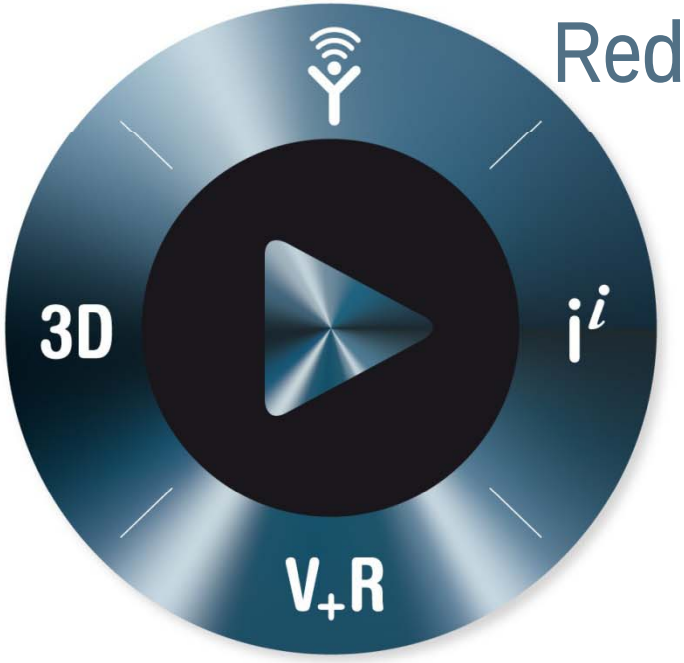
Development Planning for Producibility and Maintainability Reduces Total Cost of Ownership and Increases Readiness



3DEXPERIENCE

DASSAULT SYSTEMES | IF WE ask the right questions we can change the world.

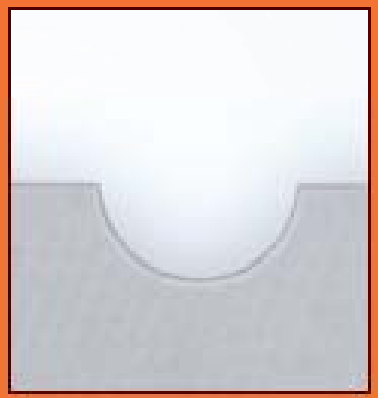


Fig. 1

¼" hole in Fiberglass composite
Left – Burrs/spurs after drilling
Right – Clean holes new process

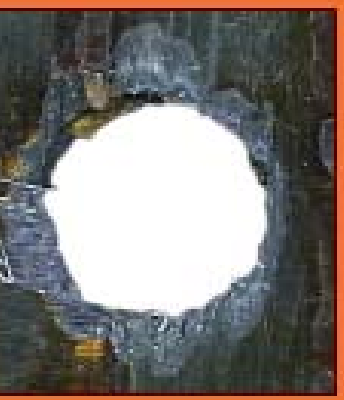
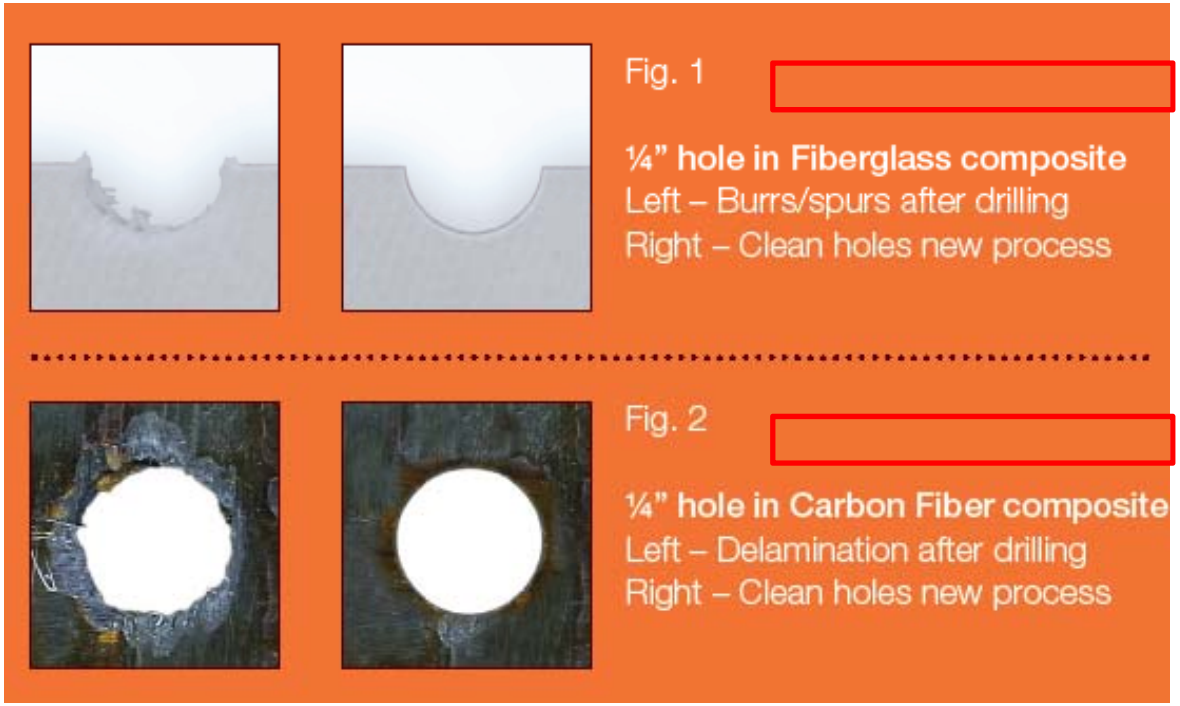


