Angus Model Flying Club

Student Training Book
(The B Test)

Student Name:_____

The official remit of ‘B’ certification is to ‘recognise the pilot’s more advanced ability and a demonstrated level of safety suitable for flying at a public display’, a statement that’s often misinterpreted to brand the ‘B’ certificate as a display licence, which it isn’t.
However, since the BMFA recommend that pilots of large models and model jet turbines (and any pilot wishing to fly in front of the public) hold a ‘B’ certificate, the ‘display licence’ tag isn’t likely to be going away any time soon.

The test is, in essence, a level of personal achievement that’s rated above the ‘A’ Certificate. But it doesn’t end there - beyond the ‘B’ is the ‘C, which is much more aerobatic specific than the ‘B’. we’ll take a look at it if you’d like to go further :)

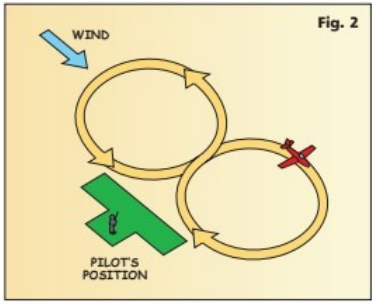
As the ‘B’ is at a more advanced level than the ‘A’, the test has to be conducted by two club examiners (the ‘lead’ examiner must be fixed-wing qualified) or one fixed-wing Area Chief Examiner.

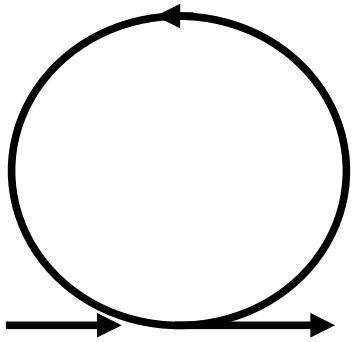
Step	Activity	Notes	Comments
-	Legal Requirements	See Modules 4 and 6 of BMFA book 'A Flying Start' Insurance Who/what are the CAA ? Article 16 Club Rules *Starting area* *Taxi areas*	

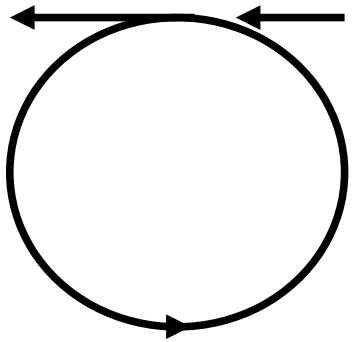
Step	Activity	Notes	Comments
a)	**Carry out pre-flight checks.** **Cont....**	Pre-flight checks come first, and it's essential that the examiner sees you go through the motions. Take nothing for granted and make the pre-flights applicable to the type of model you're flying. Liken this to taking a driving test. It's not sufficient to glance up into the rear view mirror like you might when driving normally, the examiner will need to see you move your head and physically look to know that you've done it. Regrettably (and it shouldn't be the case on a national scheme), there appear to be two trains of thought regarding exhibition of pre-flight checks for BMFA examinations. The first would see the pilot performing model checks as if they were 'pre-flying session checks', i.e.: * Check the airframe for any transportation damage. * Check that the servos and linkages are secure. * Check the undercarriage for secure fixing and alignment. * Check propeller for damage and secure fixing. These would assume, to a large degree, that your model is unrigged having just unloaded it from the car, and if this is the case then you should certainly perform these checks. Most examiners would expect that when you present yourself for the 'B' examination you will have already checked these issues and had a flight. Therefore expect you to go through the BMFA 'checks before each flight' pre-flights as listed below: * **Obtain frequency clearance**. The pilot should clear their frequency for use using the adopted frequency control system. This can vary from a transmitter control compound to a simple ask around other site users. You'll not be penalised if there's no pegboard or other organised structure for frequency control as long as you know how frequency use is determined on that site and that you observe the system. A brief note on the use of 2.4GHz here: Whilst it might be sufficient as far as you're concerned to switch on knowing that you're not going to cause or receive any interference from other users of the site, they won't know that. Make sure any other users are aware that you're using 2.4GHz equipment and that you're not a threat to them. * **Switch your transmitter on before your receiver.** How embarrassing it would be for you to switch the receiver on first and have servos spinning wildly through spurious interference, popping plastic clevises off the servo arms inside the model. You'd have to strip it down to remedy the situation while the examiner stood and watched. Not good for your nerves or their first opinions of your preparation! * **Check that all controls operate freely and do not bind or stick.** This test is fairly self explanatory, but you must be seen to waggle the sticks and watch the movement of the control surfaces. It's unusual to find an issue with a well flown and sorted model, but it does happen. A bad connection, trapped wire, damaged clevis etc. is all it takes. * **Check that all controls move in the correct sense.** Checking this from a position behind the model presents a much clearer picture to the examiner. Be methodical and make absolutely sure that everything is moving in the right direction. Visibly	

