

# Flying Order Book



## Joint Strike Wing

### Record of amendments

Note amendments are marked in the margins

AL	Date	Changes
1	OCT 18	Deletion of references to F18 aircraft and 892 Sqn Inclusion of Red Flag detachment annex Inclusion of STANEVAL in ORBAT guidance on use of Guard freq Guidance on formations of more than 3 aircraft.
2	Oct 18	Inclusion of NTTR procedures
3	May 20	Inclusion of revised sqn for Joint Strike wing change of name to joint strike wing (JSW) Deletion of NTTR procedures

# Introduction

These SOPs are intended to provide flying orders for the Joint Strike Wing consisting of 801NAS, 819NAS, 43Sqn . Individual squadron SOPs may be produced for the operation of a specific aircraft type.

## General Procedures

### Deviation from SOPs

1. All Pilots of JSW will comply with these orders and instructions. Situations may occur where the pilot is required to deviate from SOPs and instructions. In such situations the pilots must make reasonable decisions to divert from SOPs based upon a risk assessment that makes the risk As Low As Reasonably Practicable (ALARP).

### Currency Requirements

2. All pilots must maintain currency in all aspects of squadron operations. Currencies will be recorded by pilots after update or renewal. Squadron Pilots are responsible for recording their own currency data.

3. Pilots must maintain basic currency in the following aspects. The list is not exhaustive and only refers to basic piloting skills. Individual Squadrons may apply further requirements for specific roles and weapons events. The list below is for basic pilot competency

- Day Landing
- Night Landing
- Instrument approach
- AAR
- NAAR
- Deck landings Day
- Deck Landings Night

## Formation Operations - General

### Callsigns

4. Formation callsigns are allocated for formation use. Pilots will adopt the callsigns allocated.

### Formation check in

5. Frequency changes will be conducted as follows:

Initial Check in:

"Vixen"

"2"

"3"

"4"

"Vixen, stud 1 go!"

—Arriving on stud 1

"Vixen"

"2"

"3"

"4"

"Ground, vixen, 4 aircraft, taxi

"Vixen, clear taxi runway 27, QFE 1003

"Taxi, 27, 1003"

6. The same principle applies for all frequency changes and communications.

**NOTE..ALLpilots should listen out on Guard frequency preset "E" or 243.0 when the second radio is not in use to enable the operating authority or other aircraft to make contact in the event of losing contact on normal operating frequencies..** Guard frequency is not to be used as a chat frequency. Guard is for emergency comms.

7. Unstud frequencies (not preprogrammed to radio) either briefed on ground as "manual1", "manual2" etc etc or called in clear if required

E.g. "Vixen, manual 1... go" ...(pilots manually tune prebriefed frequency)

"Vixen, 369 decimal 5 ... go (frequency called in clear

## Formation Operations- Training Flights

8. Formation flights will always have a competent leader. Training Missions must be preceded by a formation brief. This may be conducted by Radio On the squadron frequency prior to launch when all aircraft are crewed.

9. For flights briefed by radio, It is recommended that the formation leader follows the format shown at Annex A to brief the formation requirements. **As a minimum**, the formation leader must brief the following:

Formation Callsign  
 Formation Positions and numbering  
 Take off details  
 Rejoin Details  
 Frequencies to be used  
 Formations to be employed  
 Recovery formations and procedures

In addition, specific targeting procedures must be briefed.

## Formation Operations- Operational Missions

10. Operational formations will always have a combat ready leader qualified to lead the size of the formation employed. The brief must follow the standard briefing format and must be conducted prior to crewing into the aircraft for the mission.

## Formation operations- Normal procedures

11. standard tactical formation positions to be employed are shown here. Further detail is attached at ANNEX A

## Formation turns

12. Turns in formation are not called unless they differ significantly from the brief or normal operating procedures. Planned turns as depicted by the navigation route are not called. The aim is to preserve radio silence where possible.

## Double assisted turns

13. Double assisted turns are the standard method of turning a pair of aircraft in tactical battle formation. They will be employed when the change of heading is greater than 30 degrees. In order to maintain formation integrity, formation leaders are not to employ battle formation unless their wingmen are competent in double assisted turns.

14. Pilots will be trained in double assisted turns by SQN training officers or STANEVAL staff..

## Formation landings

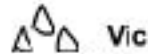
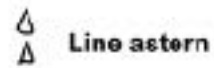
15. Formation landings must always be briefed by the formation leader.

16. Formation landings may be performed by formations of up to 3 aircraft in Vic formation. During Pairs formation landings, the wingman will remain in echelon in the upwind position. At the final stages, wingmen will look ahead and carry out individual landings. On touchdown, wingmen will immediately begin braking. In seeing the initial braking retardation, leaders may then commence breaking. Wingman will call "clear cross" for the aircraft to move to the "slow side" of the runway as appropriate. Slow side is the SOUTHERN side of the runway at KOBULETI.

