DEPARTMENT OF THE NAVY

TRAINING AIR WING ONE
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COMTRAWINGONEINST 3710.7S/
COMTRAWINGTWOINST 3710.7Q
N3
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COMTRAWING ONE INSTRUCTION 3710.7S/COMTRAWING TWO INSTRUCTION 3710.7Q

Subj: T-45 STANDARD OPERATING PROCEDURES (SOP)

Ref: (a) OPNAVINST 3710.7 series (NATOPS General Flight and Operating Instructions)
(b) NAVAIR A1-T45AB/AC-NFM-000 (T-45A/C NATOPS Flight Manual)
(c) CNATRAINST 3710.2 series (CNATRA Cross-Country Flight Operating Instructions)
(d) CNATRAINST 3710.8 series (Restriction of Flight Into, Through, or Within Aviation Severe Weather Areas)
(e) CNATRAINST 1500.4 series (Student Naval Aviator Training and Administration Manual)
(f) CNATRAINST 1542.127 series (T-45 Strike Flight Instructor Curriculum)
(g) CNATRAINST 1542.150 series (Jet Transition Strike Flight Instructor Curriculum)
(h) CNATRAINST 1542.159 series (T45 Combined Flight Curriculum Guide)
(i) CNATRAINST 1542.167 series (T-45 Combined Multi-Service Pilot Training System)
(j) CTW1/CTW2INST 1542.3 series (T-45 E-2/C-2 and Strike Curriculum Briefing Guides)
(k) CTW1INST 3710.15/CTW2INST 3710.13 series (T-45 Back Seat Qualification and Orientation Flight Authorization)
(l) CNATRAINST 3710.38 series (Use of Cameras and Personal electronic Devices in CNATRA Aircraft)

Encl: (1) CTW-1/CTW-2 Standard Operating Procedures

1. Purpose. To establish Standard Operating Procedures for Training Air Wing ONE (TW-1) and Training Air Wing TWO (TW-2) T-45 operations. This instruction contains extensive revisions and should be read in its entirety.

2. Cancellation. CTW1INST 3710.7R/CTW2INST 3710.7P

3. Background. To supplement references (a) through (l) and provide specific guidance and/or operational procedures for those instances which are not specifically addressed in the references. This instruction does not supersede any part of the references but provides additional guidance specific to the mission of Training Air Wing ONE and TWO.

4. Action. All aircrew flying TW-1 and TW-2 T-45 aircraft shall familiarize themselves and comply with the procedures contained in this instruction.

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Commander,
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Distribution:
CTW1INST 5216.4F
List I (A-E, G, H, M, P)
List II (A-C, E)
CTW2INST 5216.1U
List I (D, E, J)
List II

# T-45 STANDARD OPERATING PROCEDURES

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## I. GENERAL

### 100. AIRCREW REST/SCHEDULING

a. If any aircrew knows his/her crew rest has been compromised and/or does not feel physically or mentally ready for flight, then they should inform either the Wing/Squadron Duty Officer, squadron Operations Officer or Safety Officer to be removed from a scheduled sortie. Aircrew shall report to medical or see the Flight Surgeon at the earliest possible opportunity if a med-down status is expected. Additionally, aircrew and the Operations Officers are equally responsible for adhering to flight limitations set forth in references (a), (c), (f) through (i), and this instruction with respect to crew rest requirements. (NOTE: For example, crew rest for International students is more restrictive after returning from overseas.)

b. Instructors. Instructor Pilot (IP) crew day should not exceed 12 hours from first scheduled event until completion of last debrief (land time plus one hour). Crew rest should be no less than ten hours from last scheduled event or debrief until first scheduled event. Only the squadron Commanding Officer or the Training Air Wing Commander may waive crew day and crew rest requirements. Instructors are limited to four man-ups and three flights per day. IPs may volunteer for additional flights with the approval of the Commanding Officer after considering environmental factors, type and duration of flight.

c. ACM IP Currency:

| | |
|---|---|
| IP<750 hours in Strike/Fighter Aircraft | 1 flight within previous 6 days<br>2 flights within previous 14 days (1 flight shall be a dynamic hop) |
| IP>750 hours in Strike/Fighter Aircraft | 1 flight within previous 14 days, 2 flights within previous 30 days |

d. Instructor/IUT currency:

| Time since last flight | Warm up Criteria |
|---|---|
| 16-30 days | IPs shall complete Immediate Action Exam (IAE). First flight |

| | |
|---|---|
| | shall be a Day/VMC departure and recovery, and is limited to a Basic Stage* instructional sortie; or backseat flight with qualified IP (can be IFR or night). |

* Basic stage is defined as any Phase I or II INST, FAM, FORM, or FCLP syllabus event.

| | |
|---|---|
| 31-60 days | IP shall complete IAE; NA-13SX or a front or rear cockpit day warm-up flight with NATOPS qualified IP. |
| 61-90 days | IP shall complete IAE, NA-13SX, and a dedicated front seat flight with a current NATOPS qualified IP. |
| > 90 days | IP shall meet NATOPS currency requirements found in the NATOPS manual to include an Open/Closed Book NATOPS exam, and an IAE. |

e. Student Naval Aviators (SNA)

(1) SNAs shall comply with all IP currency requirements except where references (e) through (i) are more restrictive.

(2) Except as noted in reference (e) through (i), SNAs are limited to three man-ups and two flights per day.

101. PREBRIEF/PREFLIGHT PREPARATION

a. All aircrew shall ensure Read & Initial card is up-to-date prior to flying. CNATRA, TRAWING, MATSG and NAS staff instructor cards will be maintained on squadron read boards.

b. In addition to a flight specific kneeboard card containing the flight event, SNA name and event date for all flight events, SNAs are required to bring an up-to-date navigation bag (NAVBAG) to all flight and simulator briefs.

c. All flights should brief, to the maximum extent possible, using E-Brief, reference (j) briefing guides, or PCL

checklist.

d. SNAs shall carry airsickness bags on all flights. Airsickness episodes shall be documented on the aviation training form (ATF) for IUTs and SNAs.

e. All T-45 orientation flights will comply with references (a) and (k), and the pilot-in-command (PIC) shall ensure all requirements are completed prior to the flight. Non-T-45 rear seat crewmembers will be briefed using back seat briefing guide contained in reference (k). Non-T-45 rear seat crewmembers shall carry airsickness bags on all flights.

f. All personnel in the flight shall be present at the conduct-of-flight brief. Any changes to personnel and aircraft cockpit configuration requirements shall be updated in TIMS and maintenance control should be informed of the change no later than scheduled walk time.

