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AVIATION SAFETY BULLETIN

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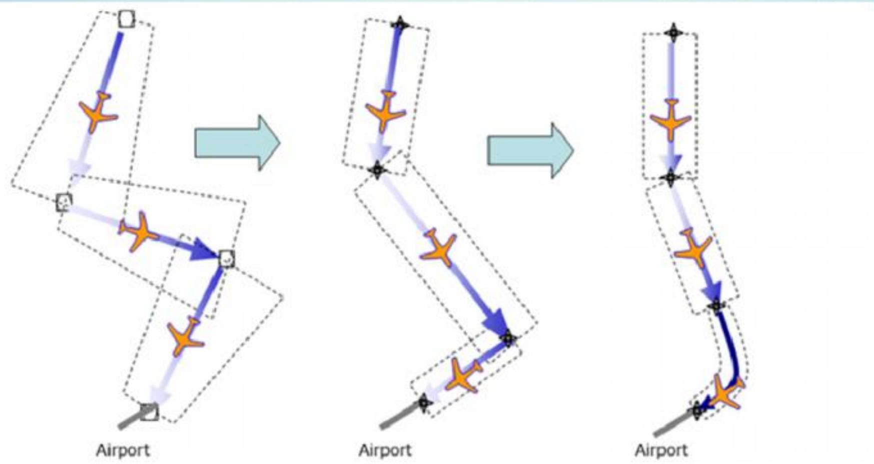
Inside this Issue:



Flight Path with Conventional Navigation
Using conventional navigation an aircraft flies to/from ground-based navigation aids.
It is often the case that navigation aids cannot be set so that aircraft fly the shortest distance because of geographical constraints, so flight distances tend to be longer, which translates to higher fuel consumption.

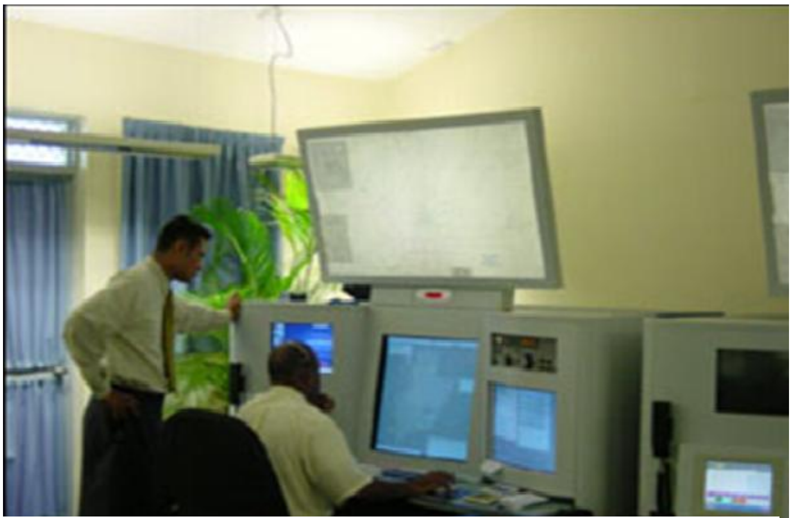
Flight Path with RNAV
Because passing points (waypoints) can be set in a flexible manner independent of ground-based navigation aids, a more optimal flight course can be designed.

Flight Path with Higher Accuracy Navigation
By using higher accuracy navigation systems such as RNP AR, a curved path can be designed to deliver a shorter flight path. In addition, where conditions allow, it may be possible to design a flight course not achievable with previous navigation methods.

SUPERVISION IN AIR TRAFFIC MANAGEMENT

Constant supervision plays an important role in the provision of a safe and efficient Air Traffic Service. To that end, it is vital that ATC Duty Supervisors are deployed on shift duties round the clock at ATC units where such a need has been identified.

30% of ATC related incidents in 2013 identify inadequate supervision as a contributory factor.



Nadi ATM Centre Supervisor, Ivan Wong, on hand to assist Air Traffic Controller, Vereniki Tinibua, during a high density traffic period at the Nadi ATMC.

Over the years, increased automation in ATC systems, has seen the duties and responsibilities of the ATC Duty Supervisor somewhat changed. It is therefore essential that ATM management ensure that any changes made to the role of the Duty Supervisor are implemented safely.

Being a Duty Supervisor requires maintaining a constant watch over the traffic activity and operational conditions in order to provide timely assistance to controllers and to ensure that available resources are deployed for optimal efficiency.

The objectives of 'Watch Supervision' are clearly stipulated in the Fiji Manual of Air Traffic Services Volume 2 ADM Section;

"3.5 Supervision

3.5.1 The provision of an efficient ATS service requires "supervision" of each watch regardless of the number of staff on duty. A supervisor's primary function is to monitor and direct as necessary the operations of an ATS unit. Persons supervising shall ensure best utilisation of staff during anticipated high and low traffic levels. Careful monitoring of traffic levels shall be made to ensure any unusual traffic peak is handled safely.

3.5.2 When two or more persons are on duty and no supervisor is available, the senior of the two officers shall be the officer in charge. The supervisory duty may be rotated among qualified staff and includes the full range of duties associated with watch supervision."

Furthermore, duties and responsibilities of the ATMC Shift Supervisor, Tower Supervisor and Tower Monitors are also detailed in the Fiji Manual of Air Traffic Services Volume 2, ADM section. All ATM staff shall be familiar with and adhere to these instructions.

