









Tactical Formation Navigation Procedures T0101 / T0102





This Presentation is Classified: UNCLASSIFIED







 The purpose of this presentation is to provide the student with the requisite knowledge to conduct the T3301 Tactical Formation Navigation sim and T4201-3 Tactical Formation Navigation flights in the T-44C.







- MAWTS-1 Courseware (Tactical Formation Maneuvering)
- MV-22 Maneuver Description Guide (MDG)
- NTTP 3-22.5 Assault Support Tactical SOP (ASTACSOP) August 2016
- Air NTTP 3-22.5-MV22 Combat Aircraft Fundamentals
- CNATRA P-912 Low Altitude Planning
- NAVAIR 01-T44AAC-1 T-44C NATOPS
- Multi-Engine FTI T-44C 2014 Rev 9-14 Change 5
- Advanced M-E Low Level and TACFORM FTI 2006 Rev 06-06

Planning



UNCLASSIFIED//FOUO

NTTP 3-22.5-ASTACSOP TACTICAL POCKET GUIDE

USMC ASSAULT SUPPORT TACTICAL SOP

THIS PUBLICATION SUPERSEDES NTTP 3-22.5-ASTACSOP TPG, AUGUST 2014.

THIS PUBLICATION IS REQUIRED FOR OFFICIAL USE OR FOR ADMINISTRATIVE OR OPERATION PURPOSES ONLY. DISTRIBUTION IS AUTHORIZED TO U.S. GOVERNMENT AGENCIES ONLY. OTHER REQUESTS FOR THE DOCUMENT MUST BE HANDLED IN ACCORDANCE WITH SECNAVINST 5510.31 SERIES.

DESTRUCTION NOTICE. DESTROY BY ANY METHOD THAT WILL PREVENT DISCLOSURE OF CONTENTS OR RECONSTRUCTION OFD THE DOCUMENT.

ISSUED BY AUTHORITY OF THE CHIEF OF NAVAL OPERATIONS AND UNDER THE DIRECTON OF THE COMMANDER, NAVAL AIR SYSTEMS COMMAND.

AUGUST 2016

UNCLASSIFIED//FOUO

By compiling lessons learned from previous conflicts, operational evaluations, training exercises, tactics development programs and threat analysis, the ASTACSOP provides an organized and functional tool for successful mission planning, briefing and execution.



Planning











- The simulator Event and the first flight will always use the MELLONS / SHINERS Route. The second flight (out and in) will be assigned by your JMPS instructor. The second flight will either be the NINJAS / VR-168 or the MARINES / OSPREYS. Both routes will be conducted on first half of the out-and-in with the second half being VFR flight briefed from a sectional.
- Entire Route shall be conducted in Combat Spread with exception of IP inbound or at discretion of the flight lead based on METT-T
- Holding Areas (HA's) shall be planned for and named after a female with first letter in congruence with cardinal direction in relation to the Objective Area (i.e. "Wendy" for HA west of Obj Area)
 - left turns, 5NM legs
 - Anchored off of the point prior to the IP or off of an identifiable terrain feature
- Initial Point (IP's) shall be named after a vehicle make or model with first letter in congruence with cardinal direction in relation to the Objective Area (i.e. "Subaru" for IP south of the Obj Area)
- Utilize "minute plus" when planning timing from IP to LZ (to account for slowdown) *if using 180 KGS, or use 120 KGS for that leg.*
- L-Hour's should be planned to the nearest 5 minute time, adjust the take-off time accordingly.
- ESA: 1000' above highest obstacle for the ROUTE (w/in 25NM) (IAW NAVMC 3500.14C)
- MSA: 500' above highest obstacle for the LEG (w/in 5NM) (IAW NAVMC 3500.14C)
- A/A Tacan shall be assigned as follows:
 - Flight Lead's personal callsign number
 - Dash-2 and Dash-3, 63 off of Lead's number
 - (i.e. Lead: 62Y, Dash-2: 125Y, Dash-3: 125Y
- MSAs for each leg shall be inserted in the "FRQ" column of the form-70; ESA shall be in Big BOLD letters in a field at the top
- Turn points are planned to be flown over not flown by
- Mission Fuel-The MINIMUM fuel required to fly the planned MISSION and land within NATOPS, SOP, and CNAF mins. Should be <u>one</u> fuel. (eg. KNGP→MELLONS→SHINERS→CRS RULES KNGP)
- Bingo Fuel- Fuel required from the furthest point on the route direct to the nearest approved refueling location (KNGP, KCRP, KSAT, KVCT) and land within NATOPS, SOP, and CNAF mins.



