

# Gliding Australia Training Manual

## Trainer Guide



### Unit 27 Advanced Aerotowing

## Unit 27 - Advanced Aerotowing

---

### AIM

To develop and demonstrate the skills and knowledge required to conduct Advanced Aerotow techniques.

### PRE-REQUISITE UNITS

- GPC Unit 13A Launch and Release Aerotow;
- GPC Unit 14A Take-off Aerotow;
- GPC Unit 19 Crosswind take-off and Landing;
- GPC Unit 20A Launch emergencies.

### COMPLEMENTARY UNITS

There are no complementary units to this GPC Unit.

## Unit 27 - Advanced Aerotowing

### COMPETENCY ELEMENTS AND PERFORMANCE STANDARDS

ELEMENT	PERFORMANCE STANDARDS
1. Changing station on tow	<ul style="list-style-type: none"> <li>• <b>Describe</b> <ul style="list-style-type: none"> <li>○ The correct high and low tow position.</li> </ul> </li> <li>• <b>Demonstrate</b> <ul style="list-style-type: none"> <li>○ Advising the tow pilot prior to commencing such manoeuvres.</li> <li>○ Transition from low tow to high tow.</li> <li>○ Transition from high tow to low tow.</li> <li>○ Correct pace to avoid getting caught in the slipstream and to avoid kiting manoeuvres.</li> </ul> </li> </ul>
2. Boxing the slipstream	<ul style="list-style-type: none"> <li>• <b>Describe:</b> <ul style="list-style-type: none"> <li>○ The steps involved in boxing the slipstream.</li> </ul> </li> <li>• <b>Demonstrate:</b> <ul style="list-style-type: none"> <li>○ The correct pace to complete the manoeuvre.</li> <li>○ The five steps in a clear &amp; distinct manner.</li> <li>○ That airspeed is maintained through the manoeuvre.</li> </ul> </li> </ul>
3. Cruising and descending on tow (B Certificate training)	<ul style="list-style-type: none"> <li>• <b>Demonstrate:</b> <ul style="list-style-type: none"> <li>○ Level flight on tow in both high and low tow position.</li> <li>○ Descent on tow, with use of airbrake where required.</li> <li>○ That airspeed is monitored and adjusted.</li> <li>○ That bows in the tow rope are corrected.</li> <li>○ Appropriate lookout.</li> <li>○ Maintaining situational awareness to avoid unsafe terrain.</li> <li>○ Knowledge of last light and weather issues that may impact the flight.</li> </ul> </li> </ul>

## Unit 27 - Advanced Aerotowing

### KEY MESSAGES

- These exercises are very useful in confidence building and co-ordination, enabling students to recover from unexpected positions, understanding the forces at work on aerotow in other than a launching situation.
- The tug pilot should be briefed prior to the tow on any such manoeuvres and any specific requirements throughout the exercise.
- Getting out of station is quite possible in each of these manoeuvres so a good level of aircraft control is required prior to introducing these exercises.
- If sight of the tug is lost at any time during the exercises, the glider must release immediately.

## LESSON PLANNING AND CONDUCT

### Briefing

#### Changing station on tow

All flight exercises in this unit will be demonstrated by the instructor followed by student practice under close instructor supervision to prevent towplane upset.

In any exercise involving deliberate station-changing on tow, the tug pilot should be briefed on any such manoeuvres and any requirement to maintain heading throughout the exercise prior to the tow. Also advise the tow pilot by radio prior to commencing the manoeuvre.

- A suggested phraseology is: "Tango Uniform Golf, Glider Xray Yankee Zulu boxing the slipstream".
- Ensure you get an acknowledgement from the tug pilot.

GPC Unit 13A is to be revised, during which the student is to demonstrate:

- Both high and low tow, and the correct way to transition between the two.
- The pace to move through the slipstream without "getting stuck";
- How to level out above the slipstream;
- The normal relative position of the towplane when in High Tow.

When the exercise is completed and the tug can again turn, call "Tango Uniform Golf, Glider Xray Yankee Zulu exercise completed".

It is imperative that the student is competent with the correct high and low position as described above prior to undertaking the Boxing the Slipstream exercise.

#### Boxing the slipstream

This is a very useful exercise in confidence building and co-ordination, enabling students to recover from unexpected positions.

If possible, first attempts at this exercise are done in smooth conditions at a slow tempo.

