

3/6/6

Steve Hovis (home 912-727-4328)

Tomorrow start at 9am, all other days 8-5

Tuesdays free breakfast @ Flight Line Cafe 730

Code 123

Full course info 1-800-625-9369

FSI SAV 912-644-1000

After hours 912-644-1071

50-question closed book exam on limitations

50-question open book exam on procedures/system

Read special interest handbook prior to check

Don't do anything below 400', consider delay until 1500'

Diane Hathaway for clubs

Primus 880 Wx Controller for radar

- all are 24" dishes now

Electrical System

- Priorities "Left before right" and "Essential before main"

- Volt-Amp = Watt

- Normal power moves from top to bottom

- Abnormal power moves from center to sides

- Emergency power moves from bottom to top

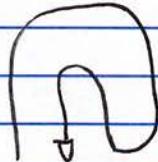
Dispatch notes:

- Warnings - 3 bongs - red - cannot dispatch

- Cautions - 2 bongs - amber - can dispatch if MEL allows

- Messages - 1 bong - blue - " " " "

COP Flow



Door close switch - Right battery only

Ground service switch - Right battery only / turns lower bcn on

External battery switch - Both batteries / " " " "

There are 3 ground service bus switches

- external door switch panel

- internal " " "

- aft equipment

Ground service bus normally runs off Right Main DC, then right battery, then external DC.

FIRE DETECT

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Lighting (Vol 1, Tab 33)

- No limitations
- Landing lights will automatically extinguish upon reaching 18,000' if not previously selected off

Fire Protection (Vol 1, Tab 26)

- Left fire bottle is #2 - also used for APU
- Right #1 - engines only
- Fire switch shuts off fuel, hydraulics, electrics
- A light in fire handle and fuel control switch = Fire

Fire Test - 8 lights (2 in test switch, 2 W's, 2 CAS messages, and 2 in fuel control switches) and 3 bangs

Loop Test - 8 lights (5 on test panel), 2 C's, 1 CAS message) and 2 bangs

APU Test - 8 lights (2 Ws, 2 C's, test light, fire ext light, 2 CAS messages) and 3 bangs

Five pop-up checklists

- Engine Fire ← Has priority
- APU Fire
- Engine Hot
- T/R unlock
- Cabin Press Low

Pylon Hot → 3 switches 250°F

LEER, REER 150°F

A bleed air problem generates alerts @ 250°F

An electrical problem 150°F

AFT FLOOR HOT L, R - Wing A/I actually goes through pressure vessel

Engine Hot caused by

- 1) Not producing enough air too cool engine
- 2) Engine running so hot you can't control it
- 3) Oil fire sensed
- 4) FADEC is hot

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Fire system test: left side last to allow pop up checklist

OM 03-03-~~03~~ 10

10. Right Engine First

FIRE TEST

8 lights: Loop A, Loop B, W, W,

LENG APU RENG

Fire handle, fuel control switch,

LOOPA

"RENGINE FIRE" and "ENGINE"

TEST

Fire loop Alt" CAS messages

LOOPB

3-chime aural

Repeat for left engine

AUIONICS

EDS

-Tube 5 is only DU you can dispatch without

-LEER

-REER

SG #1, #3 Symbol Generator

SG #2

DAU #1 Data Acquisition Unit

DAU #2

IAC #1 Integrated Avionics Computer

IAC #2

FWC #1 Fault Warning Computer

IACs contain bus controllers for Avionics Standard Communications Bus (ASCB) and Navigation Computer

Autopilot/Yaw Damper Computer → Flight Guidance Comp

Performance Computer

Autothrottle computer

Any Red X on a DU means a data problem (a SG problem)

Any SG can display 6 tubes but only 4 display types
so DU 5 and 6 will repeat 1, 2

FWC polls each DU until fault, then handles fault.

