

Insert - Air Defence Artillery (V2.4)

WARNING

ALTHOUGH NOT CLASSIFIED, THIS PUBLICATION, OR ANY PART OF IT, MAY BE EXEMPT FROM DISCLOSURE TO THE PUBLIC UNDER THE ACCESS TO INFO ACT. ALL ELMS OF INFO CONTAINED HEREIN MUST BE CLOSELY SCRUTINIZED TO ASCERTAIN WHETHER OR NOT THE PUBLICATION OR ANY PART OF IT MAY BE RELEASED.

Issued on Authority of the Chief of the Defence Staff

OPI: DAD 6-3

1999-10-01

Canada 

LIST OF EFFECTIVE PAGES

Insert latest changed page; dispose of superseded pages in accordance with applicable orders.

NOTE

The portion of the text affected by the latest change is indicated by a black vertical line in the margin of the page. Changes to illustrations are indicated by miniature pointing hands or black vertical lines.

Dates of issue for original and changed pages are:

| | | | | |
|---------------|---|------------|---------|---|
| Original..... | 0 | 1999-10-01 | Ch..... | 2 |
| Ch..... | 1 | | Ch..... | 3 |

Zero in Change No. column indicates an original page. Total number of pages in this publication is 54 consisting of the following:

| Page No. | Change No. | Page No. | Change No. |
|-------------|------------|----------|------------|
| Title | 0 | | |
| ii-iv | 0 | | |
| 8-1 to 8-50 | 0 | | |

Contact Officer: DAD 6-3

TABLE OF CONTENTS

| | |
|--|------------|
| PART 8 - ARM INSERT | 8-1 |
| TAM 804 - AD Arty | 8-1 |
| 804.01 - AD Arty Role Tactical Functions/Principles of Employment & Deployment..... | 8-1 |
| 804.02 - Comd and Con of AD/Tactical Tasks. | 8-2 |
| 804.03 - Characteristics of NATO AD Eqpt..... | 8-5 |
| 804.04 - Air Def Wpn Systems | 8-7 |
| 804.05 - Air Def Wpn Site Selection | 8-11 |
| 804.06 - Staff Planning Tables | 8-14 |
| 804.07 - AD LO Duties/Ln Aide Mémoire..... | 8-14 |
| 804.08 - AD Battle Procedure | 8-19 |
| 804.09 - AD Estimate of the Situation | 8-19 |
| 804.10 - Op Planning Procedure..... | 8-24 |
| 804.11 - Air Threat..... | 8-26 |
| 804.12 - Airspace Con..... | 8-42 |
| 804.13 - Elec Warfare (EMCON and IFF) | 8-46 |
| 804.14 - Orders and Reports Formats | 8-47 |
| 804.15 - AD Staff Briefing | 8-47 |
| 804.16 - AIRATKWARN..... | 8-47 |
| 804.17 - WCS | 8-47 |
| 804.18 - EMCON | 8-47 |
| 804.19 - Sighting Report..... | 8-48 |
| 804.20 - ENGAGEREP..... | 8-48 |
| 804.21 - Crashed AC Report..... | 8-48 |
| 804.22 - ACO..... | 8-48 |
| 804.23 - Tgt Tracking Report | 8-49 |
| 804.24 - ADREP..... | 8-49 |
| 804.25 - Det Orders..... | 8-49 |

PART 8 - ARM INSERT

TAM 804 - AIR DEFENCE ARTILLERY

804.01 - AD ARTY ROLE, TACTICAL FUNCTIONS, PRINCIPLES OF EMPLOYMENT & DEPLOYMENT

1. **AD role.** To prevent the en from interfering from the air with our grd ops.

2. **Tactical Functions:**

| TACTICAL FUNCTION | MEANING | REMARKS |
|-------------------|--|--|
| Early wng | Detection/tracking/ident of en ac | Part of the airspace con system. Ac safety is a paramount consideration |
| Protection | Area – volume of airspace under which friendly tps can move and fight while defended from en air recce and atk | ADATS is best suited for this task. |
| | Point – protection of an installation not exceeding 500 m diameter (reserve demolition, HQ, etc) | Javelin or gun/Skyguard is best suited for this task |
| | Rte – protection along a rte, axes, or series of rtes | Any AD wpn can do this task |
| | Unit – def of a specific unit or sub-unit | ADATS is best suited for this task |
| Attrition | Inflicting max attrition on an en ac overflying an area, along likely air avenues of approach. | Diverts AD from specific protection tasks |
| Airspace coord | Promotes the safe, efficient and flexible use of airspace. Integrates air, AD, aviation, unmanned aerial vehicles (UAVs) | Centralized coord through Airspace Coordination Centres (ASCC) at all levels |

3. Principles of Employment:

| PRINCIPLES OF EMPLOYMENT | COMMENTS |
|--------------------------|--|
| Mass | The concentration of sufficient resources to adequately defend an asset |
| Mix | Achieved through employment of a combination of wpns. Capability of one offsets the limitations of another. |
| Mobility | AD units should have the appropriate mobility to maintain protection of its specified task. |
| Integration | AD plan must be synchronized with all other cbt and cbt sp plans as well as the other components of the AD system. |

4. Principles of Deployment:

| PRINCIPLES OF DEPLOYMENT | COMMENTS |
|--------------------------|--|
| Def in depth | Site systems so that en ac are engaged from max effective rge until they depart the area. Density should increase as the en ac approaches the tgt. |
| All round def | Ac atk from all directions. AD should provide protection over 6400 mils. |
| Mutual sp | Systems are sited to cover the non-engagement zones of other systems and to minimize the effects of saturation atks. |
| Early engagement | Ac should be engaged prior to Line of Weapon Release (LWR). |
| Weighted coverage | AD systems should be sited to provide max fire along air avenues of approach identified and confirmed during battle procedure. |

804.02 - COMD AND CON OF AD/TACTICAL TASKS.

1. **Comd.** Comd in AD language means the full auth and responsibility that a comd has to issue orders for the allocation of tasks, deployment, movement and log sp. Comd does not include fire con or airspace con orders. Control is conducted through CPs at various levels. It includes management (current ops) and planning (future ops) as well as the allocation of tgts to AD wpn systems, airspace con orders, states of readiness and the con of AD fire. There is only one controlling auth which is normally the Airspace Con Auth (ACA) (i.e. the Air Component Comd of a joint force).

2. Comd relationships are defined in USOP 106.

3. **Chain of Comd.** Due to the size of deployed forces in the CF, units and formations have integrated, well established affiliations. AD assets aval from

higher levels are allocated through the use of sp relationships. AD arty assets can be allocated in two possible scenarios:

- a. AD arty allocated to other countries:
 - (1) allocation of AD assets outside of national formations will use NATO terms:
 - (a) OPCOM (Operational Command); or
 - (b) OPCON (Operational Control);
- b. AD arty allocated to national independent ops:
 - (1) Used in the case of independent ops such as airmobile or airborne ops where the deployed force does not possess integral AD arty and will be required to operate independently for significant periods of time.
 - (2) Used also when comd, most likely due to distance, cannot be carried out properly, such as an AD element supporting a covering force. The force will use the std Land force comd relationship.

4. **Tactical Tasks Matrix.** Tactical tasks are used because AD arty is normally commanded centrally. They are used to be able to influence the application of firepower without regrouping sub-units. The following tactical tasks will be used:

| | DS (Direct support) | R (Reinforcing) | GSR (General Support Reinforcing) | GS (General Support) |
|------------------------|------------------------------------|--|--|---|
| Auth for AD priorities | Direct supported unit comd | Reinforced AD comd | Higher AD comd | Higher AD comd |
| Auth for AD wpns loc | AD comd with direct supported comd | AD comd in conjunction with the reinforced AD comd | AD comd selects in conjunction with the Area of Ops (AO) comd and the reinforced AD comd | AD comd selects in conjunction with AO comd |
| Coord for AD wpn loc | Direct supported comd | Reinforced AD comd coord | AO comd and reinforced AD comd | AO comd |
| Estb In with | Direct supported comd | Reinforced AD comd coord | Reinforced AD comd coord | No inherent reqr |
| Estb comms with | Direct supported comd | Reinforced AD comd coord | Reinforced AD comd coord | No inherent reqr |

NOTES:

1. The provision of an ASCC to the supported comd is implied in a DS task
2. Admin relationships must be determined with the AO comd during planning if required.
3. Tactical tasks are not used higher than Div. Comd relationship is then used for AD arty and FD arty.

