

AVIATION SAFETY BULLETIN



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ISSUE 2 | 2023

An official publication of the Civil Aviation Authority of Fiji

ADS-B MANDATORY AIRSPACE
Fiji Domestic space

SPACE WEATHER IN AVIATION

THE IMPORTANCE OF SLEEP



ACCEPTANCE OF SAFETY MANAGEMENT SYSTEM AND IT'S IMPLEMENTATION

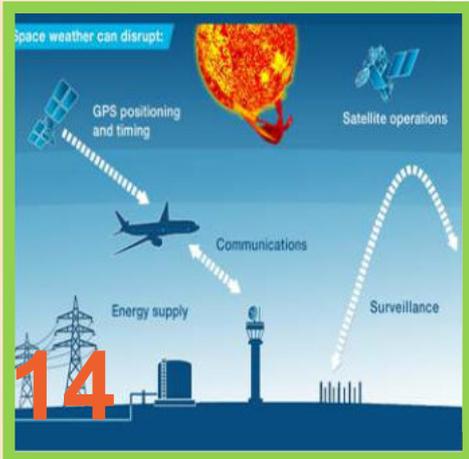
'Promoting Effective Aviation Safety and Security in Fiji and the Region.'



PACIFIC REGION ICAO CAMP COURSE



HOSTING OF ICAO LIAISON OFFICER IN FIJI FOR PSIDS



SPACE WEATHER IN AVIATION



SUSTAINABLE AVIATION FUEL

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Aviation Safety Bulletin (ASB) Committee
 Civil Aviation Authority of Fiji (CAAF)
 Private Mail Bag, NAP 0354,
 Nadi International Airport, Fiji.
 Tel: (679) 8923 155 | Fax: (679) 6721 500
 Email: info@caaf.org.fj

Editor - **Roshni Deo**

Committee - **Alisi Namoro, Asif Khan, Edward Dass, Keverieli Atama and Elisha Naidu**

Design : ASB Committee

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Aviation Safety Bulletin Editor, CAA Fiji, Private Mail Bag
 NAP 0354, Nadi International Airport, Fiji or
 email: info@caaf.org.fj

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Ni Sa Bula Vinaka !

From the Acting Chief Executive

Welcome to the Civil Aviation Authority of Fiji's (CAAF) second edition of its Aviation Safety Bulletin (ASB) for 2023. The ASB is one of the many platforms that CAAF uses to discharge its responsibility under the Civil Aviation Authority of Fiji Act 1979; *to encourage a greater acceptance by the aviation industry of its obligation to maintain high standards of aviation safety and security through comprehensive safety education and fostering of awareness within industry, and within the community generally, of the importance of aviation safety and security and the need for compliance with relevant legislation.*

The first half of 2023 has flown by at a rapid pace, with a lot happening in the aviation space. What aviation experts had predicted would be a slow return to pre-pandemic traffic and passenger levels, has instead turned out to be a fast recovery and, growth exceeding, in some months, traffic and passenger levels in 2019.

To be able to meet the growth that is happening in aviation, the International Civil Aviation Organisation's (ICAO) Asia Pacific Office, in April this year, organised the Civil Aviation Master Planning (CAMP) Training, for the Asia Pacific Region, in Nadi. Master planning of the aviation system is vital to ensuring revitalization of the aviation sector in our post-pandemic recovery. It is fundamental that all States develop a CAMP to provide our governments with an outlook of the prospect for civil aviation within our States. This training was well attended by Fiji and our neighbours from the Asia and Pacific Region.

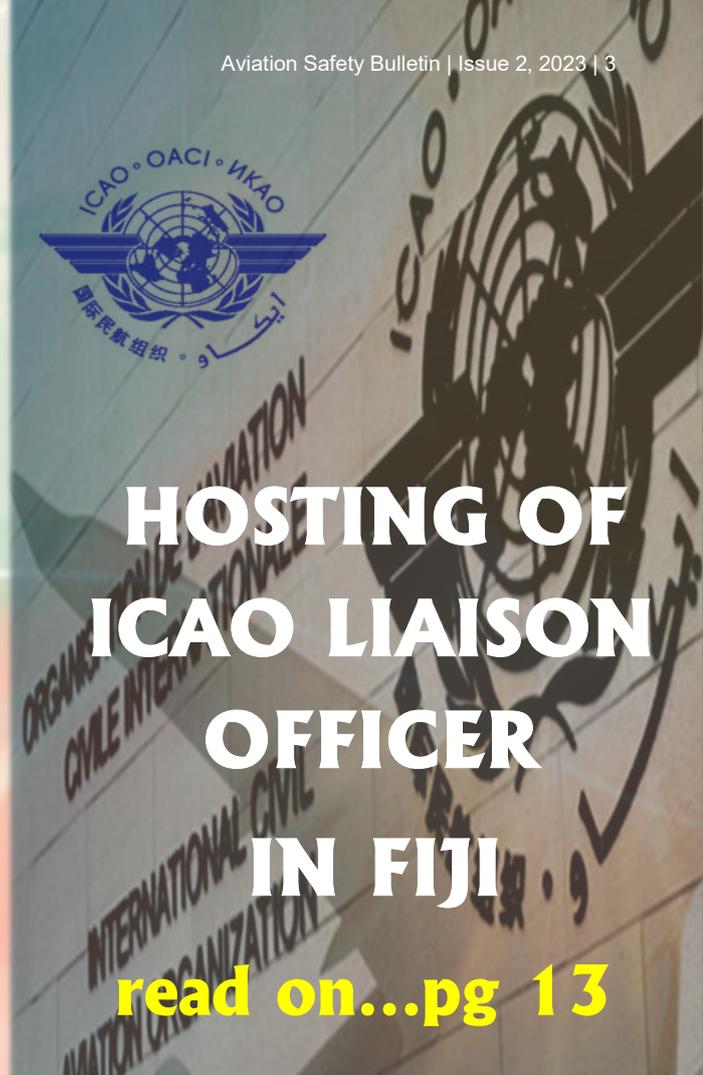
The month of May saw the Fiji civil aviation delegation, headed by the Honorable Minister for Tourism and Civil Aviation, attend the ICAO Global Implementation Support Symposium held in Seoul, South Korea. The event combined ICAO's World Aviation Forum, the Global Aviation Cooperation Symposium and the Global Aviation Training and TRAINAIR PLUS Symposium, with the aim of highlighting the Organization's latest digital tools, key initiatives, and collaborative endeavours to support aviation resilience, innovation, sustainable development and operational solutions. These areas were discussed as part of ICAO's efforts to support the realization of the United Nations Sustainable Development Goals set in the UN 2030 Agenda and ICAO's No Country Left Behind initiative. During the opening ceremony, the Honorable Minister along with the Secretary General of ICAO, signed the Hosting Agreement that will see Fiji host the ICAO Liaison Officer for the Pacific Small Island Developing States, who will be based in Nadi.

Fiji underwent the ICAO Universal Security Audit from the 06th – 16th June 2023 with nil significant security concerns raised. We now await submission by ICAO of the Final audit report after which a corrective action plan will be developed and implemented. I take this opportunity to acknowledge the CAAF team who have worked tirelessly in preparation for this audit and thank all in industry for the part you have played in keeping our aviation system secure. Your support and partnership are appreciated.

As we move into the second half of 2023, we must continue in our endeavour to grow a safe, secure and sustainable aviation environment. This will only be possible through collaboration and a genuine desire to understand the requirements and act to implement and maintain correct standards. We at CAAF are here to guide and provide advice when needed. Please engage us early to ensure we are able to provide the information and service you need in a timely manner.

Stay Safe.
Vinaka


MS THERESA LEVESTAM
ACTING CHIEF EXECUTIVE



HOSTING OF ICAO LIAISON OFFICER IN FIJI

read on...pg 13

SAFETY FIRST!



“
THE ENGINE IS THE HEART OF AN AIRPLANE. BUT THE PILOT IS THE SOUL.