In summary, the Duty ATM Supervisor shall:

- be responsible for the tactical management of an ATC watch. This will, however, not relieve the ATCOs of their responsibilities,
- ensure that the ATS personnel perform their duties efficiently and in accordance with current SOPs and instructions. Shortcomings in the performance of work by ATCOs and other supporting staff should be taken note of and personnel concerned advised to improve the performance,
- perform operational duties in addition to watch supervision duties and to that end, he/she shall periodically perform duties on active ATC positions while ensuring that the supervisory functions are not affected,
- be physically present in the operational area. If the need arises for him/her to leave the operational area or to engage in an activity which will interfere with or preclude the performance of watch supervision duties, then the next senior most officer in the shift must be designated to supervise the watch ∎

(Article By Ground Safety Department)

RUNWAY INCURSIONS

The reduction in the number and severity of runway incursions is a top priority for all Aerodrome Operators.

What is a runway incursion?

The Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) defines a runway incursion as:

"Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft."

Simply put, it is an unauthorized intrusion onto a runway, regardless of whether or not an aircraft presents a potential conflict.

All aviation safety programmes have a common goal; to reduce hazards and mitigate and manage risk in aviation. Runway operations are an integral part of aviation and thus the hazards and risks associated with runway operations need to be managed in order to prevent runway incursions which result in significant and costly flight delays and serious incidents and accidents.

A review of the investigations on runway incursions in Fiji has identified a number of factors that have contributed to runway incursions over the years, these include:

a. aerodrome improvement projects plagued with inadequate coordination and implementation of procedures, signage and markings for movement around airside by work parties,

b. breakdown in communications such as the use of non-standard phraseology, overlong and complex instructions and failure to ensure read back of instruction,

c. lack of familiarisation with the aerodrome manoeuvring areas,

d. lack of aerodrome maps for reference in vehicles,

e. inadequate fencing,

f. increases in traffic volume,

g. loss of situational awareness,

h. failure to obtain ATC clearance

Common scenarios of runway incursions in Fiji include:

a. wildlife entering an active runway causing aircraft go-arounds and holding delays by aircraft in the air and on the ground;

b. an aircraft or vehicle crossing the runway-holding position marking;

c. an aircraft or vehicle unsure of its position and inadvertently entering an active runway;

d. a breakdown in communications leading to failure to follow an air traffic control instruction.

For recording purposes, Fiji divides runway incursions into the following categories:-

a. RI-VAP – Runway Incursion involving Vehicle, Aircraft, People

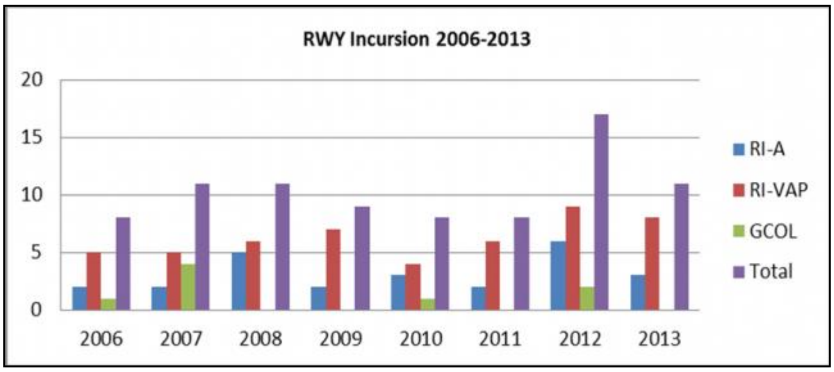
b. RI-A – Runway Incursion involving Animal, and

c. GCOL – Ground Collision

Data gathered on the runway incursions reported at Fiji Aerodromes (International, Domestic and Private) over an 8 year period from 2006-2013 show the following:-

Year	2006	2007	2008	2009	2010	2011	2012	2013	Total
RI-A	2	2	5	2	3	2	6	3	25
RI-VAP	5	5	6	7	4	6	9	8	50
GCOL	1	4	0	0	1	0	2	0	8
Total	8	11	11	9	8	8	17	11	83

(Source: CAAF Bird strike/Incident notification Form OR002)



Runway incursions reported in 2013 were 38% more than that reported in 2006. A further breakdown of the types of runway incursions over the past 8 years show that 30% were attributed to animal incursions, 60% to vehicle, aircraft and personnel incursions and 10% to ground collisions.

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RUNWAY EXCURSIONS cont...

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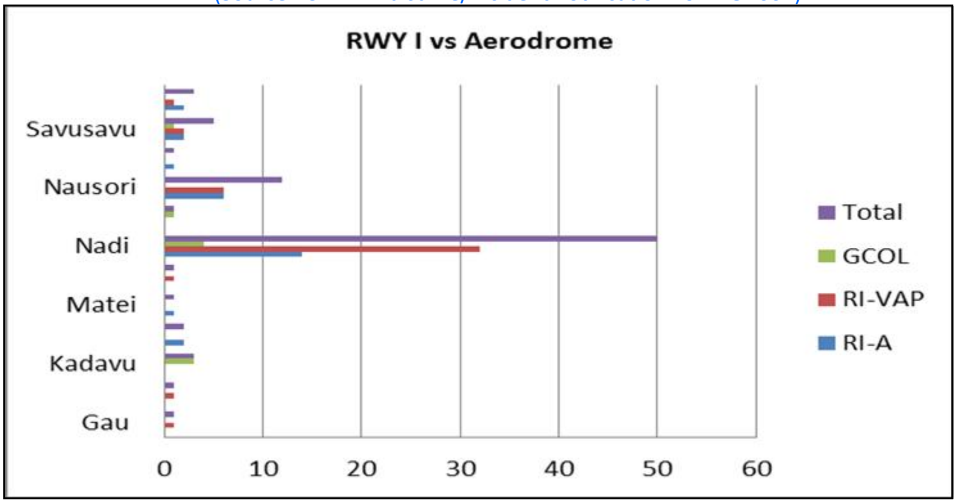
Of these totals, Nadi International Airport recorded the highest number of runway incursions at 60% of the total incursions with Nausori International Airport recording 14% and Savusavu Airport 6%.