804.03 - CHARACTERISTICS OF NATO AD EQPT

| EQUIPMENT | | AMMO READY TO FIRE | CREW | RGE (km) | | MAX SPEED (kph) | | FUEL CAP (l) | EFF RGE (km) | | RDR RGE (km) |
|------------------|-----|--------------------------|------|----------|-----------|-----------------|-----------|-----------------|-----------------|-----|--------------------|
| | | | | Rd | X-country | Rd | X-country | | Min | Max | |
| Roland | | 4 | 3 | 483 | 300 | 66 | 48 | 662 | | 8 | 12 |
| Rapier (FSC) | | 8 | 5 | 483 | 300 | 80 | 61 | 662 | .9 | 6.8 | |
| HVM (Starstreak) | SP | 8 | 3 | | | | | | 1 | 5.5 | |
| | LML | 3 | 3 | | | | | | 1 | 5.5 | |
| Gepard | | 560 | 9 | 550 | | 65 | | | | 4 | .3-16 |
| Patriot | | 4 | 6 | | | | | | 3 | 70 | 150 |
| Avenger | | 4 | 3 | 700 | | 140 | 40 | 205 | 2 | 5 | |
| ADATS | | 8 | 6 | 520 | 350 | 56 | 24 | 360 | 4 | 8 | 25 |
| Javelin | SL | 1 | 4 | | | | | | 2 | 5.5 | |
| | LML | 3 | 4 | | | | | | 2 | 5.5 | |
| 35 mm GDF-005 | | 560 | 5 | | | | | | .350 | 4 | |
| Skyguard FCU | | | 5 | | | | | | | | 25 |
| TPS-70 | | | 4 | | | | | | | | 456 |
| M113 | | | 3 | 483 | 300 | 66 | 48 | 662 | | | |
| HLVW | | | | 700 | | 80 | 50 | 400 | | | |
| LSVW | | | 3 | 400 | | 135 | 40 | 205 | | | |

NOTES:

1. SP = self-propelled
2. LML = lightweight multiple launcher
3. SL = shoulder launcher

804.04 - AIR DEF WPN SYSTEMS
JAVELIN S-15

| | |
|--------------------------|---|
| Wpn system | JAVELIN S-15 |
| Role | To provide point protection of specific grd tgts against the very low-level air threat |
| Wpn rge (km) | Max: Fighter Ground Attack (FGA) 4.5 km, heli 5.5 km Min: 350 m |
| Max effective height (m) | 1000 m |
| Guidance system | Semi auto comd to line of sight (SACLOS) through the means of a line of sight beam rider (LOSBR) with initial gathering phase. |
| Multi tgt capability | Nil |
| Grd tgt capability | Nil |
| Propulsion system | 2 stage solid propellant motor |
| Ammo | Rate of fire: LML 3 msls ready to fire, SL 1 msl ready to fire Warhead/fuze type: blast frag with impact/graze/proximity fuze Basic load: 10 msls per det |
| Surv system | Type: visual Active or passive: passive |
| Max speed | Mach 1.4 |
| Coverage | Bearing: 6400 mils Elevation (max firing) SL: -176 mils to +800 mils LML: -176 mils to +500 mils |
| Drop limits | Unpacked canister: 25 cm Canister in full standard pack (FSP): 75 cm Aiming unit: 0 cm |
| Air portability | Hel and un-pressurized ac up to 10000 feet ASL |
| Climatic operating Rges | Temp: -30° to +60° c Pressure: altitudes up to 1500 m ASL Wind: in crosswinds up to 46 km/h Humidity: up to +40°c at 95% |
| Veh | Tracked or wheeled |
| Det size | 4 |
| Modes of deployment | LML or SL |

| | |
|---------------------|--|
| Wpn system | JAVELIN S-15 |
| Method of tgt ident | Visual ident dependent on wpn con status and national rules of engagement criteria |
| C4 systems | Type: cbt net rad |

ADATS

| | |
|--------------------------|---|
| Wpn system | ADATS |
| Role | Provide Low Level Air Defence (LLAD) protection of mobile tps and static installations during day, night and conditions of low visibility |
| Wpn rge(km) | Max: 8 km+ Min: 375 m |
| Max effective height (m) | 5000 m |
| Guidance system | Cooled CO ² laser beam rider |
| Tgt capability | Grd or air |
| Propulsion system | Single stage solid propellant motor |
| Ammo | Fuze type: proximity or impact Weight 67.3 kg in canister Basic load: 12 msl (8 loaded, 4 in limber veh) |
| Surv system | Type: radar or electro-optical Rge 25 km Active or passive: either |
| Radar type | I band pulse doppler: 25 km max rge, 17 km normal rge |
| IFF | L band mode 4/SIF capability |
| Fuel consumption | Veh: 85 litres/100 km PPU: 30 litres/hr |
| Flexibility | Can operate autonomously or with up to 6 ADATS, 1 master and 5 slaves in C3 configuration |
| Deployment limitations | Max 106 mils pitch and roll to be able to fire |
| Airspace con | Display zones and corridors on PPI |
| Fuel capacity | 360 litres |
| Carrier veh | M113 |
| Det size | 6 (crew of 3) |
| Method of tgt ident | IFF or visual |
| C4 systems | Type: tgt data link Capabilities: tgt info can be passed between ADATS on data link via digital rad/landline |

| | |
|-------------------|--------------|
| Wpn system | ADATS |
| Laser rge finder | Type: Nd/YAG |

35-MM GDF-005

| | |
|---------------------|--|
| Wpn system | GDF-005 |
| Role | The role of the GDF-005 is to protect grd areas i.e. ,airfields, bridges and industrial installations, against air atk from both msl and ac |
| Description | The twin 35 mm gun is an all weather mobile unit that is towed by a heavy logistic vehicle wheeled (HLVW) |
| Wpn rge | 4000 m |
| Modes of engagement | Remote con by the FCU Local con by the gunner |
| Ammo capacity | 280 rounds allows for 8 to 10 tactical engagements before reloading is required |
| Ammo types | Drill, break up, target practice tracer (TPT), high explosive-incendiary (HEI), advanced hit efficiency and destruction (AHEAD), automatic lead angle compensation |
| Rate of fire | 1100 rounds per minute |
| Laser rge finder | 300-5000 m |
| C3 systems | By means of rad and wire link |
| Weight | 8200 kg |
| Method of tgt ident | Visual if gun operated locally and through IFF if operated from the Skyguard |
| Maximum side slope | The gun can be deployed on a max side slope of 7 degrees |
| Fuel consumption | Standby 1.5 litres/hr Op 5.5 litres/hr |
| Redeployment time | 7 minutes |
| Deployment time | 15 minutes |
| Det size | 5 |

SKYGUARD FIRE CON UNIT

| Wpn system | SKYGUARD MK II |
|---------------------------------|---|
| Role | The FCU is part of, and provides fire con for the twin 35 mm guns within a LLAD system. It is designed to protect grd vital points i.e., Airfields, bridges and industrial installations ,against air atk (msls and ac) |
| Description | One FCU is capable of controlling two GDF 005 in the remote mode. The FCU is designed as a mobile all weather unit that is towed by a HLVW. |
| Det | 6 (crew of 3) |
| Radar rge | 25 km |
| Laser rge finder | 10 km class 3b |
| Switch on time | 6 minutes |
| Deployment | 30 minutes |
| Distance measuring device (DMD) | Rge up to 1500 m |
| Optical sight (OS) chair | Extends the surv capability of the FCU |
| Radar | Pulse doppler radar, track while scan (TWS) up to 20 tgts X band search radar, 1 to 25 km X band tracking radar, 0.3 to 25 km Ka band tracking radar, 0.3 to 20 km IFF Frequency Agility (20 frequency) Electronic Protective Measure (EPM) |
| Towed speed | 15-80 km/hr |
| Weight | Skyguard: 6800 kg Power Supply Unit (PSU): 660 kg |
| Fuel consumption | Standby: 1.8 litres/hr Op: 8.7 litres/hr |
| Redeployment | 10 minutes |
| Fordability | 600 mm |

804.05 - AIR DEF WPN SITE SELECTION

| SER | WPN | SITE CHARACTERISTIC |
|-----|--------------|---|
| (a) | (b) | (c) |
| 1 | JAVELIN S-15 | <p>a. Obsn. Early engagement will permit destruction of the hostile ac prior to LWR. Ideally the wpn site should offer all round obsn to a rge of approximately 7 kms.</p> <p>b. Communications. Early engagement depends not only on obsn but on early wng via rad/digital-data link (ADATS). The wpn site must offer a positive communications environment.</p> <p>c. Air approaches. Javelin should be sited to cover the principal low-level air approaches, which can be predicted with reasonable certainty after a terrain study.</p> <p>d. Distance from point to be protected. Javelin should be sited close to the point to be protected to reduce the possible crossing angle of an air atk from any direction. As a rule, 500 m should be the maximum separation.</p> <p>e. Protection. Det should be deployed within the perimeter of friendly forces to afford protection from grd atk.</p> <p>f. Camouflage. Wpn site must offer or be capable of good camouflage/concealment to avoid detection from air or grd observers.</p> <p>g. Elevation limitation. The wpn site must be allowed to fire from -176 mls to +800 mls in elevation. This usually precludes firing from trenches.</p> <p>h. Backblast. Has a backblast and debris danger zone for unprotected pers of 40 m. In addition, for operator protection there should be no obstructions within 10 m to the rear.</p> <p>i. Accessibility. The wpn site must be accessible for resupply purposes.</p> <p>j. Man-portability. The wpn and its ammo are man-portable.</p> <p>k. Veh. Vehs are not required for firing the wpn and should be removed from the wpn site to decrease chances of detection. The veh is essentially a communication platform and</p> |

| SER | WPN | SITE CHARACTERISTIC |
|-----|-------|--|
| | | transport facility. |
| 2 | ADATS | <p>a. Siting requirement. Firm level platform (106 mils pitch and roll).</p> <p>b. Obstruction. There must be no obstruction to the turret.</p> <p>c. Visual unmask rge. Min of 10 km thru 2100 mils – optimum of 10 km+ thru 6400 mils.</p> <p>d. Radar unmask rge. Min of 14 km in primary arc – optimum of 25 km thru 6400 mils.</p> <p>e. External Targeting Device (ETD) loc. With good visibility of primary arc and dead zones.</p> <p>f. Engagement prior to LWR. With respect to a vital point (VP) [3-5 km depl] or area def.</p> <p>g. Mutual sp. All around def and def in depth (area 3-5 km between det).</p> <p>h. Given loc. Within 200 m of site indicated by recce officer.</p> <p>i. Concealment. Passive AD measures – forward/reverse slope, treeline.</p> <p>j. Protection. Out of direct line of fire from grd forces.</p> <p>k. Communications. Between master/slave and CP.</p> <p>l. Master ADATS battle posn. Good visibility and radar unmask throughout 6400 mils.</p> <p>m. PPU safety. 6 m for debris and away from primary arc to mask source and prevent interference with optical sensors.</p> <p>n. Laser safety. Nominal Ocular Hazard Distance (NOHD); guidance beam – 52 m, laser rgefinder – 9.3 km (laser safety goggles, implement no fires zones).</p> <p>o. Radar safety. 30 m for stationary emitting radar.</p> <p>p. Launch area back blast. 100 m.</p> <p>q. Alternate sites. 1000 m and coverage of same visual priority arcs (VPAs).</p> |

