GIPPSAERO
PO Box 881, Morwell, Victoria 3840, Australia
Ph + 61 (0) 3 5172 1200
Fax + 61 (0) 3 5172 1201
www.gippsaero.com.au

SL-GA8-2021-41
Issue 1

Service Letter

Subject:

Operations in Corrosive Environments

Applicability:

All GA8 and GA8-TC 320 model serial numbers operating in corrosive environments.

Amendments:

Issue 1: Initial issue. Refer to GAE12#2772.

Background:

This Service Letter has been distributed to draw attention to the importance of thorough corrosion inspections and correct maintenance practises for aircraft operating in environments with an elevated risk of corrosion.

This Service Letter aims to emphasise existing approved data published in the aircrafts instructions for continued airworthiness which includes the applicable Service Manual in addition to guidance material referenced by these documents.

Untreated corrosion can render any type of aircraft unairworthy in just a few years.

Instructions:

The onset of corrosion in aircraft is influenced by several factors which include the environment, hangarage, cleanliness, methodical inspections, and preventative maintenance. The GA8 and GA8-TC 320 Service Manuals make numerous mention of corrosion detection and prevention in addition to referencing the Federal Aviation Administration (FAA) Advisory Circular (AC) 43.13-1B Chapter 6 which refers to AC 43-4A for the Corrosion Control of Aircraft. These documents contain sufficient information to ensure any corrosion issues are properly addressed.

Specific issues are discussed in detail below;

1) **Environment:** The location in which the aircraft is operating determines how hazardous the environment is in terms of the exposure to corrosive substances. Atmosphere high in moisture is more susceptible to corrosion and traditionally costal or marine environments create the most severe conditions. The salinity from the ocean contributes chloride to the air which exacerbates the moist atmosphere. However areas where geothermal activity is present also generate chlorides in addition to corrosive gases. Other environments that warrant additional concern are regions where the atmosphere is high in pollutants as these chemicals often exhibit corrosive characteristics. Airports that are using a high degree of de-icing substances produce a more corrosive environment. The FAA published illustrations in AC 43-4A that segregate regions into geographical zones which are identified as mild, moderate, and severe with respect to how the environment contributes to corrosion. These are re-produced in Figure 1 to Figure 6. These maps are provided as a general guide and do not account for local anomalies.

