

## ***European Aviation Safety Agency***

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**EASA**

**TYPE CERTIFICATE  
DATA SHEET**

**THRUSH S2R**

Type Certificate Holder :

Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA

Manufacturer :

Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA

For variants :

S2R  
S2R-T34  
S2R-T15  
S2RHG-T65  
S2R-T660

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## **Section A : Model S2R**

### **A.I General**

- |                                    |  |
|------------------------------------|--|
| 1. a) Type                         | S2R  |
| b) Variant                         | N/A  |
| 2. Airworthiness Category          | Restricted Category  |
| 3. Type Certificate Holder:        | Thrush Aircraft, Inc.<br>300 Old Pretoria Road<br>P.O. Box 3149<br>Albany, Georgia 31706-3149<br>USA |
| 4. Manufacturer:                   | Thrush Aircraft, Inc.<br>300 Old Pretoria Road<br>P.O. Box 3149<br>Albany, Georgia 31706-3149<br>USA |
| 5. (reserved)                      |  |
| 6. (reserved)                      |  |
| 7. DGAC France certification Date: | 30 September 1981  |

### **A.II Certification Basis**

- |   |  |
|---|--|
| 1. Reference Date for determining the applicable requirements : | 1 November 1965  |
| 2. (reserved)   |  |
| 3. (reserved)   |  |
| 4. Certification Basis :  | CAR 8 and CAR3   |
| 5. Airworthiness Requirements:                                  | CAR 8 effective October 11, 1950, restricted category<br>CAR 3 effective May 15, 1956, normal category |
| 6. Requirements Elected to Comply:                              | None   |
| 7. EASA Special Conditions:                                     | None   |
| 8. EASA Exemptions:   | None   |
| 9. EASA Equivalent Safety Findings:                             | None   |
| 10. EASA Environmental Standards:                               | Not applicable   |

### **A.III Technical Characteristics and Operational Limitation**

- 1. Type Design Definition: S2R Top Drawing List
- 2. Description: single engine, one seat, steel cage construction, low wing with conventional tail and tail wheel.
- 3. Equipment: refer to Airplane Flight Manual
- 4. Dimensions: refer to Airplane Maintenance Manual
- 5. Engine: Pratt & Whitney WASP R-1340-AN-1 (S3H1 or S1H1 Commercial designation) with carburetor parts list settings 395118-3 or A-18639-7. Manifold pressure gage is to be modified per Drawing 60600 when the S1H1 engine is used. (See NOTE 1 for optional engine installation)

5.1 Firmware: Not applicable

5.2 Mapping: Not applicable

5.3 Engine Limits:

	<u>S3H1</u>			<u>S1H1</u>		
	<u>H.P.</u>	<u>R.P.M</u>	<u>M.P.(In. Hg.)</u>	<u>ALT.</u>	<u>M.P.(In. Hg.)</u>	<u>ALT.</u>
Takeoff (5 min.)	600	2250	36.0	S.L.	36.5	S.L.
Max.	550	2200	34.0	S.L.	35.0	S.L.
Max.	550	2200	32.5	5000	33.0	8000

- 7. Propeller and Propeller Limits: Hamilton Standard, constant speed, 12 D40 hub, 6101-12 blades.  
 Diameter 109 inches maximum, 107 inches minimum.  
 Pitch settings 11.5° low and 27.0° high at 42 inch station.  
 Alternate settings, 11.5° low and 21.5° high at 42 inch station.  
 Alternate blades, EAC AG100-2 - Diameter 106 inches (2 percent cutoff permitted).  
 Pitch setting, 11.5° low and 20° high at 42 inches.

- 8. Fluids:
  - 8.1 Fuel: Fuel 80/87 minimum grade aviation gasoline
  - 8.2 Oil: 100 SAE non detergents (break in) or 120-60W after break in
  - 8.3 Coolant: N/A

- 9. Fluid capacities:
  - 9.1 Fuel: S/N 1380R - 70 gallons (38.5) (66 gallons usable capacity, one 35 gallon tank in each wing, tanks interconnected).  
 S/N 1416R and subsequent - 106 gallons (38.5).  
 S/N 1416R thru 1418R - (100 gallon usable capacity, one 53 gallon tank in each wing, tanks interconnected).  
 S/N 1419R thru 1499R and subsequent and S/N 1501R thru 1510R - (98 gallon usable, one 53 gallon tank in each wing, tanks interconnected).  
 S/N 1500R, 1511R and subsequent - (104 gallon usable, one 53 gallon tank in each wing, tanks interconnected).

9.2 Oil: 11.4 gallons total (84 lbs. at -13.6) (9 gallons usable).

10. Airspeed Limits (CAS):  
    Never Exceed Speed  $V_{NE}$                       138 KIAS (159 m.p.h.)  
    Maximum Structural Cruising Speed  $V_{NO}$     109 KIAS (126 m.p.h.)  
    Operating Manoeuvring Speed  $V_o$             109 KIAS (126 m.p.h.)  
    Maximum Flap Extension Speed  $V_{FE}$         107 KIAS (123 m.p.h.)  
    (see NOTE 2 for exceptions)
11. Maximum Operating Altitude                      12,000 ft
12. Operational Capability:                              VFR
13. Maximum Mass:                                      6,000 lbs.  
    (See NOTE 4)
14. Centre of Gravity Range:                          (+22.5) to (+30.0) inches aft of datum
15. Datum:    leading edge of the wing.
16. Weight and Balance                                  Current weight and balance report including list of equipment included in certificated empty weight, and loading instructions when necessary, must be provided for each aircraft at the time of original certification. The empty weight and corresponding center of gravity location must include the following unusable fuel:  
    Model S2R, S/N 1380R  
        24 lbs. at (+38.5)  
    Model S2R, S/N 1416R and 1418R  
        36 lbs. at (+38.5)  
    Model S2R, S/N 1419R thru 1499R, 1501R thru 1510R  
        48 lbs. at (+38.5)  
    Model S2R, S/N 1500R, 1511R thru 4999R, 5000R and subsequent  
        18 lbs. at (+38.5)
17. Leveling Means:                                      spirit level: left hand longeron under cockpit  
    Optical level: 'vee' groove on bottom of rear cockpit longeron
18. Number of Seats:                                    1 (+89 ins)
19. Maximum Passenger Seating Capacity:        None
20. (reserved)
21. Baggage / Cargo Compartment  
    Maximum baggage compartment, 60 lbs. (+112).  
    Maximum hopper load, 3336 lbs. (+29.9).  
    Maximum Cargo Load See weight and balance data.
22. Wheels and Tires:  
    Main Wheel Tire Size:                            29x8.50-10  
    Tail Wheel Tire Size:                             4.000-5

23. Control Surface Movements

Elevator	Up 27° + 1°	Down 17° + 1°
Elevator Tab	Up 13° + 1°	Down 18° + 1°
Rudder	Left 24° + 1°	Right 24° + 1°
Aileron	Up 21° + 1°	Down 17° + 1°
Flaps	Down 26° - 30°	

24. Serial Numbers Eligible

1380R, 1416R thru 4999R

25. Equipment:

The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification. In addition, the following equipment is required:

- (a) Airplane Flight Manual, dated February 27, 1979, and Supplement for Restricted Category Operation, dated February 27, 1979. (Only required for S/N 2526 and up).
- (b) 24 volt electrical system, Rockwell Drawing 90159. (24 volt system includes required wing night lights), effective S/N 1380R, 1416R thru 1590R.
- (c) 24 volt electrical system, Rockwell Drawing 90326, effective S/N 1591R and subsequent.
- (d) Operative pre-stall warning system per Rockwell Drawing 90095, S/N 1416R thru 1440R.

26. Agricultural Dispersal Equipment

Any one of the ten following agricultural dispersal systems may be installed with the R1340 engines, or with the optional Wright R-1300-1B engine installation:

- (a) 2" External Spray Installation, Aero Commander Dwg. No. 80680, S/N 1416R thru 1510R.
- (b) Spreader and Calibration Installation, Aero Commander Dwg. No. 80674, S/N 1416R and subsequent.
- (c) Fire Bomber Dump System Installation, Aero Commander Dwg. No. 80792 (See NOTE 2(o)), S/N 1416R thru 1576R.
- (d) Micron air Spray System, Aero Commander Dwg. No. 80870 (See NOTE 2(q)), S/N 1416R and subsequent.
- (e) 2" Low Drag Spray System, Aero Commander Dwg. No. 81012, S/N 1511R thru 1620R.
- (f) Boom master Installation, Aero Commander Dwg. No. 80931, S/N 1416R and subsequent.
- (g) Standard Spray System, Rockwell Dwg. No. 81071, S/N 1621R and subsequent.
- (h) Spreader and Spreader Quick-Disconnect Installation, Rockwell Dwg. No. 80975, S/N 1416R and subsequent.

