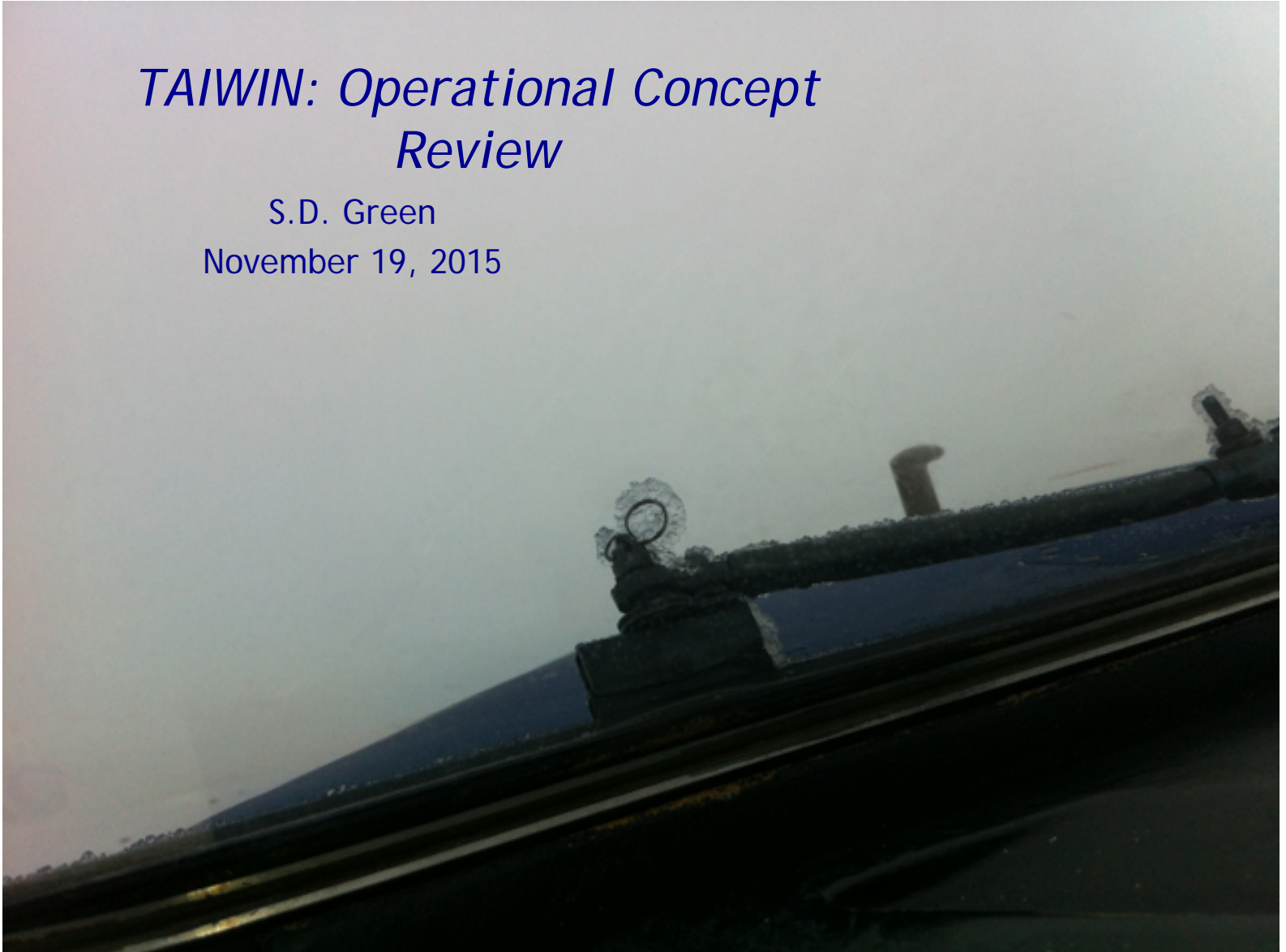




TAIWIN: Operational Concept Review

S.D. Green

November 19, 2015



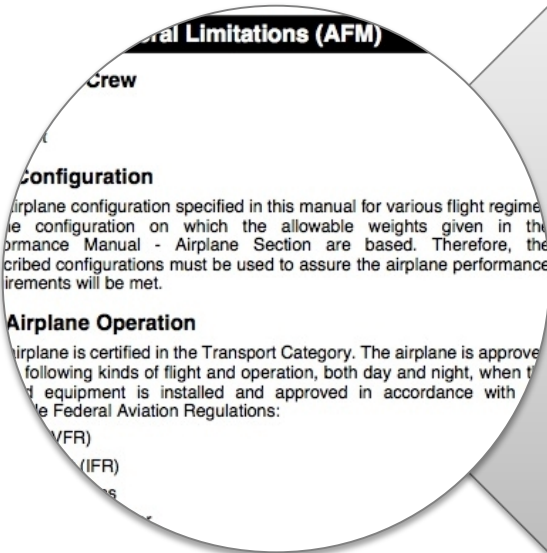


Overview

- Changes to FAR Parts 25 and 33 including FAR 25.1420 and Appendix O, will allow limited icing certification for transport category airplanes.
- Appendix O will define two additional icing environments beyond the existing Appendix C:
 - Paragraph a will define freezing drizzle conditions, and
 - Paragraph b will define freezing rain conditions
- Certification to one or more of these conditions will be at the manufacturer's discretion



Benchmark Limitation



Sample AFM Limitation Language:

- Intentional flight, including take-off and landing, into freezing drizzle or freezing rain conditions is prohibited.

