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Colonel Richard A. Greenhut

26 August 2002

MEMORANDUM FOR HQ CAP/DO

FROM: NER/CC

SUBJECT: Flight Test Evaluation: Gippsland GA-8 AirVan

As promised, attached is an expanded evaluation as well as some personal observations regarding the Gippsland GA-8 AirVan from Australia I flew 4 times last week in Buena Vista, Colorado.

Overall Impressions

The Gippsland GA-8 AirVan is a high-wing 8-seat monoplane of conventional construction. At first glance, the aircraft appears larger than it actually is. It appears reminiscent of a single-engined version of the Shorts 330 or C-23 Sherpa, but much smaller. There is a substantial ventral fin for stability, a tall single tail with a rudder that only extends for half its height, and a long untapered wing. It has a somewhat stubby look, with high wings, upswept rear fuselage and conventional tail surfaces, along with sturdy fixed landing gear. The wingspan is 41'8", length of the fuselage is 29'4", height of the vertical tail is 12'8" and the aircraft sits 2'11" above the ground.

There are separate doors for the pilot and co-pilot, as well as a large sliding cargo door on the left side. The windows bulge outwards slightly, so that in a shallow (5°) bank, you can see directly under the aircraft. The aircraft seems exceptionally well engineered, with excellent fit and finish of all visible components. The cockpit is spacious and well laid out, with transport-like yokes mounted on the floor, leaving the center of the panel free for additional instruments.

The throttle, prop and mixture are mounted on a quadrant in the center of the panel. There is a "gate" for the propeller control, allowing you to increase RPM from the standard 2,500 RPM to 2,750 RPM for extra takeoff power with no time limit. The engine is a Continental IO-540 producing 300 hp. The aircraft is certified to FAR Part 23, amendment 54 standards (the latest amendment), which includes 26 G crash absorbing seats.

AFM/POH

The current Aircraft Flight Manual and Pilot's Aircraft Familiarization Guide use U.S. conventions and the FAA standard layout, but uses metric values for all but the altimeter (ft) and airspeed (kts). Personnel from the company indicated that the U.S. version would use the customary system for values in all printed materials as well as instruments and markings in the aircraft itself.

WEIGHT AND BALANCE

The aircraft currently has a 4,000 lb gross weight fully loaded. With the pending gross weight increase to 4,200, passengers in all 8 seats and full fuel (88 gal usable fuel / 528 lbs.) can be safely flown within weight and balance and C.G. limitations:

- ⇨ **Aircraft Basic Empty Weight (as flown, including furnishings, oil & unusable fuel) 2,192.6 lb**
- ⇨ **Full Fuel (88 gal X 6 lb/gal) 528.0 lb**

2,720.6 lb

- ⇨ **Full Fuel Payload = 1,279.4 lb**
  = 7 FAA-STANDARD 170 LB PASSENGERS (1,190 LB) + 89 LB BAGGAGE

- ⇨ **With pending gross weight increase**

- ⇨ **Full Fuel Payload = 1,479.4 lb**
  = 8 FAA-STANDARD 170 LB PASSENGERS (1,360 LB) + 119 LB BAGGAGE

The aircraft has an unusually wide C.G. range, and it is almost impossible to load beyond the aft end of the C.G. envelope. It has been designed to it cannot be loaded so far to the rear that the aircraft tips up on its tail, due to the placement of the main wheels.

NORMAL PREFLIGHT

There are 5 fuel drains, one in each wet wing, one under the cowl for the gascolator and two under the right forward fuselage for the sump tank. Fuel management is straightforward, with both wing tanks feeding the sump tank under the co pilot's seat. In fact, you cannot start the aircraft until the single fuel control on the upper left corner of the instrument panel is placed in the "On" position.

The modified NACA duct in the "chin" of the cowl feeds air to the engine via the air filter, as well as providing cooling air to the oil cooler. We saw no evidence of FOD in this intake (which is about 3'6" off the ground during taxi) during the two days of intense flight operations. The walk-around is straightforward, with no unusual items or areas to examine. The tops of the wings, tail and fuel filler caps all require a ladder for access.

The brief checklist is adequate, but the manufacturer's engine start procedures did not always work in the high density altitudes found in the area this evaluation was conducted in. At one point, departing from Leadville, CO (the highest airport in America at 9,927 ft MSL), the density altitude was 13,145 ft, and the hot engine was very difficult to start in these conditions.

