

Bowling David

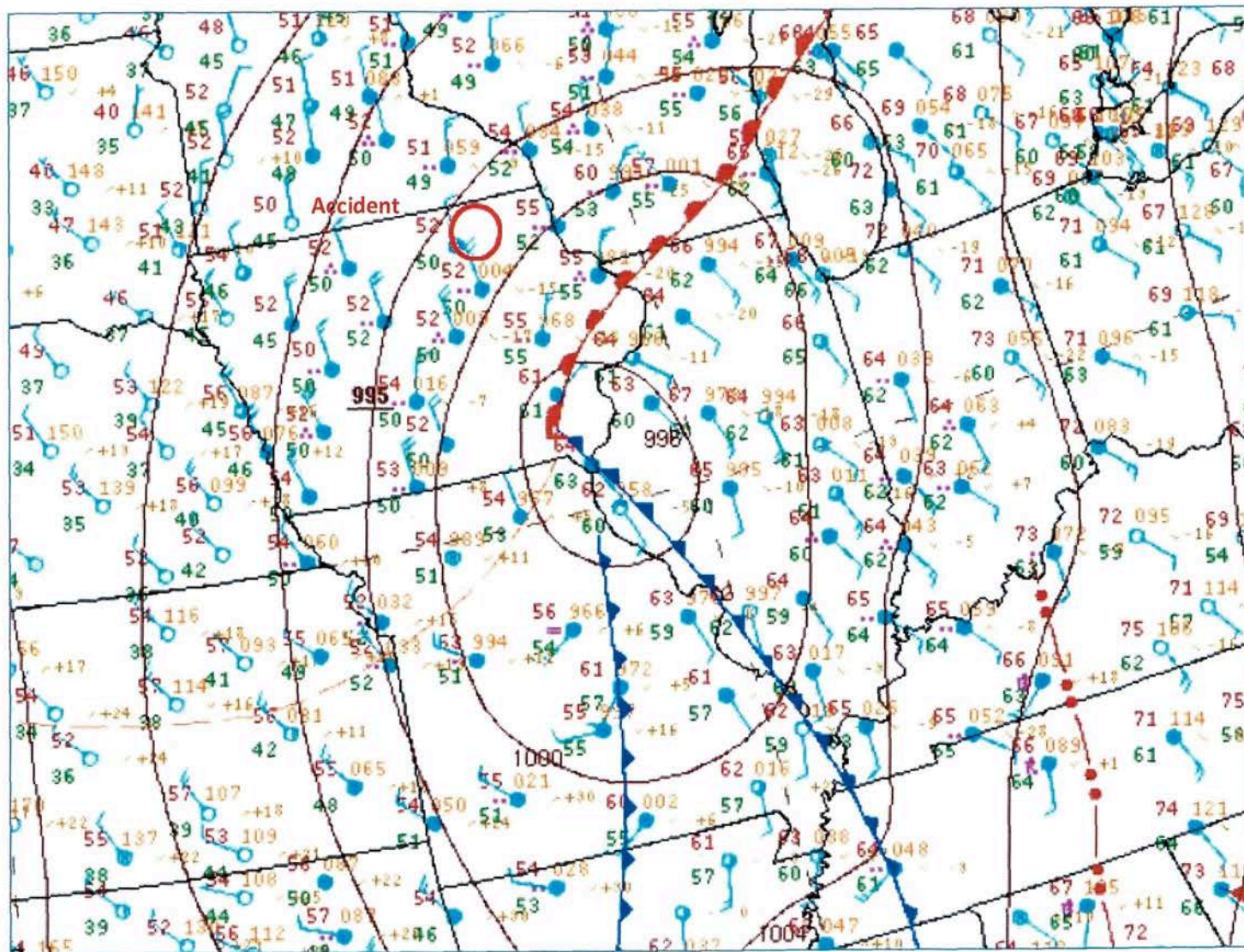
From: Eick Donald
Sent: Tuesday, April 12, 2016 7:46 AM
To: Bowling David
Subject: FW: Dubuque, Iowa weather
Attachments: GOES-13_0400Z.PNG; KDVN WSR-88D 0404Z base reflectivity.png

Previously send weather data.

