ANNEXES

Contents

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CONVERSION TO TYPE – LASHAM TUGS

Name:	Total Hrs Power:
Licence No:	P1 Hrs Group A Since PPL or Last 12 Months:
Medical:	P1 Hrs SLMG:
Cert Of Exp:	P1 Hrs Gliding:

AIRCRAFT TYPE

	Exercise	Pct	OK
1	Position of Controls, Ground handling, Prop Handling		
2	Refuelling, Oil, Keys etc.		
3	Log Sheets, Booking Out, Recording Times.		
4	Daily Inspection (Check A)		
5	Starting, Taxy, Run Up		
6	Pre-flight Checks, Airfield Traffic, R/T Procedure		
7	Take-Off, Keeping Straight, Monitor Instruments		
8	Climb, Constant Attitude, Correct Speed		
9	Go-Around from Finals & Base Leg		
10	Identify Noise Sensitive Areas		
11	Stalls: Level & Turning, Slow Flight, Effects of Trim		
12	Engine Failure at Altitude		
13	Engine Fire at Start, Fire in Flight (Engine & Electrical)		
14	Circuits: High/Wide & Low /Close, Downwind Checks		
15	Approach Handling/Speeds & Threshold Speeds, Landings		
16	Crosswind Circuits		
17	Engine Failure: After Takeoff, Downwind Leg, to Precision Landing		

Cleared For Solo: **Signature** **Name**

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Narrative Remarks:

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CONVERSION TO TOWING – LASHAM TUGS

NAME: _____ **AIRCRAFT TYPE:** _____

	Exercise	Pct	OK
1	Speeds – Correct selection/pitch attitude and accuracy of flying		
2	Tow with level flight		
3	Low tow exercise		
4	Descent on tow and airbrakes open signal		
5	Tow with glider conducting out of position exercises		
6	Tow with glider simulating being unable to release		
7	Wave off signal from tug		
8	Engine handling		
9	Planning of tow (noise abatement, best lift, descent path)		
10	Oral questions		
11	Revision of noise abatement procedures and rejected take-off		

Cleared For Solo Towing: Signature **Name**

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Logbook Signed and Tug Insurance Paid **Yes/No**

Narrative remarks:

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ROBIN REGENT OPERATING NOTES

These notes are for the information of Lasham tug pilots and give Lasham operating procedures for the aircraft type. They do not supersede the information in the Aircraft Flight Manual, a copy of which is available for study as required.

1. ROBIN REGENT DR 400/180R G-BJUD, G-BSFF AND G-CDOY

These aircraft were built in France by Avions Pierre Robin who make a number of types of light aircraft, principally those descended from the earlier Jodel series. The flying controls of the Regent are responsive, and the view from the cockpit is superb. Since the airframe is light, the Regent has a higher rate of climb than most other tugs with the same powered engine, but due to its higher stalling speed the minimum towing speed is 60 knots. The Regent is therefore not suitable for towing the slower gliders, particularly since the climb is steeper than our other tugs. After takeoff this transition into the steeper climb could easily be more than an inexperienced glider pilot in a slow glider could handle and should be born in mind particularly on windy days.

2. STALLING

Our Regents drop the port wing at the stall, and if you let it go further they would spin. This is aggravated with the fitting of four bladed props. They are therefore more critical than our other tugs during the approach and require more precise handling. Too slow is obviously dangerous (if you are in trouble you need lots of power quickly), too fast and it floats a long way as it is a clean aircraft with only a small flap area. Don't approach too slowly; Regents have dropped a wing on many experienced pilots and they do not try it any more. Stalling will be covered during the conversion to type. Be aware that the three aircraft do have slightly different handling and different instrument fits.

3. WHEEL BRAKES & NOSEWHEEL STEERING

The wheel brakes are operated differentially at the furthest reach of the rudder travel, or together by centring the rudder and operating the brake handle. Directional control on the ground is also through a steerable nosewheel connected via the rudder circuit when weight is on the nosewheel. As the Regent lands faster than our other tugs, it is important not to expect too much deceleration from the brakes especially on wet grass or in no headwind conditions. Some Regents have occasionally failed to automatically reconnect the nose wheel steering on landing if the nose wheel is lowered very gently onto the ground; this can be overcome by gently moving the stick forwards. Please use the brakes sparingly.

4. FUEL SYSTEM

The aircraft has one fuselage tank holding 24 imp gal/110 litres of which 2.2 imp gal/10 litres may be unusable. The aircraft are fitted with electric fuel gauges, low fuel pressure warning lights and a low fuel contents light which illuminates with aprox. 5 gals remaining. The aircraft have 3 fuel drains, two in the fuel tank and one at the fuel strainer to the rear of the engine. Note: G-CDOY does have a 50L ferry tank. For towing purposes we will not use this tank.

5. WEIGHTS

Approx. empty weight	1340	lbs	607.8	kg
Maximum weight	2205	lbs	1000.2	kg
Max. Usable Fuel	173	lbs	78.5	kg
Approx. cockpit load	692	lbs	313.9	kg
Max parcel shelf loads	60	lbs	27.2	kg

6. ENGINE

Lycoming 0-360 rated at 180 HP
Limitations

Max RPM	2700 rpm
Max CHT	260 °C
Max oil temp	118 °C
Min oil pressure	25 psi
Max oil pressure	90 psi

All the Robins are fitted with four blade propellers and silencers. Fitting of the four blade props means that the red rpm avoid bands for the engines are not applicable.

7. OPERATING PROCEDURES

Limiting speeds

Never exceed (VNE)		166 kts.
Normal operating (VNO)		140 kts.
Manoeuvring (VA)		116 kts.
Flaps extended	(Vfe)	106 kts.
Design load (clean)		+3.8 & -2.2g.

Best glide speed in the event of engine failure 78 kts.
Aircraft is not approved for aerobatics or spinning.

8. THE DI, COVERING ONLY POINTS PARTICULAR TO THE REGENT

Include the other normal DI checks as you go around the aircraft.

1. Get up onto the wing carefully to open the canopy and enter the cockpit. The black walkway can be slippery when wet or if you have damp shoes. Note that the wing is fabric covered close to the walkway. The aircraft should be parked with the flaps down as it reduces the risk of feet damaging the flaps.

2. Before opening the canopy, ensure no one has opened the oil filler hatch. If the canopy hits this it cracks the very expensive canopy. Get into the cockpit carefully. Regent seat backs are prone to collapse. They should not be used to help getting in and out. Hold the rear canopy frame, and try not to put any load on the seat back.

3. Once in the cockpit, check the following: -

   CONTROLS: for full and free movement.

   TRIM: for movement, check the indicator follows.

   FLAPS: Check they latch into the 15° and 60° positions, then leave them down to lessen the chance of treading on them as you get on and off the wing.

   CIRCUIT BREAKERS: Check that all CBs that have red trip buttons are tripped out.

   MASTER SWITCH ON: Check fuel contents.

   LEAVE THE COCKPIT again taking care not to strain the seat back, walk round and check the audible stall warning by operating the switch on the right wing. Reach back into the cockpit and turn the Master off to avoid draining the battery.

4. Close the canopy clear of the cowling. Never push on the Perspex, only on the frame. Note that the front edge of the windscreen screen is painted Perspex and not metal. When the canopy gets stiff the runners need lubricating with PTFE spray not oil or grease.

5. Open the engine bay access cover on the starboard side and check the oil. Close the access cover if you have to leave the aircraft for any length of time in case anyone pushes the canopy forward while you are not with the aircraft. Pushing forward the canopy while the access cover is open will twist or damage the cover.

6. Do not remove the cowlings as part of the DI. Put your hand inside the cowling to check the clearance above the starter ring, it should be close to half an inch.

7. The Fuel Filter drain is under the front fuselage, and there are two tank drains near the TE of the wing.

8. Continue the DI around the aircraft in the usual way. Note that aileron movement is less than most aircraft, about 5 inches at the root trailing edge.

9. The flaps should have some free play in them. Check the hinges are not loose.

10. There should be no play at all in the all-flying tailplane pivot.

11. The metal plates on either side of the hook are linked by the rope ring and should bring on the Rope On light on the top of the instrument panel. Do not worry if it flashes on and off in flight.

12. When you move the aircraft using the tow bar you will find full lock on the nosewheel puts the respective brake on, DO NOT pull down on the fin to lift the nosewheel off the ground to turn the aircraft.

When putting passengers into the back, slide the seat adjusters back and the seats will tip forward. Anytime the seats are moved check the adjusters are pushed fully forwards or the seat may move in flight.

9. TAXYING

Do not try to turn in too tight a circle, the nosewheel steering allows very tight turns and you can twist a tyre or lock a wheel. This can damage an undercarriage leg and could get you grounded in more ways than one!

10. TOWING

Climbing speeds

K13's and similar	60 kts
Glass	70 kts
Glass + water ballast	75 kts

Descent technique: Initially keep the rpm at 2500 and speed below 80 kts for at least 20sec. Then slowly increase speed to 115 kts and then reduce the rpm to 2300. Once below 700', start reducing the speed and then the power to achieve a steady reduction of both towards finals.

11. ROBIN REGENT - CHECKS

START UP CHECKS

NOSEWHEEL TOW BAR ..... REMOVED
RADIO ..... OFF
PARKING BRAKE ..... ON
FUEL ..... ON
CIRCUIT BREAKERS ..... TRIPPED
MIXTURE ..... RICH (in)
CARB HEAT ..... COLD (in)
MASTER SWITCH ..... ON (in)

WARNING LIGHTS

LOW OIL PRESS ..... ON
LOW FUEL PRESS ..... ON
LOW FUEL CONT ..... OUT
FLAP LIGHT ..... OUT
ALTERNATOR ..... ON
FUEL PUMP ..... ON
PRIME WITH THROTTLE
MAGS ..... LEFT MAG ON
CHECK THE AREA IS CLEAR

STARTING

STARTER WARNING LIGHT ..... OUT
OIL PRESSURE ..... RISING
MAGS ..... BOTH ON
ALTERNATOR ..... ON and CHARGING
RADIO ..... ON

POWER CHECKS

Mag drop ..... 125 rpm max at 1800 rpm
CARB HEAT DROP ..... 50 – 100 at 1800 rpm
IDLE ..... 700 rpm

Please note that each mag should be first checked with the engine at idle before the power checks, if you really must do a dead cut check this must also only carried out with the throttle fully closed. If during the power checks the engine loses a lot of power, allow the engine to stop or shut the engine down and re-start on the good mag. This is to avoid damage to the engine and the very expensive exhaust system caused by the engine back firing when the mags or good mag are turned back on.

