NEWS AND VIEWS

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Coming Events

1. Next COPA 26 Meeting is Tuesday Sept 10,, 2024.
2. The next Pilot Decision Making (PDM) Zoom Workshop is Sept 4, 2024. To join, send an email to cykf.pilotworkshop@gmail.com.

In this Issue!

WELCOME!!

**Transport Canada NPA Updates
(From COPA National)**

NPA 2024-001 Update

Following comments made by COPA, its members, and other stakeholders like UPAC regarding the Notice of Proposed Amendments 2024-001, Transport Canada have issued a "What We Heard" report, outlining the feedback they received. The report highlights that a significant number of comments surrounded the definition change of an "ultralight aeroplane". As a result, TCCA will remove the proposed amendments to the definition of ultralight aeroplane. COPA commends TC for taking the comments into consideration and responding accordingly. The report can be found here.

NPA 2023-005 Update

With input from COPA, other industry organizations, and all that submitted feedback, Transport Canada received over 300 responses to NPA 2023-005, that proposed changes to night VFR, VFR meteorological conditions, training, and currency requirements along with other flight training and commercial regulations. Due to the number of responses received, this item is no longer a part of the 2-year regulatory plan April 2024-2026. Thank you to all of those who commented, and made your voice heard on this important matter.

Coming Aviation Events!

- Airventure at Oshkosh, Wisconsin. July 22-27, 2024. This one needs no introduction and is well worth the visit!
- UPAC fly-in at Lubitz airstrip (CLB2), Plattsville, Ontario. August 17, 2024 (1 day only - a scaled down version). Contact Kathy Lubitz for more details (klubitz@upac.ca).
- Aero Gatineau /Ottawa. Gatineau-Ottawa Executive Airport, Gatineau, Quebec. Sept 6-8, 2024. The lineup includes the USAF Thunderbirds.
- Discovery Aviation event, Sept 7, 2024, at CYKF. COPA 26 members can support this by providing aircraft flights for attendees. Contact Derek Hammond at: derek@fliteline.ca. More details to follow….
- London Airshow. Sept 13-15, 2024.

"TRAFFIC IN SIGHT"

By Warren Cresswell

Too Close for Comfort!!

These three little words are at the core of the principle of "See-and-Avoid" traffic avoidance.

Spoken to ATC, or perhaps just enunciated to yourself in the cockpit, "traffic in sight" confirms that you have visually acquired potential conflicting traffic yourself, or to which you may have been alerted to watch for, such as a traffic advisory from ATC. In the case of the latter, it is not good enough to just "see the traffic on an electronic, cockpit display" and avoid it electronically without actually ever acquiring the target visually but pilots do this much of the time. Indeed, while the guidance from Transport Canada is not as definitive, the FAA mandates that pilots flying under Visual Meteorological Conditions (whether VFR or IFR in VMC) must actually acquire the traffic with their eyes, regardless of how they may have become alerted to the presence of potential traffic.

“See-and-Avoid” success depends upon several key factors, with a key one being some detailed knowledge of the physiology of the human eye and its function and limitations with respect to aviation. Another is conducting a proper traffic scan looking outside the window.

This article focuses on these two topics. Of course, every pilot was taught from the earliest stage of training about these matters, but it is a safe bet that some pilots have forgotten this material a long time ago or maybe never developed a good effective traffic scan. Ask yourself, do you really remember this stuff and what it means for your flying vision? And, do you have a proper, effective scanning technique and do you allocate the right amount of time to it? For most pilots the answer to these questions is probably “no.”

So, let’s proceed to fix that.

Why This Is Important:

The goal is to have a safe flight and avoid becoming a statistic of a Mid-Air Collision “MAC” or even a Near-Miss Air Collision “NMAC.”

In Canada, over the last seven years (data ending 2019) there have been 138 MACs (20 per annum) and 907 reported NMACs. The number of NMACs is probably quite understated because many go unreported. More distressing, the annual rate of MACs/NMACs is rising in recent years.

The record in the U.S. parallels the Canadian data and reinforces the need for heightened traffic conflict resolution recognition and avoidance. In the past 18 years in the U.S. MACs have continued at a steady rate of 15-25 per annum with about 75% resulting in fatalities. In the last ten years (2012-2020) the U.S. has experienced over 2,000 NMACs, equivalent to over 200 occurrences per year or about one every second day.

So, it is very worthwhile on the part of the pilot to take a fresh look at “See-and-Avoid” and scanning for traffic.

Some ”Where and When” MACs/NMACs statistics are outlined below. These may surprise you, and reinforce the need to revisit and “beef up” your “See-and-Avoid” skills.

- Nearly all occur in excellent VFR conditions, usually during the weekend between 10am and 5pm local and usually during the warmer months.
- Many occur in the traffic pattern or within 5nm of an airport, usually an uncontrolled one.
- Only 2% of MACs occur at night.
- Only about 14% occur as a result of a high-speed closure rate, or head-on collision. Indeed, 39% occur while converging and result in a side impact. Furthermore, 47% occur as one aircraft overtakes another.

- Newbie pilots and high time "greybeards" are just as likely to experience a MAC.

- Surprisingly, 37% of MACs occurred when an instructor was on-board, making training flights about the most dangerous for MACs.

