STANT

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70TH

TACTICAL FIGHTER SQUADRON

CONVENTIONAL TACTICS

27 JAN 80

70 TFS

CONVENTIONAL TACTICS

27 JAN 1980

DEFINITIONS:

TACTICS - Tactics is the means whereby a fighter aircrew employs available resources in a given defensive environment to destroy a target with an acceptable chance for survival. Each tactical fighter unit must optimize its own tactics to maximize the unique capabilities of its own men and machines, overcome or take advantage of local environmental conditions and exploit enemy limitations. The essence of tactical fighter planning is to know and recognize your individual limitations, in terms of both aircrew training and available weapon systems, and to use this knowledge in tailoring your tactics to the enemy's limitations in a specific combat arena.

INTRODUCTION:

This Conventional Tactics guide was designed to provide 70TFS aircrews with a basic conventional attack reference. The guide presents fundamental attack options and weapons parameters which, when considered in a broader environment of target type, enemy defenses, weather, terrain, available weapons, and aircrew skill, can be used to develop realistic combat tactics. Although this guide is relatively comprehensive, it was not intended to be a single-source document. For in-depth coverage of conventional tactics, the following documents should be reviewed:

TACM 3-1
TABS
HAVE IDEA REPORT
FIGHTER WEAPONS SCHOOL TEXTS
FIGHTER WEAPONS SCHOOL REVIEW
JMEM
RED FLAG/MAPLE FLAG REPORTS

Comments and suggestions concerning this Conventional Tactics guide are solicited and should be brought to the attention of 70TFS/D Flt, ext 3375.

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CONVENTIONAL TACTICS

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SECTION I

ASSUMPTIONS

70TH TACTICAL FIGHTER SQUADRON

ASSUMPTIONS

The split, B'NAI and echelon attacks are calculated for $35^{o}/20^{o}$ DT with a $30^{o}/15^{o}$ direct back up. The double 90^{o} attack is calculated for a 10^{o} Hi-Drag, direct delivery. Tracking time on final is 3 sec for all deliveries; however, the time on final is increased if the backup delivery is used due to a lower pickle altitude, decreased release slant range, etc. For 30^{o} direct delivery, additional tracking time on final is 5 sec; for 15^{o} direct delivery, additional tracking time on final is also 5 seconds.

The sequence for the DT/DB delivery is as follows: At PUP, pull to the climb angle calculated for the DT delivery you planned to use. Continue the attack as planned for your DT delivery. If your DT works, press on! If you have to revert to your back up direct delivery, at the preplanned DT release altitude, rotate to direct, pull up to the AOD, check IPP and continue to the direct delivery release altitude.

INGRESS:

1) Airspeed - 540 TAS
2) Turn radius - 5400'
3) Degrees/Second - 10^{o}
4) "G" - 5

DELIVERY TURN RADIUS BASED ON:

1) Airspeed - 500 TAS
2) Turn radius - 6500'
3) Radial "G" - $3\frac{1}{2}$ - 4

EGRESS:

1) Airspeed - 540 TAS
2) Turn radius - 5400'
3) Degree's/Second - 10^{o}
4) "G" - 5

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SECTION II

SPLIT ATTACK

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SPLIT ATTACK

(LOW/LOW or LOW/HIGH)

Split Attack - attacks where the target is attacked from approximately opposite directions.

1. Low/High

a. The most effective geometry is just a little short of 180° from one another and different release parameters. Ideally, two-ship mutual support is maintained until approximately 4.5 NM short of the target. Lead turns 30° and pops immediately for a low angle off delivery; the wingman turns 45° and pops for an almost 90° angle off delivery. The resultant attack axes will converge at approximately 120-150°.

b. Target separation is accomplished through timing and both horizontal and vertical separation. If free fall munitions with relatively close-in release ranges are being employed, the wingman should establish some time separation over the target by delaying his roll-in. This is accomplished by delaying his pop, using more angle off, and obtaining higher release parameters than lead. As on all multi-ship attacks, the subsequent aircraft must ensure that release parameters will clear the frag envelope.

2. Low/Low: The same geometry is used as in the low/high profile with the exception of different aimpoints. At the split point lead turns 45° and pops immediately for a low angle off delivery; the wingman turns 45°, delays 5 seconds, and also pops to a low angle off delivery. The resultant attack axes will converge at approximately 160-180°. Exercise caution when selecting the aimpoints for each aircraft. Separation for MK-82s should be approximately 6000'. Because both aircraft are performing low angle off deliveries simultaneously, each aircraft must ensure frag clearance not only from their delivery, but from the subsequent aircraft's frag also. On the following page the low/low profile depicts a 180° egress. In order to maintain frag clearance for each aircraft a greater target separation is required. In this particular attack, 10,000' is required.

3. Several recovery options are available. The one selected will depend on terrain available for masking and enemy defense positions.

