N0101

Low Level Navigation

- Know the FTI, read it entirely and then read it again.
- Pay attention to these slides, the daily brief will have questions that are covered here, be prepared.
- Call your IP's the day prior for your routes.
- Prep your charts, keep all of them on you. Prep your stick diagrams. Look at classmates sticks/charts ahead of you, see what their stuff looked like; as a reference it.
- Arrive early for your brief, you will need the extra time for unexpected changes.
- Brief in Safety NATOPS on glass table or were you IP's told you.
- DO NOT BUST YOUR 12 HOUR CREW REST!!!

N0101

- **TACTICAL NAVIGATION**
- PRE-MISSION PLANNING
- FLIGHT OPERATIONS
- HOMEWORK

MILITARY AIRLIFT

- Strategic Airlift (AIRFORCE)
  - Intertheater
  - C-5, C-17, C-130
- Tactical Airlift (USMC/AIRFORCE)
  - Intratheater
  - Mostly C-130
  - Can be strat airlifters
- Operational Support Airlift (OSA, all branches)
  - Diplomats and high ranking individuals
  - C-21, C-12

TACTICAL AIRLIFT

- Deliver people or material accurately through hostile environments to arrive at the correct destination at the correct time

THREAT AVOIDANCE

We are targets with no attack capability. The threat environment and mission needs dictate tactics.

- En Route
  - Hi Altitude (low radar threat)
  - Low Altitude (high radar threat)

- Destination,2 ways to get there:
  - Airland (runway)
  - Airdrop (drop zone)

LOW LEVEL

The Good: Threat Avoidance

- Detection capabilities
  - Audio
  - Visual
  - Radar
- How we avoid them
  - Slant range
  - Terrain masking
  - Ground clutter

The Bad: Hazards

- Natural
  - Terrain (CFIT)
  - Birds
- Manmade
  - Towers
  - Wires
  - Aircraft
- Enemy
  - AAA/SAMS
  - Air assets
  - Small arms

LOW LEVEL

- Real world routes
  - Determined by mission and threat
  - Planned by Tactics Cell
  - Planned from the destination backwards

- Training routes
  - Determined by training needs
  - Planned by the crew flying the mission
  - Use Military Training Routes (MTR) or Local Routes

TRAINING ROUTES

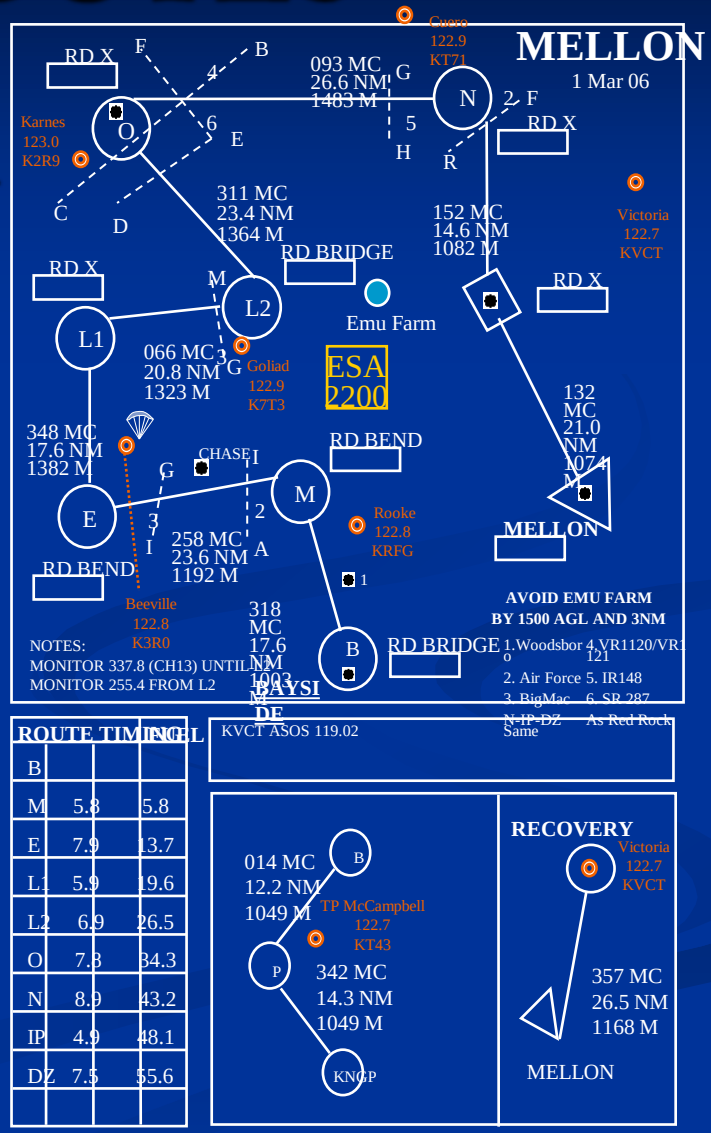
- IR Routes
  - "Instrument"
  - One way
  - 3000 and 5
  - ATC clearance
  - Must file flight plan (DD 175)
  - IR 136
  - **ANY** plane
- VR Routes
  - "Visual"
  - One way
  - 3000/5
  - Monitor FSS
  - Squawk 4000
  - VR51
  - **T-38 F-16 (kelly)**
- SR Routes
  - "Slow"
  - One way
  - **1500/3**
  - **Monitor FSS**
  - 250 KIAS max
  - **T-1 T-6**

Information in AP/1B

- No need to call Laughlin or Randolph, just VT-35 to deconflict

LOCAL ROUTES

- Not published, only TW-4
- VFR flying
- Require **1500/3**
- VT-31 and VT-35 specific
- Common routes back to back
  - Mellon/Redrock
  - Mellon/Shiner
  - BigMac/Nobird

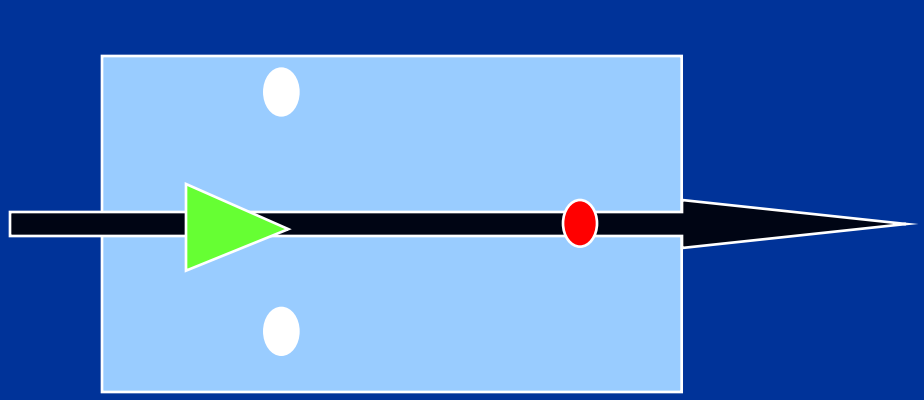


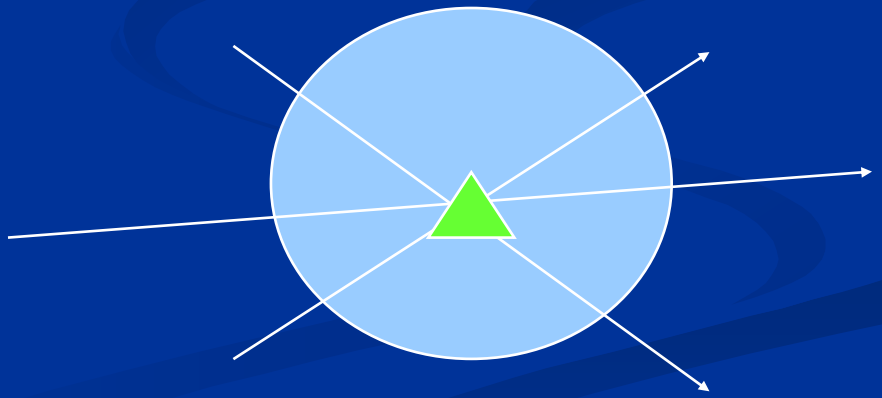
Types of Airdrops

- Heavy Equipment
- Personnel
- Containerized Delivery System (CDS)
- Training Bundle
- Combination

DROP ZONES (DZ)

- Rectangular
  - Dimensions 1000x500yds
  - Run-In Heading
  - Pro/Cons??
- Circular
  - Dimensions 500yds
  - Run-In Heading
  - Pro/Cons???

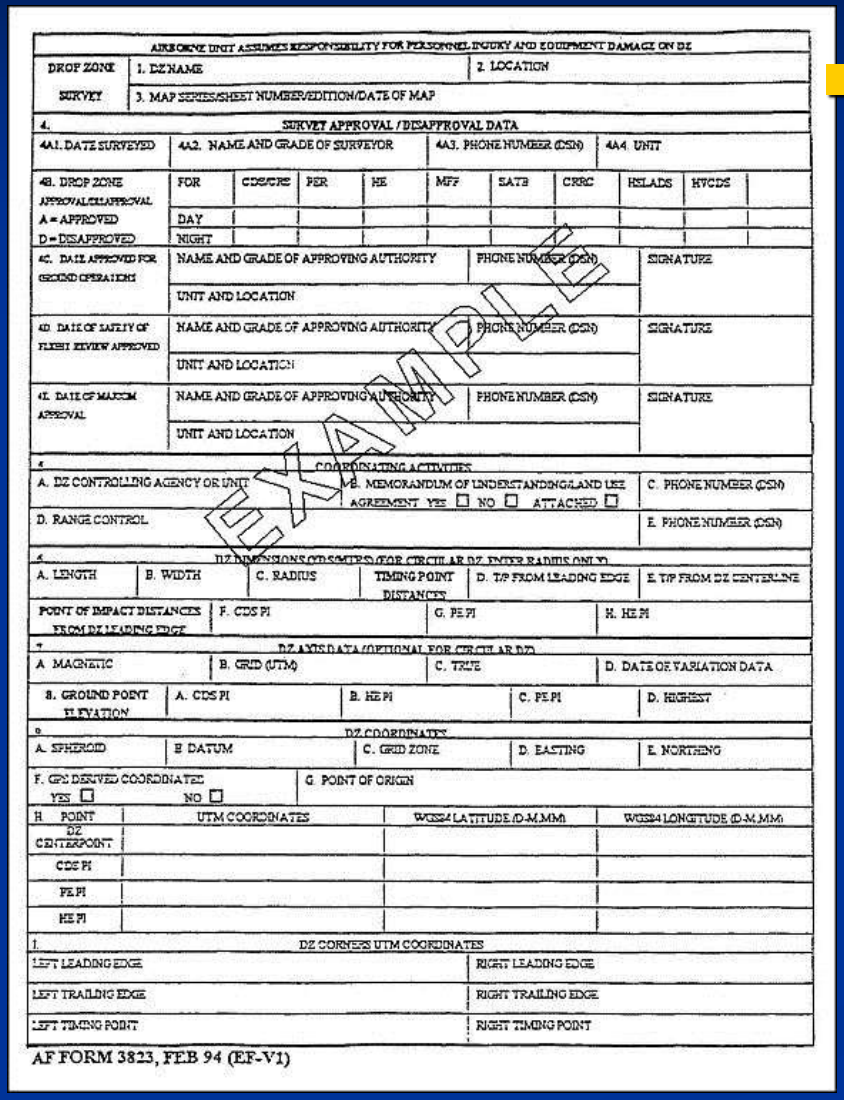




DZ MARKINGS

- Block letter
  - Rectangular: J, R, A, C, S
  - Circular: H, O
- Raised Angle Marker (RAM)
- Cerise panels
- Smoke, flares, mirrors, lights, IR lights
- NO DROP: wrong letter or an "X", red smoke red lights, verbal
- DZ overrun by enemy, scramble lights, kicked over etc…

DZ SURVEY



AIRBORNE UNIT ASSUMES RESPONSIBILITY FOR PERSONNEL INJURY AND EQUIPMENT DAMAGE ON DZ

DROP ZONE SURVEY	1. DZ NAME	2. LOCATION
	3. MAP SERIES/SHEET NUMBER/EDITION/DATE OF MAP	

4. SURVEY APPROVAL / DISAPPROVAL DATA

4A1. DATE SURVEYED	4A2. NAME AND GRADE OF SURVEYOR	4A3. PHONE NUMBER (DSN)	4A4. UNIT

4B. DROP ZONE APPROVAL/DISAPPROVAL A = APPROVED D = DISAPPROVED	FOR	CDS/CRS	PER	HE	MFF	SATB	CRRC	HSLADS	HVCDS
	DAY								
	NIGHT								

4C. DATE APPROVED FOR GROUND OPERATIONS	NAME AND GRADE OF APPROVING AUTHORITY	PHONE NUMBER (DSN)	SIGNATURE
	UNIT AND LOCATION		
4D. DATE OF SAFETY OF FLIGHT REVIEW APPROVED	NAME AND GRADE OF APPROVING AUTHORITY	PHONE NUMBER (DSN)	SIGNATURE
	UNIT AND LOCATION		
4E. DATE OF MAJCOM APPROVAL	NAME AND GRADE OF APPROVING AUTHORITY	PHONE NUMBER (DSN)	SIGNATURE
	UNIT AND LOCATION		

5. COORDINATING ACTIVITIES

A. DZ CONTROLLING AGENCY OR UNIT	B. MEMORANDUM OF UNDERSTANDING/LAND USE AGREEMENT YES ☐ NO ☐ ATTACHED ☐	C. PHONE NUMBER (DSN)
D. RANGE CONTROL		E. PHONE NUMBER (DSN)

6. DZ DIMENSIONS (YDS/MTRS) (FOR CIRCULAR DZ, ENTER RADIUS ONLY)

A. LENGTH	B. WIDTH	C. RADIUS	TIMING POINT DISTANCES	D. T/P FROM LEADING EDGE	E. T/P FROM DZ CENTERLINE
POINT OF IMPACT DISTANCES FROM DZ LEADING EDGE	F. CDS PI		G. PE PI		H. HE PI