## Formation take offs

17. Formation take offs must be briefed by the formation leader. Specific points will vary between aircraft types and must be covered in full to ensure a safe take off.

### Close formation positions



### Tactical formation positions



"Battle"



Fighting wing



"Card"

18. The following restrictions are in force:

- The maximum number of aircraft permitted to take off in close formation is 3
- If a formation is greater than three aircraft, leaders should plan the line up and formation take off procedures in detail. (A 4 ship should normally be 2 pairs at 5 or 10seconds)
- If 2 aircraft are taking off, the wingman should be upwind ie "wind from the left =echelon left"
- Pairs take off into low cloud is permitted if the leader is competent with instrument flight and the wingman is competent and current at close formation.
- A stream take off will be at a minimum of 5 seconds for individual aircraft and 10 seconds for a pair or vic formation.

### **Close formation- operation of services**

19. In close formation, the wingmen are only looking at the leader. In the simulated flight environment, hand signals cannot be used by formation leaders so all pilots will revert to voice procedures. The formation leader will call for the formation action. Wingmen will pause then select the required action

VIXEN, gear, gear, ..... go!

PAUSE, then SELECT

The formation leader also pause before selection to enable the operation to be carried out simultaneously by all aircraft.

Other commands available are listed below

Flap

Gear

Nozzles

Airbrake

20. On take off, at the formation leaders discretion, more experienced pilots may expect the leader to omit the calls for gear, flap and nozzle since these services are selected in a natural cadence during the take off and the wingman will observe the movement of the leaders gear, flap or nozzle as it occurs and take that as signal for selection.

### **Singleton Flights**

21. All pilots are allocated individual callsigns for singleton sorties. The initial Trigraph of JSW will be used by JSW pilots. Squadrons will allocate callsigns to individuals

### **Circuit practice**

22. Circuits are an essential skill to maintain proficiency in aircraft handling and accuracy of flight. Pilots are encouraged to practice various circuit types on return from training sorties to maintain currency as required by specific type and to practice various types of approach. The standard circuit pattern is shown below. Adherence to the basic pattern ensures the visual circuit is standard for a mix of aircraft types. Standard circuit height is 1000ft

*Notes*

*Individual aircraft procedures may adjust the circuit profile*

*Pilots should endeavour to fly compact circuits and avoid extending the downwind leg*

### **Visual Run in and Break**



23. Fast jet aircraft are permitted to join the circuit using the standard run in and break procedure. If a climbing break is performed, the minimum height on the dead side of the circuit whilst running in is to be 500ft QFE. Breaks may be performed as Singleton or in formation. If breaking from arrow formations of 3 or more aircraft, no2 MUST position his aircraft to be lower than the leaders aircraft when running in from initials. Lead aircraft MUST pitch up before the turn during the break to ensure separation from no2

### Formation run in and break.

24. Formation breaks may be carried out from close echelon formation or ARROW formation. For breaks in arrow formation with more than 2 aircraft, the "heavy" side will be in the opposite to the break direction and no2 must maintain a position lower than the leader on the run in. No2 will move lower on the run in from initials. The lead aircraft will pull up before breaking over the top of the no2

25. All pilots must exercise caution during the break manoeuvre and maintain the AOA within airframe limits and commensurate with safe control of the aircraft.

26. Normal formation break is at 3 second intervals. The formation leader will make the raid call on behalf of all aircraft. Individual aircraft must make individual finals calls. The "on the break" call is equivalent to a downwind call.

27. On landing, aircraft are to land on on the centreline and move to the slow side of the airfield. At KOBULETI, this is the south side of the airfield. This allows aircraft with brake failure or braking difficulties to maintain the centreline and remove the risk of collision with slower aircraft ahead already on the runway.

### Joining and leaving the circuit

28. Aircraft joining the circuit will normally join through initials. Initials is 3-5 miles on the extended centreline as shown.

29. Aircraft leaving the circuit or after initial take off are not restricted in their departures but must remain clear of the POTI range bombing pattern.

