

PHOTOGRAPHY SETTINGS AT RIAT

A BEGINNER'S GUIDE

Created by Jack Skedje | The Big Guide to RIAT

Welcome, I want make camera settings less confusing

If you are attending RIAT with a camera for the first time, the settings can feel like a minefield. One aircraft is moving slowly along the taxiway, the next is a fast jet crossing the display line, and then a helicopter appears and needs a completely different shutter speed. You do not have much time to think, and it is very easy to start changing everything at once.

I have created this guide to make that part of the day easier. It gives you practical starting settings for the situations you are likely to photograph at RIAT, using basic photography language and without overcomplicating it. These are not magic settings that will work perfectly every time. The weather, light, aircraft, lens and your position along the crowdline will all make a difference. However, they will give you a safe place to begin.

My advice is simple: start with a reliable setting, take a photograph, check the result and change one thing at a time. Get the safe photograph first. Once you know you have something sharp, you can slow the shutter, try a different angle or be a little more creative.

JACK'S QUICK TIP: Do not spend the whole display looking at the back of the camera. Check a few photographs when the aircraft has moved away, make a small adjustment and then get ready for the next pass.

The simple startup before the flying begins

Set the camera up before the first display. You do not want a rare aircraft appearing while the camera is still set for a static aircraft or a long exposure from the night before. The good thing about RIAT is you generally see some arrivals and departures before the flying display begins. If you are lucky to be arrive from Wednesday, then you will have plenty of time to practice before the show itself. Use this to get your settings correct, I do this, even with 15+ years of experience. You will see most photographers doing this.

File type: RAW, or RAW + JPEG. RAW keeps more detail and gives you more room to recover bright skies and dark aircraft when editing. JPEG is fine if you do not plan to edit much, but RAW gives you more flexibility. If this is your first air show, then shooting in JPEG, is perfectly fine.

Camera mode: Shutter Priority – S on Nikon and Sony, or Tv on Canon. You choose the shutter speed and the camera works out the aperture. This is normally the easiest mode for a beginner at an airshow.

Focus mode: AF-C, AI Servo or Continuous AF. The camera continues to adjust focus while the aircraft moves towards you, away from you or across the sky.

Drive mode: Continuous high-speed burst. A short burst gives you several frames to choose from when the aircraft is banking, crossing or passing display centre.

Metering: Matrix or Evaluative. This is a good general option for changing aircraft and backgrounds.

White balance: Auto. This is a sensible starting point, especially when shooting RAW, because the colour can be corrected later.

Image stabilisation: On. Use normal mode for general flying and a panning or sport mode if your lens offers one. Check your own lens instructions, because stabilisation systems can behave differently.

Focus area: Set to Group or Single Point It is easier to keep a group of focus points on a moving aircraft than one tiny point, but it is less likely to grab the cloud or background than using the whole viewfinder.

ISO: Auto ISO to begin with. This lets the camera raise or lower the sensitivity as the light changes. If your camera allows it, set a maximum ISO that still looks acceptable on your camera, perhaps ISO 1600 or 3200. Older cameras may look better with a lower limit.

JACK'S QUICK TIP: Photograph a distant sign, vehicle or parked aircraft before the flying starts. Zoom into the photograph and check that it is sharp. It is much easier to correct a problem before the first display.

What is the correct shutter speed for aviation photography?

Shutter speed controls how long the camera records the scene. A fast speed, such as 1/2000 second, freezes movement. A slower speed, such as 1/160 second, shows movement in propellers, rotors and backgrounds, but it is harder to keep the aircraft sharp.

At RIAT you will change shutter speed more than most other settings. Jets normally need a faster shutter. Propeller aircraft and helicopters normally need a slower shutter so the blades do not look completely frozen. This is why leaving the camera on one setting all day will not give the best result.

This is also why we recommend having two bodies, meaning one can be left on a Slow Shutter speed, and the other on a fast one.

Fast jets and high-speed passes

Fast jets are often the easiest place to start because you are trying to freeze the movement. The difficult part is keeping the aircraft inside the frame and allowing the autofocus enough time to lock on. Remember, practice makes perfect. It will take you some time to learn and get the shot you want.

Safe starting shutter speed: 1/1000 second. This should freeze many normal fast-jet passes while keeping the ISO manageable in reasonable light.



Very fast pass, tight turn or vapour: 1/1600 to 1/2000 second. Use the faster end when the aircraft is very close, crossing quickly, pulling hard or when you are using a long lens.