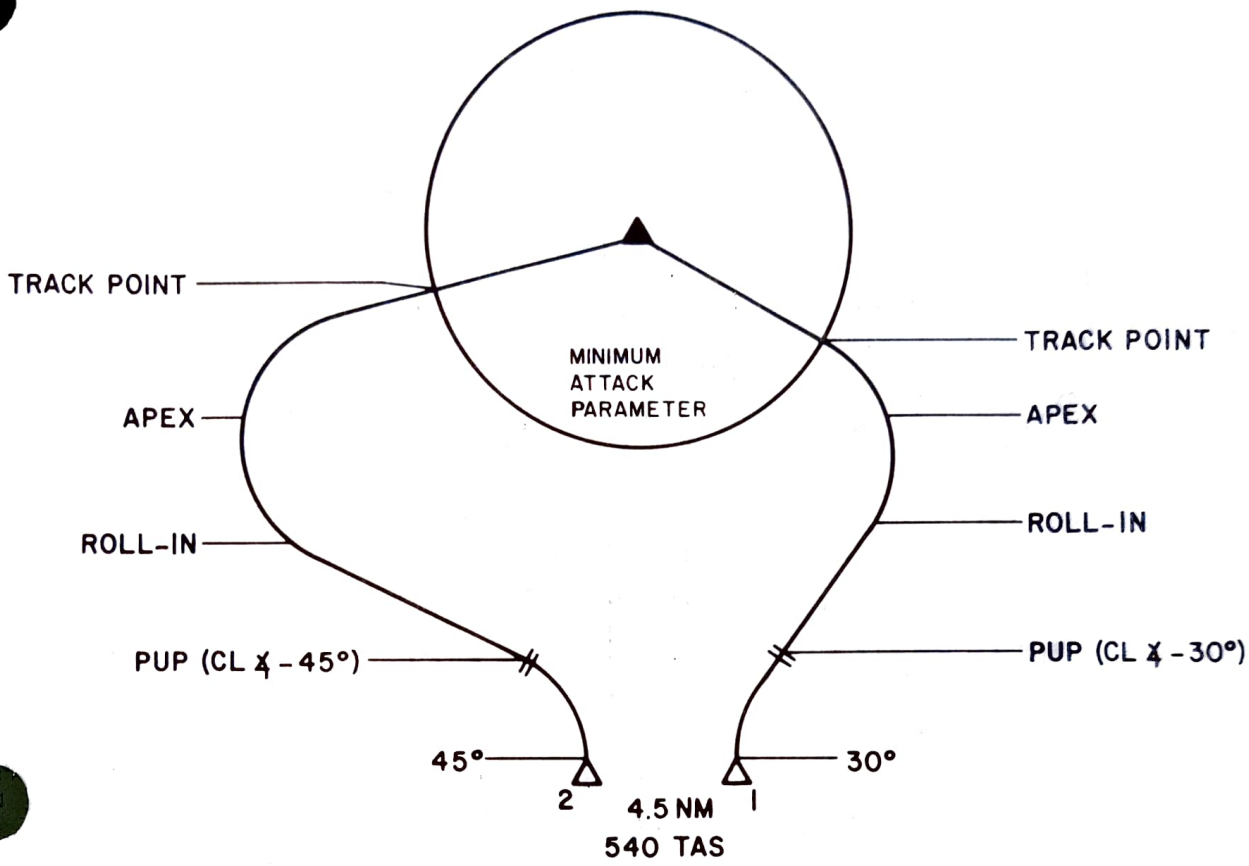
a. Advantages of split:

(1) Enemy defenses split.
(2) May cause confusion, further reducing enemy defense.
(3) Ideal for simultaneous attacks on separate targets in the same area (minimum separation).
(4) Both attacks can be low angle.
(5) Minimum time in target area.

b. Disadvantages of split:

(1) Loss of some mutual support.
(2) Potential flight path conflict over the target and on recovery.
(3) Possible frag clearance problem for the subsequent aircraft.

