What If …?

What If You Were Flying VFR and You Encountered IMC?

Strategies for Inadvertent IMC Encounters

Presented to: FAA Safety Seminar Attendees

By: W. J. Doyle, Jr., CFI A&I, AGI, IGI, FAAST Rep

Date: 2013 - 2014

Federal Aviation Administration

How to Download this Presentation

- You can download this presentation at the link below. The link is case-sensitive.
  - The PPT format is password-protected. Click the read-only button on the right.
  - http://williamjdoylejr.net/FAAST/What_IF/What_If_VFR_into_IMC.ppt/
- Changes to PHL Class B Airspace
  - http://williamjdoylejr.net/FAAST/PHL_Class_B_Airspace/2013-07-25_Summary_of_PHL_Class_B_Airspace_Changes.pdf
- Email me at doylewj@ix.netcom.com to request these links

Presentation Agenda

- FARs 91.3 and 91.103
- NTSB VFR into IMC, Scud Running, Pre-Flight Planning and Accident Trends
- Planning a Hypothetical “Hundred Dollar Hamburger” Flight
- The Flight Down
- The Flight Back
- A VFR into IMC Accident
- A “Scud Running” Accident
- How to Query the NTSB Database
- Credits and Reference Information

What … If?

- What if you were flying VFR and you saw IMC several miles ahead across your route of flight?
- What would you do?
  - Would you continue on?
    - 95% chance of a fatal accident for continued VFR into IMC
  - Would you try to “duck” below the layer?
    - 83% chance of a fatal accident for “scud running”
- Stay with us for a flight that encounters these choices
  - See NTSB accident statistics for continued VFR into IMC and scud running
  - See NTSB cases for continued VFR into IMC and scud running

Two FARs You Really Need to Understand

14 CFR 91.3

- Responsibility and authority of the pilot in command.

  a) The pilot in command of an aircraft is directly responsible for, and is the **final authority** as to, the operation of that aircraft.

  b) In an **in-flight emergency requiring immediate action**, the pilot in command **may deviate from any rule of this part to the extent required to meet that emergency**.

  c) Each pilot in command who deviates from a rule under paragraph (b) of this section shall, **upon the request of the Administrator**, send a written report of that deviation to the Administrator.

14 CFR 91.103 – Preflight Action

- Each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include—

  a) For a flight under IFR or a flight not in the vicinity of an airport, **weather reports and forecasts**, fuel requirements, **alternatives available if the planned flight cannot be completed**, and any known traffic delays of which the pilot in command has been advised by ATC;

  b) For any flight, **runway lengths at airports of intended use**, and the following takeoff and landing distance information:

  1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and

  2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.

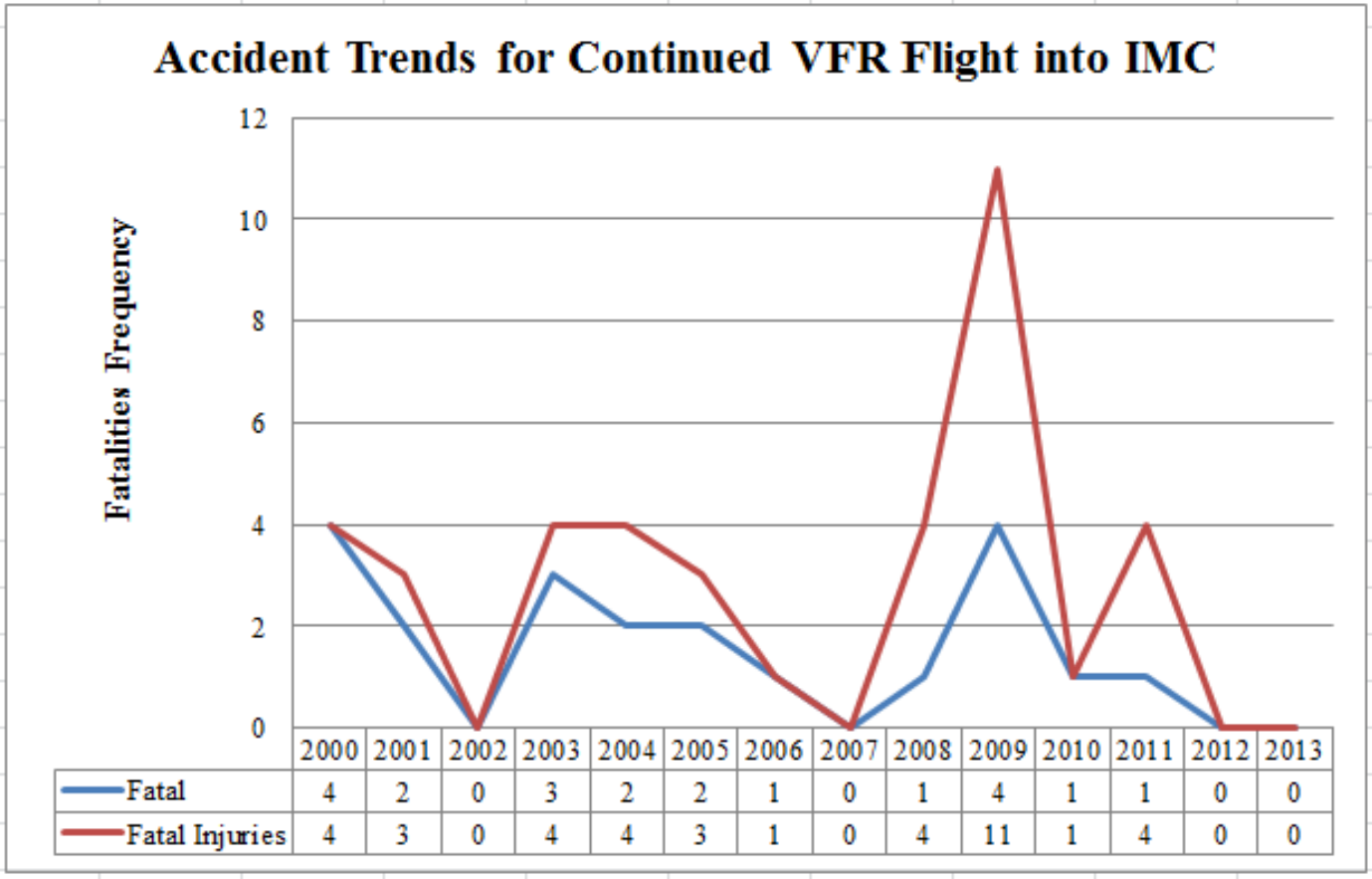
NTSB Statistics
on
Continued VFR Flight into IMC
and
Scud Running
General Aviation Accidents
in the
United States
3/27/1993 and from 1/1/2000 to 7/31/2013

NTSB Continued VFR Flight into IMC

U.S. – 1/1/2000 – 07/31/2013

95% Fatal

Continued VFR into IMC Accidents from 01/01/2000 to 07/31/2013						
U.S.	Fatal	Non-Fatal	Fatal Injuries	Serious Injuries	Minor Injuries	No Injuries
22	21	1	39	2	2	0

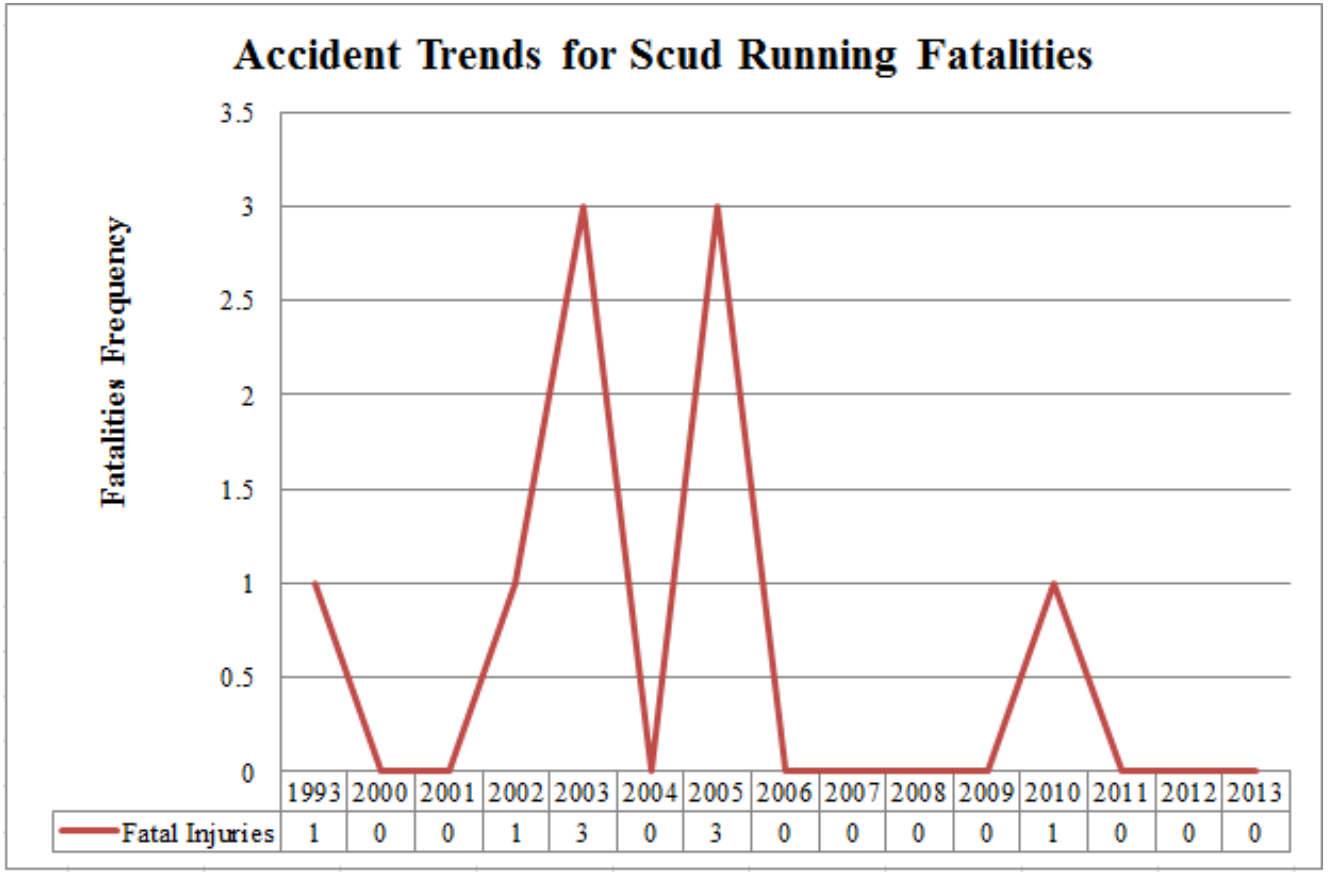


NTSB Scud Running

U.S. – 3/27/1993 and 1/1/2000 – 07/31/2013

83% Fatal

Scud Running Accidents for 1993 and from 2000 to 2013						
U.S.	Fatal	Non-Fatal	Fatal Injuries	Serious Injuries	Minor Injuries	No Injuries
6	5	1	9	0	1	3