7. DZ AXIS DATA (OPTIONAL FOR CIRCULAR DZ)

A. MAGNETIC	B. GRID (UTM)	C. TRUE	D. DATE OF VARIATION DATA

8. GROUND POINT ELEVATION

A. CDS PI	B. HE PI	C. PE PI	D. HIGHEST

9. DZ COORDINATES

A. SPHEROID	B. DATUM	C. GRID ZONE	D. EASTING	E. NORTHING

F. GPS DERIVED COORDINATES YES ☐ NO ☐ G. POINT OF ORIGIN

H. POINT	UTM COORDINATES	WGS84 LATITUDE (D-M.MM)	WGS84 LONGITUDE (D-M.MM)
DZ CENTERPOINT			
CDS PI			
PE PI			
HE PI			

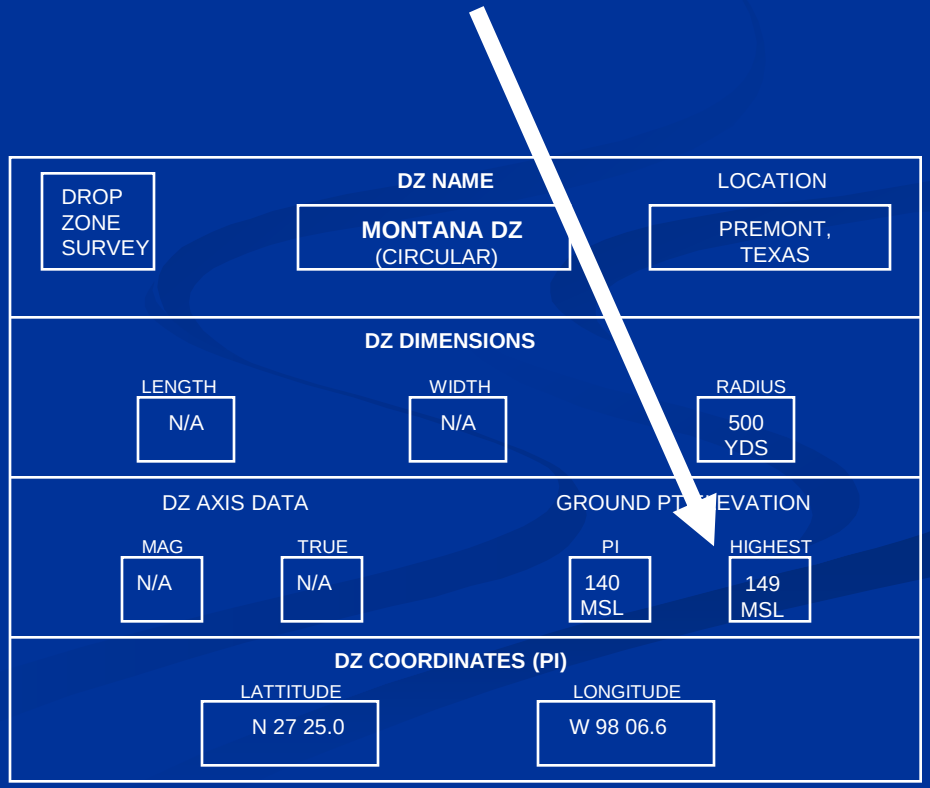
I. DZ CORNERS UTM COORDINATES

LEFT LEADING EDGE	RIGHT LEADING EDGE
LEFT TRAILING EDGE	RIGHT TRAILING EDGE
LEFT TIMING POINT	RIGHT TIMING POINT

AF FORM 3823, FEB 94 (EF-V1)

EXAMPLE

- Important part: highest point is what we use to drop from AGL



AIRDROP DEFINITIONS
KNOW THESE WELL

- DZCO/LZCO
- Point of Impact (PI)
- Forward Throw
- Mean Effective Wind (MEW)
- Time Aloft
- Computed Air Release Point (CARP)
- Safety Box

4 Kinds of Airdrop Forward Throw "chips"

- As the load leaves the plane it still will travel forward depending on its drag, chute, speed etc, these are rough estimates from 1000ft AGL.

- C CDS 550yds
- H Heavy 450yds
- P Personnel 250yds
- S SATB (sandbag) 150yds

ALL AMERICAN DZ (Little Rock)

Typical type of Drop Zone

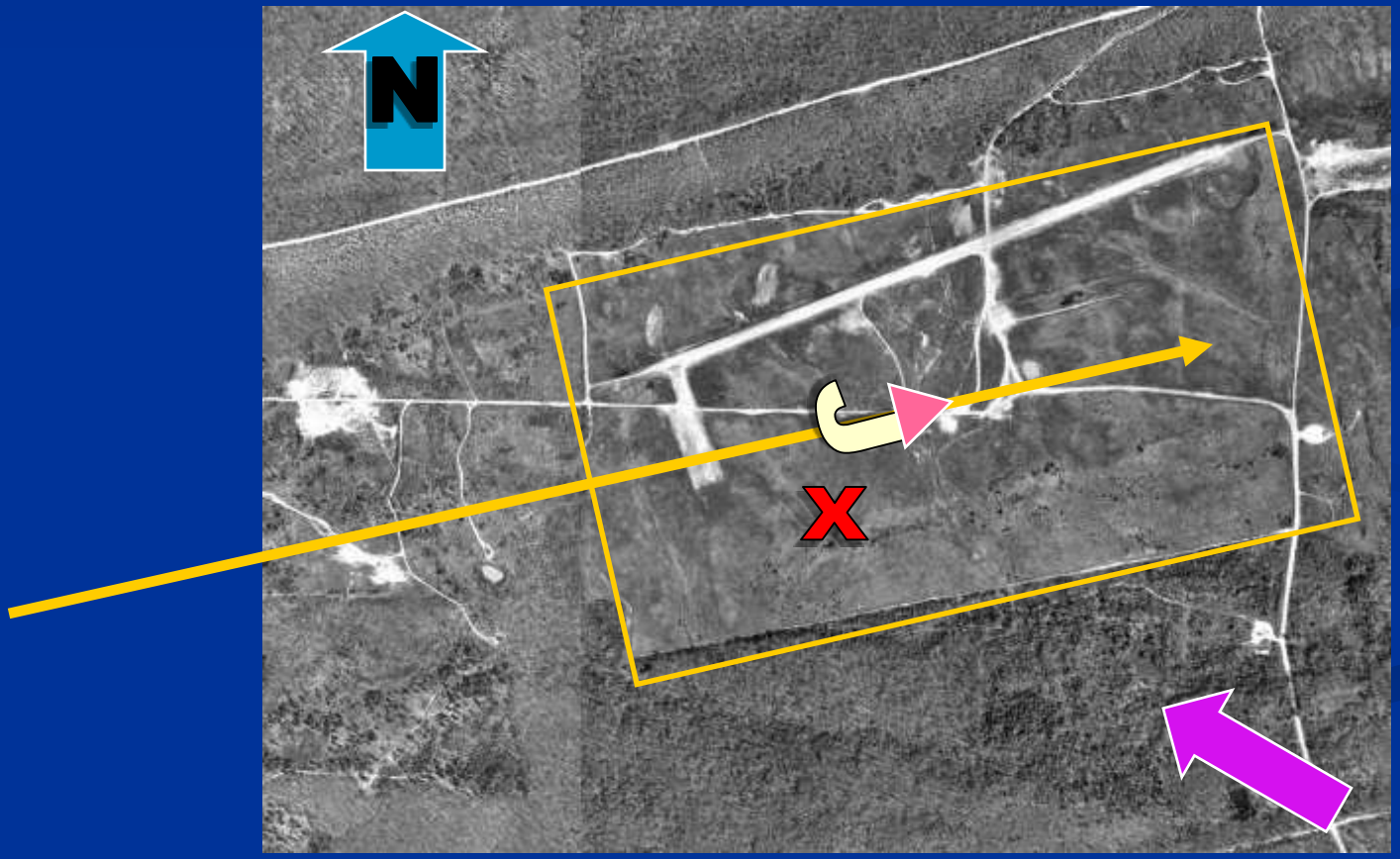
SAMPLE CARP, using "chips" where would you drop the load from

Remember, forward throw for a Heavy (pallet) is about 400-450YDS and the Rectangular DZ is typically 1000yds long---Winds are 130 at 20 Knots

DROP SOLUTION

Wind 130@20, Heavy Equipment

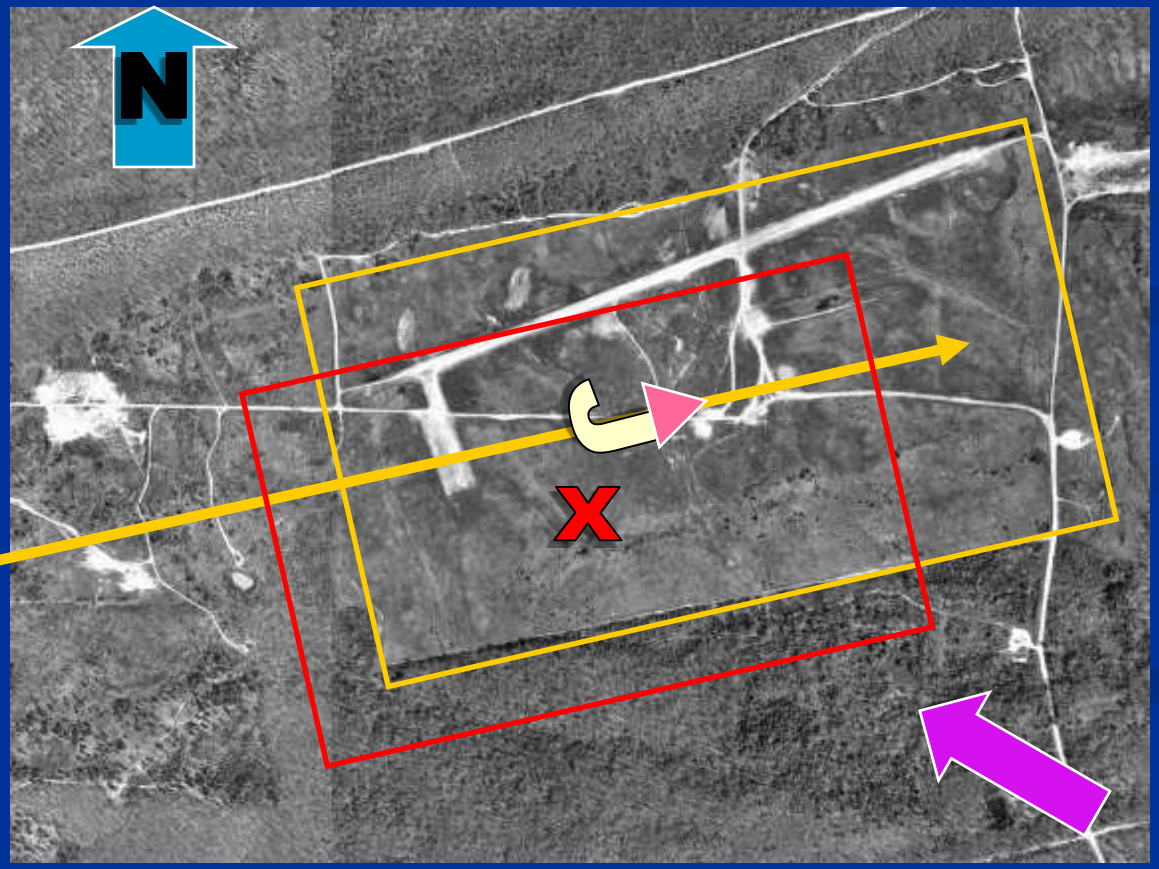
Forward throw about 450, right quartering headwind



DROP SOLUTION w/Safety box

Wind 130@20, Heavy Equipment

Forward throw about 450, right quartering headwind



THE BIG PICTURE
how we fly low level's in country

- Takeoff
- Departure
- Route
- Run-In From an I.P.
  (most important part to find)
- Slowdown
  (must slow down and climb
  for troops to jump out)
- Drop
  - "GREEN LIGHT" (guys jump out)
  - "LOAD CLEAR" (time out or last guy)
  - "RED LIGHT" (time out or last guy)
- Escape (fast, low, 500AGL)
- Recovery

THE BOTTOM LINE
Your job is to say "NO DROP"

For a good drop, you need to be on altitude, on heading, on airspeed, on time, and within the safety box. The pilot monitoring should be spring-loaded to say "NO DROP" every time he hears "1 min, or 5 sec" UNTIL HE IS CONVINCED OTHERWISE! You don't want to hear GREEN light unless its PERFECT.

-worst case, race track back, try again.

Don'tsay "GREEN"

MINIMUM ALTITUDES

- **Minimum Safe Altitude (MSA)--** NON weather
- **Emergency Safe Altitude (ESA)-- typically for WEATHER**

MISSION PLANNING

- Check TFRs/BAM/BASH on the VT31.net website and formulate a plan.
- Pick primary and secondary routes for your event based on WX and BASH.
- Call your IP the day prior and firm up your plan for action.
- After your initial mission planning if there are any conflicts (WX, traffic, BASH/BAM, etc) that could negatively influence your primary routes roll to your secondary plan.
- Prepare Charts (fold with tape/cut 10mi)
  - Drawn/CFPS/Route library
  - Both routes and run-ins
  - Sticks
- Look over your briefing items.
- Show up 1-2 hrs EARLY for your brief.

MISSION PLANNING (cont.)

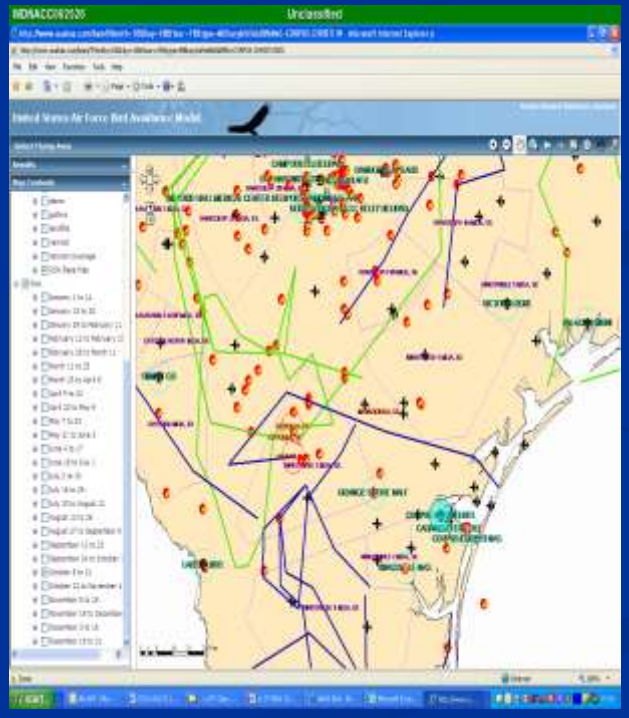
- Tell SDO the route you will be flying and find out if there will be any conflicts.
  - SDO will annotate on the schedule
- Request a WX brief
  - Average winds along route
  - 1500 and 3?
- Prepare Stick Diagrams (Spin your winds)
  - **Fuels/Times/Headings/ Speeds**
- Check NOTAMS
- Get a Time Hack
  - DSN 762-1401

CHECKING BASH/BAM

- Go to the AHAS website: www.usahas.com

CHECKING BASH/BAM

- Select the appropriate area, VR, and or field to fill in your BASH/BAM sheet. TIMES ARE IN ZULU!



