

### **T-3A DASH 1** CHAPTER 1

WARNING: personal injury or loss of life. CAUTION: damage.

NOTE: emphasize.

Shall or Will is mandatory. Should or May isn't.

- tech. is a technique, not procedure. Wing Span-35' 2", Length-24' 9".
- Lycoming AEIO-540-D4A5 260 hp @ 2700 RPM.
- 6 Quarts start, 7 fly, 12 capacity.
- Low oil pressure when cold is OK. Oil press relief approx. 75 PSI (5.1 bar). Oil cooler closed at 85° C. 10 Sec 0 G oil limit. Left mag has shower spark device.
- Starter: 30 sec, 3 min. cooling. CAUTION: Starter Warning Light fails to go out--stop engine-mixture cutoff-may need master switch off.
- Hoffman 3 bladed prop. Increase pressure: prop goes to fine. Prop fails to coarse. RPM < 2700 = full fine. CAUTION: Don't move prop control abruptly.
- Manifold Press, Fuel Press: direct reading. Can have fuel in cockpit from gauge.
- CHT: electric from #5 cylinder.
- Tach: mechanical from rear of engine.
- Oil temp: electric from back of engine.
- Oil press: electric from front of engine.
- EGT: self powered thermocouple. Lean until slight loss of power (EGT drop). Taken at cvln. # 5.
- FUEL SYSTEM: CAUTION: must return mixture to full rich before increasing power. Continuous flow fuel injection system. Flop tube is in a collector tank. 5 min. inverted flight limit when less than 1/2 tank. Electric fuel pump: starting, takeoff, landing, acro, stalls and spins, ground ops when >80°F. Engine Driven Pump (EDP) on center back of engine. Fuel: 20.77, 41.54 useable, 21.27, 42.54. Low fuel warning: approx. 3 gallons, comes on when inverted. Fuel Quantity: electric, coordinated straight and level. WARNING: Can have fuel in cockpit from fuel flow gauge.
- ELECTRICAL SYSTEM: 24 volt DC, 11 ampere hour gel type battery for starting and alternate source of power, 28 V, 70 amp alternator. Alternator requires excitation current. Alternator has 2 CBs, needs 1000 rpm. Alternator failure: light and neg. ammeter: turn off alternator, reset CB. Ammeter initially indicates +20, falls to 10 after 60 seconds, then to +2 as battery becomes fully charged (20-10-2). If CB trips, turn equipment off, let CB cool 30 seconds, reset, turn on equip. Electric trim CB on bottom right.
- CAUTION: Don't move rudder pedals when AC is stationary. Brakes share common reservoir.
- CAUTION: Don't let flaps slam down.
- WARNING: Visually check flap button and keep area around lever clear.
- Stall Warning: 5-10 KIAS before stall, inoperative during inverted flight.
- Pull trim CB before using manual trim.
- Elevator trim tab: 1/4 inch play is OK.
- It is OK to move rudder up and down.
- CAUTION: If winds > 20 kts. use gust locks.
- Full right rudder lock on ground prevents movement during wind.
- FLIGHT INSTRUMENTS: Emrg. static vent error: +180@130, +350@195. Left Artificial Horizon and DG are vacuum driven. Slips may cause airspeed errors. VSI  $\pm$  100 ft, Altimeter  $\pm$  50 ft. Altimeter calibrated to 20,000 ft. Turn and slip up to 3° per sec, electric. Vacuum below 4.5 < 1500 RPM, 2 min. run up, 1 min. after suction failure. Suction instruments: no fail indication. DG accuracy to  $10^\circ$  per hour with up to  $60^\circ$  of bank
- and pitch. Structure temp at wing/fuselage junction. WARNING: Canopy full open or closed. Canopy open in flight, static instruments will be hard to read.
- WARNING: Pull on harness straps to check locked, releases at  $40^{\circ}$
- Heat knob: full out goes all window. Fresh air: push for feet, pull for body. Avionics air from right hand inlet.
- COMMUNICATIONS: Emrg. Comm (2 switches set) bypasses audio control panel, reduces electrical needs, disables intercom. All radios off for engine start. Nav-Com no warm-up time. Override squelch by pulling volume knob. OBS 10° in VOR, 2° in ILS. DME GS/Time accurate only if going directly to or

