations involving takeoffs and landings or low approaches where the aircraft does not exit the traffic pattern. Continuous closed traffic is automatically approved for aircraft in the Pueblo, Butts, or Colorado Springs traffic pattern, unless specifically restricted by the Tower.

COLORADO SPRINGS DEPARTURE/APPROACH. For aircraft receiving radar services north of the Pueblo terminal area, Colorado Springs Departure/Approach controls the airspace utilized when transitioning between Pueblo and Butts/Bullseye.

COMPANY. Used by ATC when issuing traffic if the aircraft in question is another Doss aircraft.

CONTACT. Establish communication with (followed by the name of the facility and, if appropriate, the frequency to be used).

CORRECTION. An error has been made in the transmission, and the correct version follows.

CORRIDOR CALL POINT. A point designated in each of the Doss arrival corridors at PUB 18 DME where pilots proceeding inbound from the outer areas (12 – 27) establish radio contact with the approach controller.

CROSS (POINT) AT (ALTITUDE). Used by ATC when a specific altitude restriction at a specified point is required.

CROSS (POINT) AT OR ABOVE (ALTITUDE). Used by ATC when an altitude restriction at a specified point is required. It does not prohibit the aircraft from crossing the point at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment.

CROSS (POINT) AT OR BELOW (ALTITUDE). Used by ATC when a maximum crossing altitude at a specific point is required. It does not prohibit the aircraft from crossing the point at a lower altitude.

CROSSWIND. At any airfield used in the IFS program, the word means “closed turn” or “crosswind leg” (FAA equivalent to the closed turn). This term is used by Pueblo Tower, Butts Tower, and at all public non-towered airfields to refer to the closed turn. Non-Doss aircraft in the pattern will generally fly a wings-level crosswind leg rather than a continuous turn. Pueblo Tower will use this term when issuing traffic (e.g., “break to follow company ahead turning crosswind”) or when directing a pilot to turn closed (e.g., to an aircraft on extended upwind, “start your crosswind”).

DENVER DEPARTURE/APPROACH. For aircraft receiving radar services in the Pueblo terminal area, Denver Departure/Approach controls the airspace below 12,000 MSL outside the Class D airspace, and within the Class D airspace above 6,500 MSL. Denver Departure/Approach control is operated out of the Denver Terminal Radar Approach Control (TRACON) facility in Denver, Colorado.

DIRECT. Straight line flight between two points.

DISCRETE CODE. Any one of the 4096 selectable Mode 3/A aircraft transponder codes except those ending in zero zero (e.g., 4525). Nondiscrete codes are normally reserved for other purposes such as emergencies (7700), radio failure (7600), or VFR aircraft (1200).

DISREGARD. My last transmission was made in error, so disregard it. For example, ATC may say “disregard” after addressing the wrong aircraft in a transmission. A pilot may say “disregard” after transmitting on the wrong frequency, or when the transmission was erroneous or misleading.

DOWNWIND. When used concerning the traffic pattern, the word generally refers to the *inside* downwind leg, which is the traffic pattern leg that immediately precedes “base turn” and “final approach.” (Reference to the “outside downwind” should include the word “outside” to distinguish it from the inner circuit.)

DV20/U. The FAA type designator and equipment code for Doss DA20-C1 aircraft used by ATC and FSS.

EMERGENCY. A distress or an urgency condition.

ENTERING. Currently crossing the vertical or lateral boundary of a defined airspace, training area, etc.

ESTABLISHED. To be stable or fixed on a specified route, corridor, altitude, heading, etc.

EXPEDITE. Used by ATC when prompt compliance is required to avoid the development of an imminent situation.

EXTEND DOWNWIND. Used by ATC to delay the base turn, usually to build spacing in the pattern. This instruction may be accompanied by a specific distance to extend downwind, or a notification that the tower controller “will call your base.” Pilots shall apply proper wind drift correction to maintain at least 1/2 mile lateral displacement from the extended runway centerline (or final approach course) when flying an extended downwind track.

FINAL. When used concerning the traffic pattern, the word means “final approach leg” (e.g., “Tiger 25, cleared to land runway 26L, number 2, following Cessna on short final.”) Commonly used to mean that an aircraft is on the final approach course or is aligned with the intended landing area.

FIRST TIER AREAS. Doss training areas located between 12 and 18 DME. Includes areas numbered 1 through 11.

FLY HEADING (DEGREES). Informs the pilot of the heading he/she should fly. The pilot may have to turn to, or continue on, a specific compass direction in order to comply with the instructions. The pilot is expected to turn in the shorter direction to the heading unless otherwise instructed by ATC.

FOLLOW. Used by ATC to instruct a pilot to follow a specific aircraft in the departure/arrival sequence or during pattern operations (e.g., “Tiger 25, break to follow Cessna midfield downwind, report traffic in sight”).

GO AHEAD. Proceed with your message. (Not to be used for any other purpose.) For example, you call the SOF to relay a PIREP with the initial call, “Fur Ball, Tiger 25, PIREP” to which the SOF might reply, “Tiger 25, Go ahead.”

GO AROUND. Instructions for a pilot to abandon his/her approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, VFR aircraft are expected to overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg (i.e., closed turn). EXCEPTION: Doss aircraft conducting a go-around at KPUB may need to temporarily level off over the runway prior to reaching pattern altitude in accordance with the IFS Local Flying Procedures.

HOLD SHORT (OF) _____. ATC instruction for the pilot to stop the aircraft prior to the location specified and await further clearance before proceeding (e.g., “turn left on Alpha Six, hold short of runway 26L,” “turn right on runway 17, hold short of Taxiway Alpha,” or “taxi to runway 26R, hold short of runway 26L”).

HOLD YOUR POSITION. Stop where you are and hold there until receiving further instructions.

HOW DO YOU HEAR ME? A question relating to the quality of the transmission or to determine how well the transmission is being received.

I SAY AGAIN. The message will be repeated.

IDENT. A request for a pilot to activate the transponder identification feature. Press the IDENT button once on the transponder.

IMMEDIATELY. Used by ATC or pilots when such action compliance is required to avoid an imminent situation.

INTERSECTION DEPARTURE. A departure from any runway/taxiway intersection other than the end of the runway.

INITIAL. When used concerning the traffic pattern, the word means “initial approach” and refers to the first leg of the overhead pattern. An aircraft established on initial tracks the extended runway centerline. Doss aircraft will report initial on the Pueblo Tower frequency one nautical mile prior to the runway landing

threshold, regardless of whether instructed to do so by ATC, and regardless of whether descent to pattern altitude has already been approved.

JET BLAST. Jet engine exhaust (thrust stream turbulence).

JOIN THE CORRIDOR. Intercept and maintain the centerline of the adjacent corridor until crossing the corridor exit point at 12 DME.

KNOWN TRAFFIC. With respect to ATC clearances, means aircraft whose altitude, position, and intentions are known to ATC.

LAND AND HOLD SHORT OPERATIONS. Operations which include simultaneous takeoffs and landings and/or simultaneous landings when a landing aircraft is able and is instructed by the controller to hold short of the intersecting runway/taxiway or designated hold-short point. Pilots are expected to promptly inform the controller if the hold short clearance cannot be accepted. (Solo students and MFIs cannot accept LAHSO clearances.)

LANDING DISTANCE AVAILABLE. The length of runway which is declared available and suitable for the ground run of an airplane landing.

LANDING ROLL. The distance from the point of touchdown to the point where the aircraft can be brought to a stop or exit the runway.

LINE UP AND WAIT. Used by ATC to inform a pilot to taxi onto the specified departure runway in takeoff position and hold until receiving takeoff clearance. It is not authorization for takeoff. It is used when takeoff clearance cannot immediately be issued due to traffic or other reasons.

LOW APPROACH. An approach that terminates with a planned go-around prior to touchdown.

MAYDAY. The international radiotelephony distress signal. When repeated three times, it indicates imminent and grave danger and that immediate assistance is requested.

MAINTAIN. Concerning altitude, the term means to remain at the altitude specified. The phrase “climb and” or “descend and” normally precedes “maintain” and the altitude assignment (e.g., “descend and maintain 5,500”). Concerning other ATC instructions, the term is used in its literal sense (e.g., maintain VFR).

MAKE LEFT/RIGHT THREE-SIXTY/TWO-SEVENTY. ATC instruction designed to achieve proper spacing during departure/arrival or pattern operations.

MAKE SHORT APPROACH. Used by ATC to inform a pilot to alter his/her traffic pattern so as to make a short final approach.

NEGATIVE. "No," or "permission not granted," or "that is *not* correct."

NEGATIVE CONTACT. Used by pilots to inform ATC that previously issued traffic is not in sight. This phrase may also be used when a pilot was unable to contact ATC on a particular frequency. **CAUTION:** do not use the phrase “traffic *not* in sight” (incorrect) because this is easily mistaken for the standard phrase “traffic in sight,” which means the opposite of “negative contact.” (See TRAFFIC IN SIGHT.)

NON-MOVEMENT AREAS. Taxiways and ramp areas not generally under ATC control (e.g., the Doss ramp, and the Pueblo main ramp). **EXCEPTION:** Doss aircraft taxi eastbound to Rwy 26L runup area via the Pueblo main ramp and remain under ATC control. However, ATC does not assume responsibility for your avoidance of vehicles, aircraft, and other hazards in the non-movement area.

NUMBER (LANDING SEQUENCE NUMBER). Added to a landing clearance to establish your position in the landing sequence. If you are “cleared to land, number three,” there are two aircraft ahead that you need to visually identify and follow with adequate spacing.

OBJECT-FREE AREA. At KPUB, the area between the dashed taxiway edge markings and the non-movement area boundary marking.

ON THE GO. Used by pilots to respond to a “go around” instruction from ATC, or to announce a pilot-initiated go-around in specific cases defined in the local flying procedures.

OFFSET. Used by ATC to direct a lateral offset from the runway centerline, or by pilots to request a lateral offset. Pilots must request and receive approval from the Tower to fly a lateral offset (e.g., “Tiger 25, on the go, request offset”), unless an immediate offset is required to maintain safety of flight.

OUTER AREAS. Doss training areas located between 19 and 28 DME. Includes areas numbered 12 through 27.

OVER. My transmission is ended, and I expect a response.

PILOT'S DISCRETION. When used in conjunction with altitude assignments, means that ATC has offered the pilot the option of starting climb or descent whenever he/she wishes and conducting the climb or descent at any rate he/she wishes. He/she may temporarily level off at any intermediate altitude. However, once he/she has vacated an altitude, he/she may not return to that altitude.

PILOT WEATHER REPORT (PIREP). A report of meteorological phenomena encountered by aircraft in flight.

PROCEED INBOUND. Proceed inbound to KPUB as specified in the published arrival procedure.

PUEBLO TOWER. Controls aircraft in the Pueblo Class D airspace.

RADAR CONTACT. Used by ATC to inform an aircraft that it is identified on the radar display and radar flight following will be provided until radar identification is terminated. Radar service may also be provided within the limits of necessity and capability.

RADAR CONTACT LOST. Used by ATC to inform a pilot that radar data used to determine the aircraft's position is no longer being received, or is no longer reliable and radar service is no longer being provided.