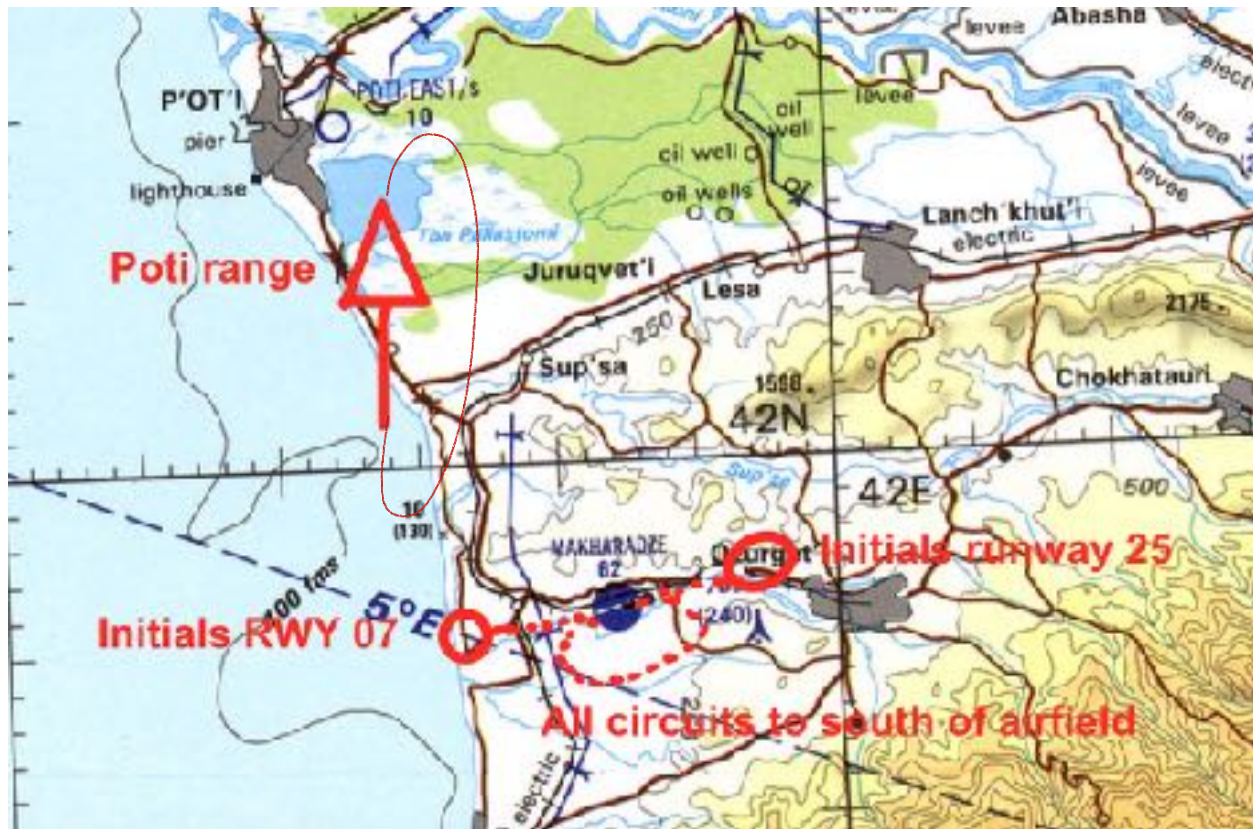
30. All circuits are flown to the south of the runway

RWY 07. Right hand circuits



RWY 25. Left hand circuits

RWY 07 is the main instrument runway



### POTI Range- Joining Procedures and range orders

31. Poti range is a local air to ground weapons range to the South East of Poti, approximately 20 miles north of KOBULETI airfield.

32. The following restrictions must be adhered to:

- The range must be contacted on the correct frequency prior to joining
- Formation are to join the range pattern along the LOA and break into the circuit if arriving as a formation... a 3 second break will be performed

- Formations are permitted to perform FRA (first run attack) at 20 second intervals without joining the range pattern and may subsequently remain in the academic range pattern or leave the pattern for a further FRA.
- Aircraft are to fly a 1500 ft downwind pattern for Retarded bomb dive attacks
- Aircraft are to fly a 500 ft pattern for Laydown passes and descend to drop height when established inbound. **PILOTS MUST EXERCISE CAUTION WHEN PERFORMING LAYDOWN ATTACKS DUE TO THE HEIGHT OF THE TREES ON THE RUN IN TO THE TARGETS.**
- Max altitude in the range pattern for CCRP/Auto bombing and LGB drops is 10000 ft to avoid gross ballistic errors
- Loft bombing is permitted
- Dive toss bombing is permitted
- All targets are right hand pattern for all events
- The LOA for all attacks is 360 +/-10 degrees
- Targets are numbered from Left to right as depicted in the range diagram below

### Range layout.

Target 1	Target 2
N42 06' 11" E041 44' 00"	N42 06' 14" E041 44'14"
N42 06.19 E041 44.13	N42 06.24 E041 44.24
elevation 16 ft	elevation 16 ft

