

Re-categorization of Aircraft Weight Categories to Aircraft Wake Categories

Topic 5: Towards Re-categorization of Wake Turbulence Separation Standards

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8-9 January 2009

WakeNet 3 Workshop

Thales University – Paris- Versailles



Federal Aviation
Administration



RECAT Objectives

- Increase capacity at airports through redefining wake turbulence categories and the associated minimum separations with the same or improved level of safety
- Identify and evaluate any potential areas of concern within present ICAO separations standards
- Propose to ICAO an amendment to the existing wake turbulence categories and their associated prescribed separations that provides harmonization



RECAT Opportunity

- Why?
 - Demand vs capacity => *delays*
 - A wide range of weights exist in each category
 - Separation minima are set to protect the most vulnerable (often lightest) from the worst-case wake generators (often heaviest)
 - Opportunity exists to optimize based on fleet mix
- Why now?
 - SESAR and NextGen Focus on Increased Capacity
 - Significant fleet mix changes over the last 15 years
 - RJ growth as percent of operations has been significant
 - Last re-categorization in US was 1994
 - Many States are already using different categories – no harmonization
 - Knowledge of wake vortex phenomenon increased during recent years



RECAT Assumptions

- Increase capacity while ensuring same or better level of safety
- Use existing knowledge and data
- Use multiple a/c characteristics
- Cost/benefit case
- Methodology may be applied to future aircraft types
- No changes to the flight deck (procedures or automation)
- Minimum modifications to ANSP procedures and automation



RECAT Approach

- Relative risk assessment
- Methodology that is comprehensive and adaptable
 - Includes models for
 - Wake decay
 - Encounter hazard
 - Hazard metric and criteria
 - Traffic mix
 - Optimization
 - Models and hazard metrics are plug and play
- Safety Case
 - Apply the methodology to today's ICAO separation standards to determine hazard criteria (distribution)
 - Evaluate all pairing of aircraft for minimum separation that does not exceed criteria
 - Evaluate all possible grouping for maximum capacity
 - Iterating using multiple models and hazard metrics to strengthen safety arguments

