

The Way Forward: NextGen Arriving Now in LAX

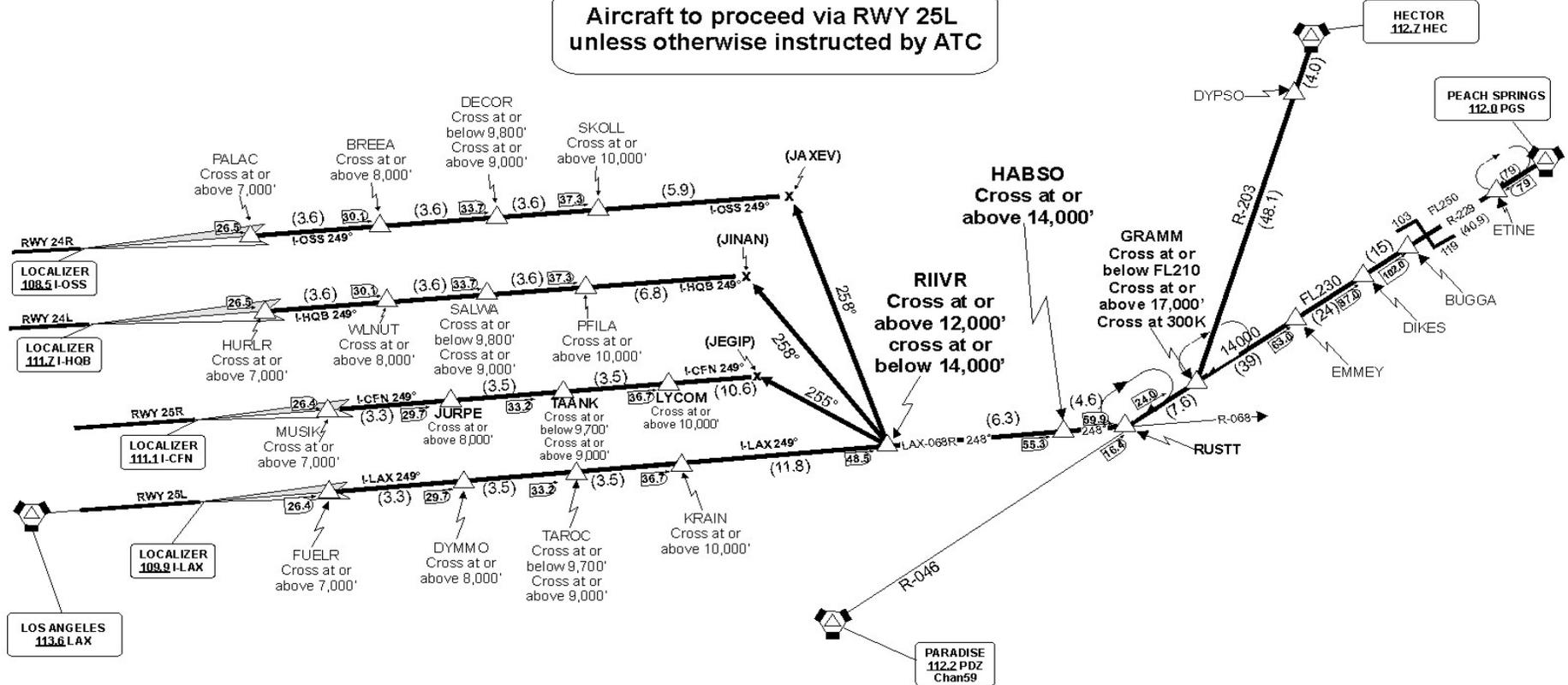


NOTE: DME and RADAR required.

RIIVR ONE Optimized Profile Descent ARRIVAL

12/12/2008

Aircraft to proceed via RWY 25L unless otherwise instructed by ATC



The Way Forward: New Aircraft Technology



Opportunities

- Historically new technology accounts for 90% of environmental footprint reduction
- New concepts offer promise for improvement
- Collaborative demonstrations with industry can stimulate technology transition
- Need a balance in maturing technologies and enabling revolutionary concepts