# T-3A FIREFLY QUICK REVIEW

- away from station. DME remote sets auto freq. pair. Transponder: 14 volts DC, 2 CBs, 1 min. warm: up, referenced to 29.92.
- Carbon monoxide detector good for 30 days, darkens: run smoke'n fume elim.
- ELT transmits on 121.5 & 243.0.
- Mineral oil for 50 hours, 12 quart capacity. Fuel 100LL (low lead, blue in color) @ 42.54 gallons, 41.54 useable. Hydraulic fluid: 1 quart.
- Storage = 66 lbs. 10 for survival kit.
- Use eng pre-heat at or below 30°F.
- **CHAPTER 2**
- >5000 ft density altitude use high density altitude procedures. Main strut 2-3 inches, nose 1-2 inches. Brakes min. 3/32.
- Prop: no cracks on leading edge, no damage on inner 1/3. Don't
- hand turn prop.
- Up and down rudder movement OK.
- WARNING: Ensure rudder pedals locked.
- If Ext. Power is > 26 volts, no alt warn.
- VSI ± 100 ft.
- STARTING: Engine-prime (throttle-full, mixture-cut off, EFP-on, mixture-full-then cutoff, EFP-off), Throttle-1/4" open, CLEAR, Starter-press, Starter Warning Light-out, Mixture-rich, 800-1000 RPM, Ignition Switch-both, oil pressure, alternator-on.
- Check starter warn light on during start, must go out after start. Engine should start in four revolutions, if not check for fuel venting, re-prime for ONE second. WARNING: Over-prime can cause fires that are hard to detect by crew.
- Oil pressure indication within 30 sec.
- Canopy open-1500 max RPM. 2200 max RPM on ground to prevent overheating.
- Magneto 175 drop,  $\pm$  50 RPM. If rough engine or more than 150 RPM drop, set 2000 RPM, lean for max RPM rise for one minute, leave leaned, reset 2000 with throttle and retry mag check, abort if drop exceeds 150 or engine roughness.
- Exercise prop 4 times, 300-500 drop.
- Idle 700 RPM minimum.
- For unusual delay, set 1200-1300 RPM for cyln. head cooling, vibration, oil pressure, alternator output, plugged nozzles.
- Nose wheel liftoff at 40-45, fly at 53 w/18°, 58 no flap. High crosswind delay rotation until takeoff speed (53/58). (> 5000' DA takeoff speed is 65/70).
- WARNING: Don't close canopy in flight, 20% loss in performance and steeper approach angle.
- Takeoff 2 minutes behind heavy aircraft.
- OBSTACLE TAKEOFF: 18° flaps, climb at 75.
- SOFT/SHORT FIELD TAKEOFF: 18° flaps, hold brakes @ 2200 RPM, roll, lift nose wheel ASAP, once airborne level off and accelerate (@75 to clear obstacle). WARNING: Landing on grass, don't push stick fwd. Don't land within 2 minutes of heavy.
- Rectangular Landing Pattern: 95 KIAS, slow to 85 before base, 18° flaps and 75 on base, 40° flaps and 65 on final.
- No Flap: 85 final turn, 75 final, touchdown at not less than 53 KIAS
- Gusting crosswind: add 5 KIAS to final.
- Downwind is 1/2 to 3/4 mile.
- Short Field Landing: 40° flaps, approaching threshold, slow to 58, (48 is stall speed) carry power, lower nose wheel immediately, apply max braking, move stick aft. WARNING: Watch for sink.
- Closed Pattern: min. 90 KIAS, After takeoff check completed, mid-field before request, 90 KIAS min. during climbing turn. Ignition grounding check: if engine stops leave ignition switch off.
- CHAPTER 3
- EMERGENCY GROUND EGRESS: (Emergency Engine Shutdown on Ground) Parking brake, headset, harness, canopy,
- breaker tool. WARNING: Watch for AC, props. ABORT: smooth, even brake application.
- PARTIAL ENGINE FAILURE: bad EDP, fuel leak, fuel distribution, spark plugs, magneto, fuel selector, oil system. Fuel fumes: shut engine down when landing assured (tech: high key). Indications: fluctuating RPM, high oil temp, rough sounding or running engine.
- SPIN RECOVERY: Throttle idle, raise flaps, stick full aft and neutral, determine spin direction outside and in, full opposite rudder and hold, pause 1 second, smoothly move stick forward of neutral to break stall, spinning stops, neutralize rudder, recover from dive. WARNING: With CG at rearward limit, full forward stick may be needed for spin recovery. Do spin secondary drill if spin doesn't stop by one turn after full antispin controls: check rudder anti-spin, stick to rear stop, then stick forward.
- Greatest glide distance is 72 KIAS.
- Don't restart with fuel fumes.