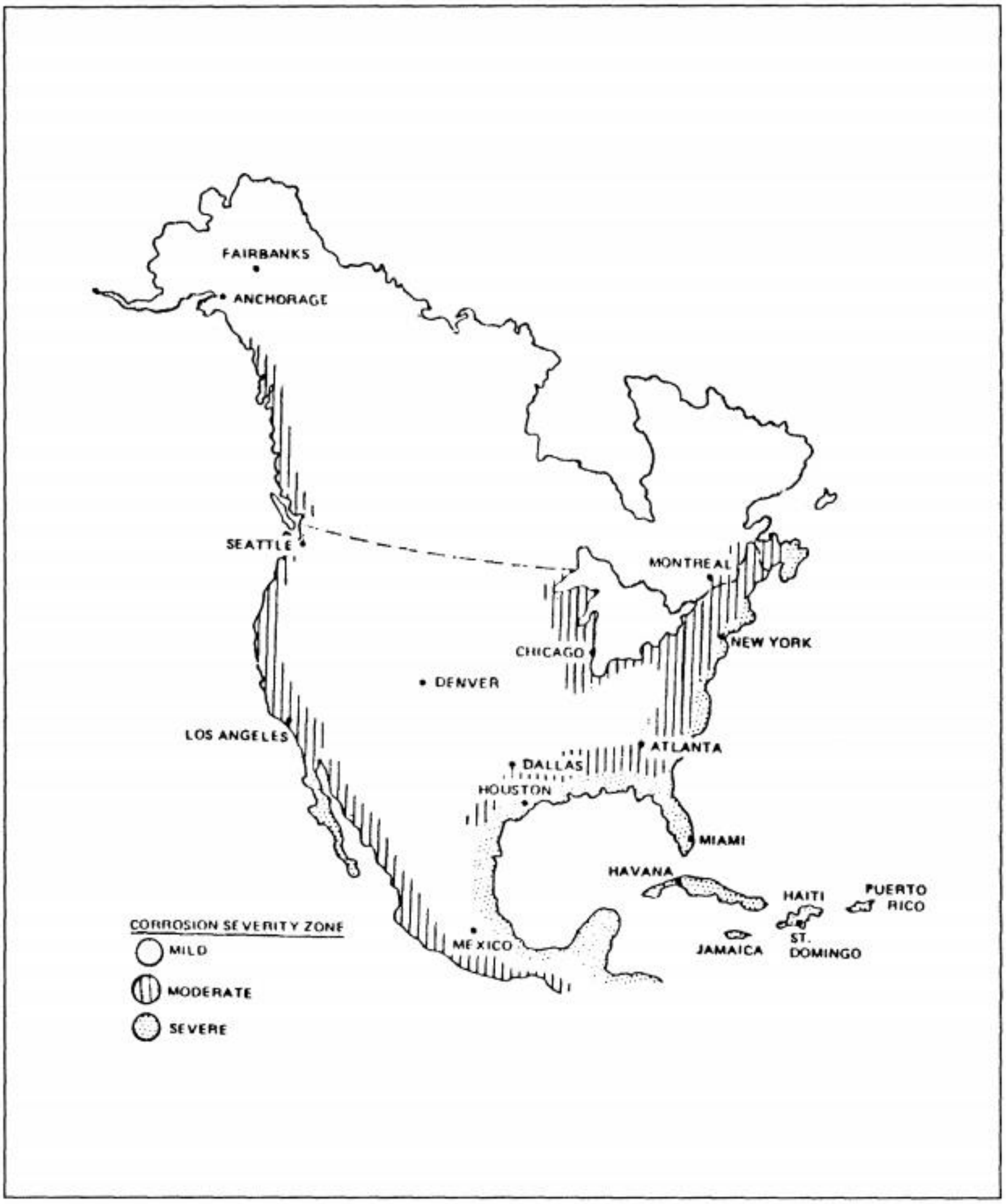

Figure 1 – North America Corrosion Severity Map

Figure 2 – South America Corrosion Severity Map

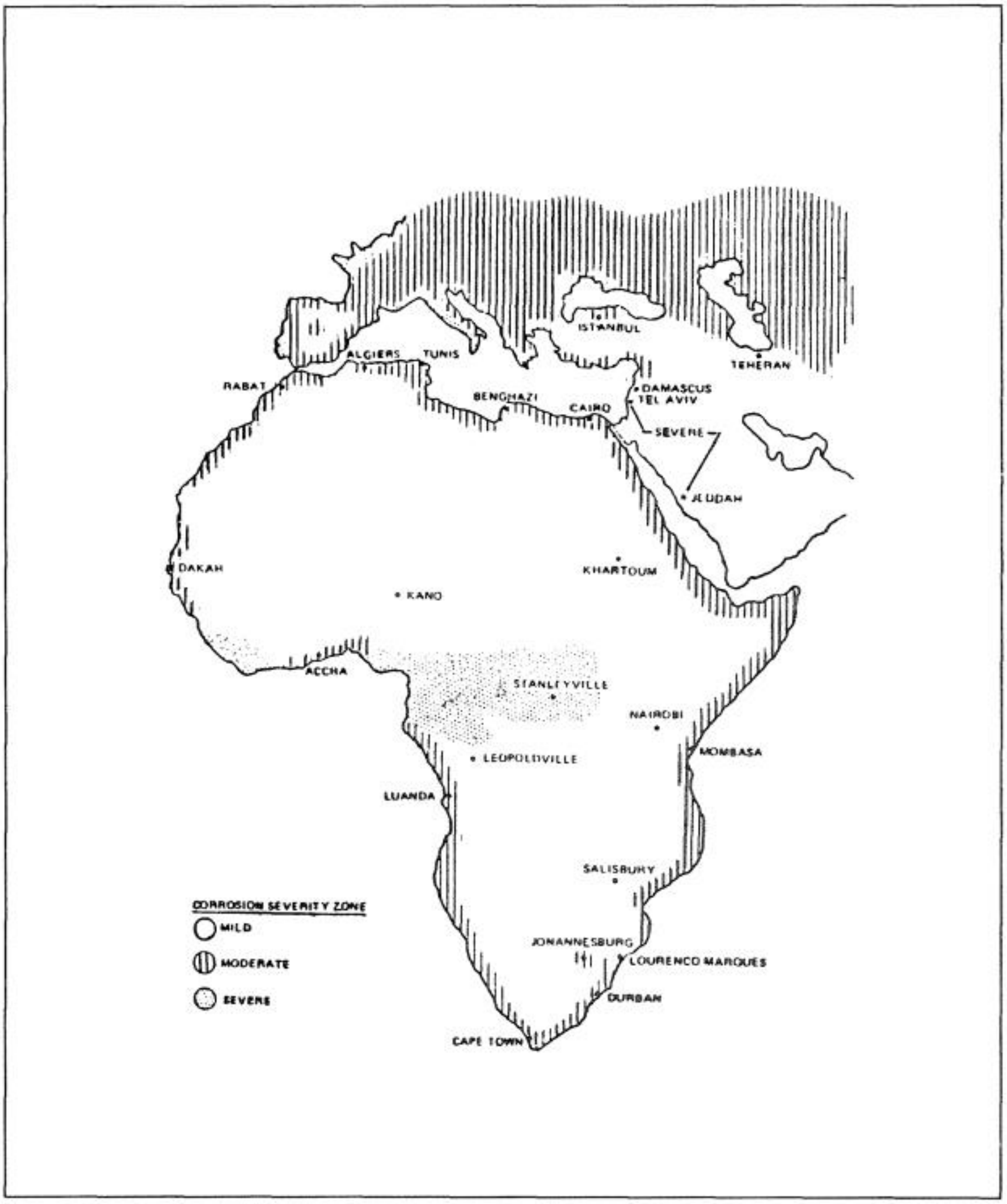

Figure 3 – Africa Corrosion Severity Map

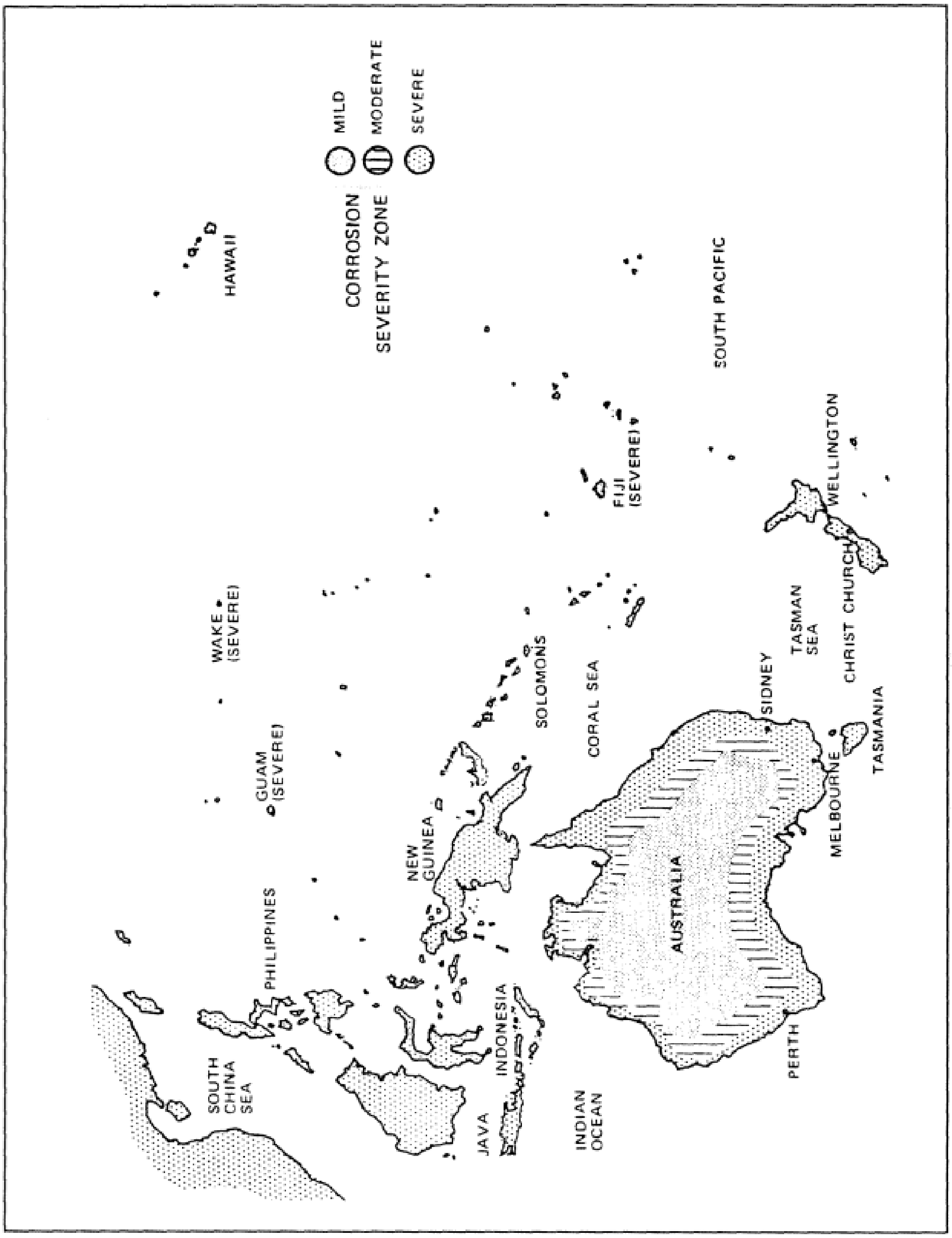

Figure 4 – South Pacific Corrosion Severity Map

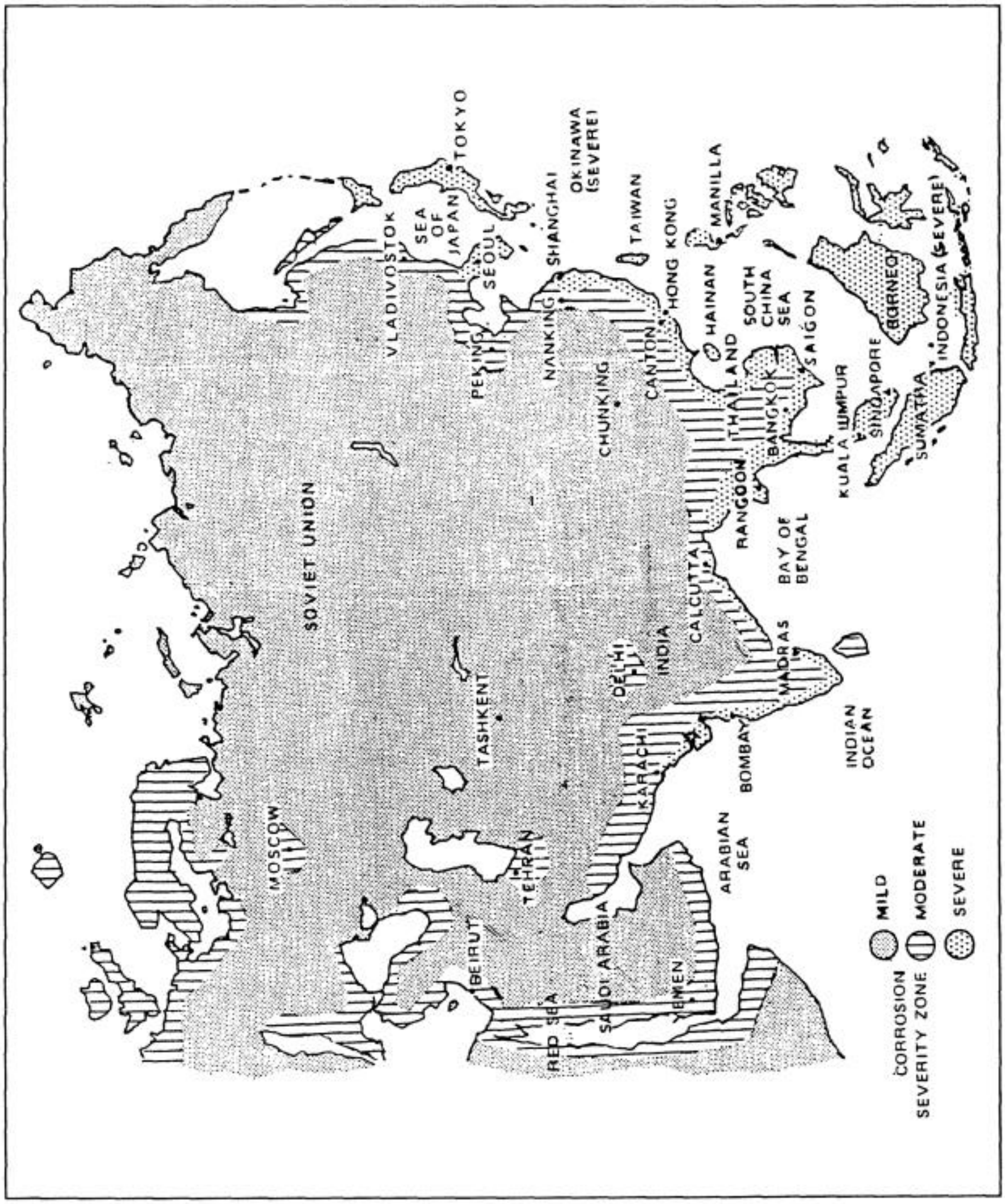

Figure 5 – Asia Corrosion Severity Map

Figure 6 – Europe and Asia Minor Corrosion Severity Map

2) **Hangarage:** Aircraft that are exposed to the elements are at high risk of corrosion and require