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The Airline Monitor

"Business as Usual"
Is this Growth Possible?

Donald P. Schenk

SpeedNews Conference
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Beverly Hills, CA

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Introduction to ACA

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International Aviation Consulting Firm

- Founded by Don Schenk in 1989 as an aviation consulting and financial advisory firm specializing in the airline, airport and aerospace industries.
- Recently added alternate energy practice.

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A review of trends in the airline and commercial jet aircraft industries.

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Outline

- **Forecast** - The Airline Monitor
  - **Core Assumptions**
    - Economic demand model remains substantially the same
    - No regulatory constraints
  - **Status Quo seldom is accurate Assumption**

- **Discuss Environmentally Induced Risks**
  - Fuel Availability
  - Airport Capacity
  - Sustainable Production

- **Conclusion**

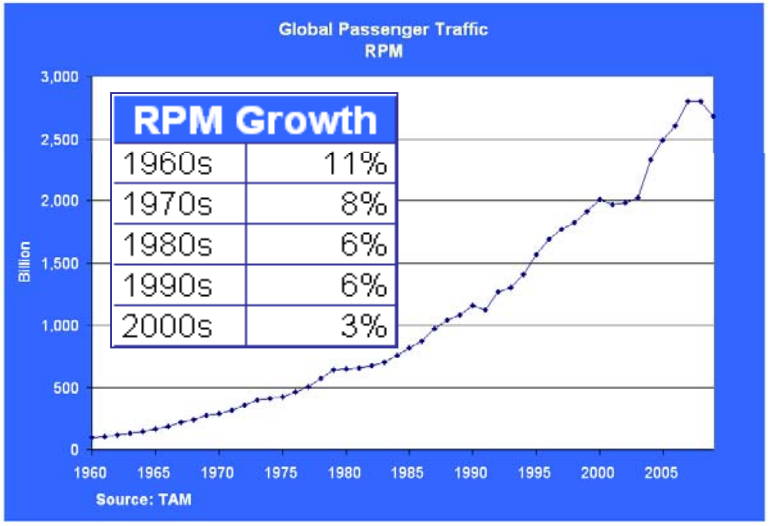
The Future Mirrors the Past

Past cycles very similar

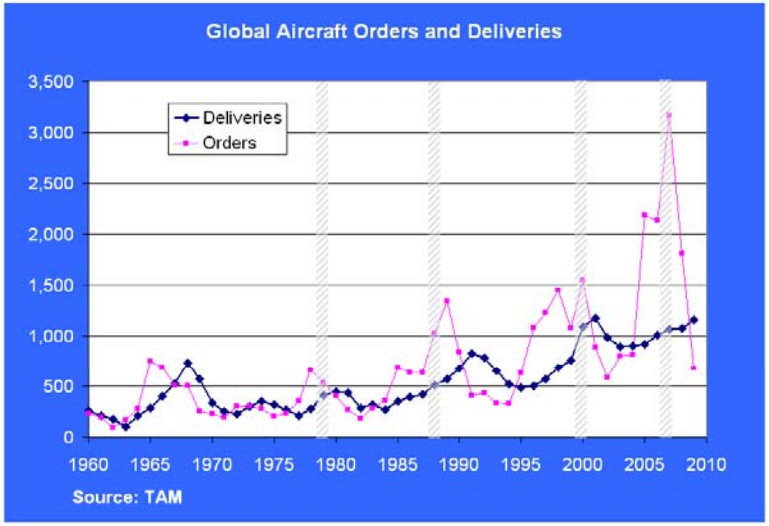
- "**Bad**" years have reasonable growth
- "**Peak**" years have great growth

- Peak aircraft orders coincide with high GDP growth
- Peak deliveries occur as economic growth slows
- Traffic growth unconstrained
  - Phenomenal technology improvements
  - Fuel plentiful, mainly cheap
  - Infrastructure adequate

