DFC100
Integrated Flight Control System
for R9-equipped Cirrus Aircraft

Webinar will begin at 5pm EST (2200UTC)

Use your Telephone for Audio portion of webinar :
Toll-free dial-in number (US and Canada): **(866) 478-7713**
International dial-in number:(518) 874-0704
Conference code: **7814027434**

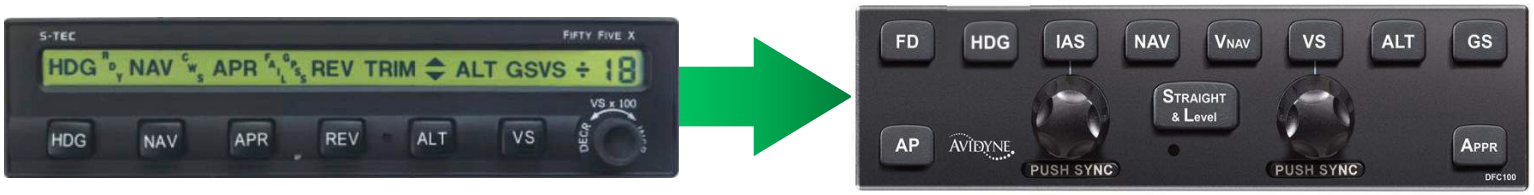
For a list of International Toll Free dial-in numbers, please visit:
http://www.avidyne.com/support/webinars/intl-numbers.asp

Rev 02 - 4/2/10

AVIDYNE

DFC100
Integrated Flight Control System
for R9-equipped Cirrus Aircraft

Product Overview



Rev 02 - 4/2/10

Agenda

- Avidyne's Mission
- *DFC100 Overview*
  - Comparison – STEC55X-DFC90-DFC100
  - Key DFC100 Features
- Flight Scenarios
- Availability
- Summary

Avidyne's Mission

"To increase the utility of owner-flown aircraft by making flying simpler and safer for single-pilot IFR operators."

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- Avidyne's Mission
- *DFC100 Overview*
  - Comparison – STEC55X-DFC90-DFC100
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DFC100 Autopilot - Comparison

Integrated Flight Control System

	STEC 55X	DFC90	DFC100
Attitude-based	---	●	●
Adds IAS Hold	---	●	●
Improved Flight Director	---	●	●
Auto Reverse Sensing	---	●	●
Straight & Level button	---	●	●
Flight Envelope Protection	---	●	●
Full-time Flight Envelope Alerting	---	---	●
Flap Position Awareness	---	---	●
Accepts Dual ADAHRS inputs	---	---	●
One-button mode engagement	---	---	●
Coupled VNAV	---	---	●
Full FMS Automation	---	---	●

Flight Envelope Protection & Alerting

- DFC90 & DFC100 have Flight Envelope *Protection* - Autopilot computer provides aural & visual alerts AND actively intervenes using Autopilot/Servos to keep Aircraft out of Stall or Overspeed condition when AP is ENGAGED.
- DFC90 has Flight Envelope *Alerting* - Autopilot computer provides aural & visual alerts when approaching stall or overspeed when FD is ENGAGED.
- *DFC100* has *Full Time Flight Envelope Alerting* - Autopilot computer will continue to provide aural & visual alerts when approaching stall or overspeed, even when FD is not engaged.

Flight Envelope Protection & Alerting

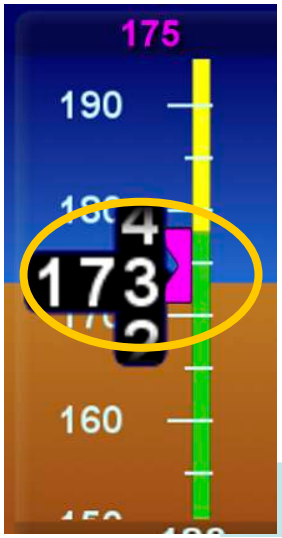
DFC90 Mode	Event	Flight Envelope Alert (Aural +Visual)	Flight Envelope Protection (Servo drive)
AP +FD Engaged	Approaching Stall	“Speed Protection Active”	Servos drive the aircraft (Pitch and Roll) as needed to stay within speed envelope
AP +FD Engaged	Approaching VNE	“Speed Protection Active”	Servos drive the aircraft (Pitch and Roll) as needed to stay within speed envelope
FD Engaged	Approaching Stall	“Underspeed Alert”	No servo action
FD Engaged	Approaching VNE	“Overspeed Alert”	No servo action
AP/FD Not On	Approaching Stall	No Alerting	No servo action
AP/FD Not On	Approaching VNE	No Alerting	No servo action

DFC100 Mode	Event	Flight Envelope Alert (Aural+Visual)	Flight Envelope Protection (Servo drive)
AP +FD Engaged	Approaching Stall	“Speed Protection Active”	Servos drive the aircraft (Pitch and Roll) as needed to stay within speed envelope
AP +FD Engaged	Approaching VNE	“Speed Protection Active”	Servos drive the aircraft (Pitch and Roll) as needed to stay within speed envelope
FD Engaged	Approaching Stall	“Underspeed Alert”	No servo action
FD Engaged	Approaching VNE	“Overspeed Alert”	No servo action
AP/FD Not On	Approaching Stall	“Underspeed Alert”	No servo action
AP/FD Not On	Approaching VNE	“Overspeed Alert”	No servo action

DFC100 – Attitude Based Autopilot

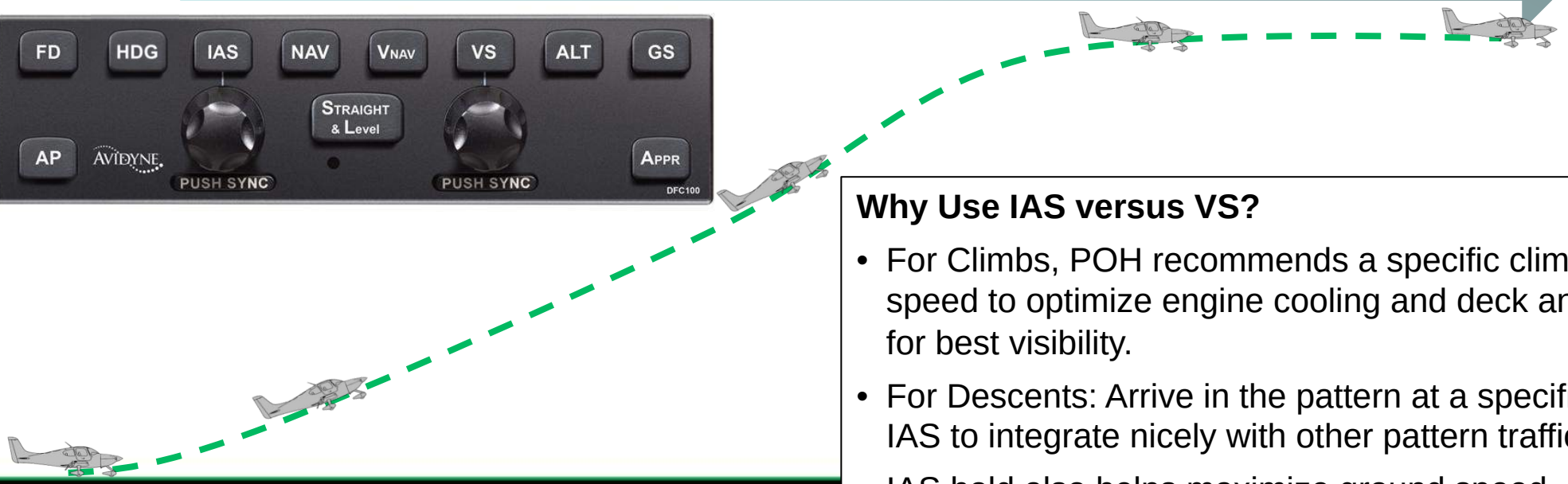
- *Attitude-based* digital autopilot for *Entegra R9*-equipped Cirrus aircraft
- Slide-in replacements for existing STEC55X
- R9+DFC100 = Truly Integrated System
- Utilizes *dual* digital Air Data & Attitude Heading Reference Systems (ADAHRS)
  - Provide greatly-improved stability
  - Particularly evident and important when tracking an ILS to minimums in windy conditions.

