N12VD

VAN'S AIRCRAFT RV-7A

PILOT'S OPERATING HANDBOOK

N12VD

N12VD

CONSTRUCTION INFO

Builder	Ryan Drake
Model	RV-7A
Serial Number	74583
Start date	9-Nov-2016
Date of initial registration	TBD
Registration	N12VD

N12VD

PERFORMANCE - SPECIFICATIONS

Span	25' 0"
Length	20' 4"
Height	7' 10"
Speed	
Max at sea level	180 KTAS
Cruise, 75% Power at 8,000 ft	171 KTAS
Cruise, 55% Power at 8,000 ft	154 KTAS
Range (includes 3 gal. for taxi, takeoff & climb)	
75% @ 8,000 ft, no reserve	665 nm
55% @ 8,000 ft, no reserve	817 nm
75% @ 8,000 ft, 1 hour (10 gal.) reserve	494 nm
55% @ 8,000 ft, 1 hour (10 gal.) reserve	663 nm
Rate of climb at sea level	1,600 fpm
Service ceiling	19,500 ft
Takeoff distance	575 ft
Landing distance	500 ft
Stall speed (CAS)	
Flaps up, power off	55 KIAS
Flaps down, power off	50 KIAS
Maximum weight (Normal category)	1,800 lbs
Empty weight	1,117 lbs
Maximum useful load	683 lbs
Baggage allowance	100 lbs
Wing loading	14.8 lbs/sq.ft.
Power loading	10 lbs/HP
Fuel	
Capacity (total)	42 gal
Capacity (usable)	40 gal
Type	91/96 or 100LL
Oil capacity	8 qts
Engine	Lycoming YIO-360-M1B
Propeller	Hartzell HC-C2YR-1BFP

AIRSPEED LIMITATIONS

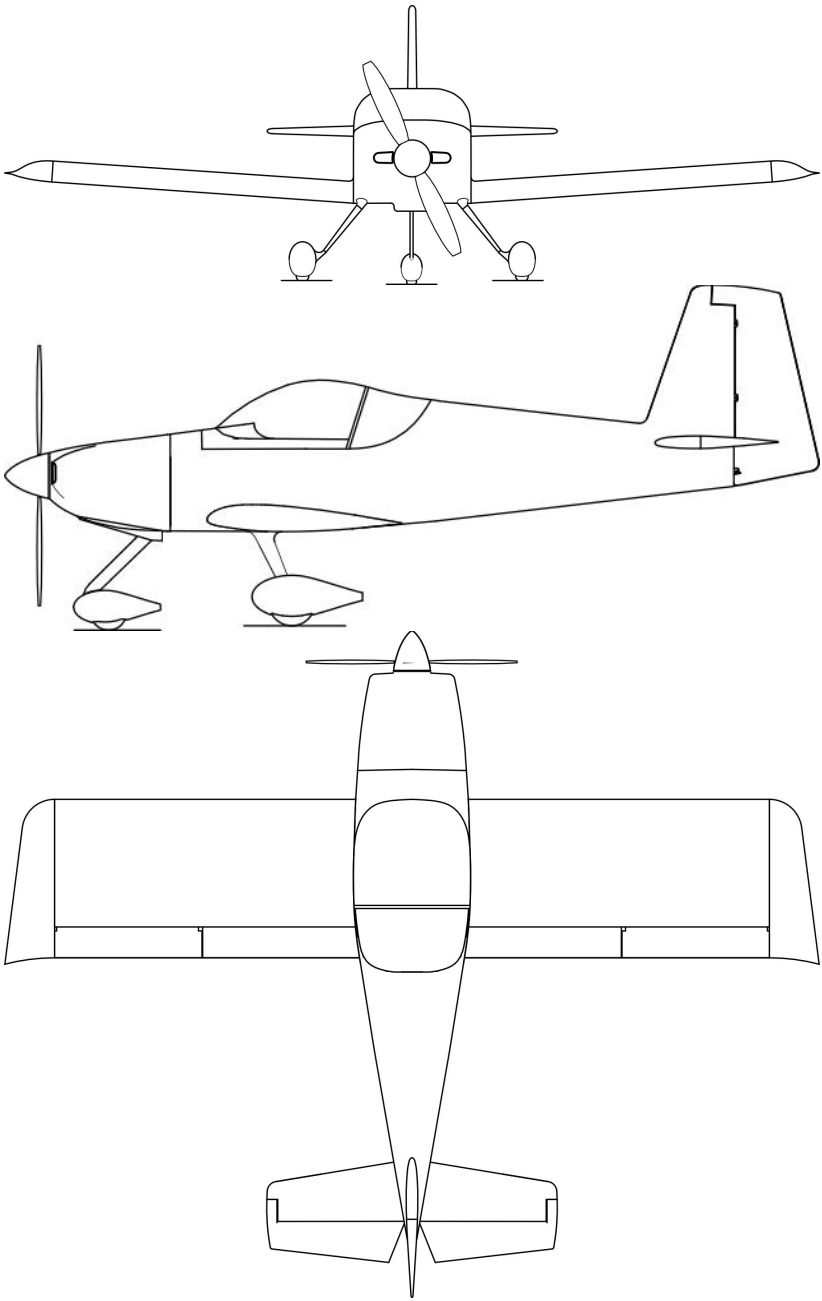
	SPEED	IAS	REMARKS
V_{NE}	Never Exceed Speed	**200 KIAS**	Do not exceed this speed in any operations.
V_{NO}	Maximum Structural Cruising Speed	**168 KIAS**	Exceed this speed only in smooth air.
V_A	Maneuvering Speed	**123 KIAS**	Do not make full control movements above this speed. Full elevator deflection will result in a 6g load at this speed.
V_{FE}	Maximum Flap Extended Speed	**96** - 20° **87** - Full	Do not exceed this speed with flaps down
V_y	Best Rate of Climb	**96 KIAS**	
V_x	Best Angle of Climb	**70 KIAS**	
V_s	Stall Speed Clean	**56 KIAS**	
V_{so}	Stall Speed Landing Configuration	**50 KIAS**	