PRE TAKE OFF CHECKS - REGENT

TRIM .....SET TO 5 FOR TOWING
MIXTURE..... RICH
MAGS..... BOTH ON
MASTERS.....RADIO, SROBES ETC ON
CARB HEAT .....COLD
FUEL ..... ON, CONTENTS
FUEL PUMP ON, PRESSURE LIGHT OUT
FLAPS.....FIRST STAGE
GUAGES & GYROS.....NORMAL & SET
HATCHES.....LOCKED
HARNESS..... TIGHT & LOCKED
SEATS LOCKED, push adjuster fully forward.
CONTROLS.....FULL & FREE

WARNING LIGHTS: For take off, all off except flap light & rope light.

12. APPROACH - REGENT

It is recommended to use 70 kts as a minimum speed until the final turn has been completed, after which the speed can be reduced in average wind conditions to 65kts, and 60 kts in no wind.

SHUT DOWN

RADIO.....OFF
LIGHTS .....OFF (if in use)
FUEL PUMP .....OFF (if in use)
MIXTURE.....FULLY LEAN
Engine Stopped
MAGS.....OFF, Remove Key
ALTERNATOR.....OFF
CIRCUIT BREAKERS .....ALL TRIPPED
MASTER SWITCH .....OFF
FLAPS..... DOWN
BRAKES .....A/R

SUPER CUB OPERATING NOTES

These notes are for the information of Lasham tug pilots and give Lasham operating procedures for the aircraft type. They don't supersede the information in the Aircraft Flight Manual, a copy of which is available for study as required.

1. PIPER SUPER CUB PA-18 150M G-ATRG

The Piper Aircraft 18 (PA 18) Super Cub first appeared in 1949 and is descended from the original J3 Cub and the PA 11 Cub Special. The Super Cub continued in production until 1969 and over 10,000 were made fitted with six different size engines between 95 and 150 hp. During 1989 the new Piper Aircraft Company started making Super Cubs again. Apart from the basic 95 hp version, which did not have flaps or counterbalanced elevators, all the airframes were similar with flaps as an option. Super Cubs also joined various Air Forces as L18s (95hp) and L21s (125hp), some people incorrectly call these PA 19s once they have been civilianised but Piper never used this series number. By the mid 1960s, the price of second-hand Super Cubs had fallen sufficiently for the growing gliding movement to operate them and the advantages of the Lycoming 150 engine, performance, economy and reliability, soon became apparent.

Lasham bought G-ATRG in 1966 for £1750. It was built in the mid fifties and was converted by Piper in 1962 to a crop sprayer. It was then shipped to England, and then on to Cyprus where it was registered as SB-CAB. Finally, in 1966 it was re-registered in the UK and the spray gear removed. It is an old aeroplane, and needs handling as such.

2. MODIFICATIONS MADE TO G-ATRG

We have done 4 significant modifications. The first was to change the cockpit glazing in 1977 to the military style with improved view. Cleveland disc brakes came next followed by the 150 hp engine being replaced by a 180 hp unit. The only snag was the fuel system, which despite fitting larger bore fuel pipes, with the more powerful engine was just unable to meet the official requirements for fuel flow from the lower part of the left tank and all of the right. For this reason the tanks have been placarded as the left tank being the Main Tank with 7.5 gallons of its 15 gallon capacity being officially available for take-off and landing, and the right tank is now named the Auxiliary Tank and has 15 gallons available for the cruise. In practice we have found no fuel flow problems, and the official requirement, which was tested on the ground, was for a fuel flow in excess of that actually demanded by the engine at full power, because the CAA impose a proof factor of 1.5 as a margin. The last modification made was the addition of a silenced exhaust system. Finally, the fabric has been re-covered three times by Lasham, the last time during the winter of 2006.

3. STALLING

In flight the aircraft has reasonable but not sprightly handling, and has a docile but positive stall. However, at least one Super Cub, not ours, has been spun in from a low steep turn so do not expect the aircraft to correct your mistakes! Remember that the most docile characteristics shown in smooth air may prove very different in conditions of turbulence and wind gradient. Stalling will be covered in depth during the conversion to type. Beware that the indicated stalling speed may change due to various factors but on the Cub the pitot tube under the left wing is vulnerable, and if bent may cause erroneous airspeed readings.

4. FLAPS

Super Cubs have two stage flaps, 25 and 50 degrees (TRG has an extra detent at 40 degrees). The flap limiting speed is low at 85 mph (74 Kts) and there are significant trim changes with the use of flap. Roll response to aileron is reduced with flap, so in turbulent conditions, land with half or no flap.

5. POOR VIEW INTO TURNS

As with most high wing aircraft, view into a turn is poor, so develop the habit of lifting the inside wing first for a lookout prior to turning. This will be emphasised during training, and it will be seen that once the area has been cleared steep turns provide better visibility.

6. TRIMMING SYSTEM

The trim system uses a screw jack to move the leading edge of the tailplane. This provides a powerful trimmer but requires no less than 26 turns of the cockpit handle to cover its full range. It is therefore not easy to re-trim quickly if you take off with the trim significantly out of position and the stick loads are high so be sure to set it before each flight. Note that pilots with long arms can knock the rear throttle with their elbow when re-trimming.

7. WHEEL BRAKES

Cubs have heel brakes providing independent braking to each main wheel. The brakes are usually quite powerful and if too much pressure is used on them the aircraft can easily be nosed over. A parking brake function is provided by the small lever on each of the two brake cylinders under the front seat being pulled back while the heel brakes are pushed; a further firm push on the heel brakes then releases the parking brake. Do not rely on the park brakes and if it is necessary to leave the Cub with the brakes on it should be chocked.

8. FLYING WITH THE DOORS OPEN

The aircraft can be flown with the doors open provided they are securely tied or removed, but there is a considerable performance loss in this condition. This should only be done for a specific purpose such as approved air-to-air photography. Note: the suggested speed is kept below 82 knots.

9. FUEL SYSTEM

As mentioned in a previous paragraph the fuel system has been modified with the fitting of the 180hp engine; the result is that at first sight the fuel system may seem slightly confusing. The aircraft holds 30 gallons 15 in each wing tank, each tank has a sight gauge in the cockpit. Each sight gauge has two scales one labelled tail down for use on the ground and one for use in level flight. In the sight gauge is a small cork ball, which floats at the top of the fuel to indicate the level. The problem with this is that it is not easily visible when the tank is full or yes, you guessed it, when it is empty. The best way to check that the tank is full is to look in the tank. The left tank is the MAIN tank and the right tank is the AUXILIARY tank. You will notice that the MAIN (left) tank is labelled empty when it has 7.5 gallons remaining; this tank also has a vent in the filler cap, which must point forwards into the airflow to increase the pressure in the tank. The MAIN (left) tank is labelled for use during take-off and landing. The AUXILIARY (right) tank has all 15 gallons useable and is labelled level flight only. The fuel cock has 4 positions MAIN (left), AUXSILARY (right), OFF and OFF. The lever should be considered as an arrow with the tail feathers being the bit you grasp to move the lever and the tip should point at the selection you require. There are three fuel drains in the system, one in each tank and one at the fuel strainer located in the engine bay. Whilst appearing slightly complicated, the fuel system is, in practice, straightforward to operate.

10. CROSSWINDS

Super Cubs have a Flight Manual crosswind limit of 12 mph (10.4 kts). They are reasonably easy to handle in crosswind take-offs because, due to the high wing, they

can be carefully banked onto the upwind wheel in the final part of the ground roll, or held down with forward stick and then cleanly unstuck at a slightly higher speed than usual. Crosswind landings are less straightforward. In crosswinds approaching the limit, wheeler landings should be made and as the wind increases wheelers touching down with the into wind wing down and touching down on one main wheel should be adopted. This technique requires a slightly higher threshold speed than normal and a checking forward of the stick after touchdown to keep the tail up and thereby improve directional control. After touchdown some gentle differential brake may be required, until the tailwheel is firmly on the ground as speed falls and you get directional control from the tailwheel. The wheeler type landing is also a good technique if landing on tarmac, particularly in any crosswind, since tailwheel aircraft are particularly directionally unstable on hard surfaces (more stable on longish grass) and three-pointing can more easily lead to ground looping.

11. STRONG WINDS

Light tailwheel aircraft cannot be operated safely in wind conditions that are okay for heavier low wing nosewheel aircraft; so choosing the time to put the Cub away if the wind is getting stronger is a critical decision and safety must be the overriding factor. 20 knots or gusty/turbulent conditions are limiting for Cubs. If, as you taxy downwind, the flaps blow down despite their springs, then the wind is too strong for a Super Cub. Particular care must be taken when turning crosswind as this is when most problems occur. Care should be taken when taxying, particularly downwind, as unlike a nose wheel aircraft the wind will have a marked affect on a taildragger whilst on the ground.

12. GENERAL

These notes are not intended to teach you how to fly taildraggers. We are prepared to do tailwheel conversions for those with only tricycle experience but pilots in this situation should first read some of the books written on the subject to get an understanding of the likely problems. A discussion of topics such as ground loops, nosing over, handling bounced landings etc will precede the flying. You will find the Cub easy to fly but it can be a challenge to produce consistently good landings.

13. WEIGHTS

Approx empty weight	1122	lbs	505.9	kg
Maximum weight	1750	lbs	793.8	kg
Max usable fuel	216	lbs	98	kg
Approx cockpit load	412	lbs	186.9	kg
Max Load behind rear seat	50	lbs	22.7	kg

14. ENGINE

Lycoming 0-360 rated at 180 hp

Limitations

Max RPM	2700 rpm
Max CHT	260 ºC
Max oil temp	118 ºC
Min oil temp	25 psi
Max oil pressure	90 psi

This aircraft has an avoid band between 2150 and 2350 rpm and is marked with a red band on the rev. counter. At the time of writing this is not applicable because the engine fitted has a solid crankshaft.

