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<th><strong>Title</strong></th>
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<td><strong>Author(s)</strong></td>
<td>Rudy, Ryantono Setiawan</td>
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The Hazards of Aircraft Wake Vortices

Research Motivation
- A380s entered commercial service in 2007
- Limited airport capacity
- Instrument Flight Rules separation requirements too conservative

Research Objective
To recommend a less conservative, yet safe set of guidelines to in-trail spacing of aircrafts during critical flight phases (take-off and landing) to increase airport capacity

Wake Vortex Encounters
- Penetration along the axis of the vortex results in roll upset (Mode 1)
- Flight through the downwash region results in a loss of rate of climb and hence increased take-off distance (Mode 2)
- Penetration across the vortex results in significant structural load factors (Mode 3)
- Focus on Mode 1 and Mode 3 during take-off and landing

Criteria for Safe Separation
- Mode 1: \( \frac{C_l}{C_{\alpha}} < 1 \)
- Mode 3: \( \frac{C_m}{C_{\alpha \delta}} < 1 \) and \( |\Delta n| < 1 \)

Sample Results
A380s as both generating and following aircrafts
- Simplified Mode 1 encounter: no ground effect, no vortex dissipation

Future Work
- Apply methodologies to various classes of aircrafts for Modes 1 and 3
- Recommend revised separation minima