AIRSPEED INDICATOR MARKINGS

MARKING	VALUE	SIGNIFICANCE
White Arc	**50-87 KIAS**	Full Flap Operating Range Lower limit is V_{so}. Upper limit is maximum speed with flaps extended
Green Arc	**56-168 KIAS**	Normal Operating Range Lower limit is V_s. Upper limit is maximum structural cruising speed
Yellow Arc	**168-200 KIAS**	Operations must be conducted with caution and only in smooth air
Red Line	**200 KIAS**	Maximum speed for all operations

N12VD

VIEWS



N12VD

AEROBATIC INFORMATION

Weight limitation	1,600 lbs

N12VD

PREFLIGHT INSPECTION

1. CABIN
    a. Documentation - AVAILABLE in airplane
    b. Charts - CURRENT and APPROPRIATE TO FLIGHT
    c. Seat Belt Securing Control Stick - RELEASE
    d. Passenger Control Stick - CHECK SECURE
    e. Camera - CHECK security
    f. Magneto / Ignition Switches - OFF
    g. Alternator Circuit Breaker - IN
    h. Autopilot Enable Switch - OFF
    i. Fuel Boost Pump - OFF
    j. Main Power Switch - SET to MASTER
    k. Engine gages - ON
    l. Fuel Quantity - CHECK quantity
    m. Flaps - DOWN
    n. Pitot Heat - CHECK, if needed
    o. Position and Strobe Lights - CHECK, if needed
    p. Taxi Lights - CHECK, if needed
    q. Landing Lights - CHECK, if needed
    r. Main Power Switch - OFF
    s. Parking Brake - ENGAGED
2. EMPENNAGE
    a. Tail Tie-Down - DISCONNECT
    b. Rudder, Elevators - CHECK movement and security
    c. Left Static Source - CHECK for blockage
    d. Tail light and Strobe - CHECK condition
    e. Right Static Source - CHECK for blockage