- (i) Large Swath master - Small Gate Installation, Rockwell Dwg. No. 80815, S/N 1416R thru 2068R.
- (j) Swath master Installation, Rockwell Dwg. No. 81061, S/N 1416R thru 2068R.
- (k) 2" Spray System Installation, Rockwell Dwg. No. 80852, S/N 1511R thru 1620R.
- (l) Spray System Installation, Rockwell Dwg. No. 80854, S/N 1511R and subsequent.
- (m) Fire Bomber System Installation, Rockwell Dwg. No. 81069, S/N 1577R and subsequent.

#### **A.IV Operating and Service Instructions**

1. Airplane Maintenance Manual of December 1, 1975; last issue of August 21, 1989
2. Airplane Flight Manual (FAA approved) of June 30, 1975; last issue of March 13, 1996
3. The following information on placards pertaining to flight and operating instructions and limitations must be displayed in full view of the pilot:
  - (a) "Restricted"
  - (b) "This airplane must be operated as a restricted category airplane in accordance with the operating limitations stated in the form of placards and the Airplane Flight Manual."
  - (c) "No acrobatic maneuvers including spins approved."
  - (d) "The operation of this airplane is limited to day and night VFR conditions.  
Flight into known icing conditions prohibited."
  - (e) "Design Maneuvering Speed: 110 KIAS (126 mph)  
Maximum Crosswind Velocity: 13 Kts (15 mph)"  
"Maximum flap-down speed: 107 KIAS (123 mph)"
  - (f) "Avoid continuous ground operation between 1280 and 1900 R.P.M."
  - (g) Adjacent to stall warning switch when dry battery stall warning system is installed (S/N 1380R, 1416R thru 1440R):  
"Stall warning switch must be on in flight. Change battery every four months to dated Eveready 6V No. 1461. Mark date battery changed on battery."
  - (h) Adjacent to stall warning switch when 12 or 24 volt electrical system installed (S/N 1380R, 1416R thru 1440R):

- “Stall warning system is inoperative with generator and battery switches off.”
- (i) When stall warning system is installed (S/N 1380R, 1416R thru 1440R):  
 “Stall warning light -- test light daily before flight by moving lift indicator until light comes on.”
  - (j) When canopy is installed: “No smoking”
  - (k) Park brake: “On, depress pedals and pull lever. Off, depress pedals”
  - (l) When locking tail wheel is installed: “Push stick forward to unlock tail wheel.”
  - (m) Usable tank capacity (See "Fuel Capacity")
  - (r) The following placard must be displayed on the wings and adjacent to the fuel filler caps:  
 “FUEL (\*) US GAL. MIN. OCTANE 87 FUEL TANKS ARE INTERCONNECTED - ALLOW SUFFICIENT TIME FOR FUEL LEVEL TO EQUALIZE BEFORE TOP-OFF OF TANKS. NO AROMATIC FUEL.”  
 \*35 for S/N 1380R, 53 for S/N 1416R and subsequent (See NOTE 3)
  - (s) The following placard must be displayed adjacent to the oil filler cap:  
 “OIL TANK (9.2) GAL. CAP.”
  - (t) “Sulphur dusting is prohibited unless special fire prevention measures have been incorporated in the aircraft.”

**A. V Notes**

NOTE 1: Model S2R, Optional Engine Installation (Only sections different are shown.)

Engine: Wright R-1300-1B  
 Fuel: 100/130 Minimum grade aviation gasoline

Engine Limits:

<u>H.P.</u>	<u>R.P.M.</u>	<u>M.P.(In. Hg.)</u>		<u>ALT.</u>
Takeoff (1 min.)	800	2600	44.0	S.L.
Takeoff (1 min.)	800	2600	42.5	3500
Max. Continuous	700	2400	39.5	S.L.
Max. Continuous	700	2400	38.0	5000

Propeller and Propeller Limits: Hamilton Standard, constant speed, 3D40 Hub, (as modified by STC SP148NW)  
 EAC-AG100-0S blades.  
 Diameter 108 5/16 inches maximum, 106 5/16 inches minimum.  
 Pitch settings, 23° low and 38.0° high at 42 inch station.  
 Governor, Hamilton Standard 4M-12-5

or

Hamilton Standard, constant speed, 23D40 Hub, 6601A-30S blades. Diameter 108 inches maximum, 106 inches minimum.

Pitch settings, 24.5° low and 44.5° high at 42 inch station.  
Governor, Hamilton Standard 4G-10-5

C.G Range: (+22.5) to (+28.0)

Control Surface Elevator Up 27° + 1° Down 17° + 1°  
Movements Elevator Tab Up 8° + 1° Down 22° + 1°  
Rudder Left 24° + 1° Right 24° + 1°  
Aileron Up 21° + 1° Down 17° + 1°  
Flaps Down 26° - 30°

Serial Numbers Eligible: 5000R and subsequent

Engine installed per STC SA2969WE.

Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification.

In addition, the following equipment is required:

- (1) 24 volt electrical system, Rockwell Dwg. No. 90326.

Placards: Remove the following placards previously installed:  
(1) "AVOID CONTINUOUS GROUND OPERATION BETWEEN 1280 AND 1900 RPM."  
(2) If alternator was installed:  
"DO NOT TURN OFF ALTERNATOR IN FLIGHT EXCEPT IN CASE OF EMERGENCY"  
"75 AMP MAX." (on left instrument panel)  
"C/B - LAT." (on left instrument panel)  
(3) At fuel filler caps: "87 OCTANE"

Add the following placards:

- (1) Adjacent to manifold pressure gage:

<u>H.P.</u>	<u>R.P.M.</u>	<u>M.P.(In. Hg.)</u>	<u>ALT.</u>
Takeoff (1 min.)	800	2600 44.0	S.L.
Takeoff (1 min.)	800	2600 42.5	3500
Max. Continuous	700	2400 39.5	S.L.
Max. Continuous	700	2400 38.0	5000

Straight line variation between points given.

"100/130 MINIMUM GRADE AVIATION GASOLINE"

- (2) At auxiliary fuel pump/circuit breaker:  
"AUXILIARY FUEL PUMP ON/OFF"

- (3) At primer switch:  
"PRIMER ON/OFF"

- (4) At generator circuit breaker:  
"CB GEN"

(5) At fuel filler cap:  
"100/130 MINIMUM GRADE AVIATION GASOLINE"

(6) At altimeter:  
"ALTITUDE LOSS IN STALL RECOVERY - 300 FEET"

NOTE 2: Model S2R

(1) when the Fire Bomber System, Dwg. No. 80792 for S/N 1416R thru 1576R or Dwg. No. 81069 for S/N 1577R and subsequent, is installed the following airspeed limitations must be observed:

"With Fire Bomber Dump System installation and any disposal load, do not exceed 105 KIAS (120 mph)."

(2) (Agavenco Pump Only): "Do not operate pump above 100 KIAS (115 mph)"

(3) "Do not operate Micronair Units above 109 KIAS (125 mph)"

NOTE 3: Model S2R

The following table summarizes increased fuel capacity limits for the models and serial numbers listed:

Configuration*	A.	B.
S/N	2564R-4999R	2577R-4999R

\*Configuration:

A. Eligible for optional installation

-190 gallons usable, one 96 gallon tank in each wing, tanks interconnected.

B. Eligible for optional installation

-228 gallons usable, one 115 gallon tank in each wing, tanks interconnected.

NOTE 4: Model S2R

These aircraft have demonstrated satisfactory operation in the Restricted Category under the following conditions:

(a) with P & W R-1340 Engine; at 6,900 lbs., Standard Day, 400 ft. Altitude, C.G. Limits of 25.0 to 30.0 inches, Stall Speed 68 KIAS (78 mph), Maximum Speed 110 KIAS (126 mph).

(b) with Wright R-1300-1B Engine; at 7,800 lbs., Standard Day, 1700 ft. Altitude, C.G. Limits of 24.0 to 28.0 inches, Stall Speed 72 KIAS (83 mph), Maximum Speed 110 KIAS (126 mph).

While items (a) & (b) have been satisfactorily demonstrated, all parts of CAR 3 have not necessarily been complied with for restricted category operations at the increased weights. Also additional operating instructions may need to be established for individual restricted operation approvals under FAR 21.25.

NOTE 5: The serial numbers 1526 through 3002 were produced by the Ayres Corporation (originally Rockwell) at its Albany, Georgia, facility (later serial numbers not listed below were manufactured after July 2003 by Thrush Aircraft, Inc.).

NOTE 6: Model S2R. Use of the Ayres P/N 20500 and 20511 (optional) wing tip extension is limited to Restricted Category operation only.

NOTE 7: The serial numbers eligible for Ayres P/N 40220 metal tail as an optional installation if a fabric tail was originally installed by the factory\*\* are S/N S2R 1416R and up

\*\*The S2R S/N 1380R is eligible for the metal tail only.

NOTE 8: Model S2R, S/N 2584R and subsequent (Diet Thrush)

The following major components have been reduced in weight and structural strength:

ASSEMBLY	PART NUMBER
Wings	20209-600 L/R
Fuselage	10601-600
Horizontal Stabilizer	40087-100

These components are identified at the time of manufacture with the part numbers listed above. This weight and strength reduction effectively reverts these assemblies to their 1977 capabilities. Ayres Corporation will use these components only on Ayres models with a hopper capacity of 400 gallons or less and with engines that are rated at no more than 680 SHP.