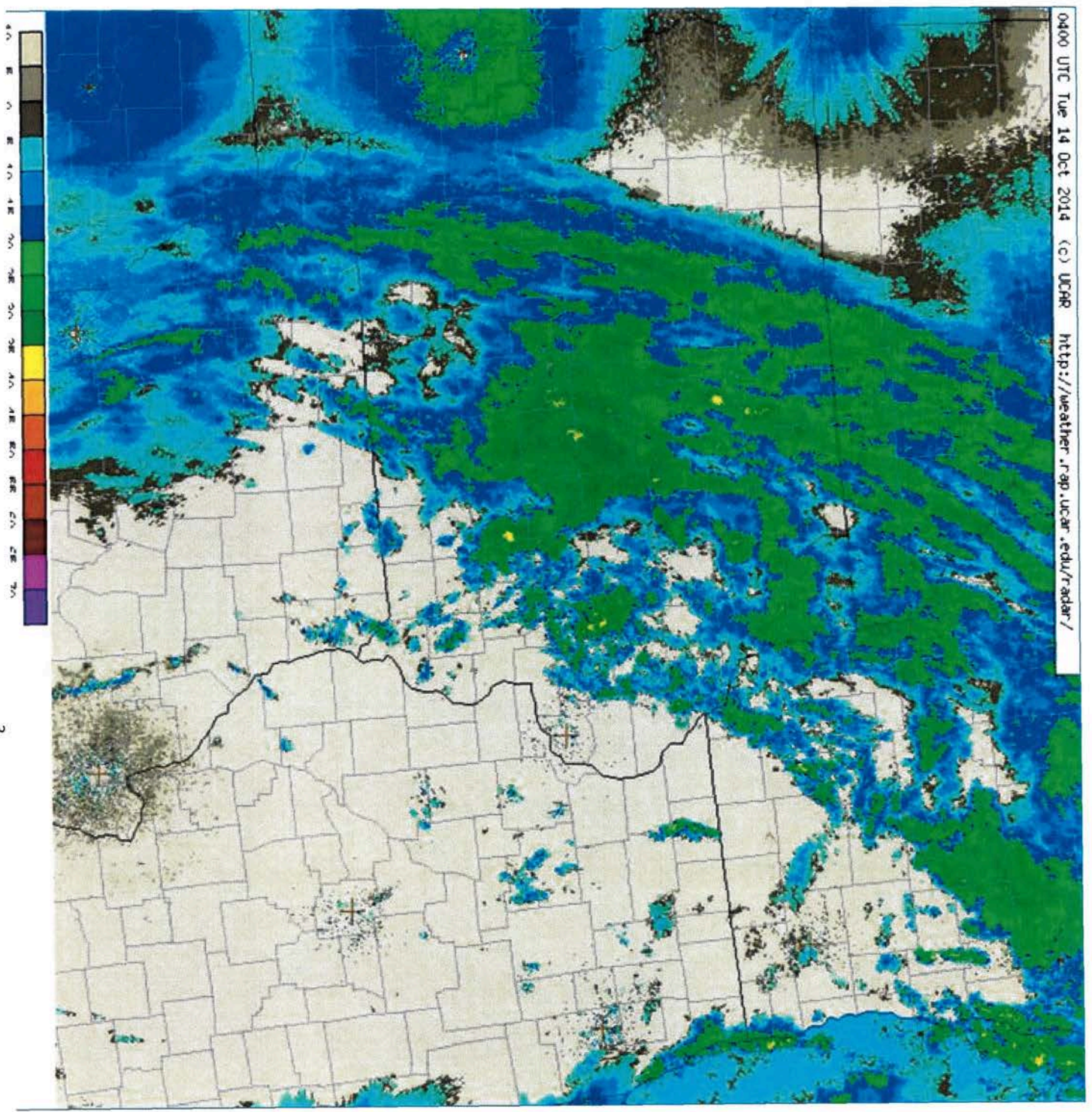
From: Eick Donald
Sent: Tuesday, October 14, 2014 12:07 PM
To: [REDACTED]
Cc: [REDACTED]
Subject: Dubuque, Iowa weather