If DU 3 fails, DU 4 gets compacted EICAS display

4 3

2 or 5 - nothing except CAS msg

Unusual attitude → turn towards and step on sky pointer

Green → short range data

Blue → long range data

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$\frac{1}{2}$ Trapezoid = 1 ball

Set MDA For call outs

- number starts white
- 600' bug in view and number turns amber
- 100' get "Approaching Minimums" and a black box on PFD
- @ MDA get "Minimums, Minimums" and [MDA] on PFD

Thrust Director shows where thrust lever should be when A/T are off (only when 2E). "Split the don't" when thrust levers agree

↓ too low ↑ too high ↗ split

Pitch Limit Indicator (PLI)

- ⚡ Appears @ 0.7 AOA



- Shaker @ .85 AOA



- Pusher @ 1.0 AOA



Trend Indicator shows Altitude or Speed in 6 seconds



Cockpit Preflight Technique (WRT NA-1) (Vol 3 03-~~03~~-10)

- Check CBs (LEER, REER, POP, CPOP)

- Emergency Power Check

ON ARM OFF

- ARB1 EBAT



- "LIGHTS" "AV PWR"

will illuminate

- Check lights in STBY instruments on and flags out

- 3 gear lights

- RFMU on

- Audio control panel

- Turn batteries on 100% for 22V min

- Turn ebats off

- Cabin Press Control check out flow valves open

- Check Parking Brake Accumulator Pressure

(cycle down to preload 1200 psi)

- Set Brake

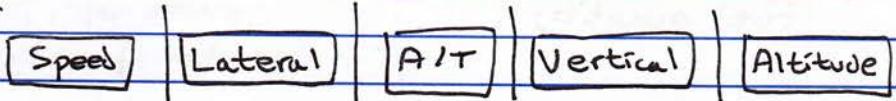
- EMER STAB ARM

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- Flap Handle to 10°
- SG ALT
- Turn Aux Pump on
- Flaps move to 10° (stab does it)
- Brakes charge 3000 psi, check Fuel, oxygen
- Turn everything off (Aux Pump, Emer Stab)
- Batteries off

Parking Brake good for 4-24 hours

PFD Status Bar



Arms in white, captures in green, boxes for 5 seconds
Exception: EDM in red

EDM - Emergency Descent Mode

- Requires a/p engaged; aircraft above 40,000'; cabin pressure low CAS message, "auto throttle should be on"
- Results in 90° turn to left; altitude select 15,000'; Speed select VMO, alt retard to idle
- Must disengage A/P to change settings

PFD Failures

- No ads, no alt, no VVI → MADC Fail
- ATT FAIL; HDG FAIL → IRU Fail
- XX on Flaps/stab → reporting sys has failed

Waypoints - Magenta is "TO" waypoint

A/T modes - TOGA, FLEX, CLB, CRZ, MCT, MAN

FADEC Controls engines with EPR at all times except ① when in Reverse (then uses LP), or ② EPR not avail

Virtually everything you have to set, you set in HP and check on LP

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At 42% HP, IGN cuts out, as does starter valve
but ~~SOV~~ SVO icon usually tatics till 47%

2:30 EVM test >.80 amber

Select Sec, then test 1.8-2.2

Pri., 1.8-2.2, release test

Fuel can gel below -40°C

Fuel quantity | comes up if differential 100#
 | total bar is 500#

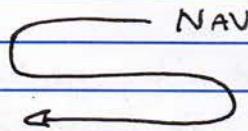
Do not rectify low brake pressure at altitude - will be
a problem on descent

CAS

Can inhibit cautions on takeoff, in which case the
80 knots to V₁ brief can be "any aural warnings"

Display Controllers are your inputs into Symbol Generator

Display Controller Test



CBs - Red are ESS

Black are Main

2:03

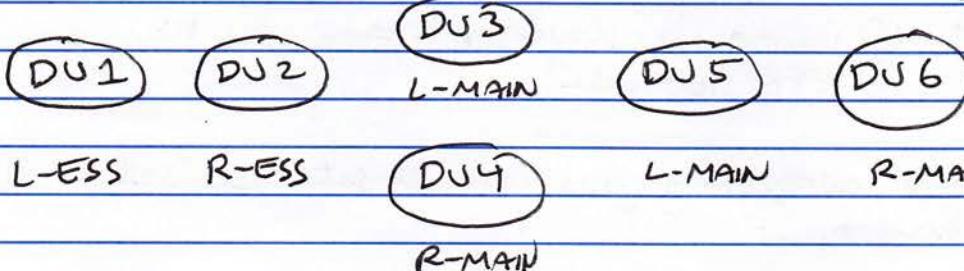
Power Sources For DUs / SGs

SG1 - LESS

2 - RMAN

3 - ~~B~~ MAIN

L



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Blank Tube → dead tube, bad tube, power loss, or
brightness