BIG MAC		
LEG	BASH	CONDITION
B-I	IR136 B-C	
I-G	KINGSVILLE 4	
G-M	SR287 D-E	
M-A	SR287 D-E	
A-C	SR287 C-D	
C-IP	VR1105 C-E	
IP-DZ	VR140 B-C	
DZ-24R	VR140 B-C	

NO BIRD		
LEG	BASH	CONDITION
24R-N	VR156 C-D	
N-O	VR1105 A-B	
	SR287 B-C	
O-B	SR287 A-B	
B-I	IR148 B-C	
I-R	RANDOLPH 1A	
R-D	RANDOLPH 1A	
D-IP	KINGSVILLE 4	
IP-DZ	KINGSVILLE 4	

SWORDS		
LEG	BASH	CONDITION
24R-S	VR156 D-F	
S-W	VR1122 E-F	
W-O	VR168 H-I	
O-CP WOOD	VR168 G-H	
CP WOOD-VAND	LAUGHLIN 2	
VAND-D	VR1122 C-D	
D-S	RANDOLPH 2A	
S-IP	VR1105 A-B	
IP-DZ	VR1105 A-B	

RED ROCK		
LEG	BASH	CONDITION
VCT-R1	VCT	
R1-E	IR148 G-H	
E-D	SR292 C-D	
D-R2	SR292 D-E	
	VR1120 A-B	
R2-O	VR1120 A-B	
O-C	VR1120 A-B	
C-K	IR148 G-H	
K-IP	KINGSVILLE 4	
IP-DZ	KINGSVILLE 4	

SHINER		
LEG	BASH	CONDITION
VCT-S	VCT	
S-H	RANDOLPH 1A	
H-I	VR151 F-G	
I-N	VR151 F-G	
N-E	VR151 C-E	
E-R	VR151 H-I	
R-IP	VR151 H-I	
IP-DZ	A632E	

MELLON		
LEG	BASH	CONDITION
B-M	IR136 A-C	
M-E	IR136 B-C	
E-L1	KINGSVILLE 4	
L1-L2	KINGSVILLE 4	
L2-O	SR287 D-E	
O-N	SR287 E-F	
N-IP	KINGSVILLE 4	
IP-DZ	KINGSVILLE 4	

AIR FORCE		
LEG	BASH	CONDITION
B-A	IR136 B-C	
A-I	KINGSVILLE 4	
I-R	KINGSVILLE 4	
R-F	IR148 G-H	
F-O	IR148 G-H	
O-R	IR148 F-G	
R-C	IR148 E-F	
C-E	SR292 F-G	
E-IP	SR286 E-F	
IP-DZ	SR292 A-B	
DZ-11R	SR292 A-B	

SILVER		
LEG	BASH	CONDITION
G-S	DWH	
S-I	DWH	
I-L	DWH	
L-V	IR127 A-B	
V-E	IR127 A-B	
E-R	IR127 G-H	
R-IP	VR142 A-B	
IP-DZ	VR142 A-B	
DZ-W	VR142 D-E	
W-T	VR142 D-E	

GRANDE		
LEG	BASH	CONDITION
B2-G	IR166 A-B	
G-R	A632A	
R-A	IR166 B-C	
A-N	IR167 A-B	
N-D	IR167 A-B	
D-E	KINGSVILLE 2	
E-IP	IR135 B-C	
IP-DZ	IR135 C-D	
DZ-HBV	IR135 C-D	
HBV-L	IR147 D-E	

LOU ONE		
LEG	BASH	CONDITION
L-O	KINGSVILLE 1	
O-U	IR167 D-E	
U-O	KINGSVILLE 1	
O-N	IR135 B-C	
N-E	IR167 C-D	
E-IP	IR167 C-D	
	IR166 D-E	
IP-DZ	IR166 I-J	
DZ-S	IR135 A-B	
S-P	A632A	
P-G	IR166 A-B	

GO HOME		
LEG	BASH	CONDITION
DWH-G	DWH	
G-O1	VR151 E-F	
O1-H	VR151 F-G	
H-O2	VR151 F-G	
O2-M	VR151 C-D	
M-E	VR151 H-I	
E-IP	VR151 H-I	
IP-DZ	A632E	

AIRFIELDS	
KNGP	
KVCT	
KSAT	
KDWH	
KCLL	

AIRFIELDS	
KLRD	
KBRO	
KHRL	
KNQI	
KMFE	

CHECKING BASH/BAM

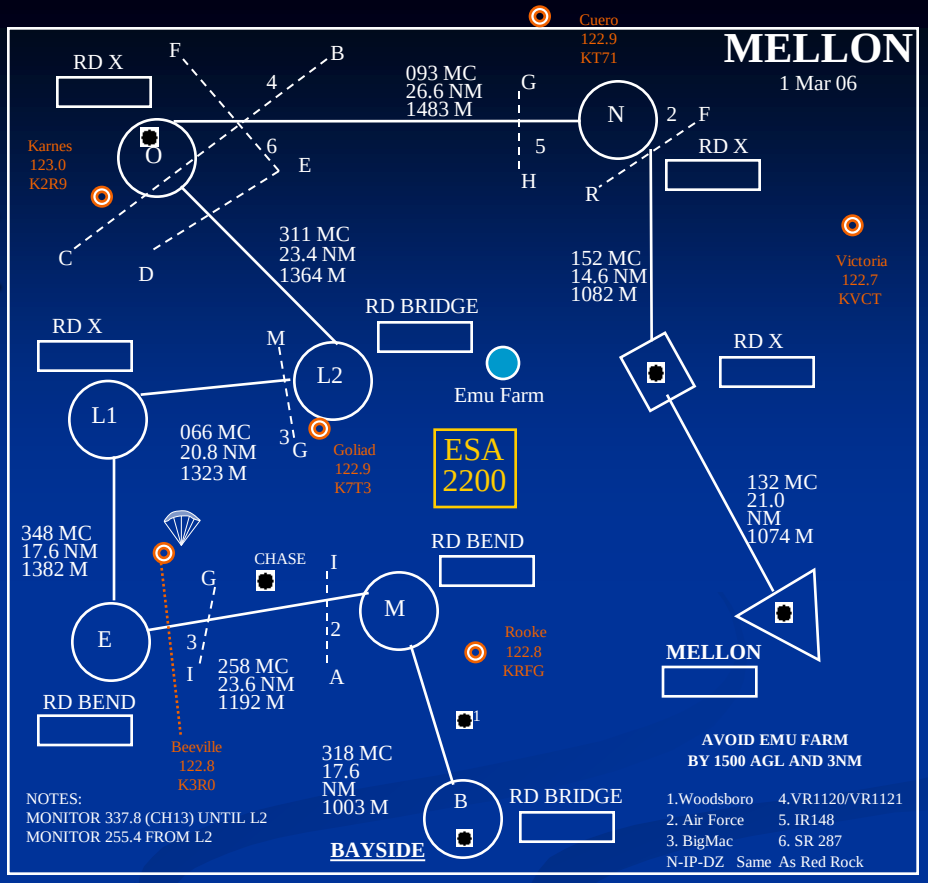
- If more than 1/3 of your route is BASH/BAM SEVERE you can not fly that route, you have to go somewhere else (i.e. if Mellon/Shiner won't work go south to Grande/Louone).

COMPLETE STICK DIAGRAM

- Make copy from the TAC Flimsy Packet
- Times *(see next slide)*
  - TOT
  - Waypoints
  - Route Entry
  - Takeoff
- Add Information
  - **Add** Relevant navaid freq's

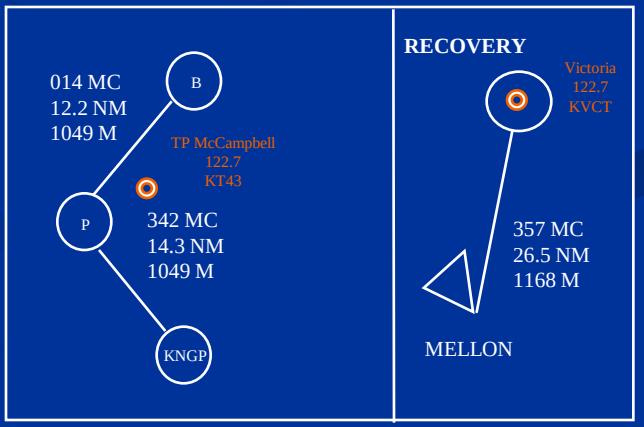
Spin winds, times, use pencil.

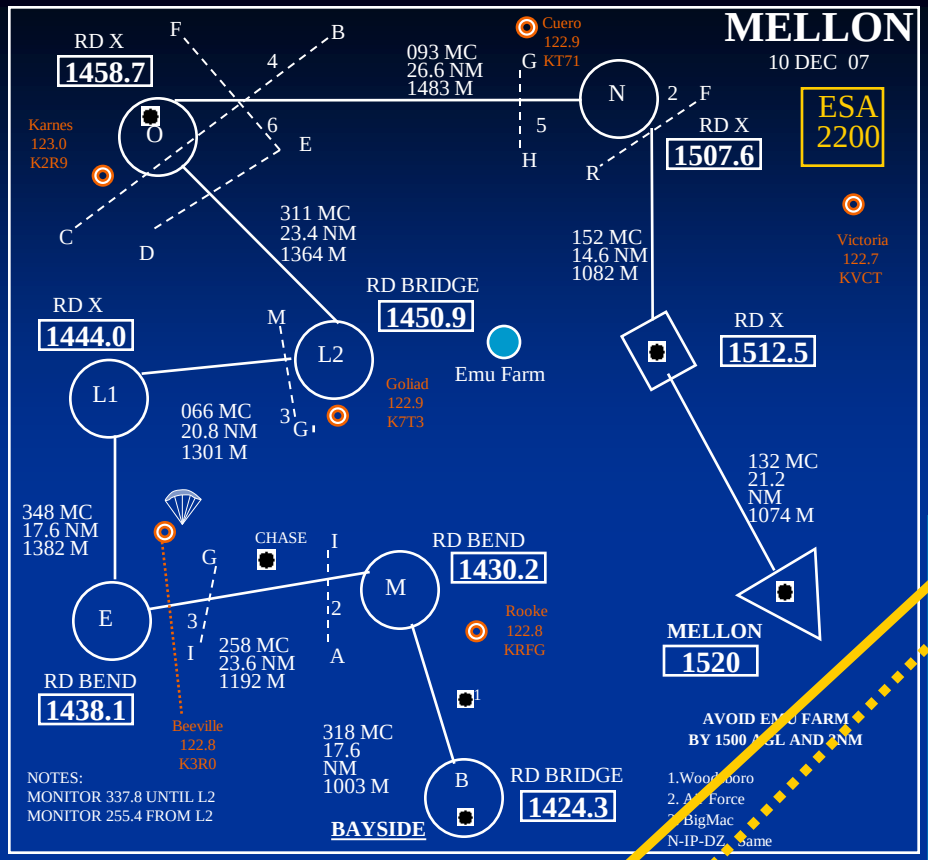
Look at classmates sticks!!!!



ROUTE TIMING			FUEL
B			
M	5.8	5.8	
E	7.9	13.7	
L1	5.9	19.6	
L2	6.9	26.5	
O	7.8	34.3	
N	8.9	43.2	
IP	4.9	48.1	
DZ	7.5	55.6	

KVCT ASOS 119.02

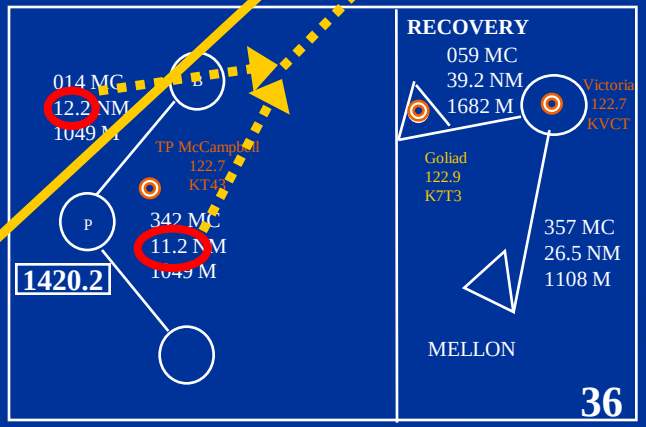




ROUTE TIMING			
B			
M	5.9	5.9	
E	7.9	13.8	
L1	5.9	19.7	
L2	6.9	26.6	
O	7.8	34.4	
N	8.9	43.3	
IP	4.9	48.2	
DZ	7.5	55.7	

KVCT ASOS 119.02

T/O: 1416.5



36

Scheduled T/O @ 1415

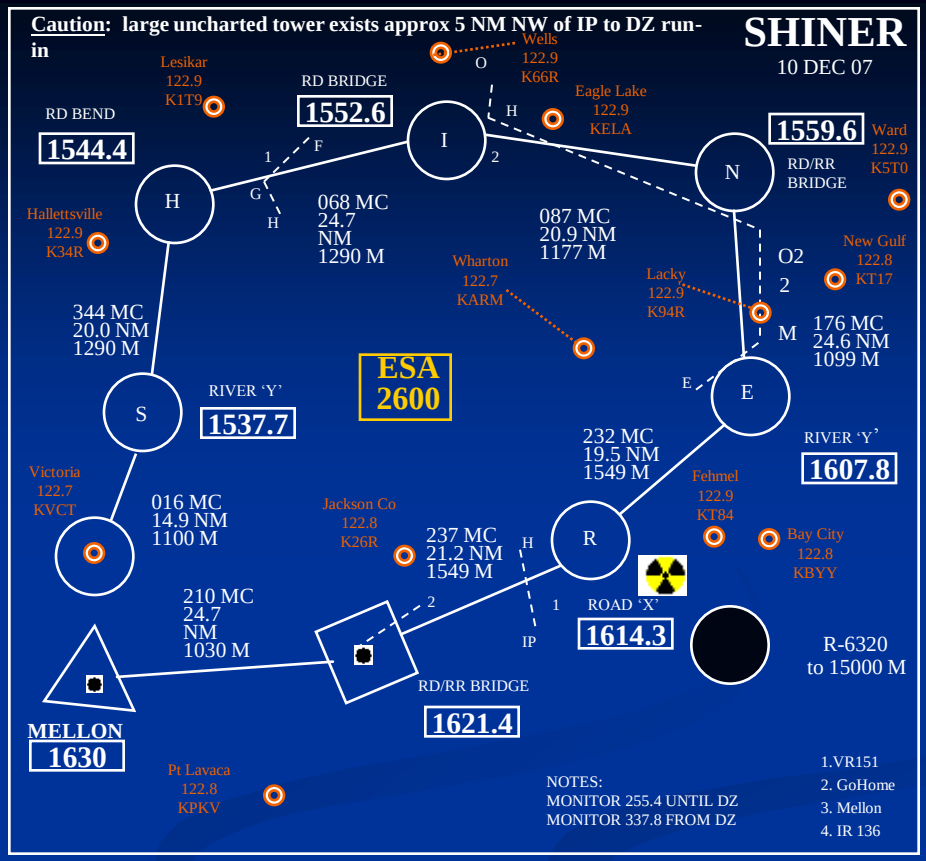
T/O time (1415)
+ Time to entry (~8 min)
+ route time (55.7) = TOT
1415+ 63.7 (rd up to 65)= 1520
(5 min interval)

Start @ TOT (1520) and work back to T/O time (TOT – 7.5 min from IP, time @ IP – 4.9 =time @ pt. N, time @ pt N – 8.9= time @ pt O, etc)
All the way back to a T/O time.

