



# Contact Information

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- Bookings, Questions



# Slipping

- Review *Coordinated Flight*
- Definition and Motivation
- Slips
- Summary and Questions
- Pre-Flight Briefing

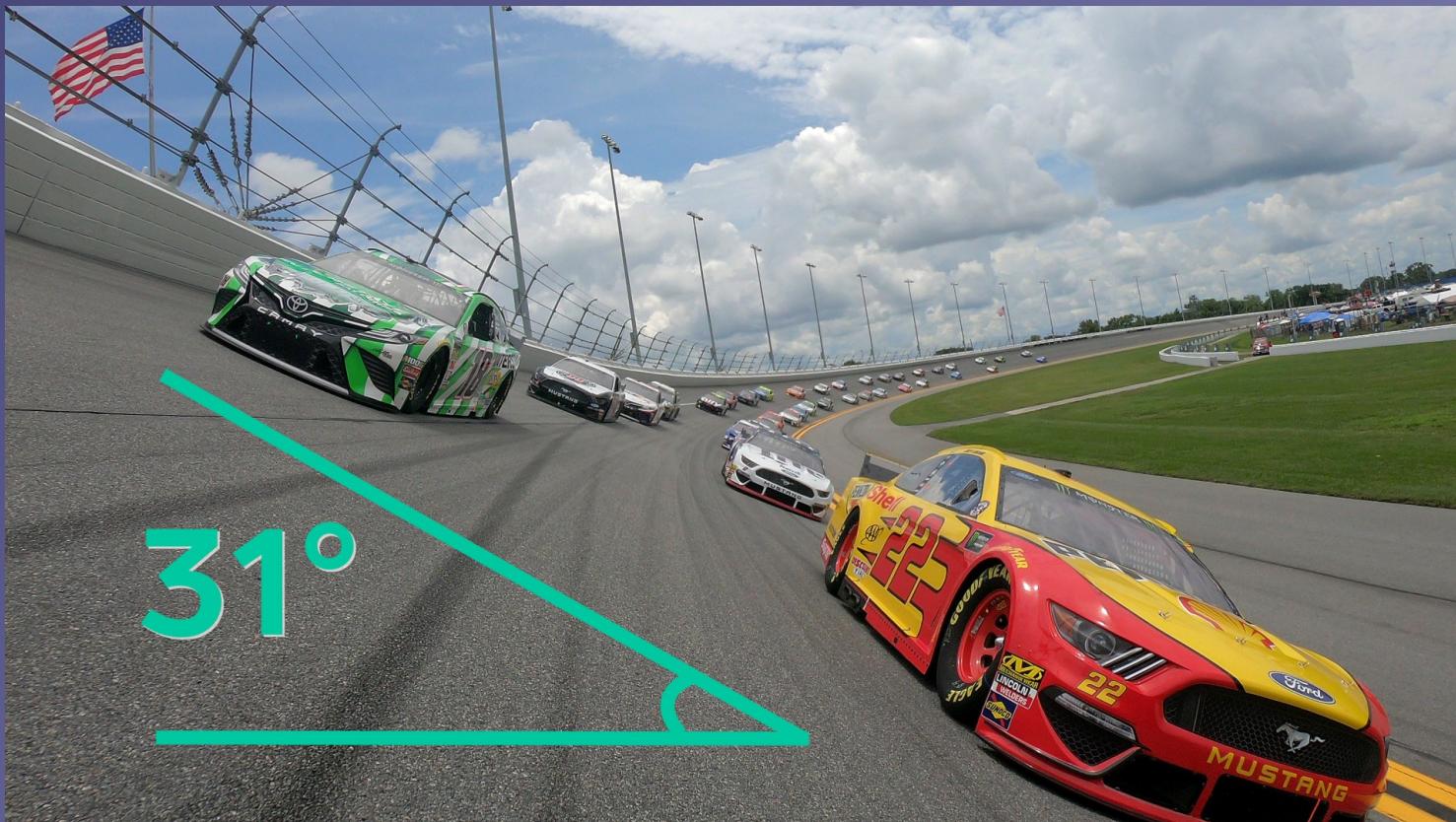


# Review Coordinated Flight

- Define *coordinated flight* and what needs to be done to remain *coordinated*.
- What instrument helps to remain *coordinated*?
- Give examples of when control inputs need to be more pronounced to remain *coordinated*.
- What would you feel during a turn with too little or too much rudder application?