LOW/HIGH
SPLIT



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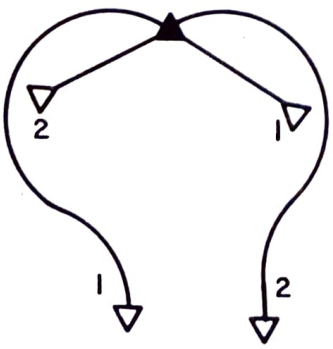
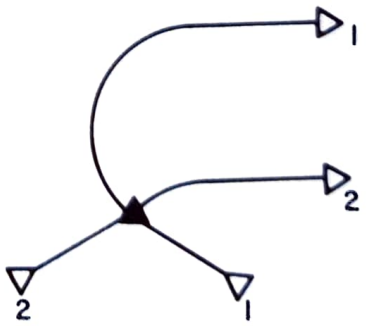
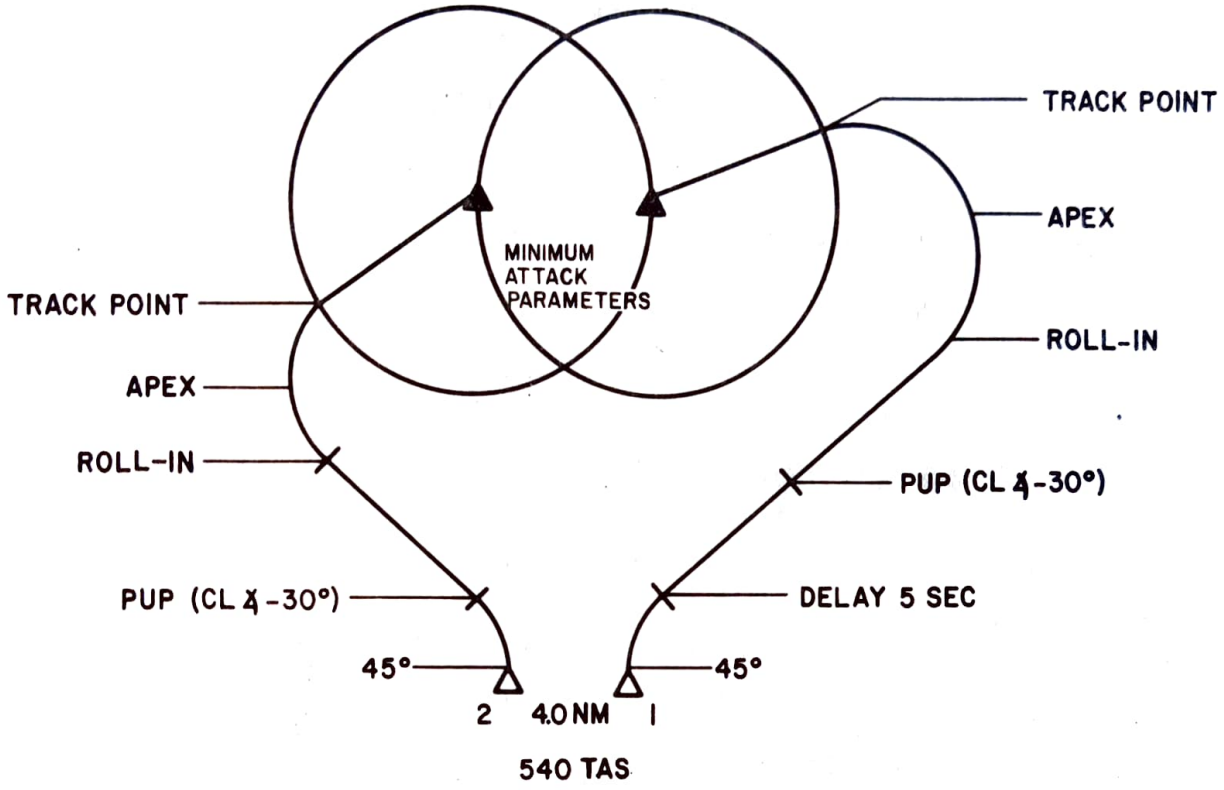




LOW/LOW

SPLIT (SEPARATE AIMPOINTS)



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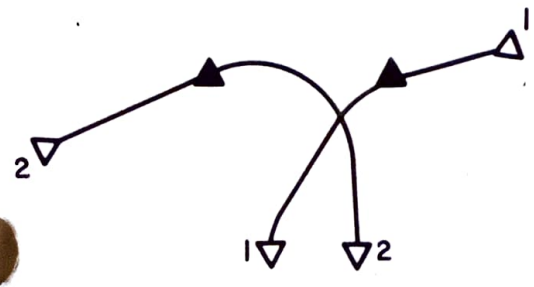

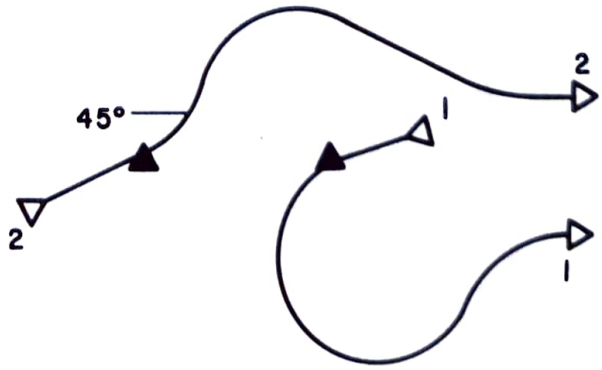

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SECTION III

B'NAI ATTACK

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B'NAI ATTACK

(LOW/HIGH)

1. The B'NAI attack was designed by the Israelis in the 1973 Mid East war to improve visual cross-coverage during a pop up attack in an SA-6 environment. Because of this greater SAM threat, the SA-6 was considered a primary threat and MIGs were secondary.