increased attention for the detection and prevention of corrosion. It is strongly recommended that hangarage is provided for storing aircraft for any period of time. In the event hangarage cannot be obtained the use of covers is recommended.

3) **Cleanliness:** Frequent washing with the appropriate substances, such as mild detergents with a neutral pH and warm water and applying the appropriate polish, is required for all aircraft but must be performed more regularly as the severity of the corrosive environment is increased. Cleaning compounds such as MIL-PRF-85570 Type II and MIL-PRF-680 Type II are compatible with the primer and topcoat surface finishes used on the aircraft conforming to MIL-PRF-23377 Type I & II Class C2 and MIL-PRF85285 Type I Class H respectively. Acceptable compounds for waxing and polishing conform to Boeing specification D6-17487, or equivalent. Ensuring the wax is applied to areas with dissimilar metals, lap joints and rivets is important. Refer to point (5) for recommended intervals.

4) **Methodical Inspections:** The Service Manuals for the GA8 and GA8-TC 320 model aircraft contain comprehensive inspection requirements that will be sufficient to detect corrosion. The materials from which the aircraft is fabricated are adequately protected to ensure that corrosion cannot appear and develop to an unairworthy state in between 100 hourly / Annual inspections even in the most severe environments. However a detailed inspection must be performed at the 100 hourly / Annual maintenance event which includes <u>removal of all necessary access panels</u> and careful attention to critical areas and parts susceptible to corrosion.

