



National Transportation Safety Board

**Office of Aviation Safety
Washington, D.C. 20594-2000
April 19, 2017**

**ATTACHMENT 1 to the METEOROLOGY GROUP FACTUAL REPORT
DCA16LA214**

Meteorology analysis provided by United Airlines.

*Submitted by: Mike Richards
NTSB, AS-30*

UAL1945 SEA-IAH 17AUG2016

INFORMATION PROVIDED BY UNITED

Flight Number	1945
Date	17Aug2016
Aircraft Type	B737
City Pairs	SEA / IAH
Location	40 minutes west of IAH, On profile Decent
Description	Flight encounter moderate turbulence while inbound to IAH, resulting in the injury, possible broken ankle, of a F/A. Passengers were seated and F/A was attempting to be seated when incident occurred.
Flight Level	Unknown

Assume ~1215CDT (1702-1715GMT) as flight landed at 1242CDT, but decent didn't start until after 1710GMT

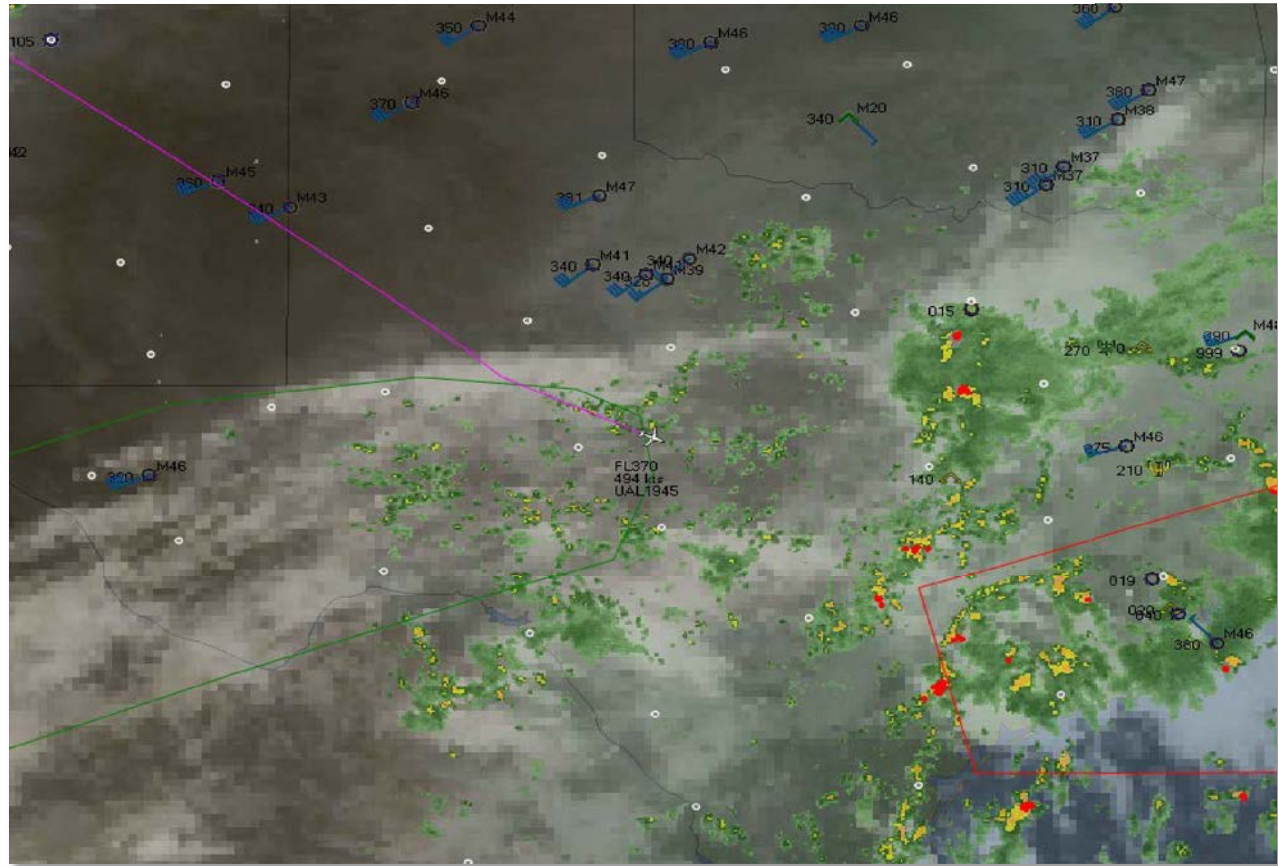
UAL1945 SEA-IAH 17AUG2016

WEATHER ANALYSIS

- It appears the turbulence encountered by Flight 1945 on August 17th at approximately 1715z was likely related to localized convectively induced turbulence.
- Any large scale synoptic turbulence from wind shear would have occurred over western TX as noted by the stronger moisture gradient on the edge of the cirrus shield.
- PIREPS as well as AMDAR data do not show the presence of wind shear in the general area.
- The model data and AMDAR data are in good agreement which bolsters confidence that this was a localized event related to one or two convective cells near the flight path of UAL1945.