2. The B'NAI is a 2-3 NM in-trail attack formation. While lead is attacking, number two is at low altitude visually covering lead's six o'clock. Lead executes a turning recovery to minimum altitude and egress heading. In the meantime, he is in position to visually cover the wingman during his attack.

3. Number two comes off the target in the opposite direction from lead and both aircraft continue to turn until established on egress heading or line abreast, whichever is considered most important at the time.

4. The easiest way to set intrail spacing for the B'NAI is to approach the IP at nearly 90^{o} angle off with lead on the side of the formation nearest the target. At the IP, lead turns inbound and number two turns away momentarily and then back inbound.

a. Advantages of B'NAI:

(1) Maximizes each aircraft's six o'clock coverage during his pop up attack.

(2) Good offensive maneuverability.

(3) No flight path conflicts.

b. Disadvantages of B'NAI:

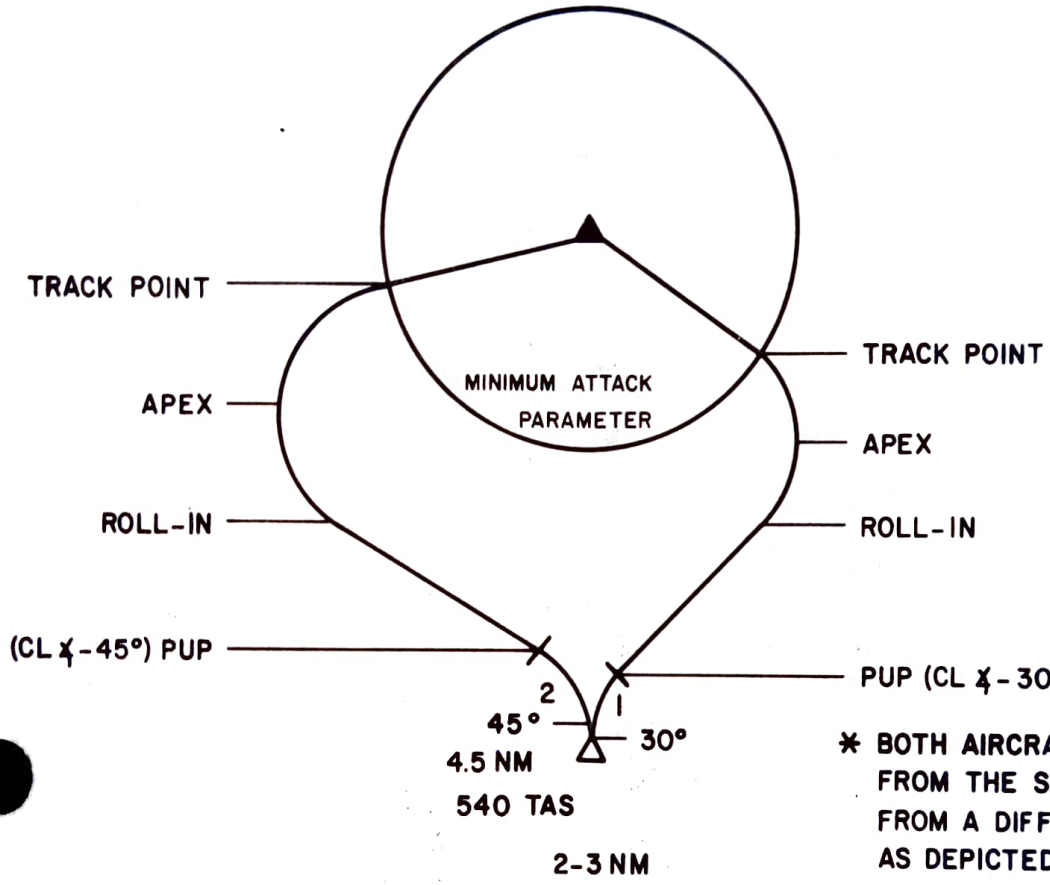
(1) No visual cross coverage from IP to the pop.

(2) Same ingress ground track.

(3) Extended time in immediate target area.

(4) Defenses alerted for number two aircraft.

