CHAPTER 7

Launch and Recovery Procedures and Flight Maneuvers

This chapter discusses glider launch and takeoff procedures, traffic patterns, landing and recovery procedures, and flight maneuvers.

AEROTOW LAUNCH SIGNALS

Launching a non-powered glider requires the use of visual signals for communication and coordination between the glider pilot, towpilot, and launch crewmembers. If the aircraft and launch crewmembers are equipped with compatible radios, communication is enhanced over hand signals. Aerotow launch signals consist of pre-launch signals and in-flight signals.

PRE-LAUNCH SIGNALS FOR AEROTOW LAUNCHES

Aerotow pre-launch signals facilitate communication between pilots and launch crewmembers preparing for the launch. These signals are shown in Figure 7-1.

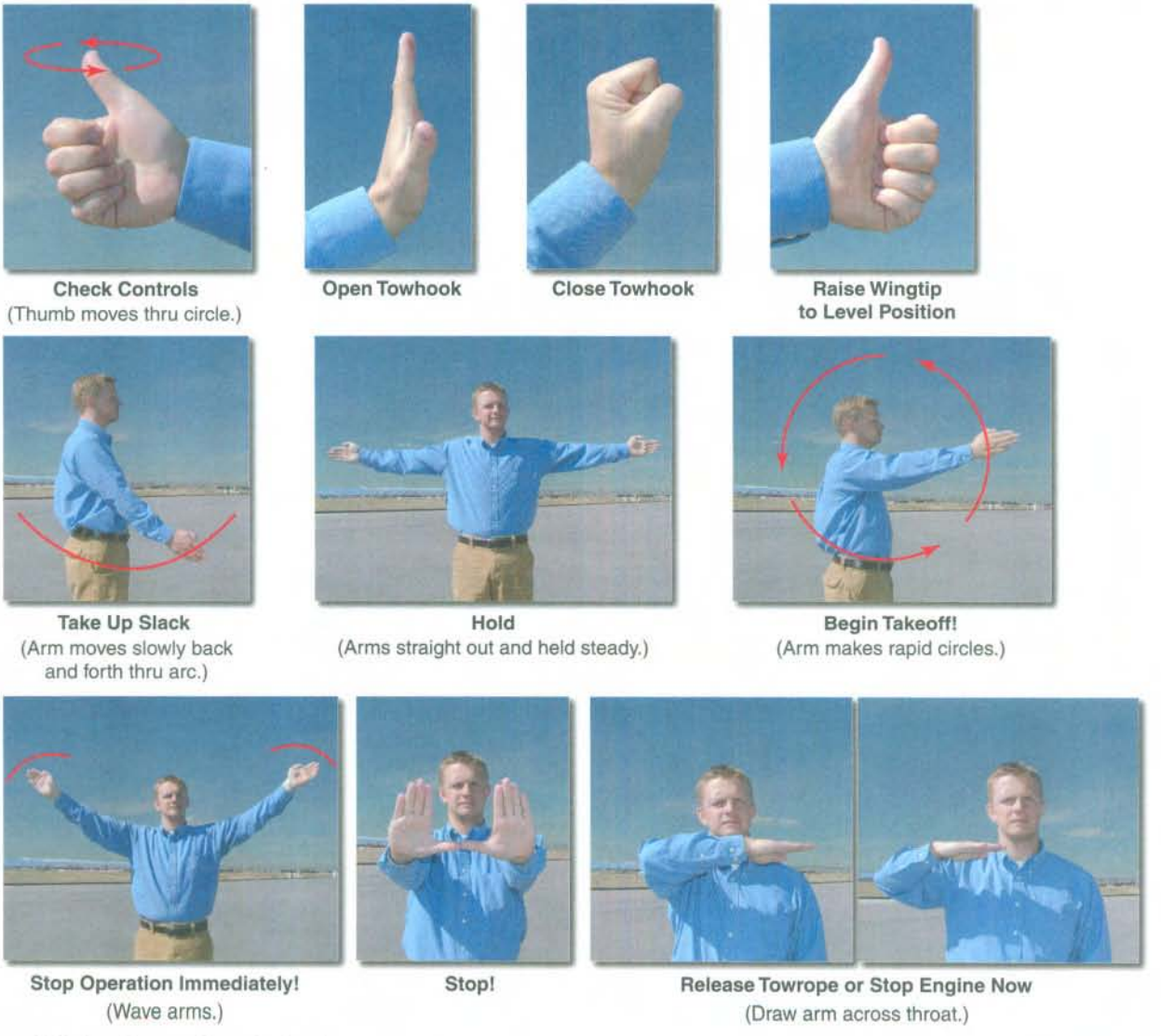

Figure 7-1. Aerotow pre-launch signals.