15. OPERATING PROCEDURES

Limiting speeds

Never exceed (VNE)	153 mph
Rough Air (Vra)	121 mph (105 kts)
Manoeuvring (VA)	94 mph (82 kts)
Flaps extended (Vfe)	85 mph (74 kts)
Best glide	58 mph

16. THE DI, COVERING ONLY POINTS PARTICULAR TO THE SUPER CUB

Include the other normal DI checks as you go around the aircraft.

1. Start in the cockpit. Check the switches are all off and the controls for full and free movement. Inspect around the base of each stick and the area beneath it, this area is vulnerable to loose articles and in the past we have found a nice strong metal pen amongst the controls!

2. The trim should have 26 full turns of travel, as you turn it watch the tailplane LE move up and down and the trim indicator following the movement. Leave it in the mid position.

3. Unclip the seat cushion and check the seat locking mechanism, ensure you understand how the seat locks. Check there is nothing in the rear seat pocket especially if the rear stick is in place. The rear stick should be removed and the rear harness secured except for dual instruction. Place the rear stick in the stowage behind the rear seat. Locate the brake cylinders under the front seat and inspect for leaks.

4. Out of the cockpit check the undercarriage bolts. A broken bolt can be spotted as one of the ends starts to work its way out. Complete a general check of the starboard side wheel and brake assembly. While you are in this area check the wing strut fork ends, then, having unclipped the water tester, close the upper cockpit door to gain access to the tank drain near the back of the wing, check for water in the fuel. While the door is closed stand on the tyre to check the upper wing surface and fuel cap.

5. Open the cowling; check the oil, then the engine generally for leaks, loose leads etc. Inspect the engine mount and its bolts then the exhaust manifold for cracks.

6. Close the cowling, check the spinner and propeller then the air filter and oil cooler. Open the port cowling to continue the engine inspection and to drain the engine fuel filter.

7. Continue the DI with the port side undercarriage and the wing strut fork ends.

8. Stand on the tyre to check the upper surface of the wing and the tank cap. The port side cap on a 180 Cub has to have a forward facing vent; this uses air pressure to assist fuel flow. Check the port fuel tank drain for water in the fuel.

9. Having got as far as the wing tip, try moving it gently up and down to check for play in the strut fittings, none should be found. As you go around the wing, normal checks apply to the ailerons; the flaps are spring loaded and can be pulled down to check their pushrods. Also check the flap hinges.

10. Once at the tailplane check the bracing struts for security. The aircraft must not be flown if these are loose as it causes wear on the trim jack and reduces the strength of the tail unit. The leading edge of the tailplane should have a little side to side play but there should be very little up and down play in the trim jack. From time to time broken ribs are found in the tailplane resulting from excessive pressures used during ground handling; feel for these.

11. Check the tail wheel assembly and spring. The bolt that holds the whole tailwheel unit onto the spring goes at regular intervals, and occasionally one leaf of the spring breaks. The spring flattens in use over several years, making it more difficult to get good tailwheel steering as the tailwheel pivot goes further and further from the vertical.

12. Ensure there is some free play in the tow release cable in the hooked on position.

13. Note the position of the fire extinguisher.

17. TAXYING

Remember that tailwheel aircraft are basically directionally unstable on the ground and so can be ground-looped if your attention wanders or you try to turn too fast. Use full back stick for taxying to keep a good pressure on the steerable tailwheel, unless going downwind in a strong tailwind in which case keep the stick central. Always use rudder first for steering assisted with brakes when absolutely necessary. It is best to consider the aircraft as being flown at all times even when taxying, the only time this is not the case is when it is in the hangar with the doors shut!

18. TOWING

MINIMUM TOWING SPEED	50 mph (43 Kts)
K13	60 mph (52 Kts)
Normal GLASS GLIDERS	70 mph (60 Kts)
WITH WATER	add 6 mph (5 Kts)

Take-off flap is only used when towing vintage gliders and is not used for take-off in normal operations.

Descent technique: once off tow keep the rpm at 2500 increasing speed to 80 mph. Then after 25 sec reduce rpm to 2350. After 25 sec slowly increase speed to 100 mph and reduce the rpm to 2150. Once below 700' start reducing the speed and then the power to achieve a steady reduction of both towards finals. It is generally true that because of position error mph indicated corresponds to the equivalent in knots indicated by the glider being towed.

19. SUPER CUB - CHECKS

START UP

RADIO.....OFF
MASTER SWITCH .....ON
FUEL.....SELECT TANK
MIXTURE.....RICH (In)
BRAKES ..... ON or at least feet on heel brakes
THROTTLE.....SET (1/2 inch open)
STICK..... BACK
MAGS..... LEFT MAG ON
CHECK THE AREA IS CLEAR

STARTING

OIL PRESSURE .....RISING
RIGHT MAG .....ON
AMMETER ..... CHARGING
RADIO .....ON
ANTI-COL .....ON

POWER CHECKS

MAG DROP .....125 RPM MAX AT 1800 RPM
CARB HEAT .....50 –100 AT 1800 RPM
IDLE .....600 – 700 RPM

Please note that each mag should be first checked with the engine at idle before the power checks, if you really must do a dead cut check this must also only carried out with the throttle fully closed. If during the power checks the engine looses a lot of power allow the engine to stop or shut the engine down and re-start on the good mag. This is to avoid damage to the engine and the very expensive exhaust system caused by the engine back firing when the mags or good mag are turned back on.

PRE TAKE OFF CHECKS - SUPER CUB

TRIM .....HALF (ABOUT 12 TURNS FROM FULL IN EITHER DIRECTION)
MIXTURE..... RICH, KNOB FULLY IN
MAGS..... BOTH ON
MASTERS..... RADIO, ANTI-COL AND STROBES ALL ON
CARB HEAT .....COLD
FUEL .....CORRECT TANK, CONTENTS
FLAPS..... UP
GAUGES & GYROS..... NORMAL
HATCHES..... CLOSED & LOCKED
HARNESS..... TIGHT & LOCKED
CONTROL .....FULL & FREE

20. APPROACH – SUPER CUB

It is recommended to use 70 mph up to the final turn reducing to 60mph for the approach, on no wind days 55mph can be used with a min threshold speed with full flap of 50 mph.

SHUT DOWN

RADIO .....OFF
STROBES.....OFF
MIXTURE.....FULLY LEAN

Engine Stopped

MAGS.....OFF
ANTI-COL .....OFF
MASTER SWITCH .....OFF
BRAKES.....A/R

Intentionally left blank

PAWNEE OPERATING NOTES

These notes are for the information of Lasham tug pilots and give Lasham operating procedures for the aircraft type. They don't supersede the information in the Aircraft Flight Manual, a copy of which is available for study as required.

1. PIPER PAWNEE PA25-260 G-TOWS

The aircraft has been modified by:

Installation of 4 bladed Hoffman propeller
Installation of Gomolzig exhaust hush-kit

2. DAILY INSPECTION

Carry out a daily inspection that is common to all aircraft. Inspection items that are specific to the Pawnee are:

1. The fuel cock is left **ON**. Check that the fuel has **NOT** been switched off. Fuel cock actuating handle is on the forward right hand side of the cockpit.

2. Check brake pedal support tubes for cracking.

3. Tail brace wires should be taut.

4. Fuel strainer is on lower firewall.

5. Oil is checked via hatch on top of cowling (12 quarts capacity). The oil level should be kept between 9 and 10 quarts, as there is a tendency for the last 2 quarts to be thrown out through the engine breather.

6. Adjust seat height, position and check shoulder strap lock.

7. Check for tube cracking adjacent to tow hook.

8. Check turtle deck is secure.

9. Check the fairings around the strut to wing attachment points particularly the ones that have the aileron cables running through them. These fairings are critical for safe flight and must be secure.

10. Check the undercarriage. Particular attention should be paid to the attachment bolts, brakes, tyres, tailwheel springs and bungees.

3. ENGINE

Engine is rated at 260 HP

Limitations

Max rpm	2750 rpm (max 2600 for normal ops)
Max oil temperature	245 ºF
Minimum oil pressure	25 psi
Maximum oil pressure	90 psi
Maximum CHT	500 degF (260 degC)

4. FUEL SYSTEM

Capacity	38 US Gallons	3 US Gallons unusable
	143 litres	12 litres unusable

Float indicator indicates fuel content in US gallons, which is only accurate on level ground.

Consumption is approx. 7.8 litres per tow to 2000', allowing 13 tows to 2000'.

Refuel to full before you have used 105 litres.
Consumption at 75% cruise power is 16 US gph, (60 litres per hour).

THE FUEL SHOULD ONLY BE SWITCHED OFF IN AN EMERGENCY. ~~IF YOU ACCIDENTALLY SWITCH IT OFF OR FIND IT SWITCHED OFF PLEASE LEAVE IT SWITCHED OFF, MARK THE AIRCRAFT U/S AND INFORM ONE OF THE ENGINEERS OR THE TUGMASTER (~~we promise ~~there will be no recriminations). The problem with the fuel cock is that when it is switched from OFF to ON the fuel cock may not be completely open leading to the engine losing power or stopping just after take off.~~

5. WHEEL BRAKES

Toe brakes are fitted to allow differential braking. Parking brake is applied using handles adjacent to each toe brake. Parking brake is released by applying toe brakes. Do not rely on the parking brakes if the aircraft is to be left for some time; use chocks.

6. WEIGHT AND BALANCE

Please note that G-TOWS is limited to a max take off and landing weight of 2150lbs (975.2kg).

Empty Weight	1534 lbs	695.8 kg (includes unusable fuel and oil)
Maximum weight	2900 lbs	1315.4 kg
But restricted to 2150 lbs (975.2kg) for G-TOWS (see Flight manual)		
Max. Usable fuel	216 lbs	98 kg
Max. Pilot weight - full fuel	284 lbs	128.8 kg
Max. Pilot weight - no fuel	213 lbs	96.6 kg
Min. pilot weight - full fuel	155 lbs	70.3 kg
Min. pilot weight - no fuel	not restricted	

7. OPERATING PROCEDURES

Limiting speeds

Never exceed (V_{NE})	135 kts
Manoeuvring (V_M)	104 kts
Flaps extended(V_{FL})	94 kts

Max. Positive load factor 3.8g
No inverted flying
Best glide speed in the event of engine failure 65 kts
Aircraft is not approved for aerobatics or spinning.

