



# Van's Aircraft RV Super 8

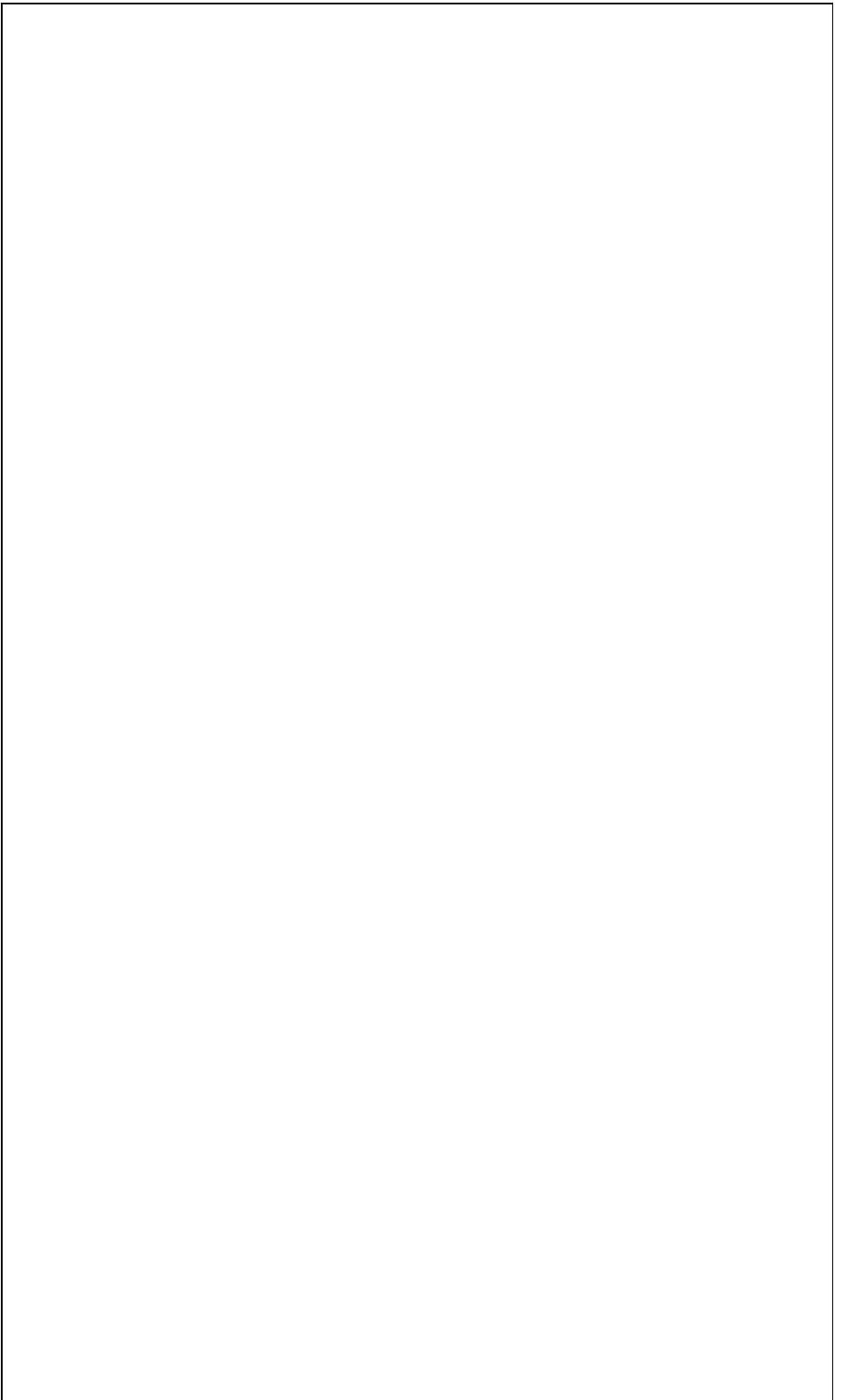
## Pilot's Operating Handbook

### N687MS

Note: This POH is for this plane only. **This plane is highly modified from the designers original specifications.** Its of higher power and weight. Both these items should be carefully considered when flying this experimental. Speed, G's, aerobatics, and stick force should all be monitored carefully. This airplane significantly reduces the designers built in safety factor. **DO NOT** take this lightly. You are flying this plane at your own risk. The builder can not emphasize enough the reduced safety margins of this aircraft as a result of the big engine. Be Safe and conservative when flying this wonderful machine.

