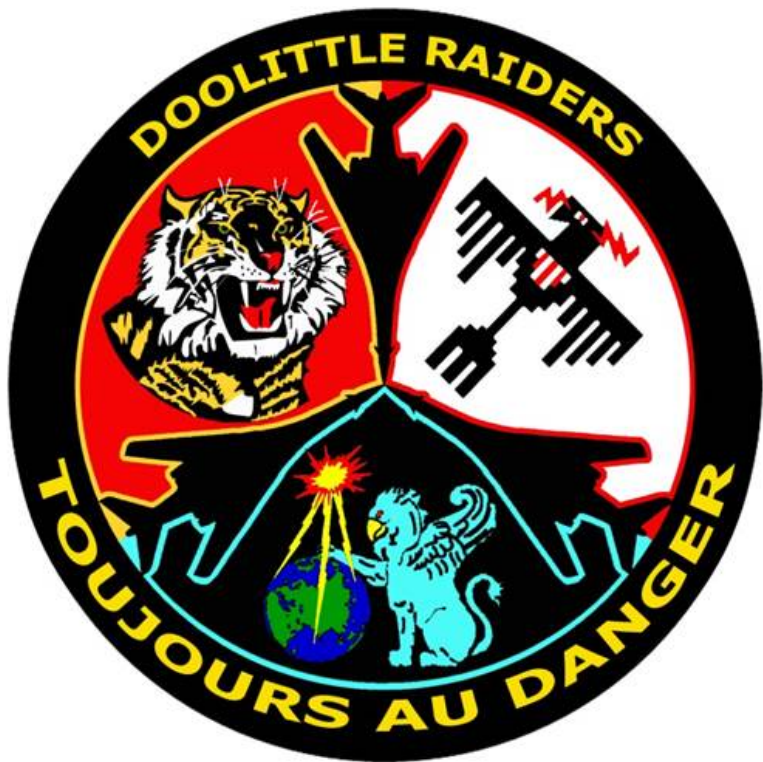


# 28th Bomb Wing

## In-flight Guide



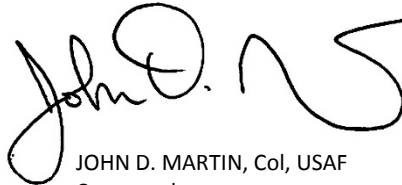
15 Aug 16



TO ALL B-1 CREW MEMBERS:

The In-flight Guide is published to assist you during mission planning and in-flight operations. It contains tab data, checklists, regulation references, and a great deal of other information condensed from flight manuals, regulations, and instructions. This data **does not** supersede published technical data or directives, but rather is intended to ease the crew member's workload in flight. Although considerable effort was given to ensure accurate transcription and reproduction of data published in this guide, it is the crew member that is responsible for complete and accurate information involving flying operations. You must ensure the In-flight Guide is kept current by making necessary write-in changes due to instruction or tech data changes until a formal change can be distributed.

Direct any suggestions for changes or updates to the In-flight Guide to the 28th OG/OGV.

A handwritten signature in black ink, appearing to read "John D. Martin", with a long horizontal flourish extending to the right.

JOHN D. MARTIN, Col, USAF  
Commander

### LIST OF EFFECTIVE PAGES (LEP)

[illegible]

LEP, \_\_\_\_\_, \_\_\_\_\_  
DATE INITIALS

[illegible]

## STATUS OF FLIGHT CREW INFORMATION FILE (FCIF)

This status page is based on information available to the IFG editor as of the date of this publication.

FCIFs IN THIS CHANGE			
Number	Date	Subject	Section
08-44B	17-Nov-08	MBW Weapon Corrections	4
11-36B	2-Dec-11	BDU-50 C/B Release Criteria	4
16-09B	11-Mar-16	Cold Temperature 11-202V3 Guidance	4
RESCINDED FCIFs			
Number	Date	Subject	Section
OUTSTANDING FCIFs			
Number	Date	Subject	Section

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## CREW SPECIFIC BRIEFING GUIDE

(Note: This briefing guide is to be briefed after the mission briefing.)

### Introduction / Briefing ROE

**Go/No-Go Checklist:** FCIF part B & C/Monthly EP test/DNIF status/Crew rest

- Currencies/Qualifications (Flying/Ground/T.O.)

### Ground Ops

- Seat positions (front/aft)
- Walk Around/FOD/Interior (who)
- Weapons preflight (who)
- Problems affecting planned taxi time
- Formation Check-In (who talks/what radio)

### CRM/Crew Coordination

- "Climb", "Go Around", "Withhold", "Abort", "Rollout"
- Abort Criteria
- Conservative decision making
- Teamwork/Discipline

### Mission Review (as required)

- Cleanup items left unresolved by FL (i.e. formation spacing, TF vs. VC, etc.)
- Takeoff/Departure (who, non-standard procedures/emergencies, etc.)
- Enroute (action points, radar vs. visual search, mutual Support, etc.)
- Air Refueling (who, boom interphone vs. AR freq, echelon vs. observation, etc.)
- Strike (who, bomb run/withhold coord, defensive comm/maneuvers)
- Contested/Degraded Ops
- Contingencies (if single ship, etc.)

### Mission After Formation Break-up (as required)

- Plan/Fuel reserve/divert options
- ERCC/Hot Refueling oncoming crew requirements, (DTUC/DTC/FLIP specifics)

### Recovery

- Planned transition
- Low visibility approaches (as required)
- Simulated EPs

### Emergency Procedures

- Non-standard considerations, Non-standard crew coordination

### Other

- Special Interest Items/ORM

### Questions?

## ORIENTATION FLIGHT/BUSY TAXI CHECKLIST

Busy taxi - cover items annotated by an asterisk (\*)

### 1. PRE-BRIEF

- a. Review AFI 11-401, ACC Sup, EAFB Sup, and AFI 11-218. Clothing requirements are listed in AFI 11-401 ACC Sup A6.2.1.4 \*
- b. Complete Orientation Flight Checklist from EAFB Sup, fax to OSS/OSO (x1241), provide copy to step desk
  - (1) Flight Surgeon Examination NET 14 days prior
  - (2) Egress, Hanging Harness, Life Support Equipment Training complete within 72 Hours
  - (3) Life Support Equipment Issue/Fit \*
  - (4) PIC mission brief
  - (5) FOD brief for ERCC \*
  - (6) DD Form 1381 (Non-DoD Flyers only)
- c. Participant manifested on DD Form 2131
- d. Flight above FL180 only w/ current altitude chamber training
- e. Do not log incentive flyer time on the 781

### 2. GENERAL PROCEDURES

- a. Act on Aircrew's Instructions \*
- b. Ramp Safety / Ear Protection \*
- c. Aircraft Danger Areas \*
- d. Hand signals – Egress \*
- e. FOD Considerations \*
- f. Hair/Helmet considerations
- g. Passenger Flying
  - (1) Transfer of Aircraft Control
  - (2) Flight Control Interference
  - (3) Stick / Throttle Technique
- h. airsickness

### 3. COCKPIT FAMILIARIZATION

- a. Strap In / Personal Leads \*
- b. Seat and Rudder Adjustment
- c. Seat Pins
- d. Interphone / Radio Operation \*
- e. Oxygen System
- f. "DSO Not Flying" academics if occupying DSO seat (EMUX interrupt, Latch reset, Essential CB panel)
- g. Toilet Operation
- h. Hatch Operation

### 4. GROUND OPERATIONS

- a. Life Support
  - (1) Helmet Test
  - (2) Mask Removal Practice
  - (3) Emergency Breathing w/ Mask On
  - (4) airsickness Bag Set-Up
  - (5) Ear Plugs \*
- b. Strap In \*
- c. Pilot Check Strap In \*
- d. Cockpit Layout Review \*
- e. Primary / Backup / Emergency Oxygen System Review
- f. Busy taxi only - Cover handles/switches that must not be touched \*

### 5. EMERGENCY PROCEDURES

- a. Emergency Ground Egress, Meeting Location \*
- b. Smoke and Fumes \*
- c. Windshield Failure
- d. Intercom Failure \*
- e. Bird strike
- f. Ejection/Bottom Bailout
- g. Pilot Incapacitation \*
- h. Physiological Incident

## SIMULATED OPERATIONS IN CONTESTED/DEGRADED EM SPECTRUM

B-1B CDO Constraints for training sorties should reflect the following menu, derived from the B-1B RTM:

CDO Constraint: **Aircraft, flight, support, or theater DL denial** (ROVER, JRE, link 16)

Simulation: Pilot/Operator removal from, or avoidance of JRE/other networks

CDO Constraint: **Weapon, Aircraft, flight, support, or theater GPS denial**

Simulation: Pilot/Operator removal from, or avoidance of GPS acquisition (Assumed/simulated weapon-related GPS denial)

- 1) To deny aircraft GPS (INS Only sortie) select GPS Init All (do not select NAV All)
- 2) To simulate weapon not acquiring GPS, inhibit GPS keys to weapons (status will be SR GO)

CDO Constraint: **WRM Limitations/Shortages**

Simulation: Fraggd secondary weapons, fuses and/or tail kits, non-standard loads, Rack limitations

CDO Constraint: **Advanced Adversary A/A, S/A Tactics/IRCM/ECM**

Simulation: Ground based jamming (simulated):

- 1) Simulated radar jamming requiring ECCM use/alternate targeting/ingress methods
- 2) EMCON (expected/unexpected) tactics, reduced pre-vul radiation; S/A kill removal

CDO Constraint: **Communications Degradation**

Simulation: Single Frequency Jamming/Spoofing (BCSS/other systems if available):

- 1) Mandatory use of HAVE QUICK and/or SECURE VOICE; Tactical controlling agency geo-NORDO/BLIND SPOTS
- 2) MPC denial of/removal from SATCOM, JRE, computer networks

CDO Constraint: **Reduced-Effectiveness/Alternate Weapons Delivery/ID Modes/System Failures**

Simulation: Scenario-driven IAM relative targeting deliveries:

- 1) Dynamic Target (DMPI/fuse/route/TOT change/Target/Smack/Investigate)
- 2) Weather-driven (simulated/actual) denial of TGP
- 3) Illumination-driven (simulated/actual) denial of EO/TV TGP modes
- 4) Simulated/actual ALQ-161, ALE-50, EXCM, TGP, Laser/LSS/LST etc. failures
- 5) Stability Enhancement Function / Stall Inhibit System denial
- 6) Situational Awareness Enhancement/Beyond Line of Sight denial
- 7) Simulated weapons bay failures
- 8) Statistical reduction in weapons effectiveness (DWE not achieved)
- 9) CAS CDE concerns, PID errors, DC constraints, ECAS situations
- 10) Blue force coordination constraints
- 11) Political limitations: airspace/overflight/basing/AGM-158 no-fly/must-fly areas

CDO Constraint: **Adversary GOB/MOB/AOB Changes**

Simulation: Camouflaged/dummy/decoy/mobile targets (range dependent), Low confidence targets (TLE), miss-plotted targets (location differs from intel/ATO coordinates)

## ELECTRONIC FLIGHT PLANS (DD 175)

1. Login to the AISR web site at: <https://www.aisr.nas.faa.gov/AISR/>
2. Enter username and password (update current password in pencil)  
RCA34BS \_\_\_\_\_  
RCA37BS \_\_\_\_\_
3. Click on “Flight Plan” tab and submenu as appropriate. Enter new flight plans via the “DD175” tab.
4. Flight Plan Formatting: Items in “Red” are required for Flt Plan processing. **Use help menus for each data block** to assist in data format.
5. Route of Flight Formatting: Always check the “Route Override” block. “Route Override” requires periods to separate flt plan points. Begin and end the route of flt w/ 2 dots “..” and use 2 dots between pts for pt to pt nav. Use 1 dot between entry and exit fixes when flying a published route (IR, AR, VR, Jet Route, etc...):  
**Ex 1 MOA:**  
..ARCOT..LIBON..PLAAT/D(hr)+(min)..ARCOT..  
**For specific AR tracks & IR routes reference FLIP GP & AP/1B**
6. Enter “ON FILE” for Wt and Balance and PIC-leave SSNs blank.
7. Save file format using format: callsign\_date (Ex: TH21\_24OCT12)
8. Filing: When ready to file, use the “Immediate” function. The flt plan will be available 30 mins prior to the filed departure time, regardless of date at the top of the DD175. You must initiate the file command within the window from “23 hrs prior” to “1 hr after” proposed departure time.
9. After filing: Click on the “Messages” tab and click “Refresh”.
10. Step procedures: Provide the duty desk with a signed print out of the flight plan.
11. Amending Flight Plan: To amend a flight plan (change alternate, route or destination) use the Amend function at the top of the screen. Enter your callsign in the Aircraft ID block and click on submit search. Make the changes necessary and click on Amend at the bottom of the screen. **You will get an amendment message when this works properly.** Alternately, you can enter the Amend screen and cancel the flight plan completely, then refile using the normal method.

DATE* 03/14/2016		AIRCRAFT CALL SIGN* THNDR01		AIRCRAFT DESG AND TD CODE* H/B1/J		PROPOSED DEPARTURE TIME (Z) 1234		ALTITUDE* 210822	
TYPE FLT PLAN* I - IFR		TRUE AIRSPEED* 440		POINT OF DEPARTURE* RCA		PROPOSED DEPARTURE TIME (Z) 1234		ALTITUDE* 210822	
ROUTE OF FLIGHT <input checked="" type="checkbox"/> ROUTE OVERRIDE ..ARCOT..L1SON..PLAAT/D2+00..ARCOT..									
DESTINATION* RCA		ETE* 0030		RANK AND HONOR CODE		NUMBER ON BOARD 4		NOTAMS <input checked="" type="checkbox"/> YES <input type="checkbox"/> CREW/PASSENGER LIST <input type="checkbox"/> ATTACHED <input type="checkbox"/> SEE PSGR	
INTERCENTER REMARKS		ALTN AIRFIELD DYS 0600		ETE TO ALTN 0148		HOME STATION RCA		WEATHER <input checked="" type="checkbox"/> YES <input type="checkbox"/> SEE PSGR	
INTRACENTER REMARKS		AIRCRAFT SERIAL NUMBER		UNIT 28BW		SSN		ORGANIZATION AND LOCATION 34BS. ELLSWORTH AFB. SD	
RANK AND HONOR CODE		NAME AND INITIALS		RANK		SSN		ORGANIZATION AND LOCATION	
FUEL ON BD 0600		ON FILE		ON FILE		ON FILE		ON FILE	
WT AND BALANCE ON FILE		ON FILE		ON FILE		ON FILE		ON FILE	
DUTY		ON FILE		ON FILE		ON FILE		ON FILE	

# ORM CHECKLIST

ORM WORKSHEET	LOW=0	MED=1	HIGH=2	MP	FLY	TOP 3
Currency/Qualification	Current/Qualified	1 Non-Cur / Non-CMR	> 3 Items = TOP 3	Planned	Step	After Step
Last Low Altitude Flown	Less than 30 days	30 - 60 days	> 60 days (Note 1)			
Experience (Pilots)	Both Experienced	1 Exp / 1 Non-Exp	Both Inexperienced (Note 1)			
Experience (WSOs)	Both Experienced	1 Exp / 1 Non-Exp	Both Inexperienced			
Last Formation Flown	<= 30 days	> 30 days	> 60 days (Note 1)			
Circadian (Local Time)	0800-2000	0400-0800 / 2000-0400	0000-0400			
Ops Tempo	1st Sortie/Week	2nd Sortie/Week	3rd Sortie/Week			
Crew Duty Day (CDD)	CDD<12hr	12hr<CDD<16hr	CDD>16hrs			
Last Sortie Flown	< 7 Days	7 - 14 Days	> 14 Days			
Formation	Single Ship	2-Ship	DACT/Lg Force Ex			
Refueling	None	Day VMC	Night/IMC			
Mission Profile	High Altitude Only	High and Low Alt	Low Altitude Only			
Terrain	Flat/Rolling	Mixed Terrain/Water	Mountainous			
Weapons	None	Inert	Live			
Defensive Maneuvering	None Planned	SS Maneuvering	2-ship DT			
Special Events	None	3 pilot pro / Inc Ride / 11-202	Airshow/Flyby			
Transition	Local (<=45 min)	Local (> 45 min)	Off Station Tx			
ENVIRONMENT			> 2 Items = TOP 3	Planned	Step	After Step
Bird Condition	Low	Moderate	Severe			
Dept Wx	Better than 3000/3	Non-Precision Mins	Precision Mins			
RCR	26	12 - 25	< 12			
Enroute Wx	Day VMC	At least 1500/5	Night/IMC			
Icing	None	Trace/Light/Induction	Moderate			
Tstorms	None	Isolated	> Isolated			
MOA/Range Wx	VMC	IMC above MSA	IMC at/below MSA			
Recovery Wx	Better than 3000/3	Non-Precision Mins	Precision Mins (Note 2)			
RCR	26	12 - 25	< 12			
Crosswinds	0 - 15	15 - 25 (Note 2)	> 25			
Nav aids	0 Inoperative	1 Inoperative	> 1 Inoperative			
STEP BRIEF			> 2 Items = TOP 3	Planned	Step	After Step
Mission Capability	FMC	PMC/ETIC<2hrs	ETIC > 2hrs			
Configuration	As Fragged	# Wpn/Exp Chg	Type Wpn/Exp Chg			
Tail Number	As Fragged	Tail Swap / Spare	Bag Drag / 2nd Spare			
Mission Changes	None	Some (1-3)	Multiple (>3)			
Plan Variations	None	Minor	Major			
Personal Issues	None	Minor	Major			
TOTALS				Planned	Step	After Step

## NOTE 1:

-If the last low altitude flown is greater than 60 days by any crew member or both pilots are inexperienced, consider executing one set of defensive maneuvers at 2000 ft. AGL before stepping down to lower altitudes or performing defensive maneuvering.  
 -If the flight lead has not led a formation in greater than 60 days, brief formation procedures (high tactical maneuvers, low altitude maneuvers, air refueling, weapons release, etc.) in-depth during the mission brief.

## NOTE 2:

-If weather is below non-precision mins or crosswinds are greater than 15 kts and multiple approaches are flown, consider having the more experienced pilot fly the first approach.

Actual departure weather or forecast recovery weather below lowest compatible approach minimums requires CC or DO approval.



FREQUENTLY USED TELEPHONE NUMBERS
-----------------------------------

Ellsworth Command Post	675-3800
Ellsworth Weather	675-1042
Ellsworth Base Ops	675-1052
34 <sup>th</sup> Bomb Squadron (Thunder Ops)	675-4711
37 <sup>th</sup> Bomb Squadron (Tiger Ops)	675-1213
Ellsworth MOC	675-1805
Ellsworth Transportation	675-2907
Ellsworth SOF	675-1120
9 <sup>th</sup> Bomb Squadron (Bat Ops)	461-7453/7451
28 <sup>th</sup> Bomb Squadron (Hawk Ops)	461-2828
77 <sup>th</sup> Weapons Squadron (Slam Ops)	461-8000/8110
337 <sup>th</sup> Test & Evaluation Sqdn (Slayer Ops)	461-8000/8110
Dyess SOF	461-4684
Dyess SOF Cell Phone	325-668-4048
Dyess MOC	461-1959
Dyess Command Post (Raymond 37)	461-1970
Dyess Metro	461-2524/3211
Mountain Home Command Post	728-5800
Mountain Home Metro	728-6303
Denver Center	887-1104
Minot Command Post	453-3101
McConnell Command Post	743-3251
Grand Forks Command Post	362-6711
Hill Command Post	777-3007
Mountain Home Command Post	728-5800
Offutt Command Post	271-3725
Colorado Springs/Peterson Command Post	834-4555
Nellis Command Post	652-2446

**28 BW STANDARD FREQUENCY ASSIGNMENTS**

ARC-164 Presets			ARC-210 Clear Presets			ARC-210 HQ Presets		
Ch	Agency	Freq	Ch	Agency	Freq	AJ	ID	CS
1	SQ Cmn	###.##	1	SQ Cmn	###.##	1	A00.025	HQ0
2	GND	275.8	2	GND	275.8	2	A00.125	HQ1
3	TWR	253.5	3	TWR	253.5	3	A00.000	HQBU
4	DEPT	289.4	4	DEPT	289.4	4	A00.500	HQBU5
5	DENVER	338.2	5	DENVER	338.2	5	A00.400	HQBU4
6	APPR	259.1	6	APPR	259.1	6	A00.300	HQBU3
7	ARRIVE	284.0	7	ARRIVE	284.0	7	A00.200	HQBU2
8	ATIS	269.9	8	ATIS	269.9	8	A00.100	HQBU1
9	SOF	311.0	9	SOF	311.0	9	A00.000	HQBU
10	FSS	255.4	10	FSS	255.4	10	A01.525	HQ15
11	CP	321.0	11	CP	321.0	11	A01.425	HQ14
12	METRO	375.775	12	METRO	375.775	12	A01.325	HQ13
13	BLF	381.3	13	BLF	381.3	13	A01.225	HQ12
14	DISPCH	372.2	14	DISPCH	372.2	14	A01.125	HQ11
15	CLOVER	363.5	15	CLOVER	363.5	15	A01.025	HQ10
16	TOSS	324.7	16	TOSS	324.7	16	A00.925	HQ9
17	NELLIS	343.0	17	NELLIS	343.0	17	A00.825	HQ8
18	BLKJCK	377.8	18	BLKJCK	377.8	18	A00.725	HQ7
19	YUMA	274.0	19	YUMA	274.0	19	A00.625	HQ6
20	JOSHUA	348.7	20	JOSHUA	348.7	20	A00.525	HQ5
21	UNASS		21	UNASS		21	A00.425	HQ4
22	HQBU	A0.000				22	A00.025	HQ0
23	HQ3	A0.325				23	A00.325	HQ3
24	HQ2	A0.225				24	A00.225	HQ2
25	HQ1	A0.125				25	A00.125	HQ1

**Other Useful Frequencies:**

<b>37<sup>th</sup> COMMON:</b>	<b>377.0</b>	<b>34<sup>th</sup> COMMON:</b>	<b>343.0</b>
<b>9<sup>th</sup> COMMON:</b>	<b>341.75</b>	<b>28<sup>th</sup> COMMON:</b>	<b>267.0</b>
<b>AR 659:</b>	<b>289.65/305.5</b>	<b>AR14:</b>	<b>336.1/359.1</b>
<b>AR 678:</b>	<b>280.4/377.7</b>	<b>POWDER TACTICAL</b>	<b>296.7</b>
<b>DYESS FOXTROT:</b>	<b>261.0</b>	<b>RCA SINGLE FREQ APPCH</b>	<b>318.8</b>
<b>Hill METRO:</b>	<b>342.3</b>		

**HF Frequency List:**

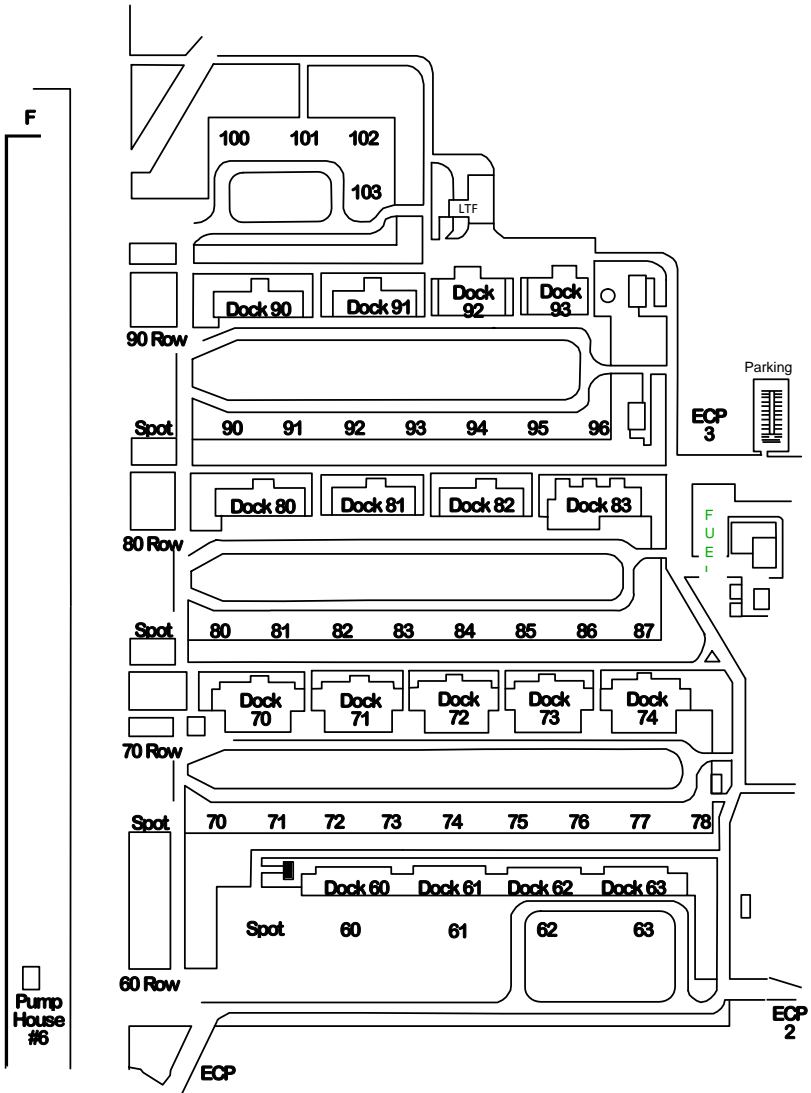
MARS	ARMED FORCES	GLOBAL "MAINSAIL"	ELLSWORTH COMMAND POST
13.927	5.965	4.724 (Night)	
14.606	9.755	6.739 (Night)	1500-0459Z
4.577	11.805	8.992 (24 hrs)	13.2515
3.299	15.320	11.175 (24 Hrs)	0500-1459Z
7.313	15.410	13.200 (Day)	6.686
4.557	15.430	15.016 (Day)	
<b>TANKER</b>	21.505	<b>TIME HACK</b>	
6.761		5.000, 10.000, 15.000	

**ELLSWORTH AFB PARKING SPOT COORDINATES**

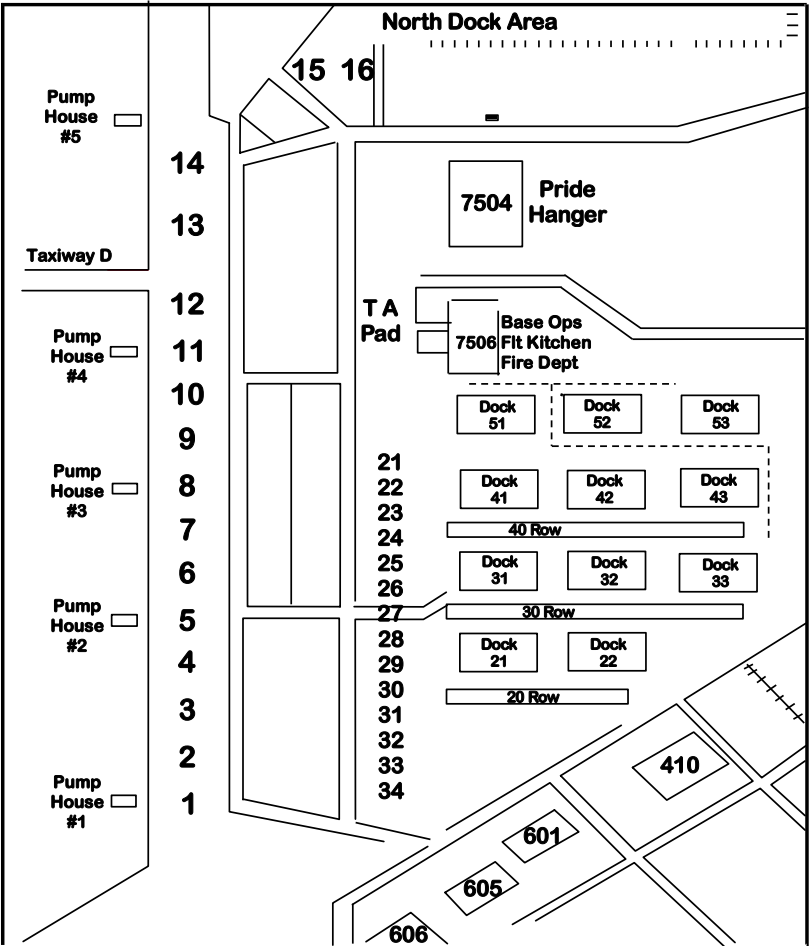
<b>Spot</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Elevation</b>
1	N 44 - 08.284	W 103 - 05.339	3185
2	N 44 - 08.317	W 103 - 05.380	3187
3	N 44 - 08.352	W 103 - 05.380	3189
4	N 44 - 08.386	W 103 - 05.465	3192
5	N 44 - 08.420	W 103 - 05.508	3194
6	N 44 - 08.452	W 103 - 05.550	3196
7	N 44 - 08.489	W 103 - 05.593	3196
8	N 44 - 08.523	W 103 - 05.636	3198
9	N 44 - 08.558	W 103 - 05.678	3199
10	N 44 - 08.592	W 103 - 05.721	3201
11	N 44 - 08.626	W 103 - 05.764	3202
12	N 44 - 08.652	W 103 - 05.798	3203
13	N 44 - 08.743	W 103 - 05.911	3208
14	N 44 - 08.771	W 103 - 05.951	3209
60	N 44 - 08.989	W 103 - 06.000	3220
61	N 44 - 09.025	W 103 - 05.945	3221
62	N 44 - 09.059	W 103 - 05.890	3222
63	N 44 - 09.094	W 103 - 05.836	3222
69	N 44 - 08.959	W 103 - 05.947	3219
<b>North</b>			
HH 1	N 44 - 09.543	W 103 - 07.143	3273
HH 2	N 44 - 09.548	W 103 - 07.217	3276
<b>South</b>			
HH 1	N 44 - 07.929	W 103 - 05.133	3177
HH 2	N 44 - 07.898	W 103 - 05.160	3178
70	N 44 - 08.998	W 103 - 06.127	3224
71	N 44 - 09.017	W 103 - 06.101	3224
72	N 44 - 09.034	W 103 - 06.072	3224
73	N 44 - 09.051	W 103 - 06.054	3224
74	N 44 - 09.069	W 103 - 06.016	3225
75	N 44 - 09.089	W 103 - 05.987	3225
76	N 44 - 09.108	W 103 - 05.959	3225

Spot	Latitude	Longitude	Elevation
77	N 44 - 09.126	W 103 - 05.931	3226
78	N 44 - 09.144	W 103 - 05.902	3227
80	N 44 - 09.089	W 103 - 06.229	3230
81	N 44 - 09.108	W 103 - 06.200	3230
82	N 44 - 09.126	W 103 - 06.172	3230
83	N 44 - 09.144	W 103 - 06.144	3230
84	N 44 - 09.163	W 103 - 06.114	3230
85	N 44 - 09.181	W 103 - 06.086	3230
90	N 44 - 09.175	W 103 - 06.334	3237
91	N 44 - 09.193	W 103 - 06.307	3238
92	N 44 - 09.212	W 103 - 06.279	3238
93	N 44 - 09.230	W 103 - 06.250	3238
94	N 44 - 09.249	W 103 - 06.222	3238
95	N 44 - 09.267	W 103 - 06.194	3238
96	N 44 - 09.285	W 103 - 06.166	3238
100	N 44 - 09.269	W 103 - 06.468	3245
101	N 44 - 09.286	W 103 - 06.442	3245
102	N 44 - 09.303	W 103 - 06.415	3245
103	N 44 - 09.290	W 103 - 06.392	3245
LOLA 1	N 44 - 09.340	W 103 - 06.566	3298
LOLA 2	N 44 - 09.380	W 103 - 06.505	3293
LOLA 3	N 44 - 09.387	W 103 - 06.623	3295
LOLA 4	N 44 - 09.427	W 103 - 06.565	3295
200	N 44 - 07.764	W 103 - 05.465	3162
201	N 44 - 07.757	W 103 - 05.526	3164
202	N 44 - 07.745	W 103 - 05.624	3166
203	N 44 - 07.740	W 103 - 05.714	3168
204	N 44 - 07.735	W 103 - 05.744	3169
205	N 44 - 07.753	W 103 - 05.804	3170
206	N 44 - 07.777	W 103 - 05.773	3169
207	N 44 - 07.782	W 103 - 05.713	3167
208	N 44 - 07.787	W 103 - 05.653	3166
209	N 44 - 07.772	W 103 - 05.593	3165
210	N 44 - 07.799	W 103 - 05.533	3163
211	N 44 - 07.803	W 103 - 05.473	3162

# AIRFIELD DIAGRAM - NORTH RAMP



AIRFIELD DIAGRAM - SOUTH RAMP



## **OFF-STATION TRANSITION**

Aircrews are encouraged to take advantage of off station training opportunities as it can be extremely beneficial to instrument and general airmanship development. It is expected that all AFI 11-202 Vol 3, AFI 11-2B-1 Vol 3, and AFMAN 11-217 rules and procedures will be adhered to and that airfields are chosen with good training in mind. Off-station transition is approved for any mission at any airfield, provided the following requirements are met:

1. Approved off-station transition fields are: any DoD installation, Casper/Natrona County (KCPR), Joe Foss Field (FSD) and Billings (KBIL). Rapid City Regional (KRAP) is approved for low approaches. Other airfields require 28 OG/CC approval.
2. Minimum runway length is 10,000' unless waived by OG/CC.
3. Aircrew must coordinate with the appropriate airfield manager and obtain a PPR if it is required.
4. No transition during noise abatement hours at the selected field.
5. If not annotated on the flying schedule, off-station transition requires Top-3 approval and 28 OG/CC notification.
6. Fuel and weather are appropriate to conduct transition and make it back home with required fuel reserves.
7. FLIP AP/1 and IFR Supplement are reviewed and appropriate airfield restrictions complied with.