2nd Route:

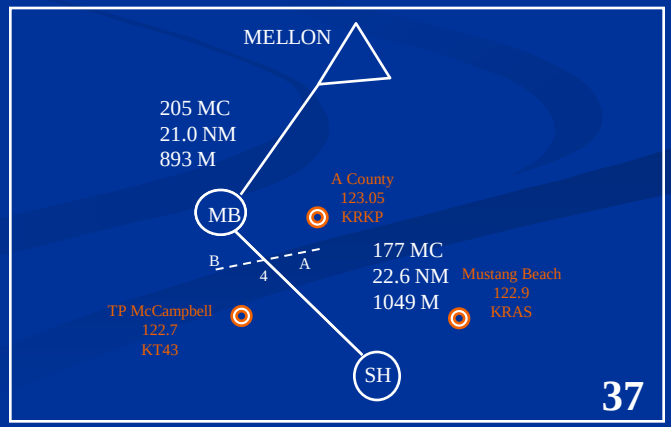
Last TOT (1520) +
Time to LZ (8.8 min)
+ delay time (5 min)
+ enroute time to entry (n/a incl)
+ Route time 57.3)= TOT
1520+ 71.1 (rd dn to 70)= 1630
(5 min interval)

Start @ TOT (1630) and work back to T/O time (TOT – 8.6 min = time @ IP, time @ IP – 7.1 =time @ pt. R, time @ pt R – 6.5= time @ pt E, etc)
All the way back to an entry time.



ROUTE TIMING			FUEL
S	5.0	5.0	
H	6.7	11.7	
I	8.2	19.9	
N	7.0	26.9	
E	8.2	35.1	
R	6.5	41.6	
IP	7.1	48.7	
DZ	8.6	57.3	

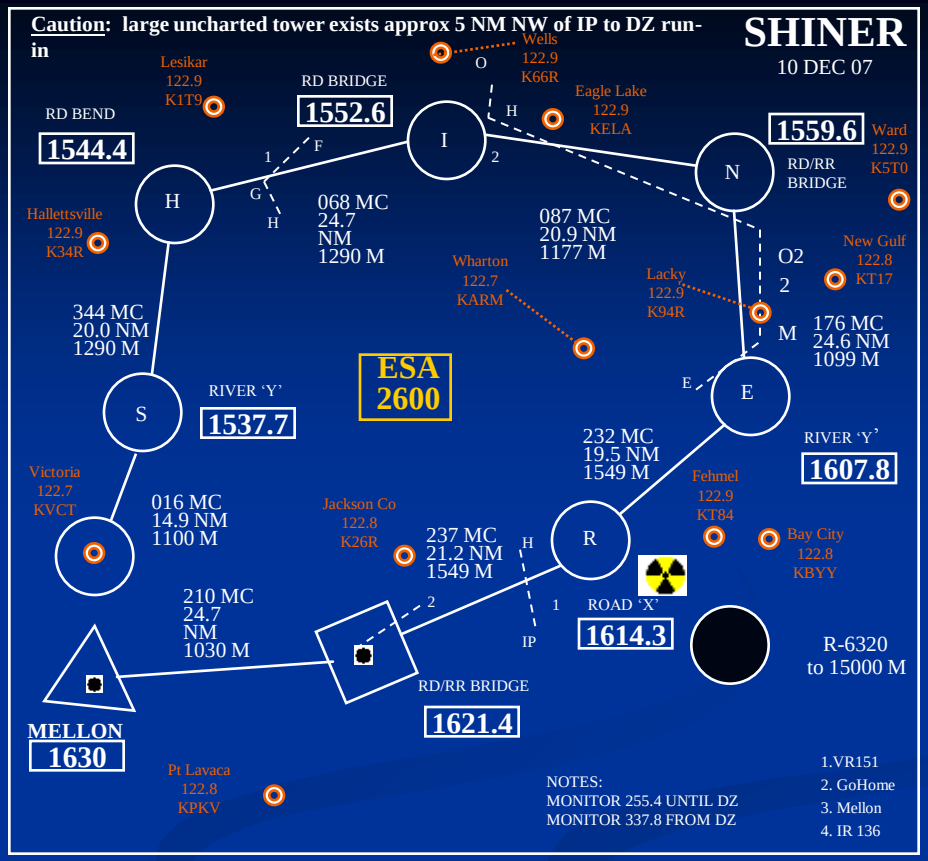
KVCT ASOS 119.02
KBYY AWOS 118.07
KPKV AWOS 118.27



Fuels Computed @ 600 lb/hr (10 lb/min)

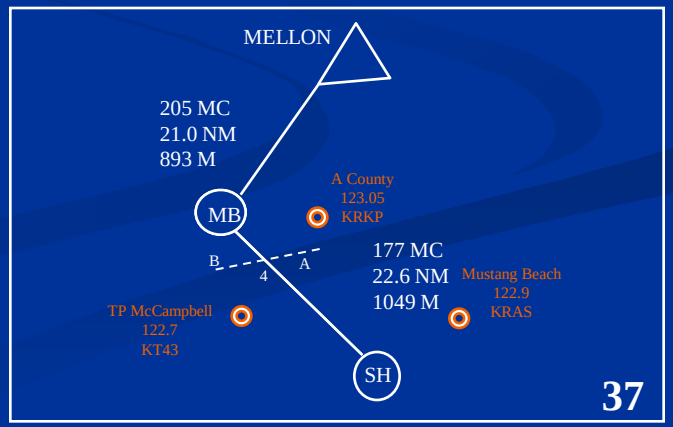
SOP mins (Outside the yellow (530))
+ Time to Alternate (CRP (200 lbs.)
+ Approach fuel (125 lbs.)
+ enroute time from each pt.

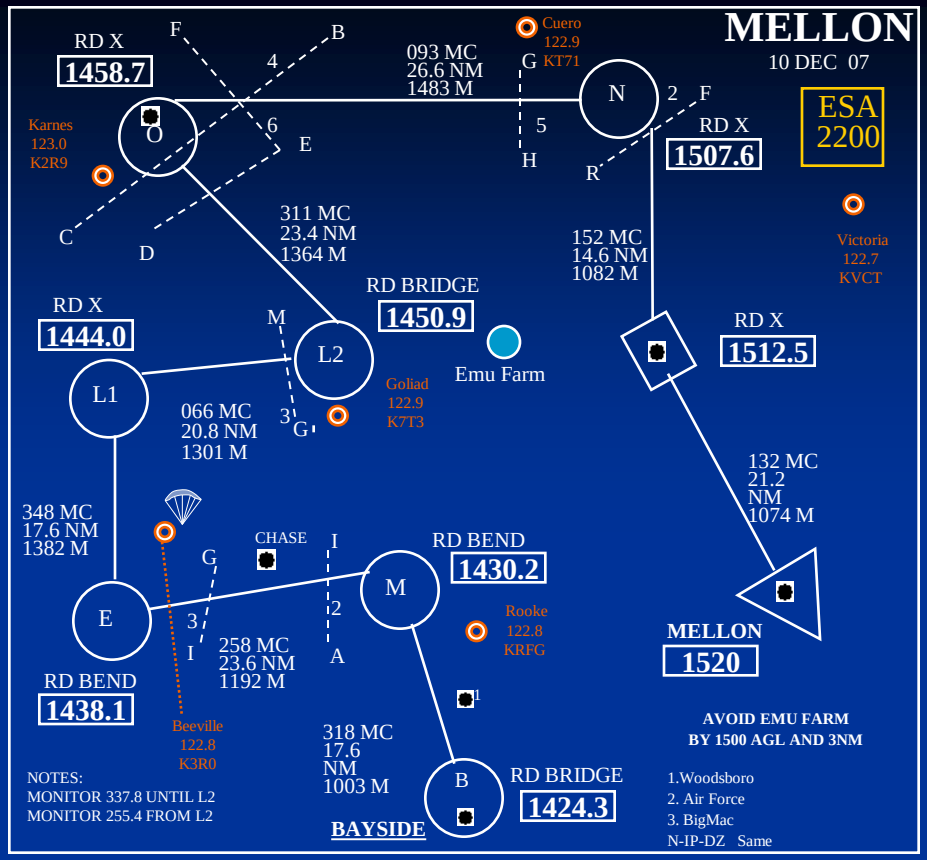
Start @ Shamrock (855 lbs.) and work back.



ROUTE	TIMING		FUEL
S	5.0	5.0	1523
H	6.7	11.7	1456
I	8.2	19.9	1374
N	7.0	26.9	1304
E	8.2	35.1	1222
R	6.5	41.6	1157
IP	7.1	48.7	1086
DZ	8.6	57.3	1000
SH	14.5		855

KVCT ASOS 119.02
KBYY AWOS 118.07
KPKV AWOS 118.27

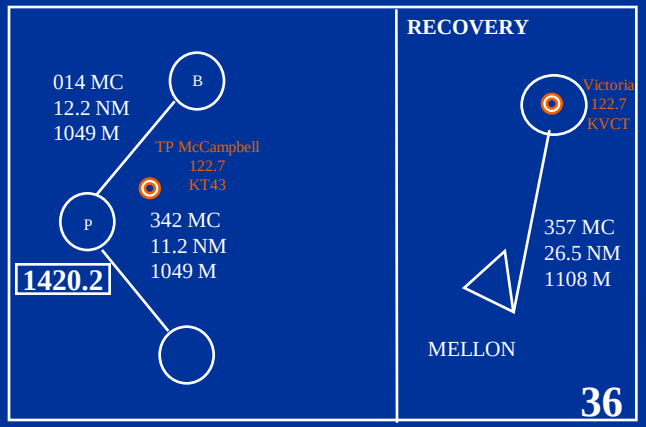




ROUTE TIMING			
B			2268
M	5.9	5.9	2209
E	7.9	13.8	2130
L1	5.9	19.7	2071
L2	6.9	26.6	2002
O	7.8	34.4	1924
N	8.9	43.3	1835
IP	4.9	48.2	1786
DZ	7.5	55.7	1711

KVCT ASOS 119.02

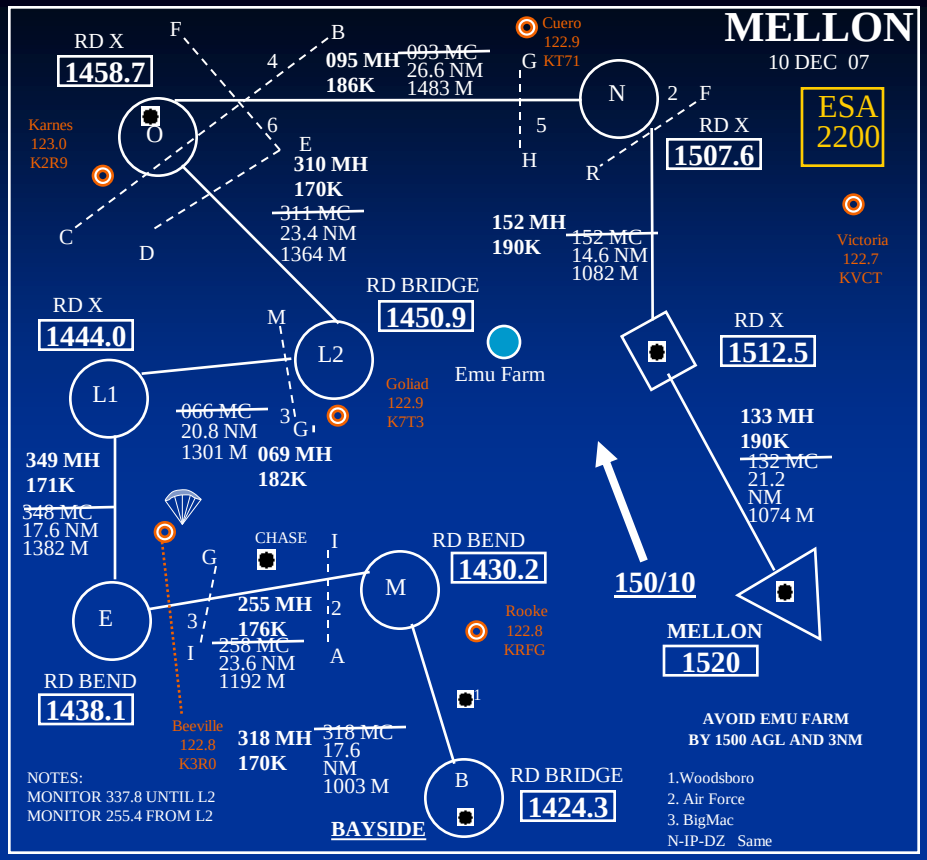
T/O Fuel: 2346 lbs
T/O: 1416.5



Fuels continued to first route

Mins @ prev pt. (1523 @ S)
+ Fuel to get to prev pt (VCT to pt. S (50 lbs))
+ Delay fuel (50 lbs (5 min))
+ fuel from DZ to LZ (88 lbs)
= Fuel @ DZ

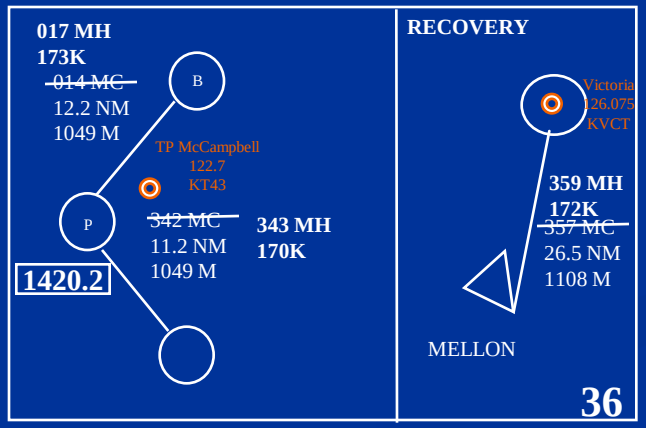
Work from DZ fuel to T/O fuel



ROUTE TIMING			
B			2268
M	5.9	5.9	2209
E	7.9	13.8	2130
L1	5.9	19.7	2071
L2	6.9	26.6	2002
O	7.8	34.4	1924
N	8.9	43.3	1835
IP	4.9	48.2	1786
DZ	7.5	55.7	1711

KVCT ASOS 119.02

T/O Fuel: 2346 lbs
T/O: 1416.5



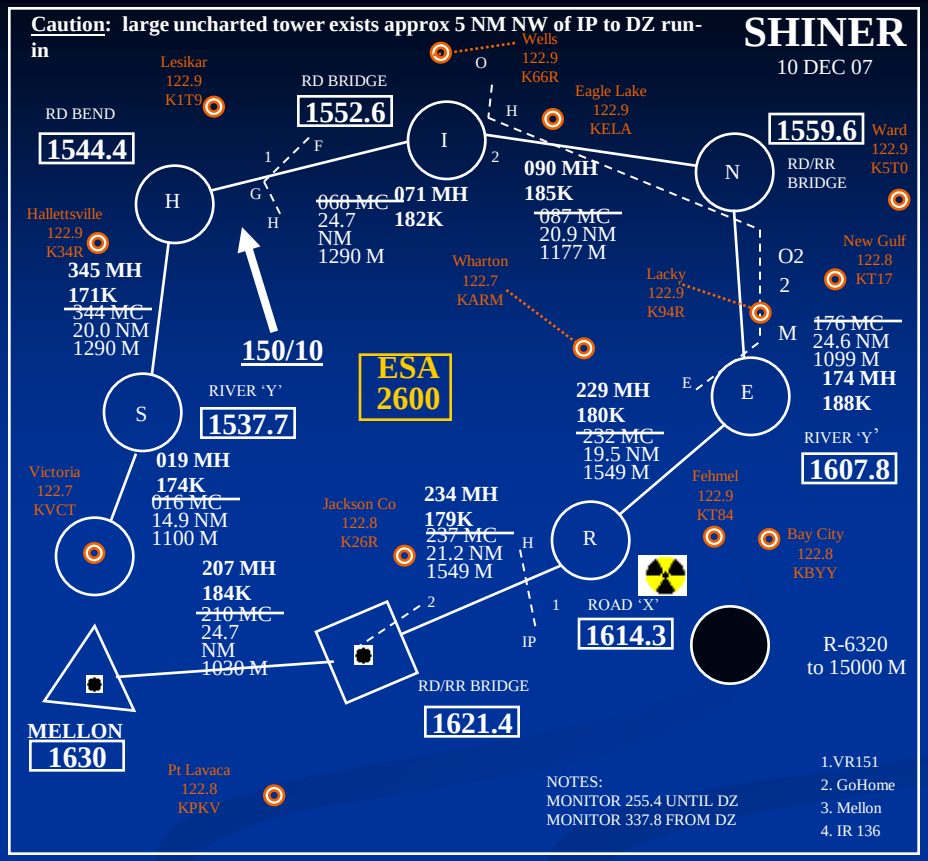
Winds

Determine winds
Draw wind arrow
Spin winds for each leg
Put Magnetic Heading (MH) and Wind corrected airspeed (K) on each leg