102. FLIGHT RECORDS/GRADING FLIGHTS

a. Flight Records shall be completed and delivered to Maintenance Control immediately following the flight.

b. Instructors should complete ATFs immediately following a flight. For MPTS flights, IPs, at a minimum, shall complete the "Resume" post flight and may revisit the ATF within 24 hours to complete the comments section. IPs shall give an overall event grade prior to concluding the debrief (ATF, verbal, etc). In all cases, IPs shall ensure that all ATFs are completed in TIMS within 24 hours after returning to base.

103. UNSATISFACTORY FLIGHTS. When an Instructor Pilot decides that SNA performance is unsatisfactory, the instructor shall terminate that particular student's training. He may continue to "plat" the flight in order to continue the training of other students on a multi-plane event. Upon completion of the flight, the instructor shall inform the squadron Commanding Officer or Operations Officer, Student Control and Schedules immediately (not via the radio).

## II. ON DECK PROCEDURES

### 200. WEATHER RESTRICTIONS

a. Regarding flights into or through WW/CAWW aircrew shall follow the procedures outlined in reference (d).

b. To launch aircraft into or through a Convective SIGMET the following must be satisfied:

(1) Aircraft can remain VMC for the duration of the flight.

(2) Airfield will remain VMC for the duration of the flight.

(3) Squadron CO/XO approval (notify CTW-1/CTW-2 that this action is occurring.)

c. DET OICs will be the approving authority for flights into or through a Convective SIGMET when on a combined TW-1/TW-2 detachment.

d. Maximum sustained wind for shore-based operations is 25 knots primarily due to post ejection parachute landing performance and risk of dragging.

e. For all crosswind computations, the effective wind shall be calculated to determine if the wind is within limits. Effective wind shall be determined by adding one half of the gust velocity (incremental wind factor) to the sustained wind velocity; e.g., if the wind reported as 040/20G30, the effective wind is 040/25.

### 201. FOD PREVENTION

a. FOD prevention is the responsibility of all aircrew. A complete inventory of all NAVBAGs and flight suit/G-suit pockets should be conducted before and after each flight. A maintenance action form (MAF) shall be initiated immediately for any missing items and the aircraft will be in a down status until the item is located or maintenance determines the cockpit and engine are FOD-free.

b. At no time shall any items be placed on the glare shield or on the canopy when the canopy is open. Never place

hard objects (e.g., kneeboard) on the glare shield as they may cause scratching and/or gouging of the windscreen glass. Hand-held GPS units may be used if properly secured to the glare shield.

c. All charts and pubs shall be secured prior to canopy opening to prevent engine ingestion.

d. If the engine is running, FOD screens must be in place on the left intake prior to the canopy being opened for a hot seat or maintenance action.

e. Nothing shall ever be placed inside an engine air intake or hung on crew boarding steps during pre/post-flight.

f. All kneeboard pens/pencils shall be secured by lanyard. Pens/pencils shall be of a one-piece design to minimize FOD

g. No cameras or video recording equipment will be carried in the cockpit without the approval of the Commanding Officer or higher authority IAW Ref(1).

202. BIRD/ANIMAL STRIKE HAZARD (BASH) PROCEDURES

******Review local directives for specific BASH procedures******

a. The Avian Hazard Advisory System (AHAS) is a web-based planning and advisory tool available at www.usahas.com, and shall be used by all aircrew to assess the risk of bird strikes for all flight operations. The Bird Avoidance Model (BAM) is useful in indicating the most probable BASH condition to be expected over a given timeframe. All aircrew shall check departure and destination airfield, route, and target area BASH condition (as applicable) during pre-flight planning IAW the following guidelines and procedures:

b. The Wing/Squadron Duty Officer shall check the BASH condition for home field operations on an hourly basis and should coordinate all updates/changes with Air Operations for ATIS broadcast. In the event of a conflict between the website's BAM information and the local airfield BASH condition, local airfield facilities personnel retain authority at all times to set the BASH Condition IAW their respective BASH Programs.

203. MAN-UP AND PREFLIGHT

a. Aircrew shall walk to be in maintenance control a minimum of 30 minutes prior to their scheduled takeoff on all flights. Aircrew shall not walk early without prior coordination with the Wing/Squadron Duty Officer.

b. The pilot-in-command shall maintain the responsibility for aircraft preflight on dual flights.

c. IPs shall not hide FOD in the aircraft or reposition switches, latches, or systems to test the SNA preflight performance.

d. Aircrew are ultimately responsible for ensuring all pins and covers are removed prior to flight. All six landing gear/arresting hook ground safety pins shall be removed and properly stowed prior to any aircrew commencing exterior preflight inspection. Both pilots, if applicable, shall verbally acknowledge the proper stowage and sight check of all six ground safety pins. At home field, the external pins should be removed and stowed by the plane captain. Aircrew shall pull the MDC and ejection seat pins during man-up and stow them in the map case.

e. The pilot in command shall visually check the other crew member is properly strapped in and the area is clear of loose articles or FOD on the crew member's initial flight.

f. Gear Stowage. On solo flights, nothing will be strapped into or stowed in the rear seat/cockpit.

204. EJECTION SEAT

a. Aircrew should avoid stepping on the ejection seat when entering and exiting the cockpit.

b. The command eject selector position shall be placed in the "both" position on dual training flights. On flights with non-aviators or aviator with limited ejection seat experience the command eject selector shall be placed in the FWD-BOTH/AFT-SELF position. The rear cockpit occupant will advise the front cockpit occupant of the eject selector position on the initial ICS check.

c. The ejection seat "ARM/SAFE" handles shall be moved together with a distinct ICS report and verbal acknowledgment.

d. Ejection seats shall not be "SAFED" until clear of the active runway(s).

e. Aircrew may unstrap following landing after ejection seats have been "SAFED" with an ICS report and verbal acknowledgment. Once the seats are safe and either aircrew has begun to unstrap, the crew is committed to a ground egress. FAM stage SNAs may unstrap while returning to the line after there has been a change of control of the aircraft.

f. Aircrew shall not raise or lower the ejection seat prior to strapping in or after unstrapping in order to prevent damage to the trombone fittings on the sides of the seat.

g. SNA solos shall not install ejection seat and canopy safety pin(s) during taxi.

h. Aircrew shall install MDC and ejection seat pins prior to leaving the aircraft.