33. The range has 2 bombing targets as shown below.





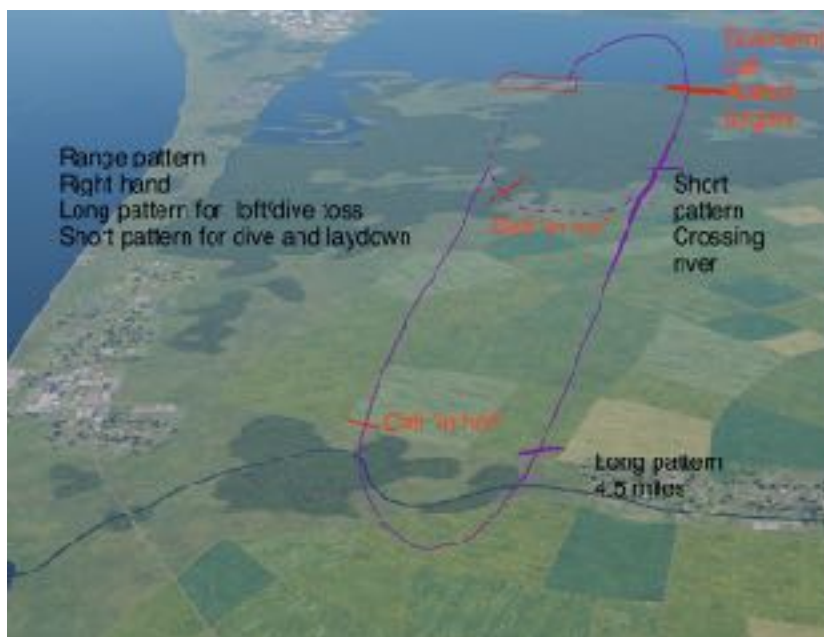
## Range Pattern

34. the range pattern for all profiles is to be a right hand pattern. For loft or toss attacks the pattern is to be extended. High altitude and high angle dive attacks are to be flown using the extended pattern. The turning points for the inbound course are as follows:

35. Short pattern (dive/laydown) abeam the river through the forest as shown in the diagram below

Long pattern (high angle dive/dive toss/loft. 4.5nm from target.

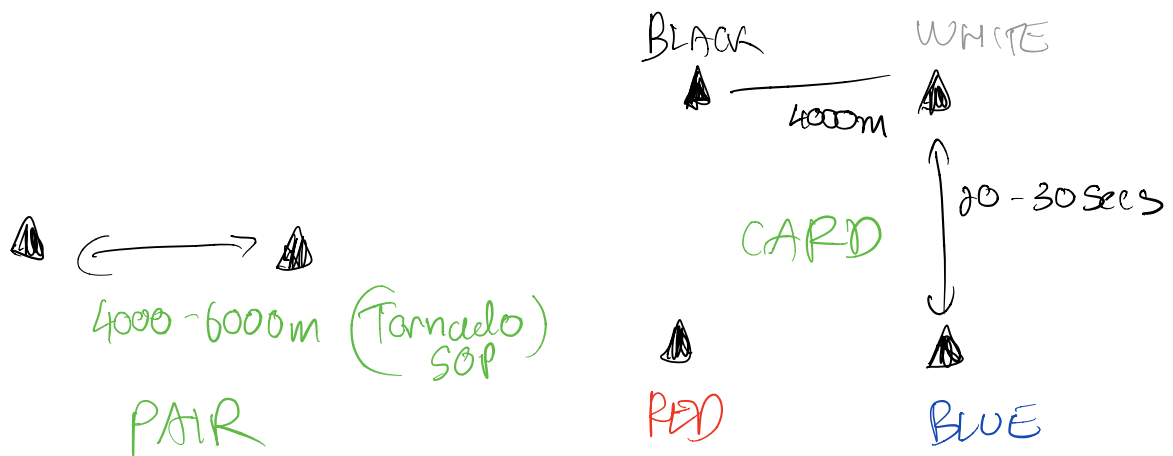
The diagram below indicates details of the range pattern and positions for radio calls.



the following restrictions are in force:

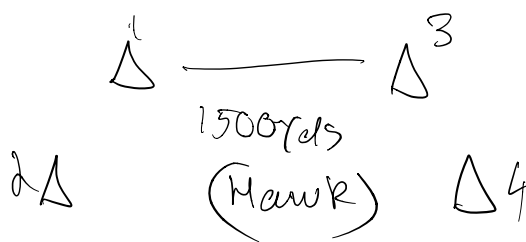
- Profiles may only be conducted on the indicated LOA
- Laser may be used for ranging and marking on all targets
- Switches must be safe before leaving the range
- Pilots must call position and intentions in the range pattern for downwind and when committing to the attack profile.
- Pilots must fly the correct profile and spacing.