Fig. 2

¼" hole in Carbon Fiber composite
Left – Delamination after drilling
Right – Clean holes new process

New processes may enable better performance and lower cost



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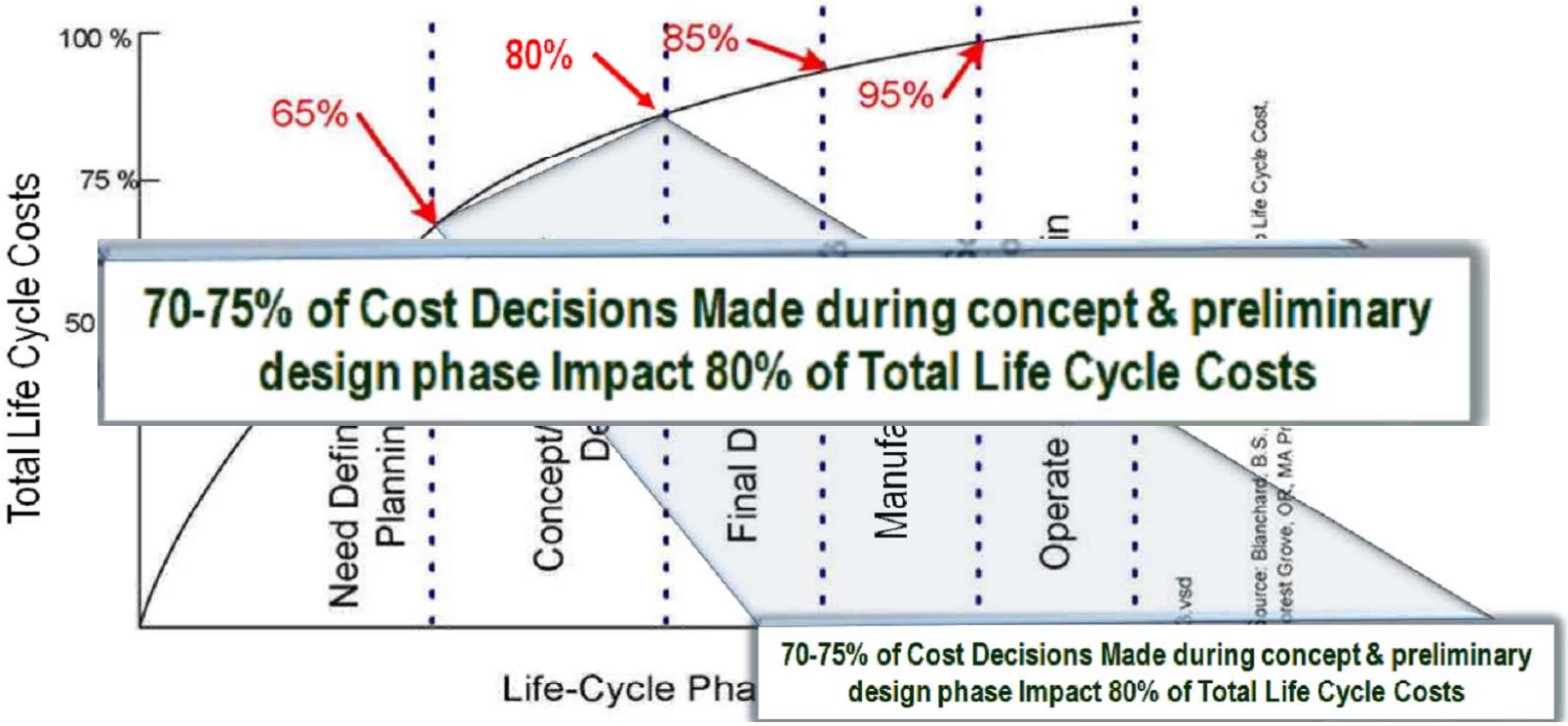
Source: IKONICS® Micro-Machining Solutions

