INTRODUCTION

If you would like to share your flying partner's knowledge and skills as regards air pilotage or in a more serious vein have sufficient knowledge to bring the aircraft safely to mother earth in the event of incapacitation of your flying partner, then undergoing this AOPA Flying Companion's Course could be a good investment. Moreover, it should increase your enjoyment, participation and confidence if you regularly accompany a pilot in the air.

Satisfactory completion of the course will enable the candidate to obtain the Flying Companion's Certificate. The course consists of a minimum of 8 hours dual flying with a qualified flight instructor conducted within a period of 12 months. In addition, the theoretical knowledge section of the course comprises a minimum of 10 hours of briefings and lectures, including a briefing prior to every flight to cover the intended in-flight exercises.

The student would fly from the right-hand seat i.e. the seat that the companion or partner would normally occupy. The course can be completed in a Cessna 152 aircraft, a Piper PA 28 aircraft, or an aircraft of the student's choice in the case of a privately owned aircraft.

The overall aim is to equip the student with sufficient knowledge and ability so that in an emergency that person could take over control of the aircraft and make a safe landing, always assuming that the aircraft is flying in visual weather conditions and the horizon and the ground are clearly visible. The course is described in detail on the following pages together with a copy of the syllabus which requires to be signed by the instructor as the course proceeds.

In addition, it is recommended that the student obtains from the School a Pilot's Log Book to record the flights. After completion of the course the student could continue to use the log book to record flights made with a companion to provide a permanent record. Such flights must be recorded as passenger flying. Later, if the student requires top-up instructional flights or if starting a PPL course the log book can continue to provide a record.

The course culminates in a simulated in-flight emergency with recovery to an appropriate airfield and a safe landing. Satisfactory completion of the course will enable the candidate to obtain the Flying Companion's Certificate if desired.

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FLIGHT AND GROUND TRAINING

Starting the Course

The student will require to complete and sign the School's membership form to complete the formalities. At the same time the flight instructor will issue the student with a copy of this booklet and also raise a training record purely for instructor use. This last will include a copy of the syllabus which will be signed by the instructor for possible reference by AOPA. The training record also helps to maintain a high standard of training. Before the first flight clearly it will be advisable for the student to have been shown round the aircraft and to have received the long briefing on the Effects of Controls. At this early stage the student would be shown the relevant aircraft flight manual, for later reading as necessary. Likewise, sight of the aircraft check list would be beneficial.

Integration of Ground and Flight Training

As stated previously the course comprises 10 hours ground training and 8 hours flight training. The ground training covers both the theoretical knowledge subjects listed in the syllabus at the rear of this manual and also briefings carried out before each flight to cover the exercises to be flown on that particular flight. The timing of the theoretical knowledge long briefings will be co-ordinated by the instructor to ensure that the student will receive maximum benefit when in the air.

Flight Training

The syllabus is listed at the rear of the manual. Each flight will normally last about an hour including taxying time. The instructor will plan the content of each flight to suit the individual's rate of learning and also depending on the weather conditions. For instance the first flight may not just cover the effects of control but may touch on cockpit familiarization, use of radio and part of straight and level flight. The information that follows will describe how the various exercises are likely to be flown together with some general advice.

Cockpit Familiarization and Use of Radio

To begin with the instructor will most likely operate on a 'need to know' basis widening the extent of knowledge as the lessons proceed and as the long briefings are given. It should be noted that if the student wishes to operate the radio in the aircraft when flying with his, or her, companion which will certainly make the flying more interesting then the student must obtain a radio telephony licence. This, incidentally, can be obtained by self study and a short course at the Devon School of Flying.

How to use the Controls in Flight

As a matter of course, the instructor will take the student through the pre-flight procedures and checks - concentrating on a 'need to know' basis. This could cover all procedures until the aircraft becomes airborne.

On the climb-out the instructor will probably show the student the rudiments of climbing.

In the training area at cruise altitude the instructor will demonstrate the primary effects of the main flying controls, use of the throttle, (and the propeller pitch control if fitted) and the trim control (s). Detailed practice of these controls would be carried out later in the lesson. Similarly, use of flaps could be left until later, if required. In addition, the student would be shown the other features in the cockpit such as carburettor heat control, fuel selector, master switch, magneto/ignition switch, ventilation and heating controls etc.

As regards the actual flying controls the student should appreciate that a car is normally controllable in one plane of movement only. A cycle or motor cycle in two. However, an aeroplane is capable of movement in three planes: pitching (nose up and nose down), rolling (left wing down and right wing down) and yawing (nose left and nose right) And when the aircraft turns it combines the last two planes of movement.

An aeroplane can be trimmed to fly 'hands off' and a student could fly the aircraft for hours on end without learning about the proper and precise use of the flying controls. The instructor will stress the following main features:-

1) the flying controls are moved by firm and precise pressures and not by large hefty movements. To select an attitude i.e. the relationship of the aircraft 'nose' to the horizon, two, not one, control pressures are needed.

