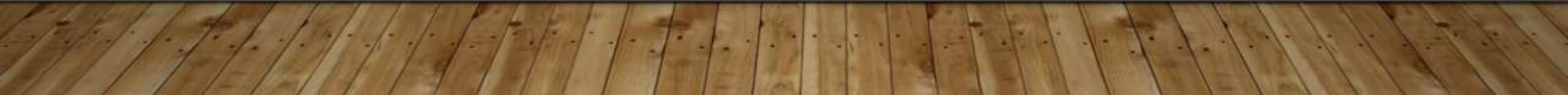


CAP OCT 17 FLIGHT CLINIC

PRESENTED BY: LANCE OAKLEY ARKANSAS WING/DOV



CAP OCT 17 FLIGHT CLINIC

- Welcome
 - PRESENTERS
 - LANCE OAKLEY
 - SCOTT JAMES
 - TOM MINTON

OVERVIEW

AUTOMATION ISSUES

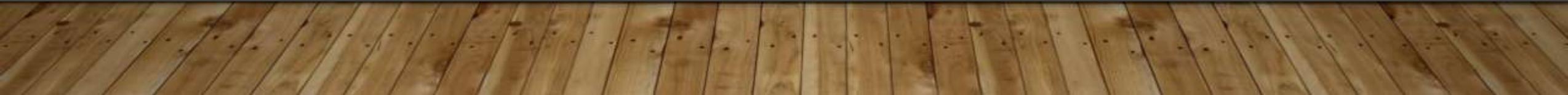
G1000

PERFORMANCE CALCULATIONS

Can I Fly?

AUTOMATION ISSUES

Pilot Verses Plane Air France Airbus A320







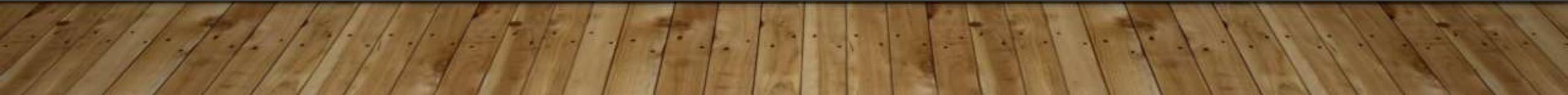


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AUTOMATION ISSUES

GENERAL AVIATION ACCIDENTS ATTRIBUTED TO AUTOMATION



AUTOMATION ISSUES

Automation in Aviation – Accident Analyses

MITRE Corporation

Dr. Valerie Gawron, January 2019

AUTOMATION ISSUES

Two extensive reviews

FAA

NASA

Aviation Safety Reporting System. (ASRS)

AUTOMATION ISSUES

FAA Human Factors Team

Team concluded from the ASRS data that there were several major categories of problems

One of which is Automation.

AUTOMATION ISSUES

Data from ASRS indicated that 28 percent were a result of incorrect settings of automation.

$\frac{3}{4}$ of those were considered a primary factor in the incident

AUTOMATION ISSUES

Incorrect settings can be attributed to

Inadequate Interface Design

Poor Understanding of the System

Genuine human error (Fat Fingering the Data)

AUTOMATION ISSUES

Excerpts from ASRS

Needless to say, Confusion was in abundance. There are just too many different functions that control airspeed and descent rates, all of which affect the altitude capture.

My first priority was Data Entry rather than SA.

AUTOMATION ISSUES

Examples of Incident and Accidents

VOR/DME approach. Descended below MDA, Clipped trees, landed short. Contributing factor was crew loss of situational awareness and terrain awareness, and lack of vertical guidance for the approach. And insufficient communication and coordination by the flight crew.

