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The Global Voice of Pilots

news



Situational Control examined
ICAO Language standards explained

July/August 2007

Developing Situational Control



By Capt. Gavin McKellar

You may recall learning the teachings of situational awareness, most probably on a Crew Resource Management Course. A while back, I heard the topic of situational control discussed and I'd like to take a look at some aspects of the concept and how it can help us as we endeavor to operate aircraft safely.

Consider an argument you might be having, perhaps with your partner. You are aware of how it is progressing and indeed, how bad it is getting! This is situational awareness. There are times when you continue the argument with the attendant risks – you may get hit or end up sleeping on the sofa! Other times you can recognise that it's all getting out of hand and you choose to disengage. In other words, you sacrifice victory in the battle in order to hold on to the chance of winning the war. You decide to compromise, you look for win-win outcomes. This, I would describe as Situational Control. I believe that this has a place in aviation in the interests of safety and efficiency.

Close the safety loop

This is a powerful and practical philosophy. It is saying that it's not good enough to just identify risk; we need to do something about it and ensure that the 'something' is the 'right thing'. In other words, we need to close the loop.

From this thinking Safety Management Systems (SMS) were developed. SMS will be adopted as an ICAO Standard for airline operations by 2009 but I argue that we should get the SMS culture in place sooner rather than later. In SMS, we first identify risks and then demonstrate and document what has been done to either remove the risk or, if that is not practical, to mitigate its effects. Furthermore, the SMS culture places the airline's CEO in a position of ultimate responsibility and as a result safe-

ty programmes will assume similar stature in airline management culture as other elements like finance and marketing.

Managing the risk...

The best way to manage risk is to work in team, be transparent, have and know the goal, dialogue, use resources and exercise leadership and assertiveness. This is to say, use good CRM principles whether you are in the office or in the aircraft.

Out of the safety loop philosophy we get Threat and Error training. Here we say that we need to identify threats and then do something (manage) them before they result in errors and undesired aircraft states (or crisis management if you work in an office) so it is not good enough just to be situationally aware. We need to do something about it when we see something going wrong. We need to see there is risk management and steps are implemented and monitored that the steps we decided on control the risk.

Safety and efficiency model

The statistics for aircraft accidents often show a 'loss of situational awareness' as a common factor leading up to the accident. They also often cite this loss as leading to poor decision making in the run up to a crash or mishap. These statistics are obvious it follows that if you don't know where you are you will make poor or inappropriate decisions.

As a result I argue that in order to achieve safety and operational efficiency we need good decision-making. For good decision-making, we need situational awareness. For good situational awareness we need to identify and communicate and manage



continually looking to manage that threat with what you have. You have plans; you implement the best ones and revise as you go along to ensure you accomplish a goal.

The ‘unsafe window’

In SA training we are taught that there is a safety window, that is an area within a five mile radius of the airport and below 2,500ft MSA. Since this is the area where most aircraft accidents happen I’ve always thought it should be called the ‘unsafe’ window. Indeed in traditional teaching, the unsafe window is called the red box (red for danger) The idea is that if you lose situational awareness within this red box you should exit it by climbing away to safety only re-entering the red box once SA has been regained. This is simple teaching but it could save your life and those of your crew and passengers.

If you lose SA in the red box climb away to safety and stay out of it until SA is regained

threats. To understand and management the threats we need legal knowledge, technical knowledge, flying skill and CRM skills.

So how do we know how SA is decaying? Let’s look at some common indicators:

Error producing conditions

Let’s consider what elements are likely to produce a high frequency of error. At the top of the error-producing graph is ‘unfamiliarity with the task’. When we are new at something the tendency is to focus on the new elements and in effect use all our brain’s spare ‘RAM’ with the result that our circle of awareness contracts and we fail to pick up on peripheral details which may be threats or warnings. Unfamiliarity with a task will increase error frequency by a factor of 17. At number two in the error production charts, with an error production factor of 11, is time pressure. Time pressure can be a killer, remember the old maxim “never go anywhere in an aircraft that your mind hasn’t been five minutes before”? We need to manage time to slow things down so that threats can be managed situational awareness is expanded and as a result sound decisions are made.

Situational Awareness

The loss of situational awareness still features regularly in the causes of aircraft accidents, you can’t argue with the logic...if you are unsure of your position you can fly into the ground or run off the end of a runway because your aircraft’s energy state is not what you thought it to be. Situational awareness (SA) is often confused with the spatial awareness but in reality it encompasses a good deal more than ‘which way is up’. You must also factor in what is going on with you, your crew, aircraft, and all around you. It involves energy states, configurations, fuel states, weather, ATC, what you are capable of doing and what you cannot do.