X → Data loss

SG 1 → DU 1, 2

2 → 5, 6

3 → 3, 4

Treat care of "X" First with Display System Control "Alt"
- then get a compressed EICAS
- repel invader with ND switching

If all three Display System Control switches in "Alt",
same as all in "Norm"

If all three in "OFF" while in Air, same as "Norm"

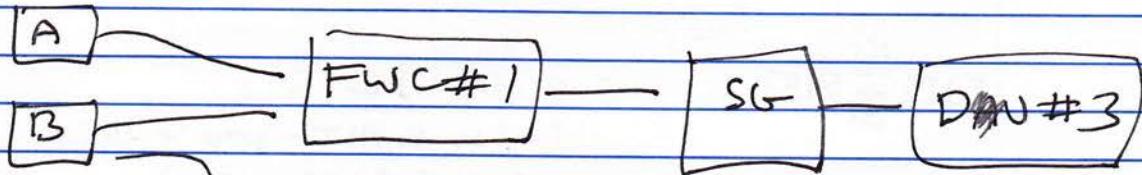
FWC#1 FAIL → In new OM not yet in QRH

- Select opposite FWC
- Select SENSOR on Display Controller
- Select ENG DATA (5L)
- Change to DAU (4L)
- Check "L FADEC NOT CTRL" message, if present
select DAU 1 to opposite channel
- Check Failed FWC CB

Same for FWC #2

Rationale

EEC



DAU#1



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Dual Generator Failure "4-3-2-1"

- 4 black tubes (lost main buses)

- 3 switches on Standby Electrical Power
MASTER ON

L ESS

R ESS

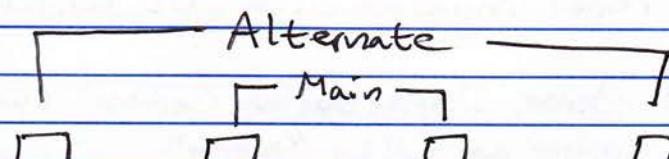
- 2 switches on Display System Control

EICAS-ALT

COPilot-ALT

- 1 switch - Cross Flow

Boost pumps



L MAIN LESS R ESS R MAIN

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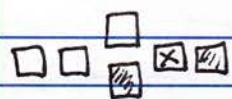
→ Brightness control down
(otherwise PFD would be revert)



→ L MAIN DC BUS
(EICAS SG to ALT - goes to SG2
Pilot's ND to EI)



→ SG3 (set to ALT, moves to SG2)

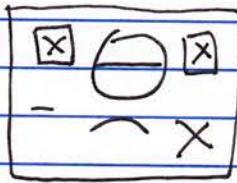


→ R MAIN DC BUS
(CP SG to ALT - goes to SG3
Copilot's ND to CAS)

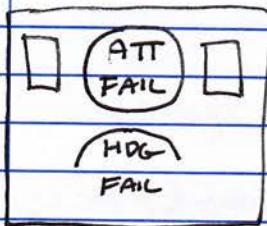


→ DU6 panel bad

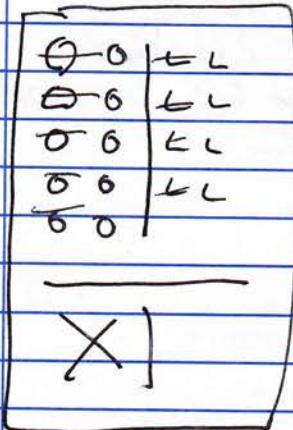
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→ Bad MADC (Go to Sensor page, select another)



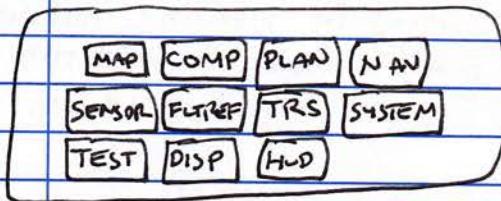
→ IRU Fail (Go to Sensor page select another)



FWC #1 (go to sensor page
select FWC #2
then DAU2)

(if "FADEC NOT IN CTRL"
select other DAU channel)

DISPLAY CONTROL PANEL



Important Buttons

NAV → Always up for approach

SENSOR → ~~Sync~~ for failures

FLTREF → MDA, VREF

SYSTEM → Synaptics

HUD

DISP → Set up PFD

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24:00	LNAV	Blue	Green
	GPS	ILS	
	VOR	BC	
	NDB	LDA	
		LOC	
		VOR	
		NDB	