IN-FLIGHT AEROTOW VISUAL SIGNALS

Visual signals allow the towpilot and the glider pilot to communicate with each other. The signals are divided into two types: those from the towpilot to the glider pilot, and those from the glider pilot to the towpilot. These signals are shown in Figure 7-2.

TAKEOFF PROCEDURES AND TECHNIQUES

Takeoff procedures for gliders require close coordination between launch crewmembers and pilots. Both the glider and towpilot must be familiar with the appropriate tow procedures.

AEROTOW TAKEOFFS

Normal takeoffs are made into the wind. Prior to takeoff, the towpilot and glider pilot must reach an agreement on the plan for the aerotow. The glider pilot should ensure that the launch crewmember is aware of safety procedures concerning the tow. Some of these items would be proper runway and pattern clearing procedures and glider configuration checks (spoilers closed, tailwheel dolly removed, canopy secured). When the required checklists have been completed and

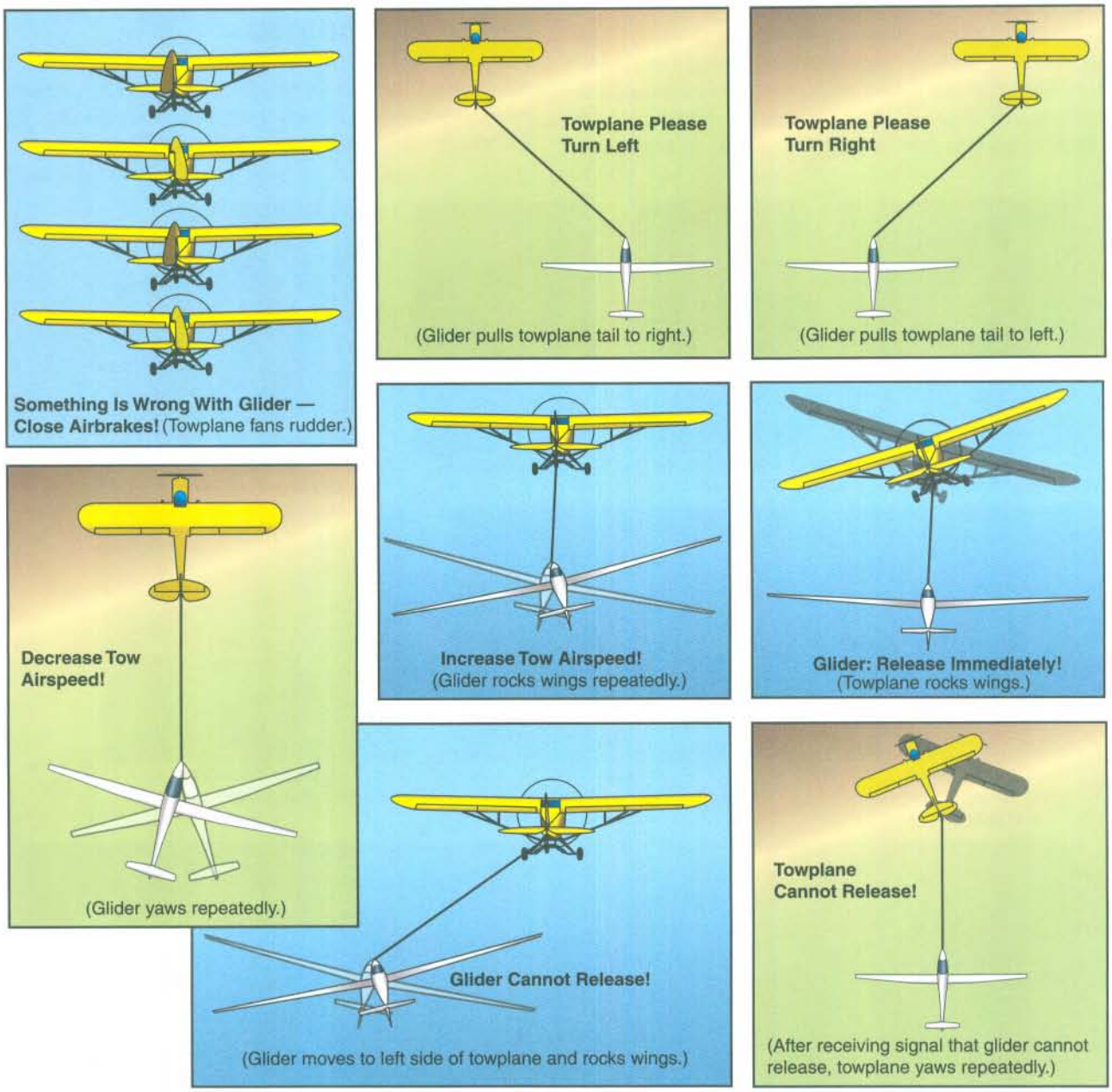

Figure 7-2. In-flight aerotow visual signals.

both the glider and towplane are ready for takeoff, the glider pilot signals the launch crewmember to hook the towrope to the glider.