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# PERFORMANCE – SPECIFICATIONS

SPAN: .....	24' 0"
LENGTH: .....	21'
HEIGHT: .....	5' 7"
Wing Area.....	116ft <sup>2</sup>
 SPEED:	
Maximum at Sea Level .....	206
iKTAS Cruise, 75% Power at 10,000 Ft .....	197
iKTAS Range	
<i>1/2 hour (6 gal.) reserve: <b>LOP Operations</b></i>	
WOT 2450RPM.....	748 nm
WOT 2350RPM.....	785 nm
MP 17.4, ITAS 167, 2350rpm.....	860 nm
 RATE OF CLIMB AT SEA LEVEL Solo.....	
SERVICE CEILING Demonstrated.....	2,800fpm
FT	29,000'
TAKEOFF PERFORMANCE: .....	500 Ft
LANDING PERFORMANCE: .....	800 Ft
STALL SPEED (CAS):	
Flaps Up, Power Off .....	55 Knots
Flaps Down, Power Off .....	50 Knots
 MAXIMUM WEIGHT (Normal Category): .....	
EMPTY WEIGHT .....	2270 Lbs
MAXIMUM USEFUL LOAD: .....	1326 Lbs
BAGGAGE ALLOWANCE Aft/Fwd.....	944 Lbs
Lbs	100/60
WING LOADING (Pounds/ Sq. Ft) .....	19.5
POWER LOADING (Pounds/ HP) .....	8.4
FUEL:	
Capacity/Usable gal.....	60/59
Type .....	100LL/87oct
 OIL CAPACITY in Qts.....	
normal	12, 10
ENGINE: Lycoming 6cyl 260hp, Fuel Inj., Elect. Ign.....	IO540-C4B5

Propeller: Hartzell 76" Aztec Blades chopped to 76"... HC-C2YR-1B

# AIRSPEED LIMITATIONS

	<b>SPEED</b>	<b>KIAS</b>	<b>REMARKS</b>
<b>V</b> <b>N</b>	Never Exceed Speed	<b>200 Kts</b>	Do not exceed this speed in any operations.
	Maximum Structural Cruising Speed	<b>156 Kts</b>	Exceed this speed only in smooth air.
<b>V</b> <b>A</b>	Maneuvering Speed	<b>115 Kts</b>	Do not make full control movements above this speed.
<b>V</b> <b>F</b>	Maximum Flap Extended Speed	<b>96</b> –20 deg <b>87</b> - Full	Do not exceed this speed with flaps down
<b>V</b>	Best Rate of Climb	<b>85 Kts</b>	
<b>V</b>	Best Angle of Climb	<b>75 Kts</b>	
<b>V</b>	Stall Speed Clean	<b>55 Kts</b>	
<b>V</b> <b>s</b>	Stall Speed Landing Configuration	<b>50 Kts</b>	

# AIRSPEED INDICATOR MARKINGS (std. RV-8)

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	<b>43 – 87 Kts</b>	Full Flap Operating Range.
Green Arc	<b>47 – 156 Kts</b>	Normal Operating Range.
Yellow Arc	<b>170 – 200 Kts</b>	smooth air.
Red Line	<b>200 Kts</b>	Maximum speed

# AEROBATIC INFORMATION

Weight Limitation – 1600 Pounds 6G's, 1800 5G's

Recommended Entry Speeds:

Loops, Cuban Eights	140 – 165 Kts
Immelman Turns	130 – 165 Kts
Aileron Rolls, Barrel Rolls	105 – 165 Kts
Snap Rolls	70 – 95 Kts
Vertical Rolls	155 –165 Kts
Split-S	85 - 95 Kts

# PREFLIGHT INSPECTI ON

## 1. CABIN

- a) Documentation  
-- Available In Airplane
- b) Aeronautical Charts --  
CURRENT AND  
APPROPRIATE TO  
FLIGHT
- c) Seat Belt  
Securing Control Stick --  
RELEASE
- d) Ignition Switch  
-- OFF
- e) Avionics -- OFF
- f) Master Switch --  
ON
- g) Engine Monitor  
-- ON
- h) Fuel Quantity --  
CHECK QUANTITY  
  
-- VERIFY ENGINE  
MONITOR PRESET
- i) Flaps -- DOWN
- j) Master Switch --  
OFF

## 2. EMPENNAGE

- a) Tail Tie-Down --  
DISCONNECT
- b) Control Surfaces  
-- CHECK freedom of  
movement and security

## 3. RIGHT WING

- a) Aileron --  
CHECK freedom of movement  
and security
- b) Flap -- CHECK  
security

- c) Wing Tie-Down  
-- DISCONNECT
- d) Main Wheel Tire  
-- CHECK for proper inflation
- e) Chock --  
REMOVE
- f) Right Wing  
Tank -- SUMP
- g) Fuel Quantity --  
CHECK VISUALLY
- h) Fuel Filler Cap --  
SECURE

## 5. NOSE

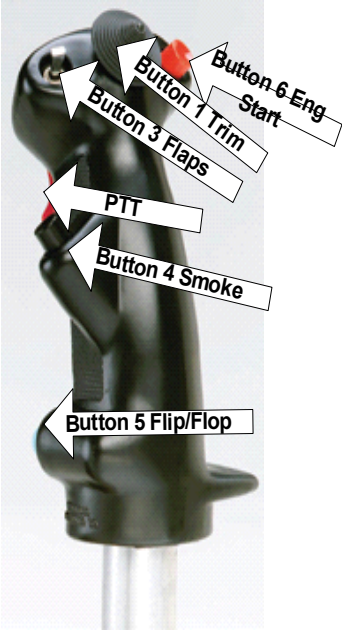
- a) Engine Oil Level  
-- CHECK, do not operate with  
less than 4 quarts
- b) Propeller and  
Spinner -- CHECK for nicks  
and security
- c) Cowl Hinge Pins -- CHECK  
for security
- d) Air Inlet --  
CHECK for restrictions
- i) Chock --  
REMOVE
- j) Fuel Tank Vents  
-- CHECK for blockage

## 6. LEFT WING

- a) Wing Tie-Down  
-- DISCONNECT
- b) Main Wheel Tire  
-- CHECK for proper inflation
- c) Chock --  
REMOVE
- d) Left Wing Tank  
-- SUMP
- e) Fuel Quantity --  
CHECK VISUALLY
- f) Fuel Filler Cap --  
SECURE
- g) Pitot Tube Cover  
-- REMOVE and check for  
blockage
- h) Landing Light --  
CHECK condition
- i) Aileron --  
CHECK freedom of movement  
and security

j)

security Flap -- CHECK



**BEFORE STARTING ENGINE**

- a) Preflight Inspection -- COMPLETE
- b) Seat Belts and Shoulder Harnesses -- ADJUST and LOCK
- c) Fuel Selector Valve -- DESIRED TANK
- d) Avionics and Electrical -- ALL OFF
- e) Brakes -- SET
- f) Canopy adjust