Weather conditions on October 13, 2014 in the Dubuque, Iowa area

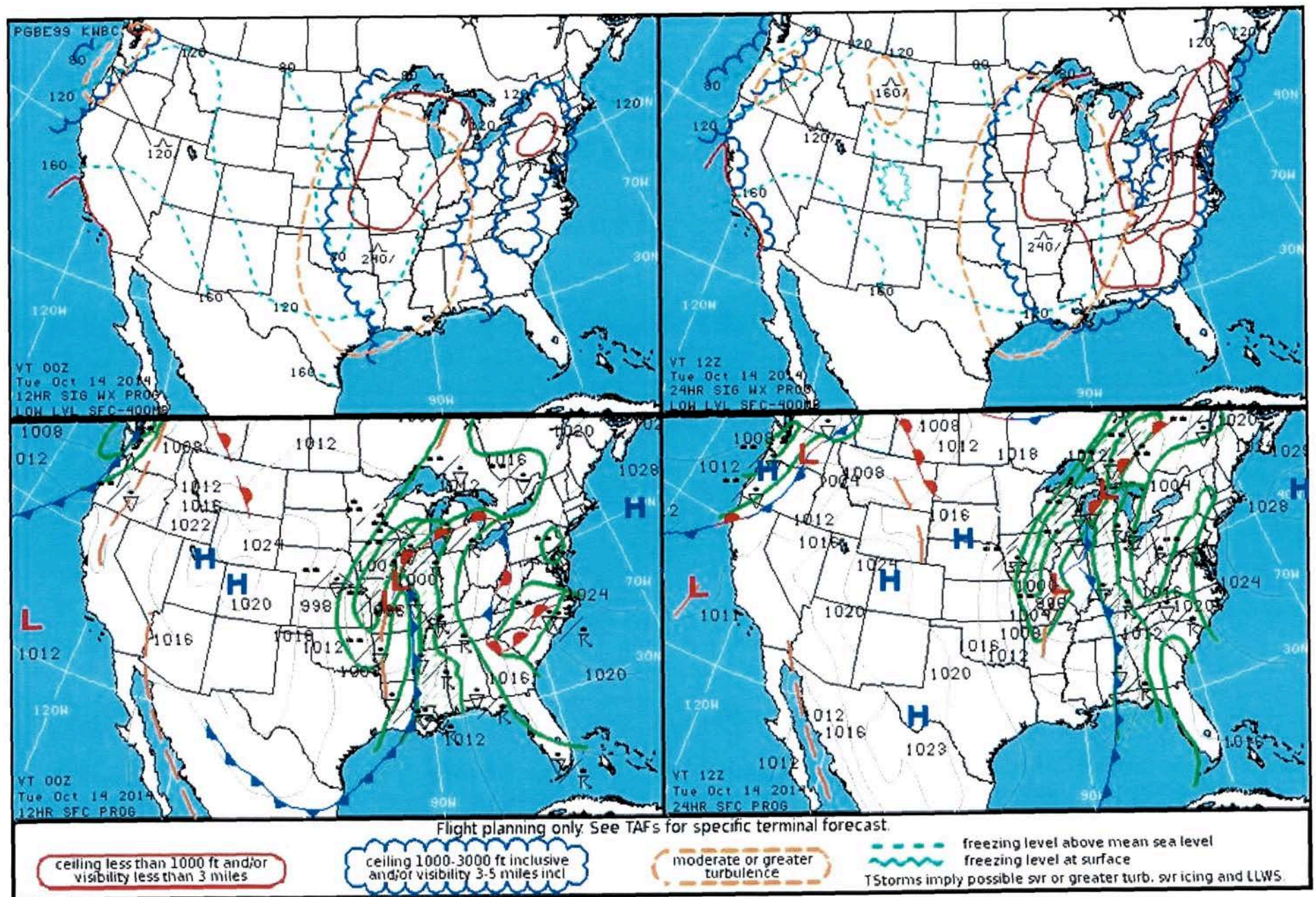
Synoptic conditions – The National Weather Service (NWS) Surface Analysis Chart for 2200 CDT on October 13, 2014 (0300Z on October 14, 2014) depicted a low pressure system at 995-hectopascals (hPa) over southeastern Iowa with an associated frontal wave, with a cold front extending southward and a warm front extending northeastward over eastern Iowa and into Illinois and Wisconsin, and in the immediate vicinity of the accident site. The station models and pressure gradient indicated north to northeasterly winds of 15 to 25 knots over the area with numerous stations reported light to moderate rain. The chart is included below.



The regional radar mosaic for 2300 CDT (0400Z) is included below and depicted an extensive area of precipitation over the area associated with light to moderate rain showers oriented in a cyclonic pattern associated with the low and warm frontal systems over the area. The closest WSR-88D was also documented below.



The NWS 12 and 24 hour low-level prognostic chart current for the period expected rain and instrument flight rule (IFR) conditions over the area.



Observations – Dubuque Regional Airport (KDBQ) at an elevation of 1,077 feet and a magnetic variation of 3° E, had an Automated Surface Observation System (ASOS) installed and reported the following conditions surrounding the period:

Dubuque Regional Airport special weather at 2343 CDT (0343Z), automated report, wind from 360 at 11 knots, visibility 5 miles in light rain and mist, ceiling broken at 200 feet above ground level (agl), overcast at 700 feet, temperature and dew point 13° Celsius (C) or 55° Fahrenheit (F), altimeter 29.46 inches of mercury. Remarks; automated observation system, rain ended at 2318 and began again at 2342 CDT, hourly precipitation 0.10 inches, temperature 12.8° C, dew point 12.8° C, maintenance indicator.

