

防禦性飛航 為不可預期做準備

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如同防禦性駕駛，防禦性飛航就是要提前一步做好安全防護。當我們到了機場做飛行前準備，我們會有許多執行防禦性駕駛及避免潛在危險的機會。大家應該都有遇過汽車駕駛開車時超速、傳簡訊、忽略交通號誌或不專心的經驗，同樣地，駕駛航空器不論是在滑行道或航路上都極富挑戰性。

防禦性飛航的原則就是絕不要假設其它駕駛員、管制員、地面人員或甚至於大自然會顧及我們的安全，因飛行員也是人，我們常受困於自己的小世界，忘記去大範圍思考。在某些情況下，我們必須防範因自我判斷錯誤及得意自滿，導致即便是最有經驗的飛行員都可能出的錯。然而，適當的規劃及良好的情境察覺讓飛行員能更有效地應付各種可能影響飛航安全的因素。

適當的準備

如同任何複雜的任務，模擬準備是成功駕駛飛機重要的一環，這說來或許陳腔濫調，但你獲得多少真的端看你付出多少。無論一次飛航是否包含訓練、越野飛行或實際測試，準備的多寡總是影響全盤的結果。多準備勝過在空中遭遇猝不及防而不可預期的突發事件，這些狀況對飛行員及乘客來說都不是胡鬧的，最好的習慣是在飛行前從頭到尾模擬預演整趟飛行。事先準備整趟飛行中可能受天氣、機械問題或其他不可預期因素影響之備用計畫。比較簡單的是執行一個深思熟慮、屏除偶發事件的飛航規劃，避免在飛行中做出影響飛航安全的突兀決定，預先規劃能消彌飛行員的沉重壓力，進而加倍地增進飛行安全。

預先規劃備用飛行計畫的另一項好處，是讓飛行員於遭遇不同於規劃狀況時做出即時處置，且只需作些微的調整。飛行員於飛行前對各類安全操作的防禦性思維考量，經常能帶給飛行員更大滿足，因在地面時深思熟慮的準備，在空中即能正確的執行並得到正面的結果。

起飛前模擬飛行準備

起飛前良好的模擬飛行準備應是每位機長的首要工作。飛行員通常不會對飛航中起飛及初始爬升階段可能遭遇的不預期狀況做太多準備。如果飛行員沒做足夠的預期性思考，不論是每天的第一趟或第十趟飛行，很多東西都會出錯。

預期心態是對起飛時可能遭遇突發狀況最好的準備方法－每次起飛前在心裡告訴自己：今天可能在起飛時遭遇引擎失效或不正常狀況。或許這有點太悲觀，但這個模擬演練卻能降低突發狀況的發生，不論是單飛或是搭載乘客，飛行員若能執行此項模擬預演，當起飛時遭遇不正常狀況時，就能有較多的寶貴時間做出及時反應，研究顯示當遭遇無預警狀況，駕駛艙內會花到7-8秒鐘做適當處置。簡單的執行這些可能發生狀況的模擬演練，能幫助縮短做出有效及正確反應的時間。

檢查表、標準操作程序及紀律

秉持專業紀律、使用核准之檢查表及執行標準操作程序，會影響飛行員在駕駛艙內遭遇不正常狀況時之處置能力，正如Title 14 Code of Federal Regulations (14 CFR) section 91.103所述，飛行員應了解任何與此次飛行相關之資料，飛行員對各種有用資源能全盤了解是十分重要的，這項認知能提高飛行安全及增進飛行的樂趣。

標準作業程序能幫助飛行員在遭遇正常/不正常事件時，避免不幸狀況發生，許多飛行員認為標準作業程序只適用於法規121部及135部操作大型飛機的組員使用。錯！對於任何機型的飛航操作，飛行員都需實施標準操作程序。標準操作程序藉由對各種狀況的訓練，強化了飛航安全水平。

適當的使用檢查表是另一項飛行員在駕駛艙內，用來處置不正常及緊急狀況的資源；然而不幸的，很多駕駛員

卻隨著飛行時間的增加而降低使用檢查表的習慣，切記！適當的使用檢查表是改善飛行表現及加強飛航安全的資源，即使飛相同機型的飛機，皆不可因自滿而停止使用檢查表。

我錯失什麼？

絕大多數完美的儀器進場可讓飛機成功落地，但若需重飛時，許多駕駛員多會感到驚訝。若無適當的準備及提示，誤失進場會是複雜且極具挑戰性。儀器進場中的錯誤概念，將導致損失慘重的結果，因誤失進場程序是在極靠近地面且低速時才開始實施的，飛行員在壓力情境下，導致飛機處於「不正確」的重飛外型配置，飛行員應在執行誤失進場程序前，先模擬準備然後不慌不忙地執行，最終始能成功地完成重飛。

自始至終皆須準備

準備是成功地執行飛航任務的關鍵要素，適當的飛行前規劃及良好的模擬準備。飛航計畫就像是接近穩固的基石，應當將預期或不預期影響飛航安全的因素包含在飛行前的規劃中，便能讓飛行員得到最大效益，飛行員應將飛行規劃中的偶發事件及可能之變化性謹記於心。萬全而專業的準備是保障飛行安全不可動搖的基石，飛航安全啟始於飛行員進入座艙，終止於安全飛航落地後的航機固定。✈

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Defensive Flying Being Prepared for the Unexpected

Steve Sparks

Much like defensive driving, defensive flying involves staying one step ahead of the curve when it comes to safety. As we drive to the airport in preparation for an upcoming flight, we are bombarded with opportunities to exercise defensive driving skills and elude potential danger. Most of us have experienced situations involving drivers who exceed speed limits, text while driving, ignore traffic signals, or fail to pay attention — period. In a similar way, navigating an aircraft — on taxiways and in airways — can be quite challenging. It's a jungle out there!