In many ways SA is like a game of chess. You know what pieces you have on the board and what they can do, plus their strategic positions. You are continually aware of the state of your pieces, plus you are aware of the threats of the other team’s pieces and

- Nobody is flying the aircraft
- Unresolved discrepancies or disagreement between crew
- Failure to meet targets
- You ask crew or ATC to “say again”, you miss your name or call sign.
- You have problems with data entry-briefing, communicating.
- You get this ‘gut feeling’ that all is not well; that something is wrong.
- You have a feeling of resignation
- You feel discomfort with the level of automation being used/not used.
- You feel discomfort with the way the other pilot is flying.
- You are operating outside of the SOPs.
- You feel time pressure or running out of time. Remember time pressure has an 11 times error rate attached to it.

You can help improve your SA by;

- ▶ Managing stress
- ▶ Managing fatigue

- ▶ Gaining experience
- ▶ Having good system and human factor knowledge, knowledge loops.
- ▶ Improving and developing and retaining skills.
- ▶ A good realistic attitude helps.
- ▶ Having gates and meeting them.
- ▶ Not assuming that all will be OK and ignoring warning signs.
- ▶ Sticking to SOPs
- ▶ Know and understand human performance limitations.
- ▶ Check for complacency and overconfidence. Invulnerability can be a lethal mindset.
- ▶ Manage time. Slow down. Do what you can earlier. Be proactive.
- ▶ Understanding that we tend to feel invulnerable and this can be a trap for us. Know that accidents can happen to any of us.
- ▶ Understand there may be more information-we just need to look for it.
- ▶ Don't fall into the trap of following a programmed mental set
- ▶ Know there may be different ways to accomplish a task and look for more options.

Tell others if you are loosing SA, verbalize it. Climb above MSA or get out of a high-risk situation when you hear or feel you are loosing SA. Use resources such as fellow crew, the autopilot, books, systems etc to help you gain SA. Practical steps like turning up the scale on your PFD may help. You remember the rule? "If you lose situational awareness in the safety window (what we are now calling the red box), exit the red box. Only return once you have regained situational awareness and here I would like to add;" only return when you have situational control."

Mutual situational awareness.

The idea behind this was to say that the Captain, the decision maker, needed SA and the crew (or followers, team members, company staff) must make it their duty to make sure the Captain (or leader, CEO etc) has the right picture of what is going on. Only then the right decisions can be made and implemented. It is worth-

less if one person in the crew has a better appreciation of a given factor and does not pass it on to the Captain as the decision maker. Clearly to achieve this goal there must be good teamwork and communication, essentially an extension of CRM skills.

Moving on to Situational Control

The essence of Situational Control (SC) compared with SA is that we should not be at the mercy of circumstances but rather should take a proactive stance in managing the risk and the situation. In this way the concept is very much like the philosophy of Safety Management Systems (SMS) where as I mentioned earlier the goal is gather information about threats, assess the risks and quantify what we are doing to remove the risk or mitigate the effect of the risk. In other words, we need to actively manage; things will not necessarily be alright if we leave it to chance or to others.

Let's consider data gathered by Flight Data Analysis, this data together with crew feedback shows that for example, visual approaches often result in exceedences from SOPs. The aircraft ends up 'hot and high' on the approach, with the crew struggling to get the speed in the bucket and the path on profile. Sometimes this is because the crew has accepted a visual approach too soon or has made the turn to final as soon as ATC clear them for the approach. This comes from a natural desire to please. Please ATC with a prompt response to their instructions, Please the passengers with a prompt (or less delayed) arrival. please the company by burning less fuel.

Situational control would teach one to only turn when ready. It would teach that you manage the situation; you tell ATC if you are too high, you tell them or your crew if you need more track miles, you look at the SA, the risks and where you are with what you have. Then you control the situation so that you can achieve the desired goal, in this case, to execute a good landing following a safe and stable approach.

In summary

We need to know what's going on first, i.e. good situational awareness. This is done by gathering information, and then assessing it and deciding on the level of risk. (Having good SA) To manage the risk we enter resource management and use all



Situational and spatial awareness but is it SC?

that we have available, in the time available, so that the decision we come up with is the best possible one we can come up with. We need to ensure the decision makers understand the risk. (Mutual SA)

We then implement the decision and ensure it stays implemented. (Situational Control)

We need to review and monitor the actions we have implemented and review if we are not achieving as we intended, or the level of risk still remains too high. (Situational Control).

