Takeoffs, Approaches, and Landings for the Cirrus Design SR20 and SR22

Federal Aviation Administration

Presented to: FAA Safety Seminar Attendees

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- http://williamjdoylejr.net/FAAST/Cirrus

Just a Real Nice Picture at PNE
This is what a climb out looks like!

Presentation Agenda

- NTSB Cirrus SR20 and SR22 Accident Trends
- Cirrus Generations
- Flap Deployment & Malfunctions; Trimming & Landing Procedures
- Mishaps and Gotchas: Takeoffs, Enroute Descents, Approaches, and Landings
- What Are the Risks in Flying a TAA?
- Doing It by the Numbers: Vspeeds, ASI Arcs, and Performance Data
- An SR20 Weight & Balance Scenario
- How to Query the NTSB Database
- Credits and Reference Information
- Gotchas with Garmin 530/430/420 Units

NTSB Statistics
on
Cirrus SR20 and SR22
General Aviation Accidents
in the
United States
from 1/1/2000 to 12/31/2012

NTSB Cirrus SR20 and SR22 Accident Trends U.S. – 1/1/2000 – 12/31/2012

38% Fatal

Cirrus SR20 and SR22 Accidents from 01/01/2000 to 12/31/2012					
Total	**Fatal**	**Non-Fatal**	**Incident**	**SR20**	**SR22**
179	**68**	**98**	**13**	**49**	**130**

34% of Pax/Crew Died

	Total Fatal Injuries	Total Serious Injuries	Total Minor Injuries	Total Uninjured	VMC	IMC
SR20	37	11	11	35	37	10
SR22	93	22	24	150	102	26
Total	**130**	**33**	**35**	**185**	**139**	**36**

	TAXI	TAKEOFF	CLIMB	CRUISE	DESCENT	APPROACH	MANEUVERING	LANDING
SR20	1	6	1	7	1	5	7	13
SR22	5	11	8	10	4	12	13	24
Total	**6**	**17**	**9**	**17**	**5**	**17**	**20**	**37**

	Instructional	Personal	Business	Positioning
SR20	13	32	3	1
SR22	7	107	14	1
Total	**20**	**139**	**17**	**2**

NTSB *Cessna* 172, 182 and 206 Accident Trends U.S. – 1/1/2000 – 12/31/2012

14% Fatal

14% of Pax/Crew Died

Cessna 172, 182 and 206 Accidents from 01/01/2000 to 12/31/2012

U.S.	Fatal	Non-Fatal	172	182	206
2807	386	2418	1835	795	175

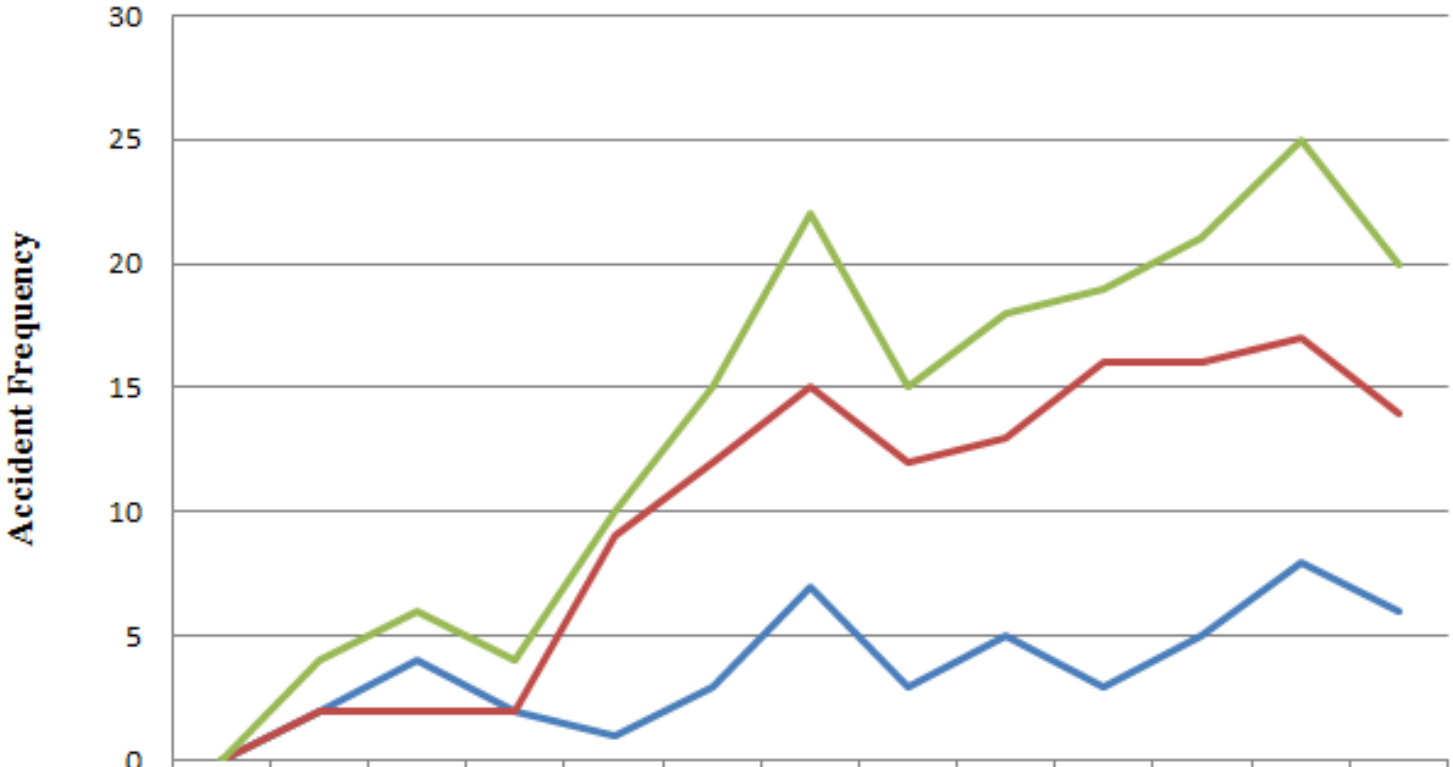
U. S.	Total Fatal Injuries	Total Serious Injuries	Total Minor Injuries	Total Uninjured	VMC	IMC
172	388	221	441	2097	1760	70
182	259	104	217	984	727	63
206	84	31	70	246	163	12
Total	731	356	728	3327	2650	145

U. S.	TAXI	TAKEOFF	CLIMB	CRUISE	DESCENT	APPROACH	MANEUVERING	LANDING
172	87	297	30	151	37	107	119	724
182	28	109	17	99	32	69	49	286
206	10	30	6	23	6	18	4	56
Total	125	436	53	273	75	194	172	1066

U. S.	Instructional	Personal	Business	Positioning	Aerial Observation
172	707	1042	19	11	20
182	52	605	31	13	10
206	6	107	14	18	3
Total	765	1754	64	42	33

NTSB Cirrus SR20 and SR22 Accident Trends U.S. – 1/1/2000 – 12/31/2012

Cirrus Accident Trend by Year



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SR20	0	2	4	2	1	3	7	3	5	3	5	8	6
SR22	0	2	2	2	9	12	15	12	13	16	16	17	14
Total	0	4	6	4	10	15	22	15	18	19	21	25	20

Cirrus Generations

Cirrus SR20/SR22 – Perspective

Show of hands …

How many fly an SR22 with this?

How many fly an SR20 with this?

Cirrus SR20/SR22 Avidyne

Show of hands …

How many fly an SR22 with this?

How many fly an SR20 with this?

Cirrus SR20 – "Six Pack" with Avidyne MFD

Know Your Airplane

- Study your airplane's POH
  - If non-owner, purchase the information manual(s) for the airplane(s) you regularly fly
- Learn your airplane's limitations and performance capabilities
- Look at the NTSB database (see usage instructions at end)
  - Check accident histories for the airplane(s) you fly
  - Check accident histories for the airports you fly to
  - Could you make mistakes similar to the pilots in those accidents?
- Check inoperative equipment against Kinds of Operational Equipment List (KOEL) in POH Section 2
  - Can you fly if your right strobe light is out?
  - Can you fly if your stall warning horn is out?

Know Your Airplane – KOEL

Cirrus Design
SR20

Section 2
Limitations

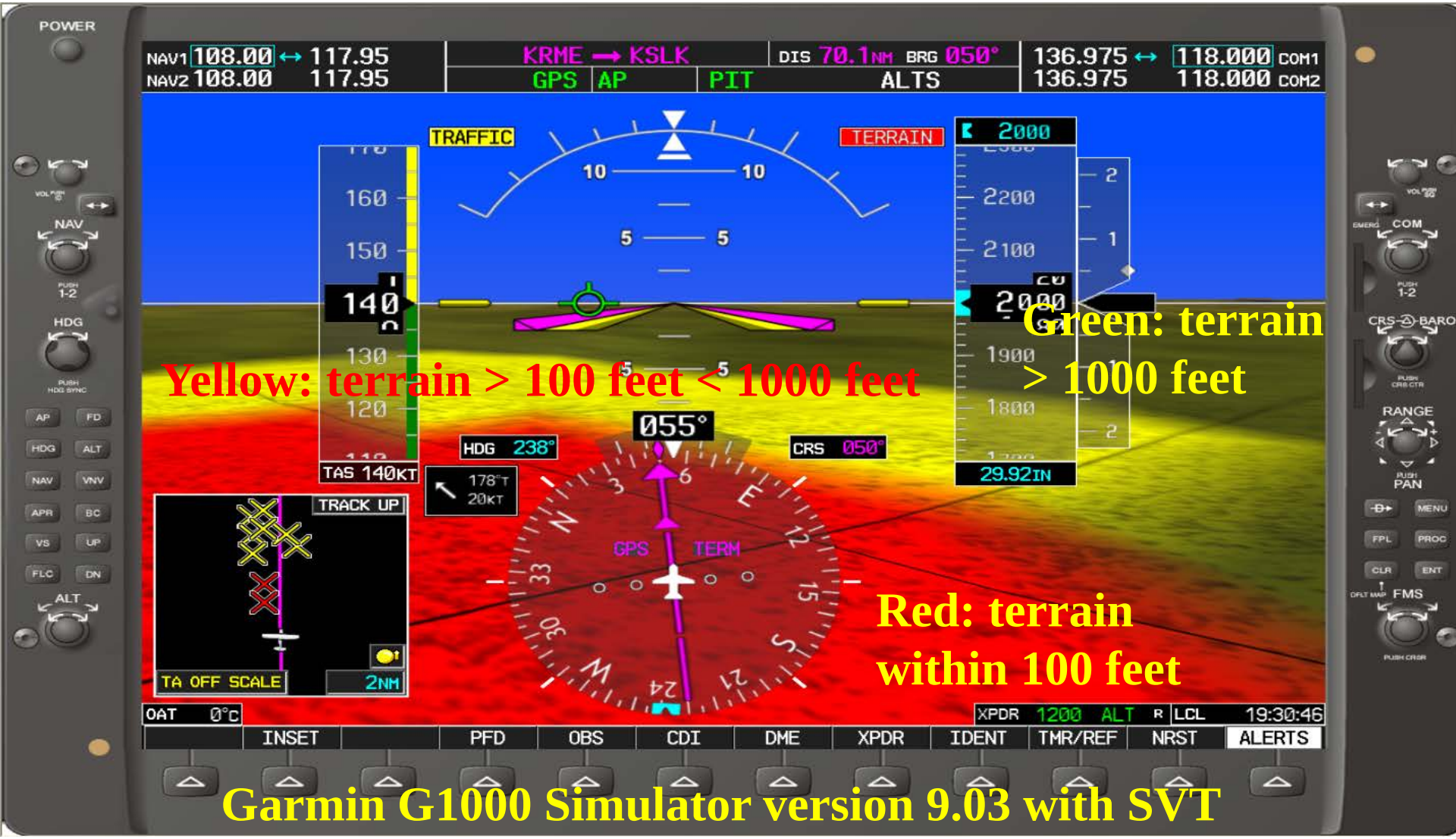
System, Instrument, and/or Equipment	Kinds of Operation				Remarks, Notes, and/or Exceptions
	VFR Day	VFR Nt.	IFR Day	IFR Nt.	
Lights					
Anticollision Lights	2	2	2	2	
Flight Controls					
Stall Warning System	1	1	1	1	