# Coordinated Turns



- Coordination: *corresponding bank angle* and **rate of turn**
- Horizontal and vertical forces are *balanced* during coordinated turns



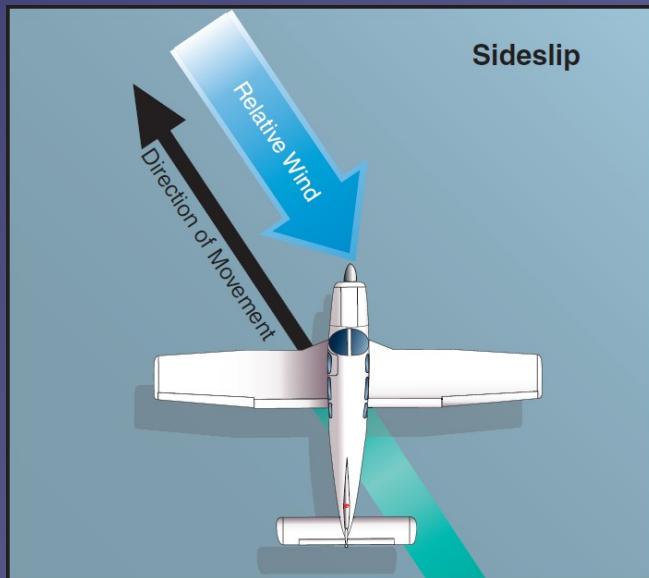
# Definition and Motivation



- *Uncoordinated flight with insufficient rate of turn*
- Sideways **force** towards *low wing* while **drag** is increased
- Types: **side slip** and **forward slip**
- Applications: **crosswind landings, power-off descents, emergencies**



# Side Slip



- **Longitudinal axis** is *parallel* to original flight path
- Banked attitude (wing low) into the wind to *prevent* sideways **drift**
- *Just enough* opposite **rudder** to *prevent* turn
- Aircraft would *not* achieve a straight track during side slip without wind
- Compensates **drift** during **crosswind landings**



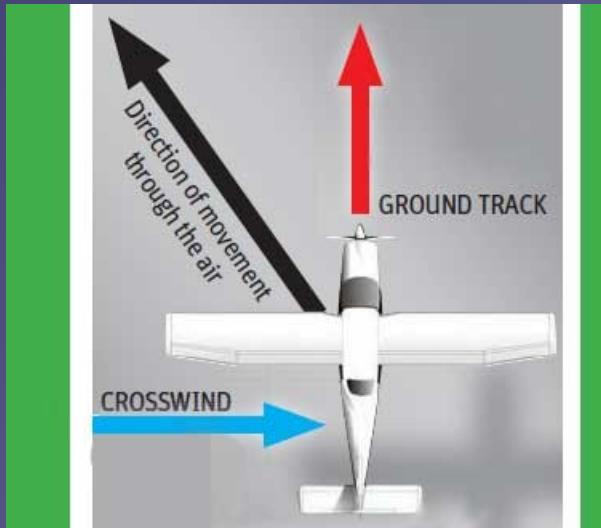
# Entering a Side Slip



- Roll one wing *into the wind* using **ailerons** while *simultaneously*
- Apply *just enough* opposite **rudder** to *prevent turn*
- Apply **elevator** as *required* to desired maintain **pitch attitude**
- Adjust and balance **aileron** and **rudder** input for desired **heading**