To oil the process we must Aviate, Navigate, Communicate, Manage and Monitor throughout. (Remember in aviation 'Navigate' includes time and fuel management).

Be mindful of the safety loop and the need to close it. It is here we find our most powerful decision-making and risk management models. Assess and identify properly. Allocate a risk and according to time enter into CRM risk management. Once the risk management decision is reached, ensures it is implemented and remains in place. Always monitor and verify that the risk is being managed to an acceptable level and the controls are adequate and correct. Change and modify if need be.

From the above we can see that just having situational awareness is not enough to meet our goals of safety and efficiency. We must add the concept of situational control to it in order to achieve success and meet our goals. Situational control (SC) is active. It seeks information, assesses it, looks at the risks and then manages or eliminates these risks, monitoring throughout. SC builds on SA and Mutual SA. The SC concept fits in well with present

safety thinking of threat and error management, the safety loop, SMS, CRM. It involves active thinking, listening and action. It is purposeful with a goal in mind. The SC concept should be most welcome in our workplace.



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Mind your language - ICAO's new language requirements

By Capt Enrique "Rick" Valdes

Investigations of several major airline accidents over the last few years have found that a lack of language proficiency by pilots and controllers has been a major causal factor. Although a majority of pilots and controllers are familiar with the ICAO standardized phraseology, when an abnormal situation arises or an event occurs that requires a pilot to exchange information with a "foreign" controller in plain language, the ability to communicate sometimes diminishes greatly. The result, rather than being a helpful resolution of uncertainty, may be the introduction of further confusion and, ultimately, a complete breakdown of awareness that leads to catastrophe.

To address the all too frequent problems of miscommunication and their serious safety implications, the ICAO Assembly directed the Air Navigation Commission (ANC) to introduce provisions that would improve the effectiveness of operational radiotelephony communications. The ANC subsequently created the Proficiency Requirements in Common English Study Group (PRICE SG) to assist the Secretariat in drafting proposals for new provisions for a minimum required level of language proficiency. The outcome was to mandate standards (regulations) that would ensure that air traffic control personnel and flight crews engaged in flight operations in airspace where the use of the English language is required, are proficient in speaking and comprehending Aviation English.

In November of 2000, the first meeting of the PRICE SG took place at ICAO's Headquarters in Montreal, Canada. It comprised operational and linguistic experts from airlines, industry associations, academia, regulators and air traffic service providers from around the world. Over the next three years the group continued to meet

and work on designing new language requirements.

Specifically, the focus of the group was to:

- ▶ strengthen the requirement for the use of English in radiotelephony communications, both in the use of standardized ICAO language phraseologies and in the use of plain language when such phraseologies do not apply;
- ▶ ensure that pilots and air traffic controllers not presently proficient in Aviation English genuinely become so by imposing strict testing requirements that would necessitate appropriate training;
- ▶ assign responsibility for compliance of controllers and pilots with these standards to airline operators and air traffic services providers.

On 5 March, 2003, The ICAO Council adopted the recommendations of the Secretariat, as endorsed by the ANC, and the provisions came into effect as Standards within the ICAO Annexes.



Did they say what she thinks they said? ICAO aims to standardise aviation English comprehension with new minimums for language proficiency

The date of 5 March, 2008 was agreed to be the day on which the new requirements would become effective.

Subsequently, the ICAO Secretariat produced a guidance manual for use by States, operators and providers. It is ICAO Document 9835, Manual on the Implementation of ICAO Language Proficiency Requirements. This manual includes close definitions of the language proficiency requirements by way of a Language Proficiency Rating (LPR) Scale and Holistic Descriptors and elaborates on these;

- ▶ provides guidance in the development, management, design, and administration of licensing tests (initial and recurrent);
- ▶ establishes qualifications for personnel engaged in test development, management, design and administration. Test administration team requirements are that there be a minimum of 2 raters: an interlocutor with operational expertise and an interlocutor with linguistic expertise;
- ▶ requires that to qualify as an interlocutor with operational expertise, a person must have a working knowledge of the test administration guidelines, radiotelephony experience as flight crew, air traffic controller or aeronautical station operator, a minimum proficiency equivalent to ICAO level 5 on the LPR scale and have successfully completed initial and recurrent interlocutor training;
- ▶ requires that to qualify as an interlocutor with linguistic expertise, a person must have a working knowledge of test administration guidelines, experience or training in aviation language instruction, minimum proficiency equivalent to ICAO level 5 on the LPR and have successfully completed initial and recurrent interlocutor training;
- ▶ suggests that best practice would provide a language rater and an operational pilot to rate the speech of pilots, and a language rater and an operational controller to rate the speech of controllers.