**Why embracing the
acceptance of SMS
and it's
implementation is so
vitally important ?**

Management commitment and Responsibility

Good safety management is not about having an SMS manual on the shelf, outlining each of the elements you have in place. Safety management needs *context* to be effective – you need to establish a few fundamentals before you even consider things such as a manual. The ultimate responsibility for safety rests on the shoulders of senior managers—those at the top. You should demonstrate your commitment to, and responsibility for, safety in a formal safety policy, which then flows into safety objectives. These safety objectives must be practical, achievable, regularly reviewed and re-assessed, and communicated to the staff with clear endorsement of senior management.

Checklist:

SMS ITEMS

Management commitment and responsibility

- »» There is commitment of the organisation's senior management to the development and ongoing improvement of the SMS.
- »» There is evidence of decision-making, actions and behaviours that reflect a more positive safety culture.
- »» There is a defined disciplinary policy clearly identifying when punitive action would be considered (for example in cases of illegal activity, negligence or wilful misconduct).
- »» There is evidence that the organisation is applying its disciplinary policy.

To successfully implement an SMS you need to:

- »» Establish expectations. These must come from senior management. What safety standards does senior management want?
- »» Engage personnel (somebody to run the SMS) with competence (some knowledge of the science of safety).
- »» Get staff involved and committed to identifying safety risks. That way you create a culture of shared accountability and responsibility for managing risks from the very start. The stage for a positive safety culture is set by the extent to which organisations accept the importance of proactive risk management.
- »» Do a gap analysis of your existing SMS to see what is missing and develop a customised SMS implementation plan – one which is relevant and appropriate to your organisation.

SMS – what's in it for you?

The business benefits of an SMS

Those in business know that a structured approach to safety management is something that complements and supports good management, engineering and human factors practices. Some of the generally accepted benefits of an SMS include:

- »» Reduction in the direct cost of incidents, aircraft and component damage, aircraft recovery and lost time injuries
- »» Reduction in indirect costs such as insurance, business reputation etc.

What does an SMS cost?

Yes, setting up and maintaining an SMS will cost depending on the size and complexity of your organisation, but an accident will cost far more - potentially your business. History shows that organisations which have had fatal accidents often do not survive. The cost of developing an SMS is estimated at about F\$10,000 to \$30,000 for small and medium-sized airlines with ongoing annual operating expenditures of between \$30,000 and \$40,000. These costs would be much less if an operator already has a functioning SMS. You have to weigh these costs against the direct and indirect costs of accidents and incidents. For a small maintenance organisation, this figure is likely to be halved.

Direct costs

There are obvious, easily measured, on-the-spot costs. These mostly relate to physical damage, and include things such as rectifying or replacing equipment, or compensating for property damage or injuries.

For example, the direct cost of damage from a propeller strike on a light twin aircraft may range from F\$30,000 to \$50,000 for overhaul and engine strips. Recovery and clean-up costs for a 20-seat regional turbo prop aircraft are estimated at F\$350,000 per aircraft.

Why embracing the acceptance of SMS and it's implementation is so vitally important cont.....

Indirect costs

Indirect costs are usually higher than direct costs, but are sometimes not as obvious and are often delayed. Even a minor incident will incur a range of indirect costs. These costs include:

- »» Loss of business and damage to the reputation of an organisation
- »» Legal and damage claims
- »» Increased insurance premiums
- »» Loss of staff productivity
- »» Recovery and clean-up
- »» Cost of internal investigations
- »» Loss of use of equipment
- »» Cost of short-term replacement equipment.

As well as the direct costs of \$15-20,000 in the propeller strike on a light twin aircraft example mentioned previously, indirect costs for aircraft cross hire, rescue and ferry activities could add a further \$20,000.

The above figures suggest that an SMS is likely to produce a number of business benefits, the most obvious being a reduction in accidents and incidents, and in the longer term a reduced insurance rate. An effective SMS will also help to create a more positive working environment, resulting in better productivity and morale.

'The other positive about a good SMS is that if you take the word safety out of it, it's a good management system. It improves the way you do business.'

Lindsay Evans, Network Aviation

Business benefits – parallels between business, safety and quality management

Business and safety management both involve goal setting, establishment of policies, measurement of performance and continuous improvement. However, an SMS goes beyond a business/quality assurance management system (QAM) because it focuses on how people contribute to the safety outcomes of a business. In other words, it focuses on protection; while a QAM focuses on the products and services of an organisation – on production. This people focus underlines the importance of integrating human factors in all parts of an SMS.

Safety culture - where does your organisation sit?

A *safety culture* within an organisation is generally thought to be a set of beliefs, norms, attitudes or practices which reduce the exposure of all people in and around the organisation to conditions considered dangerous or hazardous. According to the International Civil Aviation Organization (ICAO: 1993), the characteristics of a 'safe culture', which should guide decision makers in modelling corporate safety culture, include the following:

- »» Senior management places strong emphasis on safety as part of the strategy of controlling risks.
- »» Decision makers and operational personnel hold a realistic view of the short- and long-term hazards involved in the organisation's activities.
- »» Those in senior positions do not use their influence to force their views on other levels of the organisation, or to avoid criticism.
- »» Those in senior positions foster a climate in which there is a positive attitude towards criticism, comments and feedback from lower levels of the organisation.
- »» There is an awareness of the importance of communicating relevant safety information to all levels of the organisation (and with outside entities).
- »» There is promotion of appropriate, realistic and workable rules relating to hazards, to safety and to potential sources of damage, with such rules being supported and endorsed throughout the organisation.
- »» Personnel are well trained, and fully understand the consequences of unsafe acts. Safe organisations generally:
- »» Pursue safety as an organisational objective and regard it as a major contributor to achieving production goals.
- »» Have appropriate risk management structures, which allow for an appropriate balance between production and risk management.
- »» Enjoy an open and healthy corporate safety culture
- »» Possess a structure which has been designed with a suitable degree of complexity.
- »» Have standardised procedures and centralised decision-making consistent with organisational objectives and the surrounding environment.
- »» Rely on internal responsibility, rather than regulatory compliance, to achieve safety objectives.
- »» Put long-term measures in place to mitigate latent safety risks, as well as acting short term to mitigate active failures.

Safety culture has as much definitional precision as a cloud
James Reason

Other benefits of an effective safety culture

An effective safety culture not only helps to meet your moral and legal obligations (such as providing a safe work environment for employees), but also has other benefits, including:

- »» **Return on investment:** A positive safety culture provides a much greater control over losses. In turn, this allows your organisation to operate in inherently risky environments where the return on investment is the greatest.
- »» **Trust:** A positive safety culture will generate trust on the part of other customers and other aviation organisations, potentially generating more business through alliances.
- »» **Improved audits:** A positive safety culture will welcome audits as an important source of external information and/or confirmation about how well your organisation is performing. There is a strong relationship between safety culture and a safety management system. A safety management system consists of a number of defined minimum standards. However, standards are just words on paper. As *Professor Patrick Hudson* says:

'Sound systems, practices and procedures are not adequate if merely practised mechanically. They require an effective safety culture to flourish. Improvements in safety culture are needed to move off the plateau of performance.'

While safety culture can be considered to be the oil that lubricates the engine parts (elements of the SMS), ultimately, safety culture is the link between behaviour (errors and violations) and the effectiveness of the SMS. An SMS will not be effective unless there is a positive safety culture, which in turn determines how your people will contribute to the SMS and what they think about it.

Managing the risks of organisational accidents.
Aldershot, UK, Ashgate. Reason, J. (1997).

FLEXIBLE CULTURE An organisation can adapt in the face of high-tempo operations or certain kinds of danger - often shifting from the conventional hierarchical mode to a flatter mode.

INFORMED CULTURE Those who manage and operate the system have current knowledge about the human, technical, organisational and environmental factors that determine the safety of the system as a whole.

JUST CULTURE There is an atmosphere of trust. People are encouraged (even rewarded) for providing essential safety-related information, but they are also clear about where the line must be drawn between acceptable and unacceptable behaviour.

LEARNING CULTURE An organisation must possess the willingness and the competence to draw the right conclusions from its safety information system and be willing to implement major reforms.

