
787
DREAMLINER
BOEING

eing has to define its core competences and ckle severe supply chain issues

Situation	Complication	Question	Answer
stry leader until ly successful ufacturer of afts e competence n R&D	Transition to ”Built to Performance” has been challenging Boeings' future competitive advantage is unclear	How can Boeing avoid or reduce supply chain challenges? How can Boeing leverage the 787 experience to create long term competitive advantage?	“Build to Fly”, a new supply chain strategy Boeing BIO1000, a fuel efficient medium sized aircraft

enda

Agenda

1. Situational analysis
2. “Build to Fly”
3. The Boeing BIO1000
4. Timeline and financials
5. Wrap-up

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1. **Situational analysis**
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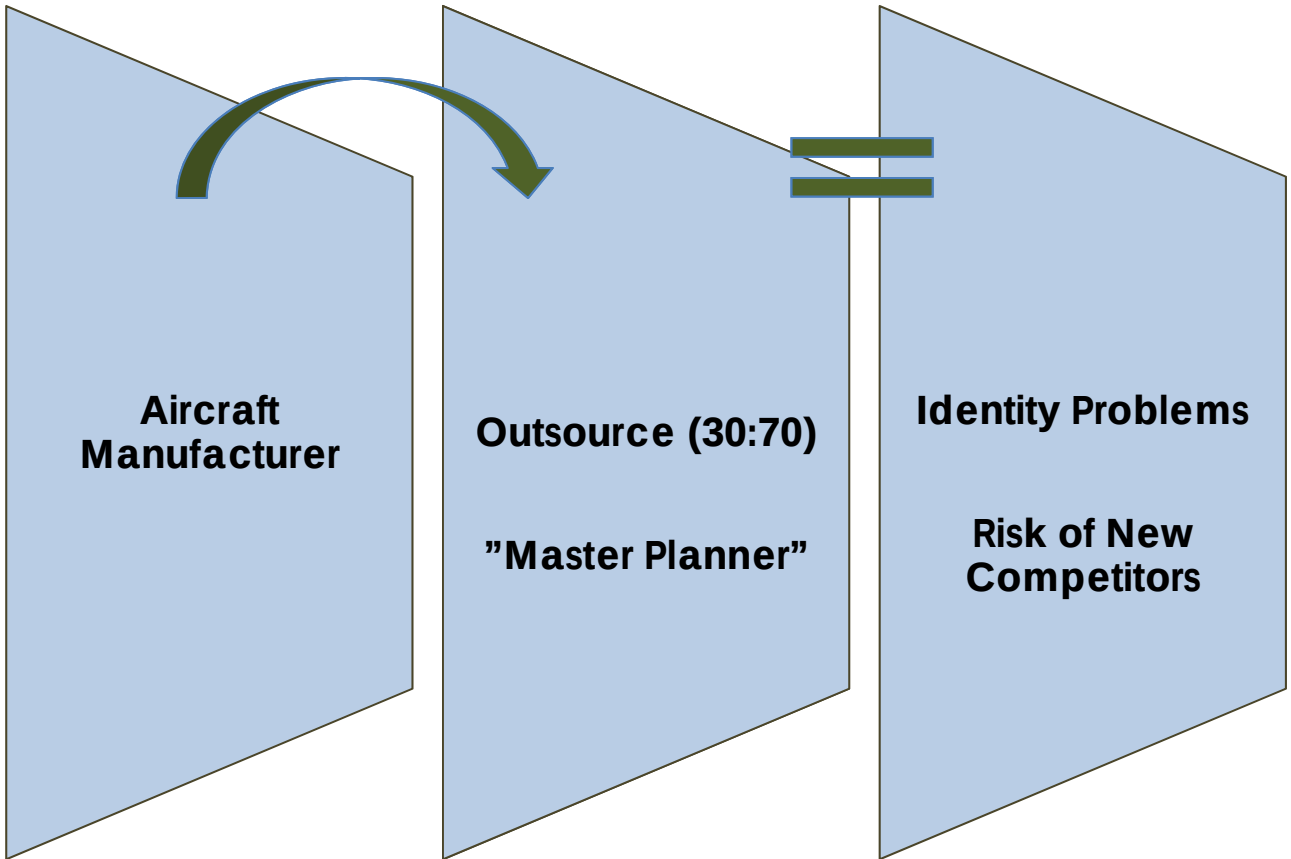
ng has transformed itself from an aircraft manufac- to a master planner – not without complications

The transformation from **manufacturer** to **master planner** has cost two years delay and close to $2,5 billion



ft from “Build to Print” to “Print to Performance” s been problematic

	Build to Print	Build to Performance
t		
trol		
ed		
ibility		
ance		
		
ply Chain bility		

In theory

Developer skills
Higher innovation
Risk sharing

Reality

Miscommunication
Delays
Lack of control

us and Boeing could potentially lose 50% of single aisle market to new entrants

Current Market Situation	Threats
h costs affiliated with arket entry eing/Airbus are fiscally ong obally supported astructure	Increased competition in the Large Carrier Aircraft (LCA) market Estimates state that Airbus/Boeing could lose 50% of the single aisle market Postponements by Boeing and Airbus creates opportunities for new entrants

w civil aircraft competitors on the horizon despite
n costs of entry; four major potential competitors

China

mercial Aircraft Company of China CC China) is building up manufacturing city

s fastest growing aviation market

ssengers predicted to grow 11% annually next 20 years

ly subsidized, around $3 billion

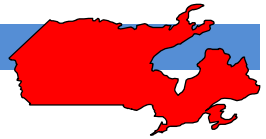
Russia

oi Civil Aircraft Company (SCAC Russia)

ly subsidized, around $1 billion

an to build LCA with up to 150 seats g the next 10-15 years

Canada



Bombardier (Canada)

Furthest along of new entrants – has begun Cseries – 100 to 130 seat aircraft with ETA in 2013

Skills within manufacturing, support infrastructure and brand recognition

Lack of financial resources

Japan

Kawasaki Heavy Industries (KHI)

Major advantage is experience with building critical aero structures from composites.

Lacks the levels of fiscal support available to the Russian and Chinese companies

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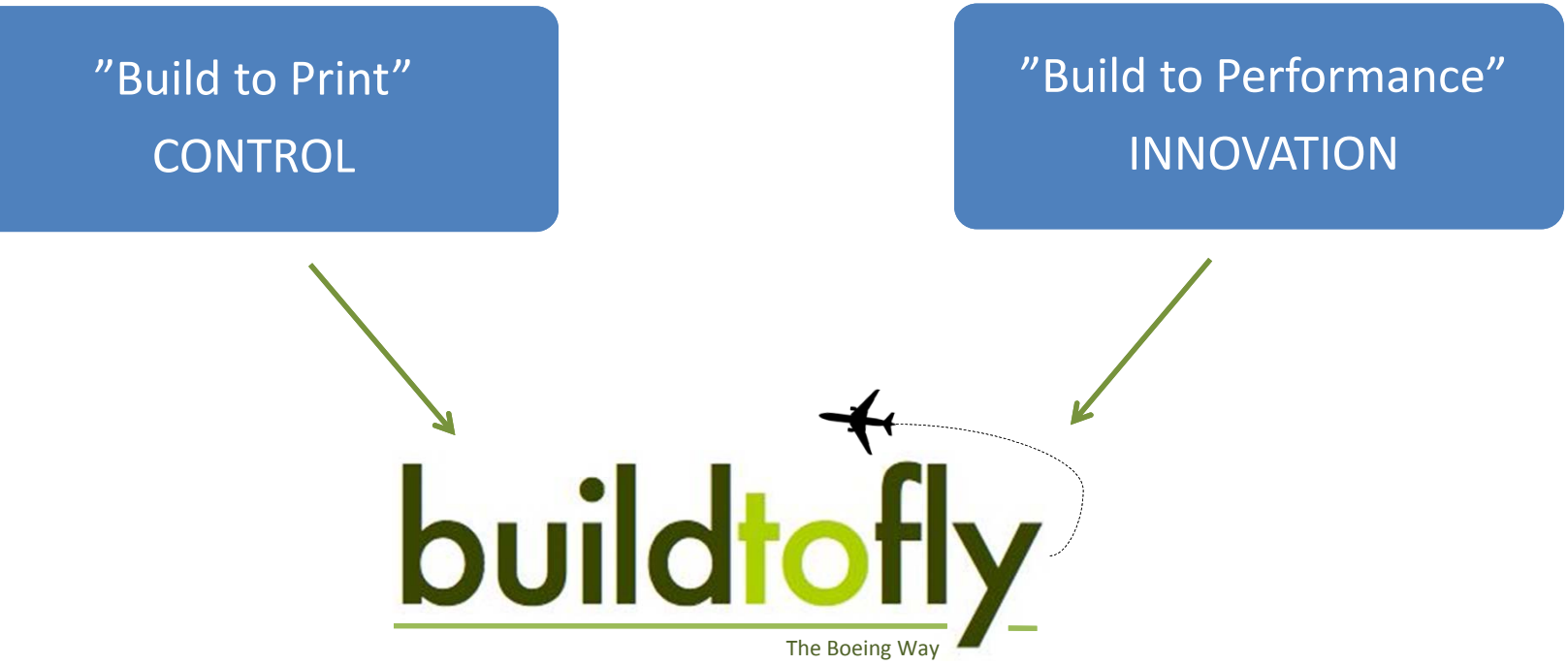
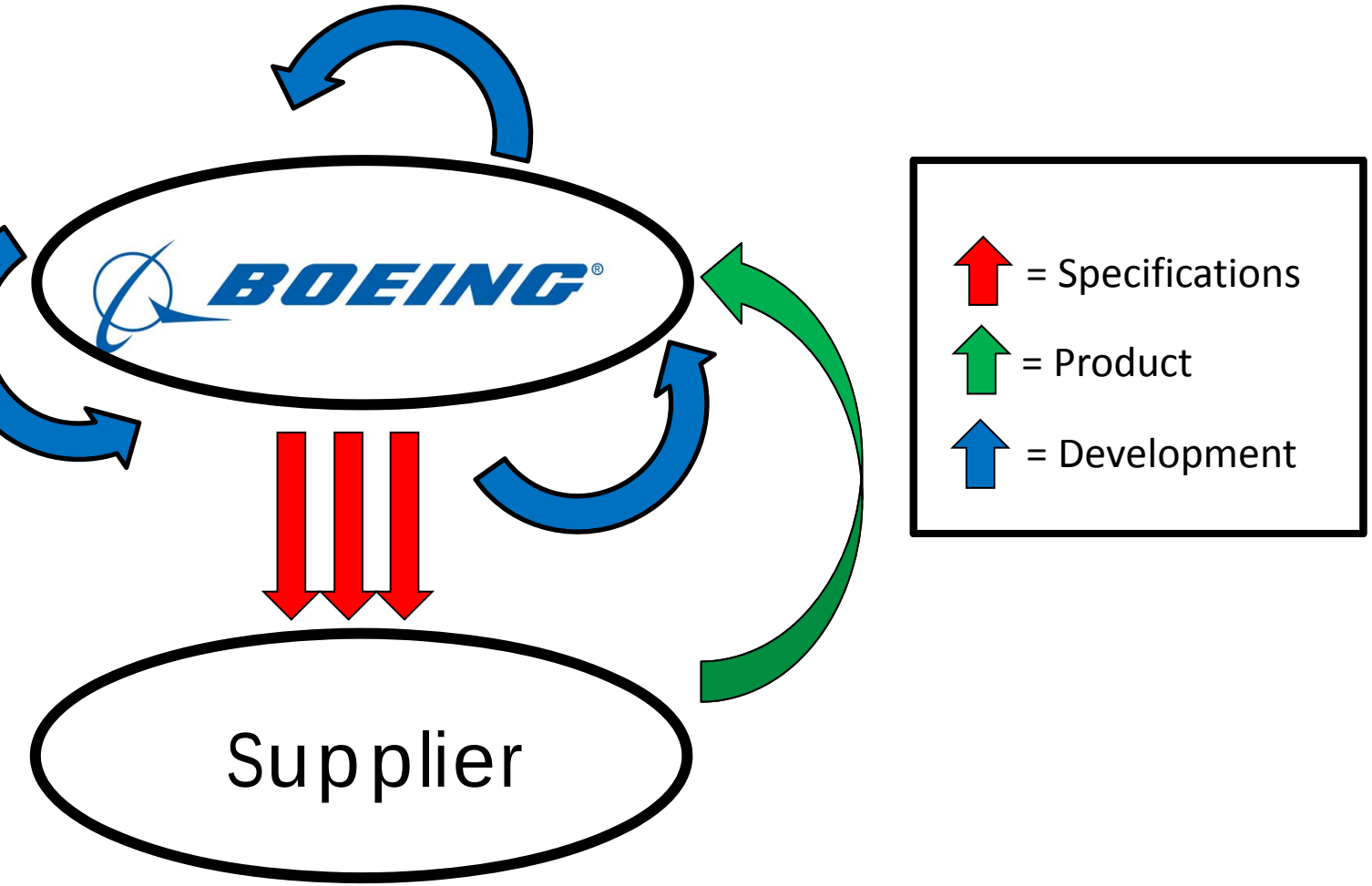
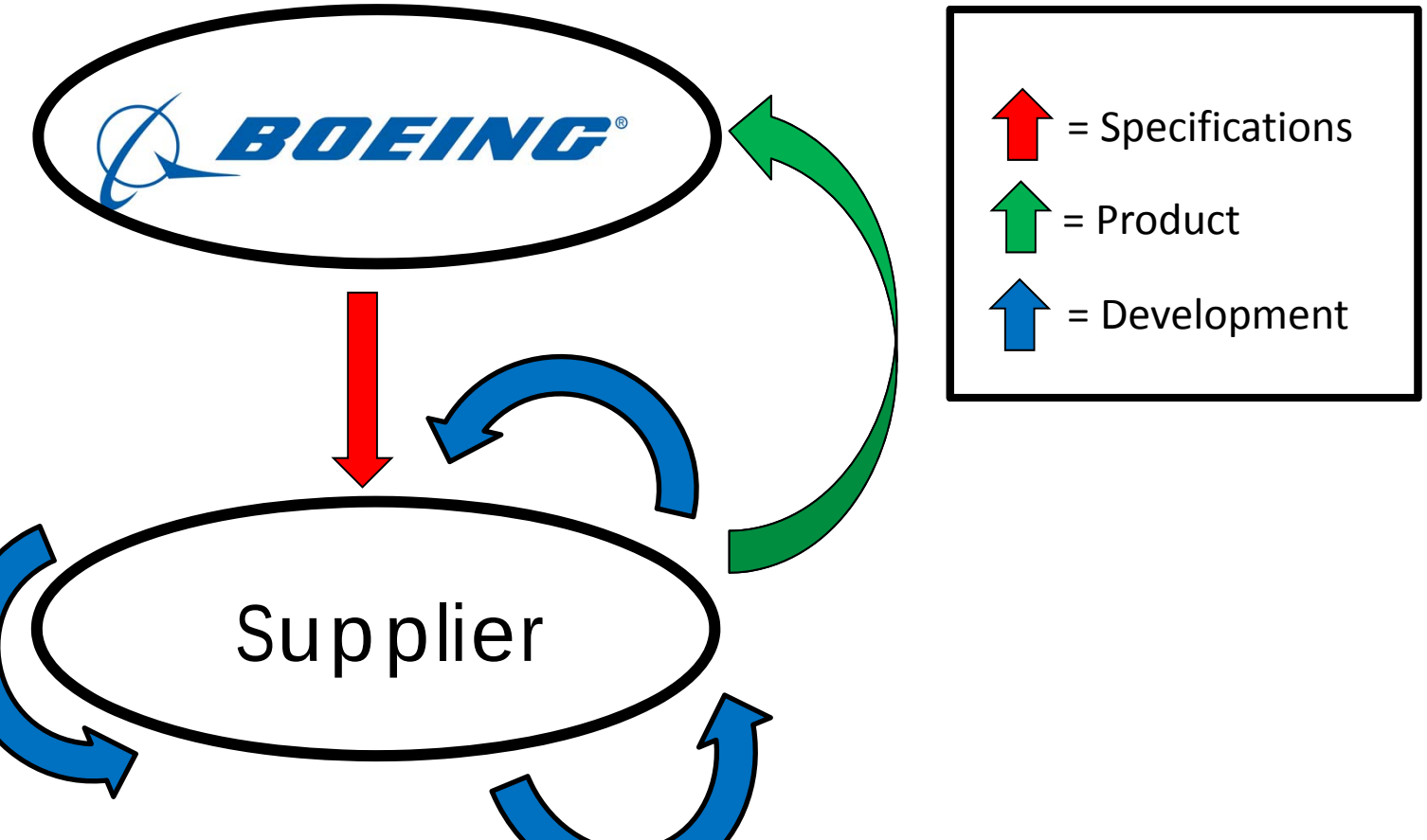
ild to Fly" will increase global integration by
ing the best from the previous strategies