RADAR SERVICE TERMINATED. Used by ATC to inform a pilot that he/she will no longer be provided any of the services that could be received while in radar contact.

RADIAL. A magnetic bearing extending from a VOR/VORTAC/TACAN navigation facility.

READ BACK. Repeat my message back to me.

REPORT. Used to instruct pilots to advise ATC of specified information; e.g., "Report initial Runway 8R."

RESUME OWN NAVIGATION. Used by ATC to advise a pilot to resume his/her own navigational responsibility. It is issued after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored.

ROGER. I have received all of your last transmission. It should not be used to answer a question requiring a yes or a no answer. Doss pilots should normally state the callsign only in lieu of using the term "roger."

RUNWAY HEADING. When cleared to "fly/maintain runway heading," pilots are expected to fly/maintain the heading that corresponds with the extended centerline of the departure runway. Drift correction shall not be applied once the aircraft is beyond the departure end of the runway. EXCEPTION: Doss pilots shall not allow the aircraft to drift toward the extended centerline of the parallel runway at KPUB.

SAFETY ALERT. A safety alert issued by ATC to aircraft under their control if ATC is aware the aircraft is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions, or other aircraft. The controller may discontinue the issuance of further alerts if the pilot advises he/she is taking action to correct the situation or has the other aircraft in sight. A terrain/obstruction alert may be issued when you are at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain/obstructions (e.g., "Tiger 25, Low Altitude Alert, check your altitude immediately"). An aircraft conflict alert may be issued to de-conflict your flight path from an aircraft that is not under ATC control (e.g., "Tiger 25, Traffic Alert, advise you turn right heading zero niner zero or climb eight thousand immediately"). NOTE: the issuance of a safety alert is contingent upon the capability of the controller to have an awareness of an unsafe condition. The course of action provided will be predicated on other traffic under ATC control. Once the alert is issued, it is solely the pilot's prerogative to determine what course of action, if any, he/she will take.

SAY AGAIN. Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received (e.g., "Say again all after 'direct Pueblo VOR'").

SAY ALTITUDE. Used by ATC to ascertain an aircraft's specific altitude. When the aircraft is climbing or descending, the pilot should state the indicated altitude rounded to the nearest 100 feet.

SAY HEADING. Used by ATC to request an aircraft heading. The pilot should state the actual heading of the aircraft.

SPEAK SLOWER. Used in verbal communications as a request to reduce speech rate.

SQUAWK ____. Activate specific modes/codes/functions on the aircraft transponder (e.g., "Squawk one two zero zero," "Squawk VFR," "Squawk standby," or "Squawk your assigned code").

STAND BY. Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in "stand by for clearance." The caller should reestablish contact if a delay is lengthy. "Stand by" is not an approval or denial.

STRAIGHT-IN APPROACH (VFR). Entry into the traffic pattern by interception of the extended runway centerline (final approach course) without executing any other portion of the traffic pattern.

TAILWIND. Any wind more than 90 degrees to the longitudinal axis of the runway. The magnetic direction of the runway shall be used as the basis for determining the longitudinal axis.

TAKE-OFF DISTANCE AVAILABLE. The length of the take-off run available plus the length of the clearway, if provided.

THAT IS CORRECT. The understanding you have is correct.

TRAFFIC IN SIGHT. Used by pilots to inform a controller that previously issued traffic is in sight. A "traffic in sight" reply to ATC must be based on seeing an aircraft out the window, not on the TAS display. (See NEGATIVE CONTACT.)

TRAFFIC NO FACTOR. Indicates that the flight path of traffic described in a previously issued traffic advisory is no longer a potential conflict with your flight path.

TRANSITION. Used by ATC to instruct a pilot inbound to KPUB to transition to a runway other than the default runway for that arrival procedure.

TRANSMITTING IN THE BLIND. A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

UNABLE. Indicates inability to comply with a specific instruction, request, or clearance.

VECTOR. A heading issued to an aircraft to provide navigational guidance by radar.

VERIFY. Request confirmation of information (e.g., "verify assigned heading").

VISUAL SEPARATION. A means employed by ATC to separate aircraft. There are two ways to effect this separation: a) the tower controller sees the aircraft involved and issues instructions, as necessary, to ensure that the aircraft avoid each other; or b) a pilot sees the other aircraft involved and upon instructions from the controller provides his/her own separation by maneuvering his/her aircraft as necessary to avoid it. This may involve following another aircraft or keeping it in sight until it is no longer a factor.

WAKE TURBULENCE. Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.

WAYPOINT. A predetermined geographical position used to define routes, corridors, reporting points, etc.

WEATHER RECALL/DIVERT. An instruction issued by the SOF directing aircraft to immediately recover to KPUB or to divert to another specified airfield.

WHEN ABLE. When used in conjunction with ATC instructions, gives the pilot the latitude to delay compliance until a condition or event has been reconciled. Unlike "pilot discretion," when instructions are prefaced "when able," the pilot is expected to seek the first opportunity to comply. Once a maneuver has been initiated, the pilot is expected to continue until the specifications of the instructions have been met. "When able," should not be used when expeditious compliance is required.

WILCO. I have received your message, understand it, and will comply with it.

WIND CHECK. A phrase used in isolation by pilots (without addressing the tower or stating callsign) to request pattern wind condition.

WIND SHEAR. A change in wind speed and/or wind direction in a short distance resulting in a tearing or shearing effect. It can exist in a horizontal or vertical direction and occasionally in both. Use the wind shear reporting criteria in AIM 7-1-24 for PIREPs.

SECTION 3: GROUND OPERATIONS

3.1 TAXI TO THE RUNWAY

- (a) **TOWERED AIRFIELDS.** Request taxi clearance to the runway from the ground controller. From the Doss ramp, taxi clearance must be received prior to crossing the non-movement area boundary marking located outside the gate. From the Pueblo solo ramp, or from the parking area at Butts, request taxi after completing the runup checklist and before leaving the parking spot. The taxi request includes your intentions after takeoff (patterns, a specified departure procedure, or a pattern delay), which will also help the controller determine your runway assignment at Pueblo. Examples:

- *“Pueblo Ground, Kitty 57, solo ramp, information Whiskey, request taxi, patterns.”*
- *“Pueblo Ground, Tiger 05, Doss ramp, information Golf, request taxi, South Departure.”*
- *“Pueblo Ground, Tiger 22, Doss ramp, information Alpha, request taxi, patterns, South Departure.”* (Pattern delay.)
- *“Pueblo Ground, Tiger 43, Doss ramp, negative ATIS, request taxi, North Departure to Butts.”* (ATIS not received.)
- *“Pueblo Ground, Tiger 07, Rwy 26L runup area, request taxi Rwy 8R.”* (Due to an observed change in pattern wind condition, or a known runway change, this is a request to taxi to another runway.)
- *“Butts Tower, Tiger 05 Solo, parking ramp, information Whiskey, request taxi, patterns.”* (“Kitty” call sign not used at Butts.)
- *“Butts Tower, Tiger 05, parking ramp, information Yankee, request taxi, Butts Departure to Pueblo.”*

RESPONSE: the controller will respond by issuing taxi instructions, and you will read back those instructions, including any specified taxi routing and hold short instructions. Understand the following standard taxi instructions normally issued by Pueblo Ground to Doss aircraft requesting taxi from the Doss Ramp:

- **“RUNWAY 26L TAXI VIA 1 EAST CROSS RUNWAY 35”** – Phraseology giving Doss aircraft permission to taxi to Runway 26L via Taxiway C1, cross Runway 35, Taxiway D, ALP 1W, The Blue Line, ALP 1E, Runway 26L/26R Run-Up, Taxiway A, Hold short Runway 26L.

NOTE: Doss aircraft taxiing eastbound from 1W to 1E may cut the northwest corner of the Pueblo main ramp slightly as required by normal taxi speed, rather than remaining exactly on the 90 degree bend in the blue line. Likewise, Doss aircraft can angle away from the blue line into the OFA when taxiing eastbound for the the RWY 26L/R runup area as soon as they are past Twy A6.

NOTE: the ground controller may temporarily relocate the 26L/26R runup area to ALP 1E in order to ensure proper wingtip clearance for large aircraft using Taxiway A. If instructed to runup at 1E, you must receive further taxi clearance from the GROUND controller prior to re-entering the movement area.

- **“RUNWAY 8R TAXI VIA 1 WEST CROSS RUNWAY 35”** - Phraseology giving Doss aircraft permission to taxi to Runway 8R via Taxiway C1, cross Runway 35, Taxiway D, ALP 1W, The Blue Line, Runway 8R Run-Up, Taxiway A, Taxiway F, Hold short Runway 8R.
- **“RUNWAY 8L TAXI VIA CHARLIE, ALPHA”** - Phraseology giving Doss aircraft permission to taxi to Runway 8L via Taxiway C, Taxiway A, Runway 8L Run-Up, Taxiway A, Taxiway A1, Hold short Runway 8L.

- (b) **NON-TOWERED AIRFIELDS.** On the CTAF, announce your current location and intention to taxi to a specific runway. In most cases the taxi routing to the end of the runway will be obvious to other aircraft operating at the airfield and therefore may be omitted. Resolve any potential conflicts during ground operations on the CTAF. CAUTION: if it is required to taxi via any runway or to back-taxi on the active runway, include this information in the transmission (e.g., La Junta Rwy 12; Fowler Rwy 4, 12, 30). Examples:

- *“Bullseye Traffic, Kitty 57, parking ramp, taxi Rwy 17.”*
- *“Fowler Traffic, Tiger 05, parking ramp, taxi Rwy 12 via Rwy 22 and back-taxi Rwy 12.”*
- *“Fremont County Traffic, Tiger 25, parking ramp, taxi Rwy 29, Fremont County.”*
- *“La Junta Traffic, Tiger 35, parking ramp, taxi Rwy 26, La Junta.”*

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

3.2 READY FOR TAKEOFF

- (a) **TOWERED AIRFIELDS.** After the runup is complete and you are holding short of the assigned runway, advise the Tower that you are “ready for takeoff.” In general, you will make this call holding short of the assigned runway immediately behind the holding position markings. Include your intentions after takeoff (e.g., patterns, or a specified departure procedure). NOTE: pay attention to whether Pueblo is using split Tower frequencies, as indicated on the ATIS broadcast, or as announced over the Ground/Tower frequencies. NOTE: do not call “ready for takeoff” unless you are in fact ready to accept the takeoff clearance without delay. NOTE: do not call “ready for takeoff” until you are number one (i.e., all aircraft who have finished their runup before you have been cleared onto the active runway). CAUTION: do not attempt to taxi around another aircraft holding short of the runway in front of you. CAUTION: include your location when calling “ready for takeoff” other than from the end of the runway. Examples:

- *“Pueblo Tower, Tiger 15, Runway 26R at A9, ready for takeoff, North Departure to Butts.”*
- *“Pueblo Tower, Kitty 63, Runway 26L, ready for takeoff, patterns.”*
- *“Pueblo Tower, Tiger 03, Runway 8R, ready for takeoff, patterns, South Departure.”*
- *“Butts Tower, Tiger 22 Solo, Runway 13, ready for takeoff, patterns.”*
- *“Butts Tower, Tiger 22, Runway 13, ready for takeoff, Butts Departure to Pueblo.”*

RESPONSE: the tower controller will respond with a takeoff clearance if there is no reason to delay your requested takeoff, and you will read back this takeoff clearance, including the runway designator and any additional instructions. If the controller cannot yet issue you a takeoff clearance, expect a response with one of the following instructions: “standby,” “hold your position,” “hold short runway __,” or “line up and wait runway __.” Read back these instructions verbatim, including the runway designator if stated. NOTE: an instruction to “hold short runway __” means that you may taxi up to and hold short of the runway immediately behind the holding position markings if you are not already there. NOTE: once tower acknowledges you by callsign, you may omit the phrase “Pueblo Tower” from subsequent calls and begin transmissions on the tower frequency with your callsign.

