



Innovation – Boeing's Key to Enabling Engineering for the Future

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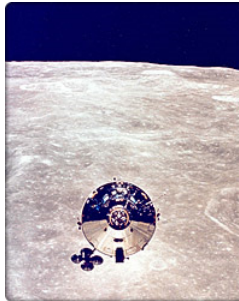
HSF Innovation at Boeing



Mercury
(1961)



Gemini
(1965)



Apollo
(1969)



Shuttle
(1979)



Space Station
(1998)

What does “Innovation” mean to Boeing?

Imagination is the uniquely human capacity to envision that which is not, and is therefore the fount of all invention and innovation.

JK Rowling, author

Innovation is the act that endows resources with a new capacity to ***create wealth***.

Peter F. Drucker, business consultant

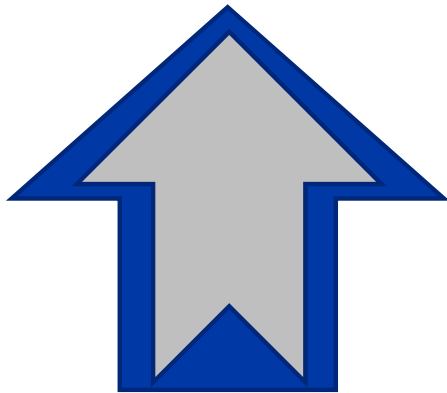
It was Steve Jobs who said, “If your cool new technology doesn’t provide a benefit to a customer and generate enough money to cover its development costs and make a profit, it isn’t innovation, it’s just art.”

Innovation is creativity and value creation

The foundation of innovation...

Business as-usual

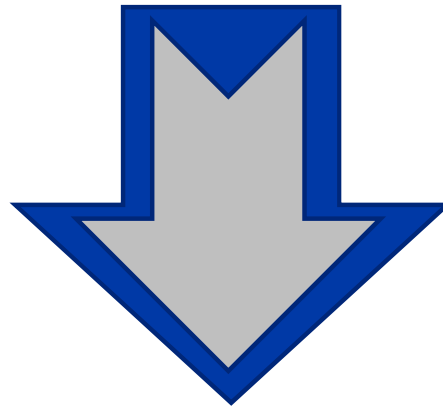
Find a Need



Known Solution

Business innovation

Known Need



Find a Solution

Our Customers wants more...
they want it faster at lower cost...
with focus on managing more
information

Creativity and value creation start with the customer need

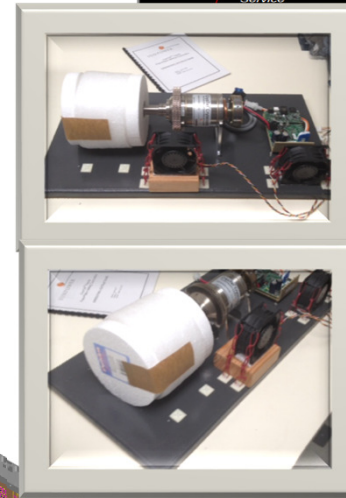
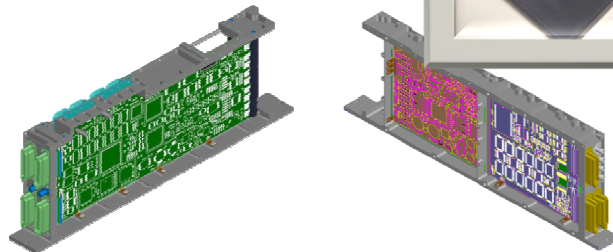
The Types, Approaches, and People: the many facets of innovation...