Another thing to be mindful of is the closure rate of conflicting aircraft and the human reaction time (almost completely dependent upon vision). In some cases, closure rates can be quite high. One high profile accident in Canada occurred in 1995 in Sioux Lookout and involved a MAC between a Navajo and a Sweringen 23 being operated by Bearskin Airlines. Both aircraft and all souls aboard were lost in this accident. (Refer to TSB report A95H0008). The closure rate of the two aircraft was 410 knots.

As studied by the U.S. Navy, the typical reaction time for a pilot is about 12. 5 seconds.

Table 1: Pilot Response Limitations

Process	Response Seconds	Cumulative Seconds
See an object ahead	0.1	0.1
Recognize the object as an aircraft	1.0	1.1
Become aware a collision course exists	5.0	6.1
Make a decision to turn, climb, descend	4.0	10.1
Muscular reaction to execute avoidance tactic.	0.4	10.5
Aircraft lag in response to flight control input	2.0	12.5

In this particular accident, sadly for both aircraft and their occupants, the probability of them seeing each other was no more than 20%.

A study of the eye concludes that it is really a pilot's vision that is the leading contributor to MACs/ NMACs- a failure to visually acquire the traffic, or visually acquire the conflicting traffic soon enough to permit avoidance.

The Traffic Conflict That Bites

The traffic conflict that the pilot has the most trouble detecting is the one that can bite the hardest.

When two aircraft have a constant relative bearing to each other, with constant headings and constant speed, the aircraft appear motionless to each other. Initially, the traffic may just appear as a small dot on the windscreen, but it appears motionless, thereby increasing the difficulty for each pilot to visually acquire the other aircraft. Even if one aircraft is travelling faster than the other, as long as their relative bearings remain constant, the two aircraft will collide.

The apparent size of the oncoming traffic roughly doubles with each halving of the distance apart. For example, in the case of a closing speed of 180 kts, two light G.A. aircraft only 40 seconds and 2 miles away from impact, the aircraft will only appear to be one-quarter size. At 10 seconds to impact the gap distance is now only ½ mile and the target is only normal size. The image size of the oncoming traffic remains extremely small until about 5 seconds to impact, at which time the target "blooms" to an image about twice as wide. Now consider again that the pilot needs about 12.5 seconds to react and implement/execute avoidance.

Above all, consider that if another aircraft shows no horizontal or vertical motion in the windshield but it is increasing in size, BEGIN TO TAKE IMMEDIATE EVASIVE ACTION for this is the traffic that can bite you. It should be crystal-clear that the need for earlier traffic recognition is critical to avoiding MACs/NMACs. Fortunately, with good knowledge and technique "the eyes have it."

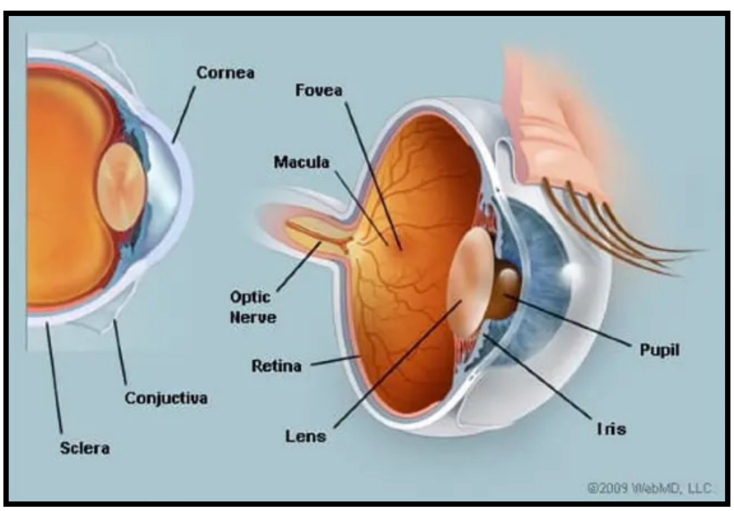
Isn't the "See-and-Avoid" Principle A Weak Defence – Is It Worth the Effort?

Unquestionably under certain circumstances such as physiological limitations of the eye, angular size of approaching traffic, cockpit distractions, workload, head-down time on the panel, and environmental effects in the background, a pilot's ability to see approaching traffic may be adversely affected. Consequently, the "See-and-Avoid" principle is the weakest defence by far, especially if you are not alerted to look for traffic in the vicinity. But just remember that, even if you are alerted to traffic via a radio call or electronic display, you still should try to make visual contact with that traffic and follow it until it ceases to be a threat.

Characteristics & Limitations of Human Eyesight for Aviation

The human eye is a very complex system. About 80% of our total information is received through the eye. It is therefore our prime means of identifying what is going on around us. The human eye receives information about the movement, shape and colour of objects we see and the glare/light that those objects give off.

Fig. 2: Structure of the Eye



That information falls onto the retina (the inner layer at the back of the eye) which contains millions of light-sensitive receptors, mainly rods and cones. Cones are stimulated by bright light, provide colour perception, and are concentrated in "fovea" which is the highly central area of the retina. Light entering the eye focuses directly on the fovea area of the retina making it the site of greatest visual acuity and providing the ability to distinguish fine details. The retina is connected to the optic nerve which relays the light hitting the fovea in a series of electrical impulse transmitted by the retina then the optic nerve to the brain. The brain then processes these impulses into images and makes determinations as to appropriate responses or actions.