Planning

- Objective Area Diagram (IP inbound) shall contain the Following:
 - IP
 - Push time
 - LZ
 - L-hour
 - North arrow/compass rose
- LZ diagram shall contain the following:
 - Name of LZ
 - LZ information (size, description, MGRS and LatLong, etc)
 - LZ comm info
 - Ingress heading arrow
 - Egress heading arrow
 - Waveoff direction arrow
 - Sun AZ/ELV
 - North arrow/compass rose
 - Wind arrow with predicted winds typed out or pen/ink
- Smart pack shall contain the following:
 - LL/TF Briefing Card
 - NavLog (AF form 70)
 - DTF (Stick Diagram) ensure you check it over for changes
 - If flying an MTR, include the 8 $\frac{1}{2}$ x 5 $\frac{1}{2}$ SPINS . (These are the pages for that route in the AP1B.)





Briefing



ORIENTATION	Frequinon
1. TIME HACK	1. CONCEPT OF OPERATIONS (< 60 SEC)
2. ROLL CALL	A. CURRENT LOCATION / DEPARTURE
3. CURRENT LOCATION / OPERATING AREA	B. OVERALL
4 MAPS/CHARTS	C. CONTROL MEASURES (BOUNDARIES / PHASE LINES / I.P.'S / B.P.'S / H.A.'S)
5 SMARTPACK INVENTORY BRICK LOAD	D. ROUTES (INGRESS / EGRESS)
6 WEATHER (LOCAL AREA EN POLITE AND DESTINATION)	E. LANDING ZONES (PZ / PRI / ALT)
	2. SCHEME CLAMANEUVER
	(1) DECK SPOT / CROSS DECK / WAVES
1. ENEMIT (3-A-L-0-1-E)	(1) BESKER OFFICIESS BESKER WARES
A. OPERATING AREA	(3) TURN-UP
B. INTENTIONS (D-R-A-W-D) (MLCOA / MDCOA)	(4) RIO
C. CAPABILITIES AND LIMITATIONS	(5) LOADING PLAN / BUMP PLAN
D. KNOWN THREAT LOCATIONS (GROUND / ADA / SAM / AIR)	B. LAUNCH
E. NBC / LASER / ELECTRONIC WARFARE (MIJI)	(1) TAXI / TAKEOFF / FREQUENCIES
F. THREAT MATRIX (BRIEFED BY PILOT)	(2) ABORT
2. FRIENDLY FORCES	(3) RENDEZVOUS / MADSHAL PROCEDURES
A. HIGHER	(4) LATEJOIN
B. ADJACENT	. INGRESS
C. SUPPORTED (GROUND TACTICAL PLAN)	 (1) FORMATIONS / AIRSPEED AND ALTITUDES / LIGHTING / COMMUNICATIONS / ORDNANCE / NAVIGATION / SENSORS (FALCONS)
D. FIXED WING	(2) FENCE CHECKS
E. ROTARY WING	(3) ESA / MSA
F. AMPHIBIOUS SHIPS	(4) NVG CONSIDERATIONS
G. FIRE SUPPORT COORDINATION MEASURES	(5) CONTROL MEASURES
H. MISSION ASSETS	(6) CIPST PROBABLE POINT OF ENEMY CONTACT
MISSION	D. OBJECTIVE AREA
1. MISSION STATEMENT	(1) ROULES
A L-HOUR / H-HOUR	(2) DECONFLICTION (TIME / SPACE / ALTITUDE / DESCENT PT)
B MISSION PRECEDENCE	(4) CONTROL MEASURES
C SECONDARY MISSIONS	(5) PRI / ALT LANDING ZONE CONSIDERATIONS (SIZE / LANDING PLAN /
D TASKS (SPECIFIED / IMPLIED)	DIRECTION / FORMATION / ITG / WAVEOFF)
2 COMMANDER'S INTENT	(6) FIRE SUPPORT PLAN
	(7) "WINTER / DEVIL" CRITERIA
A. (PURPUSE/ENDSTATE)	(8) IMMEDIATE REEMBARK / EMERGENCY EXTRACT