DFC100 – IAS Hold



- Adds Indicated Airspeed Hold (IAS) vertical mode
  - Flight Level Change Mode
- Adds IAS bug on IFDs
- Dedicated IAS knob on Flight Computer

Provides Constant IAS throughout Climb/Descent and Alt Capture

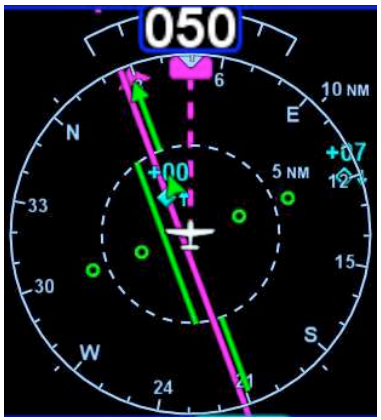


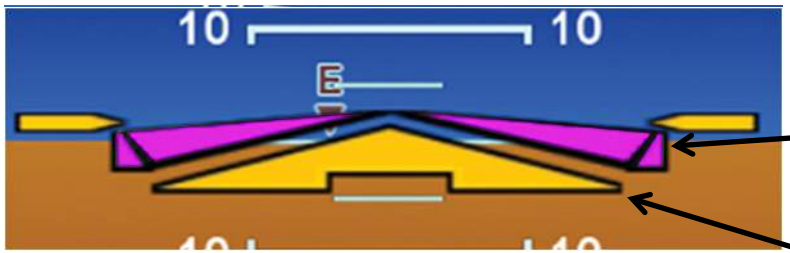
Why Use IAS versus VS?

- For Climbs, POH recommends a specific climb speed to optimize engine cooling and deck angle for best visibility.
- For Descents: Arrive in the pattern at a specific IAS to integrate nicely with other pattern traffic.
- IAS hold also helps maximize ground speed
- For Engine-out Emergency
  - Use to hold “Best Glide”

DFC100 – Improved Flight Director

- Vastly-improved Flight Director performance greatly enhances ability to hand-fly approaches
  - better algorithms
  - digital ADAHRS
  - No longer ‘chasing’ the rate-based and pressure transducer-based computations





FD Command Bars

Symbolic Airplane
(Ownship/Delta Symbol)

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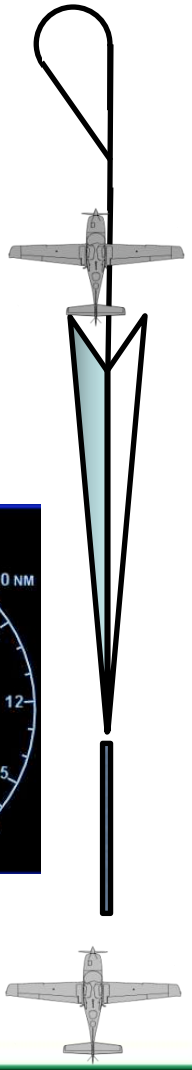
DFC100 – Auto Reverse Sensing

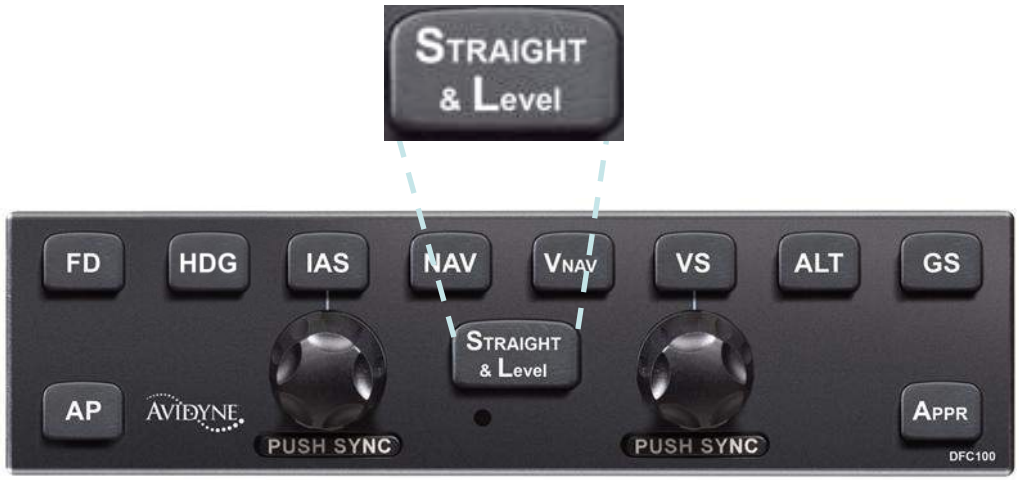
- No “REV” button for Back Course tracking
- The autopilot will respect the course selected on PFD and track as needed
- Set HSI for Front Course on a LOC BC approach (same for outbound procedure turn on ILS)



DFC100 – Straight & Level

- *"Straight & Level"* button overrides all autopilot modes and levels the aircraft in both pitch and roll from a wide range of capture attitudes
  - One-button Unusual Attitude Recovery
  - Adds peace of mind for non-pilots (like the Cirrus Parachute)

Check out DFC100.com & DFC90.com for AOPA video on S&L



DFC100 – Full Time Flight Envelope Alerting

- Envelope Alerting (EA) provides speed-based & attitude-based alerting even when the autopilot is NOT engaged
- Guards against inadvertent autopilot–induced stall and over-speed situations
- Triggered when DFC100 recognizes underspeed, overspeed, or excessive bank condition
  - Provides Aural & Textual Alerts
  - When engaged, Autopilot acts unobtrusively to manage bank & pitch to maintain 1.2x V_{STALL}
- Provides pilots with an added measure of safety
  - Especially vital in high-workload IFR environments where pilots might be easily distracted.

EA provides helping hand when you need it most.

- DFC100 addresses common errors and contributing causes identified in 28% of all Cirrus accidents over the past eight years

"Speed Protection Active"