3. RIGHT WING
    a. Flap - CHECK security
    b. Aileron - CHECK movement and security
    c. Nav and Strobe - CHECK Condition
    d. Landing Light - CHECK condition
    e. Leading Edge - CHECK
    f. Wing Tie-Down - DISCONNECT
    g. Main Wheel Tire - CHECK for proper inflation
    h. Chock - REMOVE
    i. Tank - SUMP
    j. Fuel Quantity - CHECK VISUALLY
    k. Fuel Filler Cap - SECURE
4. NOSE
    a. Oil Level - CHECK, don't operate with less than 5 quarts
    b. Cowl Hinge Pins - CHECK for security
    c. Ground Power - CLOSED
    d. Access Door - CLOSED
    e. Exhaust - SECURE
    f. Fuel Tank Vents - CHECK for blockage
    g. Nose Wheel Tire - CHECK for proper inflation
    h. Chock - REMOVE
    i. Tow Bar - REMOVE
    j. Propeller and Spinner - CHECK for nicks and security, grease & oil leaks. (Gently shake each blade to feel for movement up to 1/8th inch allowed, check screws)
    k. Air Inlet - CHECK for restrictions

5. LEFT WING
    a. Tank - SUMP
    b. Fuel Quantity - CHECK VISUALLY
    c. Fuel Filler Cap - SECURE
    d. Pitot Tube Cover - REMOVE and check for blockage
    e. Stall Warning - CHECK
    f. Leading Edge - CHECK
    g. Landing Light - CHECK condition
    h. Nav and Strobe - CHECK condition
    i. Wing Tie-Down - DISCONNECT
    j. Main Wheel Tire - CHECK for proper inflation
    k. Chock - REMOVE
    l. Aileron - CHECK movement and security
    m. Flap - CHECK security

BEFORE STARTING ENGINE

a. Preflight Inspection - COMPLETE
b. Passenger - BRIEF
c. Seat Belts and Shoulder Harnesses - ADJUST and LOCK
d. Fuel Selector Valve - DESIRED TANK
e. Autopilot Enable Switch - OFF
f. Ext Lights Switch - SET to NAV+STROBE
g. Parking Brake - ENGAGED
h. Canopy - CLOSE
i. Canopy Primary Latch - CHECK
j. Canopy Secondary Latch - CHECK
k. Throttle Friction - ADJUST

STARTING ENGINE (cold)

a. Throttle - OPEN to 1/4 of travel
b. Mixture - RICH
c. Prop - HIGH RPM
d. Backup Power Switch - ON
e. Main Power Switch - SET to ALT+MASTER
f. Fuel Boost Pump - ON
g. Flaps - UP
h. Fuel Boost Pump - OFF
i. Propeller Area - CLEAR
j. Magneto Switches - HOLD both to START
k. Oil Pressure - CHECK 25 psi at idle
l. Parking Brake - DISENGAGE

STARTING ENGINE (hot)

a. Throttle - OPEN to 1/4 of travel
b. Mixture - LEAN
c. Prop - HIGH RPM
d. Fuel Boost Pump - OFF
e. Backup Power - ON
f. Main Power Switch - SET to MASTER+ALT
g. Flaps - UP
h. Propeller Area - CLEAR
i. Magneto Switches - HOLD both to START
j. Mixture - ENRICH
k. Oil Pressure - CHECK 25 psi at idle
l. Parking Brake - DISENGAGE

N12VD

TAXI

a. Brakes - CHECK
b. Taxi Clearance - OBTAIN

BEFORE TAKEOFF

a. Radio - SWITCH to Tower
b. Brakes - ENGAGED
c. Canopy - Main Latch - SECURE
d. Flight Controls - FREE and CORRECT
e. Elevator and Aileron Trim - NEUTRAL
f. Flight Instruments
   - Altimeter - CORRECT PRESSURE
   - GPS - CURRENT DATA AND PROGRAMMED
g. Fuel Selector Valve - DESIRED TANK
h. Mixture - RICH (below 3,000 feet)
i. Throttle - 1,800 RPM
j. Magnetos - CHECK (Right 125 max drop, 50 diff max)
k. Prop - cycle (2x) CHECK operation
l. Engine Instruments - CHECK
m. Annunciators - CHECK NONE
n. Throttle - IDLE
o. Throttle - 800-1,000 RPM
p. Radios - SET
q. Transponder - ALTITUDE
r. Fuel Boost Pump - ON
s. Lights - AS REQUIRED
t. Departure - REVIEW
u. Passenger - READY and willing

NORMAL TAKEOFF

a. Flaps - UP
b. Prop - HIGH RPM
c. Mixture - RICH
d. Throttle - Gently & Smoothly to FULL OPEN
e. Elevator Control - LIFT NOSE WHEEL (55 knots)
f. Climb Speed - 96 knots (Vy)
g. Trim