TILTROTOR LOW-LEVEL/TACFORM BRIEF

- 21/1JINZ1
- 1. CALL SIGNS/TACAN/AIRCRAFT ASSIGNMENTS/PARKING
- LEAD
- DASH 2 _____
- DASH 3 _

2. WEATHER / NOTAMS / BASH / DECONFLICTION

- 3. RADIO PROCEDORES AND FREQUENCIES
- OUT OF CHOCKS WITH BASE 140.325
- INTRAFLIGHT: PRIMARY: 140.52 / SECONDARY: 140.95 / TERTIARY
- COMM DELEGATION (BASE/PEG BASE/ATIS)

4. GROUND PROCEDURES

- LEAD COORDINATES CLEARANCE AND TAXI
- NAV LIGHTS ON
- RAMP'S UP AFTER RUNUP COMPLETE
- 5. TAKEOFF, DEPARTURE, AND RENDEZVOUS
- COURSE RULES
- RUNINING / RADIAL/DME

6. ROUTES (TO BE BRIEFED BY STUDENTS)

- ORIENTATION / CONOPS
- ESA/MSA
- FENCE CHECKS
- FORMATION/ALTITUDE AND AIRSPEED/LIGHTS/COMMS/OBSTACLE/NAVIGATION
- PRI LANDING ZONE/L-HOUR/LANDING DIRECTION/CONFIGURATION POINT/WAVE-OFF/EGRESS/LEAD CHANGE

7. RTR PROCEDURES

- COURSE KULES
- OVERHEAD/STRAIGHT IN

8. FUEL PLANNING

- MISSION/BINGO
- 9. LOW ALTITUDE RULES OF CONDUCT
- BRIEF MINIMUM AIRSPEED AND ALTITUDE
- WINGMAN IS ALWAYS RESPONSIBLE FOR SEPARATION AND DECONFLICTION
- WINGMAN WILL NOT FLY STEP-DOWN WHEN LEAD IS 500' AGL OR BELOW
- AFTER A "KNOCK IT OFF" CALL, ALL AIRCRAFT IN THE FLIGHT WILL ROLL WINGS LEVEL AND ESTABLISH A CLIMB TO A PRE-BRIEFED ALTITUDE (MSA AND MSA +500)
- ALL AIRCREW WILL "KNOCK IT OFF" IF ANY OF THE FOLLOWING OCCUR:
- ANY AIRCRAFT DESCENDS AND REMAINS BELOW THE MINIMUM BRIEFED ALTITUDE - ANY AIRCRAFT DESCENDS IN A TURN THAT WAS INTENDED TO BE LEVEL
- ANY AIRCRAFT DESCENDS IN A TORN THAT WAS INTENDED TO B - ANY AIRCRAFT BECOMES NO RADIO (NORDO) OR LOSES ICS
- ANY AIRCRAFT BECOMES NO RADIO (NORDO) OR EOS
 ANY AIRCREW LOSES SITUATIONAL AWARENESS (SA)
- AN INTERLOPER ENTERS THE FLIGHT
- ANY UNSAFE CONDITION OBSERVED BY ANY CREWMEMBER
- FOLLOWING "KNOCK IT OFF", LOW LEVEL TRAINING WILL NOT BE RESUMED WITHOUT VERBAL COMMUNICATION FROM ALL AIRCREW IN THE FLIGHT
- MORE THAN ONE FLIGHT MAY OPERATE ON A LOW LEVEL ROUTE SIMULTANEOUSLY PROVIDED THE FOLLOWING:
 - A COMMON FREQUENCY IS MONITORED BY EACH FLIGHT
 - EACH FLIGHT HAS THEIR OWN DISCRETE FREQUENCY
 - FLIGHT SEPARATION ALONG THE ROUTE IS PRE-BRIEFED