AL1- Aug 17



### Battle formation

- Used for cross cover in a pair
  - Depending on size of jet (hawk = 1200-1500 yds. Tornado 4000m)
  - Double assisted turns to maintain integrity (**see later**)
  - Card formation normally used for 4 ship/6 ship/8 ship...alternative is goose
  - No3 leads rear element acting as independent pair when required
  - 20-40 seconds separate the front and rear pair
  - Some Sqns use SOP of "black, white, red blue" to nominate card position.
  - E.g. "**Red, tally 1 left 9**". = back left man sees an aircraft in his 9 o'clock position.
- Thus all know where in space the potential threat is in relation to the formation.

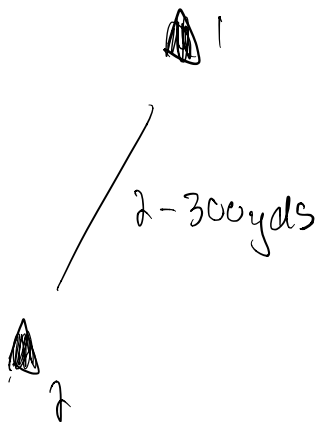


### "Chivenor" battle

Old Skool method not really used by ground attack squadrons much outside TWU in 1980's but remains available for use if circumstances dictate

1+3 operate as a pair in battle with 2+4 forming on respective leaders

1+3 use double assisted turns to maintain formation integrity. 2+4 formate on their leader in arrow or fighting wing



### Fighting wing

- Swept position with full manoeuvre behind leader at 2-300 yds.
- Good transit formation
- Lots of movement and freedom
- Not much cross cover. No2 six is exposed

### Arrow

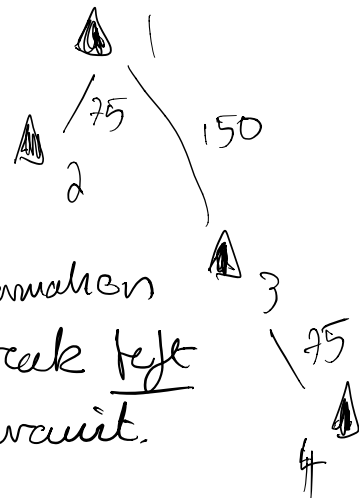
V useful tactical manoeuvring

Used for

- Tight valley flying in terrain when battle is not appropriate
- Recovery to base for run in and break
- Low level manoeuvring in poor weather
- Never below the leader
- Staggered formation if more than 2 aircraft
- All aircraft have freedom in their "slot". No3 must keep no2 movement area clear
- On visual run and break, go heavyside away from break, lead breaks over no2... MUST pull up before break

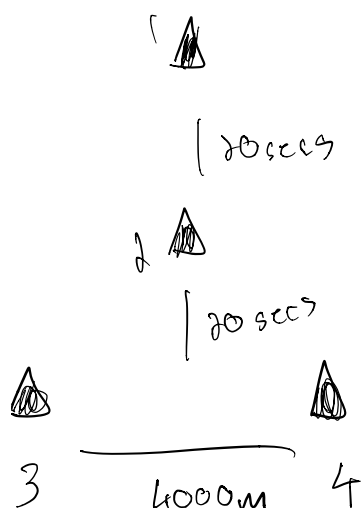


Arrow four  
"heavy side right"



This formation  
would break left  
into the circuit.

## Other tactical formations



### Goose

- Easy manoeuvrability
- Rear pair fly in standard battle pair thus swap sides on each assisted turn
- Good all round protection and takes pressure off leader

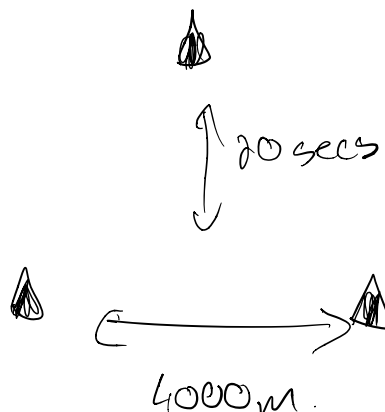
### Escort

Like a mini goose.