   These include but are not limited to;

   1. *Exhausts and areas subject to exhaust gases. Monitor the firewall behind the muffler heat shields and the belly skins.*
   2. *Bilge areas; check positive drainage and cleanliness in floor bays and cabin floor etc. (ensure floor covering is completely removed). The floor beneath the rudder pedals and at the rear cabin door tends to collect dirt and sand which can block drain holes.*
   3. *External skin; check protective finishes, fasteners and areas around fasteners, lap joints and any faying surfaces, check for lifting/bulging. The fuselage belly skins in particular need to be monitored, along with control surface skins.*
   4. *Electrical compartments; battery bay, ground power receptacle, circuit breaker panels etc.*
   5. *Moisture collection points; under fairings in empennage, wing strut, wing roots, Main Landing Gear (MLG) legs, inside any cargo/camera pod etc. Chafing of the fairings is a particular issue in dirty or sandy areas as it removes the paint and protective layers from the metal so fairings that tend to get dirty, such as the MLG and strut fairings, should be closely monitored.*
   6. *Frontal areas; parts subject to abrasion and impact from the airstream in service, such as engine fins, oil coolers, nose wheel fork, air vents in tailcone for air conditioning system etc. Frontal areas combined with other risk factors listed here require particular attention, for example the steel crew steps, door hinges, and the components of the Nose Landing Gear (NLG) leg, such as the steering collar, the internal surface of the strut and nose wheel fork joining block, particularly at the lower end..*
   7. *Thick/machined parts. These are used in a number of places in the GA8 including the wing spar and wing strut assemblies, elevator and rudder hinges, horizontal stabiliser pivots, elevator walking beam brackets, aileron and flap arms, undercarriage supports, firewall fittings, seat tracks, seat fittings in floor etc. In particular;* ***monitor the wing spar straps in proximity to the strut attachment*** *and the machined fittings around the MLG leg. Ensure a detailed internal inspection of the wing structure inboard and outboard of the wing strut is performed at every 100 hourly / Annual by removing the adjacent access panels.*
   8. *Ferrous parts. Examples of steel parts in the GA8 include flight control cables, aileron hinges, aileron bellcrank, aileron and elevator drive horns, aileron and elevator pushrods, elevator walking beam, flap torque tube and torque levers, flap horn, flap control lever, undercarriage legs, firewall, engine frame, seat attachment points, door frames etc. Mechanisms, such as the control surface hinges and door latches, must be monitored to avoid binding or wear.*
   9. *Extrusions; stringers in the wing and empennage, and stiffeners in the floor ribs etc.*
   10. *Galvanic corrosion; check areas with dissimilar metals, such as where steel is joined to aluminium alloy and fasteners are often a different material to the airframe.*

   Refer to Figure 7 for some guidance on the exterior of the aircraft.