SHORT FIELD TAKEOFF

a. Flaps - 20 degrees
b. Prop - HIGH RPM
c. Brakes - APPLY
d. Throttle - Gently & Smoothly to FULL OPEN
e. Mixture - RICH (above 3,000 feet lean to obtain max RPM)
f. Brakes - RELEASE
g. Climb Speed - 70 knots (Vx)
h. Trim

ENROUTE CLIMB

a. Airspeed - 108-130 knots
b. Throttle - 25 in. Hg, or full throttle
c. Prop - 2,300 - 2,400 RPM
d. Boost Pump - OFF at 1,000 feet AGL
e. Fuel Pressure - CHECK
f. Mixture - LEAN above 5,000 feet
g. Trim
h. Traffic - CHECK

CRUISE

a. Throttle - 23.6 in. Hg
b. Prop - 2,300 RPM
c. Mixture - LEAN to 100°F rich of peak
d. Trim
e. Traffic - CHECK

LANDING

a. Autopilot - DISCONNECT and OFF
b. Approach speed - 80 knots
c. Flaps - 15 degrees
d. Prop - HIGH RPM
e. Mixture - RICH
f. Engine - 1,800 - 1,900 RPM
g. Fuel - SET Fullest Tank
h. Base Leg - Flaps 25 degrees, 75 knots
i. Final - Full Flaps, 70 knots

AFTER LANDING

a. Flaps - UP
b. Lights - AS REQUIRED
c. Boost Pump - OFF
d. Mixture - LEAN
e. Transponder - STANDBY
f. Radio - SWITCH to Ground

ENGINE SHUTDOWN

g. Flaps - DOWN
h. Prop - FULL FORWARD
i. Throttle - IDLE
j. CHT decidedly dropped
k. Mixture - IDLE CUT-OFF
l. Wait for shut down
m. Magnetos - OFF
n. Electrical switches - OFF
o. Main Power Switch - OFF
p. Backup Power Switch - OFF
q. Parking Brake - ENGAGE

SECURING AIRCRAFT

a. Main Power and Electrical Switches - OFF
b. Fuel Selector Valve - LEFT
c. Seat Belt - SECURE CONTROL STICK
d. Cockpit - ORGANIZE
e. Wheel Chocks - INSTALL
f. Wing & Tail Tie-Down - CONNECT
g. Pitot Tube Cover - INSTALL
h. Canopy - SECURELY CLOSED

N12VD

WEIGHT AND BALANCE DATA

Builder: Ryan Drake — Model: RV-7A
Serial Number: 74583 — Registration: N12VD

Datum: 70 inches forward of wing leading edge

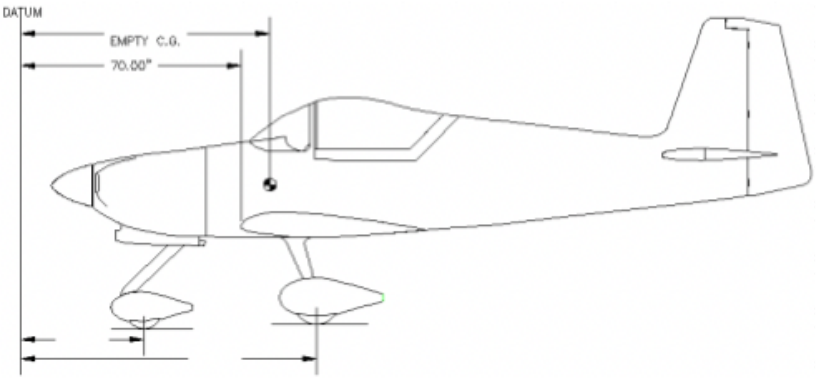
LIMITS

Design C.G. Range: 15% to 29% of wing chord OR 78.7" to 86.82" aft of Datum
Maximum gross weight 1800 lbs
Aerobatic gross weight 1600 lbs
Aerobatic aft C.G. limit 25% of chord OR 84.5" aft of datum

ARMS

Fuel 80.0" aft of datum
Pilot & Passenger 97.48" aft of datum
Baggage 126.78" aft of datum

