SHOW US YOUR ANGLE.

BOEING INNOVATION CHALLENGE

Virtual Student Kickoff2
October 2, 2019

SEPT 2019 - JAN 2020
PUGET SOUND, WA

Please contact your school faculty focal for student information package
10/2 BIC Kickoff2 Agenda

Video Introduction
- BIC Challenge Overview
- Topic Sponsor Presentations
- Phase 1 Competition Requirements
- Key Dates
- Phase 2 - Hackathon in Everett

Live Q&A session with Boeing
BIC Contacts
SHOW US YOUR ANGLE.

BOEING INNOVATION CHALLENGE

BUILD
Build your innovative ideas to shape the edge for the next generation aerospace on the given areas.

INSPIRE
Inspire Boeing experts with your ideas and come join an on-site challenge in the Boeing Puget Sound.

CONNECT
Connect with Boeing experts, work with students from other universities to show your new angle.

Aircraft design/build Simplification  Adaptable Cabins  Applied Industry Innovation

SEPT 2019 - JAN 2020
PUGET SOUND, WA

Please contact below for further information
(YourStudentCoord @ YourUniversity)
10/2 What’s BIC Next – Live Q&A Session

Todays Focus:
• Students Submit Team Registration – Nov 1
• Teams submit final idea definitions - Nov 15
• Boeing judges ideas, and announces Phase 1 Team and Student winners – Nov 27
• Phase 2 Virtual Winner Teaming – Jan 10
1. The Student Package – From Your Univ. Student Coordinator

2. Student BIC Registration – Download from University Website (or other) – Students to register their participation by Nov. 1st.

3. Team Idea Submittal Form – Students fill in each section of the Quad (see example or other) to well summarize their idea – if need more graphics, processes or ref. - attach a page 2 (one added page only) and submit final no later than Nov 15th.

4. University BIC Web Page – University coordinators to set up a quick University page they can post local BIC information and linked forms to the Boeing BIC Web Page: http://www.boeing.com/commercial/innovation-challenge/index.page

5. Commercial Aircraft Innovation Ref. Guides – See attached and updates on BIC Web

6. BIC Contacts: First – Your University Student Coordinator, Second your Boeing University Champion, Third – email: boeinginnovationchallenge@boeing.com
Boeing Innovation Challenge – Useful Ref. Material:
(Also anything similar in your University Library – use for design drivers and known options)

Introduction to Aircraft Design
John P. Fielding
Cambridge University Press, 1999

Evolution of the Airliner
Ray Whitford
Crowood, 2007

AIRCRAFT DESIGN: A Conceptual Approach
Daniel P. Raymer, Ph.D.
AIAA Education Series, 1999

Value Proposition Design: How to Create Products and Services Customers Want
Alexander Osterwalder, Yves Pigneur, et al.
Wiley, 2014

Ten Types of Innovation: The Discipline of Building Breakthroughs
Larry Keeley
Wiley, 2013
**2019 Boeing Innovation Challenge Rough Example Inputs**

**Team Name:** SwiftBus  
**Team Members:** John Do-It, Sally Booker, Igor Exiter  
**Prime Challenge Topic Area:** 1. Simplify Aircraft Design / Build & 2. Efficient Aircraft Cabins

**Topic Problem:** Topic 1 Key problem is design requirements for multi Mission Customer needs are too broad – requires many conflicting solutions to be integrated into a complex product capable of all and optimized for none.

**Proposed Solution Idea:** to enable a simple airliner change requirements - design the basic model to fit one basic efficient short range mission with one large full passenger load and use like a bus – multi stops with fast on/off load & refueling Infrastructure  
Value- Reduces expensive complex design variable of Non-Stop longer and shorter range passenger preference

**Key Risks:**
1. Turn time cannot be reduced to Bus like efficiency and passenger preference  
2. Complexity actually driven by Certification, and airline features not mission ranges

**Assumptions:** Must assume Airlines will want to take advantage of a simple low cost bus like aircraft, and not add back complex features

**Idea Validation Approach:**

**Idea Validation At Hackathon:**
1. Define useful short mission  
2. research existing concepts  
3. Define configuration to leverage Bus short range, small fuel load, and enable fast turn time e.g. multi hull, many exits and many boarding ramps with front boarding, aft exit  
4. Estimate simplification benefit, $ value

Boeing development would require Rapid loading Infrastructure changes, Airline Customer Testing and new route value planning

**Idea Value of key elements:**
Simplified Aircraft Value from reduced build cost with lower cost build labor, earlier implementation of more efficient lighter point designed materials, airframes and powerplants  
Build Cost reduction ~ 50% (lower weight and more bonded, less bolted joints)  
Operating Cost reduction – small fuel load enables high payload revenue/cost  
Boeing Benefit: Increased units x (lower price-lower cost/unit ) = large profit

**Aircraft Application:** Technology is currently available (requirement and loading infrastructure change only) – Could implement in a 737 replacement in next 5 years.
Team Name: SwiftBus
Team Members: John Do-It, Sally Booker, Igor Exiter

“Turn Time” Web Search Ref: https://www.boeing.com/commercial/aeromagazine/aero_01/textonly/t01txt.html#fig1

SwiftBus Turn Time - Change Elements
1. Deplane – XYZ new process
2. Cleaning – QRS
3. Enplane – ABC
4. Luggage - NOP