Please note that these are a guide, we also use the Rule of thumb, of Shutter speed, equals to your focal length, meaning If you are shooting at 500mm, then set your shutter to 1/1000 or higher to create sharp images. Your ISO may need to be increased to make your images lighter depending on the cloud cover.

Aperture: Chosen by the camera in Shutter Priority. If you use Manual mode, f/7.1 or f/8 is a useful starting area when there is enough light. Generally, most lenses will be a sweet spot for sharpness.

ISO: Auto ISO. Watch that it does not rise unnecessarily high. In bright conditions it may remain around ISO 100–400; under dark cloud it may rise much further. I personally like to use manual ISO.

Autofocus: AF-C / AI Servo with a small group or subject tracking. Begin tracking the jet before it reaches the point where you want the photograph.

For a fast pass, start slightly wider than you think you need. Find the aircraft, follow it smoothly and zoom in only once you have it under control. If you use too much focal length straight away, the aircraft can disappear from the viewfinder, and you may miss the entire pass. I have done this a few times before.

JACK'S QUICK TIP: Leave a little space in front of the aircraft and around the wingtips. You can crop the photograph later, but you cannot put a clipped wingtip or smoke trail back into the frame.

Jets arriving and departing

Arrivals, departures and runway movements give you different opportunities from the main flying display. You may capture rotation, touchdown smoke, afterburner, a pilot wave or the aircraft banking away. The distance and angle can change quickly, so a zoom lens is very useful.

Take-off: 1/1000 to 1/1600 second. Use the faster end for a powerful rotation, a close departure or visible heat and exhaust movement.



Landing: 1/800 to 1/1250 second. This gives you a good chance of freezing the aircraft and the moment the wheels touch down.



Taxiing jet: 1/320 to 1/800 second. A slower taxi does not need the same speed as a flying pass. Raise it if the aircraft is moving quickly or your longer lens is difficult to hold steady.



Heat haze can make a perfectly focused aircraft look soft, particularly close to the runway on a hot day. A faster shutter will not remove heat haze. If it becomes severe, concentrate on closer aircraft, wait for a different angle or include the haze as part of the atmosphere.

Propeller aircraft – keep movement in the blades

Propeller aircraft need a different approach. If you use 1/2000 second, the aircraft may be sharp but the propeller can look stopped. Slowing the shutter shows the engine is running and gives the photograph more life. The trade-off is that your success rate will fall, so work down gradually rather than going straight to a very slow speed.

Safe beginner starting point: around 1/320 second. This normally gives some blade movement while still giving you a reasonable chance of a sharp aircraft.



More propeller blur: 1/250, then 1/200 or 1/160 second. Try each speed after you have secured a sharp photograph. The slower you go, the smoother your panning needs to be.



Fast aerobatic propeller aircraft: around 1/500 second to begin. These aircraft can change direction quickly. Secure the airframe first, then reduce the speed on a later pass.



Taxiing propeller aircraft: around 1/250 second. If your tracking feels smooth, try 1/160 or 1/125 second for more movement. Any lower you will risk the whole shot being blurry, trust me, I have many images like that.



JACK'S QUICK TIP: Do not chase a perfect full propeller disc at the expense of a sharp aircraft. Some movement in the blades normally looks much better than a lovely blurred propeller attached to a soft airframe.

Helicopters and rotor blur

Helicopters can be difficult because rotor speeds vary and a very fast shutter makes the blades look frozen. Start safely and reduce the speed as your confidence improves.

Safe beginner starting point: 1/250 to 1/320 second. This should show some rotor movement while giving you a fair chance of keeping the helicopter sharp.



More rotor blur: 1/160 to 1/200 second. Try this once you have a sharp frame and the helicopter is moving in a predictable direction.



Hovering helicopter: around **1/200 to 1/250 second**. Even though the helicopter is hovering, keep following small movements and hold the camera steadily.



Do not assume that every helicopter needs exactly the same speed. A large helicopter with slower-looking rotors may need a slower shutter to show movement than a smaller machine. Check a photograph when it is safe to do so and adjust.

Large transport aircraft and heavy displays

Large aircraft may look slow because of their size, but they can still be moving quickly. They also give you a chance to photograph banking topsides, wingtip vortices and formations with smaller aircraft.

Normal flying pass: 1/800 to 1/1250 second. This is usually fast enough for a sharp heavy aircraft while avoiding an unnecessarily high ISO.



Propeller transport aircraft: around 1/320 second. Treat it as a propeller aircraft if you want visible blade movement, then work down slowly.