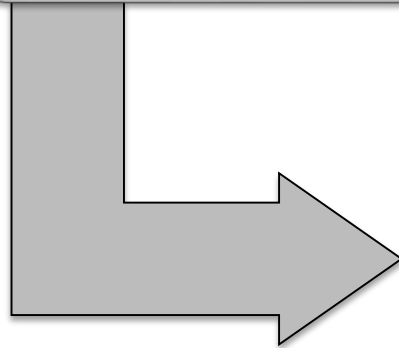


Operational Control

FAA 8900.1, Volume 3, Chapter 25, Operational Control For Air Carriers.
Paragraph 3-1921(C)

Specifying the conditions
under which a flight may
be dispatched or released

(weather minimums, flight
planning, airworthiness of aircraft,
aircraft loading, and fuel
requirements)

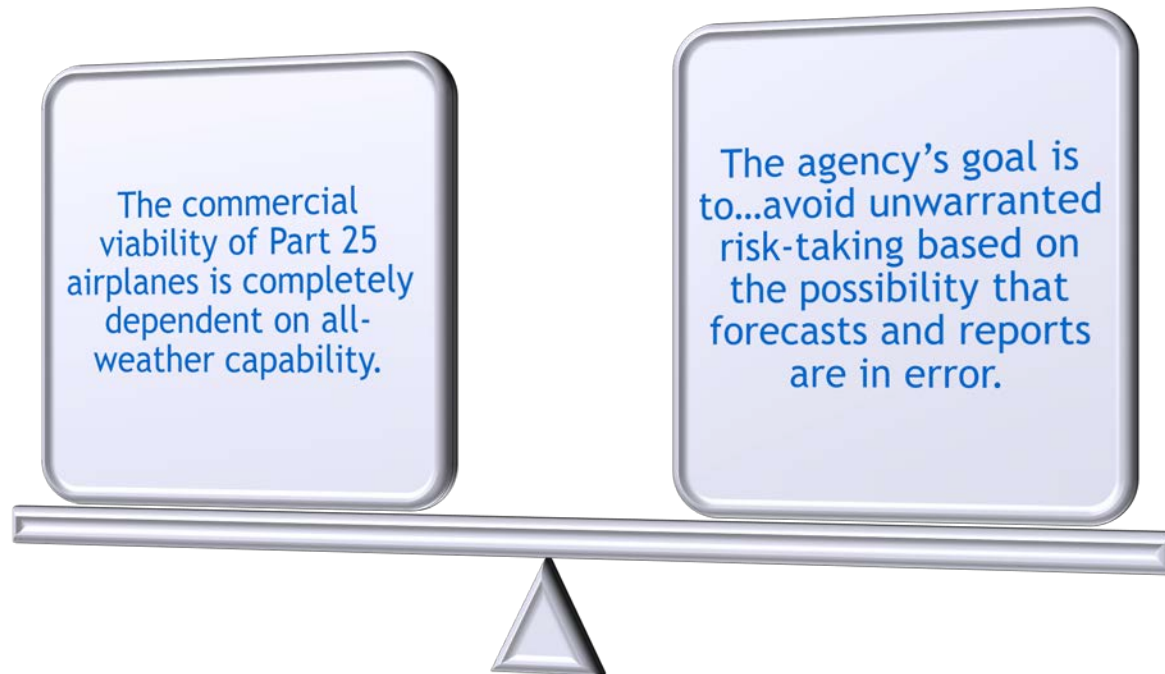


Restricting or suspending
operations when
conditions hazardous to
safe operations are known