Passenger Traffic



Aircraft Orders and Deliveries



Jan 2010 TAM Outlook

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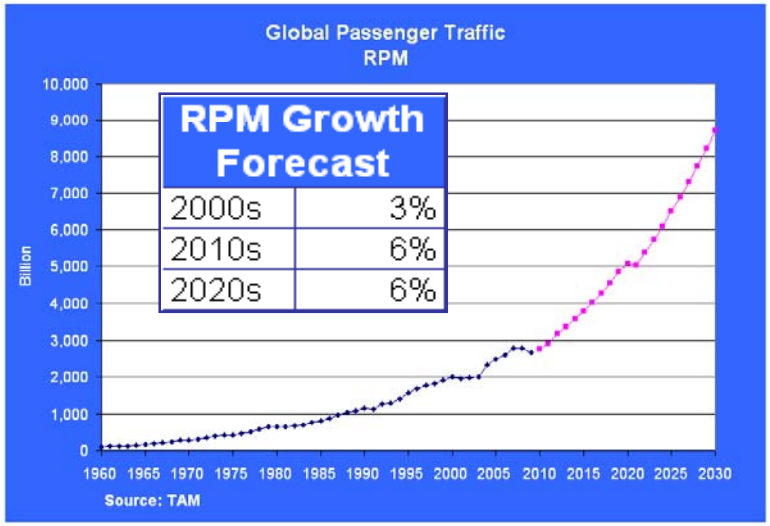
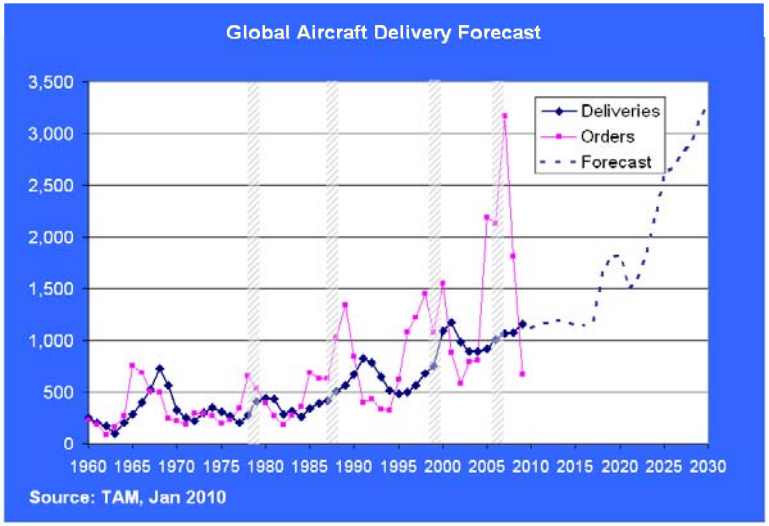
Passenger Traffic



- Deliveries grow at an impressive rate
- The seeds of change are hidden if they exist

- The current cycle is unique
  - No drop in production
- Two critical questions
  - Why?
  - Will it be correct?

Delivery Forecast

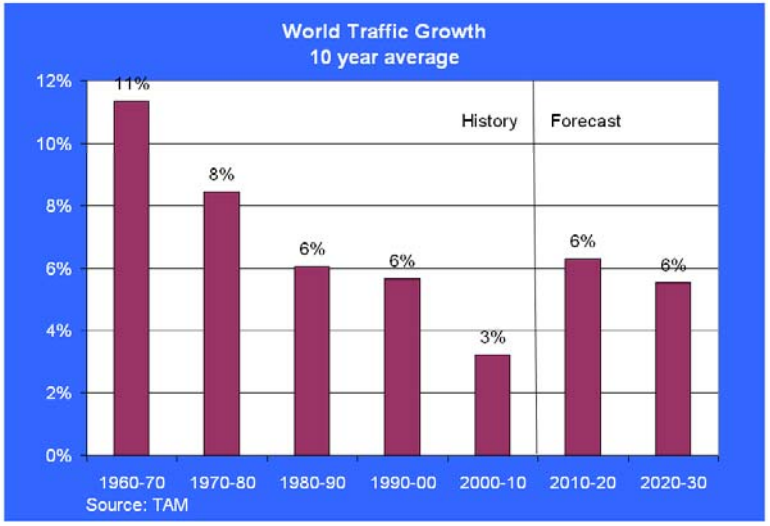


The Impact of Economic Development

- The future will be different

- Historical drivers
  - Rapid technological improvements
  - Plentiful and cheap fuel
  - Abundant aircraft infrastructure
  - Developed markets

- The Future?
  - Emerging markets
  - Technology?
  - Fuel?
  - Airports?
  - Sustainability concerns?



