

IFR Made Easy!

Instrument Procedures Simplified for Single-Pilot Operations

Saturday, February 10, 2024

Reading Regional Airport (RDG)

Sponsored by

FAA Safety Team
and
NorthEast Bonanza Group

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Welcome

- Exits
- Restrooms
- Emergency Evacuation
- Breaks
- Silence Phones & Pagers
- Sponsor Acknowledgment
- Other



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FOR TRAINING USE ONLY

WARNING

- We can't cover every specific autopilot, avionics, or aircraft configuration.
- These are general principles.
- Expert training from a qualified CFI in your airplane is highly recommended.

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Objectives

- Challenges of Single-Pilot IFR
- Autopilot as a tool in single-pilot operations
- SOPs to make instrument flying easier

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In the early days of aviation, aircraft required the continuous attention of a pilot to fly safely. As aircraft range increased, which enabled flights of many hours, the constant attention led to serious fatigue.

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No type of flying requires greater skill or longer periods of concentration than Single Pilot IFR.

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What is the problem?

Pilot workload, aggravated by the need for multi-tasking

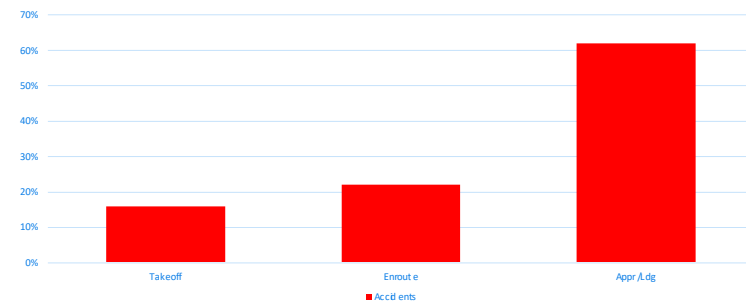
A single IFR pilot also serves as:

- Navigator
- Radio Operator
- Systems Manager
- Onboard Meteorologist
- Record Keeper
- Flight Attendant



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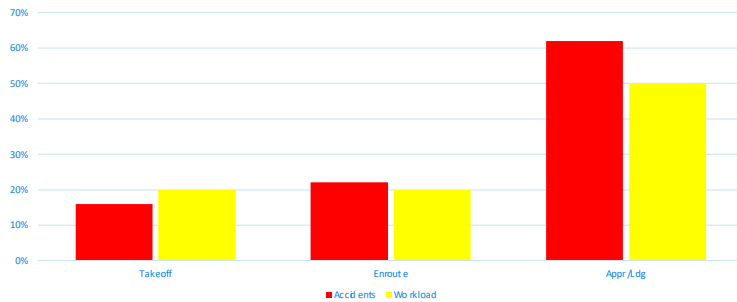
When do most accidents happen?



Source: NTSB US Civil Aviation Accident Dashboard: 2008-2022

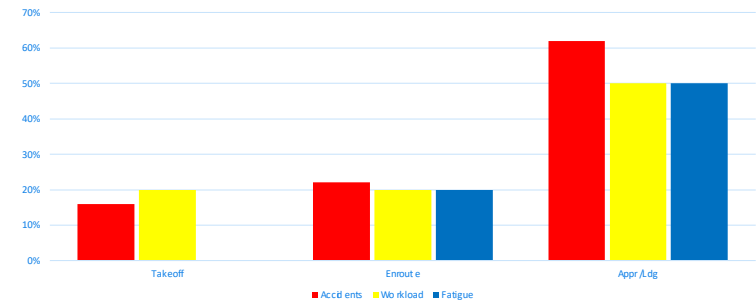
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When do most accidents happen?



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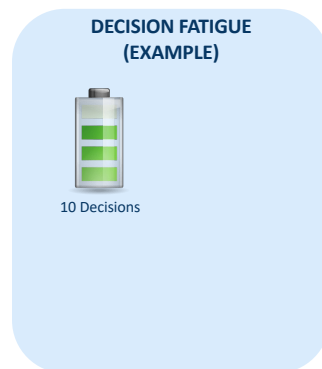
When do most accidents happen?