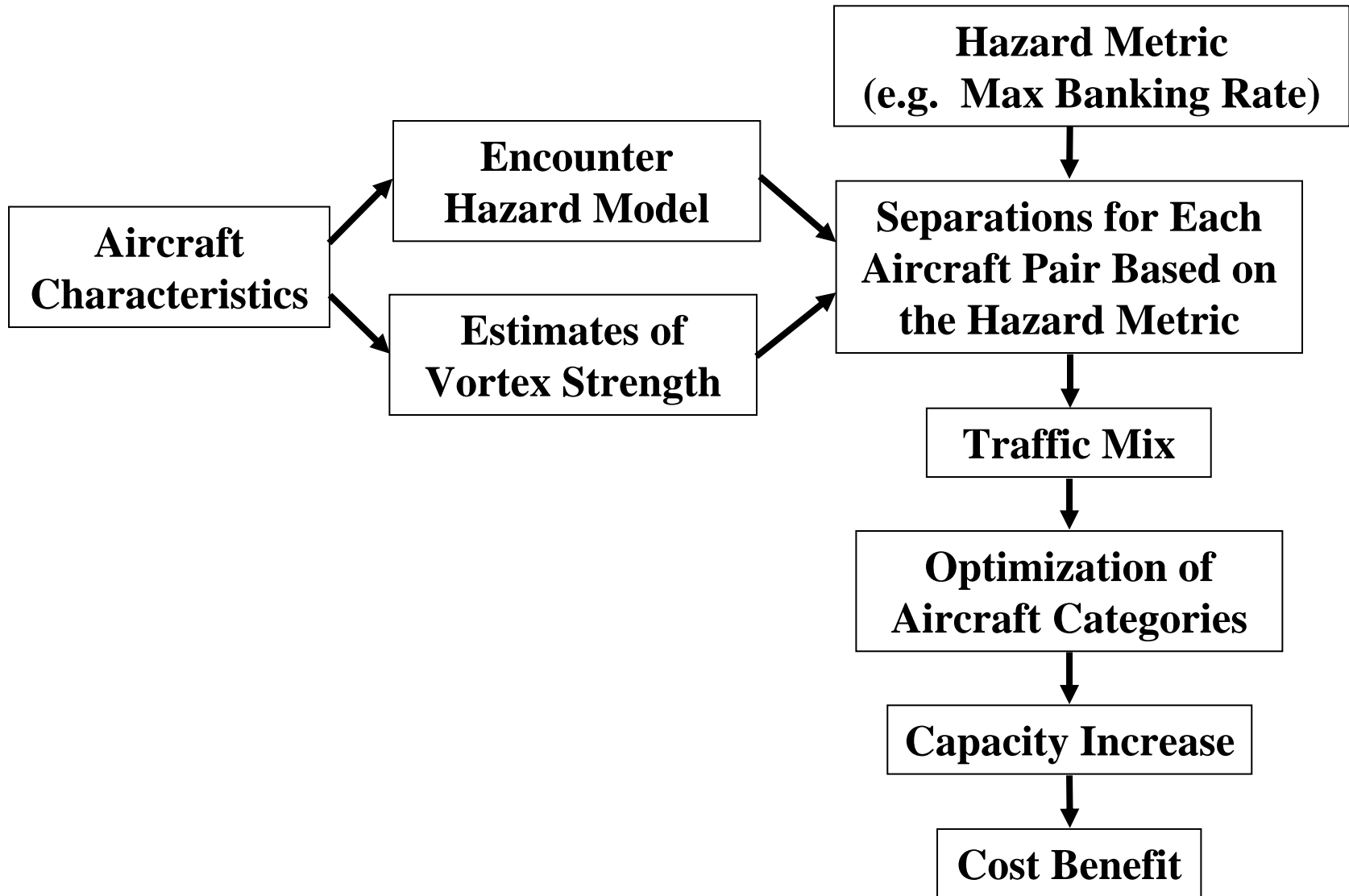


RECAT Practical Aspects

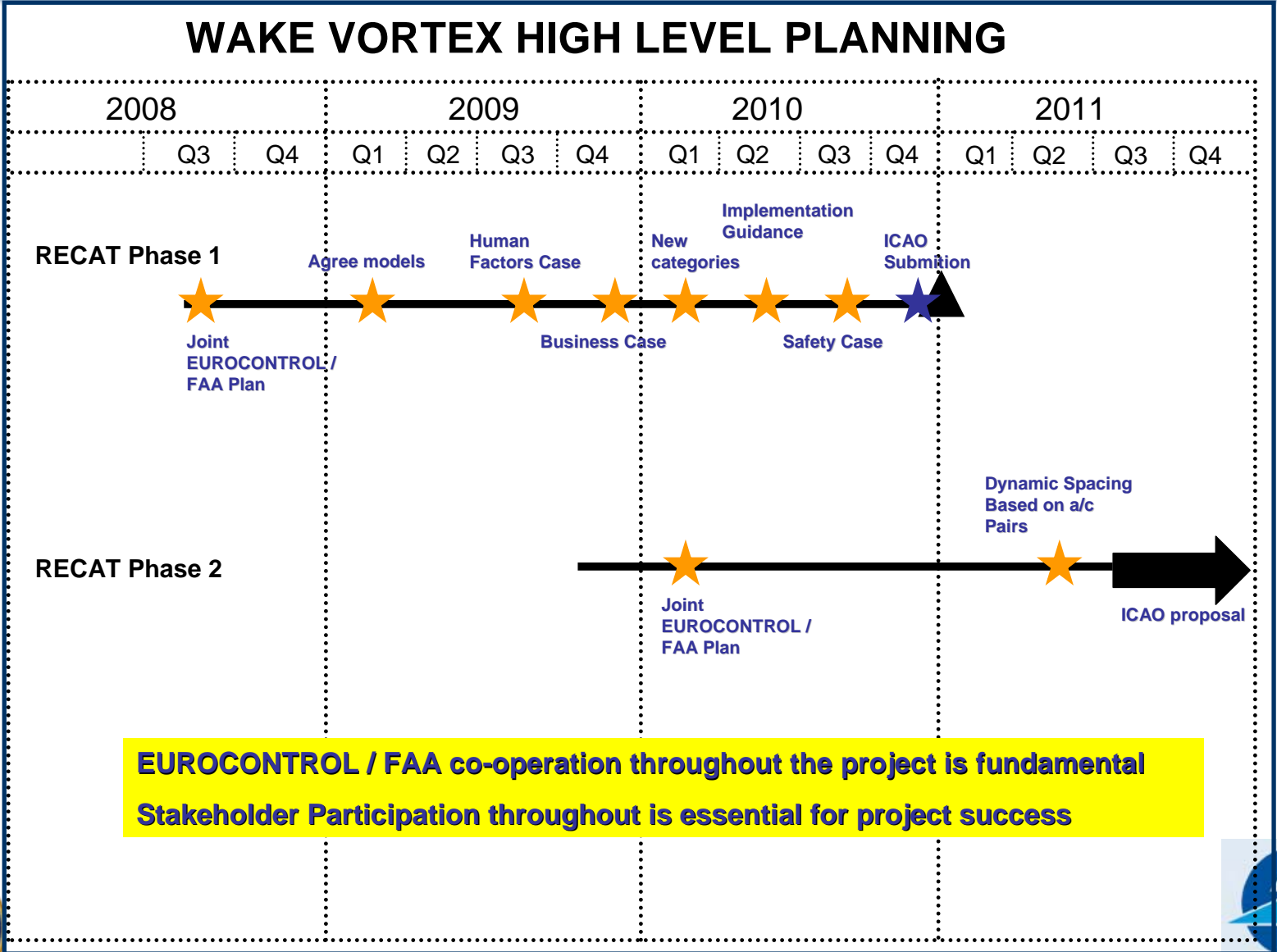
- The number of aircraft to be evaluated directly must be manageable
- US and European operations were assessed to identify which aircraft types drive airport capacity
- 61 aircraft types were identified for direct evaluation with re-categorization methodology
 - %80 (+) of US and European aircraft movements
 - Some additional aircraft from the same family as those in the top 80%
 - A few additional aircraft that may fall on the boundary of an aircraft category
- The selection of aircraft types in this manner assures that
 - The analysis will be based on aircraft pairings which will dominate capacity and
 - The resulting categories and separation minima will result from an impartial, scientifically-based approach



Methodology Flow Chart



RECAT – When ?



EUROCONTROL / FAA co-operation throughout the project is fundamental
Stakeholder Participation throughout is essential for project success



- Near-term
 - Run with the 61 a/c types database (precise a/c characteristics)
 - Representative traffic mix
 - Use discrete separation distances (e.g. 2.5nm, 3nm ...)
 - Sensitivity analysis using multiple wake behavior, wake encounter models and hazard metrics
 - Evaluation of existing ANSP separation tools and need for training and/or tool modifications to support recommended categories
- Mid-term: Phase 2 Re-categorization plan

Why a Human-Factors Case?

- To capture end-users concerns
- To check the acceptance of the WT categories and prescribed separation minima
- To identify possible human errors and associated mitigation means
- To design implementation guidance: transition and training, recommendations for system update

Which Methodology?