AUTOMATION ISSUES

This study also listed 7 problems associated with Automation

Failure

Automation induced error compounded by the crew

Crew error in equipment setup

Crew response to a false alarm

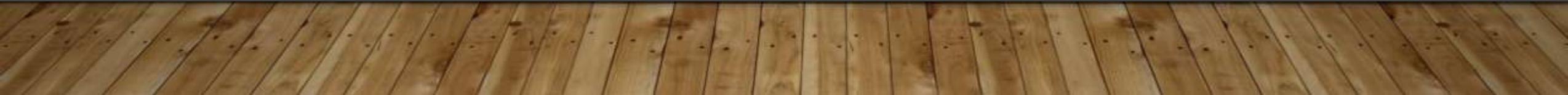
Failure to heed an automatic alarm

Failure to monitor

LOSS OF PROFICIENCY

AUTOMATION ISSUES

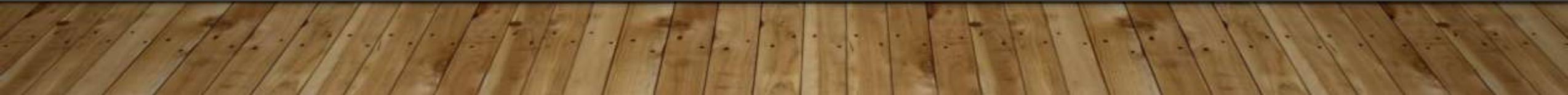
Automation Questions?