AVIDYNE

DFC100 – Flap Position Input

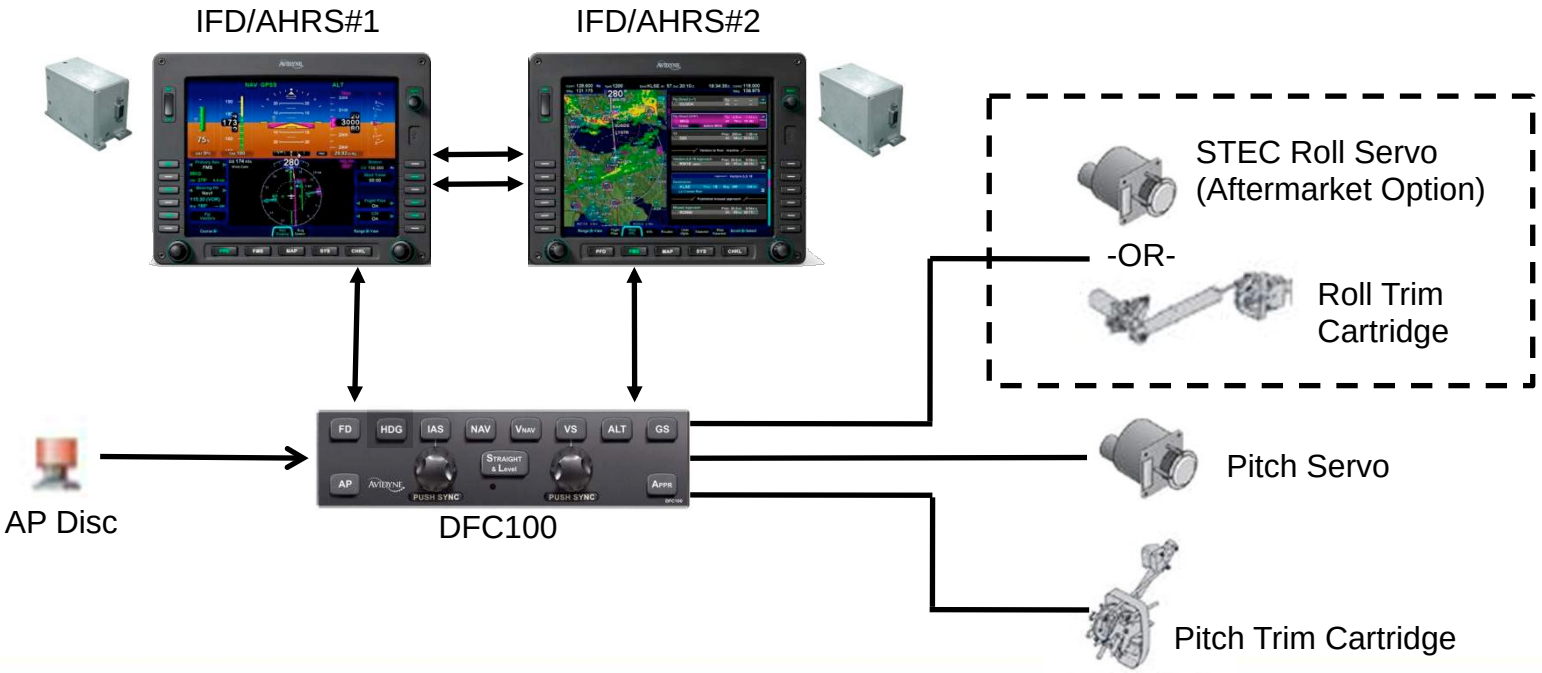
- DFC100 accepts Flap Position input
- DFC100 uses knowledge of flap position to dynamically compute true stall speed and provide better-defined underspeed protection & alerting

DFC100 – Dual ADAHRS

- DFC100 utilizes R9's *dual* digital Air Data & Attitude Heading Reference Systems (ADAHRS)
  - Provide greatly-improved stability & flight precision
  - Particularly evident and important when tracking an ILS to minimums in windy conditions.
- Provides highest level of redundancy and safety
- 'Fly-through' during failure modes – In the event of an ADAHRS failure, AP will auto-switch to 2nd ADAHRS without disengaging.

DFC100 – Support for Roll Servo Mod

- DFC100 supports aftermarket-modified Roll Servo-equipped Cirrus aircraft.
- At DFC100 install time, the installer merely selects which configuration the airplane has and the rest is automatic.



DFC100 – One-Button Mode Engagement

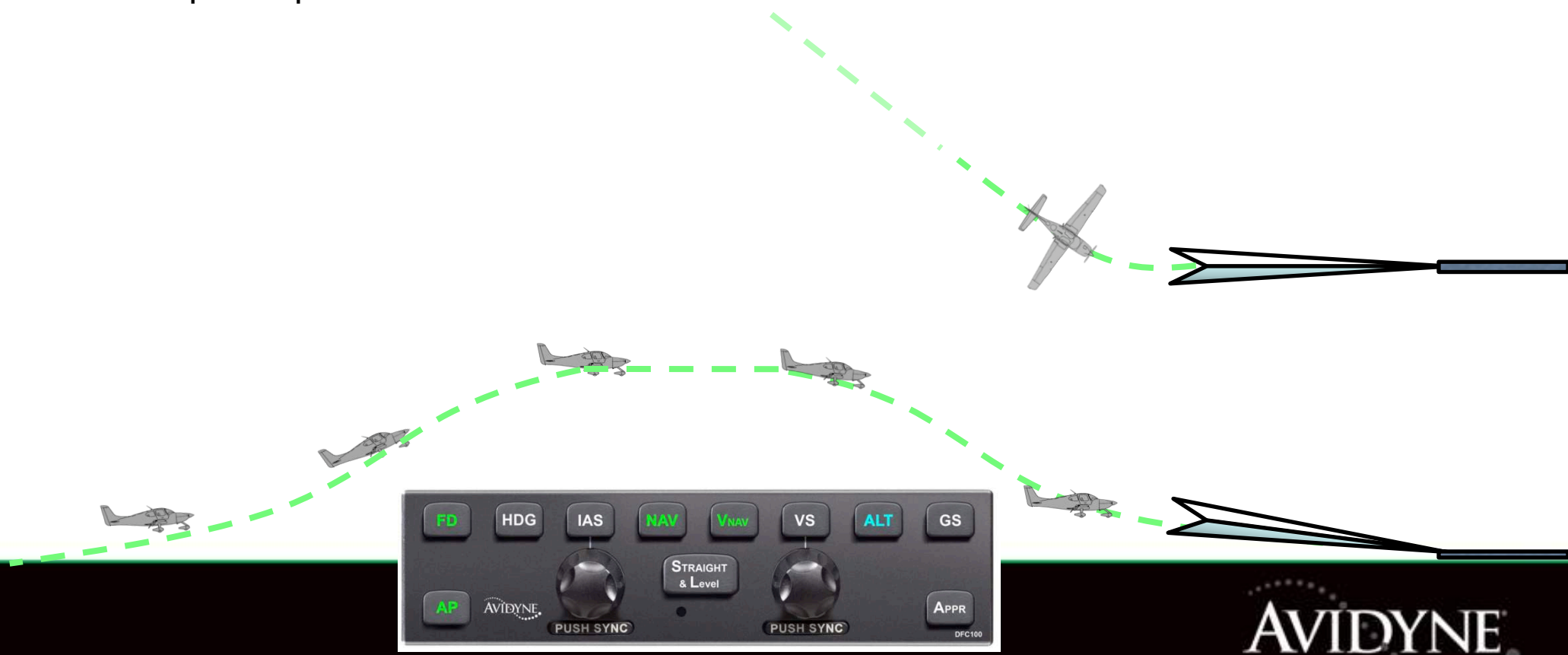
- DFC100 provides one-button vertical & lateral mode engagement
- Dual button press (IAS+ALT or VS+ALT or VNAV+ALT, etc) is no longer needed to perform an altitude capture as was required with the STEC55X.
- Example, when pilot presses just the VS button, VS Hold mode will engage and the ALT (Altitude hold) mode will also automatically arm.
- DFC100 mode selection logic is more intuitive and reduces pilot workload.

DFC100 – Coupled VNAV

- Vertical Nav (VNAV) will capture and track the Enroute, Arrival, Approach, and Missed Approach legs of the active flight plan within the R9 FMS.
- In Enroute & Descent operations, VNAV will hold current altitude until reaching top of Descent (TOD) point for active leg, and then will automatically start descent when TOD point reached.

DFC100 – Full FMS/AP Automation

- DFC100 w/R9 is designed to dramatically reduce manual autopilot interaction throughout entire flight.
- Selecting a published Approach or Arrival within the FMS will automatically fill in any associated altitude constraints in the flight plan, thereby eliminating any need for pilot input of VNAV altitude constraints.