| SER | WPN | SITE CHARACTERISTIC |
|-----|--------------|---|
| | | <p>r. Limber veh/ammo. 100-150 m from ADATS and outside VPA.</p> <p>s. Admin area. 100-150 m from the ADATS and 50 m from the limber veh and outside the VPA.</p> <p>t. Resupply guidance. On position or withdraw under cover.</p> |
| 3 | Gun/SKYGUARD | <p>a. Area. The gun/Skyguard section require an area of at least 250 m x 250 m to be deployed.</p> <p>b. Radar unmask rge. The Skyguard must be able to “see” to its maximum (25 km).</p> <p>c. Vehs loc. Should be camouflaged, concealed and located 200 m from the wpn site.</p> <p>d. Local def. Each indiv FCU or gun loc should be defensible.</p> <p>e. Accessibility. Concealed track plan for entrance and exit including resupply veh.</p> <p>f. Distance from point to be protected. At least 1000 m.</p> <p>g. OS chair loc. Should be outside of the arcs but must be visually see in primary arcs and should also visually see in secondary arcs.</p> <p>h. Obsn. To choose a section site, you must consider visually seeing for a distance of 7 km and visually seeing for minimum arcs of 2100 mils.</p> <p>i. Communications. Should be tested if emission control (EMCON) measures permits.</p> <p>j. Platform. It is important that the guns and Skyguard platforms are solid and flat to withstand the weight of the primary call signs.</p> <p>k. Concealment. From air and grd obsn.</p> <p>l. Alternate position. Preferably two if time permits during recce ensuring to maintain the same arcs at a distance not to exceed 1000m.</p> |

804.06 - STAFF PLANNING TABLES

1. Consumption data:

| VEH TYPE | FUEL TYPE | AVG DAILY (1) CONSUMPTION (litres/day) | CONSUMPTION (litres/km) | FUEL CAPACITY (litres) |
|--------------------|-----------|--|-------------------------|------------------------|
| ADATS | D | 1043 (2) | 1.43 | 359 |
| M557 | D | 54 | 0.83 | 359 |
| M548 | D | 50 | 0.78 | 377 |
| M113 | D | 53 | 0.83 | 360 |
| HLVW | D | 53 | 0.81 | 400 |
| MLVW | D | 23 | 0.35 | 177 |
| LSVW | D | 33 | 0.51 | 205 |
| ILTIS | G | 8 | 0.12 | 65 |
| SKYGUARD Generator | D | 208.8 | | 22 |
| GDF-005 generator | D | 132 | | 22 |

NOTES:

1. Based on daily travel of 65 kms/day
2. Includes PPU fuel consumption (960 litres/day)

2. Veh lift data:

| Veh | ADATS (msl) | JAVELIN (msl) | BULK (Diesel) (litres/veh) | BULK (Gas) (litres/veh) | JERRYCAN (Diesel) (litres/veh) | JERRYCAN (Gas) (litres/veh) |
|----------|-------------|---------------|----------------------------|-------------------------|--------------------------------|-----------------------------|
| ADATS | 8 | | | | 40 | |
| M548 | 10 | | | | | |
| HLVW | 40 | 240 | 6600 (pod) | 6600 (pod) | 4080 | 4080 |
| MLVW | | 60 | | | 2180 | 2180 |
| LSVW sev | | 8 | | | | |

804.07 - AD LO DUTIES/LN AIDE MÉMOIRE

1. The AD LO acts on behalf of his unit and other AD units grouped with his unit or the formation with which he is placed. He advises on all AD matters affecting the formation including activities in flanking areas and especially on the capabilities of his own and other AD units. He must ensure that the Div ALO, CAS, aviation and arty intelligence know:

- a. the loc of the AD Arty; and
 - b. the wpn con status (WCS) in force.
2. LO's will normally be deployed during passage of line ops, with flanking formations, to sector ops centres or wherever the reqr is determined in the estimate. They will normally deploy for early wng and co-ord. They will always be deployed during rad silence. He may have to impose a new WCS to safeguard friendly ac. As these restrictions greatly reduce the effectiveness of AD, they must only be applied to the minimum of wpns and for the shortest possible time. WCS should allow AD to operate permissively, especially at night. He must pass and obtain information both from the supported formation and the air component to his unit as outlined in para 3. He must obtain permission and instructions for any road move required by the AD units he is representing. He may have to obtain clearance for areas in which to deploy the RHQ/BHQ, workshop and echelon.

3. **AD In aide-mémoire:**

| BEFORE DEPARTING FOR LN | ON ARRIVAL AT THE LN LOC | INFO FOR THE UNIT | RECOMMENDATIONS |
|--|---|--|---|
| <p>The AD rep should ensure that he has the fol info:</p> <ul style="list-style-type: none"> a. comd and admin relationship; b. AD tactical task; c. duration of task; d. loc, time and who to report to at the specified unit; e. WCS; f. AD wng state; g. air threat and hostile act criteria; h. AD coverage aval from all AD units in the area; i. all AD CP loc; j. NBCD status; k. passwords; l. rad freq and codes. | <p>The AD rep should req the fol from the sp unit:</p> <ul style="list-style-type: none"> a. deployment plan; b. obstacle plan; c. anti-tank plan; d. STA plan; e. AAAD plan; f. DF tgts; g. deception plan; h. hide/harbour loc; i. light policy; j. track plan; k. CEOI, passwords, frequencies, recognition signals; l. USOPs; m. expected grd threat; n. unit pri int reqrs and other int reqrs; o. unit op O/overlays; p. unit AD priorities; q. points which comd wants covered by AD rep in daily O gp/brief; r. contact for log & maint sp; s. casevac, PW, BLP, along with postal and chapel loc. | <p>The AD rep should also pass the fol info to the sp unit:</p> <ul style="list-style-type: none"> a. comd relationship; b. AD tactical msn; c. duration of task; d. WCS for AD and AAAD; e. AD wng state; f. air threat and hostile act criteria; g. early wng procedures within the formation; h. coverage aval from all AD units in the area; i. maint/admin reqrs of the AD assets as applicable; j. strength and composition of the AD assets; k. current depl of the AD assets and if applicable future posns and rtes. | <p>The AD rep should make recommendations on the fol:</p> <ul style="list-style-type: none"> a. AD; b. tasks and groupings of AD assets; c. siting of AD assets; d. coord of AAAD; e. improvements to passive AD measures. |

4. **Eqpt.** The LO requires the following eqpt and crew:
- A rad on his comd net with sufficient cable to remote up to 800 m.
 - Sufficient pers for continuous manning. A minimum of two is normally required to be on duty at any one time.
 - USOPs.
 - A copy of all current op orders as issued by his unit, including CEOIs.
 - 1:1,000,000 and 1:50,000 map coverage of the force area.
 - Map for producing deployment traces.
 - Staff tables for planning road moves and deployment by airlift.
 - An info board showing:
 - the eqpt state for firing units and vehs;
 - the msl state;
 - the AD ARTY limits; and
 - AD ARTY task numbers.
5. **A Future Task Table.** The comd is likely to require recce to be carried out for a number of tasks to cover contingencies. For each task allocated the table must show:
- loc of task;
 - what is to be defended;
 - the comd's priorities for AD;
 - redeployment plan;
 - time to be effective; and
 - the AD ARTY task numbers.

804.08 - AD BATTLE PROCEDURE

- Steps of battle procedure are as per TAM 101.

804.09 - AD ESTIMATE OF THE SITUATION

| FACTORS | FACTS | DEDUCTIONS |
|---------------------|--|---|
| (a) | (b) | (c) |
| MSN ANALYSIS | 1. Comd's intent and concept of ops with AD priorities (2 up, 1 up, arty comd) 2. Assigned tasks 3. Implied tasks 4. Limitations on the aim | 1. Aim: to destroy/protect/deny from air atk (Who, what, when, where, why and for how long) |

| FACTORS | FACTS | DEDUCTIONS |
|---|--|---|
| (a) | (b) | (c) |
| EN GRD OPS | <ol style="list-style-type: none"> 1. Strength and composition 2. Loc 3. Immed and subsequent objs 4. Rtes to objs 5. NBC 6. Morale 7. Eqpt 8. Break down en grd forces relating it to the grd | <ol style="list-style-type: none"> 1. Inherent air sp with en formations 2. Approaches to expect air sp 3. States of readiness 4. WCS/AD policy 5. NBC measures 6. Likely tgts and probable wpns used to engage tgts 7. Ac loiter times based on rge 8. Stand-off wpn rges 9. AD priorities |
| EN AIR OPS (AIR INTELLIGENCE PREPARATION OF THE BATTLEFIELD) | <ol style="list-style-type: none"> 1. No and types of en ac, wpn match, LWR. Relate each phase of the air battle to the battlefield (when are we going to see it and how will it affect us) and (how does it relate to what the grd forces are doing) 2. Wpns used 3. Atk parameters/tac 4. Recce 5. ECM eqpt/tac 6. Stand off rges 7. En suppression of en AD (SEAD) priorities 8. All weather capability 9. Ac markings/configuration | <ol style="list-style-type: none"> 1. Air sp phases 2. Amount of ac expected by phase 3. LWR 4. Deployment consideration 5. Ac engagement consideration 6. EPM methods (passive/active) 7. Early wng/obsn reqr 8. Integration of friendly units into AD plan (arty tactical grouping, MFC, FAC, AA, tanks) 9. AAAD, active or passive AD policy considerations 10. Cam/concealment and met considerations 11. 24/7 op considerations for manning and eqpt 12. AD priorities |
| FRIENDLY FORCES | <ol style="list-style-type: none"> 1. Dispositions 2. Type of op 3. AD aval 4. Flank/rear AD coverage 5. Friendly air sp | <ol style="list-style-type: none"> 1. Types of AD to be considered: active, passive or combo 2. Manoeuvre reqr 3. Assist aval from other units – comms |