Example approaches

VOR 17 → Blue okay but needle has to be up
station has to be up

VOR GPS 17 → Don't even need a needle

VOR DME 17 → Need needle and DME displayed

RNAV (GPS) 17 → Blue, but must be in GPS, DME/DME, VOR/DME

RNAV GPS 17 → Blue, only in GPS mode

30:00 VNAV → Must have FMS coupled

FLCH → Below 6,000' power levers move in
proportion to altitude change

→ Above 6,000' power lever moves to
IDLE or Max Cont

High Bank 28° @ 4°/second

Low 20° 20° — only in heading mode
goes to low at 24,500
High to 28,500

Stall Series, select low bank, Flaps 20°,
Power idle, follow command bars,
at stall "Sync Heading Bug"

When do you use GS Inhibit?

- BC
- GS unreliable
- Manoeuvring
- All the above



Select "all the above"
even though BC answer
not true

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APR Button indicates we are doing ILS w/GS changes Blue to Green

Circling is done with Raw Data

To engage A/P, yaw damper must be engaged first.

If pitch trim not engaged, engaging A/P will automatically engage pitch trim

If below 1200' AGL with both PFDs in ILS, A/P goes to dual coupled. (Now data averages and A/P fail passive)

1:01 Capture logic: if @ ALT and V/S, A/P will fly away from captured altitude.

To engage A/T both engines must be above 1.05 EPR.

1:23

Takeoff

Brief

"Your yoke"

Bring PL > 1.05, engage A/T

A/T Hold at 60Knts through 400'

At 40 Knts PM "Airspeed Alive"

At 60 Knots "60kts Hold Mode"

80 Knots - tiller to yoke

V_I - both hands

V_R - rotate

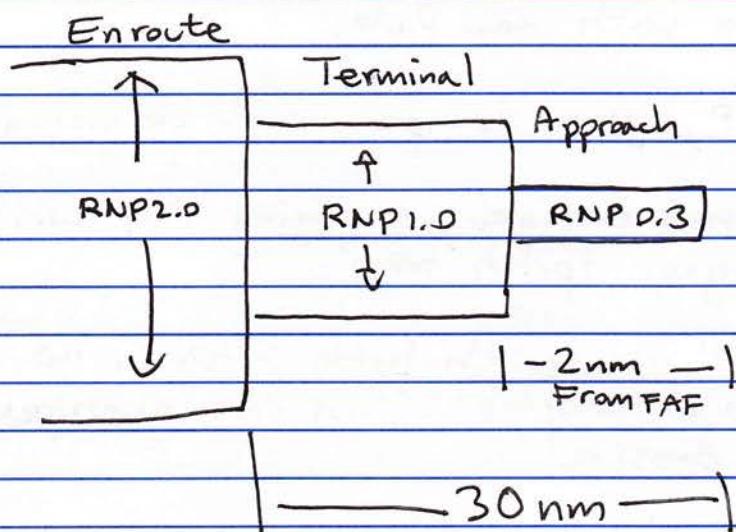
"Gear up,
Flaps up, FLC,
A/P on"

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IRU → 6.2 hours begins when other sensors gone.

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GPS RNP



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RAIM 99,9% "Receiver Autonomous Integrity Monitor"
FOM 95,9% "Figure of Merit"

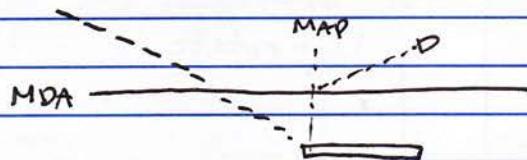
Predictive RAIM Keystrokes

- NAV
- POS SENSOR
- GPS STATUS
- PRED RAIM

LNAV

Set DC MDA

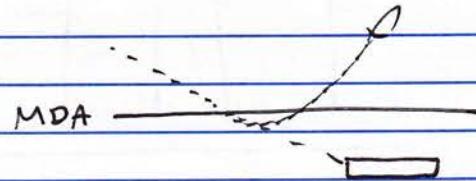
ALT MDA until VMC then Field elevation



LNAV/VNAV

Set DC MDA

ALT Field elev



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Weather Radar Primus 880 24" Dish