- (b) **NON-TOWERED AIRFIELDS.** Immediately prior to entering the runway for takeoff, announce on the CTAF that you are entering the runway for takeoff and your intentions after takeoff. Make this call prior to crossing the holding position markings. If back-taxi is required (e.g., La Junta Rwy 12; Fowler Rwy 4, 12, 30), make this call after turning around at the approach end of the runway. When holding short of the runway in the number one position for traffic on base or final, announce on the CTAF that you are “holding short runway __.” CAUTION: do not enter the runway until base and final are clear and the runway is clear. Line-up-and-wait operations are prohibited at non-towered airfields. NOTE: at public non-towered airfields (e.g., Fremont County, La Junta, etc.), state cardinal direction of departure rather than a departure procedure title from the IFG, because general aviation traffic will be unfamiliar with the Doss departure procedure. Examples:

- *“Kitty 56, holding short Rwy 17.”*
- *“Kitty 56, takeoff Rwy 17, patterns.”*
- *“Tiger 01, takeoff Rwy 35, patterns, Bullseye Departure to Pueblo.”*
- *“Tiger 13, takeoff Rwy 17, Bullseye Departure, Area 11.”*
- *“Tiger 22, takeoff Rwy 30, Fowler Departure to Pueblo.”*
- *“Tiger 05, takeoff Rwy 12, patterns, Fowler Departure, Area 22.”*
- *“Fremont County Traffic, Tiger 03, takeoff Rwy 8, patterns, Fremont County.”*
- *“Fremont County Traffic, Tiger 25, takeoff Rwy 29, departing southeast, Fremont County.”*
- *“La Junta Traffic, Tiger 35, takeoff Rwy 26, departing west, La Junta.”*

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

3.3 AFTER LANDING

- (a) **TOWERED AIRFIELDS.** After landing, do not leave the tower frequency until directed to do so. Pueblo Tower will generally direct you to contact Pueblo Ground for taxi clearance at a specific location after landing (e.g., clear of the landing runway; after reaching a specific point on Rwy 17; after crossing a runway; etc.). Pueblo Tower will generally handle all taxi operations until you are south of Rwy 8R/26L, and in some cases you will remain on the tower frequency for the entire taxi back to the ramp. At Butts, all taxi instructions will be issued on the tower frequency because there is no separate ground control frequency. NOTE: after landing, the tower may issue runway exit or initial taxi instructions. Read back these instructions, including any specified taxi routing, hold short instructions, and the instruction to contact Ground at a specific location (e.g., “Kitty 57, turn left on A6, hold short Rwy 26L,” “Kitty 57, cross Rwy 26L, contact Ground 121.9 on the other side,” or “Tiger 05, turn right on Rwy 17, contact Ground passing Twy A.”). The following examples show proper phraseology for contacting Ground/Tower for taxi clearance to the ramp. Examples:

- *“Pueblo Ground, Tiger 25, A6, request taxi, Doss.”* (Situation: entering Twy A from A6 and requesting taxi clearance to the Doss ramp. This call will ideally be made immediately after clearing the runway at A6, but may not occur until the aircraft is already taxiing westbound on Twy A, slightly beyond A6, due to the local requirement to continue moving to avoid obstructing the runway exit at A6.)
- *“Pueblo Ground, Kitty 57, A3, request taxi, solo ramp.”* (Request taxi to the solo ramp. Even though you will be exiting the taxiway into the OFA and then the non-movement area, call Ground for taxi clearance.)
- *“Pueblo Ground, Tiger 26, abeam the tower, request taxi, Doss.”* (Situation: after exiting the runway onto Twy A, if unable to contact Tower until well past the actual runway exit point, state your position on Twy A using known references. In most cases, you will be able to briefly identify the nearest intersecting taxiway, as in the previous examples.)
- *“Pueblo Ground, Tiger 04, Rwy 17, request taxi, Doss.”* (Rolling out on Rwy 17, contact ground at the point specified by the Tower after landing.)
- *“Pueblo Ground, Kitty 61, solo ramp, request taxi, Doss.”* (Dual crews retain the Kitty callsign after initial pattern solo at Pueblo.)
- *“Butts Tower, Tiger 15 Solo, Twy D, request taxi, parking ramp.”* (If Butts tower has not issued taxi instructions to the parking ramp before you exit the runway, stop the aircraft on the taxiway after it has completely cleared the runway holding position markings, and then request taxi to the parking ramp.)

RESPONSE: the tower or ground controller will respond with taxi instructions to your requested destination, and you will read back those instructions, including any specified taxi routing and hold short instructions.

- (b) **NON-TOWERED AIRFIELDS.** After landing, announce on the CTAF when you are “clear of the runway” and your taxi intentions. In most cases your location and taxi routing to the parking area will be

obvious to other aircraft operating at the airfield and therefore may be omitted. Resolve any potential conflicts during ground operations on the CTAF. Examples:

- *“Kitty 56, clear of the runway, taxi parking ramp.”*
- *“Tiger 03, clear of the runway, taxi Rwy 17.”* (Intends to taxi back to Rwy 17 for another takeoff.)
- *“Tiger 04, clear of the runway, taxi parking ramp.”*
- *“Fremont County Traffic, Tiger 01, clear of the runway, taxi parking ramp, Fremont County.”*
- *“La Junta Traffic, Tiger 33, clear of the runway, taxi parking ramp, La Junta.”*

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

SECTION 4: PATTERN WORK

4.1 PATTERN ENTRY

- (a) **INITIAL POINT (PUEBLO).** At Pueblo, report the one mile initial point. NOTE: if descent to pattern altitude has already been verbally approved or directed by the tower, do not request descent again when reporting initial. CAUTION: do not descend to pattern altitude (5500 MSL) until approved by the Tower. Examples:

- *“Tiger 22, initial, Runway 8R, request descent.”*
- *“Tiger 11, initial, Runway 26L.”* (If descent to pattern altitude already directed or approved by the tower.)

RESPONSE: the tower controller will normally respond with “Tiger __, descent approved,” to which you will respond with your callsign only and plan a standard break point in the first 2000 ft of the runway. However, read back and follow any non-standard instructions from the tower, such as the following examples: “Tiger 22, maintain 6000 until departure end, descend in the break;” “Tiger 14, descent approved, break at the approach end;” “Tiger 03, descent approved, break to follow Cessna turning crosswind;” “Tiger 33, descent approved, *report* the break;” etc.).

- (b) **ENTRY POINT (ALL NON-TOWERED AIRFIELDS).** On the CTAF, report crossing the pattern entry point inbound, or re-entering the pattern after a breakout. Standard pattern entry points for non-towered airfields are located two miles from the runway on a 45-degree intercept to midfield downwind. Pattern entry points are programmed in the GPS for all non-towered airfields in the local flying area approved for pattern work. This radio call alerts aircraft operating in the vicinity of the airfield to your exact position, and it indicates that you will intercept the downwind leg in approximately one minute if flying a standard entry leg (1.5 miles at 85 kts). CAUTION: at the pattern entry point, pay close attention to aircraft on the upwind leg, in the closed turn, or on pre-midfield downwind. If it is necessary to deviate from the standard entry leg track to achieve proper spacing with aircraft already established in the pattern, add the phrase “following aircraft __” with the current position of the aircraft you intend to follow. NOTE: if proper spacing with other aircraft (3000 feet minimum) cannot be achieved during pattern entry with reasonable adjustments to entry leg track and/or airspeed, you must then yield to aircraft established in the pattern by breaking out. CAUTION: always cross the pattern entry point wings level tracking toward midfield downwind; do not cut inside the pattern entry point and shorten the entry leg. Examples:

- *“Tiger 03, entry Rwy 22.”* (Fowler pattern entry.)
- *“Tiger 05, entry Rwy 17.”* (Bullseye pattern entry.)
- *“Tiger 11, entry Rwy 35, following aircraft turning closed.”* (Bullseye pattern entry, adjusted pattern entry track to follow aircraft in the closed turn.)
- *“Tiger 24, entry Rwy 30, following aircraft on closed downwind.”* (Fowler pattern entry, adjusted pattern entry track to follow aircraft on closed downwind.)

- ***“Fremont County Traffic, Tiger 12, entering on a 45, Rwy 29, Fremont County.”*** (Fremont County pattern entry.)
- ***“La Junta Traffic, Tiger 33, entering on a 45, Rwy 26, following aircraft on crosswind, La Junta.”*** (La Junta pattern entry, adjusted pattern entry track to follow aircraft in closed turn or on crosswind leg.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

- (c) **HIGH KEY (ELP ALL AIRFIELDS).** High Key is the default pattern entry when recovering with any type of engine malfunction or any condition associated with potential engine failure. Report entering the emergency landing pattern at High Key on the tower frequency or on the CTAF. **CAUTION:** be more descriptive at public non-towered airfields to ensure that any general aviation aircraft in the pattern understand your intentions. **NOTE:** an ELP can be entered at a point lower than High Key when required by the circumstances. Examples:

- ***“Tiger 13 Emergency, High Key, Rwy 26R.”*** (Actual emergency, Pueblo Rwy 26R ELP.)
- ***“La Junta Traffic, Tiger 23 Emergency, High Key, 360 degree overhead pattern, Rwy 26, La Junta.”*** (Actual emergency, La Junta Rwy 26 ELP.)
- ***“Fremont County Traffic, Tiger 25, High Key, 360 degree overhead pattern, Rwy 29, Fremont County.”*** (Simulated emergency, Fremont County Rwy 29 ELP.)

RESPONSE: at towered airfields, there is no specific response to this call. The tower may issue a landing clearance at high key, but the landing clearance may come at any point before or after high key. At non-towered airfields, there will be no response to this call unless another aircraft responds with an advisory on the CTAF.