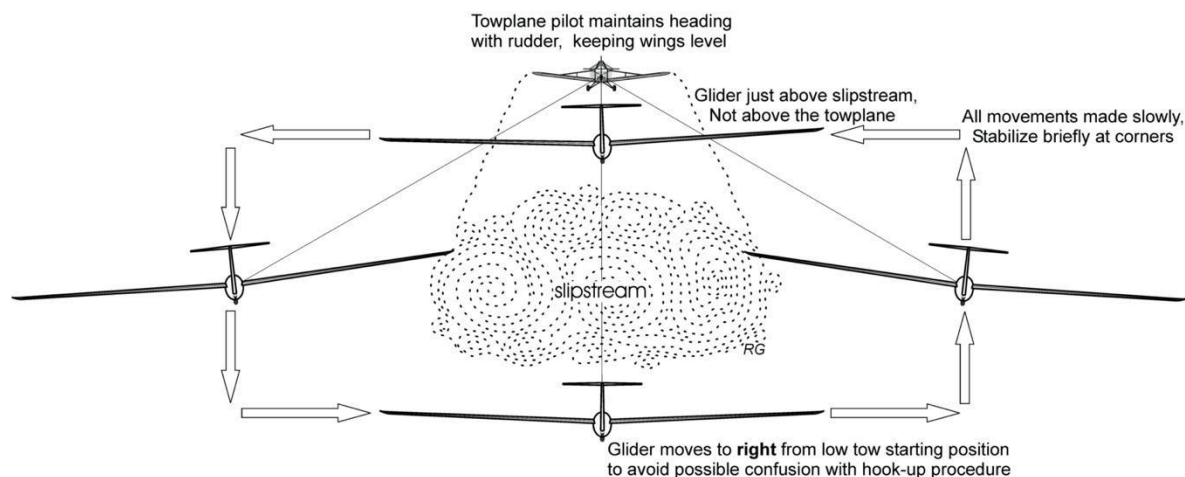
The Instructor will demonstrate the procedure, with emphasis on pace of the different legs of the box, and smooth use of controls. Explain that the exercise is commenced by going RIGHT first so as not to confuse with the hookup procedure.

## Unit 27 - Advanced Aerotowing

Make gentle control inputs to prevent overcontrolling. Use rudder and aileron to bank the glider and move to each side so that the glider's nose is slightly outside of the towplane's wingtip. Hold just enough bank to stabilise in each corner of the box for a couple of seconds. When traversing from the top right to top left corner, initially reduce the amount of right bank to drift into the centre and don't reverse to left bank until almost behind the towplane. Maintain the towplane's wheels on the horizon from the top right to top left corners.

If the glider moves too quickly into the centre, a bow may develop in the rope. As soon as a bow starts to form, increase the pressure on the towrope by increasing the bank slightly away from the towplane and slow the rate of movement into the centre. If the bow in the rope tightens too quickly, the instructor must be ready to release the towrope just before the rope pulls tight to avoid a tug upset or broken weak link.

Student practicing will receive assistance from the Instructor if required.



### Cruising on tow

On long retrieves or positioning tows, low tow is easier to maintain, especially in turbulent conditions.

In smooth conditions, high tow has the advantage of the glider pilot being able to see more of the ground ahead for situation awareness. Also if the glider has a belly release, it lessens the rope rubbing on the nose.

It is important to know what the maximum aerotow speed of the glider is from the Aircraft Flight Manual and cockpit placards.

The Tug Pilot must be briefed on:

- The glider's maximum aerotow speed of the glider; and
- The sequence of the flight exercises to be carried out.

In level flight, with the tug/glider combination not climbing, e.g. cross-country ferry flights, the feel of the glider is quite different, as follows:

- The trim of the glider is considerably affected - the trim control will almost certainly need to be reset;
- Slack will develop in the rope very easily;
- Airbrakes may be cracked and used to help keep the rope tight, or the glider can be flown in the tug slipstream - this creates quite a lot of extra drag.

## Unit 27 - Advanced Aerotowing

---

When releasing from tow in level flight, there must be no delay in making the right turn, otherwise the rope may get quite close to the glider.

This is true whether releasing from the high tow or the low tow position.

The slipstream may be in a slightly different position compared to where it usually is. However, as usual, low-tow is still just below the slipstream and high-tow just above.

### **Descending on Tow**

Descending on tow is:

- Safer in low tow, less chance of losing sight of the tug and causing a tug upset.
- More likely to result in a slack rope, in particular if the tow pilot reduces power too quickly;
  - Use of airbrake and/or yaw is likely to be required.
  - This may be the case when descending below airspace steps or below cloud ahead.

Radio communication with the tow pilot is typically required.

### **Lookout**

Emphasise to look ahead at the tow plane but also search for possible conflicting traffic.

The glider pilot will typically have better visibility than from the tow plane.

Scan ahead, above and to each side on a regular cycle.

## **FLIGHT EXERCISES**

### **Changing station on Tow**

Brief the Tug Pilot prior to take-off and advise by radio prior to commencing the manoeuvre.

