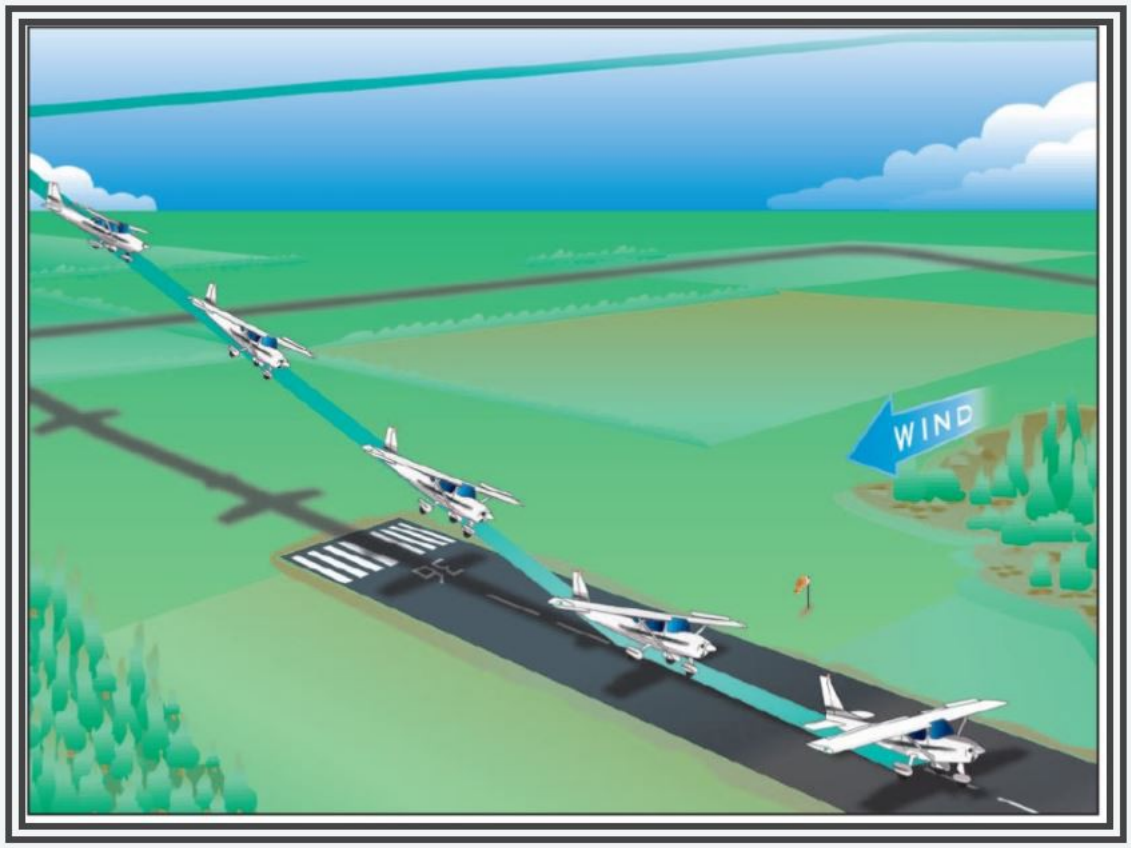
Ex. 15 - Slipping

What you will learn:

- ✓ How to enter, hold and recover from a slip
- ✓ How to use side- and forward slips.

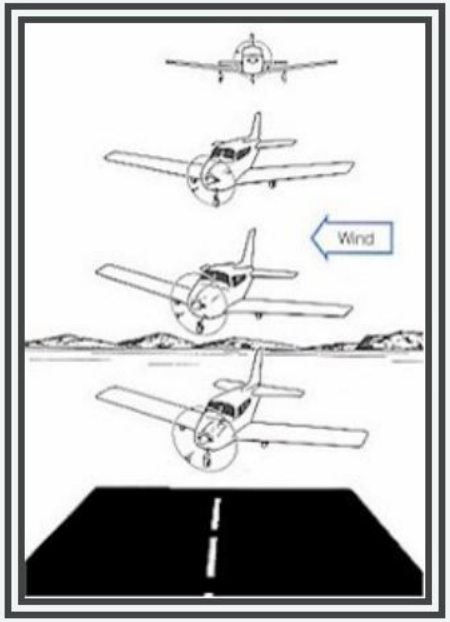


Why learn this:

- ✓ Slips are useful for:
  - losing altitude quickly without increasing airspeed
  - eliminating drift in crosswind landings
  - sightseeing
  - some emergency situations (windshield iced over, wing fire).