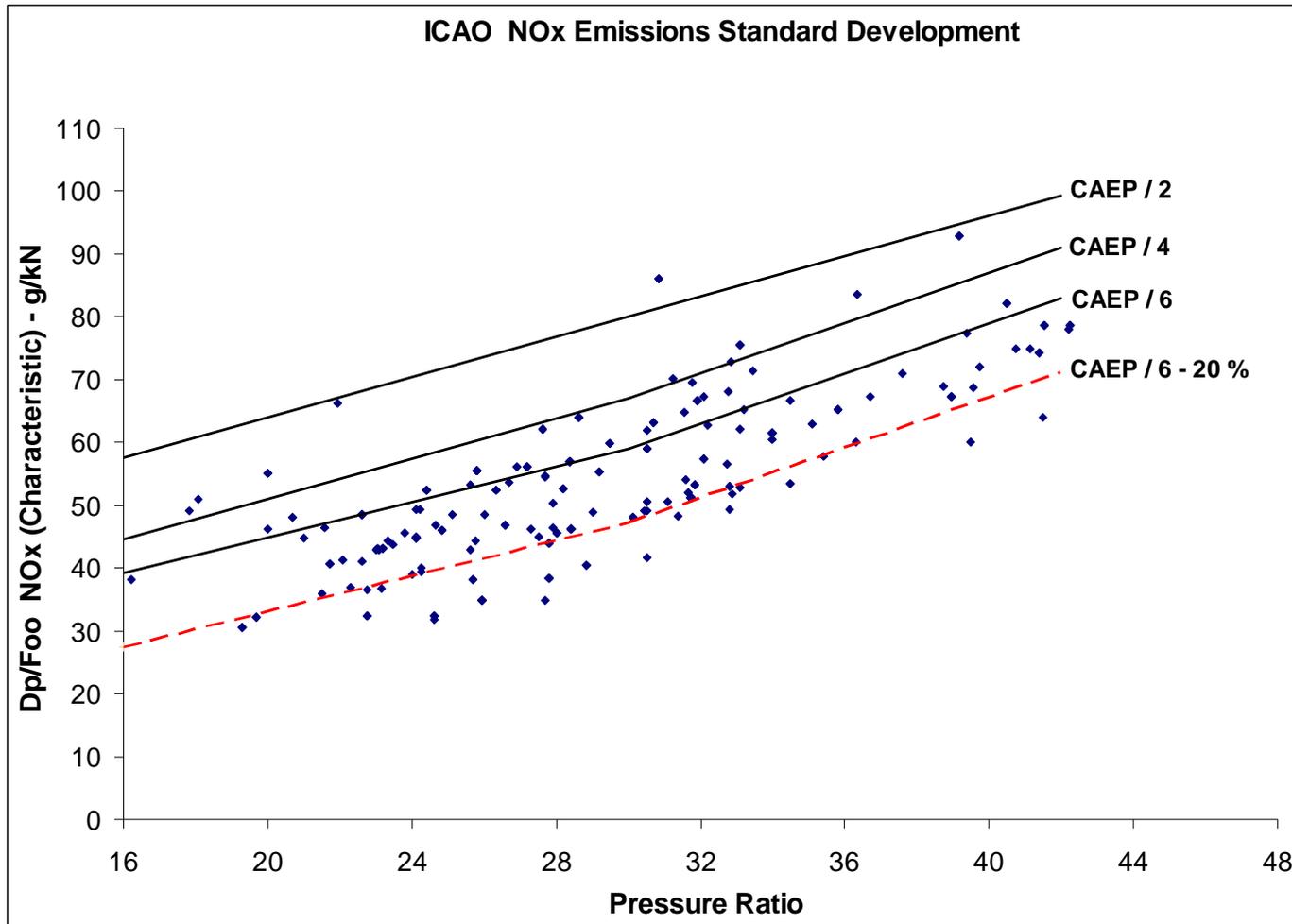


The Way Forward: Aircraft Technology & ICAO Standards

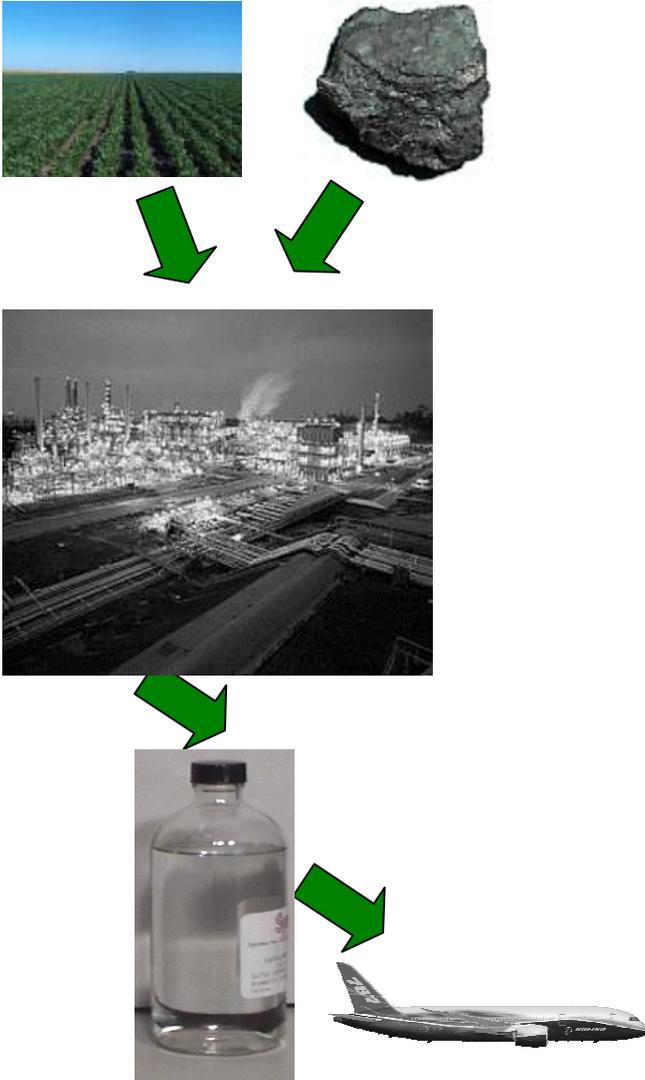
- Underlying ICAO principles for standard-setting
 - Technological feasibility
 - Economic reasonableness
 - Environmental benefits
 - Environmental interrelationships and tradeoffs
- Standards Linked to Technology Goal Process
 - Goals Exist for NO_x
 - Work ongoing for Noise and Fuel Burn
- Standards currently address carbon monoxide (CO), oxides of nitrogen (NO_x), unburned hydrocarbons (UHC), and smoke
- No standards for particulate matter (PM) emissions or carbon dioxide (CO₂)
 - Research programs are developing PM emissions measurement and sampling procedures to characterize these emissions and understand their evolution
 - Review in late 90s found market incentives for fuel minimization obviated the need for a CO₂ standard
 - Ongoing assessment of potential range of NO_x stringency options up to CAEP/6 minus 20% at OPR = 30 for application no sooner than 2012