NORMAL TAKEOFFS

The hook-up should be done deliberately and correctly, and the release mechanism should be checked for proper operation. The launch crewmember applies tension to the towrope and signals the glider pilot to activate the release. The launch crewmember should verify that the release works properly and signals the glider pilot. When the towline is hooked up to the glider again, the launch crewmember repositions to the wing that is down. When the glider pilot signals "ready for takeoff" the launch crewmember clears both the takeoff and landing area, then signals the towpilot to "take up slack" in the towrope. Once the slack is out of the towrope, the launch crewmember verifies that the glider pilot is ready for takeoff, then raises the wings to a level position. With the wings raised, the launch crewmember does a final traffic pattern check and signals the towpilot to takeoff. At the same time, the glider pilot signals the towpilot by wagging the rudder back and forth, concurring with the launch crewmember's takeoff signal. The procedures may differ somewhat from site to site, so follow local convention.

As the launch begins and the glider accelerates, the launch crewmember runs alongside the glider, holding the wing level. If there is a crosswind, the launch crewmember should hold the wing down into the wind, but not in a way as to steer the glider from the wingtip.

When the glider achieves lift-off airspeed, the glider pilot eases the glider off the ground and climbs to an altitude within three to five feet of the runway surface, while the towplane continues to accelerate to lift-off speed. The glider pilot should maintain this altitude by applying forward stick pressure, as necessary, while the glider is accelerating. Once the towplane lifts off, it accelerates in ground effect to the desired climb airspeed, then the climb begins for both the glider and the towplane.

During the takeoff roll, use the rudder pedals to steer the glider. Control the bank angle of the wings with aileron. Full deflection of the flight controls may be necessary at low airspeeds, but the flight controls become more effective as airspeed increases. [Figure 7-3]

In most takeoffs, the glider achieves flying airspeed before the towplane. However, if the glider is a heavily ballasted glider, the towplane may be able to achieve liftoff airspeed before the glider. In such a situation, the towplane should remain in ground effect until the glider is off the ground. Climb-out must not begin until the previously agreed upon climb airspeed has been achieved.

Figure 7-3. Tracking the runway centerline.

CROSSWIND AEROTOW TAKEOFFS

Crosswind takeoff procedures are a modification of the normal takeoff procedure. The following are the main differences in crosswind takeoffs.

- The glider tends to yaw, or weathervane, into the wind any time the main wheel is touching the ground. The stronger the crosswind, the greater the tendency of the glider to turn into the wind.
- After liftoff, the glider tends to drift toward the downwind side of the runway. The stronger the crosswind, the greater the glider's tendency to drift downwind.

Prior to takeoff, the glider pilot should coordinate with the launch crewmember to hold the upwind wing slightly low during the initial takeoff roll. If a crosswind is indicated, full aileron should be held into the wind as the takeoff roll is started. This control position should be maintained while the glider is accelerating