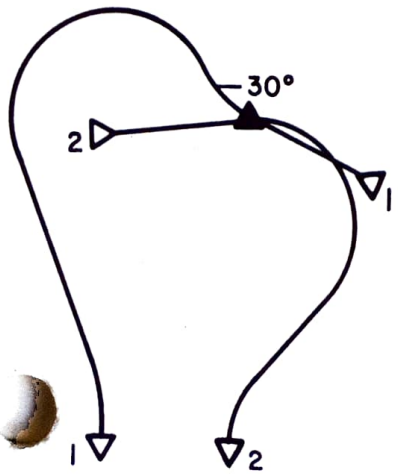
LOW/HIGH
B'NAI

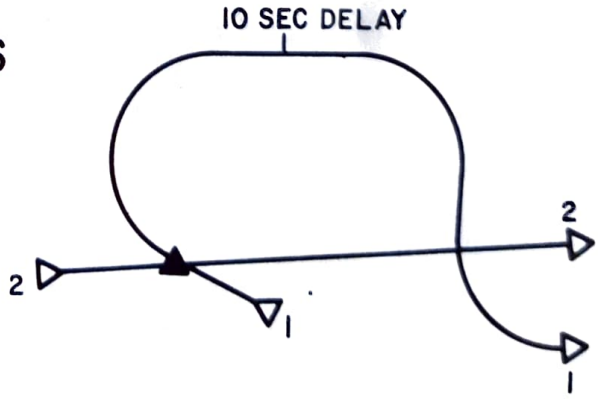


* BOTH AIRCRAFT MAY ATTACK FROM THE SAME DIRECTION OR FROM A DIFFERENT DIRECTION, AS DEPICTED.

△

EGRESS





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SECTION IV

ECHELON ATTACK

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ECHELON ATTACK

(LOW/HIGH)

Echelon Attack - Attacks where all aircraft in the formation attack from the same hemisphere.

a. Notice in the illustration that a different attack axis has been created. This allows the formation to maintain mutual support all the way to the pop point. Lead employs a low angle off low altitude delivery, while the wingman uses a 90° angle off medium altitude delivery. Number two delays his pop up five seconds and climbs to a higher and wider base. This gives the wingman spacing on lead, precluding distraction while tracking and conflict during recovery.

b. The second aircraft must ensure recovery above the highest anticipated frag. Lead should jink and turn to the egress heading so that number two can maneuver rapidly to line abreast.

(1) Advantages of echelon:

(a) Good visual cross-coverage and mutual support throughout most of the attack.

(b) Flight integrity in poor weather or limited visibility.

(c) Minimum time in the target area.

(d) Best utilized when attack axis is limited.

(e) An excellent low visibility alternate to the split for separate targets in the target area.

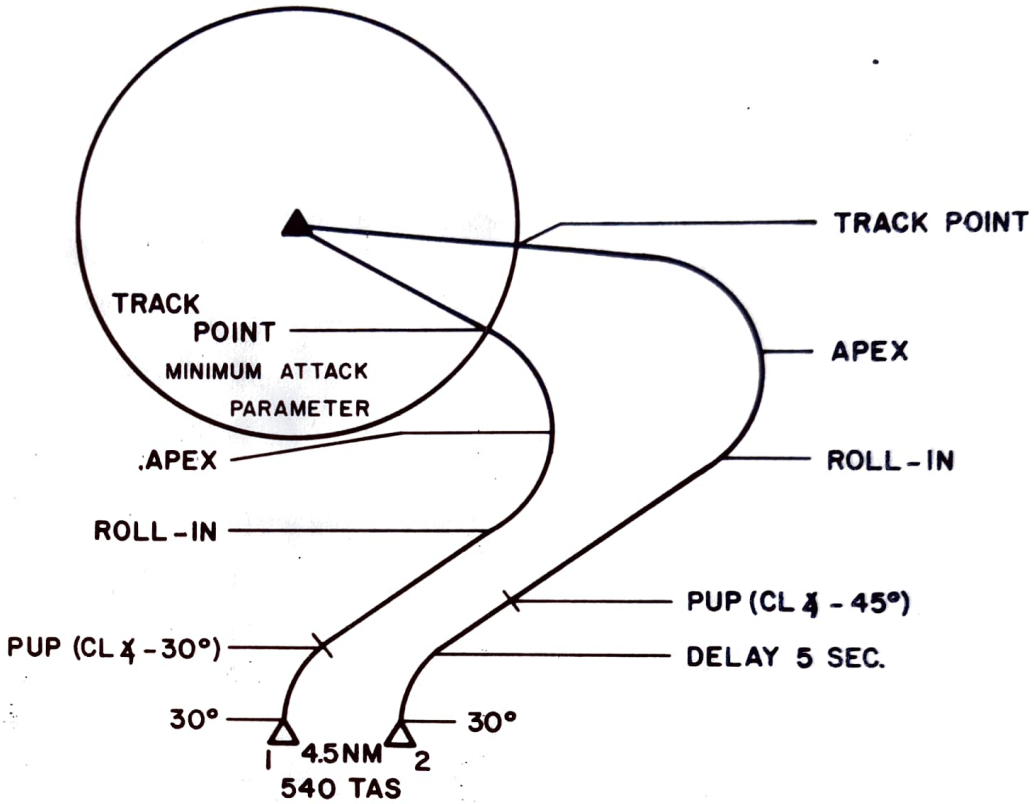
(2) Disadvantages of echelon:

(a) Minimum attack axis divergence.

(b) If wingmen doesn't delay pop up long enough, he will end up in in-trail with lead.

(c) Requires one attacker to go high to obtain frag separation.