Step	Activity	Notes	Comments
		check the throttle operation (unless your carburettor is cowled and can't be seen). Show the examiner that you're looking, and make your checks obvious to the point of embarrassment. * **Check that all control surfaces are in their correct positions with the transmitter trims at neutral.** With most modern transmitters now employing digital trims it's not easy to check the position of a trim. Linkages used to be mechanically adjusted to get the transmitter's mechanical trim into the middle, but this practice occurs less and less now. That said, it's more difficult to accidentally alter a trim position with a digital set-up as the transmitter has to be switched on to effect any change, deliberate or accidental. And when it is switched on, the unwanted disturbance of a trim is usually accompanied with a clearly audible beep. * **Look for any minor radio malfunctions such as slow or jittery servos, glitches etc.** Any slow servos or unexpected jitters when checking the operation of the control surfaces could be a sign of something more onerous. This is especially applicable to a slow-moving servo, which could indicate the beginnings of battery failure. You should immediately examine any such problem, and if you're in any doubt at all, don't fly. You'll not be penalised for stopping due to an electromechanical hiccup. However if you end up having to charge your batteries, it could be the end of that day's activities. * **After starting the motor (i.c. engine) and allowing it to warm up, check that it throttles well from tick-over to full power, and carry out a lean check.** You're probably well used to doing this, but watch out for canny examiners who may stand in line with the prop, waiting for you to ask them to move before you start the motor. Make sure that your pit area is tidy, with no stray wires that can come into contact with the rotating prop and no loose rags or the like that can get sucked into the prop as it spins. Make any adjustments to the needle setting from behind the motor and be sure to give your helper clear instructions of when to raise and lower the model for the lean check.	
	Cont....	The motor of an electric powered model should be treated like an idling i.c. engine once power has been connected. As a final precaution before carrying the model to the strip, double-check your transmitter using one of the BMFA- favoured acronyms, SMART: * **S**witch on. * **M**odel selected is correct / meter in the green. * **A**erial extended and secure (if such an aerial is used). * **R**ate switches positioned correctly. * **T**ransmitter voltage good and all trims in the right place.	

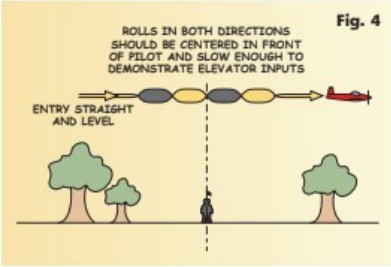
Step	Activity	Notes	Comments
b)	**Take off and fly a left or right hand circuit** 	Calls to flight line "Ok to take off ?" With a final check to make sure there are no obstructions waiting to thwart your take-off effort, you should proceed and get the model into the air. If a helper is holding it for you then be sure to let them know what you want them to do and again remind them not to assume that they know what you want. The take-off should be smooth and straight, don't pull the model off the ground too soon. Abandoning a take-off for any legitimate reason isn't grounds for a fail, so it's better that you demonstrate you're at least thinking about what you're doing rather than trying to persist by taking off with a sick engine, for example. Just ensure that if you do abort your take-off then you do it in a safe manner.	

Step	Activity	Notes	Comments
c)	**Fly a 'figure of eight' course with the cross-over point in front of the pilot, height to be constant.**  	You could be forgiven for wondering why the first part of the test mimics the 'A' certificate so closely. There is of course a figure-eight requirement in the more basic test but here it must be flown much more accurately. You already set the height and speed for this flight pattern when you completed your first circuit and these should be repeated without significant deviation here. Where the 'A' certificate figure-eight can be lazily flown across the patch with almost diagonal intersecting lines, it is perhaps best to view the 'B' Certificate figure-eight as two opposite-hand circles of equal diameter touching each other at a point on their circumference coinciding with a point along the centreline in front of the pilot. In short, the model must be turned to 90-degrees away from the pilot in the first turn so that it is flying exactly away. To fly the figure-eight correctly, it is vital that you get a picture of what it will look like in your mind's eye, where you will enter and exit, but more importantly, exactly where that crossover point will be. You should also be able to maintain a steady height throughout the manoeuvre. Incidentally, many, many pilots cock- up the intersection and switch to the opposing turn too soon leaving them with little depth to fly the remainder accurately. It is here that most of the mistakes are made, indeed doing this will affect the remainder of the flight pattern. The examiner will be watching the first 90-degree quadrant intently and mentally noting its size, height and the speed at which you fly it. Many examiners will stand immediately behind the pilot for the figure-eight, some even holding up a pen at the point where the completed first circle should intersect the primary arc as the model comes around. Obviously then the full circle should also end with the model flying directly away from the pilot. You should avoid immediately switching to a tight bank for the remaining 270 degree arc as soon as you hit the intersection. As mentioned above, fly through and deep enough to avoid a snap turn when you get the model back to the start point. The finish should be at the point where you started your first 90-degree turn with the model flying at standard height and line. Obviously the angle of bank throughout the figure eight will need to be constantly adjusted to allow for wind strength. A windy day will mean shallow turns on the into-wind sections and tighter turns for the downwind parts to ensure that you hit the key intersections. As good as you may think you are, hitting the intersection and starting point on a windy day is tricky and will need practice in order to pass. Your examiner can make no allowance for the wind strength during the figure-eight circuit. The next manoeuvre is the inside loop but you're not expected to go straight into it after completion of the figure-eight as your model will probably be too close and considerably out of position. You can take a circuit now to re-position for the loop and its recommend you do so to slow the pace and give yourself time to prepare.	