### Aircraft Classification Number (ACN)

This chart is to be used with the ACN/PCN (Pavement Classification Number) system located in the Airport/Facility Directory Legend of each Enroute Supplement

GWT	RIGID PAVEMENT				FLEXIBLE PAVEMENT			
	HIGH	MED	LOW	ULTRA LOW	HIGH	MED	LOW	VERY LOW
189	14.0	16.0	20.0	24.0	11.0	12.0	11.0	9.0
200	16.1	18.4	22.8	26.9	11.8	12.6	11.5	9.2
210	17.9	20.7	25.3	29.6	12.5	13.2	11.9	9.4
220	19.8	22.9	27.8	32.3	13.3	13.7	12.3	9.6
230	21.7	25.1	30.3	35.0	14.0	14.3	12.7	9.9
240	23.6	27.3	32.8	37.6	14.7	14.8	13.1	10.1
250	25.4	29.6	35.3	40.3	15.4	15.4	13.5	10.3
260	27.3	31.8	37.8	43.0	16.2	15.9	14.0	10.5
270	29.2	34.0	40.3	45.7	16.9	16.5	14.4	10.7
280	31.1	36.2	42.8	48.3	17.6	17.1	14.8	10.9
290	32.9	38.4	45.3	51.0	18.4	17.6	15.2	11.1
300	34.8	40.7	47.8	53.7	19.1	18.2	15.6	11.3
310	36.7	42.9	50.3	56.4	19.8	18.7	16.0	11.5
320	38.6	45.1	52.8	59.0	20.6	19.3	16.5	11.7
330	40.4	47.3	55.3	61.7	21.3	19.8	16.9	11.9
340	42.3	49.5	57.8	64.4	22.0	20.4	17.3	12.1
350	44.2	51.8	60.3	67.1	22.7	20.9	17.7	12.4
360	46.1	54.0	62.8	69.7	23.5	21.5	18.1	12.6
370	47.9	56.2	65.3	72.4	24.2	22.1	18.5	12.8
380	49.8	58.4	67.8	75.1	24.9	22.6	19.0	13.0
390	51.7	60.7	70.3	77.8	25.7	23.2	19.4	13.2
400	53.6	62.9	72.8	80.4	26.4	23.7	19.8	13.4
410	55.4	65.1	75.3	83.1	27.1	24.3	20.2	13.6
420	57.3	67.3	77.8	85.8	27.8	24.8	20.6	13.8
430	59.2	69.5	80.3	88.5	28.6	25.4	21.0	14.0
440	61.1	71.8	82.8	91.1	29.3	25.9	21.5	14.2
450	62.9	74.0	85.3	93.8	30.0	26.5	21.9	14.4
460	64.8	76.2	87.8	96.5	30.8	27.1	22.3	14.6
470	66.7	78.4	90.3	99.1	31.5	27.6	22.7	14.9
477	68.0	80.0	92.0	101.0	32.0	28.0	23.0	15.0
480	68.6	80.7	92.8	101.8	32.2	28.2	23.1	15.1

**MINIMUM RUNWAY REQUIREMENTS**  
**(AFI 11-202V3)**

Minimum Runway Length (excluding overrun)	10,000 ft
Minimum Runway Width	148 ft
Minimum Taxiway Width	75 ft

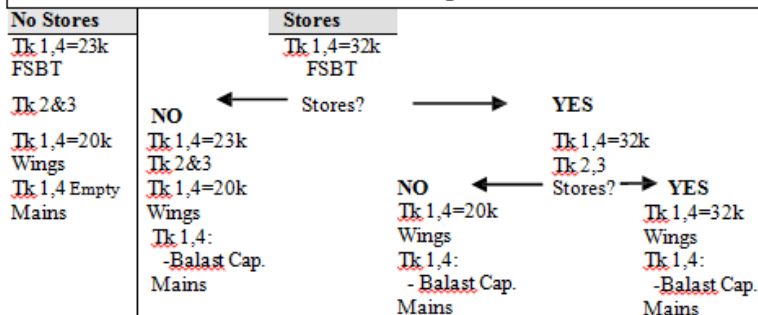
Waiver Authority: OG/CC

NOTE: Minimum load bearing capability for runway, taxiway and ramp is required for all aircraft.

**STANDARD FUEL PLANNING FACTORS**  
**(AFI 11-2B1-V3)**

Start Engines and Taxi	5,000 lbs
Takeoff and Climb to FL 200 (10 minutes)	12,000 lbs
Combat Departure to FL 200	22,000 lbs
Cruise	16,000 pph
High Altitude Maneuvering/AB Air Refueling	25,000 pph
Low-Alt Visual Contour or Terrain Following	38,000 pph
Air Refueling	20,000 pph
DACT	40,000 pph
Transition	20,000 pph
Endurance Fuel for Hours of Fuel on Board (FOB)	12,000 (based on max endurance at 10KMSL 245GW)

**FUEL BURN SEQUENCE**



## WEIGHT & BALANCE DATA

### To Calculate PID/SID Inputs:

Obtain *basic* weight and moment from T.O. 1-1B-40, Chart C, or MXGI weight and balance sheet.

From the standard configuration data below, add the appropriate weight and moment numbers to the *basic* weight and moment to get the *operating* weight and moment.

The first four digits of the operating weight comprise the operating weight input (i.e. 190,476 lbs. would be 190.5).

Use this formula to calculate the operating CG input (round off to 4 digits):

$$\text{CG in \% MAC} = [ (\text{Operating Moment} / \text{Operating Weight}) \times 543.33 ] - 511.73$$

### Standard Configuration Data

REF: TO 1B-1B-5-2

Description (number)	Weight (lbs.)	Moment/1000		
Crew (4)	900	308		
Crew Equipment	218	75		
EXCM Covers (8)	24	14		
TOTAL	1142	397		
Deployment Gear	300	145		
Chaff Dispenser (1)	42	25		
Flare Dispenser (1)	73	43		
Moment shift for 20 Wing	0	526		
		FWD	INT	AFT
180-inch Stores Bay Tank	1132	730	951	1397
28 Carry Module	3517	2265	2951	4337
10 Carry Module	3206	2071	2696	3959
JDAM CRL	2023	1268	1663	2460
JASSM CRL	2055	1286	1687	2497
Targeting Pod (with Pylon+VDL)	1320	682		

CONTINUED NEXT PAGE...

Description (number)	Weight (lbs.)	Moment/1000			
12 Flares	49	29			
120 Chaff	84	49			
			FWD	INT	AFT
MK-82 / BDU-50 AIR	533	Fwd Bank	321	425	635
		Aft Bank	358	462	672
MK-82 / BDU-50 LD	502	Fwd Bank	301	399	597
		Aft Bank	335	433	631
CBU-103	961	Fwd Bank	578	765	1144
		Aft Bank	644	831	1210
CBU-104	738	Fwd Bank	445	589	880
CBU-105	949	Fwd Bank	572	757	1131
BDU-33 HD & LD	25		NA	20	30
GBU-31 1/B (JDAM MK-84)	2057		1302	1703	2514
GBU-31 3/B (JDAM BLU-109)	2127		1346	1761	2599
GBU-38 (JDAM MK-82)	552	Fwd Bank	333	440	658
		Aft Bank	370	478	NA
JASSM	2148		1362	1781	2627

#### NORMAL CG LIMITS

Wing Sweep	Forward	Normal	Opt Cruise	Aft
<b>Flaps / Slats Extended</b>				
15	10	17	--	21
20	16	20	--	32
<b>Flaps / Slats Retracted</b>				
15	10	17	17	27
20	10	20	20	36
25	10	21	35	39
45	22	28	35	36**
55	25	30	35	43 to 52*
67.5	25	30	35	43 to 52*

\* Dependent on altitude and gross weight

\*\* NOTE: The CG Limit displayed by FCGMS when operating at 45 degree wing sweep depict actual aircraft limits, not the operational limits. Do not exceed 36% MAC when conducting flight at 45 degree wing sweep. Light stick forces and pitch oscillations may be experienced between 36% and 51% MAC.

<b>B-1 CG CONSIDERATIONS (TAKEOFF)</b>			
<b>15Λ Takeoff Jettison (CG Limits: Fwd = 10 / Tgt = 17 / Aft = 21)</b>			
<b>Bays Loaded</b>	<b>Hung Bays</b>	<b>CG Shift</b>	<b>Corrective Action</b>
Fwd / Mid	None	11% Aft	Sweep to 20Λ
Fwd / Mid	Mid	7% Aft	Sweep to 20Λ
Fwd / Mid / Aft	None	6% Aft	Sweep to 20Λ
Fwd / Mid / Aft	Aft	12% Aft	Sweep to 20Λ
Fwd / Mid / Aft	Mid / Aft	8% Aft	Sweep to 20Λ
<b>20Λ Takeoff Jettison / CG on Target (CG Limits: Fwd = 16 / Tgt = 20 / Aft = 32)</b>			
<b>Bays Loaded</b>	<b>Hung Bays</b>	<b>CG Shift</b>	<b>Corrective Action</b>
Mid / Aft	Mid	5% Fwd	No abrupt control
Fwd / Mid / Aft	Fwd / Mid	5% Fwd	No abrupt control
<b>20Λ Takeoff Jettison / CG Aft of Target (CG Limits: Fwd = 16 / Tgt = 20 / Aft = 32)</b>			
<b>Bays Loaded</b>	<b>Hung Bays</b>	<b>CG Shift</b>	<b>Corrective Action</b>
Mid / Aft	Aft	3% Aft	Retain Mid if req'd
Fwd / Mid	None	11% Aft	Retain Mid if req'd
Fwd / Mid	Fwd	3% Aft	Retain Mid if req'd
Fwd / Mid	Mid	7% Aft	Retain Mid if req'd
Fwd / Mid / Aft	None	6% Aft	Retain Fwd if req'd
Fwd / Mid / Aft	Mid	3% Aft	Retain Fwd if req'd
Fwd / Mid / Aft	Aft	11% Aft	Retain Fwd if req'd
Fwd / Mid / Aft	Mid / Aft	7% Aft	Retain Fwd if req'd
<b>B-1 CG CONSIDERATIONS (EMPLOYMENT)</b>			
<b>Bays Loaded</b>	<b>Hung Bays</b>	<b>CG Shift</b>	<b>Corrective Action</b>
Fwd / Mid	None	16.5% Aft	If 45Λ, sweep wings or preposition
Fwd / Mid	Fwd	5% Aft	None
Fwd / Mid	Mid	11% Aft	If 45Λ, sweep wings or preposition
Mid / Aft	None	2% Fwd	None
Mid / Aft	Mid	7% Fwd	No abrupt control
Mid / Aft	Aft	5% Aft	None
Fwd / Mid / Aft	None	10% Aft	If 45Λ, sweep wings or preposition
Fwd / Mid / Aft	Fwd	2% Fwd	None
Fwd / Mid / Aft	Mid	4% Aft	None
Fwd / Mid / Aft	Aft	17.5% Aft	If 45Λ, sweep wings or preposition
Fwd / Mid / Aft	Fwd / Mid	7% Fwd	None
Fwd / Mid / Aft	Mid / Aft	11% Aft	None

CG shift is based on worst case at 275,000 lbs GW (28 Mk-82s per bay).

Standard Jettison for Mk-82s: 3000 AGL / 500 TAS / 1.72 to 2.1 VSD NAP prior to target / authorized jettison area.

**CONTINUED NEXT PAGE...**

**Ballast Fuel Required** (Tank 1) Landing w/ retained aft bay (based on 20Λ at **27%** MAC):

GBU-31V3 = 11390; Mk-82AIR = 9950; CBU-87 = 6050

**Ballast Fuel Required** (Tank 1) Landing w/ retained aft bay (based on 20Λ at **32%** MAC):

GBU-31V3 = 4300; Mk-82AIR = 3400; CBU-87 = 700. Landing may be safely accomplished with CG aft of 27%. Add 10 knots to approach and landing speeds.

**Ballast Fuel Required** (Tank 4) Land w/ retained Fwd & Mid bay (15Λ at **10%** MAC):

GBU-31V3 = 4300; Mk-82AIR = 2500; [CBU-87 = 0 (CG = 13%MAC)]

All fuels rounded up to next 100 lbs. Basic Wt / MOM used = 186692 / 186089.

Assumes all bays loaded with maximum # of like weapons.

**JP-8/JAA FUEL LOADING CHARTS**

**JP-8/JAA FUEL LOADING CHARTS**

**SERIES "B", DENSITY = 6.8 LBS/GAL**

**STANDARD LOADS – FWD STORES BAY TANK INSTALLED**


TANK	70	75	80	85	90
3	0	0	0	1000	3000
2	0	0	3000	7000	10000
WINGS	29000	32499	32499	32499	32499
1	19000	20000	21000	20000	20000
4	1000	1000	2000	3000	3000
MAINS	21262	21262	21262	21262	21262
SB1	0	0	0	0	0
	95	100	105	110	115
3	5000	7000	9000	11000	14000
2	13000	16000	19000	22000	24000
WINGS	32499	32499	32499	32499	32499
1	21000	21000	21000	21000	22000
4	2000	2000	2000	2000	1000
MAINS	21262	21262	21262	21262	21262
SBI	0	0	0	0	0
	120	125	130	135	140
3	16000	18000	20000	22000	24183
2	27000	30000	33000	36000	39342
WINGS	32499	32499	32499	32499	32499
1	22000	22000	22000	21000	21000
4	1000	1000	1000	2000	2000
MAINS	21262	21262	21262	21262	21262
SB1	0	0	0	0	0

**Fuel Density vs. Full Tank Capacity**

DENSITY	3	2	WINGS	1	4	MAINS	SBI
6.9	24539	39921	32977	32754	53539	21575	20031
6.8	24183	39342	32499	32279	52763	21262	19741
6.7	23827	38763	32021	31804	51987	20949	19451

# JP-8/JAA FUEL LOADING CHARTS

## SERIES "B", DENSITY = 6.8 LBS/GAL (cont) STANDARD LOADS – FWD STORES BAY TANK INSTALLED

TANK	145	150	155	160	165
3	24183	24183	24183	24183	24183
2	39342	39342	39342	39342	39342
WINGS	32499	32499	32499	32499	32499
1	19000	17000	15000	13000	16000
4	4000	6000	8000	10000	12000
MAINS	21262	21262	21262	21262	21262
SB1	5000	10000	15000	19741	19741
	170	175	180	185	190
3	24183	24183	24183	24183	24183
2	39342	39342	39342	39342	39342
WINGS	32499	32499	32499	32499	32499
1	19000	22000	25000	27000	30000
4	14000	16000	18000	21000	23000
MAINS	21262	21262	21262	21262	21262
SBI	19741	19741	19741	19741	19741
	195	20° WING T/O 			
		200	205	210	215
3	24183	24183	24183	24183	24183
2	39342	39342	39342	39342	39342
WINGS	32499	32499	32499	32499	32499
1	32279	32279	32279	32279	32279
4	26000	31000	36000	41000	46000
MAINS	21262	21262	21262	21262	21262
SB1	19741	19741	19741	19741	19741

## Fuel Density vs. Full Tank Capacity

DENSITY	3	2	WINGS	1	4	MAINS	SBI
6.9	24539	39921	32977	32754	53539	21575	20031
6.8	24183	39342	32499	32279	52763	21262	19741
6.7	23827	38763	32021	31804	51987	20949	19451



# JP-8/JAA FUEL LOADING CHARTS

SERIES "A", DENSITY = 6.8 LBS/GAL

STANDARD LOADS – NO STORES BAY TANK INSTALLED

TANK	70	75	80	85	90
3	0	0	0	1000	3000
2	0	0	3000	7000	10000
WINGS	29000	32499	32499	32499	32499
1	20000	21000	21000	21000	21000
4	0	0	2000	2000	2000
MAINS	21262	21262	21262	21262	21262
	95	100	105	110	115
3	5000	7000	9000	11000	14000
2	13000	16000	19000	22000	24000
WINGS	32499	32499	32499	32499	32499
1	21000	21000	21000	21000	22000
4	2000	2000	2000	2000	1000
MAINS	21262	21262	21262	21262	21262
	120	125	130	135	140
3	16000	18000	20000	22000	24183
2	27000	30000	33000	36000	39342
WINGS	32499	32499	32499	32499	32499
1	22000	22000	22000	22000	22000
4	1000	1000	1000	1000	1000
MAINS	21262	21262	21262	21262	21262
	145	150	155	160	
3	24183	24183	24183	24183	
2	39342	39342	39342	39342	
WINGS	32499	32499	32499	32499	
1	25000	27000	30000	32279	
4	3000	6000	8000	10000	
MAINS	21262	21262	21262	21262	

## Fuel Density vs. Full Tank Capacity

DENSITY	3	2	WINGS	1	4	MAINS	SBI
6.9	24539	39921	32977	32754	53539	21575	20031
6.8	24183	39342	32499	32279	52763	21262	19741
6.7	23827	38763	32021	31804	51987	20949	19451

# JP-8/JAA FUEL LOADING CHARTS

SERIES "A", DENSITY = 6.8 LBS/GAL (cont)  
STANDARD LOADS – NO STORES BAY TANK INSTALLED

	20 WING T/O			
TANK	165	170	175	180
3	24183	24183	24183	24183
2	39342	39342	39342	39342
WINGS	32499	32499	32499	32499
1	32279	32279	32279	32279
4	15000	20000	25000	30000
MAINS	21262	21262	21262	21262

Fuel Density vs. Full Tank Capacity

DENSITY	3	2	WINGS	1	4	MAINS	SBI
6.9	24539	39921	32977	32754	53539	21575	20031
6.8	24183	39342	32499	32279	52763	21262	19741
6.7	23827	38763	32021	31804	51987	20949	19451

## TAKEOFF DATA

		<u>NOTES</u>	
A. CHARTS		Manual	Checklist
1. Takeoff Factor		A2-37	P2-4
2. Max Brake Speeds		5-37	P6-24
4. Takeoff/Rotate Speeds: Max AB	A2-43		P2-3
5. Critical Field Length: Max AB	A2-52/53		P2-20 thru 2-24
6. Takeoff Distance: Max AB	A2-44/45		P2-6 thru 2-9
7. Engine Out Climb Performance	A2-62 thru 65		N/A
8. Refusal Speed Factor: Max AB	A2-56		P2-30
9. Refusal Speed: Max AB	A2-57/58		P2-31
 <b>B. WARNING</b> (A2-43, A2-73, A2-99) –			
<b>15 Wing Sweep-</b> With SIS ON (and SEF OFF), add 1 knot (Delta Vto) to all speeds for each 1% MAC Aft of Target CG.			
<b>20 Wing Sweep-</b> With SIS ON (and SEF OFF), add 1 knot (Delta Vto) to all speeds for each 1% MAC <u>Aft</u> of 27% MAC CG. (SEF ON aircraft do not require speed adjustments for AFT CGs). For SIS <b>or</b> SEF ON, add 1 knot (Delta Vto) for each 1% MAC <u>Forward</u> of 21% MAC CG.			
<b>Both 15 &amp; 20 Wing Sweep-</b> SEF ON aircraft do not require speed adjustment for AFT CG.			
 <b>C. ASSUMPTIONS</b> used in computations			
1. 20° Wing Sweep and SEF/SIS off, Delta Vto = 12 knots			
2. Wind = 0, Runway slope = 0, RCR=26			
3. Without brake limits and configured with gear, slats, and full flaps			
4. At or less than 415,000 pounds gross weight, initiate back stick pressure at T/O speed minus 15 knots for max-afterburner thrust takeoffs			
 <b>D. REFUSAL SPEED</b> - Computed using Runway Available. Runway Available is the usable runway length minus 300' for lineup.			
 <b>E. CLIMB PERFORMANCE</b> - Based on 15° Wing Sweep, and Delta Vto = 0			
 <b>F. BRAKE SPEEDS</b> – All data is for WBSI brakes.			
1. Caution Speeds will give you brake temps above 600 Degrees			
2. Danger Speeds will give you brake temps above 720 Degrees			
 <b>G. CRITICAL FIELD LENGTH</b> - To determine Category (I, II, III) of the runway, you must compare with Runway Available (see D. above).			
 <b>H. THREE ENGINE ROTATE SPEED</b> - If you lose an engine, rotating 10 knots above the normal rotate speed in this guide will ensure you are at or above the minimum 3 engine rotation speed from the performance manual.			

B-1B TAKEOFF FACTORS												
TEMP °F (°C)	FIELD PRESSURE ALTITUDES											
	SL	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	6000
120 (49)	44	47	51	54	58	62	66	71	75	81	85	98
110 (43)	39	42	45	48	52	55	60	63	67	72	76	87
105 (41)	36	39	42	45	49	53	56	60	64	69	73	82
100 (38)	34	37	40	43	46	49	53	56	60	65	69	79
95 (35)	32	35	37	41	43	47	50	53	57	62	65	75
90 (32)	30	33	35	38	41	45	48	51	55	59	62	71
85 (30)	29	31	34	37	39	43	46	49	52	56	60	68
80 (27)	27	30	32	35	38	41	44	47	50	54	57	65
75 (24)	26	28	31	33	36	39	42	45	48	52	55	63
70 (21)	25	27	29	32	35	37	40	43	46	50	53	61
65 (18)	24	26	28	31	33	36	39	42	45	48	52	59
60 (16)	23	25	27	29	32	35	37	41	43	46	50	57
55 (13)	22	23	26	29	31	33	36	39	42	45	49	56
50 (10)	21	23	25	27	30	32	35	38	41	44	47	54
45 (7)	20	22	24	26	29	31	34	37	39	43	46	52
40 (4)	19	21	23	25	28	30	33	36	38	42	45	51
35 (2)	19	20	23	25	27	29	32	35	37	41	44	50
30 (-1)	18	20	22	24	26	29	31	34	37	40	43	49
25 (-4)	18	19	21	23	26	28	31	33	36	39	42	48
20 (-7)	17	19	21	23	25	27	30	33	35	38	41	47
15 (-9)	17	19	21	23	24	26	29	32	34	37	40	47
10 (-12)	16	18	20	22	24	27	29	31	34	37	40	46
5 (-15)	15	18	20	22	24	26	28	31	34	36	39	46
0 (-18)	15	17	19	21	23	25	28	30	33	36	38	45
-5 (-20)	15	17	19	21	23	25	27	30	33	35	38	44
-10 (-23)	14	17	18	21	22	25	27	29	32	35	37	43
-20 (-29)	14	16	18	20	22	24	26	28	31	33	36	42

**MAX AB**

210 GWT	SPEEDS			15 WS or 20 WS			20 WS SEF/SIS OFF			
	ROTATE			119			131			
	TAKEOFF			134			146			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	1650	1750	1900	2050	2150	2300	2450	2600	2700
	20 WS S/S OFF	1950	2100	2250	2450	2600	2750	2950	3100	3250
CLIMB	3 ENG	3750	3625	3525	3400	3275	3200	3125	3025	2950
	2 ENG	2000	1925	1825	1750	1650	1575	1500	1450	1375

Brk Caution/Danger and CFL – NA

220 GWT	SPEEDS			15 WS or 20 WS			20 WS SEF/SIS OFF			
	ROTATE			123			135			
	TAKEOFF			138			150			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	1750	1900	2050	2200	2350	2500	2650	2800	2950
	20 WS S/S OFF	2100	2250	2450	2650	2800	3000	3150	3350	3550
CLIMB	3 ENG	3600	3500	3375	3250	3125	3050	2975	2900	2800
	2 ENG	1875	1800	1700	1625	1525	1450	1375	1325	1250
BRK	CAUTION	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFL (dry)	NORM	2300	2500	2675	2875	3050	3250	3425	3625	3800
	20 WS S/S OFF	2725	2925	3100	3325	3500	3700	3900	4100	4300
	WET (12) NORM	2350	2550	2750	2925	3125	3300	3500	3675	3875
	20 WS S/S OFF	2875	3125	3325	3575	3800	3975	4200	4400	4650
	ICY(9) NORM	2400	2575	2775	2975	3175	3350	3550	3725	3925

230 GWT	SPEEDS			15 WS or 20 WS			20 WS SEF/SIS OFF			
	ROTATE			126			138			
	TAKEOFF			141			153			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	1950	2150	2300	2450	2600	2800	2950	3100	3300
	20 WS S/S OFF	2350	2600	2750	2950	3100	3350	3550	3700	3950
CLIMB	3 ENG	3450	3350	3250	3125	3000	2925	2850	2750	2650
	2 ENG	1775	1700	1600	1525	1425	1350	1275	1225	1150
BRK	CAUTION	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFL (dry)	NORM	2500	2700	2925	3125	3350	3525	3750	3950	4150
	20 WS S/S OFF	2925	3150	3375	3575	3825	4000	4250	4400	4675
	WET (12) NORM	2600	2800	3000	3225	3425	3625	3825	4050	4250
	20 WS S/S OFF	3225	3475	3700	3925	4173	4450	4700	4975	5250
	ICY(9) NORM	2625	2925	3050	3250	3475	3675	3875	4100	4300

**MAX AB**

240 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF			
	ROTATE		129				141			
	TAKEOFF		144				156			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	2150	2350	2500	2700	2850	3050	3200	3400	3600
	20 WS S/S OFF	2600	2800	3000	3250	3400	3650	3850	4050	4250
CLIMB	3 ENG	3300	3200	3100	2975	2850	2775	2700	2600	2500
	2 ENG	1650	1575	1475	1400	1300	1225	1150	1100	1025
BRK	CAUTION	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFL (dry)	NORM	2700	2925	3150	3375	3600	3925	4050	4275	4500
	20 WS S/S OFF	3150	3375	3600	3850	4075	4425	4575	4825	5075
WET (12)	NORM	2825	3050	3275	3500	3725	3950	4175	4400	4625
	20 WS S/S OFF	3450	3700	3975	4225	4500	4750	5050	5300	5600
ICY(9)	NORM	2850	3100	3325	3550	3775	4000	4225	4450	4700

250 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF			
	ROTATE		132				144			
	TAKEOFF		147				159			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	2350	2550	2750	2950	3150	3350	3500	3750	3950
	20 WS S/S OFF	2800	3050	3300	3550	3800	4000	4150	4400	4650
CLIMB	3 ENG	3175	3075	2975	2850	2750	2650	2575	2475	2400
	2 ENG	1575	1475	1375	1300	1225	1150	1075	1025	950
BRK	CAUTION	NO	NO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFL (dry)	NORM	2950	3200	3425	3675	3900	4150	4375	4625	4850
	20 WS S/S OFF	3400	3650	3900	4175	4400	4675	4925	5225	5500
WET (12)	NORM	3075	3325	3575	3800	4050	4300	4550	4800	5075
	20 WS S/S OFF	3625	3900	4150	4425	4700	5000	5275	5625	5950
ICY(9)	NORM	3125	3350	3600	3850	4100	4350	4625	4875	5150

**MAX AB**

260 GWT	SPEEDS		15 WS or 20 WS					20 WS SEF/SIS OFF		
	ROTATE		135					147		
	TAKEOFF		150					162		
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	2550	2750	2950	3200	3400	3600	3800	4050	4250
	20 WS S/S OFF	3050	3300	3550	3850	4050	4250	4450	4750	5000
CLIMB	3 ENG	3050	2950	2850	2750	2625	2550	2450	2375	2275
	2 ENG	1475	1400	1300	1225	1125	1050	975	925	850
BRK	CAUTION	NO	NO	N/A	N/A	N/A	N/A	N/A	199	190
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFL (dry)	NORM	3200	3450	3700	3950	4200	4450	4700	4950	5200
	20 WS S/S OFF	3675	3925	4200	4450	4775	5025	5300	5600	5875
	WET (12) NORM	3325	3600	3850	4125	4400	4775	4950	5225	5500
	20 WS S/S OFF	4025	4325	4600	4900	5200	5525	5800	6100	6400
	ICY(9) NORM	3375	3625	3900	4175	4450	4725	5025	5300	5575

270 GWT	SPEEDS		15 WS or 20 WS					20 WS SEF/SIS OFF			
	ROTATE		138					150			
	TAKEOFF		153					165			
TOF		20	25	30	35	40	45	50	55	60	
TOR	NORM	2750	3000	3200	3450	3700	3900	4150	4400	4650	
	20 WS S/S OFF	3300	3600	3850	4100	4350	4600	4850	5150	5400	
CLIMB	3 ENG	2925	2825	2725	2625	2525	2425	2325	2250	2175	
	2 ENG	1400	1300	1200	1125	1050	975	900	850	775	
BRK	CAUTION	NO	NO	N/A	N/A	199	190	185	182	179	
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
CFL (dry)	NORM	3450	3725	4000	4275	4550	4825	5100	5375	5650	
	20 WS S/S OFF	3925	4225	4500	4825	5125	5450	5750	6075	6400	
	WET (12) NORM	3575	3875	4150	4450	4750	5050	5350	5650	5925	
	20 WS S/S OFF	4225	4550	4875	5175	5550	5900	6250	6625	7000	
	ICY(9) NORM	3625	3925	4200	4525	4825	5150	5450	5725	6025	

**MAX AB**

280 GWT	SPEEDS			15 WS or 20 WS			20 WS SEF/SIS OFF			
	ROTATE			141			153			
	TAKEOFF			156			168			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	2950	3200	3450	3700	3950	4200	4450	4750	5000
	20 WS S/S OFF	3550	3850	4100	4350	4650	4950	5200	5500	5800
CLIMB	3 ENG	2800	2700	2600	2500	2400	2300	2200	2125	2050
	2 ENG	1300	1200	1100	1025	950	875	800	750	675
BRK	CAUTION	NO	NO	N/A	190	183	180	178	175	165
	DANGER	DATA	DATA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CFL (dry)	NORM	3700	4000	4300	4600	4900	5200	5500	5800	6100
	20 WS S/S OFF	4200	4500	4850	5200	5550	5900	6225	6575	6925
	WET (12) NORM	3825	4150	4475	4800	5125	5450	5750	6050	6375
	20 WS S/S OFF	4450	4825	5175	5575	5950	6350	6775	7200	7650
	ICY(9) NORM	3875	4200	4525	4875	5200	5525	5850	6150	6475