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Decision Fatigue

Decision Fatigue refers to the deteriorating quality of decisions made by an individual after a long session of decision making.



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Decision Fatigue

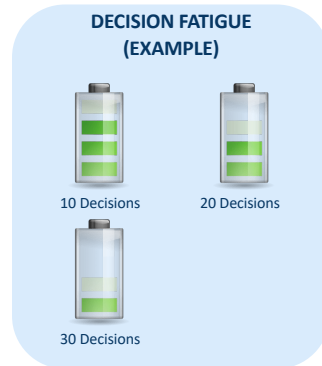
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Decision Fatigue

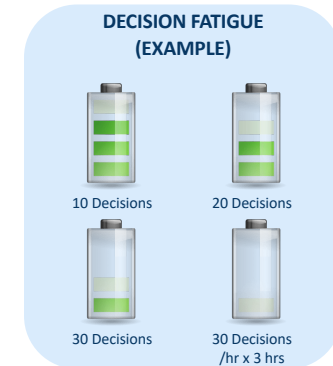
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13

Decision Fatigue

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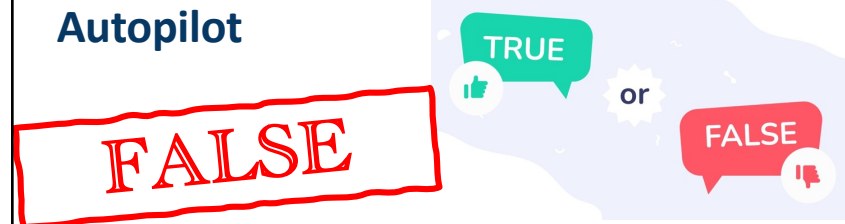
Autopilot

Never hand-fly and waste brain power on the simple stuff if you have an autopilot.



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Autopilot



Pilots should hand fly more and use the autopilot less to be safer.

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Autopilot

Let the autopilot maintain altitude and heading or course while you attend to other things:

- CHECKLISTS
- LOOK OUTSIDE
- CHECK WEATHER
- MANAGE THE BIG PICTURE



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Autopilot Knowledge

Know your autopilot!!!

There is variability in each autopilot and they are configuration and aircraft specific.



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Autopilot Knowledge

RTFM – Read The Flight Manuals!

- Pilot's Guide
- Airplane Flight Manual Supplement (AFMS)
- Training Videos from reputable sources



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Autopilot Limitations

- Every autopilot has limitations that are aircraft/installation specific.
- The autopilot flight manual supplement lists these limitations and must be carried in the aircraft.



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Autopilot Limitations – STec 60-2 (P35)

- Entire Preflight Procedure in supplement must be completed
- Off for takeoff and landing
- Maximum Speed 170 kts
- Go-around or missed approach not authorized during autopilot operation



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Autopilot Limitations – GFC500 (P35)

- Entire Preflight Procedure in supplement must be completed
- Off for takeoff and landing
- Minimum Speed 70 kts
- Max Fuel Imbalance 15 gal
- Disengaged below 200' AGL for approaches
- Disengaged below 800' AGL for ops other than approach operations
- Pilot must be seated in left pilot's seat with seatbelt fastened



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Autopilot Basics

Know how to kill the autopilot!

There are four ways on the GFC-500:

1. AP DISC/TRIM INT button



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Autopilot Basics

Know how to kill the autopilot!

There are four ways on the GFC-500:

1. AP DISC/TRIM INT button
2. Electric Trim Switches



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Autopilot Basics

Know how to kill the autopilot!

There are four ways on the GFC-500:

1. AP DISC/TRIM INT button
2. Electric Trim Switches
3. AP button on mode controller



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Autopilot Basics

Know how to kill the autopilot!

There are four ways on the GFC-500:

1. AP DISC/TRIM INT button
2. Electric Trim Switches
3. AP button on Mode Controller
4. A/P Circuit Breaker



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Autopilot Basics

What MODE am I in?

Lateral Modes:

- HDG
- NAV
- APR
- TRK



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Autopilot Basics

What MODE am I in?

