



ARENA AVIATION LIMITED

Aerial Filming – A Production Manager’s Guide

This is a summary guide to some of the basic factors you should consider when booking aerial filming facilities.

Camera systems: An externally mounted gyro-stabilised camera will provide the most flexible solution for aerial filming.

- Controlled remotely from inside the aircraft
- No need to take the doors off
- 360 degrees of continuous rotation
- No airspeed restrictions



Cineflex VI4: Arena only offers the renowned VI4 as there is currently nothing better on the market. Notably the VI4 is technically superior to the Cineflex variant fitted to the Robinson HD News Helicopter.

- Sony HDC-F950 “Cinealta” top-end 3-CCD Cinematographers HD camera system
- Fujinon 84x (HA42x9.7BERD) high definition lens – 9.7mm to 815mm (with x2 extender)
- Horizontal, Vertical & Roll axis stabilised to 0.001 of a degree, so absolutely no wobble

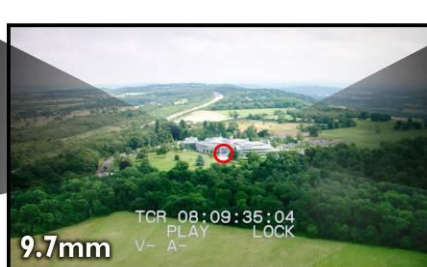


Angle of View: Flying isn’t cheap, so it’s important to maximise the use of every airborne minute. The more powerful the camera system, the quicker and easier it will be to get the shot.

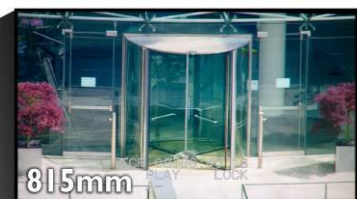
- 9.7mm (wide end) = 52.7° horizontal x 31.1° vertical x 59.1° diagonal
- 815mm (full zoom) = 0.7° horizontal x 0.4° vertical x 0.8° diagonal
- A 21x7.8 ENG lens with x2 produces 1.8° diagonal “angle of view” for comparison
- 9.7mm–815mm equates to 36mm–3000mm in traditional 35mm photographic terms



A typical 21x 7.8mm ENG lens using a x2 extender (21x7.8x2 = 336mm)



9.7mm



815mm

VI4’s 42x 9.7mm lens using the x2 extender (42x9.7x2 = 815mm)



Nose Mount or Side Mount: Cameras mounted on the very tip of the aircraft nose have a number of limitations. For instance it's hard to fly towards an object, then pan as it goes past on one side without seeing the landing skids in shot. The great majority of UK operators have therefore chosen to mount the camera to one side of the nose, or on the side of the aircraft. This then allows the aircraft to approach, fly past & orbit objects without any obstructions.

SD or HD: We shoot in HD irrespective of whether the product is ultimately for use in SD, (don't worry you'll only pay the SD price). HD images are cleaner and compress better into SD, so they look sharper than material originated on an SD camera. HDCAM & HDCAM SR are the formats of choice for top-end productions as they record at up to 880mb/s, but we can also shoot on P2-HD or XDCAM-EX (data rates are limited by these formats to 35-100 Mb/s).

- SD dubs from HD are available in Digi-beta, Beta SP, DV, P2 & XDCAM formats
- HD is recorded in 4:4:4 on HD-Cam SR or HD-Cam; P2-HD / XDCAM-EX optional

Aircraft type: The basic choice for aerial filming is either single engine or twin engine helicopters. The Eurocopter AS355 twin squirrel and the Robinson R44 Raven II are amongst the two most popular types for work as camera ships. At Arena we fly over 1,100 hours (or 120,000 miles) every year in our fleet of five dedicated aerial filming aircraft.



Eurocopter AS355 Twin Squirrel



Robinson R44 Raven II

Eurocopter AS355 Twin Squirrel	Robinson R44 Raven II
Two Rolls Royce 250-C20 turbine engines	One Lycoming IO-540 Piston engine
Carries Pilot and up to 5 passengers	Carries Pilot and up to 3 passengers
Range circa 3 hours / 400 miles	Range circa 2 hours 40 mins / 350 miles
Typical cruise speed 135mph	Typical cruise speed 135mph
Can fly anywhere over built up areas	Needs to be able to glide clear of built up areas
Can fly as low as 750ft over built up areas	Needs to fly above 1,000ft over built up areas
Can be flown with safety floats	Can be flown with safety floats

CAA AOC: Aircraft may be flown under three categories in the UK. "Private" is purely for individuals to fly family and friends without receiving any financial benefit. "Aerial Works" is typically used for carrying the air-operator's staff but not fare paying passengers. "Public transport" is used when a client is paying to be carried in the aircraft. Arena's AOC number is 2144. We are also on the BBC, ITV & Sky approved list.



