Gliding Australia Training Manual

Trainer Guide

GLIDING
AUSTRALIA

Unit 13A

Launch & Release (Aerotow)

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AIM

To develop and demonstrate the skills and knowledge required to safely fly an aerotow launch in the correct low tow position after transitioning from the initial climb, and then release from aerotow.

Note that this aligns with the normal training sequence and risk profile for these units. Upper air aspects of launch are taught first, then ground roll and take-off, then crosswind conditions and emergencies.

A number of launches may be required to demonstrate competence and underpinning knowledge.

PREREQUISITE UNITS

- GPC Unit 2 Ground Handling, Signals
- GPC Unit 8 Sustained turns all controls
- GPC Unit 9 Lookout Procedures

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- Unit 14 Takeoff
- Unit 19 Crosswind Takeoff and Landing
- Unit 20 Launch Emergencies
- Unit 27 Advanced Aerotowing

COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. **Conduct an aerotow glider launch above 300 feet AGL in the low & high tow position**	• **Demonstrate:** ○ Identification of tug slipstream with glider held below slipstream for low tow and above slipstream for high tow (using elevator). ○ Maintaining glider bank angle parallel to towplane bank angle at all times (through use of coordinated aileron/rudder). ○ Maintaining line astern position behind towplane (through use of rudder). ○ Recovery from out of station position using coordinated controls. ○ Maintenance of situational awareness during the launch with respect of traffic, location and emergency options. ○ Correct procedure to correct bow in tow rope. ○ Correct transition between low and high tow.
2. **Conduct the release from aero-tow**	• **Demonstrate:** ○ Pre-release lookout for tug and glider. ○ Locate-Identify-Operate tow release. ○ 'Rope Gone!' verified visually. ○ Clearing right turn and confirming tug separation. ○ Post release actions if appropriate. ○ Transition from launching pilot to soaring or landing pilot.

KEY MESSAGES

- Early introduction of the aerotow launch is inappropriate. It can reduce a student's confidence and will probably prolong their training. The student must not be introduced to aerotow until their competence in smooth and reasonably accurate co-ordination of aileron, elevator and rudder controls has been acquired. Only when the student can maintain straight flight and gentle turns at 60, 65 and 70 knots, without over-controlling or jerky movements can towing instruction be commenced – not before.
- The student's initial and early attempts to fly the aerotow launch must always start at a safe height, say above 800' AGL, and will be progressively lowered as their skills develop.
- In the introduction to aerotow, the student should be taught to remedy small divergences from position by keeping the glider's wings parallel with the towplane's wings using aileron, and then using rudder only to ease the glider into position. This is supported by the glider's self-centring tendency when using a nose release.
- Lookout during aerotow launch is critical. Get the student to look to the horizon, ahead and to the side; do not let them fixate on the towplane.
- Emphasise that if the pilot loses sight of the towplane, then the tow rope must be immediately released.

LESSON PLANNING AND CONDUCT

Briefing

Terminology

At this stage introduce the terminology of Launching Pilot – Soaring Pilot – Landing Pilot, each of which requires different mindsets and actions to configure the glider correctly for the next phase of flight.

Stages of aero-tow launch are described:

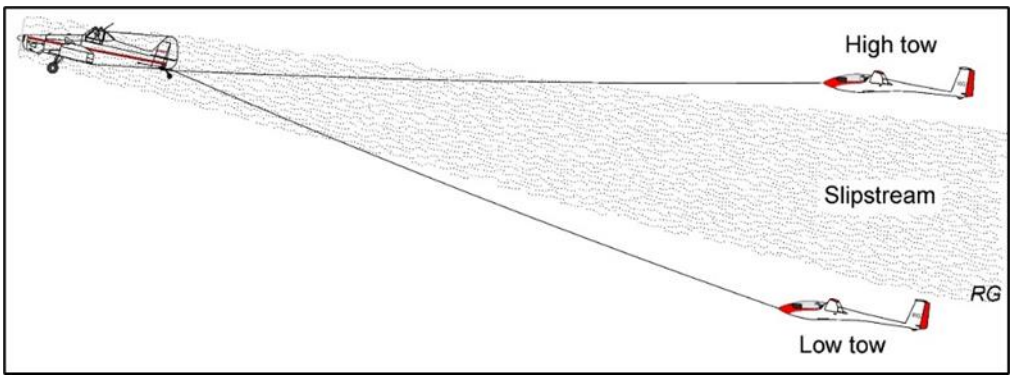
- Normal climb and release (this unit).
- Ground roll, separation, and initial climb (Unit 14A).
- Correcting for crosswinds (Unit 19).
- Launch Emergencies (Unit 20A).

Normal climb

Explain that they will initially develop their skills for normal climb above 800 feet AGL for safety reasons, above any hazardous wind gradient or turbulence.