Impact of Large Numbers

Aircraft required to serve 1% growth in traffic

1980 - 55 aircraft
2010 - 180 aircraft
2030 - 450 aircraft

Potential Risks to Status Quo

- Global Issues
  - Global warming
  - Sustainable growth
  - Availability of Jet A
  - Financing
  - Changing modes of communication
    - Skype, Twitter, etc.
  - Improving train service

- Regional Issues (US)
  - Global warming
  - Particulate matter and airport expansion

THESE ISSUES MATTER

Aircraft Life Cycle – 35 to 50 Years

5 years development
15 to 20 year production
30 to 40 year life

Do These Concerns Matter?

Failure to Manage the Future is Costly

- Airlines & Deregulation
- Media & the Internet
- “Detroit” & Consumer Needs
- Local Phone Companies & the Last Mile

Alternative Aviation Fuel Environmental Imperative

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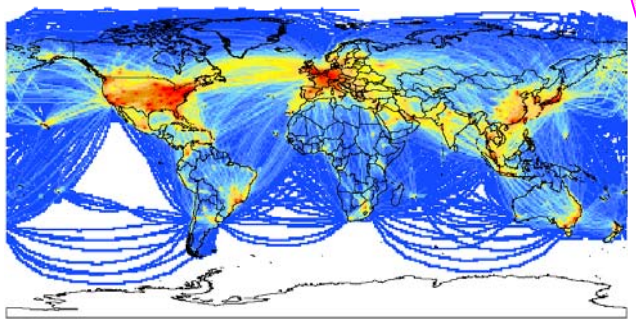
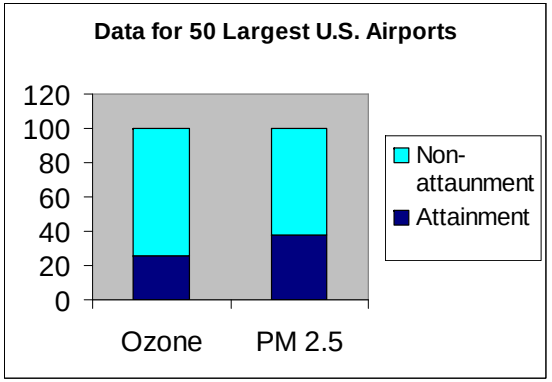
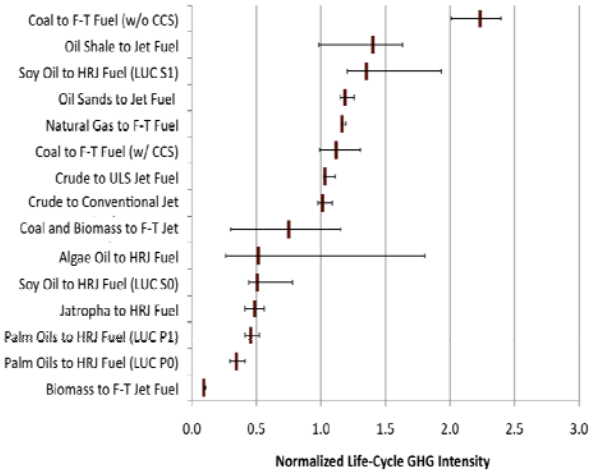
Air Quality