Determine winds
Draw wind arrow
Spin winds for each leg
Put Magnetic Heading (MH) and Wind corrected airspeed (K) on each leg

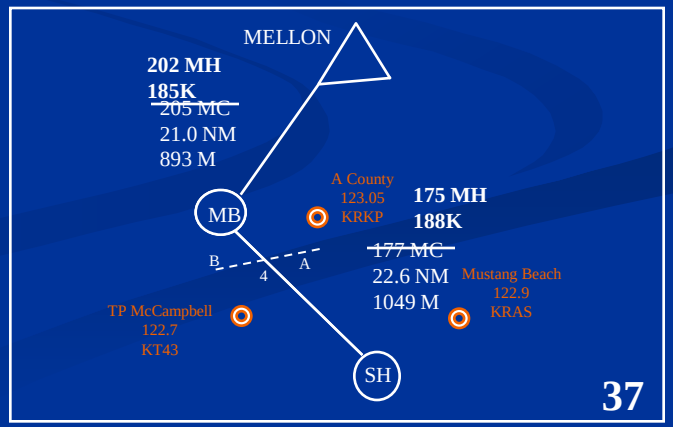
Minimums on stick diagram will include

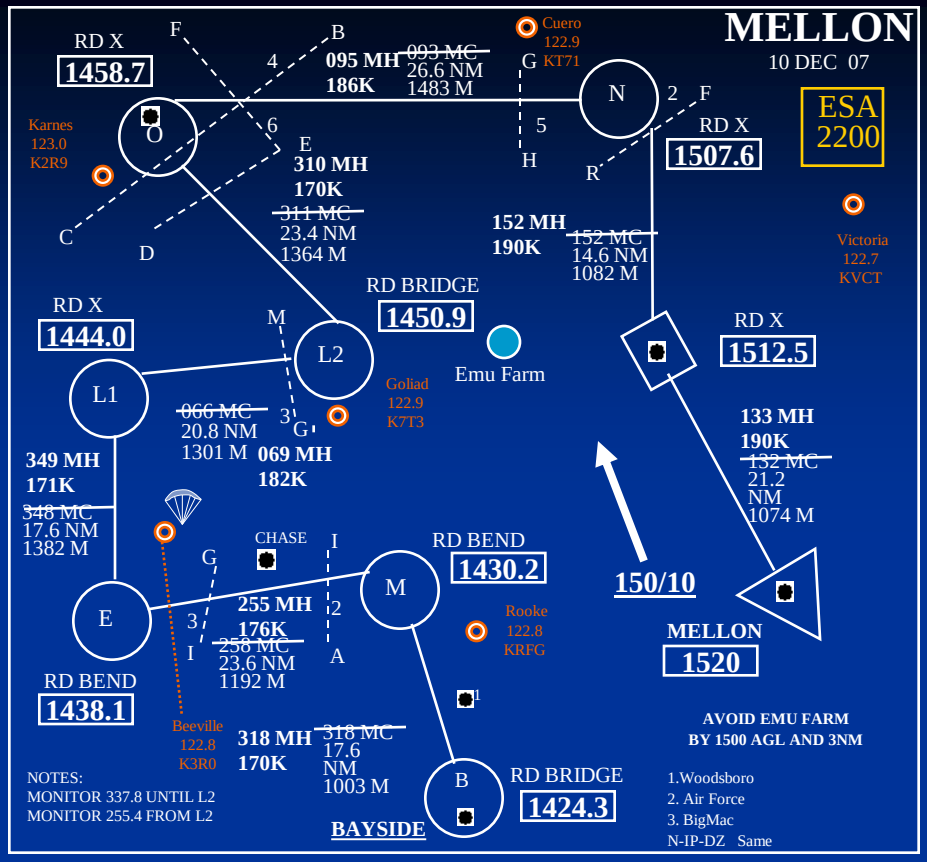
1. **Times**
2. **Fuels**
3. **Wind Corrections**

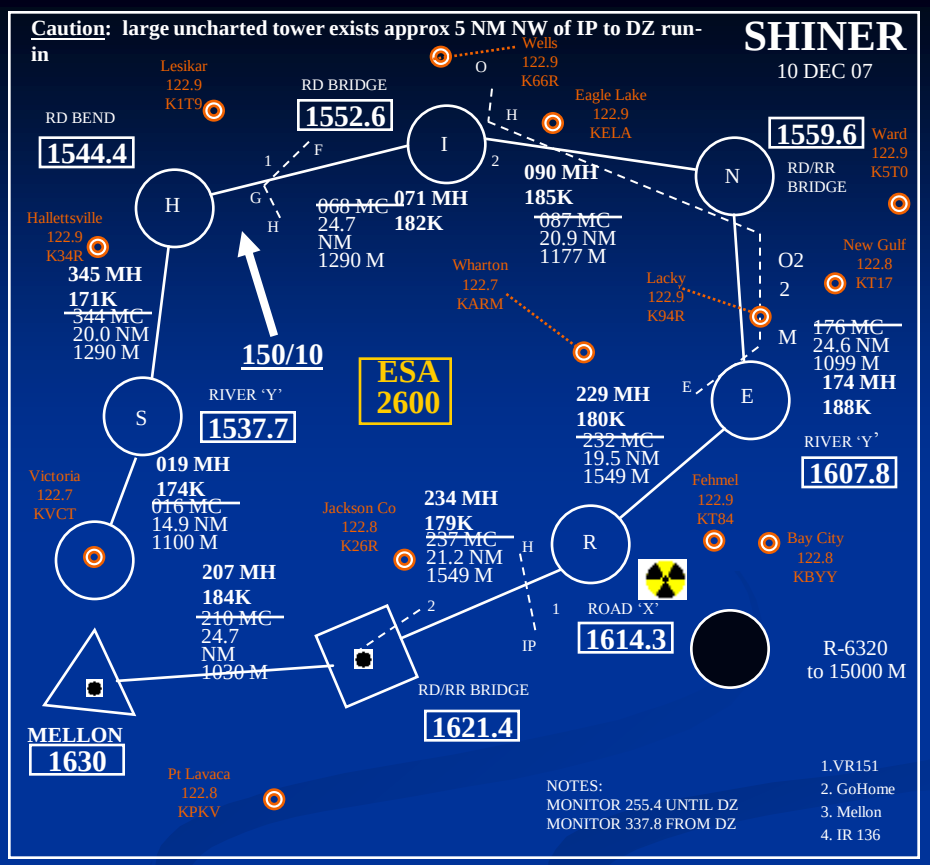


ROUTE	TIMING		FUEL
S	5.0	5.0	1523
H	6.7	11.7	1456
I	8.2	19.9	1374
N	7.0	26.9	1304
E	8.2	35.1	1222
R	6.5	41.6	1157
IP	7.1	48.7	1086
DZ	8.6	57.3	1000
SH	14.5		855

KVCT ASOS 119.02
KBYY AWOS 118.07
KPKV AWOS 118.27



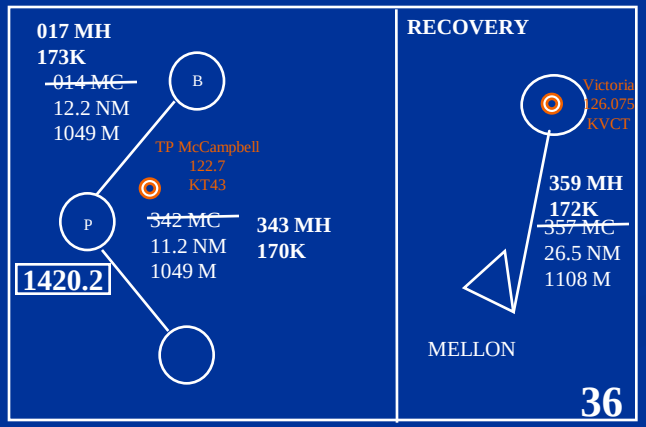




ROUTE TIMING			
B			2268
M	5.9	5.9	2209
E	7.9	13.8	2130
L1	5.9	19.7	2071
L2	6.9	26.6	2002
O	7.8	34.4	1924
N	8.9	43.3	1835
IP	4.9	48.2	1786
DZ	7.5	55.7	1711

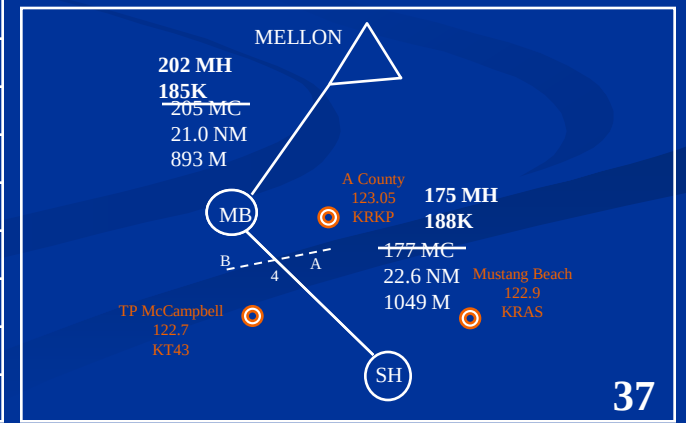
KVCT ASOS 119.02

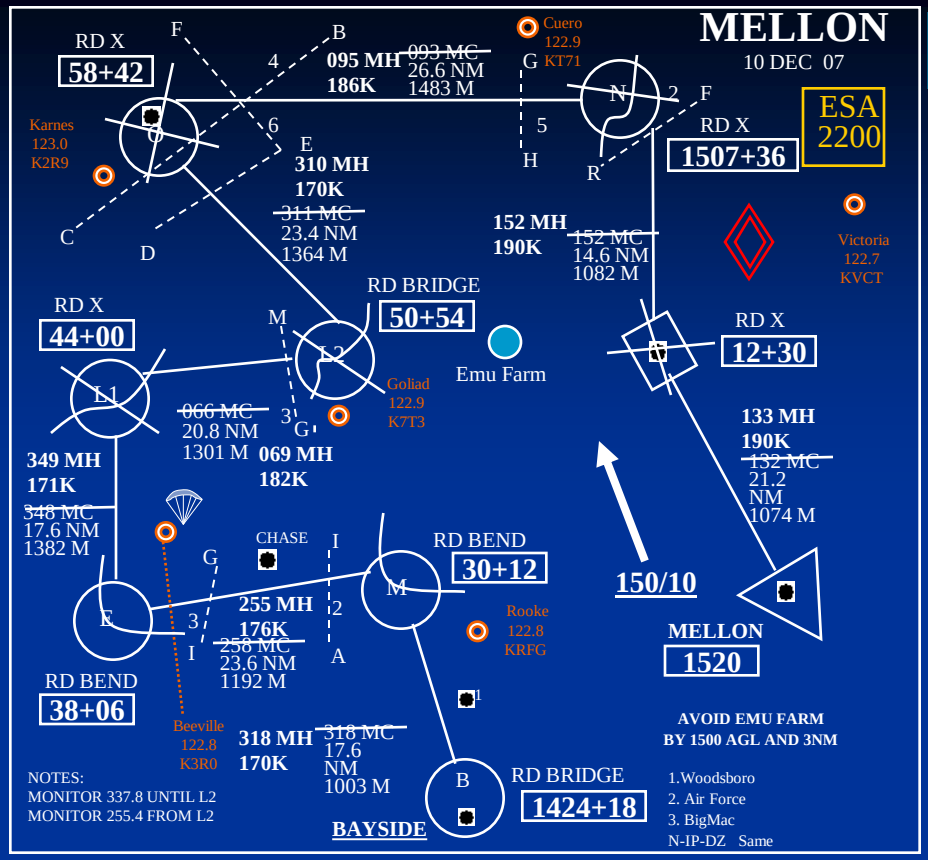
T/O Fuel: 2346 lbs
T/O: 1416.5



ROUTE TIMING			FUEL
S	5.0	5.0	1523
H	6.7	11.7	1456
I	8.2	19.9	1374
N	7.0	26.9	1304
E	8.2	35.1	1222
R	6.5	41.6	1157
IP	7.1	48.7	1086
DZ	8.6	57.3	1000
SH	14.5		855

KVCT ASOS 119.02
KBYY AWOS 118.07
KPKV AWOS 118.27





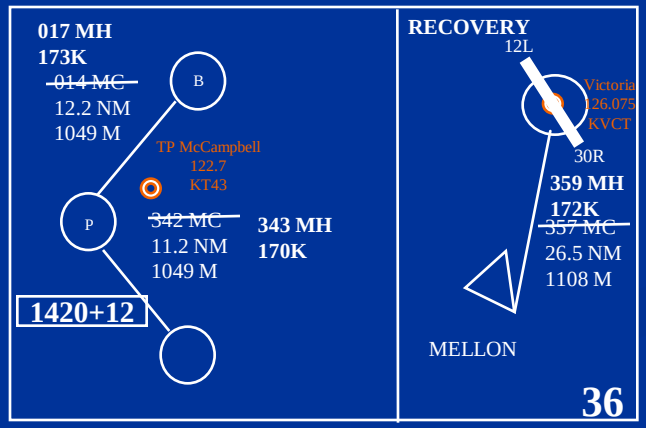
ROUTE TIMING			
B			2268
M	5.9	5.9	2209
E	7.9	13.8	2130
L1	5.9	19.7	2071
L2	6.9	26.6	2002
O	7.8	34.4	1924
N	8.9	43.3	1835
IP	4.9	48.2	1786
DZ	7.5	55.7	1711

KVCT ASOS 119.02

Hou Ctr. 134.6

T/O Fuel: 2346 lbs

T/O: 1416.5



Additional Items (Technique Only)

1. TP description drawn into circles
2. Times converted to seconds (Only show hours when hour starts, entry and TOT
3. Draw Scale on Side (minute ticks)- Right side of Stick works better.
4. Depict ESA
5. Depict Recovery Runway orientation and numbers
6. Add Center Freq for reference in case of IFR coordination..etc
7. Put DZ picture on back

Take off time, and TOT?