The general flight category and raw observations surrounding the period were as follows:

LIFR SPECI KDBQ 131916Z 05009G18KT 1 3/4SM RA BR OVC003 13/13 A2968 RMK AO2 CIG 002V006 P0009 T01280128 \$=
LIFR METAR KDBQ 131953Z 03008KT 1 1/2SM +RA BR OVC004 13/13 A2965 RMK AO2 SLP043 P0032 T01280128 \$=
LIFR SPECI KDBQ 132010Z 03011KT 2 1/2SM RA BR OVC004 13/13 A2964 RMK AO2 CIG 002V007 P0005 T01280128 \$=
LIFR SPECI KDBQ 132050Z 04015KT 1 3/4SM R36/5500VP6000FT RA BR OVC003 13/13 A2958 RMK AO2 CIG 002V006 PRESFR P0016 \$=
LIFR METAR KDBQ 132053Z 03016G21KT 1 3/4SM RA BR OVC003 13/13 A2958 RMK AO2 CIG 002V005 PRESFR SLP016 P0016 60063 T01280128 56041 \$=
LIFR METAR KDBQ 132153Z 03014KT 1 3/4SM R36/6000VP6000FT RA BR BKN004 OVC010 13/13 A2956 RMK AO2 SLP010 P0035 T01280128 \$=
LIFR SPECI KDBQ 132204Z 03012KT 2SM RA BR BKN004 BKN008 OVC012 13/13 A2956 RMK AO2 P0002 T01280128 \$=
LIFR SPECI KDBQ 132230Z 03016KT 3SM -RA BR OVC002 13/13 A2954 RMK AO2 CIG 001V005 P0005 T01280128 \$=
LIFR METAR KDBQ 132253Z 02009KT 1 1/2SM -RA BR OVC003 13/13 A2955 RMK AO2 SLP006 P0007 T01280128 \$=
LIFR SPECI KDBQ 132331Z VRB05KT 4SM -RA BR OVC003 13/13 A2953 RMK AO2 CIG 002V007 P0003 T01330133 \$=
LIFR METAR KDBQ 132353Z 02013KT 4SM -RA BR OVC003 13/13 A2953 RMK AO2 SLP002 P0006 60111 T01330128 10133 20128 56014 \$=
LIFR METAR KDBQ 140053Z 03008KT 7SM -RA BKN002 OVC012 13/13 A2951 RMK AO2 SLP995 P0005 T01280128 \$=
LIFR METAR KDBQ 140153Z AUTO 01012KT 8SM -RA OVC003 13/13 A2949 RMK AO2 RAE0058B18 CIG 002V007 SLP988 P0003 T01280128 \$=
LIFR METAR KDBQ 140253Z AUTO 02014KT 4SM RA BR BKN003 OVC007 13/13 A2947 RMK AO2 RAE28B44 SLP981 P0004 60012 T01280128 58020 \$=
IFR SPECI KDBQ 140259Z AUTO 02011KT 2 1/2SM +RA BR SCT003 BKN007 OVC014 13/13 A2947 RMK AO2 VIS 1 1/2V4 P0006 T01280128 \$=
IFR SPECI KDBQ 140312Z AUTO 36014KT 7SM -RA FEW003 BKN009 OVC012 13/13 A2946 RMK AO2 P0010 T01280128 \$=
LIFR SPECI KDBQ 140343Z AUTO 36011KT 5SM -RA BR BKN002 OVC007 13/13 A2946 RMK AO2 RAE18B42 P0010 T01280128 \$=
Accident 0403Z
LIFR METAR KDBQ 140353Z AUTO 36012KT 5SM -RA BR OVC002 13/13 A2946 RMK AO2 RAE18B42 SLP977 P0010 T01280128 \$=
LIFR METAR KDBQ 140453Z AUTO 35007KT 10SM BKN002 OVC007 13/13 A2945 RMK AO2 RAE23 SLP972 P0003 T01280128 \$=

Pilot Reports (PIREPs) – the following pilot reports were issued surrounding the period below 18,000 feet:

MCW UA /OV MCW/TM 2031/FL010/TP PAY2/TA 10/RM LGT-MOD RAIN BASES 1000AGL 3 MILES VIS=
DSM UA /OV DSM360045/TM 2202/FL180/TP C56X/TA 02/TB MOD 180-210/IC MOD RIME 180-210=
DBQ UUA /OV DBQ360030/TM 2230/FL050/TP TRIN/TB MOD TO SEVERE=
DSM UA /OV DSM135005-DSM /TM 2350 /FLUNKN /TP E45X /TB LGT-MOD BLO 010 /RM DURD ON FINAL=
DSM UA /OV DSM270020/TM 0032/FL110/TP CRJ7/TA 8/TB NEG/IC NEG/RM DURGC=
OTM UA /OV DSM-OTM /TM 0200 /FLUNKN /TP UNKN /TB MOD 110-230 /RM MULTI JETS=