Key SwiftBus Aircraft and Operation Simplification elements:
1. Structure – ABC
2. Engines – QRS
3. Cabin – TUV
4. Ramp - XYZ

This Idea Target: 25 Min
# 2019 BIC – 12 Participating Universities & Contacts

<table>
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<th>Participating University</th>
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<td>Washington Univ.</td>
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<td>Rhonda Crate</td>
<td>WSU Corp relations VP - Shelley N Pressley, <a href="mailto:spressley@wsu.edu">spressley@wsu.edu</a></td>
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Q&A: 2019 BIC – 12 Participating Universities

WSU

Cal Poly SLO

Cal Tech

USC

Iowa State

Purdue

Case Western

Virginia Tech

Boeing BIC Sponsors and Leaders Q&A

Copyright Boeing 2019
Back-Up Video Slides Shown:
The Boeing Innovation Challenge (BIC)

This is a multi-university competition that brings diverse students together to demonstrate their capabilities in a fast paced, open innovation teeming environment (Just like Industry)

This Challenge is a unique student opportunity with diversity and inspiration to create solutions of value to Boeing and to the world.

Why participate in the BIC?
• Gain experience with real industry problems with faculty and professional mentors
• Demonstrate your innovation, diversity, teaming, and productivity skills
• Create a network of students, faculty, and professionals (including Boeing leaders)
• Win the opportunity to apply for exclusive Boeing internships (2nd phase participants only)

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BIC Category Overview

Topic 1: Simplifying Commercial Airplanes

- Innovations to dramatically simplify an aspect of design, manufacture or operation.
- Significant design/build cost reductions over competitors, while improving useful functionality.

Examples:
- Innovative structures architectures, and/or material systems.
- Improvements in safety, quality or build costs.
- Simplification or reduction of design requirement.
- Multifunctional, more integrated architectures (e.g. combining two or more of structures, systems, passenger cabin, propulsion, flight sciences.)
Topic 2: Creating Efficient, Adaptable and Flexible Airplane Cabins

- Innovations that strengthen the capability of the future Boeing Cabin by meeting the current and future needs of airlines and passengers.

Examples:
- Getting people, baggage/cargo on and off the airplane more efficiently
- Reducing the time needed for servicing the airplane cabin, including: catering, cleaning, water and waste systems, and even fixing/checking something that is not working properly.
- Enablers for rapid cabin reconfiguration between flights
Topic 3: Cross Industry Aircraft Innovation

- Non-aerospace technologies with beneficial applications for airplanes, crews and passengers to enhance the total travel experience.
- Cross industry “not invented in Aerospace” innovation applies concepts from non-aviation fields into new aviation applications to quickly enable significant value improvements.

Recent examples

- Additive manufacturing.
- WiFi communication.
- Tablet computing.
- Virtual reality.
BIC Student Eligibility

Eligible participants must be:

1. A U.S. citizen or U.S. person (Green Card+)
   Note: Boeing is precluded from hosting citizens of Cuba, Iran, North Korea, Sudan, and Syria.

2. An active student at a participating school through the duration of the competition.

3. At least a sophomore.

4. Part of a two- to three-member idea-forming team.

5. Willing and able to participate in the next phase of the competition.

6. Willing to diversify their ideas and team if selected to participate in the next phase.

7. Willing to sign the “Boeing Innovation Competition Student Agreement” if selected for the next phase
   (Boeing Proprietary and Work Product IP Assignment)

Eligible participants must not be:

1. A direct Boeing employee or contractor working for The Boeing Company at any time during the competition.
Key BIC Dates

Phase 1
- Nov. 1, 2019 – Student Registration Complete
- Nov. 15, 2019 – Idea Entries Submitted
  (by Midnight Pacific Standard Time)
- Nov. 27, 2019 – First-round winning entrants notified

Phase 2
- Jan. 10, 2020 – Virtual Team Diversification
  - Self-formed re-teaming down to 8-10 separate ideas of greatest group interest

Phase 3
- Jan. 20-22, 2020 – Hackathon in Mukilteo, Washington to evolve ideas and present to Boeing leaders
Judging Criteria

Entries will be judged based on:

• Creativity - Surprising innovation
• Technical content, modeling, or analysis.
• Relevance to Commercial Aircraft Challenge Topics
• Lifecycle value, with increased flying travel preference.
• Clarity/ Organization – Diverse team synergy
• Diverse Elements – Integration of business, technology, and customer
Phase 2 - Selected Student Innovation Agreement

• Phase 1 winning participants will sign the “Boeing Innovation Competition Student Agreement”.
• Ideas further developed with Boeing in Phase 2 of this Challenge become Boeing Proprietary ideas and may not be shared outside of The Boeing Company without approval.
• Students creating new inventions will join any Boeing patent application as an inventor.
• Additional Details of the student agreement can be provided early on request to your school BIC focal.
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Example Virtual Teaming Process

Ideas + Individual Participants + Student Voting + Team RE-Signup =

1 smiling face
2 smiling faces
3 smiling faces
4 smiling faces

Includes Boeing votes

Virtual diversity

1+ smiling faces
2 smiling faces
3 smiling faces
4 smiling faces

Boeing 2019
BIC Phase 3 – Hackathon Overview In Everett Wa.

Jan 20-22, 2020

• Travel to Everett sponsored by Boeing
• Reception, Meet Boeing Executives
• Factory Tour
• Develop Ideas in Cross University Teams
• Presentation to Boeing Judges
• 2020 Intern Opportunity