

The Brain Book - Version 1.0

Nov 05

I can not even begin to take any credit for the contents of this document. My contribution to this project is the assembling of various C-130 gouge that I've come across, and the reformatting of it into a product that is uniform and easily accessible. My apologies for my inability to give credit to all who have contributed, for most of the information offered is the result of the dedication, professionalism and hard work of others.

This version of the "Brain Book" is geared towards the C-130 H-2s flown by the Tennessee Air National Guard. Please feel free to edit and adapt the contents of this document to suit the needs of your individual unit's requirements.

I will continue to maintain and update the Master Document, which with the help of Baseops.net will be made readily available to the C-130 community.

If you come across any mistakes, have information that you'd like to see added, or have any suggestions on how to improve the contents within this Brain Book, please contact me at: john.rojas@tnnash.af.mil.

Pages are in no particular order. Feel free to organize your brain book in a way the suits you. Mine is broken into: Numbers, Mission Planning, Briefings and Guides, TAC, Emergency and Abnormal, and I put the SKE turn guides last.

Safe Skies,
Capt. J. Tucker Rojas

ENGINE TORQUE	
Max Allow. T/O	19,600 / 5 min.
Max Allow. Flight	19,600 / 30 min.
Max Continuous	19,600 in-lb
Oil Temp < 0°	Min Torque
Oil Temp 0-40°	4,500 (include airstart)
NTS Action	-1,260 ± 600
Allow. Reverse Diff.	1,000 (symmetricals)
ENGINE RPM	
Fuel Flow/Igniters	16% (P.I.E.D.)
Prop/Brake Disengage	23% (or starter torque)
Ignit & Oil Press by	35%
Starter Disengage	60%
LSGI	69 - 75.5%
Flight Idle on Gnd	92.5 - 100.5%
Normal Gnd Idle	94 - 102%
Max Reverse	96 - 106%
Normal in Flight	98 - 102% (± .5%)
Pitch Lock	103% or loss of Hyd Press
Fuel Topping	103.5%
Starter Duty - 1On	1 Off, 5 Off, 30 Off
STARTING TIT	
Max Start Enrich	100° (on ground)
Max Norm/Air Start	200°
Cold Start requiring MX & Write-up	<720°
Cold Start requiring Temp Cont✓	720-750°
Max during Start	830° (exc peak @ 94%)
Continue Start but Write-up	830-850° (exc peak @ 94%)
Stop, Write-up & 1 Retry	850-965° (exc peak @ 94%)
Stop Start, Write-Up, Over temp Ins.	965°
Abnormal Torch	Stop Start, Write-up, MX
ENGINE TIT	
Green Arc	200 - 1010°
Crossover	820±20 (65° throttle)
Max Downshift TIT	850°
Climb/Max Continu	1010°
Military / Time	1049° / 30 min
Takeoff Range	1067 - 1083°
Takeoff Max /Time	1083° / 5 min
Overtemp Insp. Req	1083° for 5 sec or 1175°
FUEL SYSTEM	
Outbds > Inbds	500-1000
Symmetrical Tanks	<1000 (exc Aux)
Wing-to-Wing	<1500 (exc Aux)
Aux Max Diff	1 empty, 1 full
Main Fuel Boost Pump Press/Light	15 - 24 psi / 8.5 psi
Aux/Ext Fuel Boost Pump Press/Light	28 - 40 psi / 23 psi

GEARBOX OIL PRESSURE	
Max (Start/Warm-up)	250+ psi
Normal Range	150 - 250 psi
In flight Min to complete msn	130 psi
Low Speed Gnd Idle Min press	50 psi
Flux	±20 psi
ENGINE OIL TEMP	
Max Flight/Time	85-100° / 5 Min
Max Ground/Time	85-100° / 30 Min
Normal Range	60 - 85°C
Oil Cooler Flaps	78 - 82°C
Min for Takeoff	40° and increase
4,500 torque	0-40°
Min Torque	< 0°
Min for Start	-40°C
ENGINE OIL PRESSURE	
Normal Range	50 - 60 psi (±10 flux)
Max (Start/Warm-up)	100 psi
LSGI Minimum	<50 psi if norm @ 100%
After -G	2 min (monitor engine)
-G loss of Press?	10 sec
Should return within	(no return of press=esp)
ENGINE OIL QUANTITY	
Capacity range	4-12 gal + 7.5 expansion
Low Light	4 gal
Allow Burn Rate	1 quart / hr
HYDRAULIC PRESSURE	
Max Pressure	3500 psi
Norm Press / Max	2900 - 3200 / 3500 psi
Aux Press / Max	2900 - 3300 / 3500 psi
LSGI	2550 psi
Low Rudder Boost	1100-1400 psi
Low Rud. Bst Caut.	1600 psi
Press to perform Cruise ESP (Failed Pressure Relief Valve)	>3900 psi
Press not to turn off Hyd Switches (Failed Hyd Pump Compensator)	>3450 psi
Good press if Suct Bost Pmp fails	>2500 psi
Aileron Boost Press	2050 psi
Low Press Light On / Off	1000/1350psi
Suct Boost Light On	20 psi
Thermal CB on Suct Boost	11 ampere
RPM for Hyd Indication	on speed
RPM for Norm Hyd Press	on speed + 30 sec
Amt of fluid in isol circ	1 gal
Norm Brake 2 Apps left	2900 - 3200 psi
Norm Brake 1 App left	2250 psi
Norm Accum Preload	1500 psi ± 100
Emer 1 Brake App	2900 psi
Emer Brake Accum Preload	1000 psi ± 100

BLEED AIR	
Diffuser temp/press	600°F / 125 psi
Eng Min Press	70 psi
Eng Bleed Leak ✓	65-35 psi in ≥ 16 sec
Regulated Norm Press	40 – 50 psi
Regulators w/in	3 psi of each other
APU Min Press	35 psi
APU Bleed Leak ✓	30-15 psi in ≥ 16 sec
PRESSURIZATION	
Gauge Range	-1.2 to 15.8 in/HG
Safety Valve Open	-0.76 to 15.9 in/HG
Nominal Press	15.16 in/HG
Rate Cont Min/Max	30-200 / 1600-2900 fpm
Crew door Jettison press	< 3.1 in/HG
Cockpit (1or2) or Cargo (1Only) Cracked Pane	10 in/HG
Cargo Pane Cracked (2pane)	0 in/HG
AC ELECTRICAL	
Gen Capacity	40 Kva
Voltage range/Norm	110 - 125 / 115 Vac
Freq Range / Norm	380 - 420 / 400Hz
Max Load in Flight	1.05
AC I&EFC	115 Vac / 400Hz / 1Ø
I&EFC steepdown trans	26v / 1Ø (for #1 & #2)
CP Instrument	115 Vac / 400Hz / 1Ø
DC ELECTRIC	
Voltage range/Norm	25 - 30 / 28 VDC
Max Load	1.03
Battery Voltage/Min	24 VDC / 21 VDC
AC I&EFC Inverter	2500 Volt/Amps
CP Inverter Rating	250 Volt/Amps
LEADING EDGE ANTI-ICE	
Max Ground Ops	30 Sec
Normal range	75° – 200°F
Control valve range	158° - 180°F
Overheat Lights	200°F aprox
Clear Leading Edge	>5000' agl / or < 20°C
PROP DE-ICING / ANTI-ICING	
De/Anti Ice Load	65 - 90 Amps
Timing cycle - Delce	15 sec on/ 45 sec off
Max Gnd Ops - Delce	2 Cycles (2 Minutes)
WINDSHIELD ANTI-ICING	
Cold Start Procedure	5s on, 10s off, till -43°C
Max OAT operations	81°F (27°C)
APU	
APU Starter Limit	1 min on, 4 min off
RPM Normal	95 – 105%
RPM Max	106%
Exhaust Gas Temp	260 -650°
Warm-up	1 min prior to bleed air
Door open gnd / ft	35° - 15°
Start / Operate	↓ 20,000'

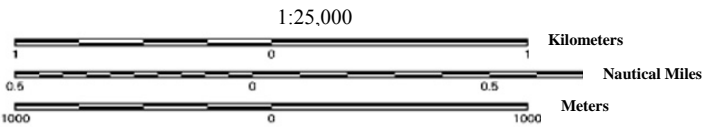
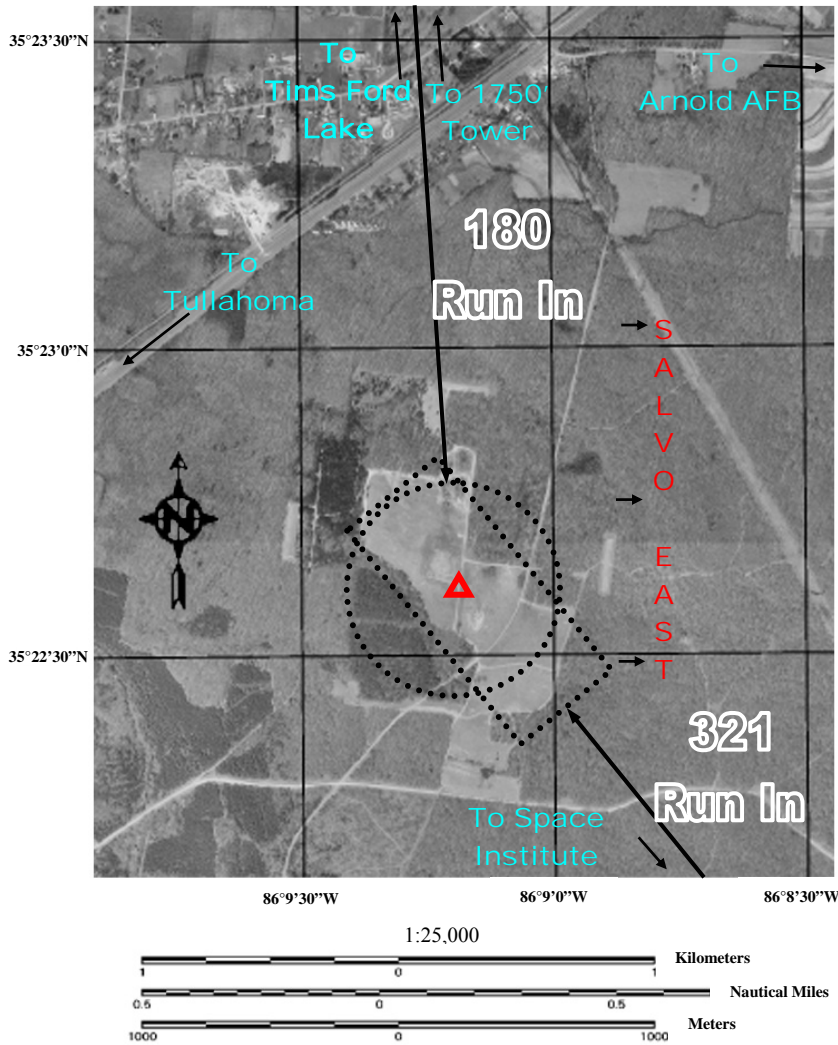
PROPS	
Prop Brake Engage	<23%
Prop Brake Diseng.	>23% or Starter Torque
Feather Blade Angle	92.5°
Reverse Blade Angle	-6 to -8°
Pitchlock Engages	103% or loss of hyd press
Pitchlock Range	25 to 55°
P-lock Desired RPM	96 - 98%
Low pitch stop	23°
Low pitch stop ✓	>200 lbs/Torque increase
Prop Oil Qty	26 qts (6.5 gallons)
Pressurize sump/light	6.5 qts / 2 qts Low
Safety Coupling	-6,000 lbs/Torque
NTS operates at	-1260 ± 600 lbs/Torque
Aux Feather Limits	1 Min On, 1 Min Off 2 min in 30 min period
Static Feather ✓	25sec R to F / 6 sec pull feather override button
RPM Acceptable Flux	+ or - .05%
OXYGEN SYSTEM	
Fully Serviced	25 liters
Low Light	2.5 liters
Min O2 for Mission	ETP to landing / 5ltrs min
Press No Flow	270 - 455 psi
Press Continuous	270 - 340 psi
AIRSPEEDS / GROUND SPEEDS	
Max Speed	0.64 Mach
↓ 15,000'	316 KIAS
↓ 20,000'	290 KIAS
Severe Turbulence Penetration	65 above Power-Off Stall not over 180
Flaps 10 / 50 / 100	220 / 180 / 145
Cargo Door Only	185 KIAS
Ramp and Door	150 KIAS
Air Deflector Doors	150 KIAS
Crew Door Bailout	150 KIAS
Windshield Wipers	150 KIAS
Paratroop	150 KIAS
Paratroop up and Locked	250 KIAS
Gear and Lights	165 KIAS
Holding	170 KIAS
Prop Malfunction	150 KTAS
2 Eng Speeds	170/160/150 or approach
X-winds for Taxi	30kts norm / 60kts max
Ditching	Power off stall +10 KIAS
Recommend Airstart	180 KIAS / 200° TIT
Airstart (No NTS)	130 KIAS / below 5000'
Nose wheel 0-20°	20kts
Nose wheel 20 to 60°	5kts
Nose wheel @ 155k	10kts / 20° Max
Tire Rotation Nose	139 Ground Speed
Tire Rotation Main	174 Ground Speed

THROTTLE POSITIONS	
LSGI range	9 - 30°
Reverse Range	0 - 18°
Ground Idle detent	18°
Flight Idle Gate	34°
Beta Throttle Range	0 - 34°
Alpha Throttle Rnge	34 - 90°
Crossover	65° (820° ± 20 TIT)
Temp. Limiting	0 - 65°
Temp. Controlling	65 - 90°
CARGO COMPARTMENT	
R.H. Locks Restraint	20,000 fwd/10,000 aft
L.H Locks Restraint	20,000 fwd/250to4000 aft
Ramp Locks Restraint	5,000lbs at 8 G's
Ramp Weight w/stool	5,000lbs (4,664 w/ rails)
Ramp Unsupported	2,000lbs
Ground troops	90 plus 2 loadmasters
Over water max	80 (4 x 20/life raft)
Litters	74 with 2 attendants or 70 with 6 attendants
Paratroopers	64
Tie downs 5000lbs	11-sidewalls 33-ramp
Tie downs 10000lbs	175-floor & top of rails
Tie downs 25000lbs	10 under rails/2@FS 737
MISCELLANEOUS	
Fire Exting Press	600 - 640 psi (@ 70° F)
Cold Wx Ops	≤32°F or 0 °C
Hot Wx Ops	>95°F or 35°C
T/O Weight/EWP	155,000 / 175,000
Max Landing Wt	155,000 @ 300 fpm
Normal Ldg Wt	130,000 @ 540 fpm
G's	-1 to 3 G's
> 25,000lbs cargo	0 to 2.5 (see fig 5-5)
<10 or >40 fuel	0 to 2.5 (see fig 5-5)
Max Bank Angle	60° / 2 g
Max Bank w/Flaps	45° / 1.4 g
Max Effort Fuel	<6,200 out; 5,700 in Ext empty, 130,000 lbs
AIRDROP	
Max Air Drop	42,000 over ramp
CDS Buffer stop	>500lbs
Buffer stop max	26,650lbs (4 locks @ 3Gs)
CDS max number	2 sticks of 8
CDS max weight	
CDS Aft Weight	<104k not recommended
Paratrooper out ramp	20 max
Max Paratroopers	20 per static line
Wind Limit Heavy	17kts
Wind Limit SATB	25kts
Wind Limit CDS	13kts (G12), 20 (G13/14)
Wind Limit Paratroop	13kts Static line Land

INSTRUMENTS and FLIGHT RULES		
Category A	<91	1.3NM
Category B	≥91 but <121	1.5NM
Category C	≥121 but <141	1.7NM
Category D	≥141 but <166	2.3NM
Category E	≥166	4.5NM
Holding Speeds	0-6000' MSL - 200KIAS 6000-14,000' - 230KIAS above 14,000' - 265KIAS	
Holding Time	90sec above 14,000' 60sec @ or ↓ 14,000'	
Airspeed and Altitude	No limit @ or ↑ 10,000' 250KIAS ↓ 10,000'	
Airspeed ↓ Class B	200KIAS	
Airspeed ↓ 2500' w/ in 4NM of Class C/D Primary Apt	200KIAS	
Non PT side	20° correction if >180ktas	
Tacan ground ✓	1/2 Nm or 3%, and 4°	
Altimeter ✓	±70' of field elevation	
VOR ground ✓	± 4°	
Screen Height USAF & Navy	0 feet All others = 35 feet	
Divers Departure	400', turn, the 200'/NM	
Min Climb Gradient	158'/NM 3eng / 200 4eng	
Bottle to Throttle	12 hours	
Scuba/Chamber/Blod	24/12 if ↑ 25k/72 hours	
Congested Areas	1000' AGL/2000' Radius	
Non Congested Areas		
Recreation/Wildlife	2000' AGL	
Landing Lights	↓ 10'000 within operational constraints	
45/180 @ Start turn	1:15min (technique only)	
Diverse Departure	400' turn then 200/nm	
WEATHER		
Class A	N/A IFR Only	
Class B	3SM / C; ear of Clouds	
Class C	3SM/500↓/1000↑/2000→	
Class D	3SM/500↓/1000↑/2000→	
Class E&G ↓ 10,000'	3SM/500↓/1000↑/2000→	
Class E&G ↑ 10,000'	5SM/500↓/1000↑/2000→	
VFR Filing	1500/3 @ Destin at ±1hr	
IFR Filing	Approach Mins ±1hr	
Take Off WX	1/2SM or 1600 RVR 1000 RVR w/dual RVR	
Destination WX	3000&3 / 2 ↑ Appr Vis	
Alternate WX	1000&2 / 500&1 ↑ Appr	
Partial Instruments	300&3/4 min DH/MDA	
Approach Lts Out	Add 1/2sm to vis	
Correct DH when	≤0° C (FIH)	
Precision Approach	DH must be ≥ 200&1/2	

TANG DROP ZONE

This image map should not be used for navigation.
UNCLASSIFIED



TANG Drop Zone

Field Elevation: 1090'

PI: N 35° 22' 36.1" W 086° 09' 10.0"

MAX AIRSPEEDS

(p 5-15 in -1)

(VH) Speeds are for "AREA A" of Weight Limitation Chart using Primary Fuel Management
 ::Under 4k of Cargo will fall in AREA A regardless of fuel load::

(VD) Speeds are for ALL weight areas except "AREA E" using Primary Fuel Management
 ::Under 24k of cargo will not fall in AREA E regardless of fuel load::

ALTITUDE (VH) RECOMMENDED (VD) MAX

30,000'	210	238
29,000'	214	243
28,000'	217	249
27,000'	221	254
26,000'	225	259
25,000'	228	264
24,000'	231	270
23,000'	235	275
22,000'	239	280
21,000'	242	286
20,000'	246	291
19,000'	249	296
18,000'	253	302
17,000'	257	307
16,000'	260	312
15,000'	264	318
14,000'	267	318
13,000'	271	318
12,000' & Below	269	318

TANG DZ

TANG DZ

MAX AIRSPEEDS

MAX AIRSPEEDS

mini 1801

Local Trouble T's

PRIORITY	ADDRESSEE(S)		
FILING TIME	ORIGINATOR		
SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR			
3. MESSAGE TYPE	7. AIRCRAFT IDENTIFICATION	8. FLIGHT RULES	TYPE OF FLIGHT
9. NUMBER	TYPE OF AIRCRAFT	WAKE TURBULENCE CAT.	10. EQUIPMENT
13. DEPARTURE AERODROME	TIME	(Surveillance Equip. Mode S w/ Aircraft ID & Press Alt use: "/>)	
15. CRUISING SPEED	LEVEL	ROUTE	
16. DESTINATION AERODROME			
18. OTHER INFORMATION			
NOT FOR TRANSMISSION			
19. SUPPLEMENTARY INFORMATION			
REMARKS			
AIRCRAFT SERIAL NUMBERS AND TYPE			
AIRCRAFT IN FLIGHT			
SIGNATURE OF APPROVING AUTHORITY			
AIRCRAFT HOME STATION OR ORGANIZATION			

||||| EFFECTIVE 15 APR 04 |||||
NASHVILLE INTL, TN (KBNA)
 Rwy 20L, 20C, 20R, 1500-3*
 Rwy 31, 1500-3**
 * Or Standard with minimum climb of 240/NM to 2600.
 **Or Standard with minimum climb of 230/NM to 2600.
 Use TITAN DEPARTURE.
 TAKE-OFF OBSTACLES Rwy 31:
 Tower, 1472' from DER, 916' left of centerline, 143' AGL/646' MSL.