- May not take off on EXACT time, ROLEX the TOT or do cut offs, speeds, slow downs etc….
- Re adjust TOT times for EACH leg

BRIEF

- **Use the briefing guide in the FTI: when you brief you will go through this line by line and will be expected to know each item.**
- Briefs should take place in SAFETY NATOPS, if unable revert to the normal briefing spaces.
- Topics to be discussed in the FTI will include:
  - NOTAMS/TFRs/BAM/BASH/WX
  - Stick diagrams
  - Charts
  - Everything accomplished in mission planning, etc, etc.

BRIEF (cont.)

- Route study/turn point brief
  - Brief each leg's doghouse, the route's ESA, threats, and any other safety concerns you feel should be addressed.
- NATOPS/Blue Card
- Practice your briefs at home, don't show up to your event and try to wing it. You will sound like a moron and make your IP upset!
- Be ready **at** brief time or get a READY ROOM UNSAT!

N0101

- TACTICAL AIRLIFT
- PRE-MISSION PLANNING
- FLIGHT OPERATIONS
- HOMEWORK

Pilot Monitoring Responsibilities you sit in RIGHT seat

- CLEARING
- Backup pilot at controls
- Monitor instruments
- Navigate ENTIRE flight
  - "Chock to chock"
  - Overhead, downwind, low approch ?????
- Time control

(TOT time vs leg time)

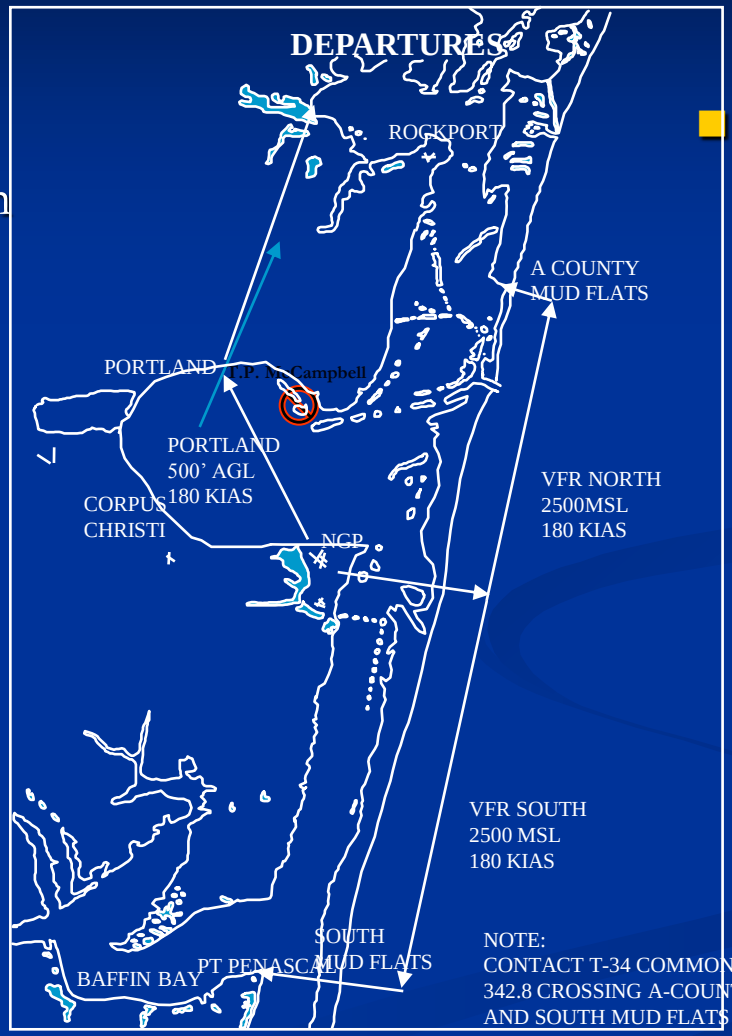
- Communications

(Beeville, etc)

- Checklist discipline
- Be proactive, YOU are in charge of where and how we go

DEPARTURE & ROUTE ENTRY

- Departure
  - **"Portland Low"** on request with tower prior to takeoff
  - Look @ inflight guide- Rwy 17 is different
  - TP McCampbell advisory call
  - Terminate with ATC when "feet dry"
    - Change Squawk
    - Change Freq



- Route Entry
  - On heading
  - On altitude
  - On airspeed
  - Hack clock for leg timing
  - Check TOT

ENROUTE

- Day altitude = Modified contour
  - Reference to base altitude (500’ AGL) above the terrain with momentary deviations above and below that base for terrain depressions and obstructions to permit a smooth flight profile

COMMUNICATIONS

- Reporting points
- Airfields

DEAD RECKONING

- Precise Heading
- Precise Airspeed
- Precise Time

You'll stay on course!

TURN POINTS
(dog house is on next slide)

- Briefing
  - Approx 5 miles prior
  - Turn point and next route course (doghouse)
- Identify the point
  - Timing
  - Ground references
- Turn
  - Fly-over
  - "Ready, Ready, TURN"
  - Hack clock
- Check TOT status

DOGHOUSE

- Doghouses give the data for each leg of the route
- Brief it, the speed and the "controlling obstacle" for each leg
- Place them so they are usable, but do not cover up a lot of information

TIMING CORRECTIONS

- Off course maneuvering
  - New time vs. planned time
  - New MSA?
  - Rough Approximation
  - Sword (off-crs) vs. Scalpel (a/s)

- Airspeed Changes
  - 10% of groundspeed
    - **(18 KIAS change)**
  - Incremental
    - **(30 KIAS change)**
  - Proportional
    - **Seconds late/early → +/- KIAS for 3 minutes**

10% Method

Time ahead or behind (seconds)	Time to hold speed change (minutes)
6	1
12	2
18	3
24	4
30	5
36	6
42	7
48	8
54	9
60	10

Incremental Method

Time ahead or behind (seconds)	Time to hold speed change (minutes)
10	1 min
15	1 min 30 sec
20	2 min
25	2 min 30 sec
30	3 min
35	3 min 30 sec
40	4 min
45	4 min 30 sec
50	5 min
55	5 min 30 sec

RUN-IN

- Initial Point I.P.
  - On Course
  - On Airspeed
  - On Time
- Critical navigation
  - **3 update points**

  (towers, roads, etc)
- Brief the Drop Zone (Preferably pre-IP leg)
- Use the picture, describe it, Drop Altitude

SLOW DOWN

- Day – Ascending
  - 400 ft-lbs
  - Climb at 1,000 fpm
  - Approach flaps on speed
  - Add power to maintain 120 knots for T-44 or 130 knots for C-12
  - Level off at Drop Altitude
    - 1,000’ above highest point on DZ

Acquiring the DZ verbally

- Don't say "I have the DZ at 11:00 tally ho!"
- Say: "Pilot has the DZ"
- "Copilot has the DZ"
- THEN…..discuss where it is.
- "Roger, I got the farm house at 11 o'clock next to a road"

“GREEN LIGHT”

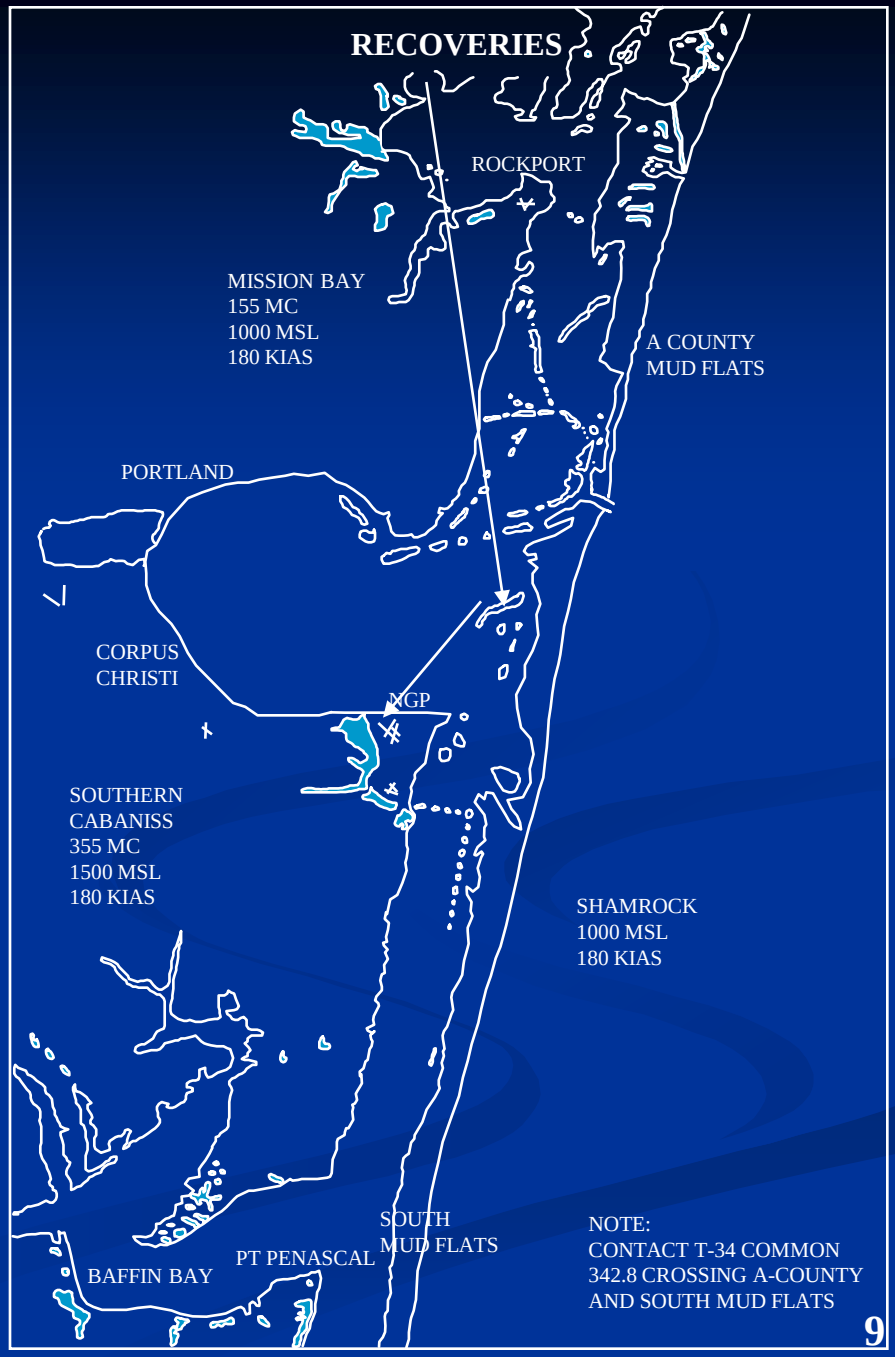
- Anticipate the slowdown point and announce internally “1 MINUTE TO SLOWDOWN”
- At your slowdown point announce “SLOW DOWN, SLOW DOWN, NOW”
- Use PI as the CARP
- “5 SECONDS TO DROP”
- “GREEN LIGHT”
- “LOAD CLEAR”
- “RED LIGHT”
- Clean up, accelerate, and execute your escape .

COMBAT ESCAPE

- Minimize time as a vulnerable target in the threat environment
- Turn to escape heading
- Retract flaps/Ramp/Doors
- Accelerate to 180KIAS or as briefed
- Climb/Descend to enroute altitude (500AGL typically or 1000 if going to an airfield)

RECOVERY

- Route entry for second route
- After second route, VFR recovery via Shamrock
  - Via Woodsboro from the North
    - Bayside Bridge is the VFR reporting point



WHAT NOW?

- Homework
  - **Finish** your routes
    - Charts
      - CHUM
    - Stick Diagram
      - Fuels
      - Times
      - Wind Corrections
      - (**500ft AGL VCT, SAT** etc)
  - Read the FTI again
  - Check Ride route
- Special Notices
  - Don't forget to call IP night prior
  - No more IFR escapes or recoveries

T0101/02

TACTICAL FORMATIONS

T0101/02

- **FORMATION OPS**
- PRE-MISSION PLANNING
- FLIGHT OPERATIONS
- HOMEWORK

TACTICAL FORMATIONS

- Single Ship
  - Surprise
  - Flexibility
  - Spacing for Airland
- Formation
  - More than what 1 Herc can provide
  - Protection
  - Deconflict with other Hercs

ALL WEATHER

- Instrument Formations
  - C-130J is capable
- Visual Formations
  - All we teach here

CREW RESPONSIBILITES
Know these terms

- Mission Commander (MC)
- Formation Lead (Usually MC)
- Weather ship
- Communications
  - Interplane
  - External

F0101

- FORMATION OPS
- PRE-MISSION PLANNING
- FLIGHT OPERATIONS
- HOMEWORK

STILL GOING LOW
same as single ship but work together

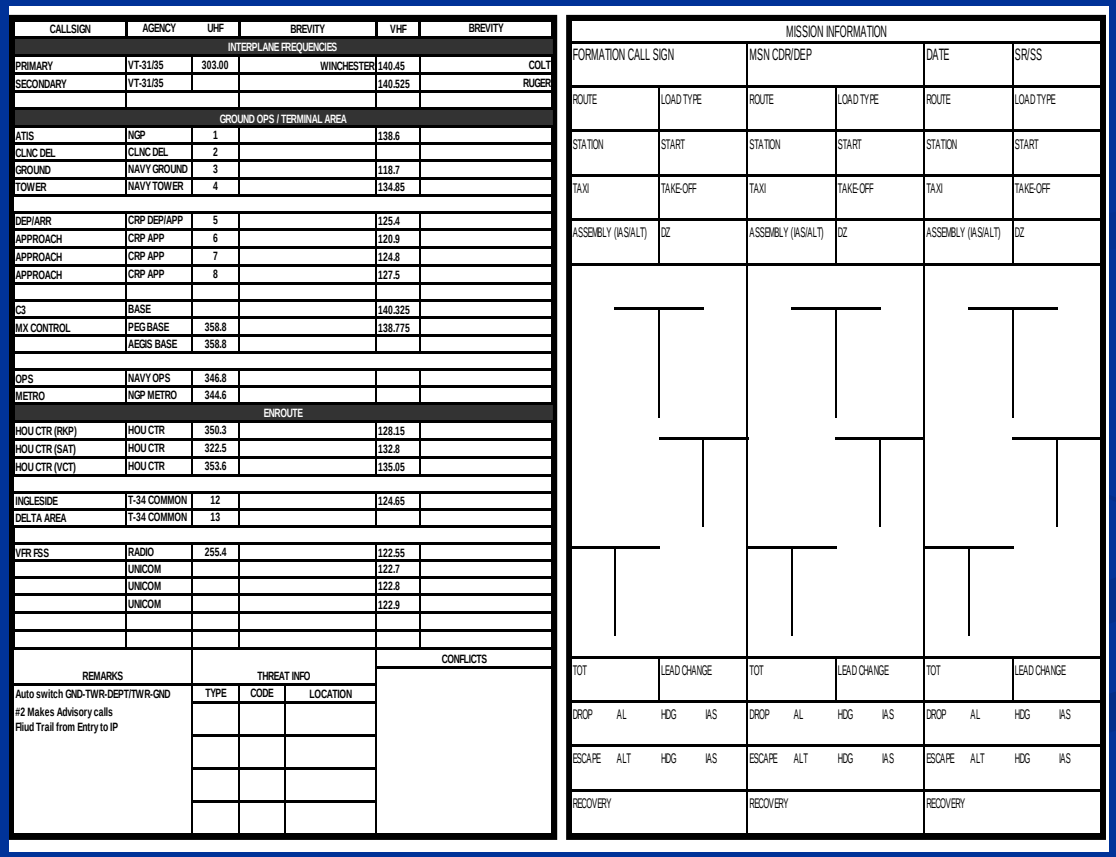
- Call MC day prior
  - Call other students
  - Call SDO for scheduling
- Have charts for both aircraft
- WX/NOTAMS
- TFRs/BAM
- Time hack
- Stick Diagrams
  - Formation geometries
  - Threat locations
  - Lead changes
- Copies for Everyone