- (d) **STRAIGHT-IN APPROACH (ALL AIRFIELDS).** A straight-in approach may be used during abnormal or emergency conditions where there is no engine malfunction and no apparent threat of engine failure (e.g., in order to land without delay; to avoid turning maneuvers required in a normal pattern; etc.). During normal operations, a straight-in approach may be the standard arrival procedure (e.g., Butts Rwy 31), or it may be allowed by the procedure if directed or approved by ATC (e.g., Pueblo Rwy 17 north arrivals, etc.). Other pattern entries via straight-in approach should be avoided under normal conditions, because straight-in approaches tend to generate conflicts for aircraft established in the closed pattern. At towered airfields, make any position reports specifically requested by the tower during straight-in approach. At non-towered airfields, straight-in approaches should include at least the following reports on CTAF unless otherwise specified in a published arrival procedure: current position upon release by ATC; base leg (if used) with a distance from the runway; intercepting final approach with distance from the runway; and two-mile final approach if final was intercepted outside two miles. **CAUTION:** during a straight-in approach, use additional communications on the CTAF/Tower frequency if required to resolve conflicts with aircraft in closed traffic, with special attention to aircraft on downwind that intend to turn base. **CAUTION:** cropduster aircraft landing Fowler will generally enter the pattern via base leg and straight-in approach. Examples:

- ***“Tiger 22 Emergency, request straight-in Rwy 26R, full-stop.”*** (An emergency aircraft already in contact with Pueblo Tower specifically requests a straight-in approach to Pueblo Rwy 26R.)
- ***“Fremont County Traffic, Tiger 23 Emergency, 8 mile final, Rwy 29, full-stop, Fremont County Traffic.”*** (The emergency aircraft reports an 8-mile final on CTAF upon release by Denver Approach. A two-mile final call will follow this call, plus additional communications on CTAF if required for deconfliction.)
- ***“La Junta Traffic, Tiger 23 Emergency, 3 mile left base, Rwy 8, full-stop, La Junta.”*** (An emergency aircraft reports a 3 mile base leg for La Junta Rwy 8. This call will be followed by a position report intercepting final approach with distance from the runway, plus an additional two-mile final call if intercepting final outside two miles.)
- ***“Tiger 04, final, Rwy 17, full-stop.”*** (Tiger 04 makes this call rolling out on final during a straight-in approach to Rwy 17 after being specifically directed to “report established on final.”)

RESPONSE: a position report requested by the tower, or one required by procedure, may serve as a trigger for the controller to issue further instructions or a landing clearance, which you will read back. At non-towered airfields, there will be no response to position reports during a straight-in approach, unless another aircraft responds with an advisory on the CTAF.

4.2 DOWNWIND

- (a) **TOWERED AIRFIELDS.** Do not report intercepting downwind at towered airfields unless requested by the tower.
- (b) **NON-TOWERED AIRFIELDS.** Always report intercepting the downwind leg from the entry leg or after a runway change procedure. At public non-towered airfields (e.g., Fremont County, La Junta, etc.), announce “downwind” after each closed turn. At private non-towered airfields (Fowler and Bullseye), reporting “closed downwind” after the closed turn is not required, but may be used as an additional position report to remind an aircraft on the entry leg to verify proper lateral separation during their pattern entry. NOTE: the aircraft on closed downwind has the right of way over any aircraft entering the pattern from an entry leg. Examples

- **“Tiger 03, downwind, Rwy 30.”** (Intercepting Fowler Rwy 30 downwind from the entry leg, or after runway change.)
- **“Tiger 12, downwind, Rwy 17.”** (Intercepting Bullseye Rwy 17 downwind from the entry leg, or after runway change.)
- **“Tiger 24, closed downwind, Rwy 30.”** (Rolling out on Fowler Rwy 30 closed downwind, additional call to remind potential conflicts on entry leg to check their spacing.)
- **“Tiger 22, closed downwind, Rwy 17.”** (Rolling out on Bullseye Rwy 17 closed downwind, additional call to remind potential conflicts on entry leg to check their spacing.)
- **“Fremont County Traffic, Tiger 21, left downwind, Rwy 29, Fremont County.”** (Intercepting Fremont County Rwy 29 downwind from the entry leg, and turning left downwind for each pattern.)
- **“La Junta Traffic, Tiger 01, left downwind, Rwy 8, La Junta.”** (Intercepting La Junta Rwy 8 downwind from the entry leg, and turning left downwind for each pattern.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.3 BASE

- (a) **TOWERED AIRFIELDS.** Report “*base*” at the perch or base turn location, or report “*extended base*” if turning beyond the 45° line from the runway landing threshold. Add the phrase “*full stop*” to the base call if the approach will terminate with a full-stop landing. Add the phrase “*stop-and-go*” if requesting stop-and-go. After a pattern delay at Pueblo, squawk your assigned code on the last downwind and add the phrase “*___ departure after this option*” to the base call. NOTE: at Pueblo or Butts, report base even if landing clearance has already been received. Examples:

- **“Tiger 22, base, Rwy 26R.”** (Pueblo Rwy 26R, base call at the perch.)
- **“Kitty 57, base, Rwy 8L, full stop.”** (Pueblo Rwy 8L, base call at the perch, full stop landing.)
- **“Tiger 04, base, Rwy 8R, South Departure after this option.”** (Pueblo Rwy 8R, base call at the perch, last pattern followed by the Pueblo South Departure procedure.)
- **“Tiger 21 Solo, base, Rwy 31.”** (Butts Rwy 31, base call at the perch.)
- **“Tiger 03 Solo, base, Rwy 13, full stop.”** (Butts Rwy 13, base call at the perch, full stop landing.)
- **“Tiger 41, base, Rwy 13, Butts Departure to Pueblo after this option.”** (Butts Rwy 13, base call at the perch, last pattern followed by the Butts Departure procedure.)

RESPONSE: if landing clearance has not already been issued, the tower will generally respond to the base call with current surface winds and one of the following clearances: “cleared option” (full stop, touch-and-go, stop-and-go, or low approach at pilot’s discretion); “cleared to land” (full stop only); “cleared touch-and-go” (touch-and-go only); or “cleared low approach” (low approach only). **Read back the clearance verbatim including runway designator.** Also read back and follow any additional instructions from the tower.

- (b) **NON-TOWERED AIRFIELDS.** Report “*base*” at the perch or base turn location, or report “*extended base*” if turning beyond the 45° line from the runway landing threshold. Add the phrase “*full stop*” to the base call if the approach will terminate with a full-stop landing. Add the phrase “*stop-and-go*” if planning a stop-and-go. Add the phrase “*last pattern*” to your last base call prior to departing the pattern. If unable to make the base call at the perch (e.g., due to aircraft control or radio frequency congestion), report actual position as soon as possible using one of the following: “*base-to-final*,” “*final*,” or “*short final*.” At public-use non-towered airfields only (e.g., Fremont County and La Junta), include the direction of turn (“*left/right base*”). **NOTE:** in the event you fail to observe a preceding aircraft on extended downwind/base/final, your *timely base call at the perch* should allow adequate time for that aircraft on extended downwind/base/final to announce its position (asserting its right of way) and for you to immediately correct your flight path to avoid conflict. **NOTE:** if significantly extended on the downwind leg, consider breaking out rather than turning an extended base. Examples:

- “*Tiger 22, base, Rwy 4.*” (Fowler Rwy 4, base call at the perch.)
- “*Kitty 57, base, Rwy 17, full stop.*” (Bullseye Rwy 17, base call at the perch, full stop landing.)
- “*Tiger 04, base, Rwy 22, last pattern.*” (Fowler Rwy 22, base call at the perch, last pattern.)
- “*Kitty 63, base-to-final, Rwy 35, full stop.*” (Bullseye Rwy 35, unable to report base at the perch, reporting in the base turn, full stop landing.)
- “*Tiger 20, final, Rwy 17.*” (Bullseye Rwy 17, unable to report base at the perch, reporting final.)
- “*Tiger 01, short final, Rwy 30.*” (Fowler Rwy 30, unable to report base at the perch or make a radio call until short final.)
- “*Fremont County Traffic, Tiger 02, left base, Rwy 29, Fremont.*” (Fremont County Rwy 29, base call at the perch.)
- “*La Junta Traffic, Tiger 54, left base, Rwy 8, last pattern, La Junta.*” (La Junta Rwy 8, base call at the perch, last pattern.)
- “*Tiger 03, extended base, Rwy 30.*” (Fowler Rwy 30, base call at a slightly delayed perch.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.4 FINAL

- (a) **TOWERED AIRFIELDS.** Do not report final unless requested by the tower
- (b) **NON-TOWERED AIRFIELDS.** At public non-towered airfields (e.g., Fremont County and La Junta) announce intercepting “*final*” during each pattern. Add the phrase “*full stop*” to the final call if the approach will terminate with a full-stop landing. At private non-towered airfields (Fowler and Bullseye), reporting final is not normally required, but should be announced with your distance from the runway if an aircraft appears to be entering the base turn so as to generate a conflict with you. **NOTE:** the call may also be used to alert aircraft on the ground that you are on final approach (e.g., if that aircraft announced takeoff intentions). **NOTE:** the aircraft on final has the right of way over an aircraft on base. Examples:

- “*Fremont County Traffic, Tiger 04, final, Rwy 11, Fremont County.*” (Fremont County Rwy 11, final call.)
- “*La Junta Traffic, Tiger 01, final, Rwy 8, full stop, La Junta.*” (La Junta Rwy 8, final call, full stop landing.)
- “*Tiger 22, half-mile final, Rwy 4.*” (Fowler Rwy 4, final call to deconflict with aircraft entering the base turn so as to generate a conflict with your final approach.)

- **“Kitty 57, short final, Rwy 17, full stop.”** (Bullseye Rwy 17, short final call to assert your right-of-way in response to an aircraft at the hold line that announces intentions to enter the runway ahead of you without proper spacing.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.5 CLOSED/CROSSWIND

- (a) **TOWERED AIRFIELDS.** Do not report the closed turn unless requested by the tower. NOTE: the tower will generally use the term “crosswind” (FAA equivalent term) rather than “closed” when issuing instructions or traffic advisories.
- (b) **NON-TOWERED AIRFIELDS.** Report **“closed”** (Fowler and Bullseye) or **“left/right crosswind”** (public-use non-towered airfields) entering the closed turn for all patterns at non-towered airfields. Add the phrase **“no-flap”** to this call if your next approach will be a no-flap. If unable to make the closed call rolling into the closed turn (e.g., due to radio frequency congestion), report closed as soon as possible in the turn, or **“closed downwind”** if unable to call until rolling out on closed downwind. NOTE: the term “crosswind” is used at all airfields except Fowler and Bullseye, but the closed turn is flown the same way at all airfields as a continuous turn rather than a square crosswind leg. NOTE: the addition of the phrase “no flap” does *not* imply that the no-flap approach should turn base later than the 45 degree point; but it does alert the aircraft following you in the pattern to consider extending upwind slightly due to a *tendency* for no-flap aircraft to *inadvertently* extend downwind, especially in strong wind conditions. NOTE: in the event an aircraft entering the pattern fails to observe you on the upwind leg, your *timely closed call* should allow adequate time for that aircraft to decide whether to maneuver to follow you on downwind or to break out from the entry leg. Examples:

- **“Tiger 22, closed, Rwy 4, no flap.”** (Fowler Rwy 4, closed, no flap approach.)
- **“Kitty 57, closed, Rwy 17.”** (Bullseye Rwy 17, closed.)
- **“Tiger 04, closed downwind, Rwy 22.”** (Fowler Rwy 22, unable to report closed, so reporting closed downwind.)
- **“Fremont County Traffic, Tiger 02, left crosswind, Rwy 29, Fremont County.”** (Fremont County Rwy 29, crosswind call.)
- **“La Junta Traffic, Tiger 54, left crosswind, Rwy 8, no-flap, La Junta.”** (La Junta Rwy 8, crosswind call, no flap.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.6 GO-AROUND

- (a) **TOWERED AIRFIELDS.** A radio call announcing a go-around is not required unless the go-around could put your aircraft in an unexpected position that generate conflicts, or if it is performed after you have already been cleared to land. When going around prior to a planned touch-and-go inside ¼ final, the call is unnecessary. NOTE: use this same phraseology to respond to an ATC instruction to go around. CAUTION: *do not make this radio call until the Go-Around procedure is complete* (i.e., after the aircraft is safely climbing at V_Y).

