# The FAA Safety Team Presents

Federal Aviation Administration

## Aircraft Accident Investigation by the NTSB & FAA

Presented to: 2020 Nuclear & Facility Safety Workshop

By: John DeWitt

Date: February 27, 2020

**Produced by AFS-850**
**The FAA Safety Team (FAASTeam)**

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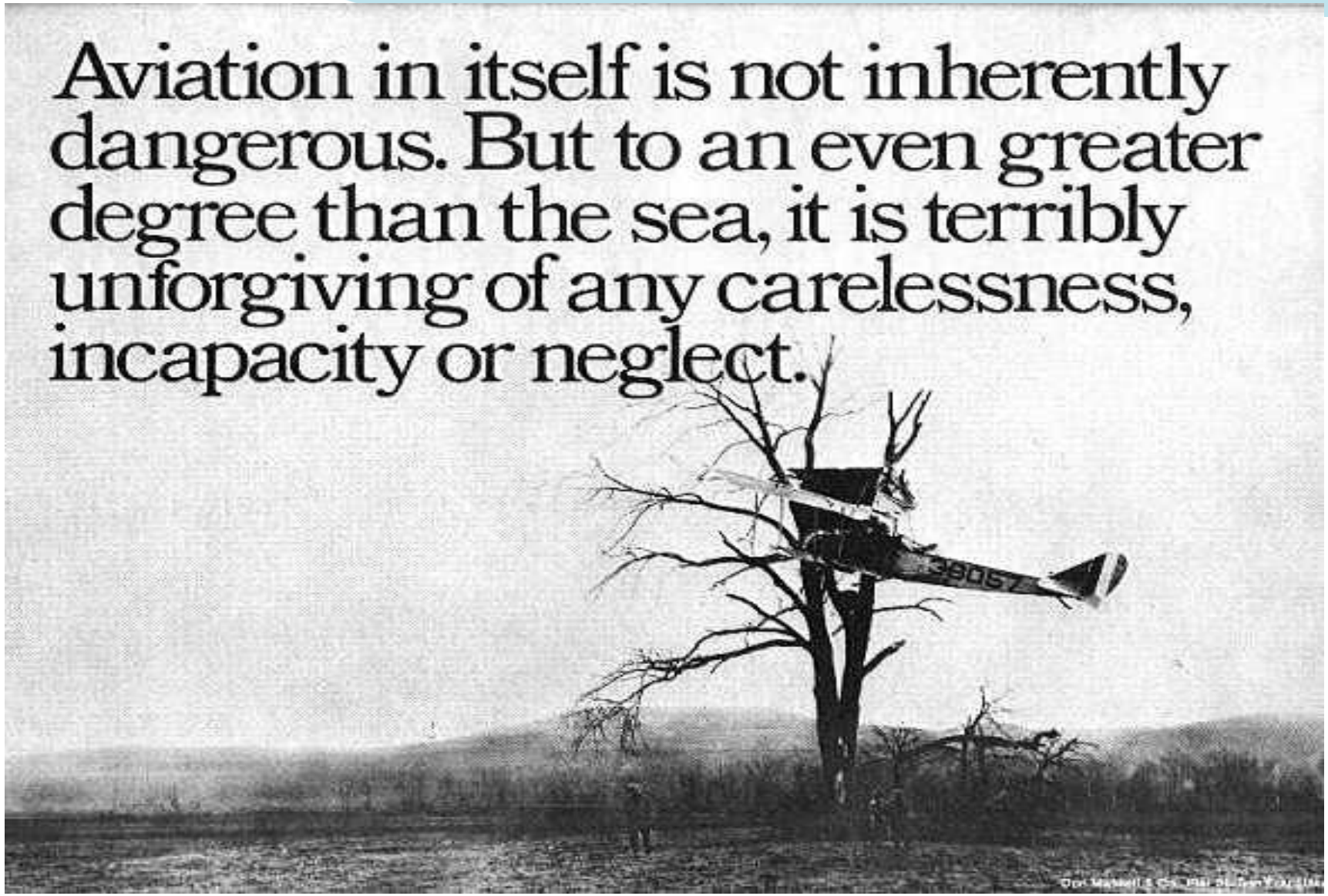
Aviation in itself is not inherently dangerous. But to an even greater degree than the sea, it is terribly unforgiving of any carelessness, incapacity or neglect.

# Categories of Aircraft

**Airplane**

**Rotorcraft**

**Powered-Lift**

**Glider**

**Balloon**

**small Unmanned Aircraft Systems**

# small Unmanned Aircraft Systems

**Weighs between 250 grams and 25 Kilograms**

**(.55 pounds and 55 pounds)**

**Includes**

**A Small Unmanned Aircraft**

**A Control Unit and**

**A Communications Link**

**Maximum Authorized Speed = 87 kts (100 mph)**

**Maximum Authorized Altitude = 400 ft AGL**

**Flight Range =  Only to PIC's Line of Sight**

# Weight and Mass

**At Launch,**

**What is the Weight of a 90,000 Cubic Foot Hot Air Balloon with a Pilot and Two Passengers on Board?**

# Weight and Mass

**A Balloon is a Lighter-Than-Air Aircraft**

**Weight at Take Off Must Be Less Than Zero**

**And Yet**

**The Mass is Nearly 4 Ton (7,800 lb)**

**Envelope, Gondola, Fuel Tanks, Pilot, 2 Passengers and instruments = approx. 1,500 lb**

**90,000 cu ft of Hot Air = approx. 6,300 lb**

# Questions?

# Wait, its Weight

- The **maximum landing weight** (MLW) is the **maximum aircraft** gross **weight** due to design or operational limitations at which an **aircraft** is permitted to land.