8. FIRST FLIGHT

First of all read these notes then get a briefing in the aircraft from one of the Check Pilots as currently listed. Having gone through the outside checks with the check pilot and ensuring the aircraft is in an open area enter the cockpit. The briefing will include: -

Adjusting the seat.
Identify all controls, and ensure that they can be reached.
Check fuel-cross checking gauge against tow log.
Note the elevator trim will need to be almost fully nose up.
Note nose attitude and wing tip angle, which will be the landing attitude.
Be gentle with the brakes, they are mounted on a weak bar.
Note the position of the fire extinguisher on the floor to the right of the seat.

Having started the engine (**use both magnetos to start; both have impulse drives on this aircraft**), taxi the aircraft to get used to the feel of the aircraft on the ground and the nose attitude. For starting from cold pump the throttle 4-5 times; if the engine is warm only one or even none are required. Throttle movements must be slow and smooth to allow the engine counterbalance weights to do their job.
On take off, ***apply power gently reaching max. power in not less than 4 secs*.**
Apply gentle forward pressure just to reduce load on tail wheel, not to lift the tail. The aircraft will be quickly airborne
Climb at 75 knots.
If oil pressure is high (when oil is cold) reduce power to 2300 rpm.
Rudder is heavy but effective, slight buffet in turns indicates that the ball is not centred.
Stalls are docile, with buffet at 52 kts, no particular wing drop, and increasing sink rate.
Flaps have no effect on stall speed.
In the descent, don't exceed manoeuvring speed of 104 kts, and 2600 engine rpm.
Approach at 70 kts (65 kts on calm days)
There is no trim change with flap.
On landing, aim for the attitude noted when the aircraft was on the ground; if necessary keep just a trickle of power on until the wheels touch. It is not necessary to have the stick right back to stop the aircraft bouncing. In some conditions it is possible to end up with a high sink rate particularly if the approach speed is allowed to get too slow. Other than this, the Pawnee is very forgiving for a taildragger. It's easy to keep straight with rudder, go easy on the brakes though. It handles crosswinds well and has few vices.

9. TOWING

Climb speeds

K-13's and similar	65 kts
Glass	70 kts
Glass + water ballast	75 kts

There are speed bugs incorporated on the ASI labelled Wood and Glass to give appropriate speeds that cater for the known position error when towing with this aircraft. Please adhere to these.

Descent technique: once off tow keep the rpm at 2500 increasing speed to 85 kts. Then, after 25 secs, increase speed to 100 kts slowly reducing the rpm to 2300. Once below 700', start reducing the speed and then the power to achieve a steady reduction of both towards finals. (Do not allow the rpm to exceed 2600 at any time in the descent).

The Pawnee is very nose up particularly at 65 kts so it is important to weave whilst on tow. Very steep turns should be avoided when off tow as the covered roof will restrict visibility. Please note whilst towing the fuel gauge is awful so get to know how much fuel you use, please make a record on the fuel log when you uplift fuel and the amount. Make sure you check the canopy catches between tows. Also the flap lever and the cable release are fairly adjacent and they have been mixed up in the past. The Pawnee is fitted with wing tip strobes and anti-collision light which must be ON whilst towing (the nav lights should not normally be required).

10. CHECKLISTS

BEFORE START

Fuel ..... Check contents
Fuel cock ..... Open
Adjust Seat
Trim ..... Nose up
Mixture ..... Fully rich
Carb heat ..... Cold
Prime ..... Use throttle, 5 when cold, 1 when hot
Throttle ..... Set, just open
Master switch ..... ON
Beacon ..... ON
Radio ..... OFF
Mags ..... ON Both
Stick ..... Fully back
Area clear

STARTING

Starter warning light ..... Check out
Oil pressure ..... Check rising
Alternator ..... Charging
Mags ..... Both ON
Radio ..... ON

POWER CHECKS

Mag drop ..... 125 rpm max. At 1800 rpm
Carb heat drop ..... 150 rpm min. at 1800 rpm
Min idling ..... 700 rpm

Please note that each mag should be first checked with the engine at idle before the power checks, if you really must do a dead cut check this must also only carried out with the throttle fully closed. If during the power checks the engine looses a lot of power allow the engine to stop or shut the engine down and re-start on the good mag. This is to avoid damage to the engine and the very expensive exhaust system caused by the engine back firing when the mags or good mag are turned back on.

PREFLIGHT

Trim ..... Set
Mixture ..... Fully forward for rich
Mags ..... Both on
Masters ..... Radio, Ani-col, Strobes ON
Carb heat ..... Cold
Fuel ..... Fuel cock OPEN, contents sufficient (min fuel 5 US Gallons)
Flaps ..... UP
Gauges ..... Altimeter set, temperatures and pressures checked.
Hatches ..... Both secure
Harnesses ..... Secure
Controls ..... Full and Free

SHUTDOWN

Strobes ..... OFF
Radio ..... OFF
Mixture ..... Idle Cut Off

Mags .....OFF
Beacon.....OFF
Master .....OFF
Fuel ..... LEAVE FUEL ON

On a final note please be careful when ground handling the Pawnee, it normally requires more than one person especially when getting the aircraft in and out of the hangar. The easiest way is to put the nose towards the north side of the door and rotate it out being careful of the tips and the nose. Please always ensure the aircraft has at least one spare rope in the hopper along with the field rope, which the tug check pilot will show you how to recognise. Lastly this aircraft is in exceptionally good condition due to a recent major rebuild so please ensure it is cleaned and washed when it is put away. This includes under the wings!

TUG TRAINERS & CHECK PILOTS

Gordon MacDonald (Tugmaster & Chief Engineer)

Andy Aveling

Alan Meredith

Alex Hartland

Alan Greensmith

If none of the above are available, refer to:

Colin Watt (CFI)

Or refer to the *instructor* in charge of the airfield.

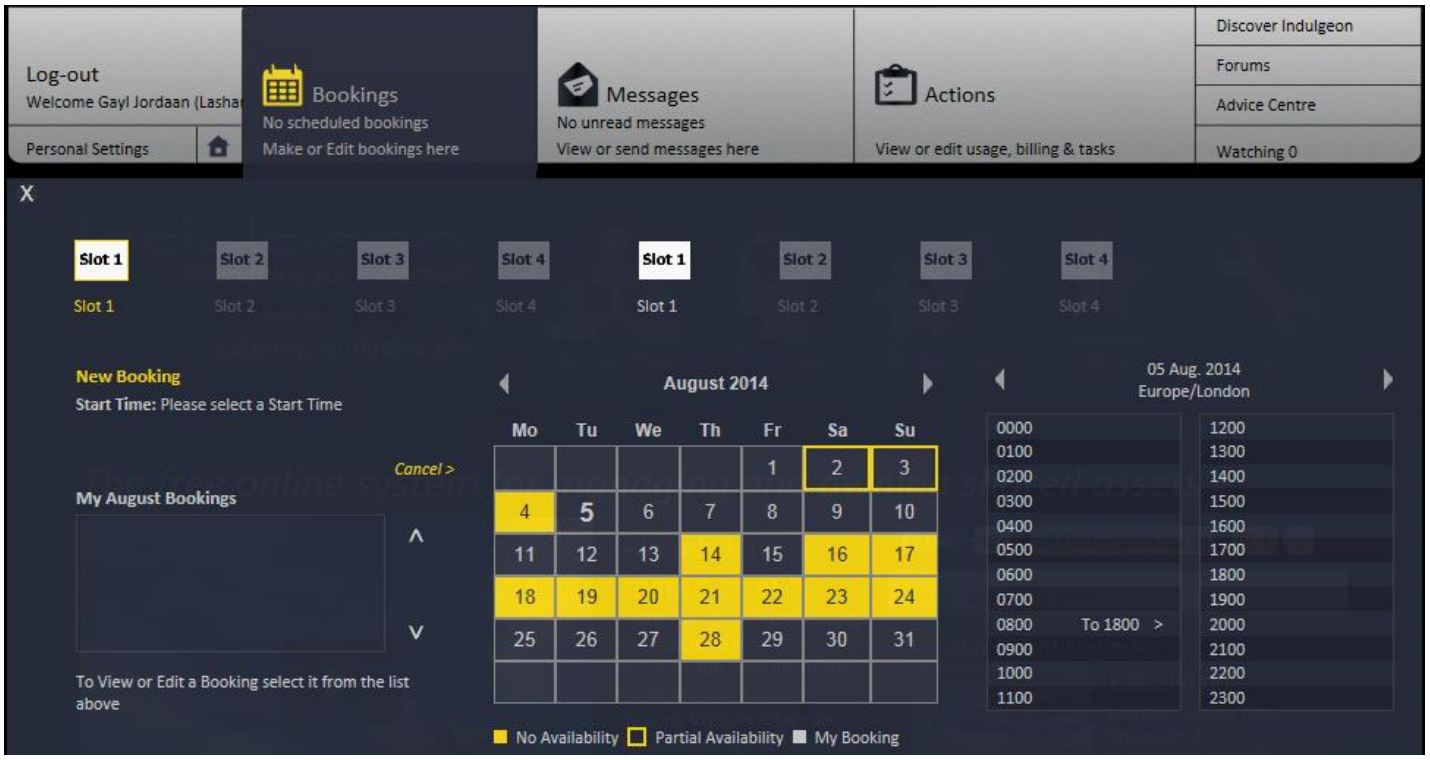
TUG PILOT ROTAS

Tug Pilot Roster – Summer Months

Volunteer tug pilots are required to work with the staff tug pilot during the week in the summer months. Member pilots fly the number 2 priority tug. The requirement is for a full day, **to be ready to launch at 0930** and to continue until 1800. The staff tug pilot has priority all day; however on days where only one tug is required the member tug pilot will share the flying with the staff tug pilot in the number 1 Priority tug.

On the weekend in the summer, the staff tug pilot does not fly and slots for 4 tugs are available for member tug pilots to book.

Five slots may be booked at any one time. Any slots still remaining 7 days prior to date may be taken by any pilot regardless of previous number of slots taken.


