Space Weather and Wake vortex issues

FPAW 2007
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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
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      - (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.