- The **maximum takeoff weight** (**MTOW**) or **maximum** gross **takeoff weight** (MGTOW) or **maximum takeoff** mass (MTOM) of an aircraft is the **maximum weight** at which the pilot is allowed to attempt to **take off**, due to structural or other limits.

# Cessna CE-172R

**Max TO Weight 2,450 lb;** **Fuel Capacity = 56 US gal**

**Empty Weight = 1,691 lb**

**Wingspan = 36 ft, 1 in;** **Length = 27 ft, 2 in**

**Height = 8 ft, 11 in**

**Cruise Speed = 122 kts**

**Maximum Endurance = approx. 4.5 Hours or**

**No Wind Range of 696 nm**

**Service Ceiling = 13,500 ft**

# Gulfstream G550

**Max TO Weight 91,000 lb;** **Fuel Capacity = 6,165 US gal**

**Max, Landing Weight = 75,300 lb:** **Empty Weight = 48,300 lb**

**Wingspan = 93 ft, 6 in;** **Length = 96 ft, 5 in**

**Height = 25 ft, 10 in**

**Cruise Speed = 0.80 Mach (approx. 459 kts)**

**Maximum Endurance = approx. 14.7 Hours or**

**No Wind Range of 6,750 nm**

**Service Ceiling = 51,000 ft**

# Boeing 747-800

**Max TO Weight 987,000 lb; Fuel Capacity = 63,034 US gal**

**Max. Landing Weight = 688,000 lb**

**Operating Empty Weight = 485,300 lb**

**Wingspan = 224 ft, 7 in; Length = 250 ft, 2 in**

**Height = 63 ft, 6 in**

**Cruise Speed = 0.86 Mach (approx. 493 kts)**

**Maximum Endurance = approx. 16.2 Hours or**

**No Wind Range of 8,000 nm**

**Service Ceiling = 43,100 ft**

# Questions?

# *Who is involved in an aircraft accident investigation in the U.S. ?*

- **NTSB leads the investigation**
  *(if accident is on U.S. territory)*
  - Provides the Investigator-in-charge (IIC)
  - Organizes technical expertise


- **FAA is a "party" in all NTSB investigations** *(via statutory authority)*
  - Designates a FAA IIC - called *"FAA Coordinator"* by NTSB
  - Responsible for aviation safety in the U.S., but does not determine the cause of accidents
  - Supports the NTSB investigation, *and* also investigates *"Nine FAA Responsibilities"*


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# 49 CFR 830.2 - Definitions

- ***Aircraft accident*** **means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.**
- **For purposes of this part, the definition of "aircraft accident" includes "unmanned aircraft accident," as defined herein.**

# 49 CFR 830.2 - Definitions

***Fatal injury*** **means any injury which results in death within 30 days of the accident.**

***Serious injury*** **means any injury which: (1) Requires hospitalization for more than 48 hours, commencing within 7 days from the date of the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.**

# 49 CFR 830.2 - Definitions

***Substantial damage*** **means damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component.**

**Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage" for the purpose of this part.**

# FAA's Role in Aircraft Accident Investigation

- Has the responsibility to ensure the safety and efficiency of the U.S. national airspace system.
- Participates in NTSB aviation investigation as a party (by statute), but *not* in the determination of probable cause.
- Determines if any of FAA's "nine responsibilities" were involved.
- If appropriate, initiates corrective or enforcement action -- *separately* from the FAA "safety investigation".

# NTSB vs. FAA Investigations

- **Most GA aircraft accidents are deemed "limited" accidents by NTSB.**
  - NTSB travels to about 15% of the 1,200 GA accidents annually, but still "investigates" 100% of them.
- **FAA also "investigates" *all* aircraft accidents**
  - *-- FAA travels to all aircraft accidents, fatal or not.*
- **FAA also investigates 3,000 "incidents" annually**
  - FAA AIDS Database
- **As a Party, FAA shares what it learns with NTSB**
- **FAA also uses the information gleaned for its "Nine Responsibilities" investigation**

# NTSB "Priority" (49 CFR 831.5)

Any accident or incident investigation conducted by NTSB has priority over all other investigations conducted by other Federal Agencies

# "Parties" to an NTSB Investigation

- **FAA** *(automatic on all invest., per statute)*
- **UAS/Drone Manufacturer**
- **Air Carrier / Operator**
- **Airport**
- **Employee Unions** *(i.e. ALPA, NATCA)*
- **Other Government Agencies**
- **Others** - *as needed by NTSB*