Step	Activity	Notes	Comments
d)	**Fly into wind and complete one inside loop** 	The inside loop is a perfect example why flying an accurate test flight is so tricky. The quality of the manoeuvre is secondary, you'll still have to do a good one of course but the examiner will be much more concerned with an accurate entry position at the correct line and speed whilst watching to see that you're close to the height and line of entry on completion. If your model can loop without skewing out then it's a good sign that you've set it up correctly, that lateral balance imperfections are not evident, and that you started the loop with the wings level. If an error does start to occur, your eagle-eyed examiner will be looking for adequate adjustments to be made and will pay special attention to the correct use of throttle throughout. You will be required to demonstrate an increase of power for the climb part of the loop but not too early, i.e. not on your approach the manoeuvre. Again, this manoeuvre has to be performed in front of the pilot and you should make sure that no corrections to line are required as you run in. As you approach a point perhaps 45 degrees to your side and heading for the centreline in front of you, you should increase power whilst avoiding any change in pitch that the extra airspeed brings. Allow the speed to build holding your height and line and get a good mental picture in your mind of the loop you are about to fly. Do not try to make it too big as if to impress your examiner with the mighty power of your model! Fly the manoeuvre you have been practising and concentrate on getting it reasonably round, holding the line over the top and exiting at the correct point. Anticipate the application of up elevator to ensure that the centre of the loop is at a point directly in front of you at or near to the crossover point you established during your figure eight circuit. As your model nears the vertical try to take a millisecond or so to view its progress objectively. Are any corrections needed? Will you perhaps need to apply rudder to regain the line? Take careful note of the height and size of this manoeuvre as it will be used as a benchmark by the examiner and this alone is reason enough not to make it too little or too large. Just because your fun fly or 3D model will do a 6ft loop doesn't mean that this is what your examiner wants to see! As the model reaches the top, check again for wing drop and reduce the power of the motor to at least a quarter. Only go to tick-over if you are still carrying plenty of inertia as to do so has the effect of slowing the model and making the loop look balloon shaped, not in itself a failure, but you do want it to look reasonably accurate, don't you? Once over the top, all you need to be concerned about is re-establishing that all-important entry height and line. Bring in a little power as you come around to level flight again and exit at cruising speed on the correct line.	

Step	Activity	Notes	Comments
e)	**Fly downwind and complete one outside loop downwards from the top (a bunt).** 	As the bunt (see left) needs to be performed both downwind and from the top, some thought has to be given on how the aircraft is going to achieve the correct height and line to execute the manoeuvre without rushing. Throughout this test the pilot is required to change circuit direction a number of times and, as mentioned in previous parts of this, these periods are perfect opportunities for the pilot to buy themself a few extra minutes for relaxation and concentration. Whilst the examiner won't include these turns as part of their test assessment, they will give them some indication as to the amount of thought and practice that you've put into the test schedule. Clearly, if you try something flash and cock it up they'll be forced to reconsider! Whilst the required height gain may be achieved by flying a further circuit in the wrong direction at increased power, there will still be the opposite hand 'switch' to deal with. You may think it best to continue flying on right out of the loop to the far end of the circuit and gun the motor, climbing in a half loop before rolling off the top (Immelman turn), heading downwind at an increased rate of knots. The trouble with flying in this way is that whilst you might well achieve it admirably your positioning will have to be spot on, and it won't leave you much time for adjustment to line if required. The best turn to make here is a climbing, procedure-type turn. Here the model turns away from the looping circuit as if making a standard circuit turn, but after the first 90° of the arc the turn is switched to the opposite direction and a smooth, climbing 270° arc flown outside the boundaries of the normal circuit but ending on the correct line and at increased height for the bunt. Flying outside the normal limits of the circuit in this way will buy considerable extra time and provide a long run in to the top of the bunt, during which you can adjust your line and speed if required. So now you're on the correct path (up on the 'display' line), between the two standard circuit legs but high enough to complete the manoeuvre downwards from the top. Let's take some time out here to deal with a popular misconception: The bunt does not need to be superimposed on the path of the loop you've just flown, if you normally fly like that then all well and good, but you won't be failed for not doing so. A further misconception is that the bunt has to be the same diameter as the loop. This is also not true, and unless your model has abundant power to climb and accelerate upwards from the bottom of a stretched manoeuvre back to the entry point, it's actually quite hard to achieve. The most important aspect of performing this manoeuvre is to get the entry and exit points close together. Most failures in the bunt occur when the path of the outside loop is tightened to produce something that looks like a number 6 rather than a clean circle. The bunt should be entered with decent speed and downwind to ensure that the first part of the arc maintains an adequate curve. To achieve this fly along the chosen line at full power and as you approach the starting point reduce the power to at least 1/3 (closing the throttle to idle can lead to carburation problems with combustion type engines when you open it up again).	