**STARTING ENGINE (cold)**

- a) Mixture -- **LEAN**
- b) Throttle to 1/8 (**crack**)
- c) Prop -- **HIGH RPM**
- d) Master Switch -- ON
- e) Alt Field On
- f) Flaps -- UP
- g) Brakes Set
- h) Fuel Boost Pump -- ON
- i) Prime -- Mix to rich (5-7 seconds when cold)
- j) Fuel Boost Pump -- OFF, Propeller Area -- CLEAR
- k) Crack Throttle
- l) L&R Ignitions ON
- m) Ignition Switch -- START 900rpm
- n) Instruments, Essential & APRS switches -- ON
- o) Oil Pressure -- CHECK >50 psi at idle
- p) Strobe -- ON
- q) Noise Canceling On
- r) EFIS Accept, GPS Ent, Ent

**STARTING ENGINE (Warm)**

- a) Mixture -- Lean ,Throttle to 1/8
- b) Prop -- HIGH RPM
- c) Master Switch -- ON
- d) Alt. Field
- e) Flaps -- UP, Brakes Set
- f) Propeller Area -- CLEAR
- g) Ignition Switch -- START
- h) Count 4 blades, mixture rich
- i) Instruments, Essential & APRS switches-- ON
- j) Oil Pressure -- CHECK >50 psi at idle
- k) Strobe -- ON, GPS Ent, Ent
- l) Noise Canceling On
- m) EFIS Accept, GPS Ent, Ent

**RUN-UP**

- Brakes -- SET
- a) Canopy ----- Main Latch -- SECURE
  - b) Flight Controls -- FREE and CORRECT
  - c) Flaps - UP
  - d) Flight Instruments -- SET  
Altimeter(both) -- CORRECT PRESSURE  
Engine Instruments on the numbers
  - e) Fuel Selector Valve -- DESIRED TANK
  - f) Mixture -- RICH (below 3000')

- g) **Elevator** and Aileron  
Trim -- (elev just off the bottom)
- h) Throttle -- 1700 RPM
  - 1) Magneto/EI -- CHECK (125 max drop)
  - 2) Engine Instruments – CHECK ALL
  - 3) Throttle -- IDLE
- i) Radios – SET
- j) Trim spd sw high rate (toggle Up)
- k) Fuel Boost Pump -- ON
- l) Transponder – (GPS activated when moving)
- m) Passenger – READY and willing

# TAKEOFF

## Oddities:

- Left fuel Gage may go to zero on occasion
- #2egt may spike up on occasion

## NORMAL

### TAKEOFF

- a) Wing Flaps – UP
- b) Prop – HIGH RPM
- c) Throttle -- FULL OPEN
- d) Climb Speed -- 110 KIAS

## SHORT FIELD

### TAKEOFF

- a) Wing Flaps – 10 Deg
- b) Prop – HIGH RPM
- c) Brakes – APPLY
- d) Elev full back
- e) Throttle – 2300 RPM
- f) Mixture – RICH (above 3000' lean to obtain max RPM)
- g) Brakes – RELEASE
- h) Full Throttle, Release back pressure
- i) Climb Speed – 80 KIAS

## ENROUTE CLIMB

- a) Airspeed – 110 - 140 KIAS
- b) Throttle – Full
- c) Prop – 2500 RPM
- d) Boost Pump – OFF at 1000 feet AGL
- e) Fuel Pressure – CHECK
- f) Mixture – LEAN above 3000'

## CRUISE

- a) Throttle – FULL
- b) Prop – 2300 -  
2450 RPM
- c) Adjust trim
- d) Mixture – LEAN  
to 50deg ROP, or  
40 LOP
- e) Adjust trim
- g)  $\frac{1}{4}$  flaps abeam the  
numbers
- h)  $\frac{1}{2}$  flaps on base, Full  
on Final
- i) Base to final 90  
KIAS
- j) Over the numbers at  
75 KIAS

## LANDING

- a) Mixture Rich, Prop  
High RPM
- b) Trim spd sw high rate  
(toggle Up)
- c) Landing lights on
- d) Pattern spd 100  
KIAS
- e) Fuel Boost Pump On
- f) Adj. elev trim  
constantly as needed