CHATTANOOGA, TN
LOVELL FIELD (KCHA)
 ..Rwy 15, 300-1*
 ..Rwy 33, 500-1
 * Or standard with minimum climb of 230/NM to 1700.
 Rws 2, 15, 20, climb rwy hdg to 1700 before turning. Rwy 33, climb right turn to 2300 on hdg 020° before proceeding on course.

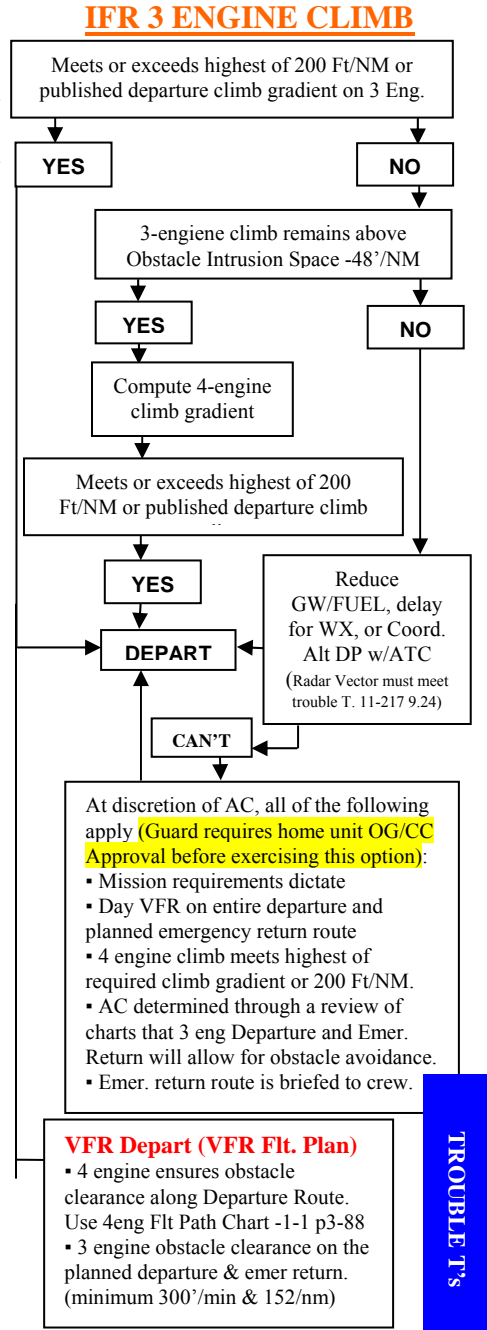
CAMBELL, AAF (KHOP)
FORT CAMBELL, KY
 None.

HUNTSVILLE INTL-CARL T.
JONES FLD (KHSV), AL
 Rws 36L and 36R climb rwy heading to 800 before turning

LEXINGTON, KY
BLUE GRASS (KLEX)
 Rwy 4 and 8, climb rwy hdg to 1400 before turning.

KNOXVILLE, TN
McGHEE TYSON (KTYS)
 Comply with SID or RADAR vectors, or; climb rwy heading to 4000 before turning on course

JACKSON, TN
JACKSON / McKELLAR-SIPES REGIONAL (MKL)
 None.

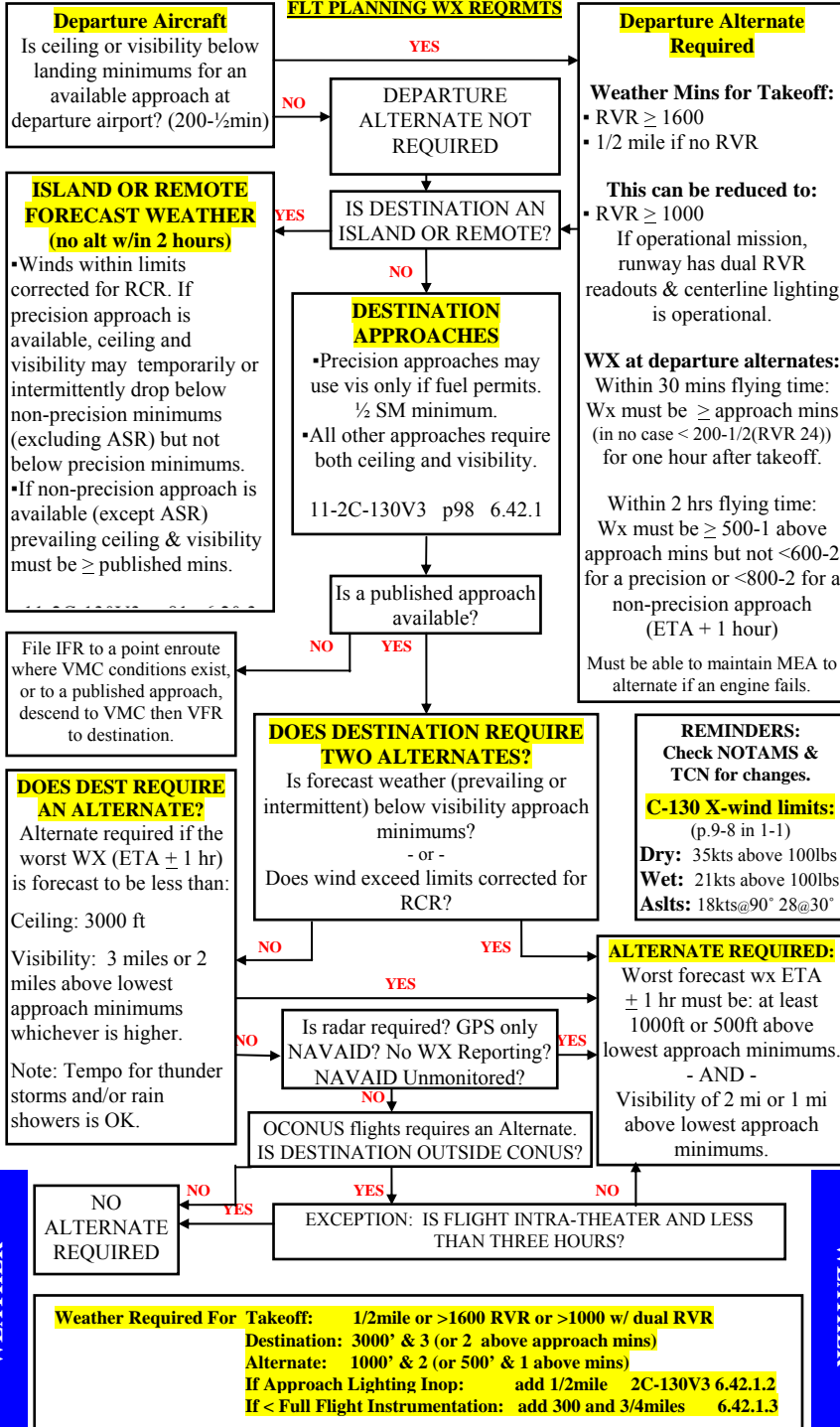


1801 FLIGHT PLAN

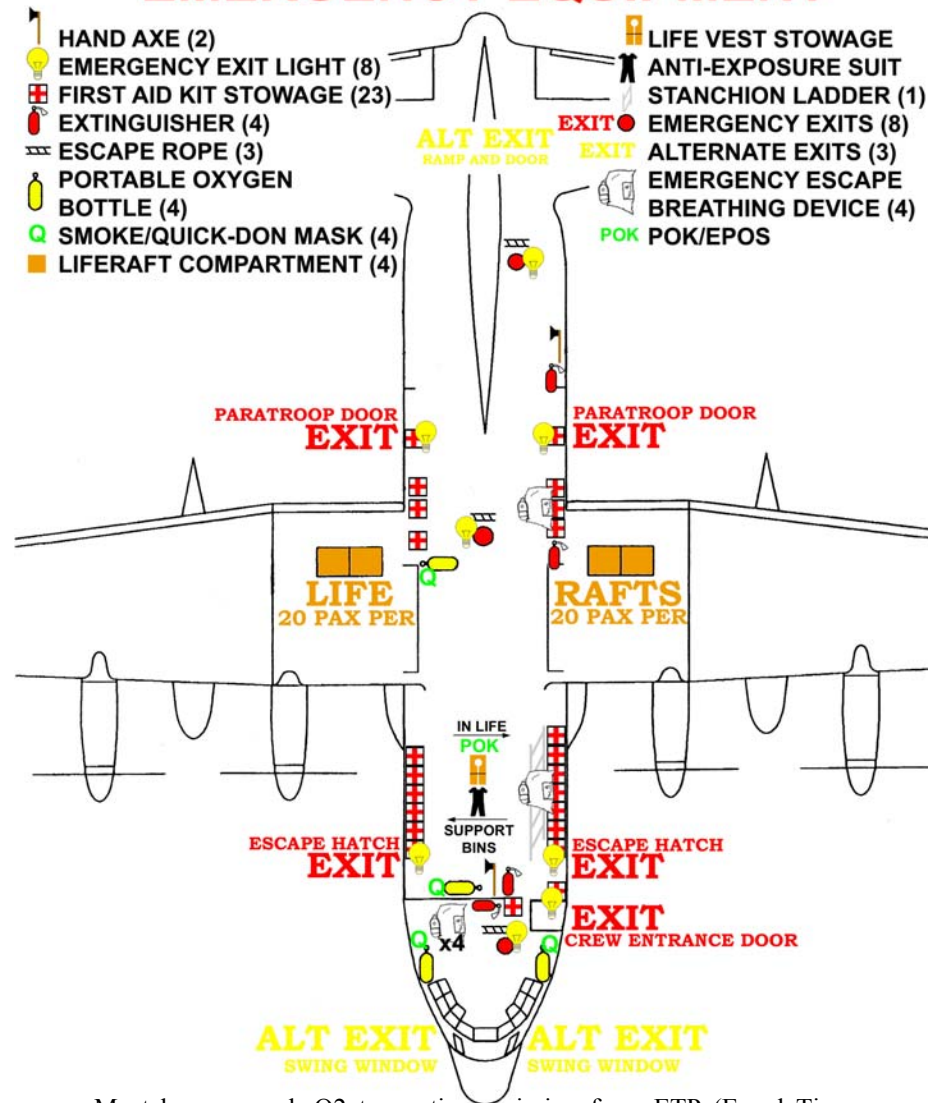
1801 FLIGHT PLAN

TROUBLE T's

TROUBLE T's



EMERGENCY EQUIPMENT



Must have enough O2 to continue mission from ETP (Equal Time Point). 5 liters min. POKs are required for PAX when ALT. exceeds FL250. EPOS are required regardless of ALT. You can't mix POKs & EPOS. Crewmembers who do not have access to O2 will have either a POK or EEBD within arms reach ↑10,000'. On over water flights the max # of PAX is 80 due to Rafts. LPUs are required when outside gliding distance of land. You must wear LPUs ↓ 2000' except takeoffs, landings, & approaches. LMs must wear a restraining harness or chute when doors are open. Harness only when ↓800' agl

WEATHER

WEATHER

EMER EQUIPMENT

EMER EQUIPMENT

COCKPIT INSTRUMENT CHECK (AT BNA)

1. GENERAL

- Check alignment of attitude indicator
- All steering bars/flags out of view
- Altimeter setting set - \pm 70 field elevation

ATIS:	DEP	135.675
	ARR	135.1
CLNC DEL:		126.05
GND CON:		121.9
TWR:		118.6

2. FLIGHT SELECTOR PANEL - HDG

- Set heading bug to airplane heading, steering bar should center.
- Rotate bug left/right, check proper steering bar deflection.

3. MODE SEL switch - TAC (Tune/Ident)

BNA TACAN Channel 88X: - • • • • , • - , - •

Allow 90 sec for warm up

a. MANUAL CHECK

- FLT DIR switch - NORMAL
- Ensure bearing pointer (BP) points to station. Check other TAC to be within \pm 4°
- Center CDI. Rotate course knob, check for proper displacement (Use 5° left/right as a guide)
- Check TO-FROM indicator changes at \sim 90° position.
- Confirm Bearing/distance indications at TACAN checkpoint prior to flight. BP/CDI \pm 4°, DME within ½ mile or 3%. whichever greater (3% only applies when > 16nm DME)

b. SELF TEST

- Set in 180° course and press TEST button
- 7 sec: DME & NAV warning flags in view, BP=270°
- 15 sec: Warning flags out of view, BP=180° (\pm 3°), CDI \pm ½ dot, "TO" indicated, DME 000 (\pm ½ mile)

6. MODE SEL switch - VOR/ILS (Tune/Ident)

BNA VOR Channel 114.1: - • • • • , • - , - •

- Set 315 course and check for proper VOR identification
- Initiate TEST cycle (TUNE 5-5, VOR 1-1, Test "ON")
- HSI BP indicates 315° \pm 3°, CDI centers, TO-FROM indicator displays "TO"
- Applicable bearing pointers indicates 315° \pm 3°
- All three marker beacon lights on pilot instrument panel illuminate steady (#1 VOR only)
- Press SCNS TEST button "OFF"

7. TUNE ADF

Operry NDB Channel 344: • • • • - , • • •

- Mode switch to "ADF"
- Take Command switch to "Take Command".
- Frequency Control switch to "MAN" and tune and identify the desired frequency.
- Test/Tone switch to "Test" and hold.
- ADF pointer advances 90° from original position.
- Release Test/Tone switch.
- ADF pointer returns to original position.

8. RADAR ALTIMETER

- Set altitude reference to 400'
- Press & release the SET control knob.
 - Height Indicator Test Display
 - Alt pointer positioned at 500'
 - Digital display shows 88888
 - R/T light illuminated
 - Receiver-Transmitter Test Display
 - Alt pointer positioned at 300'
 - Digital display 300' (\pm 10')
 - R/T light off
 - LO light illuminated
 - System returns to normal ops after \sim 3 sec. Digital display shows 0' (\pm 2')

DEPARTURE BRIEFING

1. TOLD

Airspeeds
Runway required for Takeoff vs Runway Available
Vref < Vto -- acceleration check time
50 % flap ground roll (E)

2. EMERGENCY PROCEDURES

Prior to refusal speed -- "reject prop/eng/sys/load (brief description)"

- Prop - (2 of top 3, prop low oil light, directional control)
Flight idle / ESP / reverse symmetricals
- anything else (no rush)
Gnd idle / reverse all 4 (if necessary) / wait 'til safe taxi speed

After refusal speed

- Treat as an airborne emergency //// option if on long runway
- Advisory call

Prop / engine failure -- Gear , FX, Flaps

Obstacles : gear w/i 3 // fx w/i 6 // 3 eng climb speed to MSA
(N) keep us clear of obstacles

No obstacles : try for 150 KTAS -- V_{mca2}

(E) - clear to go MECH

Engine fire / overheat -- keep it running

Anything else we'll handle after clear from ground

Fuel dumping / bleeds (> 120k 2 eng min performance) (E)

Recovery base ? (wx bad -- IAP)

Copilot & Flight Engineer coordinate Emergency Actions.

3. SIGNALS FOR GEAR AND FLAP RETRACTION

4. DEPARTURE

SID / RV / Clearance ALT / HDG

Nav Aids

SCNS - overview of plan

Radar Alt - (400' or HAT)

Hazardous terrain / obstacles (N)

Radar Monitoring for WX (N)

ITO-select heading, pitch sync, rotate speed - MCS or 5 kts prior, pitch 7°,
two positive rates - gear, climb > 300 fpm, flaps +20,

5. SKE / FORMATION PROCEDURES

SKE - (CP)

Abort Calls - (CP - ATC / N - interplane)

6. SCNS PROCEDURES

Fly in SCNS // Radial/ DME

7. Defensive/ECM Systems

8. Notes/Unit/MAJCOM Items

INSTRUMENT CHECK

INSTRUMENT CHECK

BRIEFING: Departure

BRIEFING: Departure

ARRIVAL BRIEFING

VFR CHART

1. **WEATHER** -- ATIS // METRO // FSS

2. APPROACH TO BE USED

Flap setting // type landing // speeds//runway available vs. desired ldg dis.
 Nav aids // Obstacles // ESA//MSA?
 Course
 Descent rate

Precision : drift / gnd speed (N)

Non-precision : 1500 fpm (CP) backup // Drift (N)

Altitudes -- FAF / HAT/MDA/DH/Radar Altimeter?

Timing -- calculate and backup "hack" (N)

Touchdown point and Landing Distance

(E) - "speed good" // "props good"

3. BACKUP APPROACH

Vis // Loc // anything close // missed approach

4. MISSED APPROACH

Initial hdg / alt // (N) read the rest

(E) - call 7,8,9 or 15,16,17

FUEL PLANNING

(Explanation of Fuel Items on AF Form 4116, C-130 Flight Plan and Record)

En Route	Fuel for flight time from departure overhead destination or initial penetration fix at cruise altitude (including time for planned orbit, escort, search, recovery, appropriate climb, weather recon, etc. when applicable).
En Route Reserve	10% of flight time over a Category I remote/segment, not to exceed 0+45 minutes. For orbit/search missions, 10% of flight time for that portion with inadequate NAVAIDS from the orbit/search point to destination. Compute at Terminal Fuel Flow (TFF is the fuel flow rate expected during the last hour at cruise altitude 11-2C-130V3 p.428).
Alternate and Missed Approach	Alternate: Fuel for flight time from overhead destination or initial penetration fix to alternate, or most distant alternate when two are required. Compute at terminal fuel flow. Add 10% reserve when time to an alternate exceeds 1+30. Required whenever an alternate must be filed. Missed Approach: 2200 lbs. Required if destination is below ceiling minimums but above visibility minimums for planned destination approach.
Holding	Entry required. Minimum 2000 lbs. If flight time over a Category II route is greater than 3+20, when an alternate is located in Alaska, is not available or located at latitudes greater than 59° N/S, use 3500 lbs. These holding fuel calculations meet or exceed the fuel requirements of AFI 11-202V3 2.2.3. Fuel Reserve.
Approach/Landing	Approach: 1,000 lbs. (2,000 lbs for high altitude approach). Entry always required. Minimum Landing Fuel: 4,000 lbs. Entry always required.
Pressurization Loss	Additional fuel for pressure loss at ETP (Equal Time Point) - used when pressurized, carrying passengers, and aircraft oxygen is not available to the passengers. Compute at 1000 lbs/hr for time from ETP to FSAF (First Suitable Airfield) or LSAF (Last Suitable Airfield) or "T" time. If computed fuel reserve for pressurization loss is less than total of items 2, 4, 5, and 12, no additional entry required in item 7. If computed fuel exceeds the total of items 2, 4, 5, and 12, add the difference in item 7.
Stored Fuel	Ramp fuel for succeeding legs without refueling.
Off-Course Maneuvers	Fuel for anticipated off-course maneuvering for terrain clearance, thunderstorm avoidance, ATC requirements. Compute at 100 lbs/min for departure, 50 lbs/min for en route
Icing	500 lbs for each hour of anticipated icing.
Known Holding Delays	Fuel for anticipated/planned excess holding time. Compute at terminal fuel flow.
Taxi and Takeoff	Normally 1300 lbs. For known taxi delays or additional engine-running ground time in excess of 20 minutes, add 50 lbs/min.
Unidentified Extra	Difference between ramp and actual ramp fuel. Should not exceed 2200 lbs (for fuel conservation purpose).
Minimum Diversion	Total of ALTERNATE AND MISSED APPROACH, HOLDING, and APPROACH/LANDING. Will never be less than 7000 lbs.
Min Fuel	Declare when aircraft will land at the intended destination with less than the required fuel reserve.