2) the flying controls are natural or instinctive in their use.

3) with a starting pressure and a stopping pressure precise attitudes of pitch, bank(roll) and yaw can be achieved.

There are others but these must be learned and remembered.

The instructor will no doubt also point out the role of the various flight and engine instruments including the r.p.m. gauge. If the student has any questions this would be a good time to ask them.

Before being taught the method of flying the aircraft in normal straight and level flight the student will find it beneficial to practise the use of the flying controls as follows:-

1) select pitch attitudes for fast cruise, normal cruise, and slow cruise, and climb and then back to fast cruise and return to normal cruise. Power changes won't be necessary at this stage. Neither will accuracy of the selections be required. Just selecting, say, four or more different attitudes, precisely and accurately, within the normal pitch range of the aircraft several times will suffice.

These attitudes will be selected in relation to the horizon. An alternative exercise is for the student to select, say, four different pitch attitudes above and below the horizon in 'one inch bites'. The merit of being able to do this will reveal itself when the student has to learn how to land the aircraft.

2) Select bank angles of approximately 5°, 10°, 15°, and 20° and back through the selections to wings level. Both left and right. As mentioned above, there will always be a starting and a stopping pressure for each selection. As before, the attitudes will be selected in relation to the horizon.

3) Use the rudder pedal to initiate yaw. And again to stop and prevent yaw. Practise several times. It should be noted that the rudder is used mostly to prevent yaw - this fact is most important for straight and level flight, straight climbs, and straight descents. There should be simultaneous foot pressure on both pedals - the pressures being varied to suit. No bicycling.

4) Use the trimmer to remove residual forces on the elevator (pitch) control. The aim is to 'make life easy for the pilot' If rudder trim is fitted mention can be made but it should not be a problem..

Practising these exercises will not take long but will make learning to fly the aircraft so much easier. The student must learn at this stage that the aircraft should not fly the pilot - the pilot should fly the aircraft. In particular, as suggested earlier, the ability to select precise small pitch changes will speed up learning how to land the aircraft later in the course.

How to fly Straight and level

Either towards the end of the first flight or on the second flight the instructor will introduce the student to straight and level flight, both at normal cruise speed and at a lower speed to facilitate setting up an approach to land. During this phase the instructor will provide information on the effects of power changes and how control 'feel' changes at different power settings and airspeeds.

In all probability, the instructor will begin by demonstrating what straight and level flight looks like from the pilot's point of view. Then he will teach how to fly the aircraft at a constant height i.e. level, then how to fly in a constant direction i.e. straight. Put these two together and the student will be able to fly straight and level. With wings level and no yaw the aircraft is bound to be in balance. In addition, the student will learn how to apply the mnemonic P-A-T for Power- Attitude-Trim when setting up the aircraft for a given speed or condition.

The student will receive practice at flying the aircraft at normal cruise speed and at a slower speed or even a range of speeds. In other words the student will learn how to vary the speed in the same way that a car driver can vary the speed when driving. The speeds would be approximate. Accuracy at this stage is unnecessary provided the student understands the principles because there will ample opportunity to practise the exercises during subsequent flights.

Finally a test of student understanding can easily be made by the instructor inducing a series of aircraft 'disturbances'. This will also build student confidence.

How to Climb, Descend and Turn

This part of the course is intended to give the student basic training on aircraft general handling. However, the syllabus has been prepared on a 'need to know' basis and is not as detailed as that for the Private Pilot's Licence. For example, climbing is limited to cruise climb and descending is limited to powered descents. The aims, of course, are simplicity and safety.

This lesson should prove slightly easier than the previous one because it is based on the use of the mnemonic already practised i.e. P-A-T. In addition to climbing and descending the student will be introduced to turning. Although not stated in the syllabus it is recommended that the student be given practice in recovering from a few simple unusual attitudes.

Climbing

Climbing is fairly straightforward provided the power is increased gradually and the aircraft maintained in balance i.e. wings level and no yaw. In fact, to keep the task simple the cruise climb will be taught. Extra power is essential for a sustained climb just as extra power is required for a motor vehicle travelling up a hill. The instructor will demonstrate how high the nose should be in relation to the horizon. In fact, the student will have practised this on the first flight. The procedure is basically P-A-T. No need to hurry.

Levelling off from the climb is the one occasion when the mnemonic becomes A-P-T for Attitude - Power - Trim. The instructor will demonstrate. Basically, at the required height or altitude the aircraft nose is lowered to the normal cruise attitude (pushing against the trim) and then the power is gradually restored to the cruise r.p.m.., and the aircraft re-trimmed (forward). Wings maintained level and no yaw, throughout the operation.