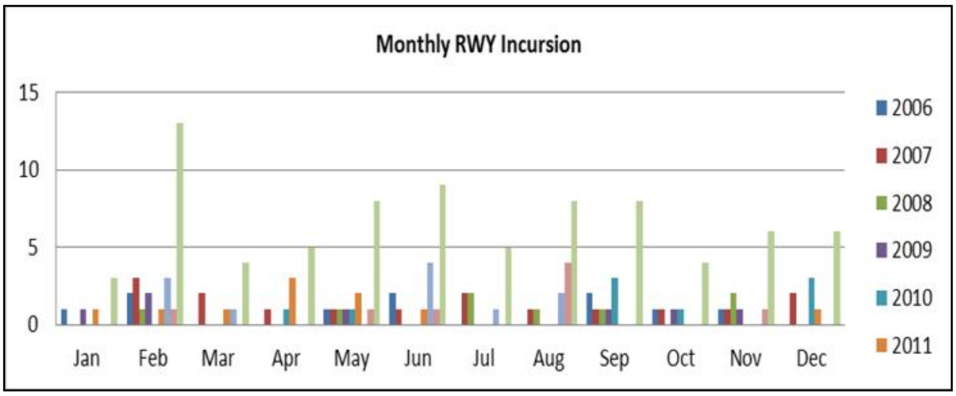
	Gau	Kdavu	Nnuku	Matei	Moala	Mllailai	Nadi	Svsavu	Vomo	Nsr	Mana	Others
RI-A	0	0	0	1	2	0	14	2	0	6	1	2
RI-VAP	1	0	1	0	0	1	32	2	0	6	0	1
GCOL	0	3	0	0	0	0	4	1	1	0	0	0
Total	1	3	1	1	2	1	50	5	1	12	1	3

(Source: CAAF Bird strike/Incident notification Form OR002)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	1	2	0	0	1	2	0	0	2	1	1	0
2007	0	3	2	1	1	1	2	1	1	1	1	2
2008	0	1	0	0	1	0	2	1	1	0	2	0
2009	1	2	0	0	1	0	0	0	1	1	1	0
2010	0	0	0	1	1	0	0	0	3	1	0	3
2011	1	1	1	3	2	1	0	0	0	0	0	1
2012	0	3	1	0	0	4	1	2	0	0	0	0
2013	0	1	0	0	1	1	0	4	0	0	1	0
Total	**3**	**13**	**4**	**5**	**8**	**9**	**5**	**8**	**8**	**4**	**6**	**6**

(Source: CAAF Bird strike/Incident notification Form OR002)



Airports Fiji Limited in their Corporate SMS Manual has identified "Runway Incursion" as one of its focus areas, assigning the following safety performance indicator to maintain the acceptable level of safety (ALoS):

a. *Focus Area* – runway incursion

b. *Objective* – to achieve a **zero** runway incursion rate at all our aerodrome; and

c. *Performance Target* – to reduce runway incursion by 80%

Runway safety is a shared responsibility among aerodrome operators, pilots, controllers, and vehicle drivers. A pro-active approach, education and situational awareness by all involved are the keys to preventing incursions. ∎

(Article Submitted by Ground Safety Team)

BROADER COST REPERCUSSIONS OF WILDLIFE STRIKES

The total cost of a wildlife strike is the sum of the direct, indirect, ancillary, hull-loss fatality and legal liability costs.

Direct costs

The direct costs refer to those incurred in the repair or replacement of damaged parts, and include the actual cost of the parts, labour and the overhead cost associated with the labour.

Industry data on these direct repair costs are available, but limited analysis has been done to isolate wildlife-strike repair costs from other foreign object damage (FOD) costs.

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BROADER COST REPERCUSSIONS OF WILDLIFE STRIKES cont...

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The under-reporting of wildlife strikes suggests that the amounts indicated in related repair-cost data will be low. Available data does indicate that repair costs resulting from wildlife strikes are significant. In the United States, the Federal Aviation Administration (FAA) reports an average direct cost for damaging strikes between 1991 and 1999 of approximately USD$90,000. These figures do not include any complete hull-loss accidents.

In December 2013, there were 3 confirmed bird strikes for Nadi – one of which cause $36,000 worth of damage to fan blades on a Fiji Airways aircraft.

Indirect costs

Wildlife strikes can also generate a vast number of indirect costs for aircraft operators. Indirect costs are influenced by the extent of damage to the aircraft, distance from the operator's nearest repair base, size of the airline fleet and the operator's type of business (passenger, cargo, charter). Indirect costs can include some or all of the following:

- Fuel used and dumped during precautionary and emergency landing procedures;
- Transporting replacement parts and mechanics to the site;
- Accommodation and meal costs for repair crews;
- Accommodation, compensation and meals for stranded passengers and flight crews;
- Replacement aircraft;
- Replacement flight crews;
- Missed connections and re-booking passengers on alternate flights, often with other carriers;
- Delaying effects on highly integrated airline schedules, particularly for airlines employing major hub-and-spoke operations;
- Replacement of damaged aircraft on subsequent scheduled flights until repairs have been made;
- Downtime costs of damaged aircraft;
- Contractual penalties for late delivery of freight;
- Lost business opportunities for delayed passengers;
- Loss of passenger confidence and goodwill.