The fovea area of the retina is about 1.5 degrees wide and 1-2 degrees vertical – equivalent to a quarter seen from one eye at a distance of 4.5 feet. Anything outside this small area will not be seen in detail. In practical terms, an aircraft that was visible in the foveal field from 5,000 feet away would only be visible at 500 feet or less if it was more than five degrees on either side of this central vision.

Therefore, if you are simply staring straight ahead while flying, you're missing a vast amount of sky.

In very low light the cones, nearer the centre of the fovea, become inactive. Vision is taken over by rods found further from the centre of the fovea. But the rods cannot distinguish colour and are not as good at distinguishing shapes as the cones. This has important implications for night vision which will be outlined further below.

Let's now take a look at some of the limitations of the human eye and how they affect our aviation sight.

Blind Spot:

The optic nerve contains no light-sensitive receptors. A blind spot therefore occurs where the optic nerve attaches to the back of the retina. This blind spot is about 5-10 degrees wide and from 1.5 degrees below the horizon to about 7.5 degrees above the horizon. This natural blind spot is normally compensated for by the other eye. However, if that other eye is blocked, say by a windshield post, an object the size of a small airplane at a distance of 600 feet ahead, could be completely eliminated by this blind spot. To overcome this, when scanning outside the cockpit, the pilot must move, not just the eyes, but also the head around to be able to see around and beyond obstacles to vision located inside the aircraft.

Related to blind spots are actions pilots should consider compensating for their aircraft's attitude and basic design - adjusting pitch in climbs to improve forward, in-flight visibility, and making gentle turns when descending to obtain a clear view of traffic ahead. It is recommended that pilots check their blinds spots caused by fixed aircraft structures such as door posts, window posts and wing design.

High-wing aircraft have restricted visibility above whereas low-wing airplanes have limited visibility below. The most frequent MAC occurrence is a faster, low-wing descending upon and impacting a slower, high-wing aircraft. Banking from time to time and taking a good look can uncover these blind spots.

Visual Acuity

Relative motion is important for detecting other aircraft because the retina, and in particular the fovea, is especially sensitive to small movements. However, the retina is not equally sensitive over its whole surface and at even small angular departures from the fovea, visual acuity diminishes significantly. For example, the acuity at five degrees to the left or right of the fovea is only one-quarter that at the retina. Consequently, a pilot visually searching for a small target is unlikely to see it if the target does not fall on the fovea, especially if the target has no relative movement.

The implication for the pilot scan is the same as for the blind spot, namely: the pilot will need to move not only the eyes but also the head for a proper scan. To maximize visual acuity, the pilot must also break the outside picture into small blocks that can be carefully examined in sequence. This increases the chance of light/glare coming off traffic to be seen by the foveal part of the retina.

Empty-Field Myopia

In the absence of a visual stimulus, such as empty airspace, the eye muscles relax, preventing the lens from focusing and the eye comes to a resting distance of about a half a metre ahead of the pilot's eyes! This presents a problem for the pilot who is attempting to scan for traffic in a clear, featureless sky. In this event, which often occurs on vague, colourless days above a haze or cloud layer when no distinct horizon is visible the eye cannot focus on empty space. Vision becomes unfocused and blurred, thereby hindering effective search and detection. Complete darkness, fog, total overcast, and cloudless blue skies all present the viewer with a monotonous field. In such conditions, normal eyes constantly try to focus on infinity but actually focus on a point just a metre or two in front of their eyes!

The antidote is to regularly cast your eye on some distant feature – perhaps a distant cloud, another aircraft ahead or some element on the ground ahead to ensure that your eye is properly focused before commencing your outside scan. Without something distant to focus on, within 60-80 seconds the eyes naturally relax to a focal distance just in front of the propeller.

This principle of the need to focus your eyes applies equally as you transition from looking at something up close, like a dark instrument panel, to something bright like a bright cloud, other aircraft or ground features outside the cockpit. This refocusing only takes about 1-2 seconds, but your vision will improve if you first give your eye the chance to refocus before resuming your traffic scanning.

Saccadic Eye Movements

When the eyes are not tracking a moving target, they may shift into a series of jerky movements called saccades. Aircrew cannot make voluntary smooth eye movements while scanning featureless airspace. Research shows that saccadic eye movement decreases visual acuity significantly, leaving large gaps in the distant field of vision. Thus, a smooth, continuous, non-stop scan outside will be fruitless. **Instead, the effective scan will involve breaking the sky into distinct blocks each of which is to be examined in detail and sequentially.**

Binocular Vision

The visual field of each eye overlaps with the other providing us with binocular vision and enabling depth perception. For the brain to accept what the electrical impulses sent from the optic nerve mean, we need to receive cues from BOTH eyes. If an object is visible to only one eye, but hidden from the other (for various reasons), the target outside may not be seen at all. This could, of course, be exacerbated by the blind spot discussed earlier. The solution for an effective outside scan is to ensure that the pilot moves not just the eyes, but also the head to look around such obstructions and ensure that both eyes can see around those obstructions. Piling stuff atop the glareshield is a bad idea for a few different reasons but causing an inhibition to clear path viewing outside the windscreen is certainly one of them.