205. CANOPY

a. The canopy will not be moved without verbal acknowledgment.

b. The canopy shall be down and locked prior to engine start if the IFR training hood is in place.

c. The canopy shall be fully closed and locked during taxi. If opened during troubleshooting or crew switch, intake screens shall be in place.

d. Helmet visor shall be down prior to closing/opening the canopy, and should remain down to the maximum extent possible.

e. When entering, exiting or sitting in the cockpit with the canopy open, care must be taken to ensure the canopy is "locked" in the open position to prevent inadvertent closing. Flight deck operations or heavy winds could cause inadvertent closing and injury to personnel or damage to the aircraft.

206. GROUND OPERATIONS

a. Prior to engine start, pilots must ensure no refueling

is being conducted within 50 feet of their aircraft.

b. Maximum power in the line area or CV flight deck shall not exceed 75% RPM without acknowledgement from plane captain/yellow shirt. Reduce power to idle prior to any turns in the line or when exhaust will sweep personnel or another aircraft in close vicinity ("tail pipe courtesy"). The plane captain shall be informed via hand signals prior to advancing power above idle RPM.

c. Initiate plane captain checks with a "thumbs up" signal. Hands shall remain above the canopy rail, parking brake set and rudder pedals centered. If the canopy has been closed, hands shall remain above the canopy rail. Use of the DEP during plane captain checks is authorized.

d. Hands shall remain above the canopy rail during final checks as described above. Any aircraft that returns to the line for troubleshooting will require final checks.

e. Exercise caution and notify the plane captain anytime the EMER GEAR handle is pulled or stowed on deck. When the EMER GEAR handle has been actuated, aircrew shall not turn on battery power until receiving clearance from the plane captain to ensure the troubleshooters are clear of the gear doors and wheel well areas. With battery power already applied, aircrews may stow the EMER GEAR handle only on the plane captain's signal. The pilot-in-command is the final authority and shall be consulted before stowing the EMER GEAR handle. The Pilot-in-command shall ensure A/C power has been removed prior to installing or removing landing gear pins.

f. Instrument Checks will be completed on all flights prior to the hold short. SNAs must complete Takeoff Checks either in marshal or stopped in the hold short until after the first FAM solo, then they may be completed during taxi to the hold short. After Landing Checks will be completed once clear of the active runways during taxi to the line.

g. Hot refueling is only authorized with a T-45 FOD screen covering the left intake. Review local directives for approval process.

h. In the T-45C, SNA solos shall not launch without a full GINA alignment (HYBD boxed).

i. For afloat operations in the T-45C, IPs may launch when headings and attitudes are available.

j. The parking brake shall be set anytime the chocks are in place, except as indicated in NATOPS (e.g. Hot Brakes).

207. MARSHAL/TAXI

a. Aircraft shall marshal in order to observe proper tailpipe courtesy for taxi, or as otherwise briefed by the flight lead.

b. Taxi speed outside of the line area should not exceed 15 knots ground speed for the T-45C. Taxi speed for the T-45A outside of the line area shall be no faster than a man can run. Taxi speed in the line area shall be no faster than a man can trot/walk for both model aircraft. Slower taxi speeds at night are recommended.

c. Day formation taxi interval is 150 feet, staggered from taxiway centerline, and 300 feet on centerline between aircraft in different flights. Night formation taxi interval is 300 feet on centerline. Operations at unfamiliar fields always require a 300-foot interval on taxiway centerline.

d. Section parade taxi (close formation) shall be at the flight lead's discretion. It is authorized on dual flights once FORM stage is complete.

e. A thorough brief of taxi, marshal, and hold short procedures shall be conducted prior to conduct of formation operations at fields other than home field.

208. NIGHT GROUND OPERATIONS

a. Wing and tail lights will be set and checked bright and steady prior to start. The white strobe light will remain off for ground operations, except in an emergency.

b. On night formation flights, form lights will be checked before leaving the line. All external lights, to include taxi light, must be operational on both aircraft.

c. The taxi light shall be used to the maximum extent possible for night taxi exercising care not to blind other pilots or ground crew.

209. HOT SWITCH PROCEDURES

a. In addition to the procedures outlined in reference (b), aircrew changes will be accomplished as follows:

(1) Pilots will not climb a boarding ladder or exit the cockpit of a turning aircraft while carrying a NAVBAG. All necessary cockpit items will be handed to/from the cockpit occupant and personnel on the ground.

(2) Control of the aircraft shall be passed verbally to the other cockpit occupant, then the disembarking aircrew will egress normally. Embarking aircrew will then enter the cockpit and accomplish the normal strap-in procedures. If no other aircrew is to embark, the plane captain shall secure the aft cockpit for solo flight.

(3) Solo pilots shall not disembark until the relieving pilot is alongside the aircraft and ready to enter the cockpit. Once the relieving pilot is seated in the cockpit, the disembarking pilot shall conduct a thorough brief on the aircraft's status.

(4) Once the pilot switch has been accomplished, the aircraft will be subject to the normal final check inspection and then depart for the next mission or marshal area as necessary.

210. VTR TAPES. VTR tapes should be used on all flights from takeoff to landing. All 8mm tapes shall be labeled with individual's name, rank and squadron/unit.

211. T-45C ADR OVERFLOW/DEGRADE/AIRCRAFT EXCEEDANCE

a. Discovery of an ADR memory overflow "X" on the BIT/MANT display during operations at home base or a detachment site where maintenance support is available, shall require an ADR download prior to flight. Aircrew experiencing an ADR memory overflow during cross-country operations shall notify the Wing/Squadron Duty Officer, who shall notify the chain of command and maintenance. Before continuing, consideration shall be given to the number and type of missions (instrument stage vice more dynamic ONAV stage) that remain to be flown before download can be accomplished.

b. Any aircraft experiencing an ADR degrade (ADR DEGD) will be in a down status until resolved by maintenance.

c. An aircraft exceedance "X" on the BIT/MANT display is a downing discrepancy and maintenance shall be notified immediately.