Most companies will insist on hiring helicopter operators who are approved for Public transport and hold a CAA AOC (Air Operators Certificate). An AOC means the operator meets certain standards required by the CAA and is regularly audited to ensure standards are met. Most people's life insurance will also require them to fly public transport. You can check if an operator has an AOC by visiting the CAA's website at: <http://www.caa.co.uk/default.aspx?catid=1196&pagetype=90> The CAA is the UK safety regulation group that enforces and monitors the rules set out by EASA the "European Aviation Safety Agency" for all of Europe's general aviation.



Special permissions: Holding an AOC affords an operator certain privileges like obtaining low level filming exemptions. Permissions often have to be requested some time in advance of the trip, however Arena has a number of on-going exemptions for filming over places like central London. We also have a good relationship with Air Traffic, Special Branch, the Diplomatic Protection Group and Buckingham Palace who are often required to approve certain flights.

Credits: Many helicopter operators advertise aerial filming of one type or another. You can also go to a hire company & get them to fit their kit onto an aircraft. However there are a couple of companies like Arena that own permanently equipped camera ships, (we were the first). This often means better rates as there is no engineering time required to fit & remove the system, more flexibility if you decide to cancel due to weather & more expertise within the staff.

Ask for a recent list of credits and watch some sample clips filmed by the same Pilot & Camera operator you'll be working with. Both the Pilot & Camera Operator work together as a team and have support from an office based filming co-ordinator. A short selection of our work includes:

- BBC's The Apprentice (Series 1 to date)
- Various high budget TV Commercials (For Peugeot, Nurofen etc.)
- BBC's The London Marathon (2 cameras and 2 aircraft)
- BBC News & Sky News helicopter contracts (Since inception to date)
- BBC's Restoration & The Chelsea Flower Show
- ITV's The Bill (Titles, general aerial shots & Police in-vision helicopter)





GENERAL INFORMATION

Air Traffic Control (ATC): In most of the airspace that helicopters fly there is no “Control” as such. There is almost always an ATC service available on the radio to provide a variety of information including weather. However, near major airfields there are zones where ATC do have control over all flights and a responsibility to maintain separation between the different aircraft in that zone.

Filming Permissions: Most reputable helicopter operators will have in place a standing authorisation to carry out filming and photography at lower altitudes and closer to objects than is normally permitted. Before shooting, it is essential to check that these permissions are in place.

Heights: Whilst most helicopters in open areas of country will travel at between 500ft & 2,000ft the exemption mentioned above will permit a helicopter for filming purposes to approach to 200ft away from a vehicle, obstacle, person or structure. In towns or ‘congested areas’ this limit, normally 1000ft, will be reduced to 750ft for twin engine helicopters - or lower in very special circumstances.

The London Zone: To fly “anywhere” over London you need a twin engine aircraft. However it is acceptable to use a single engine helicopter provided it can land clear of the built up area in the event of a power failure. Single engine aircraft need floats to carry paying passengers along the River Thames - something we can easily arrange on our R44s.

London is easy enough to operate in, with some provisos about notice, and some locations are more sensitive than others. No one should plan to spend more than two hours at a time on over-London sorties due to the high workload for the pilot, air traffic controllers and cameraman. A comprehensive and detailed shot list needs to be provided to the helicopter operator well in advance so that plans can be made and approved

Insurance: All aircraft have to be insured for third party liabilities – this can vary between £1m and £100m. It is good practice for a customer when embarking on a filming flight to ensure that their own company is named as additional insured. You should consult your brokers about this.

Health and Safety: A culture of safety has been embedded within aviation for many years. The CAA is the only arbiter of safety practice within aviation companies. Asking for a separate ‘risk-assessment’ for a job is largely inappropriate within the aviation context. If the rules applied by the operating company at the behest of the CAA are adhered to aviation is very, very safe. Please contact our operations team for more assistance on this subject. We’ve probably faced similar questions before and can hopefully resolve any queries you may have.

Weather: Although our aircraft can fly in a variety of weather, experience has shown it’s hard to get good results in low visibility or during precipitation of one type or another. Our team will work closely with you during the build up to your shoot to discuss the aviation weather forecasts with you. If the weather isn’t flyable, the job can be postponed generally without charge.

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