Descending

As a general rule to descend is simply like easing one's foot off the accelerator in a car. The power is reduced slightly and because the aircraft cannot maintain normal straight and level flight the aircraft will sink. No need to push the nose down - in fact the student will have to hold a degree of control column back pressure and re-trim. With some power set this will result in what is called a powered descent.

The instructor will demonstrate and point out how to determine the steepness of the descent from the instruments and how to vary that steepness or rate of descent. More importantly, the steepness of the descent can be determined by visual clues. This last is of great importance when making an approach to land. It is not difficult once the principle is understood. In addition, the instructor will teach the student the effect of using flap on the descent to land. There is one important feature to remember about flap - whenever flap is lowered, the aircraft nose must be lowered if the same speed is to be maintained e.g. on the approach to land.

Finally, although not specifically mentioned in the syllabus if time permits the instructor could demonstrate a glide descent i.e. a descent with no power at all to show the higher rate of descent, the large trim change (back), and the less effective controls.

Turning

Turns will also be demonstrated and practised - at first in level flight and later during climbs and descents. There is nothing difficult in turning an aircraft. All that has to be remembered is that unlike a motor car or boat the aircraft is turned by banking the aircraft gently in the direction required. The instructor will demonstrate and point out that 15 or 20 degrees of bank will normally be sufficient and that to select the required angle of bank two, not one, control pressures are needed. Moreover, the instructor will demonstrate why you must maintain the selected bank angle. To initiate and maintain a turn a touch of rudder should normally also be applied in the same direction as the turn. This will help to keep the aircraft in balance. In aircraft fitted with most American engines more right rudder will be needed in a right turn than left rudder in a left turn, especially in a climb where full power is used.

As the student achieves competency in turning the role of the direction indicator and compass will be introduced after which turning on to given headings can be practised.

As stated earlier, towards the end of this or the next lesson it is likely that the instructor will demonstrate one or two recoveries from what are called 'unusual attitudes'. It is unlikely that the student will ever have to recover from such attitudes but the practice will provide confidence and greater skill in aircraft handling,

No doubt, as previously, the instructor will demonstrate the airmanship aspects of returning to the airfield and joining for the approach and landing. Points will include cockpit checks in accordance with the aircraft check list, using the mnemonic FREDAL and how to identify the correct runway. In fact, the student will do most of the flying. In some cases, the instructor will give the student headings to fly in order to find the airfield as if receiving a radar homing.

How to make a Safe Landing
Once the student understands the previous general handling exercises but not necessarily have achieved the desired accuracy a move will be made to introduce the student to the circuit. In a very short time this will enable the student to improve his, or her, standard of flying. Initially, the student may find this task quite tiring but after a few circuits as ability improves the flying will become easier. This first flight on the circuit will normally not exceed about 50 minutes because on a short course such as this if the student is no longer 'moving forward' there is no point in continuing the lesson. How to find and fly to a suitable airfield and join the circuit will be covered later in the course.

Flying in the Circuit
Before flying the circuit exercise the student will have received the appropriate ground lecture and will have been briefed as to what to expect. The student will have been given a copy of the circuit exercise from the School's PPL Course Notes for the aircraft concerned. From that diagram and accompanying text the student can learn the names of the circuit 'legs' and the general procedures including the use of the aircraft check list. In particular, the downwind pre-landing checks should be memorized.

The instructor will teach the lesson by flying a series of circuits complete in all respects - but the student cannot learn everything all at once. The student should first concentrate on getting the pattern right; then how to set up and fly the approach; then how to land. The fact is: to make a good landing the student needs to fly a consistently good approach. To fly a consistently good approach the student needs to start the approach in the right place, and to do this the student needs to fly a good downwind leg.

One way in which the instructor may help the student is to allow the selection of the first stage of flap on the downwind leg, during or after the pre-landing checks, to slow the aircraft and to get one trim change out of the way, then select the second stage of flap in the normal way on base leg when setting up the final descent. This would certainly ease the workload In fact, this is the procedure taught to many American students.

Use of the Radio
So far, no mention has been made of the use of the radio. This subject will, of course, be covered by long briefings on the ground and later in the air. Initially, in any event the instructor will probably operate the radio whilst the student is learning to fly the circuit.

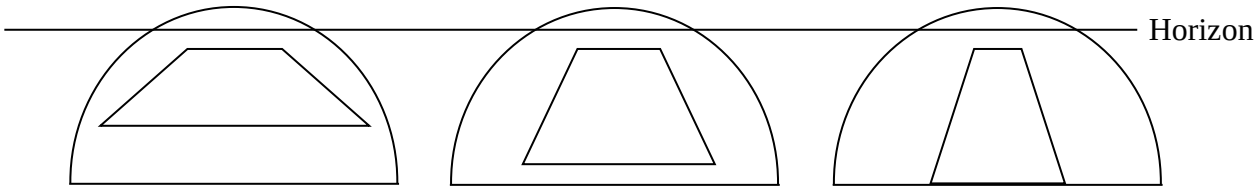
Flying the Approach
The touchdown area will have been noted whilst flying the downwind leg. The aim of the approach is to fly the aircraft in an L-shape powered descent, with flap, from half-way along base leg down to the touchdown area. A good approach will simplify making a good landing. Initially, the altimeter can be used to verify the accuracy of the approach - starting at 800 ft. on base leg the pilot will aim to 'turn the corner' on to final approach at approximately 550ft.