	WEIGHT	ARM	MOMENT
Right wheel		93.96	
Left wheel		93.96	
Nose wheel		39.11	
TOTAL			
CG			



ENGINE INFORMATION

Model:	Lycoming YIO-360-M1B
Rated power:	180 HP
Rated speed:	2,700 RPM
Bore:	5.125 in
Stroke:	4.375 in
Displacement:	361 cu.in
Compression Ratio:	8.5:1

OIL

Oil filter:	Champion CH48110
Oil sump capacity:	8 qts
Minimum safe quantity:	4 qts

Avg Ambiant Air	MIL-L-6082 Grades	Ashless Dispersant Grades
All Temperatures		SAE 15W-50 or 20W-50
Above 80°F	SAE 60	SAE 60
Above 60°F	SAE 50	SAE 40 or SAE 50
30° to 90°F	SAE 40	SAE 40
0° to 70°F	SAE 30	SAE 40, 30 or 20W-40
Below 10°F	SAE 20	SAE 30 or 20W-30

Oil temperature:	180°F desired, 245°F max, 140°F min
Oil pressure:	95 psi max, 55 psi min, 25 psi idle
Oil consumption:	0.8 qph, 0.45 qph@75%, 0.39 qph@65%

FUEL

Fuel type:	91/96 or 100LL
Fuel pressure:	35 psi max, -2 psi min
Fuel consumption:	11.0 gph@75%, 8.5 gph@65%

OTHER

Cylinder head temperature: 150°F to 400°F cruise, 500°F max

Brake fluid quantity:	Approx. 1 qt, bleed to top of reservoir
Brake fluid spec:	MIL-PRF-5606, MIL-PRF-83282, or equiv.

SYSTEMS INFORMATION

AIRFRAME

The airframe is aluminum alloy construction except for steel components comprising: engine mount, landing gear, landing gear mounts, elevator control horns and other miscellaneous items. The tips of the wings and tail surfaces as well as cowling, landing gear fairings, empennage fairings are fabricated from fiberglass. The canopy is a single sheet of plexiglass, divided into a fixed aft window and tip-up forward windscreen. Light auto filler or fiberglass filler may be used to correct minor cosmetic blemishes.

ENGINE

The aircraft is powered by a Lycoming YIO-360-M1B, 4 cylinder, fuel injected, horizontally opposed, direct drive, air cooled engine rated at 180 HP. Ignition is provided by a conventional dual Slick magneto system, model 4370. Each magneto is activated by a switch on the panel. LEFT MAG for the left magneto and RIGHT MAG for the right magneto. The magneto is active when set to the ON position, and grounded when set to the OFF position. Both magnetos are cooled by air ducted from the baffling. The starter is a Sky-Tec model 149-12LS. The starter is engaged by simultaneously holding both magneto switches to the START position. The engine incorporates a mechanical fuel pump and a horizontal induction system. The exhaust system is a crossover configuration with no mufflers. Cooling air positive pressure is produced by an aluminum baffle system and rubber seals which seal against the top cowl. Oil temperature is maintained by an oil cooler mounted onto the baffling aft of the #4 cylinder. Oil pressure is measured by a transducer on a manifold mounted to the firewall, and read and displayed on the EFIS. An annunciator light on the panel will activate if oil pressure is not detected. Oil temperature is measured by a probe installed in the engine, and read and displayed on the EFIS. Engine manifold pressure is measured by a transducer on a manifold mounted to the firewall, and read and displayed on the EFIS. Engine RPM is measured by a tachometer installed in the engine, and read

and displayed on the EFIS. Engine controls consist of throttle, propeller, mixture, and alternate air door. The throttle, propeller and mixture controls are pull cables centrally located in between the pilot and passenger positions. The alternate air door push-pull control is mounted to the left of the engine controls. Cylinder head temperature for each cylinder is measured by engine mounted probes and read and displayed on the EFIS. Exhaust gas temperature are measured by probes installed in each exhaust pipe and are read and displayed on the EFIS. Two auxiliary temperature sensors are available to measure temperature inside the engine compartment, which are read and displayed on the EFIS.

PROPELLER

The engine drives a Hartzell HC-C2YR-1BFP two-blade constant speed propeller. The propeller is capable of blade angles between a low positive pitch and high positive pitch. A pilot-controlled prop governor supplies hydraulic oil pressure to set the blade pitch.