- Business model (differential capability-based)
- Product development (DDT&E)
- Technology (roadmaps)
 - Culture & transparency
 - Engaged and diverse workforce
- Incremental (staying competitive in the game)
- Disruptive (changing the game)

Innovation is complex adaptive, exploratory...
Innovation is NOT deterministic, goal-oriented, exploitive

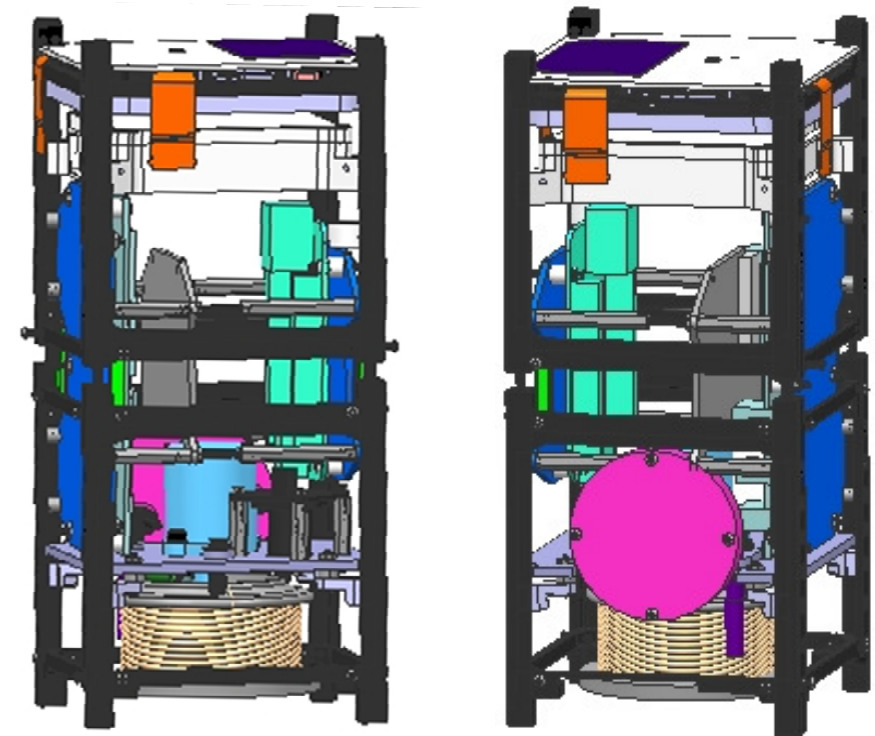
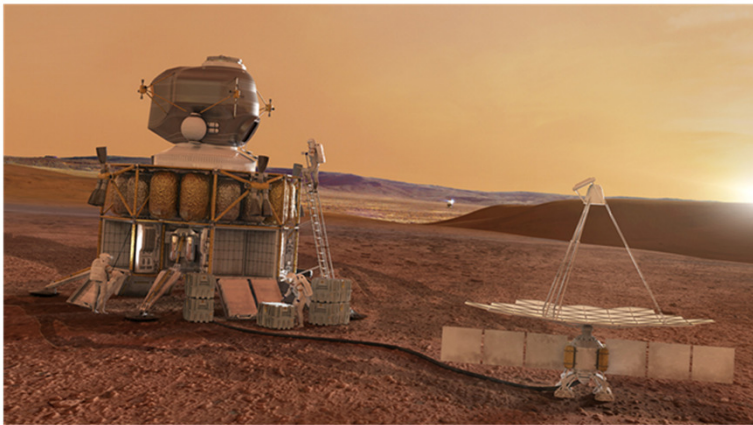
Innovation Creative Process Enablers

- R&D, IR&D, and R&T
- Innovative Organizations
- Centers of Excellence
- Innovation Cell
- Inventor's Show-n-Tell
- “Think Tank” initiatives



Innovation Value-Creation Enablers

- New Product Line Marketplace
- Strategic Vision
- Business Model Delivery

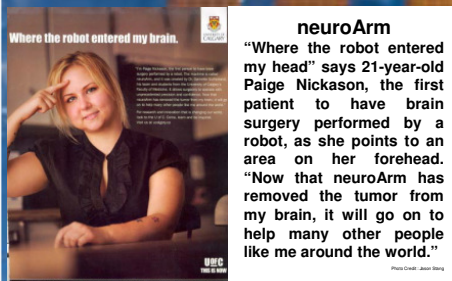


What is the Innovation Value to the Customer and Boeing?