LOW/HIGH ECHELON



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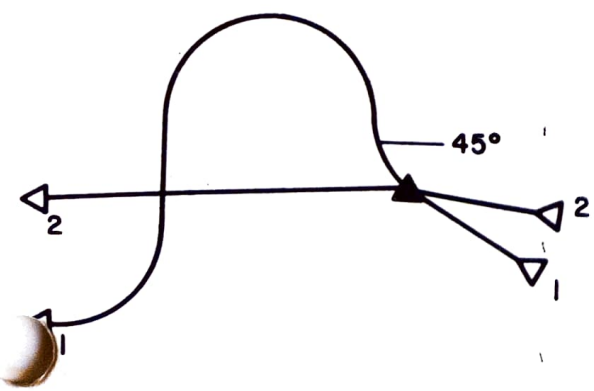

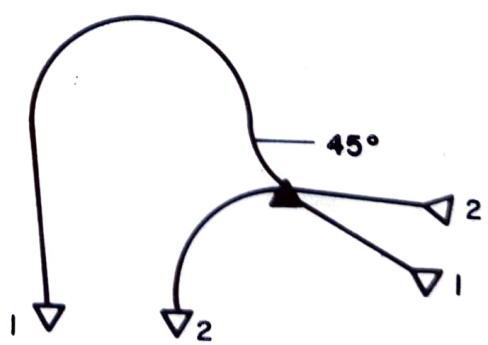

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SECTION V

DOUBLE 90 ATTACK

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DOUBLE 90 ATTACK

The double 90 attack is primarily employed when high drag weapons are being carried and time is used for frag clearance. Ideally, as in the split, two-ship mutual support is maintained until approximately 4NM short of the target. Lead turns 30° away from the wingman and pops immediately for a low angle off delivery; the wingman turns 90° into lead, delays 8 seconds and then turns 90° back towards the target. The wingman then begins his pop. (A recommended procedure is for the wingman to hack the clock on lead's bomb detonation, giving an added indication on his separation). Lead should jink off opposite the roll-in heading. This provides two things:

a. It puts lead in a position to visually clear the wingman's six as #2 completes his delivery; and

b. It provided time for number two to complete his attack and have the two-ship egress together with mutual support.

(1) Advantages of Double 90:

(a) Flight integrity in poor weather or limited visibility.

(b) Maximizes each aircraft's six o'clock coverage during his pop-up attack.

(c) Best utilized when time used for frag clearance.

(d) Ideal for low ceiling/visibility.

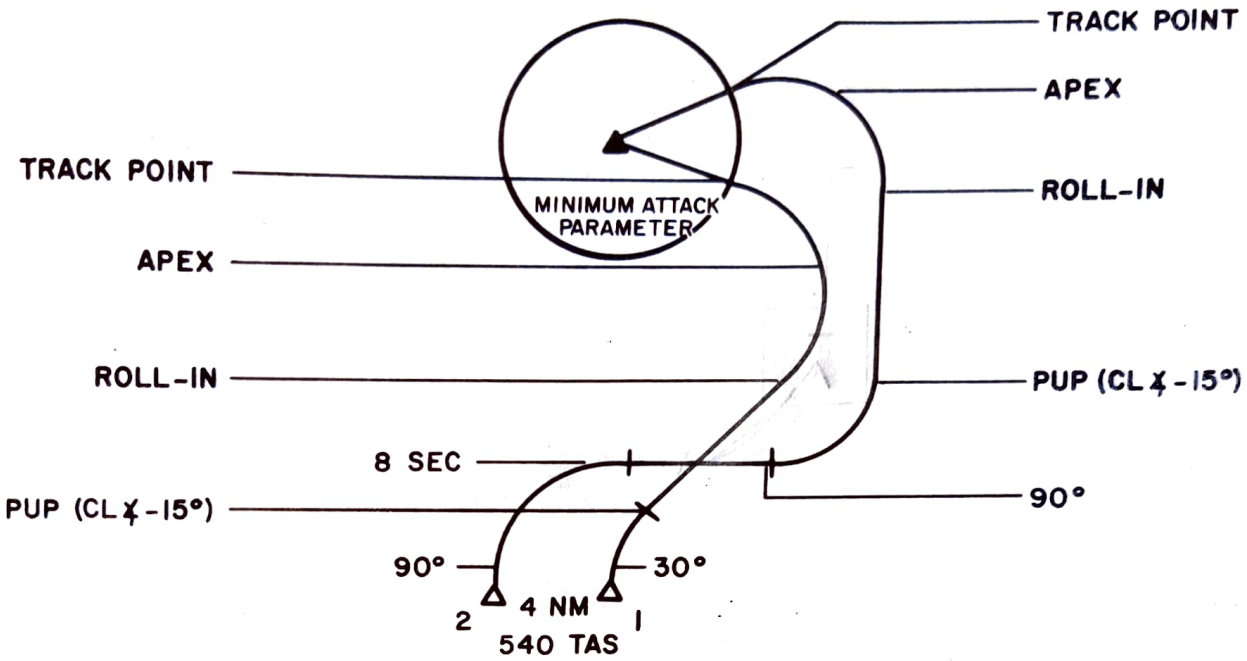
(2) Disadvantages of Double 90:

(a) Minimum attack divergence.