portance of Design for Manufacturing and Maintenance Early in the design



Early DFx trade studies of manufacturing and maintenance processes

Enable manufacturing and maintenance processes to help drive the design of complex systems

- Reduce non-recurring and recurring acquisition costs
- Reduce lifecycle costs for sustainment and service life extensions
- Increase system readiness
- Launch program on-time, on-budget, on-target

essibility difficulties are a common feature in maintenance.

A great deal of effort has been spent to improve cockpit design.

Yet much less effort has been made on designing for maintainability.

Photo: Colin Drury

able maintenance and repair procedures to help drive design of complex systems impacting TCO

US Department of Defense lists the three key questions about maintainability:

. Strength limitations:

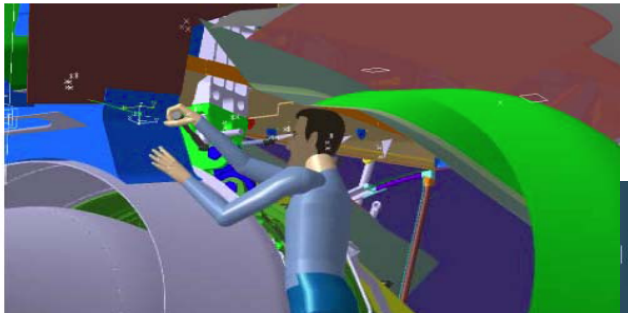
- Can the maintenance person physically carry, lift, hold, twist, push and pull objects as required?

. Accessibility difficulties:

- How easy is it to gain physical access to the work areas?