## III. LOCAL FLIGHT OPERATIONS

### 300. COMMUNICATIONS

a. COMM 1 is the primary radio. COMM 2 is the auxiliary radio and shall be used as required during the mission, with the following guidance:

(1) COMM 2 will normally be used for Tactical, Base, and ATIS.

(2) SNAs shall report de-selection of either radio via the COMM select panel.

(3) Always monitor Guard.

b. Student solos will use a "Solo" suffix to their call sign when communicating with local ATC agencies (e.g., "TALON 108 Solo").

c. Formation radio check-ins will not normally be made on ground or tower frequencies.

### 301. TAKEOFF

a. The white strobe light shall be used from takeoff until landing on all flights except when use causes disorientation.

b. For BASH mitigation the taxi/landing light shall be turned on from takeoff to landing except when its use causes disorientation or during FCLP/CQ stage events. All full stop landings shall use the taxi/landing light.

c. Aircraft with less than 2500 pounds of fuel or with carrier pressurized tires shall perform engine run-up checks at 90% RPM to prevent tires skidding on the runway. The throttle will be advanced to MRT at brake release after engine run-up checks are complete.

d. Students shall not reconfigure the gear or flaps on dual events unless cleared by the IP.

e. Aircrew shall check that the landing gear handle is fully seated in the up position after raising the gear prior to 200 KIAS. If the gear handle is not fully seated up in both cockpits, remain below 200 KIAS, lower the gear and return to land.

f. Hot mic use is encouraged during takeoff and full stop landing on dual events.

302. FORMATION TAKEOFFS

a. During formation sorties (unless briefed otherwise), the wingman's taxi light will be used as an indication of a completed takeoff checklist and readiness to take the runway.

b. Section takeoffs are authorized under the following conditions:

(1) Only with similar external store configuration and fuel state within 500 lbs. Dissimilar pylon configuration loading is permissible, but the pylons may not be loaded with external ordnance.

(2) On a dry runway with no more than 10 knots of crosswind.

(3) On SNA solo events, a section takeoff may be performed only if it was successfully completed on a previous safe-for-solo check.

(4) Minimum runway dimensions for a section takeoff are 8000 x 150 feet.

c. The minimum interval for multi-plane take-offs is 7 seconds. If directional control of the aircraft or braking action is a concern, a longer takeoff interval should be considered.

d. The minimum runway width for one or two aircraft on the runway is 100 feet.

e. The minimum runway width for three aircraft on the runway is 150 feet.

f. The minimum runway width for four aircraft on the runway is 200 feet.

g. Multi-plane events may use the dual runways for takeoff (if available and traffic permitting) when fully briefed by the flight lead.

h. The lead aircraft shall line up on the downwind side of the runway for all multi-plane launches.

303. TAKEOFF ABORTS

a. Abort criteria and procedures shall be thoroughly briefed on every event. The decision to abort should be based on weather conditions, runway conditions and length, specific malfunctions, and the indicated airspeed at which those malfunctions may occur. Once the decision to abort is made it should not be reversed, and the priority shall be stopping the aircraft safely on the remaining runway. If another takeoff will be attempted after an abort, the aircrew shall notify maintenance and receive final checks with special consideration given to the possibility of hot brakes.

b. Sympathetic abort criteria shall be thoroughly briefed by the flight lead on every multi plane flight. On multi-plane flights executing an interval takeoff, when any aircraft is aborting, succeeding aircraft with 80 knots or less (based on 6000 foot wet runway max abort speed) should sympathetically abort with consideration given to computed maximum abort speed and runway remaining. Only the words "ABORTING" and "CLEAR" shall be used over the radio to avoid confusion. The word "CLEAR" indicates the first aborting aircraft may move to runway centerline and lower the hook for a long field arrestment. If the first aborting aircraft does not hear the word "CLEAR" the pilot is obligated to pass up the long field gear and remain on the assigned side of the runway.

c. When executing a section takeoff, there shall be no sympathetic aborts. If both aircraft must abort, the aircraft farthest down the runway shall maintain his side of the runway and pass up the arresting gear unless he hears the word "CLEAR" from the trailing aircraft.

304. RENDEZVOUS

a. Unbriefed rendezvous airspeed:

| | |
|---|---|
| Clean | - 250 KIAS |
| Dirty (1/2 or full flaps) | - 150 KIAS |

b. Unbriefed rendezvous and formation flights are not authorized except in the case of a malfunction or emergency.

305. RADAR ALTIMETER (RADALT) USE

a. The RADALT/Low Altitude Warning (LAW) tone shall be acknowledged by both crewmembers. RADALT/LAW settings shall be verbally acknowledged (T-45A/T-45C) and matched between the front and rear cockpits (T-45A) on all dual flights. SNAs shall notify the IP when a change in RADALT/LAW setting is required and/or made.

b. For takeoff, set RADALT/LAW at 200 feet for low altitude awareness during initial climb and gear/flap transition. For a CV launch, set RADALT to 40 feet in the event the aircraft settles off the catapult.

c. When above 5,000 feet the RADALT tone shall be set at 5,000 feet ("platform"). The RADALT/LAW warning tone will sound when descending through platform and the "minute-to-live" rule shall be applied. The pilot at the controls shall inform the other occupant verbally upon reaching platform. If intermediate altitudes are assigned below 5,000 feet, the RADALT shall be set 10% below the assigned altitude.

d. During low-level navigation flights the RADALT shall be set as required but no lower than the minimum authorized altitude minus 10 percent.

e. Use of the RADALT/LAW during instrument approaches shall be as a backup to the barometric altimeter for cueing at minimum descent altitude or decision height. The RADALT/LAW shall be set to Minimum Descent Altitude (MDA)/Height Above Airport (HAA) less 10% for non-precision approaches, and at Decision Height (DH)/Height Above Touchdown (HAT) for precision approaches.