GI000

Scott James

GI000 Overview



G1000

Scott James

G1000 Electrical System

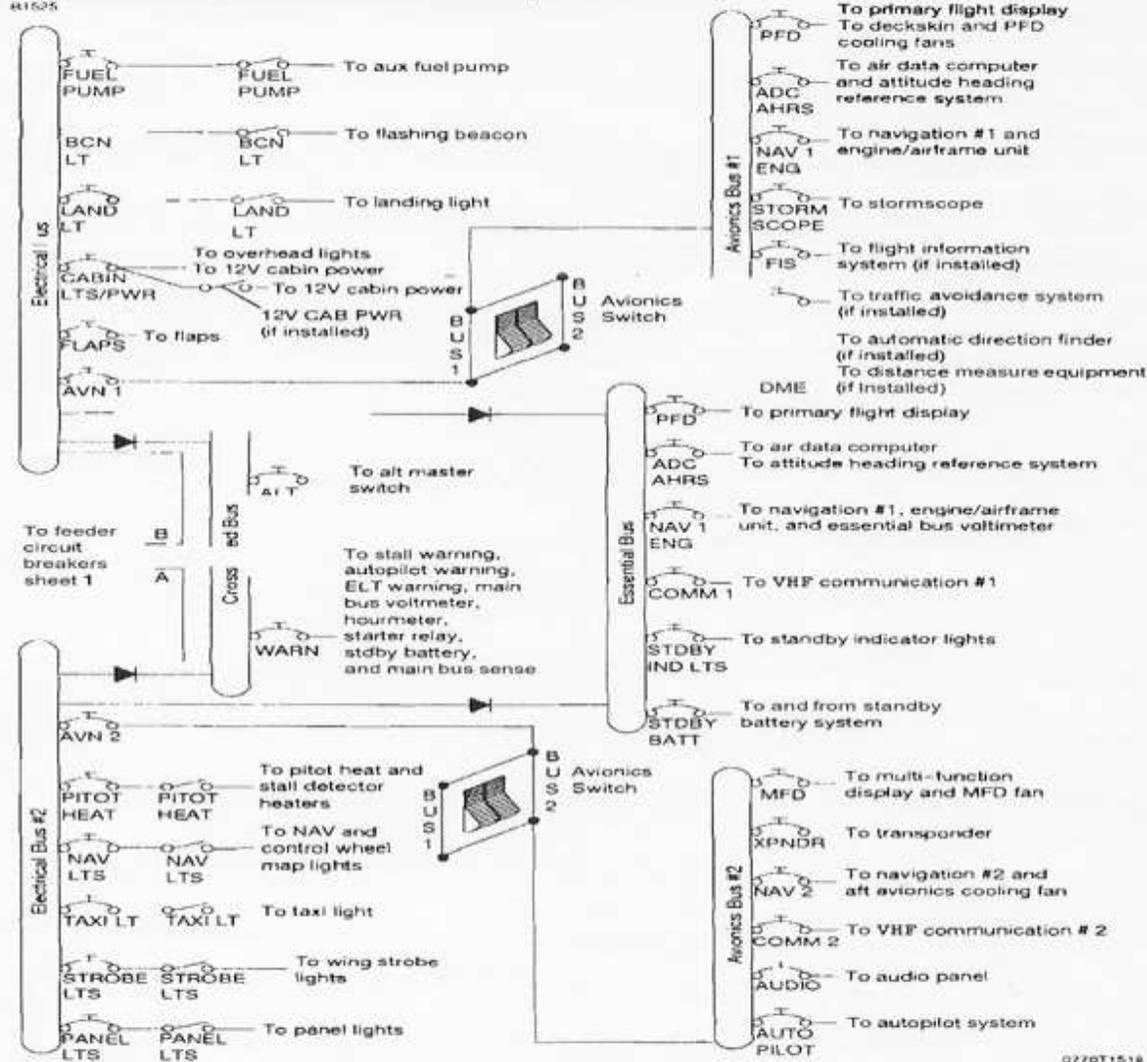
Electrical Bus #1 & 2

Avionics Bus #1 & 2

Cross feed Bus

Essential Bus

ELECTRICAL SYSTEM (Continued)

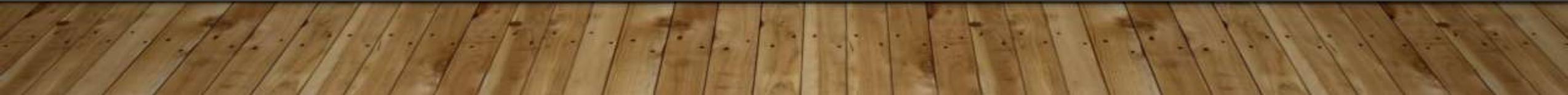


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Figure 7-7 (Sheet 2)

GI000

Electrical Power Supply System Malfunctions



G1000

M BUS VOLTS MORE THAN 32 OR M BAT AMPS MORE THAN 40
LOW VOLTS ANNUNCIATOR COMES ON BELOW 1000
LOW VOLTS ANNUNCIATOR COMES ON OR DOES NOT GO OFF AT HIGHER RPM
LOW VOLTS ANNUNCIATOR REMAINS ON

G1000

M BUS VOLTS MORE THAN 32 OR M BAT AMPS MORE THAN 40

I. Master switch (alt only) Off

NOTE

The main battery supplies electrical power to the Main and Essential Buses until M Bus Volts decreases below 20 Volts. When M Bus Volts fall below 20 volts, the Standby Battery System will automatically supply electrical power to the Essential Bus for at least 30 Minutes.

G1000

- | | |
|--------------------------|-------------------------------|
| 2. Electrical Load | Reduce immediately as follows |
| a. Avionics Switch Bus I | OFF |
| b. Pitot Heat | OFF |
| c. Beacon Light | OFF |
| d. Landing Light | OFF |
| e. Taxi Light | OFF |
| f. Nav Lights | OFF |
| g. Strobe Lights | OFF |
| h. Cabin Pwr 12V | OFF |

G1000

NOTE

Select COM 1 MIC and NAV 1 on the audio panel and tune to the active frequency before setting AVIONICS BUS 2 to OFF. If Com 2 MIC and NAV 2 are selected when AVIONICS BUS 2 is set to off, the COM and NAV radios cannot be tuned.

G1000

- i. COM 1 and NAV 1 Tune to active frequency
- j. COM 1 MIC and NAV 1 Select

NOTE

When AVIONICS BUS 2 is set to OFF the following items will not operate
KAP 140 Autopilot, GMA 1347 Audio Panel, COMM 2, NAV 2, GTX 33 Transponder, GDU 1040 MFD

- k. AVIONICS Switch (Bus 2) OFF (keep on if in clouds)

3. Land as soon as Practical

G1000

LOW VOLTS ANNUNCIATOR COMES ON BELOW 1000 RPM

- | | |
|--|-----------|
| 1. Throttle Control | 1000 RPM |
| 2. Low Voltage annunciator (Low Volts) | Check OFF |

LOW VOLTS ANNUNCIATOR REMAINS ON AT 1000 RPM

3. Authorized maintenance personnel must do electrical system inspection prior to next flight.

G1000

LOW VOLTS ANNUNCIATOR COMES ON OR DOES NOT GO OFF AT HIGHER RPM

- | | |
|---|----------------------|
| 1. Master Switch (ALT Only) | OFF |
| 2. Alternator Circuit Breaker (Alt Field) | Check In |
| 3. Master Switch (Alt and Bat) | ON |
| 4. Low Voltage Annunciator (Low Volts) | Check OFF |
| 5. M BUS Volts | Check 27.5 V Minimum |
| 6. M BAT AMPS | Check Charging (+) |