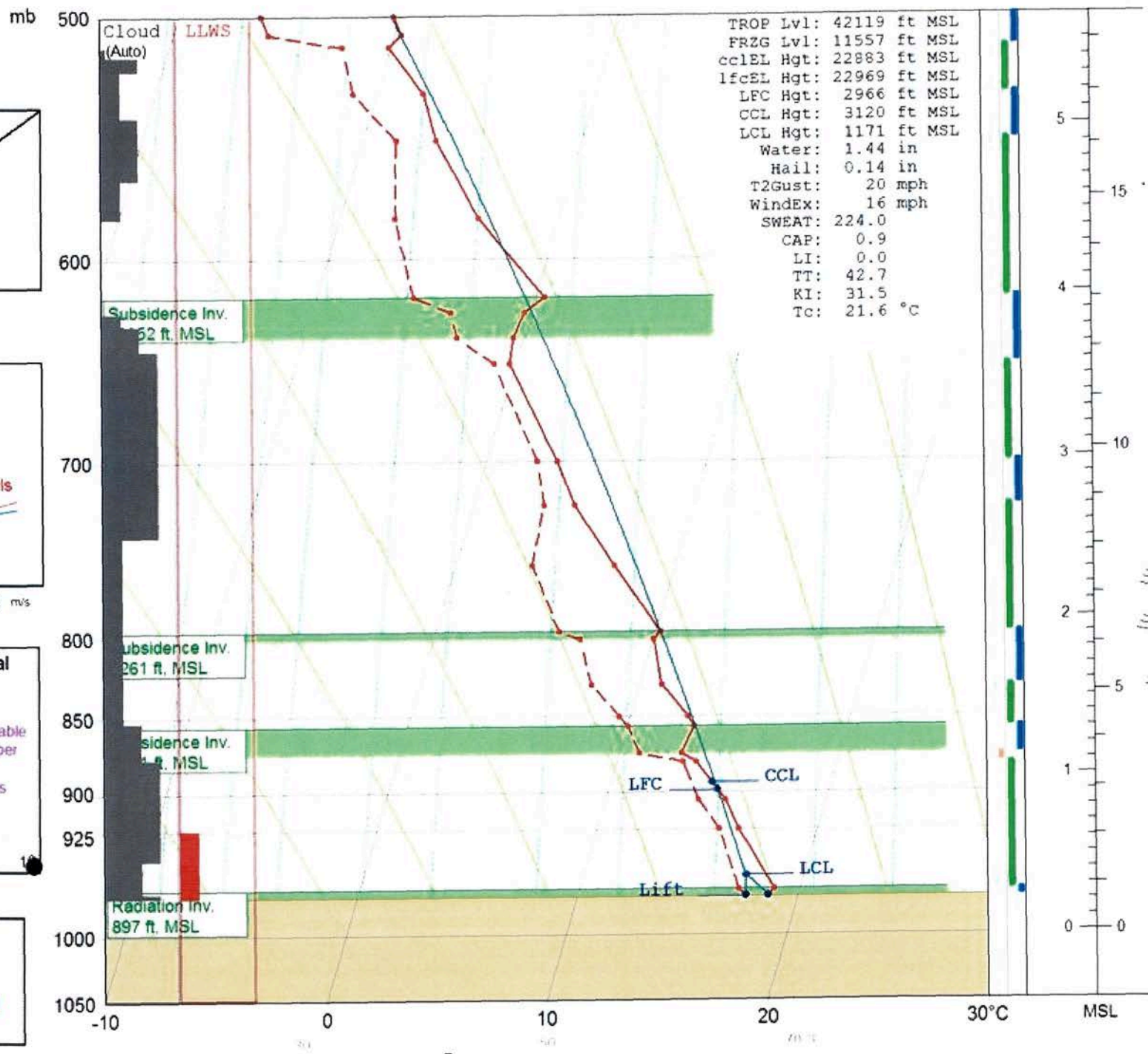
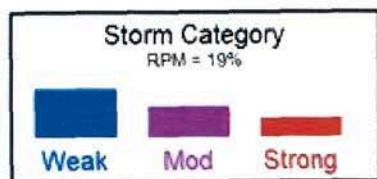
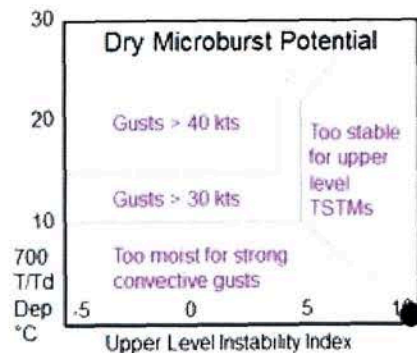
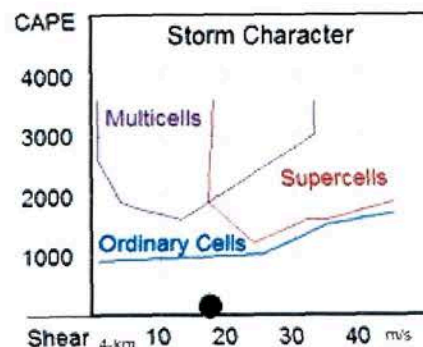
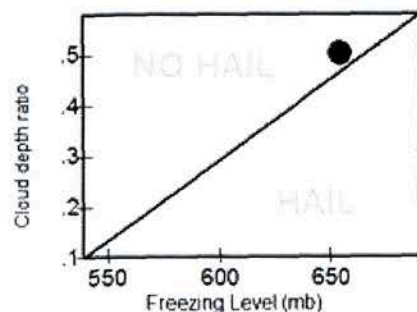
DSM UA /OV DSM-OTM/TM 0200/FL110/TP NMRS JETS/TB MOD 110-230=
BRL UA /OV BRL /TM 0242 /FL030 /TP C560 /TB MOD BLO 030 /RM BASES 013=
BRL UA /OV BRL/TM 0242/FL030/TP C560/SK BASES 013/TB MOD 030-000=
FOD UA /OV FOD/TM 0450/FL000/TP FA20/SK BASES019-TOPUNKN/RM DURGD=