Vertical Modes:

- IAS
- VS
- VNAV
- ALT



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Autopilot Basics

What MODE am I in?



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Autopilot Basics

What MODE am I in?

Mode Annunciator – GI275

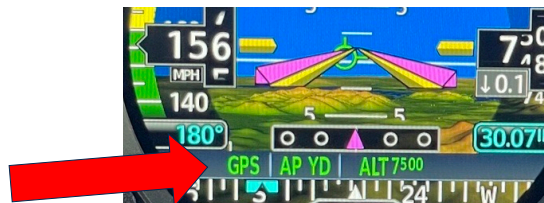


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Autopilot Basics

What MODE am I in?

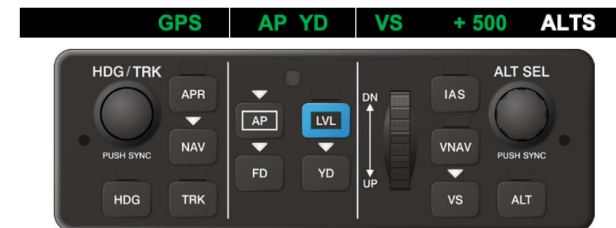
Mode Annunciator – GI275



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Autopilot Basics

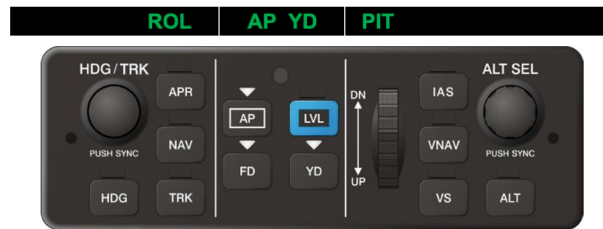
What MODE am I in?



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Autopilot Basics

What MODE am I in?



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Setting up for departure



After departure, fly heading 180, climb and maintain 3,000 feet.

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Setting up for departure



35

Setting up for departure



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Setting up for departure



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Setting up for departure



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Some thoughts on Vertical Modes



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Autopilot Tips

- Pressing the "AP" button before selecting lateral or vertical modes will activate the FD and engage the AP in the default PIT and ROL modes. Always select your desired lateral and vertical modes **before** pressing the "AP" button.
- If lateral/vertical modes are selected but the A/P and F/D are not engaged, you can engage the F/D separately by pressing the "FD" button.

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Autopilot Tips

- If your ALT hold is off by 20-40 feet, use the pitch wheel on the mode controller while ALT mode is engaged. Each click will change the selected altitude reference UP or DN in 10-foot increments.
- If you change nav sources (i.e. GPS to VLOC), the autopilot will revert to ROL mode. Make sure to reselect the appropriate lateral mode.

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Autopilot Tips

- APR or NAV mode? APR mode for an approach with vertical guidance. Otherwise, use NAV mode.
- Vector to intercept final - Press HDG and then press APR (or NAV).
- An "armed" (white) mode can be deactivated by pressing the button again.
- If climbing or descending and you need to level off immediately, press the ALT button twice.

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Autopilot Tips

TOGA (Take Off / Go Around) Mode

1. Add Power for Go-Around
2. Press TOGA button
3. Clean up airplane
4. Unsuspend GPS
5. Select appropriate lateral/vertical modes

Practice in VFR conditions before attempting this in IMC!

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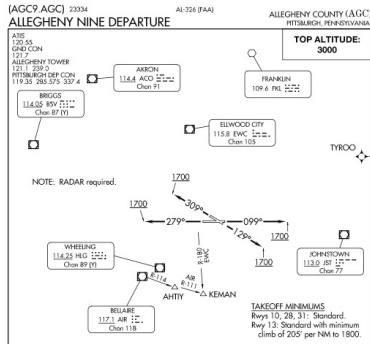
Autopilot Tips