## **Section B : -Model S2R-T34**

### **B.I General**

1. a) Type: S2R  
b) Variant: S2R-T34
2. Airworthiness Category: Restricted Category
3. Type Certificate Holder: Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA
4. Manufacturer: Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA
5. (reserved)
6. (reserved)
7. DGAC Spain certification Date: 12 July 1988

### **B.II Certification Basis**

1. Reference Date for determining the applicable requirements : 1 November 1965
2. (reserved)
3. (reserved)
4. Certification Basis : CAR 8 and CAR3
5. Airworthiness Requirements: CAR 8 effective October 11, 1950, restricted category  
CAR 3 effective May 15, 1956, normal category
6. Requirements Elected to Comply: None
7. EASA Special Conditions: None
8. EASA Exemptions: None
9. EASA Equivalent Safety Findings: None
10. EASA Environmental Standards: Not applicable

### **B.III Technical Characteristics and Operational Limitation**

1. Type Design Definition: Top Drawing List No30007, rev Ag-103

2. Description: single turboprop engine, one seat, steel cage construction, low wing with conventional tail and tail wheel.
3. Equipment: refer to Airplane Flight Manual
4. Dimensions: refer to Airplane Maintenance Manual
5. Engine: Engine Pratt & Whitney (United Aircraft of) Canada PT6A-34AG.  
 Optional Engines: United Aircraft of Canada PT6A-34 (See NOTE 9)  
 United Aircraft of Canada PT6A-36 (Dry Configuration Only)  
 United Aircraft of Canada PT6A-41, PT6A-41AG, and PT6A-42 (See NOTE 10)
- 5.1 Firmware: Not applicable
- 5.2 Mapping: Not applicable
- 5.3 Engine Limits:

<u>Takeoff and Max. Cont.</u>	<u>Start/Accel.</u>	<u>Transient Reverse</u>		<u>Idle</u>
SHP			750	
Torque (PSI)	64.5		68.4 Trans (2 sec.)	64.5
ITT (oC)	790		1090 Start (2 sec.)	790
Ng (%)	101.5		102.6 Trans (2 sec.)	101.5
Np (RPM)	2200		2420 Trans (2 sec.)	2100
Oil Press (PSIG)	85 to 100	85 to 100	85 to 100	40 min.
Oil Temp (oC)	10 to 99	-40 minimum	0 to 99	-40 to 99

The ratings shown are based on the static sea level standard condition with no external accessory loads and no air bleed.

7. Propeller and Propeller Limits: Hartzell Hub Model HC-B3TN-3C (or HC-B3TN-3D) with Blade Model T-10282, Diameter 102.5 inches maximum, 92.5 inches minimum or optional Blade Model T-10282(N)+4, Diameter 106 inches maximum, 98 inches minimum. (See NOTE 11)
8. Fluids:
- 8.1 Fuel: Fuel Jet A, Jet B, JP-4, JP-5, Automotive Diesel Number 1D or 2D in accordance with ACL Service Bulletin Number 1344. (If jet fuel is not available, aviation gasoline, MIL-G-5572, all grades, may be used for a maximum of 150 hours between overhauls.) Automotive diesel fuel is approved only for agricultural application flights and only when the free air temperature is above:  
 +20oF for Grade No. 1D  
 +40oF for Grade No. 2D
- 8.2 Oil: Engine UACL PT6 Engine Service Bulletin Number 1001 lists approved brands of oil.

9. Fluid capacities:  
9.1 Fuel Capacity: 104 gallons usable, one 53 gallon tank in each wing, tanks interconnected.  
(See NOTE 12)  
9.2 Oil Tank Capacity: 11 quarts - usable oil tank capacity 6 quarts.
10. Air speeds:  
Never Exceed Speed  $V_{NE}$  138 KIAS (159 m.p.h.)  
Maximum Structural Cruising Speed  $V_{NO}$  109 KIAS (126 m.p.h.)  
Operating Maneuvering Speed  $V_o$  109 KIAS (126 m.p.h.)  
Maximum Flap Extension Speed  $V_{FE}$  107 KIAS (123 m.p.h.)
11. Maximum Operating Altitude: 12,000 feet
12. Operating Capability: VFR Day
13. Maximum Mass: 6,000 lbs  
(See NOTE 13)
14. Centre of Gravity Range:  
(see NOTE 14)  
Forward limit at 6,000 lbs., +26.5 inches aft of datum.  
Forward limit at 4,000 lbs., and below +24.0 inches aft of datum.  
(Straight line variation in the forward limit between 4,000 and 6,000 lbs.)  
Aft limit +30.0 inches aft of datum.
15. Datum: leading edge of the wing.
16. Weight and Balance  
Current weight and balance report including list of equipment included in certificated empty weight, and loading instructions when necessary, must be provided for each aircraft at the time of original certification. The empty weight and corresponding center of gravity location must include the following unusable fuel:  
Model S2R-T34, all serial numbers 18 lbs. at (+38.5)
17. Leveling Means:  
spirit level: left hand longeron under cockpit  
Optical level: 'vee' groove on bottom of rear cockpit longeron
18. Number of Seats: 1 (+89) (see NOTE 14).
19. Maximum Passenger Seating Capacity: None (see NOTE 14)
20. Baggage / Cargo  
Maximum Cargo Load: See weight and balance data.  
Maximum baggage compartment: 60 lbs. (+112). (See NOTE 14).  
Maximum hopper load: 3336 lbs. (+29.9). (See NOTE 14).
21. Wheels and Tires:  
Main Wheel Tire Size : 29x11-1  
Tail Wheel Tire Size : 5.000-5
22. Control Surface Movements:  
Elevator Up  $27^\circ \pm 1^\circ$  Down  $17^\circ \pm 1^\circ$

Elevator Tab	Up $13^{\circ} \pm 1^{\circ}$	Down $18^{\circ} \pm 1^{\circ}$
Rudder	Left $24^{\circ} \pm 1^{\circ}$	Right $24^{\circ} \pm 1^{\circ}$
Aileron	Up $21^{\circ} \pm 1^{\circ}$	Down $17^{\circ} \pm 1^{\circ}$
Flaps		Down $15^{\circ} \pm 1^{\circ}$

23. Serial Numbers Eligible: (see NOTE 14) 6000 - 6049  
T34-001 and subsequent

24. Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification. This equipment must include Ayres Corporation Airplane Flight Manual approved June 23, 1978, and Supplement for Restricted Category Operation approved June 23, 1978, or later approved versions.

26. Agricultural Dispersal Equipment Any one of the following agricultural dispersal systems may be installed on Models S2R-T34

- (a) Micron air Spray System, Aero Commander Dwg. No. 80870.
- (b) Boom master Installation, Aero Commander Dwg. No. 80931.
- (c) Standard Spray System, Rockwell Dwg. No. 81071.
- (d) Spreader and Spreader Quick-Disconnect Installation, Rockwell Dwg. No. 80975.
- (e) Spray System Installation, Rockwell Dwg. No. 80854.
- (f) Fire Bomber System Installation, Rockwell Dwg. No. 81069.
- (g) Spreader and Calibration Installation, Aero Commander Dwg. No. 80674.

CAUTION: For operation with the Micronair Spray Equipment System or the Fire Bomber System, or with any system when an Agavenco pump is installed, the following placards for airspeed limitations are applicable:

- “With Fire Bomber Dump System installation and any disposal load, do not exceed 105 KIAS (120 mph CAS).”
- “Do not operate Micronair Units above 109 KIAS (125 mph CAS).”
- “Do not operate pump above 100 KIAS (115 mph CAS)”

#### **B.IV Operating and Service Instructions**

1. AMM Part No T15/T34-2 of October 25, 1990; last issue of July 24, 1991
2. AFM (FAA approved) of February 20, 1979; last issue of May 5, 1999

3. The following information on placards pertaining to flight and operating instructions and limitations must be displayed in full view of the pilot:
- (a) "Restricted"
  - (b) "This airplane must be operated as a restricted category airplane in accordance with the operating limitations stated in the form of placards and the Airplane Flight Manual."
  - (c) "No acrobatic maneuvers including spins approved."
  - (d) When canopy is installed: "No smoking"
  - (e) Park brake: "On, depress pedals and pull lever. Off, depress pedals"
  - (f) When locking tail wheel is installed: "Push stick forward to unlock tail wheel."
  - (g) Usable tank capacity (See "Fuel Capacity")
  - (h) The following placard must be displayed on the wings and adjacent to the fuel filler caps:  
"FUEL (\*) US GAL. MIN. OCTANE 87 FUEL TANKS ARE INTERCONNECTED - ALLOW SUFFICIENT TIME FOR FUEL LEVEL TO EQUALIZE BEFORE TOP-OFF OF TANKS. NO AROMATIC FUEL."
  - (i) The following placard must be displayed adjacent to the oil filler cap:  
"OIL TANK (9.2) GAL. CAP."
  - (j) "Sulphur dusting is prohibited unless special fire prevention measures have been incorporated in the aircraft."