NTSB Statistics
on
Pre-Flight Planning
General Aviation Accidents
in the
United States
from 1/1/2000 to 07/31/2013

NTSB Pre-Flight Planning Accident Trends
U.S. – 1/1/2000 – 7/31/2013

Pre-Flight Planning Accidents from 01/01/2000 to 07/31/2013

U.S.	Fatal	Non-Fatal	Fatalities	Serious	Minor	Uninjured	Total
388	91	297	172	92	167	368	799

Year	Fatal	Non-Fatal	Total
2000	13	40	53
2001	5	27	32
2002	13	22	35
2003	5	32	37
2004	10	33	43
2005	6	33	39
2006	9	26	35
2007	13	18	31
2008	1	22	23
2009	7	12	19
2010	4	12	16
2011	5	13	18
2012	0	6	6
2013	0	1	1
Total	**91**	**297**	**388**

PIC Certificate	Fatal	Non-Fatal	Total
ATP	10	30	40
Commercial	15	94	109
Private	64	163	227
Sport	0	1	1
Student	2	7	9
Non-certificated	0	2	2
Total	**91**	**297**	**388**

PIC Age	
Average	49
Median	51
Mode	56
High	84
Low	17

NTSB Pre-Flight Planning Accident Trends
U.S. – 1/1/2000 – 7/31/2013

Purpose of Flight

U. S.	Instructional	Personal	Business	Executive/ Corporate	Aerial Observation	Banner Tow	Ferry	Flight Test	Glider Tow	Positioning	Public Use	Skydiving	Other Work Use
Fatal	6	70	10	0	0	0	1	0	0	3	0	0	0
Non-Fatal	26	231	13	5	2	1	1	1	1	5	1	2	7
Total	**32**	**301**	**23**	**5**	**2**	**1**	**2**	**1**	**1**	**8**	**1**	**2**	**7**

Weather Conditions of Flight

U. S.	VMC	IMC
Fatal	54	34
Non-Fatal	285	12
Total	**339**	**46**

Broad Phase of Flight

U. S.	Taxi	Takeoff	Climb	Cruise	Descent	Approach	Maneuvering	Landing	Go-Around	Standing
Fatal	2	18	6	24	3	14	12	2	2	0
Non-Fatal	6	85	6	81	18	43	12	26	3	2
Total	**8**	**103**	**12**	**105**	**21**	**57**	**24**	**28**	**5**	**2**

NTSB Pre-Flight Planning Accident Trends
U.S. – 1/1/2000 – 7/31/2013

Probable Cause	Fatal	Non-Fatal	Total	Percent
Airspeed	1	3	4	1.0%
Airworthiness	3	2	5	1.3%
Approach to Landing	0	4	4	1.0%
Carburetor Ice	0	5	5	1.3%
CFIT	**7**	**15**	**22**	**5.7%**
Closed Airport	0	2	2	0.5%
CRM	1	0	1	0.3%
Crosswind	0	8	8	2.1%
Fatigue	1	0	1	0.3%
Forecast Weather	1	0	1	0.3%
Fuel Contamination	0	4	4	1.0%
Fuel Management	**18**	**155**	**173**	**44.6%**
Hand Propping	1	1	2	0.5%
HAZMAT	0	1	1	0.3%
Icing	5	1	6	1.5%
Landing Flare	0	5	5	1.3%
Loss of Control	1	7	8	2.1%
Mechanical Failure	0	1	1	0.3%
Mixture Leaning	1	3	4	1.0%
Night	1	1	2	0.5%
Obstacle Clearance	0	2	2	0.5%
Runway Excursion	**2**	**19**	**21**	**5.4%**
Takeoff Performance	**7**	**34**	**41**	**10.6%**
Thunderstorm	1	1	2	0.5%
VFR into IMC	**24**	**5**	**29**	**7.5%**
Visual Separation	5	4	9	2.3%
Weight & Balance	**11**	**13**	**24**	**6.2%**
Windshear	0	1	1	0.3%
Total	**91**	**297**	**388**	

Planning a Hypothetical Hundred Dollar Hamburger Flight

Planning Hypothetical The Flight

- You invite a friend to fly from Doylestown Airport (KDYL), PA to Cape May County Airport (KWWD), NJ for lunch
- What are you flying?
  - Cirrus SR20
- How will you plan the flight?
  - Your currency
  - Airplane's currency
  - Weight & Balance
  - Route
  - Airspace
  - Weather
  - TFRs
  - IMSAFE

Pilot and Passenger – Are They Good to Go ?

- **The Pilot – Are You Current?**
  - Do you have a current medical certificate? –
    - 14 CFR 61.23 Medical Certificates: Requirement and Duration
  - Do you have a current flight review?
    - 14 CFR 61.56 Flight Review
  - Are you current with flight experience?
    - 14 CFR 61.57 Recent flight Experience: Pilot in Command
    - General Experience – 90 days, 3 take-offs and landings
    - Night Experience – 90 days, 3 take-offs and landings to a full stop
    - Instrument Experience – 6 months, 6 approaches, airway tracking, holds
- **The Passenger**
  - What can your passenger do to help with Crew Resource Management (CRM)?
  - Is your passenger a pilot? If so, don't waste his/her skills/knowledge!

Pilot – Are You Current?

- **The Pilot**
  - Private Pilot Certificate
    - ASEL
    - Instrument Airplane
    - 1,000 hours total time
  - Currency
    - Medical - current
    - Flight Review - current
    - General Experience – current
    - Night Experience - current
    - Instrument Experience - current

Your Passenger – Can S/He Help with CRM?

- **The Passenger**
  - Commercial Pilot Certificate
    - ASEL and AMEL
    - Instrument Airplane
    - 2,000 hours total time
  - Currency
    - Medical – not current
    - Flight Review – current
    - General Experience – not current
    - Night Experience – not current
    - Instrument Experience – not current

IMSAFE – Well Are You?

I	**Illness**	**Do I have an illness or any symptoms of an illness?**
M	**Medication**	**Have I been taking prescription or over-the-counter drugs?**
S	**Stress**	**Am I under psychological pressure from the job? Worried about financial matters, health problems or family discord?**
A	**Alcohol**	**Have I been drinking within eight hours? Within 24 hours?**
F	**Fatigue**	**Am I tired and not adequately rested?**
E	**Eating**	**Am I adequately nourished?**

About Your Airplane

- Cirrus SR20
  - "Six Pack" and Avidyne MFD
  - 6 cylinder, 200 HP Continental engine, 140 knot cruise speed

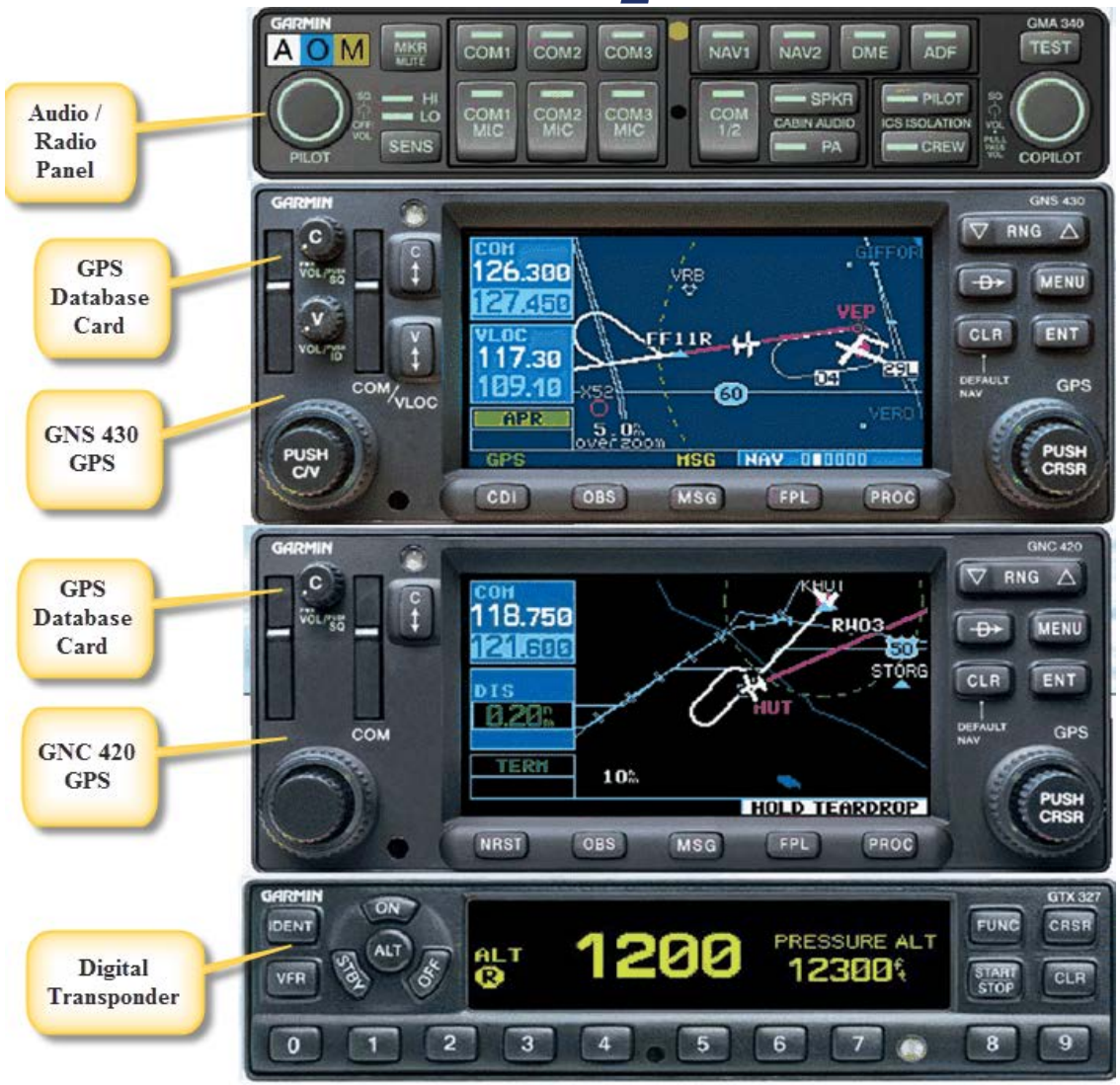
The Airplane – Is It Good to Go ?