REPORTING CULTURE An organisational climate in which people are prepared to report their errors and near-misses ■

ADS-B Mandatory Airspace Fiji Domestic Sector

Effective 13th July 2023

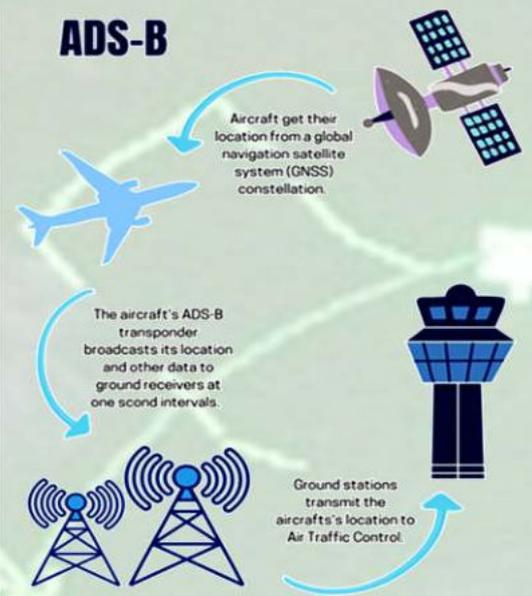


From the 13th July 2023, the Fiji Domestic Sector, becomes Automatic Dependent Surveillance Broadcast (ADS-B) Out Mandatory Airspace. The Fiji Domestic Sector is made up of the following controlled airspace.

Nadi Control Zone (CTR)	Airspace within a circle of 10nm radius from the Nadi Aerodrome Reference Point (ARP) S17 45 23 E177 26 37. Vertical Limits: SFC – 2500FT Class of Airspace – Class D
Nadi Terminal Control Area (TMA)	Airspace within a 40NM arc centered on Nadi ARP from S18 25 32 E177 25 02 clockwise to S17 10 02 E177 46 29, thence along a line to S17 26 43 E178 18 52 to S18 26 38 E177 57 02 thence to S18 25 32 E177 25 02. Vertical Limits: 2500ft – FL250 Class of Airspace – Class D
Nadi Control Area (CTA)	Airspace within 150NM semi-circle from Nadi ARP from S20 16 00 E177 24 11 clockwise to S15 14 45 E177 30 07, thence along a line to S15 17 53 W178 16 04 to S19 03 33 W178 15 42, to S20 16 50 W178 48 50, thence to S20 16 00 E177 24 11. Vertical Limits: 6500ft – FL600 Class of Airspace – Class D

The Fiji Aeronautical Information Circular 03/23; AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN THE FIJI DOMESTIC SECTOR, provides notification to all aircraft operators on Fiji's mandate for ADS-B Out Exclusive Airspace within the Fiji Domestic Sector from 13th July 2023.

The mandate does not apply to State aircraft as referred to in Article 3(b) of the Chicago Convention i.e. aircraft used in military, customs and police services and when equipment is fitted but is unserviceable and the aircraft is being flown to a place where repair or replacement can be carried out.



The provision of Surveillance Control Services within the Fiji Domestic Sector commenced on 6th October 2022.

An ADS-B capable aircraft uses GPS to determine its position and by means of Mode S 1090 ES broadcasts that position at rapid intervals combined with identity, altitude, velocity and other data to ADS-B ground stations which receive and distribute the data to ATM automation systems.

The processed data is displayed at the air traffic controller work position (CWP) enabling the provision of a surveillance control service.

To operate in ADS-B mandated airspace, the pilot or operator of the aircraft must be familiar with the ADS-B system installed in the aircraft. The pilot must be familiar with the content of the flight manual or flight manual supplement that relates to the operation of the ADS-B system, as well as any additional documentation such as pilot guides or quick reference guides.

ADS-B is required to be operational in controlled airspace and functioning from when the aircraft begins to move under its own power until it comes to a complete stop at the end of its flight.

It is important to understand how the ADS-B system operates in your aircraft and how the system determines whether you are on the ground or in the air. When familiarising with these, the pilot must ensure that the failure indications of the ADS-B system in the aircraft are well understood so that appropriate action can be taken.

The transmission of non-compliant ADS-B data is prohibited.

The transmission of non-compliant data may be the result of several factors such as incorrect equipment selection and/or installation, as well as incorrect control of the ADS-B system by the pilot. Therefore, it is essential that the pilot is familiar with the equipment and its manuals to avoid non-compliant data transmission within their control. As many systems are installed on an FAA STC or EASA STC it may be worth noting that the FAA refers to this non-compliance as "non-performing equipment" or "NPE".

Examples of pilot action that may result in the transmission of non-compliant data include:

- Movement of the aircraft under its own power with the ADS-B system turned off (unless permitted to do so by ATC or otherwise);
- Operating with a non-conforming flight identification. This includes how the flight identification is entered in the system, as well as any discrepancies between what is entered

and what is filed on the flight plan;

- Operating with barometric altitude reporting turned off (unless instructed to do so by ATC), or
- Operating the ADS-B system in ground mode whilst airborne.

When filing an ICAO flight plan, ensure the surveillance equipment is correctly filled out in Item 10b. The correct ADS-B capability code should reflect your aircraft capability.

- B1: ADS-B with dedicated 1090MHz ADS-B OUT capability.

As ADS-B in Fiji uses 1090MHz ES, the transponder ID should reflect the correct Mode S capability.

- EB1 or EB2 for standard Mode S ES ADS-B transponders.
- LB1 or LB2 for Mode S transponders with enhanced surveillance.

Operators should ensure the callsign entered into the flight plan matches the Flight ID entered into the ADS-B system.

For those operations that do not require a flight plan to be lodged, the approved callsign or registration mark (without the dash between "DQ" and the remaining characters) should be entered into the ADS-B system.

All aircraft not equipped with ADS-B Out will not be permitted to fly in the Fiji Domestic Airspace unless exempted.

Guidance on the Mode S 1090 MHz Extended Squitter (ES) is detailed in Fiji Airworthiness Notice (FAN 01/13) which was revised on 10th August 2016.

ADS-B Mandatory Airspace

Fiji Domestic Sector effective 13th July 2023

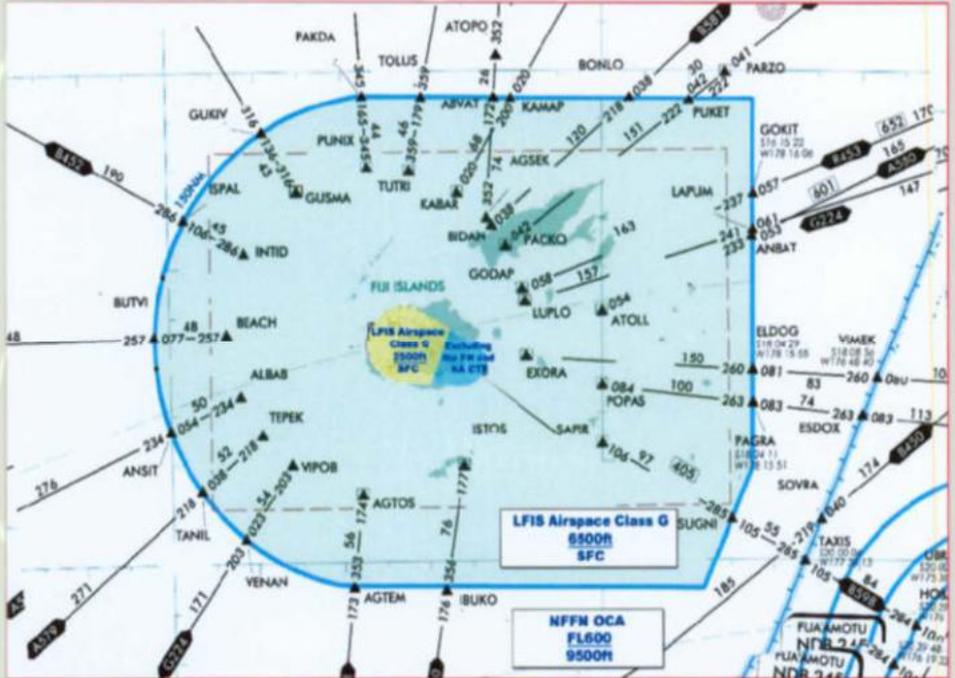
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Guidance on the Mode S 1090 MHz Extended Squitter (ES) is detailed in Fiji Airworthiness Notice (FAN 01/13) which was revised on 10th August 2016.