290 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF				
	ROTATE		143				155				
	TAKEOFF		158				170				
TOF			20	25	30	35	40	45	50	55	60
TOR	NORM		3200	3450	3750	4000	4300	4550	4850	5150	5400
	20 WS S/S OFF		3850	4100	4450	4700	5050	5300	5650	5950	6250
CLIMB	3 ENG		2700	2600	2500	2400	2300	2200	2100	2025	1950
	2 ENG		1225	1125	1025	950	875	800	725	675	600
BRK	CAUTION		NO	NO	190	180	178	170	165	162	159
	DANGER		DATA	DATA	N/A	N/A	N/A	N/A	200	200	195
CFL (dry)	NORM		3950	4275	4625	4950	5300	5600	5950	6275	6600
	20 WS S/S OFF		4450	4825	5225	5600	6000	6350	6750	7175	7600
	WET (12) NORM		4125	4475	4825	5175	5500	5850	6175	6525	6875
	20 WS S/S OFF		4825	5200	5625	6050	6475	6825	7200	7625	8075
	ICY(9) NORM		4175	4525	4900	5250	5600	5950	6300	6650	7000



**MAX AB**

<b>300 GWT</b>	<b>SPEEDS</b>			<b>15 WS or 20 WS</b>			<b>20 WS SEF/SIS OFF</b>			
	<b>ROTATE</b>			<b>146</b>			<b>158</b>			
	<b>TAKEOFF</b>			<b>161</b>			<b>173</b>			
<b>TOF</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	
TOR NORM	3400	3700	4000	4300	4600	4900	5200	5500	5800	
20 WS S/S OFF	4050	4350	4700	5000	5350	5700	6050	6350	6700	
CLIMB 3 ENG	2600	2500	2400	2300	2175	2100	2000	1925	1850	
2 ENG	1125	1050	950	875	800	725	650	600	525	
BRK CAUTION	NO	NO	180	171	165	160	156	157	153	
DANGER	DATA	DATA	N/A	N/A	N/A	200	192	190	182	
CFL (dry) NORM	4200	4575	4925	5300	5650	6025	6375	6750	7100	
20 WS S/S OFF	4725	5175	5575	6000	6400	6825	7300	7800	8200	
WET (12) NORM	4425	4800	5175	5525	5900	6250	6625	7025	7400	
20 WS S/S OFF	5075	5525	5975	6425	6850	7300	7775	8250	8750	
ICY(9) NORM	4475	4875	5250	5650	6000	6350	6750	7150	7550	

<b>310 GWT</b>	<b>SPEEDS</b>			<b>15 WS or 20 WS</b>			<b>20 WS SEF/SIS OFF</b>			
	<b>ROTATE</b>			<b>149</b>			<b>161</b>			
	<b>TAKEOFF</b>			<b>164</b>			<b>176</b>			
<b>TOF</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	
TOR NORM	3700	4000	4300	4650	4950	5300	5600	5950	6250	
20 WS S/S OFF	4350	4700	5000	5400	5750	6150	6450	6850	7200	
CLIMB 3 ENG	2500	2400	2300	2175	2075	1975	1900	1825	1750	
2 ENG	1050	950	875	800	700	650	575	525	450	
BRK CAUTION	NO	NO	173	162	159	155	153	152	149	
DANGER	DATA	DATA	N/A	199	190	187	181	180	177	
CFL (dry) NORM	4500	4900	5275	5675	6050	6450	6825	7225	7600	
20 WS S/S OFF	5025	5550	5975	6425	6850	7400	7875	8350	8750	
WET (12) NORM	4725	5125	5525	5900	6300	6700	7125	7525	7925	
20 WS S/S OFF	5425	5900	6400	6925	7475	7900	8400	8900	9375	
ICY(9) NORM	4800	5200	5625	6000	6400	6825	7250	7675	8075	

**MAX AB**

320 GWT		SPEEDS		15 WS or 20 WS			20 WS SEF/SIS OFF			
		ROTATE		151			163			
		TAKEOFF		166			178			
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	3950	4300	4600	4950	5300	5650	6000	6350	6700
	20 WS S/S OFF	4650	5000	5350	5750	6150	6500	6900	7350	7750
CLIMB	3 ENG	2400	2300	2200	2075	1950	1875	1800	1725	1650
	2 ENG	950	875	800	725	625	575	500	425	375
BRK	CAUTION	NO	NO	165	159	155	150	150	148	144
	DANGER	DATA	DATA	200	187	181	179	175	175	169
CFL (dry)	NORM	4800	5225	5625	6050	6450	6875	7275	7700	8100
	20 WS S/S OFF	5425	5925	6375	6875	7400	7925	8400	8875	9300
	WET (12) NORM	5025	5450	5875	6275	6725	7175	7600	8025	8475
	20 WS S/S OFF	5800	6300	6800	7300	7850	8375	8900	9400	9900
	ICY(9) NORM	5100	5550	5975	6400	6825	7300	7750	8175	8625

330 GWT		SPEEDS			15 WS or 20 WS			20 WS SEF/SIS OFF		
		ROTATE			154			166		
		TAKEOFF			169			181		
TOF		20	25	30	35	40	45	50	55	60
TOR	NORM	4200	4550	4950	5300	5700	6050	6450	6800	7200
	20 WS S/S OFF	4900	5300	5750	6150	6550	6950	7450	7850	8300
CLIMB	3 ENG	2325	2225	2125	2000	1875	1800	1725	1650	1575
	2 ENG	900	800	725	650	550	500	425	375	300
BRK	CAUTION	NO	NO	160	153	150	147	144	142	139
	DANGER	DATA	DATA	190	180	172	171	168	165	160
CFL (dry)	NORM	5100	5550	6000	6425	6900	7325	7775	8200	8650
	20 WS S/S OFF	5750	6275	6800	7375	7975	8475	8950	9425	9900
	WET (12) NORM	5375	5825	6275	6750	7225	7675	8150	8625	9050
	20 WS S/S OFF	6300	6800	7325	7875	8425	8975	9500	10050	10575
	ICY(9) NORM	5475	5925	6375	6855	7350	7825	8300	8775	9200

**MAX AB**

<b>340 GWT</b>	<b>SPEEDS</b>			<b>15 WS or 20 WS</b>			<b>20 WS SEF/SIS OFF</b>			
	<b>ROTATE</b>			<b>156</b>			<b>168</b>			
	<b>TAKEOFF</b>			<b>171</b>			<b>183</b>			
<b>TOF</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	
TOR NORM	4450	4850	5250	5650	6050	6450	6850	7250	7650	
20 WS S/S OFF	5200	5600	6050	6500	6950	7450	7900	8350	8800	
CLIMB 3 ENG	2250	2150	2025	1950	1775	1700	1625	1550	1475	
2 ENG	825	750	650	575	500	425	350	300	250	
BRK CAUTION	NO	NO	155	149	147	142	140	139	138	
DANGER	DATA	DATA	181	173	167	165	161	160	157	
CFL (dry) NORM	5400	5875	6350	6825	7300	7775	8250	8725	9200	
20 WS S/S OFF	6100	6650	7250	7900	8425	8850	9475	10000	10525	
WET (12) NORM	5725	6200	6700	7225	7725	8200	8700	9150	9625	
20 WS S/S OFF	6600	7175	7775	8375	8975	9525	10125	10700	11275	
ICY(9) NORM	5825	6325	6825	7350	7875	8375	8850	9300	9775	

<b>350 GWT</b>	<b>SPEEDS</b>			<b>15 WS or 20 WS</b>			<b>20 WS SEF/SIS OFF</b>			
	<b>ROTATE</b>			<b>159</b>			<b>171</b>			
	<b>TAKEOFF</b>			<b>174</b>			<b>186</b>			
<b>TOF</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>	
TOR NORM	4750	5150	5600	6050	6450	6850	7300	7750	8200	
20 WS S/S OFF	5500	5950	6450	6950	7450	7900	8450	8900	9400	
CLIMB 3 ENG	2175	2050	1950	1825	1700	1625	1550	1475	1400	
2 ENG	775	675	575	500	425	350	275	225	175	
BRK CAUTION	NO	NO	151	145	143	139	139	138	136	
DANGER	DATA	DATA	177	169	161	160	158	157	151	
CFL (dry) NORM	5750	6250	6775	7275	7800	8275	8800	9300	9800	
20 WS S/S OFF	6525	7125	7800	8400	8975	9500	10075	10625	11175	
WET (12) NORM	6075	6600	7125	7675	8200	8725	9225	9725	10275	
20 WS S/S OFF	6925	7575	8300	8950	9550	10100	10700	11275	11900	
ICY(9) NORM	6175	6700	7275	7825	8350	8875	9375	9875	10475	

**MAX AB**

<b>360 GWT</b>	<b>SPEEDS</b>		<b>15 WS or 20 WS</b>			<b>20 WS SEF/SIS OFF</b>			
	<b>ROTATE</b>		<b>161</b>			<b>173</b>			
	<b>TAKEOFF</b>		<b>176</b>			<b>188</b>			
<b>TOF</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>
TOR NORM	5050	5500	5950	6400	6850	7300	7800	8250	8700
20 WS S/S OFF	5850	6350	6850	7400	7900	8450	8950	9450	9950
CLIMB 3 ENG	2100	1975	1850	1725	1600	1525	1450	1375	1300
2 ENG	700	600	500	425	350	275	200	150	100
BRK CAUTION	NO	NO	148	141	139	138	137	136	134
DANGER	DATA	DATA	170	162	158	155	153	153	149
CFL (dry) NORM	6100	6650	7175	7725	8250	8800	9325	9875	10400
20 WS S/S OFF	6925	7650	8300	8900	9475	10075	10675	11275	11875
WET (12) NORM	6400	6975	7550	8125	8675	9225	9750	10355	10925
20 WS S/S OFF	7325	8125	8850	9475	10075	10700	11325	12000	12600
ICY(9) NORM	6500	7100	7700	8275	8850	9375	9925	10550	11125

<b>370 GWT</b>	<b>SPEEDS</b>		<b>15 WS or 20 WS</b>			<b>20 WS SEF/SIS OFF</b>			
	<b>ROTATE</b>		<b>164</b>			<b>176</b>			
	<b>TAKEOFF</b>		<b>179</b>			<b>191</b>			
<b>TOF</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>35</b>	<b>40</b>	<b>45</b>	<b>50</b>	<b>55</b>	<b>60</b>
TOR NORM	5350	5850	6350	6800	7300	7800	8300	8800	9250
20 WS S/S OFF	6200	6700	7300	7850	8450	8950	9550	10000	10600
CLIMB 3 ENG	2025	1900	1775	1650	1525	1450	1375	1300	1225
2 ENG	650	550	450	375	300	225	150	100	50
BRK CAUTION	NO	NO	143	139	138	136	135	134	132
DANGER	DATA	DATA	163	159	154	151	149	148	145
CFL (dry) NORM	6450	7025	7600	8150	8750	9300	9875	10425	11000
20 WS S/S OFF	7400	8125	8750	9375	10025	10650	11275	11900	12600
WET (12) NORM	6775	7400	8025	8625	9175	9775	10400	11000	11575
20 WS S/S OFF	7850	8675	9325	9975	10650	11300	12000	12675	13400
ICY(9) NORM	6900	7550	8175	8775	9325	9925	10600	11200	11775

**MAX AB**

380 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF			
	ROTATE		166				178			
	TAKEOFF		181				193			
TOF	20	25	30	35	40	45	50	55	60	
TOR NORM	5650	6200	6700	7200	7750	8250	8800	9300	9850	
20 WS S/S OFF	6500	7150	7750	8350	8900	9450	10000	10650	11000	
CLIMB 3 ENG	1925	1800	1675	1575	1450	1375	1300	1225	1150	
2 ENG	575	475	375	300	225	150	100	50	0	
BRK CAUTION	NO	NO	140	138	137	134	133	132	131	
DANGER	DATA	DATA	160	156	150	148	146	145	141	
CFL (dry) NORM	6800	7400	8000	8600	9200	9800	10400	11000	11600	
20 WS S/S OFF	7850	8500	9200	9850	10525	11200	11875	12600	13400	
WET (12) NORM	7175	7825	8475	9075	9700	10350	11000	11600	12275	
20 WS S/S OFF	8550	9050	9800	10400	11175	11975	12650	13400	----	
ICY(9) NORM	7300	8000	8625	9225	9850	10575	11225	11800	12500	

390 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF			
	ROTATE		168				180			
	TAKEOFF		183				195			
TOF	20	25	30	35	40	45	50	55	60	
TOR NORM	6000	6550	7100	7650	8200	8750	9350	9800	10375	
20 WS S/S OFF	6900	7550	8200	8800	9400	9975	10650	11000	11825	
CLIMB 3 ENG	1850	1725	1600	1475	1375	1300	1225	1100	975	
2 ENG	525	425	325	250	175	100	50	0	----	
BRK CAUTION	NO	NO	139	136	134	132	132	131	130	
DANGER	DATA	DATA	158	151	148	145	142	142	139	
CFL (dry) NORM	7150	7800	8450	9075	9750	10375	11025	11725	12300	
20 WS S/S OFF	8275	9000	9700	10375	11125	11850	12625	13500	----	
WET (12) NORM	7625	8325	9000	9625	10350	11050	11700	12425	13075	
20 WS S/S OFF	8825	9575	10300	11000	11850	12625	13425	----	----	
ICY(9) NORM	7775	8475	9150	9775	10550	11250	11900	12650	13375	

**MAX AB**

400 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF			
	ROTATE		171				183			
	TAKEOFF		186				198			
TOF		20	25	30	35	40	45	50	55	60
TOR NORM		6300	6875	7475	8075	8675	9250	9850	10450	11075
	20 WS S/S OFF	7275	7950	8550	9300	9950	10600	11050	11800	12600
CLIMB 3 ENG		1750	1625	1500	1400	1300	1225	1150	1075	1100
	2 ENG	450	350	250	175	100	50	0	----	----
BRK CAUTION		NO	NO	137	135	133	131	130	129	128
	DANGER	DATA	DATA	154	149	143	142	139	139	138
CFL (dry) NORM		7500	8250	8875	9575	10250	10950	11625	12325	13000
	20 WS S/S OFF	8650	9475	10175	10925	11725	12550	13425	----	----
	WET (12) NORM	8100	8800	9500	10250	11000	11700	12475	13175	----
	20 WS S/S OFF	9225	10075	10800	11575	12500	13275	----	----	----
ICY(9) NORM		8225	8950	9650	10450	11200	11875	12725	13450	----

410 GWT	SPEEDS		15 WS or 20 WS				20 WS SEF/SIS OFF			
	ROTATE		173				185			
	TAKEOFF		188				200			
TOF		20	25	30	35	40	45	50	55	60
TOR NORM		6650	7275	7900	8550	9175	9800	10375	11000	11600
	20 WS S/S OFF	7650	8700	9100	9825	10550	11175	11800	12550	13100
CLIMB 3 ENG		1675	1550	1450	1325	1250	1175	1100	1025	950
	2 ENG	400	300	200	100	50	0	----	----	----
BRK CAUTION		NO	NO	135	134	132	130	129	128	127
	DANGER	DATA	DATA	150	145	141	140	138	138	136
CFL (dry) NORM		7900	8650	9400	10075	10850	11550	12350	13000	----
	20 WS S/S OFF	9100	9925	10750	11475	12425	13175	----	----	----
	WET (12) NORM	8850	9300	10100	10925	11675	12500	13250	----	----
	20 WS S/S OFF	9825	10500	11275	12175	13200	----	----	----	----
ICY(9) NORM		8725	9450	10300	11150	11875	12750	----	----	----

**MAX AB**

420 GWT	SPEEDS			15 WS or 20 WS			20 WS SEF/SIS OFF			
	ROTATE			175			187			
	TAKEOFF			190			202			
TOF		20	25	30	35	40	45	50	55	60
TOR    NORM 20 WS S/S OFF	6950	7625	8300	8975	9650	10325	11000	11675	12350	
	7975	8800	9525	10350	11025	11725	12450	13250	14175	
CLIMB   3 ENG 2 ENG	1625	1515	1400	1285	1200	1120	1040	960	875	
	350	260	165	70	----	----	----	----	----	
BRK   CAUTION DANGER	NO	NO	134	133	129	128	128	127	125	
	DATA	DATA	149	142	139	138	136	136	135	
CFL (dry)   NORM 20 WS S/S OFF WET (12)   NORM 20 WS S/S OFF ICY(9)   NORM	8450	9245	10050	10850	11625	12425	13225	----	----	
	9650	10545	11450	12175	----	----	----	----	----	
	9000	9825	10700	11525	12425	13250	----	----	----	
	10300	11225	12125	13050	----	----	----	----	----	
	9150	10000	10950	11725	12650	----	----	----	----	

CLIMB RATE CORRECTIONS								
	2 ENGINE				3 ENGINE			
	GW				GW			
°F	250	300	350	400	250	300	350	400
-40	-225	-175	-70	-30	-260	-190	-125	-80
-20	-140	-100	-15	+20	-150	-95	-45	-10
0	-55	-20	+45	+70	-40	0	+40	+60
20	+30	+55	+100	+120	+75	+95	+120	+135
40	+100	+115	+140	+150	+185	+190	+200	+205
60	+150	+150	+150	+150	+240	+240	+240	+240
80	+110	+110	+110	+110	+195	+195	+195	+195
100	+70	+70	+70	+70	+115	+115	+115	+115
20° WS: If rate>1500 fpm add 25 fpm, If rate<500 fpm subtract 25 fpm								

### MAX AB

REFUSAL SPEED FACTOR																
GW	TAKEOFF FACTOR															
	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
240	11	15	18	22	25	28	30	33	35	36	38	40	42	43	44	
250	12	16	19	23	26	29	31	34	36	38	39	41	43	44	45	
260	14	17	21	24	28	30	33	35	37	39	41	42	44	45	46	
270	15	18	22	26	29	31	34	36	38	40	42	43	45	46	47	
280	16	20	23	27	30	33	35	38	40	40	42	44	46	47	48	
290	17	21	24	28	31	34	36	39	40	42	44	46	47	48	49	
300	18	22	25	29	32	35	37	40	41	43	45	47	48	49	51	
310	19	23	26	30	33	36	38	41	42	44	46	48	50	51	52	
320	20	24	27	31	34	37	39	42	44	45	47	49	51	52	53	
330	21	25	28	32	35	38	40	43	44	46	48	50	52	53	54	
340	23	26	30	33	36	39	41	44	45	47	49	51	53	54	55	
350	24	27	31	34	37	40	42	45	46	48	50	52	53	55	56	
360	24	28	31	35	38	41	43	46	48	48	50	52	54	55	56	
370	26	30	33	36	39	41	44	46	48	50	52	53	55	56	57	
380	27	30	34	37	40	42	45	47	49	51	52	54	56	57	58	
390	28	31	34	37	40	43	45	48	50	52	53	55	57	58	59	
400	27	31	35	38	41	44	46	49	51	51	54	56	58	59	60	
410	30	33	36	39	42	44	47	49	51	53	55	57	59	60	61	
420	31	34	37	40	43	45	48	50	52	54	56	58	60	61	62	
430	31	35	38	41	44	46	49	51	53	55	57	58	60	61	63	

RSF based on gear down, flaps and slats extended, and without brake limits.



**MAX AB**

REFUSAL SPEED													
AVAILABLE RUNWAY													
RSF	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.2*	13.5
15	160	166	173	179	185	190	196	201	205	211	216	218	221
20	155	160	166	171	177	182	187	192	198	202	207	208	211
22	152	158	163	169	174	179	184	189	194	199	203	205	208
24	150	155	161	166	171	176	181	186	191	195	200	202	204
26	147	153	158	163	168	173	178	183	188	192	197	199	201
28	145	150	155	160	166	170	175	180	185	189	193	195	197
30	143	148	153	158	163	167	172	177	181	185	190	192	194
32	140	145	150	155	160	164	169	174	178	182	186	188	190
34	138	143	147	152	157	162	166	170	175	179	183	185	187
36	135	140	145	150	154	159	163	167	172	175	179	181	183
38	133	138	142	147	151	156	160	164	168	172	176	178	180
40	131	135	140	144	149	153	157	161	165	169	173	174	176
42	128	133	137	141	146	150	154	158	162	165	169	171	173
44	126	130	134	139	143	147	151	155	159	162	166	167	169
46	123	128	132	136	140	144	148	152	155	159	162	164	166
48	121	125	129	134	137	141	145	148	152	156	159	160	162
50	119	122	126	130	134	138	142	145	149	152	156	157	159
52	116	120	124	128	132	135	139	142	146	149	152	153	155
54	114	117	121	125	129	132	136	139	142	146	149	150	152
55	113	116	120	124	127	131	134	137	141	144	147	148	150
60	107	110	113	117	120	123	126	130	133	136	138	139	141

**13,200' runway available after lineup at Ellsworth.**

**MAX AB - RS - RCR Correction**

DRY (26) 120kts	125	130	135	140	145	150	155	160	165	170
WET (12) 96kts	100	104	108	112	116	121	126	130	134	138
ICY (09) 87kts	91	64	67	100	105	109	113	117	121	125
DRY (26) 175kts	180	185	190	195	200	205	210	215	220	225
WET (12) 142kts	146	151	156	160	164	168	174	179	184	190
ICY (09) 130kts	134	138	142	146	150	154	158	164	170	174

**RS - Temperature Correction (add Knots for corrected value)**

Temp	-40F	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110
Knots	+9	+7	+6	+5	+4	+2	+2	+1	+1	0	0	+1	+1	+2	+2	+3

**RS - Slope Correction (add Knots for corrected value)**

Slope(%)	0.5 UP	0.7	1.0	1.5	2.0	2.5	3.0	0.5 DOWN	0.7	1.0	1.5	2.0	2.5	3.0
Knots	-1	-1	-2	-3	-4	-5	-6	+1	+1	+2	+2	+3	+3	+4

**RS - Wind Correction**

<b>HEADWIND:</b> ADD 1 knot to RS for each knot of headwind
<b>TAILWIND:</b> SUBTRACT 1 knot from RS for each knot of tailwind

TAKEOFF DISTANCE CORRECTIONS								
	HEADWIND						TAILWIND	
	5	10	15	20	25	30	5	10
4000'	3755	3560	3290	3070	2860	2650	4250	4500
4500'	4240	3980	3740	3500	3285	3070	4775	5050
5000'	4725	4450	4190	3930	3710	3490	5300	5600
5500'	5210	4915	4635	4355	4100	3845	5825	6150
6000'	5690	5380	5080	4780	4490	4200	6350	6700
6500'	6155	5805	5500	5195	4900	4600	6875	7250
7000'	6615	6230	5920	5610	5305	5000	7400	7800
7500'	7105	6705	6360	6010	5665	5320	7925	8350
8000'	7590	7180	6660	6140	5890	5640	8450	8900
8500'	8070	7640	7235	6830	6440	6045	8975	9450
9000'	8550	8100	7675	7250	6850	6450	9500	10000
9500'	9040	8575	8140	7700	7275	6850	10025	10550
10000'	9525	9050	8600	8150	7700	7250	10550	11095
10500'	9990	9480	9010	8535	8070	7600	11070	11645

**TAKEOFF DISTANCE CORRECTIONS**
**UP SLOPE (%)**
**DOWN SLOPE (%)**

DIST	0.5	0.7	1.0	1.5	2.0	2.5	3.0	0.5	0.7	1.0	1.5	2.0	2.5	3.0
4000'	4090	4125	4175	4245	4310	4355	4400	3975	3965	3950	3850	3750	3680	3610
4500'	4595	4630	4690	4780	4875	4944	5013	4465	4455	4435	4315	4200	4125	4045
5000'	5100	5140	5200	5320	5445	5535	5625	4960	4940	4915	4785	4650	4565	4480
5500'	5620	5665	5735	5870	6010	6125	6238	5450	5430	5400	5250	5100	5010	4915
6000'	6135	6190	6270	6425	6575	6775	6975	5940	5915	5880	5715	5550	5450	5350
6500'	6650	6710	6795	6970	7145	7315	7485	6405	6370	6315	6150	5985	5875	5760
7000'	7160	7225	7320	7515	7715	7915	8120	6875	6820	6745	6585	6420	6295	6170
7500'	7683	7755	7865	8075	8280	8520	8755	7340	7275	7180	7015	6855	6720	6580
8000'	8205	8290	8410	8630	8850	9120	9390	7805	7730	7610	7450	7290	7140	6990
8500'	8730	8820	8960	9210	9460	9760	10055	8285	8200	8070	7895	7715	7548	7380
9000'	9255	9355	9505	9785	10065	10395	10720	8765	8670	8530	8335	8140	7955	7770
9500'	9780	9890	10055	10365	10675	11030	11385	9245	9145	8990	8780	8565	8365	8160
10000'	10300	10420	10600	10940	11280	11665	12050	9725	9615	9450	9220	8990	8770	8550
10500'	10830	10960	11155	11540	11925	12345	12765	10210	10095	9920	9660	9395	9160	8925

## MINIMUM GROUND CONTROL SPEED ( $V_{mcg}$ )

### A. DESCRIPTION:

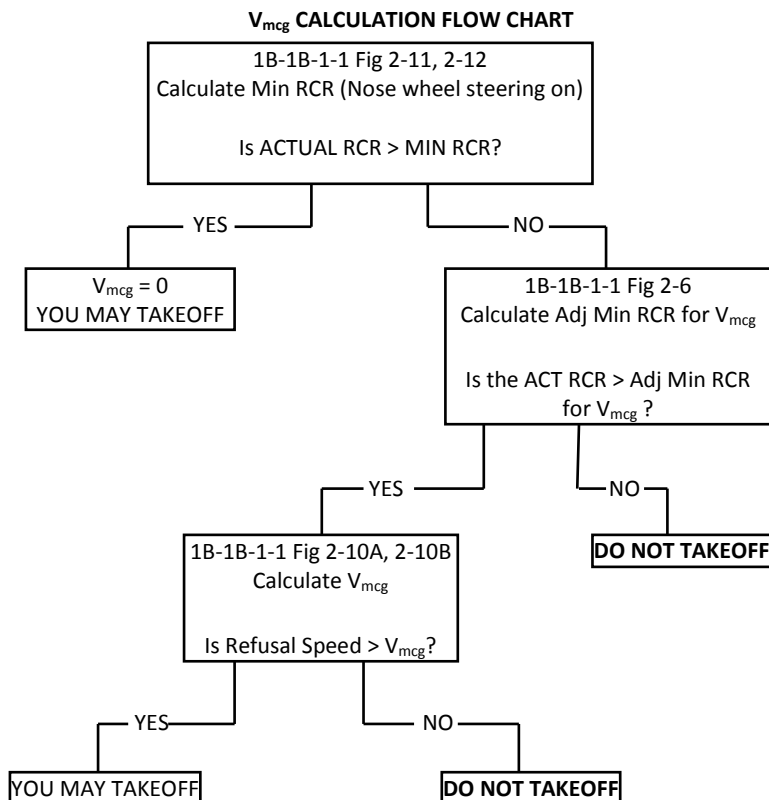
$V_{mcg}$  is the minimum speed at which directional control can be maintained within 25 feet of runway centerline when either outboard engine loses all thrust during the takeoff roll.

### B. ASSUMPTIONS:

1. Selected takeoff thrust on the remaining three engines.
2. 1.5 second pilot reaction time before applying full rudder.

### C. WARNINGS:

1. Takeoff is not recommended when actual RCR is less than the adjusted minimum RCR for takeoff.
2. Do not takeoff if refusal speed is less than minimum ground control speed ( $V_{mcg}$ ), unless emergency conditions warrant takeoff at an unacceptable risk.



# VMCG FOR TAKEOFF FLOW CHART – MAX AB THRUST

## STEP 1: DETERMINE MIN RCR

GWT	MIN RCR
250	19
300	17
350	15
400	14
450	12

- ADD / SUB 1 FOR EACH 2000 FEET BELOW / ABOVE 2000' PA
- SUB 1 FOR EACH 10 DEG F ABOVE 60 DEG F
- ADD 1 FOR EACH 3 % AFT OF 17 % MAC
- SLOPE CONSIDERED NEGLIGIBLE
- ADD 4 FOR EACH 10 KTS OF X-WIND

## STEP 2:

IF MIN RCR < ACTUAL RCR, then TAKEOFF

Else IF MIN RCR > ACTUAL RCR, then GO TO ADJUSTED MIN RCR CHART below

## ADJUSTED MIN RCR

GWT	X-WIND	MIN RCR	GWT	X-WIND	MIN RCR
250	0	2	400	0	2
	10	6		10	4
	20	11		20	7
	30	15		30	11
300	0	2	450	0	2
	10	5		10	3
	20	9		20	7
	30	13		30	11
350	0	2			
	10	4			
	20	8			
	30	12			

STEP 3: IF ADJUSTED MIN RCR > ACTUAL RCR, then DO NOT TAKEOFF

IF ADJUSTED MIN RCR < ACTUAL RCR, then GO TO

MIN GND CONTROL SPEED CHART below

## MIN GRN CONTROL SPEED (VMCG)

GWT	VMCG SPEED
250	106
300	108
350	110
400	111
450	112

- BASED ON 2000' PA - DECREASE VMCG 2 KTS/1000 FEET ABOVE 2000' PA
- - INCREASE VMCG 2 KTS/1000 FEET BELOW 2000' PA
- DECREASE VMCG 1 KT/10 DEG F ABOVE 60 DEG F  
(USE 3 KTS/10 DEG F ABOVE 90 DEG F)
- DECREASE VMCG 2 KNOTS IF 20° WING
- INCREASE VMCG 10 KNOTS FOR EACH 5 KNOTS OF CROSS WIND
- SLOPE CONSIDERED NEGLIGIBLE

STEP 4: IF REF SPEED < VMCG, then DO NOT TAKEOFF

Else IF REF SPEED > VMCG, then TAKEOFF

## TERRAIN FOLLOWING DATA

### PEAK HEIGHT CLIMB DELTA MACH (SEF ON), MIL THRUST

	1000'	2000'	3000'	4000'	5000'
<b>GW – 300</b>					
SL	.03	.06	.08	.11	.13
5000'	.04	.06	.09	.12	.15
<b>GW – 340</b>					
SL	.03	.06	.08	.11	.14
5000'	.04	.07	.10	.13	.17
<b>GW – 380</b>					
SL	.04	.07	.11	.15	
5000'	.05	.09	>MIL		

### PEAK HEIGHT CLIMB DELTA MACH (SIS ON), MIL THRUST

	1000'	2000'	3000'	4000'	5000'
<b>GW –300</b>					
SL	.02	.05	.07	.10	.12
5000'	.02	.04	.07	.09	.11
<b>GW –340</b>					
SL	.03	.06	.09	.13	
5000'	.03	.07	.13	>MIL	

### PEAK HEIGHT CLIMB DELTA MACH (SEF/SIS OFF), MIL THRUST

1000'		2000'		3000'		4000'		5000'	
GW –260									
SL	.02	.05	.08	.12	.17				
5000'	.03	.07	.12	>MIL					
GW –300									
SL	.03	.07							
5000'	.05	>MIL							

### LATERAL OFFSET FOR FLY-UP AND NORMAL CROSSING

	1000' Cliff	1000' Cliff	1500' Cliff	1500' Cliff
Mach	Fly-up Offset nm*	Normal Crossing Offset nm**	Fly-up Offset nm*	Normal Crossing Offset nm**
0.70	0.6	3.0	0.8	4.0
0.85	0.6	4.0	0.8	5.0

\*Offset distance (or less) at which a fly-up will occur when a turn into high terrain is planned using 30° bank.

\*\*Offset distance required to cross high terrain at a near zero FPA (normal crossing) using a 30° bank.