Links:

- ✓ You have already practiced:
  - descents
  - turns
  - using rudder for controlling yaw
  -
- ✓ These combined can produce a slip.

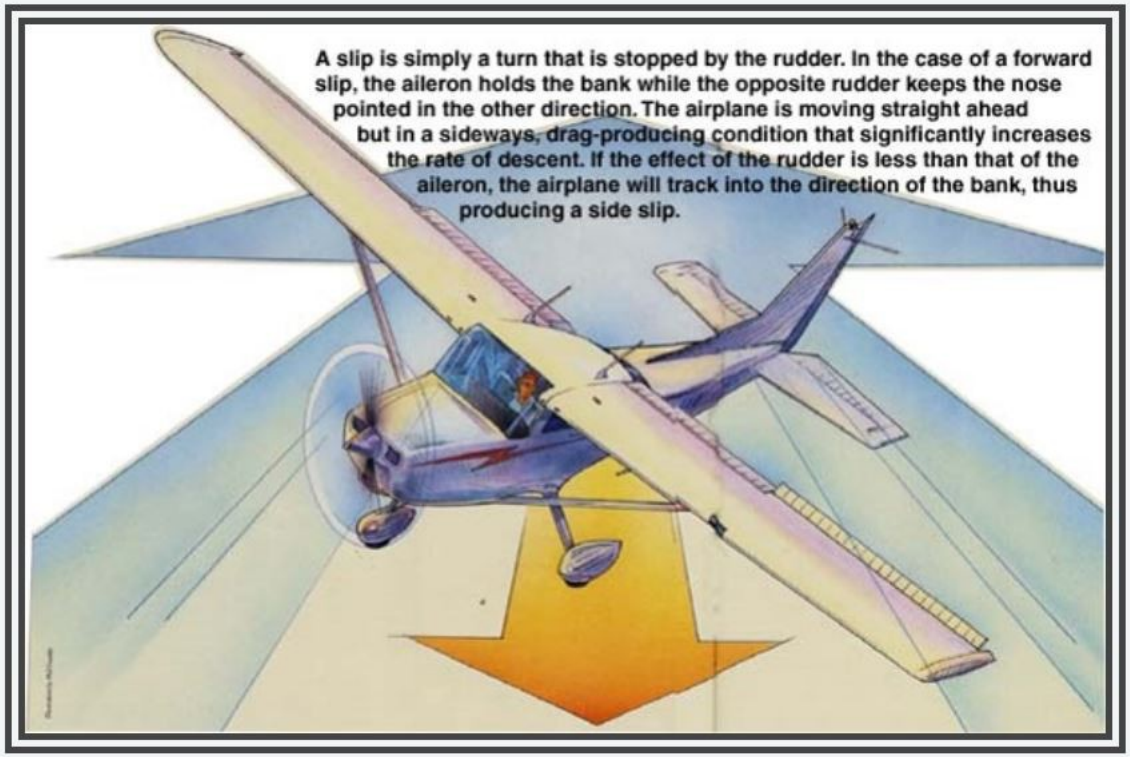


Review:

- What is adverse yaw and how does a pilot control it?
- What controls altitude during a descent? Airspeed?
- What are the methods you know for increasing descent rate without increasing airspeed?
- Which instrument helps you recognize whether you're coordinated, in a slip, or in a skid?

What is a Slip

- ✓ FTM: “Slipping is a maneuver in which the aircraft is placed in a banked attitude but its tendency to turn is either reduced or prevented by the use of rudder.”



Forward Slip

- ✓ Forward slip: airplane is at an angle to the flight path
- ✓ Lose altitude without gaining airspeed