Tug aircraft produce a turbulent slipstream in flight, consisting of a combination of wingtip vortices and propeller wash. Gliders are normally positioned either just below, or just above this slipstream while on tow. The positions are known as low tow and high tow respectively. Describe correct low and high tow positions, noting that:

- The low tow launch is the standard procedure for Gliding Australia clubs using aerotow (low tow reduces the risk of tug upset emergencies and in high tow the combination feels a little more pitch sensitive).
- Whilst the low tow position is the norm, the pilot needs to be able to transition between the low and high tow positions.
- In straight line climb, the glider's nose will normally be pointed at the tail of the towplane. The pilot should be able to see both sides of the towplane at the same time.
- In a shallow turn, the glider's nose will normally be pointed slightly to the outside of the turn towards the towplane's outside wingtip rather than directly at the tail.
- Wings are maintained parallel to the towplane's, in a line astern position, in straight and level flight through use of controls.



Maintaining Line-Astern Station

Brief on how to recover from an out-of-station position back to line-astern.

- For very small diversions, just apply a small amount of rudder whilst holding the wings level.
- The trainer may retain the elevator and aileron control and maintain height and wings level to assist the student, during the first attempts.
- Urgent correction is not required provided the diversion is small.
- For larger diversions, you will need to apply a coordinated turn in the correct direction. Use small movements.

After some experience, introduce using all three controls to maintain position and gradually extend to cover the whole tow including the release. Coordination takes time to develop and will come as the student gains experience.

If using coordinated controls, note that just centralising the stick will mean that the turn will continue. The turn must be stopped by using opposite aileron and rudder, and then centralise the controls.

It is typical that the glider will wander from side to side until you get the coordination correct – relax more on the stick, make small movements. Most out of station diversions are the result of the pilot moving the controls.

Hazards associated with out of station flight are discussed in GPC Unit 20A. Correct procedure to correct bow in tow rope is discussed.

If the student ends up with a bow in the rope a gentle correction is required otherwise they risk breaking the rope. Get the student to apply a little drag through use of rudder or in more extreme cases the gentle application of airbrake.

Be aware that the airbrakes of some gliders are apt to suck out if opened at aerotow speeds, and with some types just cracking the brakes can start them juddering in and out. Timing is important. Close the airbrakes or remove the sideslip just before the rope goes taut again, to avoid a violent jerk which may:

- pitch the glider,
- yaw and roll it,
- break the rope and/or the weak link, or
- catapult the glider forward and create an even bigger bow in the tow rope.

If you have to release with a big bow in the rope, wait until just before the rope goes tight again. Releasing without getting rid of the bow first can lead to the rings flying back and hitting the glider. In the worst case they can become entangled with the aircraft.

Situational Awareness

Lookout:

- Emphasise to look ahead at the towplane but also search for possible conflicting traffic. Scan ahead, above and to each side on a regular cycle.

Position:

- Throughout the tow both the trainer and the student must remain aware of their position in relation to the airfield and safe landing options.

Emergencies:

- Be alert to the possibility of a rope/weak link break and have a plan to deal with abnormal situations.

Release

Pre-release and release actions are described.

Plan to release. Check location and height – is this suitable?

If towing in low-tow, release from low-tow, If towing in high tow release from high tow.

Lookout: It is essential to check that, prior to release, the airspace is clear (a) to the right where the glider is just about to turn, and (b) to the left and below where the tug is just about to descend.

Locate, Identify, Operate: The tow release. The release should not be operated until it has been positively located and identified as the one required. This eliminates any possibility of error in selection of the wrong control. This principle applies to all ancillary controls.

Pull the release, observe the rope go and begin a right turn without delay to obtain maximum clearance from the rope and simultaneously applying normal targeted scan.

The release should be operated while the towrope is still under some tension. The tug pilot, after feeling “release” should check that the glider has in fact released and begin a descending turn to the left.

The towplane should be monitored to ensure that the release has been identified and that separation is maintained. It may be necessary in lighter aircraft to advise the tow plane that the glider has released.

Tell the student they will probably need to reduce airspeed on turning right, as towing is carried out at 65-70kts and the aircraft will need to slow down.

Post release actions should then be carried out and transition from launching pilot to soaring or landing pilot.

Pre-Flight Briefing

Normal Climb

Emphasise that the stable platform is just as effective on tow as it is in free flight. This will be backed up by a demonstration.

Given that the airspeed is higher than the student has been accustomed to in handling the controls in free flight, the control forces are higher, but at the same time the controls are more effective.

Some gliders are very heavy on the ailerons at aerotowing speeds, others tend to run out of elevator trim in low tow, leading to a residual push force. It is important to know the characteristics of the trainer in use and brief accordingly.

Warn the student that they will probably over-control and that this is quite normal. Emphasise the need for small movements on the controls. From a learning perspective, remember that mistakes will need to be made for learning to take place and correct feel to be developed.

Emphasise that the correct towing position is relative to the tug slipstream. If there is any doubt whether the glider is in the right place, find the slipstream and then position the glider accordingly.

Suggested patter:

"On this flight, I will hand over control to you on aerotow at about 600' AGL. The glider will be trimmed out, so you should not have much difficulty."

Note that the air should be reasonably smooth for a student's first attempts at this exercise.