# Maintaining a Side Slip



- Continuously balance **aileron** and **rudder** for desired **heading**
- Adjust *balance* to obtain desired **track** over ground
- *Steer like a car and keep straight with rudder*
- Apply as required **aileron** to adjust **drift** → **track**
- Apply as required **rudder** to keep **straight** → **heading**
- Use **elevator** to maintain desired **airspeed** and **pitch attitude**



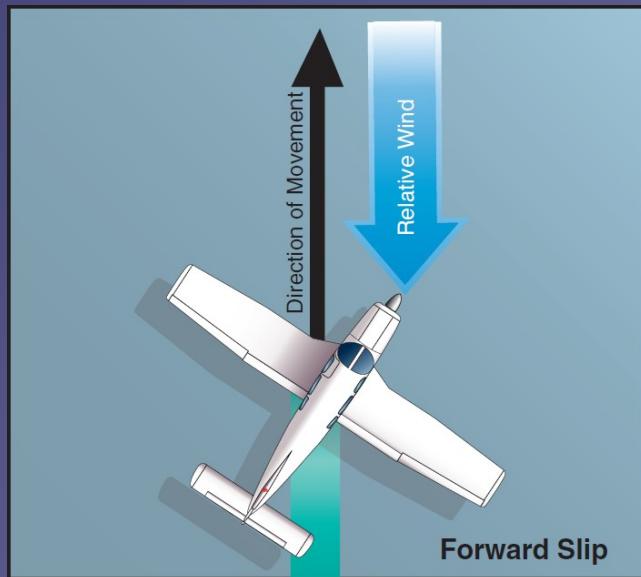
# Recovering a Side Slip



- Release **rudder** pressure while *simultaneously*
- Roll wings level using **ailerons**
- Adjust **pitch attitude** with **elevator**
- Resume **coordinated flight** in landing flare or *stable descent*



# Forward Slip



- **Longitudinal axis** is *offset* from original flight path
- Banked attitude (wing low) into the wind to increase **parasite drag**
- *Up to full* opposite **rudder** to control **rate of descent**
- Aircraft is crabbing and achieves a straight track without wind
- Increased **rate of descent** without increasing airspeed



# Entering a Forward Slip



- Roll one wing *into the wind* using **ailerons** while *simultaneously*
- Apply *up to full* opposite **rudder** to control **rate of descent**
- Apply **elevator** forward-pressure to maintain **pitch attitude**
- Adjust and *balance* **aileron** and **rudder** input for desired **track**



# Maintaining a Forward Slip



- Continuously balance **aileron** and **rudder** for desired track
- More **aileron** and opposite **rudder** increases **rate of descent**
- Less **aileron** and opposite **rudder** decreases **rate of descent**
- Use **elevator** to maintain desired **airspeed** and **pitch attitude**