## AFTER LANDING

- a) Wing Flaps –  
Leave Down
- b) Boost Pump –  
OFF
- c) Landing Lights  
off
- d) **Elevator** Trim --  
(elev just off the  
bottom)

# POSTFLIGHT

## ENGINE SHUTDOWN

- a) Flaps – DOWN
- b) Prop – FULL FORWARD
- c) Throttle – IDLE
- d) Mixture Idle cut off
- e) Immediately shut off ignition while blades turning
- f) Instruments and Avionics SW.—OFF
- g) All electrical sw – OFF
- h) **Master – OFF**

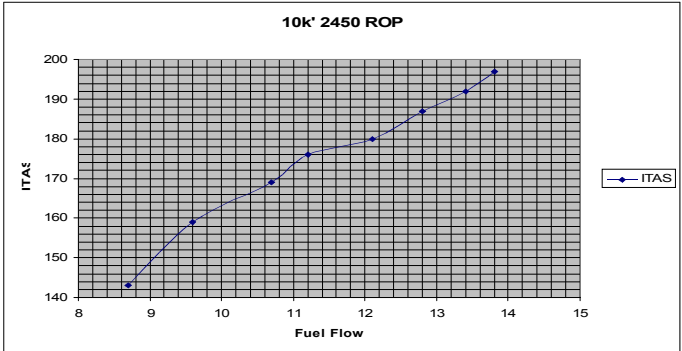
## SECURING AIRCRAFT

- a) Wheel Chocks
- b) Wing & Tail Tie-Down if necessary
- c) Lock flight controls with Pilot Seat Belt
- d) **Master** and Electrical Switches – OFF
- e) **Rudder locked** with tail wheel

# Performance

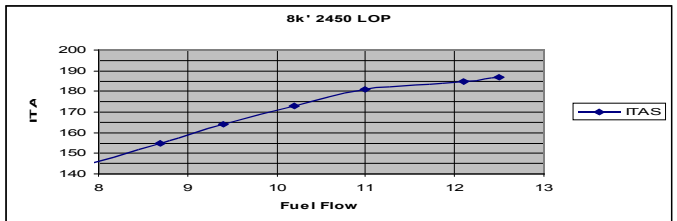
## Cruise Performance at 10,000': ROP 2450rpm

<b>FF</b>	13.8	13.4	12.8	12.1	11.2	10.7	9.6	8.7
<b>ITAS</b>	197	192	187	180	176	169	159	143
<b>IAS</b>	167	164	160	154	150	144	136	122
<b>MP</b>	20.5	19.4	18.5	17.5	16.5	15.3	14	12.2
<b>RPM</b>	2450	2450	2450	2450	2450	2450	2450	2450
<b>KTS/Gal</b>	14.28	14.33	14.61	14.88	15.71	15.79	16.56	16.44



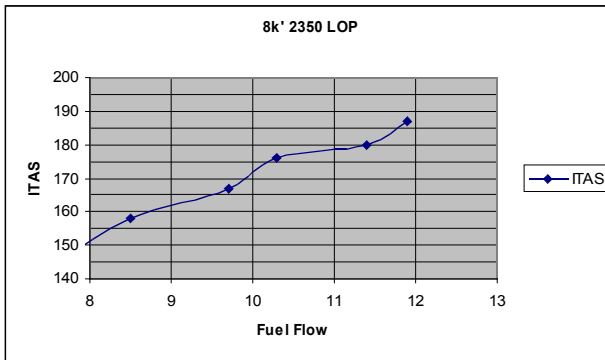
## Cruise Performance at 8,000': LOP 2450rpm

<b>FF</b>	12.5	12.1	11	10.2	9.4	8.7	7.6
<b>ITAS</b>	187	185	181	173	164	155	141
<b>IAS</b>	164	162	158	150	145	136	124
<b>MP</b>	21.6	20.4	19.3	17.9	16.3	14.9	13.1
<b>RPM</b>	2450	2450	2450	2450	2450	2450	2450
<b>KTS/Gal</b>	14.96	15.29	16.45	16.96	17.45	17.82	18.55