Balance: Outboards 500-1,000lbs > inboards; 1,000lbs between symmetricals; 1,500 between wings.

Assault Fuels: <6,200 in outboards, 0 in externals, <23,500 total in mains, 130,000lbs max gross weight

Primary Fuel Management: Main tanks are full and in balance (see above) and the external and / or auxiliary tanks contain usable fuel. Main tanks are considered full with > 7,500 lbs in the outboards; > 6,900 lbs in the inboards. This is our chief means of fuel management.

Secondary Fuel Management: Any fuel management that fails to meet Primary fuel management.

118AW will not normally operate in Secondary Fuel Management.

Usable Fuel in Level Flight (foam in tanks)

TANK	U.S. GALLONS	JP-8, POUNDS
Outboards	1222	8310
Inboards	1126	7657
Auxiliaries	855	5814
Externals	1309	8901
TOTALS	9024	61,364

BRIEF: Arrival

BRIEF: Arrival

FUEL

FUEL

AIRCRAFT COMMANDER's CREW BRIEFING

PREFLIGHT GUIDE

1. **Mission purpose (Training?)**
2. **Itinerary/Sequence of events (destination/duration)**
3. **Weather (Nav radar)**
4. **Call sign and formation position (if applicable)**
5. **Times:**
 - Radio check-in
 - Stations time
 - Takeoff (early off authorization required?)
 - TOT (does loadmaster have the times)
6. **Fuel requirements (assault landings?)**
 - Total Fuel
 - Recovery Fuel
 - Type of Landings Planned
7. **Load and drop sequence**
 - What is the Load and Sequence
 - Is the load Jettisonable/hazardous
 - Nav Marks the loads
 - JAI done on load? (DOD form 1748)
8. **Intelligence updates (EPA briefed if required)**
9. **Interphone and radio discipline**
 - Keep Interphone Clear Below 10,000ft
 - Clear/Concise on the Radio
 - Listen for Callsign if Pilots Miss it
10. **Emergency Procedures (Aircraft & Airdrop)**
 - Evacuation of Aircraft (looking for ___ individuals, load get O₂/Chocks
 - Simulated EP's--"simulated"
 - Airdrop EP's (loadmaster/cockpit duties)
 - Abort Calls (Nav-Interplane, CoPilot-ATC)
11. **Passenger/cargo load (Form F signed?)**
12. **Maintenance status (exceptional release signed?)**
13. **Personal equipment (rings/scarfs/etc.)**
14. **Crew coordination (Co-pilot/Engineer engine shutdown plan)**
 - No Secrets/Crew Concept (Back each other up)
 - 2 challenge rule
 - Time-out (inside the aircraft)/Knock-it-off (formation)
 - Copilot & Engineer Coordination for Shutdown
 - Preslowdown Times/Will doors be open below 800 AGL?
 - Engineer call 7,8,9 on run-ups/No Reject calls on Touch and Go's
 - Eng: IFF all day
 - Copilot – Stop mode (most conservative response)
15. **Notes/Unit Requirements**
 - AMC/Group/Squadron Special Interest Items
 - Questions and comments from each crew member

DAY PRIOR TO FLIGHT

1. Orders (Flight/TDY/NATO)
2. Foreign Clearance Guide
3. Diplomatic Clearance
4. Customs/Agriculture/Immigration requirements
5. Airport qualification briefing

DAY OF FLIGHT

1. FCIF/FCB
2. Mission kit
3. Navigation kit
4. Aircrew equipment:
 - Uniforms
 - ID tags
 - Helmet/mask (HALO?)
 - Required publications (new pubs out?)
 - Tool kits/airdrop kits
 - Field equipment/artic equipment/rations
 - Weapons (required?)
 - Passports/visas
 - Shot records
5. Hazardous cargo briefing (AFR 71-4/AMCR 55-18, Vol 1)
6. Buffer zone/safe passage briefing
7. Intelligence/threat/EW briefing
8. Fleet service/lunches/pax comfort kits
9. Authenticators/IFF/Mode IV/Have Quick/ Secrets

BASE OPS

1. NOTAMS
2. Weather
3. Flight plan filed
4. Secrets ???

AT THE AIRCRAFT

1. Fuel/MX status
2. Secure Radios/Have Quick
3. DD Form 365-4 (Form-F)/Manifest
4. Emergency/survival equipment:
 - Parachutes (55-130)
 - LPU's
 - Liferafts
 - Survival equipment
 - Vests/flak jackets
 - Chemical protective gear

BRIEF: Crew Brief

BRIEF: Crew Brief

PREFLIGHT

PREFLIGHT

Airdrop Equipment Info

Engine Out Information

Drop Airspeeds: For combo, use the higher airspeed		AFI 11-231 p125	
Personnel SL	130	CDS/CRS	130/140*
PJs	125	Door Bundle	130
Personnel HALO/HAHO 110min-150max	130	CRRRC/RAMZ/HVCDS	130/140*
Heavy Equipment	140	Recovery Kit	130

*Used when GW > 120k

Must be operational:

Personnel Airdrop

- Air Deflector & Paratroop Doors (if using paratroop doors)
- Anchor cables
- Anchor cable supports
- Static line retrievers
- Jump platforms
- Jump lights
- Seats (64)
- Towed Paratroop Retrieval System

Container Delivery System (CDS)

- Static line retriever
- CDS switch
- Arming jump lights
- Ramp & door w/ADS arms
- Main DC power through TD relay for ADS
- Operational Aux pump & system
- Dual rails
- Chain gate
- Buffer stop assembly
- Centerline vertical restraint (CVR)

Heavy Equipment

- Dual rails and locks
- Extraction parachute ejector (bomb rack)
- Ramp & door w/ADS arms
- Operational ADS panel
- Operational Aux pump & system
- Jump lights

Wind Limits for Personnel: If surface winds unknown, inform JM if alt winds >30kts			
SL land	13	PJs SL water	22
SL water	17	PJs HGRP water	25
MFF land	18	PJs trees	17
MFF water	20	Non-AF SL	User
Wind Limits for Equipment			
AF Equipment	17	HVCDS	None
CDS G-12	13	SATB	25
CDS G-13/14	20	Non-AF equipment	User

AIRDROP LIMITS

AIRDROP LIMITS

ENGINE OUT

ENGINE OUT

✓ Engine Shutdown Procedures

Squak / Systems / Si multaneous Radios

- set TA only on transponder
- state fuel in WT (for fire crew) and Time (SAR)

Trim- Rudder Neutral on Final (FE backup)

Airspeeds- V_{mca} , Obst clnc, 3 Eng climb

Reversing Symmetricals (FE backup)

- Pull towards the goods
- Put dead engine upwind

GO Around Procedures- Inform Crew

- Max Power/5° Bank & Rudder
- 50% Flaps/Gear Up/2 Eng V_{mca}
- Flaps Up/3 Eng Climb

✓ Decent and/or Before Landing

The Patterns

<u>3/4 ENGINES</u>	Downwind	150/170
	Base	150 or Approach Speed (140 VFR)
	Final	Approach Speed
<u>2 ENGINES</u>	Downwind	160 (w/ gear)
	Base	160 or Approach Speed
	Dogleg	150 or Approach Speed
	Final	150 or Approach Speed
	Short Final	Flaps when landing assured
<u>WINDS</u>	Dead Engine	away from the wind for easier approach
	Dead Engine	into wind for easier landing / rollout

2 Engine Out Information

- C**onfiguration: #1 & #2 Out: Flaps up, Gear down
- C**ircuit Breaker: Wing Flap Control CB, Flap Lever 50%
- H**ydraulics (#1 & #2 Out only): Cover NW Steering, Emerg Brakes
- E**lectrics: Reduce/Monitor Load on Generators
- W**eight: Dump Fuel / Salvo Load < 120k
- B**leeds Closed
- A**irspeeds: Review Pattern and Approach Speeds
- G**round Idle: Inboard First
- P**umps / **B**rakes

Combat Offload Guide

PREPARATION:

In a hostile environment, the crew briefing may be performed before the combat entry point. (The main purpose is minimal time on the ground)

LOADMASTER: »Get a communication check of PA system »Let LM know when cleared to open ramp/door »Taxi route will not cross a runway »Pressurization off »Tell Pilot when preparation checks are complete.

ENGINEER: »Runs the Annex A checklist »Have new TOLD completed

COPILOT: »Clear right side

NAVIGATOR: »Turn PA on and speaker selector switch to all usually positioned at bottom of flightdeck »Safety observer: clearing aft

PILOT: »Can I do it? (ATO/SPINS) exception on 2.18.1.1 »Where will I do it? min of 500'/1000' desired »Which method? (A or B) »A for single, multiple, ramp or married pallets; airdrop platforms; and CDS »B for all else (remember 55 gal drums required) »Consider ACMs (crew chief) as lookout for left side »Select INT/PA on pilot side for PA check (must check with INT not HOT MIKE) »Brief execution duties

EXECUTION:

LOADMASTER: »Notify P when clear to taxi »Let P know of any malfunction »Tell P when load is clear

ENGINEER: »Runs the checklist »Back P up on torques »Monitor engine performance

COPILOT: »Clear right side »Back up P on power/brakes

NAVIGATOR: »PA on »Notify P when in position (bottom of flight deck)

PILOT: »Coordinate with crew of intentions for malfunctions/ran out of space »select INT/PA on pilot side »Tech: P on INT and CP with ATC; both on HOT MIC »Notify LM when parking brake set »Set 5,000# torque (conditions permitting) »Release brakes and listen for LOAD CLEAR »Apply brakes (reverse if space is limited) »PA switch to interphone »Wait for offload checks complete call »Resume mission

LIMITS:

»No explosives without MAJCOM/DO approval »500' min 1000' desired »If fragile you may lower ramp to 18" »Single airdropped rigged platforms (< 24') ok if < 12,000lbs »Double or triple pallets ok if < 12,000lbs and height is good »if > 12,000lbs the front of the aircraft will require ballast (note: a 17,000lbs will require 5,000lbs ballast. 17-12=5) »CDS if >12,000lbs & CVR then do 1 side at a time, 1f >12,000lbs & no CVR do <4 bundles at a time.

BRIEF: Combat Offload

BRIEF: Combat Offload

ENGINE OUT

Engine Out Information Cont.

ENGINE SHUTDOWN CONDITIONS

Turbine Overheat
Throttle Control Cable Failure
TIT (uncontrollable rise)
Oil Pressure (uncontrollable drop)
Oil Temperature (uncontrollable rise)
Power (uncontrollable)
Prop Malfunctions (some)

Nacelle Overheat
Engine Fire
Visible Fluid Leak
Unusual Vibrations/Roughness
Start Valve Open (light illuminated)

Hydraulic pressure >3900 (cruise engine shutdown)

ENGINE FIRE HANDLE

Engine Fuel Control Shutoff Valve Closed
Engine Oil Shutoff Valve Closed
Firewall Fuel Shutoff Valve Closed
Firewall Hydraulic Shutoff Valves Closed
Engine Bleed Air Shut Off
Engine Starting Control Circuits Deenergized
Prop Feathered
Fire Extinguishers Positioned
Agent Discharge Switch Armed

APU/GTC FIRE HANDLE

Fuel Shutoff Valve Closed
Oil Shutoff Valve Closed (GTC)
Bleed Air Valve Closed
Fire Extinguishers Positioned
Agent Discharge Switch Armed
Door Closed (APU)/Disarmed (GTC)

ENGINE OUT

REVERSE TAXI

Quick-Don Preflight

(ref -1 p 1-223)

1. RESTRICTIONS

- 25 feet from all Obstacles
- Cargo secured and Passengers seated
- Ramp 12 inches above horizontal
- Clear area in front of aircraft

2. PREPARATION/BRIEFING

- Complete After Landing Checklist or Before Taxi Checklist (as appropriate)
- Brief Crewmembers/Loadmaster on Reverse Taxi
 - “Clear all obstacles for 25 feet/reverse taxi path”
 - “Turn towards number 1 or 4 engine”
 - “Use more turn and less turn terminology”
 - “Countdown to stop 5,4,3,2,1”
 - “Talk continuously, if stop talking, stop backing”
 - “For Emergency Stop use STOP, STOP, STOP”
 - Try to put aircraft on taxi line if able
 - If night, ensure proper illumination

3. EXECUTION

- Brief crew on direction of turn out
- Ensure all four engines are on-speed
- Confirm all engine oil temperatures 60-85 degrees
- Release brakes and announce “off brakes” (do not let the aircraft roll forward)
- Pilot and Co-Pilot feet on floor
- Do not use brakes
- LM keep talking, if stop talking, stop backing
- Put all throttles in reverse symmetrically
- Taxi no faster than a brisk walk
- Slow aircraft with forward thrust
- Taxi 5 feet forward to align gear prior to stopping
- Questions

Static pressure: **270-455 psi**, Continuous breathing: **270-340 psi**

- Supply Lever – OFF**
- Diluter Lever – 100%**
- Attempt to Breath (If you can you have a faulty regulator)**
- Supply Lever – ON**
- Emergency Toggle Lever – EMERGENCY**
- Don the goggles and adjust for proper fit. Ensure the eyewash pin is IN**
- 3 Breathing Cycles – White in, Black out**
- Hold breath and open the eyewash purge valve. The blinker should go from black to white indicating the ports to the goggles are clear**
- Emergency Toggle Lever – NORMAL**
- 3 Breathing Cycles – White in, Black out**
- Eyewash Pin – OUT for flight**
- Leave in NORMAL, 100%, ON, Oxygen Hose – Connected**

Note: For stowage purposes after flight the eyewash pin should be pushed in.

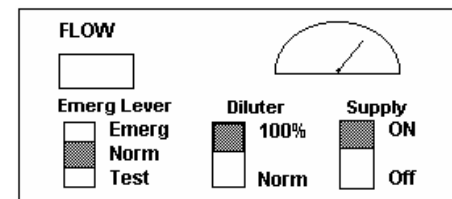
BRIEF: ERO

NOTE:

- If any engine oil temperature exceeds 100 degrees, abort the reverse taxi by taxiing forward to center the nosewheel and then stop to cool the engines.
- Although the LM is primary for directing reverse taxi, anyone can call to stop the aircraft for safety, including the marshaller.

BRIEF: ERO

OXYGEN

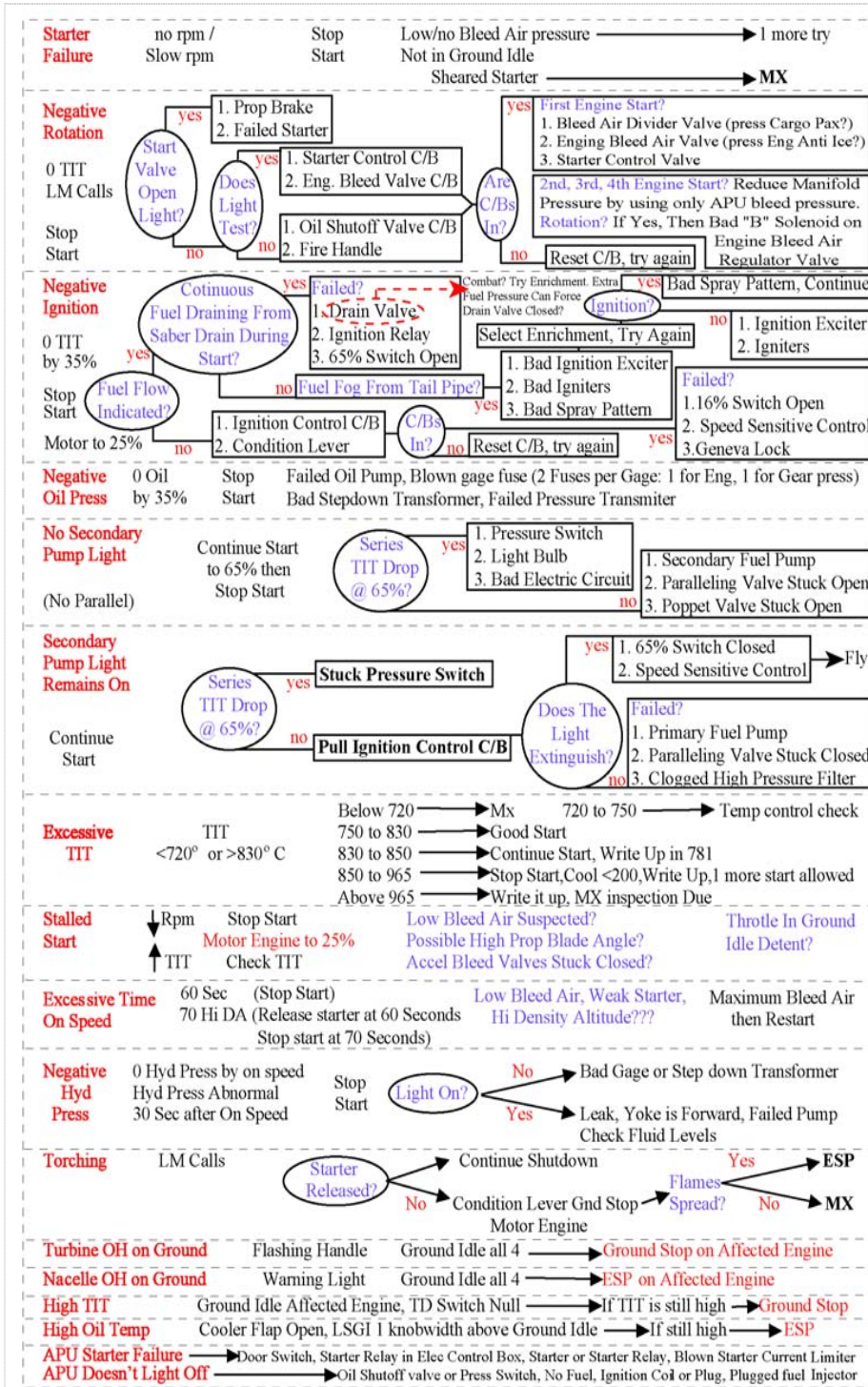


OXYGEN

ENGINE RUNNING ON/OFFLOAD

BRIEFING GUIDE

- Applicable items of **After Landing Checklist**
- Engines - Low Speed Ground Idle (check SKE & RADAR)
- Flaps & Air Deflector Doors - as req'd (Up for Dirt Ops)
- Face into Wind (Dirt Ops)
- More than 10 PAX - Ramp & Door (less - crew door)
- Vehicles/Cargo - 300' straight, 50' prior to turn
- Night Operations:
 - Landing Lights - as req'd
 - Wing Tip Taxi Lights - On
- Safety Obs (FS 245):
 - PA - On
 - Heads up on Cargo/PAX moving
 - Crew use HOT MIC
- Start with **Before Takeoff Checklist**



BRIEF: ERO

BRIEF: ERO

General TOLD Definitions

General TOLD info

- 3-4
- Rwy length gen most stringent limit on GW
 - Obst clnc may limit GW
 - Other factors: PA, OAT, wind, slope, RCR & pwr avail
 - All TOLD computed w/out nosewheel steering
 - Ground effect greatest @ gnd level, neg when wing is 1/2 wing span above gnd (approx 50')

Ground Min Control Speed

- 3-21
- Minimum speed at which the airplane may lose an outboard engine during ground run and still maintain directional control. (add 15 kts to chart)
- #1 engine windmilling on NTS, Max pwr on 3 engines
 - Normal bleed
 - Flaps 50% with high rudder boost
 - Max rudder deflection
 - Max centerline deviation of 25'
 - Wings level

Note: If $V_r < TO + V_{mcg} > V_r$, reduce GW so that $TO \leq V_r$.