306. FLAPS

a. The normal configuration for full-stop landings is full flaps.

b. The configuration for practice instrument approaches with no intent to make a full-stop landing should be half-flaps. Half-flap touch-and-go landings are permitted at the conclusion of the instrument approach.

c. At the completion of an instrument approach, the pilot-in-command may reconfigure the aircraft to full flaps on short final. Solo SNAs who intend to full-stop at the completion of an instrument approach should make every effort to execute the approach at full flaps. To assist in more effective aircraft sequencing, approach control must be informed of the slower final approach airspeed.

d. No-flap full stop landings are non-standard and shall be considered an emergency.

e. All no-flap touch-and-go landings at night shall be flown from a straight-in approach only. All no-flap landings shall be to runway centerline.

f. Flaps will normally be lowered with the gear unless syllabus requirements call for a no-flap landing. SNAs shall not reconfigure the aircraft without verbal acknowledgement from the IP.

307. SECTION INSTRUMENT APPROACHES

a. Section practice approaches should be flown at half flaps and 150 knots IAS. The touch-and-go/rejoin syllabus maneuver may be conducted at half flaps.

b. The lead aircraft on night section approaches should have the taxi/landing light off.

c. Section approaches that terminate with a full-stop landing may be planned to split the dual runways (if available), take separation on final, or drop off the wingman on final, depending on runway configuration, conditions, and flight lead discretion.

(1) When taking separation on final, the wingman shall be detached no later than circling minimums and the wingman shall immediately extend flaps to full and slow to on-speed.

308. FUEL

a. All aircrew shall adhere to the following fuel planning guidelines:

(1) Day, with forecast weather greater than 3000/3, aircraft shall full stop with a minimum fuel state of 400 pounds.

(2) At night or weather <3000/3, all aircraft shall full stop with a minimum fuel state of 500 pounds.

(3) All solo SNAs shall full stop with a minimum fuel state of 500 pounds.

b. "JOKER" fuel is a pre-briefed fuel state above BINGO intended to advise lead of the flight's fuel status. Lead shall positively acknowledge any JOKER call.

c. "BINGO" fuel is defined as the fuel state at which maneuvers must be terminated to rejoin the flight and comply with local course rules to be enroute to the destination airfield via
the required local VFR/IFR arrival procedures in order to preserve sufficient fuel for the approaches and landings required to complete the mission.

Note: During CV/CVN operations, BINGO fuel is defined as the specified fuel state that requires declaring an emergency and immediately intercepting the NATOPS BINGO profile to the nearest suitable BINGO field.

d. "EMERGENCY FUEL" shall be declared any time the computed on-deck fuel state will be less than 350 pounds, or the LOW FUEL caution light has illuminated. SNA solos shall declare "EMERGENCY FUEL" should they anticipate landing with less than 500 pounds of fuel.

e. T-45C bingo fuel setting shall be set at pre-briefed JOKER fuel, followed by pre-briefed BINGO fuel, then 500 pounds for shore-based operations. For CV operations, T-45C bingo fuel setting shall be set to HOLD DOWN fuel followed by BINGO fuel.

309. OVERHEAD BREAKS/FORMATION RTB

a. Maximum authorized break airspeed is 350 KIAS or as restricted IAW the airfield Air Operations Manual.

b. Formation flight leads should maintain a minimum of 80% RPM on RTB.

c. Standard break interval at the field is four seconds. Any interval less than four seconds shall be briefed thoroughly.

d. Fan breaks require an IP in each aircraft.

e. Aircraft that have extended three or more miles upwind shall make a mandatory "crosswind __ nm" call on tower frequency.

310. LANDINGS

a. Use of runways less than 6000 feet in length requires Training Air Wing Commander approval.

b. Maximum 90-degree crosswind component for SNA solos to land or conduct a touch-and-go landing is 10 knots. If winds are out of limits the SNA shall terminate landings, and request runway change and delta easy until it occurs (fuel permitting). If no acceptable alternate runway or airport exists, SNA shall advise the Duty Officer and plan on a short field arrested landing.

c. All emergency, simulated emergency, FAM stage roll-and-go, and no-flap landings shall be conducted to runway centerline.

d. Full stop landings:

(1) All FAM and night full stop landings shall be to runway centerline.

(2) Runway permitting, all aircraft shall complete at least 5,000 feet of landing roll prior to exiting the runway, unless otherwise required on a FCF profile or syllabus event.

(3) Do not initiate any checklist items or change the aircraft configuration until clear of the landing runway.

e. The following maximum airspeeds shall be used to monitor sufficient deceleration during full-stop landings:

100 KIAS @ 5000' runway remaining
80 KIAS @ 4000' runway remaining
60 KIAS @ 3000' runway remaining

At any time if the aircraft is not decelerating normally with 3000 feet of runway remaining, a go-around or long field arrestment decision must be made.

311. NIGHT FLIGHTS

a. All section configuration and lead changes will be initiated over the radio.

b. Night no-flap approaches shall be conducted via an instrument or visual straight-in approach and only to runway centerline.

c. If the carrier box is not illuminated at night, all touch-and-go landings shall be on runway centerline.

d. Night visual approaches shall not descend below 300 feet AGL without a ball or other valid glide path information.

312. SIMULATED/ACTUAL EMERGENCIES

a. For simulated emergencies, the SNA shall not reconfigure the aircraft (e.g., gear, flaps, or speed brakes) and shall not reposition switches without specific IP approval.

b. In an actual emergency situation with the SNA flying under the IFR hood, the instructor shall take the controls and the SNA will remove and stow the hood.

c. In an actual emergency or non-standard situation, the pilot at the controls shall maintain control until a positive transfer of control has been accomplished (if required). The pilot not flying will assist by referencing the NATOPS pocket checklist, verifying immediate action procedures have been accomplished and provide assistance as necessary. Aircrew shall, if at all possible, contact either the base (ODO/WDO), flight lead, any IP, RDO or LSO to thoroughly discuss NATOPS procedures and available options prior to landing. As always,

NATOPS procedures, crew resource management and good headwork shall be used to handle any emergency or non-standard situation. Communicate the situation and intentions to all handling agencies and assisting personnel.

d. In a formation flight, the emergency aircraft has the option of assuming the lead. A positive lead change is still required and may be initiated by the wingman while taking separation or returning to base, as the situation dictates.

e. Passing or taking control of the aircraft shall be accomplished by positive verbal communication over the ICS, initiated by the pilot at the controls stating, "YOU HAVE THE CONTROLS." The pilot receiving control shall state, "I HAVE THE CONTROLS." The pilot relinquishing control confirms and restates, "YOU HAVE THE CONTROLS." In the case of an ICS failure, aircrew shall use the "pump to pass, shake to take" method described in paragraph 503.d.

f. Immediately upon completion of any flight encountering an emergency or other abnormal situation (including a pre-flight abort), pilots shall brief the ODO/WDO, Safety office, CO/XO and complete all appropriate reporting forms/paperwork.