Global Climate



Reduce PM 2.5*



Limit CO2 LCA**

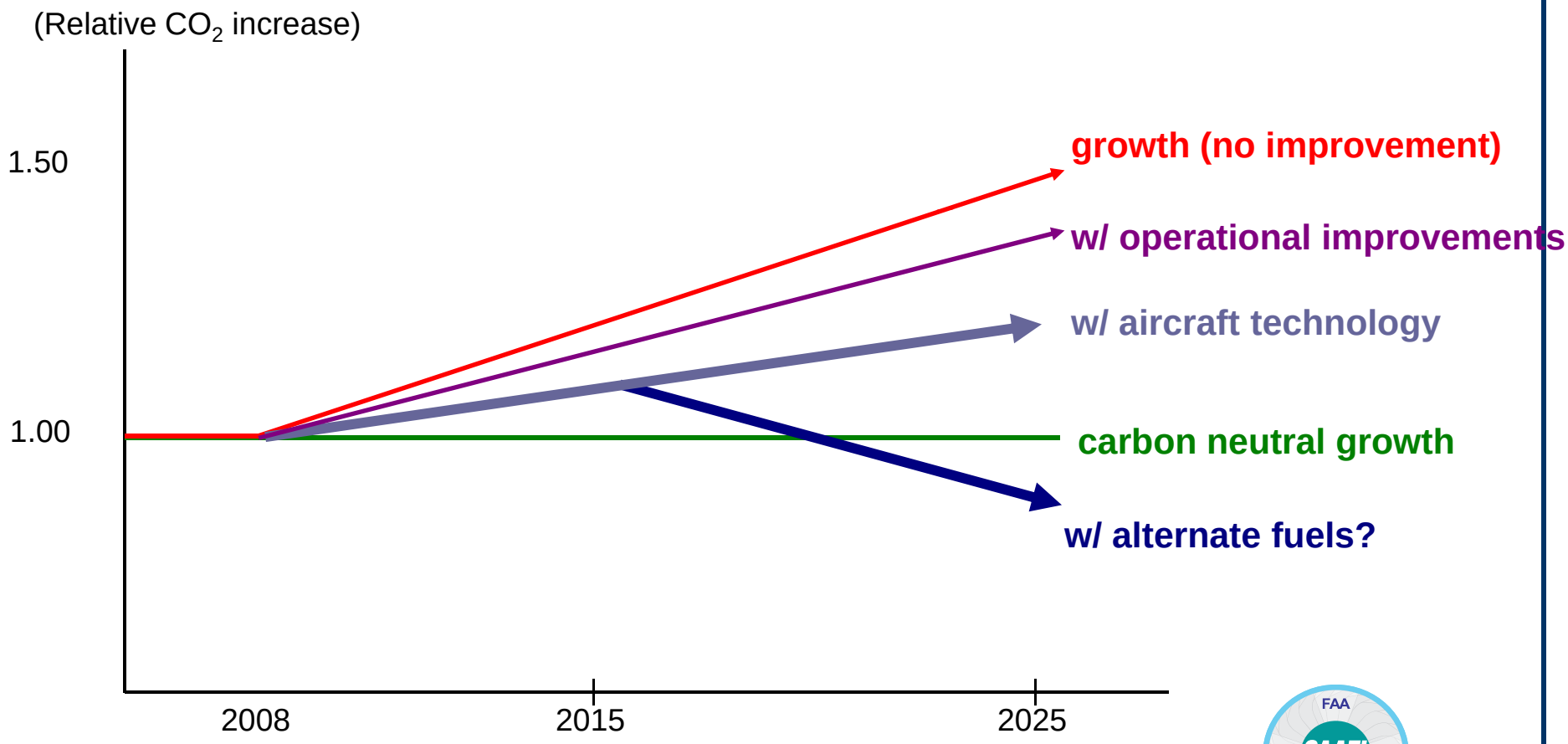
*US EPA NAAQS for PM2.5

**PARTNER COE, Hileman et al.

FAA AIA CAAFI ATA ACI-NA

Immediate Challenge: Aviation's Carbon Footprint

ICAO Goal of Carbon Neutral Growth by 2020



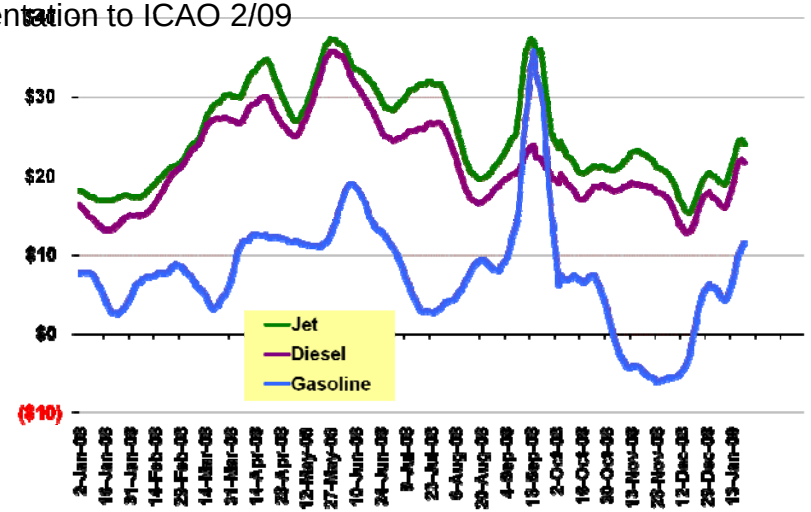
