



# Boeing's Digital Transformation Journey

**Kenny Swope**

Boeing Commercial Airplanes Engineering  
The Boeing Company

# A New Century of Innovation and Achievement

## CONNECT



## PROTECT



## EXPLORE



## INSPIRE



# HISTORY / The First 100 Years

Founded in  
**1916**  
in the Puget Sound region  
of Washington state



Became a  
**LEADING PRODUCER**  
of military and  
commercial aircraft



Completed a  
series of  
strategic  
mergers and  
acquisitions to  
become the  
**WORLD'S  
LEADING  
AEROSPACE  
COMPANY**



Boeing Airplane Co. 1916



Douglas Aircraft Co. 1921



Stearman Aircraft Co. 1927



North American Aviation, Inc. 1935



Piasecki Helicopter 1940



McDonnell Aircraft Corp. 1945



Hughes Space and Communications 1948



McDonnell Douglas Corp. 1967



Rockwell International 1968



The Boeing Company today

A heritage that mirrors the history of flight

# WHAT WE DO TODAY / The Next 100 Years



## COMMERCIAL AIRPLANES

Boeing 7-series family of airplanes leads the industry



## BOEING CAPITAL CORPORATION

Financing solutions focused on customer requirements



## DEFENSE, SPACE & SECURITY

World's largest manufacturer of military aircraft and satellites and major service provider to NASA

Large-scale systems integration, networking technology and solutions provider



## GLOBAL SERVICES

A dedicated services business focused on the needs of global defense, space and commercial customers



Connect and protect people globally

# WHERE WE ARE

Global Boeing

Products and services support to customers in more than **150 COUNTRIES**



**\$101.1 BILLION**  
in 2018 revenues



Manufacturing, service and technology partnerships with companies around the world

Contracts with more than **20,000** suppliers and partners globally

More than **150,000 BOEING EMPLOYEES**



across the United States and in more than **65 COUNTRIES**

## Excellence in Sustainability

Committing to zero growth in greenhouse gas emissions, water intake, solid waste to landfill, and hazardous waste generation from company operations

Boeing creates *positive changes* in *local communities* through charitable giving, volunteering and the way we operate our business

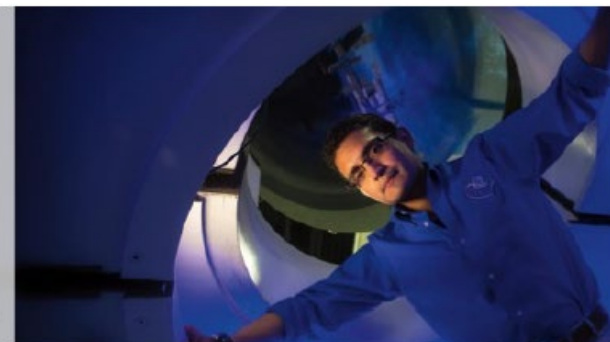
More than **\$284 million** invested by Boeing, its employees and retirees to help build better communities worldwide in 2018

**11**

Research, design and technology-development centers and programs globally



of commercial airplane revenue historically from customers outside the United States