Thereafter, certainly below 200 ft. the approach is visual - hand on throttle, flap set as required, pitch attitude noted and 'flown' to give the required indicated airspeed. The trick - as the instructor will explain -is to fly the aircraft down to the touchdown area ready to flare for the landing controlling height with the throttle, airspeed with the elevators (pitch control) and the direction with ailerons and rudder.

The student will need to learn a method of maintaining the required angle of descent to reach the touchdown area. The student has a choice of at least three methods or in fact, a mix of all three if required, as follows:-

1) Aim to keep the runway outline shape the same, only getting larger, all the way down.
2) Look for movement of the touchdown area (runway number or 'piano keys') up or down the windscreen. Moving up means aircraft getting low; moving down means aircraft getting high.
3) Look for the stationary spot in the windscreen. If the stationary area is above the touchdown area the aircraft is high; if below the aircraft is low.

The following diagram may also help.



Too Low Good Too High

A factor to be borne in mind when flying the approach is the effect of wind. The wind strength will normally reduce and back in direction during the approach. More power will be needed in a strong headwind but the reduced ground speed will give more thinking time. Calm conditions could cause the aircraft to be high on the approach with reduced thinking time. In addition, crosswind conditions could cause a problem but the instructor will show how to counter such effects.

However, the aim is to continue the approach to position the aircraft at some 15 - 20 ft. above the runway just as the aircraft approaches the touchdown area, above the runway centre-line ready to flare for the landing. If the aircraft is in the right place at the right height the student can go ahead and land. If far too high or too low the procedure is to add full power, climb away for another attempt carrying out the go-around procedure.

Finally, a word on assessing height at the lower levels. Towards the end of the approach the student will need to assess the height (above the ground) in order to arrive at the required 15 -20 ft. prior to the landing. There are various methods that can be learned - the pilot looking ahead of the aircraft and not vertically downwards out of the side of the aircraft.

To assess the flare height some sources advise waiting until individual clumps of grass or pebbles etc. can be seen. Others say guess the height of a double-decker bus or the height of two elephants! Another method of assessing height is to appreciate that the horizon is always as high as the pilot's eyes. This last method has the advantage of being usable over a larger range of heights.

Early on the approach, all the objects on the ground will be *below* the horizon so they will clearly be *lower* than the pilot. As the aircraft gets lower some objects will move above the horizon indicating that the pilot is below those objects. However, the height of any object *on* the horizon will be the height of the pilot. Therefore, if the height of the object is known or can be estimated then the pilot can estimate the height of the aircraft. For instance, if the horizon coincides with the top of a windsock, the pilot is at the height of the windsock. Similarly, if the horizon cuts half -way down a 200 ft. mast then the aircraft is around 100ft.

By glancing around, looking at wireless masts, hangars etc. a reasonable estimate of height can be made. This principle is most useful at other times of flight e.g. the pilot can decide if an aircraft will fly over a hill or into it; or under, over, or into a cloud.

Having, hopefully, arrived in the right place at the right height it will be time to land - if the pilot does nothing the aeroplane will fly into the ground - hence the need to flare (or round-out) and commence the landing.

Landing

There are basically four parts to the landing: the flare which is sometimes called the round-out, the gentle sink, the float or hold-off, and finally the touchdown - on the main wheels in the case of a tricycle undercarriage aircraft.

Knowing where to look during the landing is important. Initially, the student will need to look well ahead probably as far ahead as he would be when driving a car at, say, 50 mph. As the aircraft slows the student's point of focus will move closer to the aircraft.

The first task is for the student to learn to recognize the 15 - 20 ft. height and initiate the flare. Basically, this means gently but firmly closing the throttle at the right time, applying control column back pressure both to prevent the nose from dropping and to select a slightly higher nose attitude to reduce the angle of descent to about half of what it was - and hold! This will slow the aircraft and give the pilot more thinking time to judge when to raise the nose once again so as to 'hold off' just above the runway surface. Failure to make the 'hold-off' would again mean the aircraft flying into the ground.

The hold-off height cannot be measured or seen from inside the cockpit but experience will tell what is a safe height - it is somewhere between 1 and 2 ft. above the runway. All the time the wings must be held level and the aircraft must be kept straight, on or near the run-way centre line. At the hold-off height, as it slows the aircraft will want to sink. But the student must prevent sink with a series of small backward movements of the control column .so as to raise the nose of the aircraft progressively until the main wheels contact the runway.