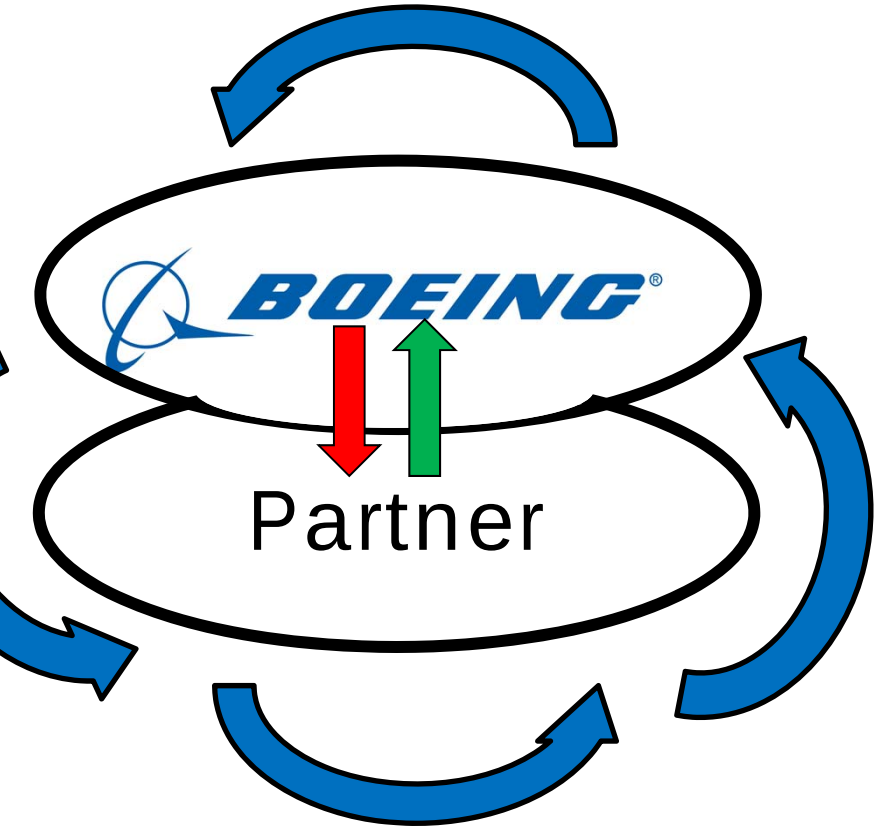
ld to Print" was constrained by heavy specification
ds by Boeing and development was kept in-house



ild to Performance" lowers specification uirements and outsources development



d to Fly” facilitates collaboration around elopment and specifications



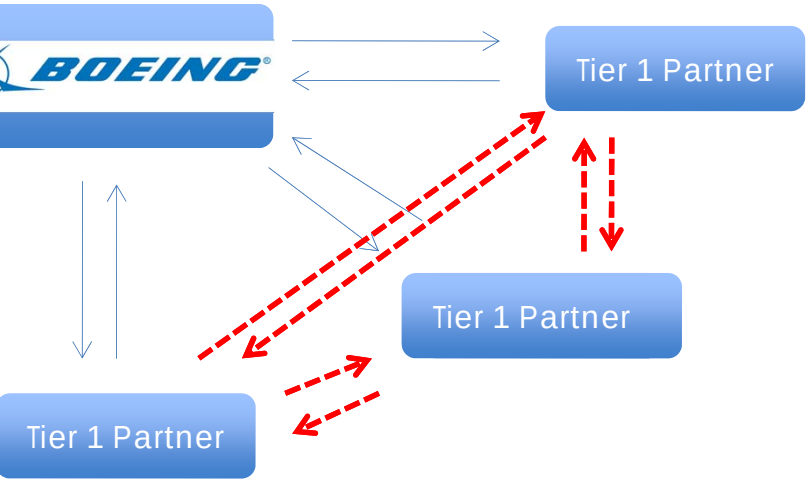
= Specifications

= Product

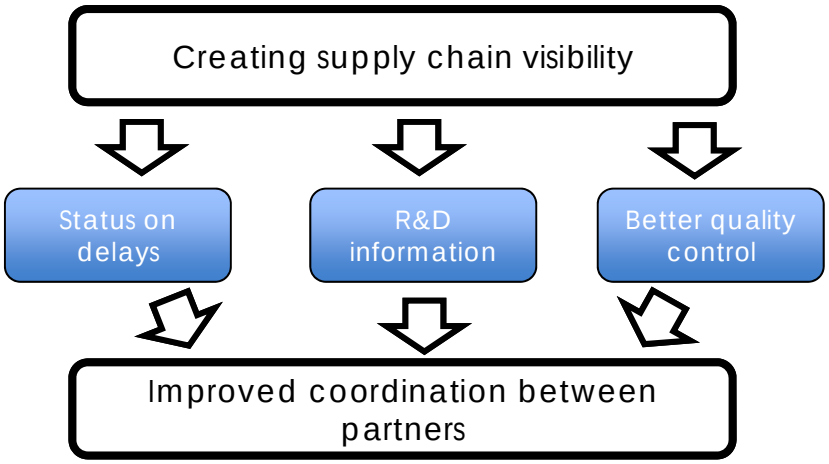
= Development

uild to Fly" facilitates communication tween partners throughout the supply chain

Facilitating links between suppliers



Improving coordination



Increased communication decreases potential delays and costs

ordination Teams will facilitate mmunication and control

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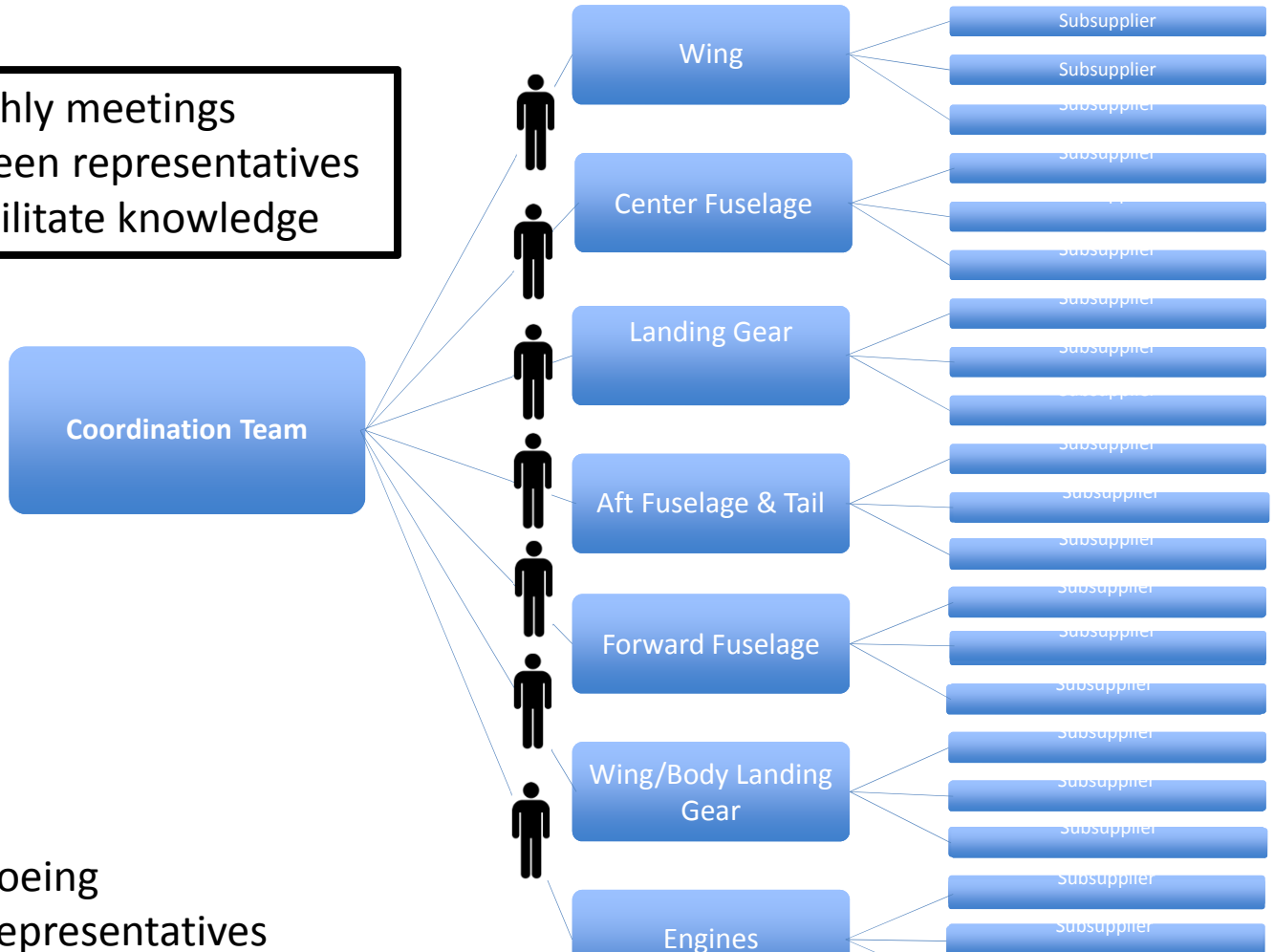
een representatives
cilitate knowledge