#### **B. V Notes**

NOTE 9: The Pratt & Whitney (United Aircraft of) Canada PT6A-34 engine is approved as an optional engine on Model S2R-T34, S/N T34-084 and up, when installed in accordance with Ayres Dwg. 19870 with the following additions:

- A. Bleed Air Case Assy. P/N 3029769; Ref. Pratt & Whitney Service Bulletins 1278 & 1279.
- B. P-3 Air Filter Installation, Ref. Pratt & Whitney Service Bulletins 1253 & 3106.
- C. Replacement of Compressor Delivery Heated Air Tube by a non-metallic hose, P/N 3026687; Ref. Pratt & Whitney Service Bulletin 1315.

Due to the anticipated operating environment, servicing and overhaul interval shall be in accordance with Pratt & Whitney's recommendations for the PT6A-34AG engine.

NOTE 10: Models S2R-T34 and S2RHG-T34, Optional Engine Installation  
(Only sections different from Section B.III are shown)

- Engine      Pratt & Whitney (United Aircraft of) Canada PT6A-41AG, PT6A-41, or PT6A-42  
 Due to the anticipated operating environment, servicing and overhaul interval shall be in accordance with Pratt & Whitney's recommendations for the PT6A-41AG engine for the PT6A-41, PT6A-41AG, and PT6A-42 engines.
- Fuel            PT6A-41AG same requirements as Section B.III.  
 PT6A-41 and PT6A-42 same requirements as Section B.III except use of Automotive Diesel Number 1D and 2D is prohibited.

Engine Limits for PT6A-41AG, PT6A-41, and PT6A-42:

	Takeoff and Max. Cont.	Transient Start/Accel.	Reverse	Idle
SHP	750		750	
Torque (PSI)	64.5	68.4 Trans	64.5	
ITT (°C)	750	850	750	660
Ng (%)	101.5	102.6	101.5	
Np (RPM)	2000	2200	2000	
Oil Press (PSIG)	105 to 135		105 to 135	60 min.
Oil Temp (oC)	10 to 99	0 to 99.	0 to 99	-40 to 99

Number of Seats      1 (+89) for S/N's without DC suffix; 1 (+89) and 1 (+127) for S/N's with DC suffix.

Serial Numbers Eligible 6000-6049, T41-089 and up, T42-089 and up, T41HG-101 and up, T42HG-101 and up

Placards            Located adjacent to the torque meter:  
 "Maximum Torque is 64.5 PSI at 2000 RPM"

NOTE 11:            Propeller Pitch Limits  
 Hartzell HC-B3TN-3C and -3D with T10282N+4 blades at 30 inch station:  
                          Reverse -8.0°±0.5°, Low 18.0°±0.1°, Feather 87.0°±1.0°  
 Hartzell HC-B3TN-3C with T10282N blades at 30 inch station:  
                          Reverse -11.0°±1.0°, Low 16.0°±0.1°, Feather 89.0°±1.0°

NOTE 12: Model S2R-T34

The following table summarizes increased fuel capacity limits for the models and serial numbers listed:

Configuration* S/N	A. T34-034 and up	B. T34-080 and up
-----------------------	----------------------	----------------------

\*Configuration:

A. Eligible for optional installation  
 -190 gallons usable, one 96 gallon tank in each wing, tanks interconnected.

B. Eligible for optional installation  
 -228 gallons usable, one 115 gallon tank in each wing, tanks interconnected.

NOTE 13:            This aircraft have demonstrated satisfactory operation in the Restricted Category under the following conditions:  
 Model S2R-T34 at 8,500 lbs., 2500 Altitude, Outside Air Temperature 7°C (45 °F), C.G. Limits of 30.0 inches, Stall Speed 68 KIAS (78 mph CAS) with 15° Flaps, Maximum Speed 110 KIAS (126 mph CAS).

NOTE 14:            For Model S2R-T34 with the serial number suffixed with "DC" (Dual Cockpit), the following data apply. All other data listed for these models remain unchanged.

Model S2R-T34 Dual Cockpit, 2PCLM  
C.G. Range

(+22.5) to (+27.5) without P/N 19661-1 (elevator down spring) installed.  
(+22.5) to (+30.0) with P/N 19661-1 (elevator down spring) installed.

Number of Seats

1 (+89), 1 (+127 Forward Facing) or (+111 Aft Facing)

Maximum Cargo Load

Passenger/Cargo compartment, 200 lbs. (+120).

Maximum hopper load, 3336 lbs. (+29.9).

S2R-T34 S/N T34-082 and up are eligible for increased hopper load limits - Restricted Category operation only. The certificated maximum take-off gross weight of 6000 pounds applies to these models and serial numbers.

Control Surface Movements

Elevator Tab 8o + 1o up; 22o + 1o down

Serial Numbers Eligible

T34-033DC and subsequent.

Required Equipment

This equipment must include Airplane Flight Manual and Supplement for Restricted Category Operation, dated August 25, 1980, or later approved versions.

NOTE 15:            External pitot type engine air inlet, P/N's 21900-1 and 21900-21, or screened fairing panel, P/N 21922, are approved optional equipment on S2R-T34 S/N T34-150 and up

NOTE 16:            Lower Spar Caps, P/N's 22507T001 and 22507T002, are life limited and must be replaced at 29,000 hours time in service. These P/N's are installed as original equipment on the serial numbers T34/41-271 and up.

### **Section C:-Model S2R-T15**

#### **C.I General**

1. a) Type S2R  
b) Variant S2R-T15
2. Airworthiness Category Restricted Category
3. Type Certificate Holder: Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA
4. Manufacturer: Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA
5. (reserved)
6. (reserved)
7. DGAC Spain certification Date: 12 July 1988

#### **C.II Certification Basis**

1. Reference Date for determining the applicable requirements : 1 November 1965
2. (reserved)
3. (reserved)
4. Certification Basis: CAR 8 and CAR3
5. Airworthiness Requirements: CAR 8 effective October 11, 1950, restricted category  
CAR 3 effective May 15, 1956, normal category
6. Requirements Elected to Comply: None
7. EASA Special Conditions: None
8. EASA Exemptions: None
9. EASA Equivalent Safety Findings: None
10. EASA Environmental Standards: Not applicable

#### **C.III Technical Characteristics and Operational Limitation**

1. Type Design Definition: Top Drawing List No30007, rev Ag-103

- 2. Description: single turboprop engine, one seat, steel cage construction, low wing with conventional tail and tail wheel.
- 3. Equipment: refer to Airplane Flight Manual
- 4. Dimensions: refer to Airplane Maintenance Manual
- 5. Engine: United Aircraft of Canada PT6A-15AG or PT6A-27

Due to anticipated operating environment, servicing and overhaul interval for both the PT6A-15AG and PT6A-27 engines shall be in accordance with Pratt & Whitney's recommendations for the PT6A-15AG engine.

- 5.1 Firmware: Not applicable
- 5.2 Mapping: Not applicable
- 5.3 Engine Limits:

	Takeoff and	Transient		
	Max. Cont.	Start/Accel.	Reverse	Idle
SHP	680			
Torque (PSI)	53.0	68.8 Trans (2 sec.)	53.0	
ITT (oC)	725	1090 Start (2 sec.)	725	
Ng (%)	101.5	102.7 Trans (10 sec.)	101.5	
Np (RPM)	2200	2420 Trans (10 sec.)	2100	
Oil Press (PSIG)	80 to 100	80 to 100	80 to 100	40 min.
Oil Temp (oC)	10 to 99	-40 minimum	0 to 99	-40 to 99

The ratings shown are based on the static sea level standard condition with no external accessory loads and no air bleed

- 7. Propeller and Propeller Limits: Hartzell Hub Model HC-B3TN-3C (or HC-B3TN-3D) with Blade Model T-10282, Diameter 102.5 inches maximum, 92.5 inches minimum or optional Blade Model T-10282(N)+4, Diameter 106 inches maximum, 98 inches minimum. (See NOTE 17)
- 8. Fluids:
  - 8.1 Fuel: Jet A, Jet B, JP-4, JP-5, Automotive Diesel Number 1D or 2D in accordance with UACL Service Bulletin Number 1344. (If jet fuel is not available, aviation gasoline, MIL-G-5572, all grades, may be used for a maximum of 150 hours between overhauls.) Automotive diesel fuel is approved only for agricultural application flights and only when the free air temperature is above: +20°F for Grade No. 1D +40oF for Grade No. 2D
  - 8.2 Oil: Engine: Oil UACL PT6 Engine Service Bulletin Number 1001 lists approved brands of oil.
- 9. Fluid capacities:
  - 9.1 Fuel Capacity: 104 gallons usable, one 53 gallon tank in each wing, tanks interconnected. See NOTE 18.
  - 9.2 Oil Tank Capacity: 11 quarts - usable oil tank capacity 6 quarts.
- 10. Airspeed Limits (CAS):
  - Never Exceed Speed  $V_{NE}$  138 KIAS (159 m.p.h.)