- **The Airplane – Is It Current?**
  - Current annual inspection?
    - Every 12 months – 14 CFR 91.409(a)(1)
  - Current ELT inspection?
    - Every 12 calendar months – 14 CFR 91.207
  - Current Mode C Transponder inspection?
    - Every 24 months – 14 CFR 91.413
  - Current Pitot-Static System inspection?
    - Every 24 months – 14 CFR 91.411
  - Current 100 hour inspection?
    - 14 CFR 91.409(b)
  - Current VOR check?
    - Every 30 days – 14 CFR 91.171
  - Use the Kinds of Operational Equipment List (KOEL) – if available
  - Are GPS databases current? Updates out every 28 days.

Cirrus SR20 – "Six Pack" with Avidyne MFD

About Your Airplane's Flight Instruments
The Traditional "Six Pack"

About Your Airplane's Avionics



Planning the Flight – Weight & Balance

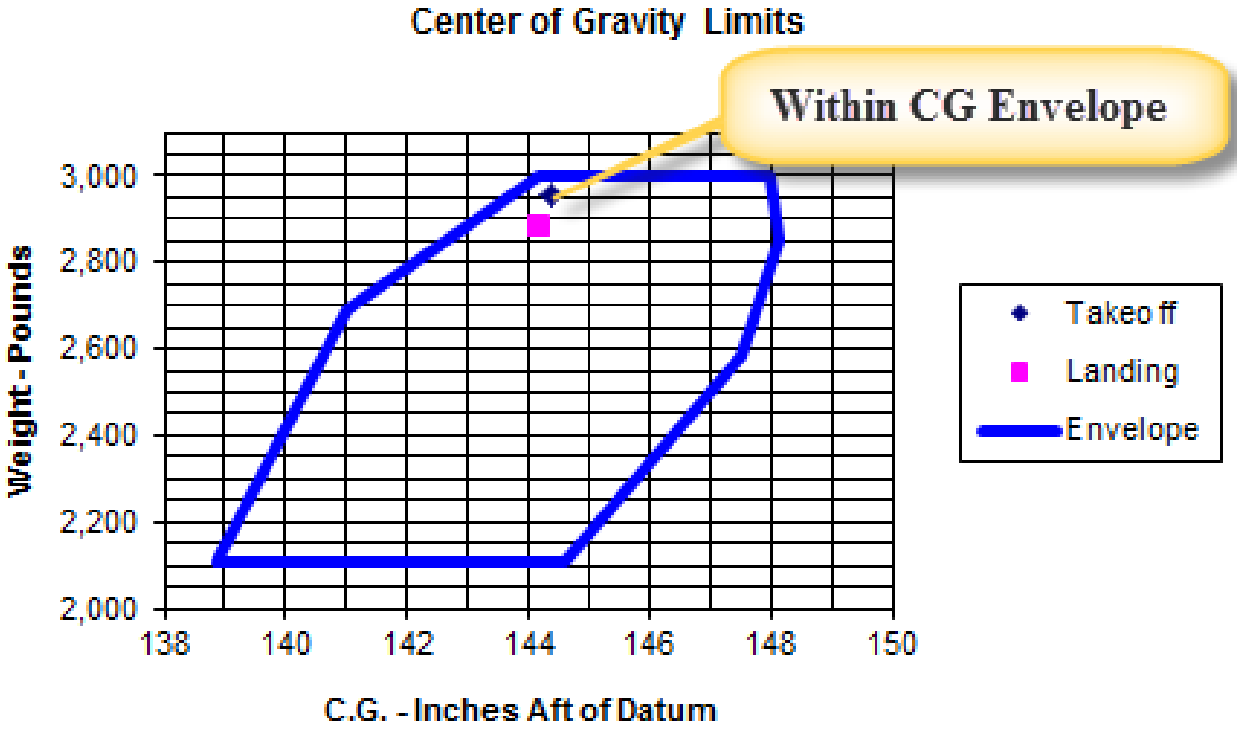
- Cirrus SR20 Weight Limitations
  - Gross Takeoff Weight = 3,000 pounds
  - Basic Empty Weight = 2,118 pounds
  - Useful Load = 882 pounds
  - Crew, Fuel, and Flight Kits
    - Pilot (left front) – 210 pounds
    - Passenger (right front) – 275 pounds
    - Pilot Flight Kit (left rear) – 10 pounds
    - Passenger Flight Kit (right rear) – 10 pounds
    - Fuel (56 gallons) – 336 pounds
- Is our crew good to go?
- See weight & balance spreadsheet on next two slides

About Your Airplane's Weight & Balance Within the Weight Envelope?

Cirrus SR20 Nxxxxx Weight & Balance				
Pilot Position	***Item***	***Weight***	***Arm***	***Moment***
Basic Empty Weight	***Cirrus SR20 Nxxxxx***	2,118	142.76	302.366
Pilot Name & Weight	The Pilot	210	143.50	30.135
Fuel (Gallons)	**56**	336	153.80	51.677
Pax Position	***Pax Names***	***Pax Weight***	***Arm***	***Moment***
Front Right	The Passenger	275	143.50	39.463
Rear Left	Pilot Flight Kit	10	180.00	1.800
Rear Right	Passenger Flight Kit	10	180.00	1.800
Bags	***No more than 130 lbs***	0	208.00	0.000
Total Weight and CG		**2,959**	**144.387**	**427.240**
Useful Load Available		***41***		
Maximum Allowable Takeoff Weight		**3,000**		

Within weight limits

About Your Airplane's Weight & Balance Within the CG Envelope?



Planning the Route of Flight

- Route of Flight (VFR)
  - KDYL → KPNE → KVAY → VCN → KWWD
- Planned Altitude = 3,000 feet MSL
  - The crew has been flying this route for years
  - Any issues?
    - Weather?
    - TFRs?
    - Airspace?
- Is the flight good to go?

Weather Forecast

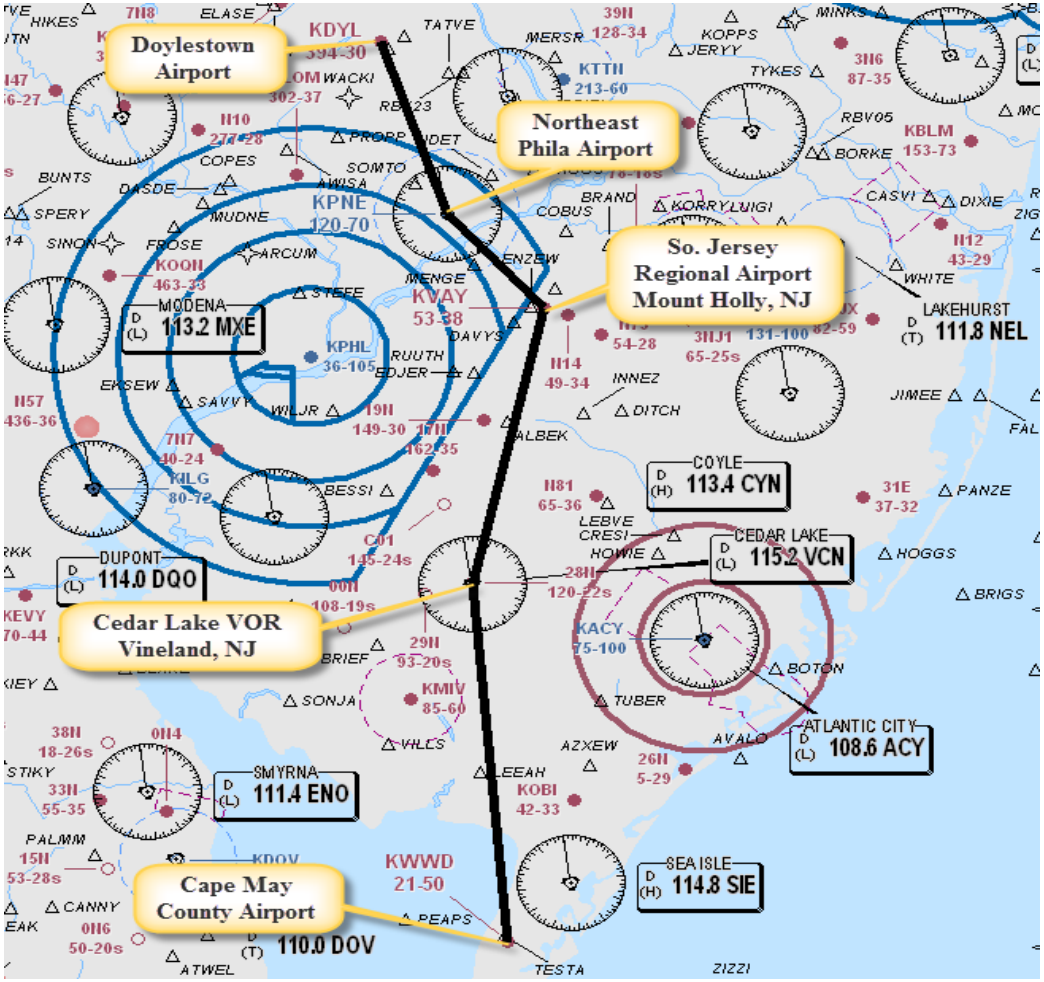
- Weather
  - For flight down FA, TAF, and METAR showed
    - Cloud ceilings in Pennsylvania: forecast for 10,000 feet broken
    - Cloud ceilings in New Jersey: forecast for 15,000 feet broken.
    - Is this a factor?
  - For flight back FA, TAF, and METAR showed
    - Cloud ceilings in PA and NJ: forecast for 5,000 feet overcast.
    - Is this a factor?
- Is the flight good to go?

TFRs

- TFRs
  - Vice-Presidential TFR near DQO VORTAC
  - None reported or expected for the route of flight
- Is the flight good to go?