in accordance with FAR 121.551,
121.553 or 135.69 as applicable



Means of Cost-Effective Operations



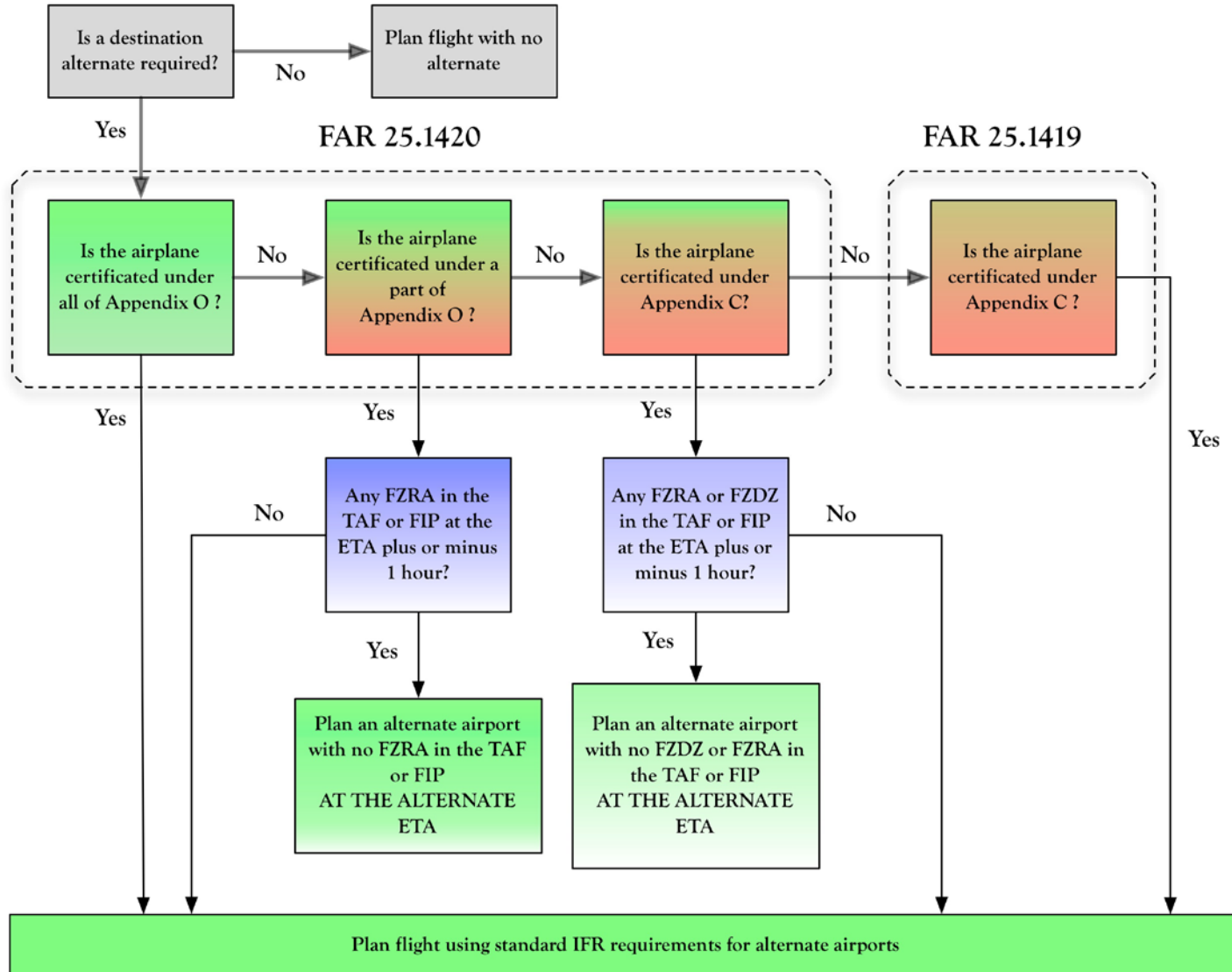


Operational Concept Review

- Part 121 dispatch planning and/or Part 91/135 flight planning
 - Can we ensure that the flight will be conducted within the AFM limitations, FARs and Operations Specifications?
- Takeoff Decision
 - Release the brakes or not?
- Approach Decision
 - Can we safely fly the approach past the final approach point?
- Diversion to Alternate
 - Once the alternate becomes the destination, the approach decision applies
- Protect the Exit Maneuver
 - What can we do to ensure that the exit maneuver remains viable throughout the icing portions of the flight?