AF FORM 280

secret squirrel comm plan and taxi plan

Look at previous classmates 280s

- Required for all Form flights
- Formation master plan
- Communications plan
- Route data



CALLSIGN	AGENCY	UHF	BREVITY	VHF	BREVITY
INTERPLANE FREQUENCIES					
PRIMARY	VT-31/35	303.00	WINCHESTER	140.45	COLT
SECONDARY	VT-31/35			140.525	RUGER
GROUND OPS / TERMINAL AREA					
ATIS	NGP	1		138.6	
CLNC DEL	CLNC DEL	2			
GROUND	NAVY GROUND	3		118.7	
TOWER	NAVY TOWER	4		134.85	
DEP/ARR	CRP DEP/APP	5		125.4	
APPROACH	CRP APP	6		120.9	
APPROACH	CRP APP	7		124.8	
APPROACH	CRP APP	8		127.5	
C3	BASE			140.325	
MX CONTROL	PEG BASE	358.8		138.775	
	AEGIS BASE	358.8			
OPS	NAVY OPS	346.8			
METRO	NGP METRO	344.6			
ENROUTE					
HOU CTR (RKP)	HOU CTR	350.3		128.15	
HOU CTR (SAT)	HOU CTR	322.5		132.8	
HOU CTR (VCT)	HOU CTR	353.6		135.05	
INGLESIDE	T-34 COMMON	12		124.65	
DELTA AREA	T-34 COMMON	13			
VFR FSS	RADIO	255.4		122.55	
	UNICOM			122.7	
	UNICOM			122.8	
	UNICOM			122.9	

REMARKS	THREAT INFO			CONFLICTS
Auto switch GND-TWR-DEPT/TWR-GND	TYPE	CODE	LOCATION	
#2 Makes Advisory calls				
Fliud Trail from Entry to IP				

MISSION INFORMATION

FORMATION CALL SIGN		MSN CDR/DEP		DATE	SR/SS
ROUTE	LOAD TYPE	ROUTE	LOAD TYPE	ROUTE	LOAD TYPE
STATION	START	STATION	START	STATION	START
TAXI	TAKE-OFF	TAXI	TAKE-OFF	TAXI	TAKE-OFF
ASSEMBLY (IAS/ALT)	DZ	ASSEMBLY (IAS/ALT)	DZ	ASSEMBLY (IAS/ALT)	DZ

TOT	LEAD CHANGE	TOT	LEAD CHANGE	TOT	LEAD CHANGE
DROP AL	HDG IAS	DROP AL	HDG IAS	DROP AL	HDG IAS
ESCAPE ALT	HDG IAS	ESCAPE ALT	HDG IAS	ESCAPE ALT	HDG IAS
RECOVERY		RECOVERY		RECOVERY	

COMM PLAN

CALLSIGN	AGENCY	UHF	BREVITY	VHF	BR
INTERPLANE FREQUENCIES					
PRIMARY	VT-31/35	303.00	WINCHESTER	140.45	
SECONDARY	VT-31/35			140.525	
GROUND OPS / TERMINAL AREA					
ATIS	NGP	1		138.6	
CLNC DEL	CLNC DEL	2			
GROUND	NAVY GROUND	3		118.7	
TOWER	NAVY TOWER	4		134.85	
DEP/ARR	CRP DEP/APP	5		125.4	
APPROACH	CRP APP	6		120.9	
APPROACH	CRP APP	7		124.8	
APPROACH	CRP APP	8		127.5	
C3	BASE			140.325	
MX CONTROL	PEG BASE	358.8		138.775	
	AEGIS BASE	358.8			
OPS	NAVY OPS	346.8			
METRO	NGP METRO	344.6			
ENROUTE					
HOU CTR (RKP)	HOU CTR	350.3		128.15	
HOU CTR (SAT)	HOU CTR	322.5		132.8	
HOU CTR (VCT)	HOU CTR	353.6		135.05	
INGLESIDE	T-34 COMMON	12		124.65	
DELTA AREA	T-34 COMMON	13			
VFR FSS	RADIO	255.4		122.55	
	UNICOM			122.7	
	UNICOM			122.8	
	UNICOM			122.9	

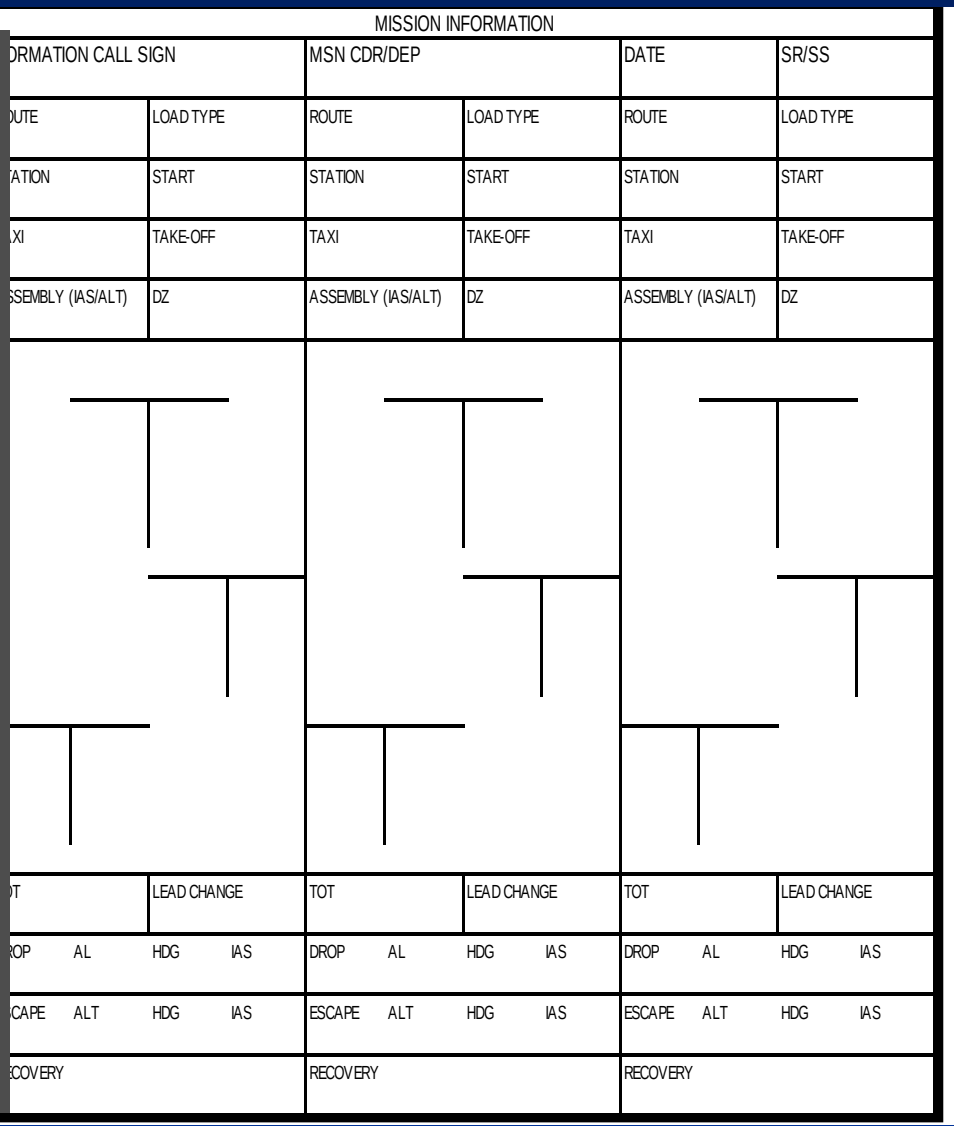
REMARKS	THREAT INFO			CONFLIC
Auto switch GND-TWR-DEPT/TWR-GND	TYPE	CODE	LOCATION	
#2 Makes Advisory calls				
Fliud Trail from Entry to IP				

- All planned frequencies
- Chattermark
  - Discretely direct frequency changes
  - Separate words for internal and external comms
  - Unrelated V/UHF Themes
  - BEER + Cars
  - Football + Schwarzenegger movies
  - Pornstars + Dictators
  - Etc etc…….

ROUTE DATA

Don't leave this blank!!!

- MC and Deputy MC
- Route identification
- Essential Times
  - Brief
  - Bus
  - Stations **(in the seat for check)**
  - Start
  - Taxi
  - Takeoff
  - TOT
- Type of drop
- Formation position
- Remarks
- Threats & Geometries
- Recoveries



FORMATION BRIEFING

- Have everything ready PRIOR to brief! Brief as a TEAM.
  - WX/NOTAMS/TFRs
  - Sticks/280/Charts/Slide
- Formation Script
  - Use TRANET CPU located in SAFETY/NATOPS
    - Follow directions on the computer to locate the PPT files
    - DO NOT SAVE YOUR CHANGES on the hard drive
    - CD's are only approved method of data transfer

ROUTE STUDY

- Route study for every route even if you flew it yesterday!!!!
- NATOPS brief, as individual crews.

T0101/02

- FORMATION OPS
- PRE-MISSION PLANNING
- FLIGHT OPERATIONS
- HOMEWORK

COMMS

- ATC belongs to Lead
- All other Communication as briefed
  - Usually 2 gets all advisory calls, Montana base, Delta etc…
  - T44C may make all CTAF calls and get ATIS
- Wingmen only respond to interplane freq changes
  - "Go"= wingman response
  - "Push"= no wingmen response

GROUND & TAKEOFF

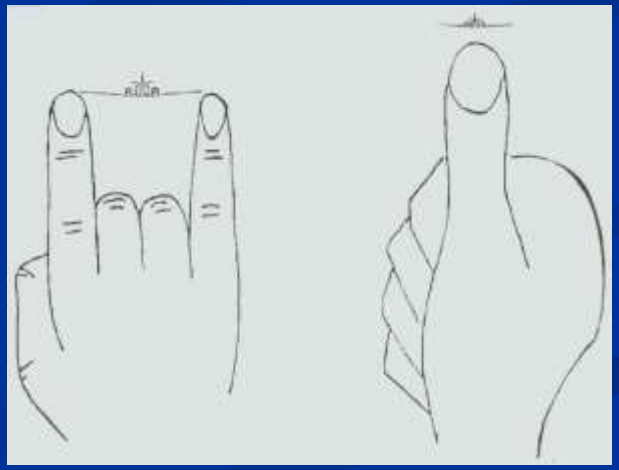
- Preflight
- Start
- Taxi
  - "Out of chocks" call signifies "Ready to Taxi"
  - 2 ship-lengths
- Engine run-up
- Takeoff
  - Lead on **down-wind side.**
  - **5 sec** delay for wingmen

IN FLIGHT

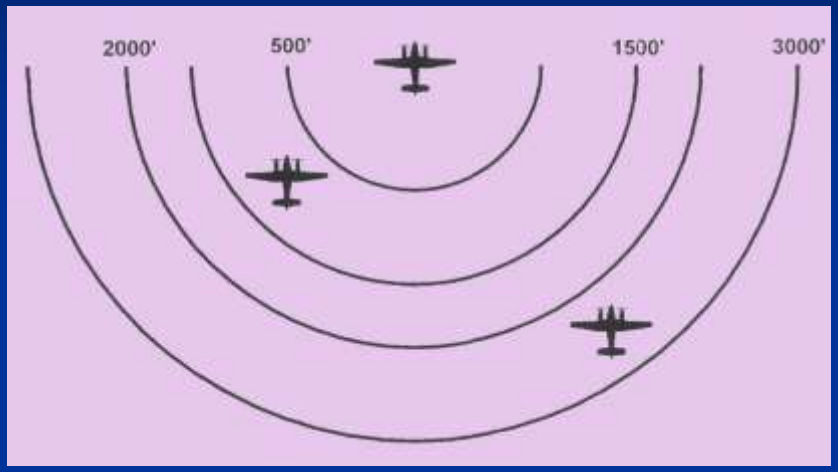
- Departure
  - Rejoin
    - 150 KIAS until -2 calls “in”
    - Flight accelerates to 180 KIAS or pre-briefed airspeed.
- Enroute
  - Lead flies the low level
  - Wingmen follow
    - Maintain SA

IN-TRAIL

- Purpose
  - Mass over the DZ
  - Fixed position
- Position
  - 2 is 500’ back, on right
  - 3 is 1,000’ back, on left
- Problems
  - Fatigue over time
  - Clearing for threat
  - Threat reaction
- Techniques
  - GIG ‘EM hook ‘em



FLUID TRAIL



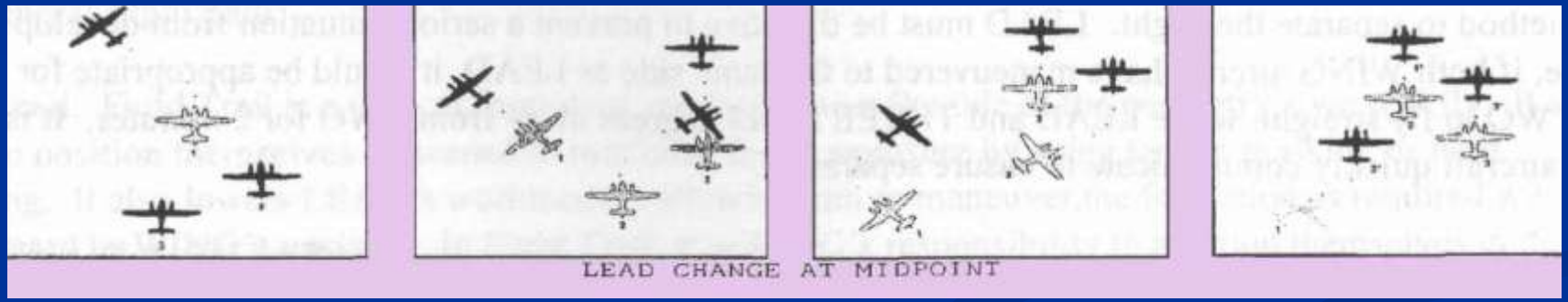
- Purpose
  - Flexibility (AAA coming from sides)
  - Threat reactions
- Position
  - 2 is 500-1500' away from lead, not in front of lead
  - 3 is 2,000-3,000' away and not in front of lead
- Problems
  - Inadvertent WX penetration
  - Longer formation over DZ
- Techniques