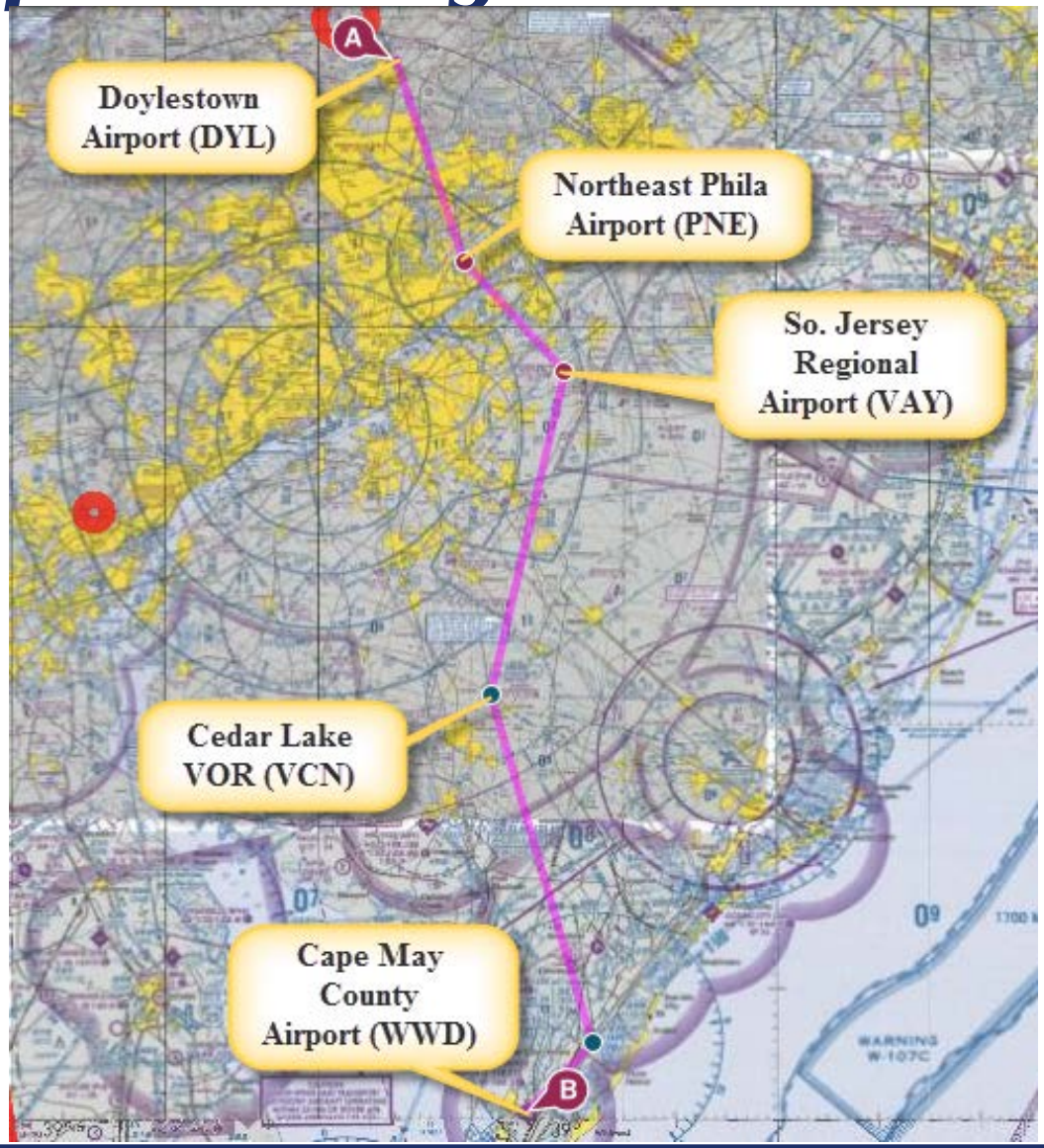
Airspace for the Flight

- Route of flight planned for 3,000 feet MSL
- Is anything wrong with this picture?
  - Yes, if flown on or after 07/25/2013
  - No, if flown before 07/25/2013

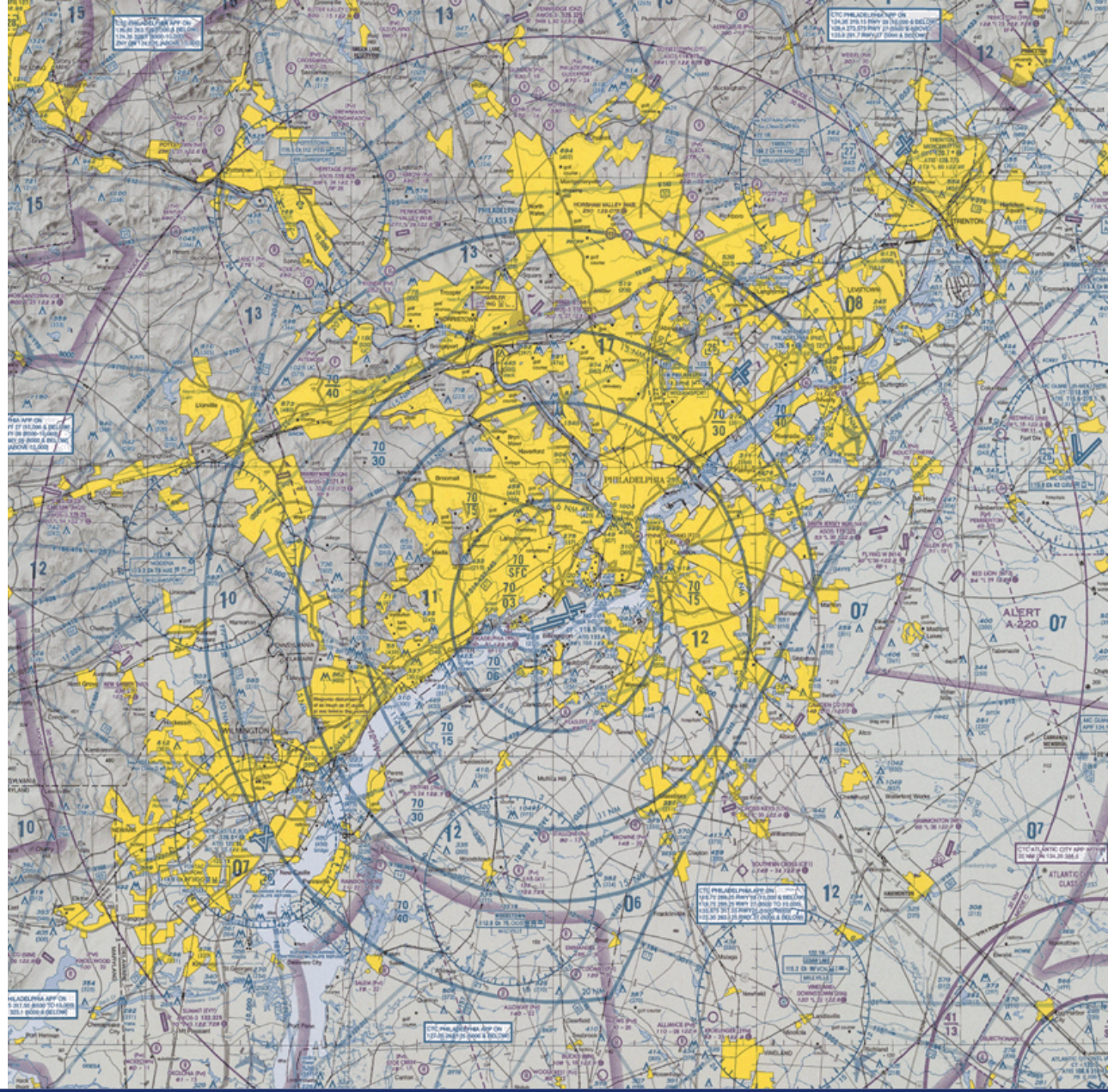


Airspace for the Flight

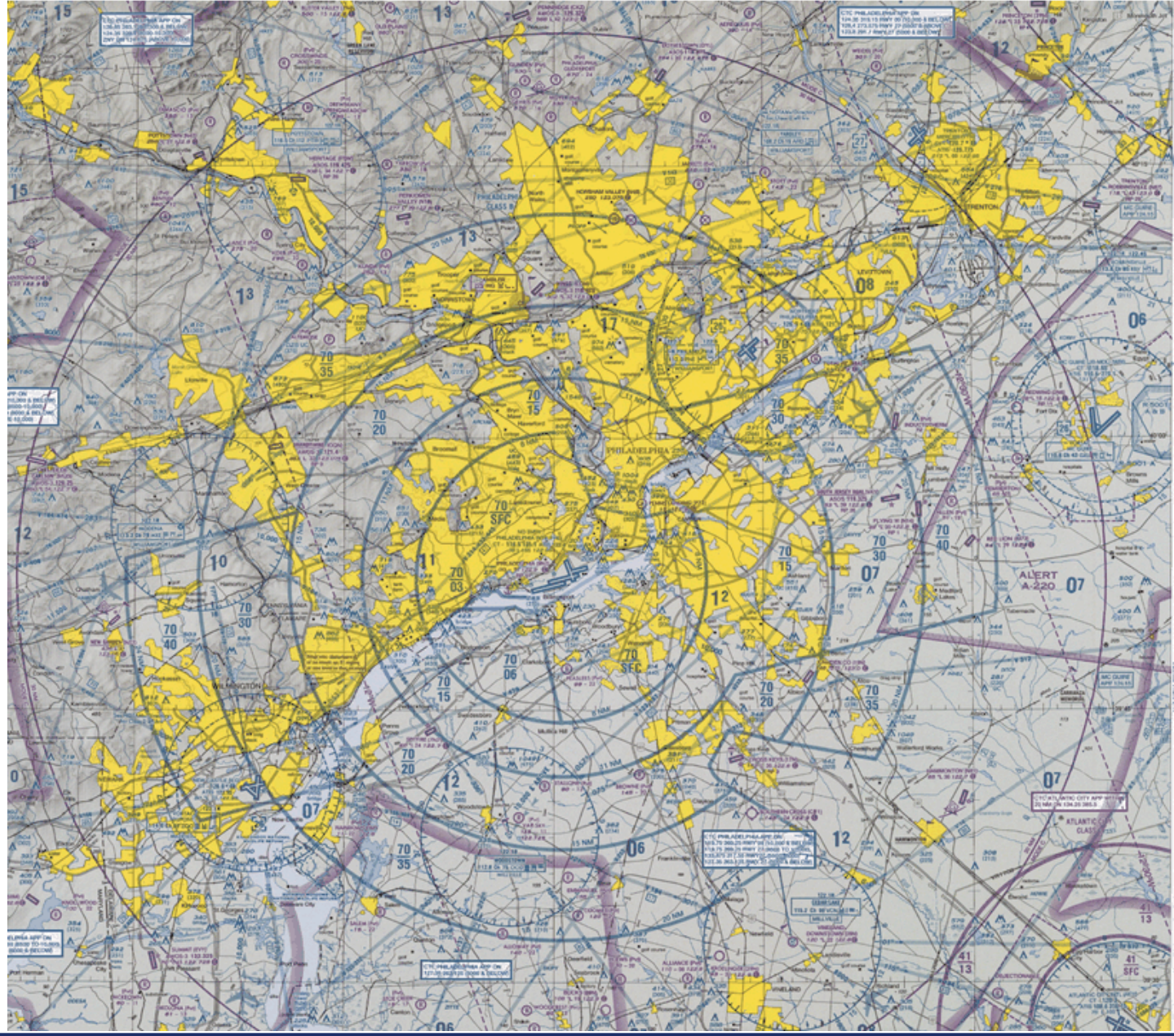
- If the flight is flown on or after 07/25/2013
  - Is anything different with this picture?
  - Should we change the route of flight from 3,000 feet MSL to 2,500 feet MSL?