Maximum Structural Cruising Speed  $V_{NO}$  109 KIAS (126 m.p.h.)  
 Operating Maneuvering Speed  $V_o$  109 KIAS (126 m.p.h.)  
 Maximum Flap Extension Speed  $V_{FE}$  107 KIAS (123 m.p.h.)

11. Maximum Operating Altitude                      12,000 feet
12. Operating Capability:                              VFR
13. Maximum Masss:                                    6,000 lbs
14. Center of Gravity Range: (see NOTE 19) Forward limit at 6,000 lbs., +26.5 inches aft of datum.  
 Forward limit at 4,000 lbs. and below, +24.0 inches aft of datum.  
 (Straight line variation in the forward limit between 4,000 and 6,000 lbs.)  
 Aft limit +30.0 inches aft of datum.
15. Datum:    leading edge of the wing.
16. Weight and Balance                              Current weight and balance report including list of equipment included in certificated empty weight, and loading instructions when necessary, must be provided for each aircraft at the time of original certification. The empty weight and corresponding center of gravity location must include the following unusable fuel:  
 Models S2R-T15: 18 lbs. at (+38.5)
17. Leveling Means:                                    spirit level : left hand longeron under cockpit  
 optical level : 'vee' groove on bottom of rear cockpit longeron
18. Number of Seats:                                    1 (+89 ins)  
 (see Note 19)
19. Maximum Passenger Seating Capacity: 1 (+89) (see NOTE19)
20. (reserved)
21. Baggage / Cargo:  
 Maximum Cargo Load:                              See weight and balance data.  
 Maximum baggage compartment:                    60 lbs. (+112). (See NOTE 19).  
 Maximum hopper load:                                3336 lbs. (+29.9). (See NOTE 19).
22. Wheels and Tires:  
 Main Wheel Tire Size : 29x11-10  
 Tail Wheel Tire Size : 5.000-5
23. Control Surface:  
 Elevator Up 27° + 1° Down 17° + 1°  
 Movements Elevator Tab Up 13° + 1° Down 18° + 1°  
 Rudder Left 24° + 1° Right 24° + 1°  
 Aileron Up 21° + 1° Down 17° + 1°  
 Flaps Down 15°+ 1°
24. Serial Numbers Eligible                              T15-001 and subsequent (see Note 19)

25.Required Equipment: The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification. This equipment must include Ayres Corporation Airplane Flight Manual approved April 3, 1979, and Supplement for Restricted Category Operation approved April 3, 1979, or later approved versions.

26.Agricultural Dispersal Equipment: Any one of the following agricultural dispersal systems may be installed on Models S2R-T15:

(a) Micron air Spray System, Aero Commander Dwg. No. 80870.

(b) Boom master Installation, Aero Commander Dwg. No. 80931.

(c) Standard Spray System, Rockwell Dwg. No. 81071.

(d) Spreader and Spreader Quick-Disconnect Installation, Rockwell Dwg. No. 80975.

(e) Spray System Installation, Rockwell Dwg. No. 80854.

(f) Fire Bomber System Installation, Rockwell Dwg. No. 81069.

(g) Spreader and Calibration Installation, Aero Commander Dwg. No. 80674.

CAUTION: For operation with the Micronair Spray Equipment System or the Fire Bomber System, or with any system when an Agavenco pump is installed, the following placards for airspeed limitations are applicable:

“With Fire Bomber Dump System installation and any disposal load, do not exceed 105 KIAS (120 mph CAS).”

“Do not operate Micronair Units above 109 KIAS (125 mph CAS).”

“Do not operate pump above 100 KIAS (115 mph CAS)”

#### **C.IV Operating and Service Instructions**

1. AMM Part No T15/T34-2 of October 25, 1990; last issue of July 24, 1991
2. AFM (FAA approved) of April 3, 1979; last issue of June 21, 1996
3. The following information on placards pertaining to flight and operating instructions and limitations must be displayed in full view of the pilot:

(a) “Restricted”

(b) “This airplane must be operated as a restricted category airplane in accordance with the operating limitations stated in the form of placards and the Airplane Flight Manual.”

- (c) "No acrobatic maneuvers including spins approved."
- (d) When canopy is installed: "No smoking"
- (e) Park brake: "On, depress pedals and pull lever. Off, depress pedals"
- (f) When locking tail wheel is installed: "Push stick forward to unlock tail wheel."
- (g) Usable tank capacity (See "Fuel Capacity")
- (h) The following placard must be displayed on the wings and adjacent to the fuel filler caps:  

"FUEL (\*) US GAL. MIN. OCTANE 87 FUEL TANKS  
ARE INTERCONNECTED - ALLOW SUFFICIENT TIME  
FOR FUEL LEVEL TO EQUALIZE BEFORE TOP-OFF  
OF TANKS. NO AROMATIC FUEL."
- (i) The following placard must be displayed adjacent to the oil filler cap:  
"OIL TANK (\*) GAL. CAP."
- (j) "Sulphur dusting is prohibited unless special fire prevention measures have been incorporated in the aircraft."

Also see the FAA approved Airplane Flight Manual for required placards.

### C.V Notes

NOTE 17: Propeller Pitch Limits  
Hartzell HC-B3TN-3C and -3D with T10282N+4 blades at 30 inch station:  
Reverse  $-8.0^{\circ} \pm 0.5^{\circ}$ , Low  $18.0^{\circ} \pm 0.1^{\circ}$ , Feather  $87.0^{\circ} \pm 1.0^{\circ}$   
Hartzell HC-B3TN-3C with T10282N blades at 30 inch station:  
Reverse  $-11.0^{\circ} \pm 1.0^{\circ}$ , Low  $16.0^{\circ} \pm 0.1^{\circ}$ , Feather  $89.0^{\circ} \pm 1.0^{\circ}$

NOTE 18: Model S2R-T15

The following table summarizes increased fuel capacity limits for the models and serial numbers listed:

Configuration*	A.	B.
S/N	T15-010 and up	T15-021 and up

\*Configuration:

A. Eligible for optional installation

-190 gallons usable, one 96 gallon tank in each wing, tanks interconnected.

B. Eligible for optional installation

-228 gallons usable, one 115 gallon tank in each wing, tanks interconnected.

NOTE 19: For Models with the serial number suffixed with "DC" (Dual Cockpit), the following data apply. All other data listed for these models remain unchanged.

Model S2R-T15 Dual Cockpit, 2PCLM

Data Sheet No. : (IM).A.040                      Thrush S2R series  
Issue : 3    Date : 1<sup>st</sup> **September 2009**

C.G. Range

(+22.5) to (+27.5) without P/N 19661-1 (elevator down spring) installed.  
(+22.5) to (+30.0) with P/N 19661-1 (elevator down spring) installed.

Number of Seats

1 (+89), 1 (+127 Forward Facing) or (+111 Aft Facing)

Maximum Cargo Load

Passenger/Cargo compartment, 200 lbs. (+120).  
Maximum hopper load, 3336 lbs. (+29.9).  
S2R-T15 S/N T15-020 and up are eligible for increased hopper load limits - Restricted Category operation only. The certificated maximum take-off gross weight of 6000 pounds applies to these models and serial numbers.

Control Surface Movements

Elevator Tab 8o + 1o up; 22o + 1o down

Serial Numbers Eligible

T15-010DC and subsequent

Required Equipment

This equipment must include Airplane Flight Manual and Supplement for Restricted Category Operation, dated October 7, 1980, or later approved versions.

## **Section D : Model S2RHG-T65**

### **D.I General**

- |                                  |  |
|----------------------------------|--|
| 1. a) Type                       | S2R  |
| b) Variant                       | S2RHG-T65  |
| 2. Airworthiness Category        | Restricted Category  |
| 3. Type Certificate Holder       | Thrush Aircraft, Inc.<br>300 Old Pretoria Road<br>P.O. Box 3149<br>Albany, Georgia 31706-3149<br>USA |
| 4. Manufacturer:                 | Thrush Aircraft, Inc.<br>300 Old Pretoria Road<br>P.O. Box 3149<br>Albany, Georgia 31706-3149<br>USA |
| 5. (reserved)                    |  |
| 6. (reserved)                    |  |
| 7. EASA Type Certification Date: | 31 May 2006  |

### **D.II Certification Basis**

- |  |  |
|--|--|
| 1. Reference Date for determining the applicable requirements: | 16 <sup>th</sup> March 2006  |
| 2. (reserved)  |  |
| 3. (reserved)  |  |
| 4. Certification Basis:  |  |
| a) FAR 21.25   |  |
| b) CAR 3   |  |
| c) FAR 23  |  |
| 5. Airworthiness Requirements:                                 | <ul style="list-style-type: none"><li>- FAR 21.25</li><li>- CAR 3, effective May 15, 1956, including Amendments 3-1 through 3-8 as modified by CAR 8.10(a)(1) effective October 11, 1950.</li><li>- FAR 23, effective February 1, 1965, Amendments 23-1 through 23.34, only applicable to Subpart C, excluding 23.571 and 23.572.</li><li>- FAR Part 23, effective February 1, 1965, including Amendments 23-1 through 23-16 only as applicable to turboprop engine installations and listed by FAR section below. :<br/>23.49(e) (2) (-21)    23.959(-7)    23.1143(-7)</li></ul> |