Boeing
Representatives

ld to Fly” will address issues of control,
ance and supply chain visibility

	Build to Print	Build to Performance	Build to Fly
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pply Chain bility			

ld to Fly" will address issues of control,
ance and supply chain visibility

	Build to Print	Build to Performance	Build to Fly
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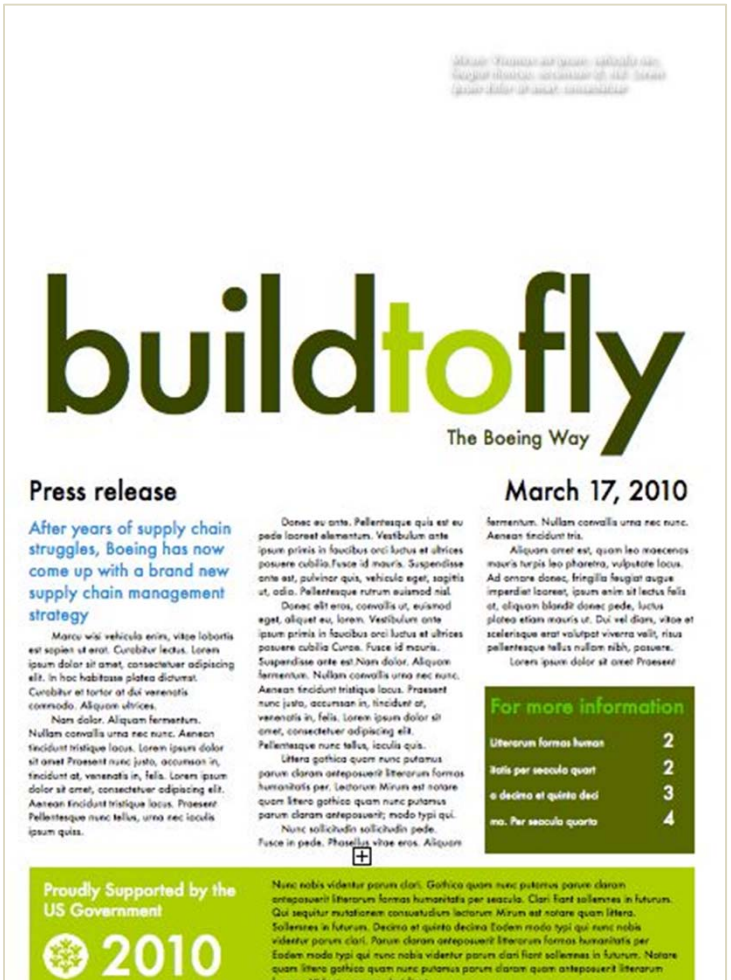
ensive information campaigns will inform
keholders of the new initiatives



buildtofly

The Boeing Way

Press release

March 17, 2010

After years of supply chain struggles, Boeing has now come up with a brand new supply chain management strategy

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For more information

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Proudly Supported by the US Government

2010

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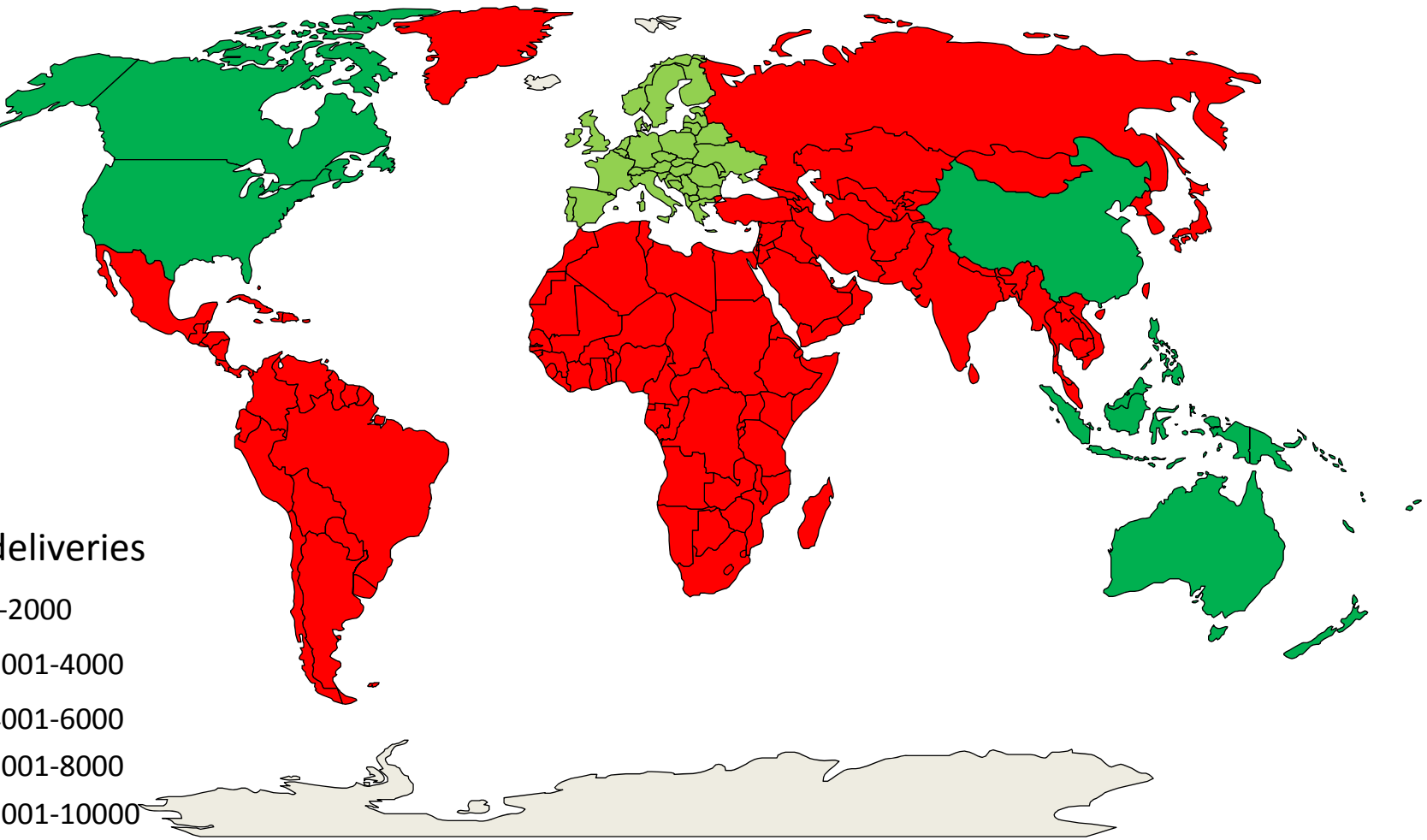
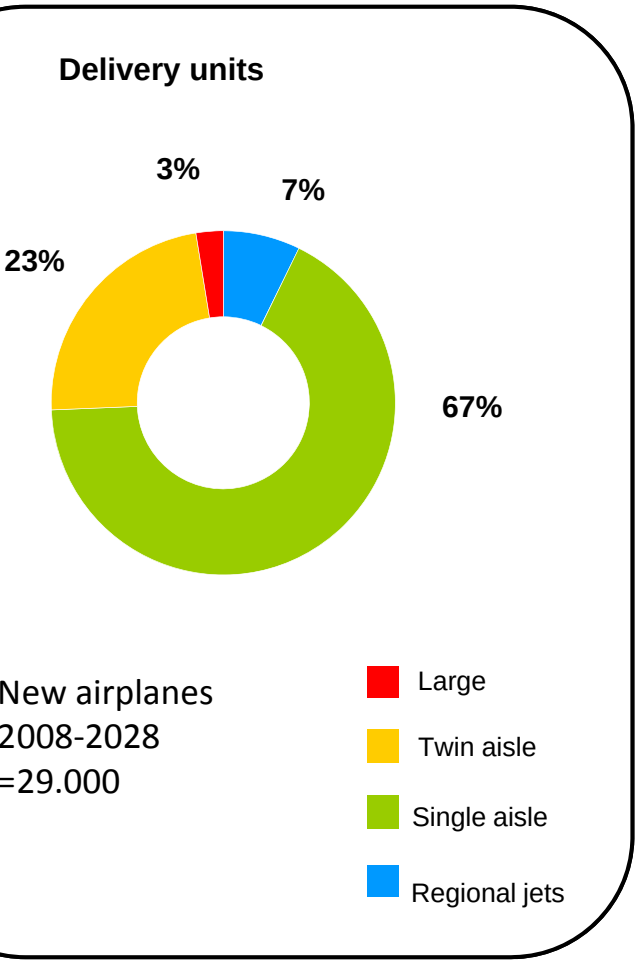
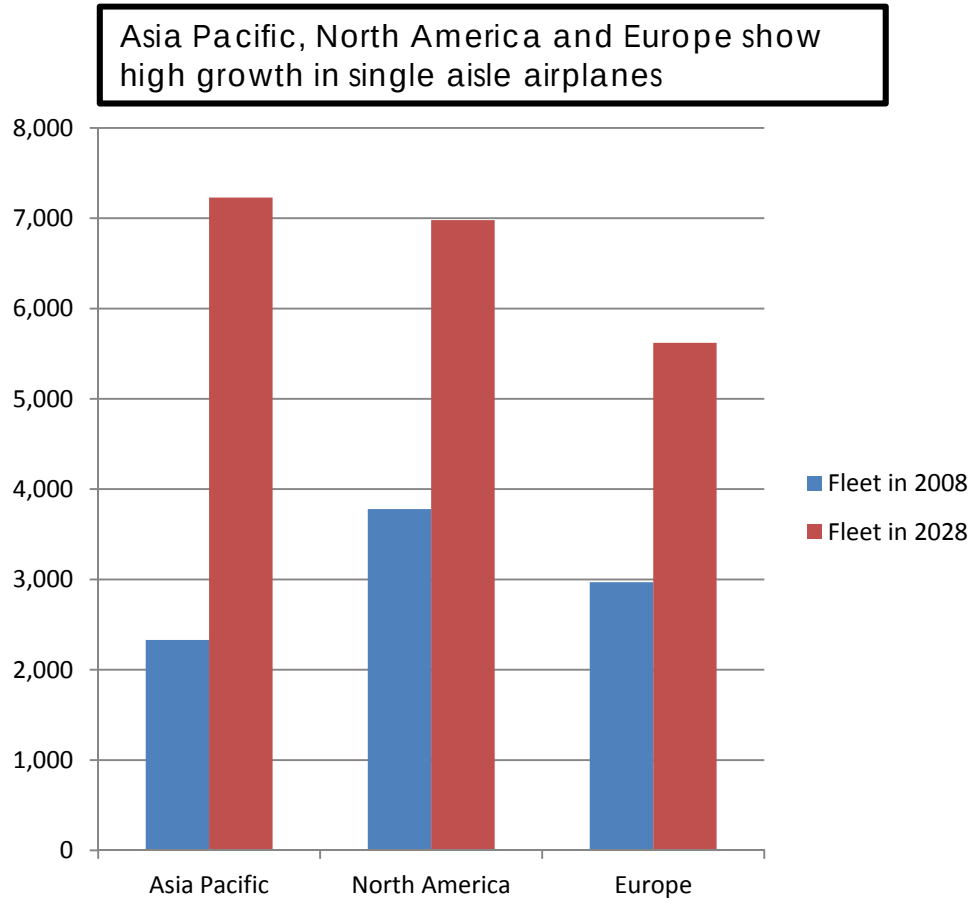
ure total deliveries are expected to be highest North America, Europe and Asia Pacific