PHL Class B Airspace from 1993 until 07/24/2013

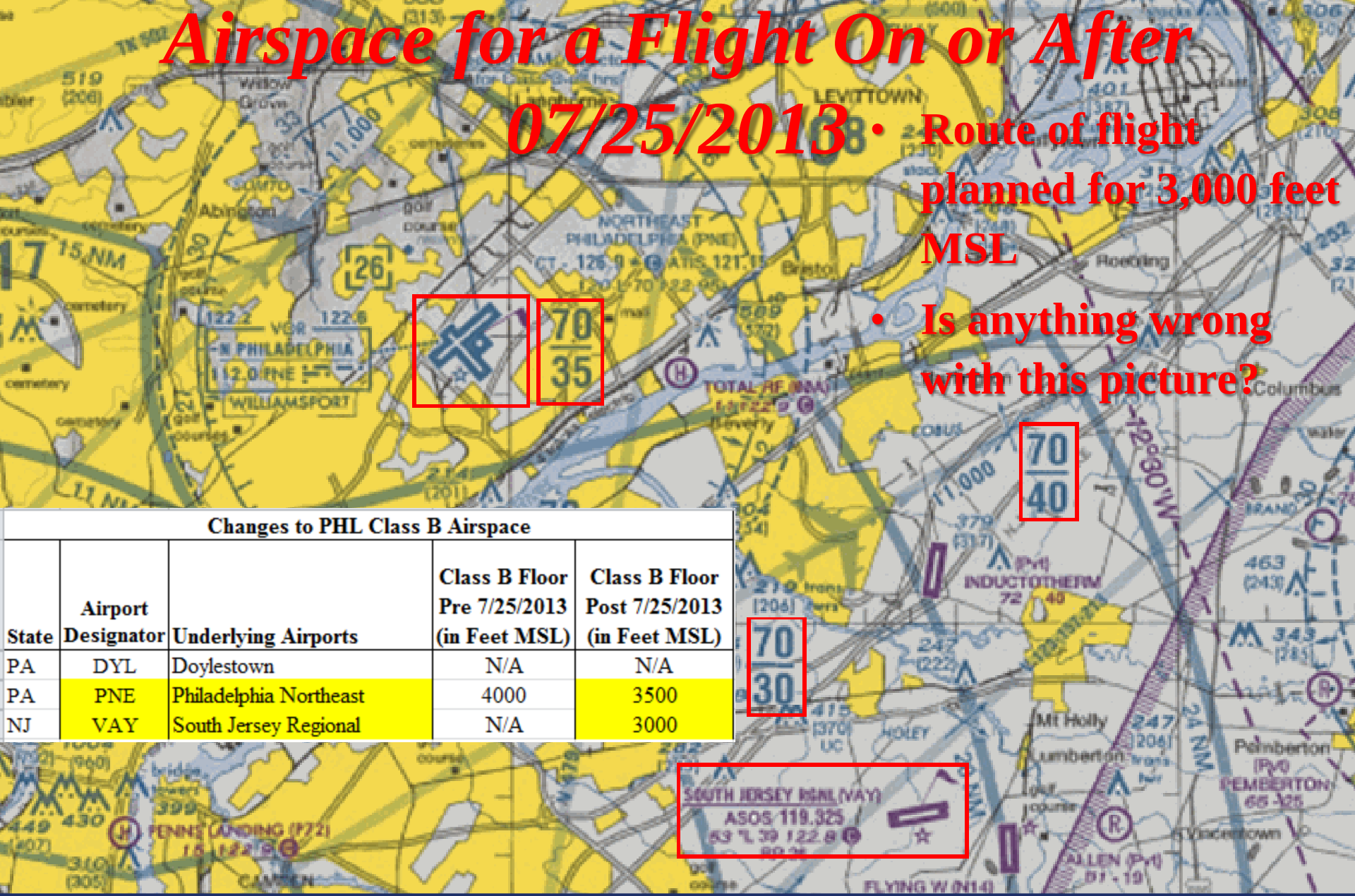


PHL Class B Airspace effective 07/25/2013



Airspace for a Flight On or After 07/25/2013

- Route of flight planned for 3,000 feet MSL
- Is anything wrong with this picture?



Changes to PHL Class B Airspace

State	Airport Designator	Underlying Airports	Class B Floor Pre 7/25/2013 (in Feet MSL)	Class B Floor Post 7/25/2013 (in Feet MSL)
PA	DYL	Doylestown	N/A	N/A
PA	PNE	Philadelphia Northeast	4000	3500
NJ	VAY	South Jersey Regional	N/A	3000

Airports for the Flight

- Doylestown Airport (DYL) Runways
  - Runways 5 – 23: 3,000 feet x 60 feet

Airports for the Flight

- Cape May County Airport (WWD) Runways
  - Runways 1 – 19: 5,003 feet x150 feet
  - Runways 10 – 28: 4,998 feet x150 feet

The Flight Down

The Pre-Flight Inspection

- Use the checklist for your airplane
- The tasks listed below are for the Cirrus SR20
  - Preflight Walk Around – 66 inspection tasks, include checking fuel and oil
  - Before Starting Engine – 5 tasks
  - Starting Engine – 17 tasks
  - Before Taxiing – 4 tasks
  - Taxiing – 5 tasks
  - Before Takeoff – 31 tasks
- All tasks were completed successfully

The Flight Down – Pre 25 July 2013

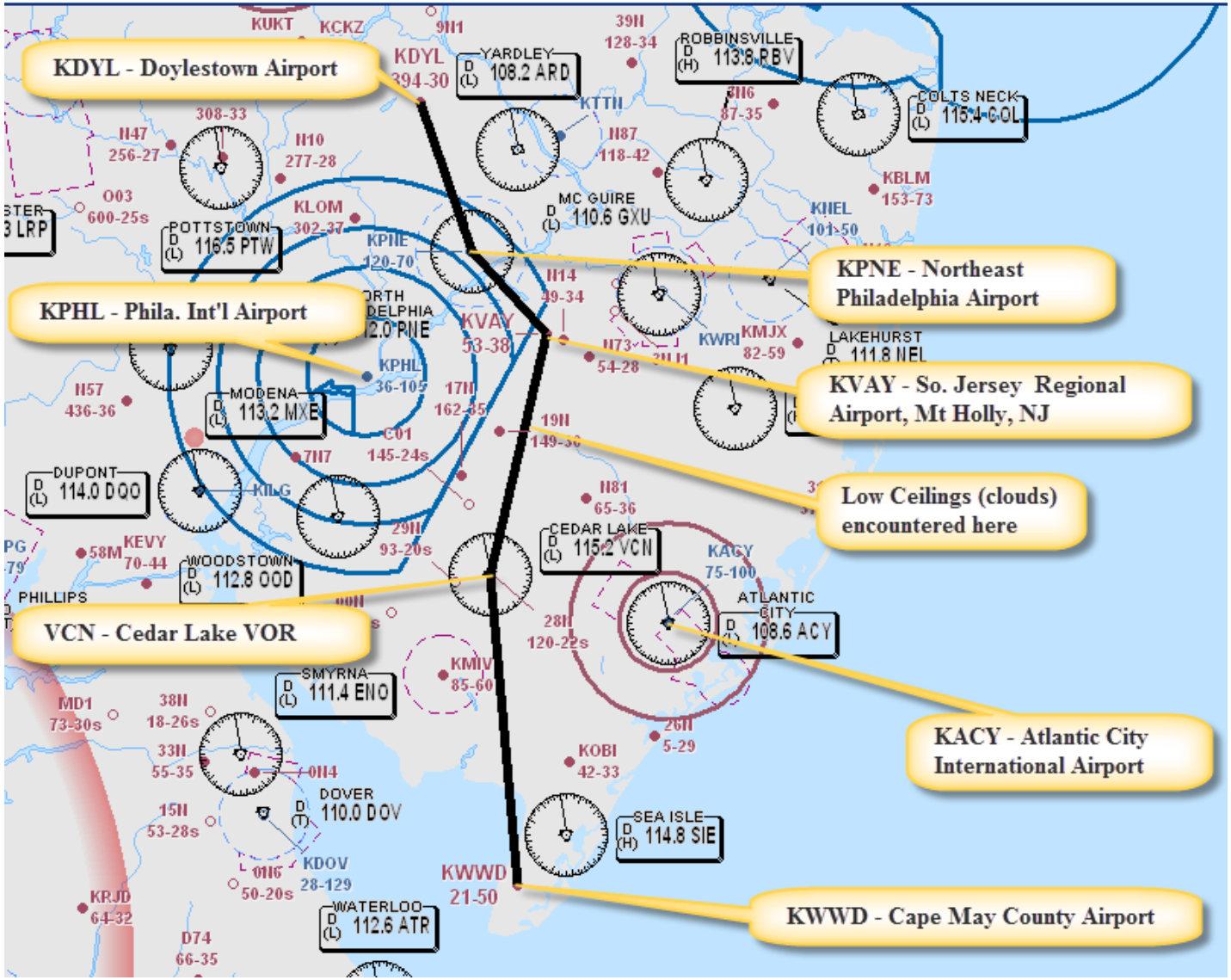
- The Pilot did the following
  - Pre-takeoff run-up
  - Departed Doylestown Runway 5
  - Executed a right turn-out on course and climbed to 3,000 feet MSL
- The Passenger did the following
  - Set the flight plan in the Garmin GNS 430
    - KDYL → KPNE → KVAY → VCN → KWWD
  - Cross-filled the flight plan from the Garmin GNS 430 to the Garmin GNC 420
- The Pilot flew the GPS route at 3,000 feet MSL
  - Descended to 1,500 feet about 10 nautical miles north of Cape May
  - Flew a visual approach into Cape May
  - Landed on Runway 19 – it was a keeper

The Flight Back

Initial Route for the Flight Back – Pre 25 July 2013

- Departed WWD via Runway 10 at 13:30 Local
  - Climbed to 3,000 feet MSL and turned on course
  - Cloud ceilings had changed from broken to overcast
  - Ceilings were lower than on the flight down
  - Flying north the weather deteriorated further.
  - 11 miles south of VAY, saw IMC “wall” in front of us
- What should we do?