Cirrus Design
SR22

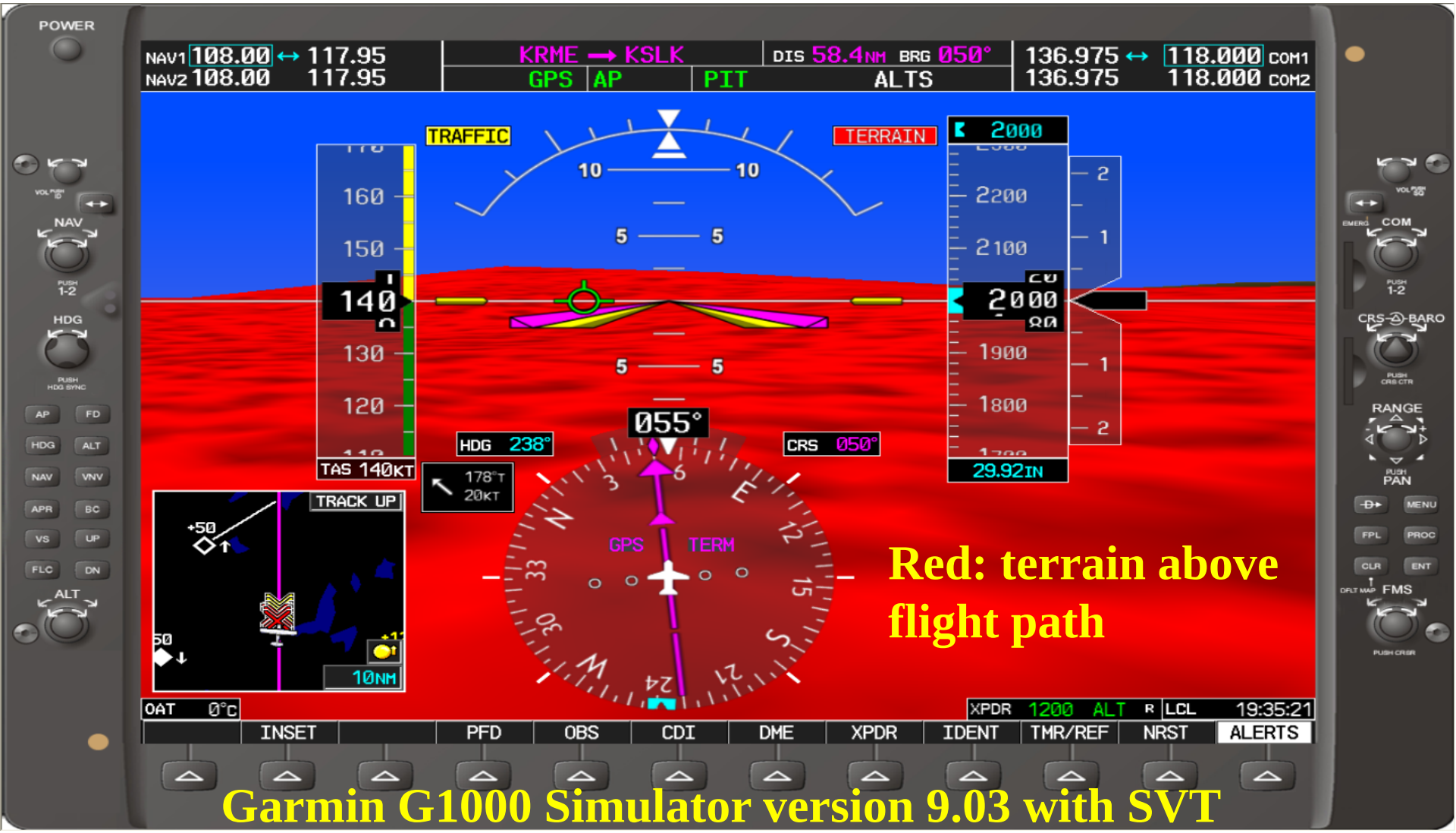
Section 2
Limitations

System, Instrument, and/or Equipment	Kinds of Operation				Remarks, Notes, and/or Exceptions
	VFR Day	VFR Nt.	IFR Day	IFR Nt.	
Lights					
Anticollision Lights	2	2	2	2	
Flight Controls					
Stall Warning System	1	1	1	1	

Anything Wrong With This Picture?



So What Do You Think? CFIT in the Making?



Flap Deployments and Flap Malfunctions

Flap Deployments

- Takeoff
  - Flaps 50%
- IFR Holding Pattern
  - Flaps 50%, ASI 120 KIAS
- IFR Approach
  - Flaps 50% at FAF, ASI 100 KIAS (SR20), 120 KIAS (SR22)
  - Flaps 100% at MAP, ASI 75 KIAS (SR20), 80 - 85 KIAS (SR22)
- VFR Pattern for Landing
  - Flaps 50% abeam Base numbers, ASI 90 - 100 KIAS (SR20), 100 KIAS (SR22)
  - Flaps 100% turning Base to Final, ASI 75 KIAS (SR20), 80 - 85 KIAS (SR22)
  - Pattern Procedures for Doylestown Airport in SR20 (“Six Pack”/Avidyne MFD)
    - http://williamjdoylejr.net/FAAST/Cirrus/Pattern_Operations_at_Doylestown_Airport_Cirrus_SR20.pdf

Flap Malfunctions

- Common Cause
  - Failed flap relay
  - Usually due to inadvertently moving Flap Selector from 0% to 100% then jerking the Flap Selector back to 50% before it has seated at 100%
- Remedial Action
  - Have mechanic replace flap relay
  - If inadvertently move Flap Selector from 0% to 100% , do the following
    1. Let the flaps seat at 100%
    2. Retract the flaps to 50%
- Airspeeds for Inoperative Flaps
  - Takeoff: 80 KIAS (SR20), 80 KIAS (SR22)
  - Landing: 85 KIAS (SR20), 88 KIAS (SR20 Perspective), 90 - 95 KIAS (SR22)
    - Note “speed boat” effect on final approach

Trimming Procedures

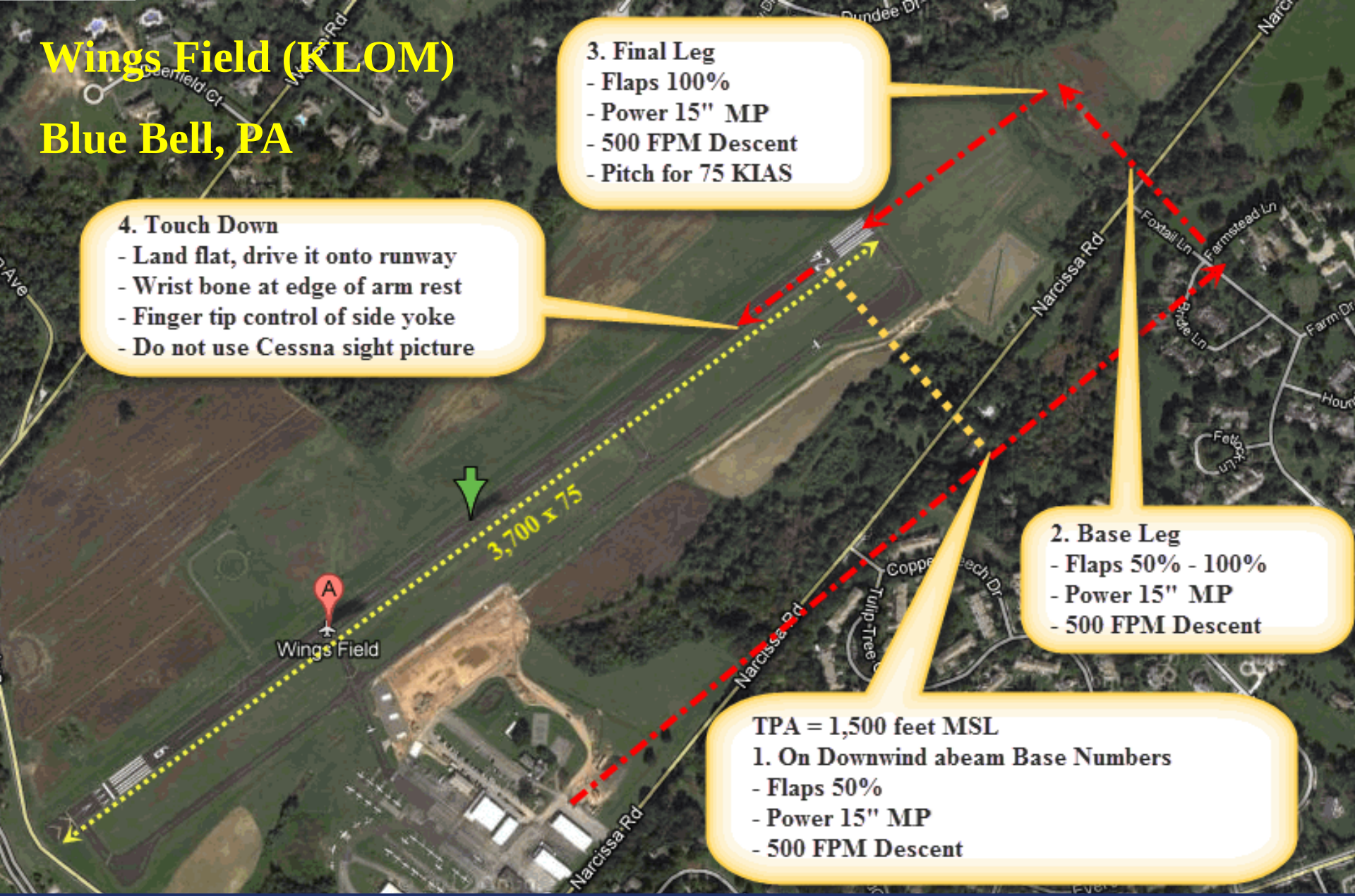
Trimming Procedures

- Pilots sometimes have difficulty setting aileron and elevator trim
  - One popular technique in trimming for level flight was to do the following
    - Engage autopilot and engage altitude hold
    - Disengage autopilot
- Tips/Suggestions for trimming
  - At safe altitude, release side yoke and observe what airplane does
  - If airplane exhibits left bank
    - Flick trim button to right, observe, adjust with right or left button flick
  - If airplane exhibits right bank
    - Flick trim button to left, observe, adjust with left or right button flick
  - If airplane exhibits pitch up
    - Flick trim button down, observe, adjust with down or up button flick
  - If airplane exhibits pitch down
    - Flick trim button up, observe, adjust with up or down button flick

Landing Procedures

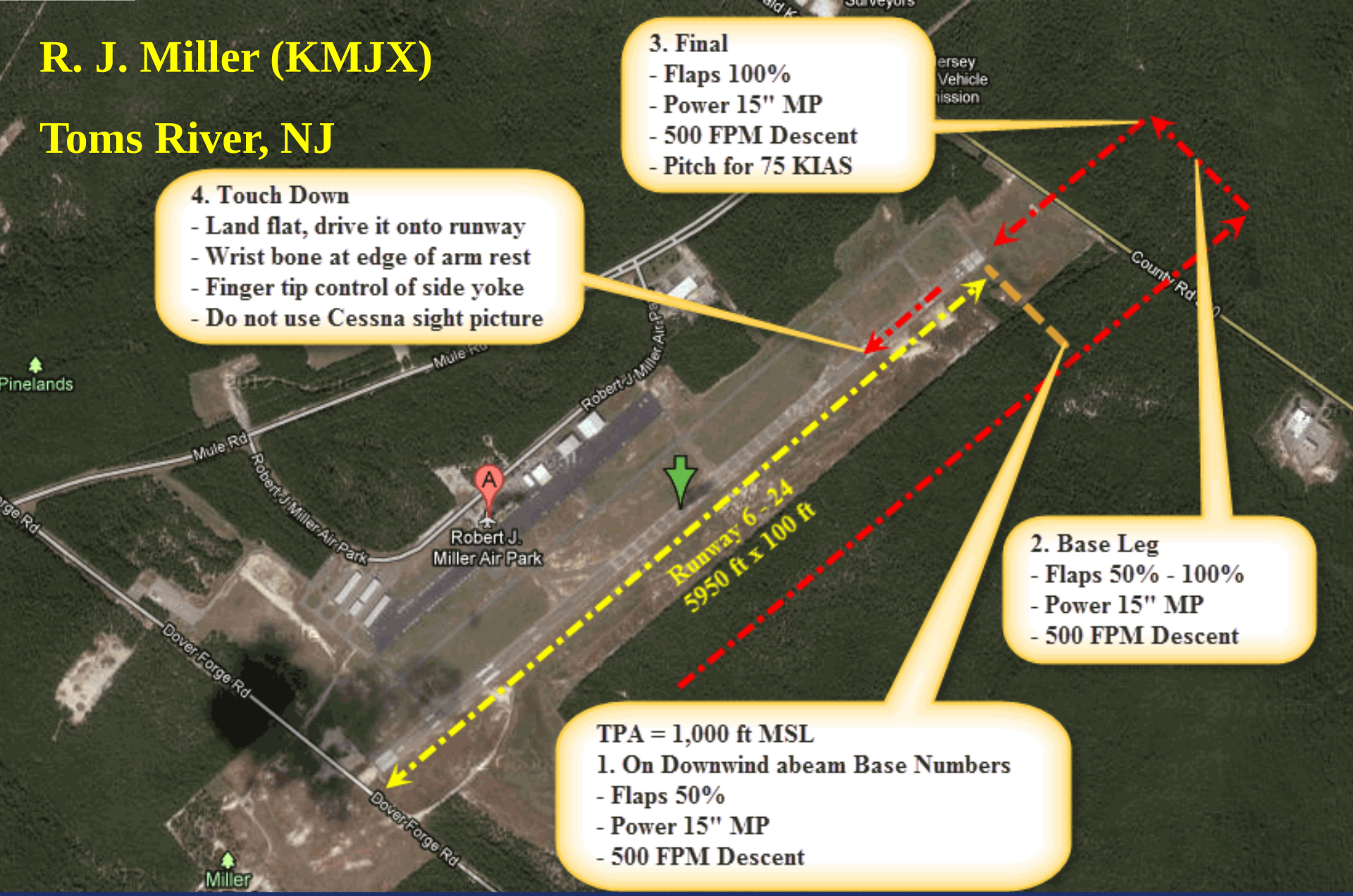
Landing Procedures

- VFR Pattern for Landing
  - Flaps 50% abeam Base numbers, ASI 90 - 100 KIAS (SR20), 100 KIAS (SR22)
  - Flaps 100% turning Base to Final, ASI 75 KIAS (SR20), 80 - 85 KIAS (SR22)
- Tips/Suggestions for Final Leg
  - Flaps 100%
  - Power set at 15” MP (throttle controls altitude)
  - Pitch for ASI 75 KIAS (SR20), 80 - 85 KIAS (SR22) (pitch controls airspeed)
  - Land flat
    - If it feels like you’re driving it on, then you’re doing it right!
  - Do not flare like a Cessna
    - If you land it like a Cessna, you will probably do a tail strike
    - Prevent over-flaring: keep wrist bone on edge of arm rest, finger tip control of side yoke
  - See Wings Field and R. J. Miller landing schematics for Cirrus SR20