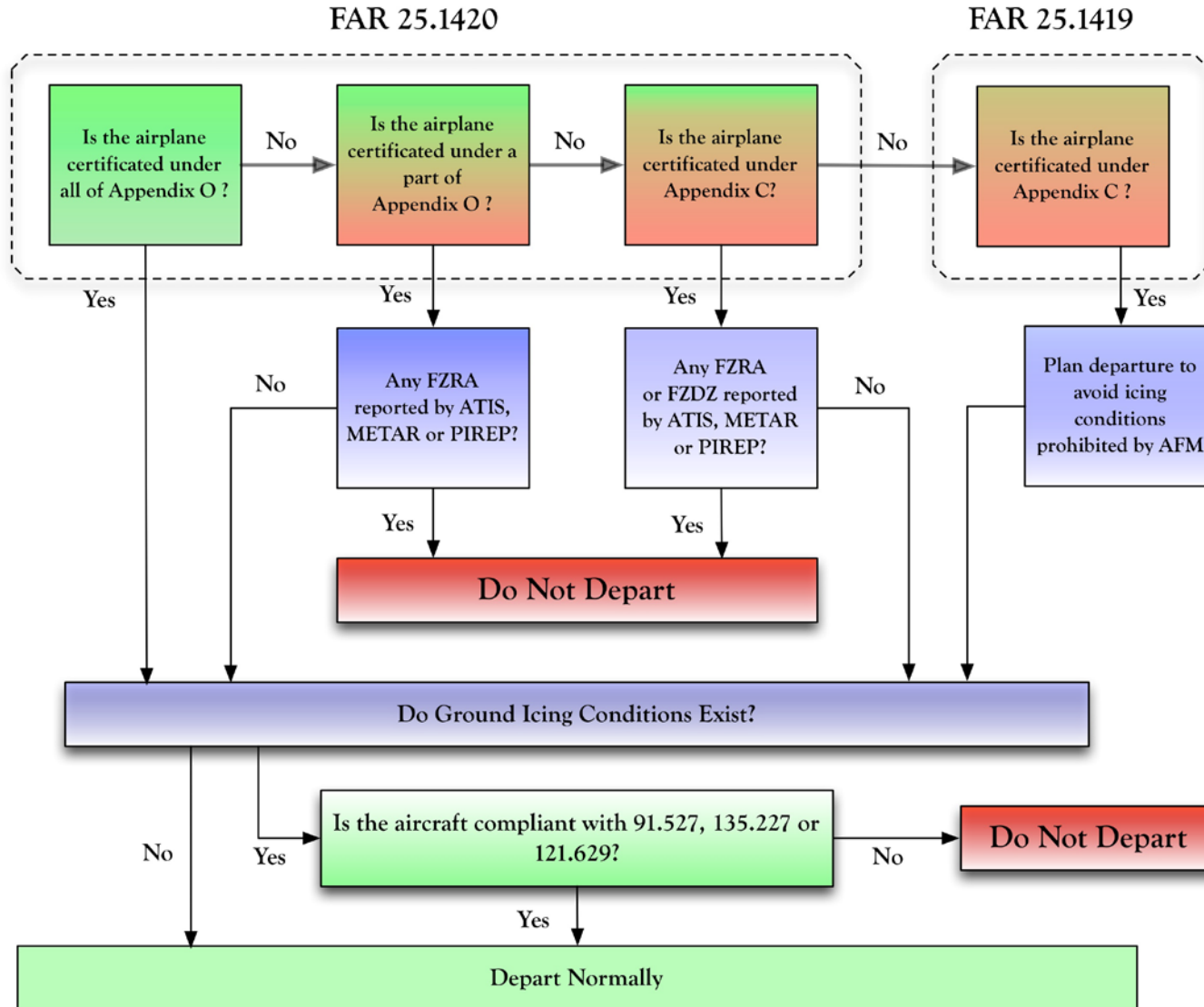


Flight Planning



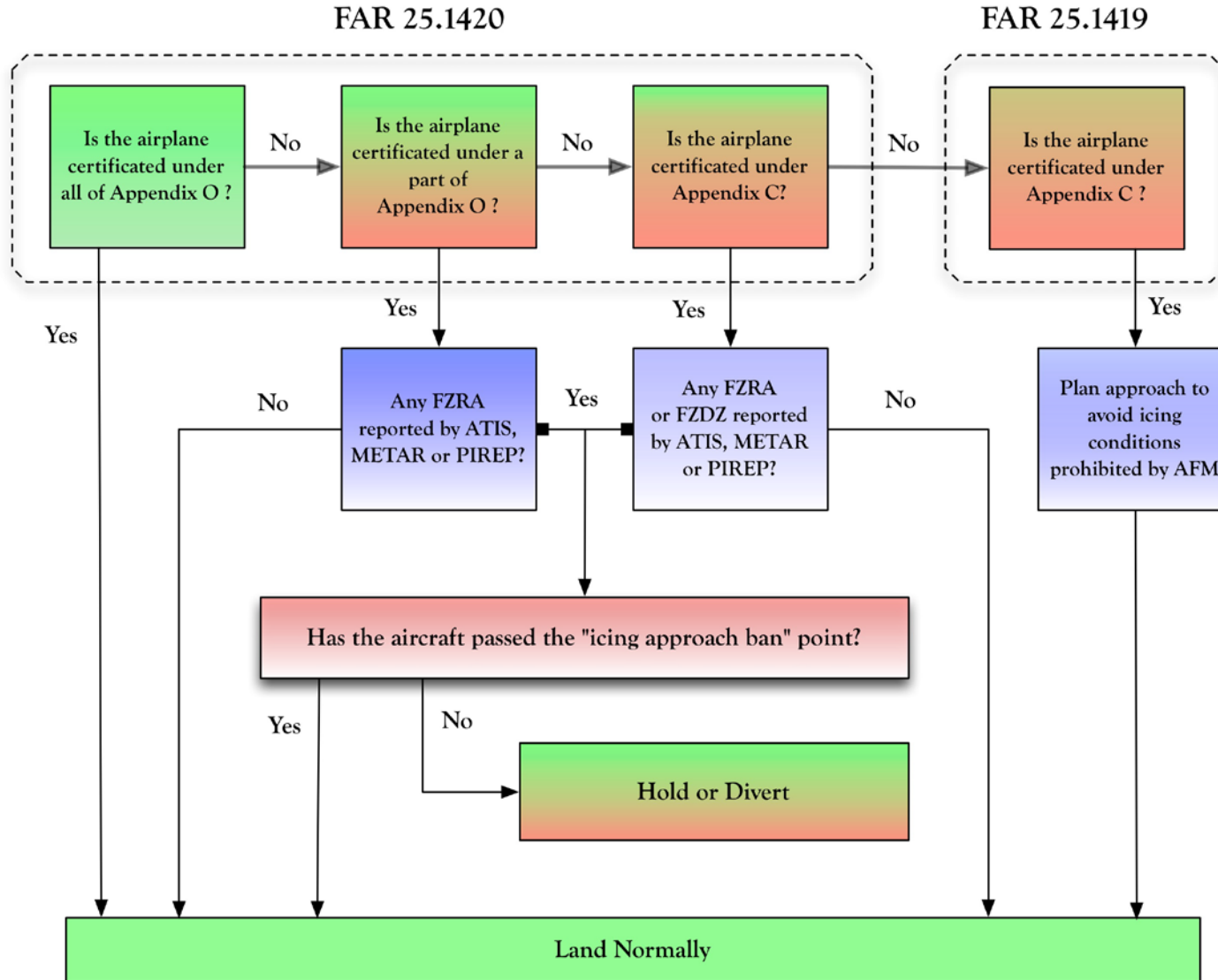


Departure Decision





Landing Decision





The Exit Maneuver

- FAR 25.1420 (2)ii states that,
 - Following detection, the airplane must be capable of operating safely while exiting *all* icing conditions.
- This requirement will be applicable during all phases of flight
- The exit maneuver assumptions used for certification are:
 - a horizontal flight of 17 nm in Appendix O conditions, followed by
 - an additional flight of 17 nm in Appendix C conditions
 - Within the envelope, the aircraft must either exit IMC or climb/descend to a temperature above freezing
- Alternatively, the aircraft may simply land
 - Within the terminal area, landing is the obvious choice
- The exit maneuver may require the pilot to use his/her emergency authority