If prop stops during acro, use start button to restart, can dive to windmill @ approx. 115 KIAS, from 72 KIAS uses 600-800 feet.

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- PROP FAILURE: Will not increase: Check oil press, Manifold press > 15, exercise prop control, if no response, set mid-range, land. Over-speeds or won't decrease: Adjust throttle (around 3/4), Prop control mid-range, slow to 80, land.
- COCKPIT FIRE: Close air and heater vents, canopy window slide 1/2 open (sucks air), assess fire damage. Don't isolate electric fire.
- SMOKE'N FUME ELIM: Hot air off, fresh air open, windows SLIDE open, land, if fuel fumes: (Don't turn electrical components on or off) shut down when landing assured (tech: high key).
- ASYMMETRICAL FLAPS: Raise good flap if no damage, fly no flap landing. If can't raise flap do controllability check.
- CONTROLLABILITY CHECK: Don't stall, 1500 ft, fly straightin, fly approach or 5 to 10 knots > controllability speed, touch down at no less than control speed. Don't reduce airspeed until close to rwy
- CANOPY OPEN IN FLIGHT: Lock canopy slide lever (between pilots), slow to 100 KIAS, land, 20% performance loss. WARNING: Don't close open canopy in flight (FCIF).
- Activate ELT after forced landing.
- ALTERNATOR FAILURE: Alternator off, check both CBs in, Alternator on, reduce electrical loads, battery lasts approx. 30 min.
- Pitot static problem and  $OAT < 0^{\circ}C$  or precip then pitot heat on. Comm failure: can turn radios off for 5 minutes.

Max takeoff, landing pressure altitude is 8000 ft. at 50°C (Density

If temp > 38°C (100°F) watch structure temp, CHT, and Oil temp.

No vertical stalls (tailslides) or inverted spins or aerobatics with

High speed dive is greatest hazard to operations (split S).

Multiple power on stalls, watch engine oil & CHT temp.

just over 2 seconds per turn (MAN 3-3 says 3 sec.).

only been entered from inverted stall condition.

Instrument TO: check DG and Artificial Horizons.

Encounter icing, get out of it.

Turbulence penetration is 120 KIAS.

Pitot heat and alternate static source if icing is suspected.

Hold at 110 KIAS. Prior to FAF 120, final 75 KIAS and 18°

COLD WEATHER: warm eng at 850 to 1000 RPM. Must have

normal eng indications prior to TAXI. Lower than normal oil

AC. Avoid taxiing through water or slush if it can be avoided.

HIGH PRESSURE ALT OPS: > 5000 ft, lean on ground, delay

rotation to 65 (70 NF). May need more power on final and

delay power reduction in flare. Forced landing glide at 85.

Decrease TO roll by 10% for 6 knots of head wind, 2 kts. tail

press at startup is OK. WARNING: No ice, snow, frost on

INTENTIONAL SPINS: Idle, 5 above stall full aft stick, neutral

ailerons, full rudder. Developed spin 30-40° nose low, rotation

WARNING: Lose approx. 300 per turn, 700 for dive recovery,

allow additional 1000 feet safety margin. From developed spin,

recovery takes 1 - 1 1/2 turns. Right spin may take 1/4 to 1/2 turn

more. WARNING: Always use flt. manual spin procedure to

recover from erect spin. If pro-spin rudder and forward stick,

spin accelerates 10-20%, 10° nose lower. Inverted spins have

Stall horn 5-10, light buffet 2-3 KIAS above stall.

After stall recovery check man. press. within 4.