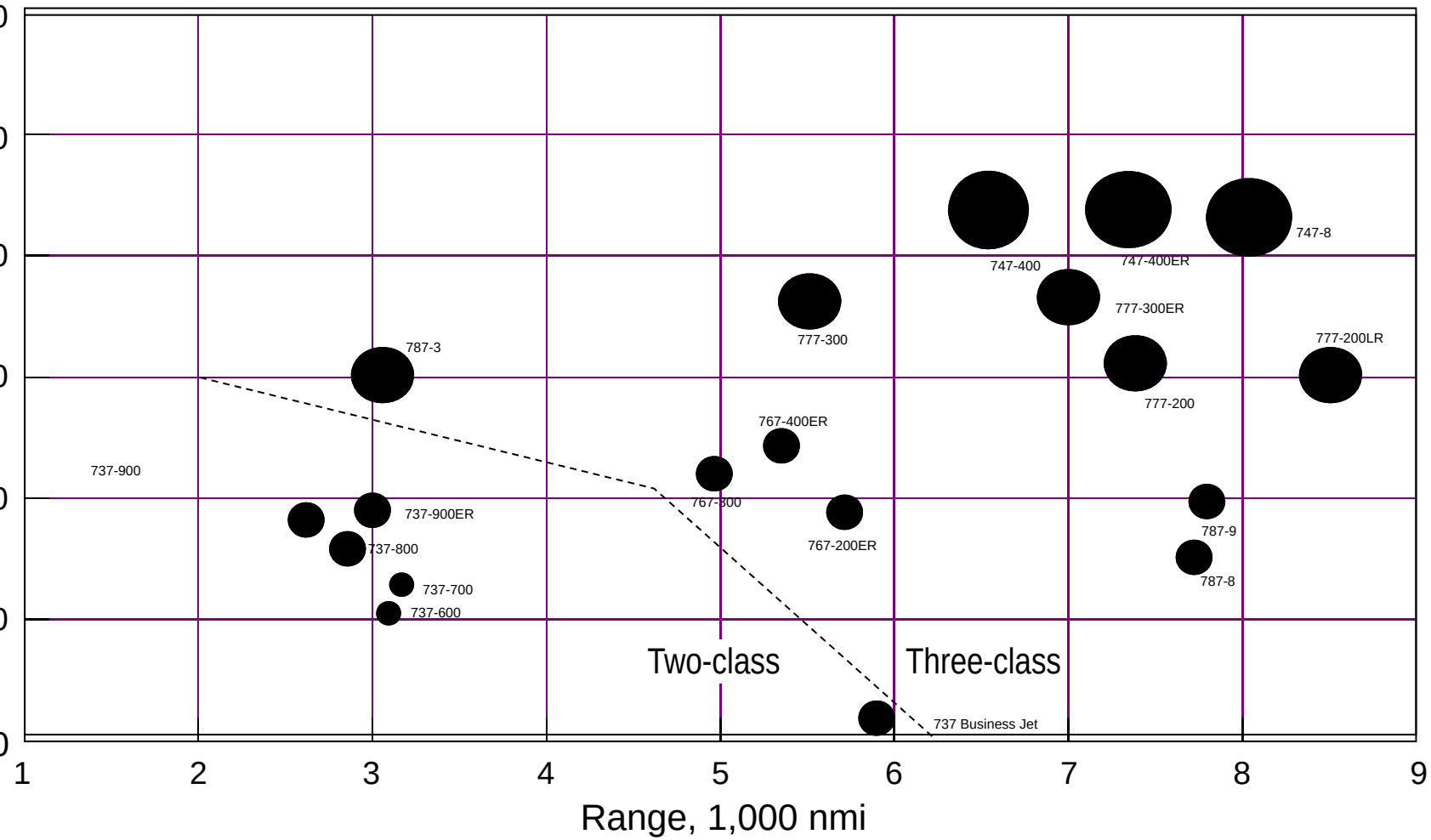


pected demand for single-aisle planes counts for 67% of new deliveries

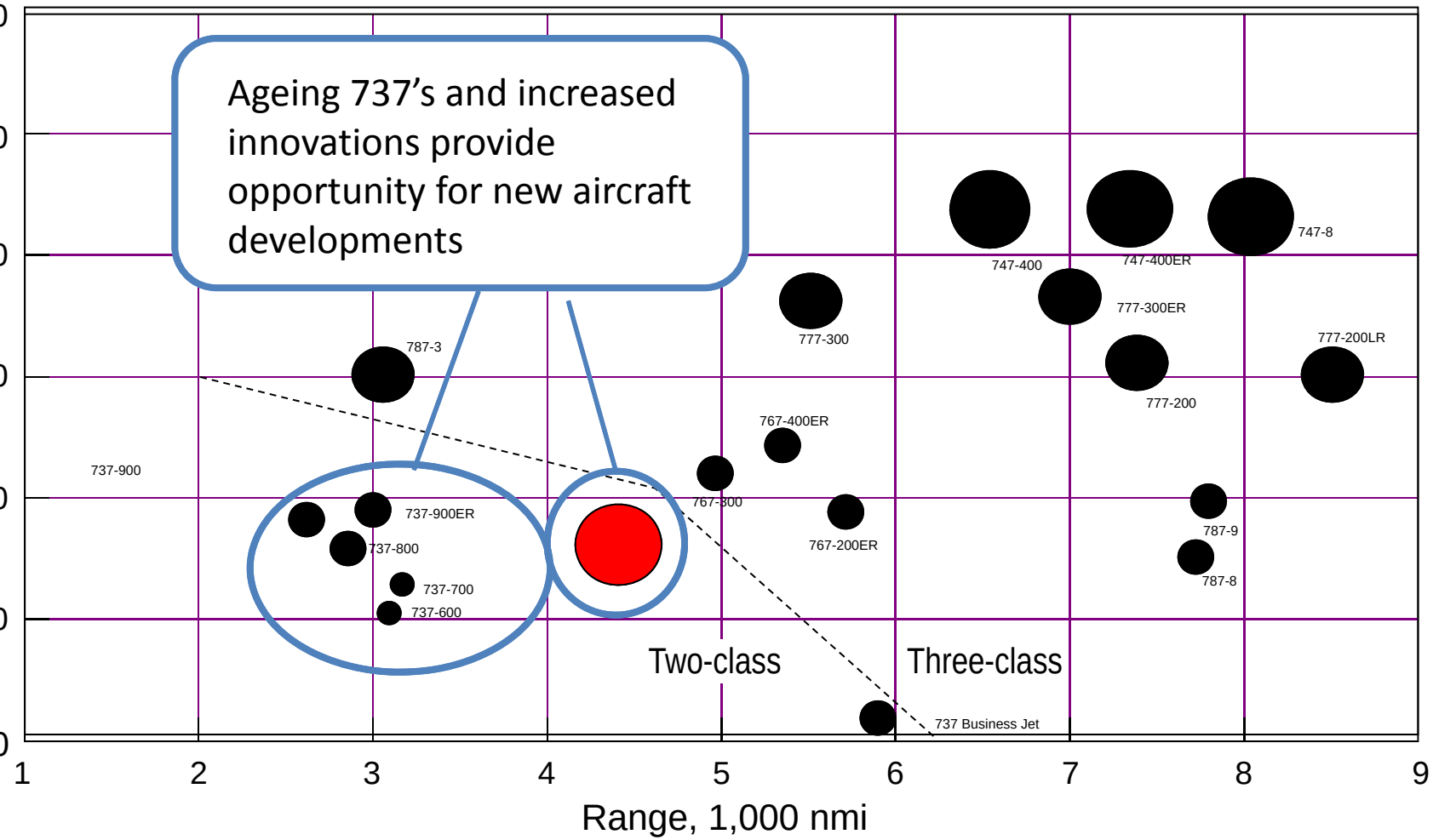




rrent product offering shows potential in single e fleet family

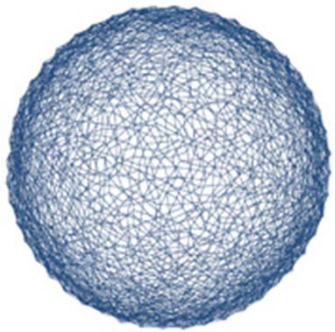


arket forecasts predict increased demand for ort-medium sized carriers



vironmental sustainability and rising fuel costs becoming ever more important issues

- Rising Fuel Costs
- International Awareness
- Sustainability is key
- Political Pressure



The price of jet fuel continues to be he greatest threat to industry rofitablity"

r Transport Association, Boeing Material

UCING

OEINGBIO1000

By Boeing Commercial Airplane Group

p of the line technical specifications will provide
mpetitive advantage

sengers	
pe 2 Configuration	148-157
pe 1 Configuration	174-188
ximum range	4-5500 nautical miles
ic Dimensions	
Ving Span	~32.3 m
With Winglets	~34.6 m
verall Length	~37.4 m
ail Height	~11.9 m
nterior Cabin Width	~3.53 m

Key innovative advantages:

Fuel efficiency:
- Environmentally friendly fuel mix (45% Sustainable / 55% Traditional)

Consumer comfort:
- Innovative solutions to complications such as interior design and relaxation

Composite materials:
- Utilization of lightweight materials and composites

uild to Fly" ensures broader innovation and ntinuous control

buildtofly
The Boeing Way

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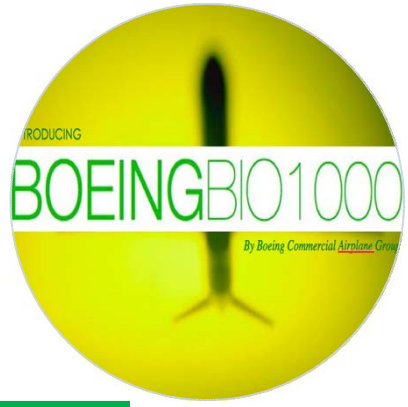
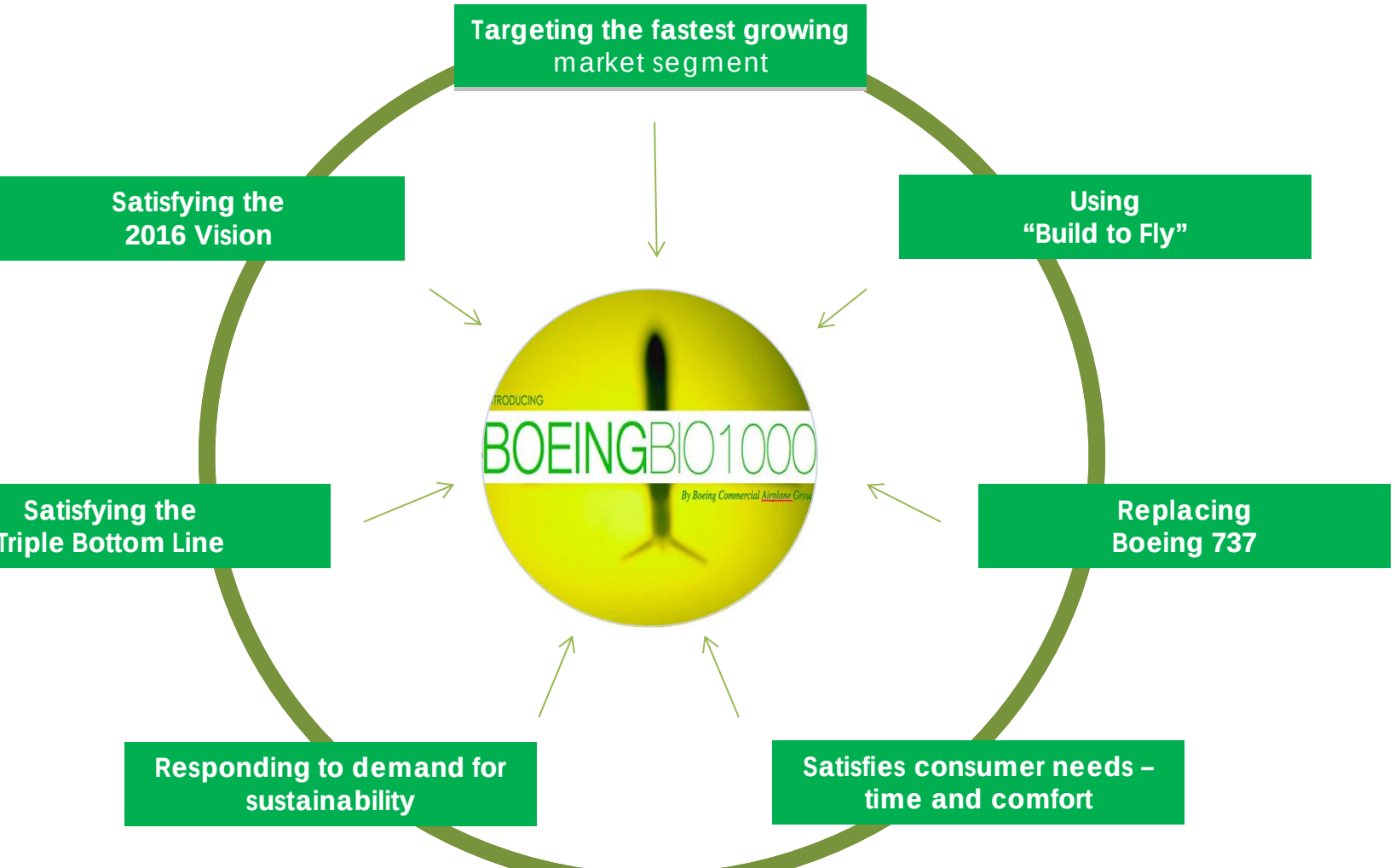