* MIN MACH FOR 25W TF CHECK (SEF ON)														
	410	400	390	380	370	360	350	340	330	320	310	300	290	280
13	.69	.68	.67	.66	.65	.64	.63	.62	.61					
14	.70	.69	.68	.67	.66	.65	.64	.63	.62	.61				≤ .60
15	.71	.70	.69	.68	.68	.67	.66	.65	.64	.62	.61			
16	.74	.72	.71	.70	.69	.68	.67	.66	.65	.64	.63	.62		
17	.76	.75	.73	.72	.70	.69	.68	.67	.67	.66	.64	.63	.62	.61
18		.78	.76	.74	.72	.71	.70	.69	.68	.67	.66	.65	.63	.62
19			.79	.77	.75	.73	.71	.70	.69	.68	.67	.66	.65	.64
20					.78	.76	.74	.72	.71	.69	.68	.67	.66	.65
21						.79	.77	.75	.73	.71	.70	.69	.68	.67
22								.78	.75	.73	.71	.70	.69	.68
23									.78	.76	.74	.72	.70	.69
24										.79	.77	.75	.72	.70
25												.78	.75	.73
* MIN MACH FOR 67.5W TF CHECK (SEF ON)														
	410	400	390	380	370	360	350	340	330	320	310	300	290	280
10	.94	.93	.92	.91	.89	.87	.84	.82	.80	.77	.75	.74	.73	.71
11	.95	.94	.93	.92	.90	.88	.85	.83	.81	.79	.76	.74	.73	.72
12		.95	.94	.93	.91	.89	.86	.84	.82	.80	.78	.75	.74	.73
13			.95	.94	.92	.90	.88	.85	.83	.81	.79	.77	.75	.74
14				.95	.93	.92	.89	.86	.84	.83	.81	.79	.77	.75
15					.95	.93	.91	.89	.86	.84	.83	.81	.79	.77
16						.95	.93	.91	.90	.86	.84	.83	.81	.79
17							.95	.93	.91	.89	.86	.84	.83	.81
18								.95	.93	.91	.89	.86	.84	.83
19									.95	.93	.91	.89	.86	.84
20										.95	.93	.91	.89	.86
21											.95	.93	.91	.89
22												.95	.93	.91
23													.95	.93
24														.95
* MIN MACH (SEF ON)														
	400	390	380	370	360	350	340	330	320	310	300	290	280	
SL	.81	.80	.79	.78	.77	.76	.74	.73	.71					
1	.82	.81	.80	.79	.78	.76	.75	.73	.71					
2	.83	.82	.81	.80	.79	.77	.75	.73	.71					
3	.84	.83	.82	.81	.80	.78	.76	.74	.72					< .70
4	.86	.84	.83	.82	.81	.79	.76	.74	.72					
5	.87	.86	.84	.83	.82	.80	.77	.74	.72	.70				
6	.88	.87	.86	.84	.83	.81	.78	.75	.73	.71				
7	.89	.88	.87	.85	.84	.82	.79	.77	.74	.72	.70			
8	.91	.89	.88	.87	.84	.82	.80	.78	.75	.73	.71	.70		
9	.92	.91	.89	.88	.85	.83	.81	.79	.76	.73	.72	.71	.70	
10	.93	.92	.91	.89	.86	.84	.82	.80	.77	.74	.73	.72	.71	
11	.94	.93	.92	.90	.88	.86	.83	.81	.78	.76	.75	.73	.72	
12	.95	.94	.92	.91	.89	.87	.85	.83	.80	.78	.76	.75	.73	.72
13		.95	.94	.93	.90	.89	.86	.84	.81	.79	.78	.76	.75	.73
14			.95	.94	.91	.90	.88	.85	.83	.81	.79	.78	.76	.75
15				.95	.93	.92	.89	.86	.84	.83	.81	.79	.77	.75
16					.95	.93	.91	.89	.86	.84	.83	.81	.79	.77
17						.95	.93	.89	.86	.84	.83	.81	.79	.77
18							.95	.93	.92	.89	.86	.84	.83	.81
19								.95	.93	.91	.89	.86	.84	.83
20									.95	.93	.90	.89	.86	.84

\*CALCULATED FOR TARGET CG ONLY, NOT FWD OF TARGET

* MIN MACH FOR 25W TF CHECK (SIS ON)															
	410	400	390	380	370	360	350	340	330	320	310	300	290	280	
10	.65												SB	=.69	
11	.69	.65											SB	=.70	
12			.67							≤ .65			SB	=.71	
13				.69	.65								SB	=.72	
14					.73	.66							SB	=.74	
15						.69	.65						SB	=.76	
16							.72	.65					SB	=.77	
17								.76	.66				SB	=.79	
18	≥ Limiting Airspeed									.77	.69		SB	=.80	
19											.78	.71	.65		
20												.79	.74		
21														.65	
* MIN MACH FOR 67.5W TF CHECK (SIS ON)															
	410	400	390	380	370	360	350	340	330	320	310	300	290	280	
10			.95	.94	.93	.92	.91	.89	.88	.86	.82	.79	.77	.76	
11				.95	.94	.93	.92	.91	.88	.86	.83	.80	.78	.76	
12					.95	.94	.92	.91	.89	.87	.83	.80	.78	.77	
13						.95	.93	.92	.90	.87	.84	.81	.79	.77	
14							.95	.93	.91	.88	.84	.81	.79	.78	
15								.95	.92	.88	.85	.82	.80	.78	
16									.95	.92	.88	.84	.80	.79	
17										.95	.91	.87	.83	.80	
18											.95	.91	.86	.82	
19												.94	.90	.86	
20													.94	.90	
21															.94
* MIN MACH (SIS ON)															
	380	370	360	350	340	330	320	310	300	290	280	270	260		
SL	.82	.81	.80	.79	.78	.77	.76	.75	.73	.71	.70	< .70			
1	.83	.82	.81	.80	.79	.78	.77	.75	.74	.72	.70				
2	.84	.83	.82	.81	.80	.79	.78	.76	.75	.73	.71				
3	.86	.84	.83	.82	.81	.80	.78	.77	.75	.73	.72				
4	.87	.85	.84	.83	.82	.81	.79	.78	.76	.74	.72	.70			
5	.88	.87	.85	.84	.83	.82	.80	.79	.77	.75	.73	.71			
6	.89	.88	.86	.85	.84	.83	.81	.79	.77	.76	.74	.72	.70		
7	.90	.89	.88	.87	.86	.84	.82	.80	.78	.76	.74	.72	.71		
8	.92	.90	.89	.88	.87	.85	.84	.81	.78	.77	.75	.73	.71		
9	.93	.92	.91	.90	.89	.87	.85	.82	.79	.77	.75	.73	.72		
10	.94	.93	.92	.91	.90	.88	.86	.83	.79	.78	.76	.74	.72		
11	.95	.94	.93	.92	.91	.88	.87	.83	.80	.78	.76	.75	.73		
12		.95	.94	.93	.92	.89	.87	.84	.80	.79	.77	.75	.73		
13			.95	.94	.93	.90	.88	.84	.81	.79	.77	.76	.74		
14				.95	.94	.91	.88	.85	.81	.80	.78	.76	.74		
15					.95	.92	.89	.86	.82	.80	.78	.77	.75		
16						.95	.91	.87	.83	.81	.79	.77	.76		
17							.95	.91	.85	.83	.83	.78	.76		
18								.95	.92	.88	.85	.79	.77		
19									.95	.91	.87	.83	.78		
20										.94	.90	.85	.80		

\*CALCULATED FOR TARGET CG, NOT FWD OF TARGET

* MIN MACH FOR TF 25W CHECK (SEF/SIS OFF)										
	310	300	290	280	270	260	250	240	230	220
10										SB = .69
11										SB = .70
12		.70								SB = .71
13		.72	.69				≤ .68			SB = .72
14		.73	.71							SB = .74
15		.75	.72	.70						SB = .76
16		.77	.74	.71	.69					SB = .77
17		.78	.76	.73	.71	.69				SB = .79
18			.78	.76	.72	.70				SB = .80
19	> Limiting Airspeed			.77	.75	.72	.70			
20					.77	.75	.72	.70		

* MIN MACH FOR 67.5W TF CHECK (SEF/SIS OFF)									
	330	320	310	300	290	280	270	260	250
6	.94	.93	.92	.91	.90	.88	.87	.85	.83
7		.94	.93	.92	.91	.89	.88	.86	.84
8			.94	.93	.92	.91	.89	.87	.85
9		≥ .95		.94	.93	.92	.90	.88	.87
10					.94	.93	.91	.90	.88
11						.94	.92	.91	.89

* MIN MACH (SEF/SIS OFF)													
	340	330	320	310	300	290	280	270	260	250	240	230	220
SL	.91	.90	.89	.87	.86	.85	.82	.80	.78	.75			
1	.92	.91	.90	.88	.87	.86	.84	.81	.79	.77	.75	< .75	
2	.93	.92	.91	.89	.88	.87	.85	.83	.81	.78	.76		
3	.94	.93	.92	.91	.89	.88	.86	.85	.82	.80	.78	.75	
4	.95	.94	.93	.92	.90	.89	.87	.86	.84	.81	.79	.76	
5		.95	.94	.93	.91	.90	.88	.87	.85	.83	.81	.78	
6			.95	.94	.93	.91	.90	.88	.86	.85	.82	.80	.75
7				.95	.94	.92	.91	.89	.88	.86	.83	.81	.77
8					.95	.93	.92	.91	.89	.87	.85	.83	.80
9						.94	.93	.92	.90	.88	.86	.84	.81
10						.95	.94	.92	.91	.90	.88	.85	.82
11		> .95					.95	.93	.92	.91	.89	.87	.84
12								.95	.93	.92	.91	.88	.86
13									.94	.93	.91	.90	.87
14									.95	.94	.92	.91	.88
15										.95	.93	.92	.90

CALCULATED FOR TARGET CG



## MAX REFUELING ALTITUDES

REF: 1B-1B-1-1/ AFTTP 3-3.B-1

GW	SEF ON 1.3G / 1.2G	SIS ON 1.3G / 1.2G	SIS OFF 1.3G / 1.2G	25 Wing Opt Cruise	AB May Be Rqd Above
200		37.0 / 39.0	33.8 / 35.7	37.2	31.6
220		35.0 / 36.8	31.5 / 33.5	35.5	30.3
240	38.3 / 40.0	32.8 / 34.8	29.3 / 31.3	33.7	28.9
260	36.5 / 38.2	30.9 / 32.9	27.3 / 29.3	32.1	27.7
280	34.9 / 36.6	29.0 / 31.0	25.4 / 27.5	30.6	26.5
300	33.2 / 35.0	27.4 / 29.3	23.6 / 25.8	29.2	25.4
320	31.8 / 33.6	25.6 / 27.8	21.9 / 24.0	27.8	24.3
340	30.4 / 32.2	24.0 / 26.1	20.2 / 22.3	26.5	23.2
360	29.0 / 30.9	22.5 / 24.7	18.6 / 20.9	25.2	22.2
380	27.8 / 29.6	21.2 / 23.2	17.0 / 19.4	24.0	21.2
400	26.5 / 28.4	19.8 / 22.0	15.7 / 17.9	22.8	20.3

--- Refueling above 1.3G altitudes is permitted, if necessary, but refueling is not recommended above 1.2G altitudes due to limited maneuvering capabilities.

NOTE: Reduce refueling altitudes 550 Ft for each drag index of 10. Reduce refueling altitudes 250 Ft for each 10° C for over standard day temperature.

--- A/B required altitudes are based on a worst case scenario of a 550,000 lb. KC-10. The lighter the tanker is, the higher the actual Mil thrust service ceiling will be. For an average training sortie, add 1000 – 3000 Ft to the listed altitude.

--- Stall warning data above 28,000 Ft is estimated.

--- NOTE: If persistent stall warnings are encountered, perform one or more of the following:

Reduce altitude two to four thousand feet.

Reduce bank angle and load factor, if in a turn.

In severe turbulence, disconnect until turbulence subsides.

--- NOTE: Above FL 210 air refueling speed will be 0.70M

**SERVICE CEILING (SC) /OPTIMUM CRUISE (OC)  
ALTITUDE (X1000)**

GW	25°			45°	55°	67°	GW	25°			45°	55°	67°
	OE	OC	SC	OC	OC	OC		OE	OC	SC	OC	OC	OC
200	31.7	37.5	40.4	35.0	34.2	28.1	320	21.5	27.5	30.7	25.0	23.6	16.7
210	30.6	36.6	39.4	34.0	33.3	27.0	330	21.0	26.8	30.2	24.2	23.0	16.3
220	29.6	35.6	38.4	33.3	32.3	25.9	340	20.2	26.2	29.5	23.6	22.3	15.4
230	28.8	34.7	37.5	32.5	31.4	24.8	350	19.6	25.5	28.8	23.0	21.5	14.7
240	27.8	33.7	36.7	31.6	30.5	23.8	360	19.0	24.8	28.3	22.5	20.8	13.8
250	27.0	33.0	35.8	30.7	29.5	22.8	370	18.3	24.2	27.4	21.8	20.2	13.3
260	26.0	32.3	35.0	29.7	28.6	21.9	380	17.8	23.6	27.2	21.2	19.5	12.8
270	25.3	31.4	34.3	28.8	27.8	21.1	390	17.2	23.2	26.5	20.6	18.8	12.2
280	24.5	30.5	33.5	28.1	26.8	20.2	400	16.5	22.5	26.0	20.0	18.5	11.2
290	23.7	29.7	32.8	27.3	26.2	19.4	410	16.0	22.0	25.4	19.4	17.8	10.7
300	23.0	28.8	32.2	26.5	25.3	18.4	420	15.5	21.4	24.9	18.7	17.2	9.5
310	22.3	28.3	31.4	25.8	24.5	17.6	430	15.0	20.7	24.4	18.1	16.5	8.8
							440	14.3	20.3	23.8	17.5	16.0	8.5

**OPTIMUM ENDURANCE (OE)** = The altitude flown using a cruise- climb technique to obtain **MAXIMUM ENDURANCE**. At this altitude, and this altitude only, the mach listed below will coincide with the AOA listed. Optimum endurance is used to loiter over station for long periods of time.

**OPTIMUM CRUISE (OC)** = The altitude flown using a cruise-climb technique to obtain **MAXIMUM RANGE**. At this altitude the mach listed below will coincide with the AOA listed. OC produces the most efficient use of fuel and provides the max possible fuel mileage.

**SERVICE CEILING** = The altitude at which the climb rate for the configuration and thrust setting is equal to 100 feet per minute.

**OE**            25°    45°        55°        67.5° Wing  
SPEED        .55M   .60M    .60M        .70M (200GW to 420GW)  
   .705M (430GW) or .71M (440GW)  
AOA\*        4.0 (300GW) +/- 0.1 per 35GW or 3.7 (200GW) +/- 0.1 per 35GW

**OC**            25°    45°        55°        67.5° Wing  
SPEED        .72M   .78M    .84M        .87M (200GW to 400GW)  
   .865M (410GW to 440GW)  
AOA\*        2.6 (300GW) +/- 0.1 per 55GW or 2.4 (200GW) +/- 0.1 per 55GW

REFERENCES: \*This data is derived from T.O. 1B-1B-1-1

# CRUISE FUEL FLOW

Drag Index = 0, in pounds per hour

Altitude	25 Wing, .72M					45 Wing, .78M					55 Wing, .85M					67.5 Wing, .85M				
	15k	20k	25k	30k	35k	15k	20k	25k	30k	35k	10k	15k	20k	25k	30k	Sea Lev	5k	10k	15k	20k
G	200	17.6	14.8	12.6	10.9	9.8	19.6	16.6	14.2	11.2	10.7	28.4	23.4	19.7	16.9	40.8	33.2	28.3	23.5	23.5
R	220	17.9	15.0	13.0	11.4	10.6	19.8	17.0	14.6	11.8	11.8	28.6	23.7	20.1	17.8	41.0	33.6	28.7	24.2	24.2
O	240	18.1	15.4	13.5	12.0	11.5	20.2	17.4	15.3	12.6		29.0	24.1	20.6	18.5	41.4	34.0	29.3	24.9	24.9
S	260	18.4	15.8	14.0	12.8		20.6	18.0	15.9	13.6		29.4	24.6	21.2	19.2	41.7	34.6	30.0	25.6	25.6
S	280	18.7	16.2	14.6	13.6		21.0	18.4	16.8	14.6		29.8	25.1	21.9	20.0	42.0	35.0	30.7	26.5	26.5
S	300	19.1	16.7	15.2	14.5		21.5	19.2	17.7	16.1		30.4	25.6	22.7	21.0	42.6	35.7	31.5	27.4	27.4
W	320	19.5	17.2	15.8	15.5		22.0	19.7	18.7			30.7	26.3	23.5	22.2	43.1	36.3	32.3	28.5	28.5
E	340	19.9	17.7	16.5			22.5	20.7	19.9			31.4	26.9	24.2		43.7	36.9	33.2	30.3	30.3
I	360	20.3	18.4	17.3			23.2	21.6	21.3			32.0	27.6	25.3		44.2	37.5	34.0	32.3	32.3
G	380	20.8	19.0	18.3			23.9	22.5	23.1			32.5	28.4	26.6		45.0	38.0	35.2		
H	400	21.3	19.7	19.4			24.7	23.6				33.0	29.2	27.8		45.7	39.0	36.5		
T	420	21.9	20.5				25.6	24.9				33.8	30.3			46.2	39.8	38.5		
	440	22.5	21.4				26.5	26.2				34.6	31.4			47.0	40.8	40.5		
	460	23.4	22.3				27.5	29.0				35.4	32.5			47.6	42.0			
	480	24.1	23.3				28.7					36.2	33.7			48.4	42.9			

Note: Optimum Cruise setting on the fuel panel saves approximately 1000 pounds per hour.

## LANDING DATA

### NOTES

#### A. CHARTS

	Manual		Checklist	
1. Landing Factors	A10-20	Ch0	P6-2	Ch0
2. Normal Landing Speeds	A10-21	Ch0	P6-1	Ch0
3. Normal Landing Distance	A10-22 thru 25	Ch0	P6-3	Ch0
4. No-Flap Landing Speeds	A10-31	Ch0	P6-126	Ch0
5. No-Flap Landing Distance	A10-32 thru 34	Ch0	P6-13	Ch0

#### B. Assumptions used in computations

1. 0 Wind for all calculations
2. Wings at 15° WS
3. RCR Wet = 12
4. Max Brake Limits Speed - Not Exceeded
5. Delta  $V_{\text{obst}} = 0$
6. RCR Dry = 26
7. Slope = 0

#### C. Landing Distances/Speeds

1. All calculated distances use the assumptions listed above.
2. Normal 20 WS landings increase landing roll 10-50 ft.
3. No-flap 20 WS landings decrease landing roll by 20-100 ft.
4. Increase ground rolls 20% with hydraulic system 2 or 3 failed.

##### WARNING (A10-19):

When landing at CGs Aft of Target for 15 degree wing sweep, or CG Aft of 27% MAC for 20 degree wing sweep, or when SIS/SEF is OFF, or under gusty wind conditions, add 10 knots (Delta  $V_{\text{obst}}$ ) to approach and touchdown speeds. For 20 degrees wing sweep, add 1 knot (Delta  $V_{\text{obst}}$ ) for each 1% MAC Forward of 21% MAC CG.

5. When speeds have been increased by 10 knots due to CGs AFT of target, gusty winds, or SEF/SIS off, the landing rolls can increase by:
  - a. Below brake limit speed - As much as 600 ft
  - b. Above brake limit speed - As much as 1400 ft
6. 10-knot tailwinds increase landing roll by:
  - a. Below brake limit speed - As much as 1300 ft
  - b. Above brake limit speed - As much as 2100 ft
7. Slope affects landing roll: (Without brake limits)  
Add downslope - subtract upslope

**NOTE:** If stall warning is activated during the approach, increase final approach and touchdown speed a maximum of 10 knots.

Normal Land Roll	1%	2%	3%	No-Flap Land Roll	1%	2%	3%
3000	100'	200'	300'	3000	100'	200'	300'
5000	150'	300'	450'	5000	150'	300'	450'
7000	300'	600'	1000'	7000	200'	400'	600'
9000	450'	1000'	1600'	9000	400'	800'	1200'
11000	650'	1400'	2200'	11000	550'	1200'	1800'

<b>MAXIMUM CROSSWIND FOR LANDING (A10-16)</b>
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**Wing Sweep 15 or 20 degrees, Gear Down, Slats Extended,  
Flaps 100%, Yaw SCAS On**

RCR		4 (ICY)		12 (WET)	
HEADWIND COMPONENT		0	10	0	10
<b>G R O S S</b>	<b>W</b>	220	19	21	23
		230	19	21	23
	<b>E</b>	240	20	22	24
		250	20	22	24
	<b>I</b>	260	21	23	25
		270	21	23	25
	<b>G</b>	280	21	23	25
		290	22	24	26
	<b>S</b>	300	22	24	26

**CROSSWIND COMPONENT QUICK REFERENCE**

RWY 13	RWY 31	Degrees Off Runway	Full Stop 26 KTS	Normal T&Go 20 KTS	EP Pattern 15 Kts	10 KTS
110 / 150	290 / 330	20	>60	58	43	29
105 / 155	285 / 335	25	60	47	35	23
100 / 160	280 / 340	30	52	40	30	20
095 / 165	275 / 345	35	45	34	26	17
090 / 170	270 / 350	40	40	31	23	15
085 / 175	265 / 355	45	36	28	21	14
080 / 180	260 / 360	50	33	26	19	13
075 / 185	255 / 005	55	31	24	18	12
070 / 190	250 / 010	60	30	23	17	11
065 / 195	245 / 015	65	28	22	16	11
060 / 200	240 / 020	70	27	21	15	10
055 / 205	235 / 025	75	26	20	15	10
050 / 210	230 / 030	80	26	20	15	10
045 / 215	225 / 035	85	26	20	15	10
040 / 220	220 / 040	90	26	20	15	10

**TAILWIND QUICK REFERENCE**

Degrees off Tail	10 Knts Tlwnd Cmpnnt	20 Knts Tlwnd Cmpnnt
0	10	20
10	10	20
20	10	21
30	11	23
40	13	26
50	15	31
60	20	40
70	29	58
80	57	>60

# B-1B LANDING FACTORS

TEMP °F (°C)	FIELD PRESSURE ALTITUDES												
	SL	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
120 (49)	60	63	66	69	72	75	78	82	85	89	92	95	99
110 (43)	57	60	63	66	69	72	75	79	82	85	89	92	95
100 (38)	54	57	60	63	66	69	72	76	79	82	85	89	92
95 (35)	53	56	59	62	65	68	71	74	77	81	84	87	90
90 (32)	51	54	57	60	63	66	69	72	76	79	82	85	89
85 (29)	50	53	56	59	62	65	68	71	74	77	80	84	87
80 (27)	48	51	54	57	60	63	66	69	72	76	79	82	85
75 (24)	47	50	53	56	59	61	64	67	71	74	77	80	84
70 (21)	46	48	51	54	57	60	63	66	69	72	75	79	82
65 (19)	44	47	50	53	56	58	61	64	68	71	74	77	80
60 (16)	43	46	48	51	54	57	59	63	66	69	72	75	79
55 (13)	42	44	47	50	53	55	58	61	64	67	70	74	77
50 (10)	40	43	45	48	51	54	56	59	63	66	69	72	75
45 (7)	39	41	44	47	50	52	55	58	61	64	67	70	73
40 (4)	37	40	42	45	48	51	53	56	59	62	65	69	72
35 (2)	36	38	41	43	46	49	52	55	58	60	64	67	70
30 (-1)	34	37	39	42	45	47	50	53	56	59	62	65	68
25 (-4)	33	35	38	40	43	46	49	52	55	57	60	63	67
20 (-7)	31	34	36	39	41	44	47	50	53	56	59	62	65
10 (-12)	29	31	33	36	39	41	44	47	50	52	55	58	61
0 (-18)	26	28	30	33	36	39	41	44	46	49	52	55	58
-10 (-23)	23	25	27	30	33	35	38	40	43	46	49	52	55
-20 (-29)	20	22	24	27	29	32	34	37	39	42	45	48	51

<b>APPROACH SPEEDS AND LANDING DISTANCES</b> <b>FLAPS/SLATS EXTENDED      15 or 20 Degree WS</b> <b>7 Degree AOA, 0 wind      DRY/WET (RCR 12)</b>										
GWT	A Spd	35	40	45	50	55	60	65	70	75
210	145	3125	3225	3325	3425	3525	3625	3725	3825	3925
		5325	5475	5650	5825	6000	6175	6325	6500	6675
220	148	3250	3350	3450	3550	3675	3775	3875	3975	4100
		5525	5700	5875	6025	6250	6425	6600	6750	6900
230	152	3375	3500	3600	3700	3825	3925	4025	4125	4250
		5750	5950	6125	6300	6500	6675	6850	7025	7200
240	155	3500	3625	3725	3850	3950	4050	4175	4275	4375
		5950	6175	6325	6550	6725	6875	7100	7275	7450
250	158	3650	3775	3875	4000	4125	4225	4350	4450	4550
		6200	6425	6600	6800	7025	7175	7400	7575	7750
260	161	3775	3900	4025	4150	4275	4375	4500	4625	4750
		6425	6625	6850	7050	7275	7450	7650	7875	8075
270	164	3925	4050	4175	4300	4425	4525	4650	4775	4900
		6675	6875	7100	7300	7525	7700	7900	8125	8350
280	168	4050	4175	4300	4425	4550	4675	4800	4925	5050
		6875	7100	7300	7525	7725	7950	8150	8375	8600
290	170	4175	4300	4425	4575	4700	4825	4975	5100	5225
		7100	7300	7525	7775	8000	8200	8450	8675	8900
300	173	4300	4425	4575	4700	4850	4975	5125	5250	5375
		7300	7525	7775	8000	8250	8450	8725	8925	9175
310	176	4425	4550	4700	4850	5000	5125	5275	5425	5575
		7525	7725	8000	8250	8500	8725	8975	9225	9475
320	179	4525	4675	4825	4975	5125	5275	5425	5575	5725
		7700	7950	8200	8450	8725	8975	9225	9475	9725
330	182	4650	4800	4950	5100	5275	5425	5575	5725	5875
		7900	8150	8425	8675	8975	9225	9475	9725	9975
340	185	4775	4925	5100	5250	5400	5550	5700	5875	6050
		8125	8375	8675	8925	9175	9425	9700	10000	10300
350	187	4900	5075	5225	5375	5550	5700	5875	6025	6200
		8325	8625	8875	9150	9425	9700	10000	10250	10550
360	190	5025	5200	5375	5525	5700	5875	6025	6200	6375
		8550	8850	9150	9400	9700	10000	10250	10550	10850
370	193	5250	5425	5575	5750	5900	6100	6300	6700	7100
		8925	9225	9475	9775	10025	10375	10700	11400	12100
380	195	5375	5500	5650	5950	6250	6625	7060	7500	8000
		9150	9350	9600	10125	10625	11275	12000	12750	13600

Shaded area is landing distance with brake limit. You must compute the Maximum Brake Limit Speed (P6-24) in T.O. 1B-1B-1-1CL-1.

**NOTE:** Initiation of brake application should be accomplished in accordance with coast down landing procedures or at the computed ground roll distance.

**NOTE:** Increase Distance by 20% for hydraulic systems 2 or 3 failure.

**NOTE:** If stall warning is activated during the approach, increase final approach and touchdown speed a maximum of 10 knots.

**WARNING:** When landing at CGs Aft of Tgt for 15 degree wing sweep, or CGs Aft of 27% MAC for 20 degrees wing sweep, or when SEF/SIS is OFF, or under gusty wind conditions, add 10 knots (Delta  $V_{obst}$ ) to approach and touchdown speeds. For 20 degree wing sweep, add 1 knot (Delta  $V_{obst}$ ) for each 1 % MAC Forward of 21% MAC CG

# NO-FLAP/SLAT APPROACH AND LANDING DISTANCE

15° or 20° WING SWEEP

TARGET CG - 6 Degrees AOA, 0 Wind

GROSS  WT	APP  SPD	LANDING DISTANCE							DRY RCR-26 WET RCR-12
		LANDING FACTOR							
		35	40	45	55	60	65	75	
200	179	4400	4550	4700	4975	5125	5275	5550	
		7400	7700	7900	8400	8650	8900	9400	
210	184	4600	4750	4900	5200	5350	5500	5800	
		7800	8000	8275	8800	9050	9300	9800	
220	188	4800	4950	5125	5425	5575	5725	6050	
		8100	8375	8700	9200	9450	9700	10250	
230	192	5000	5150	5300	5650	5810	5975	6300	
		8500	8725	9000	9575	9865	10150	10700	
240	197	5200	5350	5525	5850	6025	6200	6550	
		8800	9075	9350	9900	10200	10500	11100	
250	201	5375	5550	5725	6100	6275	6450	6800	
		9100	9400	9700	10300	10650	10950	11500	
260	205	5575	5750	5950	6300	6490	6675	7050	
		9450	9750	10100	10700	11025	11350	11875	
270	208	5750	5950	6150	6525	6725	6925	7300	
		9750	10100	10400	11050	11375	11700	12400	
280	212	5950	6150	6350	6750	6950	7150	7525	
		10100	10400	10750	11450	11780	12100	12750	
	EMERGENCY LANDING WEIGHTS								
290	216	6150	6350	6550	6950	7175	7400	7800	
		10400	10750	11100	11800	12150	12500	13+	
300	220	6350	6575	6750	7200	7400	7600	8000	
		10750	11150	11450	12200	12550	12900	13+	
310	223	6500	6750	7000	7500	7850	8200	8700	
		11000	11450	11900	12700	13+	13+	14+	
320	227	6750	6950	7200	7800	8300	8800	9800	
		11450	11800	12200	13+	13+	14+	16+	

Shaded area is landing distance with brake limit. You must compute the Maximum Brake Limit Speed from Fig. 10-3 page A10-19 in T.O. 1B-1B-1-1 or page P6-7 in T.O. 1B-1B-1-1CL-1, ChO.

NOTE: RCR corrections for RCR less than 12 in the performance checklist P6-11.

NOTE: If stall warning is activated during the approach, increase final approach and touchdown speed a maximum of 10 knots.