10. EMERGENCIES

- ABORTS
- MIDAIR

Ramp's Up

Souls

Fuel

Alpha Chk

Yardsuic

FENCE

- AIRCRAFT MALFUNCTIONS









180°



Briefing



- Time-Hack will be conducted directly after introduction, at the next available minute. The time shall be
 obtained from the Naval Observatory website: <u>http://www.usno.navy.mil/USNO/time/display-</u>
 <u>clocks/simpletime</u>
- ORIENTATION:
 - Define the boundaries of the AO (North, East, South, West) utilizing definable features such as MSRs, Northing/Easting, Bodies of water/prominent terrain features
 - Briefly discuss overall terrain lay-down, Winds/Sun, prominent civilian built-up areas, ESA feature, routes, objectives
- CONOPS:
 - Brief the "Big Blue Arrow" from takeoff to ENDEX in <60 seconds. Save the details for SOM.
- SOM:
 - "Walk the dog" TBS-style. Do not gloss over the threats on leg slides. Discuss mitigation at first point of probable EN contact.
- Briefing Turn point: Brief the turn not a maneuver at the turn point.
- Brief the entire brief Tactical first THEN clean up all the ADMIN items at the end of the brief.
- Do not use ambiguous descriptors such as: maybe, about, should, approximately, kind of, "that's gotta be it", "we are going to pass a town", etc.
- Spend most of your briefing efforts on the Objective Area Diagram (OAD) and the LZ Diagram
 - Pause, have audience open smart pack to OAD, reorient.
 - As a technique, utilize God, Man, Mission concept to build the picture of describing the Objective Area and the LZ













1

112

14

1

S

M

Ń

Frant

3

5 200

Tower?

Power line













"Ramps up Call" Lets lead know you are ready to continue (as in, my ramp is up so I am ready to launch). Passed over intra-flight when ready to taxi to hold short in the following format:

- RAMPS UP
- SOULS
 - Provides accountability for the flight.
- FUEL STATE
 - Identifies who is the limiting factor for the flight. Drives BINGO decisions for the flight.
- ALPHA CHECK
 - Read directly off of the PFD when direct to the first point on the flight plan
- YARDSTICK
 - Pro-word for TACAN A/A
- FENCED-IN (or with exceptions)

-Ex: [LD] "Stingray 11 is RAMPS UP, 2 souls, 2400 lbs, Alpha check to Pt Bravo 035 @ 21.7, good yardstick, Fenced-In (with exceptions.)

-Ex [Wg response]"Stingray 12 is RAMPS UP, 2 souls, 2350, concur Alpha check, good yardstick, Fenced-In (with exceptions.)







FENCE-IN checks shall be completed as soon as possible after launch (or on deck prior to, with exceptions) based on the threat (or as briefed) to identify maintenance / ordnance discrepancies in preparation for mission execution. Report systems malfunctions to lead using a "BENT" call and a plain-language description of the malfunction.

Complete FENCE-OUT checks as threat and safety dictate, but no later than crossing the airfield / FOB / FARP boundary. These checks can be completed prior to departure with exceptions (Weapons, ALE, etc).

- Fire control
 - N/A
- Emissions
 - A/A TACAN set per brief
 - RadAlt (Set 10% below 450AGL)
 - Lights (Nav on)
 - Transponder
- Navigation
 - MFD Setup
 - Obstacles turned on at the 10 mile with 5 NM for labels
 - Terrain inhibit *exception*
 - Second route loaded in the secondary flight plan
 - ESA shall be input into the BaroAlt minimums under "REFS"
- Communication
 - Radios set (V/UHF ready to go to manual freq per brief) <u>exception</u>
- Expendables
 - N/A







Actions at/after each turn point:

- Hack clock once wings level
- Check winds/reset GS
- Spin new MSA into PSA and brief feature's location
- Brief what the next checkpoint is (Road bend, bridge, etc.)
- Then, update features as required







Primary navigation responsibility rests with the flight leader. All aircrew shall support the Flight Lead and challenge any perceived navigation deviation when briefed Magellan parameters are exceeded. Automated navigation systems will be cross-checked with dead reckoning.