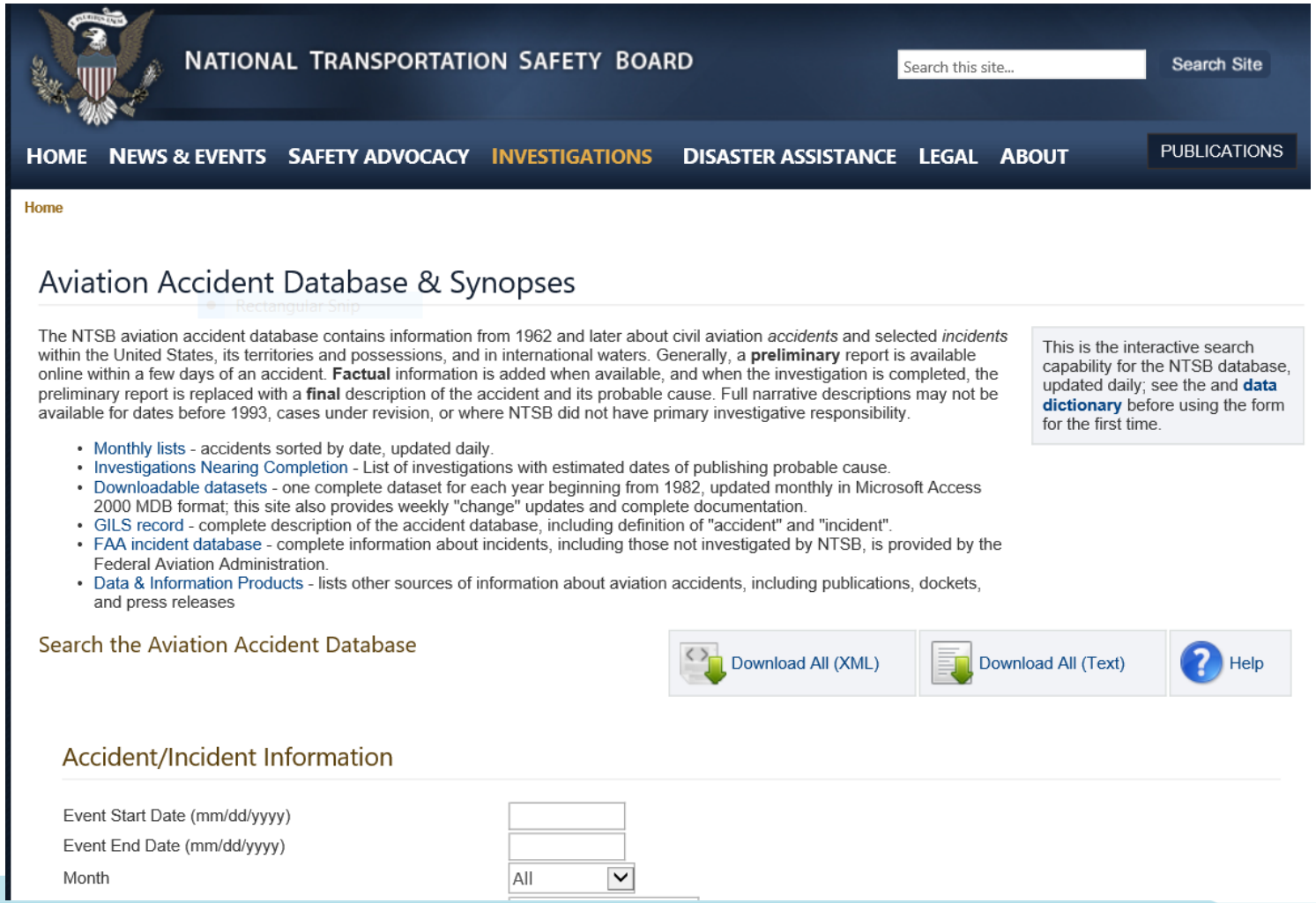
****Most of the larger organizations have professional staff investigators and experience in dealing with NTSB*

***Prohibited**: Attorneys; Families of Victims; Insurers*

**Party "Rules" to Abide By**

- ❑ No contacts with news media concerning the investigation
- ❑ No info may be passed to others within the party beyond those participating in the investigation, without NTSB approval
- ❑ Must be *"responsive to the direction of NTSB personnel"*
- ❑ No independent investigation without informing NTSB
- ❑ No relevant information can be withheld from the NTSB
- ❑ Info from Cockpit Voice Recorder and/or image recordings are held sacred and tightly controlled