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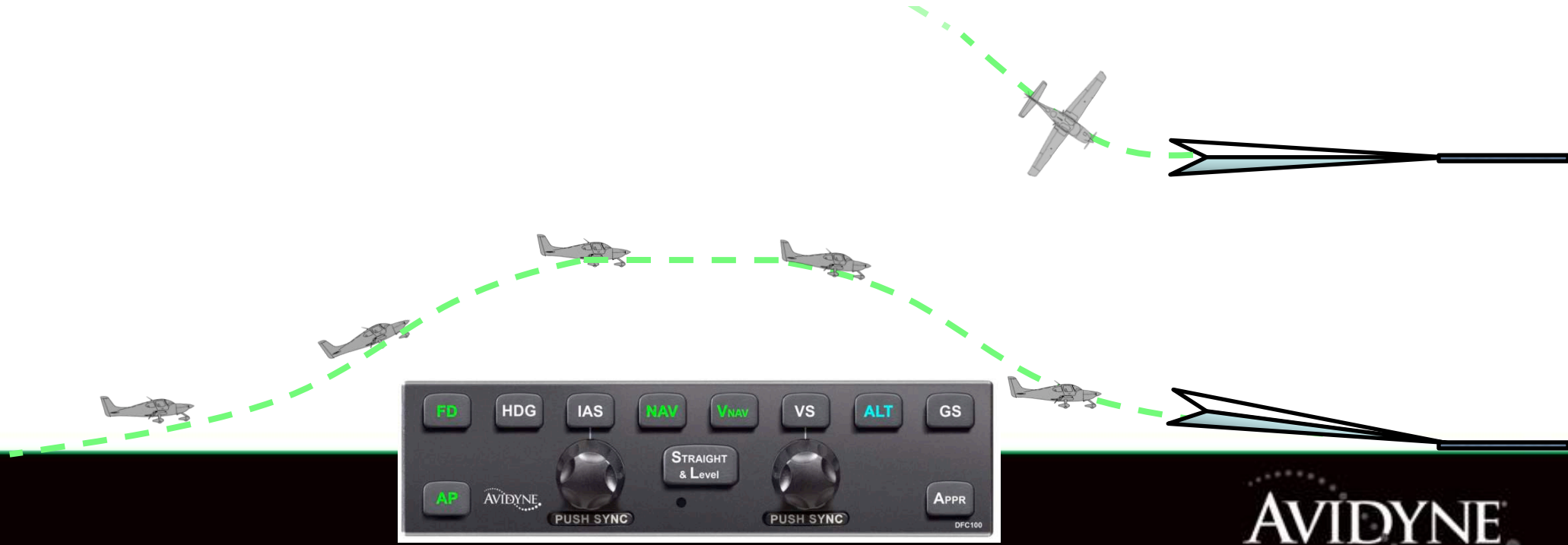
- For ILS Approaches, the system will automatically switch primary NAV source so that the aircraft continues to intercept & follow the Glideslope.



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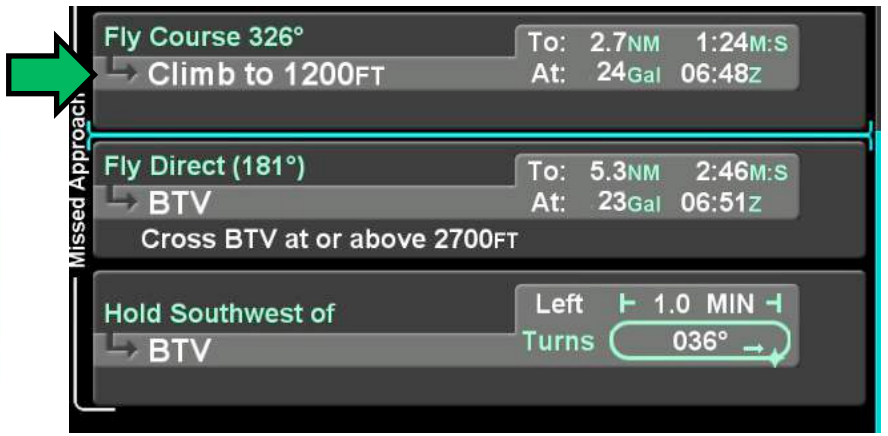
- For ILS Approaches, the system will automatically switch primary NAV source so that the aircraft continues to intercept & follow the Glideslope.
- For precision WAAS approaches, the system will automatically begin following the vertical guidance provided by the WAAS approach.

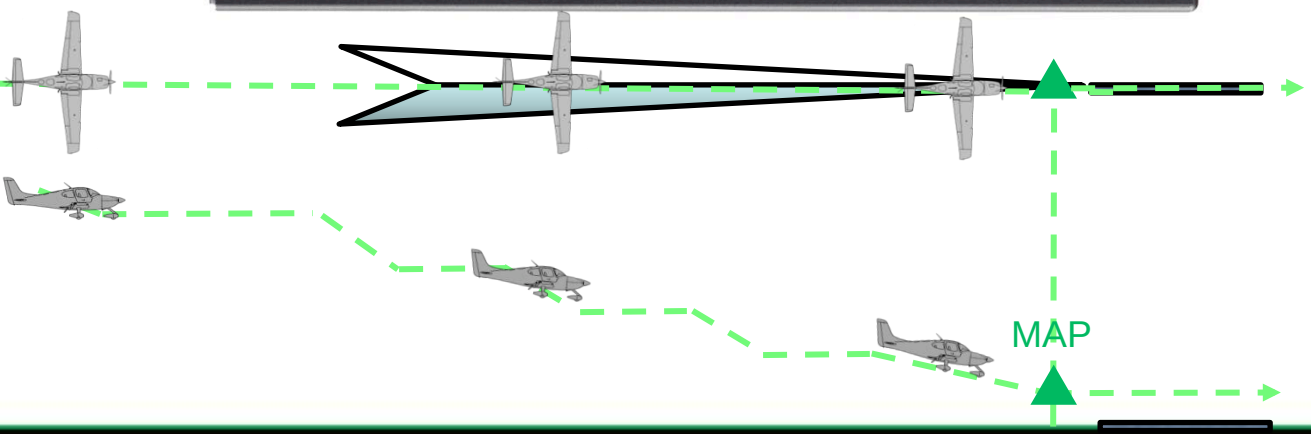
DFC100 – Full FMS/AP Automation

- During Missed Approach Operations, VNAV will climb to the target altitude and then level at that altitude until the next waypoint is crossed.



DFC100 – Full FMS/AP Automation

- For Non-Precision Approaches, VNAV will fly all defined step-down fixes
- At Missed Approach Point, VNAV will automatically disengage and transition to Altitude Hold.