2013 Case Study



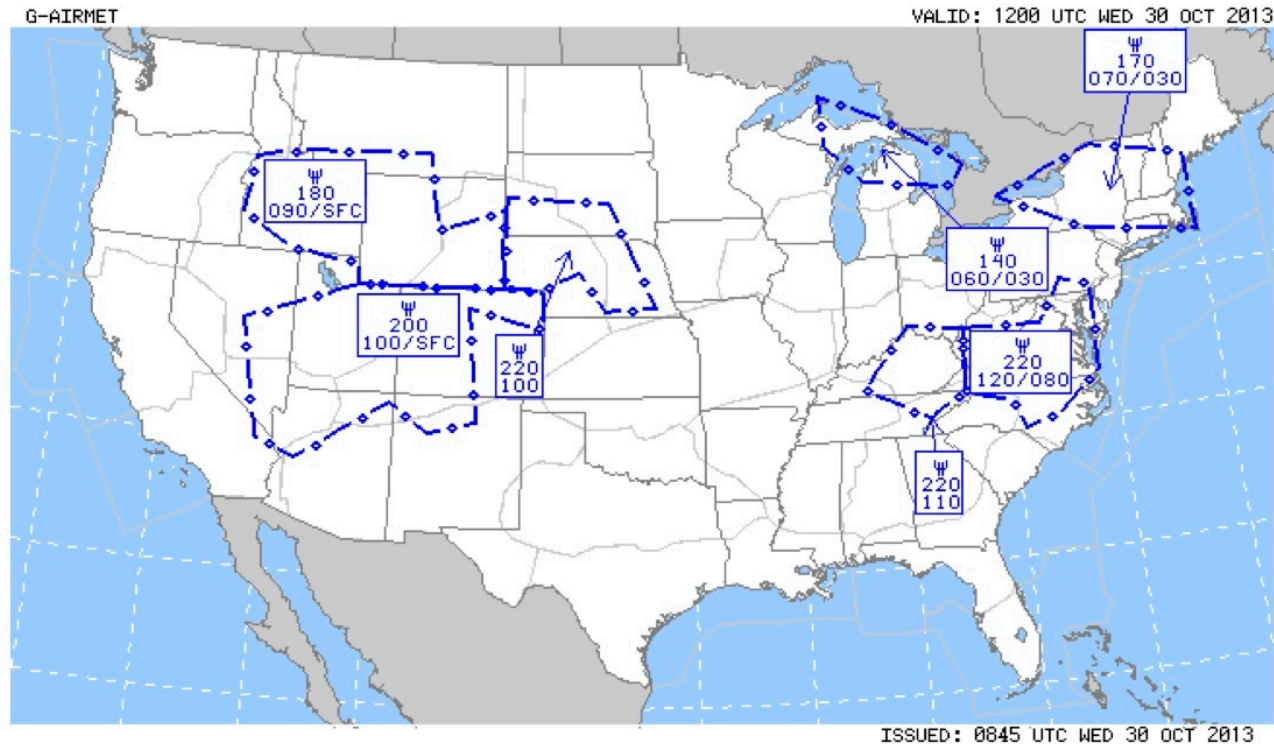


The Flight

- Typical small jet with 6 to 8 seats
- Planned departure from North Platte is at 1500Z
- Planned ETA at Rapid City is approximately 1630Z
- Rapid City field elevation is 3204 feet.



1200Z G-AIRMET ZULU



0845Z: Airmet Zulu issued for moderate icing between 10,000 and 22,000 feet



NWS Hazardous Weather Outlook

. DAY ONE . . . TODAY AND TONIGHT

A SLOW MOVING LOW PRESSURE SYSTEM WILL CONTINUE TO BRING WINTRY WEATHER TO THE AREA THIS MORNING . AREAS OF FOG AND FREEZING DRIZZLE WILL CONTINUE BEFORE DISSAPATING BY MIDDAY. OCCASIONAL LIGHT RAIN . . . LIGHT FREEZING RAIN . . . AND SLEET . . . ARE POSSIBLE THIS MORNING . . . BECOMING ALL RAIN BY THIS AFTERNOON . THESE CONDITIONS MAY RESULT IN SLICK DRIVING SURFACES AND WALKWAYS .



