

# **AUTONOMOUS VEHICLE OPERATIONS AT THE AIRSIDE – NADI INTERNATIONAL AIRPORT**

## **1. INTRODUCTION**

1.1 Autonomous vehicles (AVs) at the airside offer potential gains in efficiency, safety and security, and are being adopted at a growing number of international airports for tasks such as baggage transfer, cargo towing, security patrol and passenger or staff transport.

1.2 ICAO has yet to issue Standards and Recommended Practices, or dedicated guidance, for autonomous vehicles at the airside. However, some States have developed their own instruments and, to that end CAAF has adapted the published Civil Aviation Authority of Singapore Advisory Circular AC 139-7-7 (Rev 1), effective 31 July 2025, and on the proven, staged operational path demonstrated by Hong Kong, China, and adapted this to Fiji's regulatory framework and the scale of operations at Nadi International Airport.

1.3 CAAF's position is to permit autonomous vehicle operations only under a case-by-case approval, anchored in a safety case under CAAF's safety management framework, beginning in a controlled environment, progressing through staged

validation and retaining human oversight throughout. CAAF sets the framework and reviews the evidence. The aerodrome operator carries primary responsibility for safe operation.

## **2. PURPOSE**

2.1 This Aeronautical Information Circular (AIC) notifies the aerodrome operator, air navigation service provider and the airside community of the regulatory approach CAAF will apply to any proposal to trial or operate autonomous vehicles at the airside, and of the matters that must be addressed before and during such operations.

2.2 This AIC is advisory in nature. It does not of itself create a legal obligation and does not replace the aerodrome operator's obligations under the Civil Aviation Reform Act 1999, the Fiji Air Navigation Regulations, the applicable Civil Aviation Rules and Fiji Standards, the aerodrome certificate and the aerodrome manual.

### **3. APPLICABILITY**

3.1 This AIC applies to the certificated aerodrome operator, and to any person or organisation intending to conduct or permit autonomous vehicle operations, at the airside of Nadi International Airport. It applies equally to any other certified aerodrome in Fiji where autonomous vehicle operations are proposed.

3.2 This AIC applies to trials, demonstrations, proof-of-concept activity and routine deployment, whether the vehicle is operated with an onboard safety driver or remotely.

### **4. BACKGROUND**

4.1 The airside is a complex and dynamic environment, with aircraft, vehicles and personnel operating in close proximity and minimal tolerance for error. An autonomous vehicle must navigate this environment safely without compromising the safety, security and efficiency of aerodrome and air navigation operations.

4.2 At present there is no ICAO Annex provision, PANS or manual specific to autonomous vehicles at the airside. The matter is being progressed through ICAO regional bodies.

4.3 The introduction of autonomous vehicle operations constitutes a change to aerodrome operations and must be managed through the aerodrome operator's safety management system and change management process.

### **5. GUIDING PRINCIPLES**

5.1 CAAF's approach rests on the following principles:

- (a) Safety first and evidence based. No autonomous vehicle operation will be authorised without a completed safety case demonstrating that hazards have been identified, assessed and mitigated to an acceptable level.
- (b) Safety management system as the foundation. Autonomous vehicle operations will be treated as a change to aerodrome operations and managed through the aerodrome operator's safety management system.
- (c) Staged introduction. Operations will begin in a controlled or closed environment and progress to live operation only after defined validation criteria are met, on specific approved routes matched to their assessed risk.
- (d) Human oversight retained. A trained and competent onboard safety driver or remote operator will remain accountable for the vehicle throughout, with the ability to intervene or override at any time.
- (e) Clear allocation of responsibility. The aerodrome operator holds primary responsibility for safe operation. CAAF sets the framework, reviews the evidence and grants, conditions, suspends or withdraws authorisation.
- (f) Stakeholder engagement. The airside community will be informed and engaged, and airside driving rules revised as necessary, before live operation.
- (g) Proportionality. Requirements will be scaled to the scale and complexity of operations at Nadi International Airport.
- (h) Alignment with ICAO. CAAF will track the emerging ICAO position and adjust its approach as Standards, Recommended Practices and guidance are developed.

## **6. REGULATORY FRAMEWORK**

### **6.1 Authorisation gateway**

Autonomous vehicle operations at the airside require prior CAAF approval. The aerodrome operator must submit a proposal covering the objectives and scope, the vehicle type and number, the proposed area and routes, the concept of operations, the planned timeline and the safety case. No operation, including any trial or demonstration, may commence before approval is granted.

### **6.2 Safety case and risk assessment**

A joint safety case must be prepared and submitted by the aerodrome operator and the project proponent. It must identify hazards specific to the airside environment, including interaction with aircraft, vehicles and personnel, and human factors; set out the mitigations and demonstrate that they are in place; be integrated with the aerodrome emergency plan; and be kept valid through review whenever the airside layout, airside driving rules, operating locations, vehicle configuration or scale of operations change.