# https://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx

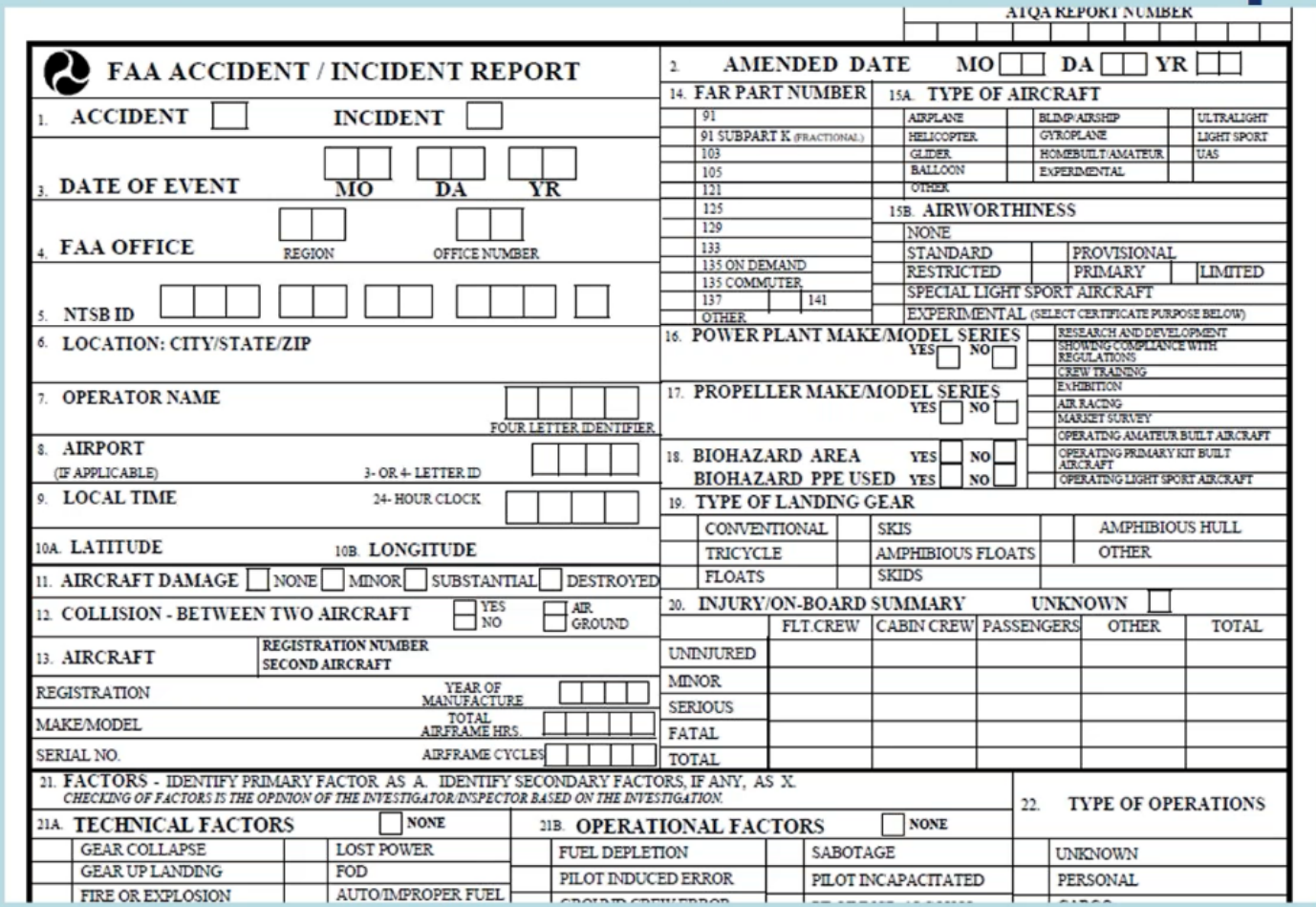


# FAA Nine Areas of Responsibilities

*(Examined by FAA inspectors for every accident)*

1. FAA Facilities and Functions
2. Non-FAA Facilities
3. Airworthiness
4. Airmen/Agency Competence
5. FAR Adequacy
6. Airport Certification
7. Security & HazMat
8. Airman Medical Qualification
9. FAR Violations

# FAA Form 8020-23 Acc/Inc Report



ATQA REPORT NUMBER

**FAA ACCIDENT / INCIDENT REPORT**

1. ACCIDENT ☐ INCIDENT ☐
3. DATE OF EVENT MO DA YR
4. FAA OFFICE REGION OFFICE NUMBER
5. NTSB ID
6. LOCATION: CITY/STATE/ZIP
7. OPERATOR NAME FOUR LETTER IDENTIFIER
8. AIRPORT (IF APPLICABLE) 3- OR 4- LETTER ID
9. LOCAL TIME 24- HOUR CLOCK
10A. LATITUDE 10B. LONGITUDE
11. AIRCRAFT DAMAGE ☐ NONE ☐ MINOR ☐ SUBSTANTIAL ☐ DESTROYED
12. COLLISION - BETWEEN TWO AIRCRAFT ☐ YES ☐ NO ☐ AIR ☐ GROUND
13. AIRCRAFT REGISTRATION NUMBER SECOND AIRCRAFT
REGISTRATION YEAR OF MANUFACTURE
MAKE/MODEL TOTAL AIRFRAME HRS.
SERIAL NO. AIRFRAME CYCLES

2. AMENDED DATE MO DA YR

14. FAR PART NUMBER
91 | 91 SUBPART K (FRACTIONAL) | 103 | 105 | 121 | 125 | 129 | 133 | 135 ON DEMAND | 135 COMMUTER | 137 | 141 | OTHER

15A. TYPE OF AIRCRAFT
AIRPLANE | BLIMP/AIRSHIP | ULTRALIGHT | HELICOPTER | GYROPLANE | LIGHT SPORT | GLIDER | HOMEBUILT/AMATEUR | UAS | BALLOON | EXPERIMENTAL | OTHER

15B. AIRWORTHINESS
NONE | STANDARD | PROVISIONAL | RESTRICTED | PRIMARY | LIMITED | SPECIAL LIGHT SPORT AIRCRAFT | EXPERIMENTAL (SELECT CERTIFICATE PURPOSE BELOW)

16. POWER PLANT MAKE/MODEL SERIES YES ☐ NO ☐
17. PROPELLER MAKE/MODEL SERIES YES ☐ NO ☐
18. BIOHAZARD AREA YES ☐ NO ☐
BIOHAZARD PPE USED YES ☐ NO ☐