Display teams, formations and crossovers

For formation teams, your main job is keeping every aircraft inside the frame. A wider view often creates a stronger photograph because it shows the shape of the formation, smoke and the scale of the display.

Formation pass: 1/1000 to 1/1600 second. This freezes the aircraft and helps when they are spread across a large part of the frame.



Break or crossover: 1/1600 to 1/2000 second. The relative movement can be very fast, so track early and begin your short burst just before the aircraft meet or separate.



Focus area: Group, zone or auto. Keep the focus area on the nearest or most important aircraft and use enough depth of field where possible. 90% of the time, I shoot in Group, giving me the best changes of aircraft in focus.

Listen to the commentary, as it may warn you about an opposition pass, break or aircraft arriving from behind. Use the first pass to learn the route. If the display repeats a similar manoeuvre, you will be better prepared the next time.

JACK'S QUICK TIP: A formation does not need to fill the frame. Smoke, cloud and empty space can make the shape much clearer and give the aircraft somewhere to move into.

Panning for movement

Panning means moving the camera smoothly with the aircraft while using a slower shutter speed. If it works, the aircraft remains sharp while the background becomes blurred. It can look excellent during taxiing, take-off or landing, but not every frame will be sharp, and that is completely normal. Expect some bad blurry and out of focus shots, the first time you do this. Even now it happens.

Beginner panning speed: 1/250 or 1/320 second. This gives you some movement without making the technique too unforgiving.



Next challenge: 1/160 or 1/125 second. Use this once you can follow the aircraft smoothly. Expect fewer sharp frames. Do not go lower than you need to, as you will be at risk of ruining your images.



To pan, stand with your feet comfortably apart, turn from your waist towards the approaching aircraft and find it early. Keep moving at the same speed as the aircraft, press the shutter gently and continue following it after the burst. Do not stop moving as soon as you press the button.

JACK'S QUICK TIP: Take the safe sharp photograph first, then try the slower pan on the next pass. RIAT is not the place to discover at home that every photograph from a rare display was blurred.

Static aircraft inside the RIAT showground

Static aircraft give you time to slow down and think about the photograph. The challenge is normally the crowd, barriers, signs and other aircraft in the background rather than movement.

Camera mode: Aperture Priority – A or Av. You choose the aperture and the camera selects a suitable shutter speed. This is simple for subjects that are not moving.

Aperture for the whole aircraft: f/7.1 to f/11. This helps keep more of the aircraft sharp, especially when photographing it from an angle.

Aperture for details: f/4 to f/5.6 where your lens allows. A wider aperture can soften the background behind a badge, cockpit, intake or piece of landing gear.

ISO: ISO 100 to 400 in good light, or Auto ISO. Keep it low when possible for clean detail, but do not allow the shutter speed to become too slow to hand-hold.

Focus: AF-S / One Shot for a still aircraft. Place the focus point on the cockpit, markings or the detail that matters most. Continuous focus is also fine if you prefer to leave the camera set up that way.

Walk around the aircraft before taking the first photograph. Move a little left or right, crouch lower or use a longer focal length to narrow the background. Popular aircraft may be quieter early in the day or later in the afternoon, so return if the first view is too busy.



People, ground crew and the wider RIAT atmosphere

A complete set of RIAT photographs should show more than aircraft against the sky. Pilots, ground crew, families, flags, trade stands, weather and reactions along the crowdline all help tell the story of the day.

General people and atmosphere: Aperture Priority, f/4 to f/8 and Auto ISO. Use the wider end for one person and a wider aperture; use f/8 when you want a group or more of the scene sharp.

Moving people or crew: at least 1/250 second. Raise the shutter speed towards 1/500 second if people are walking quickly or working around an aircraft. This will help reduce motion blur.

Wide venue photograph: f/8 to f/11. This keeps more of the scene sharp and works well for crowdline, runway and dramatic-sky photographs.



For close photographs of people, especially children, ask permission when practical. Never cross a barrier, block a working crew or interfere with the operation to obtain a photograph.

Bright sunshine, white aircraft and reflective metal

Bright sunshine can look easy, but white paint and polished metal can quickly lose detail. Once a highlight becomes completely white, it can be difficult or impossible to recover.

Exposure compensation: start at 0, then try -0.3 or -0.7 if highlights are flashing. A small reduction can protect white aircraft and bright cloud without making everything too dark.

ISO: keep it low where possible. Bright light normally allows ISO 100–400 while still using a fast shutter.