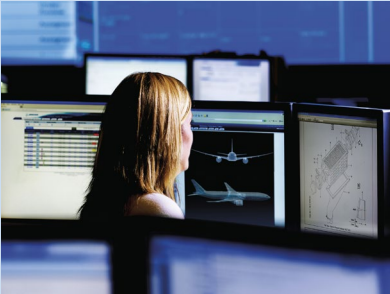


Partnering worldwide for mutual growth and prosperity

# Boeing's Global Footprint



Boeing Operations      Research & Technology      Suppliers

## Digital Evolution at Boeing

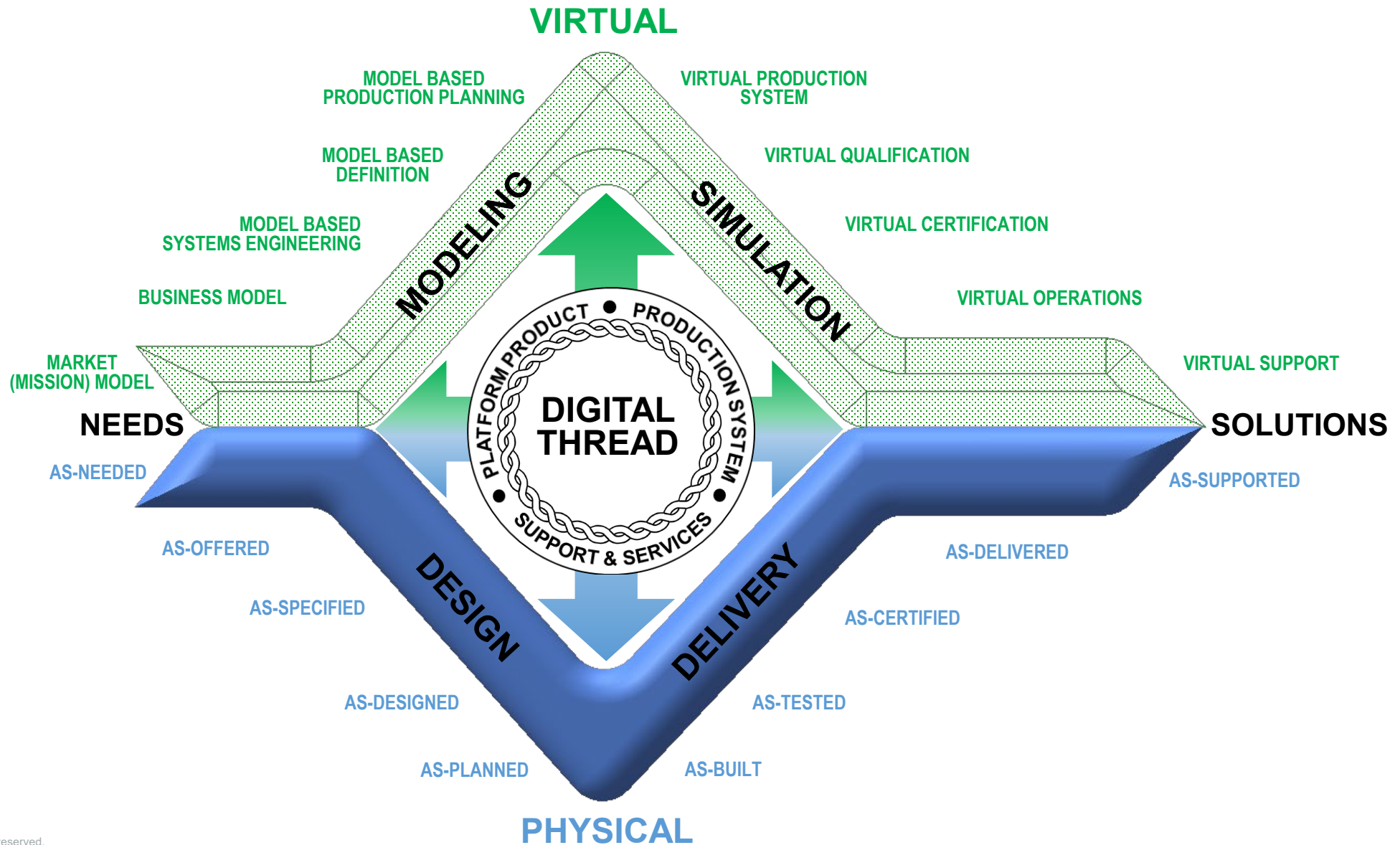
1960 - 1990	1990 - 2005	2005 - Now	Future State
			
			

# Digitalization for Boeing's 2<sup>nd</sup> Century

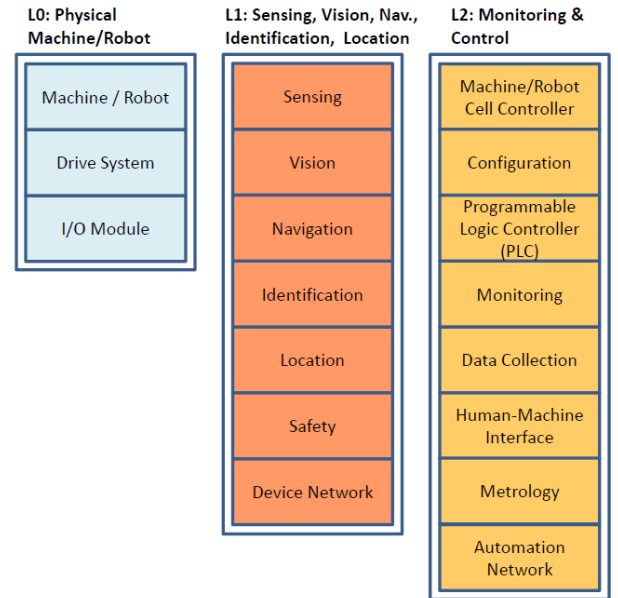




# Digitalization: Evolving the Engineering Process



# Digitalization: Connected Factory



Source: Boeing IT EA; AMR Reference Architecture  
<https://dms.web.boeing.com/dmswssso/getdoc/default.aspx?number=436-15-00083&status=1&type=pdf>

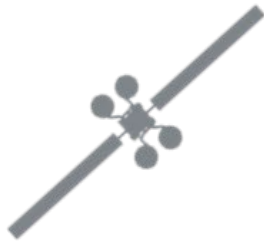
# BOEING ANALYTIX

encompasses everything big data and analytics related at Boeing. It focuses on providing services to our customers, and identifying internal opportunities for gains in efficiency and performance.