RESEARCH AND DEVELOPMENT | SHOWING COMPLIANCE WITH REGULATIONS | CREW TRAINING | EXHIBITION | AIR RACING | MARKET SURVEY | OPERATING AMATEUR BUILT AIRCRAFT | OPERATING PRIMARY KIT BUILT AIRCRAFT | OPERATING LIGHT SPORT AIRCRAFT

19. TYPE OF LANDING GEAR
CONVENTIONAL | SKIS | AMPHIBIOUS HULL | TRICYCLE | AMPHIBIOUS FLOATS | OTHER | FLOATS | SKIDS

20. INJURY/ON-BOARD SUMMARY UNKNOWN ☐

| | FLT.CREW | CABIN CREW | PASSENGERS | OTHER | TOTAL |
|---|---|---|---|---|---|
| UNINJURED | | | | | |
| MINOR | | | | | |
| SERIOUS | | | | | |
| FATAL | | | | | |
| TOTAL | | | | | |

21. FACTORS - IDENTIFY PRIMARY FACTOR AS A. IDENTIFY SECONDARY FACTORS, IF ANY, AS X.
*CHECKING OF FACTORS IS THE OPINION OF THE INVESTIGATOR/INSPECTOR BASED ON THE INVESTIGATION.*

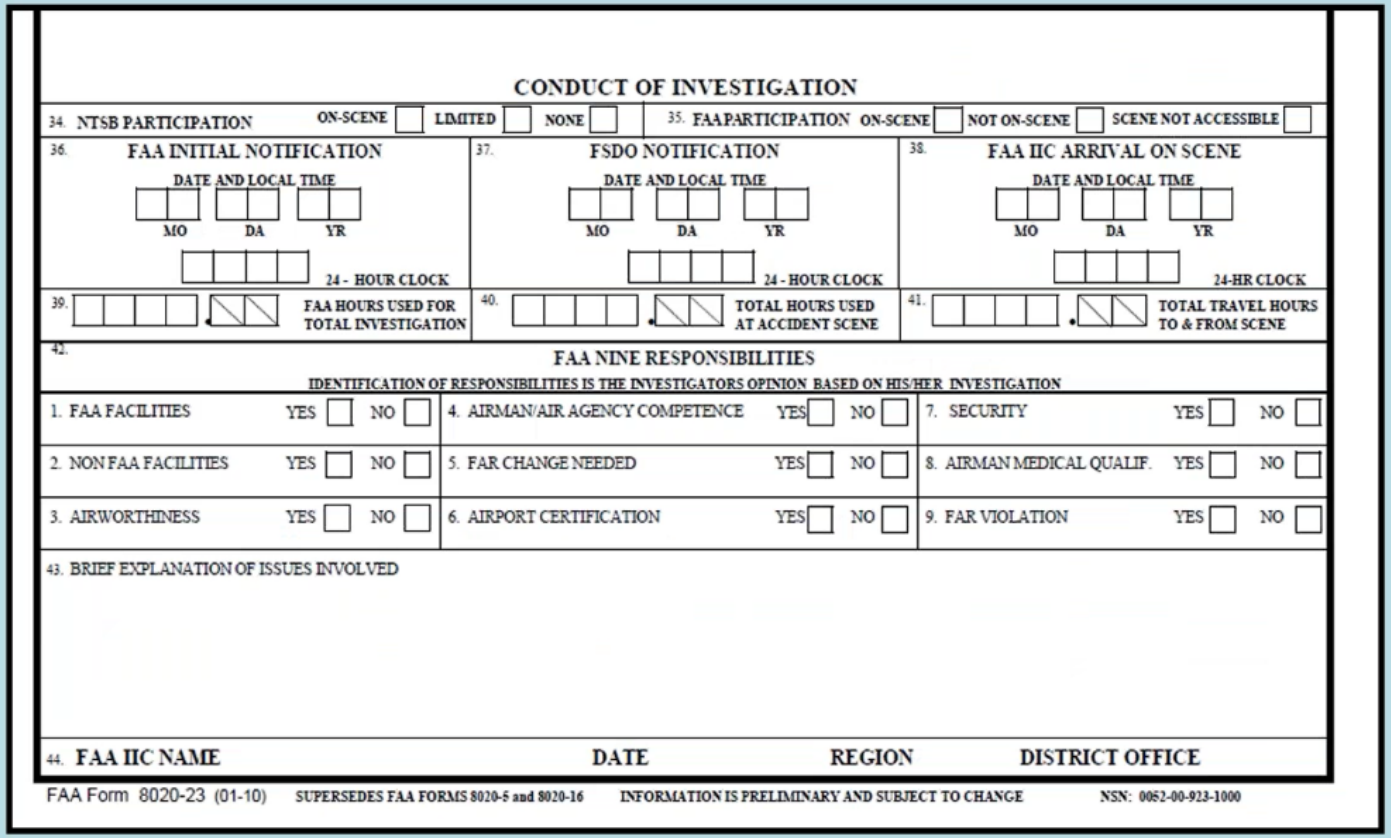
21A. TECHNICAL FACTORS ☐ NONE
GEAR COLLAPSE | LOST POWER | GEAR UP LANDING | FOD | FIRE OR EXPLOSION | AUTO/IMPROPER FUEL