313. POST FLIGHT RESPONSIBILITIES

a. Expeditiously complete all necessary paperwork. (i.e. NAVFLIR, ASAP, Bird Strike, MAFs, Gradesheets)

## IV. CROSS-COUNTRY FLIGHT OPERATIONS

400. PLANNING

a. Cross-country destinations are discussed in references (a) and (c) and include out-and-in operations. Cross-country destinations shall be limited to military, co-use or approved civilian airfields.

b. Out-and-ins shall be annotated on the flight schedule.

c. Squadron SNA/IUT training cross-countries will be submitted and processed IAW applicable TRAWING policy.

401. PROCEDURES

a. All cross-country flights shall be conducted in

accordance with references (a) and (c).

b. Any incident involving aircraft damage or personal injury shall be reported to the chain of command and ODO/WDO immediately.

c. At the completion of each leg, aircraft status, and proposed departure time shall be telephoned to Squadron/Wing Duty Officer. At the RON base, all previous information plus a recall number is required. Pilots experiencing aircraft malfunctions that require maintenance assistance shall coordinate with the Squadron/Wing Duty Officer.

d. Each pilot-in-command will remain aware of weather forecasts and, if practicable, depart early to avoid unnecessary delay or operations in adverse conditions. If departure is not possible, attempt to hangar aircraft prior to snow, ice, hail or severe weather.

e. Changes to the cross-country itinerary shall be approved by the squadron chain of command and reported to the Squadron/Wing duty officer.

402. FLIGHT PACKETS. The pilot-in-command shall obtain fuel cards and flight packet prior to departing on any flight that terminates away from home field, and turn in all documents upon return. It is the responsibility of the pilot-in-command to ensure good tool control.

403. SERVICING. At least one crewmember shall ensure the refueling door is closed after refueling operations without Navy T-45 contract maintenance.

404. CROSS-COUNTRY DESTINATION/STATIC DISPLAY AIRCRAFT CHECKLIST

a. Comply with the following procedures when an aircraft is secured at a cross-country destination or utilized for static display:

(1) Ejection seat and MDC pins installed

(2) HUD/Gunsight covers installed

(3) Canopy closed

(4) Hook and landing gear pins installed. (for gas and go stops, the aircrew are not required to pin the landing gear or hook.)

(5) Panels/doors closed

(6) Intake/tailpipe covers installed

(7) Pitot tube cover installed

(8) Gust lock engaged

(9) No visitors allowed in cockpit

b. Comply with the following procedures when an aircraft stops at an airport without returning the jet to T-45 contract maintenance (gas and go's and out and ins):

(1) Ejection seat and MDC pins installed

(2) Canopy closed

(3) Panels/doors closed

(4) No visitors allowed in cockpit

c. Viewing the cockpit will be from an adjacent platform and only when a pilot is present.

d. If the Daily Inspection has expired (greater than 72 hours), qualified maintenance personnel shall perform a daily/turnaround inspection prior to departure. During an RTB, if the Daily Inspection expires while at an intermediate stop, seek command guidance.

## V. LOST COMMUNICATIONS AND AIRCRAFT MALFUNCTIONS

### 500. SECTION FORMATION NORDO

a. NORDO procedures shall be thoroughly briefed by the flight lead.

b. The NORDO aircraft should expect to become the wingman. If the flight lead is NORDO, the lead will be passed to the wingman via visual signals.

c. If an aircraft loses radio communication after the flight is joined, remain in parade position and communicate status via standard visual signals. A NORDO wingman may attempt to move to an acute position to get lead's attention.

d. If an aircraft loses radio communication while the flight is in combat spread, or otherwise deployed, the NORDO aircraft shall initially rock its wings and then set up a 30 degree AOB turn. The non-NORDO aircraft will join to the inside of the turn and prepare to assume the lead.

e. If unable to determine whether NORDO aircraft requires a straight-in approach or if a potential for penetration of IMC exists, the NORDO aircraft should be led back to a section straight-in approach. If VMC can be maintained and the NORDO aircraft is not experiencing malfunctions that require a straight-in approach, the lead may execute a visual recovery to the overhead break IAW the following procedures:

(1) The lead shall inform the tower of the NORDO wingman. Normal 4-second break interval shall be used.

(2) The lead shall request the option on the runway that the NORDO aircraft is cleared to land and request a steady green light for the wingman.

(3) If the lead is waved off the NORDO wingman shall also wave off and maintain interval on the lead. The lead will remain in the pattern until the NORDO wingman is safely on deck.

f. If the NORDO aircraft is experiencing an emergency that requires a short-field arrestment, he shall communicate this to the lead by lowering his hook. The NORDO aircraft will be cleared for an arrested landing on the runway to which the lead has aligned the section approach.

g. If an IFR recovery is required, or at night, the lead will recover the NORDO wingman via a section instrument approach.

h. The normal configuration for a NORDO section approach is half flaps. Once the NORDO aircraft is detached, aircrew should configure the aircraft for full flaps (unless NATOPS dictates otherwise).

i. Procedures for the section approach: 150kts / ½ flaps

will be used for section NORDO approach.

(1) All configuration changes will use standard hand or light signals. At night, the gear/flap transition signal will be a circular motion with a flashlight (red/blue lens, if available), with execution occurring momentarily after dropping the flashlight straight down below the canopy rail.

(2) Lead shall signal the NORDO wingman is cleared to land:

(a) Day - point to the runway, pat the dash and smartly break away from the wingman, retract the speedbrakes, climb to pattern altitude and maintain 150 KIAS.