Used for three ship perhaps if one aircraft is u/s on start, the leader may brief escort in the "loser plan"

*The "Loser plan" what happens if someone doesn't launch  
All RAF combat ready Sqn*

*members are capable of leading up to a 4 ship in ground attack squadrons.. even first tour pilots. If perhaps the wing commander acting as leader goes u/s, the no2 takes over ... even if he is a flying officer. He has the ability. Other more experienced formation members may hold the supervisory qualification to keep him from going off on a tangent..but the junior guy does it if he is listed as no2 if the leader doesn't launch.*



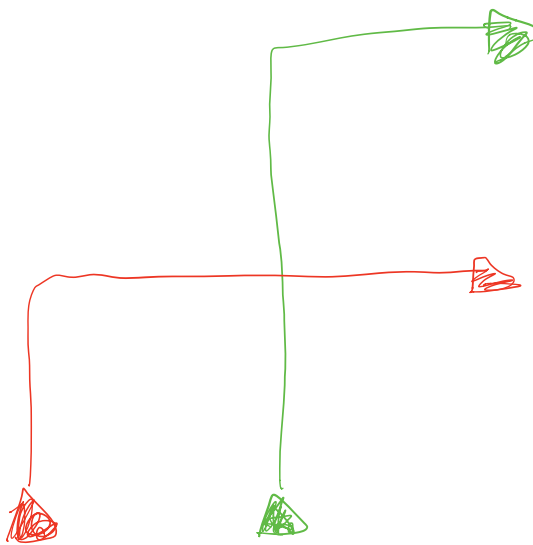
### Double assisted turns

Bread and butter stuff for all RAF tactical pilots. Taught at TWU and used always when in tactical formation at low level or medium level ops. Used by ALL fast jet disciplines (ground attack and air defence)

- Maintains formation integrity in battle formation
- Maintains cross cover of 6 o'clock for each element
- Strict rules on who avoids the other aircraft
- Uncalled turns if following route and close to desired track. =(Radio silence)

Each pilot studies the route and knows the turns coming up

- Called by leader if formation needs to be reorganised or if routing off track
- Outside man initiates
- If leader wants turn initiated cos wingman isn't paying attention.. gives lots of radio clicks or wing flashes
- All turns at 4G.. your g suit just starts to inflate at 4 g so you don't need to look in at the meter.



### The "90 starboard"

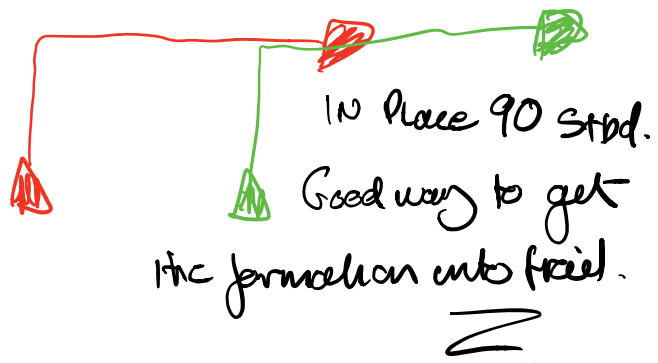
Outside man avoids  
Wait for outside man to pass your 8 o'clock and appears to move laterally behind..count 3 bananas and make your turn.

**count fewer bananas for bigger assists**

### In place turns

As it's name suggests, a turn without delay or assist. Useful for avoiding weather and making small corrections to track.

Turns less than 30 usually in place

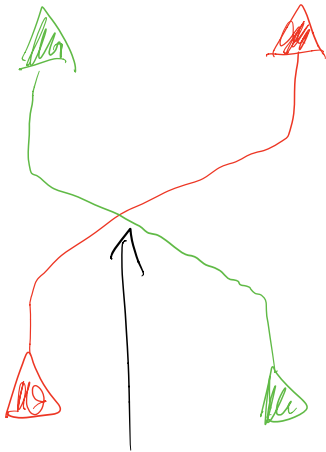


In Place 90 Starbd.

Good way to get  
the formation into final.

~





### The shackle

Used to swap sides if target brief, tactics or rtb formation requires it.

**No2 avoids**

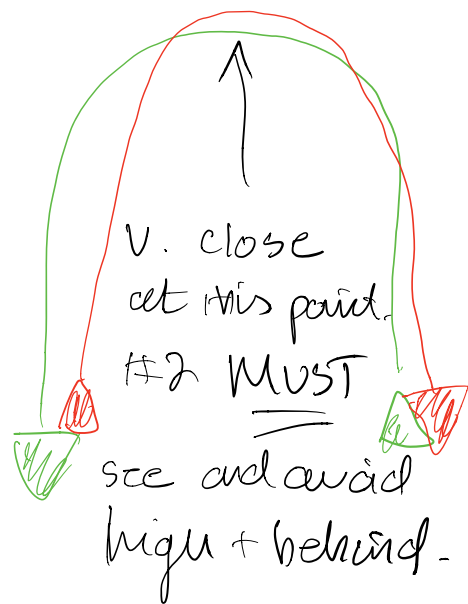
v. close here.  
#2 MUST avoid.