Initial Route for the Flight Back



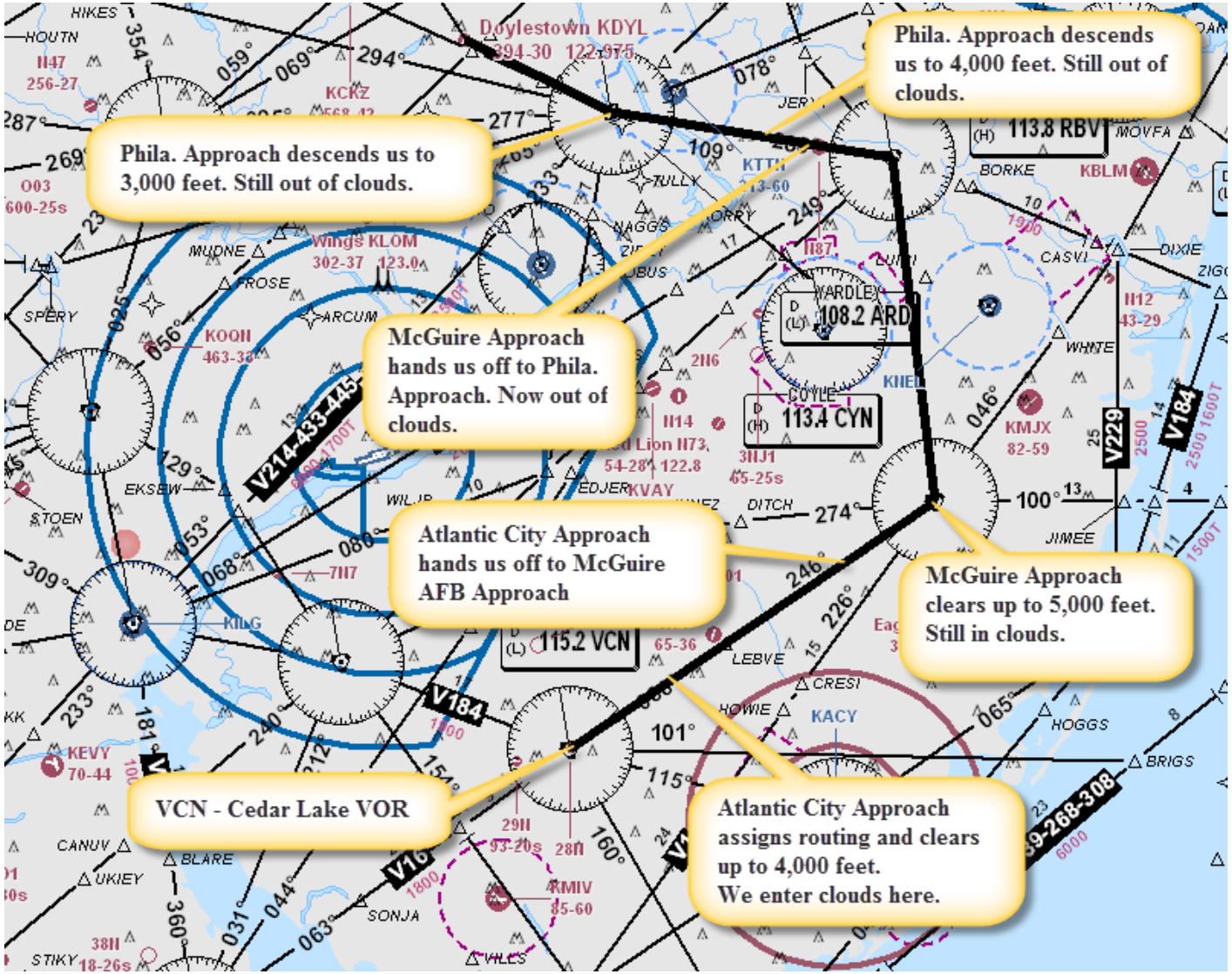
VFR Encounter with IMC

- IMC observed 7 to 10 nautical miles in front of us
- What are our choices
  - Continue to fly toward the IMC
    - What do you think?
  - Try to fly below the IMC, i.e. scud run
    - What do you think?
  - File an IFR flight plan while enroute
    - What do you think?
  - Return to WWD (RTB)
    - What do you think?
  - Any other thoughts?

Filed IFR Flight Plan for the Flight Back

- Turned 180° for VCN VOR
  - Pilot orbited VCN at 3,000 feet MSL
  - Passenger called Atlantic City Approach requesting IFR flight plan VCN to DYL
  - ACY gave squawk, cleared to 4,000 feet MSL for route
    - VCN V16 DIXIE V276 ARD
  - Passenger used Low Altitude Enroute Chart to set up in Garmin 430 and cross-filled to GNC 420
    - VCN CYN amended → RBV ARD
- Anything else we should do?

Filed IFR Flight Plan for the Flight Back



Management of the Flight Back

- **The Pilot**
  - Engaged the S-TEC autopilot with altitude hold and GPSS (GPS Steering)
  - Turned on pitot heat
  - Supervised The Passenger
- **The Passenger**
  - Communicated with ATC
  - Entered ATC route clearance changes in Garmin 430 and cross-filled to Garmin 420
- **Both crew** cross-checked enroute charts and approach plates
- Any other **CRM** suggestions?

Reflections and Lessons Learned

- **For pilots**
  - Even when you are a passenger take your charts and approach plates
  - For proficiency flying and pleasure flying, hand fly it
  - For actual IMC, especially single pilot, engage the autopilot
  - Think about how you can utilize your passengers as part of CRM
  - Keep your instrument skills current
  - Plan a worst-case (what if?) scenario into each flight
  - Do not make decisions based on Hobbs costs – are two lives worth $70?
    - Cirrus cost the pilot $116 per Hobbs hour
    - The return to VCN VOR took 4 or 5 minutes or about $11 on the Hobbs
    - ATC IFR flight services took an extra 30 mutes or about $58 on the Hobbs
- **For non-pilot passengers**
  - Learn what you can do to help the pilot, especially when workload increases
- **Any other thoughts?**

Accident Case Study of Continued VFR Flight Into IMC

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

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 (CGT) 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**
    - 10:25:43 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

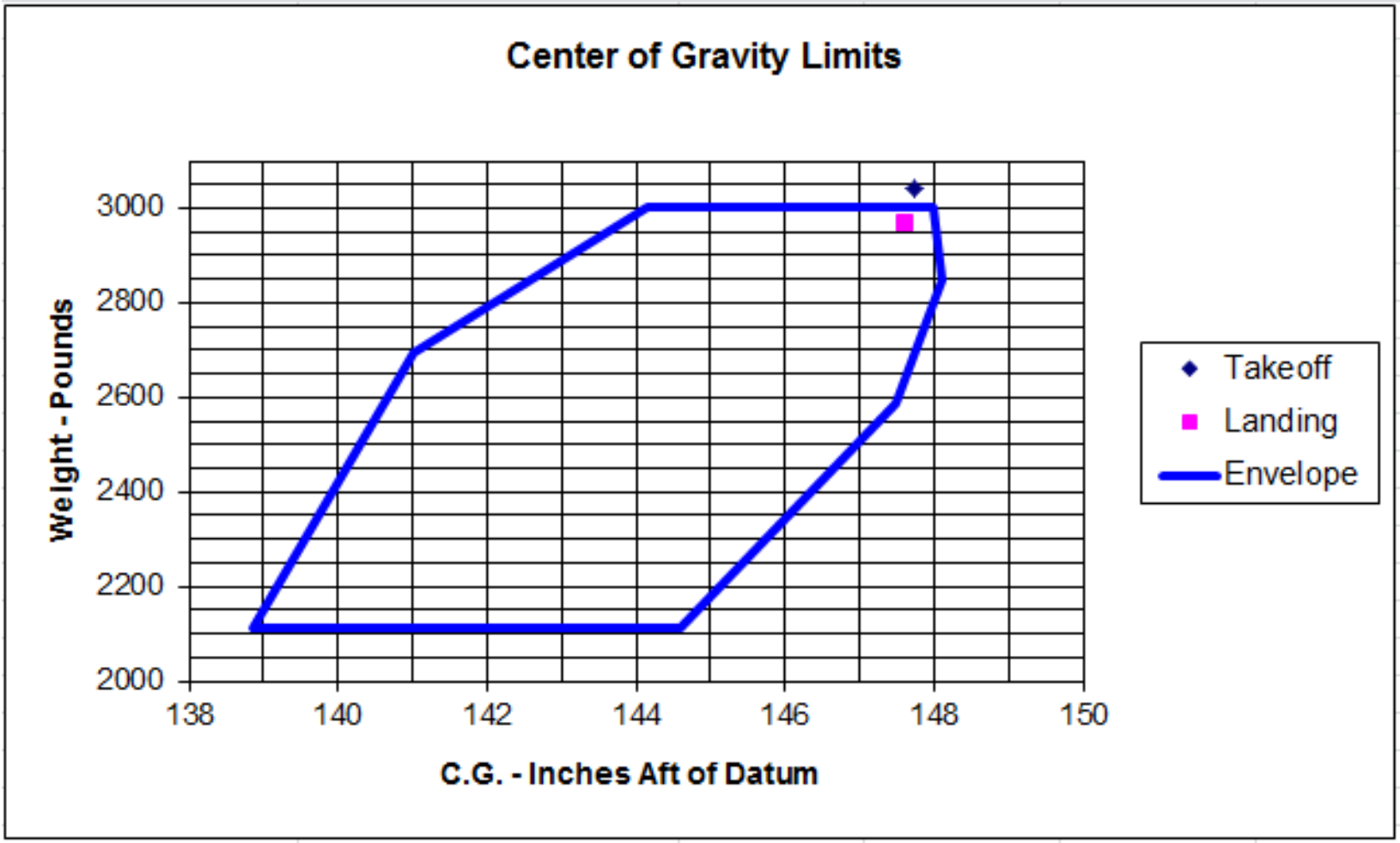
VFR into IMC in SR20 "Six Pack" with Avidyne MFD