23.65(c) (-21)	23.977(-17)	23.1145(-18)
23.75(b) (7)	23.991(-7)	23.1155(-7)
23.77(b) (-21)	23.997(-15)	23.1165(0)
23.173(-14)	23.1013(-15)	23.1183(-15)
23.175(-14)	23.1015(-15)	23.1303(0)
23.177(0)	23.1019(-15)	23.1305(-15)
23.371(-7)	23.1027(-14)	23.1323(-7)
23.629(e) (-31)	23.1041(-7)	23.1337(-7)
23.831(0)	23.1043(-7)	23.1353(-20)
23.901(-7)	23.1045(-7)	23.1521(0)
23.903(-14)	23.1091(-7)	23.1527(-7)
23.905(0)	23.1093(-15)	23.1529(-8)
23.929(-14)	23.1103(-7)	23.1545(-7)
23.933(-7)	23.1105(0)	23.1549(-17)
23.937(-7)	23.1111(-7)	23.1557(-14)
23.951(-15)	23.1121(-7)	23.1583(-10)
23.955(-7)	23.1141(-14)	23.1587(a)(-7)

- Exemption No. 4898 (CAR 3.83 - 70 mph stall speed) issued January 21, 1988. For S/N T65HG-013DC and up, compliance with FAA Policy Memorandum dated December 1, 1997, Section 23.49, has been shown (61 knot stall speed met with hopper empty), in lieu of previously required Exemption No. 4898.
- Equivalent Safety Finding to FAR 23.473(b), dated March 15, 1988 for 7,600 pound landing weight.
- The intent of FAR 25.305(c) regarding the dynamic response of the engine mount structure.

- |                                    |   |
|------------------------------------|---|
| 6. Requirements Elected to Comply: | None  |
| 7. EASA Special Conditions:        | None  |
| 8. EASA Exemptions:                | Exemption No. 4898 (CAR 3.83 - 70 mph stall speed) issued January 21, 1988. For S/N T65HG-013DC and up, compliance with FAA Policy Memorandum dated December 1, 1997, Section 23.49, has been shown (61 knot stall speed met with hopper empty), in lieu of previously required Exemption No. 4898. |
| 9. EASA Equivalent Safety Findings | Equivalent Safety Finding to FAR 23.473(b), dated March 15, 1988 for 7,600 pound landing weight.  |
| 10. EASA Environmental Standards:  | Not applicable  |

**D.III Technical Characteristics and Operational Limitation**

- |                            |  |
|----------------------------|--|
| 1. Type Design Definition: | Top Drawing List 94380 Rev. D4,<br>30007 AJ108   |
| 2. Description:            | single turboprop engine, two seat, steel cage construction, down wing with conventional tail and tail wheel. |

- 3. Equipment: refer to Airplane Flight Manual
- 4. Dimensions: refer to Airplane Maintenance Manual
- 5. Engine: Pratt & Whitney Canada PT6A-65AG  
 Optional Engine:  
 Pratt & Whitney Canada PT6A-60AG eligible on S/N T65HG-013DC and up
- 5.1 Firmware: Not applicable
- 5.2 Mapping: Not applicable
- 5.3 Engine Limits:

a) <u>PT6A-65AG</u>	Takeoff and <u>Max. Cont.</u>	Transient <u>Start/Accel.</u>	<u>Idle</u>
SHP	1230		
Torque (PSI) (2 sec.)	45.4	61.0 Trans	
ITT (oC)	810	1000 Start (5 sec.)	715
Ng (%)	104		58
Np (RPM)	1700	1870 Trans (5 sec.)	
Oil Press (PSIG)	90 to 135		60 min.
Oil Temp (oC)	0 to 110	0 to 110	-40 to 110

b) PT6A-60AG:

	<u>Takeoff</u>	<u>Max. Cont.</u>	<u>Transient*</u>		<u>Reverse</u>	<u>Idle</u>
			<u>Start</u>	<u>Accel.</u>		
SHP	1050	1020			900	
Torque (PSI)**	38.8	37.7				
ITT (oC)	820	775	1000	850	760	750
Ng (%)	104	104		104		58
Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	90 to 135	60 Minimum
Oil Temp (oC)	10 to 110	0 to 110	-40 Min.	0 to 110	0 to 104	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.

\*\*The Torque pressure limits listed are for NP=1700 RPM only.

7. Propeller and Propeller Limits:

Hartzell HC-B5MP-3C propeller, constant speed, feathering and reversing; Hub Model HC-B5MP-3C; Blade Model M10876AS or M10876ANS. Diameter 111.0 inches maximum, 110.7 inches minimum. Pitch (42 in. Sta.) 11.5° ±0.5° low, 79.0° ±0.5° feather, -11.0° ±0.5° reverse

8. Fluids:

8.1 Fuel:

Jet A, Jet B, JP-4, JP-5, in accordance with UACL Service Bulletin Number 1344. (If jet fuel is not available,

- aviation gasoline, MIL-G-5572, all grades, may be used for a maximum of 150 hours between overhauls.)
- 8.2 Oil Engine UACL PT6 Engine Service Bulletin Number 1001 lists approved brands of oil.
9. Fluid capacities:
- 9.1 Fuel: 228 gallon usable, one 115 gallon tank in each wing, tanks interconnected. See NOTE 1 for data on unusable fuel.
- 9.2 Oil 11 quarts - usable oil tank capacity 6 quarts.
10. Air Speeds Limits (CAS):  
Never Exceeds Speed Vne 220 m.p.h. (191 knots)  
Maximum Structural Cruising Speed Vno 187 m.p.h. (163 knots)  
Operating Maneuvering Speed Vo 167 m.p.h. (145 knots)  
Maximum Flap Extension Speed Vfe 157 m.p.h. (137 knots)
11. Maximum Operating Altitude 12,000 feet
12. Operating Capability: VFR
13. Maximum Mass:  
Maximum Takeoff Weight: 10,500 lbs.  
Maximum Landing Weight: 8,800 lbs for T65HG-011, -012, -014 & -016  
10,500 lbs for T65HG-013DC, 018G, -017DC & subsequent.  
Maximum Weight: 5,000 lbs.
14. Center of Gravity Range: Range Forward Limit 7600 pounds and below is +22.5 inches aft of datum Forward limit at 10500 pounds is 26 inches aft of datum with straight line variation to 7600 pounds at 22.5 inches.  
Aft Limit at all weights is +29.0 inches aft of datum.  
Datum is the leading edge of the wing.
15. Datum: leading edge of the wing.
16. (Reserved)
17. Leveling Means: spirit level: left hand longeron under cockpit  
optical level: 'vee' groove on bottom of rear cockpit longeron
18. Number of Seats: 1 (+89)  
1 (+127)
19. Maximum Passenger Seating Capacity:
20. (Reserved)
21. Baggage / Cargo:  
Maximum Cargo Load: See weight and balance data.  
Maximum baggage compartment load: 200 lbs. (+112).

Maximum hopper load: 5,500 lbs. (+20.6).

22. Wheels and Tires:

Main Wheel Tire Size : 29x11-10  
Tail Wheel Tire Size : 6.000-6

23. Control Surface:

Elevator	Up $27^{\circ} \pm 1^{\circ}$	Down $17^{\circ} \pm 1^{\circ}$
Elevator Tab	Up $8^{\circ} \pm 1^{\circ}$	Down $22^{\circ} \pm 1^{\circ}$
Rudder	Left $24^{\circ} \pm 1^{\circ}$	Right $24^{\circ} \pm 1^{\circ}$
Aileron	Up $21^{\circ} \pm 1^{\circ}$	Down $17^{\circ} \pm 1^{\circ}$
Flaps		Down $15^{\circ} \pm 1^{\circ}$

24. Serial Numbers Eligible

T65-002DC thru T65-012DC, and T65HG-013DC and subsequent.  
For T65HG-011 and subsequent, see note 18

25. Required Equipment

The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification. This equipment must include for s/n T65-002DC thru T65-012DC Ayres Corporation Airplane Flight Manual approved June 8, 1988, and Supplement for Restricted Category Operation approved June 8, 1988, or for s/n T65HG-013DC and subsequent, Thrush Airplane Flight Manual approved October 28, 2005, or later approved versions.

26. Agricultural Dispersal Equipment:

Equipment eligible on S/N T65-002DC thru T65-012DC:  
High Volume Dispersal System, Ayres Dwg. No. 21563.  
See NOTE 17 for additional optional equipment.  
CAUTION: For operation with the Micronair Spray System or the Fire Bomber System, or with any system when an Agavenco pump is installed, the placards for airspeed limitations referred to in NOTE 2(q), 2(o), or 2(p), respectively, for the S2R are applicable.  
Equipment eligible on S/N T65HG-013DC and up:  
Standard Spray System, Thrush Dwg. No. 81071.