Step	Activity	Notes	Comments
	Cont….	As you reduce power start applying down elevator and, as with the loop, concentrate on keeping the wings level and fly a large-ish but smooth downward arc. Remember, keep the manoeuvre a reasonable size, but not so tight that you just flip around it. Note that whatever height is lost in the downward part of the bunt will need to be regained on the upward side. As you approach the bottom quadrant of the circle you'll need to think about increasing power. Some models are happy to round the bottom of the bunt before smoothly applying power, whilst others need to fly the full inverted section with increasing power. The point just past inverted with the model starting to climb is where most bunt failures occur. There's a tendency to hold in the same amount of down elevator that was used to push the model over initially. But with the slowing airspeed of the climb this throw will prove too much and the model will exit the bunt much lower than its entry point. This being the case it's essential that the amount of elevator is reduced as you begin the climb back upwards, sending the model in an arc that culminates at the same height and line as the entry. Upon cresting the top of the bunt you should be at full power again, ready to reduce to cruising speed for the descent back down to the basic circuit height. The bunt will show up any problems in the model's lateral balance, side-thrust and, where applicable, carburation. Bear in mind that excessive elevator throw is often difficult to manage in the small quantities required to fly an accurate arc back from the bottom, so take care to trim these issues out of your model aerodynamically.	

Step	Activity	Notes	Comments
f)	**Complete two consecutive rolls into wind**  	This manoeuvre sounds fairly innocuous but is actually fraught with problems, especially for those pilots whose usual performance of consecutive rolls is to bang the stick over until they've had enough and sort out the ensuing mess afterwards! At 'B' Certificate level there needs to be a little more care applied. Twinkle rolls performed at blurring speed aren't acceptable! The rolls must be slow enough to demonstrate elevator control throughout. This means that as the model flies through the inverted stages, some down elevator should be seen to be applied as required. If you're capable of rolling your model so slowly that rudder inputs through the knife-edge portions are also needed then that's great, but you're not required to do so in the 'B' test. Positioning is once again crucial, and the model should be halfway between the two rolls (i.e. upright) as it passes the pilots centreline (see Fig. 4). The examiner may allow a little leeway here if the rolls are accurately flown. Note also that the rolls should be along the standard line at the standard height, i.e. in common with most other 'B' Certificate manoeuvres. There are some more misconceptions to be dealt with here. There should be no pause between the rolls. Instead they must be flown consecutively with the model rolling twice at a reasonably continuous rotational speed, without hesitation. There should also be no discernible loss of height throughout the rolls, but some level of barrelling is permissible. This is especially so if the model chosen for the flight is a typical high-wing trainer type that, due to its wing section and often sluggish aileron response, is more difficult to roll axially. The rolls do not need to be performed at full throttle. Most models will roll quite well at normal circuit speed, indeed to try and fly rolls with increased speed will create positioning and rotational speed problems. That said, as with the rest of the flight, it's essential that you perform the rolls as you've practice. Don't be tempted to slow them down on the day in the hope of impressing your examiner, as you're bound to make a mistake! There are some tricks that can be brought into play to help you perform the rolls more easily, one of which is to elect to roll in your 'worst' direction first. Most sport pilots who have been flying long enough to achieve 'B' Certificate status have developed some bad habits along the way and 'handed' rolls are just one of them. If you pitch for your worst direction first (you'll know what that is from practice) and make them messy but passable in the eyes of the examiner, there's a good chance that he'll give you the benefit of the doubt ahead of flying the opposite direction rolls that will be coming next. Make a brilliant job of the latter and they may let slide any slight mistakes incurred during the first set. It's very common to see test candidates struggling to stop rolling too fast, but by employing rate switches to give the required slower roll rate at full stick travel, a pilot can ensure a uniform rotational speed with the aileron stick held fully over. This will afford some extra concentration time to focus solely on the elevator inputs. One more thing: Don't forget to make a good mental note of the direction of your first set of rolls, as those that follow will need to be executed the other way!	