Use the histogram and highlight warning rather than judging exposure only from the rear screen. In sunlight the screen can appear darker than the actual photograph, which may tempt you to make the file too bright.



Dark aircraft, backlighting and silhouettes

A dark aircraft against a bright sky can cause the camera to make the subject too dark. You can either brighten the aircraft or use the backlight deliberately to create a silhouette. Similar to what I have done to this picture below.

To show detail in the aircraft: +0.3 to +1.0 exposure compensation as a careful starting range. Check the bright sky as you increase exposure, because it may lose detail.

For a silhouette: reduce exposure until the aircraft becomes a clean dark shape. This works best when the outline is easy to recognise and the sky has strong colour or cloud detail.

There is no perfect answer when the brightness difference is very large. Shooting RAW gives you more room to lift shadows later but protect the most important highlights and accept that some deep shadows may remain.

This is why its also important to be shooting in RAW, as you can really push your files to the max. Its also helpful if you have a higher megapixel camera, as this will help with the dynamic range. However a camera with 20mp will be sufficient.



Overcast skies and changing cloud

Overcast light can make aircraft look flat, but it can also soften harsh shadows and bring out surface detail. Broken clouds are harder because the brightness can change between one pass and the next. You might find you will have many under and over-exposed shots just by one pass.

Mode: Shutter Priority with Auto ISO. This keeps the shutter speed where you need it while the camera reacts to changing light.

Fast jets: keep 1/1000 second if possible. Allow ISO to rise rather than dropping to a speed that makes every frame soft.

Exposure compensation: +0.3 to +0.7 for a dark aircraft against pale cloud, if needed. Check the histogram and reduce it if the cloud is losing all detail.

Noise from a higher ISO can often be reduced during editing. A blurred aircraft caused by a shutter speed that was too slow is much harder to repair.



Rain, haze and difficult RIAT weather

RIAT weather does not always behave itself. Back in 2023 when on Friday we were hit with some heavy downpours. Rain, dark clouds and haze can make photography harder, but they can also create reflections, spray, vapour and far more atmosphere than a plain blue sky. I did notice that many photographers put their cameras away, however I find it's the best time to capture those unique images that you will only capture in these conditions. I have always said. Work with the weather, it's your friend not your enemy. However,

- In rain, protect the camera with a proper cover or dry bag and keep a clean lens cloth easy to reach.
- Under dark clouds, use Auto ISO and concentrate on keeping the shutter speed suitable for the aircraft.
- With dramatic cloud, expose for the aircraft but keep checking bright gaps in the sky.
- In heat haze, photograph closer subjects where possible. Editing cannot restore detail that the moving air has removed.
- In strong wind, use a stable stance, tuck your elbows in and secure loose covers and straps.

JACK'S QUICK TIP: Stop waiting for the weather you hoped for and look for the photograph of the actual weather is offering. Some of the most memorable aviation photographs are created in difficult conditions. This is my favorite style of photography in aviation.



Autofocus settings and how to keep the aircraft in focus

Use continuous autofocus for flying aircraft. On different camera brands this may be called AF-C, AI Servo or Continuous AF. If your camera has aircraft detection, try it before RIAT so you know how quickly it finds and holds a subject. Technology helps, but you still need to keep the aircraft inside the focus area.

- Begin at the wider end of the zoom, find the aircraft and only zoom in once tracking is secure.
- Track the aircraft for a moment before pressing the shutter, giving autofocus time to settle.
- Use a small group or zone if the camera keeps focusing on cloud, smoke or the background.
- If the aircraft keeps leaving the frame, zoom out. Too much focal length is often the problem.
- Keep both eyes open as the aircraft approaches. This makes it easier to find it before bringing the viewfinder fully to your eye.
- Practise before RIAT by following cars, birds or commercial aircraft. If you have a local free airshow or visiting one of Duxford's flying days, will help you gain that experience, before attending RIAT for the first time.

JACK'S QUICK TIP: A sharp photograph taken slightly wider is much more useful than a tightly framed photograph where the autofocus has missed.

Burst shooting without filling the camera buffer

Continuous burst is helpful, but holding the shutter down for the entire pass creates hundreds of similar files and can fill the camera buffer. When that happens, the camera may slow down just as the aircraft reaches the best position. I always recommend a camera with a least 6 FPS, however if your budget only allows 3FPS, then that's completely fine.