Source: Richard Altman

Aviation & Jet A

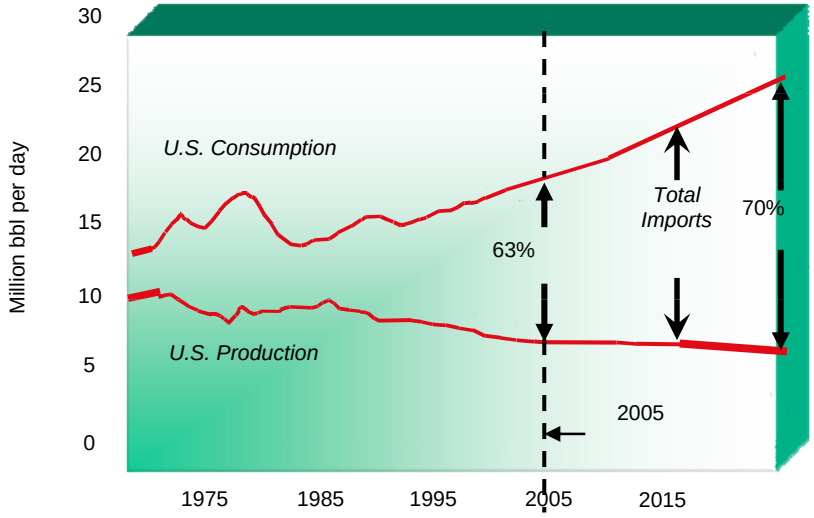
The Airline Monitor *Graphics adapted from J. Heimlich (ATA) presentation to ICAO 2/09

Financial Disadvantages (U.S.)

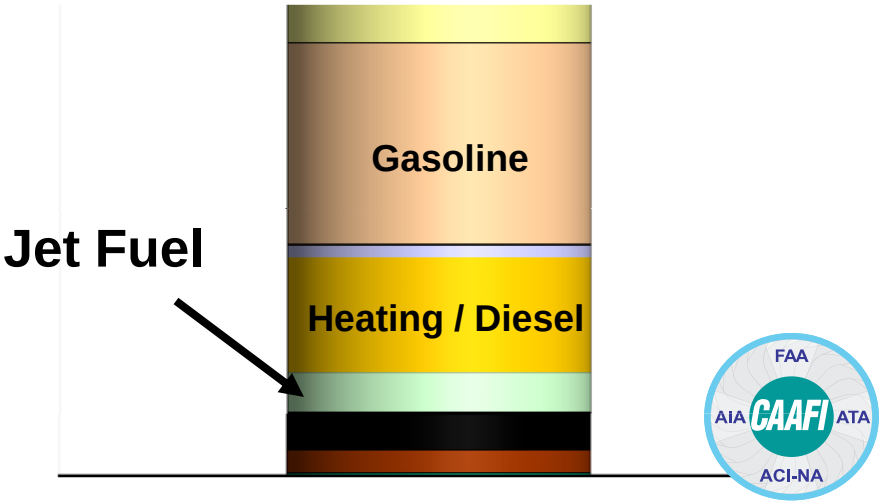
- Crack Spread
- Fuel fraction
- Price Volatility
- Security of supply