## Cruise Performance at 8,000': **LOP 2350rpm**

<b>FF</b>	11.9	11.4	10.3	9.7	8.5	7.6
<b>ITAS</b>	187	180	176	167	158	145
<b>IAS</b>	164	157	154	147	138	127
<b>MP</b>	21.6	20.1	19	17.4	15.3	13.6
<b>RPM</b>	2350	2350	2350	2350	2350	2350
<b>KTS/Gal</b>	15.71	15.79	17.09	17.22	18.59	19.08



## No Wind Range at 8,000': **Lean of Peak Operations**

\* All range calculations include 3 gal. for engine start, taxi, takeoff and climb. Engine is leaned for best economy **LOP**.

*1/2 hour (6 gal.) reserve:*

WOT 2450RPM.....	748 nm
WOT 2350RPM.....	785 nm
MP 17.4, ITAS 167, 2350rpm.....	860 nm

*No Reserve:*

WOT 2450RPM.....	837 nm
WOT 2350RPM.....	880 nm
MP 17.4, ITAS 167, 2350rpm.....	964 nm

Oxygen Cylinder Chart Usage using flow meter and O2 saving canula  
 Typical usage, @15k' 1.5L/min/person, @25k' 2.5L/min/person

Cylinder Model	Max Liters	Max Cu.	Svc Psi	Man Hrs 10k'	Man Hrs 15k'	Man Hrs 18k'
AL-415	415	14.7	2015	17.2	9.5	7.2
AL-647	647	22.8	2216	26.9	14.8	11.3

# WEIGHT AND BALANCE DATA

## WEIGHT AND BALANCE

---Weighing Procedures---

Date:	8.07.2005
Aircraft Type:	RV8 N687MS
Your Name:	Michael Stewart
DATUM:	70" forward wing leading edge

**CG Limits - 78.7 to 86.82**

78.7 79.7 80.7 81.7 **82.7** 83.7 84.7 85.7 **86.82**

Measured Weights	Scale Reading	Weight	STA	Moment	C of G Location
Left wheel	628.00	628.00	68.76	43181.28	
Right wheel	633.00	633.00	68.76	43525.08	
Nose or tail wheel 43	65.00	65.00	251.06	16318.90	
<b>BEW (Basic Empty Weight)</b>		1326.00		103025.26	77.70
Solo Configuration	Gallons				
--Right Fuel Tank (No. of gallons & STA):	30.00	180.00	70.00	12600.00	
--Left Fuel Tank (No. of gallons & STA):	30.00	180.00	70.00	12600.00	
--Pilot:	--	200.00	91.78	18356.00	
--CoPilot:	--	0.00	119.12	0.00	
--Smoke	--				
--Aft Baggage Shelf	--	21.00	152.91	3211.11	
--Aft Baggage Floor	--	0.00	138.00	0.00	
--Fwd Baggage		0.00	56.75	0.00	
Empty Weight		1326.00		103025.26	
<b>Totals Fuel Full</b>		1907.00		149792.37	78.55
<b>Totals Zero Fuel</b>		1547.00		124592.37	80.54

Pax and Baggage Configuration	Gallons				
--Right Fuel Tank (No. of gallons & STA):	30.00	180.00	70.00	12600.00	
--Left Fuel Tank (No. of gallons & STA):	30.00	180.00	70.00	12600.00	
--Pilot:	--	200.00	91.78	18356.00	
--CoPilot:	--	175.00	119.12	20846.00	
--Smoke	7.00	49.00	97.00	4753.00	
--Aft Baggage Shelf	--	20.00	152.91	3058.20	
--Aft Baggage Floor	--	80.00	138.00	11040.00	
--Fwd Baggage		60.00	56.75	3405.00	
Empty Weight		1326.00		103025.26	
	<b>Gross</b>				
<b>Totals Fuel Full</b>		<b>2270.00</b>		189683.46	83.56
<b>Totals Zero Fuel</b>		1861.00		159730.46	85.83