Air Min Control Speeds

- 3-22
- Minimum speed at which directional or lateral control can be maintained for a given configuration. HGW = 140,000#

One engine Inop

- 3-23
- In or out of ground effect
 - Normal bleed
 - #1 engine windmilling on NTS, max pwr on 3 engines
 - Max rudder deflection
 - 5° bank away from inop engine
 - Gear down
 - Flaps 50%, high rudder boost
- Note: Wings level incr $V_{mca} +9$ KIAS (+13 KIAS HGW)
5° towards dead, +20 KIAS (+37 KIAS HGW)
5° away & inop eng feathered, V_{mca} decr 2 to 4 KIAS

Two Engines Inop

- 3-23
- Out of ground effect
 - Bleed Off
 - Max power on 2 engines
 - #1 engine windmilling on NTS
 - #2 engine feathered
 - Utility hydraulic system inop
 - Max rudder deflection
 - 5° bank away from inop engine
 - Gear down
 - Flaps 50%, high rudder boost, booster system

Note:

- Wings level incr $V_{mca} +16$ KIAS (+19 KIAS HGW)
- 5° toward dead +30 KIAS (+39 KIAS HGW)
- 5° away & inop eng feathered, V_{mca} decr 4 KIAS
- Normal bleed: decr V_{mca} 2 to 5 KIAS

Runway/Taxiway Requirements

- 5.15
- Rwy Normal Ops = 80'/25m
 - Rwy Assault Ops = 60'/19m
 - Taxi = 30'/9m

Normal Takeoff Configuration

- 3-4
- 4 Engines at take-off power
 - Bleeds on: Air con and Press
 - Flaps 50%
 - Rotation speed = $TO - 5 \text{ \& } \geq V_{mca}$
 - Take off speed = $1.1 V_s$ (power off)
 - Obstacle clnc speed = $1.2 V_s$ (power off)
 - Min flap retraction = obst clnc speed
 - Normal flap retraction = $TO + 20$

All rejects assume

- 3-4/3-15
- 3 seconds to recognize
 - Max anti-skid braking
 - 2 in reverse, 2 in GI within 3 sec
 - No pause at flight idle for ESP, or at Gnd Idle
 - #1 windmilling on NTS

3 Engine TO Assumptions (& Climb Config)

- 3-27
- 50% flaps, no nosewheel steering
 - #1 windmilling on NTS
 - Take off power on 3 engines
 - Gear up 3 sec after lift off (18 sec)
 - 1 engine feathered 6 sec after lift off
 - Normal obstacle clearance speed
 - Out of ground effect

Critical Field Length

- 3-13
- The total runway distance required to accelerate on 4 engines to critical engine failure speed, experience an engine shutdown then either stop or take off in the remaining distance.
- Reject assumptions above
 - 3 Engine TO assumptions above

Refusal Speed

- 3-15
- The maximum airspeed the airplane can accelerate with 4 engines at take off power and then stop within the remainder of the runway.
- Take off power set prior to brake release
 - Reject assumptions above

MFLMETO

- 3-28/5.15.7
- The length of runway which is required to accelerate to refusal speed, experience an engine failure and stop or continue to $1.2 V_s$ in the remaining runway.
- Peacetime restriction: 3000' min & correct for V_{mca}
- 4 engines at max power prior to brake release
 - 3 engines at max power after failure
 - 50% flap, high rudder boost
 - Hard surface, paved runway
 - Take off speed of $1.2 V_s$ (power on)
 - Obst clnc speed of $1.3 V_s$ (power on)
 - Disregard ground and air min control speed
 - Min flap retraction speed = obst clnc + 10

General TOLD Definitions

Rwy Condition Reading/Rwr Surface Covering

3-10/5.15.5

RCR:	Dry/Good	Wet/Medium	Icy/Poor
Asphalt	23	12	5
Alum Mat	20	10	
M8A1 w/PSP	20	8	
M8A1 w/o PSP	13	3	
Clay	16	5	
Crushed Rock	16	5	

RSC: Water or slush depth reported in inches 1" = RSC of 10. For loose, dry snow use 1/3 actual depth up to 3"

Wind Application

- 3-11/5-9
- All winds will be in the "recommended" area
- Apply gusts to: rotation, TO, appr, TH & TD speeds (5)
 - Distances adjusted only w/tailwind
 - Headwind used only for "mission accomplishment"(50%)
 - Tailwind always applied (150%)
 - All winds used for Acc time check (100%)
 - @ Cruise, for large headwinds (> 70 kts), incr TAS by 4 kts for ever 10kts of wind over 70kts up to 923 TIT

Min Field Lengh for normal TO

- 5.15.3/6.16
- Charted Critical Field Length + screen height correction
 - corr = 50' for every 1' of alt req @ DER
 - add 1750' at Army, civil or joint use fld in US (35' DER)
 - add 800' at ICAO foreign civil/military fld (16' DER)
 - Climb gradient req 3 eng: 152 ft/nm (2.5 %)
 - Climb gradient req 4 eng: 200 ft/nm
 - If >200 ft/nm grad req, subtract 48 ft/nm to get req 3 eng grad

Correction for Obst Height based on Slope

- 3-18
- Height of Obst = alt of obst - alt of closest end of rwy
 - Corr to height = rwy avail - liftoff distance x %slope/100
 - add this correction to obst height for uphill
 - subtract this correction to obst height for downhill

Take Off Distance

- 3-26
- Total distance required to accelerate to take-off speed, lift off and climb to a 50-foot height. Broken into 2 distances: take-off ground run + distance from lift-off to 50' obstacle.

Acceleration Time Check

- 3-30
- Use V_r - 10 kts rounded down to nearest 10.
 - 3 kt tolerance
 - Required when $V_r < TO$

Cruise

- 4-1/5.27.3
- Service Ceiling: alt @ VVI = 100 fpm (@932 TIT)
 - Cruise Ceiling: alt @ VVI = 300 fpm (@932 TIT)
 - Airspeeds:
 - leg > 2 hrs, cruise @ 280 KTAS
 - leg < 2 hrs, cruise @ 260 or 270 KTAS
 - Below 10,000' IAS should be ≤ 210

TOLD

TOLD

TOLD

Range Definitions 5-8

Specific Range: NM per pound of fuel (TAS/FF)
Long Range Cruise: Aircraft velocity =1% less than the max specific range for a given weight & altitude
All bleed: Normal bleed + engine anti-ice & LE anti-ice

Driftdown 5-12

Maintain recommended speed until VVI=100 fpm then maintain 100 fpm until service ceiling (if terrain a problem) or cruise ceiling (recommended)
Assumes: 1 eng feathered, other 3 at max cont.

Endurance 6-1

Max endurance is V at which minimum fuel flow for a given configuration, altitude, temp & gross weight
Allowed: ±10kts, ±1000ft
Can shut down one eng to save gas @ low altitudes
-engines more efficient @ high pwr settings

Decent 7-2

Penetration: dwn to FL200, FI, gear up, flaps up @ L/D_{max}
FL200 to SL, 250KIAS, gear up, flaps up
Rapid: gear dwn, flaps 100%, FI, 145KIAS
Max Range: FI, gear & flaps up, @ L/D_{max}

Min Runway Length for Landing V3 5.15.4.1

Landing distance + RVR correction
- < (3/4 sm) +1000'
- ≥ 40 + 500'
Max effort: gnd roll + 500'
Peacetime: 3000' mim (MAJCOM/DO wavier for less)

Landing Distance Assumptions 8-2

- 50' over threshold
- 3° glideslope (rwy intercept approx 1000')
- Normal roundout/flare
- Stop action achieved within 1 sec
 - Nosewheel down
 - max anti-skid with cold brakes
 - 2 in reverse, 2 in ground idle
- Normal threshold speed = 1.35 V_s (power off)
- Normal landing speed = 1.2 V_s (power off)
- Max effort threshold = 1.28 V_s (power off)

Note: min speeds exist because at lower speeds, the engines will produce more thrust increasing landing distance

- Min threshold speed = 106.5 KIAS
- Min TD = 97 KIAS (98.5 for 0% flap)



Techniques, Tribulations & Turn Radius

60:1 Rule

- 1 nm per degree at 60 nm
- 1 degree = 6,000 ft at 60 nm
- 100 ft per nm for 1° pitch change
- TAS = IAS + (FL/2)
- TAS (nm/min) = TAS/60

Turn Radius

TAS	15	30	45	60	SRT	SRT°
120	0.9	0.4	0.2	0.1	1.2	19°
150	1.4	0.6	0.3	0.2	1.5	22°
180	1.9	0.9	0.5	0.3	1.8	25°
200	--	1.1	0.7	0.4	2.0	27°
220	--	1.3	0.75	0.4	2.2	29°
240	--	1.5	0.9	0.5	--	--
260	--	1.7	1.0	0.5	--	--

TR = nm/min - 2
 TD = 2 x TR = (nm/min)²/10

Lead Pt (°) = 60/ARC x TR(in nm)
 Lead Pt (nm) = ARC ± TR
 Bank angle to maintain arc
 = 30/ARC x TR
 = Radial Lead Pt/2

SRT = TAS/100 (or gnd speed)
 ½SRT = TAS/50 (or gnd speed)
 Bank for SRT = TAS/10 + 7

Turns less/more than 90°	° to turn	Fraction of TR
	180	2
	150	1 5/6 (1.8)
	135	1 2/3 (1.7)
	120	1 1/2 (1.5)
	60	1/2 (.5)
	45	1/3 (.3)
	30	1/6 (.2)

Climbs & Descents

Gradient (ft/nm) = $\frac{\text{altitude to lose/gain}}{\text{distance to travel}}$
 Pitch change = $\frac{\text{gradient}}{100}$
 VVI = Gradient x GS (nm/min)
 VVI for 3° GS = $\frac{GS \times 10}{2}$
 VVI for 2.5° GS = $\frac{GS \times 10}{2} - 100$

Note: each 60kt of wind = 1° pitch

Holding

Offset ° = $\frac{TD \times 60}{outbound \text{ dis}}$ = $\frac{TR \times 120}{outbound \text{ dis}}$
 Timing: ≤ 14,000 = 1+00
 > 14,000 = 1+30

Drift = $\frac{\text{crosswind component}}{TAS \text{ (nm/min)}}$
 Outbound time (1+00) = $\frac{3600}{inbound \text{ time}}$
 Outbound time (1+30) = $\frac{8100}{inbound \text{ time}}$
 Time in 180° turn = $\frac{1\% TAS}{2}$

Double drift

Into wind turn = 30° - 1° per ° drift
 Inbound to fix = course ± drift
 Other turn = 30°
 Outbound leg = heading ± 2 x drift
 Hold drift for same time as the time in 180° turn

Triple drift

Both turns = 30°
 Inbound to fix = course ± drift
 Outbound leg = heading ± 3 x drift
 Hold drift for same time as the time in 180° turn

Equipment Emergency Procedures.

When notified of a malfunction, the pilot will maintain drop airspeed and AGL altitude (if possible) and avoid flying over or upwind of water or built up areas to the maximum extent possible. The loadmaster will accomplish the malfunction checklist and notify the pilot when complete. The crew will then run the completion of drop checklist.

Loose platform prior to green light. The loadmaster will take the following corrective actions:

- Notify the pilot by stating "Malfunction, loose platform".
- Alert parachutists (if required) to remain forward/clear of the load.
- Apply emergency restraint chains on all platforms to be dropped, moving from front to rear.
- Raise the aft anchor cable supports, if required.
- Clear the ramp and door to close.
- Relock the platforms.
- Secure the platform(s) with aircraft tiedown equipment if unable to engage the locks.
- After completing the malfunction checklist, perform the completion of airdrop check-list.
- **NOTE:** Make no further attempt to airdrop the platform.
- **Extraction parachute fails to release mechanically/falls on the ramp. The loadmaster will:**
- Notify the pilot by stating "Malfunction" with a brief description of the problem.
- Alert parachutists (if required) to remain forward/clear of the load.
- Apply emergency aft restraint chains on all platforms moving from front to rear.
- Raise aft anchor cable supports, if required.
- Clear the ramp and door to close.
- Relock the platforms.
- Secure the platform(s) with aircraft tiedown equipment if unable to engage the locks.
- After completing the malfunction checklist, perform the completion of airdrop check-list.
- **NOTE:** Make no further attempt to airdrop the platform.
- **Load fails to extract with a single extraction parachute outside the aircraft. The loadmaster will:**
- Notify the pilot by stating "Malfunction", with a brief description of the problem.
- Alert parachutists (if required) to remain forward/clear of the load.
- Apply emergency restraint chains to all platforms moving from front to rear.
- Cut the extraction line.
- Raise the aft anchor cable supports, if required.
- Clear the ramp and door to close.

WARNING: The combined effects of aircraft gross weight, drop altitude, and temperature may prevent level flight at drop speed when towing deployed extraction parachutes as small as 22 feet. Total drag on the aircraft may be more than the thrust available to overcome it. The situation could require an immediate forced landing near the DZ.

Multiple 28 foot extraction parachutes fail to release mechanically/fall on the ramp. The loadmaster will:

- Notify the pilot by stating "Malfunction" with a brief description of the problem.
- Alert parachutists (if required) to remain forward/clear of the load.
- Raise aft anchor cable supports, if required.
- Clear the ramp and door to close.
- Relock the platforms.
- Secure the platform(s) with aircraft tiedown equipment if unable to engage the locks.
- After completing the malfunction checklist, perform the completion of airdrop check-list.
- **NOTE:** Make no further attempt to airdrop the platform.

Load fails to extract with multiple 28-foot extraction parachutes outside the aircraft. The loadmaster will:

- Ensure the right rail control handle is in the emergency position.
- Notify the pilot by stating "Malfunction, load failed to extract" (if the load still fails to extract).
- Alert parachutists (if required) to remain forward/clear of the load.
- Pull the simul open control handle full forward.
- **WARNING:** The loadmaster must apply a sustained steady pull (10-20 seconds) on the simul open con-trol handle to compensate for lock loading and binding caused by the towed parachutes.
- Report the condition to the AC if the load still fails to extract. If the load cannot be jettisoned and flight conditions permit, proceed to a suitable airfield, avoid flying over built up areas and land in a flat attitude with ramp and door open.

WARNING: With multiple 28-foot extraction parachutes deployed outside the aircraft, maximum thrust will be needed to stay aloft or to control the descent. The drag produced by the extraction parachutes should decrease if airspeed is allowed to bleed off. This reduction in drag could permit level flight or reduce the rate of descent should level flight not be possible. Do not reduce power to achieve this air-speed change and do not slow below max effort takeoff speed. Max effort takeoff speed is 1.2 X power on stall speed and provides an acceptable airspeed margin for zero bank angle. If the aircraft must be turned to get to a suitable landing area, this airspeed may not be sufficient to prevent a stall while in banked flight. If a turn is required, pilots should be sensitive to the first indication of a stall and reduce bank and/or lower nose to decrease angle of attack and eliminate the stall indication. Any power reduction will increase the stall speed. The tradeoff in selecting a landing site, straight ahead or one requiring a turn is a function of the rate of descent the required airspeed will produce. The higher the airspeed, the faster the aircraft will likely descend. A forced landing straight ahead will produce the lowest allowable airspeed, least rate of descent and most desirable impact forces. Any turn will decrease the time before impact. However, the risks associated with turning may be mitigated by the terrain the aircraft will impact such as forest or built up areas.

Personnel Emergency Procedures

Emergency Parachutist Bail Out Procedures.

• Under satisfactory conditions (static-line exit), the minimum acceptable emergency bailout altitude is 400 feet above the terrain. When an aircraft emergency occurs during static-line airdrops, the pilot maintains an acceptable attitude and altitude for the parachutists to evacuate the aircraft. If the jump must be made at an airspeed in excess of 150 KIAS, advise the parachutists of the airspeed and altitude. Order evacuation by turning on the green light and giving the briefed alarm bell signals.

• Minimum emergency bail-out altitude for free-fall parachutists is 2,000 feet AGL.

Towed Parachutist.

• The jumpmaster will stop the remaining parachutists; the loadmaster will notify the pilot; and the copilot will turn on the red light. The pilot will maintain drop airspeed, at least the minimum drop altitude (AGL) for the type parachute being used, and avoid flying over or up wind of water or built up areas.

• Crews should suspect they have a towed parachutist if static lines are not fully tucked into the upper corner of the paratroop door or if a D-bag appears to be stuck outside the door. It is unlikely for a D-bag to become caught on the outside of the aircraft and is a probable indicator a parachutist is being towed. In any case, crews should follow emergency procedures until they have confirmed no parachutist is being towed. Crews should take special effort to confirm towed jumper status at night with limited rearward visibility. They should consider using an additional source of illumination to view the rear of the aircraft.

• The jumpmaster or safety observer is responsible for identifying how the parachutist is towed. If being towed by anything other than the static line, the jumpmaster or safety will attempt to free the parachutist. If being towed by the static line, the jumpmaster or safety will make a recommendation to the AC, through the loadmaster, whether to retrieve the parachutist or cut him or her free. If all parachutists have exited and there is no safety person onboard, this responsibility rests with the loadmaster.

• The AC will make the final decision whether or not to cut the towed parachutist free. If the decision is to cut the parachutist free, the loadmaster will cut the static line on the AC's command.

NOTE: Towed parachutists indicate consciousness and that reserve parachute is ready by maintaining a tight-body position with both hands on reserve parachute. This indicates the jumper is prepared to be cut away.

• If the parachutist is towed after exit from a paratroop door, the pilot should lower the landing gear and set flaps to 100 percent to reduce parachute buffeting. (See warning below.) If possible, avoid turning the aircraft in the direction of the towed parachutist as this often causes parachutist to swing violently and increases the possibility of injury. All turns should be shallow and coordinated to reduce the severity of parachutist oscillation. During training, the first priority is to retrieve the para-chutist whether he or she is conscious or unconscious. However, if the parachutist cannot be retrieved and indicates consciousness, cut the parachutist free.

WARNING: Although 100 percent flaps selection provides an improved airflow for a towed parachutist, under certain conditions the landing gear down, 100 percent flap configuration may reduce aircraft performance. The AC should consider density altitude, aircraft weight, position in formation, or other factors deemed important in determining what flap setting between 50 and 100 percent should be used.

• For a parachutist towed after exit from the cargo ramp and door, the first priority is to cut the parachutist free if consciousness is indicated. Retrieve if the parachutist is unconscious, does not sig-nal, cannot be observed, or if a condition exists that prevents cutting the static line.

• There are two methods for the retrieval of towed parachutists from the paratroop doors. The primary method of retrieval is use of the Towed Parachutist Retrieval System (TPRS). The secondary method of retrieval is to rig a 5,000-pound tiedown strap/paratroop retriever bar in the paratroop door prior to retrieval of the towed parachutist. When the secondary method must be used, the maximum rigged weight of the parachutist is limited to 250 pounds (including equipment, parachute, etc.)

NOTE: When the parachutist is in the door area and is under the control of the loadmaster or safety observer, or jumpmaster, slightly unwind the static line retriever to relieve tension on the line so the parachutist can be brought into the aircraft.

• After retrieving the parachutist, the pilot will reset flaps to 50 percent, raise the landing gear (if required), and call for completion of drop checklist.

WARNING: There is no effective, dependable, nor consistently reliable means to manually retrieve a towed parachutist from the paratroop door or ramp and door. Manually retrieving a parachutist is a last resort. Manual retrieval techniques vary, depending on the scenario, and should be used with extreme caution.