- **“Kitty 57, on the go.”** (Pueblo, go-around after being “cleared to land,” or if go-around is executed more than ¼ mile prior to the runway.)
- **“Tiger 13 Solo, on the go.”** (Butts, go-around after being “cleared to land,” or if go-around is executed more than ¼ mile prior to the runway.)

RESPONSE: the tower will generally simply acknowledge the call, but may also issue specific instructions or advisories related to the go-around. Read back and follow any instructions.

- (b) **NON-TOWERED AIRFIELDS.** A radio call announcing a go-around is not required unless the go-around could put your aircraft in an unexpected position that generate conflicts, or if it is performed after you have already announced your intentions to full-stop. NOTE: at Fowler, announce a go-around when appropriate to let an arriving or departing crop duster know that you have completed the approach and are now climbing away from the runway. Examples:

- **“Tiger 23, on the go.”** (Fowler, announcing a go-around to advise arriving or departing crop duster.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.7 RUNWAY CHANGE

- (a) **TOWERED AIRFIELDS.** Runway changes will be orchestrated by the Tower using a variety of techniques. Read back instructions and make any position reports directed by the tower. NOTE: at Butts, the controller may use a technique similar to the runway change procedure used at Fowler and Bullseye (see airport diagram for Butts Army Airfield).
- (b) **NON-TOWERED AIRFIELDS.** At Fremont County and La Junta, runway changes involve departing well clear of the pattern from the upwind leg and then intercepting the new pattern entry point. At Fowler and Bullseye, the runway change procedure and radio calls detailed in the IFG should be used. Examples:

- **“Tiger 33, departing the Rwy 11 upwind leg to enter the Rwy 29 pattern on a 45.”** (Fremont County runway change from 11 to 29.)
- **“Tiger 02, high traffic.”** (Fowler runway change from 12 to 30.)
- **“Tiger 02, descending.”** (Fowler runway change from 12 to 30.)
- **“Tiger 02, downwind, Rwy 30.”** (Fowler runway change from 12 to 30.)

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.8 BREAKOUT

- (a) **TOWERED AIRFIELDS.** A pattern breakout may be directed by the tower for unusual circumstances, or a pilot may initiate and report a breakout for safety reasons (e.g., to avoid imminent conflict with another aircraft in the pattern). These situations are uncommon and will be handled on a case-by-case basis by the tower controller. Read back instructions and make any subsequent position reports as directed by the tower.
- (b) **NON-TOWERED AIRFIELDS.** On the CTAF, report breaking out of the pattern for re-entry at the published entry point. NOTE: *practice* breakouts are prohibited at the public-use non-towered airfields (e.g., Fremont County, La Junta, etc.) but should be accomplished at all non-towered airfields when actually required (i.e., for conflict resolution or to avoid excessively extended downwind). CAUTION: during training, breakouts are practiced only from the entry leg or post-midfield downwind leg. *Practice* breakouts from any other position in the pattern are prohibited due to the increased potential for conflicts with aircraft operating in the standard arrival, pattern, and departure flow. However, breakouts for actual conflicts may be performed from any position if required to maintain safety. CAUTION: during a breakout procedure, maintain awareness of other aircraft inbound to the pattern entry point; always observe right-of-way rules when converging on the entry point; and resolve potential conflicts on the CTAF.

- **“Tiger 13, extended downwind Rwy 17, breaking out.”** (Bullseye Rwy 17.)
- **“Tiger 22, entry leg Rwy 22, breaking out.”** (Fowler Rwy 22.)
- **“Fremont County Traffic, Tiger 05, extended downwind Rwy 29, breaking out of the pattern to re-enter on a 45, Fremont County.”**
- **“La Junta Traffic, Tiger 11, entry leg Rwy 26, breaking out of the pattern to re-enter on a 45, La Junta.”**

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

4.9 DEPARTURE TURNOUT

- (a) **TOWERED AIRFIELDS.** Do not announce the departure turnout on the tower frequency. At an undefined point during the departure procedure, the Tower will direct you to contact Departure on the departure frequency. Or, you may automatically leave the Tower frequency at KPUB when clear of the Class D airspace.
- (b) **NON-TOWERED AIRFIELDS.** As soon as practical *after completing the climb check*, announce on the CTAF that you are departing the traffic pattern. At the private-use non-towered airfields (Fowler and Bullseye), simply state that you are “departing.” At a public-use non-towered airfield, include your exit point from the pattern and your direction of flight using cardinal directions. NOTE: do not delay departure turnout to make this call. NOTE: the departure turnout is generally from the upwind departure leg, but in some cases the departure turnout will occur from the downwind leg (e.g., Fremont County Rwy 29; Butts Rwy 31; etc.) or another point in the pattern. Examples:
- **“Tiger 22, departing.”** (Bullseye or Fowler.)
 - **“Fremont County Traffic, Tiger 04, departing the Rwy 29 downwind leg southeast, Fremont County.”**
 - **“La Junta Traffic, Tiger 24, departing the Rwy 26 upwind leg northwest, La Junta.”**

RESPONSE: none, unless another aircraft responds with an advisory on the CTAF.

SECTION 5: DEPARTURES AND ARRIVALS

5.1 CONTACTING DENVER AND SPRINGS DEPARTURE OUTBOUND

- (a) **DENVER DEPARTURE.** Departing Pueblo, contact Denver Departure when directed by the tower, stating the following: callsign, current altitude/altitude climbing to, departure procedure title, and assigned area, VNAV route, or first planned airfield. **EXCEPTION:** if you are *clear of the Pueblo Class D airspace* and Tower has not yet directed a frequency change, you may automatically leave the tower frequency and contact Denver Departure. **NOTE:** all departure procedure titles used with Denver Departure refer to Pueblo Departures, so the word “Pueblo” should be omitted. Even though there is no handoff from Pueblo Tower, you do not need to state your position in this call. **NOTE:** departing Fremont County for a training area, use the format below; however, departing Fremont County to intercept a Pueblo Arrival, use the format in section 5.2 below.

- **“Denver Departure, Tiger 23, 6000 climbing 8500, South Departure, Area 13.”** (Pueblo South Departure to Area 13.)
- **“Denver Departure, Tiger 11, 6500, East Departure, Fowler.”** (Level at 6500 on a Pueblo East Departure to Fowler.)
- **“Denver Departure, Tiger 22, 7000, North Departure, KRAMER CCW VNAV route.”**
- **“Denver Departure, Tiger 10, 6000 climbing 8500, South Departure, Trinidad.”**
- **“Denver Departure, Tiger 02, 27 miles west of Pueblo, 7500 climbing 8500 direct Area 1.”**

(Fremont Departures to the south areas should terminate with Denver approximately 2 miles west of Area 1, and then report the Fremont departure and assigned area to Tiger Traffic. When terminating with Denver TRACON, use the phraseology “Tiger __, terminate.”)

RESPONSE: the departure controller will advise when you are “radar contact,” and you will acknowledge with your callsign only.

- (b) **SPRINGS DEPARTURE.** Departing Butts, contact Springs Departure when directed by the tower, stating the following: callsign, current altitude/altitude climbing to, and departure procedure title. Departing Bullseye, contact Springs Departure one mile south of Bullseye, stating the following: callsign, distance south of Bullseye, current altitude/altitude climbing to, departure procedure title, and destination (e.g., “to Pueblo” or “Area __”). **NOTE:** point WELL (Bullseye Rwy 35 Departure), or abeam WELL (Bullseye Rwy 17 Departure), is one mile south of Bullseye. **NOTE:** either add the phrase “**to Pueblo**” to the departure procedure title in order to advise Springs Departure that you will be proceeding to KPUB, or indicate your assigned training area to let the controller know that you will be squawking 1200 at the auto-terminate point for area transition. **NOTE:** stating the procedure title means that you will fly published routing and altitudes, unless specifically coordinated otherwise with the Springs Departure controller.

- **“Springs Departure, Tiger 22, 1 mile south of Bullseye, 7000, Bullseye Departure to Pueblo.”**
- **“Springs Departure, Tiger 15, 1 mile south of Bullseye, 6800 climbing 7000, Bullseye Departure, Area 11.”**
- **“Springs Departure, Tiger 03, 6800, Butts Departure to Pueblo.”**

RESPONSE: the departure controller will advise when you are “radar contact,” and you will acknowledge with your callsign only.

5.2 CONTACTING DENVER AND SPRINGS APPROACH INBOUND

- (a) **DENVER APPROACH.** When ready to depart from below a first tier area (1 – 11) inbound Pueblo, squawk assigned code for at least one minute and then contact Denver Approach. When departing from below an outer area (12 – 27) inbound Pueblo, squawk assigned code prior to entering the corridor, and then contact Denver inside the corridor no later than the 18 DME Corridor Call Point. Departing Fowler

inbound Pueblo, squawk assigned code at least one minute prior to CREEK, and then contact Denver Approach at CREEK. Departing Fremont County inbound Pueblo, squawk assigned code for at least one minute after the turn at POND, and then contact Denver Approach. On a Pueblo North Arrival from Bullseye, verify squawking 45XX at least one minute prior to G, and then contact Denver at point G. On a Pueblo North Arrival from Butts, verify squawking 45XX at least one minute prior to RANCH, and then contact Denver at RANCH. NOTE: there is no need to specify that you are “below” the training area when communicating with Denver Approach, as they do not distinguish between above/inside/below the area. NOTE: when reporting “inbound” to Denver, you will always be inbound to Pueblo, so the word “Pueblo” can be omitted. NOTE: if unable to report directly over a point specified in the procedure, state position relative to that point using terminology such as “*inside*” (past the point inbound) or “*prior to*” (before reaching the point inbound) with a distance in miles. Examples:

- **“Denver Approach, Tiger 05, Area 2, 6500, information Kilo, inbound, patterns.”** (Pueblo South Arrival from Area 2, inbound with ATIS information Kilo for patterns.)
- **“Denver Approach, Tiger 51, point Mike, 6500, information Alpha, inbound, full-stop.”** (Pueblo, North Arrival from Echo Corridor 18 DME Call Point with ATIS information Alpha, full stop.)
- **“Denver Approach, Tiger 45, CREEK, 6000, information Delta, inbound, full-stop.”** (Pueblo East Arrival from CREEK with ATIS information Delta, full stop.)
- **“Denver Approach, Tiger 31, 27 miles west of Pueblo, 7500, information Kilo, inbound, full-stop.”** (Fremont Departure inbound Pueblo, one minute after the turn at POND, with information Kilo, full stop.)
- **“Denver Approach, Tiger 07, point Golf, 6500, information Whiskey, inbound, full-stop.”** (Pueblo North Arrival from Bullseye, with ATIS information Whiskey, full stop.)
- **“Denver Approach, Tiger 20, 1 mile inside RANCH, 6500, information Alpha, inbound, full-stop.”** (Pueblo North Arrival from Butts, with ATIS information Alpha, full-stop.)

