



Sony a7RIV Exposure Settings Guide

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Introduction

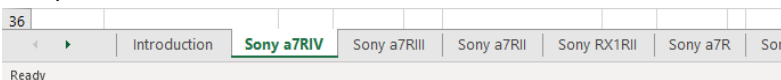
This document goes through the recommended procedure to set your Sony a7RIV's **Shutter Speed**, **Aperture** (f-stop), and **ISO**. This guide should be used only AFTER you have gone through **Sony a7RIV Menu Settings Guide** and available at fieldofviewllc.com/downloads

You may need/want different exposure settings than what this procedure dictates, so please do what is appropriate for your mission.

1. Choose your AGL Altitude

You will need to consider a variety of factors when selecting the Above Ground Level (AGL) Altitude to run you mission at. First and foremost are safety and regulatory considerations. Second is the Ground Sample Distance (GSD) you need. Field of View's Flight Planning Calculator will be the tool used to calculate GSD in this step (along with flight speed and shutter speed in subsequent steps).

- a) Go to fieldofviewllc.com/downloads and download the latest version of the Flight Planning Calculator spreadsheet.
- b) Open the Flight Planning Calculator and click on the sheet for the camera you are using (the Sony a7RIV in this case).



- c) Type in the Focal Length of the lens you are using and then experiment with different AGL Altitude values until you find a resulting GSD that meets your needs.

Inputs		Calculated Flight Parameters		
		Metric Standard		
Focal Length	21 mm	AGL Altitude	55.00 m	180.45 ft
AGL Altitude	55 m	Trigger Distance	12.38 m	40.61 ft
Frontal Overlap	80 %	Flight Line Spacing	18.57 m	60.92 ft
Side Overlap	80 %	Max Flight Speed	0.00 m/s	0.00 mph
Min Cycle Time	sec			
Note: Minimum Cycle Time can vary depending on camera settings, SD card write speed, mission type etc. It is highly recommended that you perform your own testing and experimentation to determine the safe Min Cycle Time for your setup.		Calculated Image Parameters		
		Metric Standard		
		Ground Sample Distance	0.98 cm/pixel	0.38 in/pixel
		Footprint Width	92.85 m	304.61 ft
		Footprint Height	61.90 m	203.07 ft
		Horizontal FOV	80.33 degrees	
		Vertical FOV	58.73 degrees	

2. Calculate your Flight Speed and Shutter Speed

Once you know the AGL Altitude that you are going to run your mission at, you can move on to calculating your Max Flight Speed and ultimately, your minimum Shutter Speed.

- a) Type in the Frontal Overlap and Side Overlap you want, along with the Minimum Cycle Time for your setup. The default 80% Frontal Overlap and 80% Side Overlap are good starting points for most mapping missions. When using a Sony Tough-G 128GB SD card with the Sony a7RIV configured according to the **Sony a7RIV Menu Setting Guide**, we have found a safe Minimum Cycle Time to be 1.2 seconds for multicopter missions.

Inputs		Calculated Flight Parameters		
Focal Length	21 mm			
AGL Altitude	55 m			
Frontal Overlap	80 %			
Side Overlap	80 %			
Min Cycle Time	1.2 sec			
Note: Minimum Cycle Time can vary depending on camera settings, SD card write speed, mission type etc. It is highly recommended that you perform your own testing and experimentation to determine the safe Min Cycle Time for your setup.				
		Calculated Flight Parameters		
		Metric	Standard	
		AGL Altitude	55.00 m	180.45 ft
		Trigger Distance	12.38 m	40.61 ft
		Flight Line Spacing	18.57 m	60.92 ft
		Max Flight Speed	10.32 m/s	23.08 mph
		Calculated Image Parameters		
		Metric	Standard	
		Ground Sample Distance	0.98 cm/pixel	0.38 in/pixel
		Footprint Width	92.85 m	304.61 ft
		Footprint Height	61.90 m	203.07 ft
		Horizontal FOV	80.33 degrees	
		Vertical FOV	58.73 degrees	

- a) You will notice that a value for Max Flight Speed has been calculated based on your Inputs. Type this value into the Planned Flight Speed field to determine the slowest shutter speed tolerable. *If your actual planned flight speed ends up being different than the calculated Max Flight Speed for some reason, be sure to re-do this calculation.*

Input for Shutter Speed	Shutter Speed Needed for ≤ 1 Pixel of Motion Blur
Planned Flight Speed 10.32 m/s	1/1056 sec

- b) When you are ready to set your shutter speed on your camera, power it on, then rotate the shutter speed dial until the shutter speed is one increment faster than what was calculated is displayed on the camera's screen. For our example, we would want to set the shutter speed to 1/1250 of a second.

3. Set the Aperture

A wide-open aperture (low f-stop number) lets the most amount of light in, but at the cost edge sharpness. For the Zeiss Ventum 21mm lens, we have found that f5.6 is an optimal compromise.

- a) To set the Aperture on the Zeiss Ventum 21mm lens, simply rotate the dial on the lens to 5.6



4. Set the ISO

Having the ISO to Auto will allow the camera to increase the ISO as needed.

- a) Make sure ISO is set to Auto (it should be set to Auto by default if you followed the **a7RIV Menu Settings Guide**).



5. Tune the Shutter Speed

The shutter speed calculated previously was the shutter speed necessary to minimize motion blur to acceptable levels. If you are flying a particularly bright day, you may need to increase your shutter speed even further to prevent over exposure. Its best to execute the following steps right before you fly so the lighting conditions match your mission.

- a) Power on your camera and make sure the shutter speed, aperture, and ISO have been set according to the above instructions.
- b) Point the camera straight down at a piece of white paper. Make sure the paper is not shadowed and that it mostly fills the field of view of the camera. You can perform this step with the camera mounted in the gimbal, just take extra care to make sure the white sheet of paper is not shadowed (you can tilt the camera slightly to aid in this if necessary).
- c) If you see Zebra stripes* highlighting the sheet of paper (indicating over exposed pixels), then increase the shutter speed until the zebra stripes disappear. If you don't see Zebra stripes, then leave the shutter speed as you had it.



*the **Sony a7RIV Menu Settings Guide** goes through how to turn and adjust the Zebra Settings

6. Fly your Mission

Right before your flight, be sure to check that the Shutter Speed, Aperture, and ISO are set correctly. Also, be sure you have a card in the camera and that your lens is clean.