The principle behind defensive flying is to never assume that other pilots, air traffic controllers, ground personnel, or even Mother Nature are looking out for your safety. Because pilots are human, we often get trapped in our own tiny universe and forget to consider the bigger picture. In certain cases, we have to defend against our own miscalculating and complacent ways to prevent events that could lead even the most experienced aviators down the wrong path. However, with a proper plan and good situational awareness, you'll be much better prepared for the various factors that can adversely affect aviation safety.

Proper Preparation

As with any complicated task, mental preparation plays a key role in successfully flying an aircraft. It may be a cliché, but when it comes to aviation, it is certainly true that what you get out of it depends on what you put into it. Whether a particular flight involves training, a cross-country, or a practical test, the amount of preparation is usually reflected in the overall results. It's always better to over prepare for a flight than to be

caught off-guard and be surprised by the unexpected. These situations are no fun for any pilot or passenger.

A great habit before any flight is to mentally rehearse the event from start to finish. Think through the flight as planned, but develop contingencies should the flight have to change due to weather, mechanical problems, or other unforeseen conditions. It's much easier to execute a wellthought-out contingency plan than it is to make radical decisions during flight. Prior planning eliminates a lot of pressure from pilots and can increase safety exponentially.

Another advantage of a pre-constructed alternative flight plan is that it allows the pilot to make small adjustments as opposed to reacting to circumstances that could have been mitigated from the very start. Pilots who approach flying activities using a defensive mentality often experience greater satisfaction knowing they have thought through various safety options beforehand and haven't left much to chance. Well-thought-out tasks that have been prepared for on the ground often yield positive results when decisively executed in flight.

Mental Preparation Before Takeoff

Good mental preparation before any takeoff should always be of high priority for the pilot-incommand (PIC). Too often, pilots don't think enough about preparing for the unexpected during the takeoff and initial climb segments of the flight. Whether it's the first takeoff of the day or the tenth, a lot can go wrong if the pilot isn't expecting the unexpected.

An excellent way to prepare for any surprises on takeoff is to develop a mindset of expectation: Before

each takeoff, mentally tell yourself that “today is the day that I’m going to have an engine failure or an unusual occurrence on takeoff.” Though it might sound overly pessimistic, this mental exercise can reduce the chance of being caught off guard. Whether flying solo or with passengers, pilots who perform this mental rehearsal can shave precious seconds off response times when reacting to unusual events during takeoff. Research reveals that it can take as much as seven to eight seconds for pilots to properly respond to a startling/unexpected event in the cockpit. Simply put, performing these “what if” scenarios can help train the mind to respond positively in less time.

Checklists, SOPs, and Discipline

The use of approved checklists and standard operating procedures (SOPs) while maintaining professional discipline can influence a pilot’s ability to handle unusual circumstances in the cockpit. As stated in Title 14 Code of Federal Regulations (14 CFR) section 91.103, pilots are required to be aware of all available information in connection with any given flight. Taking this rule seriously means hitting every listed item and primes the pilot to be aware of all available resources. Such awareness can increase safety and improve overall enjoyment of the flight — which is, after all, why we fly.

SOPs can help prevent unfortunate circumstances from occurring by preparing pilots to handle both normal and abnormal events. Many pilots believe SOPs exist only for crew members flying large aircraft involving part 121 and 135 operations. Wrong! Every pilot should develop and implement SOPs for all flight operations, regardless of the type of operation being conducted. SOPs add structure and an enhanced level of safety by helping the pilot implement best practices and techniques applicable to many situations.

Appropriate checklist usage is another resource pilots can use to deal with abnormal and emergency situations in the cockpit. Unfortunately, many pilots allow the habit of using a checklist to fade over time. Remember, though, that appropriate checklist usage is a

resource available for improving performance and enhancing safety. Even if you fly the same aircraft all the time, use the checklist because complacency kills.

What Did I Miss?

Since most instrument approaches end with a successful landing, many pilots are often caught by surprise when having to fly the missed approach procedure. If not properly prepared for or briefed, going missed can be a highly complex and challenging event.

Having a false sense of security on an instrument approach can lead to disastrous results. Because missed approach procedures are executed close to the ground at low airspeed pilots can rapidly become task saturated in “dirty” aircraft configurations. Pilots who are mentally prepared and physically triggered to fly the missed approach prior to starting the procedure are much more likely to execute it successfully.

Preparation from Beginning to End

Preparation is a key ingredient for successful flying. Proper pre-flight planning and good mental preparation pay huge dividends for pilots who take into consideration the expected and unexpected circumstances that might influence the safety of each flight.

As with most plans, flight plans are likely to change on a nearconstant basis. It is thus incumbent upon the pilot to develop every flight plan with contingency and flexibility in mind. Thorough preparation provides a solid foundation for safety and professionalism. Safety starts before we get into our aircraft and ends only when we’ve secured it after landing. ✈

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