

# Angle of Attack in Cirrus Perspective

- What we will discuss in this presentation
  - What it looks like
  - Where it is located
    - Legacy Perspective
    - Perspective +
  - What the numbers mean
  - What the colored arcs represent
  - What the pointer (needle) is for
  - The BASICS of how it works
  - A discussion of Best Practices
  - Some interesting observations
  - Q & A

# What it looks like

## What do the numbers mean?

- Garmin
  - Normalized to 1.0
  - 1.0 = STALL
  - .60 = 1.3 Vs AT CURRENT A/C WEIGHT : THIS IS THE MAGIC NUMBER FOR APPROACH TO LANDING
  - Number below 'AOA' = Current AOA
  - .20 = Don't worry about it!
- Others
  - Percent of Critical AOA
  - 1.0 = 100% wing at Critical AOA
    - No reserve lift
  - .60 = 60% of Critical AOA 1.3 Vs
    - 40% below Critical AOA
  - .20 = Don't worry about it.



Where is the Angle of Attack indicator located on Legacy Perspective?

To the left of and at the bottom of the airspeed tape.



## Where it is AOA located in Perspective +

### Perspective + Avionics

Moved AOA indicator under the airspeed tape and is sharing space with inset map

- One must choose
  - Inset map or AOA
  - One must manually turn off any inset map to view AoA
- There is one exception; turning on HSI map
- Setting AOA to 'auto' will not automatically remove the inset map.



# The Exception

And

What's new for 2018 that makes this issue rather superfluous

- HSI Map 'on' provides:
  - **Full time access to AOA**
  - Moving map info
  - Traffic info
  - Nexrad
  - TOPO
  - Position
- **NEW FOR 2018**
  - Vref Approach Speed Cue
  - From the AOA



### What do the COLORED ARCS mean?

- Red Arc – Stall range
  - Bottom of Red Arc - .88 or 88% of CAO
    - Stall warning sounds
    - ESP Stick pusher activates
    - Reduce AOA recommended check power
  - Top of Red Arc
    - Critical AOA achieved
    - Full Stall
    - Stick pusher is working hard
    - REDUCE BACK PRESSURE ADD POWER
  - Dynamic based on
    - Angle of bank (load factor)
    - Flap setting
- Amber Arc
  - Represents ‘maneuvering margin’
    - Up to 35° of bank angle
    - Disappears above 35° of bank
    - Don’t let ‘maneuvering margin fool you.
    - It’s all about load factor which can change instantly
- White Arc
  - A place from which to begin adjusting pitch attitude to achieve your final AOA goal
  - Typically .60
  - Or, pointer (needle) at three o’clock



## How it Works

- Only on FIKI aircraft
  - Uses FIKI stall sensing vane and Garmin S/W to determine AOA
  - Both the plate and vane are heated
  - Is calibrated during production flight test
    - Must be recalibrated per AMM procedure
  - Works with all Flap settings
- Independent of Pitot Static System which coincidentally
  - Provides a great training experience - ADC and/or pitot system failure



## How to Best Use It

- 1G environment – wings level
- Any Flap Setting
- Final Approach to landing VFR
  - Use FOM speeds on all legs of the Traffic pattern
  - On Final use pitch to walk AOA needle to three o'clock by scanning it no differently than airspeed
  - Power as required
  - Great tool to aid landing by setting correct airspeed for approach
  - 2018 M0 S/W adds a Vbref **green** airspeed cue





## INTERESTING OBSERVATIONS

- IF ONE TAKES THE TIME TO WORK WITH AOA ONE MIGHT NOTICE
  - BEHAVIOR OF AIRCRAFT AT CONSTANT AOA BUT NOTING AIRSPEED FOR:
    - DIFFERENT FLAP SETTING
    - DIFFERENT POWER SETTING
    - AIRCRAFT ATTITUDE
  - BEHAVIOR OF AIRCRAFT AT CONSTANT AIRSPEED BUT NOTING AOA FOR:
    - DIFFERENT FLAP SETTING
    - DIFFERENT POWER SETTINGS
    - AIRCRAFT ATTITUDE

## IN THIS IMAGE

- WINGS LEVEL 1G
- WEIGHT ≈ 3300LBS
- AOA @ 62% OF C-AOA
- POINTER @ 3 O'CLOCK
- FLAPS 0%
- NOTE AIRSPEED = 92
- NORMAL FOR FLAPS 0



## IN THIS IMAGE

- WINGS LEVEL 1G
- WEIGHT ≈ 3300LBS
- AOA @ 57% OF C-AOA
- POINTER ≈ 3 O'CLOCK
- FLAPS 100%
- NOTE AIRSPEED = 79
- NORMAL FOR FLAPS 100



## IN THIS IMAGE

- WINGS LEVEL 1G
- WEIGHT ≈ 3300LBS
- AOA @ 78% OF C-AOA
- POINTER ≈ 2 O'CLOCK
- FLAPS 0%
- NOTE AIRSPEED = 79
- ABNORMAL FOR FLAPS 0
- NOTE RED ARC ON A/S
- NOTICE THE DIFFERENCE IN THESE TWO IMAGES
  - GUESS THOSE FLAPS REALLY WORK



## IN THIS IMAGE

- WINGS LEVEL 1G
- WEIGHT ≈ 3300LBS
- AOA @ **88%** OF C-AOA
- POINTER ≈ 1 O'CLOCK
- FLAPS 100%
- NOTE AIRSPEED = 60
- POINTER ON BOTTOM OF RED ARC
- NOTE CAS = **STALL**
- POINTER IS **RED**
- **ESP IS ACTIVE; NOTE FLIGHT DIRECTOR BARS ARE BELOW THE AIRCRAFT SYMBOL**