Wings Field (KLOM)
Blue Bell, PA
3. Final Leg
- Flaps 100%
- Power 15" MP
- 500 FPM Descent
- Pitch for 75 KIAS
4. Touch Down
- Land flat, drive it onto runway
- Wrist bone at edge of arm rest
- Finger tip control of side yoke
- Do not use Cessna sight picture
2. Base Leg
- Flaps 50% - 100%
- Power 15" MP
- 500 FPM Descent
TPA = 1,500 feet MSL
1. On Downwind abeam Base Numbers
- Flaps 50%
- Power 15" MP
- 500 FPM Descent
3,700 x 75
Wings Field
Narcissa Rd
Foxtail Ln
Farmstead Ln
Tulip Tree Dr

R. J. Miller (KMJX)

Toms River, NJ



Takeoff Mishaps and Gotchas

Takeoff Stall in SR20 "Six Pack" with Avidyne MFD

- SR20 VFR cross country flight from Franklin County (FSO), VT to Heritage (PTW), PA (FAA Ferry Permit)
  - Departure FSO Runway 19 (3000 feet x 60 feet)
    - The winds were worsening with forecast wind shear
    - Pilot initiated takeoff roll with 50% flaps, rotating at 70 KIAS
      - Wind shear occurred between 300 – 400 feet AGL
      - Stall warning horn went off and the airplane started to sink
    - Pilot pushed the nose down and watched the airspeed build as the Runway 1 approach light stanchions loomed in the windscreen
    - Pilot rocked the airplane up to 2,500 feet
      - Pushed the nose down to build some airspeed
      - Pulling the nose up to gain some altitude
  - Lesson Learned
    - Don't forget your training

No Flap Landing in SR20 "Six Pack" with Avidyne MFD

- SR20 transition flight from Lancaster (LNS) to Doylestown (DYL)
  - Departing LNS, the flaps would not extend
    - Executed a no flap takeoff, rotating at 80 KIAS
  - Arriving DYL
    - Extended downwind for Runway 23 (3,000 feet x 60 feet) by about ½ mile
    - Reduced power to 15" MP
    - Pitched for 90 KIAS on Base leg, maintained 500 FPM descent rate
    - Pitched for 85 KIAS on Final, maintained 500 FPM descent rate
    - Attitude down Final is slightly nose high (a speedboat effect)
    - Outcome successful
- Lessons Learned
  - Pilots need to practice this.
  - At least with their BFR or annual Wings flights.

VFR Departure in SR20 "Six Pack" with Avidyne MFD

- Training flight (SR20 transition), departed Doylestown Airport (DYL) in VMC, calm wind conditions, Runway 5 (3000 feet x 60 feet)
- At rotation speed of 70 KIAS, pilot lifts off, controls get mushy
  - What would you do?
- Flaps were set to 0% not to 50%
  - What would you do?
- CFI on board instructs Pilot to do the following:
  - Do not apply 50% flaps while on the takeoff roll
  - Level the nose and execute soft field takeoff procedure
  - At 80 KIAS smoothly bring up the nose and execute climb out
- Lessons Learned:
  - Complete and verify all items on takeoff checklist

IFR Departure in SR22 Cirrus Perspective

- Departed Gaithersburg Airport (GAI) in IMC conditions (ceiling 400 feet AGL, visibility 2 sm); Runway 32 (4,202 feet x 75 feet)
- Airplane entered clouds between 700 feet and 1,000 feet MSL
  - Passenger side door "popped open”
  - What would you do?
- Pilot became disoriented; airplane’s attitude varied
  - What would you do?
- Pilot stabilized the airplane; tried to return to GAI
  - While maneuvering, with the airplane “in and out of clouds,” the airplane “stalled and started to spin.”
  - Pilot could not recall airplane's airspeed or altitude
  - Pilot recalled pressing the “level button”
  - Pilot then elected to deploy the CAPS

IFR Departure in SR22 Cirrus Perspective

- NTSB Findings
  - Flight duration and events; **elapsed time 2 minutes, 43 seconds**
    - Airplane took off at 13:39:35 EDT
    - Roll excursions began at 13:40:00 EDT **(25 seconds later)**
    - Pitch excursions began at 13:41:50 EDT **(1 minute, 50 seconds later)**
    - Autopilot engaged in Level Mode for lateral and vertical directions at 13:42:06 EDT **(16 seconds later)**
    - Stall warning at 13:42:08 EDT **(2 seconds later)**
    - CAPS deployed at 13:42:18 EDT **(10 seconds later)**
  - Airplane systems worked as designed with no malfunctions
  - Pilot, age 64, held a private pilot certificate, with ratings for airplane single-engine land and instrument airplane, held current 3rd Class Medical certificate.
    - Total flight experience – 327 hours; **Last 90 days – 3 hours**
    - Make/model flight experience – 161 hours
    - Instrument flight experience – 63 hours "simulated" and **7 hours "actual"**
  - Probable Cause - pilot's spatial disorientation after the passenger door opened during flight in instrument meteorological conditions
    - Contributing to the accident was the pilot's failure to properly secure the door latch

Enroute Mishaps and Gotchas

IFR HEF to DYL in SR20 "Six Pack" with Avidyne MFD

- IFR flight plan from Manassas (HEF) to Doylestown (DYL) in VMC
- ATC Clearance
  - Descend from 9,000 feet MSL to 5,000 MSL by 25 nm south of MXE VOR
  - ATC requests expedited descent
- Equipment
  - S-Tec 30 autopilot with altitude hold and GPS Steering (GPSS) engaged
- Pilot initiates descent with autopilot engaged, altitude hold disengaged
  - At 174 KIAS the airplane begins to vibrate badly
  - Pilot turns off autopilot, vibrations cease
- Lessons Learned
  - Prior POH showed autopilot limitation of 180 KIAS (V_{ap})
  - Subsequent versions of the Information Manual do not show that limitation

Approach Mishaps and Gotchas

VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
  - NTSB Factual Report – click link below
    http://dms.ntsb.gov/aviation/AccidentReports/3zumem55fravdc3kntm5pc451/X08022013120000.pdf
  - NTSB Probable Cause – click link below
    http://dms.ntsb.gov/aviation/AccidentReports/ydx0e4455pwhpgngnup4yg451/L08022013120000.pdf
  - Pilot Experience and FAA Certificates
    - PVT ASEL, 207 hours total time, **non-instrument rated**
      114 hours in accident airplane
  - Airplane owned by flying club at Marion Regional Airport
  - Insurance carriers for Cirrus clubs often want higher hours
    - Avemco used to require 400 hours; they now require 200 hours

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VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
  - Events from day of 11/26/2011
    - 08:30 Local, departed Marion Regional Airport (MZZ), Marion, Indiana **without a flight plan** bound for DuPage Airport (DPA), West Chicago, Illinois (167.8 NM)
      - Line Service Representative at MZZ reported that the pilot commented he was aware of the weather west of Chicago and that conditions were forecast to be VFR at their ETA.
      - Personal flight to return daughter to college, accompanied by other daughter and her boyfriend. **Four people on board with full fuel.**
    - 09:42 Local, airplane was approximately 3 miles east of the Chicago Heights VOR at 2,400 feet MSL
    - 09:57 Local, airplane turned right on a north course, about 5 miles south of DPA, at approximately 1,600 feet MSL
    - 09:58:05 Local, pilot contacted DPA Air Traffic Control Tower (ATCT) and inquired about landing at DPA. Radar data indicated that the airplane was approximately 2 miles south of the airport at that time.
      - **Controller advised the pilot that the airport was under instrument flight rules (IFR)**.

VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
  - Events from day of 11/26/2011 (continued)
    - 09:58:35 Local, pilot advised DPA ATCT that he had inadvertently flown over the airport.
    - 09:59:40 Local, controller authorized pilot to reverse course and land at DPA. The pilot acknowledged this transmission.
    - 10:00 Local, radar data indicated that the aircraft began a turn to an east course.
    - 10:02 Local, pilot informed controller that he no longer had the airport in sight. The controller provided a suggested heading to DPA.
    - 10:04 Local, pilot asked if there was another airport with better visibility because **he did not "want to get in there and get stuck all day." (Get-there-it is?)**
      - Controller noted that Chicago Executive Airport (PWK), located about 20 miles northeast of DPA, was reporting VFR conditions.
      - Controller asked if the pilot would like to be transferred to Chicago approach for assistance navigating to PWK. **(Note: opportunity to break the accident chain)**
      - Pilot replied, "**I'm still trying to decide if I want to try to land at DuPage or not** . . . Would you think that's a good idea or not." **(Note: pilot not instrument-rated)**

VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
  - Events from day of 11/26/2011 (continued)
    - 10:04 Local, continued
      - **Pilot informed the controller that the flight was "in and out of the clouds."**
      - **Controller asked pilot if he was instrument qualified**
      - **Pilot replied that he was in instrument training and that "I've let this get around me."**
    - 10:08 Local, DPA controller provided pilot with a frequency for Chicago TRACON
    - 10:12:39 Local, Chicago TRACON initiated contact with pilot.
      - Controller subsequently provided weather conditions at airports in the vicinity of the accident flight. **(Note: another opportunity to break the accident chain)**
    - 10:15:28 Local, **pilot** advised controller that he **would proceed to PWK**.
    - **10:22:49** Local, pilot advised controller that
      - he **did not "want to mess with the weather . . . I'm gonna get out . . . and I don't want to get stuck in here." (Get-there-it is?)**
      - Pilot confirmed that the flight was **no longer inbound to PWK**
      - **No further communications were received from the accident flight**.

VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
  - Events from day of 11/26/2011 (continued)
    - 10:24:03 Local, airplane entered a right turn from west course at **1,800 feet MSL**.
      - The right turn continued until the final radar data point.
    - 10:25:08 Local, airplane established on approximate east course at **2,000 feet MSL**
    - 10:25:31 Local, airplane was on approximate southeast course at **2,400 feet MSL**
    - 10:43:31 Local, airplane was on a south course **about 2,100 feet MSL**, the right turn appeared to tighten
    - 10:25:58 Local, airplane was established on a west course about **1,800 feet MSL**
    - 10:26:22 Local, final radar data point was recorded.
      - Airplane appeared to be on a south course about 1,800 feet MSL.
      - The final data point was located approximately 0.4 miles northwest of the accident site.
    - Two witnesses within ½ mile of accident site heard an airplane. Both said it sounded like the airplane was doing aerobatics, with the airplane climbing and descending. Less than 1 minute later, they saw the airplane to the south in an **approximate 70° nose down attitude**. Airplane subsequently **impacted the ground**.

VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
- NTSB Probable Cause Report
  - Occurrences
    - **Enroute - VFR encounter with IMC**
    - **Enroute - Loss of control in flight**
    - **Uncontrolled descent - Collision with terrain / object (non-CFIT)**
  - Findings
    - Personnel Issues - Action/Decision - Information Processing - **Decision Making / Judgment - Pilot** (Cause) **(Get-there-itis)**
    - Personnel Issues – Psychological – Perception / Orientation / Illusion - **Spatial disorientation - Pilot** (Cause) **(Pilot not instrument-rated)**
    - Personnel issues – **Task Performance - Use of Equipment** / Information - **Aircraft control-Pilot** (Cause) **(Was autopilot & altitude hold engaged?)**
    - Environmental Issues – Conditions / Weather / Phenomena - Ceiling/visibility/precipitation - **Below VFR minima** - Effect on operation (Factor)

VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
- Lessons Learned
  - Use autopilot and altitude hold in IMC, avoid hand flying, especially if low experience
    - See slide #12 for airplane instrument panel layout
    - S-TEC 30 autopilot with altitude hold
  - Avoid situations that can produce "get-there-itis"
    - Ticket to following day's Indianapolis Colts football game found in wreckage
    - **Most likely this ticket was "probable cause" for get-there-itis**
  - Set realistic personal minimums
    - And stick with them!
  - If you're in a bad situation and ATC offers a way out, **take it!**
    - So be it if you have to remain over night

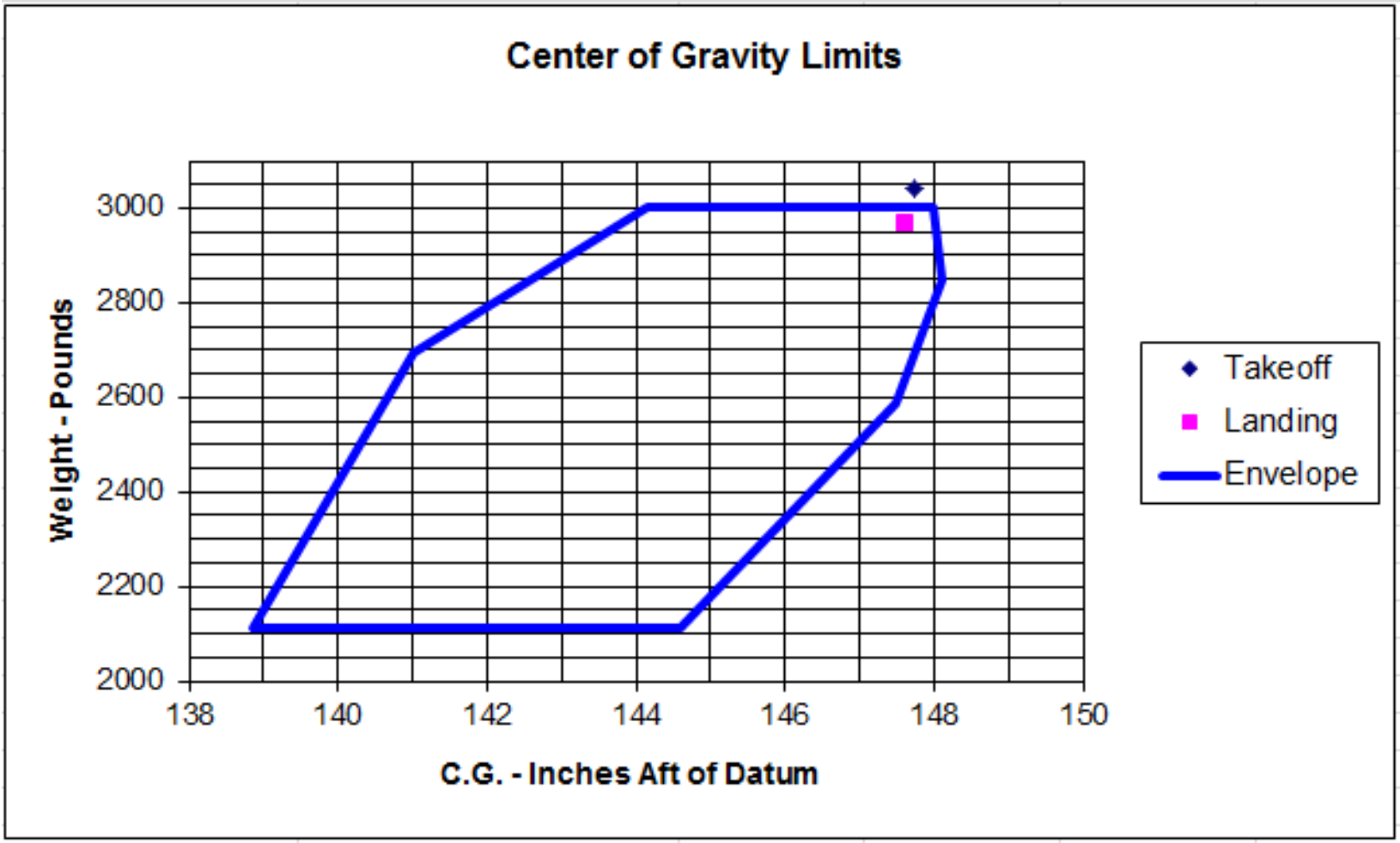
VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- Continued VFR into IMC Flight with four fatalities
- Lessons Learned (continued)
  - If you become spatially disoriented or incapacitated, deploy the parachute
    - Plane will be wrecked but you and passengers have a chance at surviving
  - Be mindful of weight & balance
    - Accident airplane had full fuel (56 gallons useable)
    - Accident airplane had four passengers
    - Using weight and balance estimates on next two slides, accident airplane was 43 pounds over gross takeoff weight
      - Pilot (46 year old male) weight estimated at 200 pounds
      - Daughter #1 and Daughter #2 weight estimated at 130 pounds each
      - Daughter #2's Boyfriend weight estimated at 170 pounds
      - Baggage estimated at 30 pounds (college woman's clothing et cetera)

VFR into IMC in SR20 "Six Pack" with Avidyne MFD
Accident Airplane Estimated Weight & Balance

Cirrus SR20 N223CD - Estimated				
Marion Regional Airport			**Date:**	26-Nov-11
Marion, IN			**Departure:**	KMZZ
			Destination:	KDPA
Position	***Item***	***Weight***	***Arm***	***Moment***
Basic Empty Weight	***Cirrus SR20 N223CD***	2047	141.07	288.77
Pilot Name & Weight	Dad	200	143.50	28.70
Fuel (Gallons)	**56**	336	153.80	51.68
Pax Position	***Pax Names***	***Pax Weight***		
Front Right	Daughter #1	130	143.50	18.66
Rear Left	Daughter #2	130	185.00	24.05
Rear Right	Daughter #2's Boyfriend	170	185.00	31.45
Bags	***No more than 130 lbs***	30	208.00	6.24
TOTAL WEIGHT AND CG		***3043***	***147.7***	***449.54***
MAX ALLOWABLE TAKEOFF WEIGHT			**3000**	
Empty Weight	**plus Fuel plus**	***Pax & Bags***	***Equals***	
2047	336	660	3043	147.7
Est. Fuel Burn (Gal)		12	72	
Est. Destination Landing Weight & CG			2971	147.6
Max Allowable Landing Weight			**2900**	
Zero Fuel Weight and CG			2707	147.0

VFR into IMC in SR20 "Six Pack" with Avidyne MFD
Accident Airplane Estimated Weight & Balance



Night IFR DYL to ABE in SR20 "Six Pack" with Avidyne MFD

- CFI A&I (Pilot) asked another CFI A&I for an IPC at night after work
  - CFI administering IPC did not have any TAA experience
  - Weather conditions forecast to be IMC
- ATC Clearance – 3,000 feet MSL enroute with radar vectors to ILS 6
  - Pilot launches from DYL Runway 5 after dark and into IMC
- Pilot workload high
  - Setting frequencies and transponder codes
  - Selecting and activating approach procedures for two ILS 6 approaches
  - Flying the airplane:
    - Maintaining assigned altitudes
    - Turns to headings
    - Altitude step-downs
    - Localizer and glide slope interception
    - Configuration changes: pitch, power, trim, and flaps

Night IFR DYL to ABE in SR20 "Six Pack" with Avidyne MFD

- CFI tells Pilot that the airplane was so completely foreign that he could not even assist with frequency changes
  - CFI copies and reads back clearance for IFR return to DYL
  - Pilot sets up the clearance electronically
- ABE Departure hands off to PHL Approach
  - PHL Approach vectors Pilot to VOR 23 approach
  - Winds favor runway 5 so Pilot executes a circle-to-land to runway 5
  - Conditions improve; Pilot executes visual turn to final
- Lessons Learned
  - CFI's need to be proficient in the airplane flown, especially if TAA and IMC
  - Pilots flying TAA's should make that their CFI is proficient in that make/model
  - Engage the autopilot ASAP, especially when flying single pilot night IFR
    - Here the Pilot continued to hand fly the airplane adding to the workload and risk

IFR DYL to ABE in SR20 "Six Pack" with Avidyne MFD

- IFR flight plan from Doylestown (DYL) to Lehigh Valley Int'l (ABE)
- ATC Clearance – 3,000 feet MSL enroute with radar vectors to ILS 6
- Enroute
  - Pilot enters clouds at 3,000 feet MSL just north of Perkasie
  - What would you do?
  - Pilot does not turn on pitot heat
- ATC vectors Pilot for the ILS 6
  - Just after intercepting localizer and glideslope, ASI indicates 0 KIAS
  - What would you do?
  - Pilot shoves nose down, VSI "pegs" at 2,000 FPM down, ASI still 0 KIAS
  - Pilot does instrument cross-check and recognizes that ASI is failed
  - Pilot re-intercepts localizer and glide slope
  - Pilot completes approach and lands without further incident

IFR DYL to ABE in SR20 "Six Pack" with Avidyne MFD

- Lessons Learned
  - Recognize that this mishap could have had a substantially worse outcome
  - Apply pitot heat when entering visible precipitation (clouds, rain, snow)
  - Do continuous instrument scan, regularly cross-checking instruments
  - Periodically correlate the ASI airspeed with the GPS groundspeed for a given flight regime or direction of flight.
    - Know wind direction and velocity for each flight leg
    - Get updates from Flight Watch, ATIS, ASOS, ATC as necessary
  - Consider the procedures on the next three slides

IFR DYL to ABE in SR20 "Six Pack" with Avidyne MFD

- Procedure for Radar Vectors to the Approach Course with failed ASI
  - Reduce power to 20" MP to obtain an airspeed of 120 Knots
  - Cross-check using the groundspeed indicated on the GNS 430.
  - When slowed and stabilized, extend flaps to 50%
  - Cross-check Flight Instruments to verify level flight attitude
  - AI: miniature airplane on the horizon
  - ALT: altitude is constant at assigned altitude
  - VSI: needle on zero

IFR DYL to ABE in SR20 "Six Pack" with Avidyne MFD

- Procedure for ILS Approach with failed ASI
  - When established, reduce power to 17" - 18" MP to obtain 100 Kts
  - Cross-check using the groundspeed indicated on the GNS 430.
  - Check VSI for 500 - 600 FPM rate of descent
  - Intercept Glideslope (GS) and follow GS prompts on HSI
  - If above Glideslope
    - Reduce power slightly (16" - 17" MP)
    - Pitch down slightly to acquire GS
    - When GS acquired, adjust power and pitch to maintain GS

IFR DYL to ABE in SR20 “Six Pack” with Avidyne MFD

- Procedure for ILS Approach with failed ASI (continued)
  - If below Glideslope
    - Increase power slightly (19" - 20" MP)
    - Pitch up slightly to acquire GS
    - When GS acquired, adjust power and pitch to maintain GS
  - At Decision Height (DH) and airport complex in sight
    - Reduce power to 15" MP
    - Extend flaps to 100%
    - Pitch for 500 FPM rate of descent on VSI
    - Pre-landing checklist (GUMP)
    - Gradually reduce power to idle when runway is "made"
    - Land the airplane

Landing Mishaps and Gotchas

Runway Excursion in SR20 "Six Pack" with Avidyne MFD

- SR20 transition flight (local) at Heritage (Pottstown-Limerick) (PTW)
  - Pilot tendency was to land hot, balloon high in flare, crash down
    - CFI and Pilot were working on landing procedures
      - Flaps at 100%
      - Power at 15" MP
      - Pitch for 75 KIAS
      - Land flat
      - If balloon in flare
        - Freeze the controls
        - Add about 1" – 2" MP to arrest sink rate
      - Land the airplane
  - Pilot had just done two textbook perfect landings on runway 28 and was going for a third landing

Runway Excursion in SR20 "Six Pack" with Avidyne MFD

- SR20 transition flight (local) at Heritage (Pottstown-Limerick) (PTW)
  - Pilot ballooned the airplane on the third landing to runway 28
    - Pilot added too much power
    - CFI asked if this was a go around
    - Pilot looked at CFI to answer, "No," apparently twisted side yoke to right
    - Airplane yawed to the right, about 45° - 60° from the runway centerline
    - CFI grabbed the controls, pulled power to idle, trying to straighten it out
    - Pilot pushed throttle to full power
    - Airplane nose went up into an unusual attitude
      - Airplane yawed badly to the right
      - Right wing dropped to within a foot or so of the ground
      - Stall horn sounded

Runway Excursion in SR20 "Six Pack" with Avidyne MFD

- SR20 transition flight (local) at Heritage (Pottstown-Limerick) (PTW)
  - Excursion and recovery
    - CFI pulled side yoke full aft, pulled power lever to idle, leveled wings
    - Airplane, now fully perpendicular to the centerline, exited the runway
      - Airplane was like a speedboat going down the trough of a very large wave.
      - Airplane went down embankment adjacent to runway 28
      - Airplane went through a sea of mud at bottom of embankment
      - Airplane went up other side of the embankment, narrowly missed a runway sign
      - Airplane went across the mid-field taxiway, down another embankment, narrowly missed a drainage grate
      - Airplane bled off its kinetic energy and came to a stop in six inch high grass
    - CFI taxied through grass to main taxiway to main ramp and shut down
    - Pilot washed off mud and checked for damage

Runway Excursion in SR20 "Six Pack" with Avidyne MFD

Runway Excursion in SR20 "Six Pack" with Avidyne MFD

- SR20 transition flight (local) at Heritage (Pottstown-Limerick) (PTW)
  - Lessons Learned
    - Make a decision and stick to it
      - Go around, if that's what you want to do but don't vacillate
    - Gentle inputs for control and power (don't overdo it on either)
    - Never stop flying the airplane (don't give up)
    - Don't "fight" the CFI for control of the airplane
      - It would have helped if Pilot had recognized that CFI was recovering from the initial 45°- 60° centerline deviation
    - Use positive exchange of flight controls
      - CFI should have said, "I have the airplane"
    - Recognize that this mishap could have had a substantially worse outcome

Landing an SR20 – A Lesson Learned from a BE76 Duchess

- SR20 Landing Technique
  - Land flat. If it looks like you're driving it onto the runway, you're doing it right.
  - Flaring like a Cessna usually results in a tail strike, which can damage the spine.
- First Landing in a Twin Engine Beech BE76 Duchess
  - I was the multi-engine student on a straight in to PNE Runway 33
  - All the way down final the MEI kept preaching, "Land flat! Land flat!"
  - The MEI yelled, "You lied to me! You told me you never had any multi-engine time. That was a perfect landing. Nobody does their first landing in a twin that perfect!"
  - I told him I did a lot of flying and flight instructing in a Cirrus SR20, which has to be landed flat as well, and that I went for the same sight picture.
- Lesson Learned
  - Ask transitioning SR20 pilots if they have light twin experience.
  - If so, land it like a twin.