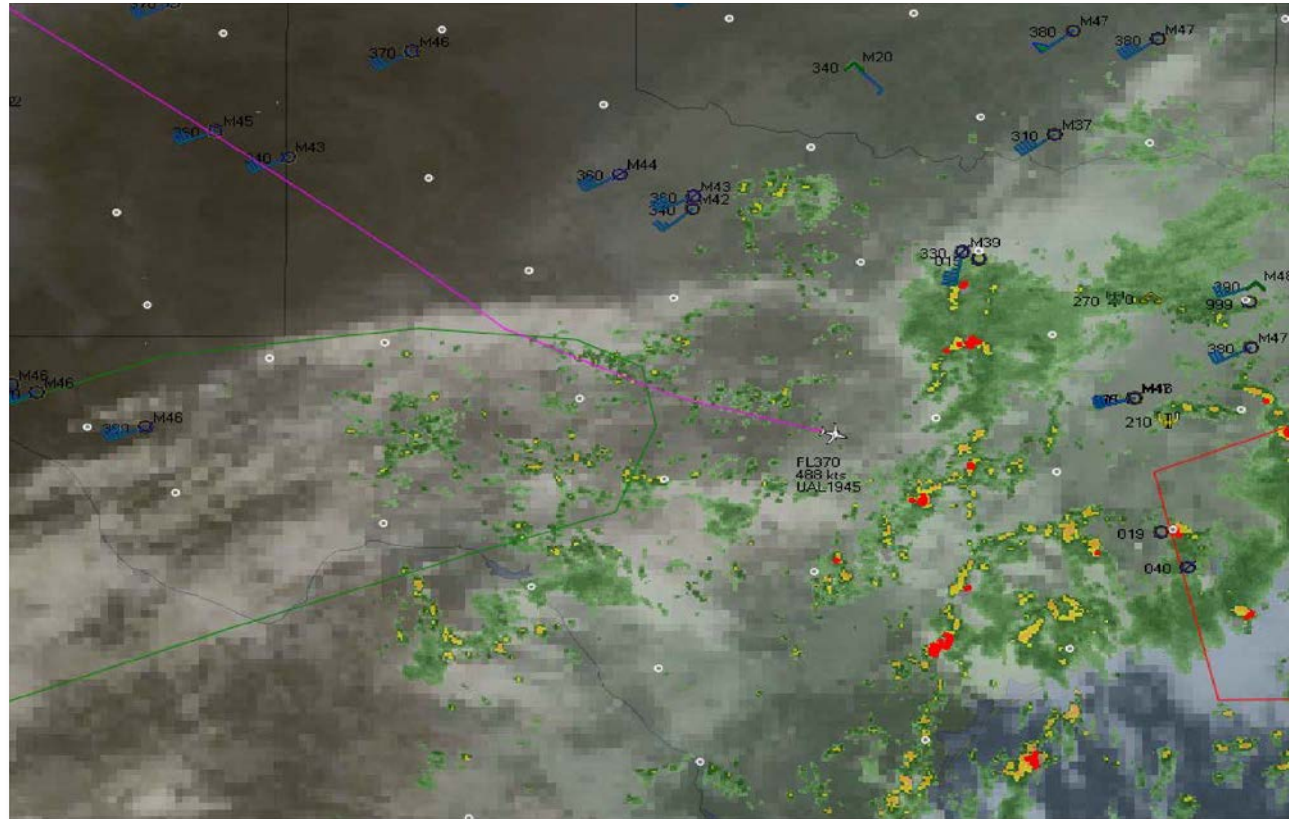
UAL1945 SEA-IAH 17AUG2016

Note the position at 17z. Still near cruising altitude about 45 minutes prior to arrival. The low top shower activity would not be enough to affect UAL1945 at this altitude.