RESPONSE: Denver Approach will advise when you are “radar contact” and instruct you to “proceed inbound,” which you will acknowledge with your callsign only. The instruction “proceed inbound” is specifically required before you can depart from below a first tier area (1 – 11). The instruction “join the corridor” means that you are to join the corridor and cross the 12 DME corridor entry/exit point rather than crossing the area’s front 12 DME border. Read back and follow any additional instructions issued by the approach controller.

- (b) **SPRINGS APPROACH.** Contact Springs Approach as specified in the **Pueblo North Departure to Butts/Bullseye** procedures after auto-terminating with Denver Departure. NOTE: stating the procedure title means that you will fly published routing and altitudes, unless specifically coordinated otherwise with the Springs Approach controller.

- **“Springs Approach, Tiger 54, 7500, Bullseye Arrival.”**
- **“Springs Approach, Tiger 02, 6700 climbing 7500, Butts Arrival.”**

RESPONSE: the departure controller will advise when you are “radar contact,” and you will acknowledge with your callsign only.

5.3 CONTACTING TOWER OR CTAF INBOUND TO THE AIRFIELD

- (a) **TOWERED AIRFIELDS.** There is no handoff from Denver Approach to Pueblo Tower, and auto-termination occurs well outside the Pueblo Class D airspace. Do not enter the Pueblo Class D airspace until two-way radio contact has been established with Pueblo Tower. In the event Pueblo Tower denies entry into Pueblo Class D airspace, remain on the assigned tower frequency and remain outside the Pueblo Class D airspace until further advised. Butts arrivals are handled differently because Colorado Springs Approach retains control until traffic conflicts are resolved and a handoff is coordinated with Butts Tower, sometimes after you have entered the Butts Class D airspace. NOTE: the default runway in a Pueblo Arrival procedure (solid red line in the IFG) is stated in the initial call, unless another runway is being

requested. NOTE: when arriving other than via an arrival control point, state cardinal direction and distance from the airfield.

- **“Pueblo Tower, Tiger 15, UKLID, inbound, Rwy 26L, patterns.”**
- **“Pueblo Tower, Tiger 03, BRIDG, inbound, request Rwy 17, full-stop.”** (Request for overhead pattern entry Rwy 17 and full-stop landing, rather than the default runway depicted by the solid red line.)
- **“Pueblo Tower, Tiger 22, SULFR, inbound, request straight-in Rwy 17, full-stop.”** (Request for straight-in approach to Rwy 17 and full-stop landing, rather than an overhead pattern, and rather than the default runway depicted by the solid red line.)
- **“Pueblo Tower, Tiger 31, 7 miles west, inbound, Rwy 8L, full-stop.”** (Pueblo Rwy 8L West Arrival.)
- **“Butts Tower, Tiger 10, 7 miles southeast, information Bravo, inbound, Rwy 13, full-stop.”** (After handoff from Springs.)

RESPONSE: the Pueblo tower controller will generally instruct you to report initial for the assigned runway, and you will repeat the instruction using the phraseology, **“Tiger__ report initial, Rwy__.”** Read back and follow any additional instructions. Butts tower may ask you to report the power plant inbound. NOTE: once tower acknowledges you by callsign, you may omit the phrase “Pueblo Tower” or “Butts Tower” from subsequent calls and begin transmissions on the tower frequency with your callsign.

- (b) **NON-TOWERED AIRFIELDS.** On the CTAF, report “inbound” *and planned runway* when released by ATC, or when approximately 10 miles from the airfield, or as specified in the arrival procedure. After the initial call on CTAF, report any additional points specified in the arrival procedure (e.g., SQURL, HUNTR). EXCEPTION: do not state runway calling inbound to Fowler. Departing the area inbound Fowler, make this call immediately after the same call to Tiger Traffic. Examples:

- **“Fowler Traffic, Tiger 33, KAYAK, inbound, Fowler.”** and **“Tiger 33, HUNTR.”**
- **“Fowler Traffic, Tiger 22, below area 17, inbound, Fowler.”**
- **“Bullseye Traffic, Tiger 06, DRAKE, inbound, Rwy 17, Bullseye.”** and **“Tiger 06, SQURL.”**
- **“Fremont County Traffic, Tiger 21, 8 miles east, inbound, Rwy 11, Fremont County.”**
- **“La Junta Traffic, Tiger 04, 10 miles west, inbound Rwy 26, La Junta.”**

RESPONSE: at Fowler, the dispatcher will respond with current winds and active runway. At other non-towered airfields, there will not generally be a response to this call unless another aircraft responds with an advisory on the CTAF. If another aircraft advises that a different runway than the one you stated is active, reply to this correction by re-stating that you are inbound to that runway (e.g., “Tiger 06, inbound Rwy 35.”)

SECTION 6: AREA WORK

6.1 ANNOUNCING THE DEPARTURE TO TIGER TRAFFIC

- (a) **DEPARTURES TO TRAINING AREAS.** Announce the *departure procedure title* and assigned area to Tiger Traffic upon terminating with Denver Departure, after terminating with Springs Departure (Bullseye or Butts departures to the areas), or when leaving the CTAF (Fowler departures to the areas). NOTE: if departing Fowler for CREEK to intercept a Pueblo East Arrival, do not make a call on 123.30. NOTE: omit the initial phrase “Tiger Traffic” in all standard position reports on the area frequency; your callsign is sufficient. CAUTION: when using non-standard/unpublished routing or altitudes to/from the areas, advise Tiger Traffic; make any additional radio calls or phraseology that may be required to ensure deconfliction. Examples:

- **“Tiger 03, South Departure, Area 12.”** (Pueblo South Departure to area 12.)

- **“Tiger 12, North Departure, Area 8.”** (Pueblo North Departure to area 8.)
- **“Tiger 01, Bullseye Departure, Area 20.”** (Bullseye Departure to area 20.)
- **“Tiger 22, Fowler Departure, Area 15.”** (Fowler Departure to area 15.)
- **“Tiger 24, Fremont Departure, COVE direct Area 1, 8500.”** (Fremont Departure, COVE direct area 1, unpublished routing/altitude.)
- **“Tiger 04, South Departure, Area 12, early level-off at 7500.”** (Pueblo South Departure to area 12, non-standard early level-off for low ceilings.)

RESPONSE: none, unless another aircraft responds with an advisory on the area frequency.

6.2 ENTERING THE ASSIGNED TRAINING AREA (7000-8000 MSL)

- (a) **CLIMBING/DESCENDING INTO A TRAINING AREA.** Departures to the areas will generally *descend into* the area from the final departure altitude of 8500 MSL. Fowler Departures to areas 6, 15, and 23 may need to *climb into* the area from below. Announce entering the assigned training area **just prior** to climbing/descending through either of the area’s vertical boundaries. Example:

- **“Tiger 06, entering area 24.”**

RESPONSE: none, unless another aircraft responds with an advisory on the area frequency.

- (b) **ENTERING THE TRAINING AREA THROUGH A LATERAL BOUNDARY.** Announce “entering” the assigned training area **just prior** to penetrating the area’s lateral boundary. Pueblo Departure will need to enter the areas through a lateral boundary via the adjacent corridor when unable to climb 8500 MSL on the departure. NOTE: if a DME arc reporting point immediately precedes area penetration, combine the DME arc reporting point call and the “entering area” call. Examples:

- **“Tiger 21, point Victor, entering area 19.”** (Bullseye Departure, entering the area at 7500 MSL.)
- **“Tiger 03, point Zulu, entering area 14.”** (Fowler Departure, entering the area 7000 - 8000 MSL.)
- **“Tiger 34, entering area 6.”** (Fowler Departure, entering the area 7000 - 8000 MSL.)
- **“Tiger 14, entering area 5.”** (Fowler Departure, entering from the corridor at 7500 MSL.)
- **“Tiger 20, entering area 13.”** (Pueblo South Departure, entering from the corridor 7000 - 8000 MSL.)

RESPONSE: none, unless another aircraft responds with an advisory on the area frequency.

6.3 ENTERING/EXITING THE AIRSPACE BELOW A TRAINING AREA (500 AGL – 7000 MSL)

- (a) **ENTERING THE AIRSPACE BELOW A TRAINING AREA.** Report “below” the training area **just prior** to crossing the vertical or lateral boundary of the airspace below that area. This call serves to warn an aircraft currently operating below the area that you intend to enter that airspace. When descending below 7000’ MSL, the call also lets other aircraft approaching the training area know that you are descending below the area and they may now enter it. CAUTION: only one aircraft at a time may be operating in the airspace below a training area. CAUTION: in the event an aircraft is working below area 6/15/ 23, it will be necessary for a Fowler Departure to area 6/15/23 to climb at or above 7000 MSL prior to crossing PUBr 120. Examples:

- **“Tiger 23, below area 15.”** (Fowler Departure, entering below the area. The call is made whether you intend to work below the area, or whether you intend to continue climbing into the training area from below.)
- **“Tiger 01, below area 11.”** (Descending below area 11 for an area SFL or ground reference maneuvers.)

RESPONSE: none, unless another aircraft responds with an advisory on the area frequency.

(b) **COMMENCING AN ARRIVAL PROCEDURE FROM BELOW A TRAINING AREA.**

Approximately **one minute prior** to departing the lateral confines of the airspace below a training area to intercept an arrival procedure, announce on the area frequency that you are “inbound” to the destination airfield. **EXCEPTION:** when intercepting a Pueblo Arrival from a first tier area (1 – 11), make this call *immediately prior* to contacting Denver Approach. When intercepting a corridor outside of 18 DME (e.g., from an outer training area; from a VNAV route; from a XC recovery), report intercepting the corridor centerline, stating the corridor name and PUB DME. **CAUTION:** in the event Denver holds you inside a first tier area, pay attention to any aircraft reporting on the area frequency inbound to your area, or working above you inside the training area. Deconflict over the area frequency as required to ensure that only one Doss aircraft at a time is working below a specific training area.

- **“Tiger 22, below area 16, inbound Fowler.”** (Announcing departing from below the area on 123.30.)
- **“Tiger 34, below area 6, inbound Pueblo.”** (Announcing departing from below the area on 123.30.)
- **“Tiger 05, Charlie corridor, 25 DME.”** (Specifying exit point into the corridor when commencing Pueblo Arrival from an outer area.)

RESPONSE: none, unless another aircraft responds with an advisory on the area frequency.

