

IOT SOLUTIONS

WORLD CONGRESS



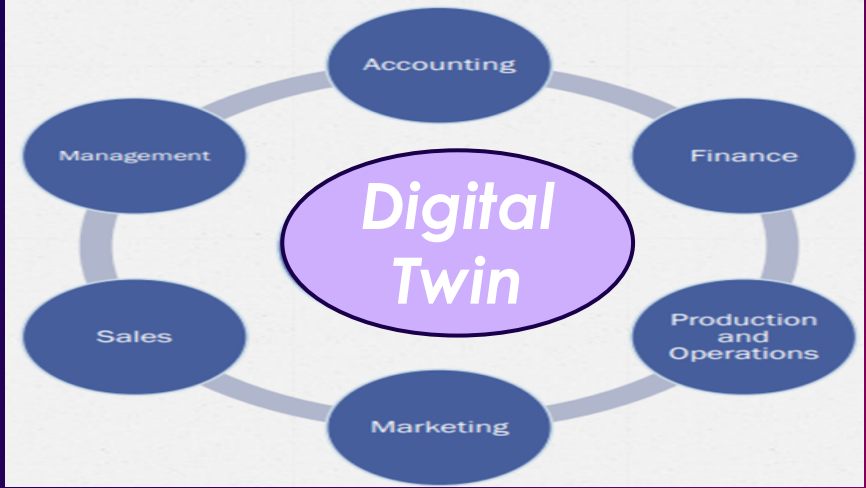
DIGITAL SUMMIT
May 11-12, 2021

NASA'S IMPERATIVE OF A DIGITAL TWIN-DRIVEN ECOSYSTEM: PRIORITIES, CHALLENGES AND USE CASES

Featuring
JOHN VICKERS
NASA

BE
THE GAME
CHANGER

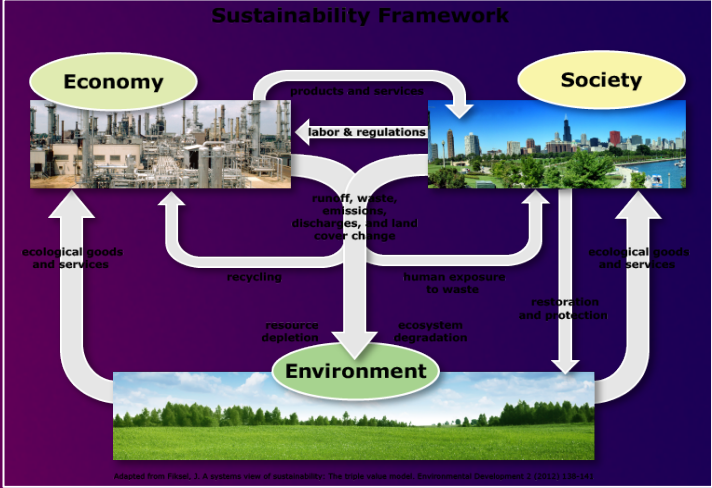
Digital Twin Broad Transformation



Business



Health



Environment



Digital Twin of Life

"Designed by pch.vector / Freepik"