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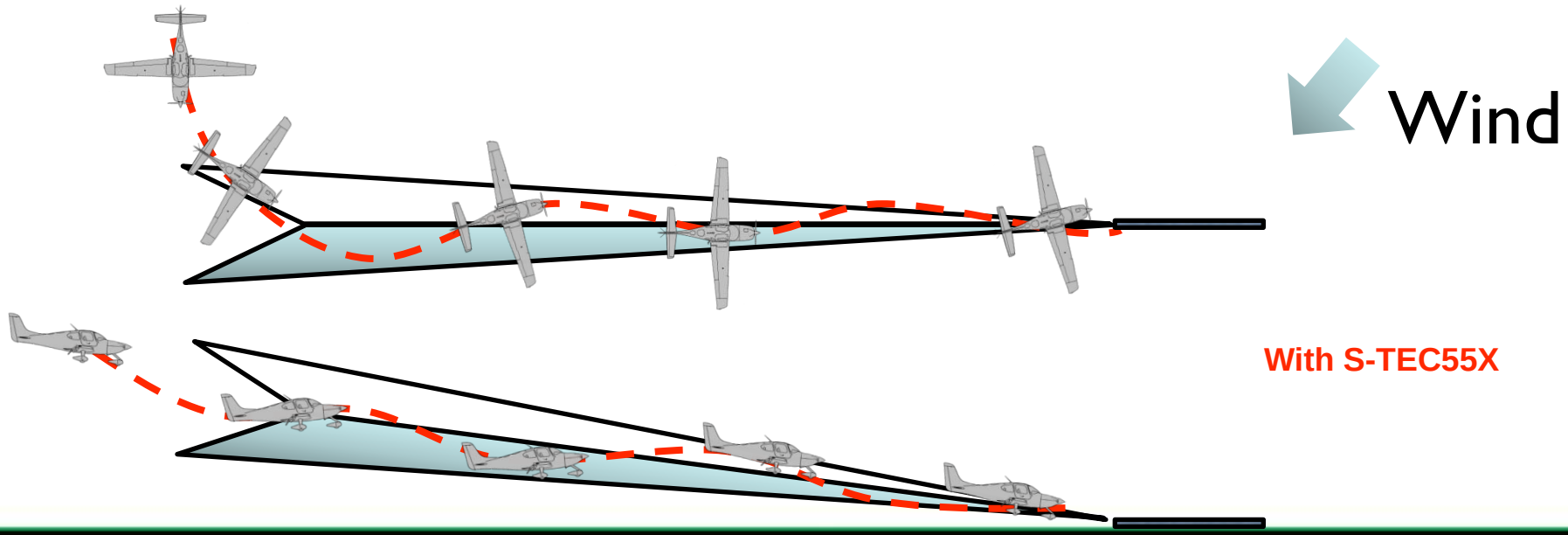
Flight Scenario 1 – ILS w/Crosswind

Intercepting ILS with crosswind **w/S-TEC 55X**

- Typical ILS intercept with S-TEC autopilot in NAV→APR mode results in overshoot and wandering in lateral and vertical axes due to nature of analog rate-based sensor & pressure transducer.

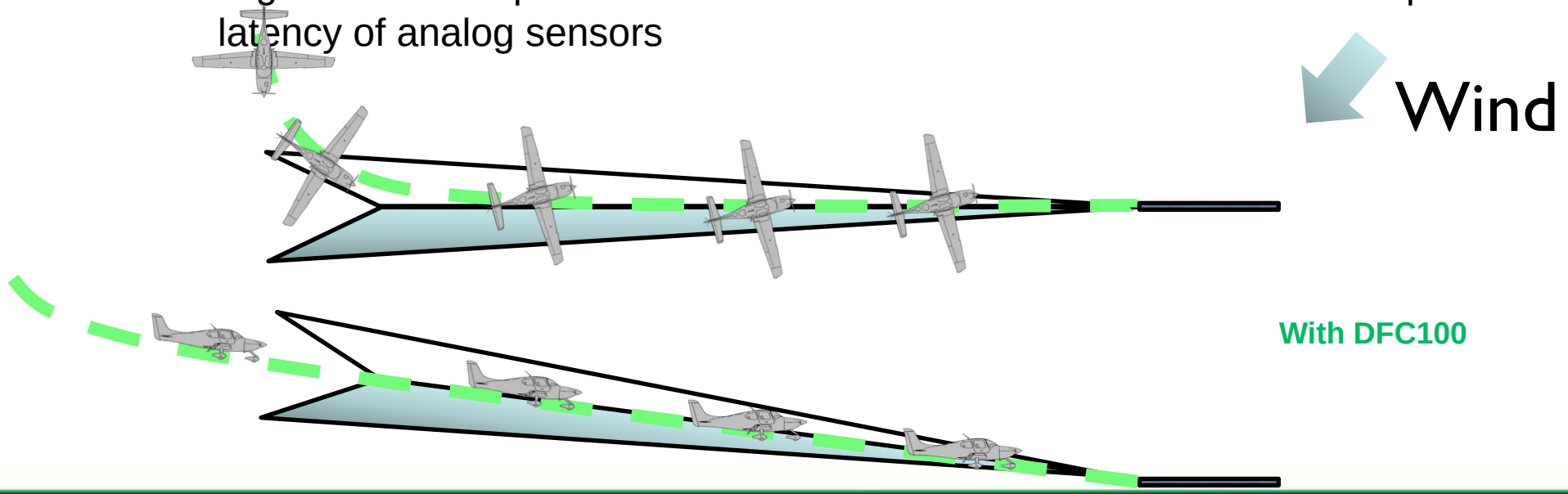


Not to scale. For Illustration purposes only.

Flight Scenario 1 – ILS w/Crosswind

Intercepting ILS with crosswind **w/DFC100**

- DFC100 provides rock-solid, ILS intercept and instantaneous control even in stiff cross wind and gusting conditions.
  - Sophisticated altitude estimators, gain scheduling, cross feeds, lift calculations and range-to-go estimations provide precision capture & tracking in both axes.
  - Digital ADAHRS provides instantaneous error correction – not susceptible to latency of analog sensors



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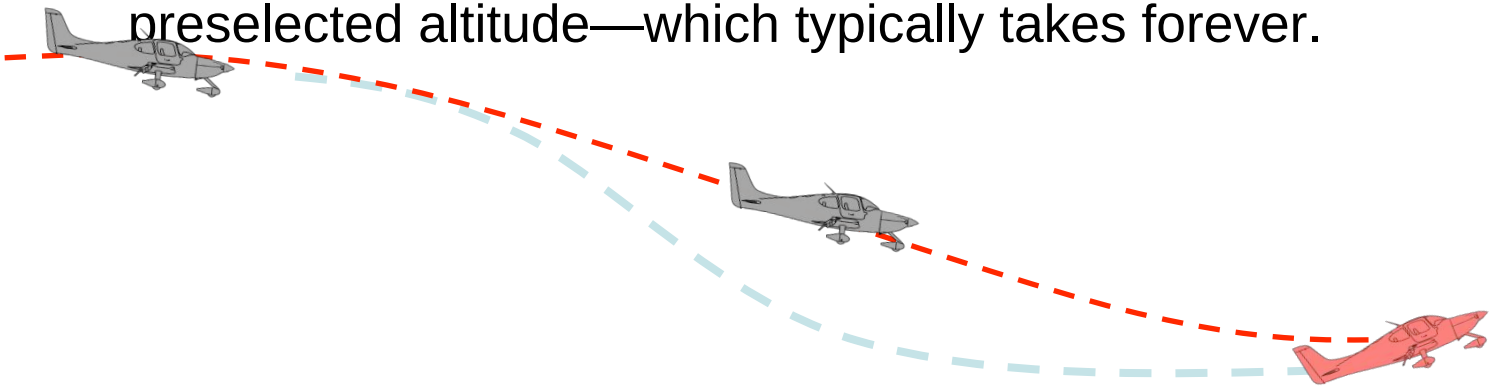
Flight Scenario 2 – Step Down NP Approach

Step down during non-precision approach **w/S-TEC55X**

- Command a 1,000 fpm descent to get to your next step-down fix.
- Flaps are extended, nose is pointing down, speed is increasing
- Throttle reduced to avoid over-speed.
- Autopilot anticipates interception of fix and gradually reduces VS to intercept preselected altitude—which typically takes forever.