CDS, SATB Emergency Procedures

Gate fails to cut/load fails to exit.

• Dearm the CDS switch (if installed).

• Notify the pilot by stating "Malfunction" with a brief description of the problem.

• Alert parachutists (if required) to remain forward/clear of the load.

• Raise the aft anchor cable supports (if required).

• Clear the ramp and door to close.

WARNING: When notified of a malfunction, extend additional flaps and lower the nose to maintain as light nose down attitude until the ramp and door are closed and the load is secured. Maintain drop airspeed and AGL altitude (if possible) and avoid flying over or upwind of water or built up areas.

WARNING: When dropping double stick using the CVR and one gate fails to cut, the loadmaster will delay notifying the pilot of a malfunction until the containers of the released stick have exited the aircraft. If the containers of both sticks fail to exit, notify the pilot immediately and continue with emergency procedures.

WARNING: When the cargo ramp and door cannot be closed from the cockpit, the loadmaster secures the load for aft movement. Ensure the lifeline is locked to a tiedown ring no further aft than FS 677 prior to proceeding aft to operate the cargo ramp and door controls.

CAUTION: If the load is jammed in the ramp area, notify the engineer to stop closing action when the cargo door releases from the uplock. If this is necessary, the loadmaster will secure the load and close the ramp using the aft controls.

• Secure the load for landing and install high altitude CDS safety pins (if required).

• After completing the malfunction checklist, perform the completion of airdrop check-list.

NOTE: If the malfunction was due to a failure of the static-line retriever or CDS remote timer system, the mission may be continued using the opposite static line retriever and manually activating the retriever switch at FS

Combat Rubber Raiding Craft Emergency Procedures.

• Follow either CDS or towed parachutist emergency procedures as required.

Container Ramp Bundle Emergency Procedures.

• Follow either CDS or towed parachutist emergency procedures as required.

SATB fails to release mechanically/falls on the ramp. The loadmaster will:

• Notify the pilot by stating "Malfunction" with a brief description of the problem.

• Clear the ramp and door to close.

• After completing the malfunction checklist, perform the completion of airdrop check-list.

NOTE: Make no attempt to remove the bundle from the ramp prior to closing the ramp and door. Do not attempt further SATB airdrops utilizing the bomb rack.

SATB outside the aircraft and fails to separate. The loadmaster will:

• Notify the pilot by stating "Malfunction" with a brief description of the problem.

• Cut the static line on the pilot's command over the DZ.

WARNING: When simulating an airdrop using the cargo ramp and door, a hung bundle could become wedged in the aircraft elevator during turns. Do not attempt to retrieve the SATB. If possible, cut the static line prior to making a turn.

• Notify the pilot the bundle has been cut away.

• After completing the malfunction checklist, perform the completion of airdrop check-list.

COMBAT BRIEFING GUIDE

1. Sanitize flight suit and personal possessions
2. Intelligence
 - a. Overall picture
 - b. Threats (type and location)
 - c. Friendly/Enemy positions
3. SAR procedures
 - a. Assign SAR call sign (Tac call sign plus letter; i.e. "Music 11 Alpha" for the AC, "Music 11 Bravo" for the CP, etc.....)
 - b. Review SAR Card
 - c. SAR forces (frequencies and locations/ 243.0)
 - d. SAR letter (primary and secondary)
 - e. Safe areas and contact procedures
 - f. Re-group procedures and locations
 - g. Evasion techniques
 - h. Survival radio discipline
 - i. Review Isopreps
 - j. Survival/Evasion kits, GPS, etc.
4. Interphone and Radio discipline
 - a. Divide radios among crew positions
 - b. Use chattermark procedures (do not compromise code)
 - c. Minimize transmissions
5. Wounded crewmember procedures
6. Low-level emergencies
7. Battle damage reporting and procedures
8. Use of lights (interior and exterior)
9. Emergency load jettison procedures
10. Bailout procedures
 - a. Controlled vs. uncontrolled
 - b. Bells (3 short/1 long) and Mayday call
11. Crash landing/ditching procedures and egress
 - a. Bells (6 short/1 long) and Mayday call
 12. Ground evacuation (accountability and passengers)
 13. Use of equipment: parachutes, LPU's, survival vests, body armor
 14. Altered/non-standard procedures: Slowdown, Random approaches, Escape
15. Chemical environment

COMBAT BRIEFING GUIDE

16. Clearing responsibilities...

Pilot: 9 to 12	Load: 6 to 9/6 to 3
Copilot: 12 to 3	Bubble: 3 to 9 Aft
Nav: 3 to 9	Eng: Primarily inside
17. Passing of the threat – Person "padlocked" stays on the threat until the next person acquires the threat and acknowledges with a "padlocked" call. Example of a bogey passing along the right side high to low: "Pilot, load, bogey passing through 4 o'clock high, bubble/copilot your way." The bubbleler or copilot at that time will acknowledge they have a visual with a "padlock" call.
18. When making threat calls...
 - a. Attempt to make calls in a monotone manner
 - b. Make all calls as concise and clear as possible
 - c. Make sure you are clear of terrain when directing
 - d. "Lose sight, lose the fight"
19. Threat calls:
 - a. Immediate Threat (Directive):
"Break left/right, Bogey/AAA/SAM, direction or clock position, range, status"
 - a. b. Non-Immediate Threat (Informative):
"Pilot, Load, Bogey 3 o'clock high, going away"
20. AAA calls and defensive tactics
21. SAM calls and defensive tactics
22. Bandit calls and defensive tactics
 - a. Bubble techniques and direction calls
 - b. Bandit vs. Bogie
23. Terminology:

Altitude – high/low, referencing horizon	Mud – RWR shows ground threat
Bandit – hostile aircraft	Nails – RWR shows AI in search
Bogey – unidentified aircraft	No joy – lost sight or don't see it
Break Turn – 45° to 60° of bank	Padlocked – dedicated visually
Engaged – threat is attacking	Reverse – opposite turn, equal bank
Friendly – identified as friendly force	Rolling in – hot aspect
Going away – cold aspect	Spike – RWR shows AI in TTR
Hard turn – 30° to 45° of bank	Tally ho – visual contact with threat
Head on – threat is directly ahead	Turn – up to 30° of bank
	Visual – visual contact with friendly

General Formation Info

Vis Formation Info

Ground Ops:

Min taxi interval: 4 eng = 1 aircraft length (99' 6"), 2 eng = 2 aircraft length
 If SKE will be used/backup - accomplish FCI check, inform lead of any SKE malfunctions ASAP
 On runway, lead on left, wing alternate sides, nose to tail clearance
 Feed-on as briefed. Technique: time 15 seconds when lead crosses hold short, 2 crosses hold short on time, accelerate through turn, maintains runway center line on takeoff roll.

Takeoff: Min interval = 15 sec, *TECH: Fl at -5 sec*, don't advance power until rolling
 Abort: Nav on interplane, CP on ATC, "Music Flight, #3s aborting, #3's aborting, #3's aborting"

Airspeeds & As/Des Rates: Fly ↓ table or "As Briefed". ↑ 15,000' consider aircraft capabilities.

Lead Should Fly:	Below 10,000'	10,000' to 15,000'	Above 15,000'
Climb	180 KIAS 1,500 fpm	170 KIAS 1,500 fpm	160 KIAS 1,500 fpm
Assembly	180 KIAS	170 KIAS	160 KIAS
Cruise	Normally 210 KIAS	Normally 210 KIAS	Normally 210 KIAS
Enroute Altitude Change	Enroute airspeed or as briefed 1,000 fpm or as briefed		
Descending Slowdown	140 KIAS 1,000 fpm	As Briefed	As Briefed
DZ Escape	140 KIAS 1,000 fpm	As Briefed	As Briefed

Airborne Aborts: Notify lead, turn away in safe direction, other aircraft in element move up.

No-Drop: Lead notifies using FCI/interplane. Don't radio individual no-drops to formation.

Altitudes: Day VMC: 500' AGL minimum. **Exception:** 300' AGL on approved routes and Radar Altimeter.

MSA/Night VMC/NVG: 5nm (3nm NVG) of centerline, ↑ of 500'+obst/spot ele, or 400'+1 contour

Night VMC run-in: SD to Escape 3nm of CL; highest of: 500' + obst/spot ele, or 400' + 1 contour
 After SD: DZ in sight & remain so or +position known & terrain clnc assured may ↓ to drop altitude

IFR enroute: 5nm (10nm out-us) of centerline: highest obstacle/spot elevation +1000' (2000 mts) round up to closest 100'. IFR on MTR in US will be computed MSA unless AP/1B requires higher

IMC drop corridor: 3nm of CL: higher of 500' +obst/spot elev, or 400'+1 contour (may segment)

IMC drop: 3nm of CL: at a minimum, the highest of 500' +obst/spot ele, or 400' + 1 contour from DZ entry point to DZ exit point. If AFI 11-231 requires higher drop alt than above, use highest.

ESA: 22nm of centerline: 1000' +obs/spot ele (2000 mts). Can trim chart to 10 NM of route CL
 If next leg alt higher, climb & be at alt by the Turn Point, for descents wait until after the T Point

Peacetime Route Restrictions: They shall not fly: (as per vol 3 16.3.9)

Within 1 nm radius below 2000' agl from sensitive areas: hospitals, fish hat, ostrich, poultry, etc
 Within 3 nm from Prohibited space & nuclear plants

Through Restricted airspace (unless you have permission) or live fire/impact areas

Below 1000' AGL within 2000' radius of cities/town **magenta** on TPC (1:500,000)

Below 500' unless host nation allows or route has been environmentally surveyed for 300' ops

SKE airdrop in uncontrolled space req NOTAM 48 hrs in advance- see V3 p203

Chart Requirements: CHUM out to 22nm, may trim to 10nm after ESA established

Individual charts must have: TPs, IP, DZ, course line, course data, CHUM data, ESA

Inadvertent Weather Penetration without SKE:

May need to modify due to terrain, geometry, airspace etc.

Emergency procedure... may get violated so (if possible) stay VFR...

Lead will give base alt (min ESA), heading, and airspeed (at min)

Establish base speed & 1,000 fpm then turn 45° R/L for 2 min. Elem leads cont. straight

Last element level @ base alt, each element +500' higher than preceding

Inadvertent Weather Penetration with SKE:

Lead will give base alt (min ESA), and heading (at min) *TECH:* airspeed

Climb @ cruise speed, 1,000 fpm, select SKE, set XTRK=1000'

When level, lead directs "Assume IFR interval", wing -15Kts & drift back to 4,000/8,000'

Once in position, reset XTRK

Lead may level formation below ESA if VMC

Landing: 50% flap, GI and reverse/brakes as briefed

desired interval Vis = 20 sec, 15 sec minimum, SKE 6000', 5000' minimum.

They shall not perform touch-and-go landings during formation recoveries.

FORMATION

FORMATION

VIS FORMATION

VIS FORMATION

Reasons for Formations:

Size will be determined by user
 Mass on DZ Mutual Support Tac & Log support for Army
 Time efficient Easier to escort

Types of Formations: will be determined by the nature of the threat

Visual in-trail: 3 aircraft per element

#2: 2,000' back, right side, wing tip overlap out of wake turbulence

#3: 4,000' back, left side, wing tip overlap out of wake turbulence

#4 (2nd element lead): 12,000' back, centered

Fluid trail: allows for freedom to evade, most flexibility, optimizes terrain masking, etc...

3 aircraft per element. Spacing will be pre-briefed (ie 2 2000' to 6000', 3 8000' to 12000')

#2 & #3 move in arc from 3-9 o'clock position

Line abreast: coastal/open terrain penetration or x-ing lines of communication - allows little flexibility during turns. 2 aircraft per element, wingmen (or elem leads) 4,000-24,000' abeam lead

Box: advantages of line abreast plus has mutual support. Two, 2-ship elements. Element leads fly abeam 4,000-24,000' (line abreast) with wingmen in trail 2,000-24,000'.

Modified V: shortens formation length, good for fighter escort. three 2-ship elements: within element 2,000-4,000', 2nd element: 9,000' in trail & right of lead, 3rd element: 18,000' in trail & left.

Inverted Vic: Used when you have a limited # of RVD's. 3 aircraft elements. First two aircraft fly line abreast, with #3 in trail, spacing as briefed. (3 should be employed with Rear Vision Device)

Extended Trail: Modified fluid trail- separation increased as briefed. Followers may have to use own navigation. Used when low visibility or terrain will not permit normal formation.

Individual Ingress: Each aircraft navigates own way to join-up point/run-ins

Departure & Assembly: After airfield boundary, wingmen adhere to ATC requirements

Acceleration: May be based on radio call, time (start of lead's TO roll), geo pt, DME, etc...

Turns: TECH: after lead, #2 turns 5 sec, #3 turns 10 sec, #4 turns 30 sec

VIS Rejoin: 500' above/below formation until formation in sight & cleared to join.

Orbit: 1000' above orbit alt- must be VFR before orbit pt

Slow to 180 KIAS (or as briefed) at orbit pt. At 1st turn outbound, descend to 500' above orbit until form in sight or turn inbound

Altitude/Airspeeds: Night VFR: Lead announces speed changes >15kts. Day VFR altitude: Lead follows terrain w/ref to Radar Altimeter. Wing maintain position relative to lead while referencing terrain & Radar Alt. Night VMC: Lead follows Pressure Altimeter. Wing reference lead & monitor PA. (a wingman 2000' in trail & 175' low can impact a light weight jumper)

Slowdown: elements slow at pre-briefed point to compress formation. At night (unless tactically unsound) include visual/aural signal. Throttles 1,000 inch/lbs, flaps 50%, climb/descend @ 140KIAS. At drop alt, slow to drop airspeed.

Airdrop Procedures: each element flies own approach until red light. Wingmen main position, releases on own CARP. Crosswind >3°, wing maintains same ground track as leader.

CDS: Min spacing for CDS=6,000' (12,000' if IMC) Each aircraft flies to its own CARP.

DZ Escape: At red light & load clear, accelerate to 140KIAS & climb/descend as required. Elements will accelerate at pre-briefed time/location/radio call @ 900° TIT

Recovery: Complete Decent Checks prior to pattern entry or initial.

Downwind: 200KIAS 1,000' AGL or pattern alt (highest)

Wing fly same track as lead, stack slightly, *put leads horiz stab ½ up vert stab*

Lead break ½nm past app end w/45° bank FI, ~10 sec after dep end

Wait 10-12 sec for 20 sec interval

Level turn until 140KIAS, slow to App on final

Roll out >300' & >¼ mile from runway

Overhead: 200KIAS 1,500' AGL or pattern alt (highest)

Wing fly same track as lead, stack slightly, *break 3-5 sec after lead*

Lead break app end, wing break no earlier than lead, 45° bank, FI, maintain 150KIAS

Want 1600-1800' spacing on downwind, have CP call 160KIAS & 20° to rollout

Final turn 12-14 sec for 20 sec interval, 140KIAS until final

Roll out >300' & >¼ mile from runway

Landing: Land on centerline, 50% flaps. Ground idle, brakes/Reverse as briefed.

Clear at end. Desired interval 20 sec (15 Min) consider more for adverse conditions.

SKE Formation Info

Weather Minimums: Forms must adhere to both ceiling & visibility approach minimums but no lower than 200-1 (RVR 50). If WX worse than FLIP mins but 200-1 or better, may use departure alternates. To drop actual unilateral personnel/equipment: 300-½ w/AWADS, Joint operations: weather requirements are at the discretion of user. To drop w/out AWADS, formation must be VMC.

Tactical Airlift Formation Lead Requirements:

Unilateral Training VMC - no special requirements.

Unilateral Training IMC.

Single-element formations. A lead crew or instructor AC is required in the formation (any position). If this crew aborts and no other instructor AC or lead crew remains, the other aircraft must abort the mission or continue single-ship, as determined by the mission commander.

Multiple-element formation. A lead crew or instructor AC is required in the lead and deputy lead position. Element lead positions require an instructor AC, lead crew, or an AWADS crew. If deputy lead or an element lead abort after station time, any crew can assume their position with the concurrence of the mission commander. Any crew can fly the last ship of a formation even if it is an element lead position.

NOTE: For AWADS, deputy lead may fly as second element lead provided no aircraft occupy the number two and three positions in the first element.

Other Than Unilateral (IMC and VMC). A lead crew is required in the lead and deputy lead positions.

Element lead positions require a lead or an AWADS crew. If deputy lead or an element lead aborts after station time, a new lead or AWADS crew will assume their position. Any crew can fly the last ship of a formation even if it is a deputy or element lead position.

ESKE: Turns/climbs/desc may cause momentary loss of SKE. Turns >90° can be destabilizing to the formation, in addition, they can cause blanking of the SKE and should be avoided. With 2 formations on same freq within 80nm, use slot enablers. SKE provides for: 36 aircraft total, 34 w/ZM, Slot 01/02 are used for ZMs, max ZM reception 20nm w/LOS. All form ac must be within 10nm of master & 4 nm of leader.

Note: 36 aircraft @ 4000' = a 23nm formation. In big formations consider assembly, masters, recoveries, etc.

Use of FCI: Signal prep +30, +5 sec prep, then execute, ATC direction may act as 30 sec prep. Element lead relays all except: Turn preps/E, Drop signals, DZ escape. Priority of signals: Altitude, Heading, Airspeed.

Lead will signal airspeed changes >10 kts heading changes >10° (drift correction not signaled) Computer turns: TAS, PH, NH, →→E, Computer will dump info if E isn't sent within 1 min of 5 sec prep. You will receive a time countdown to turn, follow TWS & range marker. PPI is primary, TWS secondary

Departure & Assembly: kept as low as possible for fat aircraft but no lower than MOCA/MEA. Wingmen climb at 190KIAS, once at assembly alt may accelerate to 210KIAS to rejoin. *TECHnique:* During assembly use 500' for every 10kts of overtake. Example if base airspeed is 180 at 500' be at 190 max, 1000' be at 200max, etc...

Lead is limited to 20° in turns. During climb, lead will call passing every 2,000' and he will call upon reaching level. Also upon leveling, Wing call reaching altitude in sequence. "leads level at 4,000', 2, 3, 4, etc..."

Enroute: Spacing: #2 4,000' back/500R, #3 8,000' back/500L, #4 12,000 back

Lead accelerates w/900° TIT (or as briefed) & decelerates w/600° TIT

Abort: establish safe heading away from form, others move up in element, FCI check A/R

Loss of SKE (VMC): if only PPI avail., U can continue; if all, go SS or break out & rejoin VFR at end

Loss of SKE (IMC): if all, breakout climb 500', 30° turn for 30 sec. If in turn, climb & roll out

Rejoins:

Set up SKE w/form info to join @ end of formation

Set 16/64 on PPI range, hold 1000' above/below formation alt

Est radio contact, confirm SKE freq & leader #, check master lost indication goes away

Lead will accomplish FCI check prior to rejoin

Will be stabilized @ end before requesting descent

Must be established in position by IP (IMC), 1 min prior to TOT (VMC), Green Light (VIS Formations)

Echelon Turns: always come in pairs (20° cut = 700yds / 1 NM)

Used to adjust course alignment; called on interplane by formation/element

Prior to SD, lead restricted to 20° bank; After Slow Down, Element Lead restricted to 10° bank

Overrun:

Wing: set additional 300 in XTRK, and announce overrun. Element overruns: turn in safest direction, set additional 1300 XTRK, and announces overrun w/base heading, airspeed.

If all aircraft in formation do not set run-in cross track at the same time, the above overrun procedure might not provide adequate aircraft separation.