The indirect costs of bird and mammal strikes are not well documented. Some of the examples listed above are not tracked by airlines. In many—if not most—cases, the indirect costs associated with a damaging bird strike are greater than the direct costs.

Ancillary costs

Ancillary costs are incurred by the airport owner or operator, regulatory authorities, other airport users and emergency-response agencies that must deal with the results of bird or mammal strikes. Ancillary costs include:

- Runway closures;
- Airport emergency response;
- Off-airport emergency response by ambulances, fire fighters, police, hospital emergency-room standby;
- Runway clean-up and repairs;
- Flight arrival and departure delays;
- Additional fuel used by aircraft during delays;
- Airport wildlife-management programs;
- Off-airport search and rescue service;
- Accident investigations and safety reviews;
- Liability insurance;
- Administration of regulatory agencies involved with bird and wildlife hazards.

Ancillary costs are rarely considered in the analysis of wildlife strikes, although some estimates are available. Costs associated with flight delays have been estimated at between USD$6,000 and USD$15,000 per hour.

Legal Liability

In the past, bird strikes were often considered to be acts of God. As a result, in accidents involving bird strikes, no one could be held responsible. Thanks to the work of many natural-science professionals, the idea that wildlife cannot be managed is gradually being recognized as a myth. The behaviour patterns of some bird and mammal species adjacent to airports are reasonably predictable. These patterns can often be changed through appropriate management interventions based on the results of comprehensive wildlife studies. By declining to introduce measures to reduce the numbers of hazardous birds and mammals at and near airports, the responsible organizations and individuals expose themselves to potential liability. ■

(Article By Ground Safety Department)

LASER LIGHT INCIDENTS—AN EPIDEMIC ON THE RISE

In March 2014, a California man received what is believed to be the strongest sentence issued anywhere in the United States, 14 years in prison, for firing a laser pointer at an aircraft. His partner was also convicted on similar charges, but she will face sentencing in May 2014.

According to the criminal complaint, the defendant, in August 2012, fired his green laser pointer directly at a passing helicopter from outside of his apartment which is located less than a kilometre north of the west end of the Fresno Yosemite International Airport. Unknowingly, the 24-year-old struck not just any helicopter, but an emergency transport ambulance helicopter of the Children's Hospital of Central California. The helicopter was flying from Bakersfield to Fresno with a young patient, two crew members, and a pilot on board.

The pilot informed the airport's air traffic control, which then relayed it to a nearby police helicopter that was on routine patrol. As the police helicopter moved to the reported location, it was struck seven times as it circled overhead.

The police helicopter reported this to the neighboring town of Clovis, which sent patrol cars to the apartment complex. The perpetrator was apprehended and the green laser pointer was found on his person, his partner who was also with him said that she had fired the laser but denied intentionally firing at the helicopter, she was also arrested.

The defendant's lawyer described the laser as merely a $7.99 device, powered by AAA batteries which can be acquired at any Wal-Mart store. He said that the laser in this case was a curiosity piece and a plaything for children and although they knew one should not be pointed at anyone's eyes, they were not aware of the dangerous capability of it.

The pilot of the helicopter hit by the laser light in this incident likened the experience to shining a flashlight right in someone's face in a very dark room. There is normally a loss of visual reference resulting in disorientation; loss of focus of gauges, loss of ground reference and any sort of reference that a pilot would look for.

Reports of laser light incidents in Fiji has also been on the rise:-

- 2010 - 2 occurrences (Nausori Airport – 1, Nadi Airport – 1),
- 2012 - 4 occurrences (Nausori – 2, Nadi – 2),
- 2013 - 4 occurrences (Nausori – 1, Nadi – 3) and
- 2014 - 4 occurrences in just the first quarter of the year, all of which were reported in the vicinity of Nadi Airport.

With this rise in reported occurrences, the Authority has set about to increase public awareness by means of public notices in the daily newspapers, articles in the Aviation Safety Bulletins and coordination with the Fiji Police for further education of the public on the dangers of pointing laser lights at aircraft and Air Navigation Regulations in place that control its use in the vicinity of aerodromes.

We are all responsible for the safety of our aviation industry and thus it is important that all work together to eradicate any issues that threaten safety. All pilots, air traffic controllers and aviation personnel who become aware that there is a person pointing laser lights at any aircraft shall immediately report this incident so that action can be taken promptly. e.g. Pilots or aviation personnel should report such incidents to Air Traffic Control who will in turn report this to the police for action. A Mandatory Occurrence Report (MOR) should also be registered with the Authority ∎

(Article By Ground Safety Department , story uplifted from the Flight Safety Information Newsletter, April 1, 2014, No 067)

PERFORMANCE BASED NAVIGATION—INTRODUCTION

Increased demands on airspace capacity due the continuing growth of aviation, emphasizes the need for optimum utilization of available airspace. Improved operational efficiency derived from the application of area navigation (RNAV) techniques has resulted in the development of navigation applications in various regions worldwide and for all phases of flight. Requirements for navigation applications on specific routes or within a specific airspace must be defined in a clear and concise manner. This is to ensure that the flight crew and the air traffic controllers (ATCs) are aware of the on-board RNAV system capabilities in order to determine if the performance of the RNAV system is appropriate for the specific airspace requirements.