ICAO Document 9835 contains all the information required by pilots and controllers, operators, and air traffic service providers, to comply with the new ICAO requirements.

It is noteworthy that even though a State customarily exercises licensing authority over pilots, in order to comply with the new requirements, it is the airlines that are responsible to ensure that their pilots meet the ICAO requirements. In other words, it may be assumed that if a pilot is involved in an incident or accident where language proficiency is brought into question, it is the airline that may be called into account.

The January/February, 2004 issue of the ICAO Journal, (Vol. 59, No.1), is dedicated in its entirety to aspects of the ICAO Aviation Language Proficiency Standards and language learning in general. It is a great source of information.

You can find the journal at:

http://www.icao.int/cgi/goto_m.pl?icao/en/jr/2004/index.html

Caveat Emptor!

ICAO convened an International Workshop on Language Proficiency Implementation in Montreal, Canada from 7 to 9 May this year. This author attended the workshop with high interest.

ICAO stated from the outset that the applicable implementation date of 5 March, 2008 will be adhered to. Despite several States voicing their discomfort with the soon-approaching deadline, extensions are not being contemplated. It is evident that many States and airlines are not in position to comply by the deadline. The symposium took on an overtly commercial form. Most of the presentations were made by commercial language training providers who saw an opportunity to demonstrate their training courses and testing services. It was evident, however, that most vendors had not made sufficient effort to address the particular needs of this highly specialized sub-set of Aviation English users – or, perhaps, had an insufficient understanding of those special needs.

ICAO Document 9835 makes it very clear that the needs of pilots and controllers are not, simply, for better English language skills, nor, even, for better Aviation English skills, but better operational Aviation English skills that are highly relevant to controllers and pilots. Training material that skirts around this highly specialized realm is, at best, limited and uneconomic and, at worst, counter-productive. Pilots and controllers will be impatient, rightly, of language training that is not clearly focused on their special needs. Textual material that has no operational relevance will neither motivate pilots nor address the essential need to improve operational radiotelephony. At the same time, training material should not concentrate on standardized phraseology as this is, effectively, an operational tool; it is a highly specific coded medium of exchange that should be taught by operational instructors, not linguists. Thus the Aviation English subject matter required to train pilots and controllers to meet the

Airlines should be aware that aviation language training and testing is an unregulated industry and thus open to abuse. Any commercial language teaching entity can market "aviation language training packages for pilots and air traffic controllers". Airlines and ATS providers would be well advised to ensure that training and testing products conform to the guidelines in ICAO Document 9835.



ICAO requirements is highly specific. Few vendors of training and testing material seem to have found the right focus.

Airlines should be aware that aviation language training and testing is an unregulated industry and thus open to abuse. Any commercial language teaching entity can market "aviation language training packages for pilots and air traffic controllers". Airlines and ATS providers would be well advised to ensure that training and testing products conform to the guidelines in ICAO Document 9835.

Included in the guidelines in Doc 9835 is comment that "content-based learning" is an effective methodology for teaching the highly specific aviation English language that is required. Courseware that has relevant subject matter will be better able to speed learning by keeping pilots motivated and by building on concepts that are well known to them. Especially good content-based language courseware will use subject material that is contemporary, operationally specific and safety related. It was stated during the symposium that no less than 330 English language training programs are commercially available. That prompted me to ask during the question and answer period whether ICAO was contemplating an accreditation process for training and testing services. The reply was that a survey of the need for such a service had been conducted and although there had been an interest expressed by the States, ICAO would require special funding to initiate the program and no State(s) had stepped up to the plate with funds in hand. ICAO, however, indicated a preparedness to re-consider such a program if funds were to be made available. In the meantime, buyer beware!

Risk of 'pass the test' learning

One State suggested that only one flight crew member per crew should be required to be qualified to the required level of proficiency. ICAO replied that the requirement necessarily applies to all crew members, without any exemptions. Several States requested more guidance from ICAO as to how to comply with the new requirements. To this ICAO agreed and stated that they expected to have amended and additional material included in Document 9835 ready by the end of 2007.