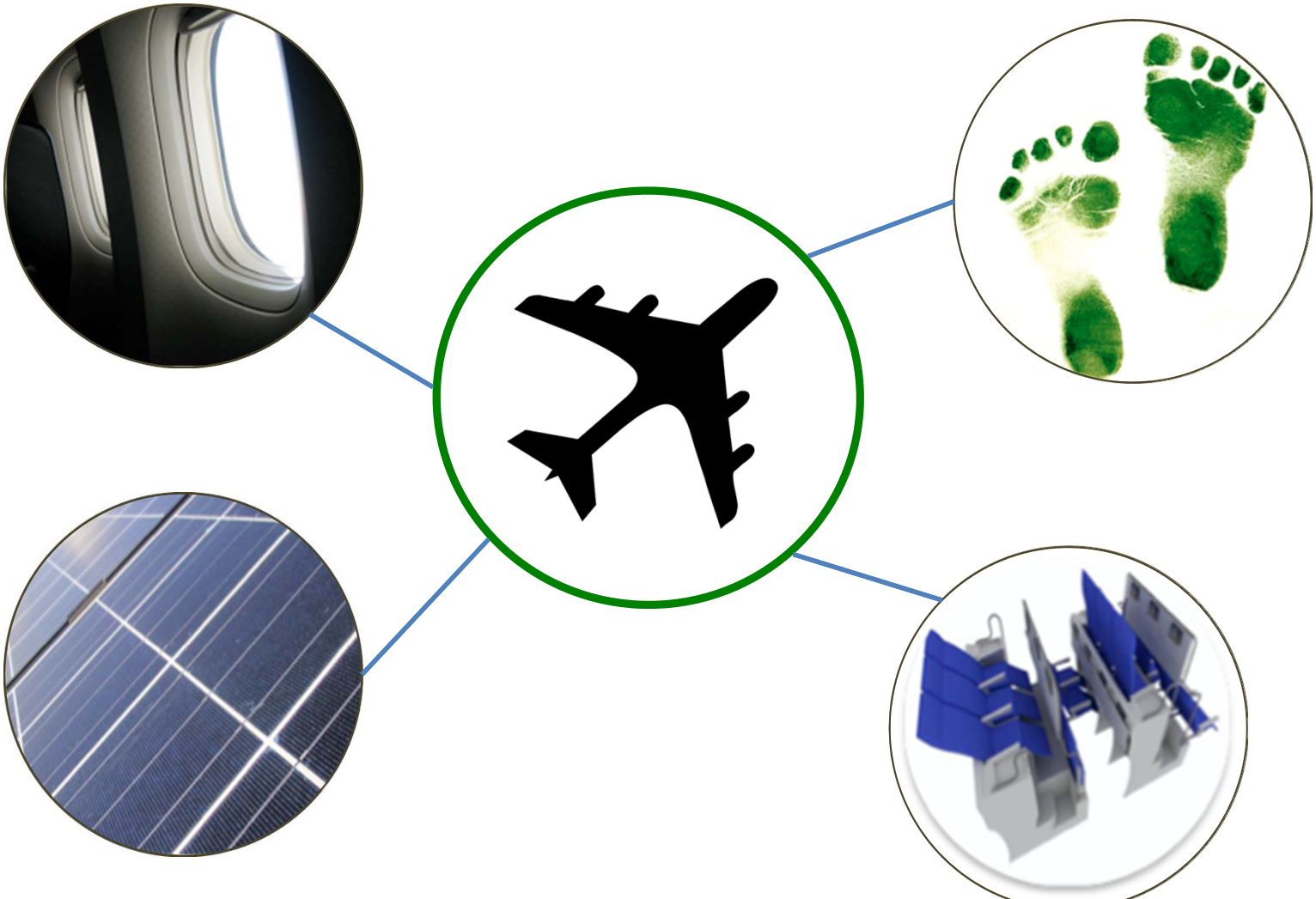
Ensuring Innovation & Control

- Latest technology
- On-time delivery
- Integration and collaboration with partners

e Boeing BIO1000 will ensure Boeings' position hin commercial aircraft



000 will implement innovative solutions within solar
gy, fuel efficiency, interior design and consumer
fort



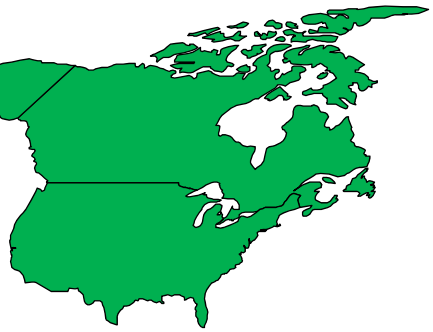
ample 1: There are ample opportunities for volutionizing interior design aboard Boeing crafts

Capture vertical space

Can be converted to an economy-class set-up on demand

veral potential buyers have been identified in growing Low-Cost Carrier segment

BOEING

North America	Europe	Asia Pacific
		
SOUTHWEST AIRLINES	RYANAIR.COM FLY CHEAPER	AirAsia.com
et size: 537 ing 737 jets rage Age: 10.5	Fleet size: 230 Boeing 737 jets Routes: 1,1000	Fleet size: 222 jets Flights pr day: 400+

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timizing supply chain gives major savings at a all cost

Assumptions & Estimates

her completion rate will reduce rage strike days.

ke costs 100 mio. USD pr day

umes 15 planes a month

ays in completion site costs 0 USD pr. day (ex. ngineering, compensation etc.)

	Now	Projected
Avg. delay to completion	600	300
Avg. % complete (- failure)	70 %	95 %
Planes manufactured pr. month	10	15

Value of "Build to Fly" project

Savings	**$1.645.000.000**
Costs	**$410.000.000**
Net value	**$1.235.000.000**

unch of BIO1000 negates potential market
are loss from new competitors

Assumptions & Estimates

vth of single aisle 90-175 seat
will be constant towards 2050

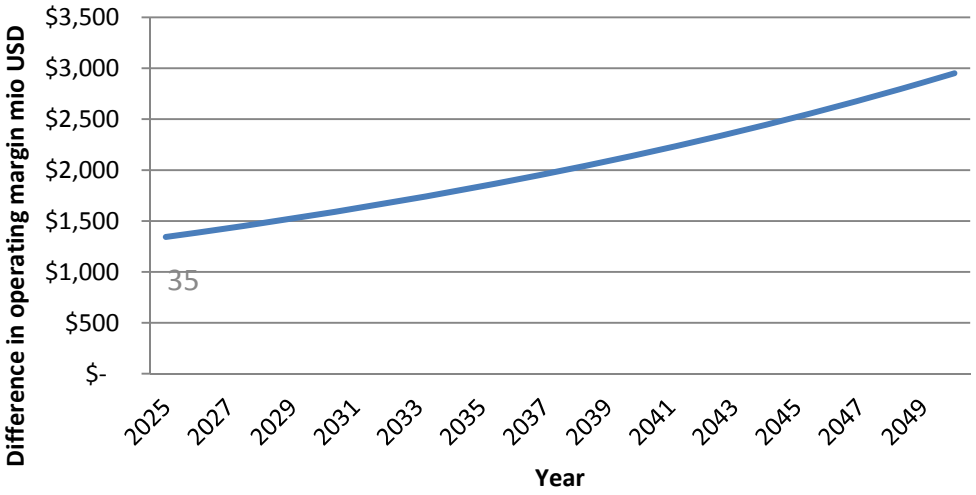
ngle aisle planes sold after
are Boeing Bio1000 planes

ket share will halve if no
tive is taken (Market report)

tional costs regarding Boeing
000 project approx 6.6 Bn USD

C 11 %

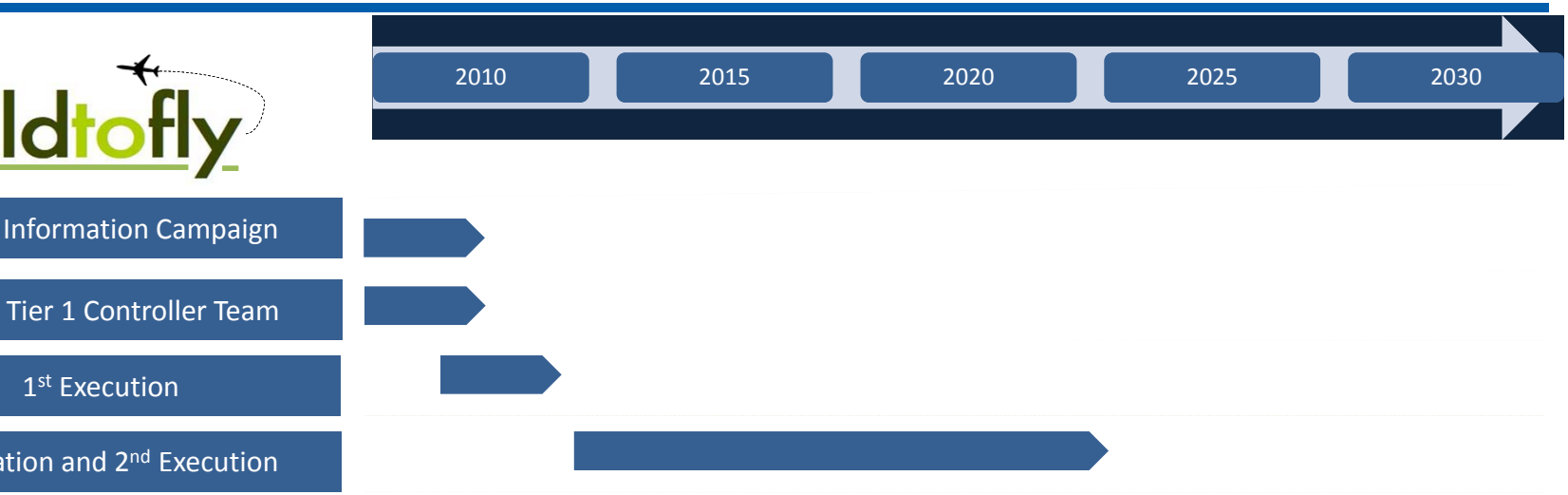
Potential loss/gain increases over time



Value of "Boeing BIO1000" project

Best Case	**$8.756.000.000**
Worst Case	**n/a**
Base case	**$2.079.000.000**

eline


2010
2015
2020
2025
2030
Information Campaign
Tier 1 Controller Team
1st Execution
ation and 2nd Execution
NGBIO1000
g BIO1000 Task Force
oduct Development
Ensure Funding
nt Application Process
Phase out 737

