

# 1989: DC10 Sioux City

## ■ General context

- Commercial flight Denver-Chicago
- 285 pax & 11 crewmembers
- Cruising at FL370

## ■ Situational context

- Loud bang/explosion
- Followed by:
  - Vibration and shuddering of the airframe
  - Failure of #2 engine
  - Failure of the 3 hydraulics systems
  - Aircraft cannot be controlled
- Capt informed pax about engine failure
- A company training check airman in the cabin **volunteering** his assistance

# 1989: DC10 Sioux City (con'd)

## ■ Situation management

- Captain send
  - ➔ the check airman in the cabin for visual inspection of the **wings**
  - ➔ (later) the FE in the cabin for visual inspection of the **horizontal stabilizer** after report from CA
- Crew has never been **trained** to such a situation
  - ➔ According to manufacturer the probability to lose the 3 hydraulic system is close to... **0**
- Captain control the **path** of the aircraft
- Check Airman control the **throttles**
- FO (radio, call out, PA, etc.)
- But aircraft **cannot** be maintained in a stabilized flight

# 1989: DC10 Sioux City (con'd)

## ■ Causes (NTSB)

- **Defects** cause failure of #2 engine whose fractures and fragments severed the 3 hydraulic systems
- Failure of the **company** to detect the crack which developed from the defect
- Failure of the **manufacturer** to protect airframe from random release and dispersion of fragments from rotating parts
- Inadequate consideration to **Human Factors limitations** in the inspection and quality control procedures used by the company resulting a faulty component that remained installed on the aircraft: procedures, trainings, supervision, performances, etc.

# 1989: DC10 Sioux City (con'd)

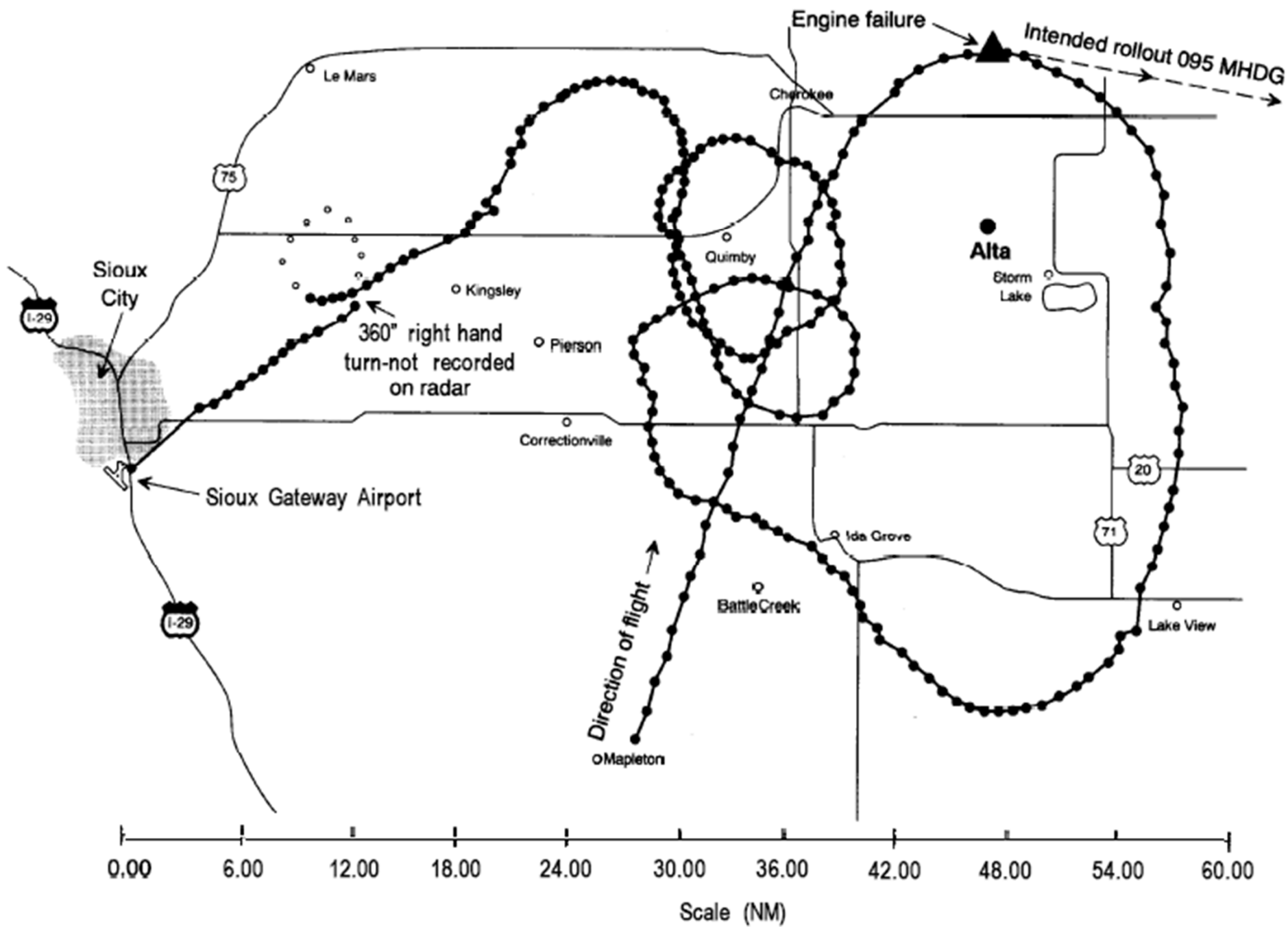
- Comments regarding simulator studies
  - Aircraft was **marginally flyable** using asymmetrical thrust on engines 1 & 3
  - Increasing-decreasing thrust has a **limited** effect on pitch attitude
  - No direct control of airspeed
  - Consequently, landing at a predetermined point and airspeed on a runway is a **highly random event**
  - Such manoeuvre:
    - Involves many unknown variables
    - Is **not trainable**
    - Rendered the landing virtually impossible due the degree of controllability during approach and landing
- **But remember DHL A300F in Baghdad (2003)...**

# 1989: DC10 Sioux City (con'd)

- Watch the video of the event on:

[http://www.liveleak.com/view?i=4f9\\_1251410014](http://www.liveleak.com/view?i=4f9_1251410014)





# 1989: DC10 Sioux City (end)

## HORIZONTAL STABILIZER DAMAGE DIAGRAM