Tunnel Vision/Peripheral Vision

Although eyes accept light rays from an arc of nearly 200 degrees, they can only focus on and classify an object within a relatively narrow area of approximately 10-15 degrees left or right. Objects outside this much narrower range cannot be accurately identified. Accordingly, aircraft may not be seen distinctly. One result is that pilots tend not to believe what they see out of the corner of their eye, so no signal of traffic in this area is sent to the brain. Anything perceived on the periphery must be brought into that narrow field to be identified. This again speaks to the need to break the sky down into individual blocks to each be examined separately using both eye and head movements. The blocks furthest left or right on the periphery especially need to be examined carefully and pilots need to be less prone to discount items seen or movement detected in these areas.

Another type of tunnel vision occurs when pilots are on final approach course for landing. Here the pilot is focused on the target landing space on the runway and this tunnel vision focus intensifies as the airplane gets closer and closer to touchdown. But, such tunnel vision on approach works against maintaining a visual awareness of other aircraft that may become a threat – such as an aircraft flying a tight base towards the aircraft flying on the final approach course or a faster aircraft overtaking a slower one and descending into the leading aircraft. Many MACs and NMACs result from incursions in the traffic pattern and on final approach. Pilots need to allocate some time to looking around at the traffic environment (left, right, above and especially below) as they proceed down the glidepath to the touchdown.

Detecting Movement

The human visual system is better at detecting moving targets than stationary targets. The eye detects movement via a neural circuit in the retina at the back of the eye that carries signals that enable the eye to detect movement. The impulse is then sent to the brain via the optical nerve. Once received the brain can detect movement. Ironically, the target that demonstrates the least movement is the one that can bite the hardest. Against a stationary, irregular background, an aircraft only doesn't need to move much to reveal its presence, but against a featureless background, like a cloudless, blue sky, the aircraft's perceived motion must be ten times faster to be noticed. What complicates the detection of relative motion is the fact that while flying, your eyes are constantly moving.

Exposure Time for Image

The longer a target can be kept in continuous image the better it is for the pilot to properly process the conflicting aircraft, including deciding what, if anything, to do to eliminate collision risk. Remember, "See-and-Avoid" relies ultimately on having the target in eyesight. An aircraft darting in and out of clouds presents a special challenge to the scanner. When the target is not in continuous sight the pilot must judge its speed and direction in order to follow its path behind a cloud or horizon. A small, slow-moving object that presents little contrast against its background (cloud, ground feature) can easily be lost during the intermittent observation.

Background Contrast

The contrast between an aircraft and its background can be significantly reduced by atmospheric effects, even in conditions of good visibility. Complex backgrounds such as ground features or clouds can cause a contour interaction, causing the aircraft to present a less than distinct image. As well, prevailing topographic background can "hide" the approaching aircraft. When scanning for traffic, pilots need to be vigilant in these cases.

Glare Is Your Enemy But Also Your Friend

The effects of glare can make objects hard to see. This is particularly true on a sunny day over a cloud layer or when flying directly into the sun. An aircraft which has a high degree of contrast against the background will be easy to see, while one with a low degree of contrast at the same distance may be impossible to see. A dirty, scratched, opaque or distorted windshield will make matters worse. As a simple matter, windshields should always be kept clean.

Extended exposure to such bright sunlight causes eye fatigue. Pilots are recommended to wear sunglasses to reduce eye fatigue from exposure to the sun, and to reduce glare.

However, elimination of all glare can be detrimental too. Light hitting aircraft causes glare, or "sparkle," to come off the windshield and airframe. These are often the first signs for the pilot that a conflicting aircraft may be present and therefore making that airplane easier to spot. Eliminating all that glare reduces the possibility of spotting the glare of a conflicting airplane.

This is one of the principal reasons why it is recommended that pilots NOT wear polarized sunglasses when flying since the polarization feature can block such glare from opposing aircraft. The other main reasons are that some of the cockpit displays already have anti-glare coatings and use of polarized sunglasses can make the displays difficult or impossible to see.

Other Environmental Factors Affecting Eyes & Vision

Dust, fatigue, emotion, germs, fallen eyelashes, age, optical illusions, effect of certain types of medications, alcohol content from last night's party, atmospheric conditions, glare, lightning, windshield deterioration and distortion, aircraft design, cabin temperature, oxygen, and acceleration forces can all play an adverse role in pilot vision. Keeping your optical prescription current and ensuring you wear your glasses, if required, and having a backup set on-board are simple but smart things to do to keep your pilot vision in good shape.

Perceptual Optical Illusions

In early flight training we are taught about illusions such as flying in rain, night flight approaches to wide and narrow runways, and "black holes". Pilots need to be aware of these optical illusions. One that has perhaps greater applicability for MACs/NMACs is that an aircraft ahead and below appears to be at your altitude, yet all the while it will be straight and level below you. In-flight collisions have occurred when pilots experience this illusion, and the higher-flying aircraft descends directly into the path of the slower aircraft flying below.

Overconfidence in Visual Abilities

Pilots tend to overestimate their visual abilities and to misunderstand their eyes' limitations. Developing a good understanding of how your eye affects your piloting vision is beneficial to avoiding MACs/NMACs. Striving to reach ever-higher standards of visual abilities through this knowledge and training of your eyes will also prove useful. Don't forget to have regular eye-checkups and adjust your prescription when needed.