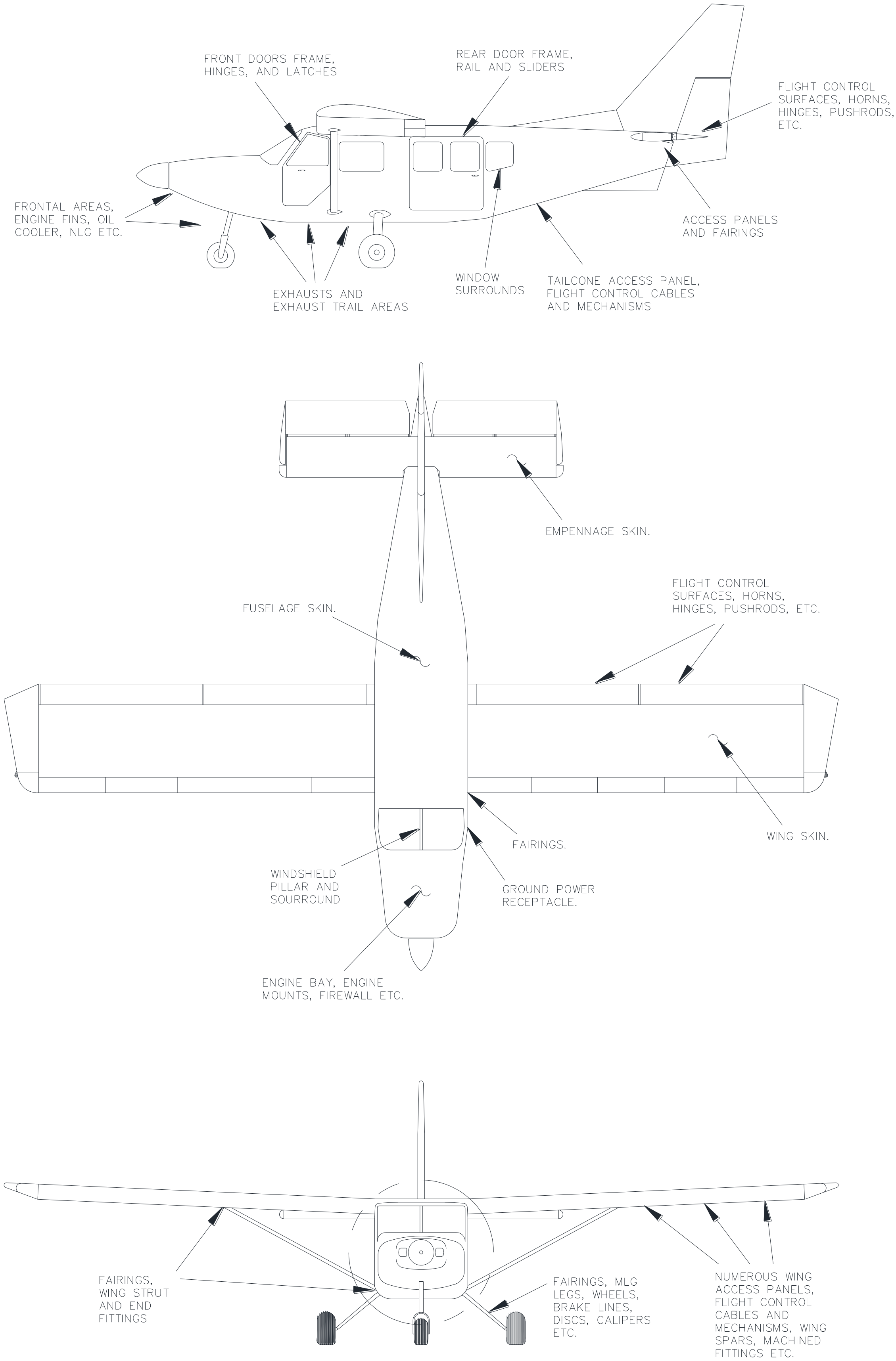

Figure 7 – 3 View of GA8

5) **Preventative Maintenance:** FAA AC 43-4A recommend thorough cleaning, inspection, lubrication, and preservation at the following intervals;

- **Mild Zones;** Every 90 days
- **Moderate Zones;** Every 45 days
- **Severe Zones;** Every 15 days

Refer to Figure 1 to Figure 6 for definition of the corrosion severity zones.

Diligence in monitoring the status of the aircraft cannot be overstated. The preservation of surface finishes is vital to the corrosion protection of the aircraft. Regular use of corrosion inhibitors is highly recommended. Compounds conforming to MIL-PRF-81309, such as ACF-50, are suitable for steel and aluminium alloys. Replacing deteriorated or damaged sealants to avoid water intrusion. Ensuring drain holes and passages are functional to prevent water entrapment. Lubrication of the aircraft in accordance with Chapter 12 of the Service Manual. Adequately trained personnel in the detection, prevention, and rectification of corrosion in aircraft is essential. Good communication between operational staff and maintenance personnel to assist in the recognition of corrosion inducing conditions is highly desirable. Applying the correct preservation techniques for long term storage in accordance with Chapter 10 of the Service Manual, when required, which includes reference to section 7 of the Lycoming Operators Manual and Lycoming Service Letter No. L180, at latest issue, for engine preservation.

The following documents provide detailed information on the subjects briefly reviewed in this Service Letter;

- GA8 / GA8-TC 320 Service Manuals (C01-00-01, C01-00-03, C01-00-04, C01-00-05, C01-00-06)
- FAA AC 43.13-1B Chapter 6
- FAA AC 43-4A

Support:

Should you require any further information please contact our Customer Support Department:

Tel.: +61 (0) 3 5172 1200

Fax: +61 (0) 3 5172 1201

Email: SUPPORT@gippsaero.com.au