One State has published the 500 questions which make up their test pool. The State's airlines have hired English teachers to school pilots in the questions' answers. This they reportedly do by

providing them with the questions and answers, so allowing them to memorize them before the test.

Several States are considering "grandfather rights" to all pilots licensed prior to 5 March, 2008. In other words, the new requirements would only apply to those pilots licensed after the implementation date.

There are various ways, obviously, in which States will seek to meet ICAO requirements, either in the letter or the spirit or both. It is to be hoped that one way or another, all parties cooperate to ensure that the good intent of the ICAO Standards is carried through to effective implementation. Airlines have a special responsibility in this regard, to procure meaningful language training programs, to assist pilots in their effective acquisition of the special language skills required and in ensuring, through a rigorous test program, that the incidence of radiotelephony mis-

communication reduces and the intended safety dividends really do accrue at the end of the process.

In the opinion of this writer, it is highly likely, unfortunately, that several airlines and ATS providers will enter into contracts with commercial training providers that are not able to "deliver the goods". In this event, the air traffic management system will continue operating without reducing the risk inherent in poor radiotelephony communication and the safety envelope will be stretched still further. This would be a travesty. Airlines will come to realize that to seek to short cut ICAO Standards by economizing on insufficient training and testing programs, or by choosing them injudiciously, is just as unsound business practice as it is unsound safety practice. In the end, it will leave a trail of dissatisfied pilots more cynical tomorrow than today. More importantly, this overdue initiative to improve the airlines' accident record by improving radiotelephony communication between pilots and controllers will be still-born and the hopes of longer lives, less tragedy and greater profits will be dashed.

Your airline should now be considering hiring expertise to train and test pilots in aviation language proficiency. My recommendation to your airline is to purchase a copy of ICAO Document 9835, Manual on the Implementation of ICAO Language Proficiency Requirements, as a first step, and become acquainted with its contents. Then require the commercial provider to demonstrate and prove how closely their training and testing programs comply with the guidance given by ICAO in that document.



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He is a member of the IFALPA Air Traffic Services Committee and considered an expert in Latin American ATC issues. In addition, he is IFALPA Representative to ICAO's PRICE SG which over the last three years has established the new ICAO English language requirements for pilots and controllers.

RESAs that meet ICAO recommendations needed... and needed *NOW*



Runway excursions and overruns account for around one quarter of incidents/accidents in air transport operations (24%). According to incident and accident statistics these events occur, on average, at a rate of around one a week. Most of these instances lead to little more than minor damage to the aircraft with few, if any, injuries to passengers and crew. However when these events happen at airports with an insufficient area in the runway overrun the risk of major injuries and death for passengers, crews, airport staff and passers-by are dramatically increased. Recent cases have shown that in runway overrun events at airports lacking adequate runway end safety areas (RESA) the threat to life and limb is 'clear & present'. In the first seven months of 2006 the cumulative death toll resulting from runway overruns was over 200.

Analysis of data from runway overrun events has shown that in the overwhelming majority of cases the aircraft leave the runway surface at a speed of less than 70kts and, furthermore, generally come to a final stop within 300m of the runway end.

Present ICAO requirements

In Annex I4 to the Chicago Convention, ICAO lays down as part of the aerodrome design section its Standards and Recommendations for runway strips and runway end safety areas.

At Code 3&4 runways (See fig 1) ICAO says that runways should be contained within a runway strip that is flat, firm and free of non-frangible obstructions. These runway strips must extend a minimum of 150m either side of the runway centre-line and at least 60m beyond the end of the runway end (including any stopway). The width requirement is reduced to 75m at code 1&2 runways and the length requirement is dropped to 30m at non-instrument code I runways. (ICAO Annex I4 Vol I para 3.4 runway strips).

In addition to the runway strip requirements, Annex I4

demands that at code 3&4 runways a runway end safety area (RESA) which extends a minimum of 90m beyond the end of the runway strip and twice the width of the runway is established. ICAO goes on to recommend that RESAs that extend 240m at code 3&4 runways and 120m at code 1&2 runways and equal to the graded portion of the runway strip are established. (Annex I4 Vol I para 3.5)

IFALPA Position

IFALPA believes that improvements in runway safety can best be achieved by avoiding runway related accidents and incidents. If, however, an accident occurs then additional runway safety measures already in place, could enhance survivability. One of these measures is safeguarding the runway environment.