Landing Mishap in SR20 "Six Pack" with Avidyne MFD

- SR20 VFR cross country flight from Heritage (PTW), PA to Franklin County (FSO), VT
  - VFR-only Private Pilot does the following at FSO
    - Lands hard then balloons
    - Executes go around
    - Lands hard again with following damage
      - Bent nose wheel strut
      - Prop strike on nose wheel strut
      - Torn motor mounts
  - Other findings
    - Mishap most likely caused by substantial clear ice on the cowling

Landing Mishap in SR20 "Six Pack" with Avidyne MFD

- SR20 VFR cross country flight from Heritage (PTW), PA to Franklin County (FSO), VT
  - Outcomes
    - Airplane out of service at FSO for six months
    - Annual inspection expires, owner elects to get ferry permit to get annual inspection done at PTW
  - Lessons Learned
    - Get (and understand) a thorough weather briefing for the route of flight
    - Establish personal minimums
      - Don't exceed your capabilities
      - Don't exceed the privileges of your certificate and ratings
      - Don't exceed the capabilities of your airplane
    - Recognize that this mishap could have had a substantially worse outcome

No Flap Landing in SR20 "Six Pack" with Avidyne MFD

- SR20 transition flight from Lancaster (LNS) to Doylestown (DYL)
  - Departing LNS, the flaps would not extend
    - Executed a no flap takeoff, rotating at 80 KIAS
  - Arriving DYL
    - Extended downwind for Runway 23 (3,000 feet x 60 feet) by about ½ mile
    - Reduced power to 15" MP
    - Pitched for 90 KIAS on Base leg, maintained 500 FPM descent rate
    - Pitched for 85 KIAS on Final, maintained 500 FPM descent rate
    - Attitude down Final is slightly nose high (a speedboat effect)
    - Outcome successful
- Lessons Learned
  - Pilots need to practice this.
  - At least with their BFR or annual Wings flights.

What Are the Risks in Flying a Technologically Advanced Aircraft (TAA)?

Technologically Advanced Aircraft (TAA)

- Please refer to the links below for more information on technologically advanced aircraft
  - http://williamjdoylejr.net/FAAST/TAA.ppt
  - http://williamjdoylejr.net/FAAST/gps.ppt
  - http://williamjdoylejr.net/FAAST/TAA-GPS_CFI_Workshop_12-13-2010_R1.ppt

What Are the Risks with Flying TAA?

- **Risk: Lack of Pilot Proficiency**
  - **Mitigation: study, study, study then practice, practice, practice**
    - Get the simulator for whatever GPS you have
      - Garmin GNS 430, Garmin GNS 530, Garmin G1000 Cirrus Perspective, Avidyne Entegra Release 9 for Cirrus
      - See reference section for links
    - Download training videos, manuals (PDF), flight planning lessons
    - Get some ground instruction and flight instruction from your CFI

What Are the Risks with Flying TAA?

- **Risk: Head in the Cockpit Instead of Outside**
  - **Mitigation: Set up as much as possible on the ground**
    - Do your flight planning at home before coming to the airport
      - File an FAA flight plan (consider IFR even if VMC)
      - Print a navigation log (consider AOPA Flight Planner)
    - Set up flight plan in GPS after engine start
      - Contact Clearance Delivery on radio or cell phone
      - Set up clearance route in your GPS

What Are the Risks with Flying TAA?

- **Risk: Single Pilot IFR**
  - **Mitigation: Take an experienced pilot or CFI**
    - Establish personal minimums, don't deviate from them
      - Consider establishing a risk management matrix
      - Refer to next section on personal minimums
    - Build experience
      - ***When appropriate***, revise your personal minimums

What Are the Risks with Flying TAA?

- **Risk: Thunderstorm Penetration**
  - **Mitigation: Avoid thunderstorms**
    - Do ***not*** use NexRad or Strike Finder features to penetrate thunder Storms
    - Use NexRad or Strike Finder features to avoid thunder Storms
      - Preferably by putting the T-Storms at your six o'clock

What Are the Risks with Flying TAA?

- **Other Things You Should Consider**
  - If possible, upgrade your GPS to WAAS
  - If possible, upgrade/subscribe to NexRad
    - Near real-time weather
    - Near real-time TFR
  - Keep your databases up to date
    - Subscriptions are available for downloads from the Internet

What Are the Risks with Flying TAA?

- **Other Things You Should Consider**
  - Foster/practice continuing pilot education
    - Get an IPC every 6 – 12 months whether you need it or not
    - Engage in self-study
      - FAA Advanced Avionics Handbook
        - » http://www.faa.gov/library/manuals/aviation/media/FAA-H-8083-6.pdf
      - FAA Risk Management Handbook - See Appendix A for Personal Minimums
        - » http://www.faa.gov/library/manuals/aviation/media/FAA-H-8083-2.pdf
      - AOPA Air Safety Foundation - Technologically Advanced Aircraft Safety and Training
        - » http://www.aopa.org/asf/publications/topics/TAA2007.pdf

Doing It by the Numbers:
Vspeeds
ASI Arcs
and
Performance Data

V_{Speeds} – SR20

Extracted from Information Manuals Downloaded from Cirrus website

For information purposes only. Do not use for flight planning. Use the actual POH.

V_{Speed}	S/Ns 2016 & subsequent with Cirrus Perspective Avionics System	S/Ns 1268 & subsequent with Analog or Avidyne Avionics System	S/Ns 1148 thru 1267 & S/Ns 1005 thru 1147 post 3000 Pound Gross Weight Modification
V_x	83 KIAS	81 KIAS	81 KIAS
V_y	96 KIAS	96 KIAS	96 KIAS
V_{fe}	119 KIAS @ 50%	120 KIAS @ 50%	120 KIAS @ 50%
	104 KIAS @ 100%	100 KIAS @ 100%	100 KIAS @ 100%
Vs	69 KIAS	65 KIAS	65 KIAS
V_{so}	61 KIAS	56 KIAS	56 KIAS
V_o	130 KIAS @ 3050 lb	131 KIAS @ 3000 lb	131 KIAS @ 3000 lb
	122 KIAS @ 2600 lb	122 KIAS @ 2600 lb	122 KIAS @ 2600 lb
	111 KIAS @ 2200 lb	114 KIAS @ 2300 lb	111 KIAS @ 2200 lb
V_{no}	163 KIAS	165 KIAS	165 KIAS
V_{ne}	200 KIAS	200 KIAS	200 KIAS
V_{rotate}	65 - 70 KIAS	67 - 70 KIAS	67 - 70 KIAS
V_{glide}	99 KIAS @ 3050 lb	96 KIAS @ 3000 lb	96 KIAS @ 3000 lb
	87 KIAS @ 2500 lb	87 KIAS @ 2500 lb	87 KIAS @ 2500 lb
V_{ap}		*180 KIAS*	*180 KIAS*
V_{pd}	133 KIAS	133 KIAS	133 KIAS
V_{xwind}	20 Knots	21 Knots	21 Knots
$V_{goaround}$	81 - 83 KIAS	75 KIAS	75 KIAS
	Flaps 50%	Flaps 50%	Flaps 50%
$V_{landing}$	88 KIAS @ 0%	85 KIAS @ 0%	85 KIAS @ 0%
	83 KIAS @ 50%	80 KIAS @ 50%	80 KIAS @ 50%
	78 KIAS @ 100%	75 KIAS @ 100%	75 KIAS @ 100%

V_{Speeds} – SR22

Extracted from Information Manuals Downloaded from Cirrus website

For information purposes only. Do not use for flight planning. Use the actual POH.

V_{Speed}	S/Ns 2979, 2992, 3002, 3026 & subsequent with Cirrus Perspective Avionics System	S/Ns 0002 thru 2978, 2980 thru 2991, 2993 thru 3001, 3003 thru 3025, 3027 & subsequent with Analog or Avidyne Avionics System
V_x	79 KIAS	78 KIAS
V_y	101 KIAS	101 KIAS
V_{fe}	119 KIAS @ 50% 104 KIAS @ 100%	119 KIAS @ 50% 104 KIAS @ 100%
Vs	73 KIAS	70 KIAS
V_{so}	62 KIAS	59 KIAS
V_o	133 KIAS @ 3400 lb 123 KIAS @ 2900 lb	133 KIAS @ 3400 lb 123 KIAS @ 2900 lb
V_{no}	177 KIAS	178 KIAS
V_{ne}	200 KIAS	201 KIAS
V_{rotate}	70 - 73 KIAS	70 - 73 KIAS
V_{glide}	89 KIAS @ 3400 lb 87 KIAS @ 2900 lb	89 KIAS @ 3400 lb 87 KIAS @ 2900 lb
V_{ap}		
V_{pd}	133 KIAS	133 KIAS
V_{xwind}	20 Knots	20 Knots
$V_{goaround}$	75 - 80 KIAS Flaps 50%	75 - 80 KIAS Flaps 50%
$V_{landing}$	90 - 95 KIAS @ 0% 85 - 90 KIAS @ 50% 80 - 85 KIAS @ 100%	90 - 95 KIAS @ 0% 85 - 90 KIAS @ 50% 80 - 85 KIAS @ 100%

ASI Arcs – SR20

	SR20		
Arcs	**S/Ns 2016 & subsequent with Cirrus Perspective Avionics System**	**S/Ns 1268 & subsequent with Analog or Avidyne Avionics System**	**S/Ns 1148 thru 1267 & S/Ns 1005 thru 1147 post 3000 Pound Gross Weight Modification**
White	61 - 104	56 - 100	56 - 100
Green	69 - 163	65 - 165	65 - 165
Yellow	163 - 200	165 - 200	165 - 200
Red Line	200	200	200

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ASI Arcs – SR22

Arcs	S/Ns 2979, 2992, 3002, 3026 & subsequent with Cirrus Perspective Avionics System	S/Ns 0002 thru 2978, 2980 thru 2991, 2993 thru 3001, 3003 thru 3025, 3027 & subsequent with Analog or Avidyne Avionics System
White	62 - 104	59 - 104
Green	73 - 177	70 - 178
Yellow	177 - 200	178 - 201
Red Line	200	201

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Performance Data – SR20

Weight, Fuel, GPH, Endurance, and Power Rating	S/Ns 2016 & subsequent with Cirrus Perspective Avionics System	S/Ns 1268 & subsequent with Analog or Avidyne Avionics System	S/Ns 1148 thru 1267 & S/Ns 1005 thru 1147 post 3000 Pound Gross Weight Modification
Maximum Gross for Takeoff	3050	3000	3000
Maximum Gross for Landing	3050	2900	2900
Standard Empty Weight	2050	2050	2050
Maximum Useful Load	1000	950	950
Usable Fuel - Full	56	56	56
Usable Fuel - Tabs	26	26	26
Payload with Full Fuel	664	664	664
Payload with Fuel to the Tabs	844	844	844
GPH @ 75% Power	11.6	11.6	11.6
Endurance - Full Fuel (Hours)	4.8	4.8	4.8
Endurance - Fuel to Tabs (Hours)	2.2	2.2	2.2

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Performance Data – SR22

Weight, Fuel, GPH, Endurance, and Power Rating	S/Ns 2979, 2992, 3002, 3026 & subsequent with Cirrus Perspective Avionics System	S/Ns 0002 thru 2978, 2980 thru 2991, 2993 thru 3001, 3003 thru 3025, 3027 & subsequent with Analog or Avidyne Avionics System
Maximum Gross for Takeoff	3400	3400
Maximum Gross for Landing	3400	3400
Standard Empty Weight	2250	2250
Maximum Useful Load	1150	1150
Usable Fuel - Full	92	81
Usable Fuel - Tabs	60	47
Payload with Full Fuel	448	514
Payload with Fuel to the Tabs	640	718
GPH @ 75% Power	17.8	17.8
Endurance - Full Fuel (Hours)	5.2	4.6
Endurance - Fuel to Tabs (Hours)	3.4	2.6

Extracted from Information Manuals Downloaded from Cirrus website

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Weight & Balance Scenarios for Cirrus SR20

Weight & Balance

- Please refer to the link below for more information on weight and balance
  - http://williamjdoylejr.net/FAAST/W&B/

Weight & Balance Scenarios

- Airplanes to be used for a cross country flight from Doylestown (KDYL) to Cape May (KWWD) and back