RNAV systems evolved in a manner similar to conventional ground-based routes and procedures. A specific RNAV system was identified and its performance was evaluated through a combination of analysis and flight testing. For domestic operations, the initial systems used Very high frequency Omni-directional Radio range (VOR) and distance measuring equipment (DME) for estimating their position; for oceanic operations, inertial navigation systems (INS) were employed. These "new" systems were developed, evaluated and certified. Airspace and obstacle clearance criteria were developed based on the performance of available equipment; and specifications for requirements were based on available capabilities.

Therefore, two fundamental aspects of any PBN operation are the requirements set out in the appropriate navigation specification and the navigation aid infrastructure (both ground- and space-based) allowing the system to operate. A navigation specification is a set of aircraft and aircrew requirements needed to support a navigation application within a defined airspace concept. The navigation specification defines the performance required by the RNAV system as well as any functional requirements ∎

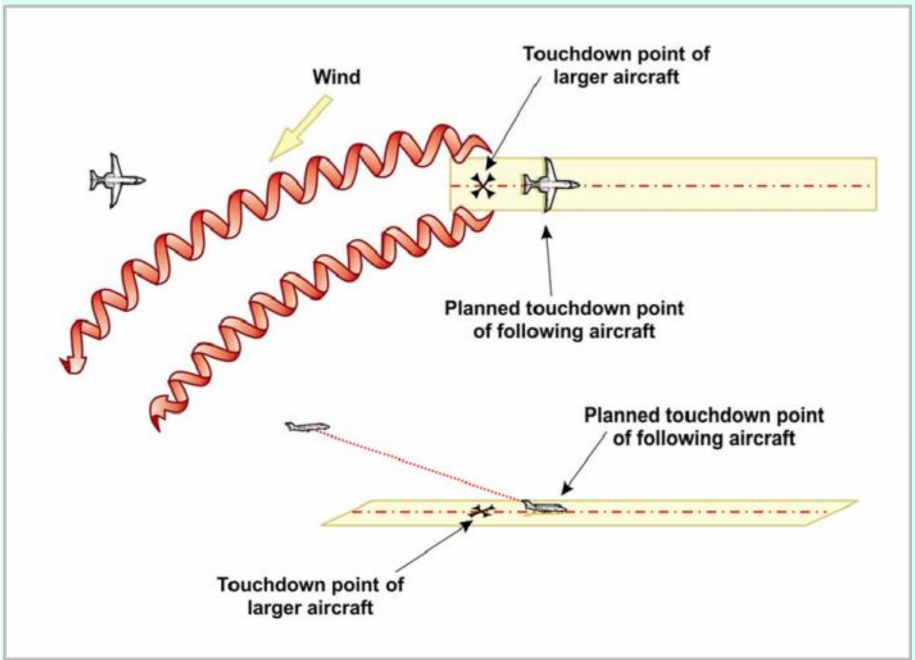
(Article By Air Safety Department - Reference ICAO Doc 9613)

AIRCRAFT WAKE TURBULENCE (PART 2)

VORTEX BEHAVIOR

Trailing vortices have certain behavioral characteristics which can help pilots visualize the wake location and movement and take appropriate avoidance actions.

FIGURE4. TOUCHDOWN POINTS OF PRECEDING AND FOLLOWING AIRCRAFT



a. **Vortex Generation**. An aircraft generates vortices from the moment it rotates on takeoff to touchdown, since trailing vortices are a by-product of wing lift. Prior to takeoff or landing, pilots should note the rotation or touchdown point of the preceding aircraft (see Figure 4, Touchdown Points of Preceding and Following Aircraft).

b. **Vortex Circulation** The vortex circulation is outward, upward, and around the wing tips when viewed from either ahead or behind the aircraft. Tests with large aircraft have shown that the vortices remain spaced slightly less than a wingspan apart, drifting with the wind at altitudes greater than a wingspan from the ground. If persistent vortex turbulence is encountered, a slight change of altitude or lateral position (preferably upwind) will likely provide a flight path clear of the turbulence.

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AIRCRAFT WAKE TURBULENCE (PART 2) cont...