(b) If wingman doesn't delay long enough, frag clearance will not be met.

(c) Low altitude deliveries increase target acquisition problems.

DOUBLE 90



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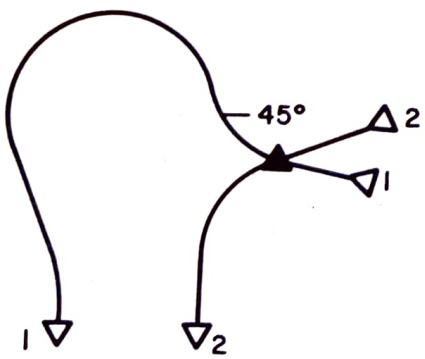

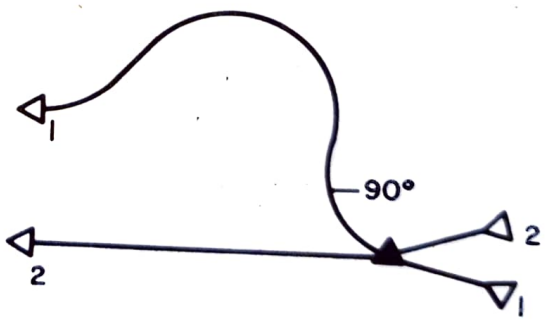

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SECTION VI

DELIVERY PLANNING SHEETS

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DIVE TOSS DELIVERY PLANNING SHEET

(CONSIDERATION'S ARE IN PARENTHESIS)

ORDNANCE (Drag index, weight, range)	-	6 MK-82LD	1 BDU-33
DELIVERY (Weather, frag, intraflight spacing)	-	35°	35°
CARRIAGE (MER, TER, or SUU, "G" Limits)	-		
FUZE (Safe separation and Safe escape, arming)	-		
RELEASE AIRSPEED	-	500 KIAS	500 KIAS
RELEASE ALTITUDE (Frag, Fuze setting, Exposure)	-	6,000'	6,000'
DRAG COEFFIENT	-	1.04	SUU 1.23 TER 1.12
PICKLE SLANT RANGE	-	10,400'	10,400'
MINIMUM RELEASE ALTITUDE/DIRECT B/U	-	4,000'	4,000'
INTERVALOMETER	-	.1	—
PATTERN LENGTH	-	870'	—
RELEASE ADVANCE	-	250	—

POP UP DATA

(ALTITUDES ARE AGL)

APEX (2 X dive ∠ X 100) + $\frac{\text{release altitude}}{2}$ = 10000

PULL UP POINT (Apex ÷ CLIMB ∠) X 60 = 13,333

CLIMB ∠ = 45°

PULL DOWN POINT (3-3½ G's) (Apex - Climb ∠ X 50) = 7,750

MAP = 10,590

NOTE: Dive Toss 4G pullout in 2 seconds

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DIVE BOMB DELIVERY PLANNING SHEET

(CONSIDERATION ARE IN PARENTHESIS)

ORDNANCE (Drag index, weight, range)	-	6 MK-82LD		1 BDU-33	
DELIVERY (Weather, frag, intraflight spacing)	-	30°		30°	
CARRIAGE (MER, TER, or SUU, "G" limits)	-				
FUZE (Safe separation and safe escape, arming)	-				
RELEASE AIRSPEED	-	500 KIAS		500 KIAS	
RELEASE ALTITUDE (Frag, fuze, arming, exposure)	-	4,000' AGL		4,000' AGL	
				SUU	TER
MILS (AOA, MILS for gas)	-	+.6 119		+.8 138	+.8 123
		H/T	X/WIND	H/T	X/WIND
CORRECTION FACTORS	-	1.07MIL/K+	12'/K+	1.2MIL/K+	12.5'/K+
PICKLE SLANT RANGE	-	6755'		6536'	6667'
INTERVALOMETER (Radar fuzing, ORD limits)	-	.1 (NORMAL)		-	
PATTERN LENGTH (Pk, accuracy of delivery)	-	136		-	
LAST BOMB OFF (Frag, pullout altitude)	-	3781' AGL		-	
AIM OFF DISTANCE	-	1500'		1650'	
IPP	-	35 Mils		45 Mils	

POP UP DATA

(ALTITUDES ARE AGL)

APEX (2 X dive ∠ X 100) + $\frac{\text{release altitude}}{2}$ = 10,000

PULL UP POINT (APEX ÷ climb ∠) X 60 = 13,33

CLIMB ∠ = 45°

PULL DOWN POINT (3-3½ G's) (Apex - (Climb ∠ X50) = 7750

MAP = 8,133

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DIVE TOSS DELIVERY PLANNING SHEET