LIGHT FREEZING RAIN



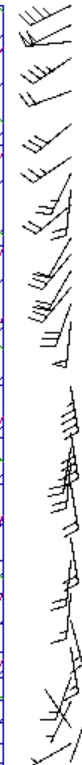
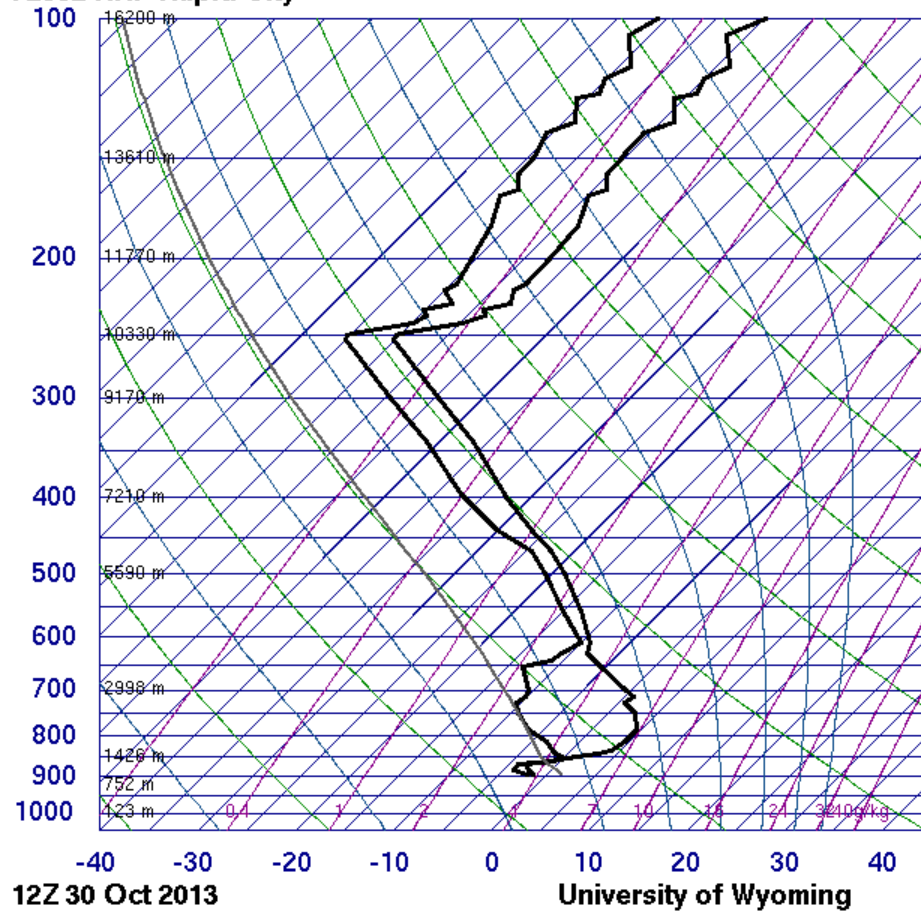
FREEZING DRIZZLE

0919Z: NWS issues a Hazardous Weather Outlook



1200Z KRAP Sounding

72662 RAP Rapid City

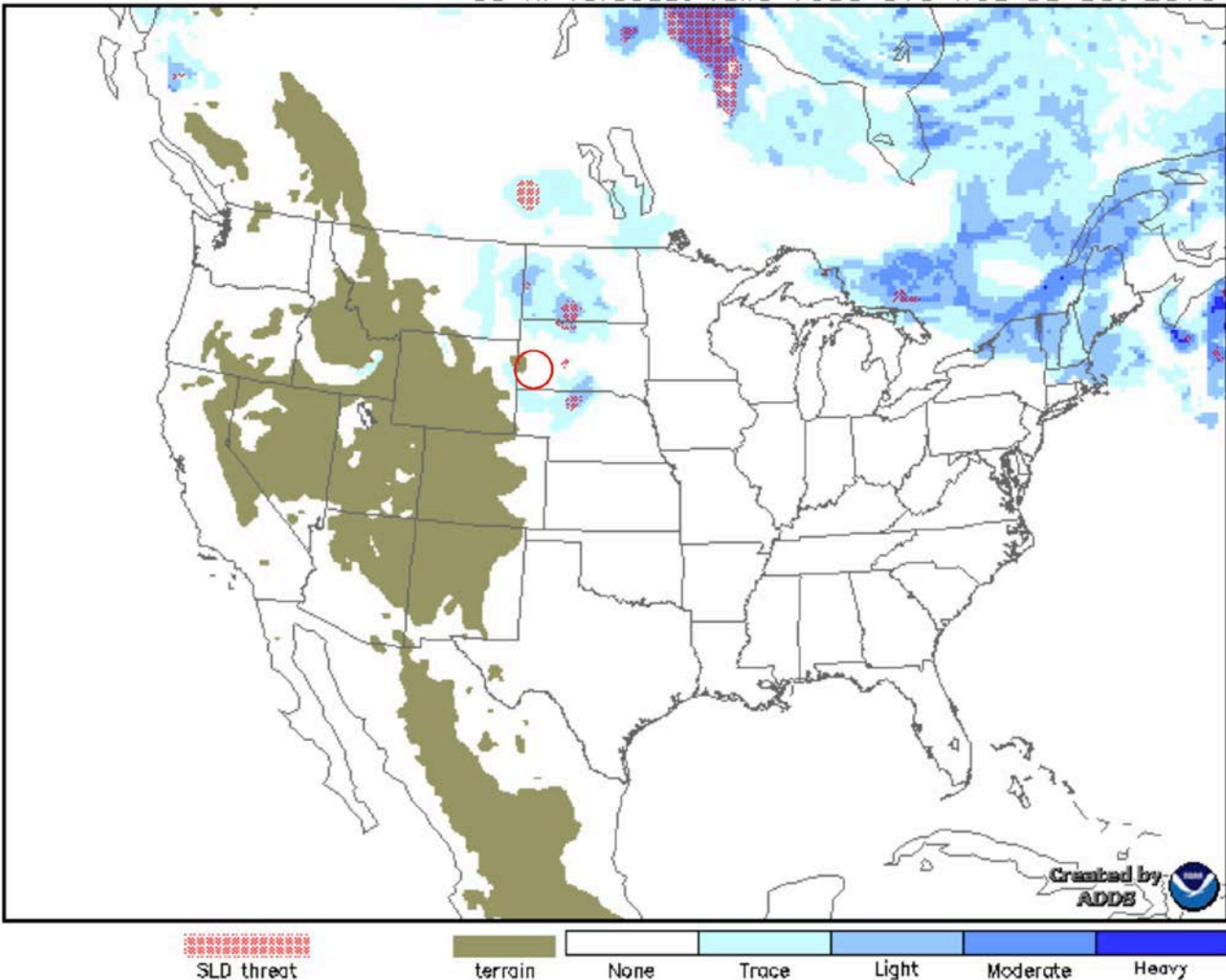


SLAT	44.08
SLON	-103.21
SELV	1029.
SHOW	10.07
LIFT	14.30
LFTV	14.46
SWET	29.99
KINX	9.70
CTOT	18.50
VTOT	19.90
TOTL	38.40
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	270.4
LCLP	846.7
MLTH	283.6
MLMR	3.75
THCK	546.7
PWAT	12.35