Daydreaming and Boredom

Most of all, the eye is vulnerable to the wandering of the mind – daydreaming. We can "see" only what the brain allows us to see. A daydreaming pilot staring out into space sees no approaching traffic and is probably the #1 candidate for a MAC. Moreover, hour and after hour of scanning without detecting target(s) can lead to complacency and boredom, and yes, daydreaming.

Pilots need to be aware of these risks which can affect their vision and flight safety. The outside traffic scan must be accorded a high priority when flying in VMC, especially in busy flight environments.

Night Vision

As mentioned earlier, in low light conditions the cones in the fovea, found at the very centre of retina, become inactive and the job is taken over by the rods located further from the centre of the retina. The cones in the centre of the fovea are unlikely to detect objects – the night-blind spot which is an area where the eye cannot detect anything. The rods, oriented further out around the centre of the retina (fovea area), are more sensitive in low light and may identify objects. However, rods cannot distinguish colour, and they are not as good at distinguishing shapes. This is why at night it is often easier to look to one side of an object, instead of right at it. This is called "side-viewing." One upside with rods being prime at night is that they are sensitive to movement and peripheral vision is enhanced.

One very important point about rods is that it takes about 30 minutes to adapt for night vision after being exposed to light. Pilots must allow time for this adaptation in preparation for night flights and, once adaptation is achieved, take steps to guard against exposure to bright lights. Light adaptation can be destroyed in seconds. Red coloured flashlights in the cockpit and utilizing night settings on avionics can help safeguard the adaptation (but have the downside of less legibility). Pilots should avoid looking at bright lights until the night flight is over. High intensity strobe lights are great to make your airplane highly visible to others at night but should not be used for ground operations to help other, nearby pilots safeguard their own night-time adaptation. The same applies to landing lights.

It is important to maintain a scan at night, especially in high-traffic environments. Scanning at night depends almost entirely on peripheral vision. The type of scan to use at night is different than for daytime. Instead of the recommended daytime regimen of examining the outside view one distinct block at a time, it is more beneficial when night scanning to make a continuous scan (whatever pattern you find comfortable). This maximizes the chance to pick up an image (aircraft lights) on the retina.

Distraction of Instruments Inside the Cockpit

Spending too much time on instruments, with head down in cockpit, can distract pilots to the point of seeing nothing at all, or lull the pilot into cockpit myopia – staring at instruments without focusing.

When flying VFR, how much time do you allocate for inside instrument viewing and external traffic scanning? If IFR, how often have you filed, got to your assigned altitude, turned the aircraft over to "Otto" and never, or very infrequently looked outside, feeling secure that the radar advisory service will protect you from all harm? For VFR flights Enroute Surveillance (formerly "Flight Following") is given on a "workload permitting basis" by ATC. When traffic gets really busy you might not get the advisory service.

An increasing number of studies are being completed using sophisticated eye-tracking data. One such U.S. study completed in 2005 concluded that the subject test pilots spent on average just under one-third of their time looking outside the cockpit. This increased to 51% during a period when traffic was known to be present, but then fell off again once the traffic dropped again. During the time not spent looking outside, fixations were predominantly directed to the instrument panel. The overall finding was that pilots spend more time looking inside the cockpit than out.

This can't be good and experts, including the U.S. military agree – maybe because they are flying such high-performance aircraft yet remain very mindful of that 12.5 second human nature factor to acquire, identify then do something to avoid a collision. The U.S. military teaches that a proper allocation of time spent on an instrument scan is about 3-4 seconds, allow 1-2 seconds for eye refocusing as gaze transfers from the instrument panel to outside, then spend about 17 seconds scanning outside the aircraft. Thus, the amount of time spent scanning outside the aircraft is almost 5 x the amount that should be spent scanning head-down in the cockpit. How does your average allocation match up with this recommendation?

How to Scan for Traffic Outside the Cockpit

The first thing to recognize is that good visual scan practices are an **acquired, not an inherent skill.** They can and should be practiced and routinized into the normal flight regimen. Pilots need to establish an effective scanning procedure that works for them in their aircraft and then to have the discipline to adhere to that procedure, overcoming inhibitions including boredom and daydreaming. Glancing outside the cockpit and moving only your eyes around from side to side without stopping to focus on anything is practically useless. So is staring into one spot for long periods of time.