During this stage the student should look past the nose of the aircraft to detect whether the aircraft is sinking or not, at the same time looking at the nose attitude to ensure that when a backward pressure is applied to the control column the nose actually responds. If the aircraft is not sinking the nose position/attitude should be held until such time as the sink commences again. Failure to do this could result in the aircraft 'ballooning' i.e. if the student continued to pull back on the control column regardless of the aircraft behaviour.

There should be no forward movement of the control column during the hold-off - although it is permissible to remove just the last control pressure if the student has been in too much of a hurry to land. Clearly, if the landing is hurried and the nose gets too high, too soon, the aircraft will 'balloon' and a go-around is the only safe solution.

As stated earlier, wind effect is another important factor. If the student encounters drift during the landing process the problem cannot be solved by rudder alone. Instead, the aircraft should be banked gently away from the direction of drift - strictly a small angle of bank - i.e. back towards the runway centre line at the same time applying opposite rudder to keep the aircraft pointing in the correct direction. That will be effective.

Finally, the student should remember that the landing is not completed until the aircraft has come to rest or at least slowed to walking speed. Once the aircraft has vacated the runway, any relevant cockpit checks can be completed. During training, however, the instructor will teach how to make a 'touch and go' landing to maximize the use of the flying time.

Going - Around

Before leaving the circuit training the instructor will teach the student this procedure. The term means what it says : if the pilot of an aircraft misjudges the approach or cannot be sure of making a safe landing for any reason or is instructed by Air Traffic Control the pilot must abandon the attempt to land by implementing the 'go-around'. The full procedure is detailed in the aircraft flight manual and in the aircraft check list. Further information is given overleaf.

Technically, there are two slightly different versions. However, they differ only in the flight paths required which the instructor will explain. The basics as regards the aircraft are much the same. The following details the general procedure to be adopted following a mis-landing:-

1) Ensure the flight path in front of the aircraft is clear
2) Apply full power, maintain wings level and prevent yaw with rudder
3) Check Cold Air i.e. Carburettor heat Off
4) Climb straight ahead, adopting a safe attitude
5) Check correct IAS for the flap setting and that the aircraft is not descending
6) Retract drag flap if used, prevent sink.
7) Select correct IAS for the new flap setting and re-trim
8) Radio call as required
9) At 300 ft. QFE retract remainder of flap and re-trim
10) Resume normal climb-out and continue in the circuit for a further approach

If the student requires further information the instructor could provide a copy of Exercise 13E from the D.S.F. PPL Course Notes for the aircraft concerned. Alternatively, the student could obtain a check list from the School shop.

Map Reading and Emergency Actions

Once the student can make a reasonable attempt at a landing the student can expect to return to flight in the training area .commencing with map reading. There will still be time to practise further landings as the course proceeds. The instructor will decide where to practise this exercise discussing with the student as necessary. One solution might be to fly a circular route around Dunkeswell such as Honiton - Chard - Taunton - Wellington etc. In any event the student can expect to have received the full ground briefing on map reading before the flight i.e. 'learn on the ground, practise in the air' the topics that the student must understand before flying this first exercise are as follows.

1) The basics of Latitude and Longitude
2) The scale of the 1: 500,000 Aeronautical Chart
3) How to measure distances using the scale and by 'guesstimation'
4) Measuring tracks using a protractor and by 'guesstimation
5) Basic information on Magnetic Variation
6) Symbols e.g. the various types of airfields
7) Height information on the chart e.g. hills, masts, layer tinting, etc.
8) The basics of the various types of controlled airspace, zones, etc.
9) Radio frequencies displayed on the chart, and their use re Dir. Finding
10) Danger and Restricted Areas i.e. where not to fly and where can fly
11) How to visualise topography
12) Reason(s) for orientating the chart in the air

Map Reading
The instructor will show the student how to orientate the map in the air - the aircraft heading being the key. The student will be shown that when correctly orientated the map is a miniature version of the earth's surface plus all the features under and around the aircraft. The bearings of distant objects will agree with those on the map. Synchronizing compass and direction indicator will also be covered if not done already.

Another useful piece of information that the student will learn and practise is how to estimate distances from the aircraft of features or objects on the ground. This is an essential part of map reading to enable the pilot to pinpoint the position of the aircraft. One recommended method is to assume that the average size of an aerodrome such as Dunkeswell or an airport is approximately one nautical mile across - mentally fitting in the known size of an aerodrome or airport into the distance to be measured is just a matter of counting 'one aerodrome' - 'two aerodromes' - 'three aerodromes' etc. The number of hypothetical aerodromes fitted into the distance becomes nautical miles.