1600Z 5000 ft icing severity

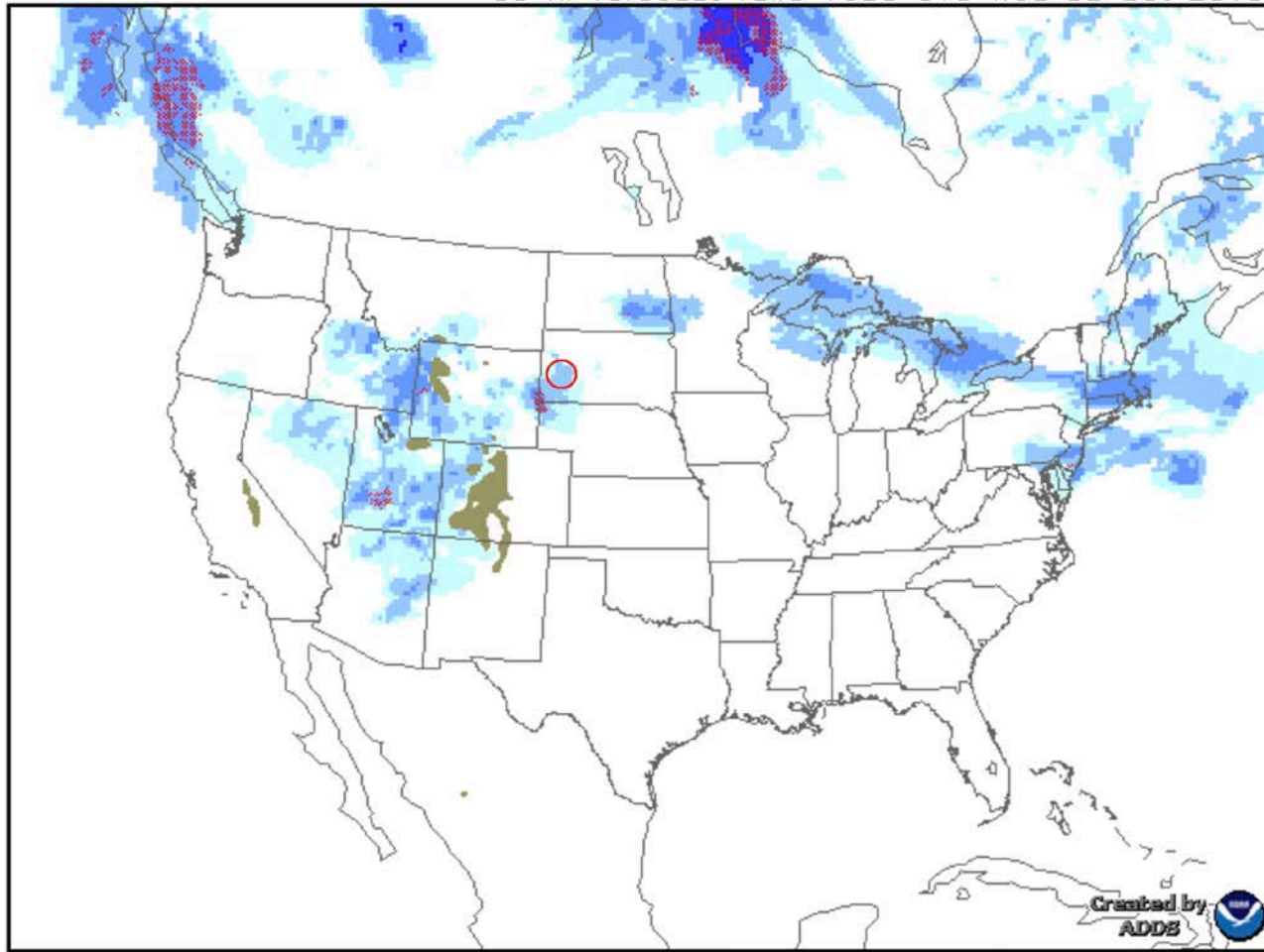
03 hr forecast valid 1600 UTC Wed 30 Oct 2013