At full power stall speed 5 less than idle.

Stall @ 48 with 0° bank and 40° flaps.

- Glide 80, 75, 70, 1000 feet per 360° turn and per mile.
- CHAPTER 5
- Manifold press 4 greater than RPM OK.
- Airspeed: 55-98 full flaps, 62-156-195,120,140.
- G limits: +6 -3, +4.4 -2, flaps: +2 -1.
- Tach: green 700-2700.
- OAT: 55°C (135°F), 65. Suction 4.5-5.5.
- CHT: 100-230-260°C. Oil temp. 0-40-118°C.

Min. temp for winterization: -20°C (-4°F).

- Oil press 2-4.1-6.2-7 bar. Ammeter +50.
- Mag 175 drop, ± 50.

Altitude of 13,200 ft.).

Datum is front face of firewall.

CG limits: 30.8 to 32.4 inches.

No forecast or known icing.

SNAP ROLL: 90 KIAS max.

**CHAPTER 6** 

CHAPTER 7

flaps.

APPENDIX

wind adds 10%.

Service ceiling is 19,000 ft.

Max weight for takeoff and ldg.: 2525.

flaps, or acro with temp > 55.

Don't pull too hard over-the-top.

HAMMERHEAD: 120, 50 KIAS.

# **T-3A FIREFLY QUICK REVIEW**

Best Endurance at 10,000' is 94 KIAS (equals 109 TAS).

# AETC REG 55-4 (T-3A OPS)

- 40 minutes min. between brief and TO for non-student sorties. One hour for SP sorties. No arms on rails. Nothing on glare shield. Don't approach from front of AC. Min. 2 AC lengths during taxi. Avoid excessive power during taxi.
- PROHIBITED MANEUVERS: (IF IN SEATT) IMC, Formation, Icing (known or forecast), Night flight, Spins with flaps or inverted, Engine shutdown in flight for practice, Aerobatics with flaps or temp > 55, Tailslides, Touchdowns from SFLs except on prepared surfaces at authorized airfields. For solo students no: no-flaps or straight-ins.

Min. fuel 9, 12 solo. Emrg. 6 gallons at final touchdown.

- Min. runway 2500 X 50 feet. Don't cross threshold with less than 3000 ft or other AC airborne.
- With AC inside 2 mile final, don't turn final unless in sight, can fly normal final, and have normal spacing behind him.
- Crosswind limits 25, 10 solo. Max wind 35. Restricted low approach 300 ft AGL. Perform all parts of spins, stalls and acro > 1500 ft.
- Must do HASELL check (Height, Airframe, Security, Engine, Location, Lookout) before stalls or spins.
- Brief all airborne simulated emergencies.

Can't fly without position lights

# AETC MAN 3-3 VOL 1

- RADIO FAILURE: Normal overhead, rock wings on initial, watch for lights, flash taxi light on final. Squawk 7600 (7500 is hijack).
- AIRSPEED INDICATION PROBLEM: fly straight-in, use power settings (tech: 20 ODW, 18 base, 2100 final).
- Energy gain: PO stalls, chandelle, nose-high recovery, Lazy 8. AGSM: breathe every 3 seconds.
- STALLS: Caused by exceeding critical AOA (angle between chord and relative wind). Affected by: weight, power, G, configuration.
- PO STALLS: 15-30-50° pitch, 20-30° bank, 12-18 manifold press.
- SLOW FLIGHT: SCATSAFE: Straight and level, Control effectiveness, Adverse yaw, Turns, Steep turns, increase pitch Attitude, raise Flaps, coordination Exercise.

LOOP: Full Power, 130-150, 3-4 Gs, constant nose track.