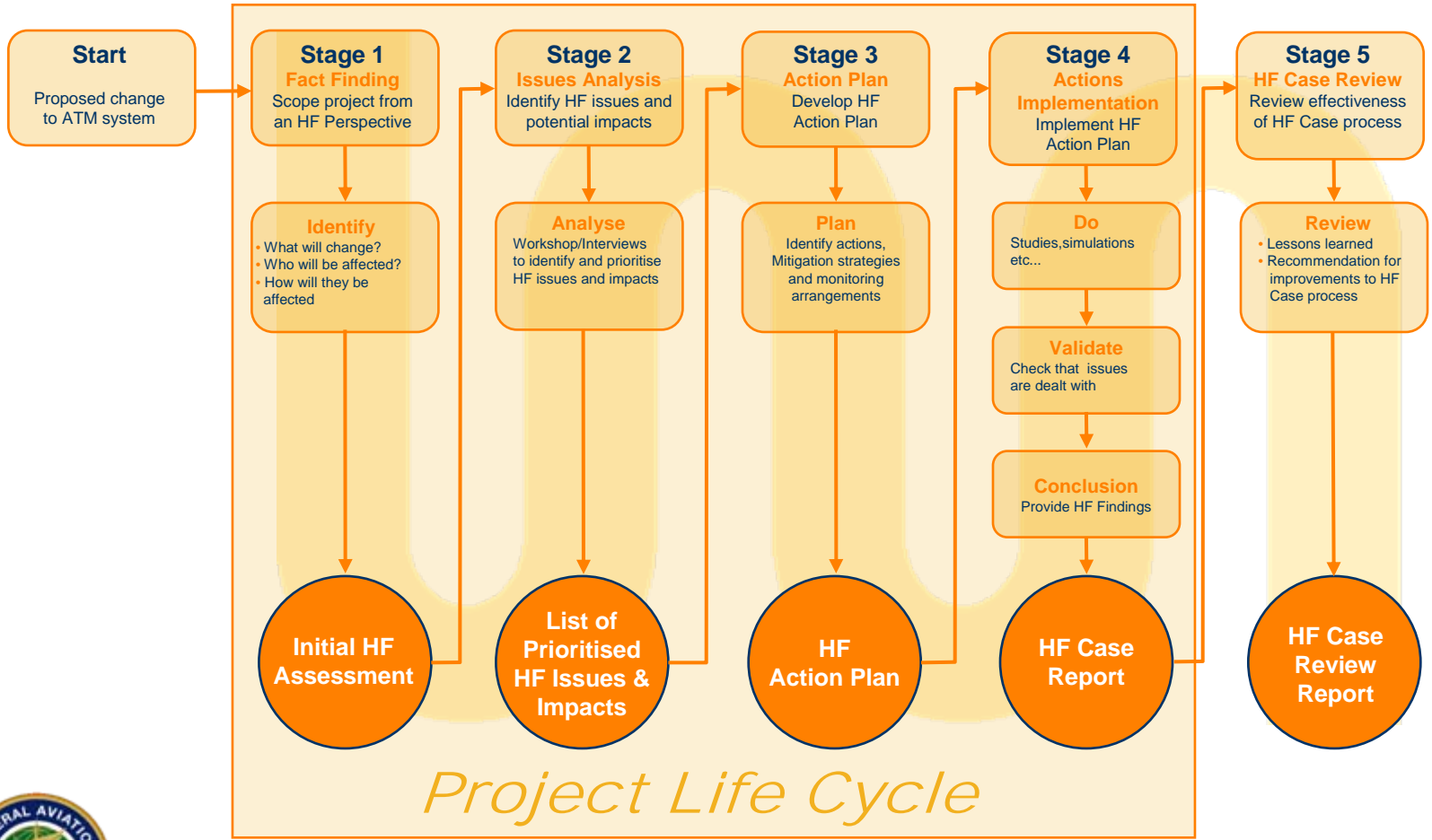
- EUROCONTROL HF Case Methodology as a starting point
- Other similar methodologies adopted by implementing ANSP



“a process to systematically identify and manage HF issues for ATM projects”



PROJECT LEVEL



Stage 1- Fact finding (done)

- Actors impacted: controllers, pilots, ANSPs
- Systems impacted: flight-plan systems, HMI, paper strips, Arrival/Departure managers, etc...
- Number of new categories:
 - 3 categories for ANSPs without automation support
 - 6 categories for ANSPs with compatible automation

Stage 2 – Issue Analysis

- Structured brainstorming planned from 17-18th March 2009

Stage 3 – Action Plan

- First plan by May 2009
- ***Specific plans will be developed by ANSPs as necessary***

Stage 4

- Develop HF recommendations to ICAO and to ANSPs for updating automation tools to support transition to and implementation of new categories
 - Data Block / radar label modifications
 - Aircraft stinger / spacing assistance tool modifications
- Develop training and transition guidelines
- ***Other development executed by ANSPs as deemed necessary (Operations and Regulatory sides)***





Thank you