G1000

IF LOW VOLTS ANNUNCIATOR REMAINS ON (Continued)

8. Electrical Load	REDUCE IMMEDIATELY as Follows
a. Avionics Switch Bus 1	OFF
b. Pitot Heat	OFF
c. Beacon Light	OFF
d. Landing Light	OFF
e. Taxi Light	OFF
f. Nav Lights	OFF
g. Strobe Lights	OFF
h. Cabin Pwr 12V	OFF

G1000

NOTE

Select COM 1 MIC and NAV 1 on the audio panel and tune to the active frequency before setting AVIONICS BUS 2 to OFF. If Com 2 MIC and NAV 2 are selected when AVIONICS BUS 2 is set to off, the COM and NAV radios cannot be tuned.

G1000

- i. COM 1 and NAV 1 Tune to active frequency
- j. COM 1 MIC and NAV 1 Select

NOTE

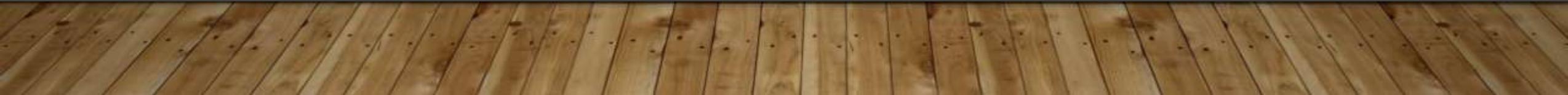
When AVIONICS BUS 2 is set to OFF the following items will not operate
KAP 140 Autopilot, GMA 1347 Audio Panel, COMM 2, NAV 2, GTX 33 Transponder, GDU 1040 MFD

- k. AVIONICS Switch (Bus 2) OFF (keep on if in clouds)

9. Land as soon as Practical

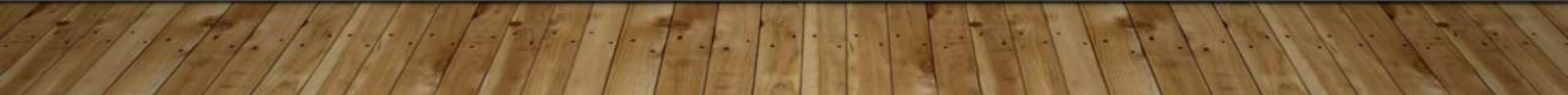
GI000

Electrical System Questions?



PERFORMANCE CALCULATIONS

CAN I FLY?