FAN 01/13 is applicable to all Fiji registered aircraft and aircraft which are operated by an operator domiciled in Fiji. FAN 01/13 requires all applicable aircraft to be fitted with ADS-B equipment as required by Air Navigation Regulation 23 unless –

- a) The aircraft's airworthiness flight authorization document (Certificate of Airworthiness, Flight Permit or equivalent) specifically allows the aircraft to operate without an ADS-B capability; or
- b) The equipment is fitted but is unserviceable and the aircraft is being flown to a place where repair or replacement can be carried out.

The ADS-B transmitter needs to comply with the minimum performance standards detailed in RTCA Document DO-260, DO-260A or DO-260B Paragraph 2.2 as appropriate for the aircraft type. Compliance with RTCA/DO-260B is preferred – noting that this is the requirement being implemented in the USA, Australia and Europe.



To provide a more comprehensive data set to other stations, transmission of the following data is highly desirable, as it is used by the Fiji ATC system:

- **SPI Indication** (in Surveillance Status Subfield of ADS-B airborne position messages);
- **Emergency Flag** (in Surveillance Status Subfield of ADS-B airborne position messages);
- **Emergency Priority Status Information** (may be broadcast in Extended Squitter Aircraft);
- Status Message, RTCA/DO-260A or RTCA/DO-260B);
- **Velocity Information** (Extended Squitter Velocity Message of Surface Position message);
- **GNSS height** (GNSS Altitude Difference from Barometric Altitude in Extended Squitter Velocity message);
- **Aircraft category** (ensure the parameter is correctly set in the extended squitter and category message).

Additional ADS-B data, defined in ICAO Annex 10, Volumes III and Volume IV, Amendment 85 or RTCA/DO-260 or RTCA/DO-260A, may also be transmitted. According to the Fiji AIC 03/23, the advisory on the new mandate for Fiji Airports requires all aircrafts flying in the controlled airspace to meet the applicable standard of Radio Technical Commission for Aeronautics (RTCA) DO-260/DO-260A and DO-260B.

Fiji Airports will ensure that that aircraft flying in the Fiji Domestic Sector will be broadcasting their position updates to ground stations receivers. All aircraft operating in ADS B mandated airspace shall be equipped with ADS-B Out by 13th July 2023 and, operators installing systems compliant with RTCA with RTCA/DO260-A and DO260-B are urged to configure their systems to transmit all available parameters■



CAAf

Directions And Publications

DID YOU KNOW?

CAAf has the power to issue directions and publications under regulation 146 of the Air Navigation Regulations 1981 (ANR).

Directions and publications include:

- Aeronautical Information Circulars (AICs)
- Standards Documents (SDs)
- Fiji Aeronautical Information Publication (AIP)
- Any other official publications as CAAf may deem fit.

To view directions and publications please visit the CAAf website on:

<https://caaf.org.fj/flight-safety/flight-safety-instructions>

Failure to comply with these directions and publication is an offence under regulation 156 of the ANR.

Penalty for non-compliance

- Fine \$2,000
- Imprisonment 12 months ■



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The Regulation of Aviation module (Module 1) provides an overview of how civil aviation is regulated in particular the Chicago Convention 1944 and international bodies, such as the International Civil Aviation Organisation (ICAO), which have established international recognised standards. The module will also look at the various regulatory authorities in terms of their areas of responsibility.

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LET'S GET STARTED

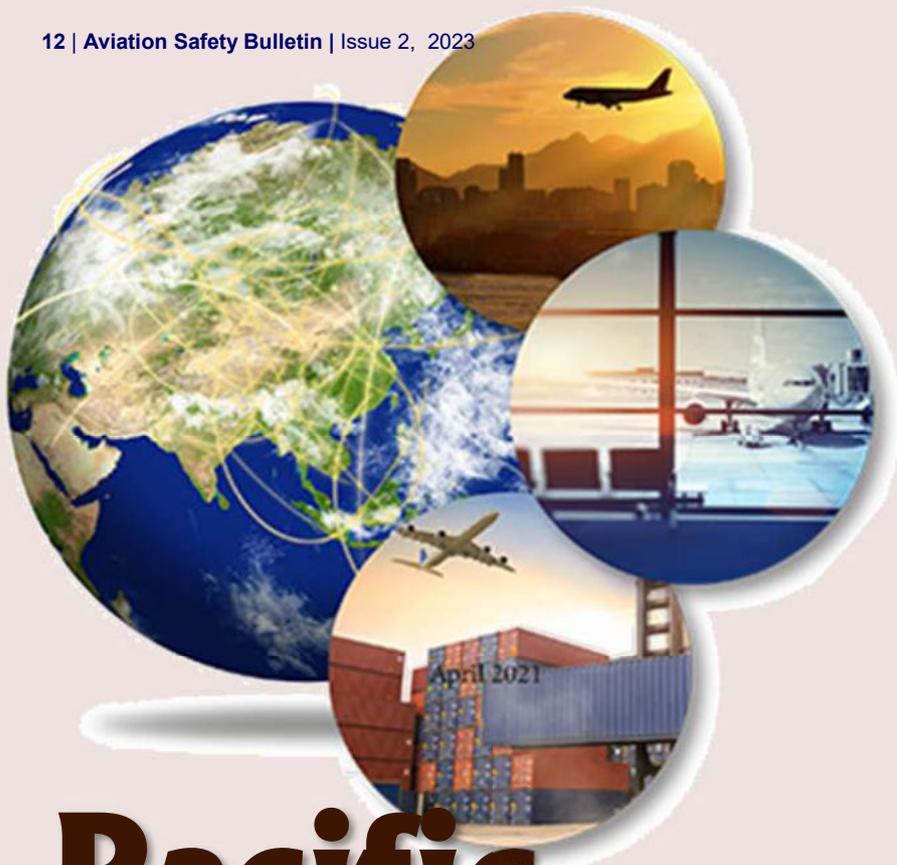
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Pacific Region ICAO CAMP Course

The International Civil Aviation Organisation (ICAO), Asia/Pacific (APAC) Office organized the Regional Session of the Civil Aviation Master Planning (CAMP) Training Course in Nadi, Fiji, from 10th to 14th April 2023.

This course was delivered to nominated participants from ICAO APAC States under the auspices of the ICAO Global Aviation Training (GAT) CAMP Scholarship Programme.

The opening ceremony of the Regional Session was held on 10th April 2023 at the Novotel Nadi Conference Hall. In the opening ceremony, several eminent personalities shared their remarks including Honorable Viliame Gavoka, Deputy Prime Minister and Minister for Tourism and Civil Aviation Fiji, Mr. Diego Martinez, Acting Deputy Director of the ICAO technical Cooperation Bureau, Dr Manjit Singh, Deputy Regional Director, and Ms. Theresa Levestam, Acting Chief Executive of CAAF. The opening ceremony also included video messages from Mr. Juan Carlos Salazar, ICAO Secretary General, and the Ambassador, His Excellency Zhou Jian, Embassy of the People's Republic of China in Fiji.

The course was attended by 25 participants from 7 members states namely Fiji, Indonesia, Kiribati, Malaysia, PNG, Samoa, and Tonga of APAC region. ICAO congratulated all the 25 Civil Aviation Authority Managers who completed the course!

ICAO was particularly proud to see so many women participating in this strategic course, paving the way to advancing #Gender Equality in aviation ■





Hosting of ICAO Liaison Officer in Fiji for PSIDS

The International Civil Aviation Organisation (ICAO) Global Implementation Support Symposium (ICAO GISS 2023) was held in Seoul, South Korea from 29th May to 01st June 2023. The Deputy Prime Minister (DPM) and Minister for Tourism and Civil Aviation, Hon. Viliame Gavoka, attended the Symposium as the Head of Delegation for the Fiji Government.