- 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



Accident Case Study
of
Scud Running
on
Student Long Cross Country

Scud Running in Cessna 152 "Six Pack"

- Student Pilot on last leg of student long distance cross country flight
  - 17 year old female, high school senior
  - Had been accepted to U. S. Air Force Academy
  - NTSB Factual Report – click link below
    http://dms.ntsb.gov/aviation/GenPDF.aspx?id=BFO93FA061&rpt=fa
  - NTSB Probable Cause – click link below
    http://dms.ntsb.gov/aviation/GenPDF.aspx?id=BFO93FA061&rpt=fi
  - Pilot Experience and FAA Certificates
    - Student Pilot ASEL, 75 hours total time
      17 hours in last 90 days; 7 hours in last 30 days

Scud Running in Cessna 152 "Six Pack"

- Student Pilot on last leg of student long distance cross country flight
  - Events from day of 03/27/1993
    - 1758 Local, departed Lancaster Airport (KLNS), PA **without a flight plan** bound for Sky Manor Airport (N40), NJ (65.8 NM)
      - Flight Service Weather Briefing at KLNS indicated flight precautions for IFR conditions along the route of flight.
      - Student called her CFI from Lancaster and told him that the weather was VFR for her return trip.
      - **CFI told student to land if any uncertainty existed once she became airborne**
    - 1915 Local, FAA radar data showed the airplane at 900 feet MSL making several turns
      - Witnesses saw the airplane through fog and drizzle circling the area.
      - The airplane collided with trees in a heavily wooded area and became inverted.

Scud Running in Cessna 152 "Six Pack"

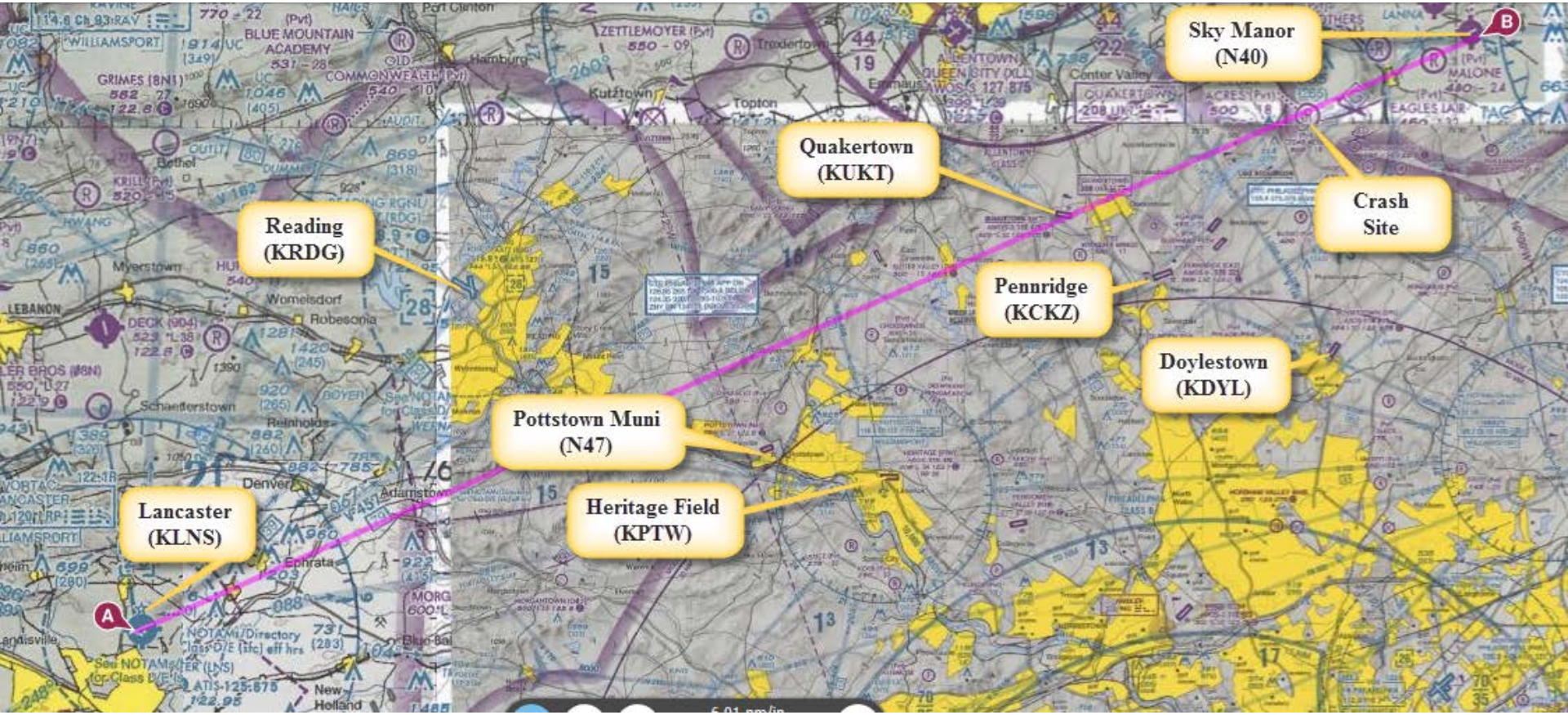
- Student Pilot on last leg of student long distance cross country flight
- NTSB Probable Cause Report
  - Occurrences (Approach Phase of Flight)
    - **In Flight Encounter with Weather (VFR into IMC)**
    - **In Flight Collision with Object (trees)**
  - Findings
    - Environmental Issues – Conditions / Weather / Light
      - **Fog, Mist, and drizzle; dark night**
    - Pilot Issues
      - **Lost and disoriented (inadvertent)**
      - **Lack of total experience and lack of night flying experience**
    - Supervision Issues - Inadequate
      - **CFI failed to adequately supervise the operation**

Scud Running in Cessna 152 "Six Pack"

Alone, at night, in a Cessna 152 with one VOR …

What options did the student pilot really have for diversion?

How would she find another airport at night?



Scud Running in Cessna 152 "Six Pack"

Cessna 152

MAKE	MODEL	TYPE	YEAR	H.P.	ENGINE
Cessna	152	C-152	1982	115	Lycoming 0-235

Scud Running in Cessna 152 "Six Pack"

Scud Running in Cessna 152 "Six Pack"
Same Day Experience in an American General Tiger

Scud Running in Cessna 152 "Six Pack"
Same Day Experience in an American General Tiger

- On the day of the accident flight, 3/27/1993, the author attempted a similar flight from Doylestown Airport (KDYL) to Lancaster Airport (KLNS)
  - Departed KDYL from runway 23 in an American General Tiger
    - At the time I had logged 212 hours total time and 53 hours in the Tiger
    - I had just started instrument training and had logged 14 hours simulated
  - Climbing through 1,800 feet MSL I activated a VFR flight plan
    - KDYL → PTW → KLNS
  - At 2,200 feet MSL I entered IMC and immediately did the following
    - Put head down on the flight instruments and started scan
    - Executed a standard rate left turn to reverse course and a gentle 300 FPM descent
  - Exited clouds at about 1,700 to 1,800 feet MSL
  - Canceled VFR flight plan, returned to KDYL and landed uneventfully

Scud Running in Cessna 152 "Six Pack"

- Student Pilot on last leg of student long distance cross country flight
- Lessons Learned
  - CFIs need to teach good judgment
  - CFIs need to closely supervise student solo flight, especially cross flights
  - CFIs need to thoroughly teach night operations, especially if it is possible that the student might encounter it in a solo situation
    - On 03/27/1993, the sun set at 1820 Local
    - This was 22 minutes into the flight
    - The "dark of night" occurs before it is legally night.
  - Students need to learn patience and to avoid "get-there-itis"
  - Students need to learn that it is okay if they have to remain over night
    - Just let everyone know – CFI and FBO/Flight School

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**

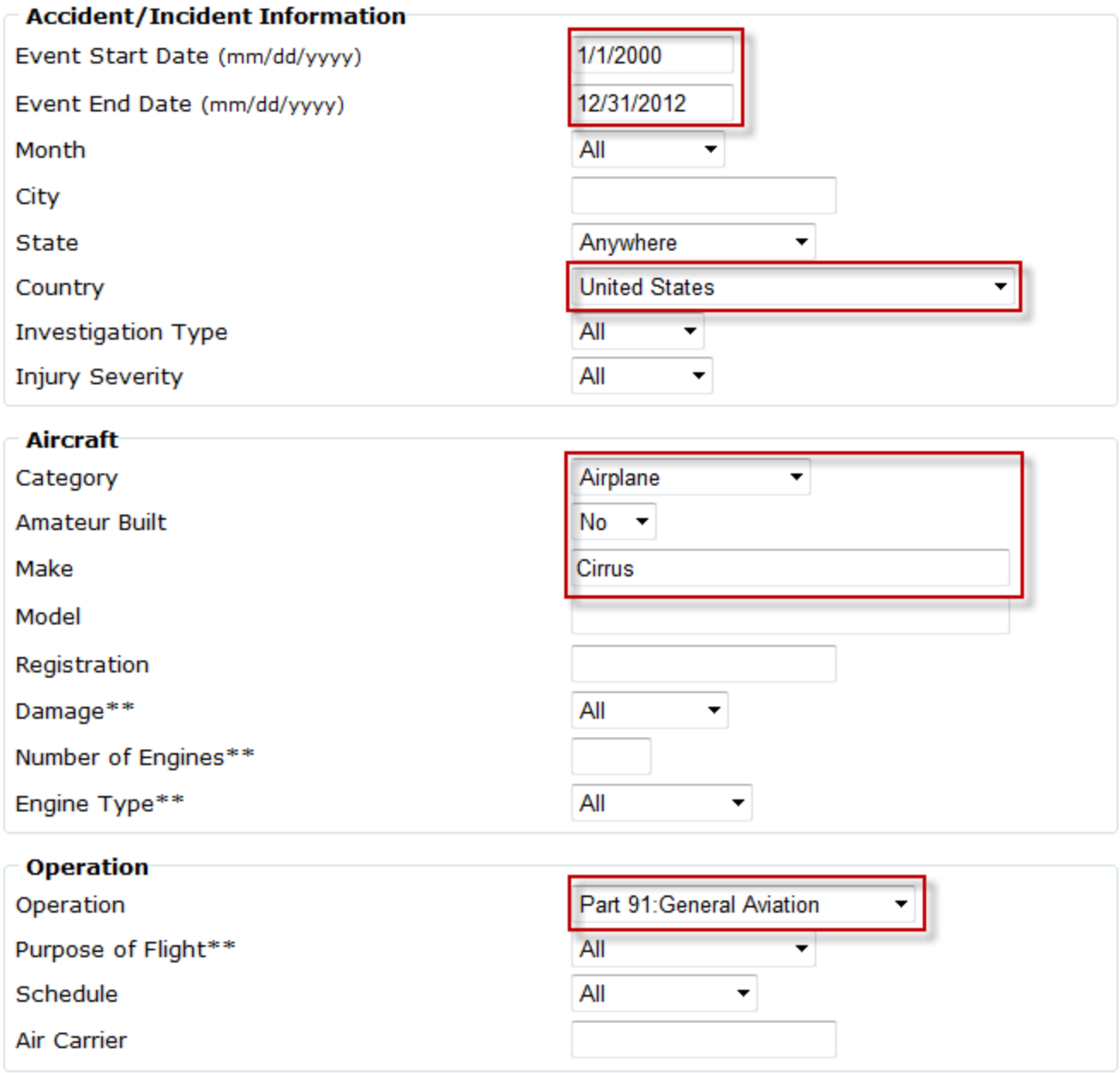
The NTSB aviation accident database contains information from 1962 and later about civil aviation *accidents* and selected *incidents* within the United States, its territories and possessions, and in international waters. Generally, a **preliminary** report is available online within a few days of an 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