### Rotate

Used to rapidly return to track 6  
 ... jets remain on original side when rolled out

Good evasion tactic when bad guy threatens from close behind in between the pair.

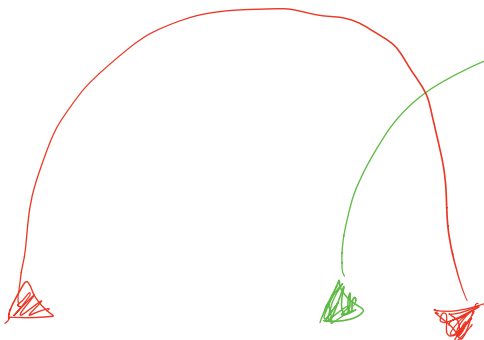
**No2 avoids**



### Turnabout

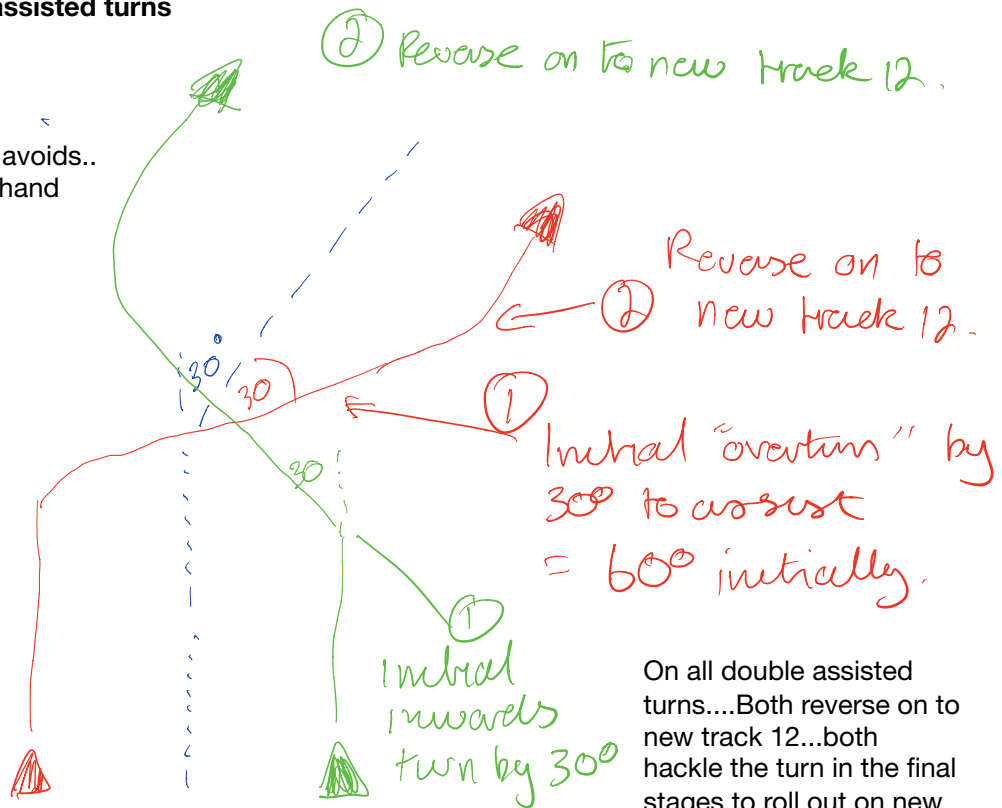
Used to return to track 6 with some displacement and to swap sides

**No2 avoids**



## Double assisted turns

30 starboard  
"Outside" man avoids..  
in this case left hand  
man



On all double assisted turns....Both reverse on to new track 12...both hackle the turn in the final stages to roll out on new track 12 in battle

The aim is to fly the same ground distance in the turns .

Assistance applies as below for other turns

Amount of turn.	Assistance
90 degrees	0. See 90 turn as described above
60 degrees	15.
45 degrees	20
30 degrees.	30
Shackle (no turn).	45

- Shackle and 90 included to demonstrate the principle that more assistance is required on smaller track change angles
- (90 is a big turn, shackle is a v small turn of 0 degrees
- Rule of thumb Assistance =  $(90 - \text{track angle change})/2$

Although after training, Sqn pilots get to know just how much by eyeballing it and **using the force**

## Condensed Close formation SOPs and general SOPs

### Runway line up and formation take off

usually as pairs

Echelon into wind "**wind from the left, echelon left**"

First wind up signal, go to max dry

Second wind-up to just above min burner aircraft types brief specific Aj value

Tap head....