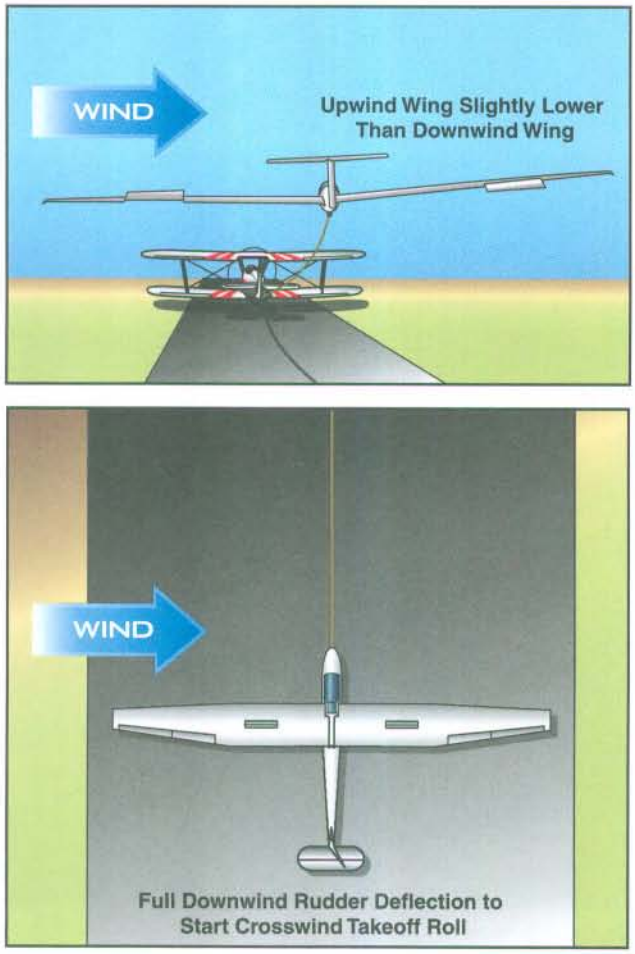

Figure 7-4. Crosswind correction or takeoff.

and until the ailerons start becoming sufficiently effective for maneuvering the glider about its longitudinal (roll) axis. With the aileron held into the wind, the takeoff path must be held straight with the rudder. This requires application of downwind rudder pressure, since the glider tends to weathervane into the wind while on the ground. [Figure 7-4]

As the forward speed of the glider increases and the crosswind becomes more of a relative headwind, the many mechanical application of full aileron into the wind should be reduced. It is when increasing pressure is being felt on the aileron control that the ailerons are becoming more effective. Because the crosswind component effect does not completely dissipate, some aileron pressure must be maintained throughout the takeoff roll to prevent the crosswind from raising the upwind wing. If the upwind wing rises, exposing more surface to the crosswind, a "skipping" action may result, as indicated by a series of small bounces occurring when the glider attempts to fly and then settles back onto the runway. This side skipping imposes side loads on the landing gear. Keeping the upwind wingtip slightly lower than the downwind wingtip prevents the crosswind from getting underneath the upwind wing and lifting it. If the downwind wingtip touches the ground, the resulting friction may cause the glider to yaw in the direction of the dragging wingtip. This could lead to loss of directional control.

While on the runway throughout the takeoff, the glider pilot uses the rudder to maintain directional control and alignment behind the towplane. Yawing back and forth behind the towplane should be avoided, as this effects the ability of the towplane pilot to maintain control. If glider controllability becomes a problem, the glider pilot must release and stop the glider on the remaining runway. Remember, as the glider slows, the crosswind may cause it to weathervane into the wind.

Prior to the towplane becoming airborne and after the glider lifts off, the glider pilot should turn into the wind and establish a wind correction angle to remain behind the towplane. This is accomplished by using coordinated control inputs to turn the glider. Once the towplane becomes airborne and establishes a wind correction angle, the glider pilot repositions to align behind the towplane.

COMMON ERRORS

- Improper glider configuration for takeoff.
- Improper initial positioning of flight controls.
- Improper use of visual launch signals.
- Failure to maintain alignment behind towplane before towplane becomes airborne.
- Improper alignment with the towplane after becoming airborne.
- Climbing too high after liftoff and causing a towplane upset.

TAKEOFF EMERGENCY PROCEDURES

The most common emergency situations on takeoff develop when a towrope breaks, there is an inadvertent towrope release, or towplane loses power. There are five planning situations regarding in-motion towrope breaks, uncommanded release, or power loss of the towplane. While the best course of action depends on many variables, such as runway length, airport environment, and wind, all tow failures have one thing in common: the need to maintain control of the glider. Two possibilities are stalling the glider, or dragging a wingtip on the ground during a low altitude turn and cartwheeling the glider. [Figure 7-5]

Situation 1. If the towrope breaks or is inadvertently released prior to the towplane's liftoff, the standard procedure is for the towplane to continue the takeoff and clear the runway, or abort the takeoff and remain on the left side of the runway. If the towplane loses power during the takeoff, the towpilot should maneuver the towplane to the left side of the runway. If the glider is still on the runway, the glider pilot should pull