21B. OPERATIONAL FACTORS ☐ NONE
FUEL DEPLETION | SABOTAGE | PILOT INDUCED ERROR | PILOT INCAPACITATED

22. TYPE OF OPERATIONS
UNKNOWN | PERSONAL

# FAA Form 8020-23 *(cont'd)*

FAA IIC pursues any issues with "9 areas of responsibility"



CONDUCT OF INVESTIGATION

34. NTSB PARTICIPATION ON-SCENE ☐ LIMITED ☐ NONE ☐ | 35. FAA PARTICIPATION ON-SCENE ☐ NOT ON-SCENE ☐ SCENE NOT ACCESSIBLE ☐

36. FAA INITIAL NOTIFICATION — DATE AND LOCAL TIME — MO DA YR — 24 - HOUR CLOCK

37. FSDO NOTIFICATION — DATE AND LOCAL TIME — MO DA YR — 24 - HOUR CLOCK

38. FAA IIC ARRIVAL ON SCENE — DATE AND LOCAL TIME — MO DA YR — 24-HR CLOCK

39. FAA HOURS USED FOR TOTAL INVESTIGATION

40. TOTAL HOURS USED AT ACCIDENT SCENE

41. TOTAL TRAVEL HOURS TO & FROM SCENE

42. FAA NINE RESPONSIBILITIES

IDENTIFICATION OF RESPONSIBILITIES IS THE INVESTIGATORS OPINION BASED ON HIS/HER INVESTIGATION

| | | |
|---|---|---|
| 1. FAA FACILITIES YES ☐ NO ☐ | 4. AIRMAN/AIR AGENCY COMPETENCE YES ☐ NO ☐ | 7. SECURITY YES ☐ NO ☐ |
| 2. NON FAA FACILITIES YES ☐ NO ☐ | 5. FAR CHANGE NEEDED YES ☐ NO ☐ | 8. AIRMAN MEDICAL QUALIF. YES ☐ NO ☐ |
| 3. AIRWORTHINESS YES ☐ NO ☐ | 6. AIRPORT CERTIFICATION YES ☐ NO ☐ | 9. FAR VIOLATION YES ☐ NO ☐ |

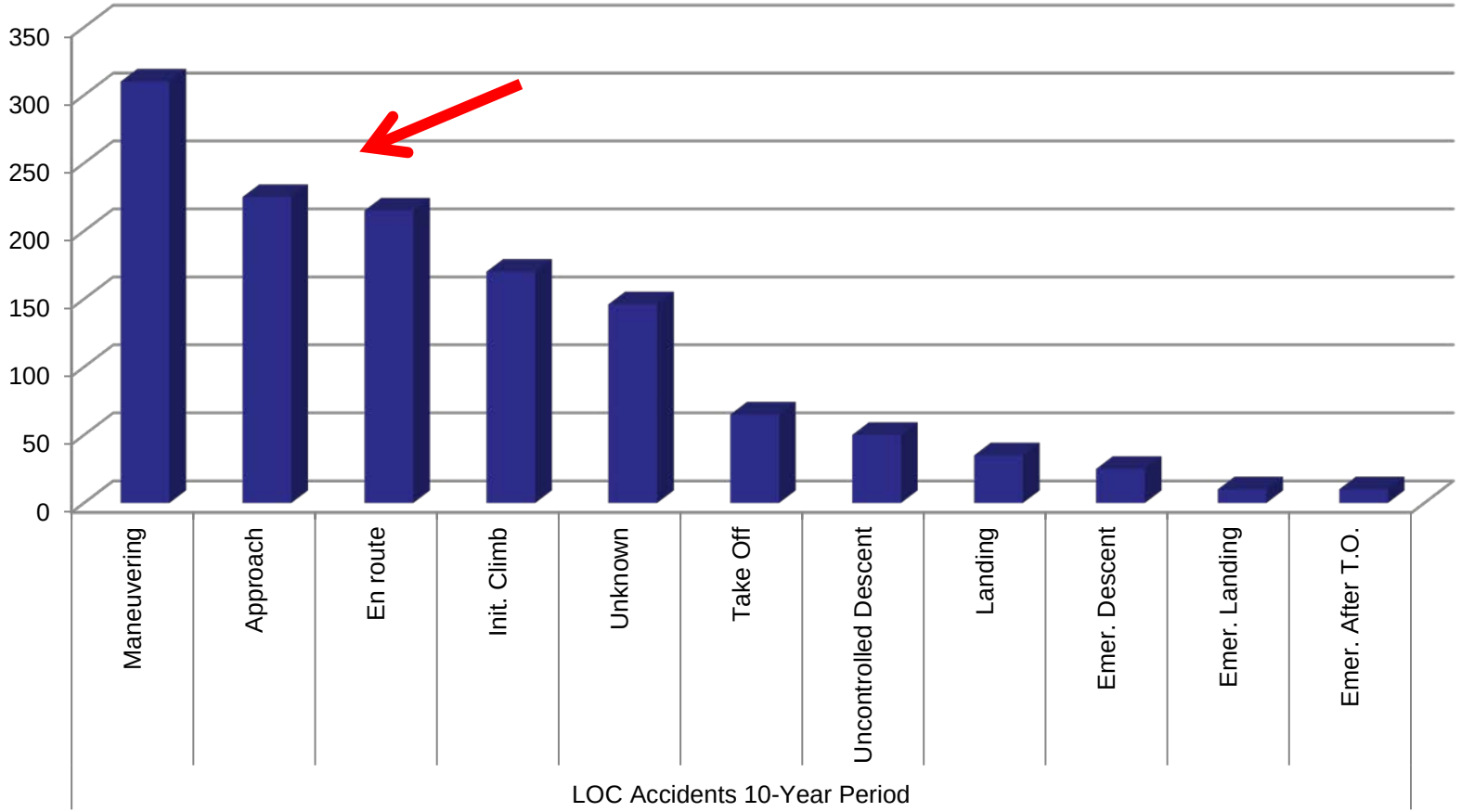
43. BRIEF EXPLANATION OF ISSUES INVOLVED

