

Gliding Australia Training Manual

Pilot Guide



Unit 14A Takeoff (Aerotow)

Unit 14A - Takeoff (Aerotow)

WHAT THIS UNIT IS ABOUT

To develop and demonstrate the skills and knowledge required to prepare and then safely fly an aerotow launch ground roll, separation, initial climb and then transition into the normal aerotow climb position.

WHAT ARE THE PRE-REQUISITES FOR THIS UNIT?

- GPC Unit 2 Ground Handling, Signals
- GPC Unit 7 - Straight flight, various speeds, trim
- GPC Unit 8 - Sustained turns, all controls
- GPC Unit 9 Lookout Procedures
- GPC Unit 10 - Use of ancillary controls
- GPC Unit 13A – Aerotow Launch and release.
- Correct control and operation of the aircraft are essential pre-requisite.

COMPLEMENTARY UNITS

This unit should be read in conjunction with:

- GPC Unit 19 - Crosswind Takeoff and Landing
- GPC Unit 20 - Launch Emergencies

KEY MESSAGES

- Plan ahead. Anticipate possible emergency options.
- The Pilot in Command is responsible for confirming “airspace clear for launch” and “pilot ready - launch approved”.
- Keep wings level with aileron, nose pointed at towplane with rudder, takeoff attitude set with elevator, ALL independently, until the glider is airborne.
- The towing pilot has a release and WILL use it if an unsafe launch is evident, or the towplane runs out of elevator authority.

PILOT GUIDE FOR THIS UNIT

Preparation for Take off

- Pre Boarding and Pre Take off checks must be performed (ABCD-CHAOTIC) and options discussed for launch emergencies. Your instructor will indicate areas on your runway and around the airfield where you can land if the rope breaks.
- You will be shown the hand signals and correct procedure in connecting the rope to your glider.
- You will be given clearance from the ground crew that the airspace is clear.

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- When ready you will give the “thumbs up” signal to the ground crew who will lift the wing indicating you are ready for takeoff.

Ground Run and Separation

- Before takeoff on aerotow the trim should be set slightly forward as required during the cockpit check. The controls used independently to get the glider into the wings level takeoff attitude, from which it will separate naturally when flying speed is attained. The glider should not be “rotated” in the nose-up sense at the separation stage.
- At this stage the wings are kept level (or banked slightly into any crosswind) with aileron, position behind the tug is maintained with rudder and takeoff attitude maintained with elevator. Coarse control movements will be required until the glider gains speed.

Ground Run, Separation, Initial climb - Pre-Flight Briefing

- There are three parts to this:
 - Glider and tug on ground.
 - Glider airborne, tug still on ground.
 - Both glider and tug airborne.
- **Glider and tug on ground.** Due to the slow acceleration of the tug/glider combination, the controls will be sluggish and unresponsive at the start of the launch, and will become more responsive slowly. The glider should be placed in the flying attitude as soon as the controls are functioning and kept in this attitude until flying speed has been attained and the glider separates. Primarily, set the glider up so it runs on the mainwheel.
- **Glider airborne, tug still on ground.** When the glider lifts off, it will start to climb higher and higher as the airspeed continues to increase. This must be resisted by a progressive forward elevator pressure, holding the glider no higher than the towplane’s tail fin. **DO NOT GO HIGHER THAN THIS, AS YOU PULL THE TUG’S TAIL UP ON ITS GROUND RUN.**
- **Both glider and tug airborne.** When the tug lifts off, maintain the glider in a position above the slipstream until the tug is positively established in a climb. Typically 100-300 feet AGL. Then move gently but positively down through the turbulence of the slipstream until the glider is once again in smooth air.

Initial Climb

- The glider should remain just below the turbulence of the tug with its wings parallel to the tugs wings.
- Its important that a good lookout is maintained for conflicting traffic and we maintain a good situational awareness during the climb.
- As we climb, our options for launch failures change. Call out the change in options when they become available.