A pilot report over Dubuque, IA at 1730 CDT reported moderate to severe turbulence at 5,000 feet msl. Several other reports of moderate turbulence was reported surrounding the period.

Sounding – the Davenport, Iowa sounding for 1800 CDT (0000Z) depicted a saturated environment with a relative humidity greater than 80% from the surface to 6,000 feet, and between 8,000 and 12,000 feet. The lifted condensation level (LCL) or expected cloud base was at 400 feet agl. The freezing level was identified at 11,557 feet msl. The precipitable water was 1.44 inches. The sounding depicted several low-level temperature inversions below 10,000 feet.

The wind profile showed a strong veering in the wind direction with a surface wind from the south with wind speeds increasing rapidly with height. The mean 0 to 18,000 feet was from 193 at 37 knots. The sounding depicted a threat of low-level wind shear due to the rapid change in wind direction and speed with height, which was associated with the frontal system over the area as well as light to moderate turbulence.

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Satellite Imagery – the GOES-13 infrared satellite image at 2300 CDT (0400Z) depicted an overcast layer of clouds over the route and accident site with a radiative cloud top temperature of 234 Kelvin or -39.16 C, which corresponded to cloud tops near 32,500 feet. The frontal position from 2200 CDT is also overlaid on the image.

Weather Radar imagery (WSR-88D) – the Davenport WSR-88D base reflectivity image with the flight track overlaid for 2304 CDT is attached. The image depicted echoes of 10 to 35 dBZ along the track. A few strong cells embedded in the area were identified west of the accident site.

NWS Forecast & Advisories – the NWS Terminal Aerodrome Report (TAF) current at the time of the accident expected LIFR conditions to prevail with a northeast wind at 10 knots with gusts to 17 knots, with 2 miles in light rain and mist, ceiling overcast at 300 feet agl, with temporary improvements in the visibility and ceiling height to 600 feet.

TAF KDBQ 132327Z 1400/1424 04010G17KT 2SM -RA BR OVC003
TEMPO 1400/1404 5SM BR BKN006 OVC012
FM140400 02012KT 2SM -RA BR OVC004
FM141400 35014G21KT 4SM -RA BR OVC007=

The NWS had advisories current for IFR conditions, light-to-moderate turbulence, and low-level wind shear over the area applicable to the flight. The following in-flight weather advisories were current at the time:

WSUS03 KNCI 140112 2014287 0111
WS3Y
-CHY WS 140112
SIGMET YANKEE 1 VALID UNTIL 140512
KS MN IA MO
FROM 40SSW RWF TO 50NNE MCW TO 60ENE SGF TO 30S BUM TO 40SSW RWF
OCNL SEV TURB BTN FL260 AND FL360. DUE TO WND SHR ASSOCD WITH
JTST. RPTD BY B752. CONDS CONTG BYD 0512Z.

WAUS43 KNCI 140245 2014287 0239
WA3S
-CHIS WA 140245
AIRMET SIERRA FOR IFR VALID UNTIL 140900

AIRMET IFR...NE KS MN IA MO WI LM LS MI LH IL IN OK AR
FROM 20ESE YQT TO SSM TO YVV TO 30SE ECK TO 50SW DXO TO 30W GIJ TO 40SE FAM TO 50N LIT TO 30W FSM TO 40SE PWE TO 40SSW BRD TO
20NE DLH TO 20ESE YQT
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 09Z THRU 15Z.

OTLK VALID 0900-1500Z...IFR KS MN IA MO WI LM LS MI LH IL IN KY OK AR
BOUNDED BY 30ESE YQT-SSM-YVV-30SSE ECK-FWA-30WSW GIJ-20ENE PXV-70WSW ARG-FSM-30WNW BUM-50SW MSP-30ESE YQT
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG THRU 15Z.