# EMERGENCY PROCEDURES

## AIRSPEDS FOR EMERGENCY OPERATIONS

Engine Failure After Takeoff:

Wing Flaps Up .....	80 Kts
Wing Flaps Down .....	70 Kts

Maneuvering Speed (Va) ..... 115 Kts

Maximum Glide ..... 80 Kts

## ELECTRICAL / ALTERNATOR FAILURE

### Total Panel Power Failure

- Engage emergency power toggle Switch Up (lower Rt. Gear Tower)
- This engages Essential Power to run Essentials only (see below)
- If this fails to put power to the panel
  - Engage emergency power to G3 EFIS with switch next to the G3 EFIS. This provides 1.5 hours of power to that unit only

### Alternator Failure

- Turn off instruments switch on rt panel
- This keeps essential items running

### Items available on **Essential Buss Only**

Com 2 SL40, EFIS BMA, GPS1 430, Instrument Lighting, Transponder. Important Items Lost (Eng. Monitor, trim, flaps, fuel pump, pitot heat)

### Items available on Instrument Buss

Com 1 Nav 1 430, EFIS GRT 1&2, Engine Monitor

## Items available on Main Buss (Master sw on)

Landing Strobe Nav Lts, Flaps, Auto Pilot, Trim, Cabin lts, Alt Field,  
Smoke, XM wx, Fuel Pump, Pitot Heat, Pax GPS

# **ENGINE FAILURES**

## **ENGINE FAILURE DURING TAKEOFF RUN**

1. Throttle – IDLE
2. Brakes – APPLY
3. Wing Flaps – RETRACT
4. Mixture – IDLE CUT-OFF
5. Ignition Switch – OFF
6. Master Switch – OFF

## **ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF**

1. Airspeed – 70 KIAS
2. Mixture – IDLE CUT-OFF
3. Fuel Selector Valve – OFF
4. Ignition Switch – OFF
5. Wing Flaps – AS REQUIRED
6. Master Switch – OFF

## **ENGINE FAILURE DURING FLIGHT**

1. Airspeed – 80 Knots
2. Boost Pump – ON
3. Fuel Selector – SWITCH TANKS
4. Mixture – RICH
5. Ignition Switch – BOTH, LEFT, RIGHT
6. Transponder – 7700

# **FIRES**

## **DURING START ON GROUND**

1. Cranking – CONTINUE, to get a start which would suck the flames and accumulated fuel through the engine.

If engine starts:

2. Power – 1700 RPM for a few minutes
3. Engine – SHUTDOWN and inspect for damage

If engine fails to start:

4. Throttle – FULL
5. Mixture – IDLE CUT-OFF
6. Cranking – CONTINUE
7. Fire Extinguisher – OBTAIN
8. Engine – SECURE

### **ENGINE FIRE IN FLIGHT**

1. Mixture – IDLE CUT-OFF
2. Fuel Selector Valve – OFF
3. Master Switch – OFF
4. Cabin Heat and Air – OFF
5. Slow to 80kts and continue to build airspeed until fire is out

### **ELECTRICAL FIRE IN FLIGHT**

1. Master Switch – OFF
2. Avionics – OFF
3. All Other Switches (except ignition) – OFF
4. Vents/ Cabin Air/ Heat – CLOSED
5. Fire Extinguisher – ACTIVATE (if available)
6. Engage G3 emergency power switch

### **CABIN FIRE**

1. Master Switch – OFF
2. Vents/ Cabin Heat – CLOSED
3. Fire Extinguisher – ACTIVATE (if available)

### **WING FIRE**

1. Nav & Strobe Lights – OFF
2. Landing Light – OFF