| FACTORS | FACTS | DEDUCTIONS |
|---------------------------------|--|---|
| (a) | (b) | (c) |
| | 6. Air Control Order (ACO) measures 7. Morale 8. NBC 9. Early wng (Super Giraffe (SUGI), grd based radar, etc) 10. Identify formation disposition by phase | 4. Early wng and coverage by other AD units 5. Coord or airspace with all users 6. Ln required with sp arms 7. Effects on pers strength 8. NBC employment considerations 9. Engr sp aval 10. Ability of units to provide cbt sup 11. AD priorities |
| MET | 1. Visibility 2. Weather 3. Temp | 1. Effects on obsn, acquisition, coverage, grd and movement, plt proficiency and tac 2. In with other AD units 3. Early wng procedures |
| ADMIN | 1. RSR 2. ASR 3. Repair and recovery 4. Casevac 5. PW | 1. Engagement constraints by wpn type 2. RSR/ASR calculations 3. Centralized/decentralized resupply 4. Priority of eqpt maint and repair and recovery 5. Casevac required for tps 6. Sp from sp arm |
| ASSESSMENT OF TASKS | 1. Tps to task matrix 2. AD priority matrix (note 1) | 1. Go back to map and see what tasks can be grouped together |
| TIME AND SPACE | 1. Time line from time now to time to be ready (TTBR) (shade night time on line) | 1. Time aval for each activity 2. Degree of recce required 3. Priority of rtes for recce and deployment 4. Prep of alt position 5. Time required for resupply |
| COURSES OF ACTION (COAs) | 1. En Courses Advantages/Disadvantages 2. Friendly Courses Advantages/Disadvantages | Most likely/most dangerous en Recommendation of friendly COA |

| FACTORS | FACTS | DEDUCTIONS |
|-----------------|-------|--|
| (a) | (b) | (c) |
| THE PLAN | | AD op orders 1. SITUATION: a. En forces: b. Friendly forces: c. Atts and dets: 2. MISSION: 3. EXECUTION: a. Gen outline b. Gping and task(s) c. Coord instrs: (1) WCS (free/tight/hold) (2) Alert state (white/yellow/red) (3) Order of march/EMCON states (4) Airspace con measures (5) Time for RV and O Gp (6) Recce Gp move at (7) Dets cease fire (8) Dets TTBR (9) Dets no move before (10) Pri of tasks. 4. SVC SP: 5. COMD AND SIGS: |

NOTES: AD PRIORITIES

1. As a general rule there is never enough AD wpns and sensors aval to protect all forces and assets. Therefore, a comd must analyze the fol prior to establishing AD priorities:
 - a. the msn;
 - b. the threat;
 - c. sp comd's intent; and
 - d. concept of ops.
2. Comd will base the priorities on the fol factors:
 - a. criticality;
 - b. vulnerability; and
 - c. recoverability.
3. During the estimate procedure (en and friendly factors) elements that are vital to the en to destroy and for our forces to protect are identified.

4. Based on the analysis of the grd and en, it is possible to determine what AD protection is required for each task including attrition. This staff check is done in the assessment of task portion of the estimate.
5. It is more than likely that there will not be enough AD to do all the tasks you have to do; you must therefore estb AD priorities. You find what are the AD priorities based on the comd's intent and concept of ops. Based on the priorities, you match resources to tasks.

CRITICALITY

6. Defined as the degree to which an asset or force is essential to msn accomplishment.
7. The determination of the criticality of an asset or force is made by assessing, the impact on the conduct of the op that would result from damage to the asset or force.
8. The degree of criticality is based on whether:
 - a. damage to the asset or force prevents the execution of the plan;
 - b. damage to the asset or force interferes with the execution of the plan; and
 - c. damage of the asset or force causes only limited interference with the execution of the plan.

VULNERABILITY

9. Vulnerability is the degree to which an asset or force is susceptible to surv an atk or to damage if atk.
10. Consideration should be given to:
 - a. the asset's or force's hardness;
 - b. ability to disperse or displace to another position;
 - c. its ability to cam and conceal (passive measures); and
 - d. its capability to provide for its own AD (maybe AAAD).

RECUPERABILITY

11. Degree to which an asset or force can recover from inflicted damage in terms of time, eqpt and aval manpower to continue its msn.
12. The comd must consider:
 - a. time and aval to replace soldiers and eqpt or entire units; and
 - b. can a different element perform the same function?

AD PRI MATRIX

13. Table format is used:
 - a. 1 is the highest value given to an elm;
 - b. X (representing the total number of elm) is the lowest value given to an elm;
 - c. never used the same value twice for the same criteria;
 - d. once the a value has been assigned to each criteria for one element/activity, the values are added together; and
 - e. the lower the total value, the higher priority it will be and vice-versa.

14. Once completed, you must review the AD pri matrix and verify that it makes sense. It is only a tool; you are the one making the decision on which pri you will recommend.

Ph: _____

| ELMS/ ACTIVITY | VULNER- ABILITY | CRITICALITY | RECUPER- ABILITY | TOTAL | PRI # |
|-------------------|--------------------|-------------|---------------------|-------|----------|
| Res | 5 | 4 | 1 | 10 | 4 |
| Fwd bg | 4 | 5 | 6 | 15 | 5 |
| Bde HQ | 3 | 2 | 4 | 9 | 3 |
| BSA | 6 | 6 | 5 | 17 | 6 |
| Rear bg | 7 | 7 | 7 | 21 | 7 |
| Arty | 1 | 1 | 2 | 4 | 1 |

AD pri matrix (example)

804.10 - OPERATIONAL PLANNING PROCEDURE

| STEPS | FORMATION COMD | FORMATION STAFF | AD ARTY PLANNER | AD TP |
|---|--|--|---|---|
| (a) | (b) | (c) | (d) | (e) |
| STEP 1 Receipt of task | Receive wng O Attends senior comd O gp | Initial wng O Staff planning process initiated | Initial wng O Staff planning process Quick map recce | Receive wng O |
| Msn analysis | Analyze tasks Define aim | Analyze tasks IPB process (G2) Ident key issues (arms/service advisors) | Analyze task Define aim IPB process with G2 Ident key AD arty issues | |
| STEP 2 Estimate & planning guidance | Comd estimate Planning guidance | Receive planning guidance Issue wng O Planning drives & timetable | Receive planning guidance Issue wng O Time analysis | Receive wng O Concur- rent plan- ning with battalion if no change to grouping |

| STEPS | FORMATION COMD | FORMATION STAFF | AD ARTY PLANNER | AD TP |
|---|--|--|--|---|
| (a) | (b) | (c) | (d) | (e) |
| STEP 3 Preliminary staff checks | Ident COA for further development Issue additional guidance | IPB process Ident possible en COA Ident tentative friendly COA Staff coord info brief | IPB process Develop en air COA with G2 Friendly COA development Staff coord | Concurrent planning Conduct recce |
| Final staff checks | | Refine en & friendly COA Comparison of COAs Wargaming Recommendation of best COA | Develop AD arty COA for each friendly COA Assessment of tasks Analysis of priorities Recommend best AD arty COA | |
| STEP 4 Decision briefing | Comd decision Articulate intent and concept of op | Decision briefing to comd Issue wng O | Be prepared to answer questions from comd and discuss critical issues that could impact on plan - issue wng o on selected COA | Concurrent planning Regrouping |
| STEP 5 Preparation and issuance of op O | Op O Backbriefs | Prepare op O Integrates input into op O Rehearsal Issue op O | AD arty paragraph to arty annex AD arty op O Rehearsal Brief AD arty portion | Receive op O Concurrent planning Recce Prepare and issue tp op O |

| STEPS | FORMATION COMD | FORMATION STAFF | AD ARTY PLANNER | AD TP |
|------------------------------------|----------------|---|---|--|
| (a) | (b) | (c) | (d) | (e) |
| | | | of supported formation op O | |
| STEP 6 Execution of plan | Comd and con | Monitor situation Comd and con Refine plan as necessary Planning for subsequent op | Monitor situation Comd and con Supervise depl Assess coverage Advise the comd Planning for subsequent op | Assesses and adjust coverage as necessary Comd and con Planning for subsequent ops Supervise depl |

804.11 - AIR THREAT

1. **Air Threat Characteristics.** The en air threat may be multi-faceted and may include the fol:

- a. Constant use of electronic recce or ESM during peace and war. The goal of ESM is to gain intelligence that may be used to design effective ECM to degrade the performance of en AD and other electronic systems.
- b. Use of UAVs and Cruise Missiles (CMs) for intelligence gathering, or in sp of cbt ops. In the latter role, UAVs may operate as jammers, decoys, or wpn carriers.
- c. Use of long-rge anti-radiation msl (ARM) and air-to-surface msl (ASM).
- d. Employment of various EW techniques in an attempt to degrade the effectiveness of AD. These would include both active ECM (jamming) and passive measures (flares or chaff).
- e. Increased use of precision guided munitions (PGM) delivered at stand off rges against hardened, well-defended, or immobile tgts such as bridges, bunkers or airfields.
- f. Carefully planned atk carried out by very low-flying ac against tps, eqpt and installations during all weather conditions using a wide rge of modern wpons.
- g. The battlefield usage of hels to atk point objects, to suppress AD, to carry out AB assault, for recce, and for transporting tps and material.