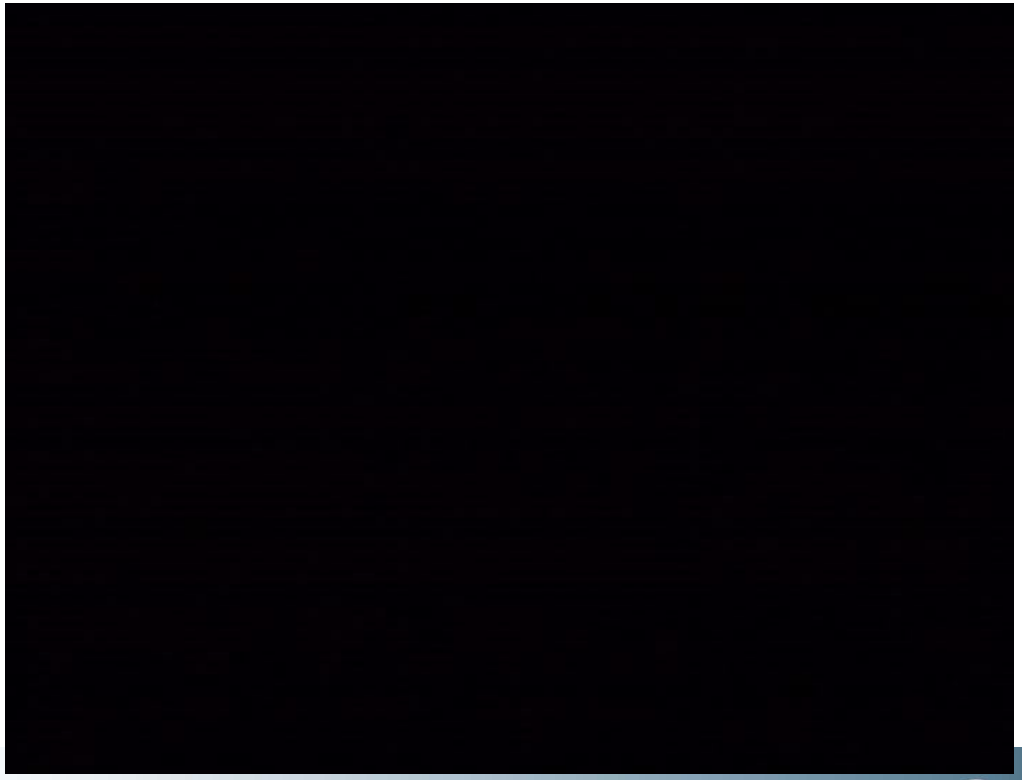
. Visibility problems:

- Can the work area be seen directly, or must work be done by feel or with the use of mirrors etc?



IF WE ask the right questions we can change the world.

ngage the manufacturing engineers in the earliest stages system engineering



ngage the sustainment engineers in the earliest ages of system engineering

Utilizing a single infrastructure for
oss discipline engineering & supplier collaboration

ott Lucero, Office of the Sec. of Defense, states:

"MBE facilitates "cross-domain coupling," ……..
Cross-domain coupling results in benefits such as improved integration of modeling and simulation, which in turn can lower product development costs."

ingle SE environment that integrates cross-cipline engineering and production modeling

End of Life

Global Sustainment

Support & Services /MRO, fleet optimization

Experience

Training

es, time and budget nize training.

Collaborate / Exchange

Manage, Collaborate on Program Related activities in an extended enterprise context