The Way Forward: Potential New NOx Standards



The Way Forward: Pursuit of New Fuels

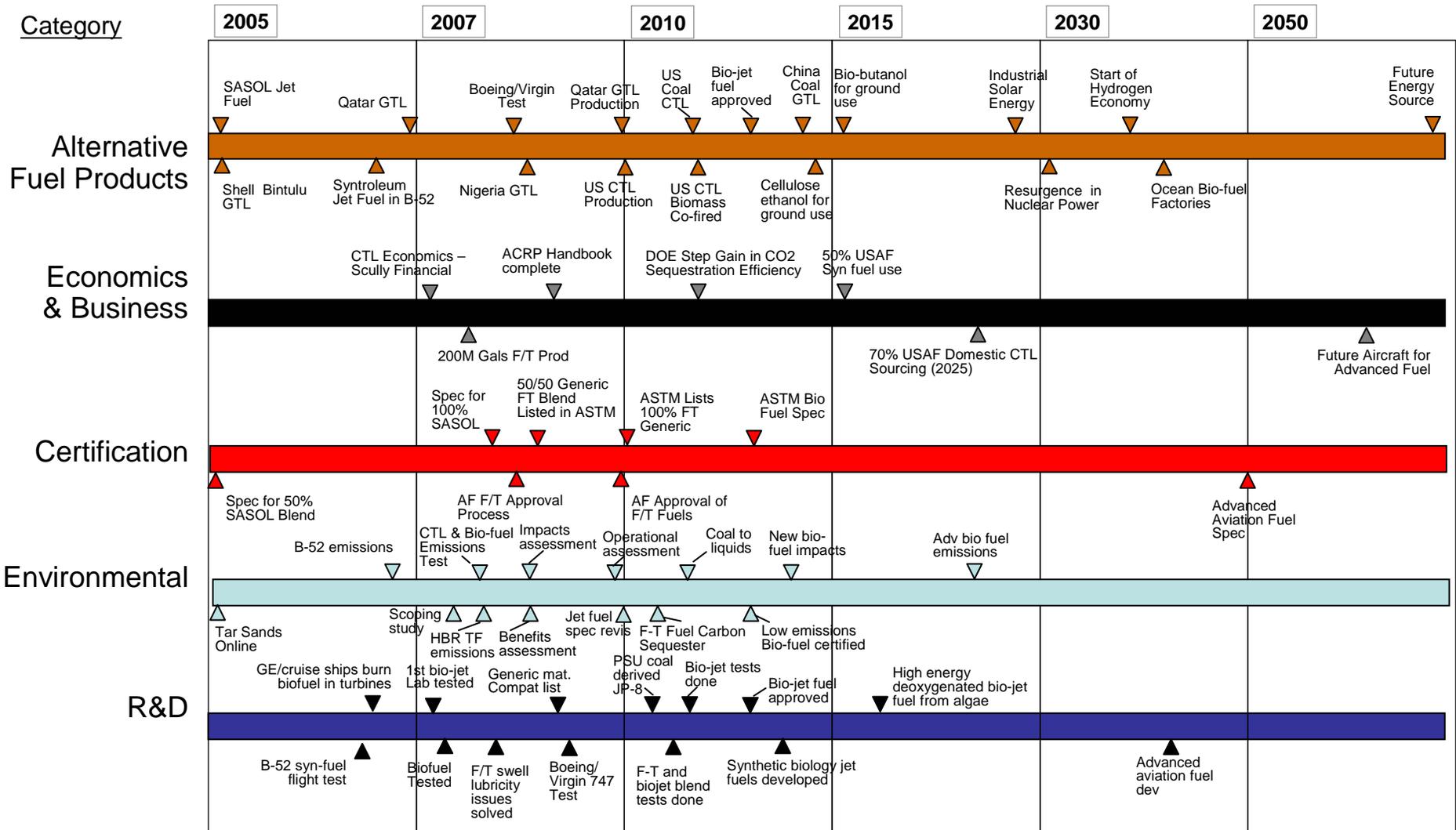


Opportunities

- Synthetic Fuels May Be More Environmentally Friendly
- Helps Manage Interdependencies
- Enhances Energy Security
- Commercial Aviation Alternative Fuel Initiative



CAAFI Roadmaps



The Way Forward: Ongoing Policy Work

- **December 2006, Executive Order 13419: “National Aeronautics Research and Development”**
 - “The environment must be protected while sustaining growth in air transportation
- **Fall 2007, FAA reauthorization proposals**
 - Environmental provisions to accelerate NextGen initiatives
- **December 2007, National Aeronautics Policy – R&D Plan**
 - www.ostp.gov/nstc/aeroplans/pdf/National
- **Aviation Environmental Policy Document**
 - High-level direction for addressing impacts of primary concern for NextGen
 - Long-term targets; significance; interrelationships
- **Environmental Management Systems (EMS)**
 - Develop/establish national strategy and framework
- **Policy implications of interdependent aviation noise and emissions models/tools**
 - Initiate review



The Way Forward: International Collaboration



Conduct research to identify and better measure the issues and impacts associated with aircraft noise and aviation emissions, and generate improved solutions to deal with these problems. Cooperative efforts ongoing with numerous countries, research organizations, and industry around the globe.



The Atlantic Interoperability Initiative to Reduce Emissions (AIRE) seeks to accelerate development of operational procedures that will reduce aviation's environmental footprint on a "gate-to-gate" basis- covering each stage of aircraft operations: surface, departure, enroute, and arrival.



ICAO's Group on International Aviation and Climate Change is a senior level policy group that is charged with developing a consensus-based action program for the aviation community to address greenhouse gas emissions.

Some Closing Observations

- Despite past progress, environmental constraints to aviation growth remain
- Future environmental challenges likely to be more complex
- Aviation greenhouse gas emissions may prove the most significant challenge
- Tackling environmental challenges is at the heart of the NextGen Plan