## Corrections Applicable to All Configurations:

15 WING Corrections		20 WING Corrections	
CONDITION	CORRECTION	CONDITION	CORRECTION
SEF/SIS OFF OR CG Aft of TGT CG OR Gusty Winds OR Stall Warning on Final	<b>Add 10 kts</b> (delta $V_{\text{obst}}$ ) to Approach and Touchdown Speeds	SEF/SIS OFF OR CG Aft of 27% MAC OR Gusty Winds OR Stall Warning on Final	<b>ADD 10 kts</b> (delta $V_{\text{obst}}$ ) to Approach and Touchdown Speeds
		FLAPS/SLATS DOWN AND CG FWD of 21%	<b>ADD 1 kt</b> for each 1% FWD of 21%



# COAST DOWN LANDING DATA

LF = 50		Runway Available (ft)					
	Weight	11,000'	10,000'	9,000'	8,000'	7,000'	6,000'
No Headwind	220	< 80	< 80	< 80	85	95	108
	240	< 80	< 80	85	95	106	119
	260	< 80	85	95	105	116	>120
	280	85	94	104	115	>120	>120
	300	95	104	114	>120	>120	>120
10 kt Headwind	220	< 80	< 80	< 80	< 80	< 80	91
	240	< 80	< 80	< 80	< 80	89	101
	260	< 80	< 80	< 80	88	98	112
	280	< 80	< 80	87	98	109	>120
	300	< 80	88	97	108	119	>120

LF = 60		Runway Available (ft)					
	Weight	11,000'	10,000'	9,000'	8,000'	7,000'	6,000'
No Headwind	220	< 80	< 80	< 80	89	100	112
	240	< 80	80	89	99	110	>120
	260	81	90	99	110	>120	>120
	280	91	100	100	120	>120	>120
	300	100	109	119	>120	>120	>120
10 kt Headwind	220	< 80	< 80	< 80	< 80	83	95
	240	< 80	< 80	< 80	83	93	106
	260	< 80	< 80	83	93	103	116
	280	< 80	83	93	103	114	>120
	300	82	92	102	112	>120	>120

LF = 70		Runway Available (ft)					
	Weight	11,000'	10,000'	9,000'	8,000'	7,000'	6,000'
No Headwind	220	< 80	< 80	83	93	104	115
	240	< 80	83	93	103	115	>120
	260	85	94	104	114	>120	>120
	280	95	105	115	>120	>120	>120
	300	106	115	>120	>120	>120	>120
10 kt Headwind	220	< 80	< 80	< 80	< 80	87	99
	240	< 80	< 80	< 80	87	97	110
	260	< 80	< 80	87	97	108	>120
	280	< 80	88	98	108	119	>120
	300	88	98	108	119	>120	>120

- Notes:
- Coast Down Distance = Runway Length - Touchdown Distance
  - Dry Runway Only
  - No Runway Slope
  - Add or Subtract 1 knot for every 2 units of LF Change
  - Add 1 knot to speed for every knot above approach speed

# TRAFFIC PATTERN AND LANDING LIMITATIONS AND RESTRICTIONS

Approach Type	Gross Weight	Crosswind Component	Weather	IP Supervision	Night	RCR
Normal Low Approach	300,000	N/A	Published Minimums	NO	YES	N/A
Normal Touch and Go (NOTE 1)	300,000	20 Knots	500 ft/1 NM NOTE 5	NO	YES	12
Full Stop Landing	300,000 NOTE 6	26 Knots NOTE 9	Published Minimums	NO	YES	9 NOTE 7
No Slat/Flap Low Approach	275,000	N/A	NOTE 2	NO	YES	N/A
No Slat/Flap Touch and Go (NOTE 1)	250,000	15 Knots	NOTE 2	NO NOTE 8	Only with IP Supervision	Dry
¼, ½, and ¾ Flap Touch and Go (NOTE 1)	250,000	15 Knots	NOTE 2	YES	YES	Dry
Simulated loss of airspeed pen/app/ low	275,000	N/A	VFR Conditions	YES	NO	N/A
Sim Eng Out Low App (NOTE 3)	275,000	N/A	NOTE 2	FTU/FIC Only NOTE 10	YES	N/A
Sim Eng Out Full Stop (NOTES 1, 4)	275,000	10 Knots	NOTE 2	FTU/FIC Only NOTE 10	YES	Dry
Sim Eng Out Touch and Go (NOTES 1, 4)	275,000	10 Knots	NOTE 2	FTU/FIC Only NOTE 10	YES	Dry
SCAS Off Low Approach (NOTE 3)	275,000	N/A	NOTE 2	FTU/FIC Only NOTE 10	YES	N/A
SCAS Off Full Stop Landing (NOTE 1)	275,000	10 Knots	NOTE 2	FTU/FIC Only NOTE 10	NO	Dry
Slat Only Touch and Go (NOTE 1)	230,000	15 Knots	NOTE 2	FIC Only NOTE 10	NO	DRY
25° Wing No Slat/ Flap Touch and Go (NOTE 1)	250,000	15 Knots	NOTE 2	FIC Only NOTE 10	NO	DRY
AMI Out Touch and Go (NOTE 1)	300,000	15 Knots	NOTE 2	FIC Only NOTE 10	NO	12

## Notes:

1. Go around if not in the designated touchdown zone. Runway length and RCR consideration must permit an aborted takeoff using computed landing ground run distance.
2. Weather required is 1,000 feet/2 miles visibility or circling minimums, whichever is higher.
3. Initiate go around/missed approach no lower than 200 feet HAT.
4. Takeoff portion and unplanned go around requires symmetrical thrust.
5. May fly published minimums with an IP.
6. Full stop landings are authorized to T.O. 1B-1B-1 gross weight limits in an Emergency or Safety of Flight situation.
7. Aircrews will not full stop when the measured RCR is less than 9 without OG/CC approval.
8. SEF/SIS must be operational to conduct no-flap touch and go training without IP supervision.
9. If mission requirements dictate, the OG/CC may authorize aircraft recovery within maximum flight manual limitations.
10. Only aircrew under the supervision of an FIC IP (to include FIC IPs in operational units certified IAW AFI 11-2B-1V1) may perform FIC Only patterns. Only aircrew under the supervision of an FTU IP or an FIC IP may perform FTU/FIC only patterns.

For gross weights between 275,000 and 300,000 pounds, aircrews are limited to a maximum of two approaches. This restriction does not apply when aircrews require multiple approaches for formal training or when necessary for safety of flight. (AFI 11-2B-1V3)

# **ALTERNATE AIRFIELDS**

BASE	RWY/ LENGTH	MC/ DIST	ETE	ROUTE	LAT/LONG	REMARKS	FUEL at RCA
Minot	12/30 13.2X300	353° 284	0+38	RAP DIK MIB	N 48-25 W 101-21		30
Grand Forks	17/35 12.3x150	052° 374	0+52	RAP ABR RDR	N 47-58 W 097-24	No fuel svcg after 0415z	32
Great Falls	03/21 10.5x150	294° 412	0+55	RAP GTF	N 47-29 W111-22		35
Billings	10/28 10.5x150	287° 266	0+36	RAP BIL	N 45-48 W108-32		30
Offutt	12/30 11.7x150	101° 358	0+49	RAP ONL OFF	N 41-07 W 095-55	TRAN ALERT 1200-0530Z	32
Hill	14/32 13.5x200	238° 469	1+12	RAP DDY OCS SLC HIF	N 41-08 W 111-58		37
McConnell	01/19 12.0X300	145° 545	1+15	RAP HCT GCK IAB	N 37-37 W 097-16	TRAN ALERT 1300-0200Z	39
Tinker	17/35 11.1X200	145° 616	1+25	RAP HCT GAG TIK	N 35-25 W 097-23	Limited Ramp Space TRAN ALERT 1400-0530Z	41
Mt. Home	12/30 13.5x200	259° 570	1+29	RAP CZI DBS MUO	N 43-02 W115-52	TRAN ALERT 1400-0700Z	41
Dyess	16/34 13.5x300	193° 782	1+48	RAP J-17 (CYS, DVV, PUB, PNH) ABI DYS	N 32-25 W 099-51		46
Barksdale	15/33 11.7x300	145° 864	1+59	RAP HCT GCK IRW SHV BAD	N 32-30 W 093-40		49
Edwards	04/22 14.9x300	238° 912	2+19	RAP DDY J- 107 HEC EDW	N 34-54 W 117-53		52
<b>EMERGENCY ONLY</b>							
Natrona	03/21 10.1x150	237° 166	0+26	RAP CPR	N 42-55 W 106-28	Fuel 1200-0400z	27
Joe Foss	03/21 8.9x150	080° 273	0+39	RAP FSD	N 43-35 W 96 45		30

**CONTINUED ON NEXT PAGE...**

**NOTES:**

1. When anticipating a divert, contact Pilot-to-Dispatch on 372.2 to activate the divert flight plan. Emergency flight plans are not on file at Base Operations.
2. Climb 9.5 min and 4700 lbs fuel: Cruise FF - 12,000 pph or 200 ppm: Descent starts 120 nm from FAF and takes 1300 lbs fuel
3. Cruise at .72 Mach. Estimated Time Enroute (ETE) computed using zero winds flying east and a 50 knot headwind flying west.
4. Magnetic Course is from RAP to first flight plan fix.
5. Computed fuel does not allow for an approach at Ellsworth. Fuel provided is the amount required to leave Ellsworth at FL250 and arrive at divert field with 20,000 pounds. If at pattern altitude, add 4,000 pounds for a climb to FL250.
6. Routing avoids all Special Use Airspace and major traffic centers.

<b>DIVERT CHECKLIST/OFF STATION SORTIES (AFI 11-2B1v3)</b>
--

**NOTIFY COMMAND POST (DSN: 675-3800)**

Reason for the Divert

Route of Flight

ETA

Fuel On Board

Fuel Reserve at the IAF of the Divert Base

Maintenance Status of the Aircraft

Pass Departure Time

Pass Tail Number

**\* SOF can pass this info to CP for you****CONTACT DIVERT BASE COMMAND POST, OR SOF**

(If neither are available, contact pilot-to-dispatch)

Type of Aircraft

Hung / Retained Weapons

ETA / Fuel On Board

Maintenance Assistance Required

Number of Crew Members on Board and Billeting Requirements

Coordinate Landing Authority and Special Instructions

Request airfield status, NOTAMS, and weather

**CONTINUED NEXT PAGE...**

**AFTER LANDING**

Perform Aircraft Post Flight Inspection

Coordinate with Transient Alert or maintenance for:

Fuel required for departure

Proposed departure date / time

Maintenance or servicing required

Store comm. kit / classified materials at Base Ops or Command Post

Contact Ellsworth Command Post

Takeoff and landing times (from AFTO 781)

Crew rest start and completion times

Aircraft Status

Crew Location & Phone Number

**DEPARTURE FROM OFF STATION LOCATION**

Notify off station command post to pass to the 28<sup>th</sup> BW command post  
DSN: 675-3800

Departure Time

Planned Arrival Time

**TDY/DIVERT DAILY REPORTING PROCEDURES**

1. Any 28BW TDY or diverted crew will provide the following information through the 28BW CP by voice, or email to 28BW.CP@ellsworth.af.mil on a daily basis.
  - a. Daily Situation Report: (Call sign) (Location) (Event)
  - b. Daily flight schedule and planned duration
  - c. Changes to previous day's flight schedule or duration
  - d. Aircraft maintenance status
  - e. Personnel issues
  - f. Remarks -- any additional information the aircraft commander/DETCO deems appropriate
2. This information will be used to provide the 28BW/CC an up-to-date picture of where 28 BW aircraft are and how they and their associated aircrew/maintainers are faring.
3. If no activity is planned, the aircraft commander/DETCO will submit a report indicating such. Nothing Significant to Report (NSTR) may be used as appropriate
4. Any events of a critical nature should be reported immediately

## GROUND SERVICING CHECKLIST

To accomplish the required aircraft servicing reference the following Job Guides. ***These will be the primary references and procedures the aircrew will follow to service the aircraft.***

**1B-1B-2-05JG-20-1 SAFE FOR MAINTENANCE**

**1B-1B-2-05JG-50-1 DOORS (OPEN AND CLOSE FOR COWLING)**

**1B-1B-2-12JG-10-1 REFUEL/DEFUEL**

**1B-1B-2-12JG-30-1 COMPONENT SERVICING**

**(ADG / IDG / APU / ENG)**

**1B-1B-6WC INSPECTION CARDS FOR THRU FLIGHT**

**1B-1B-2-70JG-10-1 ENG INSPECTION CRITERIA**

*The following section is for **information only** and **does not supersede** guidance provided in the Job Guides listed above.*

### **I. PARKING**

- 1. ESTABLISH INTERPHONE CONNECTION** - Hook up on nose-wheel interphone connection using headset and cord found in the TDY box. Insure that the flaps and slats are retracted.
- 2. CHOCKS INSTALLED** - Chock the nose-gear until after the engines are shutdown, then chock the main gear.
- 3. CHECK ENGINE OIL** - Check the engine oil gauges prior to engine shut down. If any engine is below 70%, it will need to be serviced. 60% is the minimum to fly.
- 4. GEAR SAFING PINS INSTALLED** - Leave the main gear doors up and pin the main and nose gear. The nose gear doors do not have to be pinned.
- 5. WIPE DOWN STRUTS** - After the engines and APUs have been shut down, and before any towing or refueling operation is started, all three gear struts need to be wiped with a rag soaked with hydraulic oil around chrome area. PPE IS REQUIRED WHEN DEALING WITH HYDRAULIC FLUID

**CONTINUED NEXT PAGE...**

## **II. THRU FLIGHT**

### **1. ADG (GEARBOX) / IDG (GENERATOR) SERVICING**

**(REF: Job Guide 12JG-30)**

**A. OPEN ADG / IDG COMPARTMENT** - The access panel has push-button latches underneath the engine nacelle.

**B. SERVICE ALL FOUR ADG's** - All oil servicing must be accomplished with MIL-L-7808 oil. Connect the large quick disconnect attachment first. This is the return flow. After the flow has stopped (you will hear a small burp), connect the smaller quick disconnect. Pump the handle until a good flow is seen in the site window on top of the oil cart (approximately 7 pumps). Disconnect the smaller quick disconnect, wait until the flow stops, then remove the larger quick disconnect.

**C. DEPRESSURIZE IDG** – After waiting at least 30 minutes after shut down push the white button above the IDG sight gauge. If servicing is required an adapter is required to service which is not normally packed in kit. If servicing is required contact home station. **NOTE:** Do not operate generator if oil level is low.

### **2. SERVICE ENGINE OIL (IF REQUIRED)**

**(REF: Job Guide 12JG-30)**

**CAUTION:** ENSURE APU DOORS ARE CLOSED PRIOR TO OPENING COWLING

**NOTE:** Battery power is required to close APU doors. Open small access panel on inboard side of nacelles and locate close switch to close APU doors.

**A. OPEN COWLING** - Use the "S" wrench found in the tool box to first unlatch the leading edge latches on the cowling (2 on each cowling). Next, use the "S" wrench to open the five cowling latches located on the side of the cowling starting with the front one first, then open the most aft latch, followed by the second front latch, then the second from the rear, and finally the middle latch. Be sure your shoulder is under the cowling when the last latch is opened to avoid the cowling swinging open too fast.

**B. SERVICE THE ENGINE OIL** - Use the same procedure for hooking up the oil cart as that used on the ADG.

**C. CLOSE THE ENGINE COWLING** - Use the reverse order you used to open the cowling. Ensure fuel drain on bottom of cowling is aligned.

### **3. CHECK APU OIL**

**(REF: Job Guide 12JG-30)**

**CONTINUED NEXT PAGE...**

**A. CHECK SITE GAUGE** - It should be at least half as minimum.

**B. FILL APU OIL (ONLY IF REQUIRED)** - Use the wire cutters to cut the safety wire on the drain plug. Place a bucket underneath the drain then remove the drain plug. Attach the small quick disconnect to the coupler and pump until the oil starts flowing then remove the quick disconnect. When the flow from the drain stops, reinstall the drain plug. Before closing up, make sure to install a new safety wire. Make a write-up in the 781 showing the APU was serviced so maintenance can inspect the safety wire.

**4. INLET INSPECTION (REF: Job Guide -6WC or 70JG-10)**

**CAUTION** - UP TO APPROXIMATELY 30 MINUTES AFTER ENGINE SHUTDOWN, STRONG STATIC ELECTRICAL FIELDS CAN EXIST IN THE ENGINE INLETS. SLIDE YOUR BARE HAND ALONG INLET SURFACE SLOWLY BEFORE ENTERING TO ENSURE STATIC HAS DISSIPATED.

Check the inlet lips and interior walls for chips and major scratching. Check the EBADS scoop for anything that might be stuck in the scoop. Next, check the nose dome inlet to make sure it isn't plugged. Inspect the variable inlet guide vane at the front of the engine for any cracks or chipping. Inspect struts attached at center hub and outer shroud at welds for cracks. If there are any cracks or chips, notify home station for guidance. Finally, inspect each fan blade for dings or warping. Run a Nomex gloved finger over the edge of each blade. If the glove catches, the blade is out of limits. Check probe (temp/ice) in lower left side of engine inlet for damage. Check all components for looseness. Use caution when entering engines 1 & 4 and when checking the anti-ice probe for damage (1/4 inch play for aft/up/down is OK, but no movement in or out).

**5. EXHAUST INSPECTION** - Before checking the exhaust section, ensure that the engine tail pipes and turbines have safe temperatures to work around. Use a ladder to climb into the engine exhaust section. Check the inner and outer flaps of the nozzle to make sure that they overlap properly. Next, inspect the exhaust liner for tears or burn-through. Inspect the flame holder and lighter tubes.

**6. REFUELING (REF: Job Guide 12JG-10)** Refuel the aircraft in accordance with the checklist (12JG-10). The A/C will normally act as the refueling supervisor, the DSO will be a fire guard, the OSO will run the refueling panel, and the CP will run the APU in the cockpit. The refueling supervisor will brief the truck operator on emergencies and fuel requirements. The aircraft chocks will be placed at least two inches from the tires after brakes are set. The grounding sequence is as follows: GND to aircraft, then truck to GND, then truck to aircraft. If the APU cuts off while the fuel is flowing, make sure to close the SPR nozzle valve ASAP. The refueling supervisor should walk around the aircraft during refueling inspection for fuel leaks, fire, hydraulic leaks, or anything out of the ordinary and halt the refueling if any of these are observed.

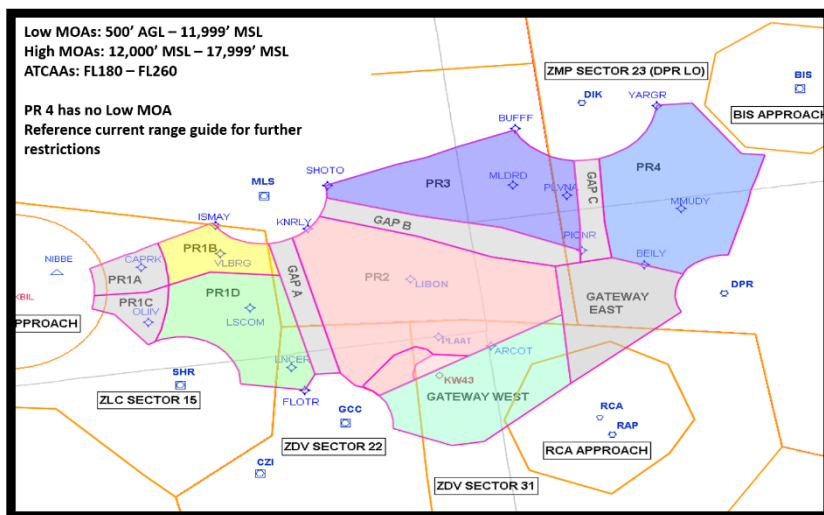
**7.** If the aircraft is to be parked over 24 hours, then run the APU for 30 minutes a day.



## MOA INFORMATION

\* Always refer to the MOA/Range guides for the most up to date information.

### POWDER RIVER TRAINING COMPLEX MOA/ATCAA



#### Entry/Exit:

- Contact RCO at/prior to entry with airspace
- Notify RCO of aux frequency if non-standard
- Check out w/ RCO prior to exit w/ exit time
- Contact ARTCC 10 minutes prior to exit with a “10 minute” call

#### Operating Procedures:

- Use local altimeter setting for all MOAs and ATCAAs
- EA from Belle Fourche – 381.3
- Chaff & Flare use – reference Chaff/Flare table
- Supersonic restrictions reference “Supersonic Restrictions” section

#### Emergency Procedures:

- MSA: 6,400' MSL
- EP Fields
  - RCA: 13,300' RWY 13/31 – Snap 120 (PR1, 2) 180 (PR3, 4)
  - RAP: 8,700' RWY 14/32 – Snap 120 (PR1, 2) 180 (PR3, 4)
  - BIL: 10,518' RWY 10L/28R – Snap 265
- Emergency Jettison – RCA 359/032, outbound at or above 4,000' AGL
- Fuel Dumping: IAW T.O. and FAA requirements
- NORDO, exit on time at 17,000' MSL direct to the IAF for the active runway at RCA

### Entry Points, ATC Frequencies and Altimeter Settings

Airspace Entry/Exit	ATC Pri	ATC Backup	Center	Altimeter
PR1 – ISMAY	127.75 / <b>351.9</b>	126.85 / 305.2	SLC	Billings
PR1 – FLOTR	135.6 / <b>363.02</b>	133.67 / 322.5	DEN	Billings
PR2 – KNRLY	126.85 / <b>305.2</b>	127.75 / 351.9	SLC	Rapid City
PR2 – ARCOT	127.95 / <b>338.2</b>	133.67 / 322.5	DEN	Rapid City
PR3 – BUFFF	126.85 / <b>305.2</b>	127.75 / 351.9	SLC	Dickinson
PR3 – SHOTO	126.85 / <b>305.2</b>	127.75 / 351.9	SLC	Dickinson
PR3 – PIONR	135.25 / <b>256.7</b>	128.42 / 284.65	MIN	Dickinson
PR4 – YARGR	135.25 / <b>256.7</b>	128.42 / 284.65	MIN	Bismarck
PR4 – BEILY	135.25 / <b>256.7</b>	128.42 / 284.65	MIN	Bismarck
1. When altimeter setting is 29.91-28.92, operate at least 1000' below ceiling; altimeter 28.91 – 27.92 operate at least 2000' below assigned ceiling				
2. Use RAP altimeter in all MOAs & ATCAAs for LFEs.				

### Chaff and Flare Use:

- Chaff use is prohibited as of the publication of this In-Flight Guide.  
Reference current range guide for up to date information
- Flares are permitted under the conditions in the Fire Conditions/Flares in PRTC Table. Request updated fire condition at airspace check-in

Fire Conditions / Flares in PRTC		
Category	Fire Condition	Aircraft Restrictions
1	Low	MDS Restriction or 2000' AGL whichever is higher
2	Moderate	MDS Restriction or 2000' AGL whichever is higher
3	High	No Flares in Low MOAs
4	Very High	No Flares in Low and High MOAs
5	Extreme	Flare use Prohibited
Ellsworth AFB uses the US Forestry Service Data on <a href="http://www.wfas.net">www.wfas.net</a>		

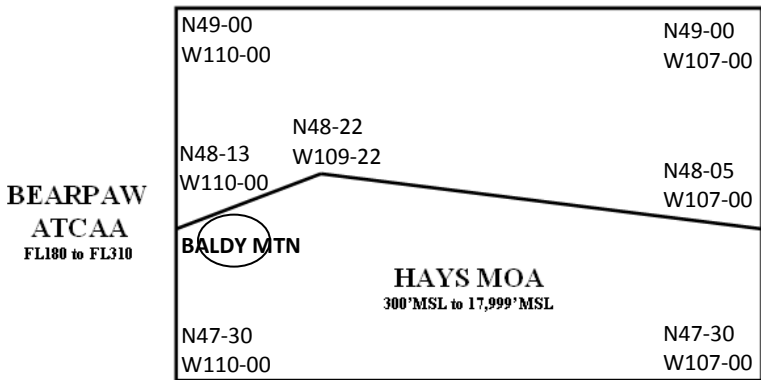
**Supersonic Restrictions:** Supersonic authorized only during LFEs under the following restrictions:

- B-1 supersonic activity is authorized above 20,000' MSL
- Fighter supersonic activity is authorized above 10,000' AGL
- No supersonic activity is authorized in PR-1C

**LFE Airspace:** The following airspace is LFE only

- All of Gap A, B and C MOAs and ATCAAs
- Gateway East ATCAA
- PR1 A and C High MOA and ATCAA
- PR1 B and D ATCAAs above FL230

HAYS MOA/BEARPAW ATCAA



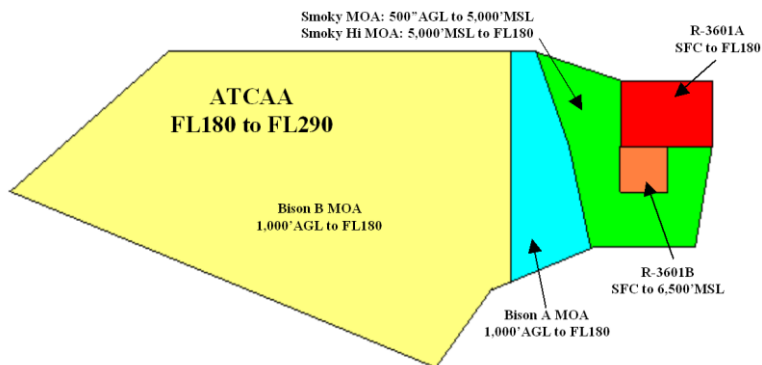
Minimum CPS 500' Day and Night/IMC

Notes:

1. Scheduling requires 2+30 min to NOTAM MOA, contact 120 FW at DSN 791-0192
2. ARTCC tactical freq SLC 364.8
3. Great Falls altimeter setting will be used within HAYS MOA and when combined with BEARPAW, 29.92 when using BEARPAW only
4. Filing: Entry Fix within HAYS/BEARPAW, Delay (hr)+(min), Exit Fix within HAYS/BEARPAW
5. High Terrain: Baldy Mtn 6916', and SCA 8000'
6. Contact Salt Lake Center 5 min prior to exit on 285.4 for coordination
7. If NORDO, exit on time, flight planned route

## SMOKEY HILL RANGE/ BISON MOA

Reference current range guide/brief for further information.



**Smoky Racetrack** provides Bomber turn off target (North/South extensions) - available with prior coordination. When Smoky Racetrack is active, BISON A and SMOKY HIGH are automatically included

North Ext: 3200' MSL – FL180      South Ext: 500' AGL – FL180

**"Little River" VFR Holding** - available if not cleared into the Range. Altitudes must be coordinated with RCO. See and avoid rules apply. ***Hold S of N38-31 W097-52 LHT Legs 5NM or less***

**ENTRY/EXIT:** Contact KCC 363.2 to coordinate MOAs and RCO handoff. Get clearance from RCO (Controlling Agency when on range) prior to range entry/exit 316.9/304.9/139.7

**Squawk:** Mode 3/A and Mode C **ECM:** "Smoky Wizard" on 316.9/304.9

**Class C Operations:** used when unmanned. Clearance for entry/exit through KCC 363.2/134.9 All passes must be dry and no flare use allowed

**Altimeters:** Use range altimeter for altitudes below FL180 and 29.92" FL180 and above. MSA: 4,000' MSL (Bison B MOA)

**Wounded Bird** - Snap vector: SLN NE for 20 NM, or IAB SE for 80 NM

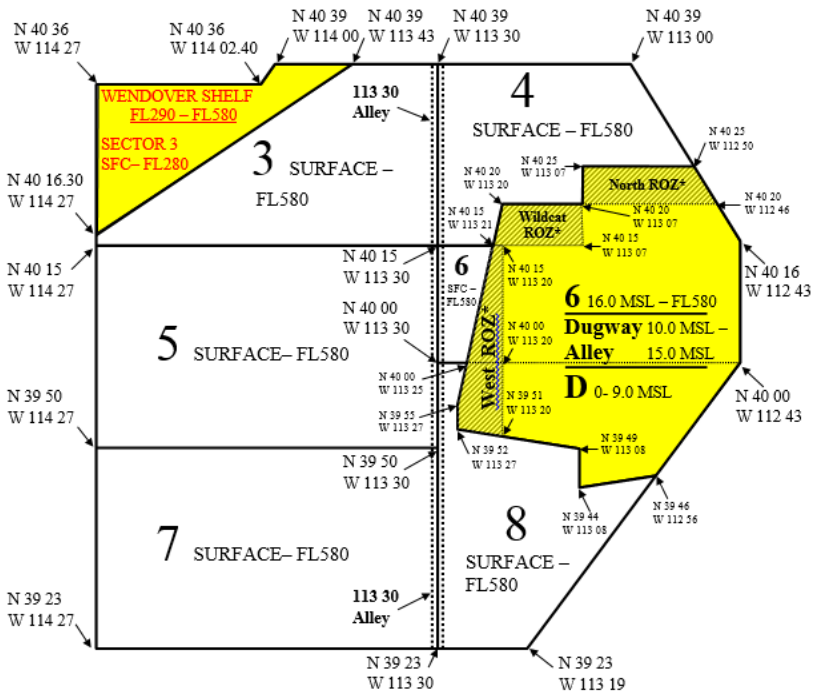
Salina (SLN): Ch. 118, RWY 17/35 13,300'x200' ILS RWY 35 only TWR: 257.7

IAB: Ch. 112, RWY 01/19 12,000'x300' ILS & TACAN TWR:295.7

**Exit:** KCC 363.2/134.9

## Utah Test and Training Range

Reference the current range guide and brief for further information



### ENTRY/EXIT

- Contact Clover prior to entry
  - South Range: 363.5
  - North Range: 285.65
- Clover is ATC
  - Squawk Mode 3/A and Mode C
  - Be ready with mission elements
- Get clearance from Clover prior to exit.
- Report number and type of weapons expended.

### OPERATING PROCEDURES

- Altimeter -- Use range altimeter for all altitudes
- Operate in and out of the airspace on an IFR flight plan
  - File in accordance with LOA (i.e. "POISN")
- Fax UTRR worksheet prior
- Reference range guide for current restrictions and procedures.
- EA from Granite Peak - 324.7

### EMERGENCY PROCEDURES

- Controlled bailout area
  - HIF 242/053, 15k MSL and below, heading W
  - In/near Kittycat, HAG, or Sector "D", stay put (UXOs) and wait for pickup
- EP fields
  - MAAF: Ch. 79, TACAN approach to RWY 12, night lighting available
  - HIF: Ch. 49, expect RWY 14
- Emergency Jettison Area
  - Live or inert
  - Between N40-21 to N40-30 and W113-38 to W113-48
- Fuel Dumping
  - IAW FAAO 7110.65 and T.O.
  - Clover will assign altitude and pattern
- MSA: **14,200 MSL**
- Wounded Bird
  - Snap vector: **DPG 120 for 20 NM**
  - HIF 040 FOR 80 NM**

# AR 678

NUMBER	ENTRY POINTS	ARIP	ANCHOR POINT	ANCHOR PATTERN	EXIT POINTS
AR678	RAP VORTAC 285/81 N44°36.50' W104°41.50' RAP VORTAC 188/70 N42°53.50' W103°35.00'	RAP VORTAC 273/70 N44°17.50' W104°34.00'	RAP VORTAC 212/70 N43°09.00' W104°08.00'	RAP VORTAC 212/70 N43°09.00' W104°08.00' RAP VORTAC 201/53 N43°14.50' W103°42.00' RAP VORTAC 284/54 N44°23.00' W104°07.50' RAP VORTAC 273/70 N44°17.50' W104°34.00'	RAP VORTAC 199/82 N42°49.00' W104°00.50'

## CR PLAN

MILITARY RADAR	REFUELING ALTITUDES	SCHEDULING UNIT	ASSIGNED ARTCC	TIMES OF OPERATION
a. 280.400 b. 377.700 c. 1-1-2 d. 2/1 e. 54/117	FL190/FL260	28 OSS/OSXS Ellsworth AFB, SD DSN 675-4246 (After hours Raymond 33, 675-3800) C605-385-4246	Denver ARCP-338.2	Unlimited

**ATC ASSIGNED AIRSPACE:** None.

**REMARKS:** Must specify altitude block necessary to perform mission. Recommend tankers use South entry point. Maneuvering within orbit authorized. If the Powder River Training complex is active (including the Gateway ATCAA), tankers must stay South of the N44 latitude.