TOGA (Take Off / Go Around) Mode

1. Press TOGA button
2. Above 400' AGL select appropriate lateral/vertical modes.
3. At 800' AGL engage AP.

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SIDs / STARs



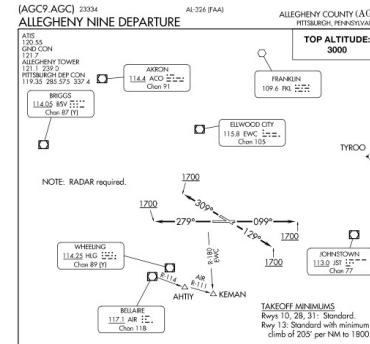
AGC Nine with Wheeling Transition

DEPARTURE ROUTE DESCRIPTION
 TAKEOFF RUNWAY 10: Climb heading 099° until 1700 thence....
 TAKEOFF RUNWAY 13: Climb heading 129° until 1700 thence....
 TAKEOFF RUNWAY 28: Climb heading 279° until 1700 thence....
 TAKEOFF RUNWAY 31: Climb heading 309° until 1700 thence....
 ...expect vectors to assigned route/fix. Maintain 3000. Expect further clearance to requested altitude 10 minutes after departure.

Manual Termination
 = Radar Vector

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SIDs / STARs



Before Takeoff

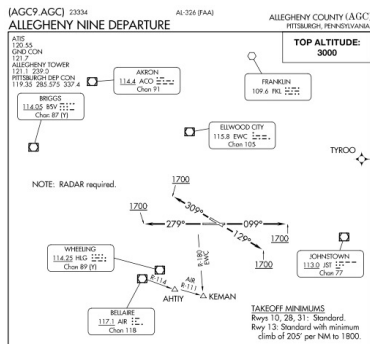
1. AP Self-test & Before Takeoff Check Complete
2. Heading Bug set to 129
3. Altitude Pre-Select set to 3,000'
4. HDG mode is selected on autopilot
5. IAS mode selected (Vy climb is bugged)
6. Flight plan is loaded and Wheeling is selected as the first waypoint.

After Takeoff @ 800'

1. AP On - HDG and IAS with ALTS
2. Verify 3,000 is pre-selected
3. After Takeoff or Climb Checklist

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SIDs / STARs



Cleared "Direct Wheeling"

1. GPS confirm D-> "HLG"
2. Change AP to NAV mode
3. Confirm Status

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Approach Procedures

Instrument
 Approaches: As Easy as
 5 A's and 5 T's

5 A's

ATIS

Altimeter

Alignment

Approach

Avionics

5 T's

Time

Turn

Twist

Throttle

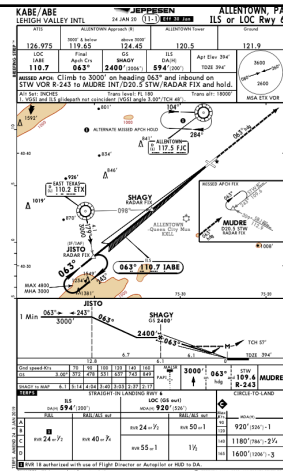
Talk

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Approach Procedures

1. Descent Check – 30 miles out

Atis
Altimeter
Alignment

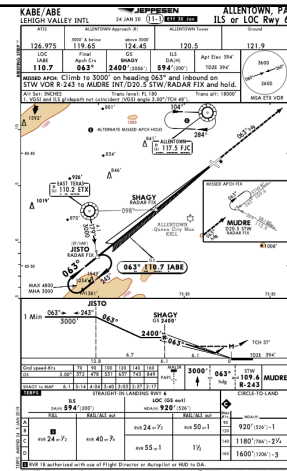


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Approach Procedures

1. Descent Check – 30 miles out

Atis
Altimeter
Alignment
Approach Brief
How long?
How low?
Course to fly?
Where to go?
Avionics



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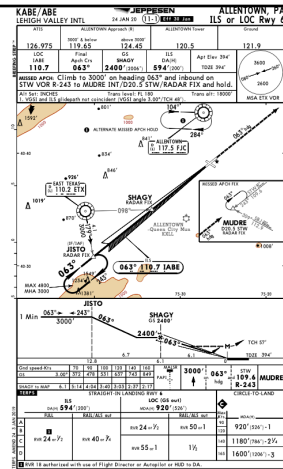
Approach Procedures