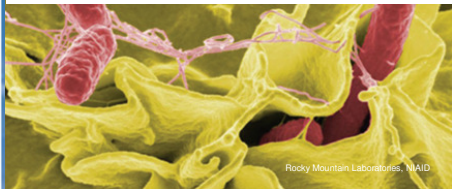
- Today's speed of innovation is causing a monumental shift not unlike the transition from biplanes to monoplanes; from propellers to jet engines; from air travel to space travel
- As innovation is driving changes in the way we consider business models, solve design & development challenges, and manage our technology, so does the priority of the innovation value:
 - Differentiation
 - Low Cost
 - Increase in Quality and Quantity of new, innovative projects
 - Long-term Problem Solving

Innovation at the International Space Station

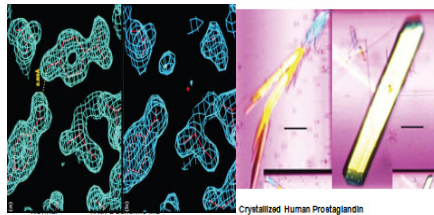
Innovations that Benefit Humanity



Vaccine Development genetic expression of bacteria in microgravity



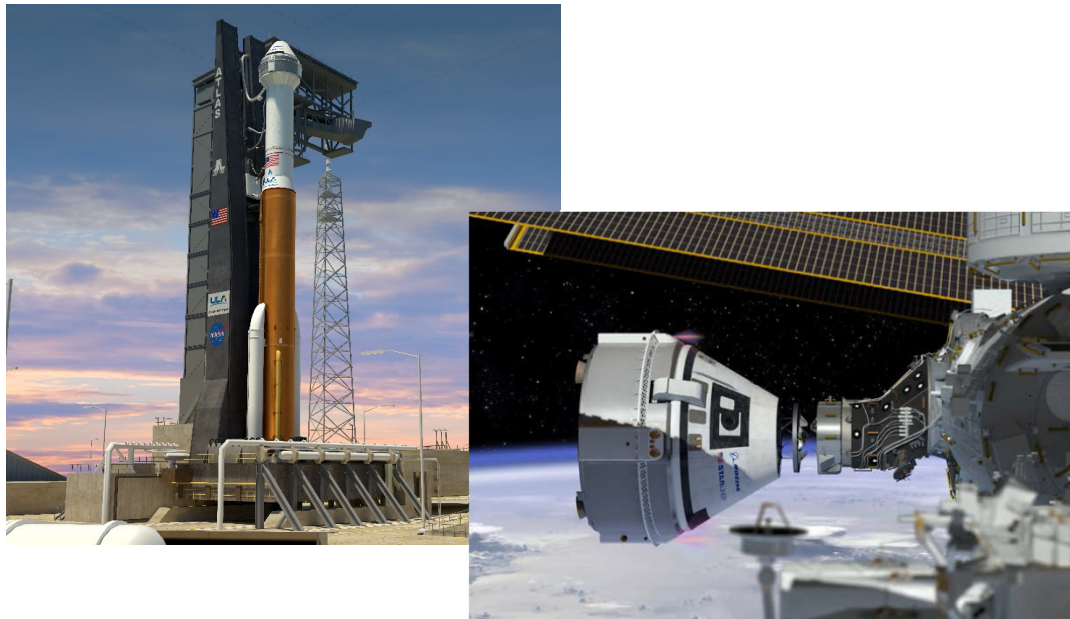
Macromolecular Crystallization Duchenne Muscular Dystrophy