## AIR REFUELING UNIT PHONE NUMBERS

AR Unit	Callsign	DSN	155 ARG (KLNK)	HUSKR	279-1270
6 AMW (MacDill)	BOLT	968-9629	157 ARG (Pease)	PACK	852-3325
19 ARW (Robbins)	RHET	497-3160	161 ARG (KPHX)	COPPER	853-9030
22 ARW (McConnell)	TURBO	743-3115	171 ARG (KPIT)	STEEL	277-7430
60 AMW (Travis)	XTNDR (6 ARS) GUCCI (9 ARS) ORCA (70 ARS) TOGA (79 ARS) QUEST (60 ARS)	837-7151	184 ARG (McConnell)	JAYHAWK	743-7178
			185 ARG (KSUX)	BAT	585-0275
			186 ARG (KMEI)	JAKE	778-9821
92 ARW (Fairchild)	ASTRO (92 OSS) EARL (93 ARS) COUNT (92 ARS)	657-2165	190 ARG (Forbes)	WYLIE	720-4682
97 AMW (Altus)	JEST (54 ARS)	866-5682	305 AMW (McGuire)	TEAM FORCE DEUCE OPEC MOVER	650-6961
	GASSR (55 ARS)	866-7448		RAID	
101 ARG (KBGR)	MAINE	698-7323	434 ARW (Grissom)	MASH (72 ARS) INDY (74 ARS)	388-2958
107 ARG (KIAG)	FUZZY	238-2555	452 AMW (March)	RATS	447-2125
108 ARG (McGuire)	TOPCAT (141 ARS) ROCCO (150 ARS)	650-4212	459 ARW (Andrews)	DECEE	857-2800
117 ARG (KBHM)	DIXIE	778-2423	507 ARW (Tinker)	OKIE	884-2117
121 ARG (KLCK)	TAZ SLUFF	696-3246	514 AMW (McGuire)	OPEC, TEAM	650-6768
126 ARG (Scott)	HAPPY	760-4263	916 ARW (Seymour)	BACKY	722-2025
128 ARG (KMKE)	UPSET	580-8701	927 ARW (KMTC)	PISTON	273-4341
134 ARG (KTYS)	SODA	266-4390	931 ARG (McConnell)	KANZA	743-4858
141 ARG (Fairchild)	EXPO	657-7115	939 ARW (KPDJ)	STOUT	638-4944
151 ARG (KSLC)	UTAH	245-2277	940 ARW (Beale)	TAHOE	368-1640

## EA SITE INFORMATION

### **BELLE FOURCHE 381.3**

**Phone:** 385-2241/42, **Fax:** 385-2243

Hours of Operation: M-TH 1600Z-0400Z, F 1500Z-1900Z

Site	Type	Lat / Long	Name
Main	Main	N4453.23 W10411.05	Main Site
MM1	C	N4518.65 W10457.12	Hammond
MM2	H	N4510.55 W10447.08	Tate Ranch
MM3	B	N4444.39 W10441.86	Hulett
MM4	K	N4452.85 W10348.36	Horman Farm
MM5	B	N4502.29 W10346.47	Castle Rock
MM6	N/A	N4455.90 W10357.53	CAS
MM7	G	N4451.37 W10433.17	Clark Farm
MM8	B	N4458.98 W10430.50	Alzada
MM10	K	N4539.74 W10422.59	Ekalaka
MM11	B	N4521.96 W10443.76	Tauck Ranch
MM12	C	N4456.54 W10359.30	Albion

### **GRANITE PEAK 324.7**

**Phone:** DSN 789-5741/5742, **Fax:** 789-5780

**Site**      40-09.564 N      113-21.041 W      4319'      MIJ      250/020

### **PECOS 258.2**

**Phone:** DSN 461-8959, **Fax:** 461-8971

Hours of Operation: M-TH 1500Z-0500Z, F 1500Z-1900Z

**Site**      31-12.973N      103-39.510W      2852'

Equipment: B, G Pedestals

Do not directly over-fly site. Tone Scoring not available.

### **SAYLOR CREEK 292.2**

Sagebrush 728-4804, FAX 728-6138; EA 728-6348, FAX 728-6843

Hours of Operation: M-TH 1500Z-0430Z, F 1600Z-2200Z

### **SMOKY HILL 316.9/309.9**

**Phone:** DSN 743-7500, **Fax:** 743-7500 x136

Hours of Operation: M-TH 1500Z-0430Z, F 1600Z-2200Z

### **SNYDER 283.725**

**Phone:** 461-8915/03, **Fax:** 461-8912

Hours of Operation: M-TH 1500Z-0430Z, F 1600Z-2200Z

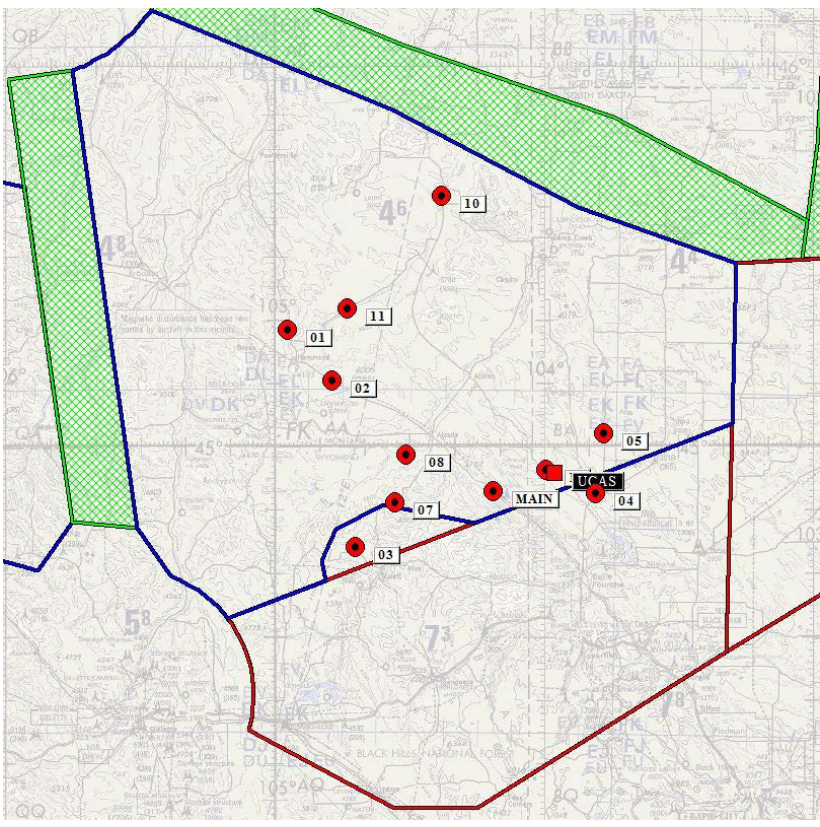
**Site**      32-42.106N      100-57.084W      2352'

Do not directly over-fly site. Tone Scoring and EW is not available within 3NM or 5000' MSL.

NOTE: Reference current range guides for most up to date information



**Belle Fourche Threat Equipment Locations**



## B-1B STATIC DISPLAY GUIDELINES

**On-station tours/displays**, aircrew will meet the following requirements:

1. For PA coordinated/requested tours and displays, aircrew will contact the PAO (385-5056) for location and special instructions (i.e. DVs, special needs). Aircrew will render proper military courtesies for military DVs.
2. For local tours and displays not coordinated/requested by PA (i.e. family tours), aircrew will contact the MOC (385-4879). Pass the following information to the MOC: location of tour, name of escort, and number of people in the tour.
3. Aircrew must contact the following agencies when scheduling flightline tours/displays and before entering the flightline: Airfield Management / Base Operations (385-1052) and the Law Enforcement Desk (385-4001).
4. Aircrew require written approval from PA for visitors to use cameras and video.
5. Aircrew must ensure no classified material or sensitive equipment is photographed or videotaped.
6. If any pictures will be released to the public, then PA must review them.
7. Aircrew must not display their line badge during photographs.
8. If using a vehicle, aircrew must have a valid flightline driver's license. Only military vehicles are allowed on the flightline unless the OSS/CC gives approval through the Airfield Manager for POV use.
9. The aircraft ejection seats must be "safed" prior to permitting visitors into the cockpit. For non-aircrew tours, maintenance should use zip ties to safe the aircraft ejections seats.

**Off-station missions/displays**, aircrew will meet the following requirements:

1. Aircrew must be current and qualified in aircraft servicing procedures.
2. Mission leads will thoroughly mission plan the sortie using the Strange Field Familiarization outline in AFI 11-2B-1, Volume 3, Attachment 10.
3. Aircraft commanders will: Ensure obstacle clearances at the destination airport for taxi, takeoff, and landing, determine restrictions and obstacles not identified in FLIP by contacting the destination airport manager, airport director, or base operations, ensure JP-8 (approved) fuel is available, ensure an electrical starting unit (AC: 115/200v, 3 phase, 90kva; DC: 28v, 1500 amp, 72kw) is available, and ensure a universal tow bar and tug are available. If any of these requirements cannot be met, then the sq commander must approve the off-station mission.
4. For airshow static displays, the aircraft commander will: Obtain an airfield diagram depicting taxi route from runway to the display location and ensure the B-1 while parked as a static display has a minimum of 25 feet wing-tip clearance in the display area. If these requirements cannot be met, then the display is not authorized.
5. Before departing Ellsworth AFB, the aircraft commander will ensure a properly inventoried maintenance divert kit and a B-1 tow bar adapter are loaded on the aircraft.
6. If the off-station mission is conducted at a USAF facility, the aircraft commander will submit an AFTO Form 88 to the destination's base operations and/or fire department.
7. Aircrew must be current in aircraft marshalling signals and procedures.
8. Aircrew must ensure that all classified material can be properly stored.

## GPS QUICK REFERENCE

**ALMANAC DATA** – Data file of position of satellite constellation.

- **Impact:** Speeds acquisition of first satellite lock, without good almanac data a JDAM release could be an INS only bomb
- **Info:** Almanac data is in the data string you get from a satellite. It takes 12 minutes for the full data string to download

**CRYPTO KEYS** – GPS crypto keys provide us the information to have a more accurate GPS fix by having the crypto to access the P(Y) code and eliminate the errors caused by selective availability

- **Impact:** Loss of accuracy due to possible no lock on of JDAM GPS
- **Info:** These keys are loaded weekly, if TDY or using pre-cut DTUCs for extended period check the dates of the CRYPTO keys

**Fix:** If unable to load Crypto Keys or Key status INVALID, [BACD] KEY OVRD may be enabled only if it is known that the **P Code** is not encrypted (this is the normal mode during peacetime). Consider that Jam resistance, Anti-spoofing, and an additional improvement in accuracy are not available without Valid Crypto.

**FOM** – Figure of Merit, statistical value of GPS accuracy, 1 is the best, 9 is the worst

**QUALITY** – The BONE has four measures of GPS quality: A, B, C, and D

- Qual A – Valid Crypto Key, FOM = 1, at least 4 satellites
  - Updates position every 30 sec, velocity every 6 sec
- Qual B – FOM = 2 or 3; 3 or 4 satellites
  - Horizontal Error > 100 ft, Vertical Error > 300 ft
  - Updates position every 3 minutes
- Qual C – FOM = 4 to 6, 3 satellites
  - Horizontal Error > 300 ft, Vertical Error > 600 ft
  - Updates DR only
- Qual D – FOM = 7 to 9, no GPS or <3 satellites
  - Horizontal & vertical errors > 3,000 ft
  - No position updates

**STATE** – Gives the state of an individual satellite, 5 is the best.

**C/N (Carrier to noise ratio)** – Displayed in dB with a range of 00 to 99. Typical values are in the 40's with INS in NAV. Higher C/Ns indicate better reception and higher communication fidelity with the satellite. Info on [BAC]

**Degradation / Jamming Indications:**

- Increasing FOM / Lower Qual state
- Decreasing C/N [BAC]
- Decreasing State
- Loss of Falconview GPS data

<b>CNMS REFERENCE</b>
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**SATS** – Gives the number of the satellite that is being tracked

**C/N** – Carrier to Noise ratio, percentage of ambient noise that the signal strength is at, typically 40-50

**Freq / Code** – Freq will be 1 or 2, Code will be C or P representing C/A code or P Code

**STATE** – number and letter with following codes:

**S** – Search for satellite signal

**I** – Satellite signal degraded due to interference

**T** – Satellite signal is being tracked

**D** – Satellite being tracked and data received

**R** – Satellite signal lost, recovery being attempted

**GDOP** – Geometric Dilution of Precision, this is a unit less number that tells you the relative position of the satellites. This is a multiplier of your error so the smaller the DOP, the lower the estimated error (about 2-4 is good).

<b>TAKEOFF MINIMUMS</b>
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**TAKEOFF RESTRICTIONS** - Do not takeoff if any of the following conditions exist:  
(AFI 11-2B1V3/EAFB SUP1/Dash-1)

- 1) RCR less than 9 (OG/CC approval for RCR less than 9)
- 2) Category III operations during peacetime
- 3) Tailwind component in excess of 10 knots on a dry runway or 5 knots on a wet runway
- 4) Takeoff with crosswind components greater than 26 knots requires OG/CC approval
- 5) Decision speed is less than Vmcg speed
- 6) Until ice and snow have been removed or under conditions of freezing rain and freezing drizzle
- 7) Actual RCR is less than adjusted minimum RCR for takeoff.

**Weather:** Published approach minimums (11-202v3) or RVR 1600' with a takeoff alternate (11-202v3 ACC Sup). 1000RVR if on HHQ directed mission with OG/CC approval (11-202v3 ACC Sup).

**TAKEOFF ALTERNATE** - Required when weather is below approach and landing minimums for the departure airfield. A suitable takeoff alternate airfield is one that is within 1 hour at cruising speed, has an operational published approach procedure, and the weather must be reported and forecast to remain no lower than:

<u>Precision:</u>	600' / 2 mi. (180 m / 3.2 km)
<u>Non-Precision:</u>	800' / 2 mi. or 500' / 1 mi. above lowest published landing, minimums, whichever is higher.

These weather conditions must exist from takeoff to 1 hour after possible ETA. Annotate takeoff alternate in the Remarks section of the DD Form 175 with identifier and ETE. (AFI 11-202V3 ACC Sup).

## APPROACH AND LANDING MINIMUMS

### DESTINATION WEATHER FOR FILING AND FLYING AN APPROACH

**Weather** - Straight-In/Sidestep Approach: Published visibility minimums or RVR 2400 ft (800m), whichever is higher; Circling Approach: Published ceiling and visibility minimums (AFI 11-202V3)

### DESTINATION FORECAST BELOW APPROACH MINIMUMS

Must have two suitable alternate airports designated on the DD Form 175. Both alternates must be at least 45 NM apart and at least 10 NM from the destination. They must have an operational and compatible precision approach and meet or exceed the criteria for alternate airport weather for filing purposes. (AFI 11-202V3)

### REMOTE OR ISLAND DESTINATION (*CONSIDER AN AIRFIELD REMOTE/ISLAND DESTINATION WHEN ITS LOCATION PRECLUDES FLIGHT TO A SUITABLE ALTERNATE WITHIN 2HRS FLYING TIME*)

Weather forecast must be equal to or better than the weather requirements for an alternate airfield. If prevailing weather conditions require an alternate, ensure that there is fuel on board to hold for two hours at the destination fix. If prior to takeoff or while enroute (prior to route decision point), it is discovered the weather will be below minimums at ETA or after holding, return to departure base or closest base on return routing (AFI 11-202V3/ACC SUP).

### AIRBORNE INSTRUMENT LANDING APPROACH (AILA)

Aircrew may practice AILAs provided (AFI 11-2B-1V3):

1. A published approach procedure, as defined by AFI 11-202V3, *General Flight Rules*, is used with a designated final approach fix (FAF). This does not restrict accomplishing an AILA when cleared for a visual approach from the radar pattern.
2. ATC clearance is obtained for the specific approach procedures selected.
3. The appropriate ATC facility has been advised that an airborne directed radar approach will be flown in conjunction with the requested approach.
4. VMC must prevail from the FAF to the missed approach point/decision height. Aircrew may only fly AILAs under lower weather conditions during emergency situations where no other compatible approach is available.
5. The AILA is terminated and pilot navigation will be resumed any time it becomes apparent to any crewmember that the aircraft will exceed the parameters established for the published procedures.

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### **ALTERNATE REQUIRED (AFI 11-202V3)**

The worst weather (TEMPO or prevailing) at the ETA ( $\pm 1$  hour) is less than a ceiling of 2,000 ft and a visibility of 3 SMs. Additionally, if the following apply, an alternate is required:

- All compatible approaches require radar
- Required NAVAIDs are unmonitored
- Destination does not have WX reporting capability
- When the point of intended landing's lowest compatible approach weather minimums are greater than or equal to a 1,500 ft. ceiling or 3 SM visibility
- Destination in Alaska, Canada, Greenland, Guam, Hawaii or Iceland

### **ALTERNATE REQUIREMENTS (AFI 11-202V3)**

The worst alternate forecast weather conditions for ETA  $\pm 1$  hour to include TEMPO conditions (except those caused by thunderstorms, rain or snow showers) will meet or exceed:

Ceiling of 1000 ft. or 500 ft. above the lowest compatible minimum, whichever is higher; and a visibility of 2 SM or 1 SM above the lowest compatible minimum, whichever is higher.

Conditions Disqualifying an Alternate:

- All compatible approaches require radar.
- All compatible approaches require an unmonitored NAVAID.
- The airfield does not have a weather reporting service.
- GPS is the only available NAVAID.
- **A** NA on all compatible approaches.
- Any note disqualifying the airfield on all compatible approaches in the IFR Alternate Minimums section **A**

For airfields without a published IAP:

Forecast weather for the ETA ( $\pm 1$  hour) must permit a VFR descent from the MIA to a VFR approach and landing.

## LIFE SUPPORT REQUIREMENTS

Aircrews will wear survival vests on combat sorties, ocean crossing sorties, during exercise sorties (RED FLAG, GREEN FLAG, etc.), and as directed by the squadron commander. (AFI 11-2B-1V3 EAFB ADDA)

28BW B-1B aircrews are required to wear the following flight clothing.  
(AFI 11-301)

### Minimum Flight Clothing/Equipment

Year Round, regardless of temperature.

The following are required:

- Flying coveralls, Nomex, CWU-27/P
- Flying gloves, Nomex
- Flight boots, FWU-8/P (summer weight) or FWU-3/P (winter weight)
- Harness, oxygen mask, helmet
- MC-1 knife, installed and secured in reinforced leg pocket of flying coveralls
- ID tags
- Eyeglasses with spare set (if required)

Winter/Cold Weather (1 Nov through 31 Mar) and also when temperatures along the route of flight are expected to be less than 15° F (-9° C), regardless of calendar month.

The following items will be worn or carried

- All items/equipment specified above
- Flight jacket winter weight (CWU-45P)
- Thermal underwear (aramid or cotton), black cotton turtleneck (optional)
- Winter flying gloves with wool inserts or N-4B mittens
- Highly encouraged but not required are the winter weight flight boots or Danners/Matterhorns (full leather uppers)

**Note:** Pilots will not wear N-4B mittens during critical phases of flight.

**For Forward Operating Locations:** As directed by the squadron commander based on location and mobility requirements.

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**Overwater Requirements:**

- Life preserver (LPU-9/P)
- Anti-exposure suit items as follows:

**Water temperature 40 degrees F to 60 degrees F:**

CWU-23/P liner                      CWU-74/P exposure suit  
Wool socks                          Flight boots  
CWU-36/P or CWU-45/P flight jacket

**Water temperature 39 degrees F and below:**

Above items plus the following:

CWU-45/P flight jacket  
CWU-43/P/44/P Aramid underwear

**Note:** Aircrews should examine forecasted weather conditions along the route of flight during mission planning and supplement clothing requirements as warranted.

**Helmet and Gloves: (11-202V3 ACC Sup/11-301V1 ACC Sup)****- Helmets are required to be worn during:**

- Initial Takeoff/climb out
- Air Refueling from ½ mile through A/R completion
- Low Altitude Training Route
- Flight characteristics demonstration
- Flight below 10,000 MSL
- Armed Ejection Seat

**- Gloves are required to be worn during critical phases of flight, which are:**

- Takeoff, approach, and landing
- Rejoin to close formation (inside 1 NM to close formation for non-fighter aircraft)
- Air-to-air refueling
- Actual live or inert weapon deliveries
- Simulated weapons deliveries (other than level deliveries)
- Tactical maneuvering where the bank angle exceeds 45 degrees
- Low altitude flight below 5000 feet AGL
- Situations deemed necessary by the Aircraft Commander

Crewmembers are encouraged to wear gloves at all times in the aircraft.

Gloves will not have holes or be modified in any manner.

<b>B-1B OXYGEN REQUIREMENTS (AFI 11-202V3)</b>
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ALTITUDE	PF	PNF	AFT
10,000' MSL THRU FL250	R	R	R
Above FL250 THRU FL350	I	R*	R*
Above FL350 THRU FL410 (two pilots)	I	I	R*
If only one pilot at controls	O	R*	R*

ACTIVITY	PILOTS	WSOS
T/O AND CLIMB TO INITIAL OXY CHECK	O	O
AR FROM PRECONTACT TO TERMINATION OF ACTUAL AR OPERATIONS	O	I
FINAL APPROACH FIX OR TURN TO FINAL THRU LANDING OR MISSED APPROACH	O	I

**R** -- Have oxygen readily available. Make sure a functioning system and mask is within arm's reach.

**\*** -- Recommend when moving about the B-1B cockpit above FL250 wear helmet with mask attached.

**I** -- Have oxygen immediately available. Wear helmet with an oxygen mask attached to one side, hose connected and toggle lever ON.

**O** -- Use oxygen.

<p align="center"><b>OPERATIONS PROCEDURES / LIMITATIONS &amp; RESTRICTIONS (AFI 11-2B-1V3)</b></p>
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This table consolidates information expanded upon in other sources. It is not intended as an all-encompassing solution, rather a quick reference for the listed system and what is required for takeoff. A \* following the reference indicates a caveats exist in the AFI or a waiver is obtainable; reference the AFI in these cases.

System	T/O Requirement	Reference (*)
INS	Operational & prime navigation model	AFI 11-2B-1v3 7.14.1 *
GSS	Operable (GSS caution light not illuminated steady)	AFI 11-2B-1v3 7.14.2 *
Attitude Systems	INS and GSS required for night or IMC flight	AFI 11-2B-1v3 7.14.3
Heading Accuracy	INS & GSS within 4 degrees	AFI 11-2B-1v3 7.14.5 *
Aft Attitude / FPI	Both attitude & one FPI	AFI 11-2B-1v3 7.14.6
Position Lights	Wing tip and wing glove position lights must be operable in bright/steady from sunset to sunrise‡	AFI 11-202v3 3.15.1
Anti-Collision Lights	On from takeoff to landing	AFI 11-202v3 3.15.2

‡ - All 4 position lights must be operable to ensure that one light per side will be illuminated at all times in flight regardless of wing position.

## **EMERGENCY PROCEDURES**

- a. Do not practice In-flight emergency procedures when weapons are loaded on the aircraft.
- b. Do not practice compound emergencies during flight (unless specifically required for upgrade training).

## **AIR REFUELING LIMITATIONS**

Do not accomplish air refueling during training missions when:

- a. In-flight turbulence is encountered that, in the opinion of any participant, results in marginal control of the receiver aircraft while in the refueling envelope.
- b. The tanker or receiver has less than all engines operating (except in an emergency).
- c. The tanker or receiver is unable to retract the landing gear (except in an emergency).

## **TANKER DISCONNECT CAPABILITY**

- a. Air refueling without tanker disconnect capability (including tanker manual operation without tanker disconnect capability or receiver emergency override operation) is allowed only under the following circumstances:
  1. When necessary to ensure safe recovery of the aircraft. Minimize contacts and contact time to that required for safe recovery of the aircraft.
  2. When necessary to complete contingency operations, deployment, redeployment, or when specifically directed by MAJCOM.
- b. Conduct Emergency Override (manual boom latching) training with receiver instructor pilot supervision. Brief procedures during mission planning. Coordinate receiver pilot and boom operator procedures IAW applicable refueling tech orders. Receivers must demonstrate disconnect capability prior to accomplishing manual boom latching.

## **AIR REFUELING BREAKAWAY TRAINING / ENVELOPE LIMITS DEMONSTRATION**

- a. Do not accomplish breakaway training or demonstrate envelope limits while in contact unless the receiver system is in normal and a tanker disconnect capability has been checked with the applicable receiver by either a boom operator initiated or a boom limit switch disconnect.
- b. For breakaway training, the tanker pilot, boom operator, and the receiver pilot must coordinate the maneuver before its actual accomplishment. This co-ordination must include when the maneuver will occur and who will give the command of execution.

## **NAVIGATION EQUIPMENT**

- a. An INS must be operational as the prime navigation model for takeoff on all missions except for:
  - 1. Flight in the local area during day VMC
  - 2. Missions outside the local area requiring INS in-flight alignment may launch with Operations Supervision approval provided VMC can be maintained until the INS is aligned.
- b. Do not takeoff with the GSS inoperative (steady illumination of the GSS caution light) unless performing a simulated GPS-out sortie in an INSR-modified aircraft. GPS-out flight considerations must be briefed during mission brief including but not limited to INS alignment procedures and radar position update points.
- c. The two primary attitude modes (INS and GSS) will be operational for night/IMC flight.
- d. Selecting Dead Reckoning (DR) as the prime navigational model for training is not considered loss or degradation of the INS.
- e. Do not take off if the INS and GSS headings differ more than 4 degrees (unless staying in the local area under day VMC).
- f. Flight Instruments: Both aft station attitude indicators and one FPI must be fully operational for takeoff.

## **AIRCRAFT LIGHTING**

- a. Position Lights: Wing tip and wing glove position lights must be operable from sunset to sunrise to ensure one light per side will be illuminated at all times in flight regardless of wing position.
- b. Anti-Collision Lights: Must be on from takeoff to landing unless their operation adversely affects performance of duties.
- c. Reduced lighting is defined as anything other than full-up normal lighting (Anti-Collision on; position Bright & Steady) and is authorized only in SUAS IAW range guide or SPINS. Ref: AFI 11-214 3.8.2.1.1, AFI 11-202v3 3.15.4, AFI 11-2B-1v3 EAFB 4.9, T.O. 1B-1B-1 section 2.

## **TRAFFIC PATTERN AND LANDING**

- a. See Landing Limitations and Restrictions table (this guide).
- b. Aircrew will not practice no flap/slat full stop landings.

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- c. Practice traffic pattern operations are prohibited under the following conditions:
  - 1. Any engine shutdown
  - 2. Unable to set military power on all four engines using normal throttle system
  - 3. Aircrew will not perform overhead patterns at night.
- d. Normal touch-and-go landings or low approaches are permitted with a PITCH AUG 1, ROLL AUG 1, YAW AUG 1, and/or SPOILER 1 caution light illuminated.

## **VISUAL FORMATION**

- a. Aircrew will only fly visual formations (Route/Observation, Fluid, Wedge, and/or Line Abreast (LAB)) during daylight hours (official sunrise to sunset). B-1 visual formation with greater than a two-ship element may be flown in support of WIC syllabus requirements or with OG/CC approval.
- b. Equipment:
  - 1. Flight leads will tailor maneuvering for aircraft with degraded Stability SEF capability.
- c. Minimum Weather:
  - 1. Aircrew flying visual formation at or above 5,000 feet AGL will remain clear of clouds with at least 2 NM visibility.
  - 2. Aircrew flying visual formation below 5,000 feet AGL will remain in VMC with a ceiling no less than 1,500 feet AGL and 5 NM visibility.
- d. Low Altitude:
  - 1. Aircrew will only fly in the Stream or Wedge position during tactical maneuvering below 5,000 feet AGL. Aircrew will not fly the Wedge position below 500 feet AGL.
  - 2. Aircrew will not initiate or accomplish rejoins below 1,000 feet AGL.
  - 3. Aircrew may fly in the Fluid or Route position below 5,000 feet AGL during departures, recoveries, or authorized flyovers. Flyovers in route/fluid are limited to 350 KIAS or less, unless both Aircraft Commanders are qualified and current in Low Altitude Visual Formation.
- e. Route/Observation:

Route/Observation is not a tactical employment formation. Aircraft will stabilize at 1,000 feet separation prior to proceeding closer to lead.

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## LOW ALTITUDE TRAINING

- a. Minimum weather for visual contour flight or TF flight for crews not night/IMC qualified is 1,500 foot ceiling and 5-mile visibility for training areas or as defined in FLIP for VR routes.
  1. Visual contour flight at night is prohibited.
  2. TF operation above cloud decks in VMC conditions is not restricted.
- b. Do not use ORS quiet mode during night/IMC below 5000' AGL.
- c. The terrain following system must be fully operational to conduct TF operations. Additionally, both pilots will select TER FLW on their VSD during night or IMC TF operations. One pilot may select BU on their VSD while the other pilot is in TER FLW during TF operations in day/VMC conditions.
- d. First and Second Detent positions will not be used to maintain TF altitudes. First Detent may only be used to increase the set clearance plane or to climb to MSA/RAA during night/IMC.

Minimum Altitudes for Low Altitude Training			
	Visual Contour	Day/VMC TF	Night/IMC TF
Aircrew under FIC Instructor IP Supervision (In support of MAJCOM formal training syllabus or with OG approval)	500' AGL	200' AGL	500' AGL
Aircrew under 77 WPS IP or Test IP supervision	300' AGL	200' AGL	500' AGL
FCF Qualified Aircrew	500' AGL	200' AGL (to accomplish required bias checks on TF systems)	500' AGL
Minimum altitudes for military training routes in FLIP AP/1B, <i>Military Training Routes</i> , and those provided by the local airspace managers at the originating activity will take precedence if higher than the altitudes listed above.			

## STEADY STATE WINDS

Normal flying training operations will not be conducted when surface winds along the intended route of flight exceed 35 knots steady state over land (25 knots over water) or when the Sea State exceeds 10 feet wave height. This is not intended to restrict point-to-point operations or ocean crossings when only a small portion of the route is affected. If possible, alter the mission-planned route to avoid the high winds and high Sea State area. The OG/CC (or equivalent) is the waiver authority.

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## **EXCESSIVE ALTITUDE VARIATION**

a. In an IR route when the altitude variation exceeds -400 feet the MSA/RAA altitude no longer provides safe terrain clearance. Aircrews are not restricted during day and VMC. At night or in IMC aircrews may fly TF without using MSA; however, if an aircrew requires flight at MSA (due to a flyup or mandatory IFR leg) the aircrew will abort the route.

b. In SUA when the altitude variation exceeds -400 feet aircrews may continue low altitude operations if they can raise their MSA without exiting the airspace. Aircrews will increase their MSA by at least the amount of the altitude variation.

1. The difference between aircraft pressure altitude with the most current altimeter setting and the Offensive Avionics System (OAS) exceeds -400 feet. Measure this by taking an altitude calibration (ACAL) and comparing MSL to OAS altitude. For example, a 2420 MSL pressure reading and a 2000' OAS altitude indicates a -420' altitude variation.

2. The aircraft radar altimeter indicates less than a 600-foot terrain crossing while at MSA/RAA. Use this method with caution in mountainous terrain. Additionally, this method may provide erroneous information when operating above a cloud deck due to occasional radar altimeter lock on to clouds.

## **LOW ALTITUDE EQUIPMENT RESTRICTIONS**

a. Do not use ORS quiet mode during night/IMC below 5000' AGL. Do not initiate the penetration to low altitude or continue low altitude training if any of the following conditions exist:

1. Any Flt Control system malfunction that denies the pilot a safe margin of control.
2. Loss of RBGM and HRGM during night/IMC. RBGM and HRGM off/out operations are authorized during day VMC only. During night VMC, climb to MSA/RAA until radar malfunction is corrected.
3. Loss of all INS during night/IMC. INS(s) out/off operations are authorized during day VMC.
4. Loss of ACUC during night/IMC. ACUC out/off low altitude operations are authorized during day VMC while attempting to recycle the ACUC.
5. At least one operable MFD at the OSO station and the DSO MFD must be operable.

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6. Loss of all attitude reference systems (GSS and INS).
7. Loss of all radar altimeter. Low altitude activity may be continued at MSA.
8. Loss of either aft station attitude indicator during night / IMC.
9. Loss of SMCS.

**NOTE**

An aircraft experiencing an inoperative SMCS after entering low altitude may continue. Annotate malfunction on AFTO 781. Aircraft continuing low altitude with inoperable SMCS will climb to MSA if they encounter sustained or frequent turbulence. If turbulence continues at MSA, abort the route.