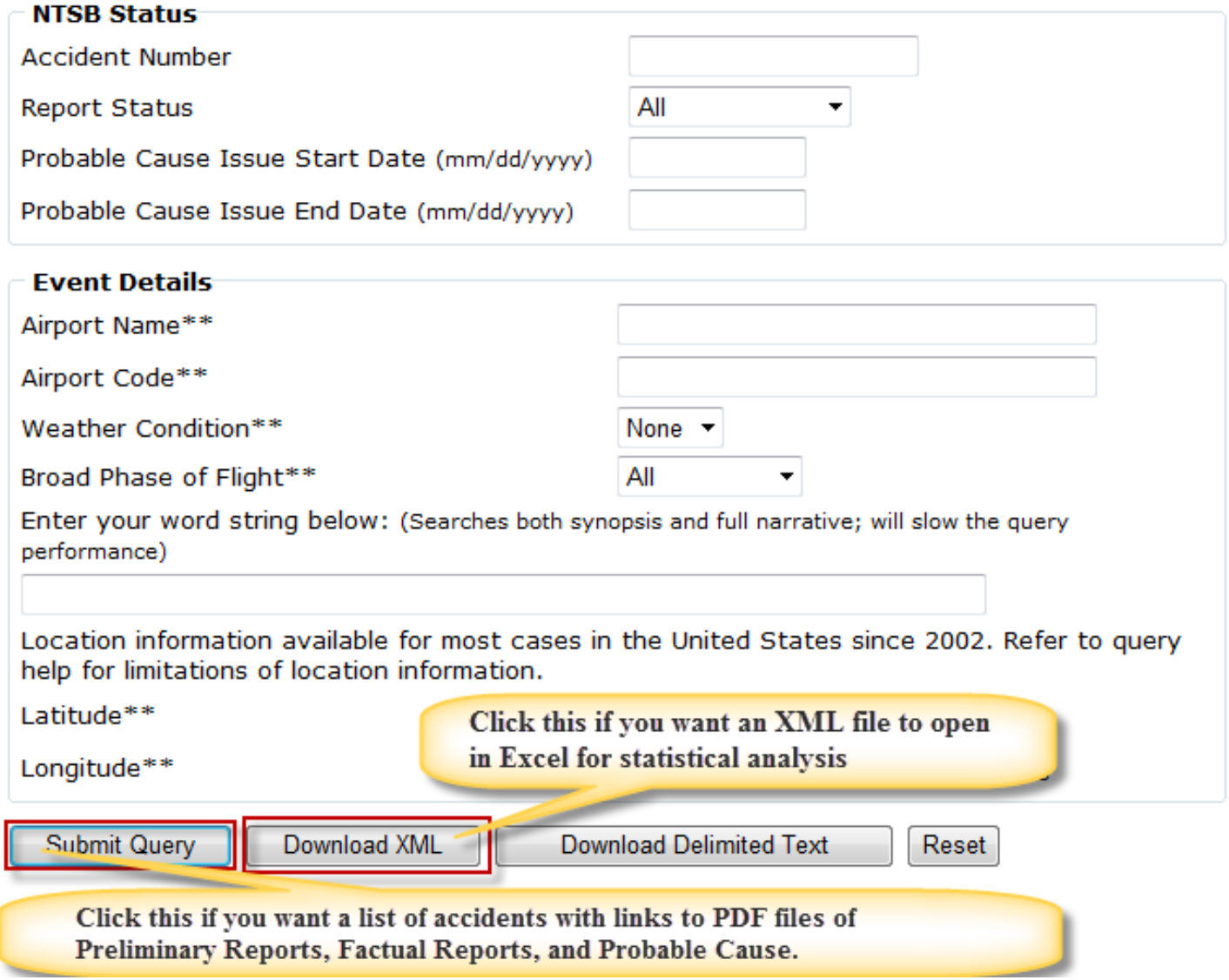
---

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.

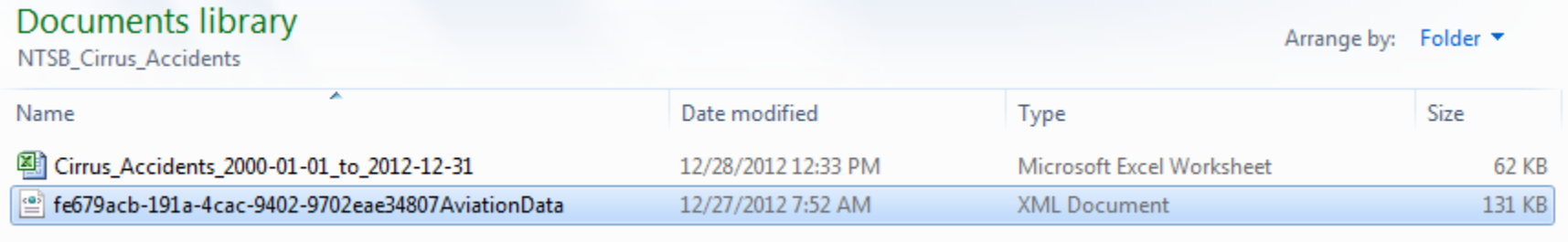
A docket of supporting materials may exist for factual and probable cause reports. Please contact Records Management Division. Dockets are not available for preliminary reports.

Accident Database & Synopses Download XML Download Delimited Text

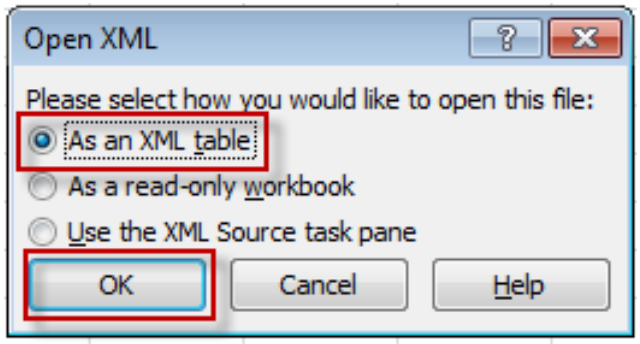
Current Synopsis	PDF Report(s) (Published)	Event Date	Estimated Release	Location	Make/Model	Regist. Number	NTSB No.	Event Severity
Preliminary	Preliminary (11/20/2012)	11/16/2012		Show Low, AZ	CIRRUS SR22	N800RW	WPR13LA043	Nonfatal
Preliminary	Preliminary (11/13/2012)	10/21/2012		Pahokee, FL	CIRRUS DESIGN 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)

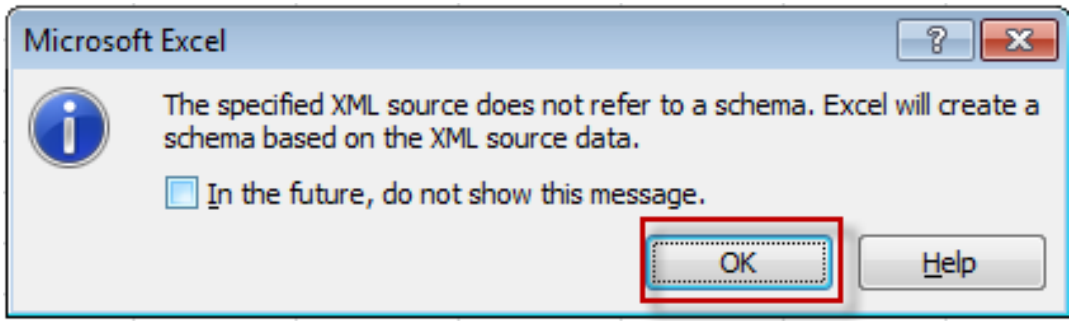
Download of Cirrus Accidents in XML Format (1 of 2)

- 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

Just a Real Nice Picture of a Cessna 172S

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**

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/What_IF/What_If_VFR_into_IMC.ppt
  - http://williamjdoylejr.net/FAAST/Cirrus/Cirrus_SR20_and_SR22.ppt
  - http://williamjdoylejr.net/FAAST/W&B/Weight_&_Balance_Cirrus_SR20.xls
  - http://williamjdoylejr.net/FAAST/Cessna/Cessna_172_182_and_206.ppt
  - http://williamjdoylejr.net/FAAST/W&B/Weight_and_Balance.ppt
- **907 Flight Squadron and the Cirrus Owners and Pilots Association**
  - for sourcing the Cirrus SR20 W&B spreadsheet to me
- **Maj Tom Woods, FAAST Rep PHL FSDO and NJWG/DO/Air**
  - for creating the W&B spreadsheets for Cessna 172S, 182T, and U206H

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 of a Cessna 182T

FAASTeam
on
What If You Were Flying VFR and You Encountered IMC?

Questions?
Comments?
Ideas?

This Completes
What If You Were Flying VFR and You Encountered IMC?

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

FAA Customer Feedback Website
http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/qms/

PHL FSDO FAAST Program Manager – Eileen Iandola
Eileen.J.Iandola@FAA.gov