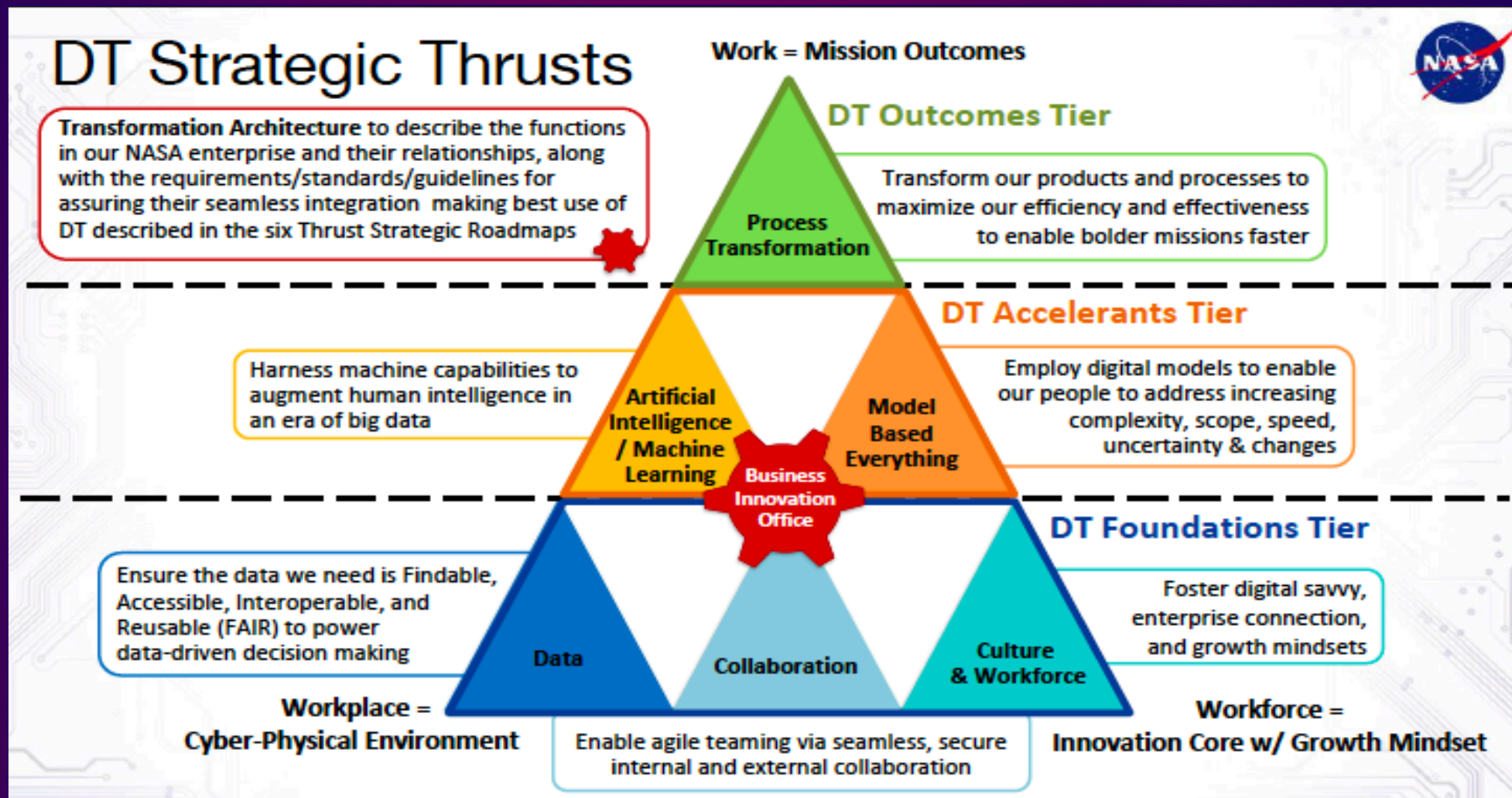
“You Can’t Always Get What You Want”

What Digital Twins Are and Not about!

- ✓ Interdisciplinarity - analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole
- ✓ Model Based - Model of Models (MBx – model based everything)
- ✓ Collaborative--Predictive--Descriptive--Investigative--Cognitive—Corrective
- ✓ As-Designed – As-Built – As-Operated
- ⊘ Digital Twin requires a physical asset (apologies to my AIAA friends)
- ⊘ Multidisciplinary - draws on knowledge from different disciplines but stays within their boundaries
- ⊘ Renaming other technology - MBSE, Digital Thread
- ⊘ Siloed execution – “throwing it over the wall”