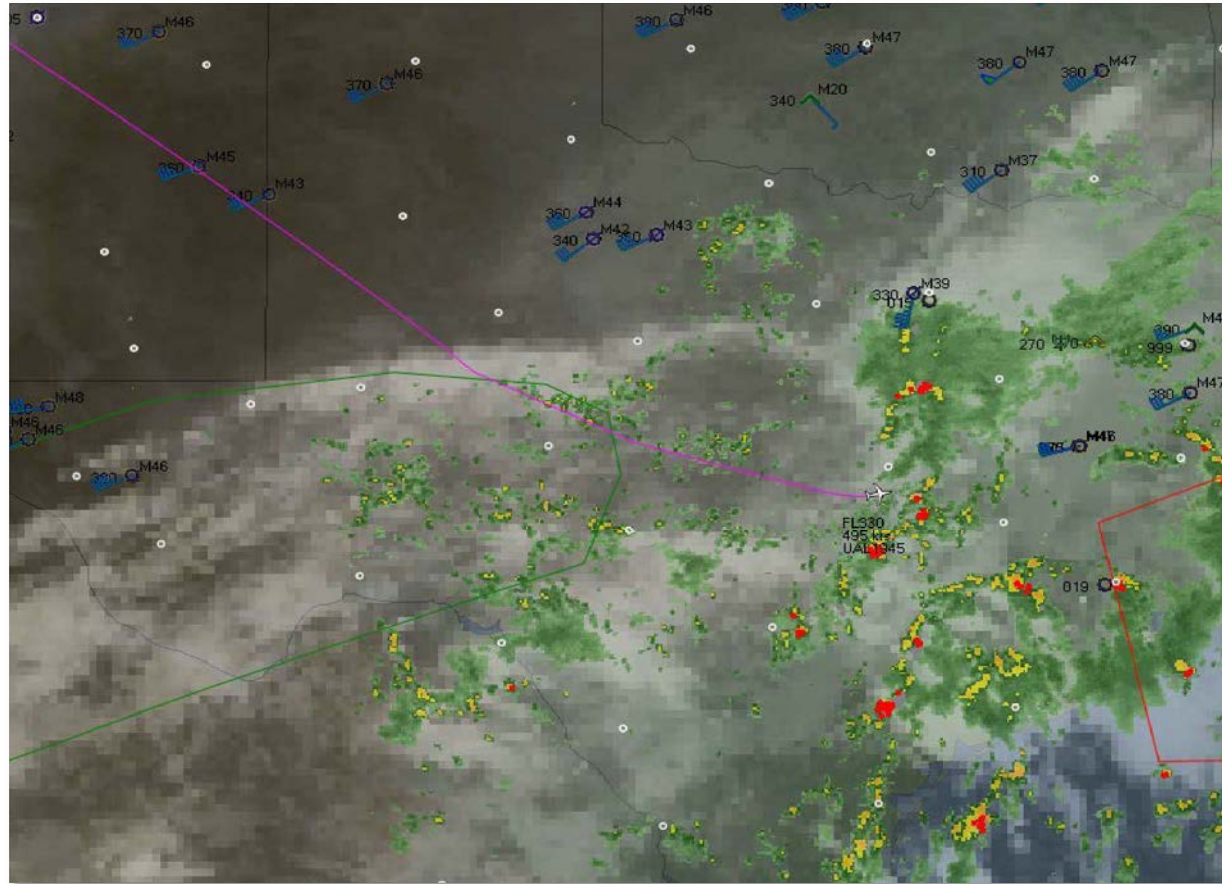
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Note
position of
UAL1945
at 1710z.
Just WSW
of KTPL.