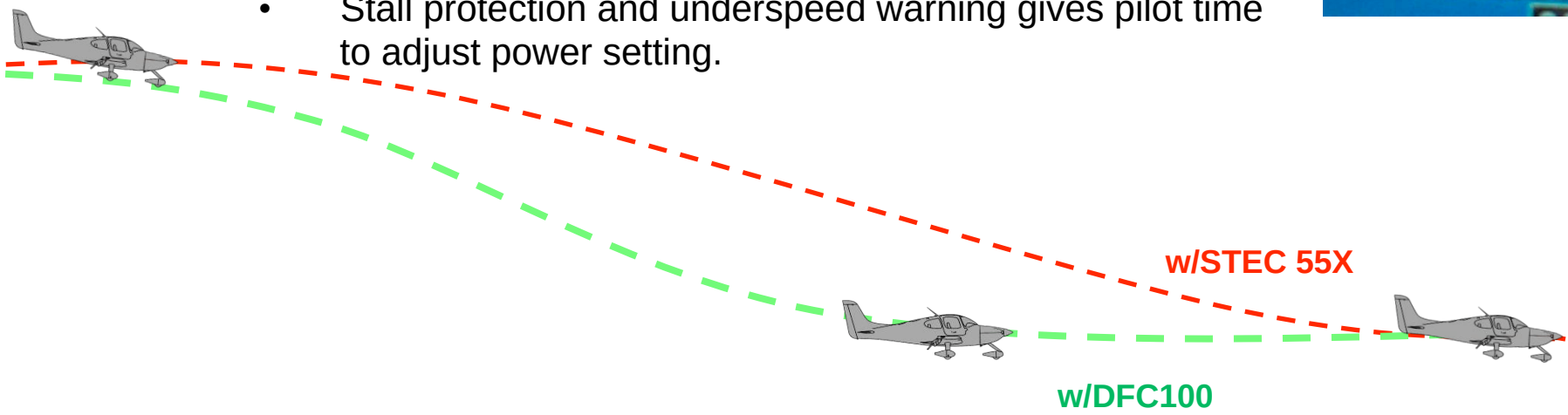
- There's traffic in the area. You are making calls on the radio. You are distracted. Airspeed is bleeding off as autopilot tries to hold your altitude and you are approaching stall/spin.

Not to scale. For Illustration purposes only.

Flight Scenario 2 – Step Down NP Approach

Step down during non-precision approach **w/DFC100**

- DFC100 will descend and flare smoothly but crisply while STEC does not, sometimes getting you in trouble.
- If you run out of speed for whatever reason (forget to add throttle after achieving altitude) our envelope protection will save you.
  - Aural alert and visual warning on your PFD
  - Autopilot seamlessly adjusts pitch input (and bank angle) to maintain 1.2 x V_{STALL}
  - Stall protection and underspeed warning gives pilot time to adjust power setting.



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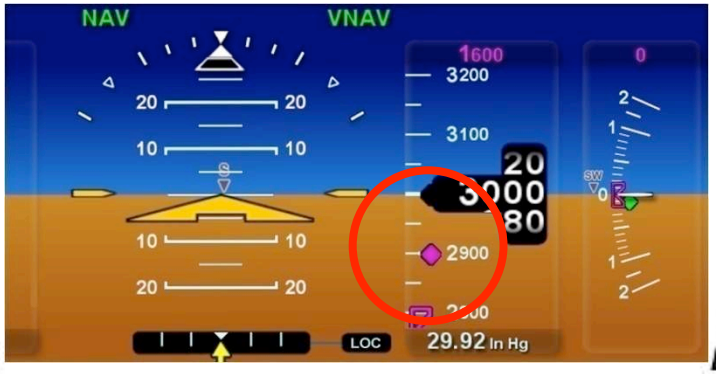
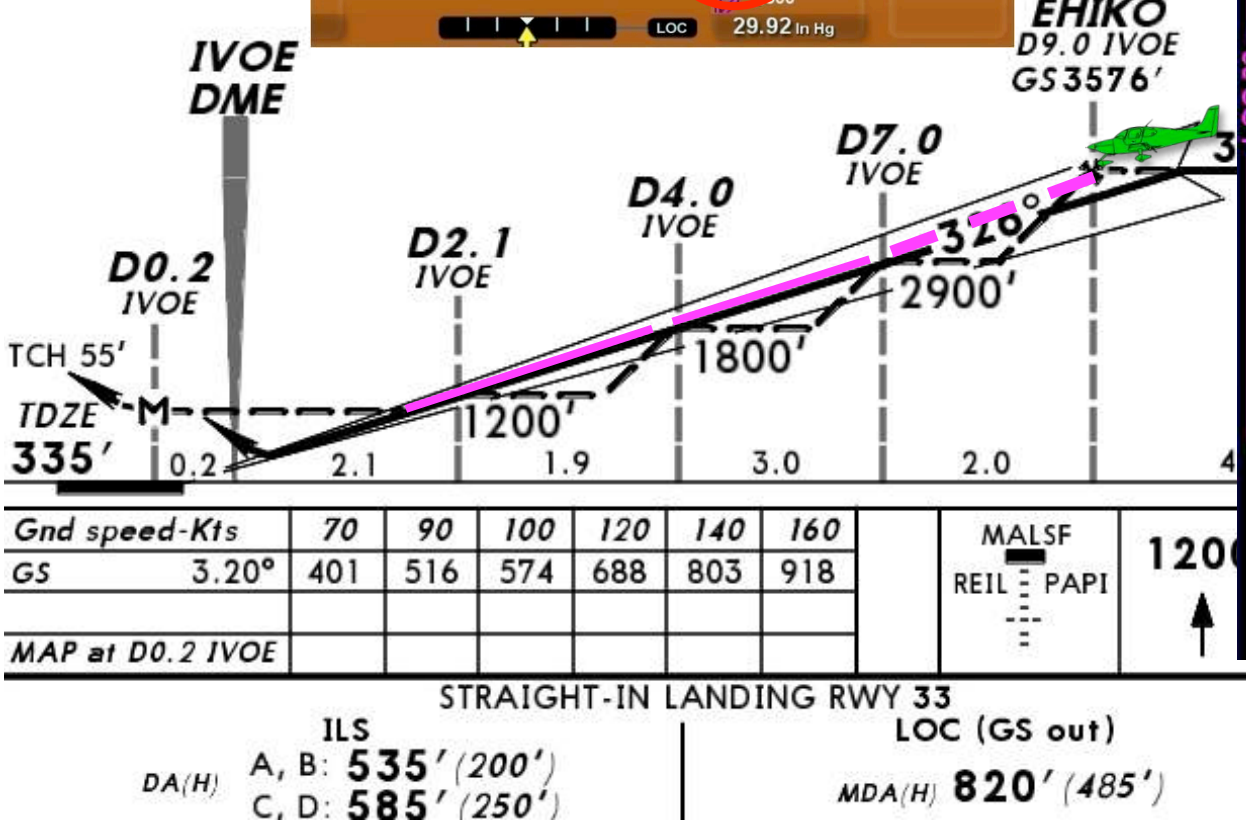
Flight Scenario 3 – VNAV NP Approach