LANDING GEAR

The landing gear is a tricycle configuration with steel landing gear legs. The nose wheel is free castering. The engine mount/nose gear assembly consists of a mount that accepts a pivoting nose gear arm, which articulates at the base of the mount and is attached using elastomer discs and retention hardware. The nose wheel tire is size 5.00-5 and is 6-ply. The main gear tires are size 11x4.00-5 8-ply. All three tires are inflated to 35 PSI.

BRAKE SYSTEM

The braking system consists of toe brakes attached to both the pilot and passenger side rudder pedals operating two brake master cylinders. The left and right brake master cylinders share a common fluid reservoir installed on the top right forward face of the firewall. A parking brake is installed inline to the system, and a control cable located on the left side of the cabin below the air vent. The parking brake is engaged by applying and holding the brakes while pulling the parking brake control cable. The status of the parking brake is read and

displayed on the EFIS. The brake system is filled with approximately 1 quart of Royco 782 brake fluid.

FLIGHT CONTROL SYSTEM

Dual controls are fitted. The passenger's control stick is removable. Elevator and ailerons are operated through a system of adjustable push rods. The rudder is operated through a cable system to the rudder pedals. Pitch trim is by a single tab on the elevators actuated by an electric servo. Roll trim is by a spring system actuated by an electric servo located in the center tunnel between the seats. Pitch and roll trim are selected by a set of four switches on the pilot's and passenger's control stick grips. Trim positions are read and displayed on the EFIS. Flaps are operated electrically and are controlled by a switch on the pilot's control stick grip and a FLAPS switch mounted to the right of the engine control knobs. The flaps are actuated by a motor positioned between the seats. The flap position is read and displayed on the EFIS. Additionally, flap limit sensors are installed which cut off power to the flap motor when flaps are at their full up and full down positions.

FUEL SYSTEM

Fuel is stored in two 21 US gallon tanks secured to the leading edge of the left and right main wing spars. Fuel drains are fitted to the lowest point of each tank and should be opened prior to the first flight of the day and after each refueling to check for sediment and water. The wing tank fuel is routed to the fuel selector valve which is located on the center tunnel in between the pilot and passenger positions. A knob on the valve handle must be lifted to change the selection to or from the OFF position. Left/Right may be selected without lifting the lever. Fuel that leaves the selector valve is routed to the fuel filter which is located in the center tunnel. Fuel then flows through an electric boost pump which is fitted in case of failure of the engine-driven fuel pump and is also used during takeoff and landing. The boost pump is controlled by a FUEL PUMP switch on the panel. On the engine side of the firewall, fuel flows to the engine driven pump. From the pump outlet, fuel flows to the servo and then up to the flow divider on top of the engine. Fuel

also flows to a manifold on the upper left firewall which houses the fuel pressure transducer. A fuel flow transducer is fitted on top of the engine between the fuel servo and fuel divider. The fuel flow and pressure transducers are read by and displayed on the EFIS. Fuel quantity is measured by a pair of capacitive plates installed inside each fuel tank. The quantity signals are processed by sender units mounted on the sub-panel, and the processed signal is read and displayed on the EFIS.

ELECTRICAL SYSTEM

The power distribution system consists of a 16 amp hour PC680 battery, a 6 amp hour backup battery, a main bus, a battery backup bus, a keep-alive bus, and a battery bus. The engine is fitted with a 40 amp 14 volt main alternator. The main battery is connected to the main bus via the main battery solenoid, which is activated by switching the MAIN POWER switch on the panel to either MASTER or MASTER+ALT. This battery is charged by the alternator. Alternator field power is activated by switching the MAIN POWER switch on the panel to MASTER+ALT. The alternator field circuit is also protected by a resettable circuit breaker on the panel. The alternator is paired with an external voltage regulator, with over-voltage protection that is tested by pushing the OV TEST button on the sub panel. OV protection should not be tested in flight! An annunciator light on the panel will activate when low voltage is detected. Alternator output current is measured by an ammeter mounted on the firewall, and read and displayed on the EFIS. Main bus electrical current is measured by an ammeter mounted on the firewall, and read and displayed on the EFIS. The backup battery is installed on the forward avionics shelf. It is enabled by the BACKUP POWER switch on the panel, and should be enabled during all phases of flight. It provides power to critical systems during cranking and when the main battery fails. A keep-alive circuit provides power to secondary systems during cranking only. The battery bus is always energized. For ground operations, power can be provided through a socket located under the cowl next to the oil fill tube. A GROUND POWER switch on the sub-panel enables this socket. Two USB sockets are available on the panel for supplying 5V electrical power to

peripheral devices. See schematic diagrams for further details on the electrical system.