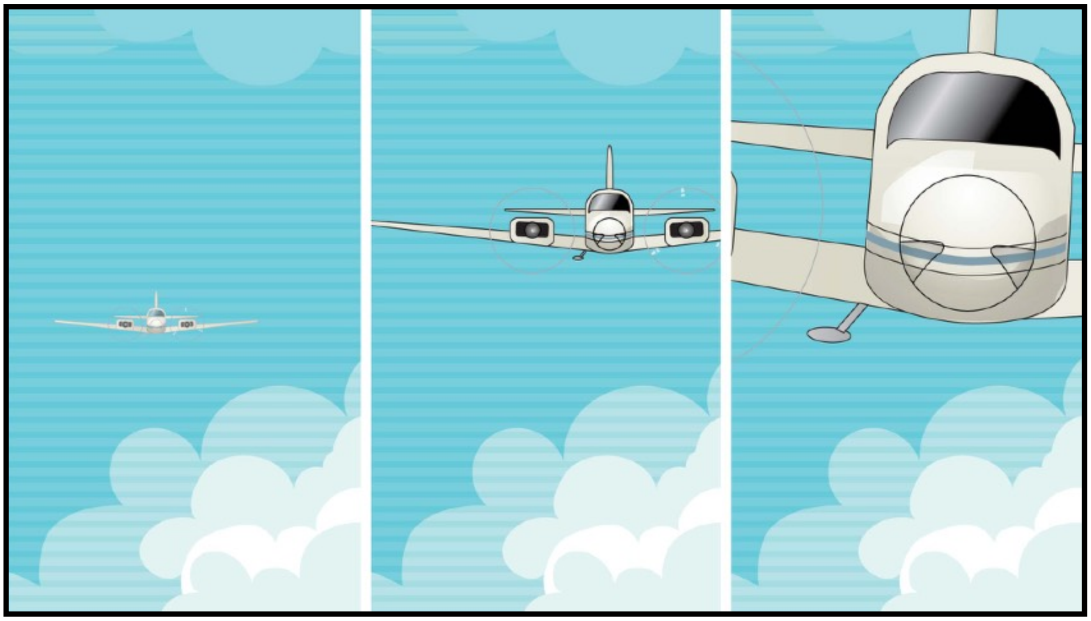
There are two basic systems recommended for daytime scanning. Both involve breaking up the 120 -degree forward arc of vision into individual blocks of 10-15 degrees. This overcomes the forward blind spot and tunnel vision problems natural to the eye.

The full 120-degree forward arc is broken up into 60 degrees left of centre and 60 degrees right of centre. Breaking these blocks of 60 degrees down into 10 to15 degree sectors yields a total number of blocks to be individually viewed at 5-6 per side or 10-12 in total.

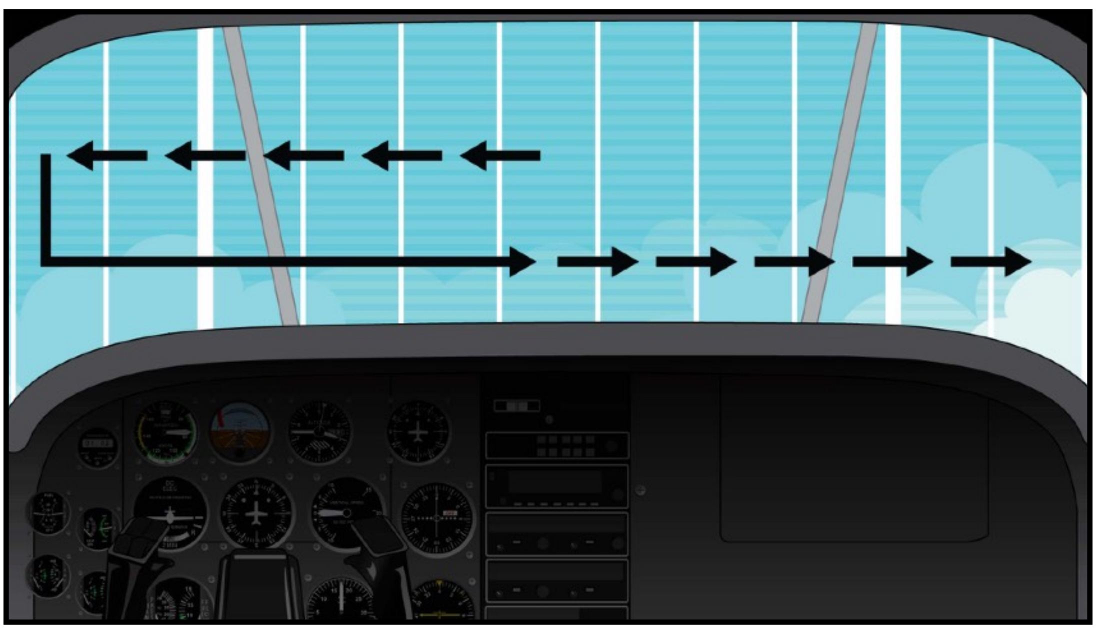
Method 1 involves: Looking away from the inside panel scan, giving your eye a second or two to refocus then looking all the way left to the first block of 10-15 degrees on the far left. Pause in this block, looking for 1-2 seconds, including out centre, and 10 degrees up and down, then move rightward on to the next block and repeat. Continue working through each block from left all the way to the right, until the full 120-degree forward arc is completed. Then return focus to inside the cockpit for another instrument scan.

Method 2 involves beginning at the centre of the windshield. Thence examine the first 10-15-degree block to the left of centre, followed by the next block to the left it, always moving to the left. When the final block on left is examined, return to the centre of the windshield, and proceed to examine the 5-6 blocks to the right of centre until reaching and completing the scan of the far-right block. Return to centre of the windshield, then move inside for a short scan 3-4 seconds of the instruments. Repeat and each time you leave the cockpit for outside, allow 1-2 seconds for eye refocusing before commencing another outside scan.