Overrunning elements/wingmen must be in position my 1 min prior to TOT or NO Drop

Lead Change:

Current lead initiates, new lead acknowledges- will need to do FCI check

Relinquishing Lead turns 45° in safest direction until 1nm from form, resets SKE, drift back and rejoin end at formation. If VMC, you may rejoin at pre-coordinated location within formation

Wingmen reset LDR #s and move up to maintain 1-2 relationship.

TECH: New lead acc to help old lead move to back

SKE FORMATION

SKE FORMATION

SKE Form Info (con't)

Slowdown/Run-in: Do not SKE airdrop in thunder storms, heavy rain or icing. Form uses lead's drift for SKE XTRK, Element Leads follow lead until drop altitude. Entire formation Slows Down w/Lead, after SD Element Leads are restricted to 10° bank. To Slow Down: throttles set 1,000 in#, flaps 50%, and climb/descend @ 140KIAS. Lead can not descend until: Lead + position, entire form within 3nm of CL, entire form past DZ entry point. Each element stacks +50', use Pressure Altimeter as primary altitude reference. Once level at drop airspeed/altitude, lead rechecks drift. Element leads fly independent run-ins to own CARP through escape.

IFR Drop Corridor: Where aircraft can operate below IFR enroute alt. This corridor can be segmented to allow stepdown altitudes. IFR Drop Corridor starts at the IP and ends at the DZ Exit Pt. Max length: 40 nm.

DZ Entry Pt: Once last aircraft is past, Entire formation can safely descend to IMC Drop Alt

Earliest Descent Pt (EDP): Where lead can safely descend entire form to IMC Drop Alt and assure terrain clearance. Provides at a minimum a 6nm IMC stabilization point.

IMC Stabilization Pt: After DZ entry pt where lead will plan to be stabilized on IMC drop alt & airspeed.

Latest Descent Pt: Latest point where lead can start descent to drop alt & have formation stabilized for drop.

Note: The DLP does not provide 6nm of stabilization.

DZ Exit Pt: Where all aircraft will be at minimum IFR enroute altitude. It is a minimum of 4nm from trailing edge of the Drop Zone, calculate using 3-eng perform at airdrop gross weight

Drop: CDS spacing in IMC=12,000' VMC=6,000', each aircraft flying own run-in/CARP, must all be AWADS. Confirm drop clearance min 2 min prior to TOT - call ND on interplane & FCI. Each lead signals their green light with "E", wing time for their green light. Once time begin, maintain constant airspeed for accurate time

Multiple Points of Impact (MPI): Used to disperse loads laterally & longitudinally on DZ. Each element has different PI, spaced further down the DZ. Wing use PI offset charts in Annex A- puts wing 200 yds L/R. Each element does separate useable DZ

DZ Escape: Element L maintains drop hdg/alt/air speed for red light +1 min then escapes as element.

Escape 140KIAS, 1,000 fpm & turn to escape heading, Lead signals acc when all off DZ. Aircraft w/drop malfunctions must notify lead, form will stay at 140KIAS until cured. If VFR, aircraft w/malf proceeds SS to salvo; if IMC, entire form proceeds to salvo.

SKE Signals from SD to Escape:

Slowdown:	Decent:		Lead's Drop:		Escape (Climb, Acc, Time/Turn):		
SD -	E	E	E	E	(LRL)	+	E
30s	5s	5s	1min	5sec	LGL	LRL+30s	LRL+55s LRL+1m

Recoveries: If 3 or more, request extended holding legs. In general limit approaches to no more than 9 A/C.

SKE computer turns not recommended for holding, PTs, TACAN arc's, or radar approaches from a holding fix

Procedure Turn/Holding: No more than 9 aircraft. Entry: within 70° (non-maneuvering) or 20° (maneuvering) of inbound crs; teardrop okay. 1000' above PT altitude, within 3 min of IAF slow to 150 & configure or 170 for holding. Lead will pass drift killed outbound heading, wing will time for turn over IAF. Outbound, abeam each aircraft descends to PT altitude @150 KIAS. Turn inbound delayed to create spacing, #2 18 sec, #3 36 sec, #4 54 sec. If not at 4000' when turn, +2 sec for 1000' long, -2 sec for 1000' short. Lead @ FAF signals slow to 140KIAS or App speed (highest) and maintain until MAP. Min interval 5,000'; desired interval 6,000'

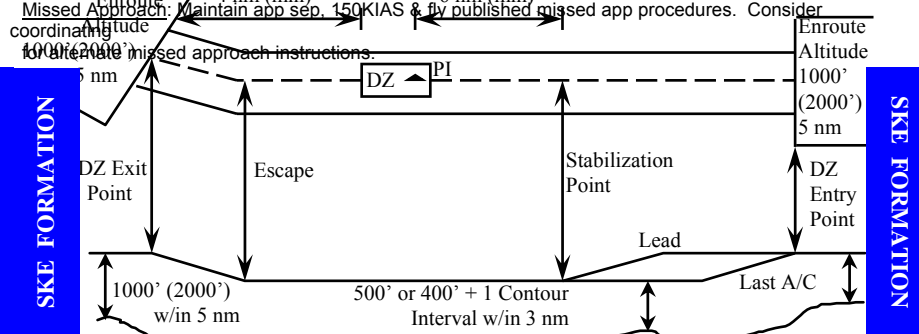
Straight-In: 180KIAS; Lead directs app separation (#999, -, E) Wing reduce -30kts >150KIAS, ITRK =6,000'

Lead will signal slow to 150KIAS for config & 140KIAS @ FAF. Allows 9 aircraft to be recovered in 12 mins.

TACAN Arc: If holding is required, max 6 aircraft. Slow to 170 prior; inbound & cleared slow 150 & configure.

Holding not required, slow to 150 & configure prior to IAF. Lead signals each turn; wing flies own app; lead signals 140 @ FAF

Missed Approach: Maintain app sep, 150KIAS & by published missed app procedures. Consider



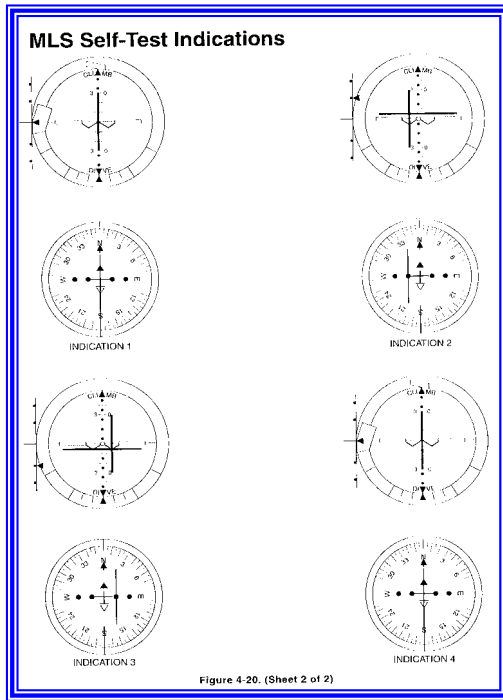
MICROWAVE LANDING SYSTEM

ELECTRICAL SYSTEM

MLS Self-Test

(Automatic if power interrupted 3 seconds)

1. Autopilot - **Disengaged**
2. Flight Director Switch- **NORMAL**
3. Nav Selectors - **MLS**
4. HSI Course Window - **Airplane Heading**
5. Self Test - **Activated**

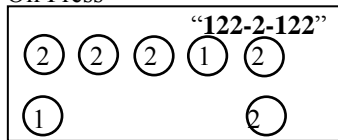


MLS Approach Guide

1. MLS and TAC – **ON**
2. Tune both MLS's – **Desired Channel**
3. TACANs - **Tune Required Frequency.**
Tune TACANs manually, don't use the reference library as per -1 Warning p 4-68
4. MLS 1-2 Page –**AUTO Mode Selected (default)**
5. MLS 1-2 Page – **NON-COMP/COMP Mode (as require)**
 - a. **Select COMP for COMPUTED MLS Approach**
(Select COMP only if approach specifically states to do so)
 - b. **Select NON-COMP for MLS Approach (default)**
6. MLS 2-2 Page - **Verify 4 Letter Identifier (Mxxx)**
7. MLS 2-2 Page - **Verify OVRD Not Selected**
8. Nav Selectors – **MLS**
(ensure TAC not selected on either Nav Selector)
9. HSI Course Window – **Approach Course**
10. MLS 2-2 Page – **Confirm TAC on MLS frequency**
11. Flight Director Switch – **NORMAL**
12. Fly the Approach
 - a. MLS Course - **Intercept**
 - b. Ident on MLS 2-2 page - **Monitor**
14. Missed Approach – **Retune TACAN as required**

MLS

LH AC	RH AC	Upper Main AC Dist Panel Curr Limiters for Main, RH, LH AC & AC, 9 Combat wired CB for Ess AC		Main AC SKE	Radio Circuits
PILOTS "LRAFBI"		COPILOT "MRSEAL"			
AC Inst & Eng Fuel Cntrl	FUSES for gyros & press ind.	Ess AC & Battery SKE	Ess AC & Isol 9 Comb Cbs & Trim	Ess DC Start & Ign Control	Ess DC Eng Inst
Ess DC Aircraft Lndg Gear Cntrl		Main DC Lights SKE & Flaps			
LH AC		ESS AC		MAIN AC	
#1 Main FBP Fwd LH Ext FBP Galley NESA Heat Underfloor Heat "Crew Comfort"		#2 Main FBP Aux Hyd Pmp Aux Feath Mtr Suct Bst Pmp Trim Compas/HDG Indications SCNS, Antiskid, GCAS Autopilot, Synrophaser		#3 Main FBP Aux FBP Aft Ext FBP Radar SKE "Dump Bus"	
RH AC				#4 Main FBP Fwd RH Ext FBP Anti-Ice All of the primary AC are 115/200 Volt 400 Cycle 3 Phase	
CP Instruments			AC Instruments and Engine Fuel Control		
Flight Directors ADIs Powered by: Inverter from Isol DC & Txfrmr from Ess AC 115 Volt 400 Cycle 3 Phase			Torquemeter TIT Fuel Flow LOX Qty Fuel Qty #1 Txfrmr "1 FEB 34" Fuel Press EmerBrake Press Boost Hyd Press 3&4 Oil Press Both are 26V		
			<p>Powered by: Inverter from ESS DC & also ESS AC Has auto-switching from Ess DC to ESS AC 115 V / 400 cycle / single phase</p> <p>Anti-Skid Test 1&2 Oil Press</p>		
Battery "FAAJIVEES" Fire Ext. Alarm Bell AC Ext Pwr Jump Lights Isol DC Bus on Bat Light Voltmeter (Bat) Emer Depress Emer Lt Ext ELT SKE Batt			Isolated GTC Start/Cont ATM Control Interphone UHF (Man) Gen Control Bus Off Ind CP Pitot Ht CP Flood Lts Bus Tie		Essential DC Valves Oil Temp Oil Qty Oil Cool Flaps Oil Low Qty Lts SCNS Fire Detect Ignition Control Control for: Aux Hyd Pump SuctBst Pump Aux Feather Moto Emer Elev Trim
			Main DC Lights Flap Ctrl Valve Norm Brakes SKE Static Line Ret Winch Anchor Cable Air Def Doors		Aft Fues Jct Box Ramp & ADS Tab & Flap Ind More Lights



SCNS Info

SCNS Info Cont.

Before Starting Engines Checklist:

- 3. SCNS (if navigator is not aboard) - Set (CP)**
- a. Present position - Entered, verified
 - b. System Configuration - Checked TST 2-2/MAINT TST 1-3/CONFIG
Check all 3 CONFIG pages
 - c. INS mode - ALIGN NAV 1-2/INIT/INS ALIGN
 - d. GPS mode - INIT or NAV NAV 1-2/INIT/GPS MODE
To manually initialize the GPS:
NAV 1-2/INIT/GPS INIT 1-2/GPS MODE (INIT)/VERIFY
Enter data for PRES POS, GMT, DD/MM/YY and GND TRK/SPD
VERIFY
GPS MODE (NAV)/VERIFY
 - e. Flight parameters - Checked, set NAV 1-2/INIT/FLT PRMTR
 - f. Clear Flight Plan - As required NAV 1-2/INIT/FLT PRMTR
/CLEAR PLAN/VERIFY
 - g. Reference points - Entered, verified PLAN/REF POINT/VERIFY
 - h. Waypoints - Entered, verified PLAN/WAYPOINT/VERIFY
Enter data into both WAYPOINT pages
(1) DZ parameters - As required
(2) LZ parameters - As required
 - i. Flight plan - Checked PLAN/CHECK PLAN
 - j. Mode control - Set, verified NAV/MODE CTRL/FLT MODE to FP/VERIFY

Before Taxi Checklist:

- 9. SCNS - Checked (CP)**
- a. System status - Checked
 - b. INS align - Checked
 - c. GPS mode - NAV

Flight Plan Management:

- Check Flight Plan PLAN/CHECK PLN
- Flight Plan History PLAN/FLT HIST
- Create Waypoint PLAN/WAYPOINT/WP number/enter data/VERIFY
- Insert Waypoint PLAN/MOD SEQ/INSERT ## ##/INSERT/VERIFY
- Direct to Waypoint NAV/MODE CTRL/# FLT MODE to IMM/VERIFY
- Direct to other than Waypoint NAV/IMMEDIATE (enter data)/VERIFY
- Convert WP to TOA WP PLAN/WAYPOINT/WP## (enter hhmmss)/VERIFY
- Mode Control NAV/MODE CTRL/FLT MOTE (to?)/VERIFY
- Mag/True Heading PLAN/CHECK PLN/NAV/ENROUTE 3-5
- Display Nav Solutions NAV/INIT FLT PARAM 3-3/IDCU HDG
- Mark Position NAV/MODE CTRL/IDCU NAV SLN
- SAR MK/STORE
- NAV/SAR/VERIFY

To load GPS codes:

1. NAV 1-2/INIT/GPS INIT 2-2
Observe MSN DURATION. If 1 is displayed, zeroize before loading.
2. Observe DAILY KEY display to monitor
3. Connect KYK-13 or DTD (black box) to interface panel
4. Set KYK-13 to proper channel or configure the DTD
5. Turn KYK-13 ON
6. Pull out LOAD INITIALIZE switch on panel for 1-4 sec then push back in
7. Within 5 sec the LOAD STATUS on the panel should flash
8. If additional loads are required, wait at least 5 sec, set up the KYK/DTD and repeat 6 & 7.
9. Turn KYK-13 OFF
10. Disconnect KYK/DTD from interface panel

Determining Distance and Bearing:

NAV(1-2):RENDEZVOUS

Provides steering to moving target
Enter Lat/Long, CRS/GS = 0.0M/0
Verify
Course and Distance will be at bottom
Will update continuously

UPDATE:VISUAL

Shows the difference between current aircraft position and a reference point.
Enter the object as a reference point
Enter ref point id (Type = PREPLN)
Course & Dis will show for each sol
Will update continuously
Note: DO NOT ACCEPT SOLUTION

NAV:AIRDROP (2-3 & 3-3)

Shows the difference between current aircraft position and a reference point.
Enter the object as a reference point
Enter ref point id on 2-3 page
Page 3-3:
Course & Dis will show for each sol
Will update continuously

SCNS

SCNS

SCNS

SCNS

Cargo Compartment Info

Cargo Area

Cargo floor (from 245 to 737): 41' x 10' 3"
 Ramp: 10' x 10' Overhead length: 50'
 Height: 9' (can +1" by removing litter mounting brackets in wheel well)
 74 litters with 2 attendants or 70 with 6
 92 ground troops (90 w/2 LM) 64 paratroopers w/equipment
 Overwater limited to 80 people total
 Ramp slope: open=11.5° closed=159°

Tie Down Fittings

5,000#: Ramp floor and cargo comp sidewalls
 Ramp: 33 fittings Sidewalls: 11 on each wall
 10,000#: Cargo floor & rings on dual rails
 7 columns- 25 per column, 175 total
 25,000#: Cargo floor: 5 each side under dual rails, 2 at FS 737
 12 sockets- only 2 usable w/dual rails, plugged when not in use

Strength Areas

Heaviest load normally placed in center of aircraft
 Floor load: max 50 psi (Exception: internal tire pressure <100 psi)
 Treadways (x2)- 35" wide, 15" from centerline
 Max inflight weight: 13000# per axel
 Max weight C,D & K: 6,000# per axel
 Ramp (L&M comp) max: 2,500# per axel
 Exception: if single axel is only thing on ramp, max=3,500#
 Max inflight weight off treadways: 5,000# per axel, ramp: 1,200# per axel
 Ramp weight max 5,000# including dual rails
 w/Dual rails, max load=4,664# w/out rollers, max load=4,824#
 Max tongue loads: floor=2,000# ramp=450#

Truck Loading Ramps

3' long x 26" wide
 Max 25,000# per pair
 Attached to ramp w/hooks & latches

Auxiliary Ground Loading Ramps

66" long x 21" wide
 Max 13,000# per axel
 Hook onto ramp but don't lock

Bridge Plates

Used between ramp & truck bed, K loader or flat bed
 Max 7,500# per plate, ramp must be supported

Ramp Support

(Milk stool)- May not use chocks...
 Supports aft end of ramp when horizontal
 Required when more than 2,000# moved across the ramp
 Ramp must exert positive pressure against support
 ADS arms may have to be disconnected
 May use layers of plywood (18" square) to raise ramp level

Tiedown Equipment

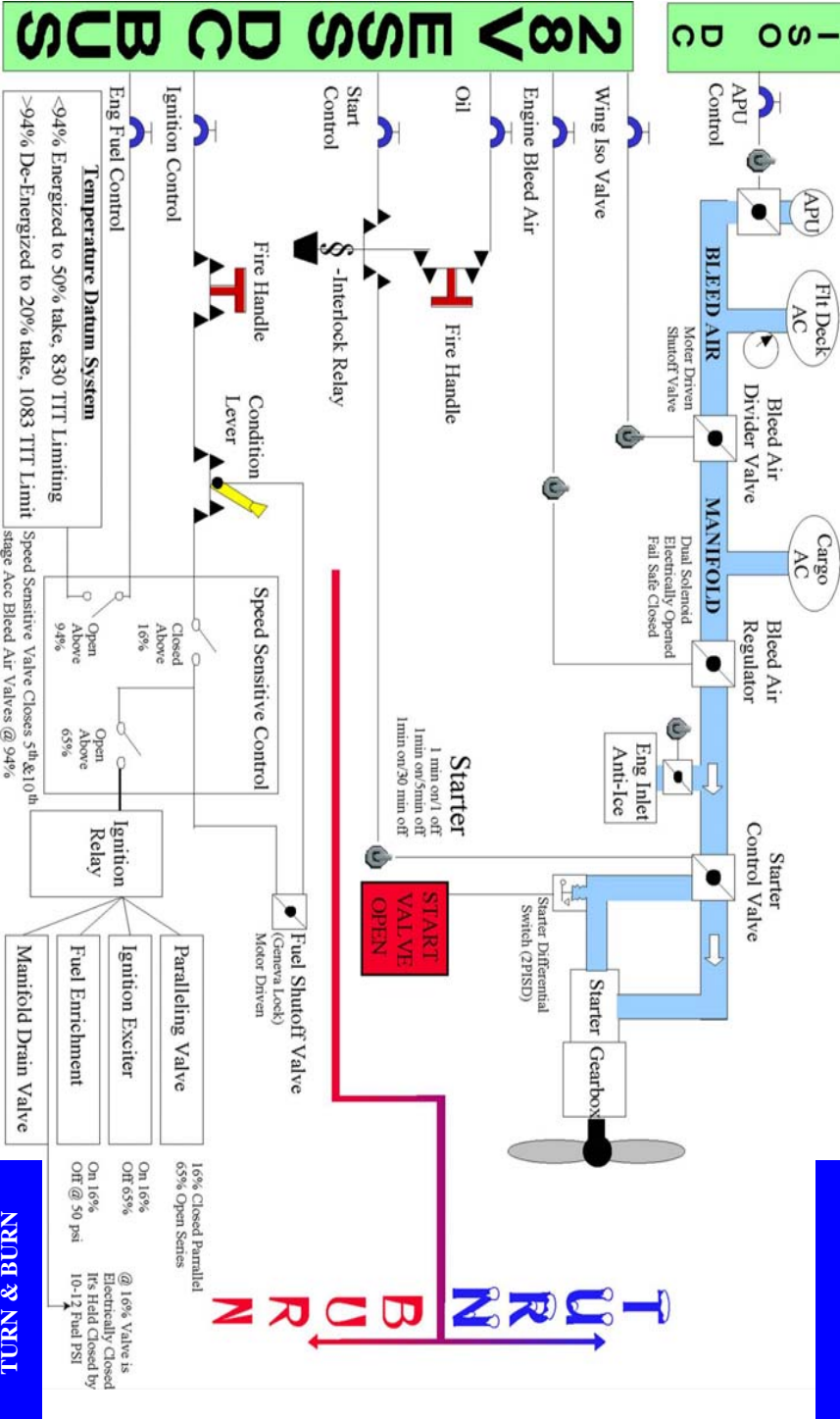
5,000# (GGU-1B)- 20' nylon webbing
 10,000# (MB-1, CGU-3/E)- 34 chains & devices carried
 25,000# (MB-2, CGU-4/E)- 6 chains/devices carried for gear tiedown

Wheeled Pry Bar

"J" Bar or MA-1 -must have hard rubber/polyurethane wheel
 Outside =5,000# per bar, In cargo comp =2,000 per bar

Snatch Blocks

two 3/4" cable blocks per aircraft
 Cannot be used with any aircraft cargo winch



TURN & BURN

TURN & BURN

CARGO COMPART

CARGO COMPART

Cargo Compartment Info (cont)

Dual Rail System- Max 6 463L pallets

Max single pallet weight w/nets height ≤96" =10,355#

Max pallet w/nets height ≥96" =8,000#

#5 position max weight = 8,500#

#6 position (ramp) max weight = 4,664# (w/rails)

With entire system installed, cannot use center row of troop seats

Roller conveyers- 4 columns of rollers entire length of cargo comp

Max loads are per 4 side-by-side rollers running laterally

Roller max 2,667# per lateral rollers/ C,D&K 2,333# per lateral rollers

Roller max on ramp 833# per lateral rollers

Right Hand Detent Latches- 11 variable detent latches, 40" apart

Numbered fwd to aft

Fwd restraint = 20,000# Aft restraint = variable from 250# to 4,000#

Set with ratchet wrench, based on airdrop extraction parachute

Adjusting bolt & indicator mark to show desired spring tension

Detent will disengage & remain disengaged when preset force overcome

Right Hand Master Control- 4 position, controls right detent latches

Checked: Full down position. Ensures detents properly engaged.