Log-out
Welcome Gayl Jordaan (Lasha
Personal Settings
Bookings
No scheduled bookings
Make or Edit bookings here
Messages
No unread messages
View or send messages here
Actions
View or edit usage, billing & tasks
Discover Indulgeon
Forums
Advice Centre
Watching 0
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Slot 1
Slot 2
Slot 3
Slot 4
New Booking
Start Time: Please select a Start Time
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My August Bookings
To View or Edit a Booking select it from the list above
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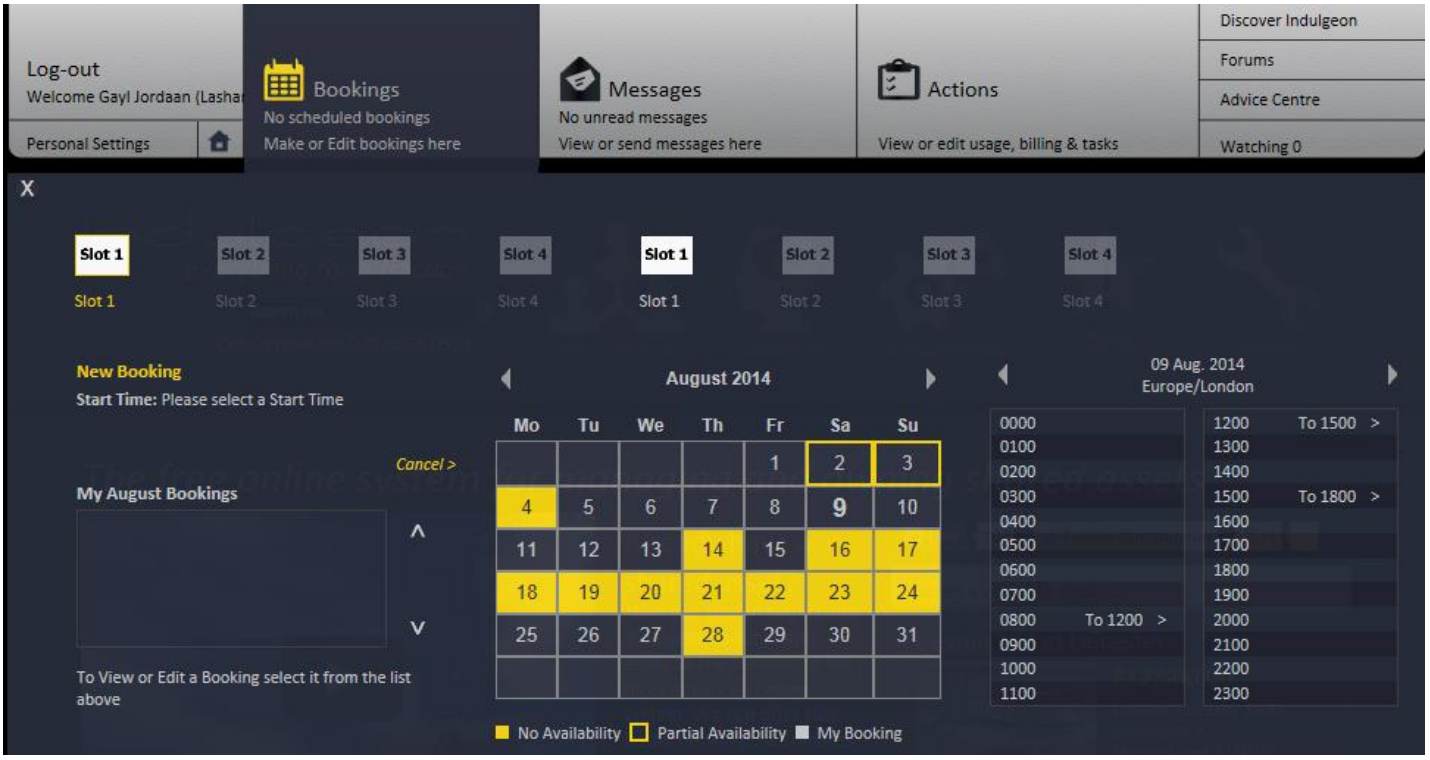
My Booking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Advice Centre
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Slot 1
Slot 2
Slot 3
Slot 4
New Booking
Start Time: Please select a Start Time
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To View or Edit a Booking select it from the list above
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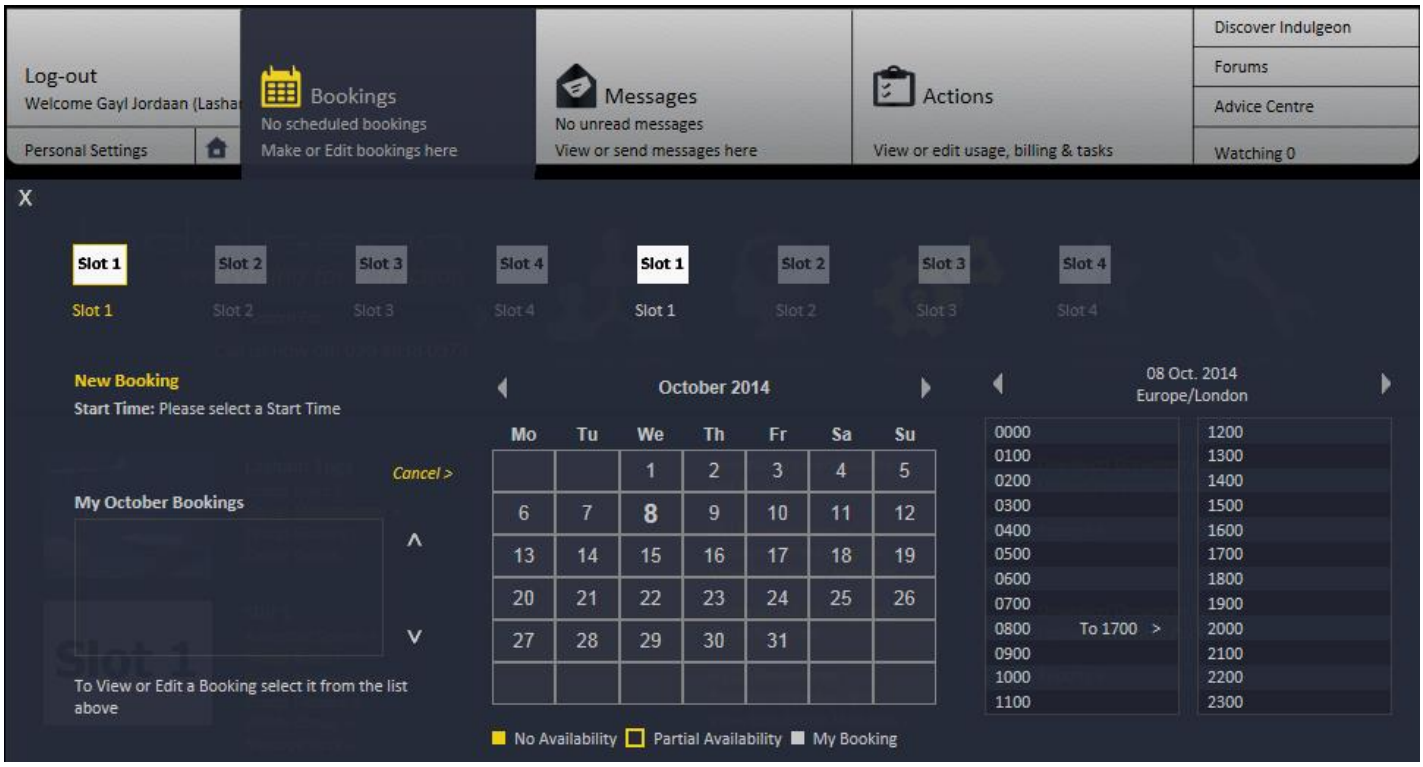
Partial Availability
My Booking

Tug Pilot Roster – Winter Months

Volunteer member tug pilots are required for the winter months. During the week the requirement is for a full day, **to be ready to launch at 0900** and to continue until flying finishes. Over the weekend, slots only need to be booked for Priority tug 1 and 2. Additional tugs will be used if required and these tugs are usually flown by any member tug pilots who are at the airfield that day.

During periods of low activity pilots are expected to mend ropes, stock and tidy the oil store, clean tugs inside and out, and generally help improve things connected with the tug operation.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X
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October 2014
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08 Oct. 2014
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No Availability
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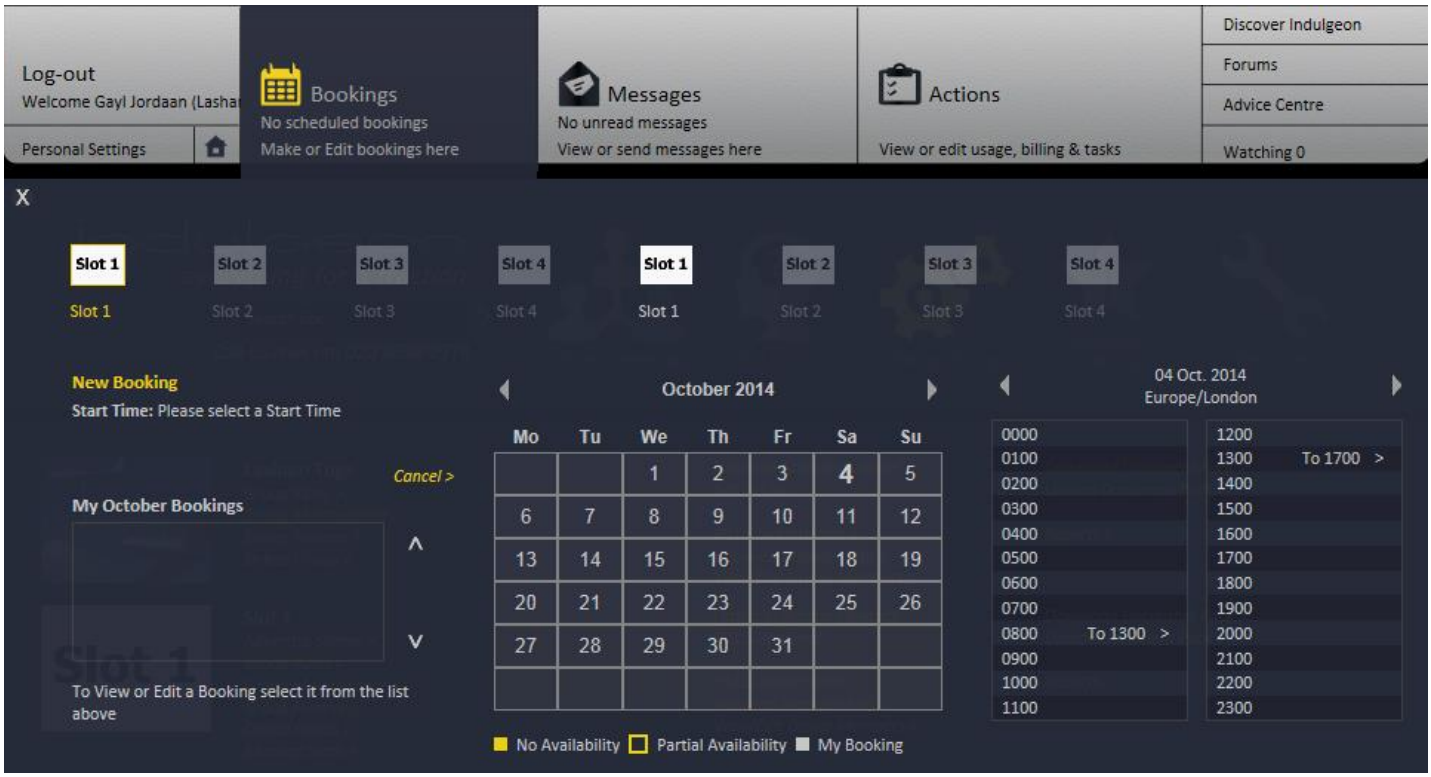
My Booking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To 1300 >
1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300
To 1700 >
No Availability
Partial Availability
My Booking