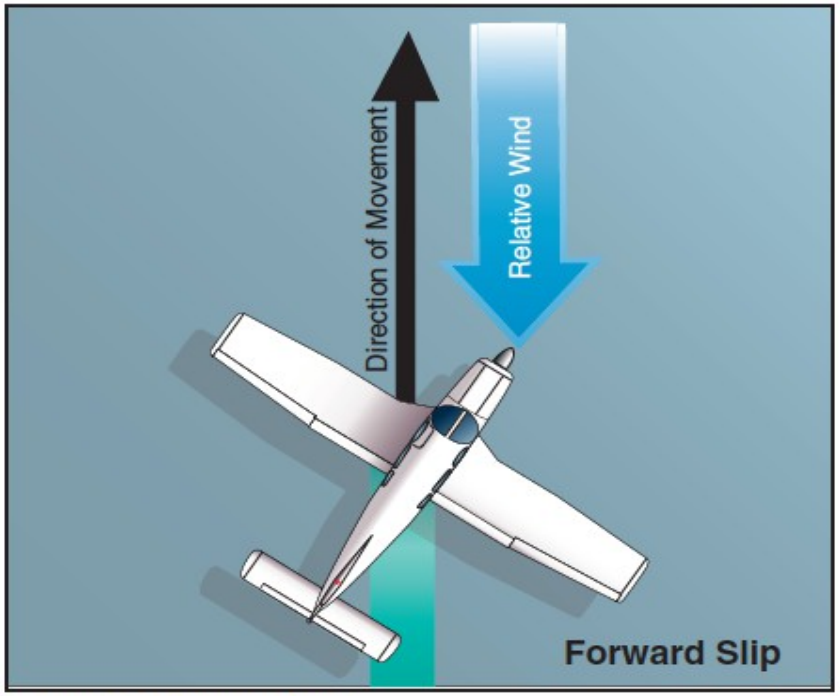


Figure 8-13. Forward slip.

In a forward slip the relative airflow strikes the fuselage at an angle, increasing parasite drag. When might this be useful?

Why not just use flaps?

- flaps can fail
- some planes do not have flaps
- flaps + slips can be combined to produce an even steeper descent than flaps alone.

Side-Slip

- ✓ In a side-slip, the longitudinal axis of the airplane remains parallel to the original flight path
- ✓ Used to offset drift in crosswind landings

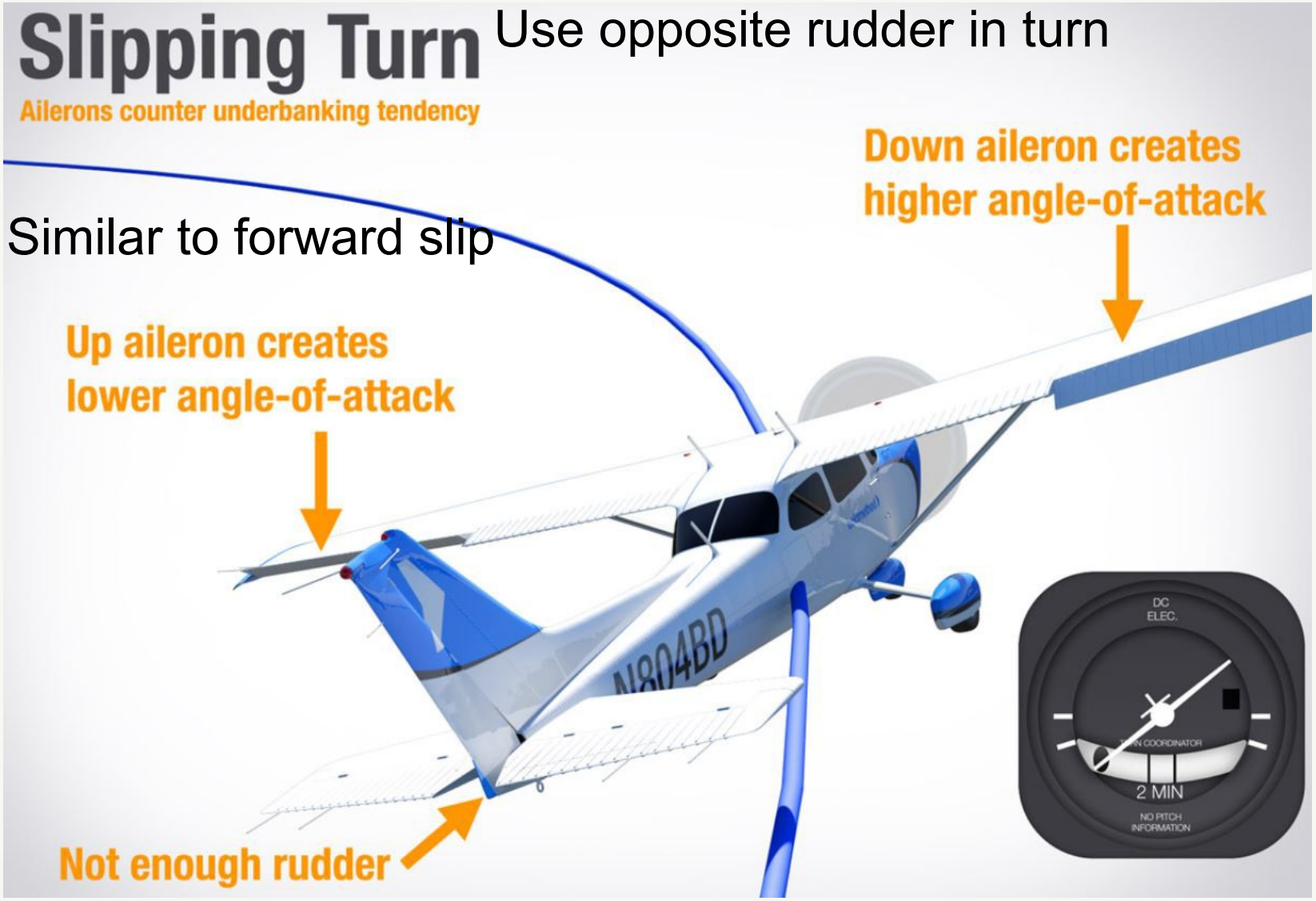
Figure 8-16. Sideslip approach.