LINE ABREAST

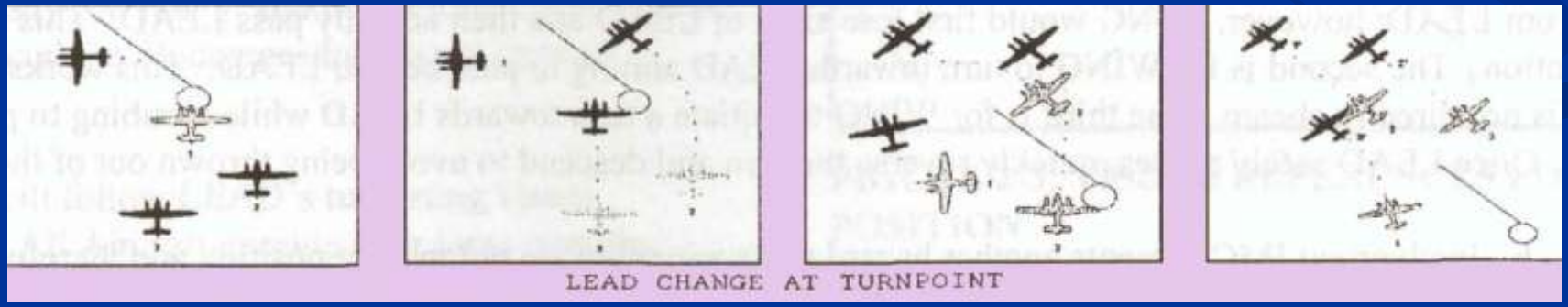
- Purpose
  - Min time over Line of Communication (LOC)
- Position
  - 2 is 500’ right abeam
  - 3 is 500’ left abeam
- Problems
  - Lead’s ability to maneuver
- Techniques

LEAD CHANGE
Don't worry, IP will demo it

AT A MIDPOINT



AT A TURNPOINT



RUN-IN

- Slow down
  - Lead calls over the radio "Montana 456 flight, slowdown, slowdown NOW"
- Drop
  - Follow lead for crosstrack
    - <3 deg drift- in trail
    - >3 follow leads ground track
  - Call your own "GREEN LIGHT"
- Escape
  - Rejoin into briefed geometry

COMMS

- IP inbound to the DZ, these are the only calls that should be made from lead to the formation:

  "MONTANA 456 FLIGHT SLOWDOWN, SLOWDOWN, NOW"

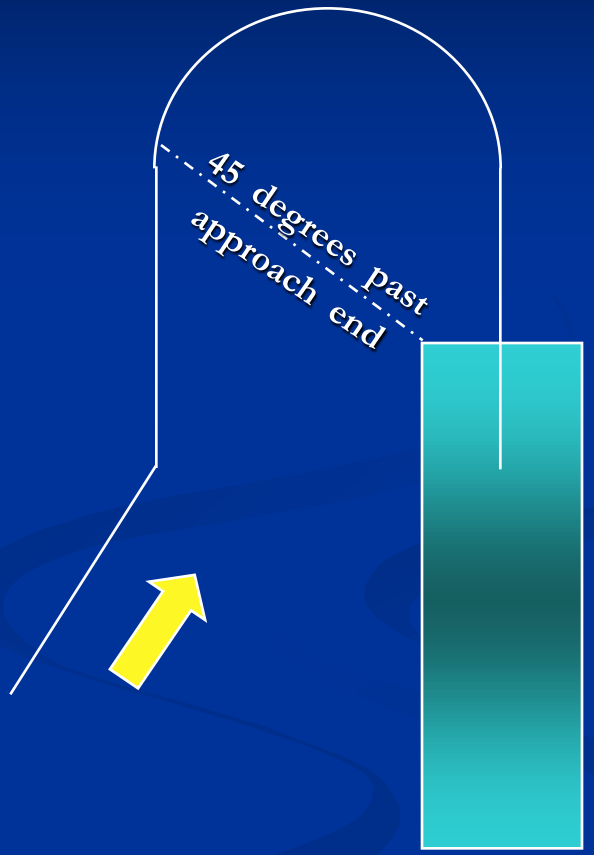
  OR in the event lead can not find the zone or safety of flight related.

  "MONTANA 456 FORMATION NO DROP"

VFR RECOVERIES

(outlying fields , back to AIR FORCE style)

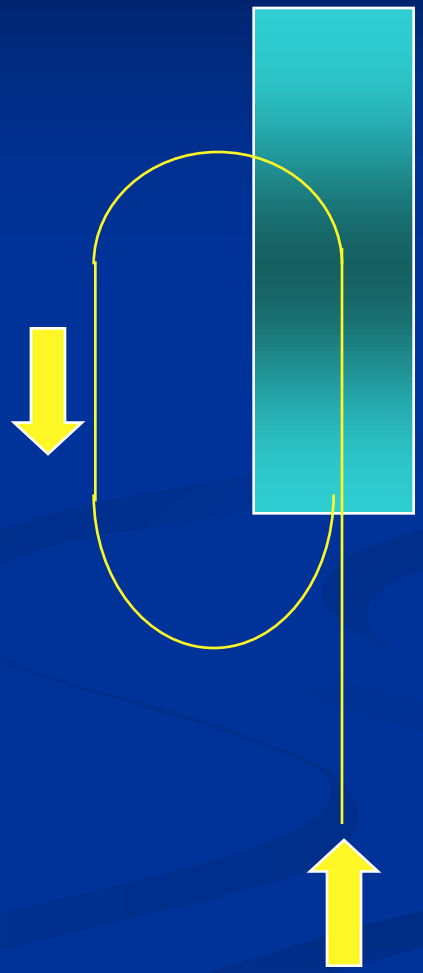
- High-speed downwind
  - 800’ AGL
  - **200** Knots
  - LEVEL break at the perch with 45° bank and idle
  - Wingmen break 7-9 seconds later
  - Flaps and gear on speed
  - 120 KIAS: begin descent
- Report gear down to lead
- Lead gets formation clearance to land



VFR RECOVERIES

(NGP)

- Overhead
  - 1,000’ AGL
  - **200 knots**
  - Break **five** seconds after lead (triangle window)
  - 45° and idle
  - Flaps on Speed
  - Gear on Speed
- Report gear down to lead
- Lead gets formation clearance to land

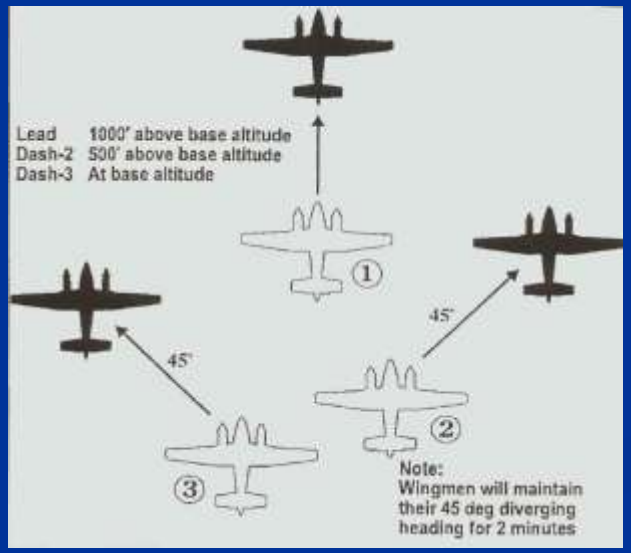


FORMATION LANDING

- On centerline
- **20 Second** interval threshold
  - 15 seconds min
  - 1500’ min
- Brakes and reverse
  - Delay until 1,000’ prior
- Clear runway
  - Past “Hold Short” line
- Taxi as a formation

ABNORMAL PROCEDURES
KNOW THESE IN DEPTH!!!

- Prohibited Maneuvers
  - Night formation
  - IMC formation
  - Fan breaks
    - All aircraft break at same time
  - Formation touch-and-go



- Formation Emergencies (in FTI)
  - "KNOCK IT OFF"
  - Aborted Take-off
  - IMC Breakup
  - Radio/Equipment Failure
  - Engine Failure
  - Mid-Air Collision
  - Airborne Aborts
  - **Inadvertent WX PEN** (BOLDFACE) Know it BY HEART word for word

T0101/02

- FORMATION OPS
- PRE-MISSION PLANNING
- FLIGHT OPERATIONS
- HOMEWORK

WHAT NOW?

- Be pro-active; as soon as you get done with your classes at the wing start creating charts, sticks, and developing plans.
- You won't have much advance warning from skeds, once you are done with the sim it's game on and you could be scheduled the next day.
  - Have products ready for your events.
    - Charts
    - Stick Diagram
    - AF Form 280
  - Read the FTI again
  - Talk to your fellow classmates learn from their mistakes.
  - Don't bust crew rest.

ROUTE TIMING

ENTRY	RECOVERY

ROUTE TIMING

ENTRY	RECOVERY

TPC/JOG Checklist

Mandatory items:

- Verify MSAs/ESA and Controlling Obstacles
- Plot Alternate/Emergency Airfields
- Conflicting Routes (MTRs and local routes)
- Plot Airspace near route
- Doghouses
- Tickmarks

Optional items:

- Airfield/ATC frequencies
- NAVAID frequencies
- Update points
- Route amendments
- Reporting points
- CRM callouts

Sticks Checklist

Mandatory items:

- Wind Vector
- Magnetic Headings
- Wind Corrected Airspeeds
- TOT
- Turnpoint Times
- Takeoff Time
- Continuation Fuels
- Tac Form: Lead Change, Threats, LOCs

Optional items:

- Route Amendments
- Drop Altitude
- Turnpoint Illustration

Pre-Brief Checklist

- Time Hack
  - http://www.usno.navy.mil/USNO
  - COMM: 202-762-1401
- Route TPCs
- Run-in JOGs
- Stick Diagram
- DZ Diagram
- Airfield Diagram/Information
- WX
  - Sunrise/Sunset for night LLs
- NOTAMS
- TFRs
- Pubs
- BAM/BASH
- Deconfliction Information
- Briefing Guide
- Tac Form:
  - Form 280
  - Briefing Binder

Low Level Briefing Guide

1. Time Hack
2. WX (preflight winds)
3. Route name/ flying time
4. ESA and location
5. Times
   a. Stations
   b. Takeoff
   c. Entry
   d. TOT
6. DZ
   a. Name
   b. Size/Shape/Elevation
   c. DZ Mag course/Run-In
   d. Load Type
   e. Drop Altitude
   f. PI Location
   g. Green Light Time
   h. Escape Heading/Altitude

   LZ
   a. Name
   b. Length/Width/Orientation
   c. LZ Mag course/Run-in Hdg
   d. Apprch Type/Ldg Direction
   e. Slowdown/Config Pt
   f. Airspace Restrictions
   g. Escape Hdg/Alt
7. Run-in (leg description and slowdown pt)
8. Departure Procedures
9. Enroute
   a. Turnpoint description
   b. Mag course/leg time/MSA/controlling obstacle
   c. Significant course/time update points
   d. Crossing routes/RA's/no fly zones
   e. Threats/locations
   f. Time control/adjustments
   g. Modified Contour (F4790)
10. Recovery
    a. Leg description
    b. Type (overhead/downwind/IAP)
11. Blue Card Brief

BIG MAC		
LEG	BASH	CONDITION
B-I	IR136 B-C	
I-G	KINGSVILLE 4	
G-M	IR136 B-C	
M-A	IR136 B-C	
A-C	VR168 A-B	
C-IP	VR1105 C-E	
IP-DZ	VR140 B-C	
DZ-24R	VR140 B-C	

NO BIRD		
LEG	BASH	CONDITION
24R-N	VR156 C-D	
N-O	VR1105 A-B	
	SR287 B-C	
O-B	SR287 A-B	
B-I	IR148 B-C	
I-R	RANDOLPH 1A	
R-D	RANDOLPH 1A	
D-IP	KINGSVILLE 4	
IP-DZ	KINGSVILLE 4	

SWORDS		
LEG	BASH	CONDITION
24R-S	VR156 D-F	
S-W	VR1122 E-F	
W-O	VR168 H-I	
O-CP WOOD	VR168 G-H	
CP WOOD-VAND	LAUGHLIN 2	
VAND-D	VR1122 C-D	
D-S	RANDOLPH 2A	
S-IP	VR1105 A-B	
IP-DZ	VR1105 A-B	

RED ROCK		
LEG	BASH	CONDITION
VCT-R1	VCT	
R1-E	IR148 G-H	
E-D	SR292 C-D	
D-R2	SR292 D-E	
	VR1120 A-B	
R2-O	VR1120 A-B	
O-C	VR1120 A-B	
C-K	IR148 G-H	
K-IP	KINGSVILLE 4	
IP-DZ	KINGSVILLE 4	

SHINER		
LEG	BASH	CONDITION
VCT-S	VCT	
S-H	RANDOLPH 1A	
H-I	VR151 F-G	
I-N	VR151 F-G	
N-E	VR151 C-E	
E-R	VR151 H-I	
R-IP	VR151 H-I	
IP-DZ	A632E	

MELLON		
LEG	BASH	CONDITION
B-M	IR136 A-C	
M-E	IR136 B-C	
E-L1	KINGSVILLE 4	
L1-L2	SR287 B-C	
L2-O	SR287 D-E	
O-N	SR287 E-F	
N-IP	KINGSVILLE 4	
IP-DZ	KINGSVILLE 4	

AIR FORCE		
LEG	BASH	CONDITION
B-A	IR136 B-C	
A-I	KINGSVILLE 4	
I-R	IR136 B-C	
R-F	IR148 G-H	
F-O	IR148 G-H	
O-R	IR148 F-G	
R-C	IR148 E-F	
C-E	SR292 F-G	
E-IP	SR286 E-F	
IP-DZ	SR292 A-B	
DZ-11R	SR292 A-B	

SILVER		
LEG	BASH	CONDITION
G-S	DWH	
S-I	DWH	
I-L	DWH	
L-V	IR127 A-B	
V-E	IR127 A-B	
E-R	IR127 G-H	
R-IP	VR142 A-B	
IP-DZ	VR142 A-B	
DZ-W	VR142 D-E	
W-T	VR142 D-E	

GRANDE		
LEG	BASH	CONDITION
B2-G	IR166 A-B	
G-R	A632A	
R-A	IR166 B-C	
A-N	IR167 A-B	
N-D	IR167 A-B	
D-E	KINGSVILLE 2	
E-IP	IR135 B-C	
IP-DZ	IR135 C-D	
DZ-HBV	IR135 C-D	
HBV-L	IR147 D-E	

LOU ONE		
LEG	BASH	CONDITION
L-O	KINGSVILLE 1	
O-U	IR167 D-E	
U-O	KINGSVILLE 1	
O-N	IR135 B-C	
N-E	IR167 C-D	
E-IP	IR167 C-D	
	IR166 D-E	
IP-DZ	IR166 I-J	
DZ-S	IR135 A-B	
S-P	A632A	
P-G	IR166 A-B	

GO HOME		
LEG	BASH	CONDITION
DWH-G	DWH	
G-O1	VR151 E-F	
O1-H	VR151 F-G	
H-O2	VR151 F-G	
O2-M	VR151 C-D	
M-E	VR151 H-I	
E-IP	VR151 H-I	
IP-DZ	A632E	

AIRFIELDS	
KNGP	
KVCT	
KSAT	
KDWH	
KCLL	

AIRFIELDS	
KLRD	
KBRO	
KHRL	
KNQI	
KMFE	