- h. Surprise atk against manoeuvre tps by ac on armed recce msns which may deliver a wide variety of wpns via low-level atk (lay down, pull-up or cbt-turn dive deliveries). These atks may often be accompanied by attempts to suppress AD (SEAD) using fighter-bombers, atk hels or long-rge arty and grd atk.
2. **Air threat categories.** For purposes of low-level AD planning, the en air threat may be divided into the fol categories:
- a. **Fighter-bombers.** Fighter-bombers are used to atk all types of military tgts such as airfields, bridges, buildings, C2 facilities, vehs, wpn systems, and pers. The basic fighting unit is two ac, although formations of four ac are normal. Much larger formations (24 ac or more) may be employed to atk large, fixed tgts such as airfields. Fighter-bombers normally use high approach/atk speeds (up to 300 m/s) combined with very low-level atk profiles (30 m+) AGL to compound the AD problem. A coordinated, multi-directional atk may also be used. Fighter-bombers may employ a wide rge of conventional wpns, including bombs, rockets and cannon, along with a variety of sophisticated ammo such as ARM, PGM and ASM. Conventional armed wpns, along with chem and nuc ones, may be delivered by fighter-bombers.
 - b. **Recce ac.** Recce ac provides the en with a major source of cbt intelligence. Modern, high performance, fighter type ac equipped with cameras, special radars and/or electro-optical (EO) sensors are capable of gathering valuable data from recce msns flown at all altitudes. Detected tgts may be reported directly by voice or via real-time data-link transmsn to other air or grd-based receiving stations, such as AWACS. Often using the same high-speed and low-level approach tac as fighter-bombers, recce ac are very vulnerable to AD in the tgt area where they normally fly higher to permit on-board sensors to gather data.
 - c. **Atk Hels (AH).** AHs may be used for a wide rge of battlefield tasks. They can be expected to fly at very low altitudes, often at treetop height or lower using terrain masking technique to keep exposure times to an absolute min. AHs carry a wide rge of conventional wpns including rockets, cannons, bombs, anti-tank guided msl (ATGM) and ARM. They may also deliver certain types of chem wpns. AHs will often be able to operate in weather conditions that preclude the effective use of fixed wing ac.
 - d. **Transport ac.** Transport ac are used for carrying pers and materials into the combat zone (CZ). They are very vulnerable to AD due to their large size, slow speed and lack of manoeuvrability.
 - e. **UAVs and Cruise MsIs (CM).** UAV and CMs may be used for a wide variety of msns including recce, EW tasks and wpns delivery (conventional, chem or nuc). Large numbers of UAVs may also be employed to saturate and confuse AD to divert fire from attacking fighter – bombers or CMs. Both UAV and CMs may be very

difficult to detect because of their small radar and visual cross-sections.

3. **Air Threat Tac.** Tac employed by the en will vary widely depending on the tgt to be attacked, the terrain surrounding it, the tgt area weather, the wpns aval to the attacker and the tgt area def. However, there are only two major categories of tgts from the attacker's perspective: Fixed tgts such as airfields, etc., and Battlefield tgts that may be highly mobile and therefore very difficult to atk with large numbers of fixed wing ac.

a. **Fixed Tgt Factors:**

- (1) **Tgt.** The en will have highly accurate tgt info such as the specific loc of fixed AD, ac dispersion, maint facilities, POL storage areas, etc. The variety of tgts permits an optimum wpns selection. In addition, TA will be greatly facilitated, permitting high-speed (250-300 m/s), very low-level approaches, wpn deliveries and escapes (30-50 m AGL). The en will normally conduct a saturation atk that will include jamming ac. This type of atk could take up to an hr to complete.
- (2) **Terrain.** The terrain surrounding airfields will normally permit the attacker to choose optimal approach/atk directions. En ac will be able to enter and exit the tgt area at high speeds and very low altitude thereby delaying detection by AD.
- (3) **Weather.** Good weather permits very low atk profiles to be flown while visibility below 5-8 km will force atk ac slightly higher (75-100 m AGL).
- (4) **Wpns.** The en will match wpns to tgts. The diverse array of tgts on an airfield will permit the selection of widely varying wpn load which may be delivered using a variety of atk profiles (lay down, pull-up or cbt-turn dive). Ac exposure times may be limited to 30-40 secs; therefore it is critical that prime consideration be given to placing all AD systems where they have a wide field of view.

b. **Battlefield Tgt Factors:**

- (1) **Tgt.** The majority of deployed field type tgts pose a difficult tgt for high-speed fighter-bombers. Tgts that are dispersed and camouflaged are difficult to detect, and unlike large fixed tgts, they are not normally subject to planned precision atk. Little or no accurate tgt info may be aval to attacking plt. There may be no aerial photo of the tgt or those that are aval may be improperly oriented. Inaccurate tgt winds and elevations, irregular tgt arrays, or the movement of tgts subsequent to the latest info received by en air, will work against accurate, well-executed wpn deliveries.
- (2) **Terrain.** Natural or man-made obstacles may prevent or inhibit a plt from using the most survivable or effective atk

direction. Terrain may tend to channel fighter-bombers into flying higher or employing higher atk dive angles.

- (3) **Weather.** Since tgt data may be incomplete, marginal weather and decreased visibility will impact on fixed wing atk ops more than in the case of a fixed tgt.

4. **Typical Fighter-bomber Atk Profiles.** The specific atk profile employed by fixed-wing grd atk ac will be determined by a combination of many variables. However, there are only four major types of deliveries (or variations thereof) that will be employed:

- a. **Offset Pull-up Atk.** The offset pull-up atk may be either planned or directed by a FAC. It consists of a run-in at very low-level (30-50 m AGL) at speeds up to 300 m/s from an initial point (IP) some 10-25+ km from the tgt. Natural terrain features are used to delay detection as long as possible in order to achieve surprise. At a pre-planned point, normally 3-10 km offset from the tgt, the ac pulls-up very rapidly to attain atk height and acquire both the tgt and the aim point. The ac then executes a hard turn to its atk heading, normally turning 45-50 degrees left or right of its run in track. Wpns will be released from 0.5-5 km from the tgt.
- b. **Cbt-turn Dive Atk.** The cbt-turn dive atk may also be a planned or FAC-directed delivery. The geometry of the atk is very similar to the offset pull-up atk. However, attacking ac will simply execute a level turn-in towards the tgt or carry out a curving pull-up manoeuvre just high enough (100-500 m AGL) to acquire the tgt. Wpns may then be released from a level delivery or shallow dive angle at rges of 0.5-5 km from the tgt.
- c. **Lay Down Delivery.** Using the lay down, the ac flies directly to the tgt from the initial point (IP), and wpns are released from a distance of 300-1000 m from the tgt at an altitude of 30-75 m AGL. Ac speed throughout the run-in, delivery, and escape will be up to 300 m/s.
- d. **Toss or Loft Bombing.** Toss or loft bombing is a method of delivering bombs without overflying the tgt. It must be carefully planned and consists of a very low approach from the IP to a pull-up point. Normally the wpn(s) will be released as the ac approaches a climb angle of 30-45 degrees above the horizon. The bombs then complete a ballistic arc until impact in the tgt area. This delivery, though relatively inaccurate, allows the ac to remain outside the rge of most AD systems that are co-located with the tgt (approximately 6-10 km).
- e. **Combination Atk.** When attacking a large, fixed type tgt, the en can be expected to employ a combination of lay down, cbt – turn dive and pull up atk in order to achieve optimum wpn parameters and confuse and degrade the AD. Such a multi-profile atk may also be executed from several quadrants almost simultaneously; for example, a mass atk carried out by 24 ac against an airfield could

be completed easily within a two minute timeframe. However, it is impossible for such large-scale, highlycoordinated atk to be executed against battlefield or mobile tgts. Here, the max number of fighter-type ac in one atk or timeframe (3-5 minutes) will be from four to eight. Normally, they will be forced to atk from only one or two directions. In this instance, combined hel/fighter-bomber atk may be expected.

NOTE: Although a combination of atk profiles may be expected, attacking plt will require minimum altitude of 20 m+ agl and a minimum of 2.5 seconds of stable striking time prior to wpn release.

5. **Examples of en ac atk profiles:**

| WPN TYPE | TYPICAL TGTS | PREFERRED DELIVERY | DIVE ANGLE (degrees) | HEIGHT OF WEAPON RELEASE (m) | SPEED OF AC (m/sec) | LWR (m) |
|----------------------|--|---------------------------|-----------------------------|-------------------------------------|----------------------------|----------------|
| Bombs (low drag) | Tps in open soft skin vehs Log installations | Low angle dive | 10+ | 300 – 500+ | 200 – 300 | 900 – 2300 |
| Bombs (braked) | Tps in open soft skin vehs Log installations | Level – low angle dive | 0 – 15 | 40+ | 250 – 300 | 500 – 1100 |
| Bombs (toss) | Tps in open soft skin vehs Log installations | Stand-off toss | Climb 30 – 60 | 300+ | 200 – 300 | 3000 – 8000 |
| Cluster bombs | Tanks APC SAM launchers SAM FC radar Pers Soft-skin vehs Runways | Level – low angle dive | 0 – 10 | 20 – 300 | 250 – 300 | 350 – 1000 |
| Guided bombs | Hard tgts | Stand – off low angle | 5 – 15 | 300 – 1500 | 200 – 300 | 10 000+ |
| ASM (fighter or hel) | Tanks APC Hard tgts | Stand – off low angle | 5 – 15 | 300 – 1500 | 50 – 300 | 5000+ |
| Napalm | Tps in open soft skin vehs Log installations | Level – low angle dive | 0 - 10 | 15 – 200 | 250 – 300 | 300 – 1000 |
| Rockets (fighters) | Delay fuze, VT fuze Bridges Tps Buildings Soft skin vehs Runways Roads | Level – low angle dive | 3 – 15 | 150 – 500 | 250 – 300 | 500 – 5000+ |
| Rockets (hel) | Delay fuze, VT fuze Bridges Tps Buildings Soft skin vehs Runways Roads | Level – low angle dive | 0 – 10 | 30 – 200 | 50 – 80 | 300 – 3000+ |
| Cannon (fighters) | Tps Soft skin vehs Log installation Tanks and APC Radars | Low angle dive | 3 – 15 | 150 – 500 | 250 – 300 | 300 – 2000 |

| WPN TYPE | TYPICAL TGTS | PREFERRED DELIVERY | DIVE ANGLE (degrees) | HEIGHT OF WEAPON RELEASE (m) | SPEED OF AC (m/sec) | LWR (m) |
|--------------------|--|------------------------|----------------------|------------------------------|---------------------|-----------------|
| Cannon (hel) | Tps Soft skin vehs Log installation Tanks and APC Radars | Level – low angle dive | 0 – 10 | 25 – 200 | 30 – 80 | 200 – 2000 |
| Chem (bombs/spray) | | Level – low angle dive | 0 – 10 | 30 – 500 | 200 – 275 | Depends on wind |