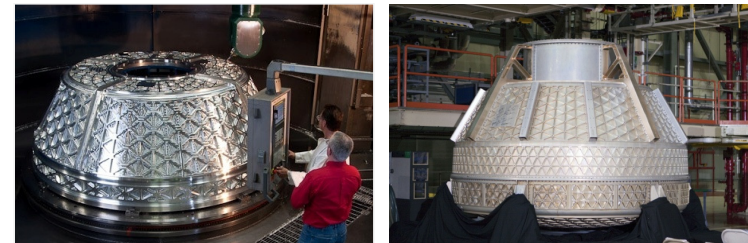
Innovations to support Exploration



Innovation on Commercial Crew



Innovative Manufacturing & Operations Approach



Innovative Operating & Business Model



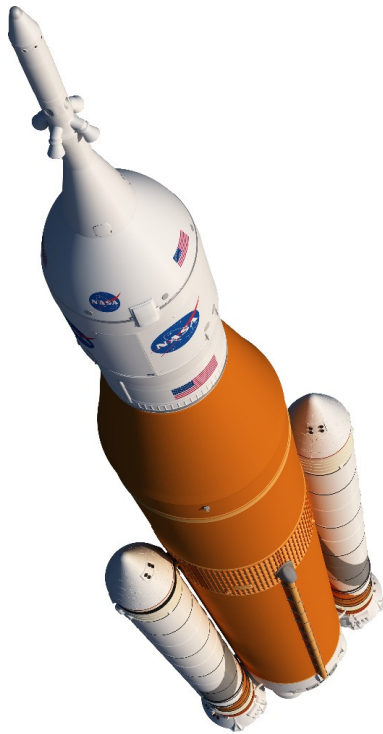
Space Adventures

- SA to market excess seating capacity to ISS
- MOA has been signed; press release planned for 9/14



- **Space Adventures has unique knowledge of the market**
 - Sold over \$200 million of spaceflights since Dennis Tito in 2001
 - 7 private astronauts flew on 8 short-duration missions to the ISS
 - All used their own personal fortunes to finance their flights
 - Some carried revenue-generating experiments onboard
 - Also sold several backup training slots and future flight options

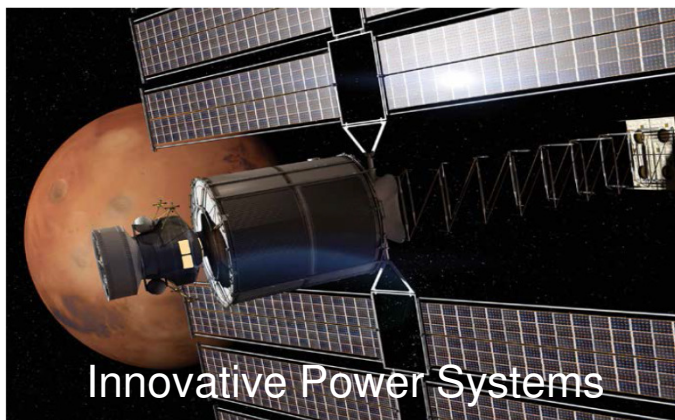
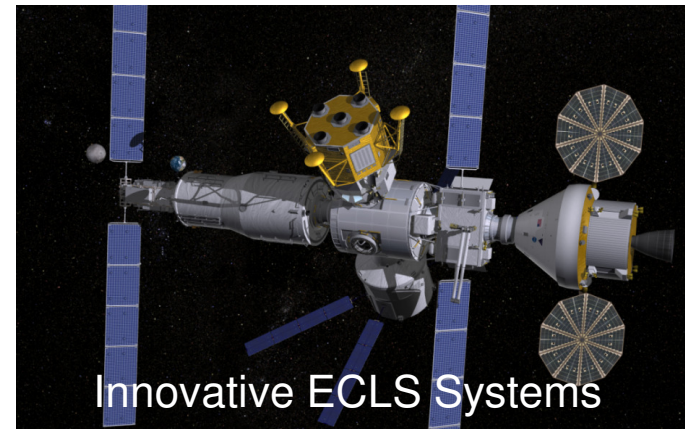
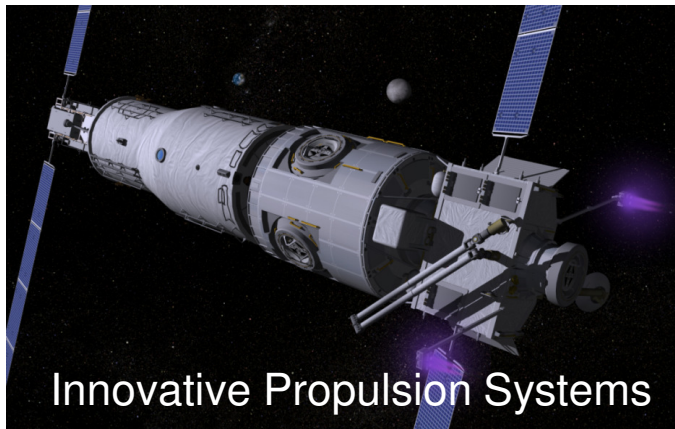
Innovation on the Space Launch System



Innovative Manufacturing & Operations Approach



Innovation on Cis-Lunar & Deep Space Exploration Platforms





Evolve the core...



Innovate for the future...