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## LOW ALTITUDE DECISION MATRIX

MALFUNCTION / SITUATION	ENTER	ABORT / CONTINUE	FLY VISUAL CONTOUR	FLY TF
ANY FLIGHT CONT MALF DENIES PILOT A SAFE MARGIN OF CONTROL	NO	ABORT	NO	NO
LOSS OF RBGM AND HRGM	NIGHT/IMC: <b>NO</b> DAY/VMC: <b>YES*</b>	NIGHT/IMC: <b>ABORT</b> NIGHT / VMC: <b>RECYCLE AT MSA</b> DAY/VMC: <b>CONTINUE*</b>	YES	YES*
LOSS OF ALL INS	NIGHT/IMC: <b>NO</b> DAY/VMC: <b>YES*</b>	NIGHT/IMC: <b>ABORT</b> DAY/VMC: <b>CONTINUE*</b>	YES	NO
LOSS OF ACUC	NIGHT/ IMC: <b>NO</b> DAY / VMC: <b>YES*</b>	NIGHT/ IMC: <b>ABORT</b> DAY / VMC: <b>CONTINUE</b> <b>TO RECYCLE AT MSA</b>	YES	NO
LOSS OF DSO MFD OR BOTH OSO MFD's	NO	ABORT	NO	NO
LOSS OF BOTH GSS & INS ATT REF SYSTEM	NO	ABORT	NO	NO
BOTH RA FAIL	NO	CONTINUE AT MSA	NO	NO
LOSS OF ONE AFT STATION ATTITUDE INDICATOR	NIGHT/IMC: <b>NO</b> DAY/VMC: †	NIGHT/IMC: <b>ABORT</b> DAY/VMC: †	†	YES
LOSS OF SMCS	NO	W/O SUSTAINED OR FREQUENT TURBULENCE: <b>CONTINUE</b> OTHERWISE: FLY MSA IF TURB CONT AT MSA: <b>ABORT</b>	YES	YES
PRIME INS FINE LIGHT ON	YES	NIGHT / IMC: CONTINUE AT MSA	YES	NO
OFF ROUTE TIMING	NO	ABORT	NO	NO
FORCASTED/REPORTED LIGHT ICING OR FORCASTED MODERATE	YES	ABORT IF ICE LIGHT ILLUMINATES OR ICING IS ENCOUNTERED	YES	YES

\*IF SA CAN BE MAINTAINED VISUALLY

† Continuing, to include defensive maneuvering, is at the discretion of the crew.

## **CARRYING MUNITIONS ON TRAINING FLIGHTS**

- a. Do not open weapon bay doors during flight with weapons on board other than for intentional release or jettison.
  - b. Accomplish the Bomb Steer or LAR check over open water or sparsely populated areas to the maximum extent possible.
  - c. Aircrew may accomplish Pre-Release checklist items prior to release when carrying weapons, however, the Bomb Release Mode Switch and the Missile Launch Mode Switch will both remain in MANUAL until release clearance is received, within range boundaries, and the aircrew is ready to release weapons.
  - d. After an unsuccessful release attempt confirm with RCO and follow hung ordinance procedures in AFI 11-2B-1v3 EAFB Addendum A and this IFG section 5 if a hung weapon is suspected.
  - e. Air refueling is authorized with hung weapons if required to ensure safe recovery of the aircraft.
  - f. While carrying weapons, do not conduct simulated bomb or missile runs, unusual maneuvers, approach to stall or touch-and-go landings. Aircrew may accomplish low altitude training and electronic attack (EA) with retained weapons provided they do not select or designate targets.
  - g. Simulated weapons attacks following actual releases: Conduct simulated attacks provided:
    1. No release system, indicator, or weapon bay door malfunction exists.
    2. Post release/abort checklist is complete.
    3. Release system is in Full Simulation.
  - h. Based upon historical weapons impact data with the Mk-82A/BDU-50A, the following range corrections are authorized for use and will be applied to the [GAB] page for all releases.

Low Drag	+450 feet
High Drag	-150 feet
- Note: Use only ballistics for actual weapons loaded (i.e. – don't use Mk-82A ballistics when dropping BDU-50A)

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i. Aircrew will visually inspect all weapons containing the BDU-50 bomb body to determine the variant on the aircraft. The BDU-50 C/B can be identified by the raised "EMPTY" lettering on the front and aft portions of the bomb body. Aircrew releasing BDU-50 C/B in any unguided configuration will:

1. Not release from greater than 17,000' height above target
2. Ensure a 2,000' radius in all directions from the target is fully within the range impact area.

#### **FUELS (AFI 11-2B1V3/EAFB ADDA)**

12,000 - Emergency Fuel

16,000 - Min Fuel, Final Landing.

35,000 - Local Area (1 Apr - 31 Oct)

40,000 - IAF, Remote or Island, No Alternate Required

45,000 - Local Area (1 Nov - 31 Mar)

60,000 - IAF, Remote or Island, Alternate Required

#### **RCR (AFI 11-2B1V3)**

TAKEOFF / LAND 9\*

TAXI 9\*

TOUCH-N-GO 12

\* = Requires OG/CC approval if less than 9.

#### **MAXIMUM CROSSWIND (AFI 11-2B1V3 AND EAFB ADDA)**

TAKEOFF 26 Kts

FULL STOP 26 Kts

TOUCH & GO 20 Kts

NOTE: OG/CC May Waive Up To Tech Order Maximum

#### **WINDS GREATER THAN 35 KNOTS (AFI 11-2B1V3)**

Landing with steady state winds in excess of 35 knots requires OG/CC approval and will be to a full stop.

<b>ELLSWORTH AFB AIR TRAFFIC CONTROL &amp; LOCAL AIRSPACE</b> <b>(EAFBI 11-250)</b>
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NAVAIDS: TACAN (RCA), VORTAC (RAP), ILS both runways

To protect the overhead pattern, departures will maintain at or below 4,000 ft MSL until the departure end of the runway.

**Standard Climbout:**

**RWY 31:** Maintain at or below 4,000 ft MSL until departure end of runway, then turn right heading 040 degrees, climb and maintain 6,000 ft MSL and contact Approach on 259.1 (or Arrival on 284.0 if appropriate).

**RWY 13:** Maintain at or below 4,000 ft MSL until departure end of runway, then turn left heading 040 degrees, climb and maintain 6,000 ft MSL and contact Approach on 259.1 (or Arrival on 284.0 if appropriate).

Overhead Pattern Altitude: 5,000 ft MSL

RWY 31: LEFT break, RWY 13: RIGHT break

VFR Rectangular Traffic Pattern 4,500 ft

All aircraft in the VFR pattern will remain north of the ridgeline separating Rapid City Regional and Ellsworth's Class D airspace unless approval is received from Ellsworth tower.

EAFB IFR CONDITIONS: Ceiling < 1,000 ft AGL or Vis. < 3 miles. (AFI 11-202v3 requirements still apply)

OVERHEAD PATTERN CLOSED: Ceiling less than 2,200 ft AGL.

RECTANGULAR PATTERN CLOSED: Ceiling is less than 1,700 ft AGL.

- The decision to open or close the VFR patterns is contingent upon the ability of the Control Tower to provide safe positive control and is at the discretion of the Control Tower watch supervisor.

**NORDO PROCEDURES:**

IFR: Aircraft losing two-way communication capability while in the IFR environment will be expected to squawk the appropriate beacon code, proceed direct to RUUSH, and complete the entire published ILS approach to the active runway. Observe the Control Tower for light gun signals prior to landing and after landing.

VFR: 28 BW aircraft losing two-way communication capability while in the VFR pattern will be expected to proceed to a 3-mile initial, rock the wings, break to the west, and observe the tower for the appropriate light gun signal.

### **Engine Start Prior to Airfield Opening**

In those instances where engine start is required prior to the airfield opening, aircrew will contact Raymond 33 on 311.0 and advise of engine start with callsign and parking location. In the event of a ground emergency, coordinate fire coverage and emergency response via Raymond 33 on 311.0. When the tower opens, positive transfer of control between Raymond 33 and ATC will occur. ATC will then conduct a roll-call of all aircraft on engines for accountability.

### **Local flight restrictions:**

Aircrew will fly restricted low approaches at 1,000 ft AGL (4,300 ft MSL).

SOF/Tower Flybys for aircraft inspection will be at 3,700 ft MSL.

Quiet hours are between the hours 0030L and 0600L. Takeoffs during this period require 28 OG/CC approval.

Aircraft will not over-fly Rapid City below 5,500 ft MSL except for approved mission requirements.

Aircrew will avoid over-flying Mt. Rushmore by at least ½ NM laterally or 7,700' MSL vertically.

Aircrew will avoid Bear Butte, defined by the RCA 317/25 fix, by 2 NM and 10,000' MSL to the maximum extent possible.

Aircrew will avoid Devils Tower by 5NM laterally unless in Class A Airspace.

## COLD WEATHER / ICING PROCEDURES (T.O. 1B-1B-1)

### DEICING SPOTS (IAW AFI 21-101/EAFB Sup)

Deicing can be done on Spots 5-22, DV1-2, 60/70 Rows, including taxiway alpha in front of 60/70 Rows, Spots 205-206 on alert pad, hot cargo pad, taxiway delta west, and taxiway delta. Rows 80-90, Spots 1-4, 328 & 329, 100 Row, LOLA, and North Hammerhead are non-discharging areas. Storm drains must be closed prior to deicing.

### GROUND OPERATIONS

**\*\* (Deviations from these restrictions require 28 OG/CC approval)**

The following definitions apply:

- Induction Icing Potential Zone: Temp less than 47°F and relative humidity  $\geq 50\%$
- Dry pavement is wetted (damp) surface, frost or non-accumulating dry snow.
- Wet pavement has visible surface water, melting snow/ice, or slush.
- Visible moisture is rain/drizzle, freezing rain/drizzle, snow or when visibility in fog is less than 1 mile.

a. In the induction icing potential zone (refer to table on pg. 3-6 for quick reference):

At or below +47° F: Position the Anti-ice switch to MAN during engine ground operation, and to AUTO when performing the Before Takeoff Check. Taxi and takeoff operations are permissible over standing water.

- Between +36° F and +47° F inclusive: Engines may be operated over dry pavement with or without visible moisture present at any power setting for 15 minutes with 15 minute increment extensions provided a ground observer can verify no nacelle ice is present. Over wet pavement, with or without visible moisture present, engines may be operated at any power setting for 10 minutes with 10-minute increment extensions provided a ground observer can verify no nacelle ice is present. Taxi and takeoff are authorized under these conditions provided no ice buildup was observed while the aircraft was stationary.
- Between -20° F and +35° F inclusive: Engine operation over dry pavement with no visible moisture present is limited to idle power for 15 minutes with 15-minute increment extensions provided a ground observer can verify no nacelle ice is present. Engine operation over dry pavement with visible moisture present or over wet pavement with no visible moisture present is limited to idle power for 10 minutes with 10-minute increment extensions provided a ground observer can verify no nacelle ice is present. Engine operation over wet pavement with visible moisture present is limited to idle power for 3 minutes with 3-minute increment extensions provided a ground observer can verify no nacelle ice is present. Engines may also be operated above idle power for any of the previously mentioned conditions and time limits provided a ground observer continuously monitors the engine run-up to verify no nacelle ice is present. Taxi and takeoff are authorized under these conditions provided no ice buildup was observed while the aircraft was stationary.
- There are no engine operating restrictions below -20° F.

b. System time limits:

- < 0° F - Do not turn on PACU for 5 minutes after power available
- < -30° F - Do not turn on PACU for 15 minutes after power available
- < -31° F - Landing: Idle engines for 10 minutes prior to shutdown

**CONTINUED NEXT PAGE...**

c. RCR less than 9: 28 OG/CC approval is required to **TAXI, T/O or LAND**.

d. UKE requires minimum RCR of 8 for aircraft towing.

- If RCR is below 8, only the 28MXG/CC, 28MXG/CD, or 28MXG/MX EM can authorize aircraft towing.

**NOTE:** Aircrew must coordinate with maintenance personnel to ensure sufficient illumination is available to verify nacelle and RCS vanes remain clear of ice when an observer is required.

B-1 Icing Envelope					
ENGINE GROUND OPERATIONS					
OAT (DEG F)	GROUND CONDITION (NOTE 1, 2)	VISIBLE MOISTURE (NOTE 3)	STATIONAR Y RUN TIME	ENGINE POWER	OBSERVER REQUIRED (NOTE 4, 5)
> +47	ANY	ANY	UNLIMITED	ANY	No
+36 to +47	DRY	ANY	15 MIN	ANY	if > 15 Minutes
	WET	ANY	10 MIN	ANY	if > 10 Minutes
-20 to +35	DRY	NO	15 MIN	IDLE	if > 15 Minutes
				Above IDLE	at all times
		YES	10 MIN	IDLE	if > 10 Minutes
				Above IDLE	at all times
	WET	NO	10 MIN	IDLE	if > 10 Minutes
				Above IDLE	at all times
		YES	3 MIN	IDLE	if > 3 Minutes
				Above IDLE	at all times
< -20	ANY	ANY	UNLIMITED	ANY	No
NOTES					
<ol style="list-style-type: none"> <li>1. Dry pavement is wetted (damp) surface, frost or non-accumulating dry snow.</li> <li>2. Wet pavement has visible surface water, melting snow/ice, or slush.</li> <li>3. Visible moisture is rain/drizzle, freezing rain/drizzle, snow, or when visibility in fog is less than 1 mile.</li> <li>4. 3, 10, or 15 Minutes is estimate of time to accrete FOD potential ice. Additional operating time possible if inlet inspection shows no ice.</li> <li>5. When observer is required "at all times", the observer will continuously monitor the engine nacelle inlet lips, nacelle walls, and the RCS vanes to verify no ice is accumulating.</li> </ol>					

**\*\*Taxi/Takeoff** is authorized in all cases provided no icing was observed while the aircraft was stationary

**CONTINUED NEXT PAGE...**



## **APU OPERATIONS**

### **CAUTION**

Prior to coupling APUs to ADGs in temperatures below 0° F (-18° C), operate APUs for at least 4 minutes to prevent damage to the APU clutch. If preconditioning was performed, this procedure is not required.

### **Ellsworth AFB – IFG Procedures**

0-40° F – Run APUs for 2 min prior to coupling

- Allow 1 minute after coupling before bringing generators online but do not exceed 5 minutes of APU operation without A/C power. For Operations below 0° F the 4 min preconditioning of ADGs and the 1 min prior to bringing generators online brings you to the 5 min limit of APU operation without A/C power.

## **TAXI OPERATIONS**

- Prior to taxiing, check flight controls and flaps and slats for ease of operation and to circulate warm fluid throughout the systems. After releasing parking brake, depress and release brake pedals to ensure freedom of Operation.
- RCR < 9, need OG/CC approval to TAXI, TAKEOFF or LAND
- Taxi and T/O are permitted over standing water when OAT is ≤ 47° F. After taxi, if the aircraft will be stopped for an extended period of time, aircrew will observe the stationary time limits outlined on page 3-5 and coordinate for a ground observer, if required.

## **ERCC OPERATIONS**

- During ERCC operations when the potential for induction icing exists, the outgoing ERCC crew will coordinate with SOF and MOCC to ensure a crew chief or ground observer is present to inspect engine inlets.

**CONTINUED NEXT PAGE...**

## INFLIGHT OPERATIONS

### INFLIGHT OPERATIONS (ICING DECISION MATRIX) REF: 1B-1B-1

	Trace	Forecast Light	Reported Light	Forecast Mod	Reported Mod	Severe	Remark
T/O / Land	Y*	Y	Y*	Y*	N	N	*Authorized if executed as rapidly as possible
Climb / Desc	Y*	Y	Y*	Y*	N	N	*Authorized if executed as rapidly as possible
Cruise	Y	Y*	N	Y*	N	N	*Avoid clouds and/or liquid precip above the freezing level
Transition	Y*	Y*	Y*	N	N	N	*Authorized if report is >20NM from field *If ICE light illuminates the next approach will be a full-stop
Low Altitude	Y*	Y*	Y*	Y*	N	N	*Terminate if actual icing conditions encountered or ICE light on steady

#### CAUTION

Do not conduct low altitude flights in areas of forecast severe icing conditions or areas of reported moderate or severe icing conditions. Engine damage due to ice FOD may occur.

#### CAUTION

Do not fly in areas of forecast severe icing conditions or in areas of reported moderate or severe icing conditions. Engine damage due to ice FOD may occur.

#### NOTE

If conditions permit, leave the gear down for approximately 30 seconds after takeoff or a touch and go, to clear struts of ice and snow when freezing conditions exist and visible moisture is present. Automatic braking after gear retraction could cause wet brakes to freeze closed and/or lock.

**CONTINUED NEXT PAGE...**

**Table of Total Temp(°C) for a given Mach # and OAT that it equates to**

OAT	.72M	.76M	.80M	.85M	.90M	.92M	.95M
<b>-20° C</b>	6°	10°	13°	17°	21°	23°	26°
<b>-30° C</b>	-5°	-2°	1°	5°	10°	12°	15°
<b>-40° C</b>	-16°	-13°	-10°	-6°	-2°	0°	2°


The Left or Right Bleed Air Overheat light illuminated in conjunction with the Ice light is indicative of significant ice accumulated on the precooler inlet. Damage to the engine is very likely, especially during large thrust changes (i.e. go-around and touch-and-go's). The precooler temperatures should be monitored closely using the PMCs on the following page (they are a quick reference--refer to the Dash 4 for more detailed analysis). The precooler blowers will be commanded on to provide cooling for the remainder of the flight. Use the "Status" PMCs on the following page to see if they're on. Overheating of the blower may occur if the wings are swept aft of 47°. If it is absolutely necessary to reset a blower, turning off both bleed air switches on the affected side for at least 10 seconds may turn it off.

Precooler Temperature Quick Reference		
3023004	Left Precooler Temp	1.83 v =200°/2.50v=300°
4023004	Right Precooler Temp	3.83 v=500° (upper limit)
Precooler Blower Status		
3023003	Left Precooler Blower	2.9 - 3.4 Volts = Blowers
4023003	Right Precooler Blower	Normal

## LANDING

- RCR less than 9 requires OG/CC approval
- Vis Moisture: rain/drizzle, freezing rain/drizzle, snow, fog vis < 1NM.
- Come to complete stop prior to exiting runway when RCR is low
- Hydroplaning may occur in slush or water in excess of 0.3 inch
- Avoid flight in rain, if req'd maintain <.85M
- During descent, if throttles in idle, alternately advance to 85% core.

# COLD WEATHER ALTIMETER CORRECTIONS (AFI 11-202V3/11-217V1/FIH)

1. When flying IFR, or VFR at night, over mountainous terrain with the outside air temperature (OAT) colder than ISA minus 10°C, plan to fly at least 1,000 ft. above published minimum altitudes obtained from terrain and IFR enroute charts (e.g. minimum enroute altitudes (MEA), minimum obstruction clearance altitudes (MOCA), OROCA's or other minimum safe altitudes during low-levels).
2. Pilots will not apply a temperature correction to an ATC assigned altitude, but may refuse a lower altitude if obstacle protection is in doubt.
3. When applying corrections to IAP altitudes, pilots will advise ATC of all applied temperature corrections.
4. If a  symbol is annotated on an approach plate, calculate corrections per "Cold Temperature Restricted Airports" NOTAM and AFI 11-202V3 guidance. If there is a discrepancy between corrections, use the highest calculated correction. Note: The FIH "Temperature Correction Chart" is under revision.

## Cold Temperature Restricted Airports NOTAM Method:

TBL 7-2-3  
ICAO Cold Temperature Error Table  
Height Above Airport in Feet

	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
Reported Temp °C														
+10	10	10	10	10	20	20	20	20	20	30	40	60	80	90
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10	20	30	40	50	60	70	80	90	100	150	200	290	390	490
-20	30	50	60	70	90	100	120	130	140	210	280	420	570	710
-30	40	60	80	100	120	140	150	170	190	280	380	570	760	950
-40	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
-50	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

### EXAMPLE-

Temperature -10 degrees Celsius, and the aircraft altitude is 1,000 feet above the airport elevation. The chart shows that the reported current altimeter setting may place the aircraft as much as 100 feet below the altitude indicated by the altimeter.

## THUNDERSTORM / LIGHTNING AVOIDANCE

### **Flying Operations:**

Pilots will not takeoff, land, or fly an approach at an airport where thunderstorms or other hazardous conditions are producing hail, strong winds, gust fronts, heavy rain, lightning, windshear, and (or) microbursts. (AFI 11-202V3)

In the vicinity of the airport of intended takeoff and/or landing, maintain at least 5 NM separation from heavy rain showers. The OG/CC or designated representative may authorize approaches or departures if thunderstorms are officially observed to be closer than 10 NM from the airport. Thunderstorms must not be producing hazardous conditions at either the airport or in the landing or takeoff corridors being used. Thunderstorms must not be forecast or observed to be moving in directions that threaten either the airport of landing/takeoff corridors. (AFI 11-202V3)

During the enroute portion of the flight, avoid thunderstorm activity by any means available by at least: (AFI 11-202V3)

20 NM at or above FL230

10 NM below FL230

### **Ground Operations:**

1. If lightning is outside of 5 NM, aircrew may shutdown and leave the aircraft for another form of shelter (vehicle/building).
2. If lightning is within 5 NM, aircrew will remain inside the aircraft.
  - Aircrew may continue to operate engines or APU's.
  - During hail, aircrew will shutdown engines (but may remain on APU's) to prevent FOD.
  - The decision to shut down or remain on power rests with the aircraft commander.
  - Consider all weather conditions (hail, induction icing, etc...) as each storm situation is unique.
3. If lightning is within 5 NM and other more severe weather conditions are present or forecast (i.e. tornadoes), then the aircrew may leave the aircraft for other shelter.
4. If lightning strikes the aircraft, aircrew will completely shutdown. The decision to egress the aircraft while lightning is within 5 NM is up to the aircraft commander and will take into consideration the closest shelter location, anticipated duration of the lightning condition, and additional hazards associated with the storm.
5. If the aircraft commander decides or is directed to move the aircraft, limit movement to the minimum required. Aircrew will not move the aircraft from the parking rows without marshallars.
6. Aircraft commanders will ensure maintenance personnel comply with their guidance and seek shelter (inside a vehicle, building, or inside the aircraft) when lightning is within 5 NM. More severe weather may require maintenance personnel to secure outside work and evacuate the flight line to take shelter.

## BIRD WATCH CONDITION CODES

### PATTERN

<u>Condition</u>	<u>Actions</u>
<b>LOW</b>	<b>LOW</b>
Normal bird activity on and above the airfield with a low probability of hazard.	Normal operating procedures are in effect.
<b>MODERATE</b>	<b>MODERATE</b>
Concentrations of birds observable in locations that represent a probable hazard to safe flying operations. For example: 10-30 small birds on the airfield environment, but not near the runway or approach/ departure paths or one or two hawk-size birds or other predators flying near runway.	<p>All aircraft arrivals will terminate to a full stop landing.</p> <p>Takeoffs require OG/CC approval.</p> <p>Aircrew may request a Bird Watch Condition update before each approach from the SOF. Make this request prior to reaching the final approach fix. Pilots will be particularly cognizant of bird activity when on final approach and will initiate an early go-around if birds are observed near the planned flight path. The SOF or tower supervisor may set minimum altitudes for low approaches.</p>
<b>SEVERE</b>	<b>SEVERE</b>
Heavy concentration of birds on or immediately above the active runway or other specific locations representing an immediate hazard to safe flying operations. For example: 20-40 small starling size birds congregating on approach or a smaller group of 4-10 duck or goose size birds.	<p>Do not takeoff without 28 OG/CC approval.</p> <p>No landings or approaches without OG/CC approval except for emergencies.</p>

(EAFB BASH Plan)

### MOA/LOWAT

Aircrew will not enter the low-altitude structure (below 5,000' AGL) in airspace where the relative risk is labeled "MODERATE" or "SEVERE" without receiving the appropriate approval.

- BAM/AHAS MODERATE. With Top 3 approval, crews may fly no lower than 1,000' AGL for no longer than 30 minutes per sortie in airspace where the relative risk is labeled BAM "MODERATE."

- BAM/AHAS SEVERE. With OG/CC approval, crews may fly no lower than 2,000' AGL for no longer than 15 minutes per sortie in airspace where the relative risk is labeled BAM "SEVERE."

### PHASE II BASH

Takeoffs, landings, and pattern work will not be conducted or scheduled from one hour prior to or one hour after sunset or sunrise without OG/CC approval.

- At night, aircrew will query the SOF for current AHAS risk conditions upon initial check-in to the local area.

- During night pattern work, the SOF will inform aircrew when the AHAS risk reported on the website is "severe." When the AHAS risk is "severe," aircrew will limit night pattern work to the minimum required for updating currencies and ensuring proficiency.

## CITS PMCs

APU START ACCUMULATOR PRESSURE				
LEFT -	310802023	ON = < 3,000 PSI	OFF = 4,000 PSI	
RIGHT -	310602025	ON = < 3,000 PSI	OFF = 4,000 PSI	
AFT BATTERY CHARGE STATUS				
310701012		OFF = CHARGED ON = NOT CHARGED		
WING SWEEP				
LEFT WING -	1223001124	20 = -3.24	55 = +2.1	
RIGHT WING	2224001124	25 = -2.48	65 = +3.62	
	15 = -4.00	45 = +0.57	67.5 = +4.0	
TF ADAPTERS				
1227203128		≥ +3.0 ATF ENGAGED (Ch 1)		
1227212128		≥ +3.0 ATF ENGAGED (Ch 2)		
2227203128		≥ +3.0 ATF ENGAGED (Ch 3)		
2227212128		≥ +3.0 ATF ENGAGED (Ch 4)		
EMUX				
311100013	MUX 1 SIDE A			
311000013	MUX 1 SIDE B		ON = SIDE ON LINE	
311100077	MUX 2 SIDE A		OFF = SIDE OFF LINE	
311000077	MUX 2 SIDE B			
BALLAST TANK ISOLATION VALVE				
310802027	ON = OPEN	OFF = NOT OPEN	}	Primary PMCs
310902027	ON = CLOSED	OFF = NOT CLOSED		
310102071	ON = OPEN	OFF = NOT OPEN	}	Alternate PMCs
310202071	ON = CLOSED	OFF = NOT CLOSED		
Note: If the valve has failed in an intermediate position, all PMC's will indicate OFF.				
CSD DECOUPLE VERIFICATION				
IDG 1:	3016020	OFF = Volts Low	3016017	OFF = Speed low
IDG 2:	3016036	"	3016033	"
IDG 4:	4016020	"	4016017	"

CONTINUED NEXT PAGE...

PRECOOLER BLEED AIR TEMPERATURES			
3023004 - LEFT	3.8 Volts = 500° Max	If Pilots get <b>Bleed Air Caution Lights</b> - Dash 1 Sec 3 - CITS Sec 3	
4023004 -	2.5 Volts = 300°		
RIGHT	1.83 Volts = 200°		
PRECOOLER BLOWERS			
3023003 – LEFT	2.9 - 3.4 BLOWER NORMAL		
4023003 – RIGHT			
FUEL TEMPERATURES			
2010014 – LEFT MAIN TANK	2.00 = 100°	1.17 = 130°	0.47 = 165°
2010021 – RIGHT MAIN TANK	1.70 = 110°	0.94 = 140°	
	1.42 = 120°	0.74 = 150°	
FLAPS DOWN/UP			
1223002124 - LEFT	Volts = +4.0 Down / - 4.0 Up		
2224002124 - RIGHT	Volts = +4.0 Down / - 4.0 Up		
GEAR DOWNLOCKS			
	Right MLG	311002053	
	Left MLG	310302053	On = Locked
	Nose LG	310302013	Off = Not Locked
BRAKE TEMPERATURES			
3 4010044	4 4010045	0.633 = 100°	
5 4010046	6 4010047	1.066 = 200°	
7 4010048	8 4010049	1.499 = 300°	
9 4010050	10 4010051	1.932 = 400°	
		2.365 = 500°	
Left	Right	<b>CAUTION</b>	<b>2.800 = 600°</b>
3 4	5 6		3.250 = 700°
7 8	9 10		3.698 = 800°
		<b>DANGER</b>	<b>4.125 = 900°</b>
			4.529 = 1,000°
FCGMS SET MODE			
311401067	BIT 14 OFF = NORMAL		
	BIT 14 ON = SET		
LINKAGE SHAKER MOTORS			
	4010121		
	4010122	Below 4.0 is a Failure.	

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SEF/SIS TF ADAPTER CHANNEL STATUS					
310001073 Chan 1		BIT 00 = ON Chan 1 VALID			
310101073 Chan 2		BIT 01 = ON Chan 2 VALID			
310901098 Chan 3		BIT 09 = ON Chan 3 VALID			
311001098 Chan 4		BIT 10 = ON Chan 4 VALID			
TRUE OUTSIDE AIR TEMPERATURE					
CADC1 CH-1 311630100			CADC1 CH-2 311631021		
CADC2 CH-1 311611100			CADC2 CH-2 311612021		
Temp	Volts	Temp	Volts	Temp	Volts
120	+1.69	60	+0.52	0	-0.62
110	+1.49	50	+0.33	-10	-0.81
100	+1.30	40	+0.14	-20	-1.00
90	+1.10	30	-0.05	-30	-1.20
80	+0.91	20	-0.25	-40	-1.40
70	+0.71	10	-0.44	-50	-1.58
MACH AIRSPEED					
311630095		Direct Mach Readout			
G-LOADING/WEIGHT/FUEL					
B316000	VOLTS x 10 = G Limit for Aircraft Configuration				
B316001	VOLTS x 10 = Current G on the Aircraft				
B316002	VOLTS x 10 = Peak Load Experienced				
B316003	VOLTS x 100k = Gross Weight				
B316004	VOLTS x 10k = Total Fuel On Board				
BOMB DOOR SPOILER POSITION					
<u>EXTENDED</u>					
310402073	FWD BAY	BIT 04 - ON			
310801113	INT BAY	BIT 08 - ON			
310902073	AFT BAY	BIT 09 - ON			
GENERATOR DIFFERENTIAL PROTECTION TRIP					
<u>GEN</u>	<u>PMC</u>	<u>DIFFERENTIAL TRIP</u>		<u>GENERATOR NORMAL</u>	
Gen. 1	3016025	CHAN 0025 = OFF		CHAN 0025 = ON	
Gen. 2	3016041	CHAN 0041 = OFF		CHAN 0041 = ON	
Gen. 4	4016025	CHAN 0025 = OFF		CHAN 0025 = ON	

CONTINUED NEXT PAGE...