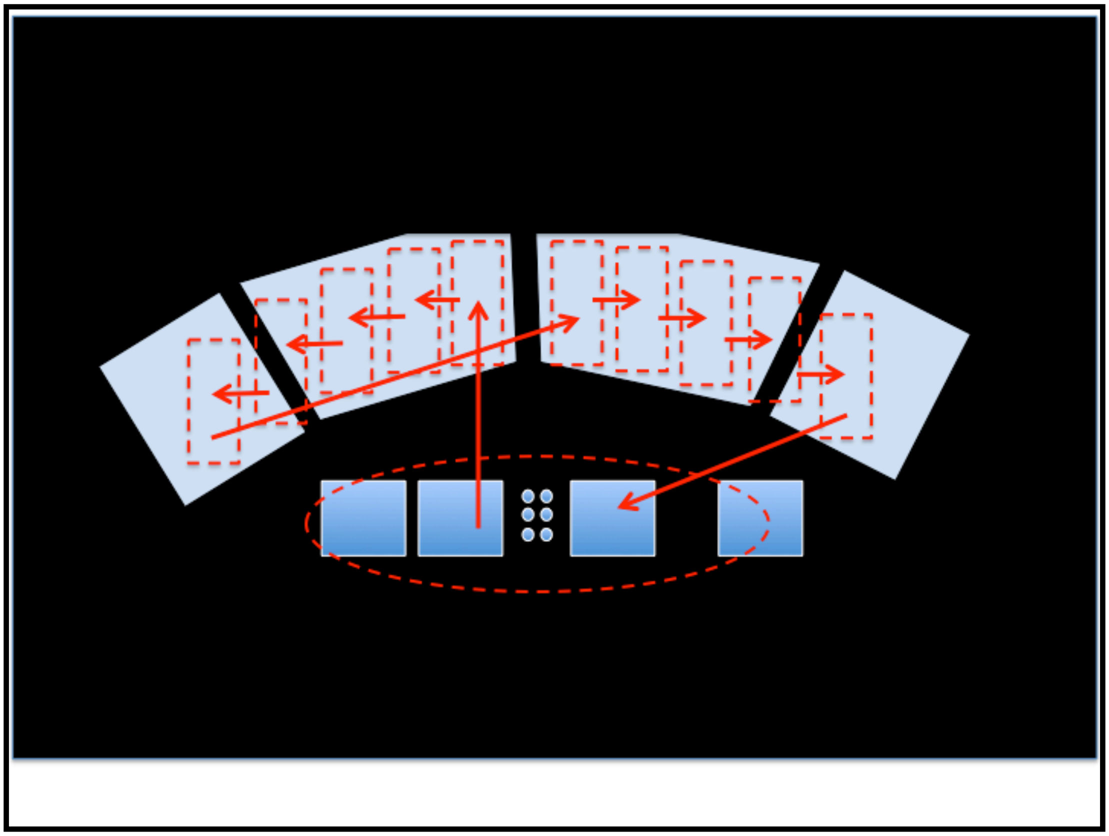
For both methods, spend about 17 seconds looking outside and only 3-4 seconds looking inside. Allow 1-2 seconds for new eye-focusing as you move from inside the cockpit to outside. As mentioned earlier, that refocusing can quickly be accomplished by momentarily focusing on some distant object such as a cloud, another aircraft or some ground feature.



A problem we want to avoid!



Centre to side scan approach



Front to side scanning technique

There is no one technique that is best for all pilots or their specific aircraft. Each pilot must develop a scan that is both comfortable, workable and reliably repeatable.

A good outside scan when flying at night is also required, but the technique is different because the eyes' cones are inactive and rods come into play, bringing with them the limitation of not being able to discern shapes as well but the advantage of heightened peripheral vision. At night, scan using a more continuous scan pattern whether you use a scan pattern such as in Method 1 or Method 2 or your own DIY pattern. The nighttime scan is more of a continuous flow scan instead of stopping and examining each block of the 120 field of vision ahead. Of course, you will be aided by the traffic aircraft navigation, strobes and landing lights. The port side navigation light is always red, and the starboard is green, the tail is white. At night, this helps you understand which way an aircraft is moving in relation to your position.

Here are some other things to keep in mind:

- Be sure to look around obstacles in the cockpit so that you can clearly see outside with BOTH eyes – this overcomes binocular vision effect.

- You must move not only your eyes but also your head as you look around obstructions and sequentially examine each individual block. This is necessary to bring successive blocks onto the small area of sharp vision in the centre of the eye.

- Examine the areas of greatest vulnerability – 60 degrees left and right and 10 degrees above and below level. On final approach course, don't focus exclusively on your landing target on the runway. Instead, overcome this tunnel vision by looking around to see if another aircraft may be presenting a threat.

- Take the design of your aircraft into account – high-wing and low-wing aircraft have separate vulnerabilities to vision.

- For "See-and-Avoid" to work, the pilot must first be able to detect the traffic by visual means, recognize the collision geometry based on visual cues, then react correctly to avoid a MAC. Remember this process could take up to 12 seconds.

- Get your time allocation for inside the cockpit and outside scanning right. Research indicates that most GA pilots are nowhere near the right allocation. How about you?

- Don't discount any movement you observe in your peripheral vision.

Just as you practice many of your repertoire of flying skills, add some practice on your scan. It will make you a better and safer pilot!