Mission Analysis / Needs Identification

Production

oduction Mockup As Built collaboration

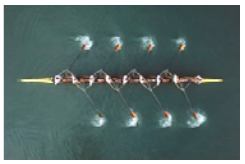
Concept Studies / Design

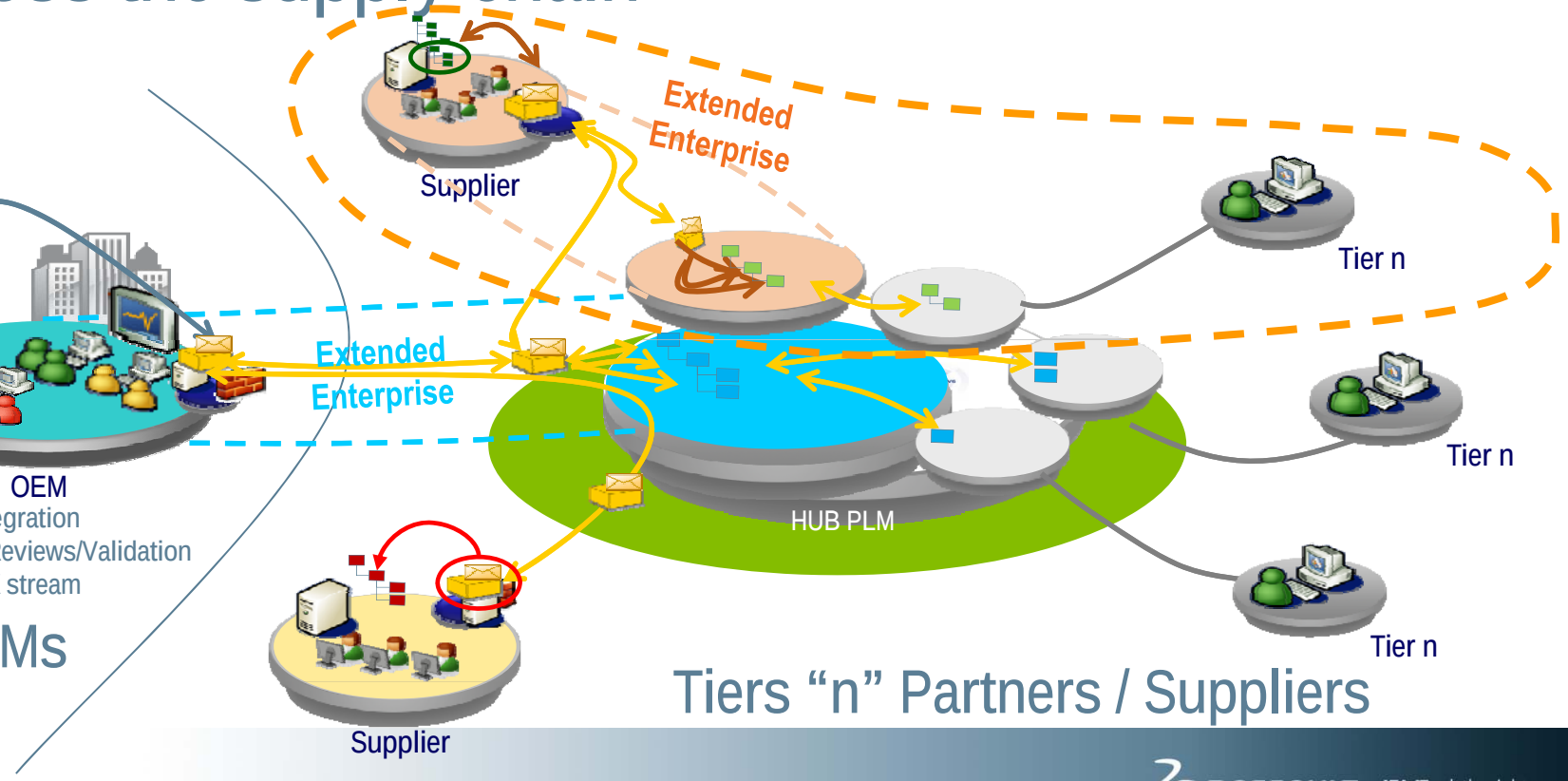
Simulation and Validation

Manage Multi-discipline simulation IP

Validate Mechanical Structure and Systems Architecture in a single environment