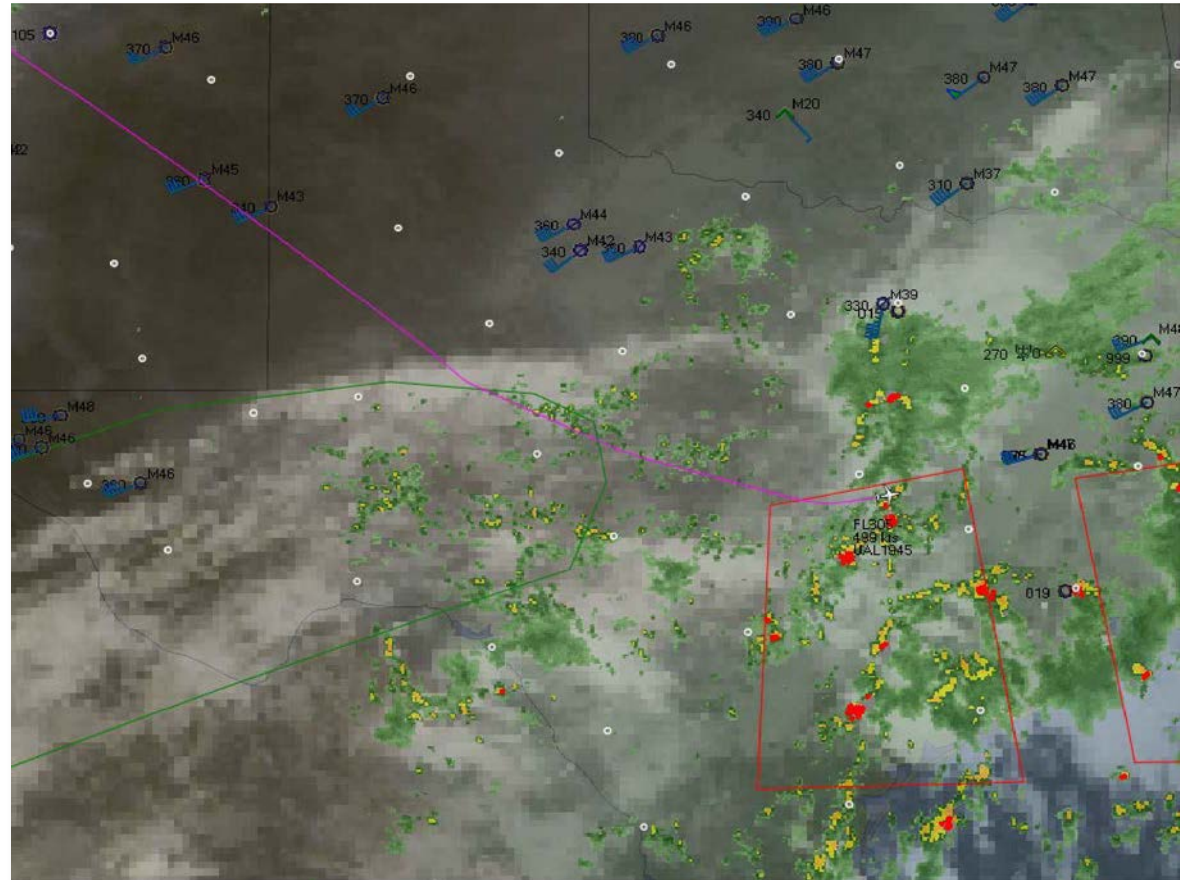
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UAL 1945 at 1715z.
Note position is now
FL330 so it appears
to be on descent into
an area of scattered
convection. There
was a SCT-BKN FPG
to the SE from earlier
convection, but
coverage does not
meet SCT-BKN
criteria at this time
near UAL1945.



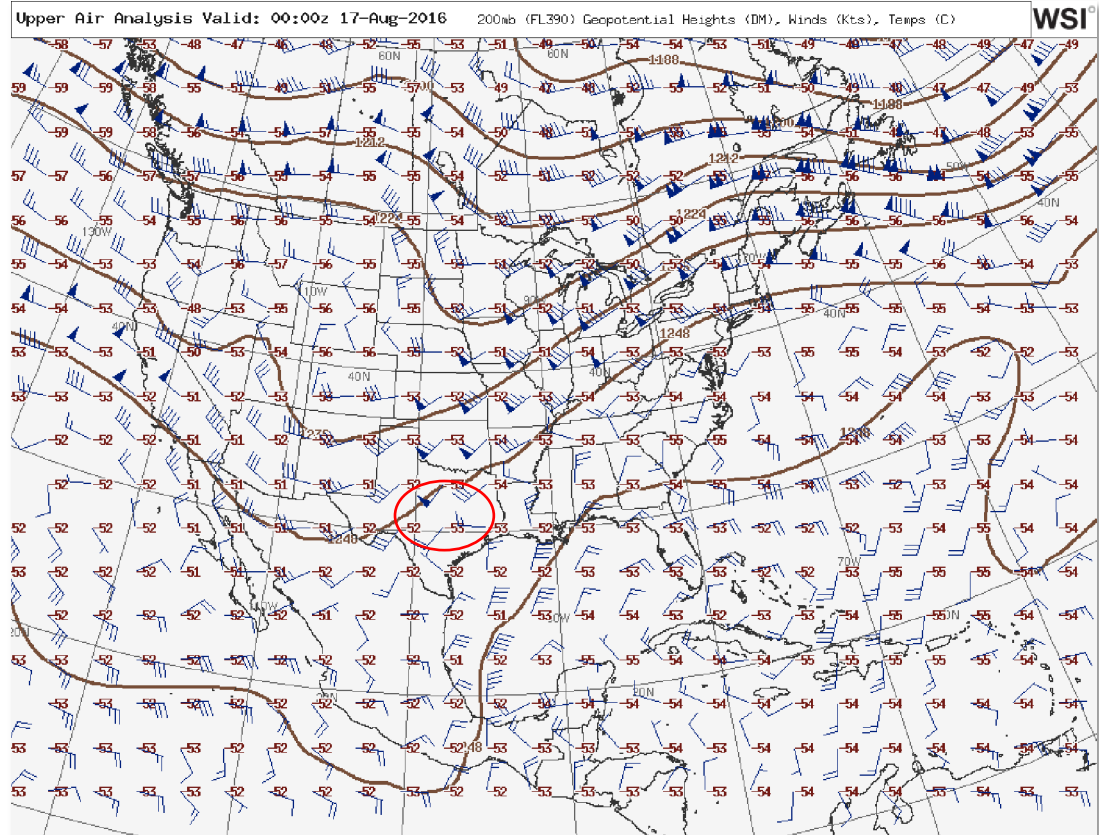
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UAL1945 at 1717z.
The aircraft is close to convection as noted by lightning. Based on the information given about being in descent, it appears that the incident may have occurred near this position. A SCT-BKN convective was drawn as convection also started to increase at this time.