6. Aircraft data:

a. **fixed wing:**

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|----------------------|-------------------|-----------------|-----------------|-----------------|---|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 1 | Alpha Jet | Grd atk / trainer | Two turbofans | 1000 | 410 | 30 mm Cannon 27 mm Cannon Rocket Launcher AIM-9 Sidewinder Bombs Cluster Bombs |
| 2 | F-15 Eagle | Fighter | Two turbofan | Mach 2.3 | 1100 | Laser guided bombs GP bombs Cluster bomb units 20 mm cannon |
| 3 | F-16 Fighting Falcon | Fighter | Single turbofan | Mach 2.02 | 550-885 | AGM-65 Maverick Laser-guided bombs GP bombs Cluster bomb units 20 mm cannon |
| 4 | F-111 | Fighter/bomber | Two turbofan | Mach 2.2 | 2000 | Laser-guided bombs GP bombs Cluster bomb units |
| 5 | Fencer-C Su-24 | Interdiction | Two turbojets | Mach 2.18 | 1795 | 1 6-barrel 30 mm cannon 8 hardpoints for up to 11,000 kg Swing wing |

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|-----------------------|--------------------------|---------------|-----------------|-----------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 6 | Fencer D/ESu-24 | Interdiction/recce | Two turbojets | Mach 2.18 | 1795 | 23 mm Gatling gun As-9 Kerry As-10 Karen As-11 Kilter As-12 Kegler As-13 Kingpost As-14 Kedge 57 370 mm rockets AA-8 Aphid |
| 7 | Fishbed-H Mig-21 | Tactical recce | One turbojet | Mach 2.1 | 700 | 1 23 mm gun Infra red sensors ECM devices 4 AAMs or rkt pods |
| 8 | Fishbed-J/M Mig-21 | Fighter/ interceptor | One turbojet | Mach 2.1 | 700 | 1 twin GSH 23 mm 4 AAMs or 4 rkt pods |
| 9 | Fitter-A Su-7 | Grd atk/ interdiction | One turbojet | Mach 2 | 650 | 2 AAMs 2 ASMs 6 rkt pods 4 bombs 2 30 mm gun NR 30 Obsolescent |
| 10 | Fitter-C/D Su-17 | Grd atk | One turbojet | Mach 2 | 650 | 4 AAMs, or 2 ASMs, or 6 rkt pods, or 8 bombs, or 4 23 mm gun pods 2 30 mm gun Swing wing |
| 11 | Fitter-H/K Su-17 | Interdiction | One turbojet | Mach 2 | 650 | 30 mm NR 30 guns AA-2 Atoll AS-9 Kyle 23 mm gun pods Bombs RKt pods |
| 12 | Flanker-A Su-27 | Air superiority | Two turbojets | Mach 2.37 | 650 | 6 AAMs 12 500 kg bombs Swing wing |

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|-----------------------|-------------------|---------------|-----------------|-----------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 13 | Flogger-C Mig-23 | Twin seat trainer | One turbojet | Mach 2.5 | 1100 | 1 twin GSH 23 mm 2 AAMs 4 bombs 2 23 mm gun pods Swing wing |
| 14 | Flogger-B/G Mig-23 | Interceptor | One turbojet | Mach 2.5 | 1100 | 1 twin GSH 23 mm 6 AAMs Swing wing |
| 15 | Flogger-D/J Mig-27 | Grd atk | One turbojet | Mach 1.6 | 1100 | 1 6-barrel 23 mm Gatling gun 4 ASMs 2 AAMs 8 bombs 4 rkt pods Swing wing |
| 16 | Foxbat-A/E Mig 25 | Interceptor | Two turbojets | Mach 2.8 | 1400 | 4 long rge AAMs or 6 AAMs |
| 17 | Foxbat-B/D Mig 25 | Recce | Two turbojets | Mach 3.1 | 1400 | SLAR Radar jammer ELINT, EW Cameras IR devices |
| 18 | Foxhound Mig-31 | Interceptor | Two turbojets | Mach 2.37 | 1900 | 8 AAMs gunpack |
| 19 | Frogfoot-A Su-25 | Grd atk | Two turbojets | 870 | 550 | 1 30 mm gun 4,500 kg payload on 10 hardpoints Swing wing |
| 20 | Fulcrum Mig-29 | Fighter/FGA | Two turbojets | Mach 2.37 | 650 | 1 6-barrel 30 mm Gatling gun 6 AAMs 4 500 kg bombs |

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|------------|---------------|-------------------------|-----------------|------------------------|------------------------|---|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 21 | AV-8B Harrier | Grd atk | One turbofan | Mach 0.85 | 640 | Laser-guided bombs AGM-65 Maverick GP bombs Cluster bomb units Napalm 2,75 in rockets 5,00 in rockets LUU-2 flares 25 mm cannon AGM-122 Sidarm ARM |
| 22 | F/A-18 Hornet | Multi-role Fighter | Two turbofan | Mach 1.8 | 750-1150 | Laser-guided bombs AGM-65 Maverick AGM-62 Walleye AGM-84 SLAM AGM-88 HARM GP bombs Cluster bomb units Aerial mines LUU-2 flares 2.75 in rockets 5.00 in rockets Napalm/FAE 20 mm cannon |
| 23 | Jaguar | Fighter/Strike/ trainer | Two turbofan | Mach 1.6 | 725-1140 | 30 mm cannon AAMs Air-to-surface rockets Laser-guided bombs Free-fall bombs |
| 24 | Mirage III | Fighter/Bomber | Single turbojet | Mach 2.2 | 290-600 | 30 mm cannon AAMs AIM-9 Sidewinder Bombs Rockets |

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|------------------|-------------------|---------------|-----------------|-----------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 25 | F-4 Phantom | Fighter/Atk/Recce | Twin turbojet | Mach 2.17 | 840 | 20 mm cannon AGM-88 HARM AGM-65 Maverick AIM-7 Sparrow AIM-9 Sidewinder |
| 26 | A-10 Thunderbolt | Grd Atk | Two turbofan | 697 | 460-740 | Laser-guided bombs AGM-65 Maverick GP bombs Cluster bomb units Aerial mines 2.75 in rockets LUU-1/-2 Flares LUU-5/-6 Flares 30 mm cannon |
| 27 | Tornado | Multi-role | Two turbofans | Mach 2.1 | 550-1200 | 27 mm cannon Nuc bombs ALARM ARM AIM-9 Sidewinder HARM Maverick Paveway II Laser-guided bombs ASMs Rockets |

b. Recce aircrafts:

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|---------------|-------------------|---------------|-----------------|-----------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 1 | Badger Tu-16 | Bomber, recce, EW | Twin jet | 566 knots | 135 nm | |
| 2 | Brewer Yak-28 | Tactical recce | Two turbojets | Mach 1.5 | 900 | Twin 30 mm gun ECM eqpt Camera, chaff Day/night recce Capability Brewer-D-Recce Brewer-E-ECM |

c. **Transport aircrafts:**

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|----------------|---------------|-----------------------------------|--------------------|----------------------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 1 | Candid II-76 | Tpt | Four turbofan | 850 | 2,500 | 120 Tps or 40,000 kg or 3 BMD Mainstay – AWACS variant |
| 2 | Cock An-22 | Tpt | Four turboprop | 740 | 5000 | 5 BMD 80,000 kg |
| 3 | Colt An-2 | Tpt | One prop | 258 | 450 | 12 tps or 6 paras 1,500 kg |
| 4 | Condor An-124 | Tpt | Four turbofan | 850 | 2,250 | 88 tps on upper deck and 150,000 kg on lower deck |
| 5 | Cub An-12 | Tpt | Four turboprop | 777 | (with max payload) 1200 | Tail turret Twin 23 mm NR guns Max payload 20,000 kg 90 tps or 60 paras or 2 BMD Cub-A-ELINT Cub-C/D-ECM |
| 6 | Curl An-26 | Tpt | Two turboprop 1 x aux turbojet | 540 | 550 | 38-40 tps 5,500 kg |
| 7 | C-5 Galaxy | Strategic tpt | Four turbofan | 919 | 6000 | |
| 8 | C-130 Hercules | Assault tpt | Four turboprops | 602 | 5387 | AC 130 variant only carries: 1 105 Howitzer 2 40 mm Bofors 2 20 mm Vulcan |
| 9 | Transall | Tactical tpt | Two turboprops | 513 | 7336 | |

d. **Helicopters:**










| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|-----------------|-----------------|-----------------|--------------------|--------------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 1 | Alouette III | Gen purpose hel | One turboshaft | 230 | 600 | 7.62 MG 20 mm GIAT M621 AS-11 AS-12 MK44 Torpedo |
| 2 | AH-64 Apache | Atk hel | Two turboshafts | 309 | 612 | M230 30-mm chain gun Hellfire 2.75 in rockets |
| 3 | UH-60 Blackhawk | Gen purpose/tpt | Two turboshafts | 296 | 600 | 7.62 mm MG Hellfire Rocket launcher pods |