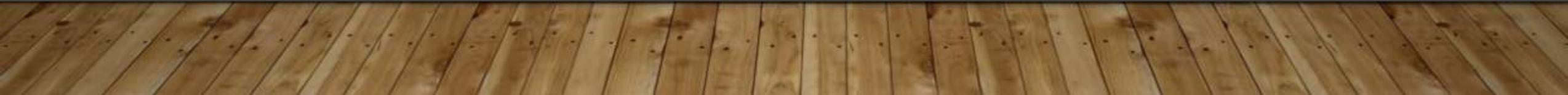
PERFORMANCE CALCULATIONS

WEIGHT AND BALANCE
USEFUL LOAD
AIRCRAFT PERFORMANCE
PARIS AR
FALCON VIRGO
HIGH DENSITY ALTITUDE
REGS
KOEL

PERFORMANCE CALCULATIONS

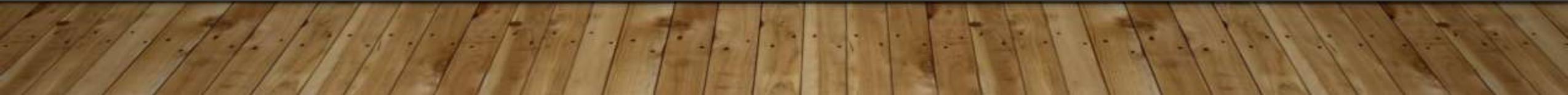
WEIGHT AND BALANCE

Pilot responsibilities



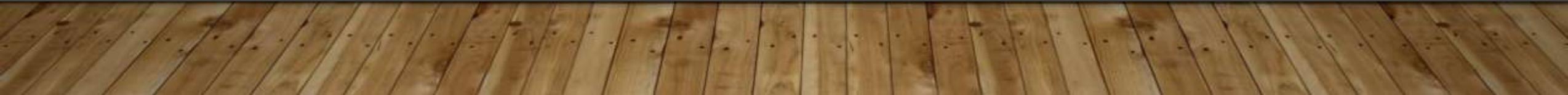
PERFORMANCE CALCULATIONS

AMRAD/DISCREPENCY LOG



PERFORMANCE CALCULATIONS

AMRAD/DISCREPENCY LOG
VERSES KOEL



KINDS OF OPERATIONS EQUIPMENT LIST

System, Instrument, Equipment and/or Function	KIND OF OPERATION				COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	
PLACARDS AND MARKINGS					
182T Nav III POH/AFM	1	1	1	1	Accessible to pilot in flight
Garmin G1000™ Cockpit Reference Guide	1	1	1	1	Accessible to pilot in flight
AIR CONDITIONING					
1. Forward Avionics Fan	1	1	1	1	
2. PFD Fan	0	0	0	0	
3. MFD Fan	0	0	0	0	
4. Aft Avionics Fan	1	1	1	1	
AUTOFLIGHT					
1. Bendix/King KAP 140 POH Supplement	0	0	A/R	NR	Accessible to pilot in flight when using autopilot
COMMUNICATIONS					
1. VHF COM	0	0	1	1	
ELECTRICAL POWER					
1. 24V Main Battery	1	1	1	1	
2. 28V Alternator	1	1	1	1	
3. 24V Standby Battery	0				Refer to Note 1
4. Main Ammeter	1	1	1	1	
5. Standby Ammeter	0				Refer to Note 1

NOTE

1. The European Aviation Safety Agency (EASA) requires the 24V Standby Battery and Standby Ammeter to successfully complete the pre-flight check before operating the airplane in VFR night, IFR day, or IFR night conditions in Europe. Correct operation of the 24V Standby Battery and Standby Ammeter is recommended for all other operations.

(Continued Next Page)

KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

System, Instrument, Equipment and/or Function	KIND OF OPERATION				COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	
EQUIPMENT AND FURNISHINGS					
1. Seat Belt Assembly	1	1	1	1	Each Seat Occupant Front Seat Occupants
2. Shoulder Harness	1	1	1	1	
FLIGHT CONTROLS					
1. Flap Position Indicator	1	1	1	1	
2. Flap Motor	1	1	1	1	
3. Elevator Trim System	1	1	1	1	
4. Elevator Trim Indicator	1	1	1	1	
5. Rudder Trim System	1	1	1	1	
6. Rudder Trim Indicator	1	1	1	1	
FUEL SYSTEM					
1. Electric Fuel Pump	1	1	1	1	
2. Fuel Quantity Indicator - LH Tank	1	1	1	1	
3. Fuel Quantity Indicator - RH Tank	1	1	1	1	
ICE AND RAIN PROTECTION					
1. Alternate Static Air Source	0	0	1	1	
2. Alternate Induction Air System	0	0	1	1	
INDICATING/RECORDING SYSTEM					
1. Stall Warning System	1	1	1	1	
2. System Annunciator and Warning Displays	1	1	1	1	
LANDING GEAR					
1. Wheel Fairings	0	0	0	0	Removable

(Continued Next Page)

KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

System, Instrument, Equipment and/or Function	KIND OF OPERATION				COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	
LIGHTING					
1. PFD Bezel Lighting	0	0	0	1	
2. PFD Backlighting		1	1	1	*Refer to Note 2
3. MFD Bezel Lighting	0	0	0	1	
4. MFD Backlighting		1	1	1	*Refer to Note 3
5. Switch and Circuit Breaker Panel Lighting	0	1	0	1	
6. Airspeed Indicator (Standby) Internal Lighting	0	1	0	1	
7. Altimeter (Standby) Internal Lighting	0	1	0	1	
8. Non-stabilized Magnetic Compass Internal Lighting	0	1	0	1	
9. Attitude Indicator (Vacuum) Internal Lighting	0	1	0	1	
10. Cockpit Flood Light	0	1	0	1	
11. Aircraft Position (NAV) Lights	0	1	1	1	
12. STROBE Light System	1	1	1	1	
13. BEACON Light	0	0	0	0	
14. TAXI Light	0	0	0	0	
15. LAND (Landing) Light	0	1	0	1	Operations for hire only

NOTE

- 2. PFD backlighting is required for day VFR flight if MFD backlighting has failed. Display backup mode must be active so engine indicators are shown.
- 3. MFD backlighting is required for day VFR flight if PFD backlighting has failed. Display backup mode must be active so flight instruments are shown.