(b) Night - turn on position and formation lights to bright, red anti-collision light immediately followed by a smart break away from the wingman, retraction of speedbrakes, and a climb to pattern altitude while maintaining 150 KIAS.

501. DIVISION FORMATION NORDO

a. If able to maintain VMC, a NORDO aircraft will be moved to the dash-2 position using the division reshuffle.

b. If IMC is expected, the NORDO aircraft shall return as dash 2 in a section. The remaining aircraft may return as a section or as singles depending upon the available section leads remaining.

502. FORMATION LOST SIGHT/INADVERTENT IMC

a. Formation flight into IMC is limited to two aircraft.

b. The wingman is responsible for collision avoidance. Any time the wingman loses sight of the lead aircraft due to inadvertent IMC, "lost sight" shall be immediately transmitted. Losing sight while IMC is an emergency.

c. Safe separation shall be maintained IAW the following procedures:

(1) In a climb or descent - the wingman shall level off and coordinate altitude separation from the lead.

(2) Straight and level - the wingman shall take a 30

degree cut away from lead's heading and coordinate altitude separation from the lead.

(3) Turn away from the wingman - wingman shall level the wings and coordinate altitude separation from the lead.

(4) Turn into the wingman - lead shall level the wings while wingman continues the turn to 30 degrees past the heading, coordinate altitude separation from the lead.

(5) Altitude, heading separation and instructions to rejoin shall be confirmed over the radio.

d. Lead shall remain predictable. Continue to call base heading and altitude after initial separation.

e. Contact ATC as necessary to facilitate rejoining the flight or establishing "radar contact" and an IFR clearance/squawk for the wingman.

f. NORDO wingman who have lost sight shall attempt to get VMC, squawk 7600, and proceed to the lost communications/lost sight rendezvous point, or as briefed.

503. ICS FAILURE

a. Check all communication cords and connections.

b. Attempt to re-establish communication using ALT ICS.

c. Attempt to re-establish communication on tactical or a discrete frequency.

d. Transfer of the controls shall be accomplished by gently pumping the stick fore and aft to pass controls and acknowledged by shaking the stick side to side. If the IP shakes the stick to take control of the aircraft, the SNA shall acknowledge the change of controls by placing both hands in view of the instructor. This technique is summed up in the phrase "pump to pass, shake to take".

504. MIDAIR

a. Aircraft involved in a mid-air will maintain visual separation from other aircraft.

b. Altitude and heading separation will be coordinated on the radio.

c. Involved aircraft will not rejoin for visual inspection.

d. Aircraft shall perform controllability checks IAW NATOPS procedures if the situation permits.

505. BIRDSTRIKES

a. If a bird strikes the fuselage, it will be assumed that it went down the intake. Throttle movement should be minimized (IAW NATOPS) and a PA will be considered during daylight/VMC, or a low oil GCA will be considered at night/IMC.

b. If a bird penetrates the canopy, attempt to establish communications with other occupant. Un-injured occupant will take control of the aircraft via ICS and/or shaking the stick side-to-side.

c. If damage to the slats is suspected, do a controllability check. If minimum airspeed is too high for landing without flaps and no damage to the flaps is evident, use of emergency flaps is recommended.

506. ARRESTED LANDINGS

a. When executing an arrested landing, use of an off-duty runway is encouraged if conditions permit. Tower may recommend an off-duty runway but the final decision (duty/off-duty) rests with the pilot-in-command.

b. Every effort should be made to have a qualified LSO on station.

c. In addition to scenarios covered by NATOPS, arrested landings should be made when arresting gear is available under the following conditions:

(1) Wet runway with standing water

(2) Student solo no-flap landing

(3) Crosswind out of limits

507. EJECTION. In a controlled ejection scenario involving a dual piloted aircraft, the aircrew deciding to eject shall call over the ICS "EJECT, EJECT, EJECT", and where the fourth spoken "EJECT" would be in tempo, pulls the handle (do not unnecessarily delay an ejection to make the ICS call). In the event of no ICS/radio, the signal is pounding with a closed fist on the side of the canopy three times, and where the fourth strike would be,
the initiating aircrew pulls the handle. The other aircrew stands by, and if ejection does not take place, backs up the initiator by pulling the remaining handle.

508. SEARCH AND RESCUE (SAR)

a. Solo SNAs who find themselves assuming On-Scene Commander will initiate the SAR effort IAW the checklist in the In-Flight Guide, then stand by to be relieved as soon as possible by an airborne instructor. Solo SNAs on SAR shall return to base when relieved or upon reaching BINGO fuel.

b. On-Scene Commander should remain on scene until SAR personnel/helicopters arrive, BINGO fuel is reached, or until relieved by a senior officer.

c. In no case will solo SNA On-Scene Commanders fly lower than 2,500 feet AGL or slower than 250 knots IAS or exceed 25 degrees AOB.

## VI. ORDNANCE PROCEDURES

600. ORDNANCE RESTRICTIONS

a. Aircrew shall not man-up an aircraft until all ordnance-loading procedures have been completed.

b. Aircraft should not fly over populated areas when ordnance is loaded.

c. Aircraft experiencing an uncommanded release shall mark their position, abort the flight, and return to base executing a hung-ordnance straight-in approach to a full stop.

d. When diverting to another airfield with hung-ordnance, inform tower or ground ASAP of hung-ordnance condition and get directions to the arm/de-arm/safe area unless instructed otherwise.

## VII. T-45A/C TRAINING MISSION EQUIPMENT GUIDE

These matrices are a guide for instructors to determine necessary systems for SNA training sorties. Listed are the systems required for flight and/or for training. For any discovered discrepancy, the pilot should use this guide to determine if the aircraft is acceptable for the mission. If a pilot accepts an aircraft, then later discovers a system failure, NATOPS systems knowledge and good judgment must dictate whether or not the aircraft can safely continue and complete the mission.