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|---------------------|---------------------------------------|--------------------------------|--------------------|--------------------|---|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| | | | | | | Mine dispenser MK46 or 50 Barracuda |
| 4 | BO 105 | Gen purpose hel | Two turboshafts | 270 | 575 | HOT msls HOT II msls TOW msls Stinger |
| 5 | AH-1T Huey Cobra | Atk hel | One turboshaft | 291 | 200-240 | Super Cobra has two turboshafts |
| 6 | SA-341 Gazelle | Aslt/Gen purpose hel | One turboshaft | 310 | 360 | 2 7.62 mm MG or 1 20 mm GIAT M621 cannon AT-3 Sagger SA-7 Grail AS-12 HOT msls Mistral |
| 7 | Griffon | Gen purpose hel | | 259 | 745 | 7.62 mm MG Rocket packs |
| 8 | Halo-A Mi-26 | Hy tpt | Two engines 1*8 blade rotor | 295 | 300 | 20,000 kg or 2 BMD 90 tps |
| 9 | Haze Mi-14 | ASW, SAR and mine counter-measures | Twin turbine | 124 kts | 612 nm | Torpedo Bombs Depth charges |
| 10 | Havoc Mi-28 | Gunship | Two engines 1*5 blade rotor | 300 | 240 | 1 23 mm gun 2 AAMs 14 ATGMs |
| 11 | Hermit Mi-34 | Lt utility | | 210 | 170 | 4 AT-3 Sagger or 4 rkt pods 8 tps |
| 12 | Hind-A Mi-24 | Gunship | Two engines 1*5 blade rotor | 320 | 160 | 1 12.7 mm HG 4 Swatter ATGMs 4 rkt pods or 4 small bombs 8 tps plus full ordnance |
| 13 | Hind-D Mi-24 | Gunship | Two engines 1*5 blade rotor | 320 | 160 | 1 four-barrel 12.7 mm Gatling gun 4 Swatter ATGMs 4 rkt pods or 4 small bombs 8 tps plus full ordnance |
| 13 | Hind-E/F Mi-24 | Gunship | Two engines 1*5 blade rotor | 320 | 160 | 1 four-barrel 12.7 mm twin-barrel 30 mm (Hind F) |







| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|-----|---------------|--------------------|--|--------------------|--------------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| | | | | | | 4 AT-6 Spiral 4 rkt pods |
| 14 | Hip-C Mi-8 | Gen purpose hel | Two engines 1*5 blade rotor | 250 | 200+ | 6 12.7 mm internal MG 4 rkt pods or 4 250 kg bombs or 2 500 kg bombs 24 tps or 2,400 kg Hip – B/G – airborne comm variant Hip – J/K – ECM variant |
| 15 | Hip-E Mi-8 | Cbt asslt hel | Two engines 1*5 blade rotor | 250 | 200+ | 1 12.7 mm HG 4 Swatter ATGMs 4 250 kg bombs or 2 500 kg bombs 6 rkt pods 24 tps or 2,400 kg |
| 16 | Hip-H Mi-17 | Gen purpose hel | Two engines 1*5 blade rotor | 250 | 450 + | 4 rkt pods or 4 250 kg bombs or 2 500 kg bombs 24 tps |
| 17 | Hokum Ka-50 | Gunship/anti-hel | Two engines 2*3 contra-rotating blades | 350() | 250 | 1 30 mm gun AA-9 Rockets AA-11 AS-10 AS-16 Iгла ASM UPK-23-250 gun pod GUV-8700 MG pod |
| 18 | Hook Mi-6 | Hy tpt | Two engines 1*5 blade rotor | 300 | 300 | Fitted with 1 12.7 mm MG 65 tps or 6,000 kg |
| 19 | Hoplite Mi-2 | Lt utility | Two engines 1*3 blade rotor | 210 | 170 | 4 AT-3 Sagger or 4 rkt pods 8 tps |
| 20 | Hound Mi-4 | Lt tpt | One engine 1*4 blade rotor | 210 | 250 | Fitted with 1 12.7 mm HG 4 rkt pods 12-16 tps or 1,250 kg |
| 21 | UH-1 Iroquois | Utility hel | Single turboshaft | 185 | 399 | 7.62 mm MG Rocket packs |
| 22 | OH-58 Kiowa | Gen purpose | One turboshaft | 222 | 481 | 12.7 mm MG pods Stinger Hellfire 2.75 in rocket launcher |

| SER | AC | ROLE | ENGINES | MAX SPEED (kph) | CBT RADIUS (km) | REMARKS AND ARMAMENT |
|------------|----------------|-------------|-------------------|---------------------------|---------------------------|--|
| (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| 23 | SA-330 Puma | Tpt hel | Two turboshafts | 294 | 570 | 2 23 mm guns Rocket pods ZT-3 Swift ZT-35 |
| 24 | CH-53 Stallion | Hy tpt | Three turboshafts | 315 | 414 | |

7. Wpn selection for tgt type:

| Weapon Selection | | Weapons | | | | | | |
|-----------------------|---|----------------------------|-----------------------------|----------------|--------------------------|-----------------------|--------------------------------|--|
| | | Guins | Cannon | Rockets | Anti-tank missiles | Heavy guided missiles | Low-Dwn attack bombs | |
| Targets | | | | | | | | |
| Armoured vehicles |  | | | ● | ☆ | ● | ● | |
| Soft-skinned vehicles |  | ● | ☆ | ☆ | ● | | ☆ | |
| Gun emplacements |  | ● | ☆ | ☆ | | | ☆ | |
| Field fortifications |  | | | ☆ | | | ☆ | |
| Anti-aircraft weapons |  | | ● | ☆ | ● | ☆ | | |
| Helicopters on ground |  | ● | ☆ | ☆ | | | ● | |
| Fuel depots |  | | ☆ | ☆ | | | ● | |
| Ammunition depots |  | | ☆ | ☆ | | | ● | |
| Combat bridges |  | | | ● | | ☆ | ● | |
| NF | Neutralising fire only | | | | | | | |
| ☆ | Primary weapon | | | | | | | |
| ● | Secondary weapon | | | | | | | |
| | | Foreage or target obscured | Turret or carriage obscured | Forward firing | Wire, laser or IR pulsed | TV or IR guided | Fire chaser or container bombs | |

8. Data on wpns carried by rotary wing ac.

| | |  |  |  |  |  |  |
|---|--|---|---|---|---|---|--|
| Helicopter Attack Data | | Guns 75-13 mm | Cannons 20-40 mm | Rockets 50-100 mm | Anti-tank Guided Missiles | Heavy Guided Missiles | Lay Down Attack Bombs |
| Speed: (m/sec) | Approach Attack | 30-70 15-80 | 30-70 15-80 | 30-70 20-80 | 30-70 0-60 | 30-70 0-60 | 30-70 40-80 |
| Altitude (m/AGL) | Approach Attack | 10-300 5-60 | 10-300 5-60 | 10-300 10-60 | 10-300 10-60 | 10-300 10-500 | 10-300 20-100 |
| Weapon Delivery Angle | | 5-15/45 | 5-15/45 | 5-15 | 3-15 | 5-20 | 0-5 |
| Visibility Angle Above Obstacles (mils) | | 5-20 | 5-20 | 5-20 | 5-20 | 10-40 | 10-25 |
| Exposure Time | Detection Acquisition of Target Roll-in Time (sec) | 4-6 | 4-6 | 5-7 | 4-10 | 8-12 | 4-8 |
| | Stabilization and Aiming Time (sec) | 4-8 | 4-8 | 6-10 | 6-10 | 6-12 | 4-8 |
| | Firing or AGM— Tracking Time (sec) | 2-3 | 1-2 | 0.5-2 | (1) Wire guided 2000m: 9 4000m: 16 (2) Laser IR: 2 | Television and infrared 2-3 Laser Guidance 3000m: 10 8000m: 32 | 0-1 |
| Weapon Release Range (m) | | 200-1000 For Turlet -1500 (NF) | 300-2000 -3000 (Cal 30 mm) -1500 (NF) mm | 300-1000 2000-3000 (NF) | 400-4000 -6000 (3rd Gen) | 3000-8000 | 150-500 |
| Firing Positions: Forward Laterally | | * * | * * | * * | * * | * * | * (seldom used) |
| Legend NF= Neutralization or Suppression Fire (Max. Release Range) | | Chin turret or fuselage mounted, manually controlled | Chin turret | Pods | (1) 2nd Gen Wire guided (2) 3rd Gen Laser, infrared Guidance | Television and Infrared guidance *Fire and Forget | Fire, Container, Cluster, Braked or General Purpose Bombs (delay fuse) |

804.12 - AIRSPACE CON

1. All airspace con measures will be promulgated and detailed in the airspace con plan (ACP) for the specific op or theatre of ops.

| TERM | DEFINITION |
|--------------------------|--|
| (a) | (b) |
| Air rte | In tactical usage, a rte established to facilitate movement of op sp traffic and non-op air traffic through friendly air defs |
| Airspace con | A service provided in the cbt zone to increase op effectiveness, by promoting the safe, efficient, and flexible use of airspace. Airspace con is provided in order to permit greater flexibility of ops, while auth to approve, disapprove, or deny cbt ops is vested only in the op comd. In this context the word service means the action of serving, helping or benefiting all those who are concerned with the use of airspace. |
| Airspace con auth (ACA) | That subordinate comd, designated by the op comd, to assume overall responsibility for the op of the airspace con system (ACS) in the airspace con area. |
| Airspace con area | Airspace which is laterally defined by the boundaries of the area of ops. The airspace con area may be subdivided into airspace con sub-areas |
| Airspace con boundary | The lateral limits of an airspace con area, airspace con sub-area, high density airspace control zone (HIDACZ) or airspace restriction |
| Airspace con sub-area | A sub-division of the airspace con area, designated by the ACA |
| Airspace con system | An arrgement of those organizations, pers, policies, procedures and facilities required to perform airspace con functions |
| Airspace in the cbt zone | That airspace required by cbt forces for the conduct of ops where the potential exists for interference and competition between friendly cbt forces |
| Airspace restrictions | Special restrictive measures applied to segments of airspace of defined dimensions |
| Airspeed con | A defined speed band within which ac may fly, normally as a supplement to other forms of ident and/or airspace con |
| Base def zone (BDZ) | An air def zone established around an airbase and limited to the engagement envelope of the SAM/short rge air def wpns system defending that base. The size of BDZ and procedures relating to their op of the grd- |