Airplanes					
Make	**Model**	**Gross Weight**	**Fuel - Full**	**Fuel - Tabs**	**Tabs + 7**
Cessna	C172S	2,550	53	35	N/A
Cessna	C182T	3,100	87	64	N/A
Cessna	U206H	3,600	87	64	N/A
Cirrus	SR20	3,000	56	26	40

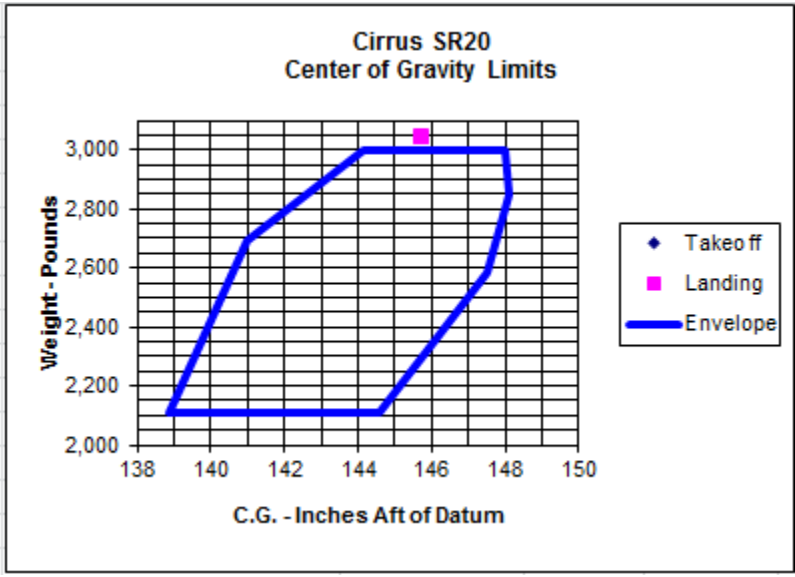
- Crew weights and positions

Crew Weights	
Position	**Weight**
Front - Left	280
Front - Right	200
Rear - Right	175
Rear - Left	20

- Will each airplane be within weight and CG limits?

Weight & Balance Scenario – Cirrus SR20 – Full Fuel

Cirrus SR20 Weight & Balance				
Position	*Item*	*Weight*	*Arm*	*Moment*
Basic Empty Weight	*Cirrus SR20*	2,119	141.572	299.992
Pilot Name & Weight	PIC	280	143.500	40.180
Fuel (Gallons)	**56**	336	153.800	51.677
Pax Position	*Pax Names*	*Pax Weight*		
Front Right	Pax #1	200	143.500	28.700
Rear Left	Gear	20	180.000	3.600
Rear Right	Pax #2	175	180.000	31.500
Bags	*No more than 130 lbs*	0	208.000	0.000
Runup Fuel	*Less runup fuel*	-7	153.800	-1.077
TOTAL WEIGHT AND CG		3,123	145.901	455.649
Useful Load Available		*-123*	Over Gross!	



Airplane 123 pounds overweight

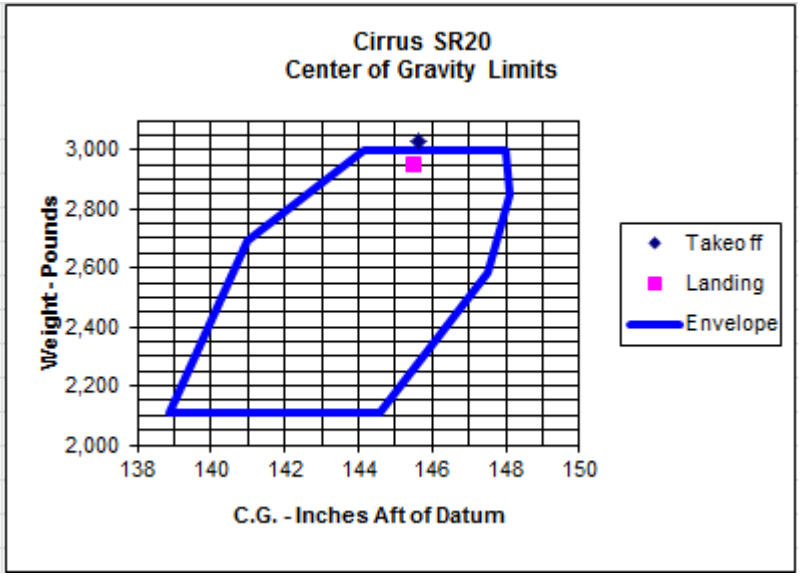
CG above the envelope

Airplane not legal to fly

http://williamjdoylejr.net/FAAST/W&B/Weight_&_Balance_Cirrus_SR20.xls

Weight & Balance Scenario – Cirrus SR20 –Tabs + 7

Cirrus SR20 Weight & Balance				
Position	***Item***	***Weight***	***Arm***	***Moment***
Basic Empty Weight	*Cirrus SR20*	2,119	141.572	299.992
Pilot Name & Weight	PIC	280	143.500	40.180
Fuel (Gallons)	**40**	240	153.800	36.912
Pax Position	***Pax Names***	***Pax Weight***		
Front Right	Pax #1	200	143.500	28.700
Rear Left	Gear	20	180.000	3.600
Rear Right	Pax #2	175	180.000	31.500
Bags	*No more than 130 lbs*	0	208.000	0.000
Runup Fuel	*Less runup fuel*	-7	153.800	-1.077
TOTAL WEIGHT AND CG		3,027	145.650	440.884
Useful Load Available		***-27***	**Over Gross!**	



Airplane 27 pounds overweight

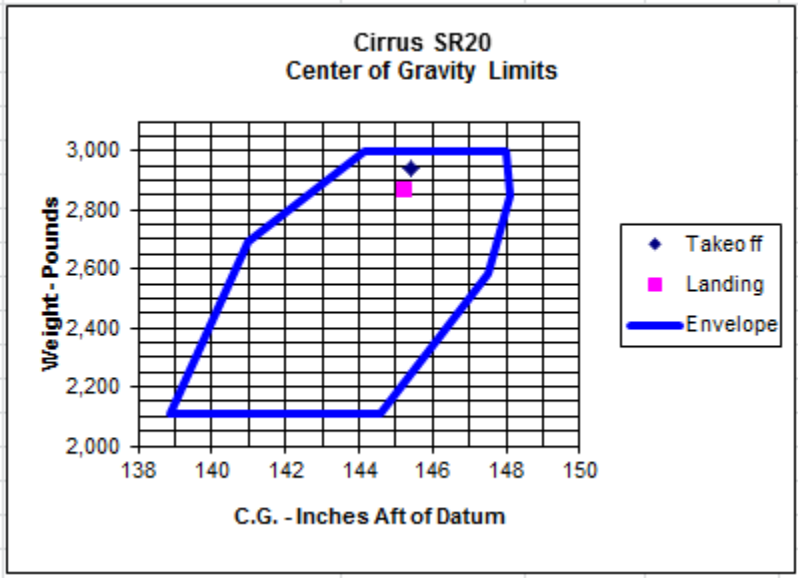
CG above the envelope

Airplane not legal to fly

http://williamjdoylejr.net/FAAST/W&B/Weight_&_Balance_Cirrus_SR20.xls

Weight & Balance Scenario – Cirrus SR20 – Fuel to Tabs

Cirrus SR20 Weight & Balance				
Position	*Item*	*Weight*	*Arm*	*Moment*
Basic Empty Weight	*Cirrus SR20*	2,119	141.572	299.992
Pilot Name & Weight	PIC	280	143.500	40.180
Fuel (Gallons)	**26**	156	153.800	23.993
Pax Position	*Pax Names*	*Pax Weight*		
Front Right	Pax #1	200	143.500	28.700
Rear Left	Gear	20	180.000	3.600
Rear Right	Pax #2	175	180.000	31.500
Bags	*No more than 130 lbs*	0	208.000	0.000
Runup Fuel	*Less runup fuel*	-7	153.800	-1.077
TOTAL WEIGHT AND CG		2,943	145.418	427.965
Useful Load Available		*57*	**Okay**	



Airplane within weight and CG limits

Airplane legal to fly

http://williamjdoylejr.net/FAAST/W&B/Weight_&_Balance_Cirrus_SR20.xls

How to Query the NTSB Database

Accessing the NTSB Database

- Use your web browser to access the NTSB Database
  - http://www.ntsb.gov/aviationquery/index.aspx

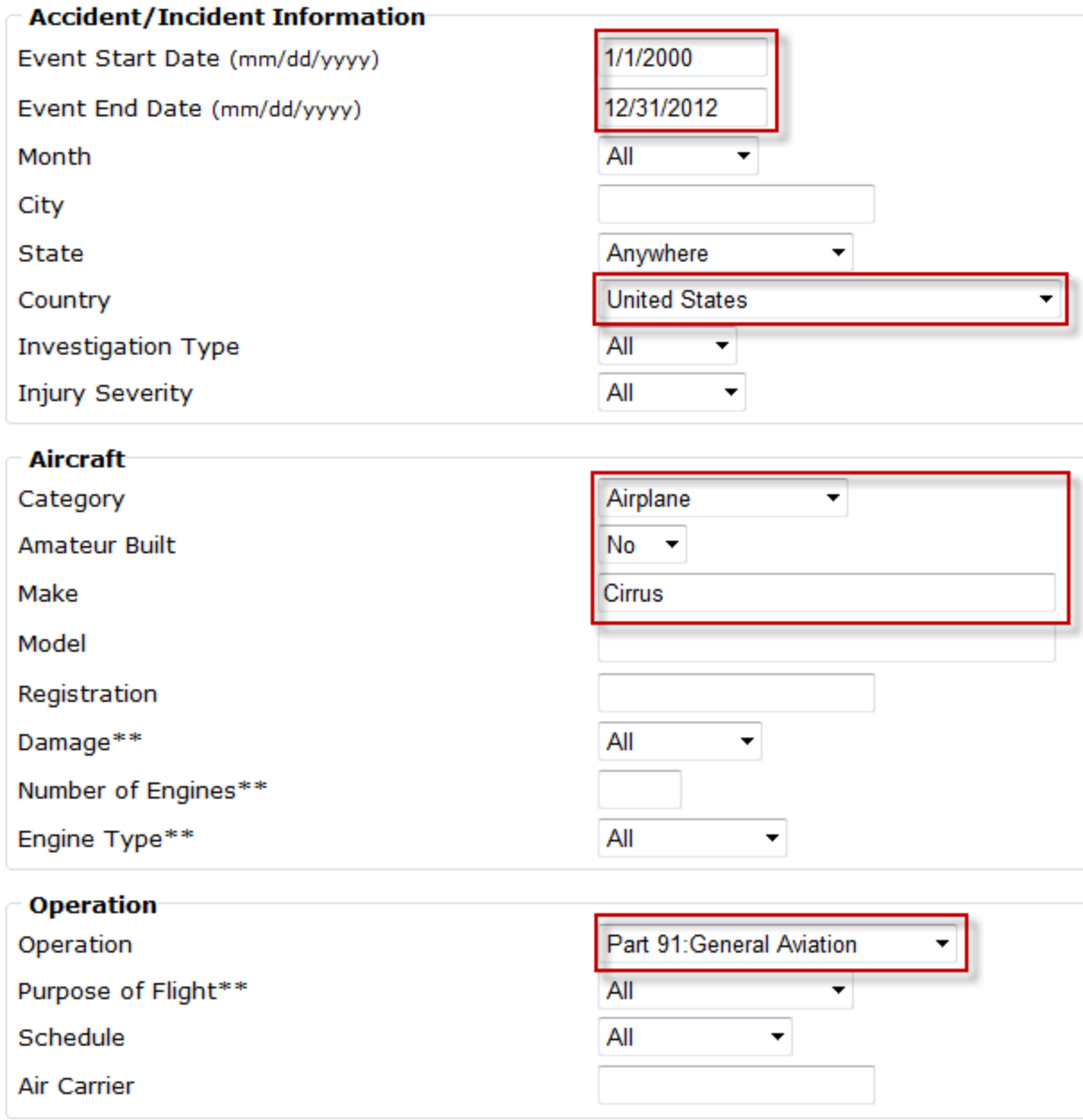
Aviation **Accident Database & Synopses**

The NTSB aviation accident database contains information from 1962 and later about civil aviation *accidents* and selected *incidents* within the United States, its territories and possessions, and in international waters. Generally, a **preliminary** report is available online within a few days of an accident. **Factual** information is added when available, and when the investigation is completed, the preliminary report is replaced with a **final** description of the accident and its probable cause. Full narrative descriptions may not be available for dates before 1993, cases under revision, or where NTSB did not have primary investigative responsibility.