700. T-45A Training Mission Equipment Guide

| | INST | FAM | FORM | NFAM | NFORM | ONAV | WEPS | TACF | ACM | FCLP | CQ | LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accelerometer (Both) | | R | R | | | R | R | R | R | | | |
| ADR | R | R | R | R | R | R | R | R | R | R | R | R |
| Anti-collision lights (One req'd) | R | R | R | R | R | R | R | R | R | R | R | R |
| AOA exterior approach lights | | | | | | | | | | R | R | |
| AOA indexer | R | R | | R | | | | | | R | R | |
| AOA indicator (Note 1) | R | R | R | R | R | R | R | R | R | R | R | |
| Arm over-ride (Aft) | | | | | | | R | | | | | |
| Arresting hook | R | R | R | R | R | R | R | R | R | R | R | R |
| Brakes/Anti-skid | R | R | R | R | R | R | R | R | R | R | R | R |
| Cabin altimeter (One required) | R | R | R | R | R | R | R | R | R | R | R | R |
| Caution/warning/ advisory lights/tones | R | R | R | R | R | R | R | R | R | R | R | R |
| Clock | R | | | R | | R | | | | R | R | |
| Comm/ICS control | R | R | R | R | R | R | R | R | R | R | R | R |
| Control Augmentation | R | R | R | R | R | R | R | R | R | R | R | |
| Flight instruments (Note 2) | R | R | R | R | R | R | R | R | R | R | R | R |
| Form lights | | | | | R | | | | | | | |
| Fuel Qty Ind (Both) | R | R | R | R | R | R | R | R | R | R | R | R |
| HUD/Arm panel (Fwd) | | | | | | R | R | R | R | | | |
| IFF | R | R | R | R | R | R | R | R | R | R | R | R |
| Interior lights (Night events) | R | | | R | R | | | | | R | R | |
| Launch Bar | | | | | | | | | | | R | |
| Nav trng panel | R | | | | | | | | | | | |
| NWS/NWS Aug | R | R | R | R | R | R | R | R | R | R | R | R |
| Pitot/AOA heat | R | R | R | R | R | R | R | R | R | R | R | R |
| Position lights night events | | | | R | R | | | | | R | R | |
| RADALT (Note 1) | R | R | R | R | R | R | R | R | R | R | R | R |
| Steam ingestion system | | | | | | | | | | | R | |
| Strobe light | R | R | R | R | R | R | R | R | R | R | R | |
| TACAN (Notes 1,3) | R | R | R | R | R | R | R | R | R | R | R | R(4) |
| Taxi light | R | R | R | R | R | R | R | R | R | R | R | R |
| UHF/VHF #1 | R | R | R | R | R | R | R | R | R | R | R | R |
| UHF/VHF #2 (Note 3) | R | R | R | R | R | R | R | R | R | | R | |
| VOR/ILS (Notes 1,3) | R | | | | | | | | | | R | R(4) |

**R = Required for flight**

Notes:

1. Optional equipment at IP's discretion on lead events.

2. Flight Instruments include: Barometric altimeter, airspeed indicator, VSI, FC Magnetic compass, HSI, ADI, standby attitude gyro, and turn/slip indicator.

3. Optional equipment based on MCG requirements, weather, and available airfield facilities.

4. Must have one operable, either TACAN or VOR.

701. T-45C Training Mission Equipment Guide

| | INST | FAM | FORM | NFAM | NFORM | CNAV | WEPS | TACF | ACM | FCLP | CQ | LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADR | R | R | R | R | R | R | R | R | R | R | R | R |
| Anti-collision lights (One req'd) | R | R | R | R | R | R | R | R | R | R | R | R |
| AOA exterior approach lights | | | | | | | | | | R | R | |
| AOA indexer | R | R | | R | | | | | | R | R | |
| AOA indicator (Note 1) | R | R | R | R | R | R | R | R | R | R | R | |
| Arm override (Aft) | | | | | | | R | | | | | |
| Arresting hook | R | R | R | R | R | R | R | R | R | R | R | R |
| Brakes/Anti-skid | R | R | R | R | R | R | R | R | R | R | R | R |
| Cabin altimeter (One required) | R | R | R | R | R | R | R | R | R | R | R | R |
| Caution/warning/ advisory lights/ tones | R | R | R | R | R | R | R | R | R | R | R | R |
| Clock | R | | | R | | R | | | | R | R | |
| Comm/ICS control | R | R | R | R | R | R | R | R | R | R | R | R |
| Control Augmentation | R | R | R | R | R | R | R | R | R | R | R | |
| Flight instruments (Note 2) | R | R | R | R | R | R | R | R | R | R | R | R |
| Form lights | | | | | R | | | | | | | |
| Fuel Qty Ind (Both) | R | R | R | R | R | R | R | R | R | R | R | R |
| HUD (Note 1) | R | R | R | R | R | R | R | R | R | R | R | |
| IFF | R | R | R | R | R | R | R | R | R | R | R | R |
| Interior lights (Night events) | R | | | R | R | | | | | R | R | |
| Launch Bar | | | | | | | | | | | R | |
| LAW/RADALT (Note 1) | R | R | R | R | R | R | R | R | R | R | R | R |
| NWS/NWS Aug | R | R | R | R | R | R | R | R | R | R | R | R |
| Pitot/AOA heat | R | R | R | R | R | R | R | R | R | R | R | R |
| Position lights (Night events) | | | | R | R | | | | | R | R | |
| Steam ingestion sys | | | | | | | | | | | R | |
| Strobe light | R | R | R | R | R | R | R | R | R | R | R | |
| TACAN (Notes 1,3) | R | R | R | R | R | R | R | R | R | R | R | R(4) |
| Taxi light | R | R | R | R | R | R | R | R | R | R | R | R |
| UHF/VHF #1 | R | R | R | R | R | R | R | R | R | R | R | R |
| UHF/VHF #2 (Note 3) | R | R | R | R | R | R | R | R | R | R | R | |
| VOR/ILS (Notes 1,3) | R | | | | | | | | | | R | R(4) |

**R = Required for flight**

Notes:

1. Optional equipment at IP's discretion on lead events.

2. Flight Instruments include: DEP, both MFDs, standby barometric altimeter, standby airspeed indicator, standby VSI, front cockpit magnetic compass, standby attitude gyro, and turn/slip indicator.

3. Optional equipment based on MCG requirements, weather, and available airfield facilities.

4. Must have one operable, either TACAN or VOR.