In addition, the instructor will demonstrate the overall use of the chart with the student carrying out suitable practice. Sometimes the instructor will fly the aircraft and sometimes the student will fly. The student would in all probability be estimating the headings to fly. The instructor at the same time would show the student the wisdom of cross-checking that the compass and direction indicator read the same.

As far as is possible, the instructor would cover the topics listed above bearing in mind, as ever, 'the need to know'.

How to Deal with an Unexpected Emergency
The best time to deal with this scenario is before it happens. Hence this training course. Having said that, on the ground before making any flight with a friend the companion should take an active interest in the flight planning i.e. to have a personal copy of the 1 in 500,000 topographical chart and to be aware of - even mark up - the route(s) to be flown plus relevant information such as aircraft endurance and for a long flight the fuel usage plan; also the weather situation and likely airfields close to the proposed track(s). Then if the companion takes an active interest during the flight as regards the navigation the companion can map read and keep 'au fait' with the conduct of the flight. If anything should go wrong the companion will know the situation and the likely position of the nearest airfield having the required facilities.

If in the unlikely event of having to take over control due to incapacitation of the pilot the flying companion having flown this AOPA course will be prepared. Knowing more or less where the aircraft is, where ATC assistance may be sought and how to obtain it plus how to keep safe control of the aircraft will be half the battle of coping with such an emergency.

Initial Actions
If such an event occurs the companion should remember the old saying used by professional and private pilots: Aviate - Navigate - Communicate. This means what it says.

Fly the aeroplane and keep it safe - 'navigate' means point the aeroplane in the right direction and at the appropriate height - 'communicate' means use the radio to contact Air Traffic Control (ATC). In this emergency situation it would mean using the pre-fix 'Mayday' and setting the transponder. To 7700.

So this saying sums up the first three actions to be taken by the 'new' pilot taking over control. Attending to the needs of the incapacitated pilot should be fitted in somewhere at this stage together with reassuring the other passengers if carried.

Use of Emergency Services to locate the Aircraft
In this emergency situation the initial radio call should be made on the frequency already set on the aircraft VHF radio. A typical call would be as follows:-

Mayday Mayday Mayday. This is G -**** G - **** G - ****. Pilot is incapacitated. Passenger now flying the aircraft. Request assistance for landing. Position (if known) near Minehead. Over.

This will start the process. If ATC need more information they will ask for it. Once contact is established the 'pilot' could request medical assistance for the incapacitated pilot on landing. If there is no reply or ATC has no radar or direction finding equipment the 'new' pilot should change frequency immediately to 121.5 MHhz and repeat the initial Mayday call.

Note: One sure method of locating the aircraft position is to use the 121.5 MHz Distress and Diversion Fixer Service. It is considered, however, in this particular scenario this could delay the process of aircraft recovery if there is already an airfield nearby that the 'new' pilot is aware of and that airfield has the necessary facilities for homing the aircraft for a landing, Time is of the essence. Normally, only if no contact can be made with a suitable airfield would the 121.5 MHz Distress and Diversion Service be used. The final decision as to which method to adopt will depend upon the situation at the time.

Air Traffic Control will be quick to identify the aircraft and to pass the required aircraft headings to home the aircraft for a landing. This is true whether the aircraft is being handled by the Fixer Service or by a suitable nearby airfield. At the same time instructions will be provided to enable the 'pilot' to adjust the altitude of the aircraft to prepare for approach and landing.

In addition, reminders will most likely be passed to ensure that the required pre-landing checks are carried out. In any event the 'pilot' should complete a FREDAL cockpit check to ensure that the aircraft is 'tidied up' - not only for that purpose but to reassure the 'pilot' that the aircraft is in good condition ready for the descent and the approach to land.

If a flying companion does a lot of shared flying it might be good practice to have available on card a home-made check list as an 'aide memoire'. Something on the following lines:-

1) Confirm pilot is incapacitated.
2) Fly the aircraft. Inform passengers.
3) Maintain height and heading.
4) Set Transponder 7700. Transmit Mayday on A/c frequency or 121.5 MHz a/r.
5) Follow ATC instructions. Request medical assistance for pilot.
6) Check Fuel Radio Engine DI synchd. Altimeter set Location known/Lookout
7) Prepare aircraft for landing. Brakes Off Undercarriage Down Mixture Rich and Carb. Air checked Pitch if applicable Fuel On fuller tank, Contents, Pump On a/r Flap a/r Gauges and Gyros Hatches Secure Harnesses tight.
8) Final check: QFE set and Harnesses very tight.