27. Structural Limitations:

Lower Spar Caps, P/N's 22507T001 and 22507T002, are life limited and must be replaced at 29,000 hours time in service. These P/N's are installed as original equipment on the following serial numbers:

T34/41-271 and up	G6-156 and up
T15/27-041 and up	G10-166 and up
T11-006 and up	G5-106 and up
T65-019 and up	G1-116 and up
T65HG-011 and up	T34HG-103 and up
T45-016 and up	

**D.IV Operating and Service Instructions**

AMM Manual Number T65HG-2 of May 5, 2004; last issue September 16, 2005  
AFM (FAA Approved) of October 28, 2005

Data Sheet No. : (IM).A.040  
Issue : 3 Date : 1<sup>st</sup> **September 2009**

Thrush S2R series

**D.V Notes**

**Section E: Model S2R-T660**

**E.I General**

1. a) Type S2R  
b) Variant S2R-T660
2. Airworthiness Category Restricted Category
3. Type Certificate Holder: Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA
4. Manufacturer: Thrush Aircraft, Inc.  
300 Old Pretoria Road  
P.O. Box 3149  
Albany, Georgia 31706-3149  
USA
5. (reserved)
6. (reserved)
7. EASA Type Certification Date: 19 August 2005

**E.II Certification Basis**

1. Reference Date for determining the applicable requirements : 16 December 2004
2. (reserved)
3. (reserved)
4. Certification Basis :
  - a) 14 CFR Part 21.25
  - b) 14 CFR Part 23
5. Airworthiness Requirements: 14CFR Part 23 -  
Subpart A, Amendment 23-53;  
Subpart B, Amendment 23-53;  
Subpart C, Amendment 23-53 except §§23.423, 23.425, 23.427, 23.441, 23.443, and 23.455 at Amendment 23-34;  
Subpart D, Amendment 23-53 except §23.607 at Amendment 23-34, §23.629 at Amendment 23-31, and §§23.785, 23.787, 23.807, 23.853, 23.863, 23.865 and 23.867 at Amendment 23-14;  
Subpart E, Amendment 23-14;  
Subpart F, Amendment 23-0;  
Subpart G, Amendment 23-53;  
except those regulations found inappropriate for restricted category agricultural airplanes as listed in FAA Advisory

Circular 21.25-1, dated December 1, 1997, and compliance with regulations listed in ACE-110 policy memorandum, dated December 1, 1997, demonstrated in accordance with that memorandum.

- 6. Requirements Elected to Comply: None
- 7. EASA Special Conditions: None
- 8. EASA Exemptions: None
- 9. EASA Equivalent Safety Findings: None
- 10. EASA Environmental Standards: Not applicable

**E.III Technical Characteristics and Operational Limitation**

- 1. Type Design Definition: Top Drawing List No95000, rev A-7
- 2. Description: single turboprop engine, one seat, steel cage construction, down wing with conventional tail and tail wheel.
- 3. Equipment: refer to Airplane Flight Manual
- 4. Dimensions: refer to Airplane Maintenance Manual
- 5. Engine: Pratt & Whitney Canada PT6A-60AG  
 Optional Engines:  
 Pratt & Whitney Canada PT6A-65AG, -65AR, -65B (-65AR must have automatic power reserve feature disabled)  
 Pratt & Whitney Canada PT6A-45A, -45B, -45R eligible on S/N T660-108 and up  
 Pratt & Whitney Canada PT6A-67AG eligible on S/N T660-109 and up
- 5.1 Firmware: Not applicable
- 5.2 Mapping: Not applicable
- 5.3 Engine Limits:
- a) PT6A-60AG:

	<u>Max.</u>		<u>Transient*</u>			
	<u>Takeoff</u>	<u>Cont.</u>	<u>Start</u>	<u>Accel</u>	<u>Reverse</u>	<u>Idle</u>
SHP	1050	1020			900	
Torque(PSI)**	38.8	37.7		61		
ITT(oC)	820	775	1000	850	760	750***
Ng (%)	104	104	104	104		58

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Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	90 to 135	60 Minimum
Oil Temp (°C)	0 to 110	0 to 110	0 to 110	0 to 110	0 to 99	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.  
 \*\*The Torque pressure limits listed are for NP=1700 RPM only.

b) PT6A-45A/-45B/-45R:

	<u>Transient*</u>					
	<u>Takeoff</u>	<u>Max.Cont.</u>	<u>Start</u>	<u>Accel.</u>	<u>Reverse</u>	<u>Idle</u>
SHP	1050	1020			900	
Torque (PSI)**	38.8	37.7				
ITT (°C)	800	800	1000	850	800	750
Ng (%)	104	104		104		56
Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	100 to 135	60 min.
Oil Temp (°C)	0 to 110	0 to 110	-40 min.	99 to 110	0 to 99	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.  
 \*\*The Torque pressure limits listed are for NP=1700 RPM only.

c) PT6A-67AG:

	<u>Transient*</u>					
	<u>Takeoff</u>	<u>Max.Cont.</u>	<u>Start</u>	<u>Accel.</u>	<u>Reverse</u>	<u>Idle</u>
SHP	1300	1220			900	
Torque (PSI)**	48.0	45.1		61		
ITT (°C)	800	800	1000	850	760	750
Ng (%)	104	104	104	104		51
Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	90 to 135	60 min.
Oil Temp (°C)	0 to 110	0 to 110	-40 min.	0 to 110	10 to 105	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.  
 \*\*The Torque pressure limits listed are for NP=1700 RPM only.

d) PT6A-65AG:

	<u>Transient*</u>					
	<u>Takeoff</u>	<u>Max.Cont.</u>	<u>Start</u>	<u>Accel.</u>	<u>Reverse</u>	<u>Idle</u>
SHP	1300	1220			900	
Torque (PSI)**	48.0	45.1		61 <sub>-</sub>		
ITT (°C)	810	810	1000 <sub>-</sub>	850 <sub>-</sub>	760	750
Ng (%)	104	104	104	104		56
Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	90 to 135	60 min.
Oil Temp (°C)	0 to 110	0 to 110	-40 min.	-40 to 110	0 to 110	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.

\*\*The Torque pressure limits listed are for NP=1700 RPM only.

d) PT6A-65AR:

	<u>Transient*</u>					
	<u>Takeoff</u>	<u>Max.Cont.</u>	<u>Start</u>	<u>Accel.</u>	<u>Reverse</u>	<u>Idle</u>
SHP	1300	1220			900	
Torque (PSI)**	48.0	45.1		61 <sub>-</sub>		
ITT (°C)	810	810	1000 <sub>-</sub>	850 <sub>-</sub>	760	715
Ng (%)	104	104	104	104		56
Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	90 to 135	60 min.
Oil Temp (°C)	10 to 110	10 to 110	-40 min.	-40 to 110	10 to 105	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.

\*\*The Torque pressure limits listed are for NP=1700 RPM only.

d) PT6A-65B:

	<u>Transient*</u>					
	<u>Takeoff</u>	<u>Max.Cont.</u>	<u>Start</u>	<u>Accel.</u>	<u>Reverse</u>	<u>Idle</u>
SHP	1100	1110			900	
Torque (PSI)**	43.34	43.34		61 <sub>-</sub>		
ITT (°C)	820	810	1000 <sub>-</sub>	850 <sub>-</sub>	760	700

Ng (%)	104	104	104	104		56
Np (RPM)	1700	1700		1870	1650	
Oil Press (PSIG)	90 to 135	90 to 135	0 to 200	40 to 200	90 to 135	60 min.
Oil Temp (°C)	0 to 110	0 to 110	-40 min.	0 to 110	0 to 99	-40 to 110

\*Transient engine limits are 5 seconds for starting and 20 seconds for acceleration.  
 \*\*The Torque pressure limits listed are for NP=1700 RPM only.

7. Propeller and Propeller Limits:

For PT6A-60AG/-45/-45A/-45B/-45R/-65AG/-65AR/-65B:  
 Hartzell HC-B5MP-3C propeller, constant speed, feathering and reversing;  
 Hub Model HC-B5MP-3C with Blade Model M10876ANS or M10876AS  
 Diameter 111.2 inches maximum, 110.7 inches minimum.  
 Pitch (42 in. Sta.) 16.5° low, 79.0° feather, -11.0° reverse

For PT6A-67AG:  
 Hartzell HC-B5MA-3D propeller, constant speed, feathering and reversing;  
 Hub Model HC-B5MA-3D with Blade Model M11276NS  
 Diameter 115.2 inches maximum, 114.7 inches minimum.  
 Pitch (42 in. Sta.) 13.9° low, 83.1° feather, -10.0° reverse

8. Fluids:

8.1 Fuel:

Fuel Jet A, Jet B, JP-4, JP-5, Automotive Diesel Number 1D or 2D in accordance with P&WC Specifications CPW 204, CPW 46, CPW 381. (If jet fuel is not available, aviation gasoline, MIL-G-5572, all grades, may be used for a maximum of 150 hours between overhauls.) Automotive diesel fuel is approved only for agricultural application flights and only when the free air temperature is above:  
 +20oF for Grade No. 1D  
 +40oF for Grade No. 2D

8.2 Oil: Engine

Oil UACL PT6 Engine Service Bulletin Number 1001, 3001, 4001, 11001, 12002 and 13001 lists approved brands of engine oil.