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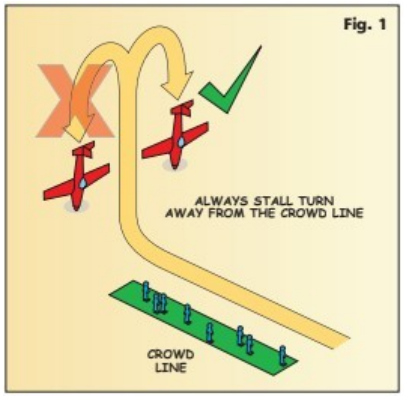
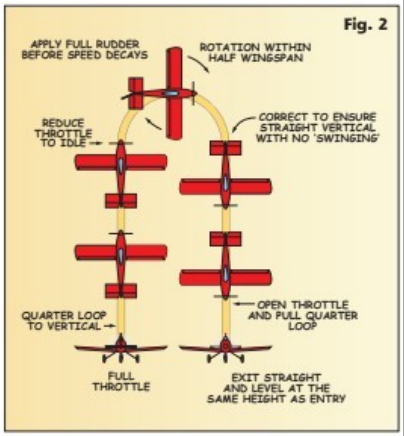
g)	**Complete two consecutive rolls downwind using the opposite direction of roll rotation to that used in (f) above**	Everything discussed above also applies here, but note that the model will be moving considerably faster as you fly downwind, eating up valuable positioning time. Give some thought to how you're going to swap circuits to the downwind and line up for the rolls. A procedure turn will ensure you can get around without affecting height or speed, but this time flown flat and not climbing or descending as before. With the model on line at the correct height you should fly the opposition rolls centred about the centreline with the model upright as it passes the pilot's box, rolling without hesitation. Discrepancies in the positioning of the rolls on the downwind leg are tolerated to a degree, but a big error on centring will see a fail. Don't get caught out by rolling in the same direction as performed earlier, otherwise you'll be asked to fly the task again. Exiting the rolls at the standard height, line and speed will almost certainly see the examiner ask you to fly straight into the next manoeuvre.	

Step	Activity	Notes	Comments
h)	**Complete a stall turn either left or right**   	The reason that 'either left or right' is stipulated is to account for the direction your model may be travelling having completed the two rolls and the fact that the manoeuvre must see the model turned away from an imaginary display crowd line (Fig. 1). If flying from left to right in front of you, for instance, the only way to perform the stall turn at the end of the circuit would be to the left. A stall turn to the right would direct the model towards the crowd and incur a fail. Likewise a run from right to left will see a stall turn being performed to the right as the model reaches the apogee of the climb. Let's break the manoeuvre down. From standard height and line (following the rolls) the model should be flown past the pilot to the extremes of the established circuit, perhaps 100yards or so off to the side. Pay particular attention to this height and line as you'll shortly be flying back past yourself in the opposing direction through the same key points when the manoeuvre is complete. The examiner isn't looking for absolute excellence in this manoeuvre but they are looking for a recognisable stall turn. There are a number of things that can go wrong here and we'll look at the more common ones in turn, however, timing is the key to performing a stall turn correctly and practice is required to get it right. The stall turn is shown in Fig. 2. With the model at the desired position towards the end of the circuit, up elevator should be applied as if entering a fairly tight loop, a loop with a smaller radius to that flown earlier in the test but not so tight that the model loses significant forward speed. When a vertical line has been established, elevator should be managed to ensure that the model continues up this vertical line for a short way. Imperfections in the model's lateral balance will manifest themselves with a dropped wing as the aircraft makes the tight quarter loop and a subsequent deviation from the vertical line towards the heavy wing. You should endeavour to trim this out with balance weights before you undertake the test. Likewise, incorrect motor side thrust will manifest itself with a steady pull in the yaw axis and a deviation of the model in the vertical line, which will need management with rudder to straighten. This too should be trimmed out of the model before undertaking the test. Good throttle control is essential, and many pilots make a rod for their own back by trying to prolong the period that the model is in the vertical line to the point where major rudder control is required to hold it straight as the airspeed and inertia from the entry dies off. Establish a vertical climb after completion of the quarter loop and immediately shut off power to idle and let the inertia of the model carry it upwards to the stall. This vertical line should be wind adjusted, i.e. as the model rises, the up line should be perpendicular to the floor. This may mean that the model itself is not actually vertical (see Fig. 3). Timing now comes into play. Application of rudder with too high an airspeed will see the model 'wingover' the top due to its excessive airspeed above the stall. Apply rudder too late and the model won't turn over the top but simply flop into a deep stall, requiring an emergency recovery probably way off the desired line.	