Following R/T Instructions to reach the Airfield

As stated above, ATC will provide headings and altitudes for the 'pilot' to fly - virtually to talk the aircraft down to the runway if necessary, certainly to position the aircraft to join the circuit. In an extreme case it has been known to despatch an aircraft to guide the troubled aircraft into land. Clearly, the area that will be most unfamiliar to the new pilot will be conversing with ATC by R/T (Radiotelephony). Normally there are procedures to be observed e.g. standard words and phrases, the need to read back numbers etc. However, these procedures were introduced mainly to avoid mistakes being made when radios were relatively inefficient. However, in this emergency case the 'pilot' cannot be expected to have professional expertise and should, therefore, just treat the radio as a telephone - because that is all it is. The following paragraphs contain some general advice.

Do be sure of the location of the transmit button and the method of selecting radio frequencies.

There is no need to shout into the microphone. An ordinary modulated voice preferably pitched up slightly rather than down is ideal.

The pilot should not transmit if another 'station' is 'talking'. In practice, ATC will normally allocate a quiet frequency which the pilot will need to select. So the problem may not arise.

The aircraft registration letters i.e. the aircraft callsign can be found on a small placard in the cockpit.

Have a biro or pencil handy to write down any figures so that they will not be forgotten e.g. headings, altitudes, transponder codes, frequencies, etc. In addition, it is advisable to read back information containing numbers as a safety measure.

Examples

ATC: G-****. Turn Left Heading 025
A/C: Turn Left Heading 025. G-****

ATC: G-**** Descend to Altitude 2000ft. QNH 1015
A/C Descend to Altitude 2000 ft. QNH 1015. G-****

A/C (Later on reaching) Level at 2000 ft. QNH 1015. G-****

ATC: G-**** Check QFE Setting 1012
A/C: QFE 1012. G-****

ATC G-****. Call 'field in sight'
A/C (Later) Field in sight. G-****

For further information and examples of R/T calls the student can ask to see a copy of the School's booklet 'Guidance Notes for Dunkeswell Air/Ground' which covers most cases of the R/T procedures in the Dunkeswell area. The official document on the use of R/T is CAP 413. This also can be obtained from the School if required.

Flight Practice
After the map reading flight the instructor will embody what has been written above into a flight exercise to demonstrate how the emergency procedure can be simulated and practised. On a later flight what has been learned can be put to a live test using genuine Air Traffic control facilities to prove to the student, and to the instructor for record purposes, that the procedure does work.

Emergency Procedures and Homing Practice
Before the instructional flights the student will receive both long briefing and a pre-flight briefing as to what is to be practised and how. If necessary, to help, the student could prepare a brief check list as outlined above to use in the air. In flight, initially at least, the entire procedure can be practised with the instructor simulating 'incapacitation' and the student assuming control as the 'new' pilot on the lines of the procedures outlined above.

The 'new' pilot would make the simulated 'Mayday' message over the intercom. (but not transmitting) making the scenario as realistic as possible. The instructor would respond to simulate the role of ATC - asking for further information such as fuel endurance, aircraft departure point, heading, souls on board etc. In addition, the instructor could provide headings to fly to a real airfield e.g. Culmhead or preferably to Dunkeswell so that a real landing could be made. En route the instructor would check the student's R/T calls, FREDAL check, synchronizing compass and direction indicator etc. as time permits.

If possible, the exercise would be repeated two or three times to ensure that the student flies the aircraft safely and can answer basic questions associated with the 1 in 500,000 topographical chart. If the student finds the workload rather high and requires more practice it is perfectly feasible to practice the procedures in the classroom with the instructor assuming the role of ATC as done in the air.

Subject to satisfactory student performance the next flight would be the final flight which would simulate the emergency drill and involve calling up a real airfield by radio and requesting radar assistance for homing to that airfield for landing. The student would make all the radio calls and fly the aircraft to the airfield and land. Almost the real thing. Note: In this live practice, for obvious reasons, the pre-fix Mayday must not be used.

Simulated Emergency using ATC Facilities

This flight is the culmination of everything the student has learned on the course and hopefully will prove most rewarding to both the student and the instructor. The flight is not a test as such but clearly the student will need to feel that he, or she, is capable of handling the emergency and making a safe landing provided assistance is available from an ATC unit on a suitably equipped airfield. Traditionally, a safe landing is one you can walk away from!

As usual, a pre-flight briefing will be given by the instructor to cover the purpose of the flight and the role to be played by the student. The instructor may or may not tell the student which airfield will be used. In any event, arrangements will be made with a suitable airfield so, as to inform the ATC unit beforehand of the special nature of the flight. In this way, the controller(s) can be asked to make the exercise realistic. In addition, the instructor might start the exercise over unfamiliar territory as far is possible within the constraints of the flying time available.

The procedures and advice have been covered on the preceding pages of these notes and the student will have practised the various procedures on a previous flight. The simulated emergency will probably start with the aircraft at least 15 nm's from the chosen airfield or airport and will involve a landing or touch-and-go landing at that airfield followed by a further landing at the home airfield. The instructor will brief the student as to the wording of the initial R/T call since the pre-fix 'Mayday' must not be used in a practice exercise.