### **6.3 Vehicle and system standards**

The vehicle and its systems must demonstrate reliable obstacle detection, geolocation and situational awareness; clear indication of operating mode (autonomous, manual or failure); prompt and prominent audible and visual alerts on fault; manual override by the onboard safety driver and remote deactivation by the remote operator at any time; secure, tamper-resistant data recording; conspicuous marking and lighting; and assurance that vehicle communications do not interfere with radio communications or air navigation systems. Evidence of testing by the manufacturer or an accredited body, with reference to recognised international standards, must be provided.

### **6.4 Staged validation**

Validation will proceed through the stages set out below. Progression to each stage depends on the vehicle meeting the passing criteria of the preceding stage without contributing to any incident, without unplanned intervention and without deviating from its designated route. Where a vehicle of the same model and system has been proven safely at

another airport, the aerodrome operator may propose a shortened validation, supported by evidence of that prior safe operation, for CAAF's acceptance.

| Stage   | Environment                                       | Human oversight                                 | Purpose                                                                                                              |
|---------|---------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Stage 1 | Controlled environment, closed to live operations | Onboard safety driver                           | Confirm basic capability, safe-stop behaviour and regulatory compliance before any live exposure.                    |
| Stage 2 | Designated live routes, no passengers or load     | Onboard safety driver                           | Validate consistent safe performance on the live airside on approved routes.                                         |
| Stage 3 | Designated live routes, normal tasks              | Onboard safety driver, remote centre monitoring | Validate performance under normal operational load and the remote-control Centre's ability to monitor and intervene. |
| Stage 4 | Designated live routes, normal tasks              | Remote operator (driverless)                    | Validate reliable driverless operation and remote oversight before approval for routine deployment.                  |

6.5 Personnel, training and competency

Onboard safety drivers and remote operators must hold the appropriate air-side driving authorisation, complete a defined training programme and be assessed as competent on the specific vehicle model, with provision for refresher training, training on system updates, alertness and fatigue management. Training must cover operating conditions and limitations, night operation, response to faults, emergencies and adverse weather, transition between manual and autonomous control, minimal-risk manoeuvres, hazard perception and pre-operation inspection.

6.6 Maintenance

The aerodrome operator must ensure the vehicle and its systems are maintained in accordance with the manufacturer's requirements, and that pre-operation serviceability checks are carried out covering at least the data recorder, sensors, control system, navigation, braking, steering,

lighting and power level, with verification of safety-critical functions including override and minimal-risk manoeuvre.

### **6.7 Coordination and infrastructure**

The aerodrome operator must inform and continuously engage the airside community on the roles and characteristics of the vehicles, planned routes, new or amended airside driving rules, points requiring caution, and the contacts and actions applicable in the event of a malfunction or accident. Supporting infrastructure must be adequate, including a reliable, low-latency data network that does not interfere with air navigation communications, clearly marked areas reserved for autonomous vehicles, and any traffic measures required at diversions, blind spots or busy intersections. Coordination with the air navigation service provider is required.

### **6.8 Reporting, contingency and suspension**

Autonomous vehicle occurrences, including collisions and deviations from the planned route, must be reported under CAAF's existing occurrence reporting requirements. Contingency plans must address malfunction and technical failure, cyber-attack, fire, collision, loss of the onboard safety driver or remote operator, failure of the control centre or other external systems, and adverse weather, and must be integrated with the aerodrome emergency plan. Where preliminary findings indicate that the autonomous driving function was directly responsible for an accident or incident, operations with the same vehicle model must cease as soon as practicable. CAAF may suspend or withdraw authorisation where a safety threshold is breached.

### **6.9 Cybersecurity**

Cybersecurity risk must be managed against recognised standards, with detection and response protocols and safe-stop behaviour on detection of a network abnormality, technology failure or cyber-attack until control is securely taken over.

### **6.10 Safety performance monitoring**

The aerodrome operator must establish leading and lagging safety performance indicators, alerts and targets for autonomous vehicle operations for CAAF's acceptance, record and analyse safety performance

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data on a regular reporting cycle and implement mitigations where adverse trends or precursor events are detected.

## **7. APPLICATION AND PROCESSING**

**7.1** Applications for authorisation, together with the joint safety case and supporting documentation, are to be submitted to the Executive Manager Ground Safety.

**7.2** Applicants should note that the assessment of a safety case requires 20 working days, and that any associated aeronautical information publication requires 56 days under the AIRAC cycle. Project timelines should provide for both, and early engagement with stakeholders and CAAF is strongly encouraged.

## **8. ENGAGEMENT AND REVIEW**

**8.1** Given the parallel works under the Nadi Airport Master Plan and the associated refurbishment programme, the aerodrome operator, the airside community and CAAF are required to engage early and to address related issues in a timely manner.

**8.2** This AIC will be reviewed as ICAO Standards, Recommended Practices and guidance material on autonomous vehicles are developed. Amendments will be promulgated by way of a revised or supplementary AIC. Operators should ensure they hold the current version by checking the CAAF website at [www.caaf.org.fj](http://www.caaf.org.fj).

## **9. FURTHER INFORMATION**

**9.1** Enquiries regarding this AIC should be directed to:

**The Executive Manager Ground Safety**

Civil Aviation Authority of Fiji

Private Bag (NAP0354), Nadi Airport, Republic of Fiji

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*Approved for issue by the Chief Executive, Civil Aviation Authority of Fiji.*