Reduce Crack Spread*



Build Domestic Supply



Improve Aviation Fuel Fraction*

Options

- CAAFI
- AIA
- IATA
- Boeing and Airbus
- Others

What is CAAFI?

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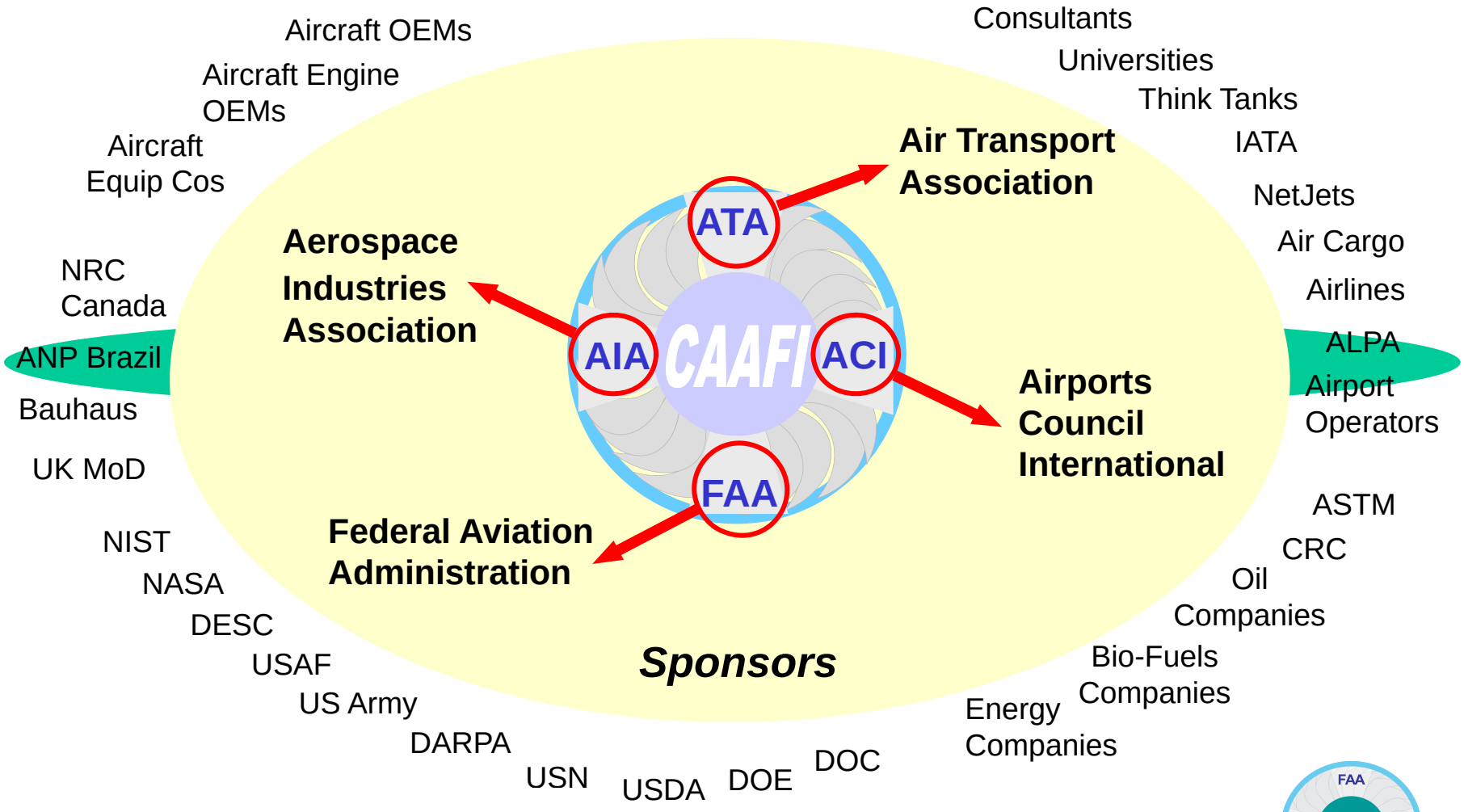
Stakeholders