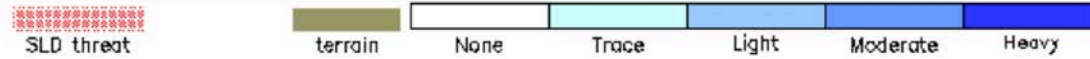


1600 Z 9000 ft icing severity

03 hr forecast valid 1600 UTC Wed 30 Oct 2013



Granted by
ADDS





History of FZDZ in the TAFs

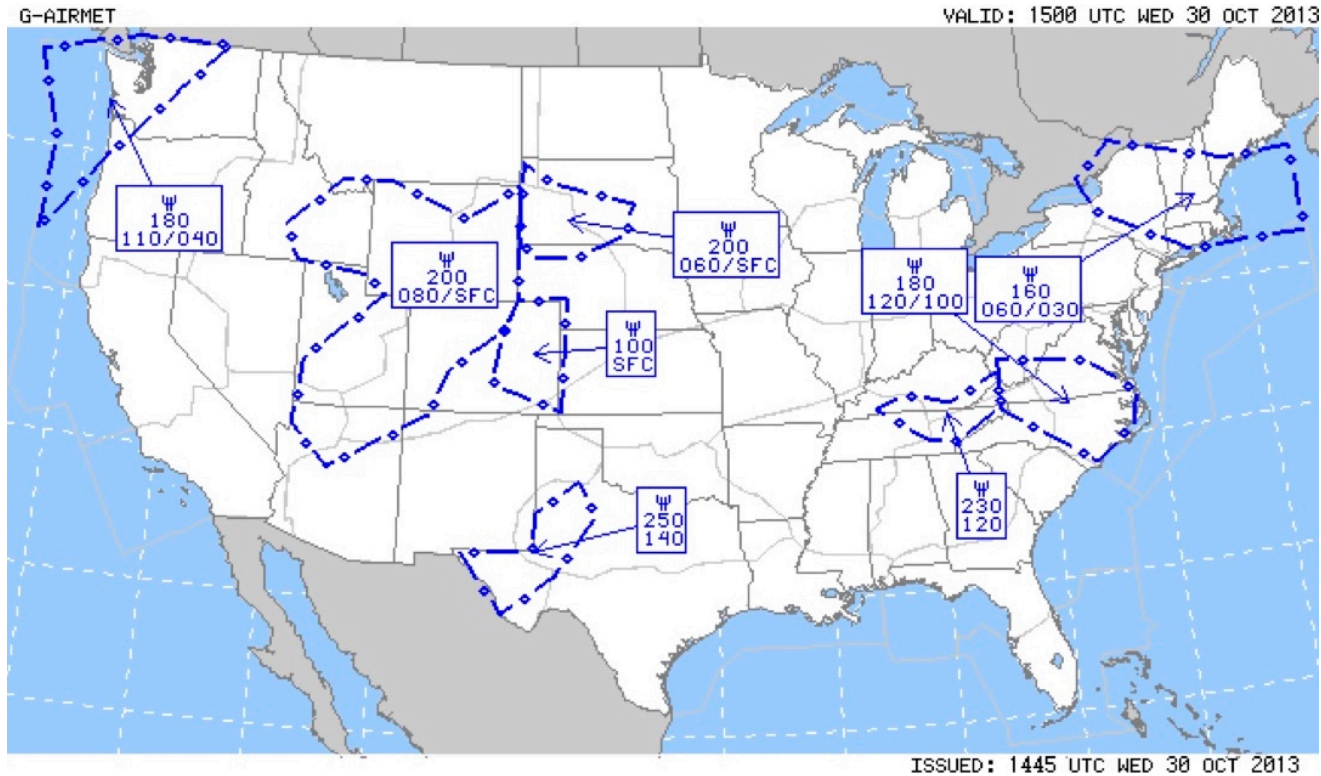
- At 1256Z, Ellsworth AFB issues an amended TAF with the following line:
 - BECMG 3012/3013 15005KT 3200 -FZDZ OVC002 660001 QNH2972INS
 - BECMG 3014/3015 15005KT 3200 -SN OVC002 620026 QNH2972INS
- at 1352Z, the NWS issues a TAF for Rapid City (KRAP):
 - KRAP 301401Z 3014/3112 14004KT 1 1/2SM BR OVC002
TEMPO 3014/3016 1/4SM FZFG
FM301700 VRB03KT P6SM OVC004
FM302200 VRB03KT P6SM BKN015
FM310300 34004KT P6SM BKN250

At 1410Z, the pilot picks up his weather briefing

There is nothing in the forecast that would require an icing alternate



1500Z G-AIRMET ZULU



1445Z: Airmet Zulu issued for moderate icing between surface and 20,000 feet



History of FZDZ in the TAFs, continued

- At 1450Z, Ellsworth AFB issues an amended TAF with the following conditional:
 - TEMPO 3014/3017 0800 -FZDZ OVC002
 - Note that this is the first forecast for FZDZ to bracket the flight's ETA
- At 1510Z, the NWS issues an amended TAF for Rapid City (KRAP) with the following conditional:
 - TEMPO 3015/3017 3SM -FZRA OVC004 FM301700 VRB03KT P6SM
 - This is 10 minutes past the planned departure time



History of METARs

- At 1336Z, Ellsworth AFB issues the following SPECI:
 - SPECI KRCA 301336Z 12005KT M1/4SM -FZDZ FZFG VV001 M01/M02 A2987 RMK AO2A DZB1330 \$=
 - FZDZ is reported from that time through the METAR at 1608Z.
- At 1552, KRAP issues the first METAR containing a reference to light rain (-RA)
 - KRAP 301552Z 26005KT 1SM -RA FZFG OVC002 M01/M02 A2985 RMK AO2 UPB33E52RAB52 SLP139 P0000 T10061017
 - Note the temperature is reported as less than zero; this condition persists until 1758Z.
 - Freezing precipitation of any kind is never referenced.



A Final Thought

“The capable and competent pilot will never allow an airplane to crack up...” .
- Civil Aeronautics Bulletin No. 5, 1939