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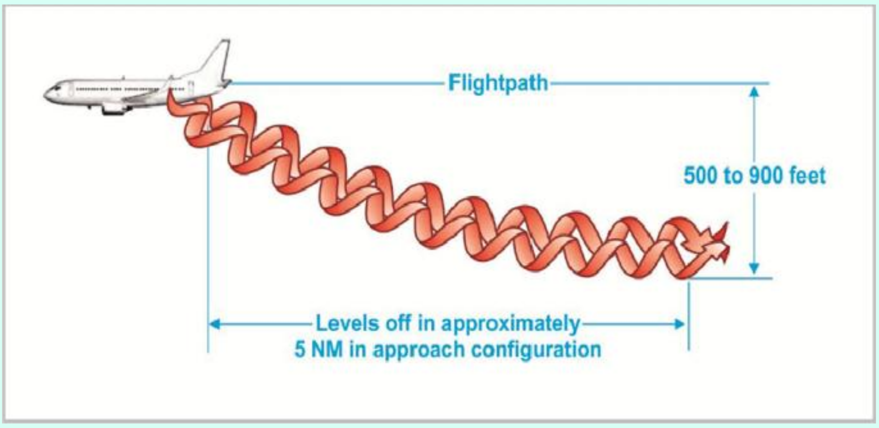
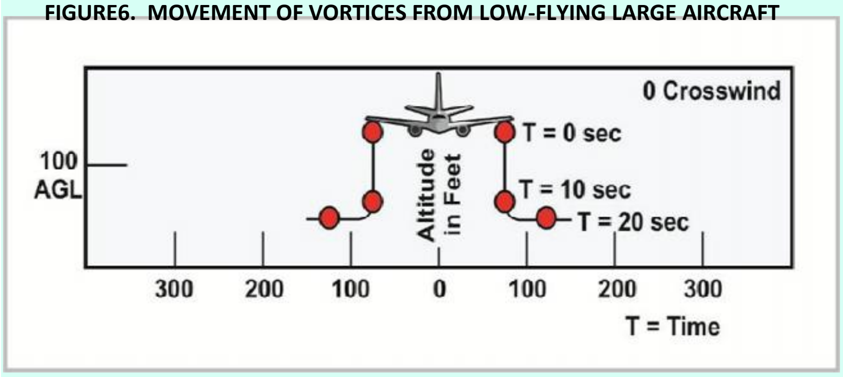
c. **Vertical Movement.** Flight tests have shown that at higher altitude the vortices from large aircraft sink at a rate of several hundred feet per minute (fpm), slowing their descent and diminishing in strength with time and distance behind the wake-generating aircraft (see Figure 5, Descent of Vortices from Large Aircraft). Atmospheric turbulence hastens decay. Pilots should fly at or above the preceding aircraft's flight path, altering course as necessary, to avoid the area behind and below the generating aircraft. It is also important that pilots of larger aircraft fly on the glide slope (GS), not above it, whenever possible to minimize vortex exposure to other aircraft. The worst case atmospheric conditions are light winds, low atmospheric turbulence, and low stratification (stable atmosphere). In these atmospheric conditions, primarily in en route operations, vortices from Heavy and especially Super aircraft can descend more than 1,000 feet.

FIGURE5. DESCENT OF VORTICES FROM LARGE AIRCRAFT



In rare cases, wake turbulence can rise in an updraft or when it bounces off of a strong inversion layer where the strong inversion layer acts like the ground.

FIGURE6. MOVEMENT OF VORTICES FROM LOW-FLYING LARGE AIRCRAFT



d. **Lateral Movement.** When the vortices of large aircraft sink close to the ground (within 100 to 200 feet), they tend to move laterally over the ground at a speed of 2 or 3 knots at an altitude of slightly less than one-half the wingspan (see Figure 6, Movement of Vortices from Low-Flying Large Aircraft).

e. **Wind.** A crosswind will decrease the lateral movement of the upwind vortex and increase the movement of the downwind vortex. Thus, a light wind with a cross-runway component of 1 to 5 knots (depending on conditions) could result in the upwind vortex remaining in the touchdown zone (TDZ) for a period of time and hasten the drift of the downwind vortex away from the runway (possibly toward an adjacent runway if one exists). Similarly, a tailwind condition can move the vortices of the preceding aircraft forward into the final approach and TDZ. A light quartering tailwind requires maximum caution, as it presents a worst case scenario where a wake vortex could more likely be present along the final approach and TDZ. Pilots should be alert to larger aircraft upwind from their approach and takeoff flight paths. See Figure 7, Effect of 3-Knot Crosswind on Vortices from Low Flying Aircraft, and Figure 8, Effect of 6-Knot Crosswind on Vortices from Low Flying Aircraft ■

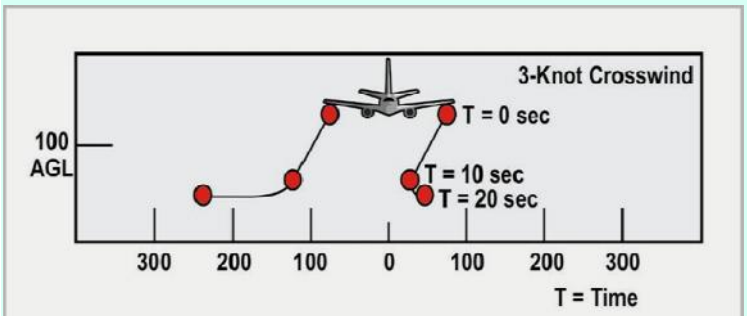


FIGURE7. EFFECT OF 3-KNOT CROSSWIND ON VORTICES FROM LOW FLYING AIRCRAFT

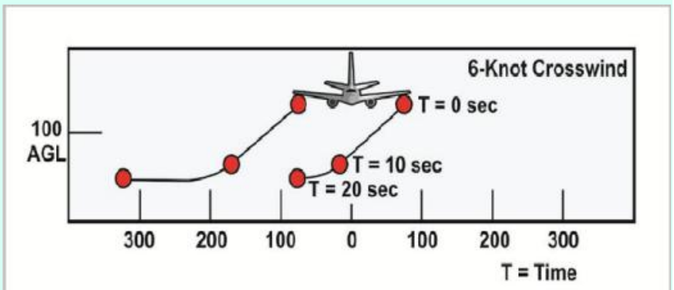


FIGURE8. EFFECT OF 6-KNOT CROSSWIND ON VORTICES FROM LOW FLYING AIRCRAFT

(Story uplifted from FAA AC.)