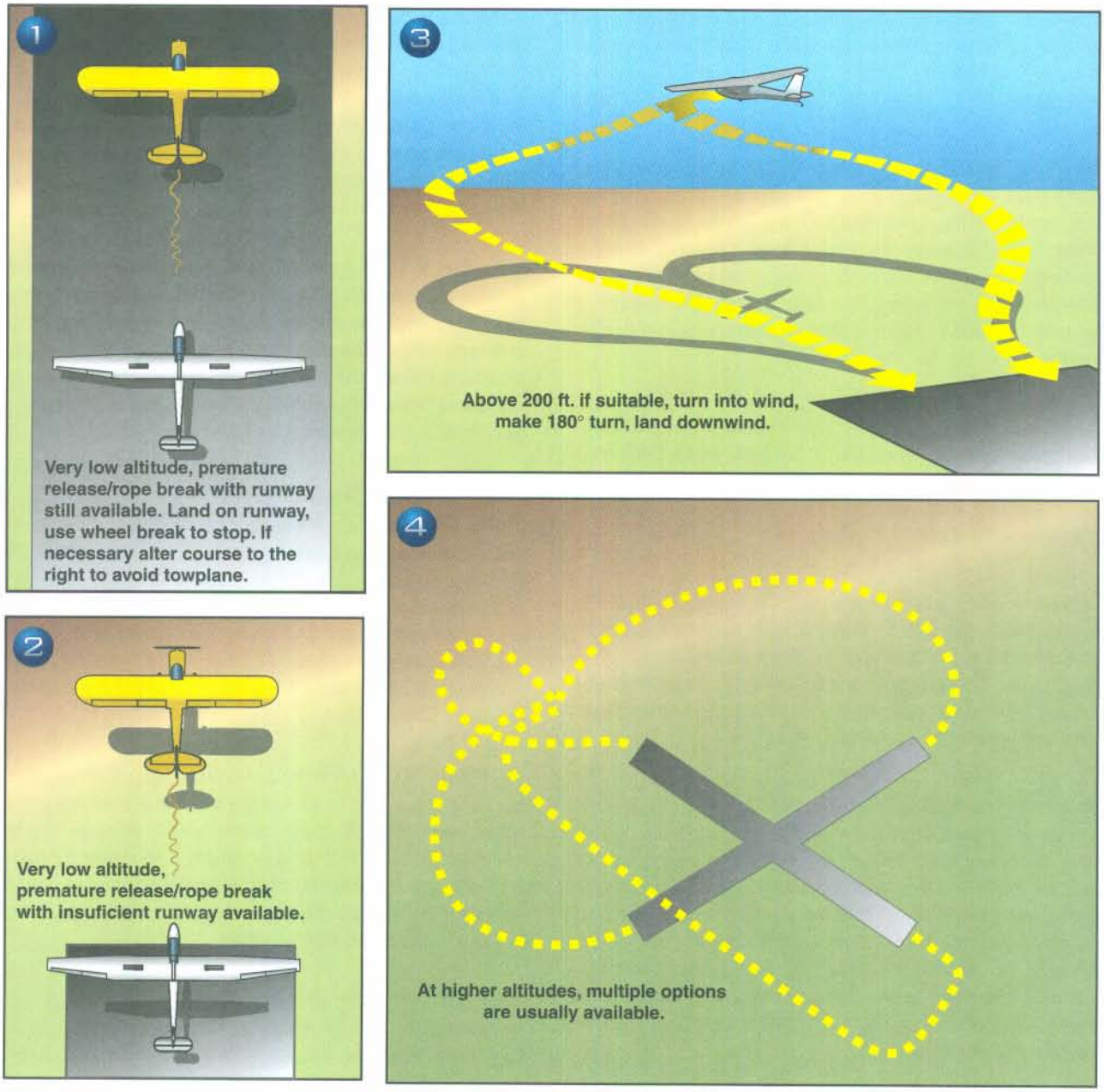

Figure 7-5. Situations for towline break, uncommanded release, or power loss of the towplane.

the release, decelerate using the wheel brake, and be prepared to maneuver to the right side of the runway. If the rope breaks, is inadvertently released, or the towplane loses power after the glider is airborne, the glider pilot should pull the towrope release, land straight ahead, and be prepared to maneuver to the right side of the runway. Pulling the towrope release in either case ensures that the rope is clear of the glider. Since local procedures vary, both the glider and towpilot must be familiar with the specific gliderport/airport procedures.

Situation 2. This situation occurs when both the towplane and glider are airborne and at a low altitude. If an inadvertent release, towrope break, or a signal to release from the towplane occurs at a point in which the glider has insufficient runway directly ahead and has insufficient altitude to make a safe turn, the best course of action is to land the glider straight ahead. After touchdown, use wheel brake, as necessary, to slow and stop as conditions permit. At low altitude, attempting to turn prior to landing is very risky because of the likelihood of dragging a wingtip on the ground and cartwheeling the glider. Slowing the glider as much as possible prior to touching down and rolling onto unknown terrain generally is the safest course of action. Low speed means low impact forces, which reduce the likelihood of injury and reduce the risk of significant damage to the glider.

Situation 3. If an inadvertent release, towrope break, or a signal to release from the towplane occurs after the