In the revision of GPC Unit 13A, the student must demonstrate:

- The correct way to transition between the High and Low tow;
- The pace to move through the slipstream without “getting stuck”;
- Levelling out above the slipstream;
- The normal relative position of the towplane when in High Tow.

It is imperative that the student can demonstrate the correct high and low position as described above prior to undertaking the Boxing the Slipstream exercise.

### **Boxing the slipstream**

Ensure that the student is competent in performing the high and low tow position as a prerequisite to the exercise. The high tow/low tow flying skills are building blocks for this exercise.

Brief the Tug Pilot prior to take-off and advise by radio prior to commencing the manoeuvre.

- A suggested phraseology is: ‘Tango Uniform Golf, Glider Xray Yankee Zulu boxing the slipstream’.
- Ensure you get an acknowledgement from the tug pilot.

Instructor demonstrates the procedure, with emphasis on pace of the different legs of the box, and smooth use of controls.

## Unit 27 - Advanced Aerotowing

- It is strongly recommended that smooth conditions are picked for student first attempts at these manoeuvres and that they are done at a slow tempo.
- Handover/Takeover for student practice.

When the exercise is completed and the tug can again turn, call 'Tango Uniform Golf, Glider Xray Yankee Zulu boxing the slipstream exercise completed'.

### Flying level on Tow

Brief the Tug Pilot prior to take-off to level off at a set altitude plus any other proposed sequence.

The Instructor demonstrates the configuration with the tug/glider combination not climbing.

Emphasise that the feel of the glider is quite different:

- The trim of the glider is considerably affected - the trim control will almost certainly need to be reset;
- Slack will develop in the rope very easily;
- Airbrakes may be cracked and used to help keep the rope tight, or the glider can be flown in the tug slipstream - this creates quite a lot of extra drag.

Handover/Takeover for student practice in both high and low tow in cruise.

Ensure when releasing from tow in level flight that there must be no delay in making the right turn, otherwise the rope may get quite close to the glider.

- This is true whether releasing from the high tow or the low tow position.

The slipstream may be in a slightly different position compared to where it usually is. However, as usual, low-tow is still just below the slipstream and high-tow just above.

### Descending on Tow

Ensure glider is stable and in low tow;

- Advise the tow pilot by radio when ready for descent.
- Descending on tow is more likely to result in a slack rope, in particular if the tow pilot reduces power too quickly;
- Use of airbrake and/or yaw is likely to be required.
- When ready, advise the tow pilot to level off.

Handover/Takeover for student practice.

- Repeat exercise until competency is achieved.

### Lookout

Emphasise to look ahead at the tow plane but also search for possible conflicting traffic.

Scan ahead, above and to each side on a regular cycle.

## COMMON PROBLEMS

Problem	Probable Cause
<ul style="list-style-type: none"> <li>• Student 'cuts corners' on boxing the slipstream.</li> </ul>	<p>Student in rush to complete exercise or cannot maintain station at the step positions.</p>

## Unit 27 - Advanced Aerotowing

	Reiterate need to pause at each step position, maintaining control inputs.
<ul style="list-style-type: none"> <li>Student allows rope to bow when descending behind tug.</li> </ul>	<p>Occurs particularly with higher performance gliders.</p> <p>Demonstrate use of yaw or small amounts of airbrake to create drag and keep tension on the tow rope.</p>

## THREAT AND ERROR MANAGEMENT

The instructor must never allow a situation to develop beyond their skills in these exercises.

This means an instructor attempting this unit must be in current practice and aware of their ability and limits.

The instructor must know when to take control as the situation demands, doing so in a calm & reassuring manner.

Instructors should note that this exercise, while challenging, should also be an enjoyable experience with minimum stress for all concerned.

If a significant bow in the rope occurs, turn the glider away from the bow and, if necessary, release the rope just before the rope comes taut.

Abort the exercise if conditions make the objectives unachievable.

- Maintain situational awareness of remaining within gliding distance of the field if practicing manoeuvres requiring the tow plane to maintain heading.
- If necessary, suspend the exercise and radio the tow plane to turn towards the airfield.

Getting out of station is quite possible in each of these manoeuvres so a good level of aircraft control is required prior to introducing these exercises.

Descent on tow may result in the glider catching up with the tow plane due to its lower drag, so be prepared to release if necessary.

Rapid use of airbrakes can break the tow rope weak link.

Poor control when in high tow and with boxing the slipstream can result in a tug upset. If you lose sight of the tow plane below the nose of the glider you must release!!!

If a large bow or loop develops in the rope and threatens the glider wingtip you must release!!!

The instructor must be mindful that it is the tug pilot's right to release the glider at any time if the safety of the combination is considered at risk.

## TRAINING MATERIALS AND REFERENCES

- Australian Gliding Knowledge.
- GFA MoSP 2 Operations.
- Pilot Guide GPC Unit 27.