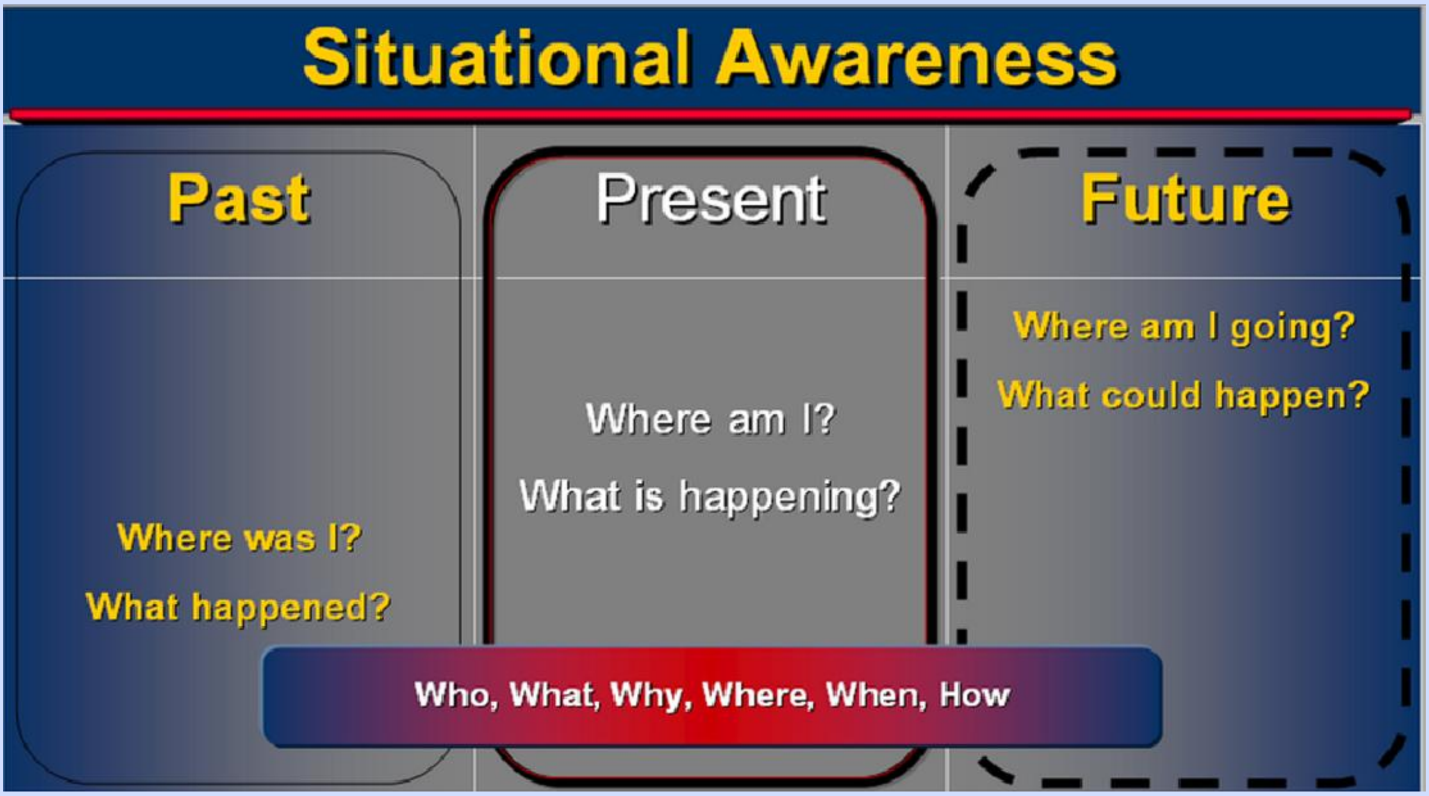
WHAT IS SITUATIONAL AWARENESS

Situational awareness is defined as a continuous extraction of environmental information, integration of this information with previous knowledge to form a coherent mental picture, and the use of that picture in directing further perception and anticipating future events.

Simply put, situational awareness means knowing what is going on around you.

Being aware of what is happening around you and understanding how information, events, and your own actions will impact your goals and objectives both now and in the near future.

Lack of Situation awareness is one of the primary factors in accidents and incidents attributed to Human Factors ∎



(Article By Ground Safety Department)

TURBULENCE WAKE-UP CALL

Many of us associate the dangers of wake turbulence with large transport aircraft, but one New Zealand pilot found that isn't always the case.

He describes his startling encounter.

It was a stunning morning, not a breath of wind and not a cloud in the sky. What could possibly go wrong?

After a short flight, I met my fellow aviators at an airfield with long grass runways. We were all heading to the same event, and decided to fly in loose formation.

We decided that I would be the last to leave, as my aircraft was slightly faster. A pilot for more than 40 years, I have flown on the front and the back ends of a rope, taught formation flying and … declined clearances because of possible wake turbulence.

At 0815 I was lined up to the right of and behind the preceding light biplane. Once it was airborne, I took off, keeping out to its right. Airspeed and positive rate of climb checked – then the left wing dropped slightly.

Just as I levelled the wings and thought about changing the climb profile, the left wing dropped past 60 degrees – the aircraft was rapidly going down. In all the time I have been flying, this was the first unintentional loss of control, and it was scary. I fought it all the way and full opposite rudder and aileron gradually had the desired effect.

For a millisecond I thought of those pilot's famous last words, "I think I can save it". The wings were almost level when I arrived heavily back on the runway. The canopy came off, and we slid a considerable distance down the runway.

Once the slide stopped, I turned everything off and climbed out (easy with no canopy!). I was stunned, but after ascertaining there was no fuel leaking, I turned on the radio, checked the ELT, and called my friends. It was obvious I had made a mess of things and could only blame myself. Wake turbulence was considered before takeoff, but not enough caution was exercised.