AEROBATIC TOWS

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(No info)

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USEFUL FREQUENCIES

Bicester Gliding	129.975
Blackbushe	122.3
Booker Gliding	126.650
Brimpton [Aldermaston]	135.125
Dunsfold	119.1
Farnborough Radar	125.250
Goodwood	122.450
Lasham ATC	126.65
Middle Wallop	126.7
Odiham Gliding	131.30 RAD / 122.1 TWR
Old Sarum	123.20
Popham	129.80
Solent Radar	118.925
Thruxton	130.450

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BI-ANNUAL CHECK FLIGHT

NAME _____ **LICENCE NUMBER**_____

C OF E EXPIRES _____ **MEDICAL EXPIRES** _____

TOTAL HRS POWER _____ **TOTAL GLIDING HRS**_____

Exercise/Procedure	Check Pilot Name	Date	Comments
FLIGHT 1 E F A T O Engine Fire (on start/in air) Slow Flight & Stalling Go-around short finals Instrument failure (ASI) Descending or Level Tow Steep Turns Effect of Trim Changes Flying Ability/ Eng Handling Airmanship/Noise Areas Normal Tow Written Paper No ☐			
FLIGHT 2 E F A T O Engine Failure (above 1700) Stalling Go-around on Base Leg Electrical Failure/Fire Figure 8 Pattern Airbrakes Open On Tow Normal Circuit Glide App Flying Ability/ Eng Handling Airmanship/Noise Avoid Normal Tow Written Paper No ☐			

Refer to Tug Manual chapter 4 for further information regarding BCF.

All or additional exercises are at the check pilot's discretion except that exercises 1, 2, 3, 4, 11 & 12 are mandatory.

Additional comments on reverse.

Check and sign logbooks, also check licences and currency in gliders.

Please return this form when completed to the Tug Master via the office.

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TEST PAPERS

TUG PILOT ANNUAL REFRESHER

PAPER 1

1. What minimum number of tows per year should you try to achieve in order to satisfy the requirements of the towing operation?
2. What requirements must be satisfied before carrying passengers on a non-towing flight?
3. What engine oil specification do we normally use? How would you know if an engine is running on straight oil?
4. What do you look for during the DI of a tow rope?
5. How could you identify a permanently live magneto? Would you take off with this defect?
6. Why is it important to climb at full throttle power setting?
7. What minimum CHT should you try to maintain during the descent?
8. What would be a quick check of tow rope length and what are the nominal and minimum acceptable lengths?
9. On which side of a preceding aircraft may you land?
10. A glider signals that he can't release. What would you do?

TUG PILOT ANNUAL REFRESHER

PAPER 2

1. You experience a rough running engine. What would you do?
2. What is the average take off distance (brake release to 50ft) for a typical tug at normal towing weight towing a 600lb single seat glider from a flat field of short grass with no wind at a temperature of 20°C?
3. What are the best glide speeds for the tugs currently in use at Lasham?
4. For how long should you warm up the engine before take off?
5. What would be a good method of obtaining a quick check of surface visibility at Lasham?
6. How should the throttle be handled at the start of the take off run?
7. What is the minimum recommended fuel quantity for take off?
8. Between which ambient temperatures is carb ice most likely to form?
9. At what minimum height should you aim to overfly obstructions in order to ensure that the training rope clears them?
10. Describe a go around from short finals.

TUG PILOT ANNUAL REFRESHER

PAPER 3

1. What is the earliest time of the day that you may normally commence towing? What is the latest time?
2. You discover a defect during the DI. What would you do?
3. What minimum fuel load is required before putting the tugs away?
4. Where would you find the aircraft limitations?
5. What causes plug oiling and how may it be cured?
6. The engine starts to overheat on two, what would you do?
7. Why is it important to keep power on during the descent?
8. What is the recommended minimum height for a final turn?
9. Describe a sensible method of crossing a runway/taxiway edge.
10. The engine fails at 500ft during the take off. What would you do?

TUG PILOT ANNUAL REFRESHER

PAPER 4

1. You experience airframe and/or flight control problems. What would you do?
2. What are the minimum towing speeds for the tugs currently in use at Lasham?
3. What are the minimum requirements to be considered current for towing?
4. What is the maximum recommended CHT for the 180/235hp Lycoming engines?
5. What is the minimum VFR requirements for aerotowing operations at Lasham?
6. The engine suffers severe vibration during flight. What would you do?
7. What minimum height is recommended for overflight of noise sensitive areas?
8. What are the normal descent speeds for our tugs?
9. What is the minimum legal weather requirement for winch launching at Lasham?
10. What is the normal cruise fuel consumption of the 180 and 235hp Lycoming engine?. What would the average gal/tow figure be in each case?

FIELD RETRIEVE SYLLABUS

OBJECTIVE

To prepare a tug pilot to be able to land in an unprepared field and to then depart either with or without a glider.

GENERAL

This course is in two parts. The first consists of a number of ground briefings that will cover most of the problems and factors that have to be considered when carrying out a field retrieve. The second part will consist of ground briefings followed by the exercises flown in the Super Cub. Standards of aircraft handling, airmanship and knowledge must be demonstrated to be above average throughout. This is required to show that the added workload of landing in an unprepared field, with all its potential hazards, plus any possible emergency can be coped with.

Part 1 Ground Briefings

1 Objective
2 General
3 Pre-flight preparation
4 Locating the glider
5 Aircraft performance
6 Wires and obstructions
7 Livestock
8 The public and the law
9 Field Perspective
10 Tow Rope
11 Taxying
12 Ground organisation and briefing the glider pilot
13 Aborting a field retrieve
14 Emergencies

Part 2 Air Exercises and Briefing

1 Short field landing
2 Soft/Short field take off
3 EFATO
4 Engine failure above 2000 feet
5 Level tow
6 Descent on tow
7 Accurate speed control whilst on tow
8 Spot landing with and without power
9 Wheel and three point landings
10 Crosswind take off & landings
11 Simulated field retrieves

PART 1 GROUND BRIEFINGS

PRE FLIGHT PREPARATION

Once a field retrieve has been asked for it must be approved in accordance with section 6.1 of the Tug Operations Manual. Having been authorised, do not be tempted to rush straight off to the field. As with all flights thorough preparation is necessary before hand.

We know the glider pilot has (we hope) made a successful field landing and in his opinion the field is suitable for an aerotow retrieve. However do not take this at face value. If at all possible talk to the glider pilot yourself about the field retrieve and be prepared to treat his comments with caution, especially if he has limited experience in field retrieves.

The most important points to establish at this stage are:

1 His exact position – latitude and longitude if possible.
2 He has permission from the owner of the field. Make sure it is the owner (a farm manager is acceptable) and not just someone who thinks he won't mind.
3 Agree a frequency with the pilot to establish radio contact and an approximate ETA at the field. Make sure you allow time for flight planning, booking out,

liaison with the office etc. Remember to cross though the landing out card and give a good estimate of your ETA back at Lasham in the booking out book.

LOCATING THE GLIDER

(Ideally use a handheld GPS with the field coordinates entered).
Once airborne (having carried out all the necessary planning) locating the glider should not be a problem if an accurate position has been given and plotted. Most pilots carry radio and contact should be made at least 10 nm before the estimated position. Often there can be more than one glider in a particular area or the glider may be obscured by trees, buildings etc so making contact with the glider pilot should help identify the field more quickly. By flying at around 2500 to 3000 feet you should have a good view of the ground whilst allowing the glider pilot to both see and hear the tug. If for some reason you have difficulty locating the glider remember to give due regard to airmanship considerations particularly fuel endurance, daylight and airspace. If after about 20 mins or so you are unable to locate the glider and time allows climb as high as possible and try to establish radio contact with Lasham, it may be possible to relay if you are outside direct radio range. If this is unsuccessful either land at the nearest suitable airfield and contact Lasham, or return to Lasham.

Once you have located the field you must start to evaluate whether the retrieve is possible. Inspect likely take off, climb out, circuit, approach and landing paths, also consider your options should you have an emergency. Be aware that conditions may have changed since the glider landed so make your own decision as to the best way to approach and land in the field. The factors described in the following sections must be given due consideration whilst airborne and must then be re-evaluated once on the ground.

AIRCRAFT PERFORMANCE

This will basically affect how much take off and landing run is required. In general if the glider has made a successful landing and conditions have not changed significantly since it landed the landing should not pose too much of a problem providing the correct technique is used. The soft field technique should be used for landing and the short field technique for take off. These are covered in the second section of this course. Obviously the field must have enough take off run available in the chosen take off direction to depart without the glider before a landing is attempted.