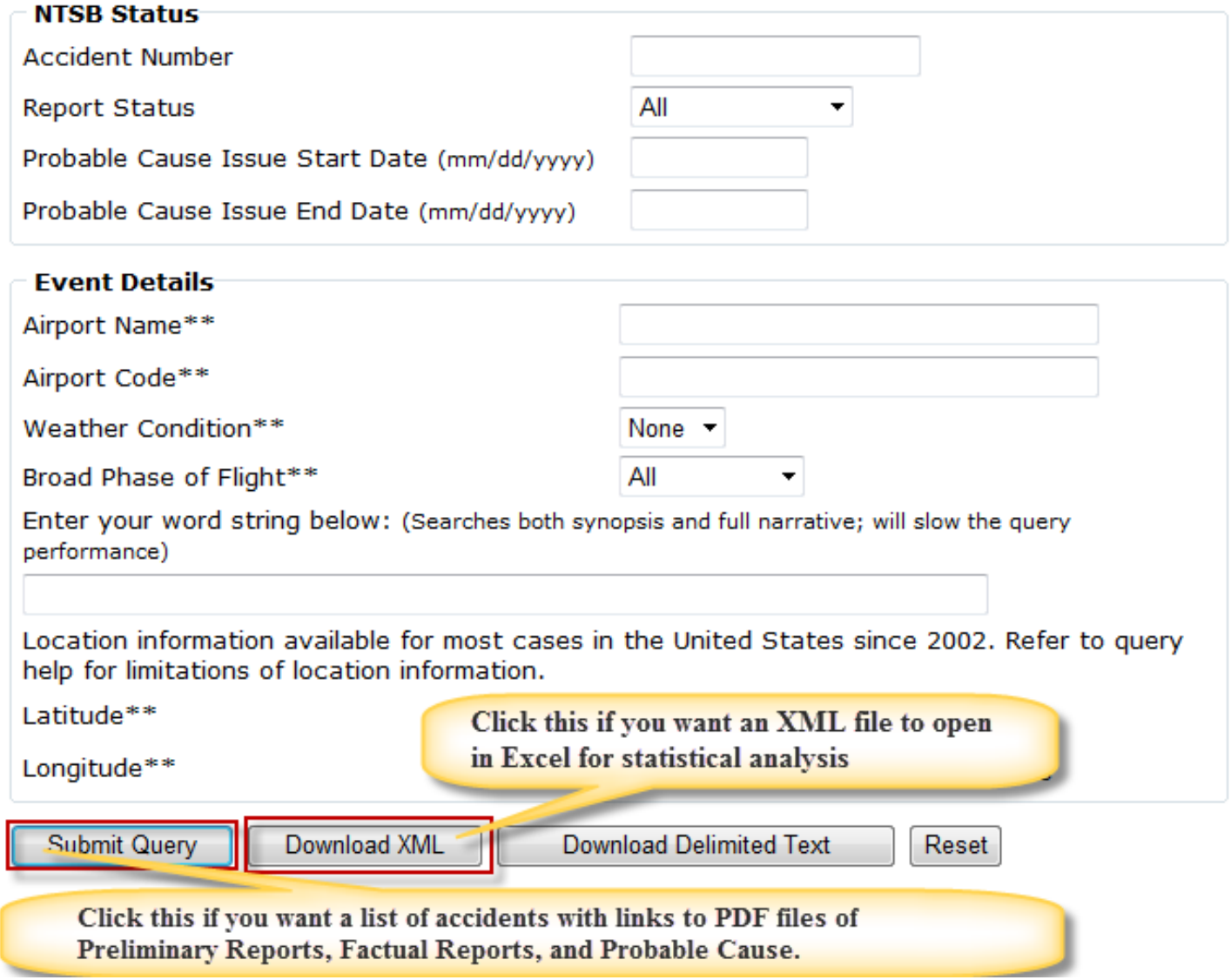
- Monthly lists - accidents sorted by date, updated daily.
- Investigations Nearing Completion - List of investigations with estimated dates of publishing probable cause.
- Downloadable datasets - one complete dataset for each year beginning from 1982, updated monthly in Microsoft Access 2000 MDB format; this site also provides weekly "change" updates and complete documentation.
- GILS record - complete description of the accident database, including definition of "accident" and "incident".
- FAA incident database - complete information about incidents, including those not investigated by NTSB, is provided by the Federal Aviation Administration.
- Data & Information Products - lists other sources of information about aviation accidents, including publications, dockets, and press releases

This interactive search capability for the NTSB database, updated daily; see the and **data dictionary** before using the form for the first time.

Accessing the NTSB Database



Creating an NTSB Database Query



Database Query Results (Partial)

179 records meet your search criteria.

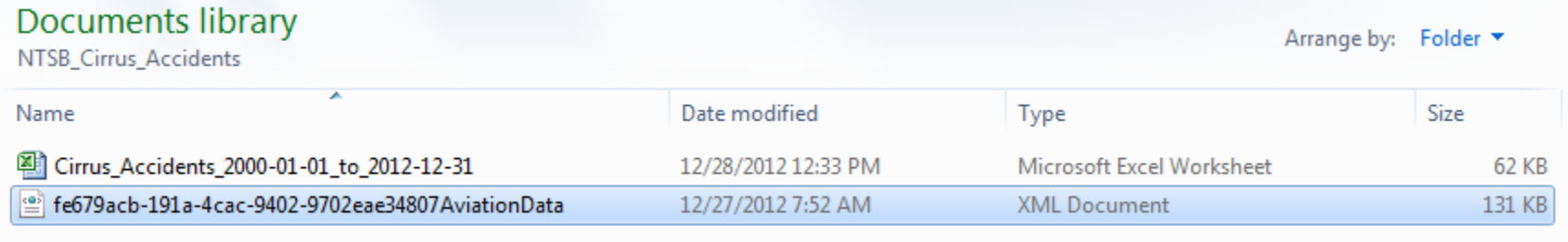
A docket of supporting materials may exist for factual and probable cause reports. Please contact Records Management Division. Dockets are not available for preliminary reports.

Accident Database & Synopses Download XML Download Delimited Text

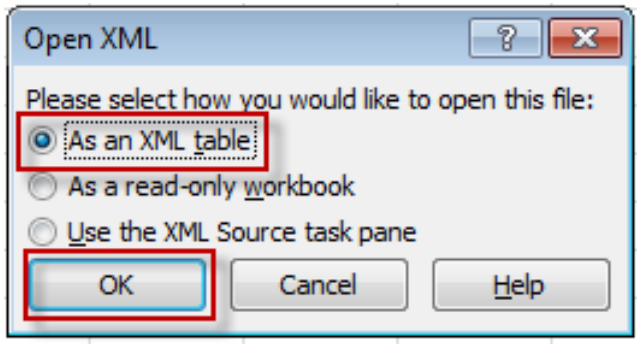
Current Synopsis	PDF Report(s) (Published)	Event Date	Estimated Release	Location	Make/Model	Regist. Number	NTSB No.	Event Severity
Preliminary	Preliminary (11/20/2012)	11/16/2012		Show Low, AZ	CIRRUS SR22	N800RW	WPR13LA043	Nonfatal
Preliminary	Preliminary (11/13/2012)	10/21/2012		Pahokee, FL	CIRRUS DESIGN CORP SR22	N6839R	ERA13LA048	Nonfatal
Preliminary	Preliminary (10/31/2012)	10/15/2012		Parker, AZ	CIRRUS DESIGN CORP SR20	N499SF	WPR13LA011	Nonfatal
Preliminary	Preliminary (10/16/2012)	10/6/2012		Birmingham, AL	CIRRUS DESIGN CORP SR22	N80KW	ERA13LA012	Nonfatal
Preliminary	Preliminary (10/11/2012)	10/3/2012		Gary, IN	CIRRUS DESIGN CORP SR22	N308PJ	CEN13FA002	Fatal(2)
Probable Cause	Factual (11/01/2012) Probable Cause (12/19/2012)	10/2/2012	12/19/2012	Eden Prairie, MN	CIRRUS DESIGN CORP SR20	N750SR	CEN13CA007	Nonfatal
Preliminary	Preliminary (09/20/2012)	9/15/2012		Willard, MO	CIRRUS DESIGN CORP SR22	N436KS	CEN12FA633	Fatal(5)
Preliminary	Preliminary (09/12/2012)	9/1/2012		Falmouth, MA	CIRRUS DESIGN CORP SR22	N221DV	ERA12FA540	Fatal(1)

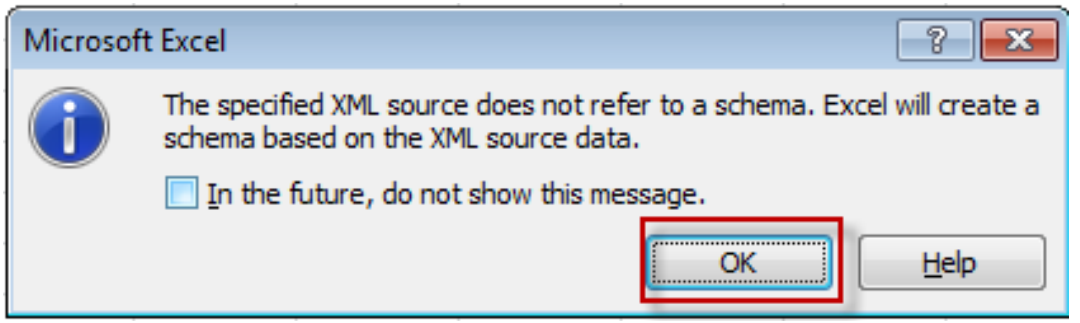
Download of Cirrus Accidents in XML Format (1 of 2)

- Download the XML file



- After you download the XML file, launch Excel and open the XML file





Download of Cirrus Accidents in XML Format (2 of 2)

- Your XML file will look similar to the screen shown below.
- You can save your XML file as an Excel workbook.

	A	B	C	D	E	F	G	H	I	J	K	L
1	EventId	InvestigationType	AccidentNumber	EventDate	Location	Country	Latitude	Longitude	AirportCode	AirportName	InjurySeverity	AircraftDama
2	20121116X62231	Accident	WPR13LA043	11/16/2012	Show Low, AZ	United States	34.218889	-109.873889			Non-Fatal	Substantial
3	20121106X04117	Accident	ERA13LA048	10/21/2012	Pahokee, FL	United States	26.784444	-80.689444	PHK	Palm Beach County Glades Airpo	Non-Fatal	Substantial
4	20121015X75934	Accident	WPR13LA011	10/15/2012	Parker, AZ	United States	34.110556	-114.627500	P20	Parker	Non-Fatal	Substantial
5	20121007X94725	Accident	ERA13LA012	10/06/2012	Birmingham, AL	United States	33.563889	-86.752222	BHM	Birmingham International	Non-Fatal	Substantial
6	20121003X24635	Accident	CEN13FA002	10/03/2012	Gary, IN	United States	41.616111	-87.412778	KGYY	Gary/Chicago Int'l Arp	Fatal(2)	Substantial
7	20121007X75550	Accident	CEN13CA007	10/02/2012	Eden Prairie, MN	United States	44.823056	-93.455278	KFCM	Flying Cloud	Non-Fatal	Substantial
8	20120915X35028	Accident	CEN12FA633	09/15/2012	Willard, MO	United States	37.305278	-93.428334	SGF	Springfield-Branson National	Fatal(5)	Substantial
9	20120901X42234	Accident	ERA12FA540	09/01/2012	Falmouth, MA	United States	41.584722	-70.542777	5B6	Falmouth Airpark	Fatal(1)	Substantial
10	20120828X83828	Accident	CEN12CA576	08/25/2012	Watkins, CO	United States	39.766667	-104.525000	KFTG	Front Range Airport	Non-Fatal	Substantial
11	20120731X35733	Accident	CEN12LA495	07/29/2012	Lakeview, AR	United States			3MO	Gastons Airport	Non-Fatal	Substantial
12	20120723X43615	Accident	ERA12LA473	07/22/2012	Pickens, SC	United States	34.810000	-82.702778			Non-Fatal	Substantial
13	20120715X25131	Accident	WPR12FA305	07/14/2012	Salina, UT	United States	38.819723	-111.432223			Fatal(2)	Substantial
14	20120711X12055	Accident	ERA12FA438	07/11/2012	Moscow, TN	United States	35.056389	-89.386389			Fatal(1)	Substantial
15	20120706X65711	Incident	WPR12IA296	06/17/2012	Deer Valley, AZ	United States	33.686111	-112.076111	DVT	Deer Valley	Incident	Minor
16	20120530X50747	Accident	WPR12FA235	05/29/2012	Duck Creek Village, UT	United States	37.435000	-112.765000			Fatal(4)	Substantial
17	20120427X35846	Accident	ERA12FA303	04/27/2012	Anderson, SC	United States	34.493889	-82.707778	KAND	Anderson Regional Airport	Fatal(1)	Substantial

Parting Thoughts

The Three Most Useless Things to a Pilot

- **The runway behind you**
  - **Moral: know your aircraft's take-off minimums and calculate the weight and balance for your flight, your airport's runway length, density altitude, any obstacles to be cleared**
- **The altitude above you**
  - **Moral: know your aircraft's power settings for climb, cruise, and descent**
- **The fuel on the ground below you**
  - **Moral: know your aircraft's fuel capacity, fuel system, GPH burn rate, and winds aloft for the route of flight.**
- **Utilize superior judgment to avoid needing to use superior skill**
  - **Moral: know your aircraft's systems and how to use them**

Just a Real Nice Picture at PNE
This is what a rotation looks like!