Normal: Locked position. Locks the detents to provide fwd & aft restraint

Emergency: Eliminates aft restraint

Load: Completely retracts all detents

Left Hand Detent Latches (2 control handles)- 11 detent latches, 40" apart

Fwd restraint = 20,000#

Aft restraint = 10,000#

Lock/Unlock Sequence Control Handle

Locks/unlocks latches sequentially: Locks fwd latch first, unlocks aft latch first

Simul Open Control Handle

Stowed: Full down & locked, locks all latches simultaneously

Operational: Attained by removing quick release pin on housing assembly

Aft Restrain Removed: Aft restraint removed

Simultaneous: All restraint remove

Ramp Latches- 2 latches, one each side

Manually engaged, mechanically disengaged

Restrain 5,000# for 8 Gs

Winches

Bulldog & Hoover

Main 28V DC- CB on CP lower panel, plug located left aft side of 245

Due to lack of internal circuit protection, never plug directly to pwr unit

¼" cable, ~100' useable cable, must keep 3 wraps on cable drum

No more than 3 broken wires per inch per strand

No more than 6 broken wires in 1" of running length of cable

Cannot have max number of broken wires in any 2" of cable

Single line pull =4,000#

HCU-9/A- rarely used on 130s, common on 141s

Main AC- Plug located next to DC plug on 245

Pendulum chord control switch to allow LM to be closer to load

Single line pull =6,500#, ¾" cable

Crew Entrance Door- Max weight 1,200#

SKE TURN GUIDE

	#2		#3	#4	
KIAS	4000' 353	6000' 356	8000' 004	12000' 360	18000' 360
220	343 003	341 011	344 024	330 030	315 045
200	10 +8 09 -8	15 15	20 -8 20 +8	30 -0 30 +0	45 45
180	338 008	333 018	334 034	315 045	300 060
170	15 +11 11 -11	22 17	30 -11 24 +11	45 -0 37 +0	60 56
150	333 013	326 026	324 044	300 060	280 080
140	20 +12 14 -10	30 21	40 -10 29 +12	60 -0 44 +0	80 67

BOLD = ANGLE OFF LEAD

BLUE = TIME

RED = +/- IAS

LEFT DRIFT OFFSET

RIGHT DRIFT OFFSET

DRIFT	#2	#3	#4
0°	300R	300L	0
1°	300R	200L	200R
2°	300R	100L	400R
3°	200R	400R	600R
4°	300R	600R	800R
5°	300R	700R	1000R
6°	400R	800R	1300R
7°	500R	1000R	1500R
8°	600R	1100R	1700R
9°	600R	1300R	1900R
10°	700R	1400R	2100R
11°	800R	1600R	2300R
12°	800R	1700R	2600R
13°	900R	1800R	2800R
14°	1000R	2000R	3000R
15°	1100R	2100R	3200R
16°	1100R	2300R	3400R
17°	1200R	2400R	3700R
18°	1300R	2600R	3900R
19°	1400R	2800R	4100R
20°	1500R	2900R	4400R

DRIFT	#2	#3	#4
0°	300R	300L	0
1°	300L	200R	200L
2°	300L	100R	400L
3°	200L	400L	600L
4°	300L	600L	800L
5°	300L	700L	1000L
6°	400L	800L	1300L
7°	500L	1000L	1500L
8°	600L	1100L	1700L
9°	600L	1300L	1900L
10°	700L	1400L	2100L
11°	800L	1600L	2300L
12°	800L	1700L	2600L
13°	900L	1800L	2800L
14°	1000L	2000L	3000L
15°	1100L	2100L	3200L
16°	1100L	2300L	3400L
17°	1200L	2400L	3700L
18°	1300L	2600L	3900L
19°	1400L	2800L	4100L
20°	1500L	2900L	4400L

CARGO COMPART

CARGO COMPART

WINDMILL TAXI START BRIEFING GUIDE

1. PREPARATION

- After Landing Checklist (if Req'd)
- Ground Stop Downwind Engine (simulated)
- Review Dash-1 (Notes, Warnings, Cautions)

2. BRIEFING

- Pilot/Co-Pilot Call:
 - “Off Nosewheel Steering”
 - “90 kts”
 - “100 kts”
 - “4000' Remaining”
- Engineer Call:
 - “Rotation”
 - “Light Off”
 - “40 %”
 - “On Speed”
- Any Crewmember “Reject” (as Req'd)
 - Less than 40% - Feather Starting Engine First
 - Greater Than 40% - Allow Starting Engine to Run
 - Starting Engine Malfunction - Feather

3. EXECUTION

- Before Takeoff Checklist
- Lineup Checklist
- Windmilling Engine Throttle - Flight Idle
- Assymetrical Throttle - Start of Torque Curve
- Symmetrical Throttles - Max Power
- Rudder - Toward Good Engine - Release Brakes
- Rudder Effectiveness - Off Nosewheel Steering
- Throttle on Assymetric Engine - Advance as Req'd
- 90 kts - Retard Throttles to Maintain 100 kts
- 40% or 4,000' Remaining - Throttles Gnd Idle
- Reverse Symmetrical On-Speed Engines as Req'd
- Starting Engines Checklist

Max Effort Takeoff Guide

Reasons: Rwy < MFL normal or CFL, whichever is longer; Rwy width < 80' (must be > 60'); or $V_{mcg} >$ Charted refusal speed that is less than Take Off speed

A. Review TOLD

- Takeoff speed: V_{mca} vs V_{meto}
Based on: WX, rwy length, TOLD, V_{meto} , V_{mcg} , V_{mca} , airfield survey, Review of hazards, obstructions, terrain both laterally and along climb path
- Decision speed: refusal, V_{to} .
- Obstacle Clearance: $V_{mca} + 10$ vs Max Effort Obst Clnc
- Flap retraction: Obstacle clearance speed + 10
- Ground run/(Stop and go distance)
- Min runway: Peacetime 3000', Contingency MFLMETO
- Winds in recommended zone
- Gross Weight/Bleed air valves

B. Crew Coordination

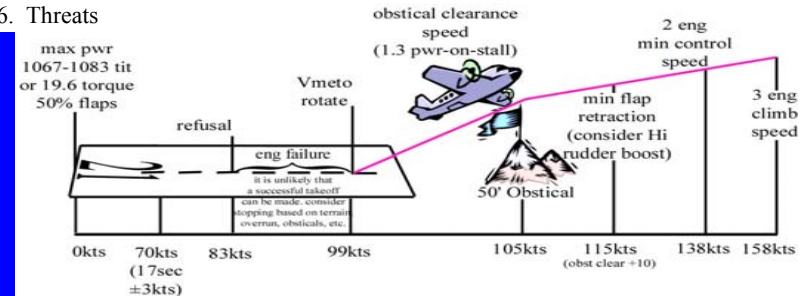
- Acc time check required if $V_{to} > V_r$
- As brakes released: Pilot states “HACK”, Nav states “TIMING”
- At acceleration time: Nav: states “TIME”, Co: if check failed (-3Kts) “REJECT TIME”
- At decision speed: Copilot states “GO” (Guard the yoke)
- At takeoff speed: Copilot states “ROTATE”
- Signals for Gear/Flap retraction

C. Emergency Actions During Takeoff

- Aborted Takeoff
 - Prop malfunctions
 - Engine malfunctions: Reject for negative torque (power loss) only
 - System malfunctions: Continue takeoff
 - Malfunctions between V_r and V_{to}
 - Hot brakes if high speed abort/Loss of normal brakes
- Fuel Dumping/service ceilings
- Emergency Return

D. Departure Procedure

- Nav aids
- Radar Altimeter: 50' vs emergency return
- Flight director, SID
- Hazardous terrain/obstacles laterally and in climb path
- Weather
- Threats



BRIEF: Windmill Start

BRIEF: Windmill Start

BRIEF: Max Effort

BRIEF: Max Effort

Max Effort Landing Guide

A. Restrictions

1. Max Gross Weight = 130,000#, 540 fpm
2. Externals empty
3. Outboard main fuel tanks (P model) Outboard main fuel tanks (E model)
215 psi, 450 psi struts: 5,200# 215 psi: 6,200
250 psi: 4,800#
285 psi: 4,000#
0-500# less in the outboards 500-1000# more in outboards
4. Runway length: Peacetime - 3000', Contingency - Ground Roll + 500'
Runway width: 60 ft/19m
5. Ensure 3 engine climb capability

B. TOLD Review/Weather

1. Speeds, winds, gust factor
2. Landing distance, ground roll, stop & go distance

C. Approach, Landing Runway and Environment

1. WX, PA, Temp
2. Approach/VFR entry
3. Obstructions/Threats on approach/in environment
4. Length, width and surface
5. Touchdown zone markings: 100-500'
Day: orange/cherise panels, Night: green, red, white, and blue lights
6. ESA/MSA/Radar Altimeter
7. Comm/Nav aids (CCT available), Security/Crash Rescue available

D. Copilots Duties

1. Airspeed deviations: 3 slow, 5 hot, backup on centerline
2. Control of ailerons, be prepared to take yoke early
3. Land short: stay on ground, Land long: "GO AROUND"
4. Flaps 50% on go around - slowly looking for 50% threshold speed
5. Normal Brake failure procedures - Emergency brakes (I'm off)

E. Flight Engineer Duties

1. Call prop/engine malfunction if detected by Engine number
Anti-skid failure - landing not permitted, anti-skid off
Back up config: 100% flaps, bleeds closed (confirm bleeds w/flaps rolling 100)

F. Miscellaneous

- Stow loose items (clear top bunk in E), Pax secure
Brake cooling time: Full anti-skid stop&go 15 min, if >130k 65 min
Partial braking: 3 sec @ 90 kts

SPECIAL INTEREST ITEMS

1. Traffic Conflict/Near-Misses
 - a. Visual Avoidance
 - i. Ref. Far 91.113 / afa 11-202 vol 3
 - ii. "See and Avoid"
 - iii. No distinction between IFR and VFR traffic with regard to maintaining Safe Flight Conditions
 - b. Radio Avoidance
 - i. Report all unadvised traffic to ATC
 - ii. Exercise caution near and around non-participating VFR traffic. (If necessary request "Avoidance Vectors")
 - iii. Notify ATC of all evasive actions taken
 - iv. If able: Contact non-participating aircraft on UNICOM or CTAF
 - c. TCAS
 - i. Monitor TCAS to ensure proactive response to traffic alerts
 - ii. Resolution Advisories (RA) vs Aircraft operating Limits
 1. a 5 sec response time should only require +/- .25G's MAX
 2. reversals / additional maneuvers should only require +/- .35G's MAX
2. TOLD Definitions, Calculations, Proficiency
 - a. Specific areas of attention
 - i. Departure procedures
 - ii. 3 Engine performance
 - iii. Dash -1 effect on performance calculations
3. Aircraft / Galley / Latrine Cleanliness
 - a. AMC mission towards customer service
 - b. Cargo / passenger compartments
 - c. Individual crewmember responsibility
4. Additional Items of Attention
 - a. AES integration: AES Transition to AMC OPS
 - b. BOLDFACE concepts: Verbatim knowledge
 - c. C-130 Specific
 - i. Adherence to current directives on maintenance and storage of PTLOX and walk-around bottles

BRIEF: Max Effort

BRIEF: Max Effort

SPECIAL INTEREST

SPECIAL INTEREST

TRAINING RESTRICTIONS

No PAX ♦ Air drops ♦ During simulated emergencies ♦ Touch-and-go landings ♦ Stop-and-go landings ♦ Buddy and windmill taxi starts ♦ Refueling/Concurrent ground ops ♦ During winching ♦ During initial crew qualification training ♦ SAAM missions requires users permission for Space-As ♦ Crew chiefs ok for JA/ATTs.

Simulated Engine Failure ♦ Certified 500 PAA hour copilot or above with direct IP supervision ♦ Prohibited during tactical operations ♦ Retard one throttle to flight idle at not less than VMCA (one-engine inoperative, out of ground effect) nor less than 300 feet AGL ♦ Authorized day IMC if WX at or above circling minimums or night if weather is at or above 1,000 foot ceiling and 2 SM visibility ♦ Crosswind component must be in the recommended zone ♦ Engine out no flap landings are restricted to ACs and above, and planned go-around are not authorized ♦ Engine out circling approaches will not be compounded with any other simulated malfunctions.

No-Flap Landing ♦ Authorized for certified copilots with 500 PAA hours, AC candidates, ACs and above ♦ Simulated engine-out no-flap approaches authorized for ACs and above ♦ No-flap circling approaches will not be combined with any other simulated emergencies ♦ Max gross weight is 120,000 lbs. and crosswind component must be within the recommended range ♦ Authorized in day IMC if WX is at or above circling minimums, and at night with WX of 1,000 foot ceilings and 2 SM visibility or circling minimum, whichever is higher.

Touch-and-Go Landings ♦ Requires flight evaluation, certification and minimum 100 hours as pilot-in-command ♦ ACs restricted to flight idle touch and go landings ♦ Ground and idle performed by any pilot from any seat when a flight evaluator, IP, or IP candidate during upgrade/evaluation occupies a pilot's seat ♦ No-flap ground idle touch and go landings not authorized ♦ Minimum runway length: flaps 50 percent, 5,000 feet - for all other, 6,000 feet ♦ Crosswind component corrected for RCR is within recommended zone ♦ Minimum ceiling of 1,000 ft and minimum visibility of 2SM (300-ft and RVR 40 (3/4 SM visibility) if an IP is in either seat)

Stop-and-Go Landings ♦ Authorized only on designated training, evaluation, or currency missions ♦ Authorized to be performed by any C-130 qualified pilot ♦ Runway remaining for takeoff must be sufficient to allow takeoff and refusal speeds to be equal ♦ Crosswind component corrected for RCR must be in the recommended zone of the landing crosswind chart ♦ Ceiling and visibility must be at least 300-feet and 3/4 mile (RVR 40).

Go-around, Missed Approaches ♦ Minimum altitude is 500-feet AGL when aircraft, equipment, or personnel are on the runway ♦ VFR - No lower than 200-feet AGL when practicing simulated emergencies ♦ Practice instrument approaches - no lower than minimum altitude for the approach.

Slow Flight Demonstration ♦ At or above 5,000 feet AGL ♦ Fly at approach, threshold, and 1.2 times stall speed with gear down and flaps 0, 50, or 100 per-cent ♦ Do not exceed 15-degrees of bank

Approach to Stalls ♦ Authorized during formal upgrade training ♦ Requires day VMC at a minimum of 5,000 feet AGL or above cloud deck.

Steep Turns (not applicable to tactical maneuvers) ♦ Authorized during day VMC with up to 60-degrees bank ♦ Restricted to at or above 5,000 feet for bank angles in excess of 45-degrees ♦ Review stall speeds before performing turns.

No-Flap Landing Limitations ♦ Direct IP supervision required ♦ Authorized for certified copilots with 500 PAA hours, AC candidates, ACs and above ♦ No-flap circling approaches authorized for AC upgrades and above ♦ Engine out no-flap approaches authorized for ACs and above ♦ Do not combine no-flap circling approaches with any other simulated emergencies ♦ Maximum gross weight is 120,000 lbs ♦ Crosswind component must be within the recommended range on the crosswind chart ♦ Authorized in daylight IMC if the weather is at or above circling minimums and at night with weather at or above 1000 foot ceiling and 2 SM visibility or circling minimums whichever is higher ♦ Use 50% flaps for a go-around ♦ Check no-flap landing distance with runway available.

Windmill Taxi Start ♦ Direct IP supervision required ♦ Authorized during daylight ♦ Crosswind component must be within the recommended zone of the flight manual takeoff crosswind chart ♦ Runway must be dry, hard-

surfaced, and at least 147 feet wide ♦ Dash one recommendations are mandatory ♦ Requires OG/CC approval when performed at units other than the Formal Training Unit (FTU).

Maximum Effort Takeoff ♦ ACs may accomplish maximum effort takeoffs ♦ Maximum effort takeoffs should be performed from the main runway when it is available (i.e., safe and practical to taxi from an assault landing zone) ♦ Takeoffs from the assault zone are authorized during formal mission qualification training or when approved by the OG/CC for currency or proficiency.

ICAO

TRAINING RESTRICT.

TRAINING RESTRICT.