- AILERON ROLL: Full power, 120, 20-30° nose high.
- SPLIT S: Idle, 20-30° nose high, (90 knots), 4 Gs or light buffet.
- CHANDELLE: Full power, 10° nose low, 130, 30-45° turn at horizon, max bank 60°, start roll out at 135°, roll out 5 knots > stall.
- BARREL ROLL: Full power, 130 KIAS, nose below ref. point, turn 20-30° off ref. point.
- CLOVERLEAF: Full power, 130-150, turn at 60° nose high, 130-150 at bottom (tech: turn with butt on horizon, or wing root on horizon).
- IMMELMANN: Full power dive, 140-150, constant nose track, about 4 Gs, approx. 20° canopy bow above horizon start roll.
- LAZY 8: Level at 130, (tech: full power) 80-90° bank and 80 knots at 90° of turn.
- CUBAN 8: Full power, 130-150, approaching 45° roll (opposite for second roll).
- SPIN: is an aggravated stall resulting in autorotation. Need stall and yaw. Do HASELL check, at first indication of stall, idle, full aft stick and rudder and hold until rudder swap. Incipient stage: nose remains below horizon but up and down. A/S fluctuating. Fully developed spin: small pitch oscillations, slight airspeed oscillations. Stabilized spin: everything steady.
- SPIN RECOVERY: Throttle idle, stick full aft and neutral, hold pro-spin until rudder swap, determine spin direction outside and in, full opposite rudder and hold, pause 1 second, smoothly move stick forward of neutral to break stall, spinning stops neutralize rudder, recover from dive. Stick may have to go full forward.
- SPIN PREVENT: Neutral aileron, move stick forward as you feed in anti-spin rudder until rotation stops, (3-3 says: Neutralize flight controls, leave throttle set) recover from nose high or low attitude, if rotation stabilizes use spin recovery. Spin prevent will work unless spin has accelerated excessively. Spin recovery will always work when performed properly. If flaps are down raise them ASAP after rotation stops (Dash-1 says 1idle, 2-flaps-up, 3-neutral, 4-aft...).
- GLIDES: Clear engine every 500 ft to 1700 RPM. A/S 80,75,70. Finished when at level cruise flight.
- STRAIGHT-IN: fully configured before 2 miles (tech: do before landing check on outside downwind).
- PATTERN: Break (30-45° bank) in first half of runway, don't break with straight-in between 4 and 2 miles. Slow to 95, set 15-18mp, before landing check, flaps 18°, min. A/S of 85, 40°

flaps at perch. No final turn if: another AC in final turn and not in sight, straight-in < 2 and not in sight, can't maintain normal spacing.

- FINAL TURN: approx. 30° bank, 80/85NF/80SFL KIAS (mp 8-10), never break out.
- FINAL: 4° glide path, approx. 300 ft at <sup>3</sup>/<sub>4</sub> miles, 70/75NF KIAS. Approaching threshold reduce power and roundout. Near max crosswind: full flaps and add 5 knots.
- LANDING: Don't re-trim during ground roll. No-Flap: half ground, half sky, no excessive flare, plan to touchdown no less than 53 KIAS.
- CLOSED PATTERN: Don't if straight-in between 4 and 2 or A/C on initial. Min. 90 KIAS, 30 to 45° of bank.
- BOUNCE AND BALLOON: If severe go around immediately. WHEELBARROW: More weight is on nose wheel. If AC is pivoting: throttle idle, stick aft of neutral, reduce braking. If AC
- is NOT pivoting, stick aft of neutral, aileron into the wind. FORCED LANDINGS: Clear engine every 500°. 200 AGL is min. Climb straight ahead to 400°. Low Key is 800 to 1000° AGL and ¾ from and abeam touchdown. Base Key 600 to 700° AGL. Aim at center of field, full flaps and shift to land in first
- AGL. Ann at center of field, full flaps and shift to land in first 1/3. Low Altitude: 0-400 turn only to avoid obstacles, 400-800 up to  $90^{\circ}$ , >800 no limit. 200 min. altitude to roll out on final in pattern.