Credits and Information

References and Information

- **Author of Presentation**
  - William J. Doyle, Jr., CFI A&I, AGI, IGI, Cessna CFAI
    - FAA FAAST Team Representative, PHL FSDO
- **Downloading This Presentation**
  - Uses PowerPoint 2003 and later
  - Password-protected, so click on the "Read Only" button
  - http://williamjdoylejr.net/FAAST - all of my FAAST Team presentations
  - http://williamjdoylejr.net/FAAST/Cirrus/ - all Cirrus presentation files
  - http://williamjdoylejr.net/FAAST/Cirrus/Cirrus_SR20_and_SR22.ppt
  - http://williamjdoylejr.net/FAAST/Cirrus/Cirrus_SR20_and_SR22.pdf
  - http://williamjdoylejr.net/FAAST/Cirrus/Cirrus_Accidents_2000-01-01_to_2012-12-31.xlsx
  - http://williamjdoylejr.net/FAAST/Cirrus/Cirrus_SR20_and_SR22_Performance.xlsx
  - http://williamjdoylejr.net/FAAST/Cirrus/Pattern_Operations_at_Doylestown_Airport_Cirrus_SR20.pdf
  - http://williamjdoylejr.net/FAAST/W&B/Weight_&_Balance_Cirrus_SR20.xls
- **907 Flight Squadron and the Cirrus Owners and Pilots Association**
  - for sourcing the Cirrus SR20 W&B spreadsheet to me

References and Information

- **Cirrus SR22 Information Manuals**
  - http://servicecenters.cirrusdesign.com/TechPubs/pdf/POH/sr22-001/pdf/20880-001InfoManual.pdf
  - http://servicecenters.cirrusdesign.com/TechPubs/pdf/POH/sr22-002/pdf/20880-002InfoManual.pdf
- **Cirrus SR20 Information Manuals**
  - http://servicecenters.cirrusdesign.com/TechPubs/pdf/POH/SR20-002/pdf/13999-002InfoManual.pdf
  - http://servicecenters.cirrusdesign.com/TechPubs/pdf/POH/SR20-003/pdf/13999-003InfoManual.pdf
  - http://servicecenters.cirrusdesign.com/TechPubs/pdf/POH/SR20-004/pdf/13999-004InfoManual.pdf

References and Information

- **Garmin G1000 PC Trainer for Cirrus Perspective, Version 11.11**
  - $24.95 plus $8.00 shipping
  - https://buy.garmin.com/shop/shop.do?pID=100714
- **Garmin GNS 430 and 530 (discontinued products)**
  - Download GNS 430 Simulator (free)
  - http://www8.garmin.com/support/download_details.jsp?id=3527
  - Download GNS 530 Simulator (free)
  - http://www8.garmin.com/support/download_details.jsp?id=3530
  - Download GNS 400W/500W WAAS Simulator (free)
  - http://www8.garmin.com/support/download_details.jsp?id=3532
- **Avidyne Entegra Release 9 for Cirrus**
  - Entegra Release 9 Free Play Simulator (free)
  - http://www.avidyne.com/products/release-9/demo-sim.asp

References and Information

- **NTSB Accident Database**
  - http://www.ntsb.gov/aviationquery/index.aspx
- **Electronic Code of Federal Regulations – Title 14 Aeronautics and Space**
  - http://www.ecfr.gov/cgi-bin/text-idx?sid=fd0d4ed9821626f95caf8cad8372ce03&c=ecfr&tpl=/ecfrbrowse/Title14/14tab_02.tpl
- **Electronic Code of Federal Regulations – Title 14 Chapter I-- Federal Aviation Administration, Department of Transportation, Subchapter D – Airmen**
  - http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=fd0d4ed9821626f95caf8cad8372ce03&c=ecfr&tpl=/ecfrbrowse/Title14/14cfrv2_02.tpl

Just a Real Nice Picture at PNE
This is what a climb out looks like!

FAASTeam
on
Takeoffs, Approaches, and Landings
for the
Cirrus Design
SR20 and SR22

Questions?
Comments?
Ideas?

“Gotchas” with Garmin 530/430/420 Units

Cross-Filling Flight Plans with Dual Garmin GNS 530 - GNS 430 – GNC 420 GPS Units

- Good safety feature to cross-fill plans on the dual GPS units
- Press Menu button
  - Select Cross-fill from Page Menu
- Can cross-fill from
  - GPS1 to GPS2, or
  - GPS2 to GPS1
- Sending unit cannot cross-fill from NAV page 2 (Moving Map)
- Sending unit can be on
  - NAV 1, 3, 4, 5, or 6, or
  - Another Page Group

Common Errors Activating ILS Approach on Garmin GNS 430 GPS

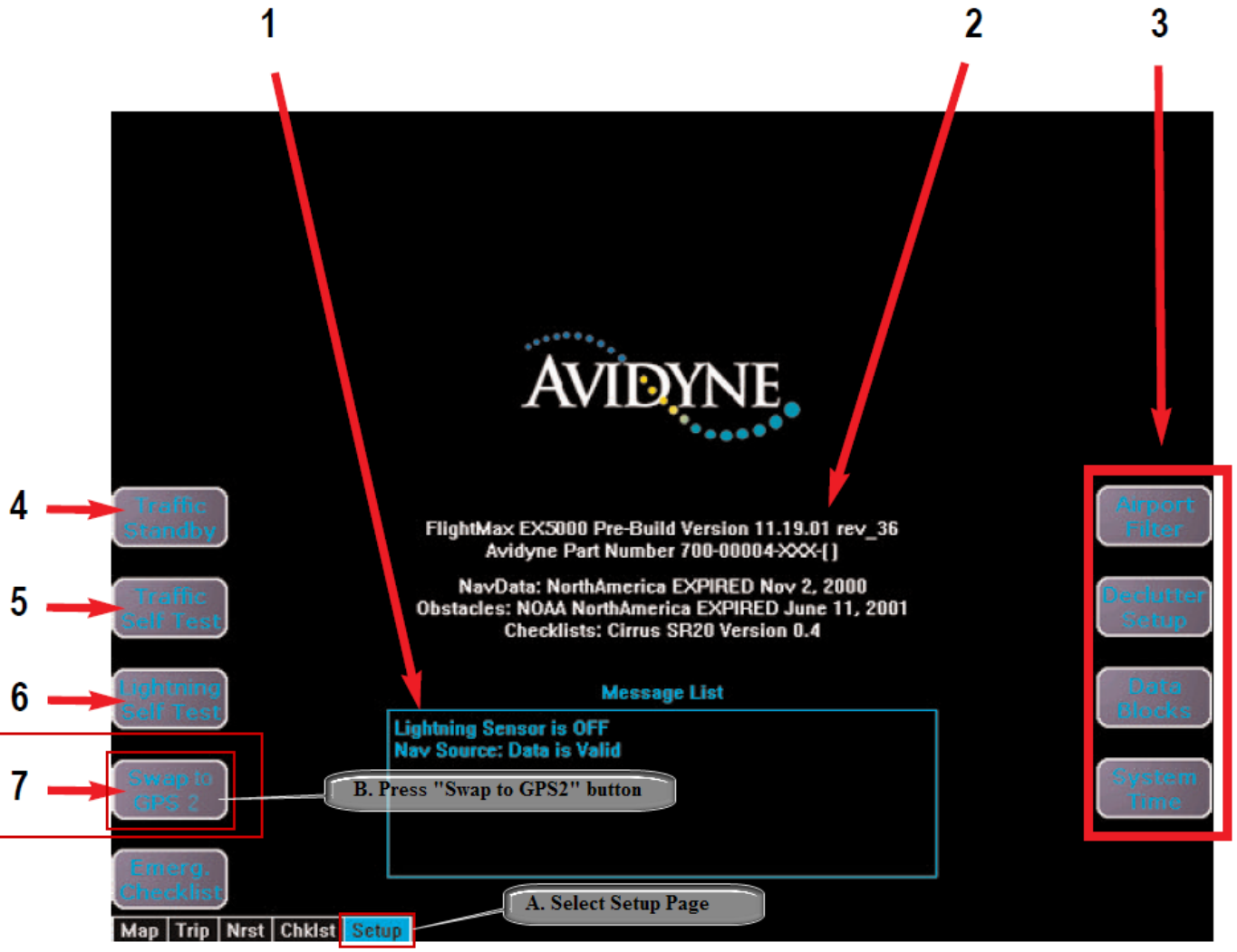
- Activating the approach from the Procedure Page does not automatically
  - Switch CDI from GPS to VLOC
  - Make LOC frequency active
- Pilots often forget this
- Press CDI button to
  - Switch from GPS to VLOC
- Press Navigation Frequency flip-flop button to
  - Switch LOC frequency from Standby to Active

Common Errors Activating ILS Approach on Garmin GNS 530 GPS

- Activating the approach from the Procedure Page does not automatically
  - Switch CDI from GPS to VLOC
  - Make LOC frequency active
- Pilots often forget this

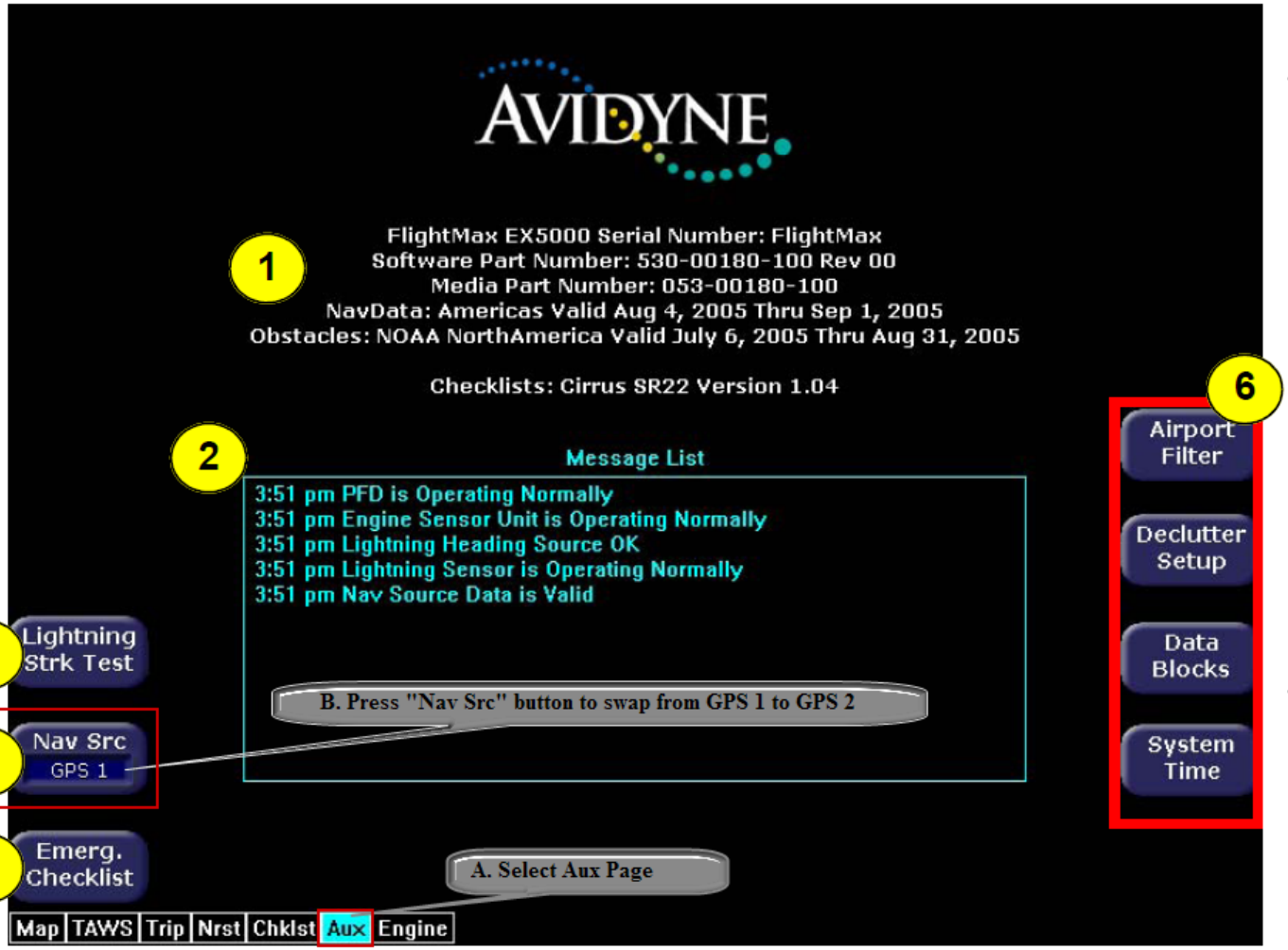
- Press CDI button to
  - Switch from GPS to VLOC
- Press Navigation Frequency flip-flop button to
  - Switch LOC frequency from Standby to Active

Switching GPS Source on Avidyne MFD When GPS1 Fails



- Avidyne MFD version on Cirrus SR20 v1
  - Select Setup Page
  - Press “Swap to GPS2” button
- May need to use Autopilot in Heading mode

Switching GPS Source on Avidyne MFD When GPS1 Fails



- Avidyne MFD version on Cirrus SR20 v2
  - Select Aux Page
  - Press “Nav Src” button to swap from GPS1 to GPS2
- May need to use Autopilot in Heading mode

This Completes

Takeoffs, Approaches, and Landings for the Cirrus Design SR20 and SR22

Be sure to sign in so your attendance is record validated!