| TERM | DEFINITION |
|--------------------------------|---|
| (a) | (b) |
| | based AD wpn systems will be contained in sops. At 10° angle from the end of the runways, it will be wpns tight and wpns free elsewhere, broken into four sectors. |
| Coord level | The height above grd level defined for deconfliction of fast and slow moving air traffic, and which may be used for advisory purposes |
| High density airspace con zone | A block of airspace which defines dimensions, designated by the ACA, in which there is a concentrated empl of numerous and varied wpns/airspace users. Therefore, in add to being an ACS system organizational measure, a HIDACZ is also a control measure. The size of the HIDACZ depends on the tactical sit and should be kept to the min possible. Friendly air activity is limited to the ac that has a specific function to perform within the bdry of the HIDACZ. All other ac must avoid the entering the HIDACZ. They are often estb within the bdry of the corps or div area but in theory could be estb across bdry. Within an approved HIDACZ, the auth to con the airspace is delegated to the comd of the formation requiring the estb of the HIDACZ. The con auth will determine the procedural means of con within the HIDACZ, subj to limitations imposed by the ACA |
| Low level transit rte (LLTR) | A temporary corridor of defined dimensions passing in either direction through the areas of organic low-level air defs of surface forces, in a HIDACZ, or restricted ops area |
| Positive con | A method of airspace con which relies on positive ident, tracking and direction of ac within an airspace, conducted with electronic means by an agency having the auth and responsibility therein |
| Procedural con | A method of airspace con which relies on a combination previously agreed and promulgated orders and procedures |
| Restricted ops area (ROA) | Airspace of defined dimensions, designated by the ACA, in response to specific op situations/reqrs within which the op of one or more airspace users is restricted. Examples of ROAs include, aerial refuelling orbits, concentrated interdiction areas, airdrop and SAR areas |
| Special corridor | A corridor established to accommodate the special |

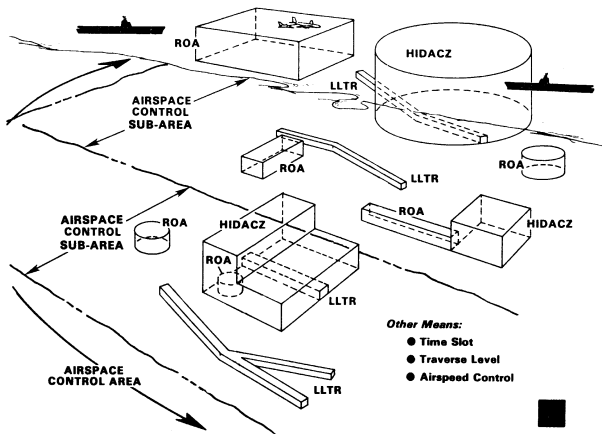
| TERM | DEFINITION |
|----------------------|---|
| (a) | (b) |
| | routing reqrs of larger formations or special msns |
| Time slot | A period of time during which certain airspace activities within airspace of defined dimensions are restrained to permit one or more users greater freedom of ops. At the end of this period, the restraint is automatically cancelled |
| Transit corridor | A corridor established to rte op cbt traffic and military op sp traffic through friendly air defs |
| Traverse level | That vertical displacement above a low-level air def (LLAD) system, expressed both as a height (AGL) and altitude above mean sea level (AMSL) at which ac can traverse the area |
| Wpns free zone (WFZ) | A volume of airspace around a critical asset that merits special protection by AD arty. It is established to permit maximum engagement of hostile ac. All friendly ac must avoid WFZ unless prior approval has been obtained from the designated controlling auth. Reqrs for the creation, or implementation of WFZ can originate at any level, in response to grd ops, and will be staffed through acs channels to ACA for approval. |

WPNS CON STATUS

| | |
|-------------------|--|
| WPNS FREE | Wpn systems may engage all ac not positively identified as friendly |
| WPNS TIGHT | Wpn systems may only engage those ac which are positively identified as hostile or which commit a hostile act |
| WPNS HOLD | Wpn systems may only fire in self def, or in response to a formal order, or if friendly tps/installations being defended are seen to be under direct air atk |

NOTE: WCS are used within the rule of engagement (ROE) of the particular op. WCS may be caveated fixed wing or hel as appropriate.

AIRSPACE CONTROL MEANS



804.13 - ELEC WARFARE (IFF AND EMCON)

1. IFF:

- a. Mode 1: This mode is used for gen ident friend or foe.
- b. Mode 2: This mode is intended for detailed ident of a specific ac.
- c. Mode 3: This mode is to be used to specify the functional class of an ac and has a direct air traffic control (ATC) application. In fact, it is the same as the mode used in civ secondary search radar (SSR) for ATC.

NOTE: In addition to those three modes of op, the ac can use iff to indicate a distress condition. By operating a special emergency switch in the ac, the transponder can be set to radiate automatically.

- d. Mode 4: Mode 4 is a cryptographic secur coded signal sent by the interrogator in the wpn system and a coded answer is returned from the transponder in the ac.

2. **EMCON.** It is very important that all electronic emissions be carefully controlled. AD pers must also be aware of the electronic emissions their eqpt radiates. For example, care must be taken to try to shield IR-emitting signatures produced by engine and PPU exhausts. Similarly, good EMCON procedures will help to minimize voice, data, radar, and laser emsns, which may be subject to intercept by an alert en. At the same time, commanders and AD tps must remember that AD systems were designed to fight and survive in the severest of EW environments. They must take care not to do the en's job by handicapping friendly AD systems with EMCON procedures that are restrictive. Perfect EMCON will result in immed availability of AD detns when required without having them give off any unwanted visual, rad, radar,

or EO signature. EMCON States are provided in USOP 203.03. The following actions are directed for AD elms:

- a. EMCON 1. **Silence imposed.** No eqpt testing which requires emission required. Rad transmission and radar emission not permitted. Visual acquisition and optical tracking permitted (dependant upon noise and heat source restrictions).
- b. EMCON 2. **As per EMCON 1.** Rad transmsn and radar emission may be broken for specific engagements but must be reimposed immedly afterwards. After first engagement one radar per tp may be authorized to emit.
- c. EMCON 3. **Silence lifted.** Eqpt testing permitted. Rad transmsn and radar emission permitted. Restrictions on radar emsns may be detailed.

804.14 - ORDERS AND REPORTS FORMATS

1. Related NATO approved AD msg formats are aval in APP 9, part 4, sect 7 and part 5. The most currently used are provided below. Format for indiv msgs are to be conformed to APP 9 std NATO formats.

804.15 - AD STAFF BRIEFING

1. En air sits including approaches.
2. AD deployment including coverage.
3. Important events during period covered.
4. Unit strength, C&S, gun and AFV states.
5. Msl and ammo states.
6. The following sources are aval to the officer for briefing purposes:
 - a. ops logs;
 - b. reports and returns;
 - c. overlays.
7. Always start briefings with “this briefing covers the period from _____ to _____.”

804.16 - AIRATKWARN

1. Format as per USOP 705.01.

804.17 - WEAPONS CONTROL STATUS

1. Format as per USOP 704.14.

804.18 - EMISSION CONTROL

1. As per FSOP 204.08 – EMCON.
2. Initiating auth.
3. EMCON state.
4. Effective period.
5. Effective area.

804.19 - SIGHTING REPORT

1. A sighting report is a priority tactical msg and will be sent to higher CP immed:
 - a. C/S;
 - b. number & type of ac; and
 - c. estimated grid and direction of travel.

804.20 - ENGAGEREP

1. Format as per APP 9, part 4, sect 7.
2. Engagement reports are cumulative and are passed to higher CP when time is aval:
 - a. C/S;
 - b. date/time of engagement;
 - c. type of tgt;
 - d. results;
 - e. loc of engagement;
 - f. type of msl used;
 - g. number of msls used; and
 - h. misc.

804.21 - CRASHED AC REPORT

1. Crashed ac report is passed to higher CP when a crash is observed or detected:
 - a. type of ac;
 - b. time of crash or discovery;
 - c. loc (encode if nec);
 - d. nationality and ident number;
 - e. number of pers on board;
 - f. number KIA, WIA, or PW;
 - g. condition of ac;
 - h. condition of cargo; and
 - i. misc.

804.22 - AIRSPACE CONTROL ORDER

1. Format as per APP 9, part 5.
2. Example:

SECURITY CLASSIFICATION (when completed)

1. Fm: (reporting unit/formation HQ)
2. To: (appropriate formation HQ)
3. ACO no: (three figures)
4. Valid from _____ to _____
 - a. (air rtes);
 - b. (transit corridors);
 - c. (traverse levels);
 - d. (LLTRs);

- e. (special corridors);
- f. (HIDACZ);
- g. (WFZ);
- h. (BDZ);
- i. (ROZ);
- j. (remarks); and
- k. (amendments).

804.23 - TGT TRACKING REPORT

- 1. Posn.
- 2. Mov (speed, bearing).
- 3. Ident.
- 4. Tracking no.
- 5. Size of raid.

804.24 - ADREP

- 1. Format as per APP 9, part 4, sect 7.
- 2. Unit/sub-unit.
- 3. Report eff pd.
- 4. Hostile air activity:
 - a. number and type ac;
 - b. activity (bomb, atk, recce); and
 - c. results of activity.
- 5. Number and type of ac destroyed.
- 6. This report is used to summarize the bty activities over a period of 12 to 24 hrs.

804.25 - DET ORDERS

- 1. Tp task and loc.
- 2. Tp RV.
- 3. Time to mov.
- 4. Rte.
- 5. TTBR.
- 6. Det loc, battle posn.
- 7. Arcs: primary; and
secondary.
- 8. Msl frequency.
- 9. Misc.