44. FAA IIC NAME | DATE | REGION | DISTRICT OFFICE

FAA Form 8020-23 (01-10) SUPERSEDES FAA FORMS 8020-5 and 8020-16 INFORMATION IS PRELIMINARY AND SUBJECT TO CHANGE NSN: 0052-00-923-1000

# Questions?

# Fatal LOC Accidents



# LOC Workgroup Findings

- Lack of single – pilot CRM skills

Un stabilized approaches

Inappropriate go-around procedures

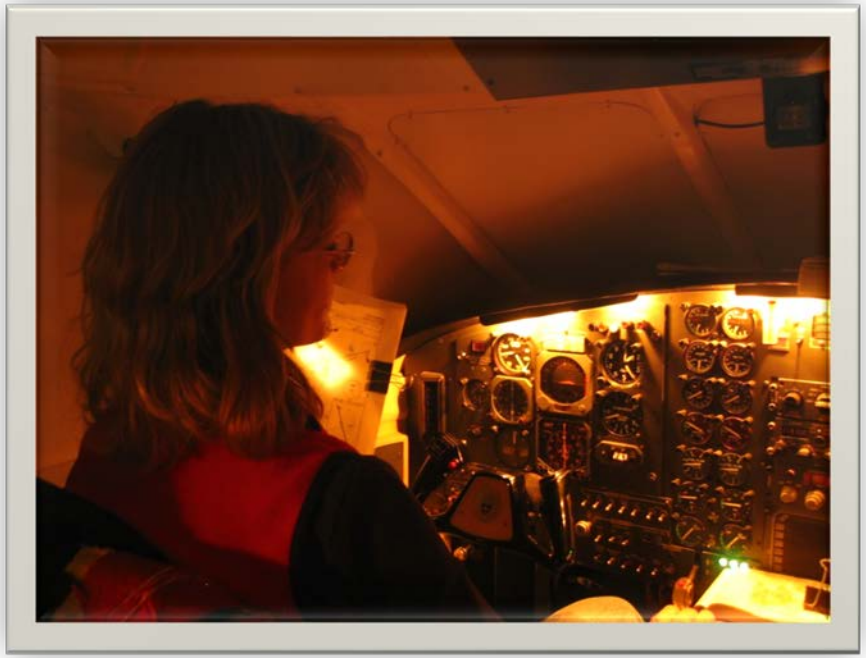
- Flight after extended periods of not flying
- Insufficient transition training

Over reliance on automation

- Flight after use of drugs

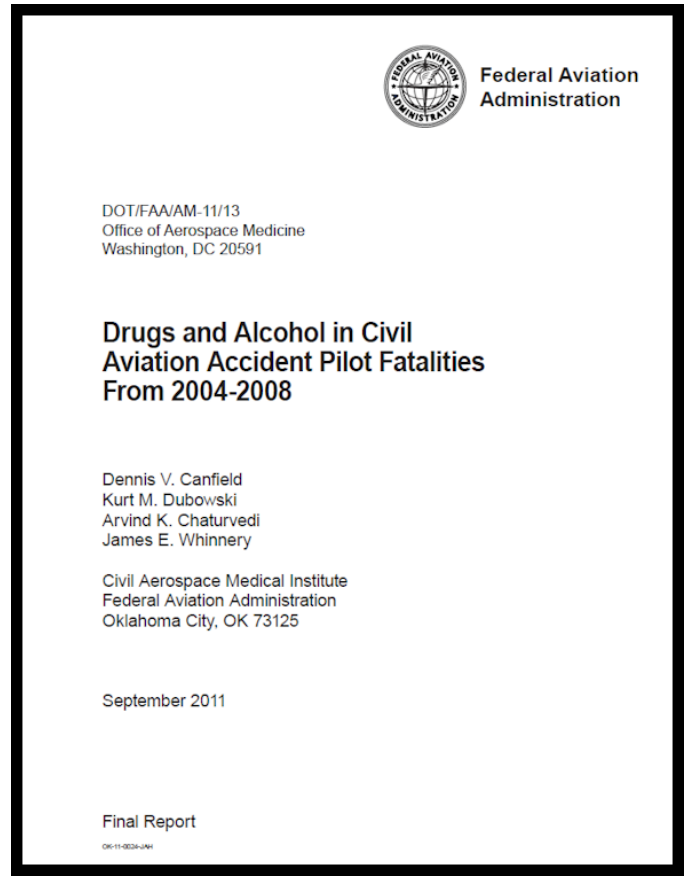
Lack of Aeronautical Decision Making Skills

# Instruments and VFR



# FAA Findings

- **In a 2011 FAA study involving pilot fatalities….**
  - 570 out of 1,353 pilots tested positive for medications/drugs.
  - 511 of the 570 (90%), were flying under CFR Part 91.
- **Extent of Impairment – Undetermined**
  - But cause for concern