"When you take control, do very little at first, let the stable platform work for you. Get used to the feel of the glider on tow, then gently exercise each control to see and feel its effect. You can expect that the elevator will be more sensitive than you are used to, while the ailerons will be quite a bit heavier. You will soon get used to this. The rudder feels about the same as in free flight."

Flight Exercises

Launch

- Trainer demonstrates the correct tow position. Point out wings parallel to towplane wings, in line behind the towplane; just below the slipstream. Demonstrate feeling for the slipstream to find the right position. Student then follows through on the controls. Point out small movements. Ask them to relax their grip on the controls.
- When comfortable, hand over to the student (handover/takeover routine).

- Small bows and horizontal displacements can usually be ignored. Bows will gradually pull out if nothing is done to worsen the situation, and any displacement will automatically correct itself.
- Talk the student through corrections – small movement, use small rudder pressure to move back into line. Ask the student to find the slipstream by gentle use of elevator, and then move back to position. Ask the student to make small bank changes and observe the ensuing turn. – put wings back level and then use rudder to correct. The trainer may have to take over at various stages of this practice.
- If serious over-controlling occurs, return to the stable platform demonstration, which works perfectly well on tow if the trim has been correctly adjusted.
- They should be shown that, should the glider get out of station laterally, it must be because bank has developed. The first requirement is therefore to ensure that the glider's wings are parallel with those of the towplane by gentle application of aileron and rudder. This will stop the glider getting further out of station, and in most cases the glider will tend to return to the central position of its own accord after a few seconds.
- During the early air exercises in aerotowing, it is important to build confidence in the student, as it is easy to get demoralised by constantly getting out of station without apparently getting any better. Let them make mistakes, then analyse the mistakes very carefully to ensure that they are actually learning from them.
- At lower altitude there is a small advantage in having a slightly nose heavy trim, in case they get a rope break. The trim will help with maintaining safe speed near to the ground. Once established, encourage the pilot to adjust the trim to reduce workload.
- When the student is relaxed, direct them to look around to identify landmarks and other aircraft. The aim is to do this without moving the controls to follow their head.

Release

- Ask the student to confirm that height and location are as expected.
- Ask them to perform a suitable lookout to ensure the airspace is clear in the direction both the tug and glider will be flying post release under your direction.
- Ask them to Locate and Identify the release knob, and then Operate it when safe to do so.
- Once it is confirmed that the rope is released, execute a turn to the right.

High Tow

- Once the student is capable of flying in low tow, you can ask them to try flying in high tow. This is a good challenge.
- Demonstrate transitioning through the slipstream and the need to maintain a small amount of back stick so they don't get stuck in the slipstream. This is good practice for when they are doing the take off and have to transition down to low tow when climbing out.
- Demonstrate the correct position just above the slipstream.
- Emphasise the problem of getting too high where you can lose sight of the tug (release).
- Handover to the student and give advice as required. They should handle this after a few attempts.
- Direct them to release in High Tow, and then in a later flight return to Low Tow and release.

Notes

1. Once released, the pilot transitions from Launching Pilot to either Soaring or Landing Pilot and should configure the glider appropriately.
2. Gliding Australia does not mandate any single post-release action list or checklist.
3. Some clubs choose to apply local checklists, which may vary for particular sailplanes and prevailing local environmental conditions. e.g., FUST Flaps set as required or fixed, Undercarriage set as required or fixed, Speed as required and Trimmed for speed. This is a CHECK and should be conducted after the release and established off-tow.

COMMON PROBLEMS

Problem	Probable Cause
• Glider swinging from side to side behind tug.	Student trying to use aileron alone to control the glider in roll, thereby inducing large amounts of adverse yaw. In the early stages of learning aerotow, the trainer should assist the student to get back into position, as the effort of students to stop this swinging on their first aerotows often leads to even larger oscillations.
• Glider much too low behind tug (very common).	Failure to use slipstream as primary reference for towing position. Failure to adjust trim to provide stable platform in normal low-tow position.
• Student over-controlling on aerotow.	Student has forgotten, or has never been instructed, that the stable platform works just as well on tow as in straight flight. A good demonstration of this will produce excellent results.
• Having got out of position and managed to start moving the glider back into position, student has difficulty in stopping the glider in the correct place.	Student has not developed the required amount of anticipation needed to apply corrective controls a little before the glider gets into position. Student may possibly have been put onto aerotowing too early in training.

THREAT AND ERROR MANAGEMENT

- Lookout tends to vanish due to concentration on the towplane. trainer to demonstrate and regularly remind the student.
- Situational awareness of height, position and other aircraft needs to be discussed and monitored.
- Releasing too low or too far away or downwind needs to be explained and safe landing options monitored.
- The towplane should be monitored to ensure that the release has been identified by the tug pilot and that separation is maintained.

TRAINING MATERIALS AND REFERENCES

- GPC Pilot Guide Unit 13A
- Gliding Basics: British Gliding Association 2019
- Australian Gliding Knowledge (AGK) pages 92-94, 104-110
- Gliding Handbook: FAA 2013