enda

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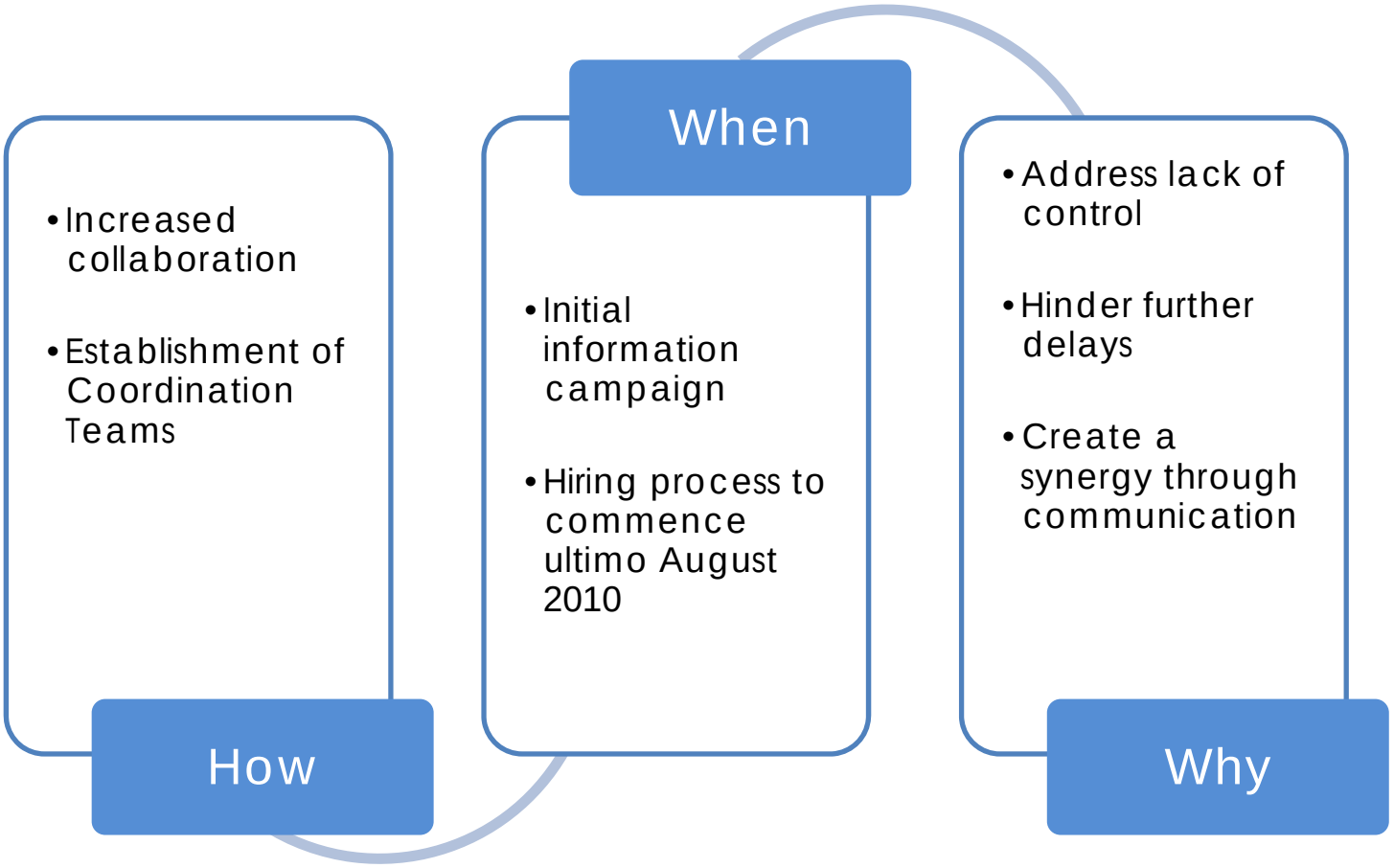
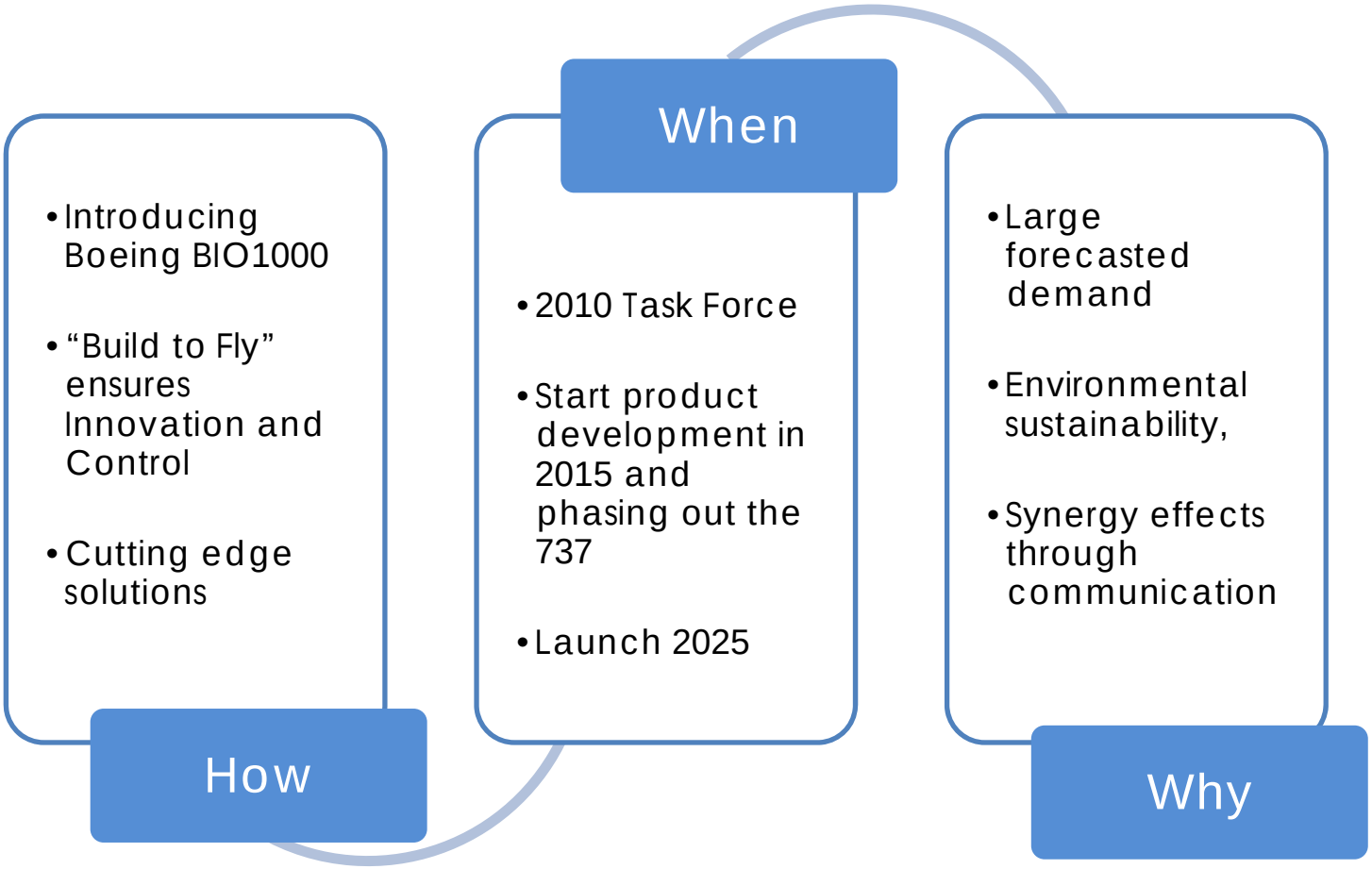
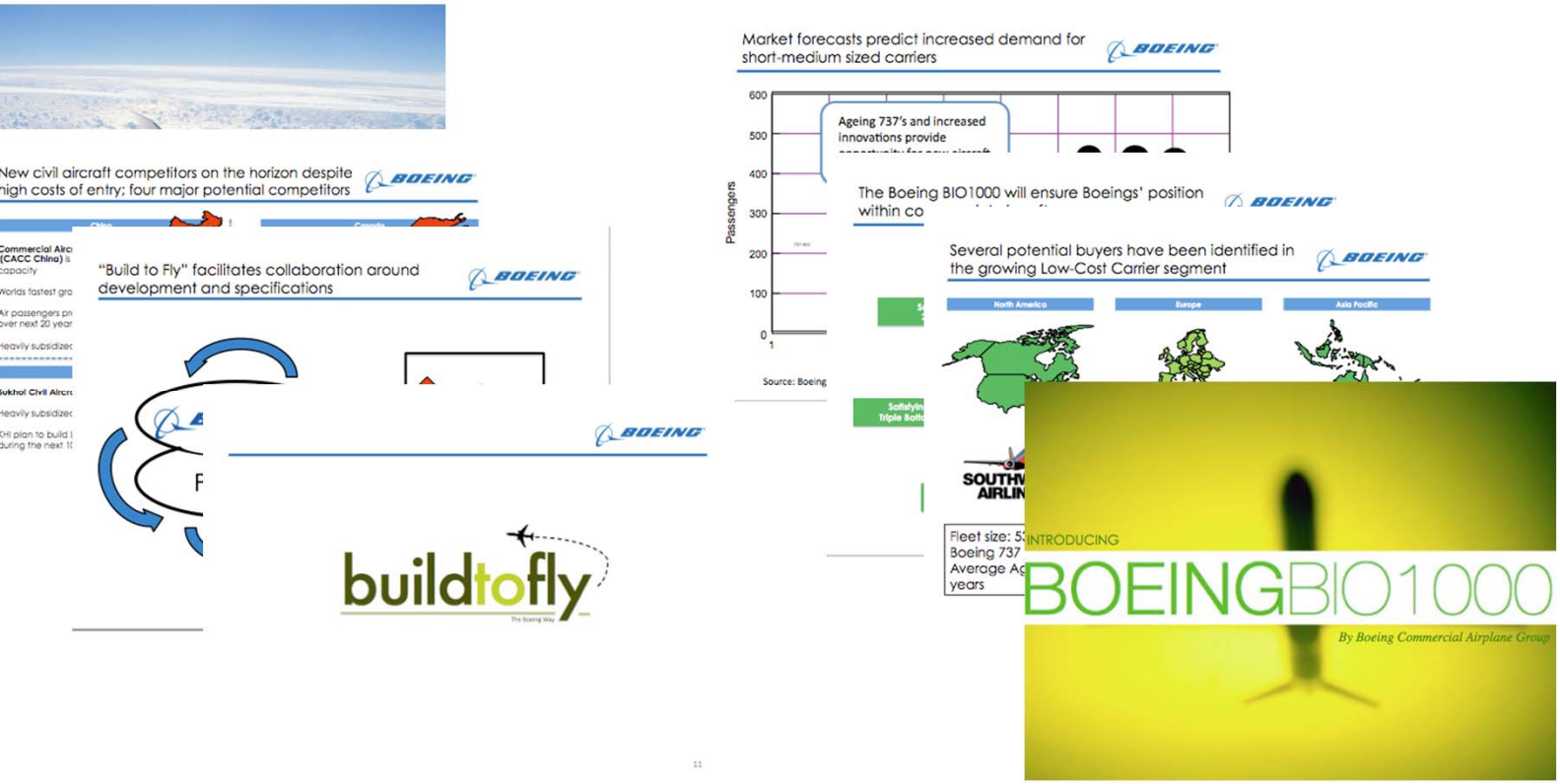
timizing Boeings global value chain integration



uring Boeings Future Competitive Edge with the oduction of Boeing BIO1000



ld to Fly” and Boeing BIO 1000 addresses the key es facing Boeing



ether the two proposals ensure that Boeing stays a crucial part of nore sustainable tomorrow

&A

ex

Recommendation

Issue slide
Transformation
Competitors

"Build to Fly"
Coordination Teams
Future total deliveries

Current product offering
Boeing BIO1000
BIO1000 innovative solutions

Financials
Timeline
How, Why, When

Appendix

- Manufacturer to Master Planner

- Triple bottom line
- Risk Mitigation
- Contingency Plan
- Contact, Control, Contract