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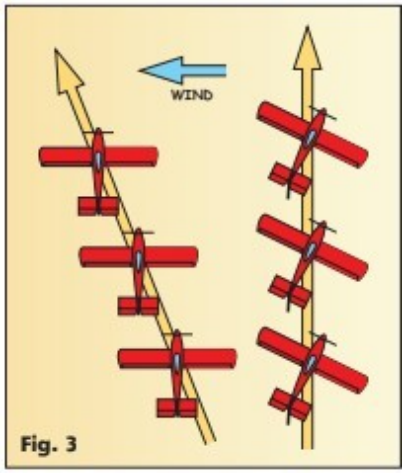
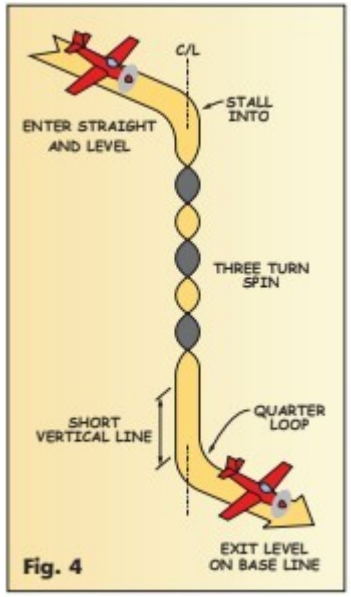
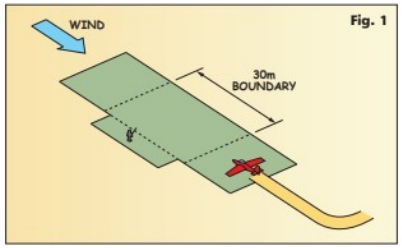
	Cont….  Fig. 3	A perfect stall turn will see the model almost rotate about its own length to head straight back down the exact same line it just flew up. It's more likely, however, that it will appear to fly around an 180° arc as if pivoting around one wing tip before gravity begins to accelerate it along the down line. Some pilots prefer a little blip of power as the model flies over the top; this isn't enough to accelerate the model but merely a coax to increase the airflow over the rudder and help drive the model around as the last of the forward speed rapidly decays. Once over the top with flying speed rapidly increasing it's vital that the pilot gets on the elevator to keep the model on the down line, wind adjusting as necessary. At the end of the rotation it may even be necessary to add a little stab of opposite rudder to stop the model fishtailing along the down line as its inertia in the yaw axis decays and airspeed increases. This isn't very common, though, and more often than not the pilot can concentrate on balancing the elevator to a point where they can recover from the stall turn with the same radius quarter loop as was used for entry. A common mistake is to pull out from the manoeuvre too high. This is usually a result of an initial prolonged climb and should be avoided. Entry and exit points should be close together, in common with many flight patterns in the 'B' Certificate schedule. Throttle should be increased through the last looped quadrant to see the model exiting along the standard line and height at cruising speed, to fly back past the pilot's position once again. Now we need to think about gaining height and perhaps changing direction to get into wind at altitude for the next manoeuvre, the spin.	

Step	Activity	Notes	Comments
i)	**Gain height and perform a three turn spin**  Fig. 4	The initial heading and the recovery heading must be into wind and the model must fall into the spin, i.e. no 'flick' entry. There's really only one way to correctly perform the 'B' Certificate spin (Fig. 4), and success in the first part lies in getting the aircraft slow enough to properly stall into the entry instead of flicking over the top through excessive airspeed. If there's any hint of an upward pitch and roll as the model enters the spin the examiner must fail you. As with most of the other flight patterns the spin must be performed on the established centreline, but as the model will be significantly higher up for safety, the line may be further out in front of the pilot. So, how do you get up there neatly and quickly, yet give yourself enough time to achieve the correct position, and bleed off speed to get to the stall in the right part of the sky? If you went straight into the stall turn from your second set of rolls you'll now be coming back into wind and you can simply fly a long and lazy climbing circuit to position your model at the right sort of altitude for the spin. If you did your stall turn at the upwind end of the circuit you'll now be flying downwind and will need to turn around. You may consider swapping through the circuit with a half figure of eight climbing as you go, but this may look a little rushed off the back of the stall turn. You might even consider flying down to the downwind end of the circuit and performing a large and extended Immelmann turn (roll off the top) to gain the height and line for the spin. The problem with this is that you'll not have much time to get the line correct and drop the speed, unless, perhaps, it's quite windy. I it is best to fly out of the stall turn to the downwind end of the circuit and begin a wide but climbing procedure turn just as between the loop and the bunt. This way you can take your time getting to altitude, and as you'll be climbing steadily throughout, your speed will only be moderate. The turn itself can be exited on the correct line for the run in to the stall point of the spin. Whichever method you use, you should ensure that you gain height smoothly and in a neat manner. With the model now at altitude and running slowly into wind you should close the throttle and hold your altitude with increasing elevator input. Juggling the elevator to get the model to the right position in the sky at the right stalling speed and still on line is one of the trickiest parts of the spin, and practice is required. Here the model should be slow and nose high, but not climbing. At the start of the spin, rudder should be applied in your preferred direction and the speed of the model should be low enough to ensure that application of this rudder input stalls the inner wing. This is where lightly loaded fun-fly or 3D models fall down, especially so in windy conditions as it's very difficult to force them to a properly stalled attitude without climbing. The model should not first stall and then spin, rather the entry should be smooth and transitional. Ailerons can be used, but you shouldn't apply them until the model has started to fall. The prohibited flick entry manifests itself by one wing of the model rising as the spin is begun, and the examiner will be watching very closely for an opportunity to fail you here. Three rotations are complete when the model has spun back around to "the into-wind heading" three times. It sounds obvious, but at the time three turns are completed you have to stop the spin. That's not to say	