FLIGHT EXERCISES FOR THIS UNIT

- The Instructor will demonstrates and explains the process.
- Then they will invite the student to come on controls to feel the stick and rudder movements.
- The Student practices under supervision and guidance.

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- Whether intending to carry out an aerotow in the high tow or the low tow position, the separation and climb-away stages are identical. The glider will lift off before the tug and should be held at a height of two metres / six feet above the ground (about the height of the tug's fin) until the tug also separates. In this situation the glider will be just above the tug's slipstream.
- **If intending to carry out a high tow**, this position above the slipstream is maintained as the combination climbs away. Remember that high tow is, by definition, just above the slipstream, not above the tug. The slipstream is the primary reference, not one of the fixtures on the tug.
- **If intending to carry out a low tow**, maintain station above the slipstream as the tug leaves the ground. When the tug is positively established in a climb, move the glider gently but positively down through the turbulence behind the tug until once again in smooth air. The glider is now in the low-tow position. Once again the slipstream is the primary reference. Do not go too low in relation to the slipstream - it is not necessary.

Notes

- **Important Note:** The glider going too low in the low-tow position results in the tug pilot needing more and more forward stick to compensate. Although this could get to the stage of running out of elevator power to keep the tug under control, it is rather unlikely to become this serious and in any case such a situation usually develops slowly enough for the tug pilot to release the glider before control is lost.
- In contrast, it is **dangerous to go too high behind the tug in high tow**, because this situation can get out of control very quickly and the tug pilot may not have enough time to pull his release before a "tug upset" occurs. See section on "implications of glider going too high behind tug". If the glider goes so high that the pilot loses sight of the tug, the glider's release should be pulled WITHOUT DELAY.

THINGS YOU MIGHT HAVE DIFFICULTY WITH

COMMON PROBLEMS

- As a prolonged ground-run is normal with aerotowing, it may be expected that you will initially have difficulty in keeping position behind the tug. Use Aileron, Rudder and Elevator independently of each other.
- Wings not kept level – you may not identify that one wing is lower. You need to identify this through reference to the horizon ahead and through peripheral vision.
- Insufficient control movement at low speed, aileron and rudder.
- Failure to adopt the takeoff attitude results in very fast taxiing with unstable handling. Instructor intervention will likely be required in the first attempts.
- Glider continues to climb after separation due to increasing effectiveness of the elevator.
- When the tug separates, it is likely that the student will have difficulty in moving cleanly into the low-tow position.

HOW DO YOU DEMONSTRATE COMPETENCE?

- Pre -Take Off checks are performed with options for launch emergencies identified (CHAOTIC).

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- Airspace clearance for launch is confirmed.
- Locate and identify yellow release handle and place hand in close proximity.
- Independent non coordinated control inputs are applied whilst on the ground:
 - Glider is kept straight behind tug using rudder;
 - Wings are kept level using aileron;
 - Elevator is used to balance the glider on the mainwheel in the correct takeoff attitude.
- Aircraft is allowed to separate from ground, held in position no higher than the height of the tug's fin.
- Use coordinated control movements once off the ground.
- Controlled transition to low tow is achieved when the tug is positively established in the climb at a safe height.
- Maintain position just below slipstream of tug.
- Maintain wings parallel to tug wing.
- Monitor options for cable break actions.
- Maintain lookout for conflicting traffic.
- Maintain situational awareness.

RESOURCES & REFERENCES

- Australian Gliding Knowledge (AGK) pages 106-8, 111.
- GFA MoSP 2 Operations

SELF-CHECK QUESTIONS

Use these questions to test your knowledge of the unit.

- When are emergency options planned for takeoffs?
- What clearance is required by the pilot before takeoff?
- What should be the trim position for an aerotow takeoff?
- Which control is used to maintain directional control on the takeoff run?
- Which control is used to put the aircraft level on its mainwheel on the takeoff run?
- What height is climbed to after glider separation and what reference point is used?
- When is transition to low tow conducted?