The ICAO GISS 2023 is a platform where aviation stakeholders are able to collaboratively exchange information and experiences and have bilateral discussions and meetings on areas of critical importance in the aviation industry.

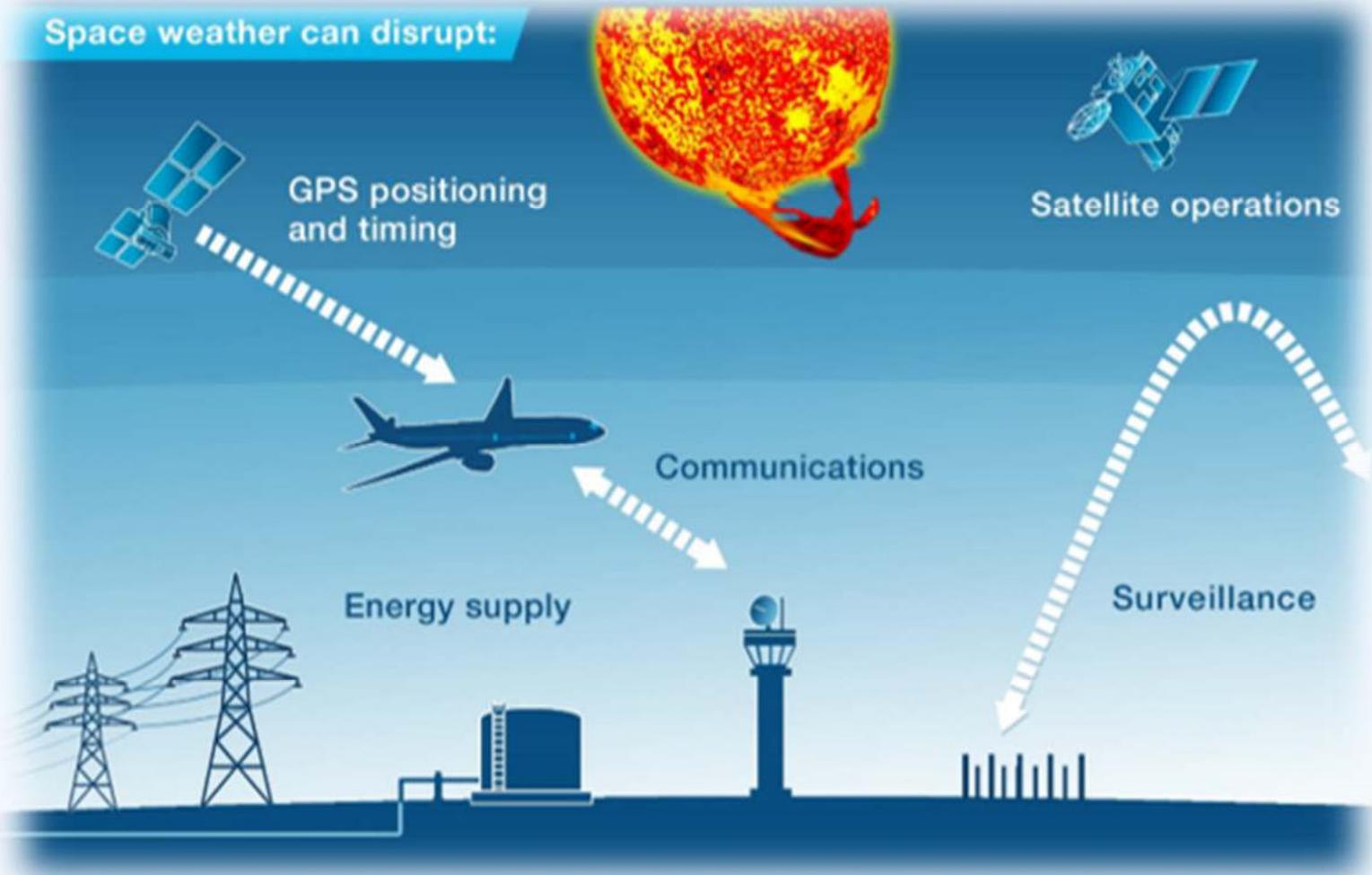
The Opening ceremony was significant as it involved the signing of key agreements by ICAO with States and institution on implementation support programmes. One of these highlight events was the signing with ICAO by DPM Gavoka on behalf of the Government of Fiji and ICAO Secretary-General, Juan Carlos Salazar, on the Agreement to host in Nadi, Fiji, the ICAO Principal Liaison Officer for the Pacific Small Island Developing States.

The Agreement signed was not just for Fiji, but for our fellow brothers and sisters in the Pacific as well. This is another step towards strengthening and promoting Regionalism.

This Agreement moves Fiji closer to ICAO and ICAO closer to Fiji and the Pacific. The remote islands have limited resources that make them vulnerable to external shocks, impacting efforts for sustainable development. Fiji sincerely thank ICAO in their efforts in recognising the distinct challenges faced in fulfilling the 2030 Agenda for Sustainable Development and strengthening of international air transport.

The Fiji Government looks forward to hosting the ICAO Liaison Officer in Fiji and assisting ICAO in its continued commitment to assist States, particularly the Pacific States, in implementing the “No Country Left Behind” initiative. ■





Space Weather In Aviation

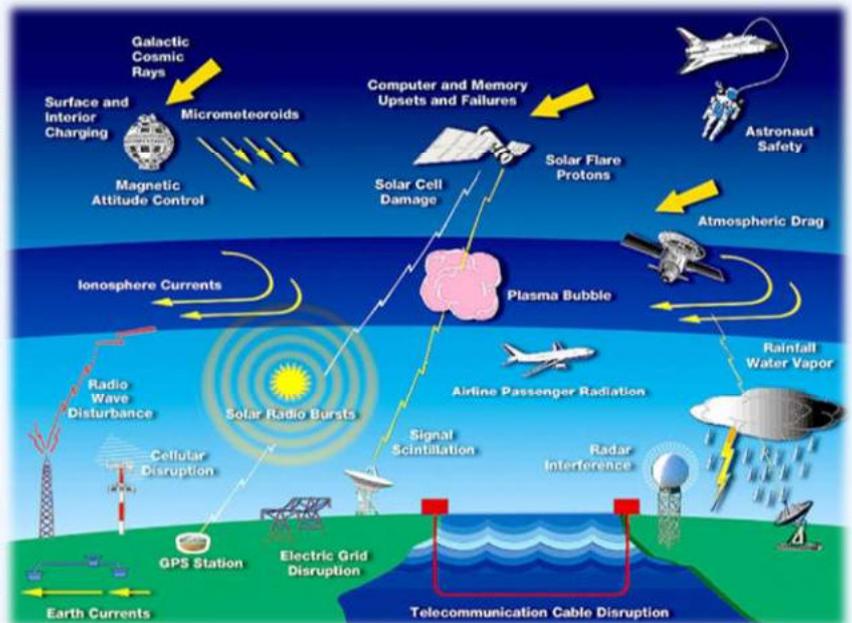
From an operations perspective, space weather events occur when the Sun causes disruptions to aviation communications, navigation and surveillance systems, and elevates radiation dose levels at flight altitudes. Space weather events may occur on short time scales, with the effects occurring from almost instantaneously to over a few days.

The World Meteorological Organization (WMO) defines space weather to be “The physical and phenomenological state of the natural space environment, including the Sun and the interplanetary and planetary environments.” This more comprehensive definition cuts a broader band across the system to include the slowly varying galactic cosmic rays (GCR) coming from outside the heliosphere, as well as the repetitive high-speed solar wind streams from voids in the solar corona.