MANUFACTURING QUALITY / PAINT / DECALS

The overall fit and finish is excellent both inside and out, with a high quality paint job and all decals, placards and vinyl overlays easy to read, as well as smooth and bubble-free. The rivets were flush or low profile (depending on airflow over specific locations), and were consistently seated and centered. There were no noticeable rough edges, sharp corners or manufacturing inconsistencies noted. The 26 G seats each only weigh 12 lbs, and the rear 6 can all be removed and stored in an area in the tailcone, creating a freight configuration with the included cargo net in under 5 minutes. The carpet is attached with Velcro, and can be taken up easily for cleaning. The sidewalls and headliner are molded fiberglass, and fit well with no obvious gaps where curved pieces fit together.

AVIONICS

The aircraft as flown had a standard fit of King radios, including a GPS with full color screen, dual nav/comms, ADF and transponder. There is a digital fuel totalizer that shows total fuel burn and time remaining that updates constantly based upon actual fuel consumption. There is an overhead switch/circuit breaker panel located in the ceiling between the pilot's and copilot's seats that contains the switches for the 12 volt dual bus electrical system as well as the master switches. There is presently no avionics master switch. The manufacturer informs us that while there is not currently an autopilot approved, they are actively working on several different options. The final choice will probably be a King KAP-140 or KAP-150, selectively driven off of either the GPS or the #1 nav/comm at the pilot's choice.

TURN RADIUS / GROUND MANEUVERABILITY

On taxi, the directly-linked rudders are somewhat stiff but responsive, with heavy but positive nosewheel steering. Brakes are light but effective. Taxi is best accomplished with no differential braking but full rudder deflection. Turn radius seems very good for an aircraft of this wingspan.

PERFORMANCE / HANDLING

On takeoff, initial acceleration is slow, and the aircraft tracks straight down the runway, but requires positive rudder inputs to cancel out wind drift and propeller torque. Climb-out requires right rudder, and the lack of rudder trim is a noticeable shortcoming. Standard takeoff uses 14° of flaps, but no-flap takeoffs only use 15% or so additional runway. The aircraft is a STOL (**S**hort **T**ake**O**ff and **L**anding) design. Typical performance for an average CAP mission might look something like this:

⇨ **TAKEOFF SCENARIO:**

- **80° F field temperature**
- **6,000 ft pressure altitude**
- **4,000 lb aircraft gross weight**
- **No wind, level, dry hard surfaced runway**
- **14° flap, 2,500 RPM takeoff – rotate at 60 kts**

3,969 FT REQUIRED TO CLEAR 50' OBSTACLE

⇨ **ENDURANCE**

- **Standard day**
- **75% power cruise**
- **6,000 ft cruising altitude**
- **Lean for best power**
- **11.5 GPH fuel burn**

7.5 HRS TO DRY TANKS

⇨ **LANDING SCENARIO:**

- **80° F field temperature**
- **6,000 ft pressure altitude**
- **4,000 lb aircraft gross weight**
- **No wind, level, dry hard surfaced runway**
- **38° flap**

1,476 FT REQUIRED TO CLEAR 50' OBSTACLE

The aircraft experiences no noticeable trim changes when raising or lowering flaps. After being trimmed for cruise, virtually no trim change is needed for the remainder of the flight. Steep 720° turns at 75° bank angles required only minimal back pressure on the yoke and light control forces, and were comfortable for pilot and passengers alike. Due to its long wingspan, the aircraft experiences adverse yaw in turns, and requires more rudder than Cessna or Piper aircraft typically do. It has an acceptable roll rate, and the elevator is light but not too light for stability, with good overall control harmony.

Cruise speeds were typically about 130 kts at 11,500 ft. At 15,000 ft, the aircraft still showed a willingness to climb at 300 FPM despite being some 25° F above standard temperature for that altitude. The stated service ceiling of 20,000 ft seems reasonable. It appears this would be a stable instrument platform, despite the fact that no approaches or hood work was accomplished due to the abbreviated testing period.

Slow flight at minimum controllable airspeeds with 90° turns showed good stability, with no tendency for the aircraft to stall unexpectedly. Both power off and power on stalls showed the platform to be highly docile, with no abrupt break and an easy recovery when back pressure is relieved. Accelerated stalls were relatively benign, with no dramatic wing drop or tendency to fall off into a spin.

Slips tended to be highly effective, due to the large fuselage cross-section, long wing and effective rudder. During a forward slip while on final approach, it was easy to peg the vertical speed indicator in a 2,000 FPM descent. The controls were solid, and it was easy to transition to a normal crab and then to land without any problem. Landings are easy from unstabilized approaches.

The manual flap system uses a "Johnson bar" type of control, and air loads make them difficult to lower above **VFE** (97 kts). The first detent of 14°, used for takeoff and initial approach, creates a nose-down attitude ideal for good visibility on climb-out or during descent to traffic pattern altitude. The second and last detent of 38° is used for landing only, and is effective in lowering the stall speed by some 8 kts, and makes for a flatter and shorter approach. No trim changes are experienced when deploying flaps, and due to light elevator forces at low speeds, there is no need to trim nose-up on landing to prevent banging the nosewheel first.