6.3 DME ARC REPORTING POINTS

- (a) **AIRCRAFT ON THE ARC.** An arrival or departure procedure may involve a DME arc transition. All waypoints on the arc must be reported on the area frequency or CTAF due to their close proximity to adjacent training areas. **EXCEPTION:** point O does *not* need to be reported during a Bullseye Departure to the areas, but the Bullseye Departure call on the area frequency will occur after terminating with Springs at point O. **NOTE:** if a DME arc reporting point immediately precedes area penetration, combine the DME arc reporting point call and the “entering area” call. **NOTE:** if a departure/arrival procedure crosses a single point on the arc (e.g., Fowler Rwy 4/22 Departures to area 23; Fowler Rwy 30 Arrival from area 24), report that point. Examples:

- **“Tiger 22, point Whiskey.”** (On the Fowler CTAF, overflying point W on the arc.)
- **“Tiger 15, point X-ray.”** (On the Fowler CTAF, Fowler Rwy 30 Arrival from area 24.)
- **“Tiger 02, point Tango.”** (Overflying point T on the arc, but not entering area 11.)
- **“Tiger 02, point Uniform, entering area 10.”** (Entering area 10 from point U.)
- **“Tiger 32, point Yankee, entering area 23.”** (On the area frequency, Fowler Rwy 4/22 Departures to area 23.)

RESPONSE: none, unless another aircraft responds with an advisory on the area frequency or CTAF.

SECTION 7: CROSS-COUNTRY COMMUNICATIONS

7.1 XC COMMUNICATIONS DEPARTING KPUB

- (a) **Beacon Code Usage.** Depart KPUB on the assigned 45XX code when Denver TRACON is providing services at KPUB (0600-2200 LT). When Denver TRACON is not providing services at Pueblo, remain on a 1200 code after departure until Springs ATCT or Denver ARTCC (depending on direction of flight) assign a discrete code.

NOTE: Denver TRACON will accomplish an automated handoff to Springs ATCT prior to CHEEK or PUBr 349/10 if you name a North Departure destination that requires flight through the airspace worked by Springs ATCT (e.g, KFCS, KCOS, 00V, CO90). In these cases, remain on the 45XX code until terminating with Springs ATCT (or as defined in the IFG).

NOTE: for Pueblo Departures that do not enter the airspace worked by Springs Approach, auto-terminate with Denver TRACON and squawk 1200 at the point defined in the IFG (e.g., 25 nm west of PUB; 10 nm north of PUB for departures to the areas or KLIC; 10 nm east of PUB; 8 nm south of PUB; or PLANT).

NOTE: Do not contact Springs on a 45XX code except in those cases specifically defined in the IFG. For example, depart Meadow Lake (00V) on a 1200 code.

NOTE: do not attempt to use a 45XX code with Denver ARTCC.

NOTE: use the assigned Tiger or Kitty call sign on all local profiles and standard XC routes, regardless of beacon code in use.

- (b) **Pueblo ATCT or CTAF.** When communicating departure intentions to Pueblo Ground/Tower, name the applicable IFG departure procedure (e.g., North/East/South/West Departure). When Pueblo ATCT is closed (2200-0600 LT), report on the CTAF the cardinal direction of departure.
- (c) **Denver TRACON.** On initial contact with Denver Departure outbound, name the applicable IFG departure procedure (e.g., North/East/South/West Departure), followed by the planned training area, VNAV route, or first XC airfield on the route.
- (d) **Springs ATCT.** On initial contact with Spring Approach at CHEEK or PUBr 349/10, state altitude followed by the planned (Butts or Bullseye) IFG arrival procedure, or first XC airfield on the route (e.g., Colorado Springs, Meadow Lake). If unable contact at CHEEK or PUBr 349/10 (e.g., due to weather or frequency congestion), state your actual position on initial contact.
- (e) **Tiger Traffic.** Make local area position reports on 123.3 between 0600-2200 LT when the training areas are in use. Immediately after auto-terminating with Denver TRACON at the points defined in the IFG, announce departure intentions on 123.3. Your position is understood to be near the auto-termination point unless you state otherwise. Name the applicable departure procedure (e.g., North/East/South/West Departure), following by the planned training area, VNAV route, or first XC airfield.

CAUTION: outbound, use 123.3 for deconfliction with company aircraft (via standard position reports and any additional required communications) until clear of all corridors, training areas, and VNAV routes.

- (f) **Denver ARTCC.** On XC profiles (excluding airspace worked by Springs Approach), request flight following from Denver Center when **outside of PUB 25 DME**. If departing via a corridor (e.g., unable to climb above the training areas due to weather), remain on 123.3 until clear of all corridors, training areas, and VNAV routes before contacting Denver ARTCC for flight following.

EXCEPTION: if the Pueblo position at Denver TRACON is closed (2200-0600 LT), you may contact Denver Center for flight following inside of PUB 25 DME.

7.2 XC COMMUNICATIONS RECOVERING TO KPUB

- (a) **Beacon Code Usage.** If receiving radar flight following services from Denver ARTCC inbound to KPUB during hours when Denver TRACON is providing approach services (0600-2200 LT), terminate with Denver ARTCC **at least 30 miles from PUB**. Receiving services inbound with Springs Approach, terminate and squawk 45XX code at least one minute prior to contacting Denver TRACON inbound at G or RANCH.

NOTE: when Denver TRACON is not providing services at Pueblo (2200 – 0600 LT), continue flight following with Springs ATCT or Denver ARTCC as desired.

NOTE: Do not contact Springs on a 45XX code except in those cases specifically defined in the IFG. For example, depart Meadow Lake (00V) on a 1200 code.

NOTE: do not attempt to use a 45XX code with Denver ARTCC.

NOTE: use the assigned Tiger or Kitty call sign on all local profiles and standard XC routes, regardless of beacon code in use.

- (b) **Tiger Traffic.** Sunrise to sunset, upon terminating with Denver Center on recoveries from the Northeast/East/South, change to 123.3 and make a position report that includes current PUB DME and the planned arrival corridor (or alternate recovery point). Make a second call on 123.3 stating “ ___ corridor, ___ DME” as you intercept the corridor inbound.

NOTE: from sunset to sunrise, there will be no IFS activity in the training areas or VNAV routes, so there is no need to make position reports on 123.3.

NOTE: recoveries from the West via POND do not need to report on 123.3 unless transitioning to one of the training areas.

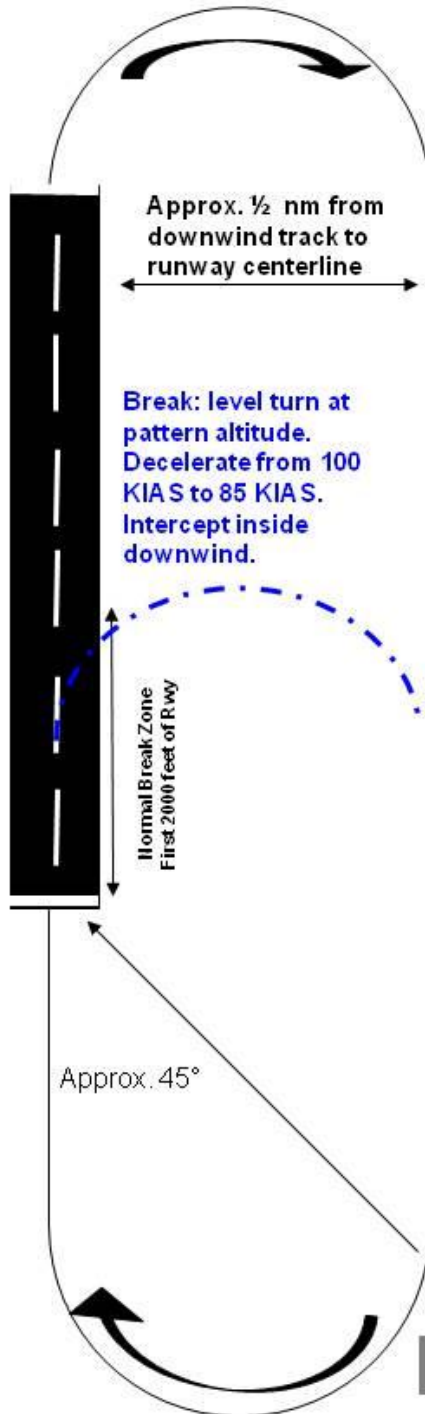
- (c) **Denver TRACON.** Use standard communications procedures with Denver Approach at the initial reporting points specified in the IFG. If alternate points are used (e.g., for weather), remember to squawk the 45XX code at least one minute prior to initial contact.

NOTE: if the Pueblo position at Denver TRACON is closed (2200-0600 LT), IFG arrival procedures and communications with Denver TRACON are not applicable.

- (d) **Pueblo ATCT or CTAF.** Use standard inbound communications when the Tower is operational. When the tower is closed (2200-0600 LT), report position and intentions on the CTAF after terminating radar service with Denver ARTCC or Springs ATCT, or approximately 10 miles from the airfield.

APPENDIX G: TRAFFIC PATTERN DIAGRAMS

Normal Pattern & Landing



Normally initiate closed traffic:

- When traffic to follow is abeam or past your 3/8 line (technique)

AND

- 500' AGL if TPA is 800' AGL
(300' below traffic pattern altitude)
Reference Inflight Guide (IFG) for Traffic Pattern Altitude (TPA)

OR

- When directed by Tower.
Assuming safe altitude and airspeed

Downwind airspeed 85 KIAS,
flaps CRUISE, TPA

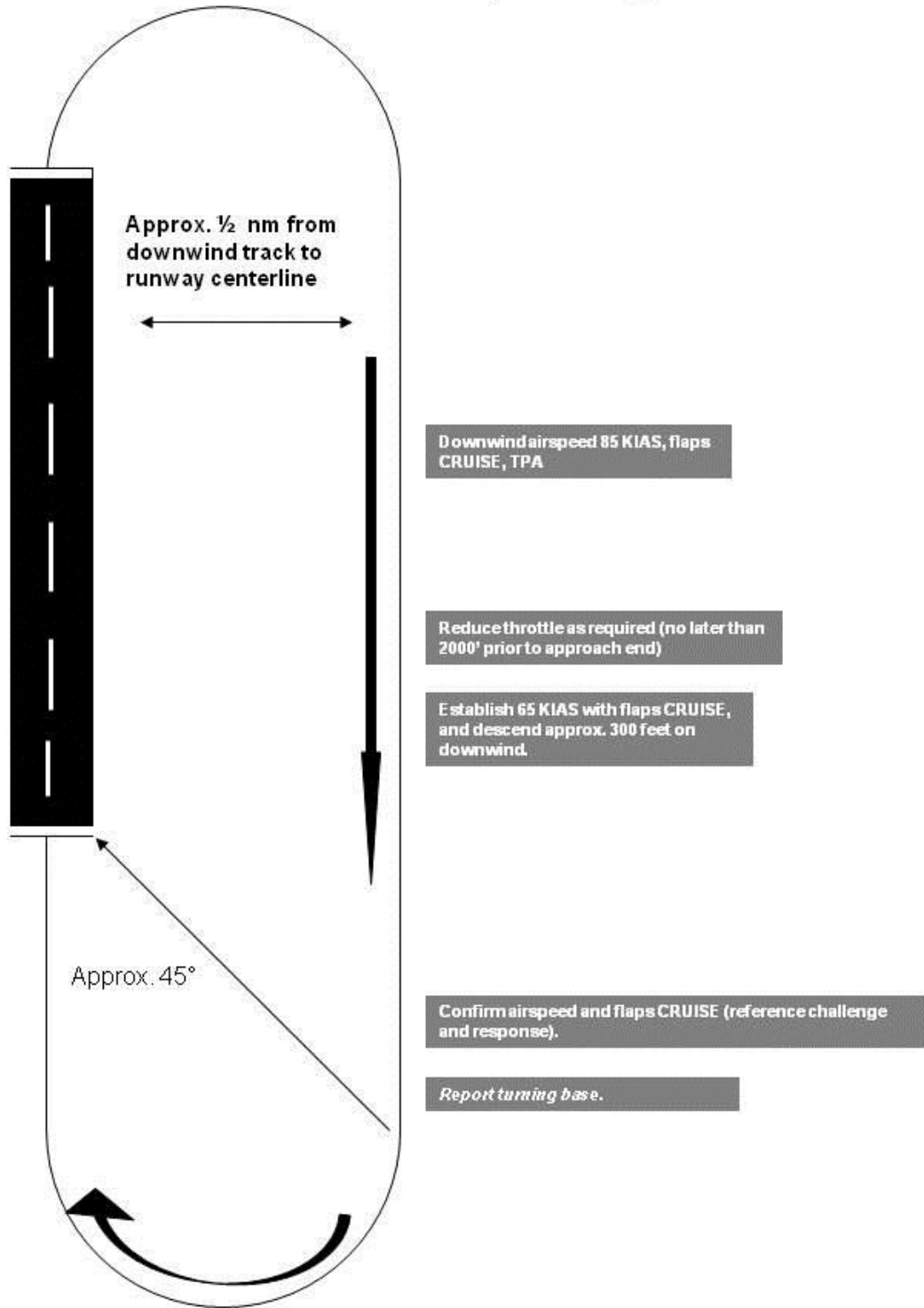
Throttle IDLE abeam touchdown zone.
Extend flaps T/O below 100 KIAS, and LDG below 78 KIAS.
Establish level flight at 60 KIAS, flaps LDG. TRIM.