….Over 300 Sponsors/ Stakeholders from all Continents

CAAFI Major Milestones

- CAAFI founded – 2006
- USAF – 600,000 gallon bio fuel buy current
  - 50/50/50 by 2016 (25% of US based consumption)
- DOE grant program for alternative energy projects
- USDA loan guarantee program with aviation - 2008
- DARPA funding of algae research – 2009 to 2011
- Demonstration flights – 2008 & 2009
  - ANZ/Rolls-Royce, Continental/CFM, JAL/Pratt & Whitney, Virgin/Rolls-Royce
- Presidential directive to USDA and DOE on common policy for alternative energy – 2009
- ASTM Passes Synthetic Jet Fuel Specification, D7566 – Aug 09
- U.S. airlines sign first-of-kind supply agreement with Rentech and ASIG for renewable synthetic diesel fuel for LAX ground service equipment
- December 15, 2009: 15 airlines from 4 countries announce launch MOUs with AltAir and Rentech to negotiate the purchase of renewable and synthetic jet fuels

CAAFI Targets

In future…..

- ASTM approval of hydro treated renewable jet – end 2010
- Deployment of 10 fuel producing projects in US by 2013
- ICAO carbon neutral growth by 2020

Leading the Way

The ATA Energy Council

ABX Air	Evergreen Int'l
Air Canada	FedEx Express
Air Jamaica	Hawaiian Airlines
AirTran Airways	JetBlue Airways
Alaska Airlines	Mexicana
American Airlines	Midwest Airlines
ASTAR Air Cargo	Southwest Airlines
Atlas Air	United Airlines
Continental Airlines	UPS Airlines
Delta Air Lines	US Airways

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U.S. AIR FORCE

ATA and CAAFI are working closely with the U.S. military to identify mutually attractive locations for deployment of alternative aviation fuels, and other opportunities for collaboration.

FAA AIA CAAFI ATA ACI-NA

CAAFI International Cooperative Vision

- Common FRL Scale for process maturity
- Single R&D Roadmap / All gaps filled
- One View of LCA Framework / Issues
- Embrace Multiple Feedstock / Process -“How Many” Deployment Path

……Under Discussion with EU (SWAFEA, Alfa-Bird) and ICAO

Where we Are

Fuel Readiness Level

FRL	Description	Exit Criteria
1	Basic Principles	Feedstock / Process Observed / Reported
2	Concept Formulated	Feedstock / *Complete* Process identified.
3	Proof of Concept	Basic Fuel Properties Validated at Lab Scale
4.1 4.2	Preliminary Technical Evaluation	System Perf. & Integration Studies Entry Criteria/Specification Properties
5	Process Validation	Scaling from Laboratory to Pilot plant
6	Full-Scale Technical Evaluation	Fuel Properties, Rig and Engine Testing
7	Fuel Approval	Fuel Class/Type Listed in Int'l Fuel Standards
8	Commercialization	Commercial Purchase Agreements
9	Production Capability Established	Full Scale Plant Operational

What Are Aviation "Drop-in" Bio-Fuel Candidates?