1. Descent Check

Atis
Altimeter
Alignment
Approach Brief
How long?
How low?
Course to fly?
Where to go?
Avionics

2. Localizer Alive

Slow to approach
airspeed



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Approach Procedures

1. Descent Check

Atis
Altimeter
Alignment
Approach Brief
How long?
How low?
Course to fly?
Where to go?
Avionics

2. Localizer Alive

Slow to approach
airspeed

3. Glideslope Alive

Gear Down
Before Landing Check



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Approach Procedures

1. Descent Check

Atis
Altimeter
Alignment
Approach Brief
How long?
How low?
Course to fly?
Where to go?
Avionics

2. Localizer Alive

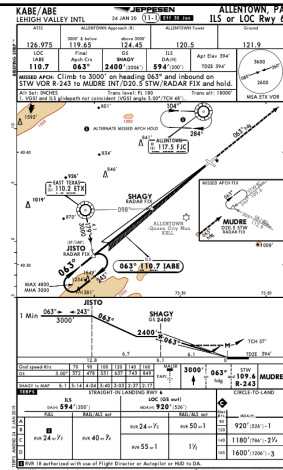
Slow to approach
airspeed

3. Glideslope Alive

Gear Down
Before Landing Check

4. Final Approach Fix

No Flags
Turn
Time
Twist
Throttle
Talk



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Approach Procedures

1. Descent Check

Atis
Altimeter
Alignment
Approach Brief
How long?
How low?
Course to fly?
Where to go?
Avionics

2. Localizer Alive

Slow to approach
airspeed

3. Glideslope Alive

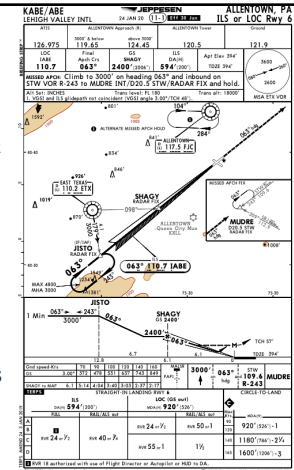
Gear Down
Before Landing Check

4. Final Approach Fix

No Flags
Turn
Time
Twist
Throttle
Talk

5. 500' to Minimums

Stabilized
Cleared to Land
400, 300, 200, 100
Minimums



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Questions?



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FAA WINGS Pilot Proficiency Program

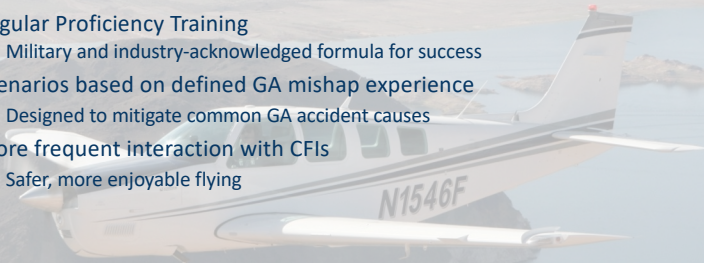
- Knowledge Activities
 - Online courses, Seminars, Webinars
- Flight Activities
 - With an Authorized Instructor
 - Per *WINGS* Syllabi
- *WINGS* Phase
 - 3 Knowledge Credits
 - 3 Flight Credits
 - Within 12 months



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Why WINGS?

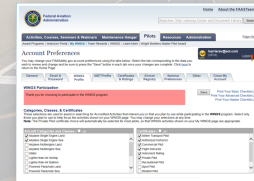
- Regular Proficiency Training
 - Military and industry-acknowledged formula for success
- Scenarios based on defined GA mishap experience
 - Designed to mitigate common GA accident causes
- More frequent interaction with CFIs
 - Safer, more enjoyable flying



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WINGS – easy as 1, 2, 3

1. Create an account on <http://faasafety.gov>
2. Complete your WINGS Pilot Profile
3. Attend a WINGS seminar or take a WINGS flight



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Thank you for attending!

You are vital members of
our GA safety community



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