HYDRAULIC SYSTEM PRESSURE					
	Master		Slave		System
1	4010025		4010029		4010021
2	4010026		4010058		4010022
3	4010027		4010059		4010023
4	4010028		4010060		4010024
	Minimum		3.3 V = 3,500 psi		
	Normal		3.7 V = 4,000 psi		
	Maximum		4.1 V = 4,500 psi		
HYDRAULIC QUANTITY					
			Sys 1 4010105		Sys 2 4010106
			Sys 4 4010108		Sys 3 4010107
	Low Limit		2.56 = 7 gal		2.83 = 12 gal
	Normal		3.50 = 9 gal		3.59 = 15 gal
INLET LIP POSITION					
			<u>40°</u>	<u>10°</u>	<u>0°</u>
1	310502035 BIT 05	OFF	OFF		ON
	311502043 BIT 15	OFF	ON		ON
2	310702035 BIT 07	OFF	OFF		ON
	311102045 BIT 11	OFF	ON		ON
3	310402054 BIT 04	OFF	OFF		ON
	310702046 BIT 07	OFF	ON		ON
4	310002052 BIT 00	OFF	OFF		ON
	311102063 BIT 11	OFF	ON		ON
FUEL COOLING SCOOPS					
Left	311302073 Bit 13	OFF = NOT CLOSED		ON = CLOSED	
	311402073 Bit 14	OFF = NOT 16°		ON = 16°	
	311502073 Bit 15	OFF = NOT 32°		ON = 32°	
Right	310702036 Bit 07	OFF = NOT CLOSED		ON = CLOSED	
	311202052 Bit 12	OFF = NOT 16°		ON = 16°	
	311302052 Bit 13	OFF = NOT 32°		ON = 32°	
SEF SYSTEM TEST STATUS					
311205036		BIT 12 = ON		Battery test complete	
		BIT 12 = OFF		Battery test not started	
310605041		BIT 06 = ON		Battery test failed	
		BIT 06 = OFF		Battery test passed	
311228052		BIT 12 = ON		SEF system test passed	
		BIT 12 = OFF		SEF system test failed	

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## MAINTENANCE BREVITY CODES

### SYSTEM LIMITATION CODES:

- (1) -- System Operationally Ready
- (2) -- System used but Performed Degraded, Minor discrepancies, capable of further mission use
- (3) -- System used but Performed Unsatisfactorily
- (3A) -- Aircrew Requests Maintenance Meet the Jet
- (4/8)-- Aircraft System has suspected NBC contamination
- (5) -- Aircraft or system has suspected battle damage

### AUTO FLIGHT CONTROL

Auto Throttle	A-1
Flap/Slat	A-2
Pitch	A-3
Roll	A-4
Yaw	A-5
SCAS	A-6
SMCS	A-7
Spoiler/Speedbrakes	A-8
Wing Sweep	A-9
Overwing Fairing	A-10
AFCs	A-11

### CITS

Computer/DAU	B-1
Display	B-2
Printing/Recordings	B-3

### COMMUNICATIONS

AFSATCOM	C-1
Aural Tone Generator	C-2
Interphone	C-3
HF Radio	C-4
MRT	C-5
Secure Voice	C-6
UHF Radio	C-7

### HYDRAULICS

Hydraulics	D-1
Landing	D-2

### FUELS

Boost Pumps	E-1
Transfer Pumps	E-2
FCGMS	E-3
Air Refueling	E-4

### DEFENSIVE AVIONICS

Band 4	F-1
Band 5	F-2
Band 6	F-3
Band 7	F-4
Band 8	F-5
Controls & Displays	F-6
EXCM	F-7
Core LRU's	F-8
Tail Warning Function	F-9

### ELECTRICAL

Anti Skid	G-1
DC Power	G-2
Emergency Generator	G-3
Generators	G-4
Lighting	G-5

### EMUX

MUX 1 / MUX 2	H-1
MUX 4 through MUX 13	H-2
Pwr Cont. MUX	H-3

### ENVIRONMENTAL

Anti Ice	J-1
ACL	J-2
ICL	J-3
LCL	J-4
Crew/Avionics Cooling	J-5
Fuel Cooling Scoops	J-6
Ram Air Scoops	J-7
Bleed Air	J-8
MSOGS	J-9
BU Oxygen	J-10

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**INSTRUMENTATION**

CADC	K-1
GSS	K-2
Flight Instruments	K-3
SPI	K-4
VSD	K-5
AOA	K-6

**JETS**

Augmentation	L-1
Nozzle Operation	L-2
Fuel	L-3
Engine Instruments	L-4
Oil	L-5
Thrust Control	L-6
Vibration	L-7
Fire Warning Protection	L-8

**NAVIGATION**

Glideslope	M-1
IFF	M-2
ILS	M-3
Marker Beacon	M-4
Mode 4	M-5
Radar Altimeter	M-6
TACAN	M-7
GPS	M-8

**OFFENSIVE AVIONICS**

ACU Complex	N-1
Controls & Displays	N-2
Doppler	N-3
INS	N-4
Rendezvous Beacon	N-5
Radar	N-6
TFACU	N-7
Weapons Delivery	N-8
Video Recorder	N-9

## **POST COMBAT EJECTION**

### **CREWMEMBER IMMEDIATE ACTIONS**

- Accomplish 4-line modification, and attempt to steer close to each other.
- While under parachute assess enemy threat- this is the best view you will get.
- Steer parachute into wind.
- Ensure feet and knees together for landing, and be ready for parachute drag.
- Turn beacon off.
- Link up with other crewmembers if possible.

### **FOLLOW YOUR EVASION PLAN OF ACTION.**

When attempting contact use the following call sign format:

1. Pilot: C/S xx ALPHA
2. Co-pilot: C/S xx BRAVO
3. WSO(O): C/S xx CHARLIE
4. WSO(D): C/S xx DELTA

## **POST NON-COMBAT EJECTION**

### **1. CREWMEMBER IMMEDIATE ACTIONS**

- Accomplish 4-line modification and attempt to steer close to each other.
- Steer parachute into wind.
- Ensure feet and knees together for landing, and be ready for parachute drag.
- **Turn beacon off.**
- Attempt contact on both channels 282.8 and 243.0.
- Re-attempt contact every 15 minutes or if recovery personnel are in area.
- Check-in with other crewmembers on radio if able.
- Link up with other crewmembers if possible.
- **Do not** wander around looking for other crewmembers if you have no idea where they are.
- **Do not** accept a ride from civilians, **do** have them call the base if possible.
- If telephone is accessible call the base yourself.

### **2. SURVIVOR 3 HOUR ACTIONS**

- If weather is extreme recovery may be delayed.
- Inflate life raft for use as shelter.
- Use vacuum-packed sleeping bag in survival kit.
- Turn beacon on and leave on until recovery is in area.
- Keep PRC-90 warm and ready for use.
- Be prepared to use signal flares and strobe light.

## ON SCENE COMMANDER (OSC) REFERENCE GUIDE

- A. FLY THE AIRCRAFT FIRST!** DONT GET LOW AND SLOW
- B. ESTABLISH OSC:** ASAP ON ENTERING AREA OF OPERATIONS
- C. INVENTORY STATUS:** FUEL/WINGMAN/ASSETS AVAILABLE (DCA/GCI)/ETC
- D. INITIAL CONTACT:** REASSURANCE/TURN LOCATOR BEACON OFF/ETC
- E. SWITCH FREQUENCIES:** 243.0 TO 282.8 OR SAR A/B (COMBAT) ROE:  
COVERT/COMM OUT PLAN/ EARPLUG /ETC
- F. AUTHENTICATION (COMBAT):** NUMBER/LETTER/QUESTION\_\_\_\_\_
- G. RELAY INFO:** PASS LOCATION TO APPROPRIATE AGENCY DON'T  
PASS POSITION IN THE CLEAR
- H. THREATS IN AREA (COMBAT):** # / TYPE / LOCATION\_\_\_\_\_
- I. GROUND FORCES (COMBAT):** NUMBER\_\_\_\_\_ LOCATION \_\_\_\_\_ FRIENDLY?  
ENEMY? WHAT DID SURVIVOR SEE WHILE IN THE CHUTE? HAVE THEY SEEN THE  
SURVIVOR?
- J. CONDITION:** INJURIES/ABILITY TO MOVE/PREVIOUS INSTRUCTIONS
- K. SIGNALING DEVICES:** (PREP SURVIVOR: DO YOU HAVE GPS (SARDOT)? FIND AND  
HAVE READY DEVICES IN KIT/VEST RADIO BATTERIES - EST TIME? MIRROR - KEEP  
COVERED UNTIL READY TO USE
- L. VERIFY SURVIVORS POSITION:** SQUELCH DISABLE/WHAT CAN THE SURVIVOR  
SEE? CONFIRM LOC/SARDOT/GPS/OVERFLT DONT COMPROMISE SURVIVORS  
POSITION (COMBAT) NO WINGROCKS OVER SURVIVOR (COMBAT)
- M. SURVIVOR ACTIONS:** RADIO CHECK-IN SCHEDULE (COMBAT):DELIVERY OF  
ORDNANCE NEAR SURVIVOR PREPARE FOR HELO (HELMET ON, SMOKE CODE,TURN  
AWAY, PJS: AUTH/RESIST/GUN, HOIST, ETC) FINAL PREP/PICKUP PROCEDURES.
- N. MISCELLANEOUS:** FINISH THIS CHECKLIST MINIMIZE NON-SECURE RADIO  
CALLS (COMBAT) REASSURE SURVIVOR OF RESCUE/OPTIONS GUIDE SURVIVOR  
THROUGH HOLE-UP PROCEDURES (COMBAT) OPTIMAL TIME TO CHECK-IN ON  
RADIO BATTERY CONSERVATION TIP IMMINENT CAPTURE PROCEDURES (COMBAT)  
EVASION - TOD/ RECOMMENDED HDG/DISTANCE (COMBAT) AVERAGE/ROUGH  
TERRAIN: 1200/1800 PACES/NM (COMBAT) MAINTAIN A/C IN POSITION TO  
COMMUNICATE W/SURVIVOR CYCLE TO TANKER/HANDOFF PLAN ESTABLISH  
CONTACT WITH RECOVERY FORCES

## EDWARDS AFB EMERGENCY RECOVERY PROCEDURES

Plan the route of flight to include the Palmdale TACAN (PMD, CH 92).

Pass your ETA to Edwards Command Post ("Conform": 304.0). This will help coordinate chase efforts, if required, and also prepare the airspace for your emergency. A B-1 test pilot may be available for consultation.

Min Safe Altitude within 25nm: 7800'

Edwards METRO:	342.4
March METRO:	239.8
ATIS:	269.9
Ground:	225.4
Tower:	318.1/353.6
"Sport":	343.7
"Joshua":	348.7 (N, W), 290.3 (S), 269.2 (E)

"Joshua" controls all Edwards's restricted areas.

"Sport" is the local RAPCON controller in R-2515. A single frequency approach is available if required.

- Expect to maintain VFR and possibly hold over visual landmarks.
- Prior coordination with "Sport" or "Joshua" is required to open the dry lakebeds.
- Tower contact is required prior to flying within 8 NM of the main runway.
- A "participant" means you can fly VFR, are familiar with the local VFR landmarks, and accept MARSA with all aircraft in R-2508. Upon request "Sport" or "Joshua" will provide heading and altitude guidance to avoid active special use airspace.
- As a "non participant" you will remain under IFR/radar, control (applies for most emergency aircraft).
- The parking area for B-1s is usually 34 56.5N and 117 53.2W (a long way to taxi).

<p style="text-align: center;"><b>HUNG ORDNANCE PROCEDURES</b> <b>(11-2B-1v3 EAFB Addendum A section 6.2)</b></p>
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Hung ordnance are live or inert munitions that do not separate from the aircraft following an attempted release and is indicated by the following on the [DAB] page:

- Guided Weapons: CRL and SBM 10: **ERAS/HUNG**
- Unguided Weapons:
  - CRL and SBM 10: **BM/HUNG**
  - CBM 28 weapons and swing arms: **H** under affected station or swing arm.
- A HUNG STORE subsystem message. Clearing this message does not remove the hung weapon status.

**Note:** Weapons not released due to being blocked, a swing arm malfunction, or a slow switch status following squib fire are considered retained if the "hung" state is removed and the fault clears following corrective action by the OSO. Reference 1B-1B-34-2-1 pg 1-56, 1-216, 1-218 for further details.

1. Accomplish Post Release/Abort checklist and reference T.O. 1B-1B-1 Section III Hung Weapons checklist. If doors remain open, close doors manually. Rotate a hung weapon on a CRL out of the down position.

2. Confirm non-release with range controlling agency.

3. Do not attempt further releases. Do not recycle WIU power for a hung store.

**Note:** IAW T.O. 1B-1B-34-2-1 Malfunction Analysis Procedures, AFS will automatically status the ejectors without cycling the WIU(s) in an attempt to clear the SMS fault. If the fault clears, and there is no HUNG indication, then further releases may be attempted.

4. Proceed directly to home station. Avoid over flight of heavily populated or congested areas.

5. As soon as practical, provide the SOF with:

- Type, quantity, status and condition of ordnance.
- Location of weapons on aircraft.
- Present location, ETA and fuel.
- Intentions

6. Declare an IFE w/approach for all hung weapons. Advise Tower of landing with a hung store. Complete one straight-in approach to a full stop.

**CONTINUED NEXT PAGE...**



7. For Live Weapons:
  - a. Taxi to the North hammerhead (via back taxi if required). Taxiway F is the alternate area.
  - b. When qualified weapons loaders arrive at the aircraft, start APUs and shut down engines. The aircrew (with the exception of the aircraft commander) will exit the aircraft and cordon area in the second maintenance vehicle and proceed to the vicinity of Spot 80 until the aircraft is safed. No actions toward safing or checking status of weapons will be accomplished until the cordon area is sterile of ALL personnel not participating in the safing procedure. The aircrew (and all non-participating personnel) will notify the expediter and/or SOF when they are outside the cordon area via ground emergency radio or UHF 311.0. Once the cordon area is clear of non-participating personnel, weapons status will be determined by the weapons personnel and the aircraft commander.
  - c. If weapons load technicians have inspected the aircraft and confirmed the aircraft is safe (either no ordnance present or the hung ordnance is secured), the crew may return to the aircraft. The aircraft can be towed or engines restarted and taxied to the parking spot. At crew discretion (with Squadron Top 3 approval), if maintenance confirms no ordnance is present, engines may be restarted and further training conducted.
  - d. If an unsafe weapon configuration is detected, the senior weapons loader will advise the aircraft commander to abandon aircraft. The aircraft commander will shut down APUs and abandon aircraft.
8. For Inert Weapons:
  - a. Taxi to the nearest hammerhead
  - b. When qualified weapons loaders arrive at the aircraft, start APUs and shut down engines. Remain on board and follow maintenance instructions.
  - c. If weapons load technicians have inspected the aircraft and confirmed the aircraft is safe (either no ordnance present or the hung ordnance is secured), the aircraft can be towed or engines restarted and taxied to the parking spot. With Top 3 approval, if maintenance confirms no ordnance is present, engines may be restarted and further training conducted.
  - d. If an unsafe weapon configuration is detected, the senior weapons loader will advise the Aircraft Commander. The crew will shut down the aircraft and leave the jet with maintenance.

## **FLARE JETTISON PROCEDURES (AFI 11-2B-1v3 EAFB ADD A)**

1. For retained flares, notify maintenance personnel prior to leaving the aircraft. There are no restrictions for aircraft with retained flares.
2. In case of flare jettison, contact the applicable airspace controller and advise them of the incident. Note the approximate location and potential hazard (e.g. jettison below flare burnout altitude/fire hazard potential altitude of 700' AGL) and immediately safe the expendable countermeasures (EXCM) system.
3. If an emergency jettison of flares was necessary due to overtemp, contact Command Post (Raymond 33) no later than 30 minutes prior to landing and report the following: suspected unsafe condition and previous actions, ETA to IAF, fuel remaining at IAF, and intentions. Declare an IFE and make one approach to a full stop. Complete landing rollout and taxi clear in departure-end hammerhead. Maintenance personnel will safe the EXCM system and inspect the flare cavities. Once flares are confirmed safe, the aircraft will be towed/taxied to parking.

**WARNING: If any portion of the flare cartridge is protruding from the dispenser, cease all operations and notify EOD.**

## **AIRCREW LASING PROCEDURES (AFI 11-301V4 & EAFBI 11-250)**

1. In the event aircrews are unexpectedly exposed to laser illumination, direct eye contact with the beam should be avoided, and eyes should be shielded to the maximum extent possible consistent with aircraft safety. ATC understands that, under these circumstances, aircrews may regard the event as an in-flight emergency and may take evasive action to avoid further exposure to the laser illumination.
2. All aircrews are requested to immediately report incidents of unauthorized laser illumination by radio to the appropriate ATC controlling facility. Reports should include event position (e.g., latitude/longitude and/or FRD), altitude, color of laser beam(s), originating direction, and any other information believed necessary for ATC, law enforcement, and other governmental action taken to safeguard the safety and efficiency of aviation operations in the NAS.
3. In the event a cautionary broadcast (by ATC or another pilot) regarding unauthorized laser illumination is made within the previous 20 minutes for a particular area, pilots should avoid the area, if practicable.
4. In the event laser activity is encountered or reported in the vicinity of flight, pilots operating in accordance with instrument flight rules (IFR) should obtain ATC authorization prior to deviating from their assigned clearance.

5. Aircrew will contact SOF with information on any lasing event upon arrival in the local area. If the aircraft was lased in the vicinity of the Ellsworth visual traffic pattern SOF will coordinate with Security Forces to attempt to locate the source of the laser by providing SF with approximate location of unauthorized laser activity. Aircrew judgment will be used to determine whether to continue pattern work, hold at RUUSH, or land. Arriving aircraft will be informed of the incident by SOF.

6. If aircrew experienced adverse effects from the lasing incident, aircrew will declare an emergency with approach and perform a full stop landing. SOF will contact the on call flight doctor and arrange to have affected crew examined after landing. If crew has noticed no adverse symptoms they may report to the flight doctor the next duty day for an examination. Affected aircrew should avoid rubbing their eyes as this may aggravate any damage caused by the laser.

7. On arrival at destination, all aircrew that have been affected by an unauthorized laser illumination will complete the Laser Beam Exposure Questionnaire. The questionnaire is located on the FAA's Laser Safety Initiative Web site at <http://www.faa.gov/about/initiatives/lasers/> and can be electronically submitted. The questionnaire may also be printed and faxed to the WOCC at (202) 267-5289, ATTN: DEN, or emailed to [laserreports@faa.gov](mailto:laserreports@faa.gov). In addition, aircrew will forward a copy of this report to the 28 BW safety office or unit safety representative as well as any amplifying information about the incident.

<b>TOWED DECOY FAILURE TO SEVER PROCEDURE (TO 1B-1B-1 &amp; AFI 21-101)</b>
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1. Mission leads will brief ALE-50 deploy, transmit, and sever procedures any time their use is anticipated. Additionally, mission leads will have a contingency plan in the event an ALE-50 fails to sever. At a minimum, the contingency plan will cover min risk routing to a recovery base avoiding populated areas, 1-1B-1 Section 3 procedures for landing with a decoy in tow, and airfield specific instructions.
2. If any portion of a towed decoy is protruding from the dispenser, cease all operations, withdraw 300 feet from the area, and notify the fire department and EOD.
3. In the case of a hung decoy, all personnel must remain **outside** a clear zone to preclude injury from ejecting decoys. The clear zone consists of 50-foot distance directly to the rear of the aircraft and 10 feet side to side.
4. Aircrew will notify MOC/WOC and SOF of hung decoy before landing. An IFE will be declared. Upon landing, aircrew will stop straight ahead until maintenance can confirm the status of the towline. Aircrew will taxi to an appropriate recovery area (if required) with concurrence by the OSC. Maintenance personnel will accomplish the following actions:
  - After engine shutdown, the weapons load crewmember will meet the aircraft and retrieve safety pins from the crew compartment.
  - The aircrew will inform the load crewmember of the number of decoys expended.
  - The load crewmember will install the ALE-50 safety pins at rear of aircraft.
  - After safing the system, the load crewmember will remain clear of the deployment area while verifying the quantity of decoys.
5. The load crewmember will notify the weapons expeditor who will notify appropriate agencies (MOC, Production Super, and Safety) of discrepancies in expenditures. Nonessential personnel will remain outside the clear zone until Super has released the aircraft.

## FUEL JETTISON PROCEDURES (11-202v3 EAFB Add A)

No prior coordination is required if an inflight emergency requires fuel jettison to safely recover the aircraft. Comply with the reporting instructions below as soon as practical following the fuel jettison / landing.

In non-emergencies, aircrew will jettison fuel only with approval of the 28 BW/CC or 28 OG/CC and in coordination with the applicable ARTCC. If possible, fuel jettison should be conducted at or above FL 200 and over unpopulated areas. Crews will notify ATC of location and altitude prior to commencing and upon termination of fuel dumping procedures.

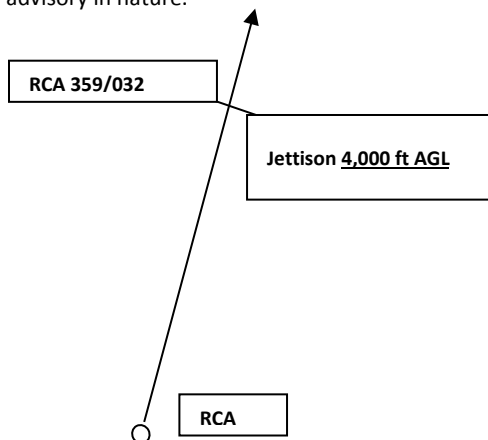
After landing, aircrew will also provide the following to Command Post:

Time, type aircraft, type fuel, jettison coordinates, altitude, airspeed, quantity, reason, rate (ppm), outside air temperature (centigrade), wind direction and velocity.

## BAILOUT/JETTISON AREAS (EAFBI 11-250)

**Controlled bailout area:** The controlled bailout area is located at N 44°40' W 102°58' which is RCA359/032. Initiate ejection/bailout outbound on the RCA 359 radial IAW T.O. procedures.

**Weapons jettison procedures:** The munitions jettison area (live and inert) is located at N 44°40' W 102°58' which is the RCA359/032. Attempt to clear the area visually if VMC or with radar if IMC. Jettison weapons outbound on the RCA 359 radial at the minimum practical airspeed at or above 4,000 ft AGL. Control instructions will be advisory in nature.



## HOT BRAKE PROCEDURES

### IN FLIGHT / POST LANDING

Aircrews will declare an emergency for a hot brake situation (Declare the emergency anytime brake temp exceeds 600 degrees). The Base Fire Department will inspect and control the situation until safe for others to enter in or around the aircraft. The north and south hammerheads are designated as hot brake inspection areas.

Aircrews returning with known or suspected dragging brakes will roll out the length of the runway, exit, and stop in the departure hammerhead to monitor brake temps before taxiing to park.

If the BRAKE TEMP light illuminates on landing roll, declare a ground emergency, and hold in the nearest hammerhead until the fire department clears the aircraft to proceed.

Dragging or Hung Brakes: One or more brakes with temperatures significantly higher than other brakes may be an indication of a dragging or hung brake(s). If the aircrew suspects dragging brakes, stop taxiing as soon as possible and follow technical order guidance. Taxiing to a hot brake area may not be feasible since the brake(s) may continue to overheat and cause additional aircraft damage.

#### BRAKE TEMP CITS CODES

LH WHEELS	RH WHEELS
3 – 4010044	5 - 4010046
4 – 4010045	6 - 4010047
7 – 4010048	9 - 4010050
8 – 4010049	10 - 4010051

#### WHEEL POSITIONS

$\begin{matrix} & \underline{1} & \underline{2} \\ \underline{3} & & \underline{5} & \underline{6} \\ \underline{7} & \underline{8} & \underline{9} & \underline{10} \end{matrix}$

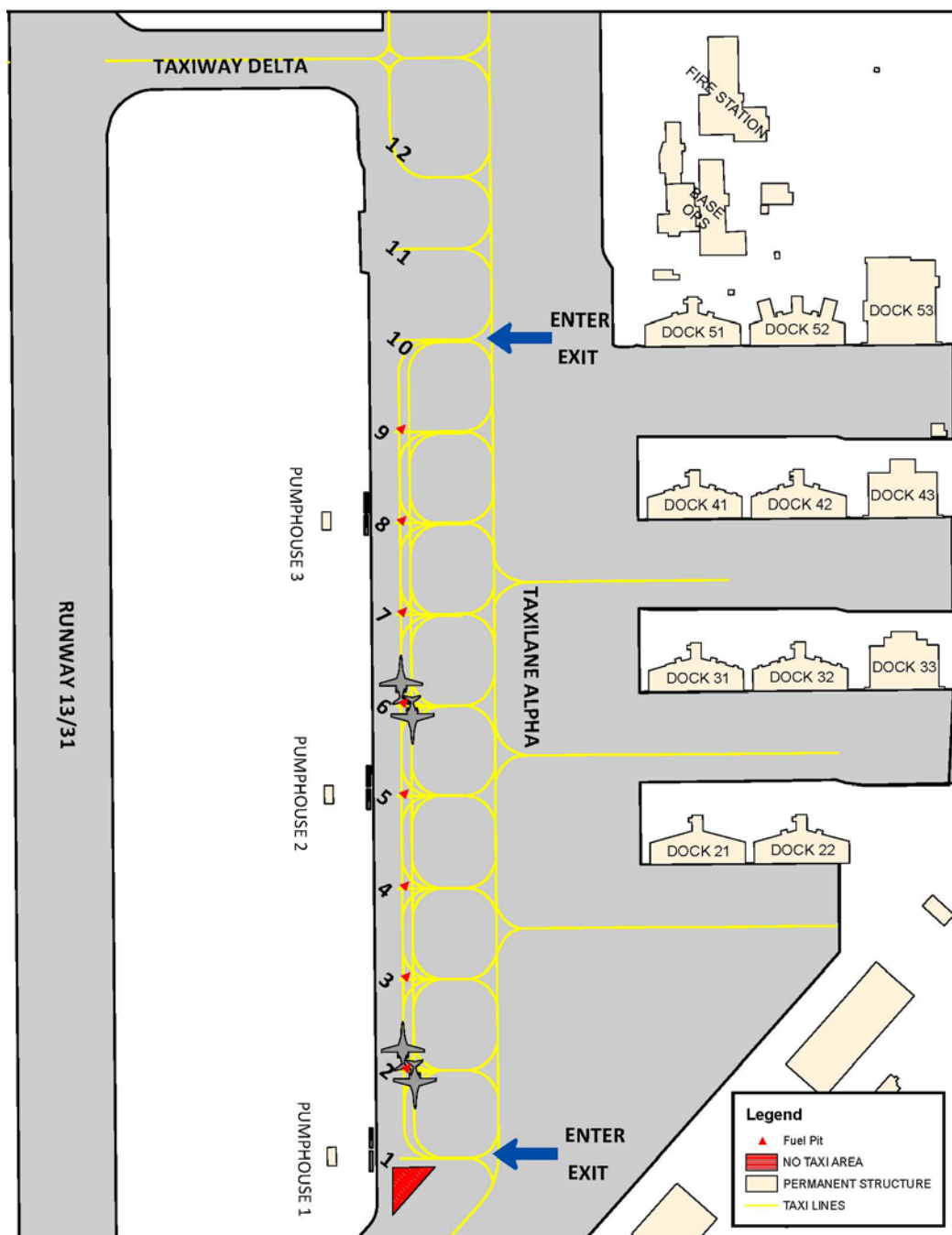
VOLTS	TEMP	VOLTS	TEMP	
0.633	100°	<b>2.800</b>	<b>600°</b>	<b>CAUTION ZONE</b>
1.066	200°	3.250	700°	
1.499	300°	<b>3.300</b>	<b>720°</b>	<b>DANGER ZONE</b>
1.932	400°	3.698	800°	
2.365	500°	4.125	900°	

### RECOMMENDED ACTIONS

Highest temp < 600°F	Normal taxi operations are permitted. Refer to MAXIMUM BRAKE TEMPS FOR TAKEOFF before attempting takeoffs.
Highest temp 600° - 719°F	If the BRAKE TEMP light illuminates, declare ground emergency. Taxiing to the hot brake area is permitted provided the aircrew does not suspect a dragging or hung brake. Do not taxi to the aircraft parking area with a Brake Temp light.
Highest temp ≥ 720°F	Shutdown and egress the aircraft. Chock the nose gear tires, time and conditions permitting.

## **PIT REFUELING OPERATIONS**

1. Pit Refueling Operations will be conducted day or night IAW TO 1B-1B-1, AFI 11-2B-1V3 and AFBI 11-250 procedures and guidance. Reference JP-8/JAA Fuel Loading Charts in this IFG for desired tank quantities.
2. Primary Hot Pits are located on the south ramp spots 2-9. Spots 1 and 10 will normally be used for entry/exit into the Hot Refueling area. Aircraft parking to the South will follow the East taxi line; aircraft parking to the North will follow the West taxi line. A maximum of 3 concurrent refuels will be conducted with a minimum of 600 ft. (2 empty parking spots) between aircraft.
3. Wind direction and speed will dictate North flow or South flow parking in the Hot Refueling spots. Aircraft will be marshaled into position by ground crew and will park into the wind to the maximum extent possible.
4. Minimum aircrew required for Hot Refueling is one qualified Aircraft Commander and one qualified WSO.
5. Crew Chief will require Government Fuel Card and nose gear pin prior to conducting Hot Refueling.
6. Before fuel transfer begins the refueling supervisor will conduct a Refueling Team Briefing with the aircrew to include emergency procedures, emergency ground egress rendezvous location, and total fuel onload.
7. Hot Refueling planning factors: Onload rate 3,000 – 3,700 lbs./min; 50K onload will take approximately 15 minutes; 100k onload approximately 30 minutes.



## SOUTH RAMP HOT REFUELING SPOTS



## NO TAXI CONDITIONS

Do not taxi with any of the following malfunctions or conditions.

- Brake malfunctions (dragging, hung, etc.)
- Hot brakes (reference HOT BRAKE PROCEDURES)
- Blown/deflated tire
- NWS failure
- Hydraulic leak
- Fuel leak
- Fuel low

## AIR ABORT CONDITIONS

The following guidance **supplements** T.O. 1B-1B-1. Aircrew will abort the mission and return to base if any of the following events are known or suspected to have occurred in-flight.

- Physiological incident
- Over-G
- Uncommanded flight control input
- Hung ordnance (reference HUNG ORDNANCE PROCEDURES)
- Bird strike (AFPAM 91-212)
- Lightning strike
- Aircraft damage

## LANDING WITH WINGS AFT OF 20 DEGREES

(Suggested additional considerations, complements TO 1B-1B-1 Section 3)

### A. Landing with Wings Aft of 20 Degrees

#### 1. CG – Check at forward limit. (P-CP)

FIC recommends 21% at 25 wing. A CG forward of this provides no significant increase in stability or aerobraking effectiveness. For 55 or 67 wing, the forward CG of 25% is recommended.

#### 2. Gross Weight – Dump fuel or jettison stores, as required. (P)

Reduce gross weight to your ballast fuel requirements. Plan to have some extra fuel available for practice approaches or an unplanned go around. FIC recommends 15,000 to 25,000 lb of ballast fuel in tanks 1 and 4 and the mains full. If necessary, allow the left and right main tank to deplete to 8,000 lb in order to keep the 15,000 lb of ballast fuel in tank 1. Attempt to land at a gross weight

between 220,000 lb and 230,000 lb. It will take approximately 13,000 lb of fuel in the number 1 tank to keep the CG at 25% with the mains full and all other tanks empty.

### 3. Landing Ground Roll Distance and Maximum Brake Speed – Computed (CP)

Landing distance and Maximum Brake Speed (P6-22 of the performance checklist). The landing distance in the performance checklist is approximately 1000' less than the performance manual. Use the higher of the two numbers. The maximum brake application speed can be viewed as the structural limit for the brakes. Below 240,000 lb you will be below the max brake speed (TO 1B-1B-1-1). The current brake energy limit charts only go up to 200 kts.

### 4. Descent/Before Landing Checklist – Complete (CP)

### 5. Fly a no flap/slat straight in approach at the computed airspeed.

Airspeed – P6-21 & 23 of the TO 1B-1B-1-1CL

a) Airspeed is more precise than AOA in this landing configuration. The AOA should not exceed 9 degrees. Be sure to add Delta velocity from page P6-23 to landing speeds. With SEF, the approach speed is a constant 20 knots above the SEF stall speed. This will give you a lower stall margin than provided by a 20 wing slats/flaps approach. The checklist on page P6-23 does not have an entry for landing factor. The data in the checklist was calculated with a 44 landing factor.

b) FIC recommends approach plus 30 kts until on final. For approaches aft of 55 wing, you may have to fly higher than your computed airspeed to avoid exceeding 9 AOA. At 8 AOA for a 67 wing approach, a flutter/buffet may be encountered in level flight or when applying aft stick movements during the descent. At 25 wing, there is a tendency for a sink rate to develop, especially above 230,000 lb.

### Approach Speeds

<b>DATA FOR 230,000 GW (Reference only), 9AOA, TGT CG</b>				
Wingsweep	SEF	SIS	NON-SIS	Ldg Roll (SEF)(LF 60)
25	188	201	208	5600 (uncorrected)
35	200	207	217	6000 "
45	212	216	226	6600 "
55	232	233	256	7700 "
67	261	264	279	9200 "

c) If landing distance is critical, apply brakes immediately after lowering the nose to the runway. Be very cautious about moving the stab to aerobrake. Expect the aircraft to bounce between the three trucks. Also expect very little deceleration during the initial brake application. Coordinate ahead of time to have the chocks

available to avoid having to set the parking brake due to the potential for hot brakes.

B) Other considerations:

Air Refueling: The following guidelines can be used safely for aft wing refueling:

- a. Maximum weight – 300,000 lb
- b. Maximum altitude – FL200 (higher if at a lighter GWT).
- c. Airspeed 340 to 350 (coordinate for a high speed boom if possible).
- d. Afterburner may be required above 290,000 lb at FL200.