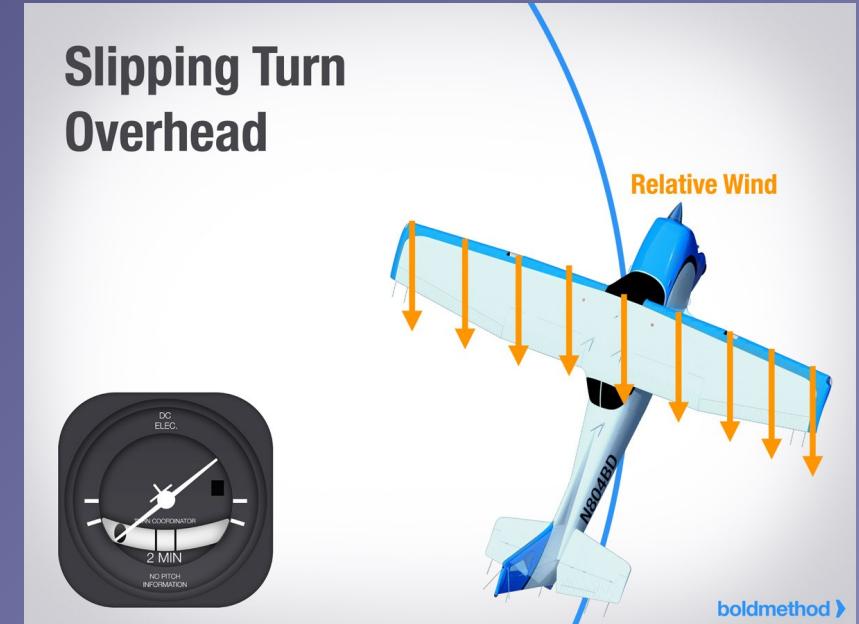
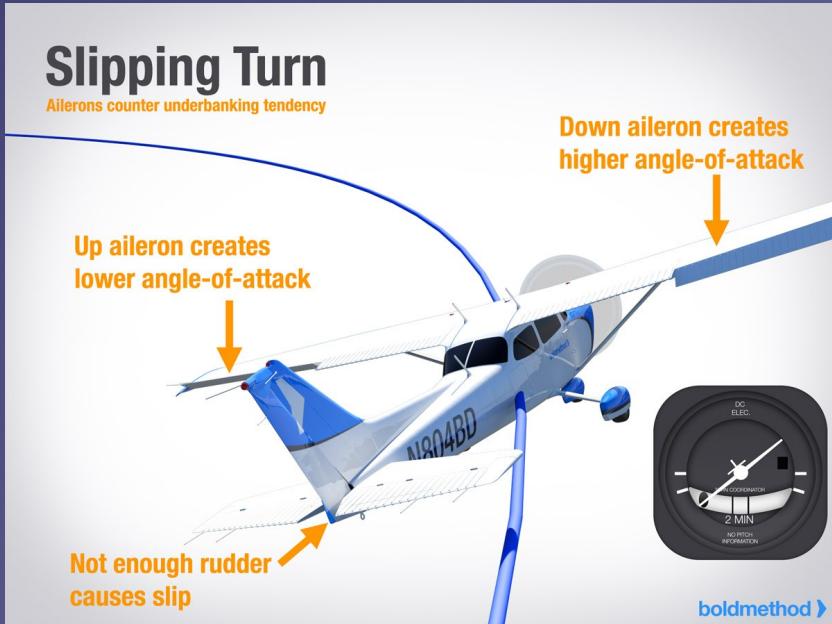
# Recovering a Forward Slip



- Release **rudder** pressure while *simultaneously*
- Roll wings level using **ailerons**
- Adjust **pitch attitude** with **elevator**
- Resume **coordinated flight** at level or in *stable* descent



# Slipping Turns



- Apply **rudder** opposite to the turn *as required*
- More opposite **rudder** *decreases rate of turn*
- More opposite **rudder** *increases rate of descent*
- Application: higher rate of descent during turn to final



# Instruments



- Turn **coordinator** with inclinometer – slip versus skid
- Airspeed indications are erroneous (*position error*)
- Rate of descent increases during forward slips



# Safety Considerations

- **HASEL** (except if briefed and practiced in the circuit)
- Maximum **30s** slip or skid duration one tank dry
- With  **$\frac{1}{4}$**  tank *prolonged uncoordinated flight is prohibited* when operating with left / right tank
- Elevator **oscillations** possible with more than **20°** flaps
- *Incorrect fuel gauges*
- Avoid skids at all times (*accelerated outer wing*)
- Recover to coordinated flight before changing slip direction



# Summary / Quiz

- Define a slip and explain the difference between a side and a forward slip and their applications.
- Mentally perform a side slip and state all observations and actions.
- Mentally perform a forward slip and state all observations and actions.
- Define a slipping turn and give an application example.



# Pre-Flight Briefing

- Exercise
- Training Area
- Departure and Arrival Procedures
- Weather Briefing / NOTAMs
- Aircraft and Documents
- Time and Fuel Requirements
- Safety Considerations and Responsibilities



# Additional Materials

- Additional materials for Slipping
- Flight Instructor Guide – Exercise 15, Lesson Plans 7, 8