What could THIS be be useful for?
Hint: how would your flight path change if the wind was coming from the left?

Why not offset drift by crabbing? Flying coordinated, pointing a bit into the wind?)

Slipping Turn

Use opposite rudder in turn



Similar to forward slip

Used to lose altitude in a turn.

Forward Slip: Entry

Line up with runway, a bit high

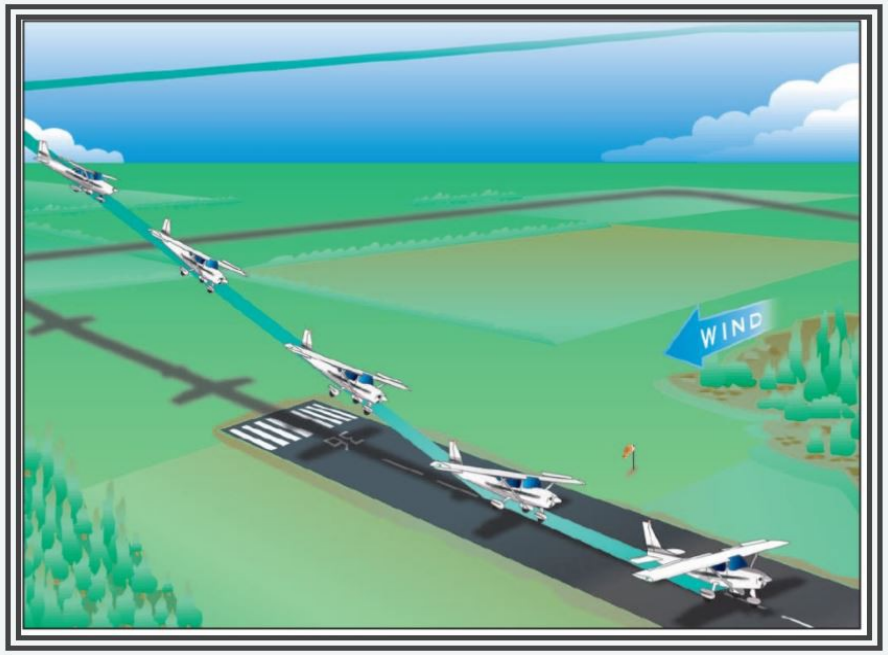
Power idle

Why take away ALL the power?