SENSORS AND ELECTRONICS

External sensing and control of electronics systems are managed by an engine management computer mounted on the forward avionics shelf, and an electronics adapter mounted below the pilot's seat. The engine management computer reads the following sensors: fuel level, trim position, flap position, fuel flow, fuel pressure, manifold pressure, oil pressure, oil temperature, CHT and EGT, two ammeters, main bus and backup battery bus voltage, tachometer, two auxiliary engine compartment temperature sensors, battery backup status, CO detector status, starter engagement status. The electronics adapter reads and controls the following sensors and systems: stall warning status, parking brake status, canopy open/closed status, flap up/down limit sensors, cabin lighting and dimming, pitch and roll trim operation, and flap operation.

SYSTEMS COMMUNICATION

All system communication is handled through CANbus and RS-232 connections. See system schematics for detailed connectivity information.

ALTITUDE/ORIENTATION

The airplane is equipped with a single Air Data Attitude Heading Reference System (ADAHRS) mounted in the tail. Outside air temperature is measured by a probe attached to the aft right access plate on the tail, under the empennage, and supplied to the ADAHRS. A solid state magnetometer is mounted to the aft deck below the vertical stabilizer, supplying magnetic heading information to the ADAHRS.

PITOT STATIC SYSTEM

The pitot system provides pitot ram pressure and angle-of-attack (AOA) to the ADAHRS. The heated pitot tube is located under the left wing, outboard of the aileron bellcrank. The pitot heat, unregulated and powered from the Main Bus, is controlled by the PITOT HEAT switch on the panel. The static pressure ports are on both sides of the rear of the fuselage. Pitot and

static pressure are also routed to an altimeter and airspeed indicator on the panel, and to a backup flight instrument mounted on the panel.

STALL WARNING

In addition to the Angle of Attack (AOA) indication on the EFIS, a mechanical stall warning switch is installed on the leading edge of the left wing, which is indicated aurally and on the EFIS.

EXTERNAL LIGHTING

Landing and taxi lights are mounted in the leading edges of both wings behind plexiglass lenses. Each light cluster consists of three landing lights aimed forward, and a single taxi light angled downward. The landing lights are activated by setting the LANDING LIGHTS switch on the panel to STEADY. The landing lights also have a “wig wag” function, which is activated by setting the LANDING LIGHTS switch on the panel to WIGWAG. The taxi lights are activated by setting the TAXI LIGHTS switch on the panel to ON. Position lights are mounted in both wing tips behind plexiglass lenses and on the aft edge of the vertical stabilizer. Position lights are activated by setting the EXT LIGHTS switch on the panel to NAV or NAV+STROBE. Strobe lights are mounted in both wing tips behind plexiglass lenses. Strobe lights are activated by setting the EXT LIGHTS switch on the panel to NAV+STROBE. A control board mounted below the passenger’s seat facilitates control of landing lights, position lights and strobe lights.

INTERNAL LIGHTING

Cabin lighting is provided through three dimmable circuits. EFIS and radio lighting can be dimmed with the AVIONICS LIGHTING knob on the panel. An LED strip attached to the underside of the glare shield provides panel lighting, and can be dimmed with the PANEL LIGHTING knob on the panel. An LED strip in the footwell provides cabin lighting, and can be dimmed with the CABIN LIGHTING knob. Lights above the baggage compartment provide additional cabin lighting. These lights are controlled with a switch next to the upper canopy latch. The switch middle position turns the lights on, while the main bus is energized. The

switch left position operates the light as a “courtesy” light and remains on for two minutes after the main bus is deactivated.