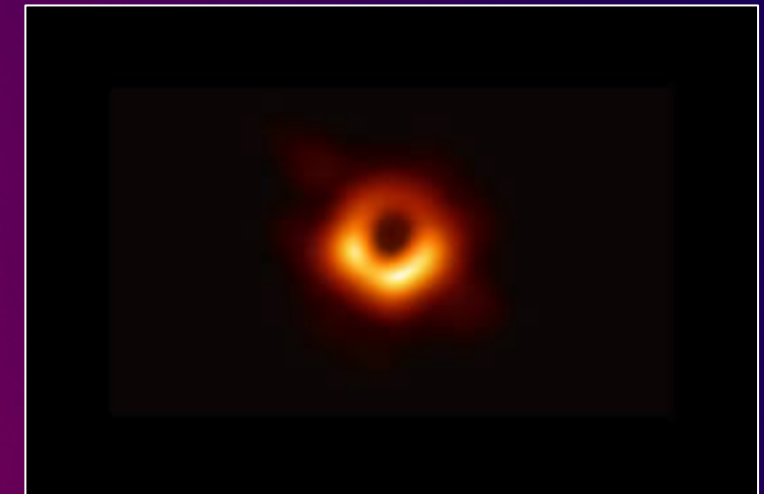
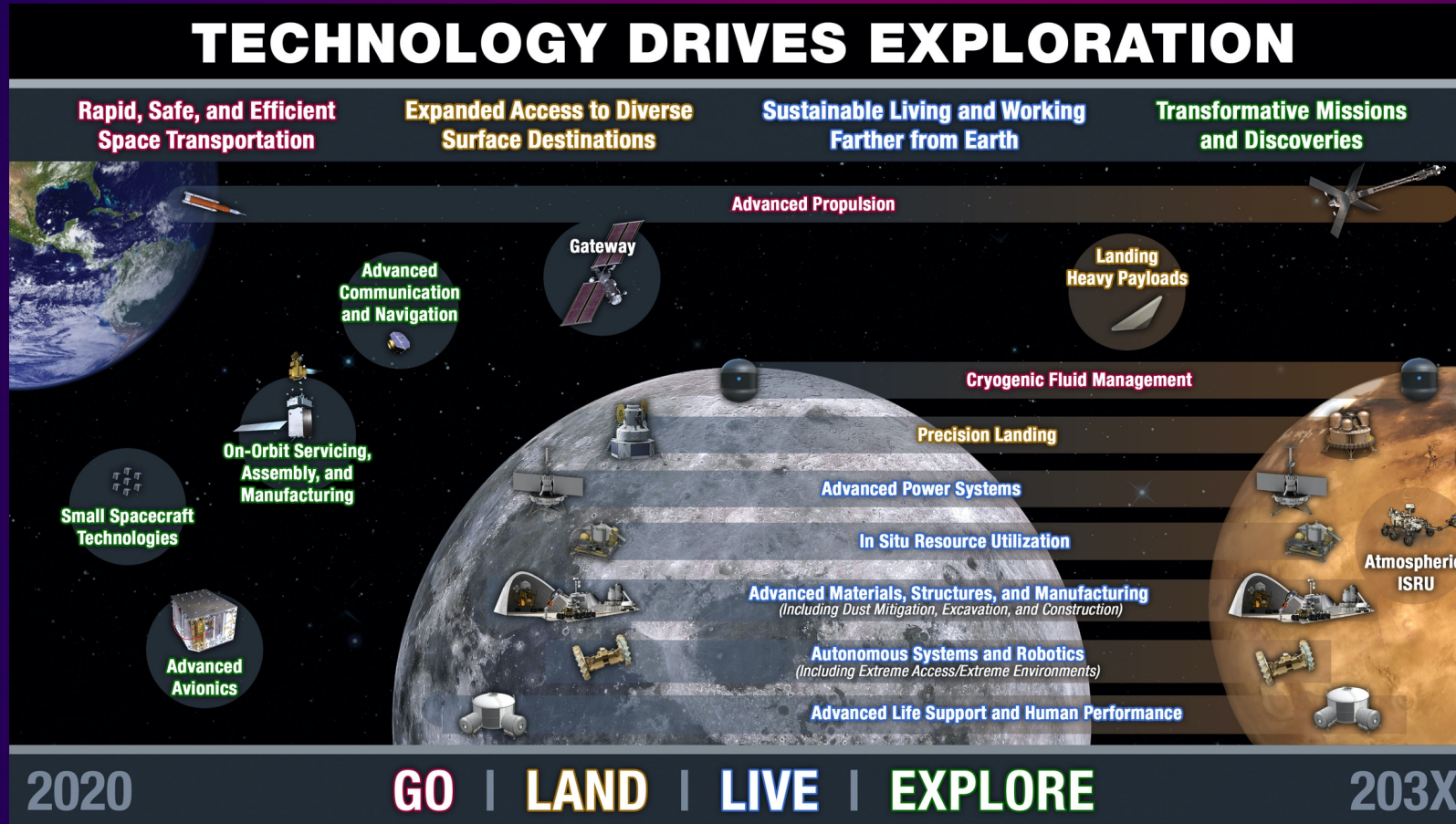
DARPA - if the experts are laughing at you then you're on the right track