Step	Activity	Notes	Comments
	Cont….	you should wait until three turns are finished and then stop the spin during a fourth. Rather, you must stop the spin bang on completion of the third rotation. Tricky to do, and many models won't simply stop spinning on the correct heading when you release the controls, especially if you've used aileron to aid rotation. You may however find it sufficient to release the controls as the third rotation approaches its end and then apply a swift input of opposite aileron to stop any continuing rotation dead in its tracks. Some small allowance can be made for the heading of the model to be slightly off, but no more than, say, 10 to 15°. The model can also drop from the spin rotation to a vertical diving line before recovering onto the correct heading with elevator input only, back to straight and level flight. Note that you cant end the spin in a vertical dive 90° out of shape and quarter roll on this down line to adjust your heading, this would be a fail. The spin finishes with the model flying straight and level into the wind.	

Step	Activity	Notes	Comments
j)	**Fly a rectangular landing approach and perform a hazard avoidance go-around from below 10 ft.** **Note that this manoeuvre is an aborted landing for the purpose of collision avoidance, not a low pass.**	The pilot should call landing and visually checked the active area before and during the manoeuvre the examiner will watch for head movements. Fly the downwind parallel to the upwind leg and avoid the turns being flown either too tight or too wide (most will try to fly them too tight and almost try to put a ninety degree 'snap' turn in, which is not a requirement). Throttle should be reduced either just before or just after the last crosswind turn with the crosswind leg descending into the turn on to final approach. Once established on final approach, on line and descending, the throttle should be closed to idle to set up the final descent rate. The aim of all this is to have the model at a speed, position and rate of descent which will guarantee an accurate touchdown on the landing area. The manoeuvre is not a high-speed low pass or a touch-and-go. The Examiner should instruct the candidate when to initiate the go-around, which should be as the model passes below 10ft on the descent, but high enough to avoid it becoming a touch-and-go. When instructed to go-around, the pilot should call the manoeuvre out loudly, 'going around', 'overshoot' or other words to this effect are acceptable. The model should be turned to an angle of 30 to 45 degrees away from the flight line, while simultaneously taken safely back up to circuit height, with appropriate use of the throttle as required to avoid a risk of stalling. Note that electric models are expected to follow typical 'i/c' flight patterns and that they can sometimes quite easily do that with propeller stopped. Make the flight path the model takes what you would expect of an i/c model.	

Step	Activity	Notes	Comments
k)	**Fly a rectangular circuit in the opposite direction to that in (j) at a constant height of not more than 40 feet**	This element of the 'B' Certificate has undergone some subtle changes throughout the years, and used to be an opposite-hand landing approach and overshoot to demonstrate that a pilot wasn't 'handed' on their approaches. While this has now changed to an opposite hand circuit, the requirement to fly it at low altitude indicates that the intent is the same. Everything that applied to the previous flying task is applicable here, except for the height loss. Be aware of the manner in which you choose to swap the circuit direction to commence this flight pattern, remembering back to our method of using a half 'figure eight' circuit or a procedure turn to change direction without adjusting height or speed. The opposite hand circuit should start over the strip as the model passes you downwind (you did do your previous overshoot into wind, didn't you?) and you should make sure that your examiner knows you've started by telling them so. Again, keep the turns crisp and accurate, but here you need to watch the height carefully. A height of 40 feet is about the same as your average house and if you need to be higher to avoid obstacles such as trees etc. or need to take an unusual line to suit your patch, this should be agreed with the examiner in advance of the flight. The back end of the 'B' Certificate test is no place for detailed negotiation! The BMFA advocate that the height of this circuit shouldn't waver, but there's sometimes a natural tendency to fly slightly higher on the back leg of the circuit. As long as this isn't pronounced and deliberate and you fly a steady circuit with good parallels, you should be fine. Bear in mind the origins of the circuit as an opposite-handed landing approach. While there's no indication now that this is the case, a circuit flown at full throttle will spoil the test. Remember the cruising speed you established before you started the aerobatic elements of the flight and stick with that or go slightly slower.	