In hindsight, plenty of 'what-ifs' come to mind. What if it wasn't a stream takeoff and was more in formation? What if there was more wind? What if I had followed directly then moved out to the right? What if I waited longer to roll? A lot of pilots I have spoken to are astounded that the aircraft in front put out so much wake turbulence – none more than me.

Many other pilots have 'close call' stories to tell about wake turbulence. "There I was, 90 degrees to the runway with nothing on the dials but the maker's name…". I have heard those stories only after the event. Was I blasé about wake turbulence? No, but three minutes does not seem too long to wait any more.

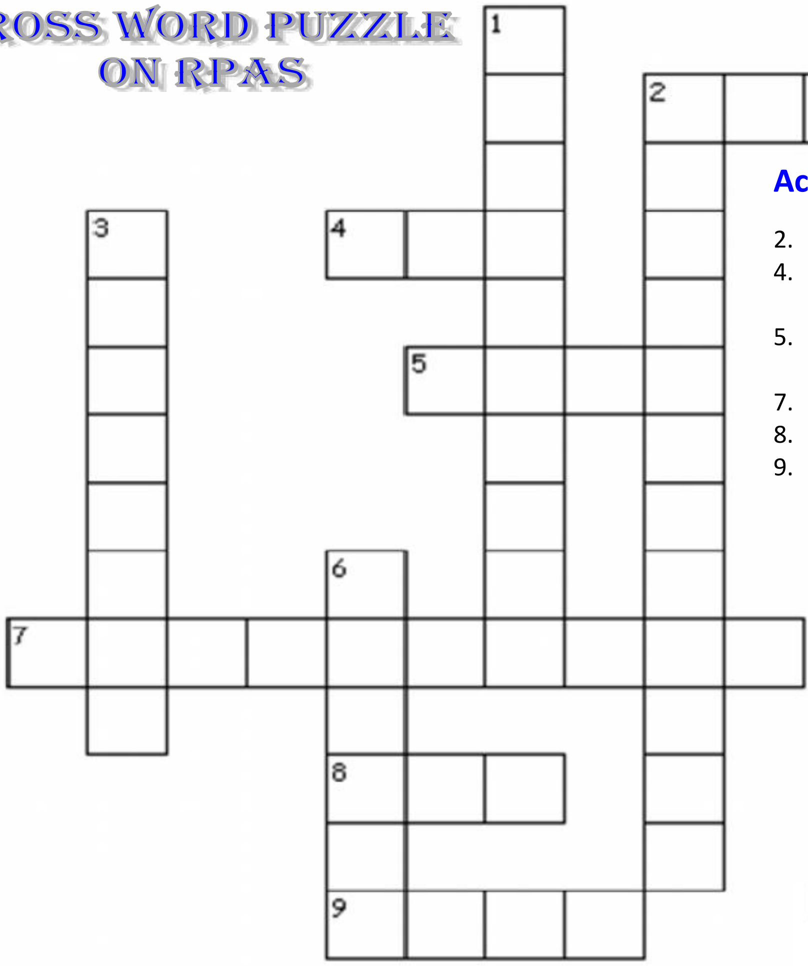
I had a couple of thoughts after this incident. The aircraft could have ended up on its back, and although it has very little roll-over protection, it does have full-harness seat belts.

This happened on an uncontrolled airfield. Had I not survived, how would the accident investigators come to the right conclusion after the event, given the perfect flying conditions and full integrity of the controls? Also, how does one log a flight that lasted seconds? I couldn't taxi, but I did walk away ■

(Source: Vector— July /August 2014)

TEST YOUR AVIATION KNOWLEDGE

CROSS WORD PUZZLE ON RPAS



Check in the next issue for Solution to the above puzzle...

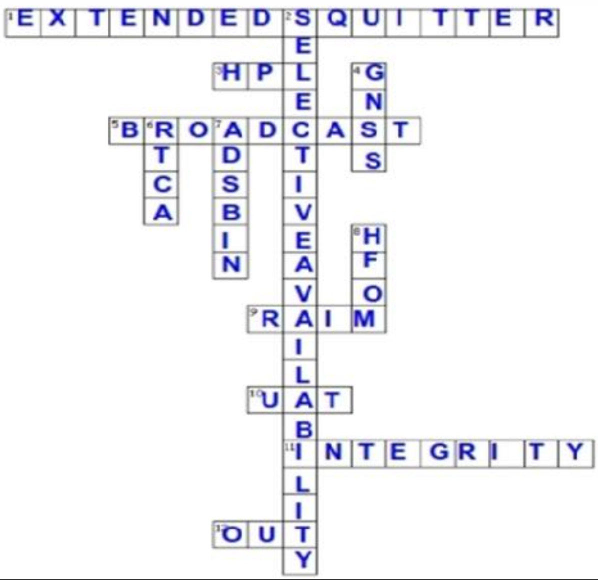
Across

2. What does R mean in the acronym RPAS.
4. ____ hundred feet AGL is the maximum legal height as per ANR 78.
5. ____ convention 07th Oct 1952 does not cover RPA activities.
7. This is required in written to operate the RPAS.
8. This is the old term for RPAS.
9. ____ batteries are used to power most RPA's.

Down

1. This control ability, is a return home feature for some RPAS.
2. This RPAS do not need a permission but require registration.
3. This means without a pilot on board.
6. This is the line of sight (VLOS).

Solution for Cross word Puzzle Published in Issue 2'2014



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AIRLINE REBRANDS PACIFIC SUN AS FIJI LINK