HEATING AND VENTILATION

Cabin heat is provided via a heat muff attached to the #1 exhaust pipe and fed with high pressure air taken from the baffling. The heated air is ducted through the firewall into the center tunnel to the cabin footwell. The CABIN HEAT pull cable on the panel controls the operation of this duct. Ventilation air is supplied from two NACA inlets located on the sides of the fuselage forward of the canopy. The inlets are ducted to eyeball vents on the left and right sides of the instrument panel.

SAFETY SYSTEMS

The airplane is equipped with an Emergency Locator Transmitter (ELT) mounted in the right side of the tail, aft of the baggage compartment. The ELT transmits on 406 MHz and 121.5 MHz frequencies while providing GPS position accuracy. The ELT can be tested by switching the ELT remote switch to TEST on the panel. A carbon monoxide detector is installed on the forward avionics shelf, which provides an aural indication and illuminates a panel light when dangerous levels of carbon monoxide are present. The carbon monoxide detector can be tested by pressing the CARBON MONOXIDE TEST button on the panel. When carbon monoxide levels are dangerous, the WARNING annunciator on the panel will indicate red. The pilot and passenger seats are equipped with a five point harness and crotch strap. The seats are removable by way of hinge pins attaching them to the fuselage.

AUTOPILOT

An autopilot controller is mounted in the center stack on the panel, which controls the autopilot system. A pitch autopilot servo is mounted in the mid-fuselage, attached to the elevator pushrod system. A roll autopilot servo is mounted in the right wing behind the outboard access panel, attached to the aileron pushrod system. The autopilot servos are powered by the AUTOPILOT switch on the panel. When set to ENABLED, power to the servos is energized, and when set to DISABLED, power is removed. A remote AP DISCONNECT button on the pilot’s

control stick grip allows for quick disengagement of the autopilot.

RADIO/INTERCOM/AUDIO

A single COM radio is mounted in the center stack on the panel. The COM antenna is mounted on the underside of the airplane near the left gear leg. Radio frequencies can be tuned from the physical radio device or from the EFIS. The radio also contains an intercom to enable cabin conversation. Radio voice transmission is activated by Push To Talk (PTT) buttons on both control stick grips, and by a RADIO PTT button on the panel. An XM radio/weather receiver is installed on the forward avionics shelf, allowing the receipt and playback of music through the intercom. The XM antenna is mounted on the glare shield and connects to the receiver through a bulkhead connector on the sub-panel. XM weather is displayed on the EFIS. Alternatively, music can be supplied by the passenger through the MUSIC IN 1/4" barrel socket on the panel. Headset jacks are located on the lower left and right sides of the panel. Both barrel sockets and LEMO-style plugs are available.

GPS

The airplane is equipped with a WAAS GPS receiver, mounted in the left side of the tail, aft of the baggage compartment. The GPS receiver meets WAAS/SBAS position source requirements for ADS-B "Out" and provides that signal directly to the ADS-B transponder. The GPS antenna is located on top of the airplane, aft of the canopy. Three alternate GPS antennas are located on the glare shield and provide backup GPS signals to the EFIS and backup flight instrument.

TRANSPONDER

The airplane is equipped with a Mode S ES ADS-B "Out" transponder, and dual-link ADS-B "In" receiver, mounted in the left side of the tail, aft of the baggage compartment. The ADS-B "Out" function transmits on 1,090 MHz and the ADS-B "In" function receives on both 978 MHz and 1,090 MHz. The unit reads both TAS/TCAS traffic and weather information, which is displayed on the EFIS.

INSTRUMENT PANEL

The instrument panel houses the Electronic Flight Information Systems (EFIS), consisting of a 10" primary flight display located in front of the pilot and 10" secondary flight display located in front of the passenger. MASTER CAUTION, MASTER WARNING, OIL PRESSURE and VOLTAGE annunciator lights are located on the panel above the primary flight display. A backup flight instrument is mounted on the pilot side of the panel and can be used in the event of failure of the primary EFIS. A "hobbs" hour meter is installed on the passenger side of the panel and is activated by positive oil pressure read from a pressure-activated switch mounted on the engine side of the firewall.

CABIN CAMERA

A cabin camera is mounted below the aft window, facing forward. Intercom audio input is supplied to the camera, and a video signal outputs from the camera for preview display on the passenger side EFIS.

TODO: Document TO/GA button

N12VD

SYSTEMS SCHEMATICS