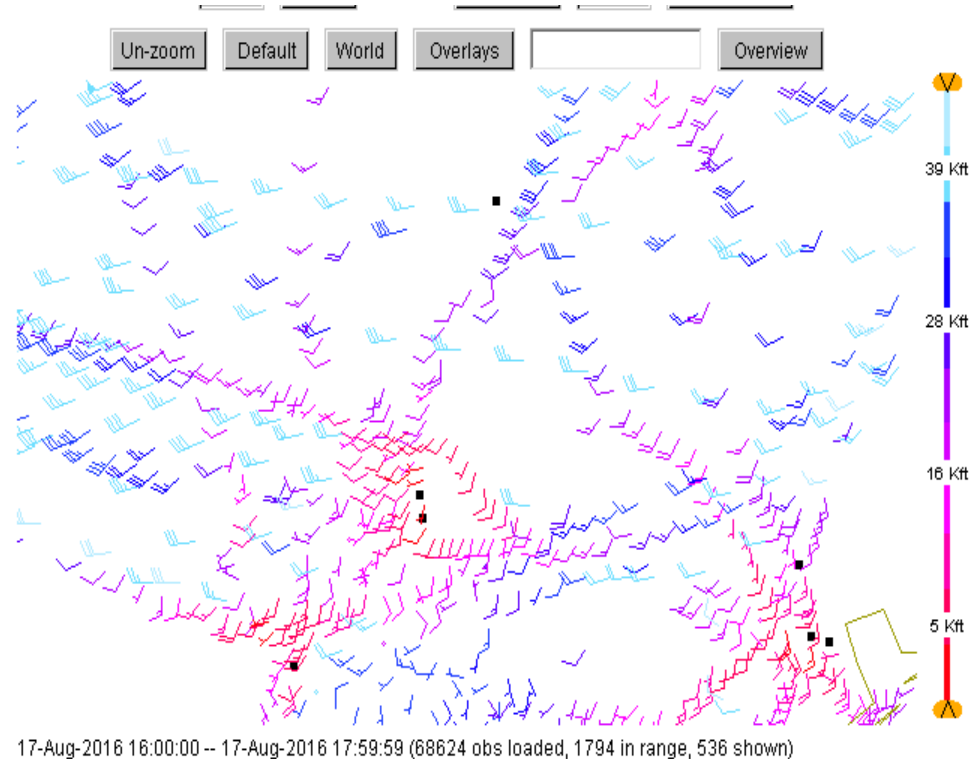
UAL1945 SEA-IAH 17AUG2016

Winds near 200mb (~FL330-FL360). Note the weak winds in the general area less than 50kts at this level. The southern end of the tail of stronger winds is, however, a favorable area for upward vertical motion which would enhance convection.



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AMDAR data from
17/16z-17/18z. IAH in the
bottom right with
Austin/Bergstrom noted
by the 2 black squares.
Note the upper level
winds above FL300 are
all uniform (between 35-
45kts). It does not appear
that any type of shear
created the turbulence.



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CONCLUSION

- It appears the turbulence encountered by Flight 1945 on August 17th at approximately 1715z was likely related to localized convectively induced turbulence.
- Any large scale synoptic turbulence from wind shear would have occurred over western TX as noted by the stronger moisture gradient on the edge of the cirrus shield.
- PIREPS as well as AMDAR data do not show the presence of wind shear in the general area.
- The model data and AMDAR data are in good agreement which bolsters confidence that this was a localized event related to one or two convective cells near the flight path of UAL1945.