- TGT looks for targets 50nm beyond selected range
7.5° either side

exceptions: 300nm range doesn't work

FPLN mode looks 5-55nm

IF "TGT" white - none

IF "TGT" amber - something

- FPLN looks out 1,000nm

- STAB - Turns pitch / roll stabilization on

- Overrides forced standby on ground (Press 4 times / 3 secs)

- RCT - Rain Echo Compensation Technique

Shows attenuated echoes in blue

- TRB - Shows wet turbulence \leq 50nm in white

- TEST - Gulfstream / Honeywell says it does not emit in test mode; manual disagrees

- TILT - $\pm 15^\circ$

Pull Knob for Altitude Compensation Tilt (ACT)

IF one radar controller OFF, other becomes SLV (slave)

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Radio Altimeter

- Comes alive below 2,500'

- Indicates $\pm 10'$ when above 200'
 $\pm 5'$ below

"Last night I was home working on our bills and I said to my wife, Dammit Jackie if you learned how to clean this house we wouldn't have to pay for the cleaning lady every other week. And she said if you learned how to make love we wouldn't have to pay the mailman, the paperboy, and all those other guys who come over."

TCAS AUTO \rightarrow level 2700' \uparrow 2700' \downarrow

climb 9900' \uparrow 2700' \downarrow

descend 2700' \uparrow 9900' \downarrow

— HUD —

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HUD ~ Bore sight → where nose is pointing

→ Flight Path Vector

→ where you are flying

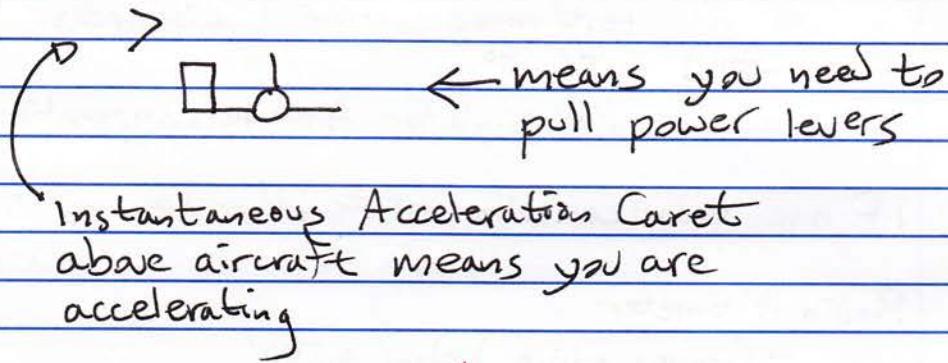
→ Flight Director

Move → to → so you see →

Pitch tape is solid above, dashed below

Caged mode keeps → centered and displays a ghost vector → where you are headed,

Error tape shows abs variance



— TCAS / EGPWS / CFIT —

130 EGPWS

Windshear Amber → Increasing Performance
(should CnX AIR)

Red → Decreasing Performance
(Escape maneuver)

Terrain Amber → One minute to impact
Red → Imminent (Escape)

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Escape Maneuver

- 1) Disconnect A/T, A/P
- 2) Full Power
- 3) Check Speed Brakes In (No other config change)
- 4) Rotate 3-4°/sec up
 - Intercept Ref-20
(Shutter @ Ref-15, so nibble shutter)
 - If PLI, hold until PLI disappears and resume
 - If a terrain escape, 40° pitch probable
 - If a windshear recovery, don't consider it over until VVI ~ 6,000 fpm

1:22 "I came home last night after a hard day's work and my wife met me at the door completely naked. 'Victory,' I said, 'what the hell are you doing?' 'This is my love suit!' 'Babe,' I said, 'you gotta get that thing ironed.'

Limitation in Q/RH

Decrease available field length 600' if automatic ground spoilers are inoperative.

For takeoff you should see 5 things on GP and PFD

GP:	SPEED	HDG	ALTITUDE
	ON	L	

PFD:	SPEED	HDG	TD	TD	ALTITUDE
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Holding: must enter into FMS > 2 minutes out

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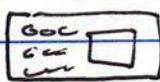
Setting up for approach:

FMS



- 1) Arrival
- 2) Landing
- 3) Sequence
- 4) Tune

DC



- 1) MDA
- 2) Course
- 3) T2E
- 4) FPA

) HUD

RFMU



- 1) Tune
- 2) Hold DME

On Approach

- 1) Set MA altitude
- 2) Hdg to course
- 3) Approach speed
- 4) DC-NAV