## Boeing Model Based Definition (MBD)

- Pervasive adoption & deployment of Model Based Definition
  - 787, 737, H47F/G, V22, T-X, C17, Phantom Swift, UCLASS, ...
- All parts are designed as a 3D MBD – CATIA V5 or NX9
  - Solid model
  - Dimensions, Tolerances and Annotation (PMI)
  - Engineering notes and attributes
- MBD data used throughout supply chain and by customer airlines for in-service support and modifications



**>3M**  
Models in distribution repository

**>71M**  
Documents in distribution repository

**>200k**  
3D PDF Views per month

**40K**  
Technical Data Packages on one program

**16k**  
Technical Data Package downloads per month

## 3D PDF Use Cases



Delivery in compliance with MIL-STD-31000



Delivery / Access to Co-Production Partners



Delivery / Access to Customers



Delivery / Access to Suppliers & Shopfloor

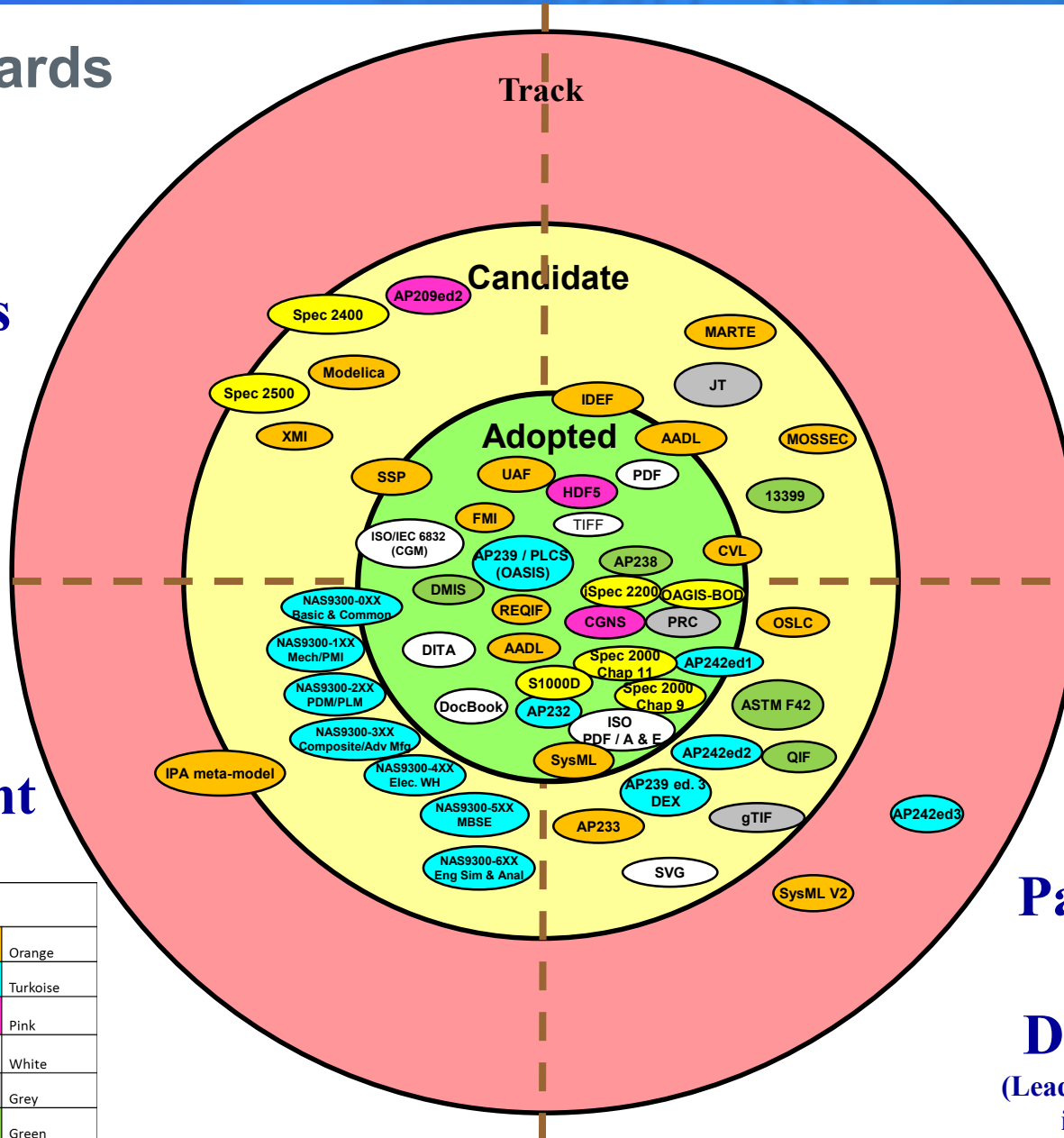
# Boeing Data Standards

**Adopt Existing standards**

**Monitor external development**

**Boeing Development**

**Participate in external Development**  
(Lead activity, team member, influence std policy)



Boeing Data Standards Color Coding Key		
System Engineering	O	Orange
Product Structure	T	Turquoise
Analysis and Scientific Data	P	Pink
2D Graphics / Documentation	W	White
Light Weight Visualization	Gy	Grey
Manufacturing	Gn	Green
Business Transactions	Y	Yellow

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