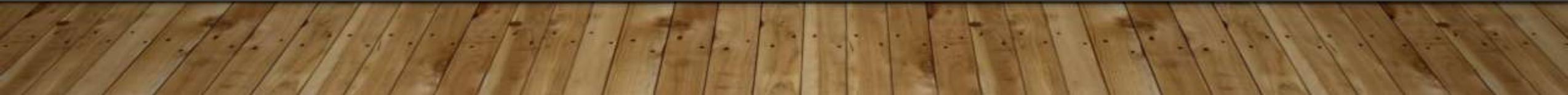
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KINDS OF OPERATIONS EQUIPMENT LIST (Continued)

System, Instrument, Equipment and/or Function	KIND OF OPERATION				COMMENTS
	V F R D A Y	V F R N I G H T	I F R D A Y	I F R N I G H T	
NAVIGATION AND PITOT-STATIC SYSTEM					
1. G1000 Airspeed Indicator	1	1	1	1	
2. Standby Airspeed Indicator	0	0	1	1	
3. G1000 Altimeter	1	1	1	1	
4. Standby Altimeter	0	0	1	1	
5. G1000 Vertical Speed Indicator	0	0	0	0	
6. G1000 Attitude Indicator	0	0	1	1	
7. Attitude Indicator - Vacuum (Standby)	0	0	1	1	
8. G1000 Directional Indicator (HSI)	0	0	1	1	
9. G1000 Turn Coordinator	0	u	1	1	
10. Non-stabilized Magnetic Compass	1	1	1	1	
11. VHF Navigation Radio (VOR/LOC/GS)	0	0	A/R	A/R	As Required Per Procedure
12. GPS Receiver/Navigator	0	0	A/R	A/R	As Required Per Procedure
13. Marker Beacon Receiver	0	0	A/R	A/R	As Required Per Procedure
14. Blind Altitude Encoder	A/R	A/R	1	1	As Required Per Procedure
15. Clock	0	0	1	1	
VACUUM					
1. Engine-driven Vacuum Pump	0	0	1	1	
2. Vacuum Indicator	0	0	1	1	
ENGINE FUEL AND CONTROL					
1. Manifold Pressure Indicator	1	1	1	1	
2. Fuel Flow Indicator	1	1	1	1	
ENGINE INDICATING					
1. Tachometer (RPM)	1	1	1	1	
2. Cylinder Head Temperature (CHT) Indicator	1	1	1	1	Cylinder #3
3. Oil Pressure Indicator	1	1	1	1	
4. Oil Temperature Indicator	1	1	1	1	
ENGINE OIL					
1. Engine Crankcase Dipstick	1	1	1	1	

PERFORMANCE CALCULATIONS

KOEL QUESTIONS?



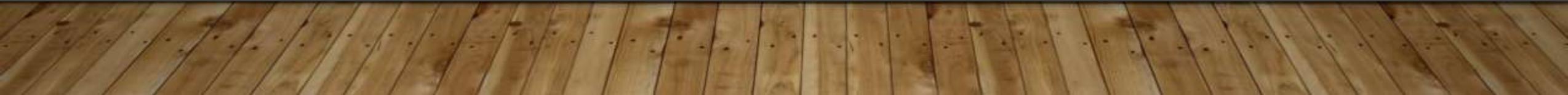
PERFORMANCE CALCULATIONS

ENVIRONMENT

RWY LENGTH

DENSITY ALTITUDE

CAP REGULATIONS



PERFORMANCE CALCULATIONS

ENVIRONMENT

Sample Problem

Fully Loaded 182T

Weather

Winds Calm

Temp 63 F (17c)

Density Altitude 565

Paris Arkansas

2710 X 60 Rwy

What is our Ground Roll and total distance to clear a 50 foot obstacle

SHORT FIELD TAKEOFF DISTANCE AT 3100 POUNDS

CONDITIONS:

