

# Space Weather and Wake vortex issues

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# Wake Vortex

- FAA defines several categories of aircraft based on weight:
  - Light
  - Medium
  - Heavy (255,000 lbs.)
- U.K. defines four categories
- Airbus 380 now flying with weight over 1 million pounds.

# New interim procedures

- N JO 7110.478
- a. *EN ROUTE*:
  - 1. Small/large/**heavy** behind an A380 – *5 miles*
  - 2. When transitioning to terminal airspace – provide a minimum of *10 miles* spacing
  - 3. Include the expression “**SUPER**” immediately after the **aircraft** call sign in communications with a terminal facility about A380 operations, and when issuing traffic advisories regarding an A380.
  - 4. Visual separation rules specified in FAAO 7110.65, chapter 7, section 2, shall not be applied with respect to the A380.
- b. *TERMINAL*:
  - 1. Separate **aircraft** operating directly behind or directly behind and less than 1,000 feet below by:
    - **NOTE-**
    - *Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.*
    - (a) **Heavy** behind A380 – *6 miles*
    - (b) Large behind A380 – *8 miles*
    - (c) Small behind A380 – *10 miles*
  - N JO 7110.478
  - 2
  - (d) When applying wake turbulence separation criteria for terminal operations that are defined in minutes, add 1 additional minute.
  - 2. Use the expression “**SUPER**” immediately after the **aircraft** call sign in all communications with or about an A380.

# Wake Vortex issues

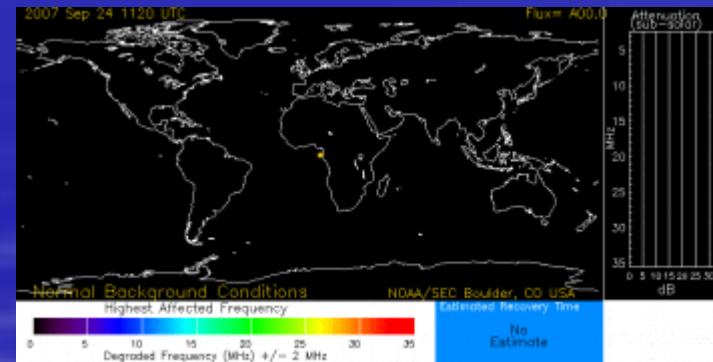
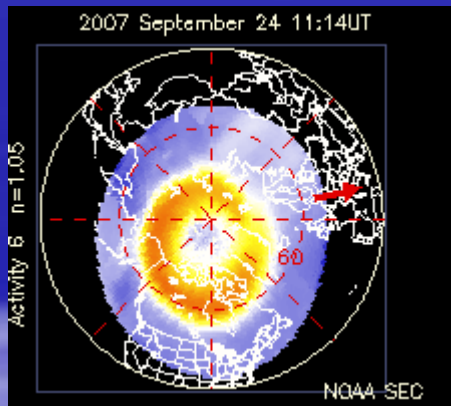
- Dissipation characteristics of a super vortex?
- Do we need to sense and track these vortex?

# Space Weather

- Two main issues for aviation
  - Operational impacts of energy fluctuations from space
    - Disruptions to communications
    - Need to reroute flights to maintain communications
    - More polar routes place more aircraft in jeopardy
  - Biological impacts
    - In Europe, aviation workers given the status of X-ray operators—crews limited to exposure amounts

# Impact of Space Weather

- SEC now showing potential operational impacts via websites



# Impact of Space Weather

- Now looking for the 4-D data cube of space weather around the globe to monitor crew exposure to radiation.