The factors which will influence take off and landing performance are as follows:

Aeroplane weight

This is not particularly relevant for the Pawnee, as its weight only changes by the fuel used which will not be particularly significant. However for the Cub you have the back seat which may be occupied. The average operating weight of the Cub solo is around 1500 lbs. This means that the addition of 150 lbs in the back seat will increase the take off run by 20% and the landing run by 10%.

A common error in the past has been when towing a two-seater out of a field. The glider is flown solo with two people in the tug; in general it is better to have two people in the glider because the glider becomes airborne at a slower speed than the tug. This then allows the tug to become airborne as soon after the glider as possible and therefore uses a shorter take off run.

Glider weight
Not only the weight but also the type of glider will affect take off performance. For instance some open gliders may be quite heavy but will fly at a much slower speed than a standard class glider. Occasionally you may find some pilots will still have some water ballast left on board, in such cases it should be dumped before departing. In general as experienced tug pilots you should be able to evaluate the different distances required by different glider types. There are however a number of exceptions; these are nearly all glass two-seaters which on occasions can require a very long run. Most notable is the Duo Discus.

Density Altitude
Four things – altitude, pressure, temperature and humidity determine density altitude. Two of these, altitude and pressure, are usually put together and are then termed pressure altitude. Performance calculations in the aircraft flight manual are calculated assuming the standard atmosphere for various heights, unfortunately life is not that simple and any deviation from the standard atmosphere will affect performance. A decrease in pressure or an increase in temperature, altitude or humidity will decrease the performance of our aircraft and therefore increase the take off and landing run required. A reduction in performance of the engine and propeller in what is essentially thinner air cause this decrease in performance. Density altitude can best be thought of as the altitude the tug thinks it's at in relation to the standard atmosphere.

Whilst in this country we don't get really big deviations from the standard atmosphere, you may be surprised to know that in the summer with a temperature of 24°C, and a QNH of 1000 mmHg, the tug taking off from Lasham will be at a density altitude of 2500 feet. To allow for this the take off run should be increased by 10% for every 1000 feet increase in field elevation and 10% for every 10°C increase in ambient temperature. In the above case this will increase the take off run required by 25%.

Slope
If there is a significant slope to the field this will probably have the greatest bearing on take off and landing direction. Always land up the slope and take off down the slope, regardless of wind direction when the slope is significant. Even a shallow slope will make a marked difference to the take off run. A 2% slope uphill (i.e. a 10 m rise on a take off run of 500 m) on take off will increase the take off distance by 10 %. Any slope greater than 2% should be considered as steep and the take off direction should be down hill unless there is a very strong wind. In some shallow slope, down wind, down hill conditions a retrieve may not be possible.

<u>Landing</u>
Landing on sloping ground requires care. The three point attitude for touchdown is considerably steeper than in a landing on level ground and the round out must be prolonged by using power to bring the nose up to the required position to avoid a premature stall. With practice even very steep slopes can be landed on with ease. However, it is inadvisable to stop on a steep slope or allow the aircraft to run in any direction other than straight up or down and it will require a considerable amount of power to keep the aircraft moving. There must be a level piece of land after the landing run where the aircraft can be stopped. Turning must be done on the level or on only a shallow slope as should be the initial take off position at least for the glider.

If you decide to make a dummy approach or a go-around to a steep slope there is a point where this is not possible and should not be attempted. This point should be

assessed before the approach is attempted and if necessary the approach should not go below the highest part of the field or obstacles in the go around path. Remember to allow for the extra ground speed and distance required if the approach is made down wind.

Take-Off

Very good acceleration can be obtained when taking off down a slope and the take off run will be short. There are no special difficulties attached to this, provided the take off run is directly down the slope. Problems only arise with obstacles after take off or if the tow has to be abandoned. Before take off, check for obstacles below the initial take off position and also rising ground in the climb out path. Remember if taking off down wind your ground speed will be quite high and can lead to flying too slowly once airborne. Look for any possible escape route if the tow has to be aborted; in general there isn't one so ensure you will not need it.

Do not accept a take off run with a dual slope or any run which gives a slope across the take off path of more than a few degrees; we have had one accident due in part to this in the past. In this situation the glider becomes airborne first and because one wing is closer to the ground than the other the tendency is to try to level the wings to the ground. This results in the glider effectively sliding down the slope eventually pulling the tug's tail round and pointing the tug uphill; the eventual consequence is lots of paper work!

Surface

This will probably have been established before departure to the field. However make your own assessment once you arrive at the field. Look for possible ruts, deep wheelings and any obvious changes in colour. Land along the wheelings where possible and avoid crossing obvious tracks and footpaths crossing the field. If the surface is damp this will increase the landing distance required by as much as 30% and if it's short wet grass this distance can be increased by as much as 60%.

A good procedure is to walk the take off run before departing, and on some occasions it may be necessary if there is any doubt about the surface to walk the taxy route after landing. Check for holes, ruts, sharp flints, rocks and soft patches, which should be noted and either moved or avoided during the take off. Expect the take off run to be increased by at least 30% when the surface is firm. If the field is soft this distance will increase further and may increase by as much as 100%.

Wind

Verify the wind direction and again remember it may have changed since the glider landed. Use the usual pointers such as smoke; cloud shadow, wind shadow on water, etc to confirm the wind direction. Also don't forget if you are working an ATSU they will be happy to give you a wind speed and direction for their airfield. Use as much into wind component as possible combined with the best landing/take off direction. Accepting a longer cross wind run may be a better option than a shorter into wind run.

Flaps

Full flap should be used for landing to give the slowest touchdown speed. Soft field landing technique should always be used and the flaps should be raised as soon after touchdown as possible to put maximum weight on the wheels for braking and directional stability. For take off use take off flap in the Cub and 0 flap in the Pawnee to give best take off performance. This subject is covered further in the airborne exercises.

Take Off Run

Once the take off direction has been decided upon you should decide on a point where if you are not airborne you should abandon the tow. This point should allow the glider room to stop before the far hedge. This is particularly important when operating from soft fields. In some fields, for instance, where there is a steep down slope, once the take off has started you are committed. This must be included in your briefing to the glider pilot. Remember, the correct procedure for the tug pilot to abandon the tow is to first release the rope then on this occasion it is permissible and preferable, if room is available, to continue the take off. If you decide to stop, make sure you do not risk the glider running into the back of the tug.

Remember the old adage “there is nothing more useless than the takeoff run behind you”. So use the maximum takeoff run available in the chosen direction.

Ensure the takeoff run is in as straight a line as possible, and avoid any run which requires anything other than the slightest of curves. Also try to position the takeoff run well away from any obstacles bearing in mind any possible swing by the glider.

WIRES AND OBSTRUCTIONS

Establish where all wires, trees, masts and any other obstructions are before landing. Also note any obstructions in the field such as bales, water troughs etc. Do not descend below wire height until you are absolutely sure you have located all wires and obstructions. Do not forget to check the possible climb out and missed approach routes before making an approach. Obstructions on the approach will require the landing run to be increased by three times the height of the obstruction, and obstructions on the climb out will increase the take off run by five times the height of the obstruction. Try to avoid a take off path, which will require a turn soon after take off to avoid an obstruction. If this is unavoidable ensure you include your intentions in your briefing to the glider pilot; if possible do not make the turn a down wind turn.

LIVESTOCK

Flying directly over animals during the take off, climb out, approach and landing must be avoided if at all possible. All livestock in the surrounding fields must be located whilst still airborne and allowed for when planning the field retrieve. If the approach takes you close to any livestock use a glide approach clearing the animals by as much height as possible. Horses are the greatest problem (and potentially very expensive) and should NEVER be over flown without permission from the owner. Any horse being ridden in the approach or take off path must be allowed to ride well clear. Sheep must be avoided during lambing. If, on arrival, you notice that you have no alternative but to take off over livestock then ask the owner if it would be possible to move the animals to the far end of the field or even another field if possible. Great care should be taken if operating from a field occupied by livestock, and in general should not be attempted unless the owner is with you in the field to help control the animals. Try to anticipate their likely reaction and leave yourself good options to avoid any problems.

THE PUBLIC AND THE LAW

Habitation, roads, railways, footpaths and any place where the public are likely to be has the potential of being one of the greatest hazards to face the field retrieve pilot. It is in this domain that we have had correspondence with the CAA in the past. One of the problems is that whilst you are exempt from the 500 ft rule when taking off and landing you are not exempt from the 1500 ft rule. Also if you do not land i.e. either

make a dummy approach, go-around or drop the rope, you are not exempt from the 500 ft rule. It would appear that if any damage to persons or property occurs either directly or indirectly as a result of the retrieve, the pilot could be liable for prosecution.

The only advice that we can give in these circumstances is do not overfly large built up areas below 1500 ft or at a height at which you could not glide clear in the event of an engine failure. Treat any public area e.g. car parks, footpaths, golf courses roads, railways etc, with extreme caution. If necessary adjust the landing/take off time so as to cause the minimum of surprise to the public.

Above all, use common sense. To operate the aircraft safely whilst causing the least amount of disturbance to people on the ground and stay within the law can be a difficult juggling act. If necessary warn those people adjacent to the field of the retrieve particularly the take off. Also be aware that what may be normal and safe practice to us may seem dangerous and reckless to the general public.

FIELD PERSPECTIVE

When judging the suitability of aerotowing out of a field the Tug Pilot must be aware of the subtle visual illusions that can result from the great variation in field size, shape and slope.

For those of us used to towing from runway based gliding sites, we will automatically feel more comfortable towing from 'runway shaped fields'. Beware though, a narrow field or strip will give the perspective of being very long where in real terms it may be limiting. The opposite is of course as valid when towing out of 'square' type fields; when the available take off/landing run may look shorter than it really is.