..... nod to release brakes

Leader doesn't use max power to give no2 some power leeway

If no burner, one wind up signal to go approx 80%

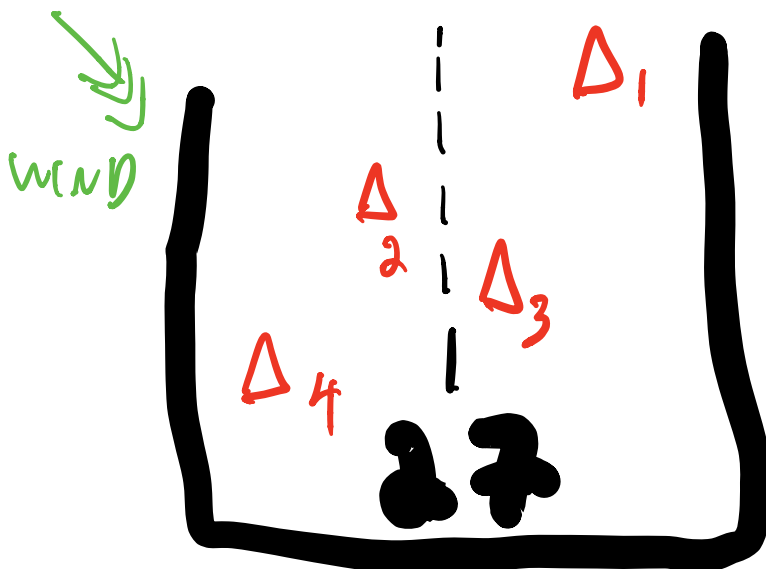
*If no2 has full power and is still dropping back, calls "**buster**".... leader reduces power slightly to help out*

### Join up of singletons after stream take off

*Brief standard climb speeds for join up, minimise radio transmissions.. always standard numbers so no calls unless really different from normal.*

### 4 ship line up

*Two pairs at 10-15 sec stream*



### Four ship line up

1+3 have one side

2+4 have other side

Keeps no4 out of jet blast  
V.v.v noisy for no3 with reheat  
equipped aircraft

2 x pairs take off

1&2 followed by 3&4

No3 leads rear pair

**Best to visualise as 2 runways  
with 1&3 on one of them and  
2&4 on the other.**

## Radio SOP

BREVITY is needed

Brief has a time hack

Brief to start up at a time

Brief a check in time

Aircraft taxi out of HAS or taxi forward a few feet prior to check in to release ground crew and to indicate to leader that they are ready.

Check in all formation frequency changes as follows at check in time.

### Initial check in at specified time

Leader "Cobra!"

#2. "2"

#3. "3"

#4. "4"

Leader. "Stud1... go".



No need for leader to say anything else..you wouldn't make the next call if you hadn't heard all the formation members

### Formation changes to new freq

Leader "Cobra!"

#2. "2"

#3. "3"

#4. "4"

Leader. "Ground, Cobra, 4 aircraft, taxi "

ATC " Cobra, clear taxi, RWY 27, QFE 1009"

Leader. " taxi, 27. 1009"

Unstudded frequencies (not preprogrammed to radio) either briefed on ground as "manual1", "manual2" etc etc or called in clear if required

E.g.

"Cobra, manual 1... go"

"Cobra, 369 decimal 5 ... go"

### Formation joining

SOP for an aircraft type. Not called on radio..power setting is not mentioned. If climbing, leader always leaves a bit of power in hand for wingmen by reducing slightly from max.

Wingman call "buster" if they are at max and leader is getting away from them. Could be due eng performance or different stores/drag/weight config

E.g., 350 its is useful transit speed  
Formating aircraft know to have 50kts overtake on level join or 20kts on turning join

## **Formation leading**

Think wingman .....always

Fly close formation lead as if you were attempting your smoothest ever instrument flying

Anticipate formation moves

Take time to position for arrival at airfield in close

- Call is "close...go"
- If radio silent or busy freq... big slow wing wiggles
- A good wingman will have anticipated and already be half way there.
- You can help if in fighting wing by a large jink 90 one way and a reversal.

## **Wingman**

Smooth movements

Join from a stable waiting position

Final moves are "forward, up and in"

Anticipate the leaders needs by thinking ahead.... bad weather coming up?.... move in to arrow... and be prepared to come into close

There is nothing more annoying as a formation leader to have a wingman on the outside of the turn not initiating a 90 port or starboard

If the wingman doesn't initiate a double assisted turn as the outside man... no problem.. because leader can initiate by turning towards him on his own assist segment.

Route turns are uncalled... radio silence

Be prepared to take the lead if leader goes U/S or if he loses pitot instruments.. he will need you to lead him back if he doesn't have an ASI.