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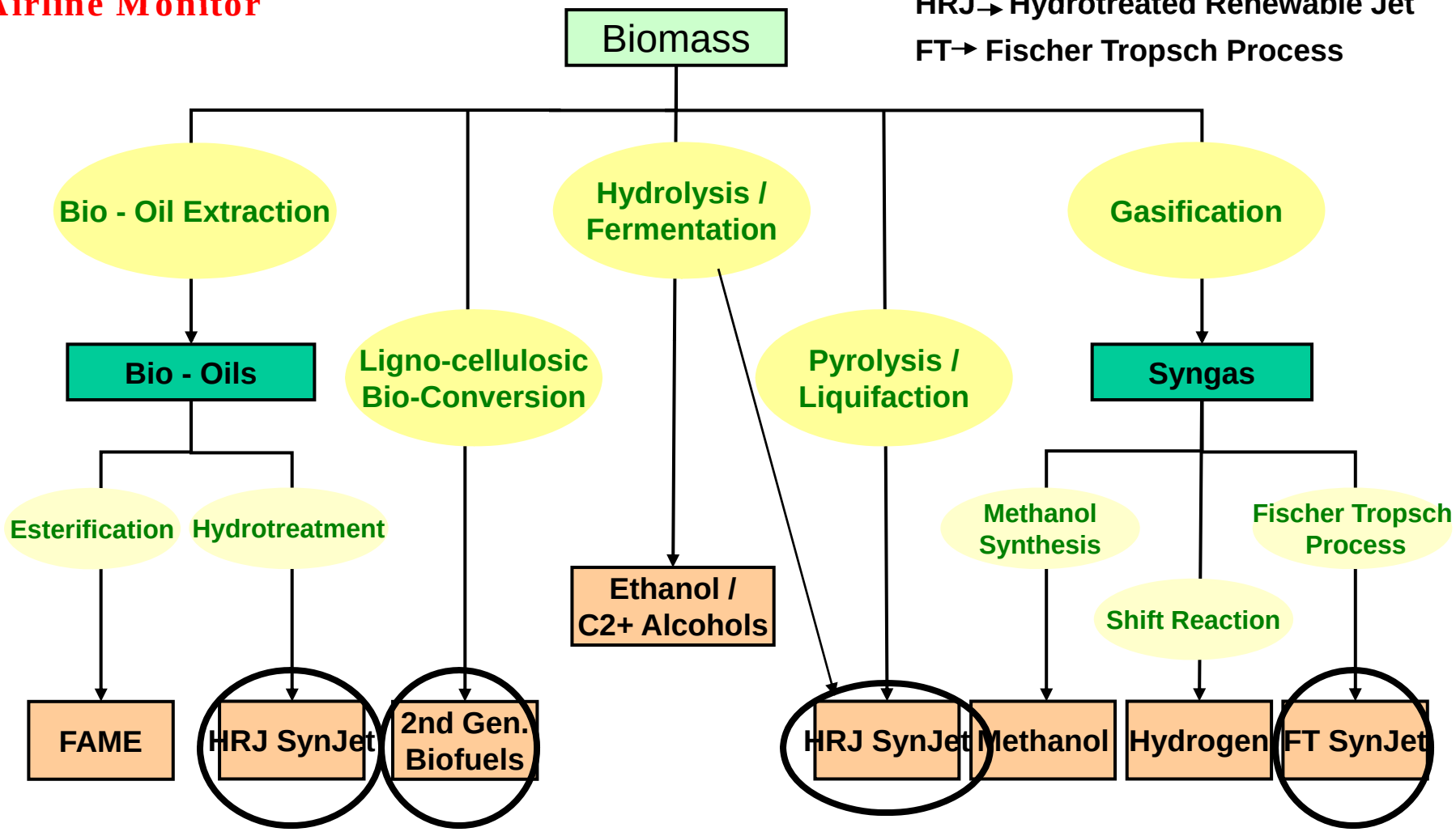
HRJ→ Hydrotreated Renewable Jet

FT→ Fischer Tropsch Process



Present "Drop-in" Options Examined by CAAFI Sponsors/Stakeholders for carbon positive Aviation Fuels

Compliments AirBP – 4/08 Future Fuels Conference, London, England (framework only)

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Don’t Replicate Detroit

- Become involved
- Develop your sustainability plan
- Understand your customers’ motivations
- Stay engaged

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Thank You

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