Taildragger Poem (Author Unknown)

Taildragger, I hate your guts,
I have the license, ratings and such.
But to make you go straight is driving me nuts.
With hours of teaching and the controls in my clutch.
It takes a little rudder, easy, that's too much.

You see, I learned to fly in a tricycle gear
with one up front and two in the rear.
She was sleek and clean and easy to steer
But this miserable thing with tires and struts
Takes a little rudder, easy, that's too much.

It demands your attention on the take-off roll
or it heads towards Jone's as you pour on the coal.
Gotta hang loose, don't over control.

This wicked little plane is just too much.
With a lot of zigzagging and words obscene
I think I've mastered this slippery machine
It's not that bad if you have the touch
Just a little rudder, easy, that's too much.

I relax for a second and from the corner of my eye,
I suddenly realize with a gasp and a cry
That's my own tail that's going by.
You grounding looping wreck; I hate your guts,
Give a little rudder, Great Scott, THAT'S TOO MUCH.

Author Unknown

Testing Carb Heat During Runup
(Source: Pilot Workshops)

Subscriber question:

"Three different instructors have told me three variations on checking carb heat during runup. What do you suggest?" —Ellie Z.

Pilot Workshops Answer: (Bullets Provided by Editor)

"My preferred method for checking the carb heat during runup is to combine it with a check of the mixture control.

- At runup RPM, apply full carb heat. You should see a drop in RPM which indicates that the heat is being added. Wait 15 seconds or so. If there is no rise in RPM, there's no carb ice.
- Then slowly lean the mixture. You should see an RPM rise as the overly rich mixture caused by carb heat is reduced.

- Continue leaning until you start to see an RPM drop, then go back to full rich mixture, and reduce the throttle to idle. The engine should idle smoothly. Increase the RPM to 1000 RPM, or as specified in the POH, and turn off the carb heat.

You have now checked that the carb heat is working, there is no ice, the mixture control is working, and the carburetor idle adjustment is correctly set.

Of course, follow all POH guidance but I think you'll find the above procedure will not be contrary to any guidance in the POH for the average single-engine piston aircraft with a carbureted engine.

One note of caution though: Always move the mixture control slowly. You should never lean so much the engine starts to quit as, this risks a backfire from unburnt fuel, which is death on muffler baffles."

MEMBER'S CORNER

Landing at Juancho E Yrausquin Airport (Caribbean Netherlands)

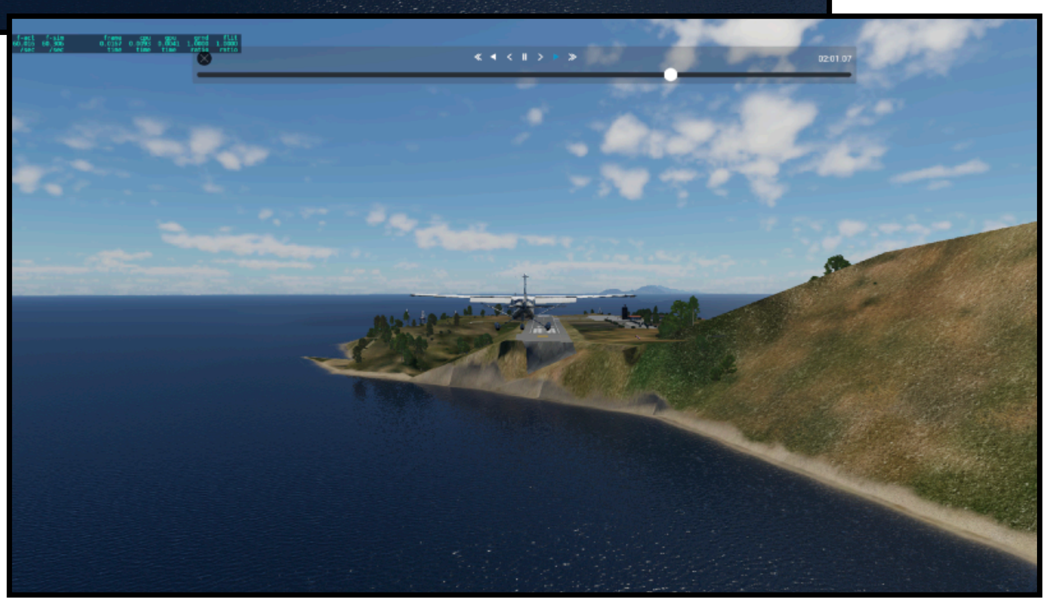
(Using XPlane 12) - Geoff Gartshore

Warren Cresswell mentioned this challenging airport in the Caribbean Netherlands in his interesting article about his checkout landings at St. Barth's airport (May-June Newsletter issue).

So I decided to take up his challenge and attempt some landings at Juancho airport (Saba Island, Runway 12) using the C172 in XPlane 12.

The challenge with this airport is the short runway on the edge of the mountainous Saba Island in the Caribbean. The terrain is conducive to swirling and variable winds, (which you can simulate in XPlane), and the short runway requires a good stabilized approach at minimum controllable speed (adjusted for any gust factor) to avoid going off the runway end into the briny deep!

Here are the fruits of my efforts in landing at this scenic and challenging airstrip. As usual, you be the final judge of the effort!



Happy Summer Flying!

(Next Issue - IFR Cockpit Organization)