NASA Digital Transformation Initiative



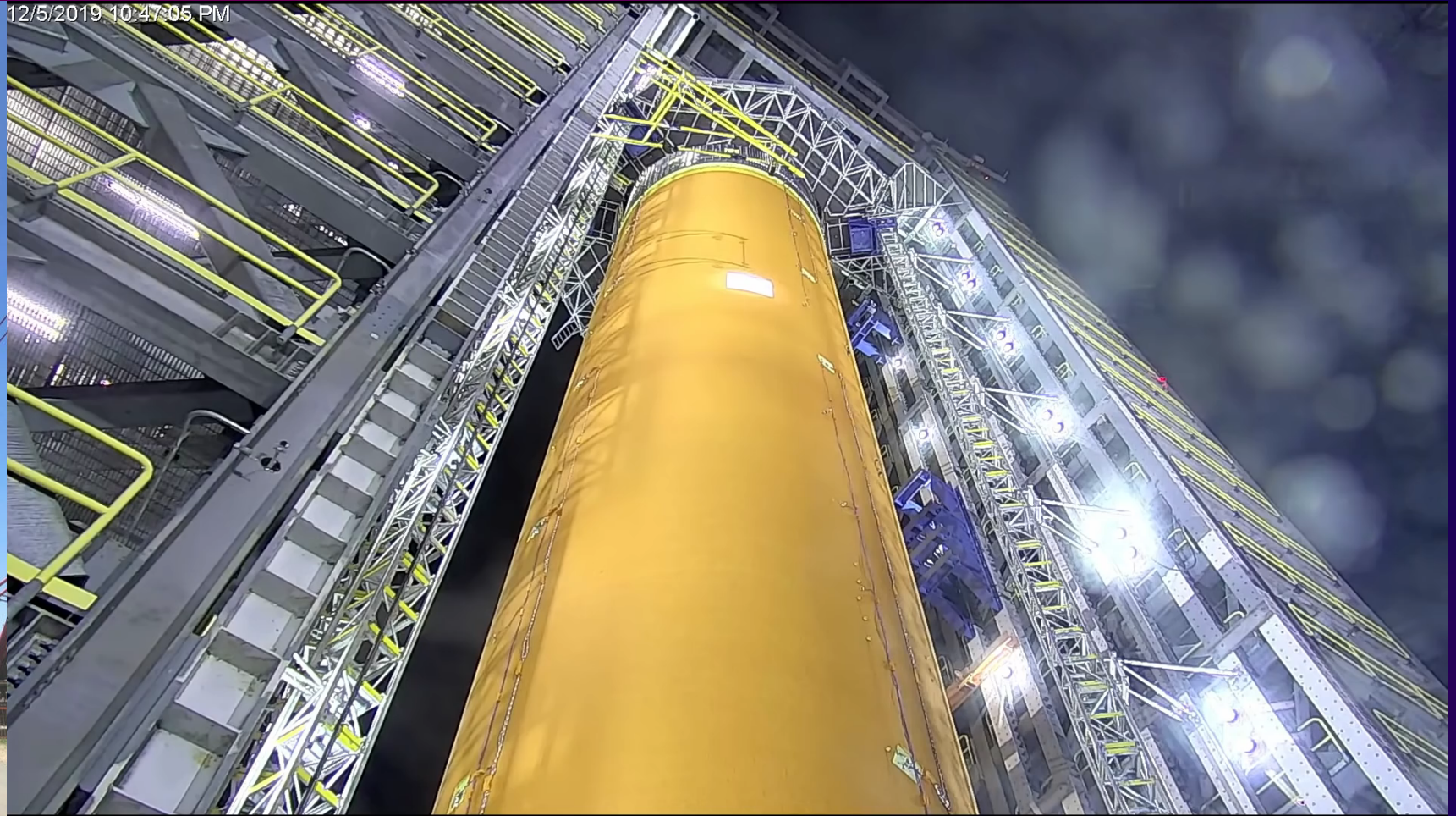
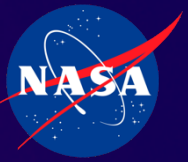
Dramatically enhances NASA's mission impact by engaging digital convergence by reinventing mission and mission support processes, products, and capabilities