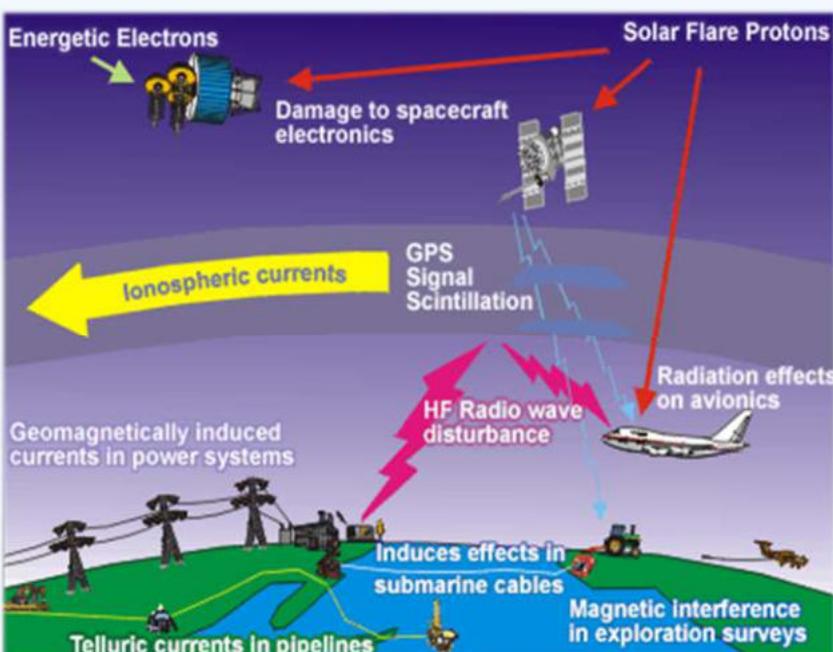
Space weather forecasts for international air navigation address particular types of disturbances, i.e. solar radiation, geomagnetic and ionospheric storms, and solar flares. In addition, predictions of the slowly varying elements (i.e. GCR and high-speed stream-induced geomagnetic storms) are also produced. These forecasts enable operators the opportunity to be situationally aware and to formulate alternative plans should the impending conditions be of a magnitude and a type that could disrupt normal operations.

Possible impact of a severe to extreme space weather event

- **Communication:** HF and, potentially, satellite communication may be degraded or temporarily lost. As an example, on 7 September 2005, solar activity severely impacted all HF communications over the US. However, line of sight VHF was not significantly impacted.
- **Satellite failure:** Potential loss of one or more satellites. Depending on which satellites are lost, the impact may vary significantly. As an example, the March 1989 space weather event may have caused the loss of four US Navy satellites.
- **GNSS-based navigation:** En-route GNSS-based navigation might be lost in a contained area for a limited duration. GNSS-based landing systems (SBAS, GBAS) may be unavailable for tens of hours. As an example, in October 2003 the US SBAS system (named WAAS) was unavailable for 9 and 15 hours.
- **Surveillance:** As a side-effect, GNSS-based surveillance applications may be degraded.
- **Power failure:** Potential power failure over part of a country for tens of hours. As an example, at 2.45 a.m. on 13 March 1989 the entire Quebec power grid collapsed and 6 million people suffered a power black-out for 9 hours.
- **Increase in the radiation level:** Passenger and crew flying at high altitude and latitude may be exposed to a higher radiation level than usual. This increased level of radiation might also lead to onboard system failure. Actual impact is difficult to assess.



Possible impact of a super-extreme space weather event



- **Communication:** HF and, potentially, satellite communication could be temporarily lost. However, line of sight VHF may not be impacted.
- **Satellite failure:** From experts' assessment, up to 50% of the space vehicles may be lost. Depending on which space vehicles are lost, impact can vary significantly.
- **GNSS-based navigation:** Space vehicle failure combined with ionosphere storms may lead to a partial or complete loss of GNSS services.
- **Surveillance:** As a side-effect, GNSS-based surveillance applications may be unavailable.
- **Power failure:** Simulations on the US power grid estimated that 50% of the US may be under a power black-out. Similar results may happen over Europe. The recovery time may vary between dozens of hours to months, depending on the system failure.

- **Increase in the radiation level:** Passenger and crew flying at high altitude and latitude may be exposed to a higher than usual radiation level. This increased level of radiation may also lead to onboard system failure. Actual impact is difficult to assess.

Space Weather in Aviation

cont...

Some Solutions

- **Satellite failure and GNSS-based applications:** A back-up to satellite communication and navigation should remain available. Depending on the flight phase, area and aircraft equipment, this back-up could be HF/VHF/SATCOM voice communication, ground based navigation, radar vectoring, inertial navigation, etc.
- **Power failure:** Air traffic control centres have alternate power generation in case of power failure to ensure the safety of air navigation.
- **Increase in the radiation level:** As the radiation dose is higher at higher altitude and latitude, a possible solution is to decrease the aircraft altitude and latitude. However, the geographic and altitude limit are difficult to determine. Currently, airlines are not flying polar routes when a radiation storm is in progress.
- **Forecasting for Aviation.** The Met Office in the UK have recently created a Space Weather Centre to monitor and inform flight crews of space weather related events and risks. This will be expanded over the coming years.

International Civil Aviation Organization space weather advisory service

The International Civil Aviation Organization (ICAO) has implemented an internationally standardised global space weather advisory service for aviation. Aviation operators receive notifications from the ICAO space weather advisory service and have plans to mitigate impacts.

The ICAO service targets 3 key areas of space weather impacts on aviation:

1. performance of GNSS-based navigation and surveillance
2. performance of HF communications systems
3. the level of radiation exposure for passengers and aircrew, particularly on polar routes.

Advisories are issued for each effect at two impact levels: moderate and severe ■

Sources: ICAO Doc 10100 - Manual on Space Weather Information in Support of International Air Navigation
<https://www.skybrary.aero> ; <https://public.wmo.int/en> ; <http://www.bom.gov.au>



Flight Crew Validation Application Process



Formal Application

Applicant submits PL101 form with supporting documents and pays relevant fees.

1

- a) Valid Foreign Pilot's Licence with associated ratings
- b) Valid Foreign Medical Certificate
- c) Up to date personal Flying Log Book detailing flying experience
- d) Passport or Birth Certificate together with a valid Photo ID
- e) Police Clearance from the State that issued the pilot licence

**Application Forms can be accessed from our website www.caaf.org.fj or collected from the counter.*

Application Evaluation

Form is checked for completeness, accuracy and payments, then assessed as per the Standard Document. Licensing Officer send a Verification Request to the issuing Authority

**Receipt of verification may take up to a week with some Authorities.*

2



Licence Processing

Once Verification Letter is received Certificate of Validation is processed and forwarded for endorsement.

3



Verification & Endorsement

Certificate of Validation is verified and endorsed. Post procedures are conducted.

4



Ready for collection

Certificate of Validation is issued to applicant.

5



ISO 9001:2015 CERTIFIED

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E-mail: info@caaf.org.fj
Website: www.caaf.org.fj

Sustainable Aviation Fuel

Sustainable aviation is a multi-disciplinary field that seeks solutions to improve the environmental and societal impacts of air transportation. It aims to reduce aviation's contribution to climate change through new practices and radical innovation.

The three pillars of sustainability – social, economic and environmental when incorporated in aviation will allow air transport to grow in an environmentally sustainable manner, while continuing to ensure freedom to travel by air.

Designing a sustainability strategy requires a thorough understanding of the company's goals, risks, opportunities, and stakeholders. The process should be data-driven, inclusive, and iterative, with clear objectives, a roadmap, stakeholder engagement, monitoring, and continuous improvement. These normally requires the following steps:

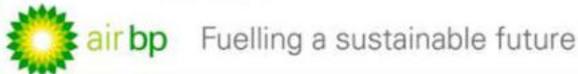
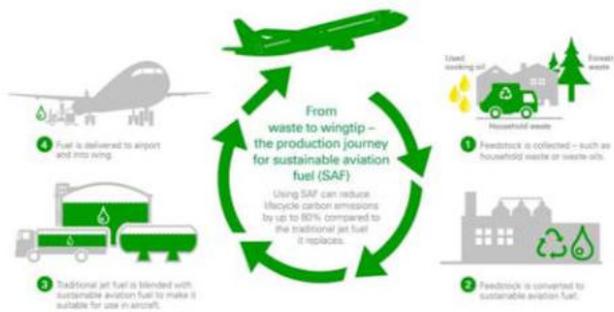
- Define sustainability objectives: The first step in designing a sustainability strategy is to define objectives in line with the company's mission and core values. Objectives should take into account the company's unique sustainability risks, opportunities, stakeholder interests, and industry-specific challenges.
- Conduct a sustainability assessment: A sustainability assessment can identify areas where the company can improve its environmental, social, and governance (ESG) performance. By conducting an assessment, it is possible to identify gaps and opportunities for improvement.
- Develop a sustainability roadmap: Based on the objectives and assessment, a roadmap for achieving sustainability goals should be developed. This roadmap should prioritize actions, set deadlines and assign responsibilities.
- Engage stakeholders: Engaging key stakeholders such as employees, suppliers, customers, investors, and community members is an important part of a sustainability strategy. By listening to stakeholders, it is possible to identify areas that require attention and develop initiatives that benefit both the company and its stakeholders.
- Implement and monitor progress: A sustainability strategy is only effective if it is implemented and monitored. Therefore, it is important to assign clear responsibilities, track progress, and report results to stakeholders. Regularly monitoring progress can help identify areas of improvement, while demonstrating the company's commitment to sustainability.
- Continuously improve: Sustainability is an ongoing process. It is important to continuously evaluate the sustainability strategy to ensure it is achieving the intended outcomes and to identify opportunities for improvement.