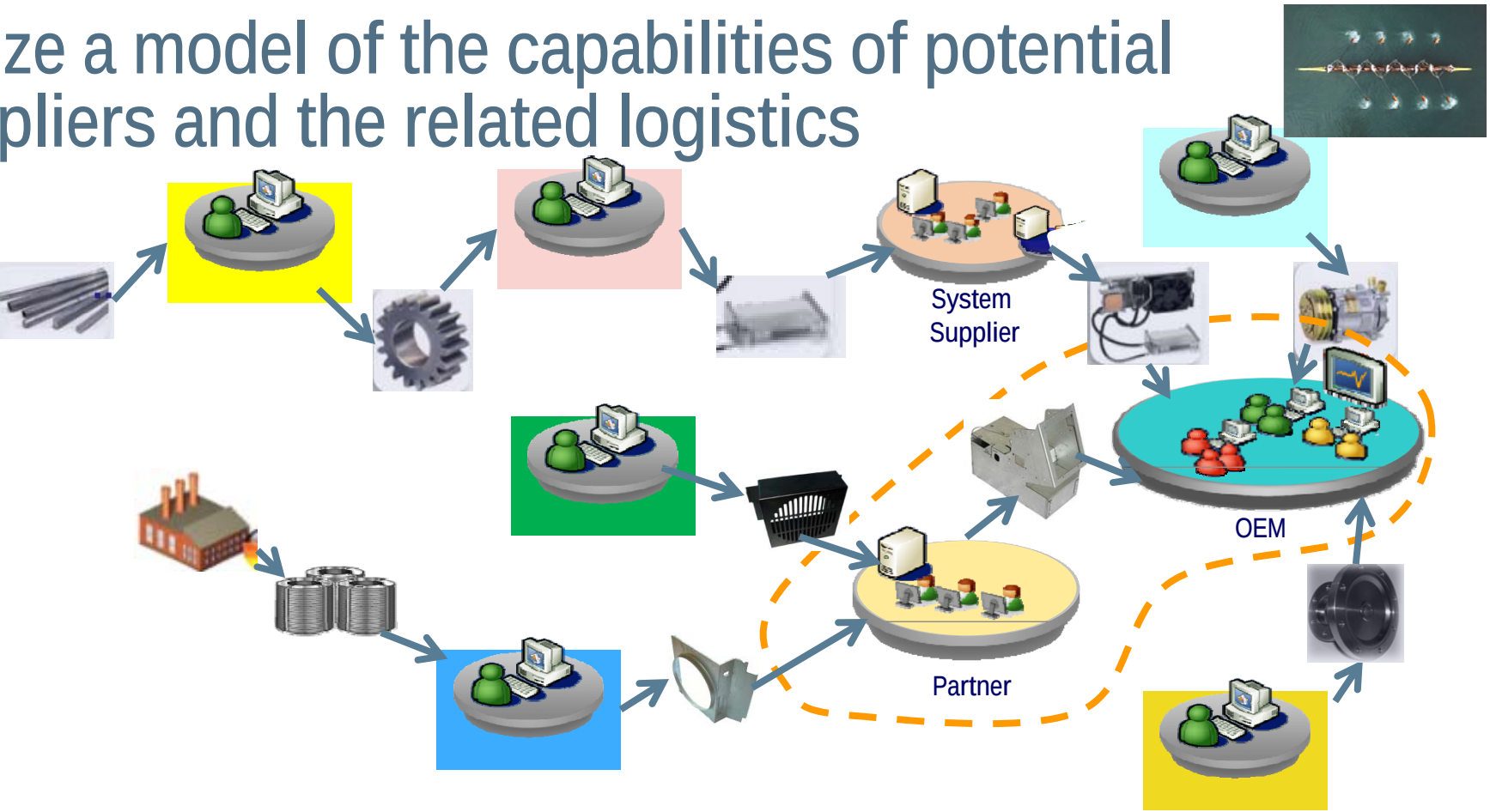
ize a single collaborative infrastructure
oss the supply chain





Tiers “n” Partners / Suppliers

ze a model of the capabilities of potential pliers and the related logistics



erstand supply chain risks early

ual validation with modeling and simulation eliminates the t and time associated with physical prototypes