Technology Drives Exploration to the Moon, Mars and Beyond



Katie Bouman 'hardly knew what a black hole was.' Her algorithm helped us see one

Testing and Certification, Today



“A Little Less Conversation, A Little More Action, Please”



Tier 3



Full-scale



Component

Analysis
Validation

Tier 2



Sub-component

Structural Element

Design Value
Development

Tier 1



Design Allowables

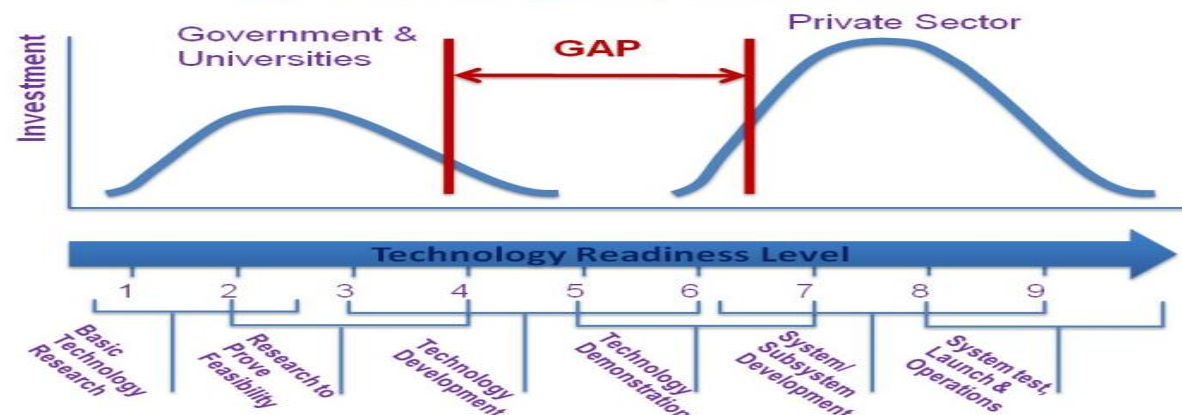
Material Specifications

Material Screening & Selection

Material
Property
Evaluation

Credit: Boeing

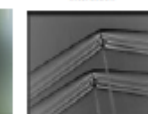
Gap in Manufacturing Innovation



NASA's 3D-Printed Habitat Challenge
Credits: Team SEArch/Apex Corp



NASA Laser Powder Bed AM

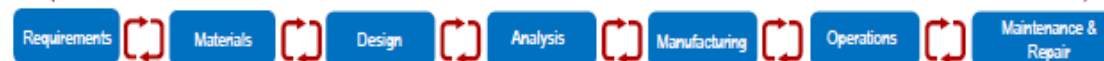


Supersonic Shock Interaction



Astronaut Scott Kelly on a Spacewalk

Digital Twin