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WAUS43 KNCI 140111 AAB

2014287 0112

WA3T

-CHIT WA 140111 AMD

AIRMET TANGO UPDT 7 FOR TURB STG WNDZ AND LLWS VALID UNTIL 140300

...SEE SIGMET YANKEE SERIES...UPDT

AIRMET TURB...SD NE KS MN IA MO WI LM MI IL IN KY

FROM 70NNW RHI TO 40SSW SSM TO FWA TO CVG TO 40SSW LOZ TO RZC TO OSW TO 50W LBL TO GLD TO BFF TO 30S PIR TO 50WNW MSP TO 70NNW RHI
MOD TURB BLW 170. CONDS CONTG BYD 03Z THRU 09Z.

AIRMET TURB...ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY...UPDT

FROM 70SW YWG TO YQT TO SSM TO YVV TO 60E ECK TO FWA TO CVG TO 30SW LOZ TO 50ENE DZR TO RZC TO OSW TO 50W LBL TO 40NNW GLD TO
30NE PIR TO 70SW YWG
MOD TURB BTN 170 AND FL400. CONDS CONTG BYD 03Z THRU 09Z.

LLWS POTENTIAL...IA MO WI LM MI IL IN KY AR TN MS AL

BOUNDED BY 60S SAW-40ENE MKG-FWA-CVG-30E VXV-GQO-20S MSL-40NNW SQS-30WNW LIT-20NW UIN-50ESE IOW-30SE ODI-60S SAW
LLWS EXP. CONDS CONTG BYD 03Z THRU 09Z.

LLWS POTENTIAL...NE KS IA MO OK TX AR LA

BOUNDED BY 20NW OVR-50SSE DSM-40W COU-20SE EIC-20ENE LFK-50ESE ACT-20SSW ACT-20W OKC-40WSW SLN-50W PWE-20NW OVR
LLWS EXP. CONDS CONTG BYD 03Z THRU 09Z.

OTLK VALID 0300-0900Z

AREA 1...TURB ND SD NE KS MN OK TX

BOUNDED BY 50S YWG-60NNE MMB-20ENE ABI-20N LBB-50W LBL-GLD-BFF-70SW RAP-50NNW ISN-50S YWG
MOD TURB BTN FL240 AND FL380. CONDS CONTG THRU 09Z.

AREA 2...TURB SD NE KS MN IA MO WI LM LS MI LH IL IN KY OK TX AR TN LA MS AL AND CSTL WTRS

BOUNDED BY 20NW YQT-SSM-YVV-30SE ECK-FWA-CVG-HNN-HMV-GQO-50SW PZD-40W CEW-130ESE LEV-120SSW LCH-80E BRO-90W BRO-40NW DLF-40N
ABI-40ESE MMB-30E ONL-30E FSD-20NW YQT
MOD TURB BLW 170. CONDS CONTG THRU 09Z.

AREA 3...TURB ND SD NE KS MN IA MO WI LM LS MI LH IL IN KY OK AR TN...UPDT

BOUNDED BY 40SSE YWG-30N INL-YQT-SSM-YVV-50ESE ECK-FWA-CVG-60W HNN-30NW VXV-30ENE DZR-20S RZC-30SSE OSW-40NE MMB-40E HLC-ONL-
60S ABR-ABR-40WSW FAR-40SSE YWG
MOD TURB BTN 170 AND FL400. CONDS CONTG THRU 09Z.

WAUS43 KNCI 140245

2014287 0243

WA3Z

-CHIZ WA 140245

AIRMET ZULU FOR ICE AND FRZLVL VALID UNTIL 140900

AIRMET ICE...NE KS MN IA MO WI IL OK AR

FROM 30ENE RWF TO 20E DLL TO SGF TO 50SE FSM TO 60SE MLC TO 30E END TO 50SSE FSD TO 30ENE RWF
MOD ICE BTN FRZLVL AND FL200. FRZLVL 080-100. CONDS CONTG BYD 09Z THRU 15Z.

OTLK VALID 0900-1500Z...ICE MN IA WI LM LS MI LH IL IN KY
BOUNDED BY 50ESE YQT-SSM-YVV-30SE ECK-FWA-CVG-HNN-HMV-20SE BWG-70S PXV-60W PXV-40W PMM-40NE BAE-30ESE DLL-30SE MSP-50E
DLH-50ESE YQT
MOD ICE BTN FRZLVL AND FL240. FRZLVL 090-130. CONDS CONTG THRU 15Z.