Therefore IFALPA contends that the RESA dimensions laid out in Annex I4 Recommendations should be adopted as a Standard, in other words the minimum requirement. Data from past incidents and accidents has shown that in the overwhelming majority of cases aircraft overrunning a runway leave the paved surface at a speed of less than 70kts and come to a halt within 300m of the runway end and therefore it is clear that the risk of injury or death for passengers, crews and passers by is significantly mitigated by a RESA meeting these dimensions. IFALPA also recognises that at some airports it is impossible to establish an adequate RESA due to the location

ICAO Runway codes

Code 1
less than 800m long

Code 2
800-1199m

Code 3
1200-1799m

Code 4
Longer than 1800m

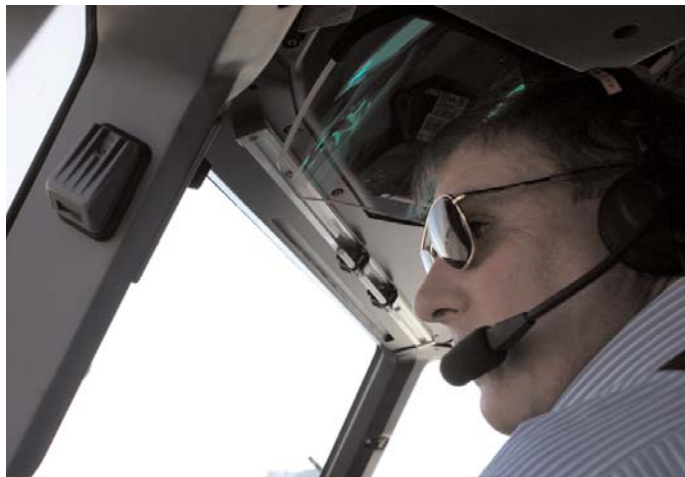
Fig 1

of the runway and the surrounding terrain and topography. In this case IFALPA believes that airports should install an Engineered Materials Arresting System (EMAS). An EMAS is an arrestor bed of crushable concrete blocks which works by transferring the energy from an overrunning aircraft into the action of crushing the concrete of the system. As a result, aircraft can be brought to a halt within the confines of the bed without injury to passengers or crew. Critically, an overrun into an EMAS will result in little or no damage to the aircraft and therefore the risk of a post overrun fire is dramatically reduced. Accordingly, The Federation has been campaigning for many years for the RESA Recommendation to be upgraded and enforced as an ICAO standard and further that the installation of an EMAS is recognised as equivalent to the 60m-240m RESA at space restricted airports.

Conclusion

While the ICAO recommended RESA has been applied at a number of airports, especially those constructed more recently, and an EMAS has been installed at a number of terrain/topographically challenged airports, it still remains a fact that hundreds of the world's runways do not comply with the recommendation (or an EMAS alternative) and therefore the lives of passengers and crews are being needlessly exposed to risk. IFALPA believes the '60+240'x twice runway width Recommendation be upgraded to a Standard forthwith. In a number of cases simple things and low cost items like filling in of ravines or culverts will provide the safety area we call for. Where the physical space does not exist then the solution to the problem has been developed and proven its worth in the real world. Accordingly, there is no excuse to delay the creation of adequate RESAs or, alternatively, the installation of an EMAS.

This article is based on IFALPA's RESA position paper which can be found on the Federation website: www.ifalpa.org



Have an idea for an article or want IFALPAnews to cover your story? Contact Gideon Ewers, IFALPA Media and Communications Officer Tel. +44 1932 579041 or email gideonewers@ifalpa.org

Dates for your Diary

September

10-12

Helicopter Committee Meeting

Aberdeen, Scotland

Contact Anne Munday: annemunday@ifalpa.org

13

8th Executive Committee Meeting

Montreal, Canada

Contact: Heather Price heatherprice@ifalpa.org

13-15

8th Executive Board Meeting

Montreal, Canada

Contact: Heather Price heatherprice@ifalpa.org

October

8

Safety Seminar

Bogotá, Colombia

Contact: Arnaud du Bédât arnauddubedat@ifalpa.org

9-11

Accident Analysis Committee Meeting

Bogotá, Colombia

Contact: Arnaud du Bédât arnauddubedat@ifalpa.org

10-12

Dangerous Goods Committee Meeting

Berne, Switzerland

Contact : Carole Couchman: carolecouchman@ifalpa.org

15-16

Industrial Committee Meeting

Mexico City, Mexico

Contact: Lesley Bastille lesleybastille@ifalpa.org

17-18

Administration & Finance Committee Meeting

Mexico City, Mexico

Contact: Heather Price heatherprice@ifalpa.org

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