Federal Aviation Administration

DOT/FAA/AM-11/13
Office of Aerospace Medicine
Washington, DC 20591

**Drugs and Alcohol in Civil Aviation Accident Pilot Fatalities From 2004-2008**

Dennis V. Canfield
Kurt M. Dubowski
Arvind K. Chaturvedi
James E. Whinnery

Civil Aerospace Medical Institute
Federal Aviation Administration
Oklahoma City, OK 73125

September 2011

Final Report

# What's the Problem

- **Not easy to determine extent of impairment**
  - Different medication effects for different people
  - Post-mortem redistribution and sample type
- **Don't know about pilot's condition**
  - Pre-existing medical condition requiring medication
- **AME not consulted?**
- **Drug interactions**

# The Automation Paradox

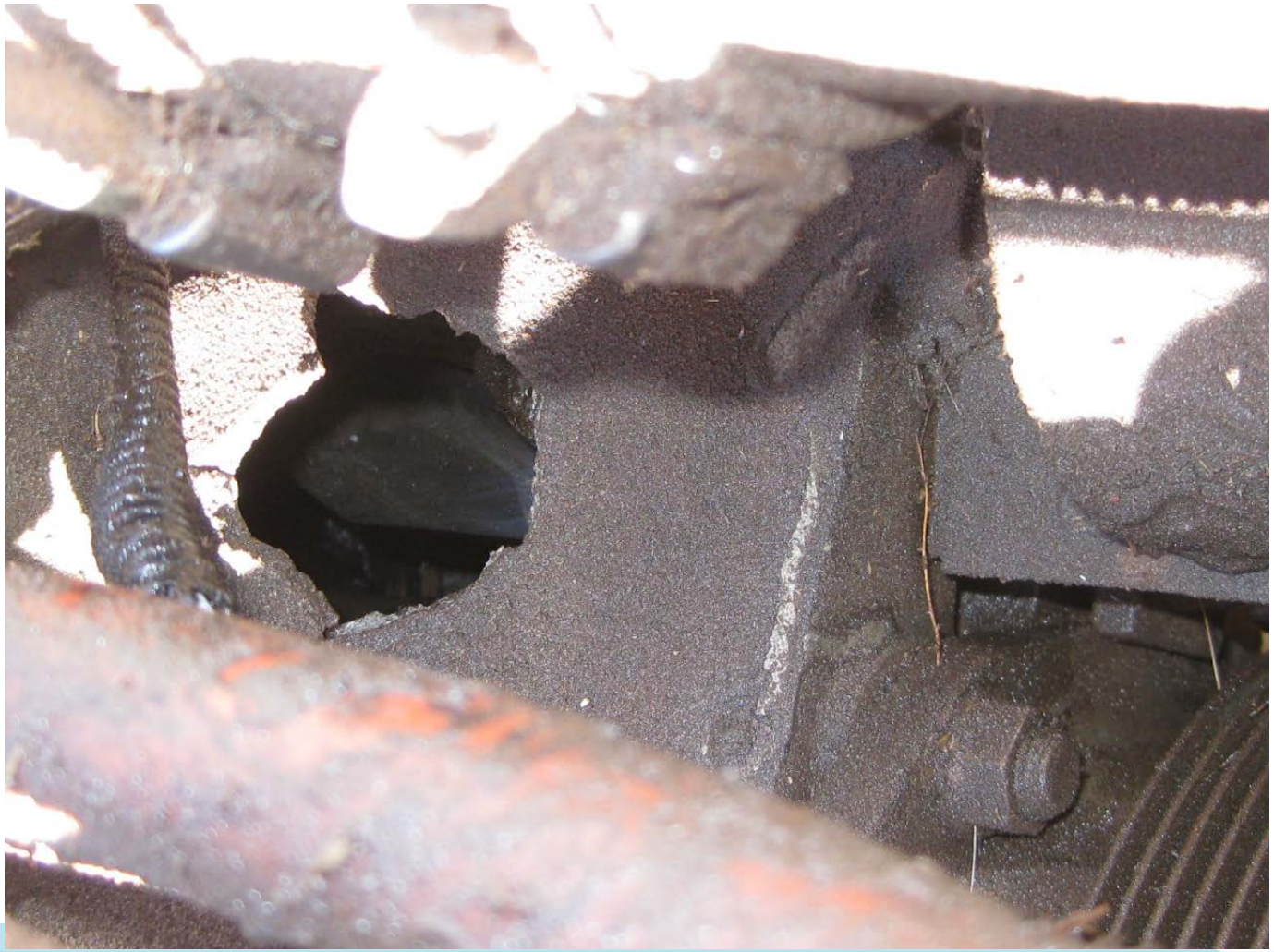
# The Automation Paradox

**Something to consider when flying automated aircraft**

**As Situational Awareness increases with Automation, “Stick and Rudder” proficiency can decrease due to “letting George do it”**

- **Hand fly to maintain proficiency**

# Questions?



# There Are Old Pilots and Bold Pilots But No Old Bold Pilots

**Albert Scott Crossfield – 10/02/1921 to 04/19/2006**

**Robert Anderson Hoover – 01/24/1922 to 10/25/2016**

**Charles Elwood Yeager – 02/13/1923 to __/__/20__**

# Questions?

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