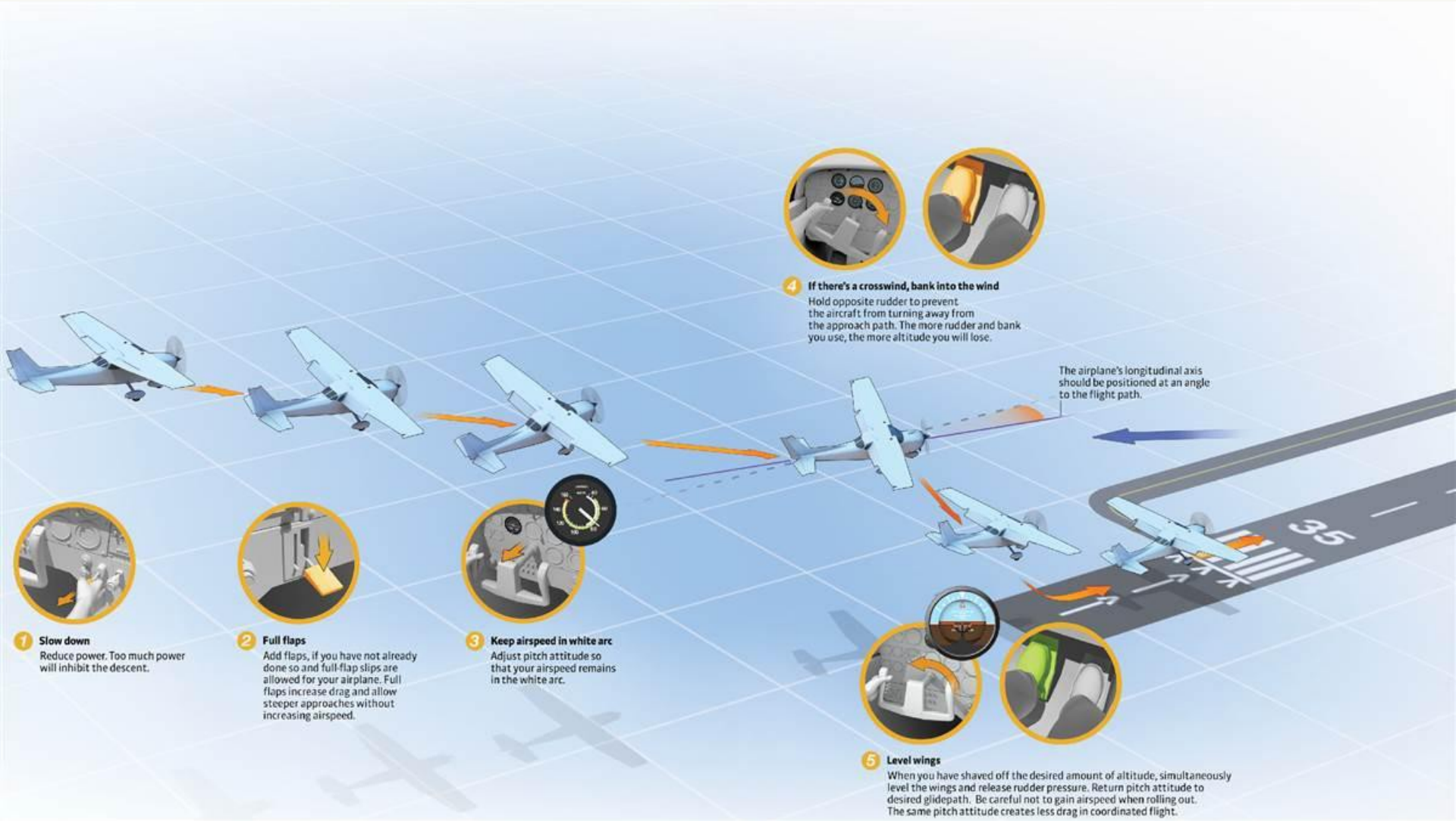
Attitude slightly nose-down

Slight pitch down may be required to maintain airspeed.

Simultaneously roll plane into the wind and apply opposite rudder maintain original track over the ground