OVCI

ICAO

- **Prop Safety Features**
 - Pitchlock
 - Low Pitch Stop
 - Feather
- **Gearbox Saftey Features**
 - NTS
 - Decouple
 - Prop Brake
- **Fire Handle**
(ESS DC BUS) 9 items
 - Engine Fuel Control
 - Engine Oil Control
 - Firewall Fuel
 - Firewall Hydraulics
 - Engine Bleed Air
 - Eng Start Control Circui
 - Prop Feathered
 - Positions Fire Extinguish Valve
 - Arms Agent Discharge
- **CB Panel - Pilot's Side**
(Little Rock AFB I)
 - LH AC
 - RH AC
 - AC Inst&Eng Fuel Cont
 - Fuses
 - Battery Bus
 - Isolated DC/ESS AC
- **CB Panel – Copilot's Side**
(MR. SEAL)
 - Main
 - Radio
 - Start (ESS DC)
 - Engine (ESS DC)
 - Airframe (ESS DC)
 - Lights (Main DC)
- **Engine Accessory Drive**
(OFF Speeds)
 - Oil Pump
 - Fuel Pump
 - Fuel Control
 - Speed Sensitive Control
 - Speed Sensitive Valve

- **Gearbox Accessory Drive**
(GHOST)
 - Generator
 - Hydraulic Pump
 - Oil Pump
 - Starter
 - Tach Generator
- **Stepdown Transformers off AC Inst & EC Bus**
(1FEB34 the score was 1222122)
 - #1 Stepdown Transform (26v AC, Single Phase)
 - Fuel Pressure Indicator
 - Emer Hyd Press Gauge
 - Booster Hyd Press Gaug
 - #3 Eng/Gearbox Oil Press (2 Separate Fuses)
 - #4 Eng/Gearbox Oil Press (2 Separate Fuses)
 - 122 2(to) 122 (equates to Hydraulic Pressure Gauges)
- **Battery Bus**
(FAA JEVVEE)
 - Fire Extinguisher
 - AC External Power
 - Alarm Bell
 - Jump Lights
 - ELT
 - Voltmeter
 - Emer Exit Light Exting.
 - Emer Depressurization
- **No Procedure Turn Required**
(SNERT)
 - Strait-In
 - No PT
 - Estab in Hold
 - Radar Vectors
 - Timed Appro.
- **Lost Communications**
 - Route **AVE-F**
 - Altitude **MEA**

Basic VFR Weather Minimums

Airspace	Flight Visibility	Distance from Clouds
Class A	Not Applicable	Not Applicable
Class B	3 statute miles	Clear of Clouds
Class C	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
Class D	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
Class E Less than 10,000 feet MSL	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
At or above 10,000 feet MSL	5 statute miles	1,000 feet below 1,000 feet above 1 statute mile horizontal
Class G 1,200 feet or less above the surface (regardless of MSL altitude).		
Day, except as provided in section 91.155(b)	1 statute mile	Clear of clouds
Night, except as provided in section 91.155(b)	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
More than 1,200 feet above the surface but less than 10,000 feet MSL.		
Day	1 statute mile	500 feet below 1,000 feet above 2,000 feet horizontal
Night	3 statute miles	500 feet below 1,000 feet above 2,000 feet horizontal
More than 1,200 feet above the surface and at or above 10,000 feet MSL.	5 statute miles	1,000 feet below 1,000 feet above 1 statute mile horizontal

MEMORY AIDS

MEMORY AIDS

AIR SPACE

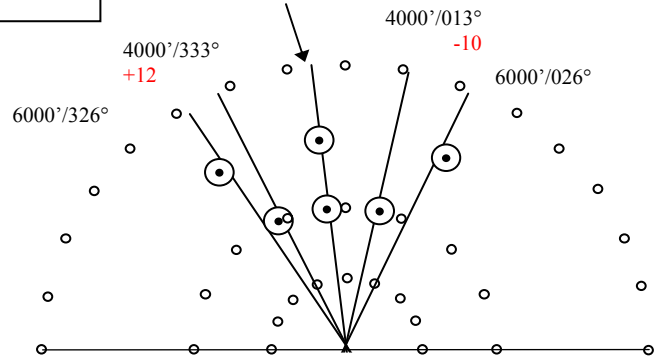
AIR SPACE

DOT METHOD - #2 SKE TURN GUIDE 4000' RANGE RINGS

150 KTS

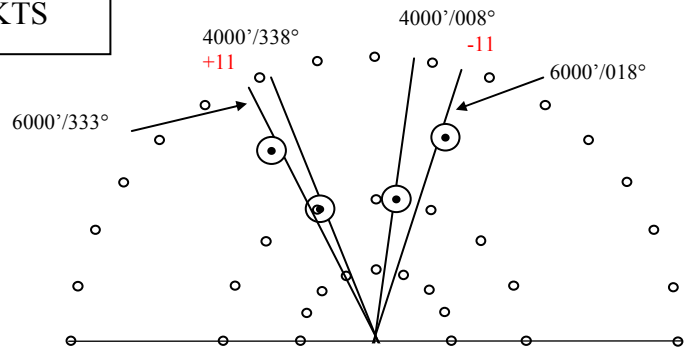
All Airspeeds 353°

4000': 20
6000': 30



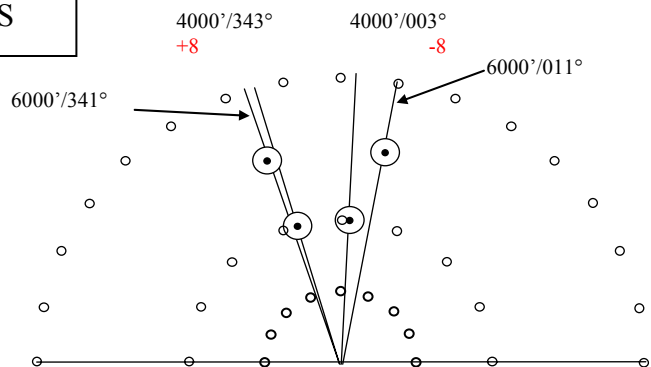
180 KTS

4000': 15
6000': 22



210 KTS

4000': 10
6000': 15



#1 SKE TURN

RED = ± IAS

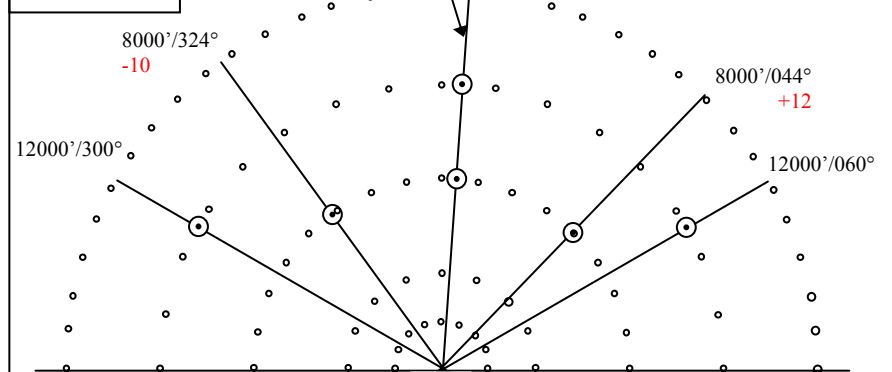
BLUE = TIME

DOT METHOD - #3 SKE TURN GUIDE 4000' RANGE RINGS

150 KTS

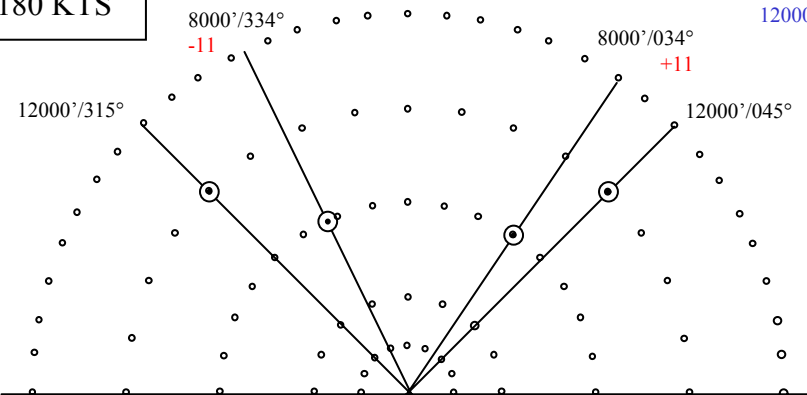
All Airspeeds 004°

8000': 40
12000': 60



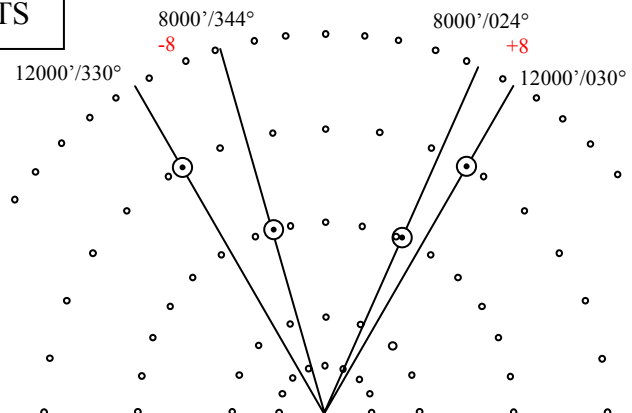
180 KTS

8000': 30
12000': 45



210 KTS

8000': 20
12000': 30



#1 SKE TURN

#2 SKE TURN

RED = ± IAS

BLUE = TIME

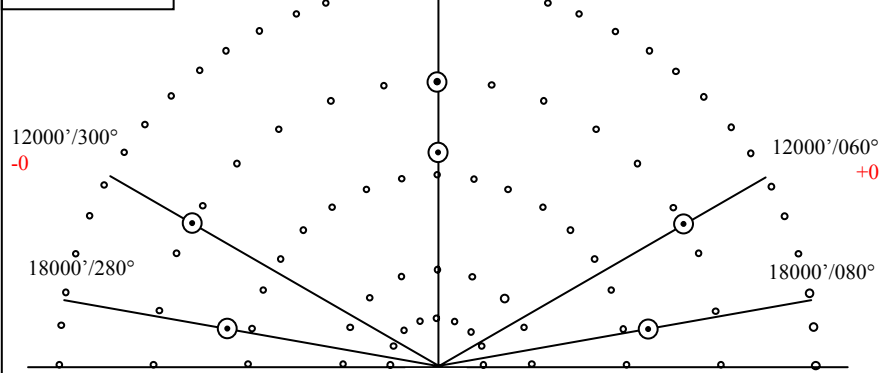
#2 SKE TURN

DOT METHOD - #4 SKE TURN GUIDE 4000' (18000' are 8000') RANGE RINGS

150 KTS

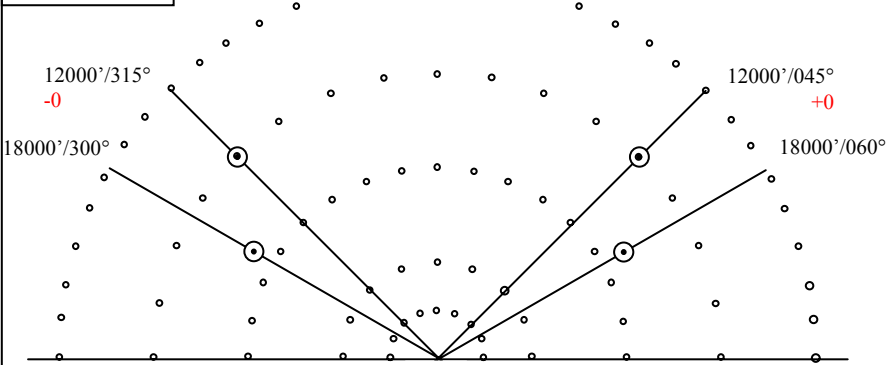
All Airspeeds 360°

12000': 60
18000': 80



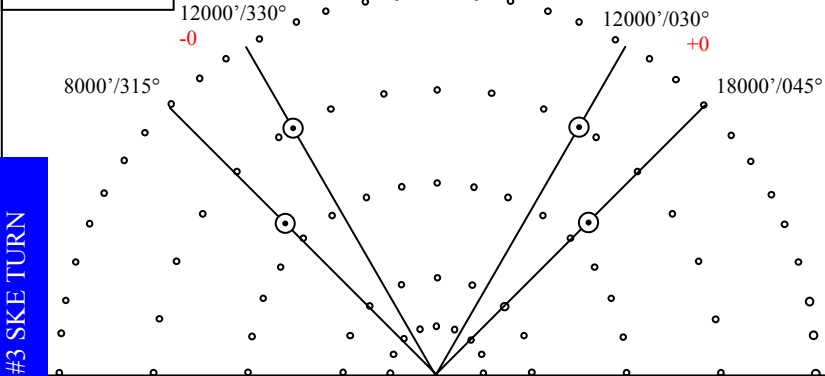
180 KTS

12000': 45
18000': 60



210 KTS

12000': 30
18000': 45



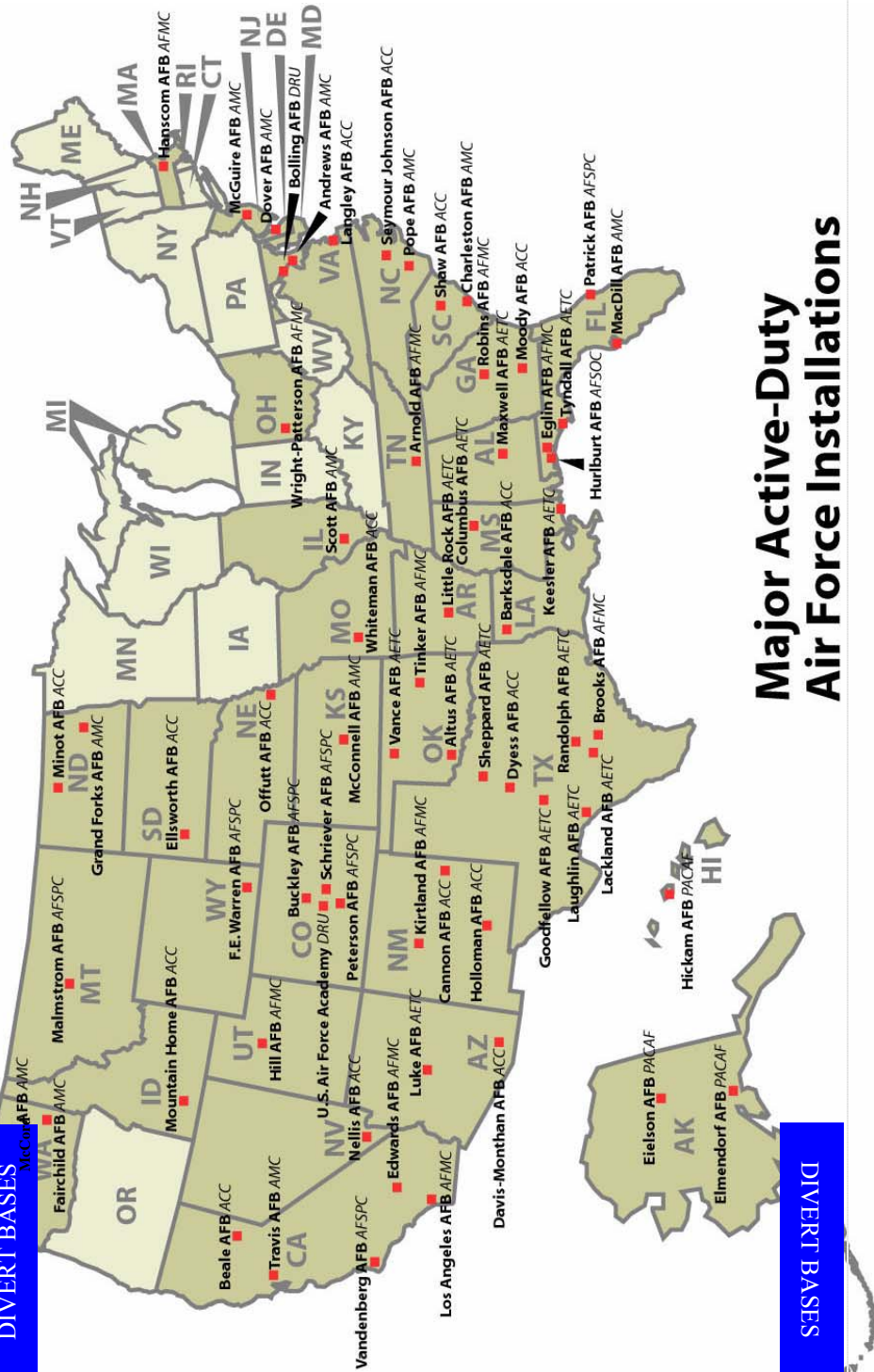
#3 SKE TURN

RED = ± IAS

BLUE = TIME

#3 SKE TURN

DIVERT BASES



Major Active-Duty Air Force Installations

DIVERT BASES

AIR SPACE

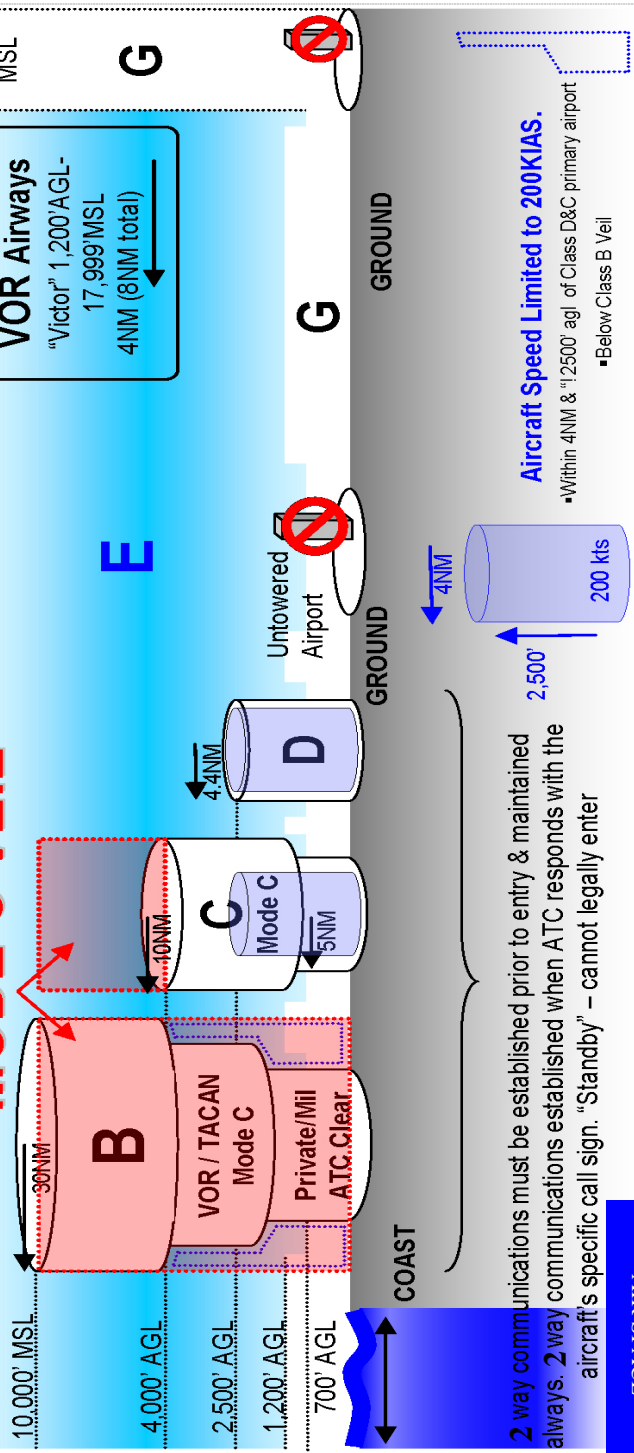
FL450+ Interference between stations w/similar frequencies

A IFR Clearance from ATC, Instrument Rating, MODE C

J (Jet Routes)
18,000' MSL-FL450

18,000' MSL, Continental U.S.

MODE C VEIL



2 way communications must be established prior to entry & maintained always. 2 way communications established when ATC responds with the aircraft's specific call sign. "Standby" – cannot legally enter

AIR SPACE

Aircraft Speed Limited to 200 KIAS.

- Within 4NM & 12500' agl of Class D&C primary airport
- Below Class B Veil