Three points not specifically mentioned in the AOPA Syllabus that follows which clearly would be necessary after the emergency landing are how to taxy, how to shut down the engine and how to secure the aircraft. This will present no problem as the student will have practised these procedures many times during the course.

On satisfactory completion, the student's log book is to be completed plus a statement confirming satisfactory completion of the course with information on total hours spent on ground lectures and flight exercises. The log book is to be signed by the instructor and countersigned by the Chief Flying Instructor. Likewise, the student's Syllabus Record Sheets will be completed and signed by the instructor(s) concerned

In addition, if the student requires the AOPA Certificate the necessary application form will be completed, and signed by the instructor. A nominal fee will be required by AOPA.

As long as the student continues to fly as a flying companion, top-up flights with an instructor would be advisable. And, of course, the new 'co-pilot' should take an increasing interest in the role of the pilot so as to become more proficient and - who knows - may train for a pilot's licence one day.

SYLLABUS AND TRAINING RECORD

THEORETICAL KNOWLEDGE

SUBJECT	**Instructor's Name and Signature**
AIR LAW The privileges of the PPL holder The need for the flight training to be conducted by a Flight Instructor	
PRINCIPLES OF FLIGHT How an aircraft flies Slow flight and stalling How an aircraft lands	
HUMAN PERFORMANCE AND LIMITATIONS Vision and lookout Motion sickness Carbon monoxide from heaters	

FLIGHT TRAINING - LONG BRIEFINGS

SUBJECT	**Instructor's Name and Signature**
EFFECTS OF CONTROLS: Primary effects of flying controls Trim and Flaps Throttle, Mixture, Carburettor Heat Fuel Selector Master Switch, Magnetos Autopilot, Retractable Undercarriage a/r Ventilation and Heating	

Cont'd over……

LONG BRIEFINGS Continued

SUBJECTS	**Instructor's Name and Signature**
MAKING USE OF THE INSTRUMENTS Magnetic compass Directional Indicator Altimeter Airspeed Indicator Artificial Horizon Vertical Speed Indicator Turn Co-ordinator Tachometer Fuel Gauges	
AIRCRAFT SYSTEMS TO BE MONITORED Fuel Radio Engine Directional Indicator Altimeter	
HOW TO USE THE RADIO AND TRANSPONDER Operation of the Radio Operation of the Transponder Changing Frequency Callsign; Height; Heading; Squawk in emergency; Use of 121.5 MHz	
HOW CIRCUITS ARE FLOWN AT AN AIRFIELD Layout of apron, taxiways and runways Circuit Pattern Pre-landing checks Going around Joining the circuit	

Cont'd

LONG BRIEFINGS continued

SUBJECTS	**Instructor's Name and Signature**
HOW TO UNDERSTAND THE AERONAUTICAL MAP Topography Types of Airspace Symbols	
HOW TO USE THE EMERGENCY SERVICES Distress and Diversion Use of Radio	

FLIGHT EXERCISES

EXERCISE	**Instructor's Name and Signature**
COCKPIT FAMILIARIZATION USE OF RADIO	
HOW TO USE THE CONTROLS IN FLIGHT Primary effects of controls Trim Effects of Power Carburettor Heat; Mixture Flaps Autopilot a/r Retractable undercarriage a/r	
HOW TO USE THE CONTROLS IN FLIGHT Primary effects of controls Trim Effects of Power Carburettor Heat; Mixture Flaps Autopilot a/r Retractable undercarriage a/r	
HOW TO FLY STRAIGHT AND LEVEL At cruise speed At approach speed	

Cont'd over…

FLIGHT EXERCISES Continued

EXERCISE	**Instructor's Name and Signature**
HOW TO CLIMB, DESCEND, & TURN Cruise climb Powered descent Use of flap in the descent 20° Banked turns on to specified headings	
HOW TO MAKE A SAFE LANDING Flight in the circuit Flying the approach Landing Going around	
HOW TO READ AN AERONAUTICAL MAP IN THE AIR Significant topographical features	
HOW TO DEAL WITH AN UNEXPECTED EMERGENCY Use of emergency services to locate aircraft How to follow radio instructions to reach a suitable airfield	
SIMULATED EMERGENCY Taking control of the aircraft Securing passengers Use of radio to obtain emergency assistance Providing information to emergency service Following instructions to reach airfield Making a safe landing	

SUGGESTED BREAKDOWN OF FLYING TIMES

	Hr. Min.
How to use the controls in flight …	0.45
Straight and level flight …	0.45
Climbing, descending, turning …	1.15
Safe landing and circuits …	2.30
Map reading …	1.00
Simulated emergency and homing …	1.00
Final flight using ATC assistance to land	0.45
Total	8.00

The above times may be varied by the instructor to suit individual students.