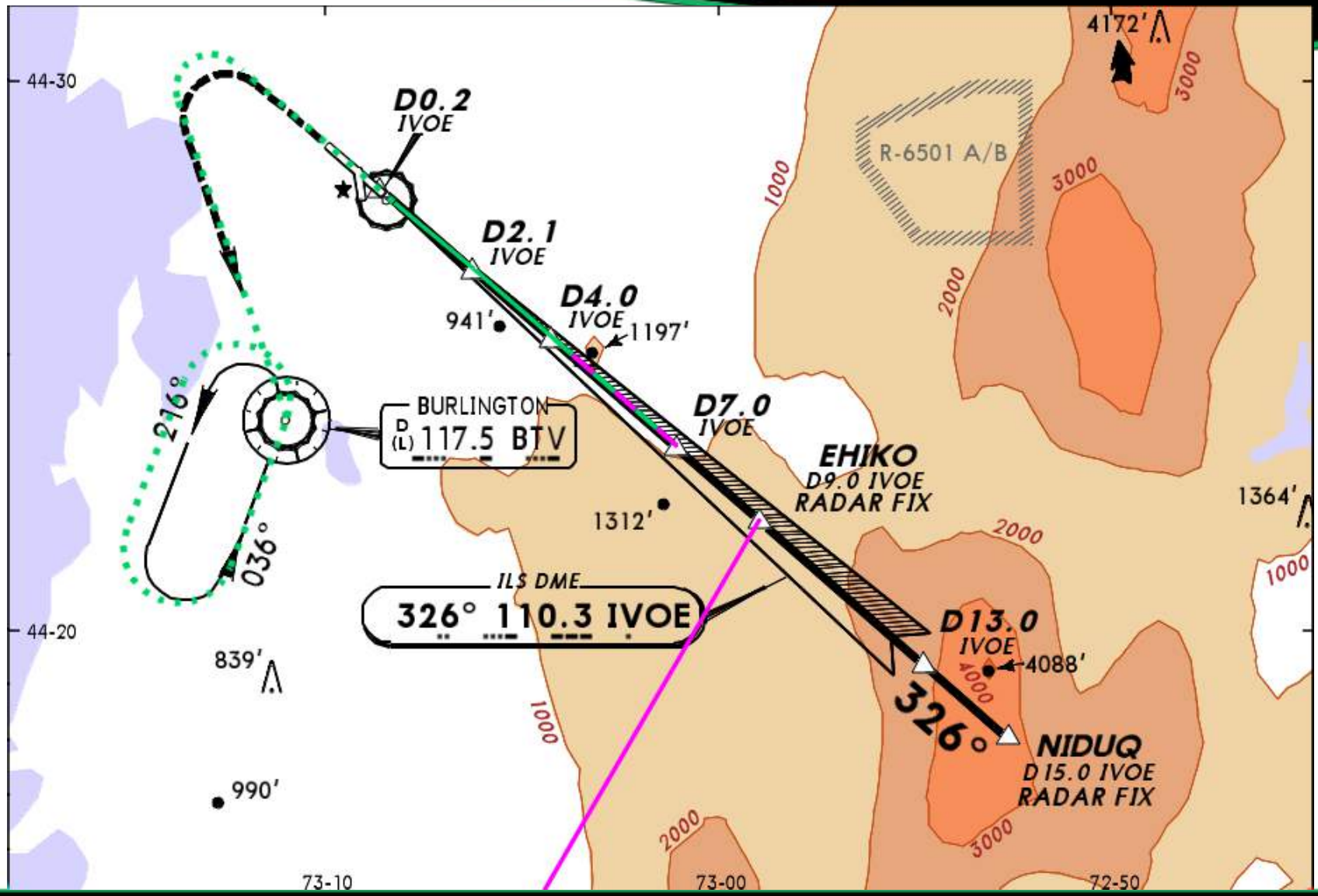
Automation

- With R9 + DFC100
- Fly coupled VNAV of all step-down Approach legs automatically





Flight Scenario 3 – VNAV NP Approach

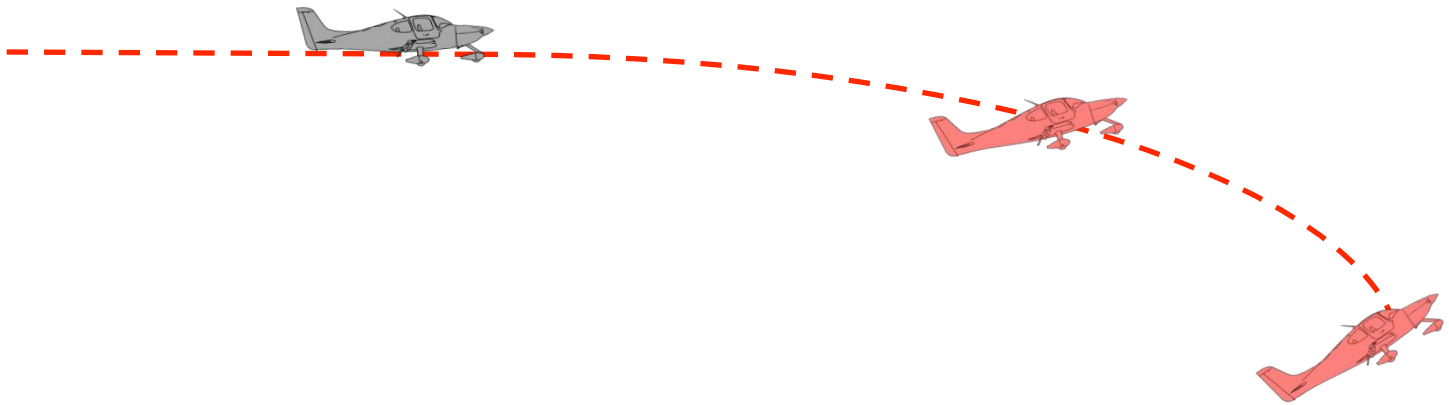


Flight Scenario 4 – Hypoxia

FEP

Loss of Oxygen while Flying at Altitude **w/S-TEC 55X**

- In a scenario where hypoxia causes pilot to fall asleep with autopilot engaged
- Airplane continues until fuel starvation



- Engine quits and autopilot continues to command pitch input to maintain altitude until reaching stall & spin.

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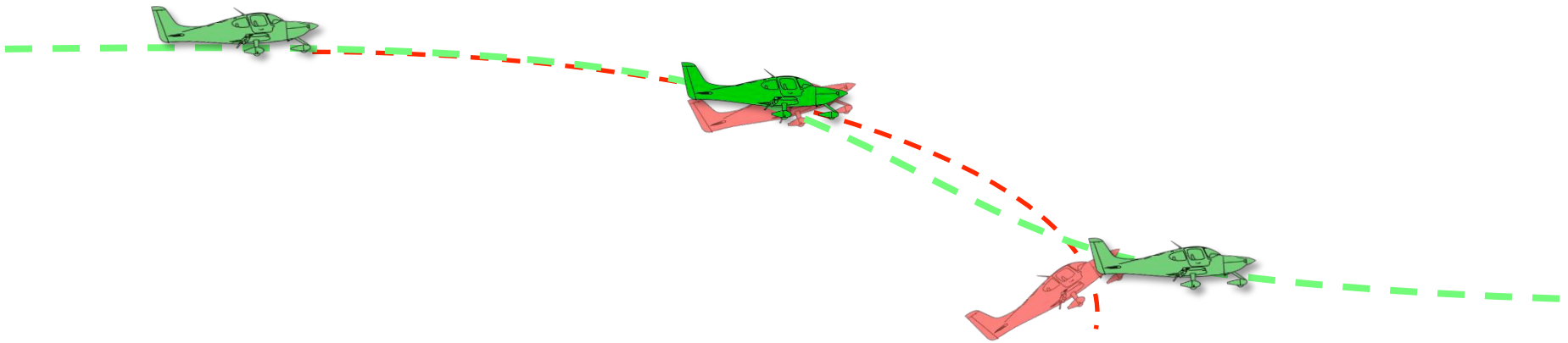
Flight Scenario 4 – Hypoxia

FEP

Loss of Oxygen while Flying at Altitude **w/DFC90**

- With DFC90/100 Envelope Protection, autopilot seamlessly adjusts pitch input to maintain 1.2 x V_{STALL} as aircraft descends to lower altitudes allowing pilot time to recover.