Confirm airspeed and flaps LDG (reference challenge and response).

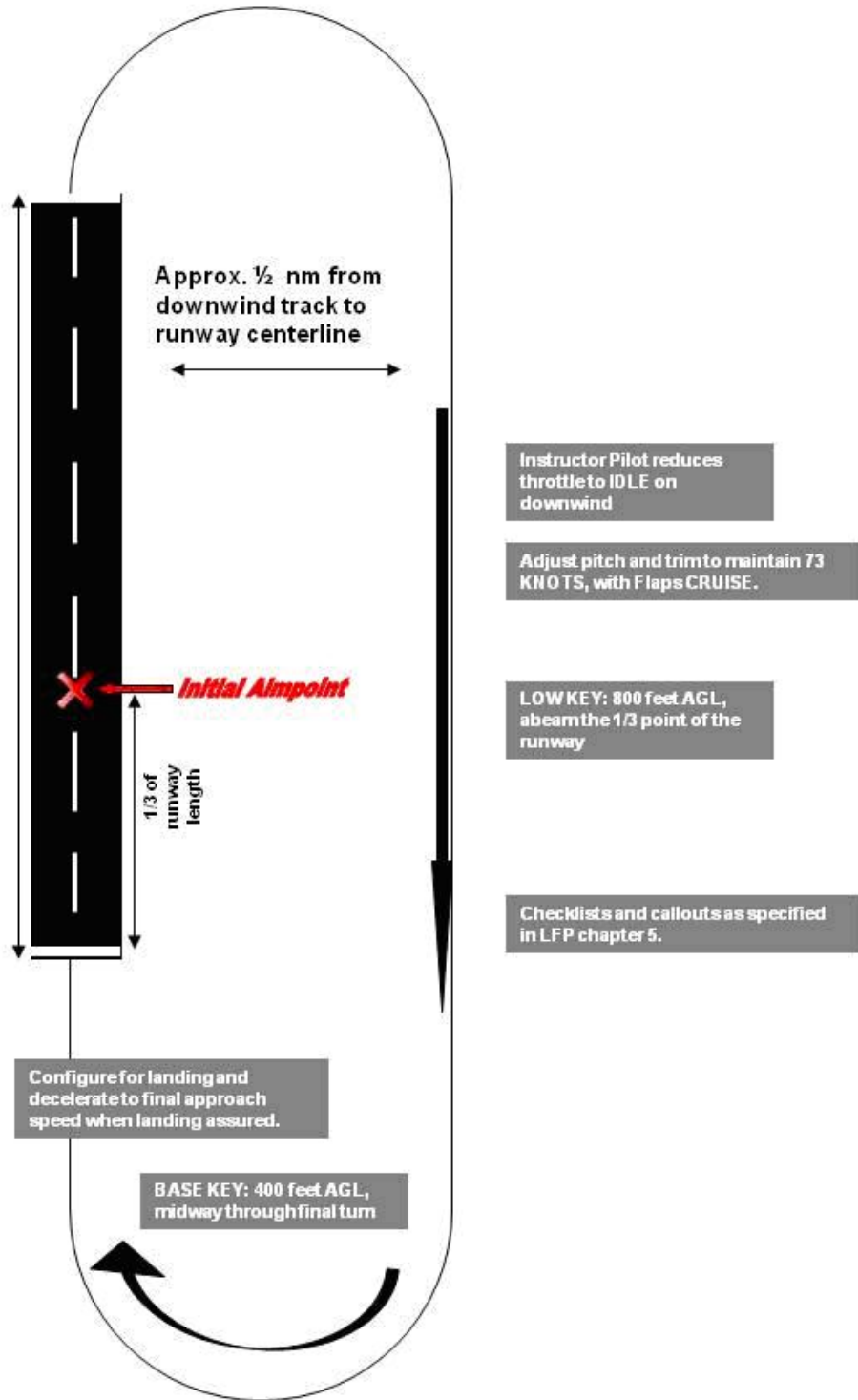
Report base rolling off the perch.

Continuous turn (generally 15-20 degrees of bank) to roll out on 1/4 - 1/2 mile final.

No-Flap Landing



Pattern SFL



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APPENDIX H: MIXTURE ADJUSTMENT

1.1 LEANING TO ELIMINATE ENGINE ROUGHNESS

- (a) **Leaning Procedure.** The high density altitudes experienced year-round in the IFS local flying area often require leaning the mixture in situations that normally call for a full-rich mixture setting (i.e., during *reduced-throttle* and *full-throttle* operations). Use the following method to lean for engine smoothness in these cases: *Pull the mixture lever slowly aft of the full-rich position until you hear and feel the engine accelerate and smooth out. You will also generally see an RPM increase on the tachometer.*

TECHNIQUE: the mixture adjustment required to eliminate engine roughness in average conditions encountered in the IFS local flying area is generally no leaner than 1 to 1 ½ inches aft of full rich, or placing the top of the mixture lever “abeam the M” in the mixture placard. This technique can help prevent over-leaning due to inexperience or inattention. It can also serve as a rule-of-thumb for situations where the mixture needs a quick adjustment to increase engine smoothness and performance, but where limited attention can be devoted to the leaning process (e.g., after a touch-and-go).

- (b) **Ground Operations.** The default mixture setting for ground operations is full rich. Lean the mixture for taxi only if required to maintain satisfactory engine operation at high density altitudes.
- (c) **Takeoff and Climb.** Lean the mixture for *all takeoffs and climbs in the IFS local flying area*. Lean for takeoff *at full throttle* at the point specified in the Runup checklist.

NOTE: when operating at lower pressure altitudes outside the local flying area, use the chart in AFM 5.3.2 to verify that engine power at full throttle will not exceed 75% rated power prior to leaning the mixture for full-throttle operations.

NOTE: during typical local sortie profiles, the takeoff mixture setting will generally be sufficient to ensure engine smoothness through the climb until reaching final leveloff altitude. For extended climbs, or climbs into significantly warmer air above an inversion layer, the mixture may need to be leaned incrementally during the climb.

NOTE: after a go-around or touch-and-go, leave the mixture in the full rich position until safely airborne in a positive climb, and then lean the mixture for climb.

NOTE: (RPA dual only) treat a “rolling” stop-and-go like a touch-and-go, and leave the mixture full rich until safely airborne in a positive climb. For a stop-and-go that is brought to a complete stop on the runway, hold the brakes, apply full throttle, lean as required for takeoff, and then release the brakes.

NOTE: after a full-stop-taxi-back, lean the mixture for takeoff at full throttle.

- (d) **Landing.** The mixture must always be set to full rich as directed in the Before Landing checklist. This setting is required not only to ensure that the mixture is rich for a potential go-around, but also to prevent engine stoppage during the idle-power approach and landing.
- (e) **Area Work.** The default mixture setting for area maneuvers is full rich as directed in the Before Maneuvering checklist. Lean the mixture for area work only if required to maintain satisfactory engine operation at high density altitudes.

NOTE: during all area work, maintain engine speed at or above 1400 RPM.

CAUTION: verify fuel pump ON and mixture full rich before any low-throttle operation where engine speed could fall below 1400 rpm.

NOTE: prior to accomplishing a power-off stall, verbally confirm that the fuel pump is on and the mixture is full rich.

- (f) **Descent/Approach.** The default mixture setting for low-throttle descent is full rich. However, when descending from high density altitudes, enrichen the mixture incrementally if required to maintain satisfactory engine operation.

NOTE: complete the Descent/Approach checklist, including full-rich mixture, NLT 5 miles prior to the airfield.

NOTE: during arrival procedures that require little or no descent (e.g., Pueblo arrivals from the training areas or Fowler), the cruise mixture setting should be maintained as long as practical before moving it to full rich NLT 5 miles prior to the airfield.

1.2 CRUISE

- (a) **Leaning Procedure.** After reaching final leveloff altitude on departure, or establishing arrival altitude before departing a training area, lean the mixture for cruise as required using the following method: ***Pull the mixture lever slowly aft to the point where the RPM first starts to drop. From this point, enrichen the mixture one inch forward.***

NOTE: set cruise power and establish steady-state cruise flight prior to leaning.

NOTE: when the Cruise/Leveloff checklist is immediately followed by a Before Maneuvering checklist (e.g., Fowler departure to areas 6/15/23) or Descent/Approach checklist (e.g., Fowler Arrival from areas 7/16/24), leaning the mixture for cruise is not required.

1.3 LEAN CRUISE (IP ONLY)

- (a) **Leaning Procedure.** A “lean cruise” setting may be established using the following method: ***Pull the mixture lever slowly aft (this may take about 30 seconds) to the point where the EGT needle peaks and then starts to cool down as the mixture is leaned further. Enrichen the mixture until temperature rises back to peak EGT, and then continue enrichening slightly until the temperature drops to 25° F colder than peak EGT.***

NOTE: let engine temperatures stabilize in steady-state cruise flight for approximately 5 minutes prior to leaning via EGT.

NOTE: determining peak EGT will require multiple incremental movements of the mixture control lever very close to idle cutoff. Always move the mixture lever in small increments for accuracy and to avoid killing the engine.

NOTE: when operating with a “lean cruise” mixture setting and increased power is desired, the mixture control must be enriched *before* increasing throttle setting.

NOTE: at cruise power settings below 65% rated power, the engine may be operated at peak EGT.