(CONSIDERATIONS ARE IN PARENTHESIS)

ORDNANCE (Drag index, weight, range)	-	6 MK82LD	1 BDU-33
DELIVERY (Weather, frag, intraflight spacing)	-	20°	20°
CARRIAGE (MER, TER, or SUU, "G" limits)			
FUZE (Safe separation and safe escape, arming)			
RELEASE AIRSPEED	-	500 KIAS	500 KIAS
RELEASE ALTITUDE (Frag, fuze setting, exposure)	-	3400'	3400'
DRAG COEFFIENT	-	1.03	SUU 1.2 TER 1.14
PICKLE SLANT RANGE	-	10,000	10,000
MINIMUM RELEASE ALTITUDE/DIRECT B/U	-	2,000'	2,000'
INTERVALOMETER	-	.1	----
PATTERN LENGTH	-	1,080	----
RELEASE ADVANCE	-	250	----

POP UP DATA

(ALTITUDES ARE AGL)

APEX (2 X dive ~~4~~ X 100) + $\frac{\text{release altitude}}{2}$ = 5,700'

PULL UP POINT (APEX ÷ climb ~~4~~) X 60 = 11,400

CLIMB ~~4~~ = 30°

PULL DOWN POINT (3-3½ G's) (apex -(climb ~~4~~ X 50) = 4200'

MAP -=11,800

NOTE: Dive Toss 4G pullout in 2 seconds

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LOW ANGLE LOW DRAG DELIVERY PLANNING SHEET

(CONSIDERATIONS ARE IN PARENTHESIS)

ORDNANCE (Draft index, weight, range)	-	6 MK82LD	1 BDU-33
DELIVERY (Weather, frag, intraflight spacing)	-	15°	15°
CARRIAGE (MER, TER, or SUU, "G" limits)	-		
FUZE (Safe separation and safe escape, arming)	-		
RELEASE AIRSPEED	-	500 KIAS	500 KIAS
RELEASE ALTITUDE (Frag, fuzes arming, exposure)	-	2000'	2000'
			SUU TER
		+.8	+.8 +.8
MILS (AOA, MILS for gas)	-	121	140 125
		H/T X/WIND	H/T X/WIND
CORRECTION FACTOR	-	.7 MIL/K+ 10'/K+	.8mil/K+ 11'/K+
PICKLE SLANT RANGE	-	5551	5428
INTERVALOMETER (Radar fuzing, ORD limits)	-	.1 (NORMAL)	-
PATTERN LENGTH (Pk, accuracy of delivery)	-	201	-
LAST BOMB OFF)Frag, pull out altitude)	-	1886'	-
AIM OFF DISTANCE	-	2300'	2650'
IPP	-	45	60

POP UP DATA

(ALTITUDES ARE AGL)

APEX (2 X 4 X 100) + $\frac{\text{release altitude}}{2}$ = 5700'

PULL UP POINT (Apex ÷ climb 4) X 60 = 11,400

CLIMB = 30°

PULL DOWN POINT (3-3½ G's) (Apex - (Climb 4 X 50) = 4200

MAP = 7,626

= 5,

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HIGH DRAG DELIVERY PLANNING SHEET

(CONSIDERATIONS ARE IN PARENTHESES)

ORDNANCE (Drag index, weight, range)	-	4 MK82HD	1 BDU-33
DELIVERY (Weather, frag, intraflight spacing)	-	10°	10°
CARRIAGE (MER, TER, OR SUU, "G" limits)	-		
FUZE (Safe separation and safe escape, arming)	-		
RELEASE AIRSPEED	-	500 KIAS	500 KIAS
RELEASE ALTITUDE (Frag, fuze arming, exposure)	-	1000' AGL	1000' AGL
MILS (AOA, MILS for gas)	-	+.8 171	SUU TER +.9 +.9 112 95
CORRECTION FACTOR	-	H/T X/WIND 1.2mil/K+ 11'/K+	H/T X/WIND .6 7.5'/K+
PICKLE SLANT RANGE	-	3070	
INTERVALOMETER	-	.1 (NORMAL)	-
PATTERN LENGTH (Pk, accuracy of delivery)	-	202'	-
LAST BOMB OFF (Frag, pull off altitude)	-	954'	-
AIM OFF DISTANCE	-	2700'	
IPP	-	70	

POP UP DATA

(ALTITUDES ARE AGL)

APEX (2 X dive ~~½~~ X 100) + $\frac{\text{release altitude}}{2}$ = 2500'

PULL UP POINT (Apex ÷ Climb ~~½~~) X 60 = 9,999

CLIMB = 15°

PULL DOWN POINT (3-3½ G's) (Apex - (Climb ~~½~~ X 50) = 1750'

IP = 5,405