No-flap landings are no problem, with the aircraft tending to float a bit and use more runway prior to touchdown. When making crosswind landings, the slip/wing-low crab method proved most effective, provided the pilot kicked out the crab and used plenty of rudder to straighten out the aircraft prior to touchdown. There is no aileron-rudder interconnect.

SYSTEMS / SUITABILITY / FUTURE ENHANCEMENTS

Visibility is outstanding in all flight regimes, with the pilot and copilot's windows being bulged out for better visibility. All passenger positions have bulged windows and an air vent above the passenger's head, fed via a cooling duct located in tail. In hot weather, this proved insufficient to provide adequate cabin cooling during most of our flight maneuvers.

The pilot and co-pilot's positions are also equipped with eyebrow windows that are provided with sunshields. These proved a significant safety feature when in steep turns, since they afforded visibility in what would otherwise have been a blind spot. There are panel air vents for the pilot and co-pilot.

The manufacturer favors a 12 volt electrical system for ease of assisted starting at remote locations. All major components are supplied by U.S. manufacturers, and even the aluminum and rivets are made here and shipped to Australia for assembly. They are contemplating future U.S. production.

When asked about a float version for Alaska, we were informed that Wipline is already doing the preliminary engineering for attaching floats, and within 12 months should have it ready.

The manufacturer also tells us that they are considering offering an additional engine as an option, the new Continental IO-580, providing 325 hp at the cost of 1.25 gal/hr additional fuel burn. This would increase cruising speed somewhat, and may also allow an increase in gross weight over the 200 lbs currently pending.

SUMMARY

This seems to be the ideal aircraft for all of CAP's missions. It can take all our standard DF and radio gear, and its large windows make it a superior SAR aircraft. Its seating capacity would give us the opportunity to dispatch an actual mission with a scanner and observer trainee aboard along with the rated mission crew, creating an invaluable training experience and adding 2 more sets of eyes to the search.

The substantial cargo carrying capacity make this the ideal platform for the coming hyperspectral imaging mission, since it could carry a full sensor fit and still easily accommodate a mission crew. Cadet flying and mission transport would also benefit from the 8 seat passenger capacity, as would the Liaison Region personnel, who could now dispatch one aircraft to do a Wing Compliance Inspection, instead of 2 or 3.

Additionally, the coming gross weight increase and float provision could make this the only aircraft Alaska Wing would ever need, thereby contributing to safety and mission efficiency by allowing training in and use of only one type of airframe.

Whether for transport, SAR, Homeland Security or Cadet orientation rides, this aircraft seems destined to replace the Cessna 206 in CAP service due to its efficient design, flexibility and the manufacturer's willingness to accommodate our needs. As the chairman of the Corporate Aircraft Distribution Committee, I strongly urge that we make an initial purchase of at least 12 of these aircraft over the next 3 years, with one going to each of the Regions, 2 to National HQ and 2 set aside for hyperspectral imaging testing and missions.

Rick Greenhut

RICHARD A. GREENHUT, Colonel, CAP
Commander

Attch: Flight Test V-Speeds Worksheet

cc: CAP National/CC
CAP National/CV
CAP National/CS
CAP Region/CC[s]
NAT CAP/LG

FLIGHT TEST V – SPEEDS

AIRCRAFT: Gippsland GA-8 AirVan

DA:	DENSITY ALTITUDE	13,145	FT
BFL:	BALANCED FIELD LENGTH	3,969	FT
VSO:	STALL, DIRTY	52	KTS
VS:	STALL, CLEAN	60	KTS
VX:	BEST CLIMB ANGLE	78	KTS
VY:	BEST CLIMB RATE	66	KTS
VGL:	BEST GLIDE	75	KTS
VR:	ROTATE/LIFT OFF	60	KTS
VTOSS:	TAKEOFF SAFETY SPEED	71	KTS
VA:	DESIGN MANEUVER	121	KTS
VNO:	NORMAL OPERATING	143	KTS
VNE:	NEVER EXCEED	185	KTS
VLE/LO:	GEAR EXTEND/OPERATE	N/A	KTS
VFE:	FLAPS EXTENDED 14°	97	KTS
VFE:	FLAPS EXTENDED 38°	80	KTS
VAPR:	APPROACH W/ FLAPS	71	KTS
VAPR:	APPROACH W/O FLAPS	80	KTS

Notes: Stressed to +3.8 / -1.52 G. Endurance @ 75% power – 7 hrs 25 minutes. Max demonstrated crosswind component – 15 Kts.