Understanding the impact of changes in requirements

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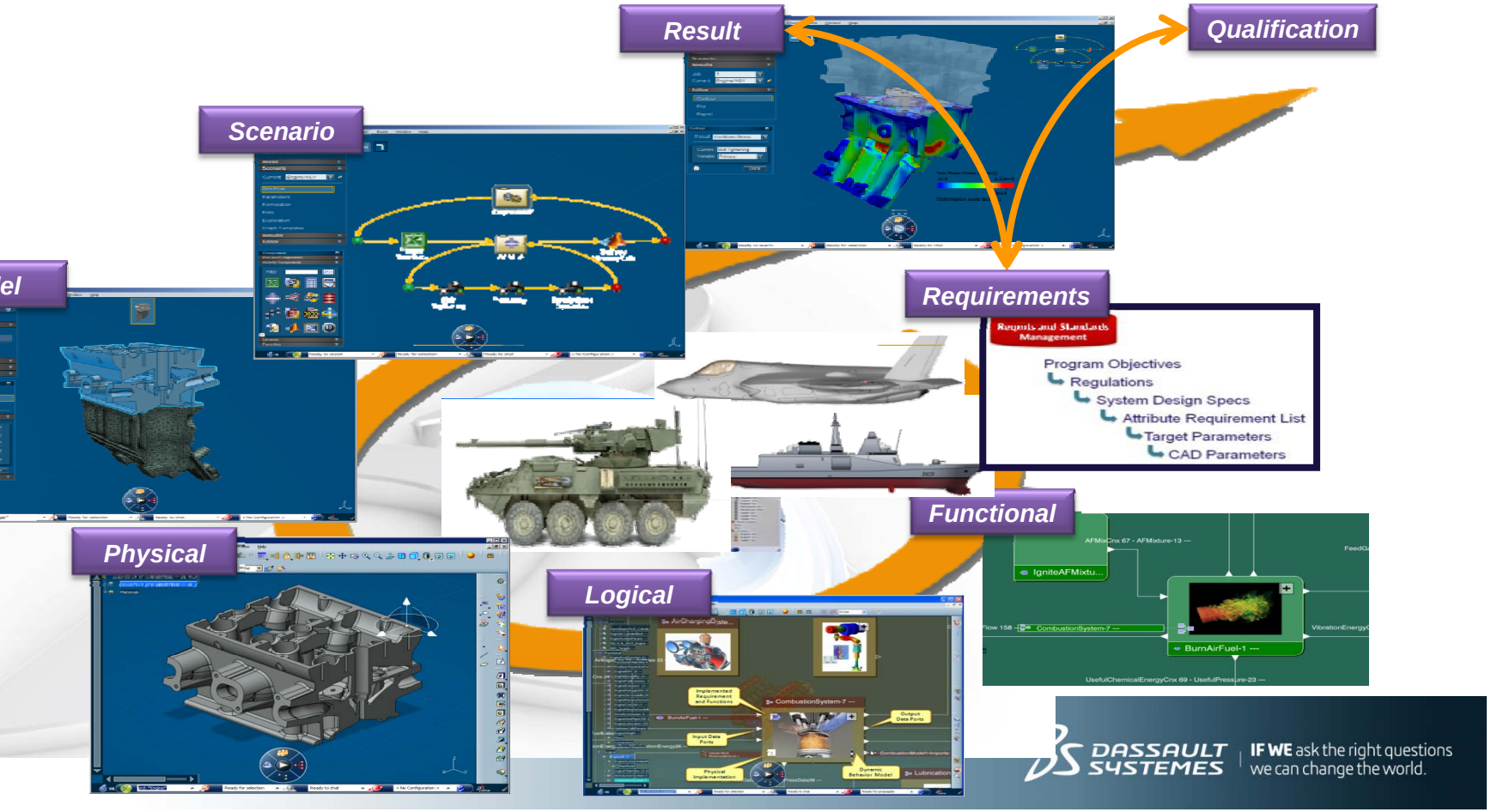

derstand the impact of changes in the Requirements manufacturing, maintenance and repair operations

- Requirements changes can impact:
  - Both the non-recurring and recurring cost
  - Schedules
  - Tooling and production, testing and maintenance equipment
  - MRL status of new processes that would have to be proven out
  - Potential supply chain participants and related logistics
  - Mean Time to Repair and related asset availability
- Make your trade study decisions on requirements changes based on facts, not opinions

Engage the manufacturing and sustainment engineers in the earliest stages of system engineering

Impact the design when it is least costly

Engage the manufacturing and sustainment engineers in the earliest stages of system engineering

- Impact the design when it is least costly
- Design for producibility and sustainment early in concept and preliminary design pay big dividends in cost and readiness

70-75% of Cost Decisions Made during concept & preliminary design phase Impact 80% of Total Life Cycle Costs

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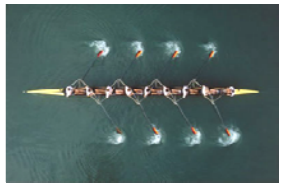

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- Understand the impact of changes in the Requirements on manufacturing, maintenance and repair operations

Provide an integrated Systems Engineering environment that includes manufacturing and sustainment engineering across the supply chain we can reduce TCO, time to mission and increase readiness

3DEXPERIENCE

THANK YOU

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Dassault Systemes DELMIA

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