Diagram A

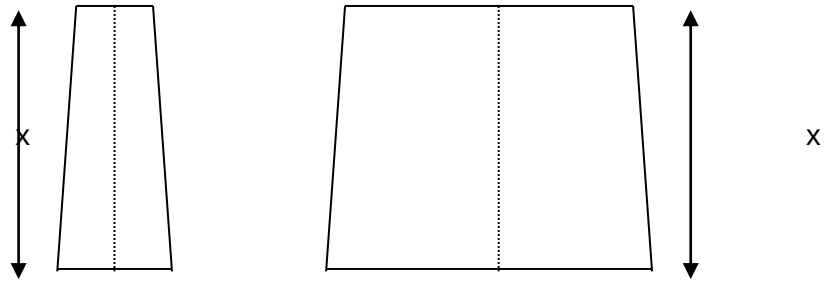

Diagram A illustrates this perspective problem, both fields are the same length but when on the approach the narrow field would feel and appear to have a longer run available than the wide field.

Sloping fields can also lead to visual illusions. When approaching a field with a marked up slope the pilot may have the illusion that the strip is shorter than if it were level. The opposite is also true and whilst we would normally be landing up a slope, a down slope would appear longer than it really is. A dangerous situation could develop if attempting to land down hill and this would be compounded if the strip were narrow.

TOW ROPE

Do not arrive at the field with a towrope attached unless you are doing multiple retrieves. Unless the field is very large you will have to drop the rope before you land; pulling that unseen fence or power line out is guaranteed to raise the farmer's blood pressure! If possible brief the glider pilot to watch where the rope falls and make a careful note yourself where it drops using some feature in the field. This exercise should be carried out as unobtrusively as possible and is not, repeat NOT, an excuse for a beat up. An approach should be made in the expected direction of landing using the normal approach speed and flap setting. Level off at not less than 200 ft above the highest obstruction and drop the rope well clear of any people, obstruction or gliders in the field, then carry out a normal go-around.

If the rope has to be shortened for take off because of a limited take off run then the retrieve should not be attempted. However as our ropes have grown in length over the years it is acceptable when operating from fields to use a slightly shorter rope. This helps the glider to take advantage of the prop wash from the tug when there is no one to hold the wing. However in this case the advice on ropes in Laws and Rules for Glider Pilots, Section 3 RP 12 should be born in mind.

TAXYING

This can often be the most heart stopping part of the field retrieve. Once you have landed in the field exercise extreme caution when taxying, particularly when turning. Cross wheelings and ruts at 45 degrees and if in any doubt shut down and walk the taxi route. If the Spring has been wet then the wheelings can be so deep that even the Pawnee at full power will not be able to pull itself out of them so be warned. If the field is suitable you can tow the glider to the take off position with the tug. However, be aware of the possibility of overheating on hot days; remember you will probably be facing down wind.

GROUND ORGANISATION AND BRIEFING THE GLIDER PILOT

Once in the field decisions have to be made regarding the take off start point and direction, bearing in mind the previously mentioned factors. Be assertive and inspire confidence in the glider pilot and those people around the glider, make your briefings thorough, concise and to the point. Make your decision and above all act in a professional manner, do not be influenced by the glider pilot to use anything other than the best run available even if the glider has to be moved a great distance as a result of your decision.

Line the glider up with the tug parked at 45° to the take off run to allow a good view of both the approach and take off run, attach the rope to the glider and let the glider pilot get strapped in. Then brief the glider pilot of your intentions for the take off and climb out including the direction of any turns to be carried out. Agree a radio frequency to be used and signals for the launch, in general it is best to use the shutting of the canopy as the signal that the pilot is ready to launch. Inform the pilot that you will allow 30 seconds before starting the launch and remind the glider pilot that if he wishes to stop the launch just release the cable. Once the cable is released use the radio or open the airbrakes to indicate that he wishes to stop the launch. In general it is not a good idea to use an inexperienced person to signal for you, this can lead to confusion. Brief the glider pilot of your intentions if there is an emergency and in particular which fields are available for the glider to land in immediately after take off if there is a rope break. If there is a wing person ensure they are briefed and in particular stress not to hold back on the wing. If there are any other people in the field ask them to stay behind the glider whilst the launch is taking place.

Once the briefing is complete and the glider pilot is ready get in the tug, start up and carry out the takeoff checks. Take one last look at the glider to see all is well and also check the approach and takeoff run to ensure it is safe to depart. Beware of the possibility of people entering the field once you have started the take off, so have a good look before you start to roll and once again try and anticipate any problems.

If there is no one to hold the wing take up slack and then hold the tug at full power on the brakes for about 30 sec to let the slipstream drift back towards the glider. If there is a crosswind, put the into wind wing down, unless it is a glass glider with a tailskid. In this case the down wind wing may have to be down to counteract the weather cocking effect of the crosswind. In either case brief the pilot to pull off early rather than late if the glider starts to swing.

If the Farmer/Owner/Manager is in the field make a point, even if you are pushed for time, of talking to and thanking him for his help; this is very important. Ensure the glider pilot has his name and address for the landing out book.

ABORTING A FIELD RETRIEVE

Remember at the end of the day you are responsible for the tug during the landing and both the tug and glider during the take off. If you believe the field is not suitable then it's your decision not to land so go home. If you decide to land but not retrieve the glider do not be persuaded by the glider pilot no matter who he is or what level of experience he has, ultimately you have the experience in field retrieves and as the tug pilot you will be responsible for the combination. If you are not happy take off without the glider and go home, you won't be the first to do so.

EMERGENCIES

As with field landings in gliders there is an increased risk when landing in unprepared fields. One of the aims of these notes and the course is to try to reduce the risk. Because of this and the performance penalty we do not take passengers in the Cub when doing field retrieves.

It would be impossible to foresee every type of situation and emergency that could occur. However, what we must do is help you to cope should the unexpected happen. By far the best chance of dealing with an emergency situation is to have thought about it and already have a plan to deal with it. This takes imagination and a certain amount of fear and it is only by considering and practising the most common types of emergency that we are better prepared for the unknown.

PART 2 AIR EXERCISES AND ASSOCIATED BRIEFINGS

Soft and Short Field Landings

Aim

To land an aircraft in an unprepared field at the slowest touchdown speed and/or using the shortest possible ground run consistent with safety.

Pre flight discussion and briefing points

1 Normal final approach speed (FAS) is calculated as 1.3 Vso (stall speed in the landing configuration) added to this is 50% of any gust factor. In strong wind i.e. greater than 15kts an additional factor may be required of 5-10kts. An example would be the Pawnee, which stalls at a Vso of 45kts; the final approach speed will be 60kts. If the reported wind is 270/14 gusts 24 the FAS would increase to 65kts (i.e. the gust factor is (24-14)÷2=5kts).

2 A stabilised approach with some power is important if consistent short/soft field landings are to be achieved. Remember that during the approach airspeed is controlled with pitch and rate of descent with power.

3 An accurate approach speed is vital to ensure the minimum landing run. For every 10% increase in approach speed an extra 21% landing distance will be required.

4 If landing on a soft surface or minimum touch down speed is required. Carry a small amount of power and hold the aircraft in the three-point attitude just before touch down, this will give the minimum touch down speed but will increase the landing distance slightly.

5 For short field landings it is possible to reduce the approach speed to as little as 1.1 x Vso on some aircraft. However you must still add any gust factor, and allow for any loss of speed in the final approach due to turbulence or strong winds. It must be realised that the aircraft will be operating on the wrong side of the drag curve, any attempt to stretch the glide by raising the nose will almost certainly lead to an increase in rate of descent and possibly a stall. The same will also result from any attempt to flare the aircraft at the normal height. In practice the aircraft will probably be in the three-point attitude on the approach and so the use of power to reduce the rate of descent, assisted by the elevator will result in a three-point touch down with a minimum of forward speed.

6 Good short field technique does not include “greasing it on”. You should arrive at your chosen touchdown point and land firmly at that point.

7 If the approach is to be made over an obstacle still use 1.3 x Vso and a constant approach angle, rather than powering in at a shallow angle and then chopping the power once clear of the obstacle. Always allow a reasonable margin by which to miss the obstacle.

8 Always pick a point during a short field landing at which if the aircraft has not touched down then a go-around should be carried out.

9 Always retract the flaps straight after touchdown so as to obtain max braking, remember not to lock the wheels, as this will increase the landing distance.

Whilst it should not be necessary to use the soft/short field landing technique due to a lack of landing distance available when retrieving a glider from a field. It is the best technique to ensure a slow touch down speed with the tail down reducing the risk of tipping the aircraft up.

Short Field Takeoff

Aim

To handle an aircraft with sufficiently accuracy to enable it to leave the ground after the shortest possible run consistent with safety.

Discussion and Briefing Points

1 Use of the elevator.

2 Use of power

3 Use of brakes

4 Use of flaps

5 Best angle of climb Vx/Best rate of climb Vy

Method

1. Carry out all normal take-off checks including manufactures recommended flap setting (0flap for the Pawnee and 1st stage for the Cub), set the correct trim setting for this flap position.

2 Check visually that the glider is ready for take off and then either by use of radio or pre-arranged signal ensure the glider pilot is ready.

3 Taxi forward taking up slack until the rope is tight.

4 Holding the aircraft on the brakes and with the stick fully back, apply full power and check that the temperatures and pressures are correct. Let the slipstream drift back towards the glider for about 30 seconds. Keep one eye on the mirror and if the glider wings start to become level release the brakes and start the takeoff immediately.

5 As the combination starts to roll move the stick forwards so as to lift the tail up into the flying attitude as quickly as possible. This will reduce the drag to a minimum and allow maximum acceleration. Remember to keep the aircraft straight with rudder and anticipate any possible swings as the tail comes up.

6 When the aircraft has gained sufficient speed above the stalling speed to provide safe control move the stick back to rotate the aircraft off the ground.

7 Allow the aircraft to accelerate in ground effect (not more than ½ a wing span above the ground) until Vx is reached and climb out at this. (Note: if obstacle

clearance is not a limiting factor allow the aircraft to accelerate to Vy or normal climb out speed for the glider on tow).

8 Once all obstacles have been cleared allow the aircraft to accelerate to Vy and clean up. (Note: when retracting the flaps after take off the aircraft must be at least 300 feet clear of obstructions, have sufficient speed to prevent a stall and have a positive rate of climb.

For field retrieve operations it should not be necessary to climb out at Vx, but the normal climb out speed for the glider. However the short field technique up to this point will require the shortest possible take off run, and then allowing the acceleration to climb speed to occur whilst airborne in ground effect will give the shortest distance to 50 feet.