There are sustainable strategies that can be considered for adoption by the aviation sector. We will discuss the use of Sustainable Aviation Fuel as a strategy for a sustainable aviation.

SAF is produced from sustainable feedstocks and is very similar in its chemistry to traditional fossil jet fuel. Using SAF results in a reduction in carbon emissions compared to the traditional jet fuel it replaces over the lifecycle of the fuel. Some typical feedstocks used are cooking oil and other non-palm waste oils from animals or plants; solid waste from homes and businesses, such as packaging, paper, textiles, and food scraps that would otherwise go to landfill or incineration. Other potential sources include forestry waste, such as waste wood, and energy crops, including fast growing plants and algae. Air bp's SAF is currently made from used cooking oil and animal waste fat.



How is sustainable aviation fuel made?



The use of SAF is important because jet fuel packs a lot of energy for its weight and it is this energy density that has really enabled commercial flight. Today, there aren't any other viable options for transporting groups of people quickly over very long distances, so operators are dependent on this type of fuel in aviation. A return flight between London and San Francisco has a carbon footprint per economy ticket of nearly 1 tonne of CO₂e. With the aviation industry expected to double to over 8 billion passengers by 2050, it is essential that aviation stakeholders act to reduce aviation's carbon emissions and SAF is one way which can achieve that.

SAF is safe to use. SAF is suitable for any aircraft that has been certified for using the current specification of jet fuel can use SAF.

SAF can be blended at up to 50% with traditional jet fuel and all quality tests are completed as per a traditional jet fuel. The blend is then re-certified as Jet A or Jet A-1. It can be handled in the same way as a traditional jet fuel, so no changes are required in the fuelling infrastructure or for an aircraft wanting to use SAF. In 2016, AirBP was the first operator to commence commercial supply of SAF through an existing hydrant fuelling system, at Norway's Oslo Airport.

SAF is currently more costly than traditional fossil jet fuel. That's down to a combination of the current availability of sustainable feedstocks and the continuing development of new production technologies. As the technology matures it will become more efficient and so the expectation is that it will become less costly for customers. There is an increased uptake of SAF as airlines and their passengers increasingly recognize and value the benefits of the emission reductions.

The aviation industry aims to achieve net zero carbon emissions by 2050. The adoption of SAF is a key part of achieving this goal ■

Sourced: Air BP



IATA's Designing a Sustainable Strategy Course, organized by Fiji Airways 19th April 2023.

INTERNATIONAL CIVIL AVIATION ORGANISATION UNIVERSAL SECURITY AUDIT OF FIJI, 6TH–16TH JUNE 2023

A four (4) member team from the International Civil Aviation Organisation (ICAO) conducted an aviation security audit of Fiji's aviation security system from the 6th – 16th June 2023 at Nadi. The team members were from France, Singapore, China and the Marshall Islands. The objective of the audit was to strengthen the implementation of aviation security globally through comprehensive audits and continuous monitoring.

Fiji had previously been audited twice by ICAO in 2007 and 2012, with a follow up audit in 2009. However, this was the first time for Fiji to be audited under the new continuous monitoring approach (CMA) methodology. The new methodology focusses on continuous monitoring through audits of a State's implementation of ICAO Annex 17-Aviation Security Standards and Recommended Practices (SARPs) and the security provisions of ICAO Annex 9 – Facilitation.

The Civil Aviation Authority of Fiji (CAAF) extended invitations to Samoa and Kiribati to observe Fiji's audit in preparation for their own audit later this year. Two (2) observers from Samoa and one (1) from Kiribati attended and observed Fiji's audit. As in all audits, there is always room for improvement and the audit provided a unique opportunity for meaningful engagement and learning, including opportunities for continuous improvement.

The Civil Aviation Authority of Fiji acknowledges with gratitude the respective stakeholders in the aviation industry for their collaboration and support during the audit. This enabled the audit to progress well. CAAF looks forward to the aviation industry's continuous support in preparing Fiji's audit corrective action plan for submission to ICAO but more importantly; to ensure that aviation security is implemented consistently and air travel remains secure from acts of unlawful interference ■

The Importance of Sleep

Why Is Sleep So Important?

Lack of sleep affects our memory, ability to think clearly and causes neurological dysfunctions like mood swings and hallucinations. It leads to a higher risk of developing obesity, diabetes and cardiovascular disease.

Sleep difficulties affect our well-being, overall functioning and quality of life. 50-70 Million Americans are chronically suffering from a sleep disorder.



Insomnia is a complaint of difficulty falling or staying asleep associated with significant distress and impairment of daytime function. It is common with a 10% prevalence in the general population.

Available treatment options include cognitive behavioural therapy (CBT) and medications such as benzodiazepines, melatonin receptor agonists, selective histamine H1 antagonists, antidepressants, antipsychotics, anticonvulsants and non-selective antihistamines.

Alcohol, benzodiazepines and barbiturates are associated with decreased REM sleep. Benzodiazepines increase the arousal threshold in N3 and REM sleep.

- We spend about a third of our lives asleep.
- Aside from exercise and diet, sleep is the single most important thing one can do to reset brain and body health.
- Depriving yourself of food, water and exercise for a day may pass largely un-noticed however 24 hours without sleep is quickly felt.

- There is a global sleep loss epidemic in modern society. The Centres For Disease Control (CDC) considers insufficient sleep a public health epidemic.

We know we all sleep though we hardly ask why we sleep.

Evolutionary, sleep is idiotic and makes no sense to us as a species. When you're asleep you're not finding a mate, foraging for food, caring for your young and worst of all vulnerable to predation.

Sleep should be strongly selected out by evolution but sleep evolved with life itself on this planet. So, sleep must be essential at the most basic of biological levels.

In fact, mother-nature didn't make a blunder with sleep – sleep will restock the weaponry in your immune arsenal making you more immune sensitive and robust when you wake up. It regulates your blood sugar levels, controls appetite, regulates the sex hormones testosterone and estrogen, it fixates memories in brain and helps in learning. Sleep de-escalates anxiety, reduce emotional difficulties and traumas and cleans away the toxic proteins that build up in the brain and body.

Even though sleep increases libido the societal expectations of couples to sleep in the same bed or same bedroom is causing a lot of disturbances to sleep. Though many couples suffer in silence, 1/3 have made the best decision to sleep separately when they are ready to sleep, either in separate beds or separate rooms. This is often termed a “sleep divorce” within a healthy marriage. Interestingly stress or lack of sleep has been sighted as a reason for actual divorce.

Though sleep is biological it requires to be aided by conducive environmental factors. Sadly, the capitalistic modern world environment has created a war against sleep, and those who crave sleep are seen as weak and unproductive.

The **Recommended Daily Allowance** of sleep is 7-9 hrs per night though 1/3 of the World’s population fail to meet this.

Eg. Average sleep hours per country - USA 6hrs 29 mins, UK 6 hrs 49 mins, Japan 6 hrs 22 mins, Mexico 8hrs.