# LOCAL AREA PROCEDURES

GROUND RALLY 06 TAXI: TOWER R06 #1 (PATTERNS): R06 #1 DEPARTURE LEG (OUTSIDE DOWNWIND) DEPARTING; SPRINGS APPROACH R06 WOODMEN ROAD PASSING 8100 FOR 9500 SOUTHEAST (WITH ALPHA); EAGLE R06 CORRAL REQUEST AREA; R06 ESTABLISHED IN AREA X; EAGLE R06 CORRAL FOR BULLSEYE: BULLSEYE R06 CORRAL: BULLSEYE R06 LOVE; R06 ENTRY (REQUEST ST IN); R06 INITIAL (REQUEST EAST BREAK); EAGLE R06 DEPARTING BULLSEYE REQUEST AREA (CLEARANCE TO ACADEMY); EAGLE R06 AREA X REQUEST CLEARANCE TO BULLSEYE; EAGLE R06 REQUEST RECOVERY FROM AREA X; SPRINGS APPROACH R06 CORRAL AT 8500 SOUTHEAST ARRIVAL; ACADEMY TOWER R06 FOREST (PALMER); R06 IN THE BREAK (at AFF); R06 CLEAR OF THE ACTIVE. UNRESTRICTED: 2000-5, RESTRICTED: 1300-3. RESTRICTED PATTERN: 1600-3 no breakouts, max 6 AC. WX SHIP: 1300-3, STOP LAUNCH: 1300-3. STANDBY: forecast to improve. STAND DOWN: terminated. Rwy must be dry for solo. Min. wind chill -20°F. Sign-in remarks: U, F, Inc, P, CAP Solo, Q, OTC. 12 hour duty day for SPs, IPs. Official sunset in chocks shutdown. 50' from refueling. 1500 max RPM on ground. Gust locks > 20, wind controls > 25, cease taxi > 35. Complete Form 645 for any ground or air abort. Local area 100 NM radius minus Denver class B, Rampart Range. No aerobatics, recoveries, or spins in # areas. North corridor is 1/4 mile wide south of PALMER, all others are 1/2 mile wide. Acknowledge ALL radio calls except landing clearance at AFF and BLS. Must monitor 243.0. Woodmen departure used for Calhan and Northeast areas. Woodmen to LOVE: climb at CORRAL to 11,500', to BRIDGES: take Garet Road, when clear of Meadow Lake Airport climb to 11,500' direct BRIDGES, to EASTON: east of Meadow Lake, direct EASTON. Areas to Bullseye @ 8500', call LOVE to Eagle 1/4 mile prior to LOVE, then call LOVE to Bullseye. Bullseye to areas @ 8000'. At KANE: Area-11,500', AFF-8500', BLS-7500'. All recoveries at 8500', squawk 2 miles prior to CORRAL. IP lands on rwy 26. Pattern spacing: 1500 air, 3000 rwy and other light aircraft. Takeoff 2 minutes behind UV-18. Turn crosswind 200' AGL, 90 KIAS, good spacing. Closed traffic: midfield, 90 KIAS, 200' AGL. "STANDBY" straight ahead at or below 400' AGL. Break zone is first half of rwy. 'DISCONTINUE'' continue to 2 mile point, go around away from pattern, twr calls xwind. RSU Restricted Low Approach-300' AGL, Tower Restricted Low Approach-500' AGL. Bullseye: 10 AC max, 8 with solo, pattern alt 6900'. Butts: 8 AC max, 6800'. COS: 2 AC norm, 4 with SOF coordination, 7000'. APA: Tower determines max AC, 6800'. SFLs: AFF, BLS (with RSU), Butts, COS, APA, PUB. Radio Failure: Squawk 7600, Ldg light on, rock wings at entry

and initial.

Elec Failure: fly 400' over RSU, pull closed.

WX Recall, IP lands, Lost: climb to 12,000, 90 KIAS.

Non-Student Flying: senior raking IP (not officer) is PIC. Minimum altitude is 1000' AGL.

### **BOLD FACE**

EMERG ENG SHUTDOWN ON THE GROUND MIXTURE-CUTOFF FUEL SELECTOR-OFF IGNITION SWITCH-OFF MASTER SWITCH-OFF

ABORT

THROTTLE-IDLE BRAKES-AS REQUIRED

ENG FAIL IMM AFTER TO OR LOW ALTITUDE GLIDE-ESTABLISH MIXTURE-CUTOFF FUEL SELECTOR-OFF IGNITION SWITCH-OFF

#### COMPLETE ENGINE FAILURE DURING FLIGHT/FORCED LANDING GLIDE-ESTABLISH

ENGINE FIRE

MIXTURE-CUTOFF FUEL SELECTOR-OFF IGNITION SWITCH-OFF

ELECTRICAL FIRE ALTERNATOR-OFF MASTER SWITCH-OFF