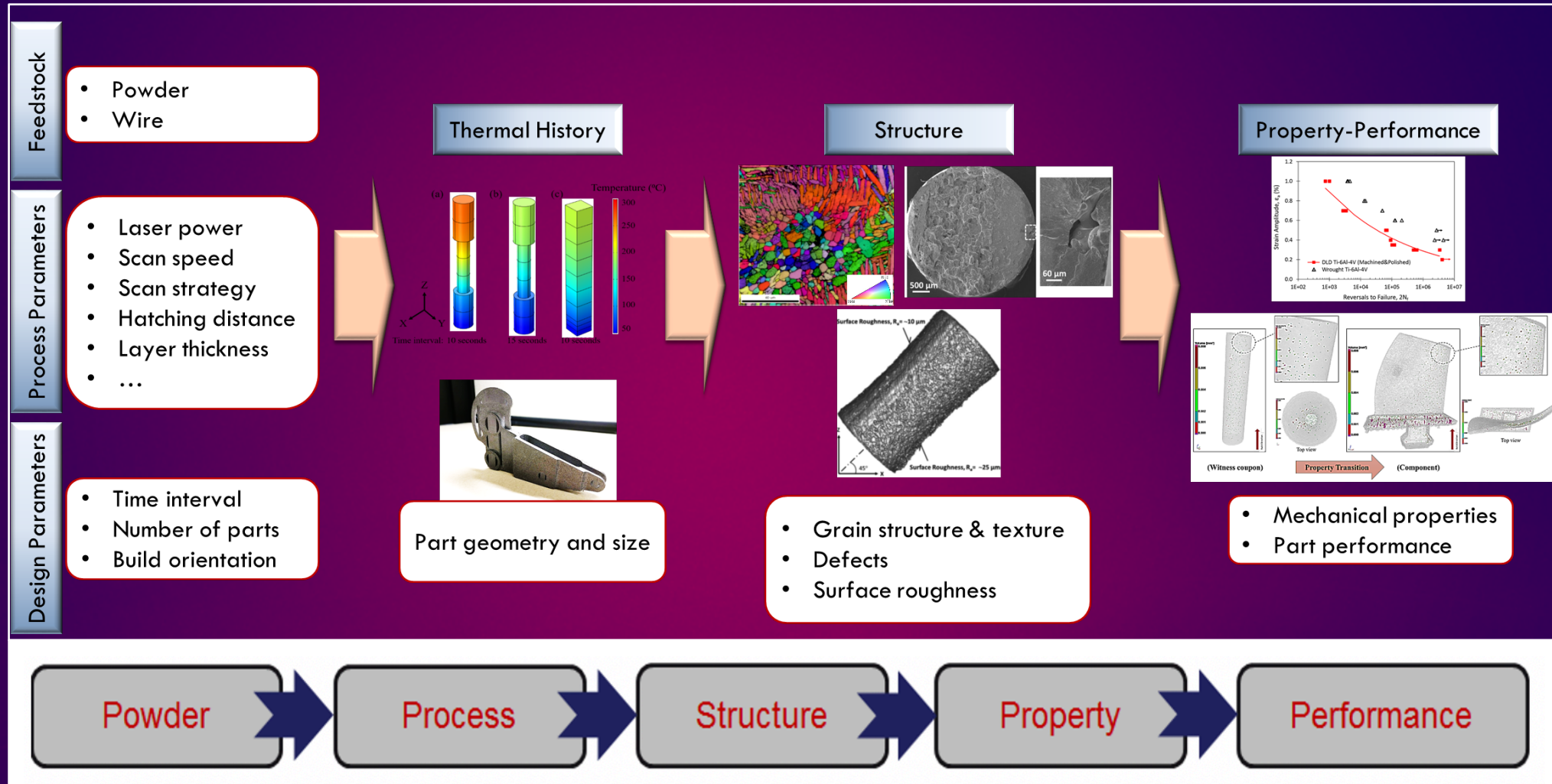
Digital Integration Allows Predictive, Detective, and Corrective – Real Time Accurate Decisions

Product Development, Testing and Certification Today
“It takes too long and costs too much to certify aerospace structures”

IOT
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industrial internet[®]
CONSORTIUM

Testing and Certification, Tomorrow



Past is Prologue

Linkages between Technology, Manufacturing and Commerce



A nation which depends upon others for its new basic scientific knowledge will be slow in its industrial progress and weak in its competitive position in world trade, regardless of its mechanical skill.

Vannevar Bush, head of the U.S. Office of Scientific Research and Development during World War II





Technology Drives Exploration

Thank You!

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