FRZLVL...RANGING FROM 070-135 ACRS AREA
080 ALG 60NW MOT-60SE BIS-20ESE ABR-30N RWF-60ESE YQT
080 ALG OSW-40E OVR-50W FOD-30ENE OBH-60NNW SLN-40S ICT
120 ALG 50WNW BNA-50W BWG-50SSE JOT-20E ORD-30WSW MBS-30SSW YVV

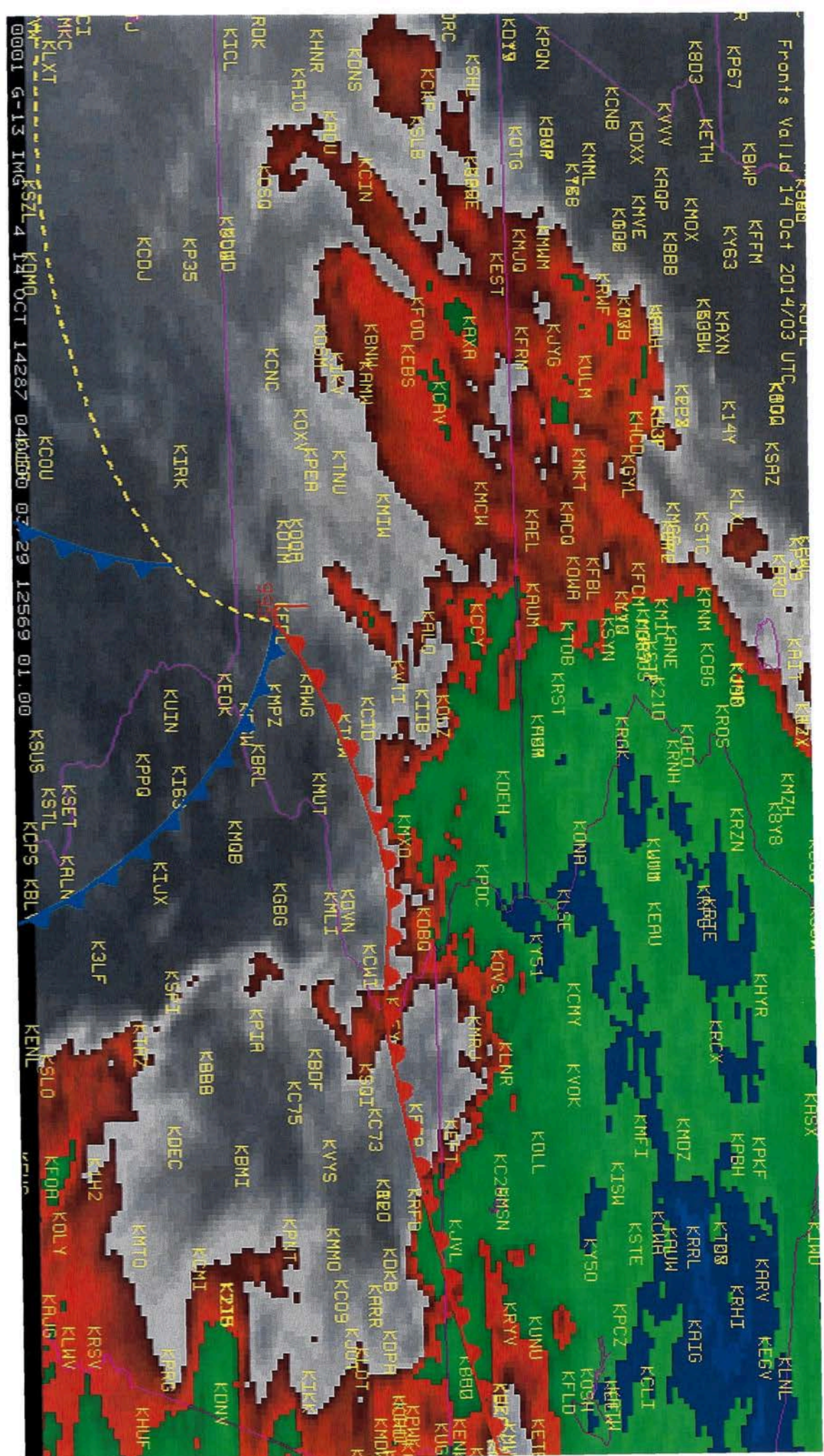
Astronomical data – for Dubuque, Iowa on October 13, 2014 was as follows for Dubuque County, Iowa:

Sunset	1824 CDT
End of civil twilight	1852 CDT
Moonrise	2231 CDT
Accident	2303 CDT

Donald E. Eick
Senior Meteorologist
National Transportation Safety Board
Office of Aviation Safety
Operational Factors Division (AS-30)



Fronts Valid 14 Oct 2014/03 UTC



NEXRAD LEVEL-II
KDVN - DAVENPORT, IA
10/14/2014 04:04:50 GMT
LAT: 41/36/43 N
LON: 90/34/51 W
ELEV: 754 FT
VCP: 212

REFLECTIVITY
ELEV ANGLE: 0.50

Legend: dBZ