- Comparison of Airbus & Boeing
- Market tendencies
- Union Member Challenges
- Airbus expectations
- Biofuel

eing has shifted from manufacturer to master nner

Build to Print

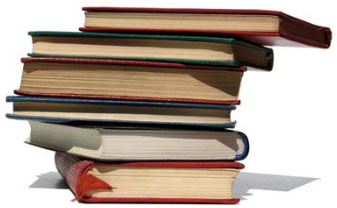
eing engineers develop the design

rtners build according to exact cifications

tailed manual with drawings and nicalities – hundreds of pages

eing engineers quick to intervene n suppliers needs technical tance or if they are not building ording to specifications

0% Internal R&D



Build to Performance

✓Suppliers do the innovation, drawings and tooling themselves

✓A complete shift in responsibility – suppliers fully responsible

✓Boeing makes a short request to suppliers with specifications – tens of pages

✓Financial risk now lies with suppliers

✓R&D

uild to Performance”
good idea – but not effectively executed

In Theory

Utilize technology and technical talent from around the world
Ensure up-to-date innovation
Risk sharing
Value Chain visibility
RFID tags
Strengthened B2B Network

In Practice

- Miscommunication
- Unnoticed Delays
- Lack of Control & Quality
- No Incentives Systems for Suppliers
- Outsourcing Core Competences
- Financial Penalties

pply Chain best practise from the auto industry nnot be transfered to the aircraft manufacturing ustry

	Toyota	Boeing
Production	8.540.000 / year	480 / year
Parts (avg.)	14.000	5-7.000.000
Price (est.)	~ $30.000	~ $50-305.000.000
Lifespan (est.)	10 years	25-30 years
Complexity	Medium	Very high

ing can sustain its future competitive advantage by
blishing itself as a Master Planner

e Competences

The Boeing 2016 Vision

Strategies

- ✓ Run healthy, core businesses
- ✓ Leverage strengths into new product
- ✓ Open New Frontiers

Values

- ✓ Leadership
- ✓ Cooperation
  Integrity
- ✓ Quality
- ✓ Customer Satisfaction
- ✓ Diverse & Involved Team
  Good Corporate Citizenship
- ✓ Enhancing Shareholder Value

commitment to understanding and anticipating customer needs and excellent
pplier management with high quality, efficiency and low transaction costs"

ecially competitive issues makes a
lacement of the aging Boeing 737 necessary

3 main reasons behind replacement

New profile

- Improved abilities
- New found competencies

Already plans regarding replacement

- Advance plans on replacing 737
- Is already part of future strategy

Technological inferior

- Cannot compete with new competitors
- Needs to brand it self in current world

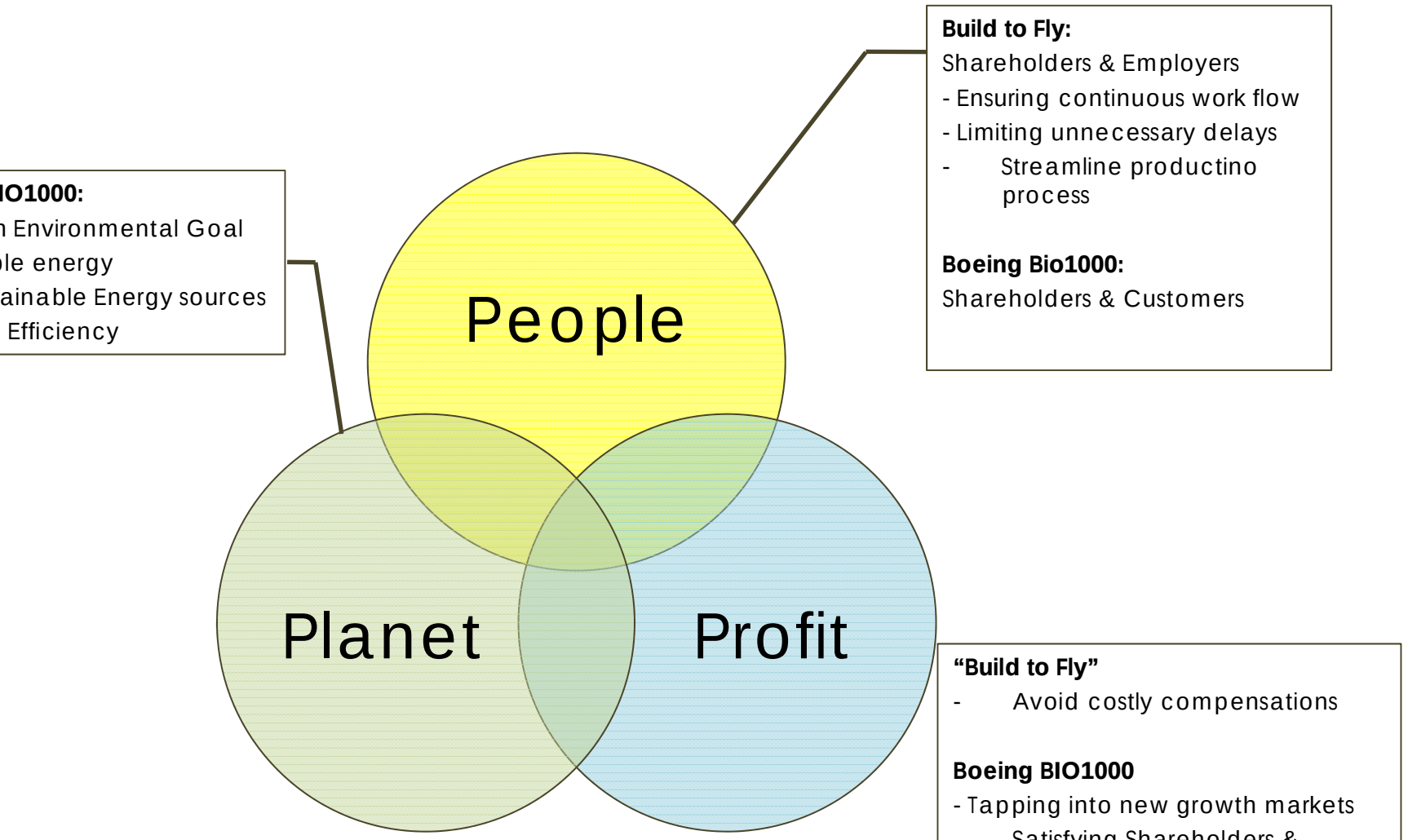
m contractors to strategic partners

Incitament structures
- On-time delivery
- Punctual delay announcement
- Completement rate

Short term:
- Completion rate decides bonus size

Long term:
-Continued succesive completion rates over 95% releases continual bonus until break
-Creates longer lasting relationships and more experienced partners

eing ensures sustainability by focusing on triple bottom line



Build to Fly:
Shareholders & Employers
- Ensuring continuous work flow
- Limiting unnecessary delays
- Streamline productino process

Boeing Bio1000:
Shareholders & Customers

IO1000:
n Environmental Goal
ble energy
ainable Energy sources
Efficiency

"Build to Fly"
- Avoid costly compensations

Boeing BIO1000
- Tapping into new growth markets
- Satisfying Shareholders &

tential risks can be mitigated by closely erserving market developments

Risk	Mitigation
"Build to Fly" strategy does not succeed in creating expected synergies and benefits	Periodically review supplier relations and decide on partnership improvements/termination
Failure to restore consumer confidence in Boeing as supplier	High incitements for suppliers and Boeing employees to finish development and production as scheduled
Boeing BIO1000 does not provide significant reasoning for customer replacement	Stress high fuel efficiency and long term benefits of environmentally conscious solutions

nforeseen delays and complications arise re are still opportunities for Boeing

Establishing a trategic alliance with key industry leaders	• Working on R&D with windmill producers such as Vestas • Key solutions to improvements of both wings for windmills and aircrafts as these use the same carbon fiber components
tablishing a strong maintenance unit	• Currently done by airlines themselves • Establish a low-cost unit offering attractive prices and swift service solutions
ourcing back the essential parts of production	• Source back wing production from Mitsubishi (Japan), that currently represent a clear threat of forward integrating and utilizing their R&D knowledge from development of Boeing products • Create jobs for union workers who have created multiple obstacles in the production of the Dreamliner

ild to Fly" solves key issues with Supply Chain nagement

Problem	Solution
Contact	
ntact phase has not ensured choice of st partner	Higher integration of PLM system to include suppliers
Control	
ality of work is not always optimal	Increased integration and collaboration between Boeing and supplier to combat potential issues as early as possible
lays are not communicated properly	Increase knowledge sharing amongst Boeing and supplier, including weekly status meetings
Contract	
rtners engagement in Boeing's ccess is not sufficient	Move suppliers to a position as strategic partner and provide incitements for creating long term relationships

Dreamliner is smaller and cheaper than Airbus A350

Differences

ing 787 Dreamliner

10-330 seats.

76 orders from 53 customers

Windows' are taller.

With any luck, Boeing will ship the first 87 to customers in the fourth quarter f this year.

oeing's answer to the A350 1000 is he 747-8 Intercontinental, a new nodel of the world's first jumbojet.

150-205 million

Airbus A350 XWB

- 270-440 seats
- A350 has 505 from 32 customers (about what the 787 had at the same stage in its development)
- The A350 windows are wider
- Reaching the market in 2012-2015
- the A350 1000, will carry up to 100 passengers more than the biggest 787.
- Lists for $225-285 million

Similarities

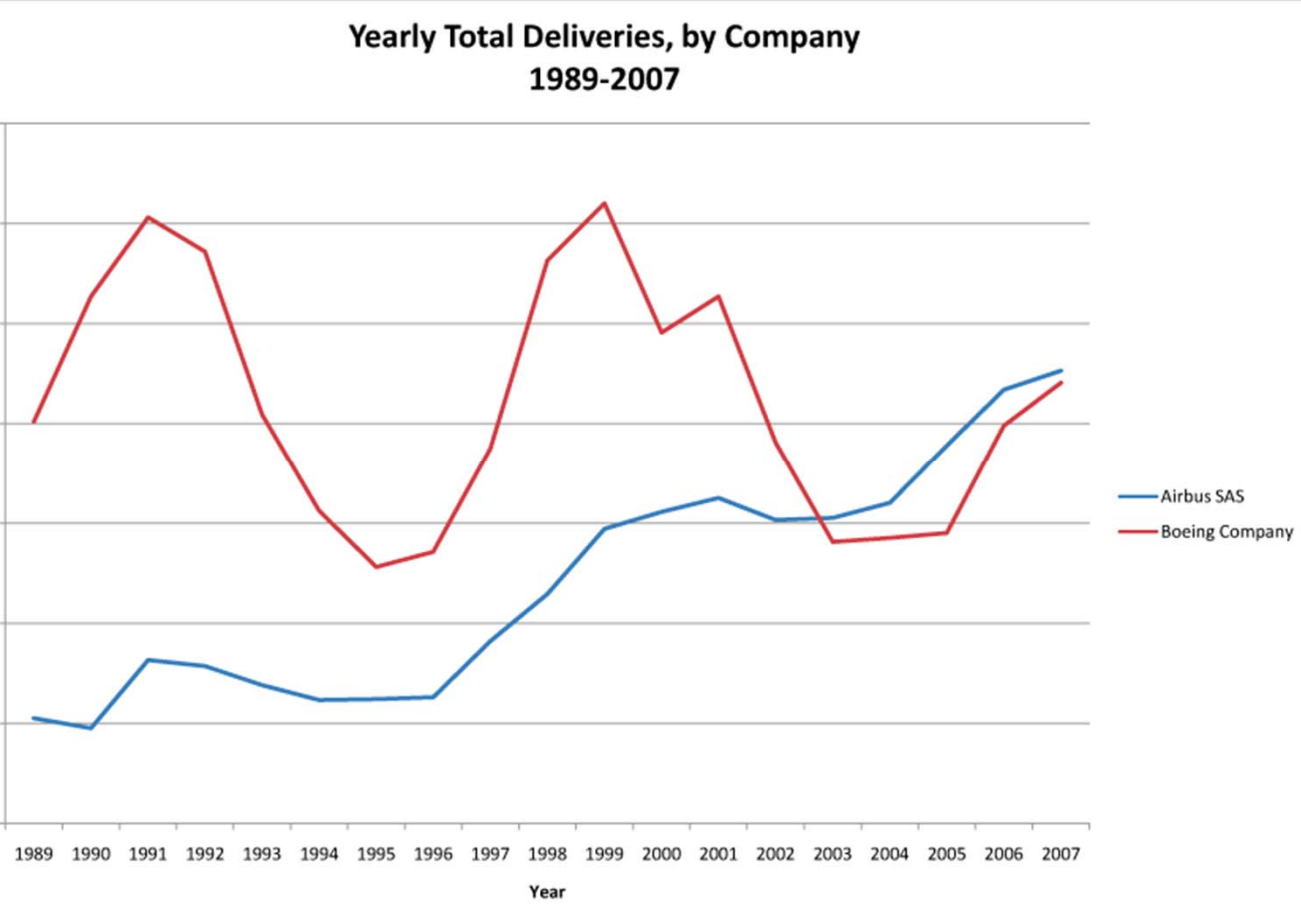
Long range

50 per cent carbon fiber.