- **Columbus procedures**. Deliberate navigational deviations shall be preceded with the proword "COLUMBUS" and the direction and distance of the deviation from a checkpoint or key terrain feature.
- **Magellan procedures**. Unplanned navigational deviation shall be challenged with the proword "MAGELLAN" followed by a steer (azimuth and distance) to the briefed course line or the next checkpoint.
 - Criteria in which to announce "MAGELLAN"
 - Unannounced deviation from route by 5 nm
 - ±2 minutes
 - Overflight of the checkpoint without appropriate turn or maneuver
- Clock to chart to ground method will be utilized primarily for Sim Events. Second Sim event will begin to demonstrate the utilization of the avionics (MFD, PFD, 120 Map Mode, FMS for timing, Prog Page, etc)
- First flight event will utilize clock to chart to ground with light reliance on the avionics available but have a basis of understanding for the following two events.
- Second and third flight event will utilize primarily the avionics in conjunction with the printed chart



Execution



TACTICAL PROWORDS / BREVITY CODES		
This section contains commonly used provords, code words and brevity codes for USMC rotary-wing and tiltrotor aircraft.		
ALPHA CHECK**	Request for / confirmation of bearing and range to described point. Joint: [A/A] Request for / confirmation of bearing and range from described point to	
	requesting aircraft.	
ANGELS	Height of friendly aircraft in thousands of feet MSL.	
BEADWINDOW	Last transmission potentially disclosed unauthorized information	
BINGO	1. Fuel state needed for recovery. 2. Proceed / am proceeding to specified base (field) or carrier.	
BLIND	[A/A][S/A] No visual contact with FRIENDLY aircraft / ground position. Opposite of VISUAL.	
BULLSEYE	An established reference point from which the position of an object can be referenced by bearing (magnetic) and range (nm) from this point.	
BUSTER	A/A) Directive to fly max continuous speed (military power). See also GATE.	
CHATTERMARK	Begin using briefed radio procedures to counter communications jamming.	
CHECK	A/A) Turn (number) degrees left or right and maintain new heading.	
CHERUBS	Friendly aircraft altitude in hundreds of feet.	
COLUMBUS*	Deviation from the briefed route due to threat, weather, timing.	
CONTACT	1. Sensor SA at the stated position. 2. [A/S] Acknowledges sighting of a specified reference point (either visually or via sensor). 3. [A/A] individual radar return	
	within a GROUP or ARM	
CONTINUE	Continue present maneuver; does not imply clearance to engage or expend ordnance.	
DEVIL*	LZ conditions do not meet briefed Winter criteria.	
FENCE IN / OUT	Set cockpit switches as appropriate before entering / exiting the combat area.	
KICK (appropriate frequency)	Change radio or data link to a specified net or frequency. See also PUSH.	
KNOCK IT OFF	A/A] [A/S] Cease all air combat maneuvers / attacks / activities / exercises (training use only).	
MAGELLAN*	Check navigation.	
YOLON	[A/A][A/S][S/A] Aircrew does not have visual contact with the TARGET/ BANDIT. Opposite of TALLY.	
NORDO*	All radios are inoperative.	
ON BOARD*	Informative call indicating that wingman is established in appropriate formation.	
POGO**	switch to previously assigned frequency.	
POPEYE	Wingman has lost sight due to weather; execute briefed IIMC plan. Joint: Flying in clouds or area of reduced visibility.	
PUSH (CHANNEL)	Switch to designated frequency; no adinowledgment required. See also KICK	
RAMPS UP*	Assault aircraft ready to lift.	
ROLEX (± TIME)	[A/A][A/S] Timeline adjustment in minutes always referenced from original preplanned mission execution time. "Plus" means later; "minus" means earlier.	
SHACKLE**	[A/A] One weave; a single crossing of flight paths; maneuver to adjust or regain formation parameters. 2. Maneuver to clear the flight's 6 o'clock position.	
STRANGLE ()	[A/A][S/A] Turn off equipment indicated.	
TALLY	A/A] [A/S] Sighting of a target, bandit, bogey or enemy position; opposite of NO JOY	
TERMINATE	In training, cease local engagement without affecting the overall exercise	
TUMBLEWEED	have limited situational awareness, (e.g., NO JOY, BLIND) and request information.	
UNIFORM	UHF / AM radio.	
VICTOR	VHF / AM radio.	
VISUAL	[A/A][A/S] Sighting of a friendly aircraft or ground position. Opposite of BLIND	
WINTER*	LZ conditions meet briefed criteria.	
YARDSTICK	A/A) Use A/A TACAN for ranging.	