Follow the aircraft, begin a short burst just before the moment you want and release shortly afterwards. For a bank, crossover or touchdown, try to anticipate the action rather than reacting after it has already happened. Over time, you will find out the type of images you want to take, and the limitations of your camera and lenses. This will allow you to take less images, I may only take around 40 images of one display, as I know the images I want. This will help save battery life and space on your SD cards, plus not clogging up your PC's memory.

Manual mode – when you are ready for more control

Shutter Priority is the easiest place to start, but Manual mode can give more consistent results when the light on the aircraft stays fairly steady. A useful approach is Manual mode with Auto ISO: you choose the shutter speed and aperture, while the camera changes ISO as the brightness changes.

Fast-jet starting point: 1/1250 second, f/7.1 or f/8, Auto ISO. This provides a reliable balance of speed and depth of field in reasonable light.

Propeller starting point: 1/320 second, f/7.1 or f/8, Auto ISO. This shows some propeller movement while the camera handles changing brightness through ISO.

Static aircraft starting point: 1/250 second or faster, f/8, Auto ISO. This helps keep the full aircraft sharp while maintaining a hand-holdable shutter speed.

These are starting points, not rules. If the lens cannot open to the selected aperture at the chosen focal length, or the ISO becomes too high, change one part of the setup and check again.

Only start to use Manual mode once you are comfy with and know what settings you need. This setting you at risk of missing the shots you are after. Trust me, when I was starting to explore manual, I missed out those shots.

A simple RIAT settings checklist

If you want one quick list to check before the display begins, start here:

- RAW or RAW + JPEG.
- Shutter Priority – S or Tv.
- AF-C, AI Servo or Continuous AF.
- Continuous high-speed burst.
- Matrix or Evaluative metering.
- Auto white balance.
- Auto ISO with a sensible maximum for your camera.
- Small group, zone or aircraft tracking focus area.
- Image stabilisation on, using panning mode if suitable for your lens.
- Start at 1/1000 second for jets.
- Start at 1/320 second for propeller aircraft.
- Start at 1/250 to 1/320 second for helicopters.
- Use Aperture Priority around f/7.1 to f/11 for static aircraft.

Common problems and the quickest changes to make

The whole aircraft is blurred: increase the shutter speed. Also steady your stance and make sure image stabilisation is set correctly.

The background is sharp but the aircraft is soft: use a smaller focus area and keep it on the aircraft. Track for a moment before beginning the burst.

The aircraft keeps leaving the frame: zoom out. Find it again at a wider focal length before zooming in.

The aircraft is too dark: add a little positive exposure compensation. Check the bright sky after each small change.

White paint has no detail: reduce exposure compensation. Use the histogram and highlight warning.

The photograph looks noisy: lower the ISO if the light allows. Do not sacrifice a necessary shutter speed simply to keep ISO low.

The propeller looks frozen: use a slower shutter speed. Move down gradually from 1/320 towards 1/250, 1/200 or 1/160.

Every panning photograph is blurred: return to 1/250 or 1/320 second. Practise the movement, then try a slower speed again. DO NOT RUSH into lowering the shutter speed.

The camera stops shooting quickly: use shorter bursts. The buffer may be full, especially with large RAW files. This comes down to your camera's buffer, and SD cards write speed.

Final advice before you head to RIAT

Airshow photography takes practice, and you will miss photographs. Everyone does. The important part is understanding why an image did not work and changing one thing for the next pass. Do not assume that buying a longer lens or a newer camera will solve every problem. Learning how your own equipment behaves will make a far bigger difference.

Start with the safe settings in this guide, get a sharp photograph and then experiment. Watch the aircraft, listen to the commentary and keep looking around, because the next photograph may arrive from behind you while everyone is watching the aircraft that has just passed.

Most importantly, remember to enjoy RIAT. Lower the camera now and then, watch the display with your own eyes and take in the sound and atmosphere. The photographs should help you remember the day, not stop you from experiencing it.

JACK'S QUICK TIP: Keep practising, compare your results and develop a style that feels like your own. Your next airshow is another chance to improve.

About The Big Guide to RIAT

The Big Guide to RIAT is an independent website created to help first-time visitors, families, aviation enthusiasts and photographers plan their visit. We are not affiliated with the organisers of RIAT. Always check the latest official information before travelling or purchasing tickets, as access, timings and arrangements can change.

Thank you for taking your time in reading this, I hope this will help improve your photography experience at RIAT.

If you have any questions, please contact me on thebigguidetoriat@gmail.com I will be happy to help answer any questions you may have.

Jack Skedge

Creator and Founder of The Big Guide to RIAT
www.thebigguidetoriat.co.uk