>8,000 miles without refueling.

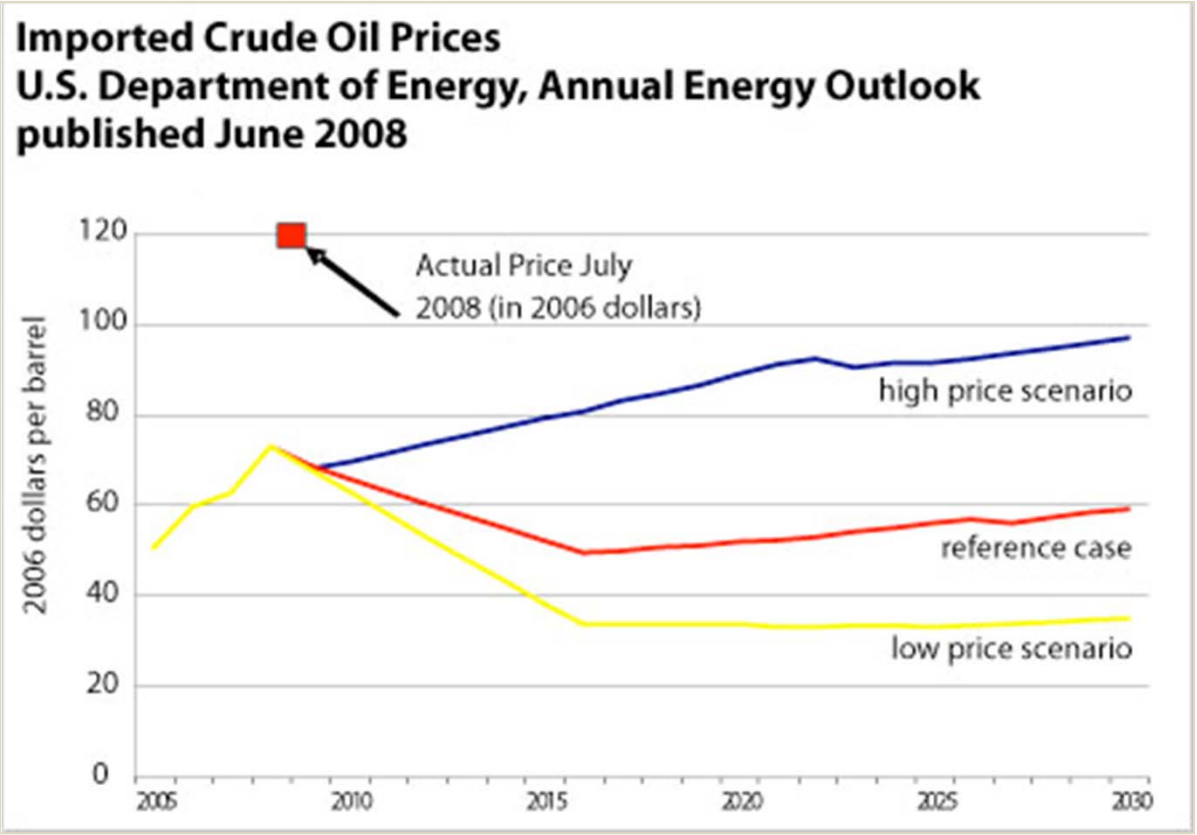
Three models (although the smallest 787 may be dropped.)

us has surpassed Boeing in aircraft sales



mparison of Aircraft Sales of Airbus and Boeing Between 1989-2007

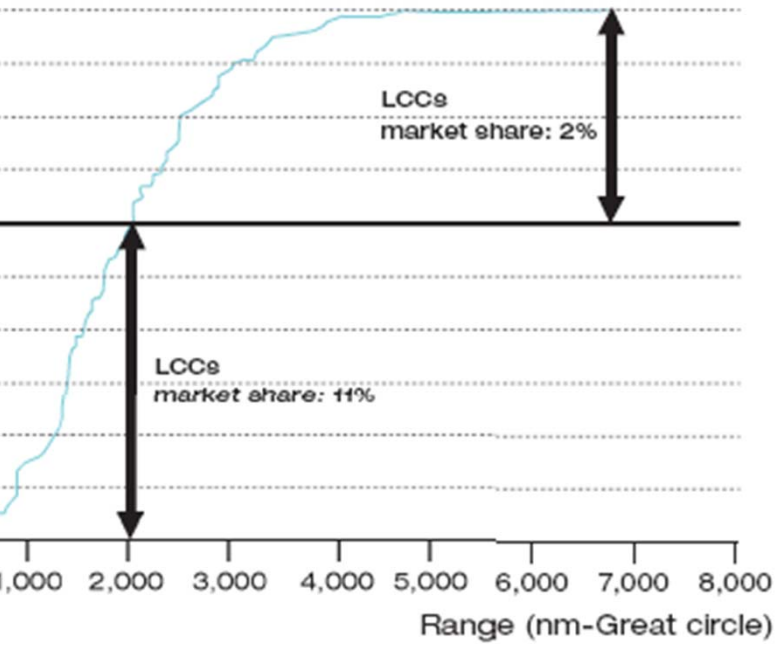
ure fuel prices are unpredictable



C tendency have not yet hit Asia. Also
tance served are mainly short range.

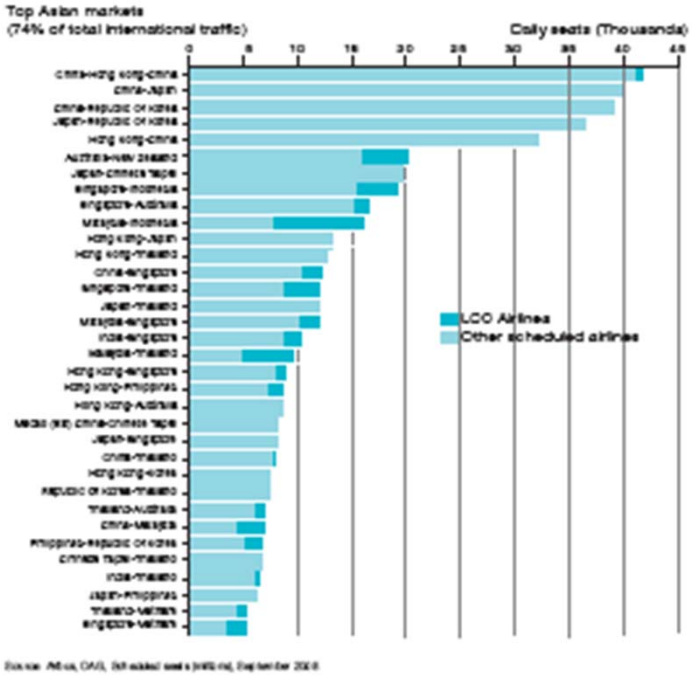
Almost entire LCC is short range travel

umulative demand from ASEAN countries to the region



LCC market in Asia is not saturated

Intra-Asia: LCC's have taken just an 8% market share, but increasing rapidly



banization provides future opportunities for ional air traffic

-Continuous expansion of major cities provide opportunities for regional air traffic to/from workplaces

- Increasing distance give grounds for complications and delays in terms of regular traffic

craft Emission Regulations

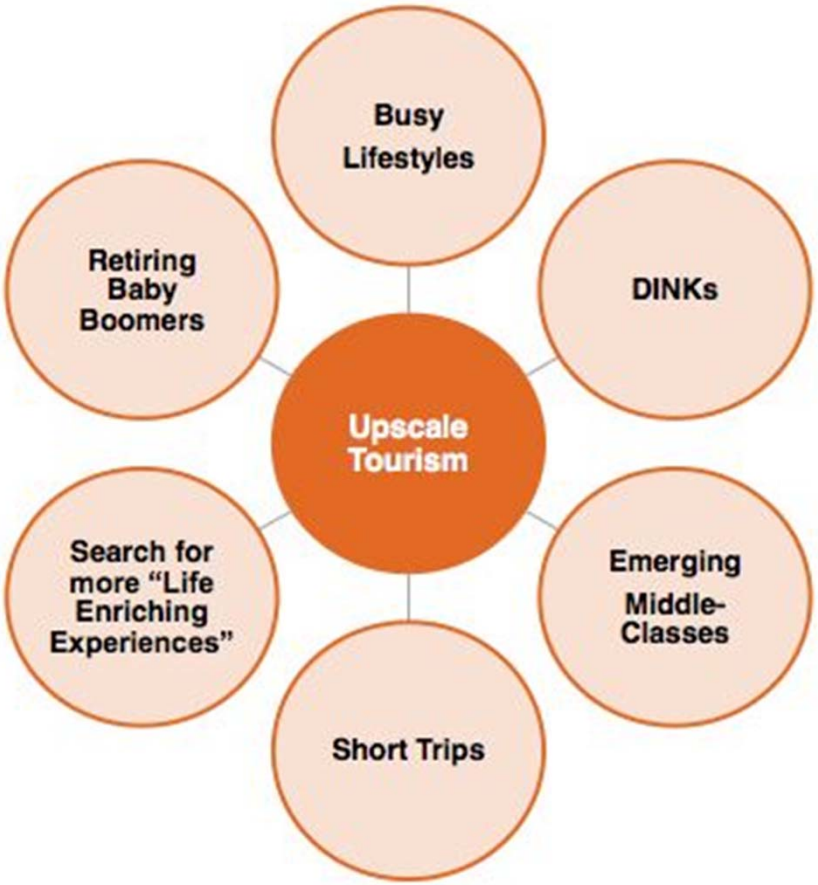
O & FAA Regulations

ulation limits the emissions of:

- Smoke
- Unburned hydrocarbons (HC)
- Carbon monoxide (CO)
- Oxides of nitrogen (No_x)
- Vented Fuel

ce: ICAO & FAA

urism trends in line with Boeing BIO1000



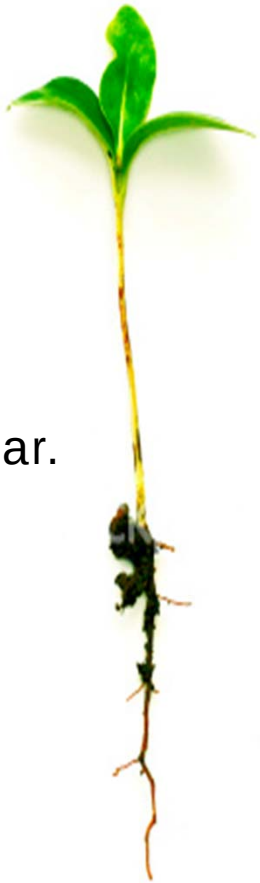
ge technical developments within biofuel

o modification to current aircrafts required
anes will run on 30% biofuel blend

ot enough biofuel available to completely
upply the industry
e industry uses 85 billion gallons of kerosene each year.

"Developing and commercializing these low-carbon energy sources is the right thing for our industry, for our customers and for future generations."

Jim Albaugh, President and CEO of Boeing Commercial Airplanes



e two initiatives will address union member allenges

buildtofly
The Boeing Way

Ensure stabile work flow and job security

Bringing back jobs with Boeing BIO1000

expect Airbus to enter the short-range, gle-aisle segment

Airbus' response	Consequences
Response #1 Remain in long-range	- Allow market share to Boeing
Response #2 Enter short-range	- Direct competition - Divide market share - "Build to Fly" will benefit Boeing - First-mover advantage

mple 2: A focus on weight and landing gear will ke BlO1000 a perfect fit for challenging airports

ntos Dumont Airport serves Rio de Janeiro, Brazil and has a very rt runway. It is the city's second major airport behind the Rio de neiro-Galeão International Airport.