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DFC100 Availability

DFC100 for R9-equipped Cirrus aircraft as replacement for STEC55X

- TSO & STC documentation submitted to FAA
- Purchase Agreements have been sent to all R9 Customers
- Pilot Program for 1-2 days once certified
- We will contact you when the DFC100 Autopilot Flight Computer is nearing delivery

Contact Information:

Avidyne Sales
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781.402.7400
800-AVIDYNE (800.284.3963)

Jared Butson
Global Sales Ops. Mgr.
jbutson@avidyne.com
781.402.7569

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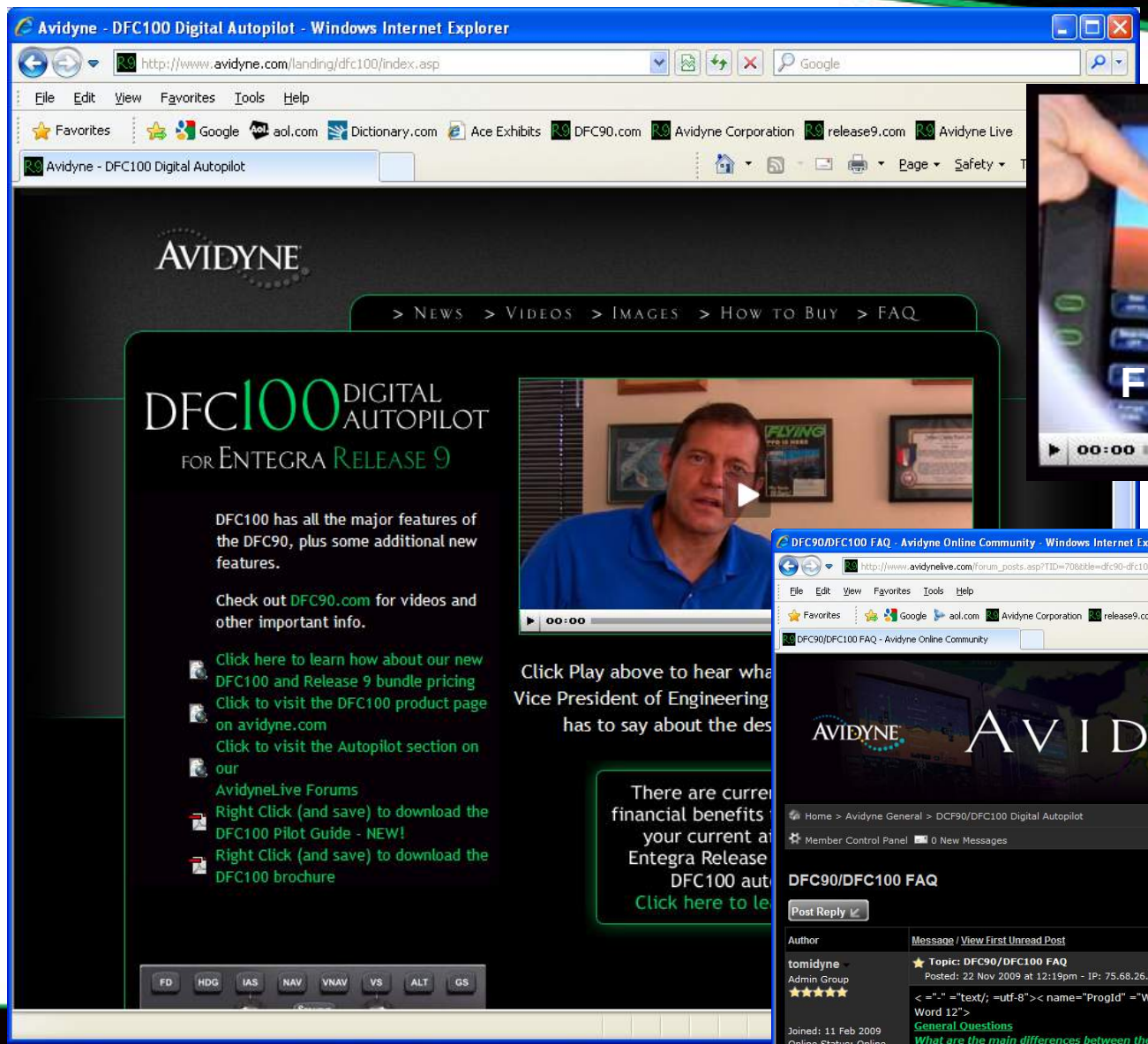
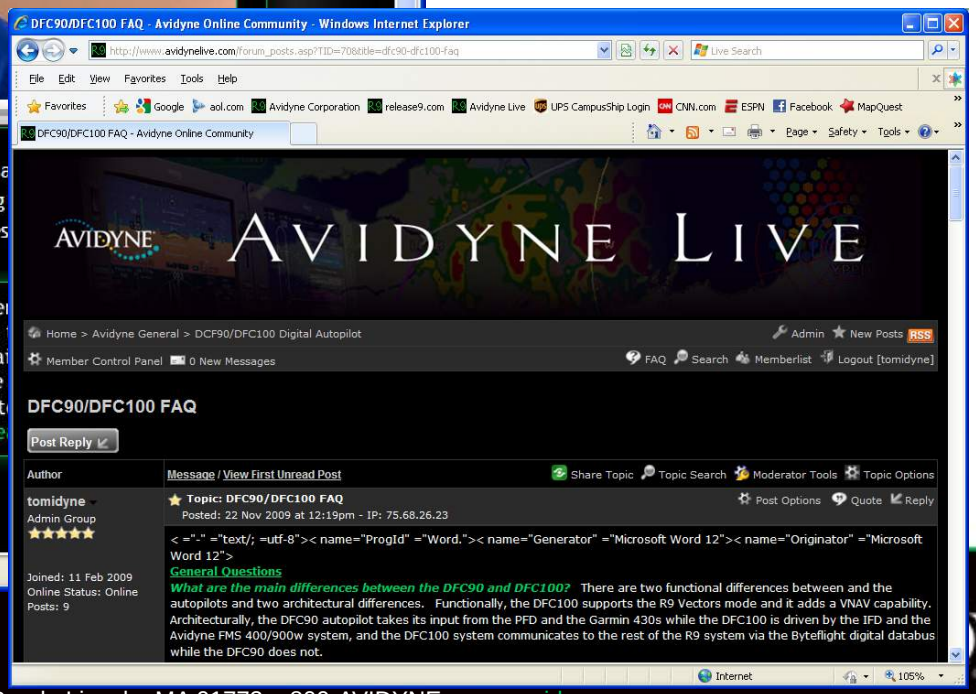
10 Reasons to Upgrade to DFC100

1. Attitude based, all-digital system with better performance at altitude, while maneuvering, and on the ILS
2. Accepts dual ADAHRS inputs for added redundancy and enhanced safety.
3. Adds IAS mode, which is more elegant way to change altitudes.
4. Flight Director *really* works. Makes it much easier to hand fly using FD guidance.
5. Auto Reverse Sensing eliminates the need for a REV button when flying back course or outbound procedure.
6. Straight & Level button provides last-ditch effort to get under control when confused or disoriented (but don't want to pull the chute yet) as well as useable at any time. Plus it even works in CRAZY attitudes.
7. Flight Envelope Protection & Alerting (EA) which prevents stalls and overspeeds: It's safe to fly around & maneuver WHATEVER the throttle setting (including dead stick).
8. Accepts Flap Position for increased FEP during all phases of flight.
9. Full FMS integration including Coupled VNAV capability for highest level of automation and hands-off operation.
10. DFC100+R9 provides the most integrated and easiest-to-use Flight Deck System available.

Resources – DFC100.com





Summary

- R9 owners will get the best performing autopilot
- R9+DFC100 is a Truly-Integrated Avionics System
- Special Bundled Pricing now includes DFC100 with R9 Purchase

Corporate Webinar Series

DFC100 Autopilot
Tuesday – Dec 14
12:00pm EST (1700 UTC)

Weather Detection & Avoidance
1st Wednesday
12:00pm EST (1700 UTC)

Choosing a Traffic System for Your Aircraft
2nd Wednesday
12:00pm EST (1700 UTC)

Choosing an Multi-Function Display
3rd Wednesday
12:00pm EST (1700 UTC)

Introducing the DFC90 Digital Autopilot
4th Wednesday
12:00pm EST (1700 UTC)

DFC90/100 Autopilots
Thursdays
5:00pm EST (2200 UTC)

DFC90 & DFC100
'Webinars on Demand'
now available!

DFC100
Integrated Flight Control System

Questions