There is no public health campaign on sleep anywhere in the World as in Suicide (insufficient sleep is a precursor of suicide), Obesity, Smoking etc.

Insufficient sleep costs most Nations ~ 2% of their GDP eg. USA \$411 Billion.

Stages of Sleep

There are 2 types of sleep:

- a) Non-Rapid Eye movement (Non-REM sleep) NREM sleep further divided into stages 1, 2, 3 representing a continuum of relative depth.
 - b) Rapid Eye Movement (REM sleep).
- 1) **N1** (Stage 1) Light sleep (5% of total sleep time)
 - 2) **N2** (Stage 2) Deeper sleep (45% of total sleep time) Stage 2 lasts ~25minutes in the first cycle and lengthens with each successive cycle. Bruxism or grinding of teeth occurs here.
 - 3) **N3** (Stage 3) Deepest Non REM sleep (25% of total sleep time). This is the most difficult stage to awaken from. If awoken at this stage the person will experience a transient state of mental foggi-ness known as sleep inertia and impaired mental performance for 30mins–1 hr. This is the stage when the body repairs and regrows tissues, builds bone and muscle, and strengthens the immune system. This is also the stage when sleepwalking, night terrors and bedwetting occurs.
 - 4) **Rapid Eye Movement -REM** sleep (25% of total sleep time). This is not considered a restful sleep stage and dreams occur here. The brain waves resemble an awake individual with rapid eye movements and the muscles remain paralysed so people cannot act out their dreams. Breathing is erratic and irregular and penile /clitoral erections occur here. This stage begins 90minutes after falling asleep and gets longer with each sleep cycle throughout the night. The first period typically lasts 10minutes with the final one lasting 1 hr . People tend to awaken spontaneously in the morning during this stage.

Stages N1-N3 are considered Non-Rapid Eye Movement (Non-REM sleep) with each stage a progressively deeper sleep. Approximately 75% of sleep is spent in Non-REM stages especially N2. A typical night’s sleep consists of 4-5 sleep cycles with the progression of sleep stages in the following order: N1, N2, N3, N2, REM. complete sleep cycle takes 90-110 minutes. The first REM period is short and as the night progresses longer periods of REM and shorter periods of NREM deep sleep occur.



Aviation Medicine cont....

NASA did an experiment in the 1980s on the effectiveness of Naps in the Astronaut programme.

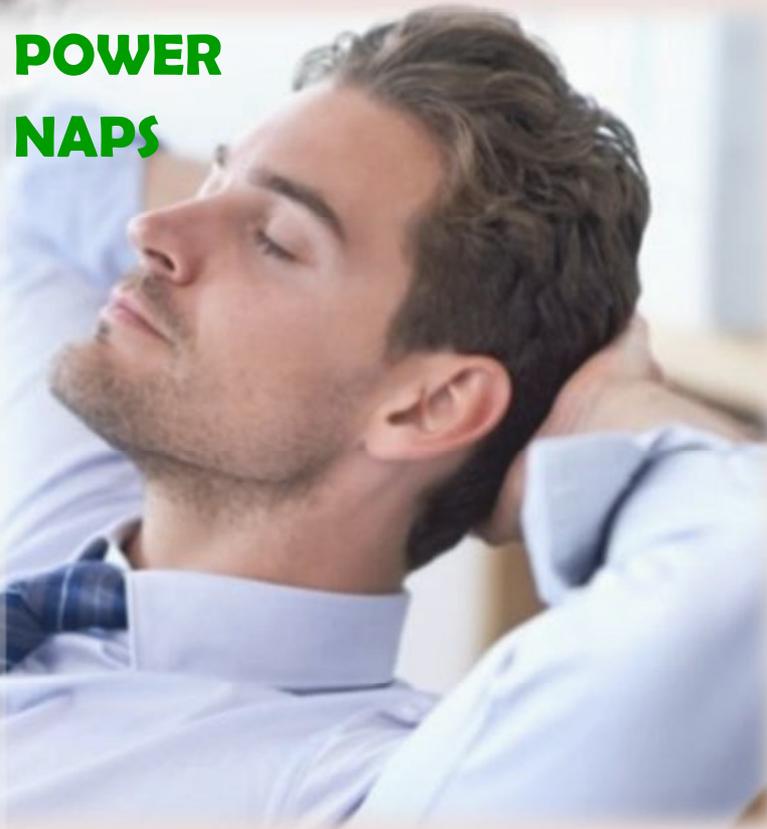
It was found that Naps of 20mins – 1 hr increases productivity by 34% - 50%. Termed (Nasa-Naps) this idea was soon copied by many other Industries.

Employees who under-sleep - refuse to take on challenging problems. Of problems they do take on, they produce fewer creative solutions. In team-work situations these employees slack off and let others do the work.

Employees who under-sleep take 11 more days sick-leave/annum. Also, their utilisation of healthcare resources increases by 80%.

Do not nap longer then recommended because you will fall into deep sleep and when you wake from this, you will feel miserable rather then refreshed. Also, do not nap late into the afternoon because it affects your night sleep.

POWER NAPS



THE DIFFERENCE BETWEEN COFFEE AND CAFFEINE

Caffeine is a chemical contained in coffee with a ½ life of 5-6 hours. It is a stimulant and when consumed close to bedtime will remain active in your body throughout the sleep duration. Caffeine latches onto Adenosine receptors in the brain and inhibits it. Adenosine is a pro-sleep neurotransmitter.

Caffeine crash – When caffeine is active adenosine levels rise in the blood. When caffeine levels fall the excess adenosine causes double or triple sleepiness. Caffeine shortens deep sleep. You don't feel refreshed when you wake up. Deep sleep refreshes the Cardiovascular system, Metabolic System and the Immune system. Deep sleep consolidates new memory in brain, cleanses the brain of metabolic toxins that play a role in Alzheimer's disease.



Coffee as a beverage have undeniable health benefits and it's got nothing to do with the caffeine content. Coffee contain high levels of antioxidants.

Sleeping Pills

Sleeping tablets should not be a first line treatment for Insomnia. Cognitive Behavioural Therapy (CBT) should be first line.



Meditation

Meditation is useful when you wake up in middle of night and cannot sleep. Also meditating prior to sleep is useful if you suffer from insomnia. Meditation apps are available that includes sleep stories which are very effective.



A Mental Walk

A mental exercise where you imagine you're on your favourite walk. Be as vivid and as detailed as possible in your imagination from the moment you exit your front door-the flora and fauna, breeze, aromas and sounds - you will fall asleep.



Remove all clocks

Knowing what time of night, it is when you're struggling to sleep is no favour. Accept your situation, it's ok, tonight is not your night and just lie in bed and rest.

Sleep Hygiene tips

- 1) Regularity of bed-time.
- 2) Get darkness in your room. Dim all lights in the home 1-2 hours before bed-time.
- 3) Keep bedroom temperature cool at 18C ambient temperature.
- 4) Alcohol is not a sleep aid. It causes fragmented sleep and blocks REM sleep.
- 5) Avoid Caffeine before bed.
- 6) Blue light from gadget screens decreases melatonin secretion.



CONCLUSION

Evolution has protected and maintained sleep throughout humanity because man cannot survive without it. However, it is ironic that the average person takes sleep for granted and pays little attention to the purpose and usefulness of sleep in the maintenance of healthy living.

A healthy sleep hygiene is just as important, if not more, than a healthy diet, weight or metabolic health and it needs to be encouraged and protected.

Pilots are particularly attuned to adequate sleep because it affects wakefulness and alertness in the cockpit. Long haul pilots that cross multiple time zones are plagued with jet lag as a direct result of sleep pattern disturbances. On the long-term Alzheimer's disease affects largely people who do not have adequate sleep chronically■

Author: *Dr Isireli Biuamaitotoya*

CAA Fiji is keen to hear from you regarding our levels of service. If you believe you have constructive ideas on how we can improve our services, or would like to report instances where we have failed to meet your expectations, please send your feedback to CAAF, preferably using the QA 108 form that can be accessed from our website. This can be sent to CAAF via email or dropping it in the feedback box in the foyer of CAAF HQ, or

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air and on
water....”**

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