9. Fluid capacities:

9.1 Fuel:

Fuel Capacity 225.6 gallons usable, one 115 gallon tank in each wing, tanks interconnected.

9.2 Oil:

Oil Tank Capacity 10 U.S. quarts - usable oil tank capacity 6 quarts.

10. Air Speeds Limits (CAS):

Never Exceed Speed $V_{NE}$	191 KIAS (220 m.p.h.)
Maximum Structural Cruising Speed $V_{NO}$	180 KIAS (207 m.p.h.)
Operating Maneuvering Speed $V_o$	140 KIAS (161 m.p.h.)
Maximum Flap Extension Speed $V_{FE}$	126 KIAS (145 m.p.h.)

11. Maximum Operating Altitude

12,000 feet

12. Operating Capability: VFR
13. Maximum Mass:  
Maximum Takeoff Weight: 12,500 lbs. (See NOTE 20)  
Maximum Landing Weight: 12,500 lbs.  
Minimum Weight: 6,100 lbs.
14. Center of Gravity Range: Forward Limit at 12,500 lbs. is 24 inches aft of datum with straight line variation to 8,000 lbs. at 27 inches aft of datum. Forward Limit below 8,000 pounds is 27 inches aft of datum. Aft Limit at 12,500 lbs. is 27 inches aft of datum with straight line variation to 8,000 lbs. at 30 inches aft of datum. Aft Limit below 8,000 lbs. is +30.0 inches aft of datum.
15. Datum: leading edge of the wing.
16. Weight and Balance Current weight and balance report including list of equipment included in certificated empty weight, and loading instructions when necessary, must be provided for each aircraft at the time of original certification. The empty weight and corresponding center of gravity location must include the following unusable fuel:  
Model S2R-T660, all serial numbers 30 lbs. at (+38.5)
17. Leveling Means: spirit level : left hand longeron under cockpit  
optical level : 'vee' groove on bottom of rear cockpit longeron
18. Number of Seats: 1 (+89 ins)  
(see NOTE 21)
19. Maximum Passenger Seating Capacity: see NOTE 21
20. (reserved)
21. Baggage / Cargo:  
Maximum baggage compartment load: 200 lbs. (+112).  
Maximum hopper load: 5,500 lbs. (+20.6).
22. Wheels and Tires:  
Main Wheel Tire Size : 29x11-10  
Tail Wheel Tire Size : 6.000-6
23. Control Surface:  
Elevator Up 27° + 1° Down 17° + 1°  
Movements Elevator Tab Up 8° + 1° Down 22° + 1°  
Rudder Left 19° + 1° Right 19° + 1°  
Aileron Up 21° + 1° Down 17° + 1°  
Flaps Down 15° + 1°
24. Serial Numbers Eligible T660-101 and subsequent
25. Required Equipment The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification. This equipment must

include Ayres Corporation Airplane Flight Manual approved March 13, 2000, or later approved revision. (See NOTE 21)

26. Agricultural Dispersal Equipment:

Standard Spray System, Ayres Dwg. No. 95340  
Spreader Installation, Ayres Dwg. No. 95370  
Transland Hydraulic Fire Door Installation, Ayres Dwg. No. 95385.

27. Structural Limitations:

The following parts must be replaced at the times in service indicated: (See NOTE 21)

<u>Part Name</u>	<u>Part Number</u>	<u>Life Limit</u>
Rear Spar Doubler, Lower	95627-3	20,000
Rear Spar, Inboard, L&R	95623-1/-2	20,000
Aft Main Spar Lug, L&R	95605-1/-2	21,750
Forward Main Spar Lug, L&R	95606-1/-2	20,000
Spar Cap Assy, L&R	95603-1/-2	26,625
Steel Doubler Plate	95614-1	38,400

**E.IV Operating and Service Instructions**

1. AMM Part No T660-3 of December 17, 2003; last issue January 10, 2005
2. AFM (FAA approved) of March 5, 2004
3. The following information on placards pertaining to flight and operating instructions and limitations must be displayed in full view of the pilot:
  - (a) "Restricted"
  - (b) "This airplane must be operated as a restricted category airplane in accordance with the operating limitations stated in the form of placards and the Airplane Flight Manual."
  - (c) "No acrobatic maneuvers including spins approved."
  - (d) When canopy is installed: "No smoking"
  - (e) Park brake: "On, depress pedals and pull lever. Off, depress pedals"
  - (f) When locking tail wheel is installed: "Push stick forward to unlock tail wheel."
  - (g) Usable tank capacity (See "Fuel Capacity")
  - (h) The following placard must be displayed on the wings and adjacent to the fuel filler caps:  
"FUEL (\*) US GAL. MIN. OCTANE 87 FUEL TANKS ARE INTERCONNECTED - ALLOW SUFFICIENT TIME FOR FUEL LEVEL TO EQUALIZE BEFORE TOP-OFF OF TANKS. NO AROMATIC FUEL."
  - (i) The following placard must be displayed adjacent to the oil filler cap:  
"OIL TANK (\*) GAL. CAP."

- (j) "Sulphur dusting is prohibited unless special fire prevention measures have been incorporated in the aircraft."

Also see the FAA approved Airplane Flight Manual for required placards.

**E.V Notes**

NOTE 20: The Maximum Weight of the S2R-T660 may be increased to 14,150 pounds if operated in accordance with the limitations shown in Revision 3 of the Ayres S2R-T660 Airplane Flight Manual, or later FAA approved revision, including airspeed indicator marking changes, or Thrush Aircraft Inc. S2R-T660 Airplane Flight Manual for serial number T660-109 and up, dated March 5, 2004, or later FAA approved revision, or Thrush Aircraft Inc. S2R-T660 Airplane Flight Manual Dual Cockpit for serial number T660-114DC and up, dated August 12, 2005. For operations in the United States above 12,500 pounds, an exemption to the pilot type rating requirements of 14 CFR Part 61.31(a)(1) obtained by the manufacturer is required. Equivalent Level of Safety Finding No. ACE-04-05 to 14 CFR Part 23.473(b) is applicable regarding the landing weight being less than the takeoff weight.

If operated at weights above 12,500 pounds the structural limitations shown in Section XVII of this type certificate data sheet are decreased and the following parts must be replaced at the time in service indicated below:

<u>Part Name</u>	<u>Part Number</u>	<u>Life Limit</u>
Rear Spar Doubler, Lower	95627-3	11,000
Rear Spar, Inboard, L&R	95623-1/-2	11,000
Aft Main Spar Lug, L&R	95605-1/-2	11,000
Forward Main Spar Lug, L&R	95606-1/-2	11,000
Spar Cap Assy, L&R	95603-1/-2	13,680
Steel Doubler Plate	95614-1	19,700

NOTE 21: For Models S2R-T660 with the serial number suffixed with "DC" (Dual Cockpit), the following data apply. All other data listed for these models remain unchanged.

Engine	Pratt & Whitney Canada PT6A-65AG, -65AR, -65B (-65AR must have automatic power reserve feature disabled) Optional Engine: Pratt & Whitney Canada PT6A-67AG
Propeller and Propeller Limits	For PT6A-65AG/-65AR/-65B: Hartzell HC-B5MP-3F propeller, constant speed, feathering and reversing; Hub Model HC-B5MP-3F with Blade Model M11276NS Diameter 115.2 inches maximum, 114.7 inches minimum. Pitch (42 in. Sta.) 13.9° low, 83.1° feather, -10.0° reverse
Number of seats	1 (+89), 1 (+127)
Control Surface Movements	Rudder Left 20° + 1° to Right 20° + 1°
Serial Numbers Eligible	T660-114DC and subsequent
Required Equipment	The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis) must be installed in the aircraft for certification.

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This equipment must include Thrush Aircraft, Inc. Airplane Flight Manual Dual Cockpit dated August 12, 2005, or later FAA approved revision, is required. (See NOTE 20)

Agricultural Dispersal Equipment

Standard Spray System, Ayres Dwg. No. 95340

Transland Hydraulic Fire Door Installation, Ayres Dwg. No. 95385

## Section F: Change Record

Issue 1 Initial EASA release

Issue 2 Major Change design for S2R/S2RHG-T65 model

Issue 3 Editorial changes

Deletion of note : "Model S2R-T34 at 9,500 lbs., sea level to 12000 ft. Altitude, Outside Air Temperature to Standard plus 41°F, C.G. Limits to 29.0 inches, Stall Speed 80 mph CAS with 15o Flaps, Maximum Speed 126 mph CAS"