Some aircraft can slip with flaps, some can not-airflow over tail



Slip: Recover

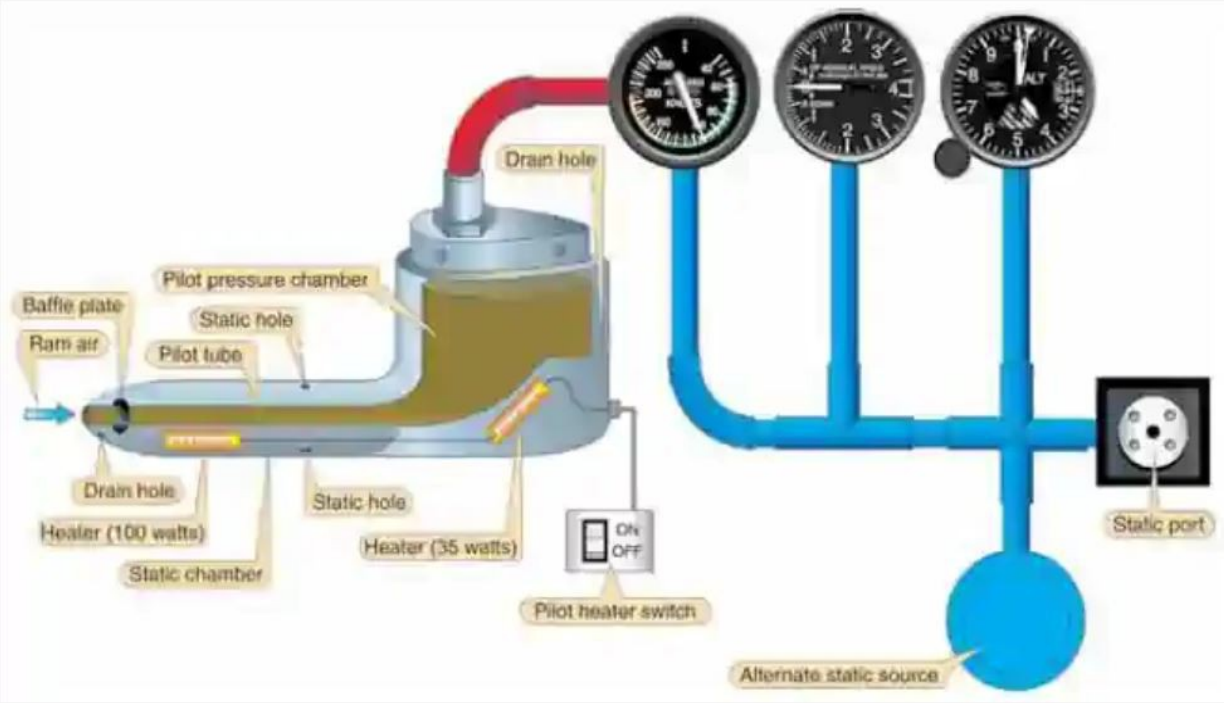
- **Keep good look-out**

  Nose down to maintain airspeed

- Forward slip, aircraft nose pointing off runway into wind; side-slip, pointing at runway
- Both slips, aircraft track straight to runway
- Recover wings level, coordinate rudder

Instruments in a Slip: Airspeed Indicator

- ✓ Airspeed unreliable in a slip.
- ✓ Flying “sideways”, airflow starts hitting the static port and NOT going directly into pitot tube
- ✓ Airspeed will *generally* over-read in a right slip and under-read in a left slip, depends on the airplane



Instruments in a Slip: Turn Coordinator

- ✓ **The miniature airplane of the turn coordinator indicates:**
  - **rate or roll**
  - **rate of turn**

As you are entering a slip, is the plane rolling or turning?

After a slip has been established, is the plane rolling or turning?

- ✓ **During slip entry the miniature airplane will be tilting in the direction of the slip**
- ✓ **After the slip is established, the miniature airplane's wings will be level**
- ✓ **The ball of the turn coordinator indicates whether any yaw is present**

Is any yaw present in a slip?

- ✓ **The ball will be displaced in the direction of the slip.**

What Is the Direction of These Slips?

LEFT SLIP

RIGHT SLIP

SLIPPING LEFT TURN

SKIDDING LEFT TURN!

SAFETY

- Avoid aggressive slips close to the ground: recovery may produce excessive sink rate and result in a poor landing
- Avoid skidding! Always use opposite ailerons and rudder
- Avoid prolonged slips when fuel quantity is low (<$^1/_4$ tanks)
- Remember that your airspeed indicator will under-read or over-read in a slip, depending on slip direction
- Do a good lookout prior to a slip: due to the “crooked” attitude, your visibility will be restricted.

Review

- What is a forward slip and when might you use it?
- What is a side-slip and when might you use it?
- Why is the airspeed indicator not accurate in a slip?
- During a side-slip to the right you notice that the crosswind from the right is pushing you to the left of the runway. How do you fix that?
- During a side-slip to the right you notice that the plane is pointing to the left of the runway. How do you fix that?

Conclusion

- ✓ This is one of the final exercises to master before you're ready to start practicing landings!
- ✓ It's crucial to be comfortable with slipping, since a good slipping technique is a key to perfect crosswind landings
- ✓ Read for next lesson: Ex. 16, 17, 18 (Take-off, The Circuit, Approach and Landing)

QUESTIONS?