Standard LL Terminology

- <u>Speed-rush Baseline (SRB)</u>: A physiological phenomenon whereby human peripheral visual perception becomes accustomed to high rates of terrain passage. This physical speed acclimatization requires lower and/or faster flight to deliver the same speed sensation.
- <u>Comfort Level (CL)</u>: The minimum AGL altitude, at which a pilot can fly and accomplish all Terrain Clearance Tasks and Mission Tasking. A perceptual concept, CL concedes individual differences and is never a hard altitude. It will vary according to terrain, aircrew skill, currency, and degree of training in the low altitude environment.
- <u>Climb to Cope (CTC)</u>: This is a maneuver where by the pilots stops his maneuvering close to the ground and climbs to a predetermined AGL altitude in order to address an urgent/emergency situation. Resumption of low altitude flight can only occur with verbal concurrence from all members in the flight.
- <u>Bucket:</u> A graphic illustration of a pilot's capacity to maintain situational awareness during high task loading and a means of teaching load shedding priorities.
- <u>Terrain Clearance Tasks (TCT):</u> Cockpit tasking involved entirely with avoiding terrain.
- <u>Mission Tasks (MT):</u> Administrative tasks conducted at comfort level essential to mission accomplishment: Navigation, lookout doctrine, communication, switchology, and threat avoidance/reaction etc. (MT = CT + NCT)
- <u>Terminate / Knock it off</u>: A radio call made in the low altitude environment which: results in the suspension of an intended low altitude maneuver (terminate), or causes a cessation of low altitude flight entirely, combined with an immediate climb to a pre-briefed AGL altitude (KIO).
- <u>Dive Recovery Rules:</u> Mathematically derived low altitude dive recovery rules which incorporate initial dive angle, maximum TAS, minimum G-loading and pilot reaction time in order to safely step down to comfort level or in the case weapons delivery avoid impact with the ground or shrapnel. Dive Recovery Rules are not utilized or flight tested in NATRACOM. **NOT CONDUCTED IN THIS SYLLABUS!!**





Standard LL Terminology

- These terms are found in the CNATRA P-912 Low Altitude Training Pub.
 - Read prior to your first flight event.
- How do we utilize these concepts to determine risk?
- How does that affect planning?
 - Think through lateral and vertical planning.
 - What are you authorized to do next to terrain?
- How may that apply in the future?
 - MV-22 LAT
 - 240 kts, 200 ft AGL, High Light Level
 - 240 kts, 500 ft AGL, Low Light Level







The following is to be read VERBATIM at the completion of every brief

- Flight will be conducted in restricted airspace, MOA, MTR or as approved by Wing / MAGTF Commanders
- Brief minimum airspeed and altitude
- Wingman is always responsible for separation and deconfliction
- Wingman will not fly step-down when lead is 500' AGL or below
- After a "Knock it off" call, all aircraft in the flight will roll wings level and establish a climb to a pre-briefed altitude (MSA and MSA +500)
- All Aircrew will "Knock it off" if any of the following occur
 - Any aircraft descends and remains below the minimum briefed altitude
 - Any aircraft descends in a turn that was intended to be level
 - Any aircraft becomes No Radio (NORDO) or loses Internal Communications System (ICS)
 - Any aircrew loses Situational Awareness (SA)
 - An interloper enters the flight
 - Any unsafe condition observed by any crewmember
- Following "knock it off", Low Level training will not be resumed without verbal communication from all aircrew in the flight
- More than one flight may operate on a Low Level route simultaneously provided the following
 - A common frequency is monitored by each flight
 - Each flight has their own discrete frequency
 - Flight separation along the route is pre-briefed





This Presentation is Classified: UNCLASSIFIED