Flaps 20°
2400 RPM, Full Throttle and Mixture Set Prior to Brake Release
Cowl Flaps Open
Paved, Level, Dry Runway
Zero Wind
Lift Off: 49 KIAS
Speed at 50 Feet: 58 KIAS

Press Alt - Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst								
S.L.	715	1365	765	1460	825	1570	885	1680	945	1800
1000	775	1490	835	1600	900	1720	965	1845	1030	1980
2000	850	1635	915	1760	980	1890	1055	2035	1130	2190
3000	925	1800	995	1940	1070	2090	1150	2255	1235	2435
4000	1015	1990	1090	2150	1175	2325	1260	2515	1355	2720
5000	1110	2210	1195	2395	1290	2595	1385	2820	1485	3070
6000	1220	2470	1315	2690	1415	2930	1520	3200	1635	3510
7000	1340	2785	1445	3045	1560	3345	1675	3685	---	---
8000	1480	3175	1595	3500	1720	3880	---	---	---	---

NOTE

1. Short field technique as specified in Section 4.
2. Prior to takeoff, the mixture should be leaned to the Maximum Power Fuel Flow placard value in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 5-6 (Sheet 1 of 3)

**SHORT FIELD LANDING DISTANCE
AT 2950 POUNDS**

CONDITIONS:

Flaps FULL
 Power OFF
 Maximum Braking
 Paved, level, dry runway
 Zero Wind
 Speed at 50 Feet: 60 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst								
S. L.	560	1300	580	1335	600	1365	620	1400	640	1435
1000	580	1265	600	1365	620	1400	645	1440	665	1475
2000	600	1370	625	1405	645	1440	670	1480	690	1515
3000	625	1410	645	1445	670	1485	695	1525	715	1560
4000	650	1450	670	1485	695	1525	720	1565	740	1600
5000	670	1485	695	1525	720	1565	745	1610	770	1650
6000	700	1530	725	1575	750	1615	775	1660	800	1700
7000	725	1575	750	1615	780	1665	805	1710	830	1750
8000	755	1625	780	1655	810	1715	835	1760	865	1805

NOTE

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If a landing with flaps up is necessary, increase the approach speed by 10 KIAS and allow for 40% longer distances.

Figure 5-12

PERFORMANCE CALCULATIONS

ENVIRONMENT

Sample Problem

Fully Loaded 182T

Weather

Winds Calm

Temp 75 F (24c)

Density Altitude ?

El Paso Biggs Army Airfield

13,557 X 150 Rwy

What is our Ground Roll and total distance to clear a 50 foot obstacle

PERFORMANCE CALCULATIONS

ENVIRONMENT

Sample Problem

Fully Loaded 182T

Weather

Winds Calm

Temp 105F (41c)

Density Altitude ?

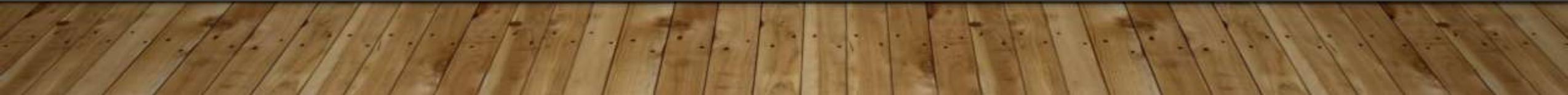
El Paso Biggs Army Airfield

13,557 X 150 Rwy

What is our Ground Roll and total distance to clear a 50 foot obstacle

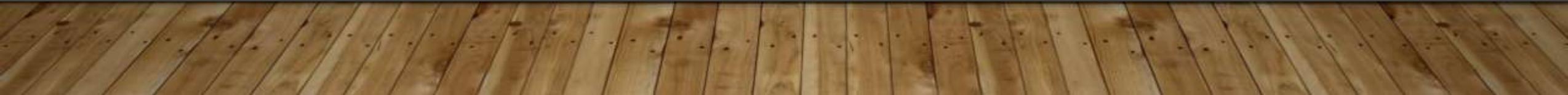
PERFORMANCE CALCULATIONS

ENVIRONMENT
CAP Regulation



PERFORMANCE CALCULATIONS

QUESTIONS ?



AVIATE

NAVIGATE

COMMUNICATE

FLY SAFE