Step	Activity	Notes	Comments
l)	**Fly a rectangular landing approach and land (wheels to touch within a pre-designated 30 metre boundary)**  Fig. 1	This final circuit of the test flight is exactly the same as the landing approach and overshoot that you just flew in j.) above, but with a termination of the flight as the model alights onto the strip. This criteria of a 30m boundary (Fig. 1) is worth a closer look here, though. I've yet to see an examiner measure out a 30m boundary when conducting a 'B' Certificate flight. Typically, what this request means is that the model should touch down at a point reasonably in front of the pilot and somewhere on the landing strip - a very broad 'spot landing', if you would. Usually the examiner will make it clear before the test that the landing should touch down between "here and here" as they point along the strip / landing circle / football pitch - whatever you're using as your patch. Note that the model doesn't have to stop in this boundary, nor should it touch down before the boundary and taxi into the area, but it should land, preferably with the motor still running. This also insinuates that you haven't floated over the area and elected to bang in a load of down elevator and dive for the spot! A three-point landing on a tail dragger or a fully flared main leg landing on a trike set-up is what we're looking for here, and is better achieved by a proper lined-up approach, good throttle management to descend to the strip, and a full landing flare with the model touching down in the correct place, just before the stall. By the time you achieve the standard of flying where you're eligible for a 'B' Certificate you'll have landed many models many times, and you'll know the difference between a good landing and a bad one. Try to make your 'B' Certificate flight test landing the best one you ever did! Here again, there are a few tricks you can employ to increase your chances of success in front of the examiner. Think about the height at which you're to start the approach. This should mirror your overshoot circuit, and if this was higher than the 40 feet you're currently flying at, think about gaining a little height as you go about the process of swapping circuits to achieve an into-wind landing. The landing circuit should commence over the patch and, again, heading into wind. It's very important that you call "landing!" quite loudly as you begin the task. Make sure that the examiner sees you visually check the area to satisfy yourself that it's safe to land the model. Remember to let them see you moving your head. If you need to perform an overshoot instead of the landing you'd best make sure you have a very good reason for doing so! Lining the model up incorrectly or fluffing your throttle control isn't a good enough excuse, and you'll fail. People on the strip, pedestrians on the approach, or the sudden 'dead- stick' of another model in the circuit are legitimate reasons for calling off the landing approach early, and your examiner should direct you to abort the circuit if any of these things occur unobserved by you. Don't rely on it, though!	

Step	Activity	Notes	Comments
m)	**Complete post-flight checks as required by the BMFA Safety Codes.**	These post-flight checks are listed in your BMFA member's handbook, and are detailed as follows: 1. Receiver off, then transmitter off. 2. Clear the frequency control system. 3. Clean the aircraft down. 4. Check propeller, airframe, undercarriage, wing fixings etc. for security of fastening and possible flight or landing damage. These are all fairly clear from their descriptions, but to be sure that you're observed doing them, go a little 'over the top' with your post-flight checks and make a point of exaggerating them a little, just as we did for the pre- flight checks. Leave nothing to chance by assuming that the examiner has seen you do them. A word of caution about electric-powered models here: these should be considered to be 'live' until the flight pack has been properly disconnected. The easiest way to ensure you treat them this way is to pretend that the motor is still running and carry the model or restrain it accordingly during retrieval. Even though your electric-powered model doesn't require a 'clean down', go over it as if you were doing just that as it gives the opportunity to really look for any damage that you might have missed. With the conclusion of the post- flight checks the first part of the test is over, and you can relax a little. It should be clear to you by now whether you've passed or failed the flying task, but if it isn't, just ask. There's little point in sitting through the scary process of answering the part two questions if you need to fly again that day, although your examiner may request that you do so just for practice or to better assess your competency. If you failed the flying, well, you can have another go at it later the same day. If you clearly passed then well done to you, and we can move to the bit that terrifies most candidates...	
	Answer Safety Questions	Answer correctly a minimum of five questions from the AS Mandatory questions list if you don't already have a current (post 1/1/2021) Registration Competency Certificate (RCC), plus a minimum of five questions on safety matters, based on the BMFA Safety Code for General Flying and local flying rules. Its also worth having a read of Annex A of the BMFA Members Handbook	

Relax !