



**Innovation Crossover:**

*The Shape of Things to Come*

**Industry Panel**



**Defense**

**University**

**Industry**

**Dr. Matt Waninger, MED Institute**



# Innovation from a Medical Device Perspective



# Global Presence, Patient Focus

Cook Medical products and technologies are used in

# 135

countries throughout the world

 Cook Medical Companies

 Cook Medical Global Coverage



- 16 Medical entities: Devices, Biotechnology, & Cell Therapy
- 13,000+ employees worldwide
- 16,000 products across 41 medical specialties



# Founding – COOK, Inc.



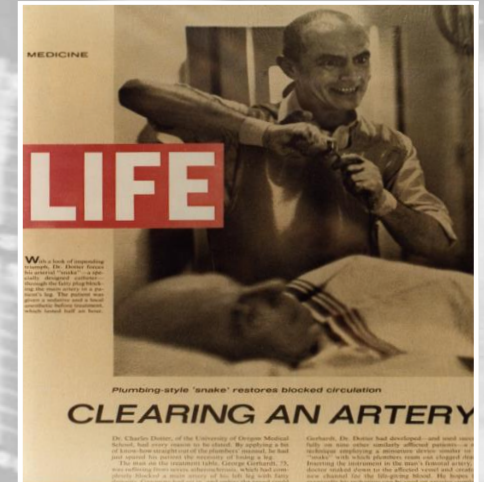
1963

- Bill and Gayle Cook founded Cook Incorporated on July 1<sup>st</sup>.
- They manufactured the first U.S.-produced tools for percutaneous catheterization, including entry needles, wire guides and catheters.

# Collaboration with Physicians



“The angiographic catheter... used with imagination, can become an important surgical instrument.”



Charles T. Dotter

# Contributions to Cardiovascular Interventions

**1964**

## Dotter Coaxial Dilatation Set

Early collaboration with Dr. Charles Dotter resulted in first device to perform peripheral angioplasty.

1

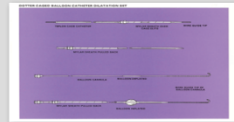


1960s

**1974**

## Dotter Angioplasty-Caged Balloon Catheter

Cook's first balloon-type design for angioplasty procedures.



1970s

**1983**

Nitinol stents are introduced when Dr. Dotter and colleagues published the results of their experimental studies.



1980s

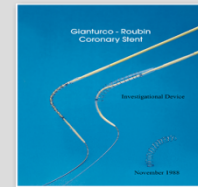
**1985**

The first paper on the Gianturco Z-Stent is published.



**1987**

## Balloon Expandable Coronary Stent



1990s

**1993**

## Gianturco-Roubin Flex Stent

Cook launches first coronary stent approved for use in the U.S.



<sup>1</sup>Dotter CT and Judkins MP. Transluminal treatment of arteriosclerotic obstruction. Circulation. 30: 654, 1964



# Contributions to Cardiovascular Interventions

1990s

**1993**

## Gianturco-Roubin Flex Stent

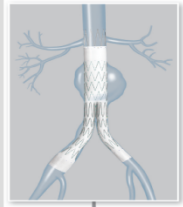
Cook launches first coronary stent approved for use in the U.S.



**1999**

## Zenith® AAA Endovascular Graft

David Hartley and Dr. Michael Lawrence-Brown's collaboration results in the first, three-piece, preloaded EVAR stent graft available in Europe.



2000s

**2001**

## Zilver® 735 Self-Expanding Stent

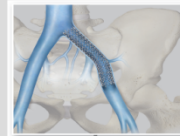
First Zilver stent is introduced to the market – 7 Fr compatible.



**2003**

## Zenith® AAA

Hartley and Lawrence-Brown's device is launched in the U.S., more than a decade after initial development.



**2011**

## Zilver® Vena™ Venous Self-expanding Stent

European launch of the first iliofemoral venous stent in the world.



**2012**

## Zilver® PTX® Drug-Eluting Peripheral Stent

FDA and PMDA approval of the world's first drug-eluting stent for the SFA.

**2013**

## Zilver PTX

More than 25,000 patients are treated with Zilver PTX.

**2015**

## Zilver® PTX® Drug-Eluting Peripheral Stent

Time-tested Zilver PTX stent available on a simple, precise delivery system in Europe and Japan.





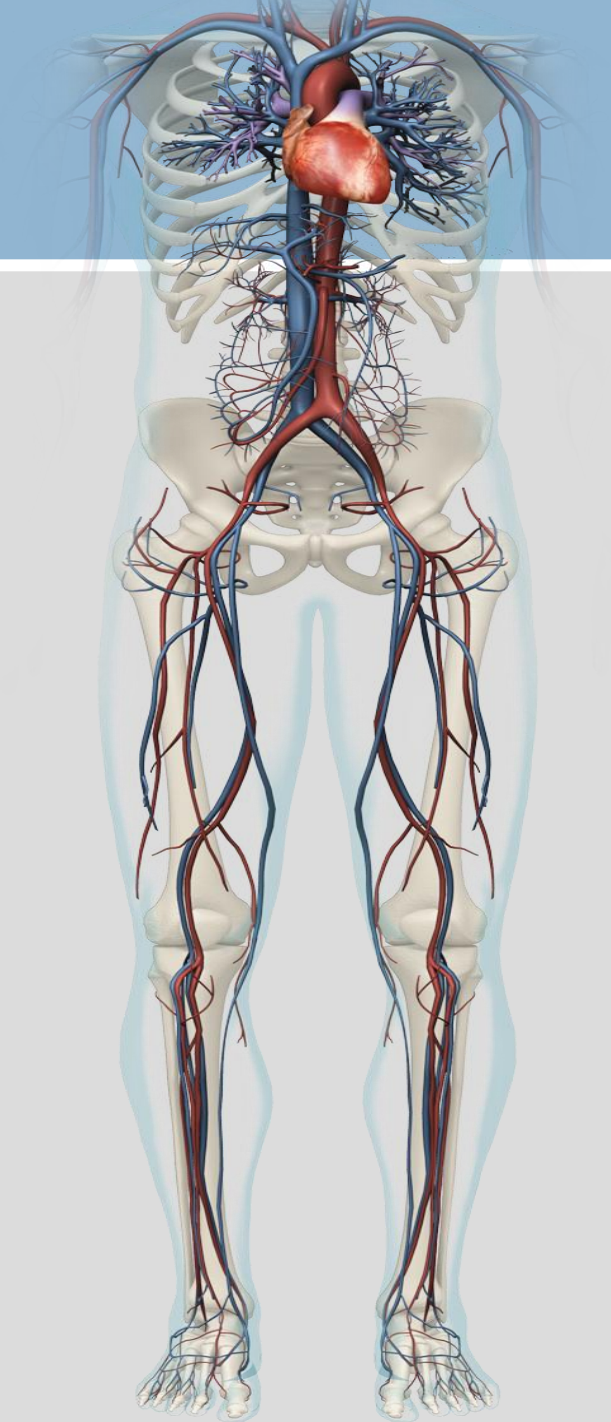
# Collaborative Innovation Today



- In the past, Cook collaborated with physicians. They brought us ideas, and we turned those ideas into products that have reached tens of millions of patients.
- However, the problems we now face in medicine are more complex than ever, and the solutions are beyond the idea of a single physician.
- We need a deeper understanding of the disease state and associated biology, and we want that understanding to be inside Cook.
- We need collaborators who help us drive to an understanding of the disease. And only from this deep understanding can we develop the products that will change patient lives and define the future of our company.

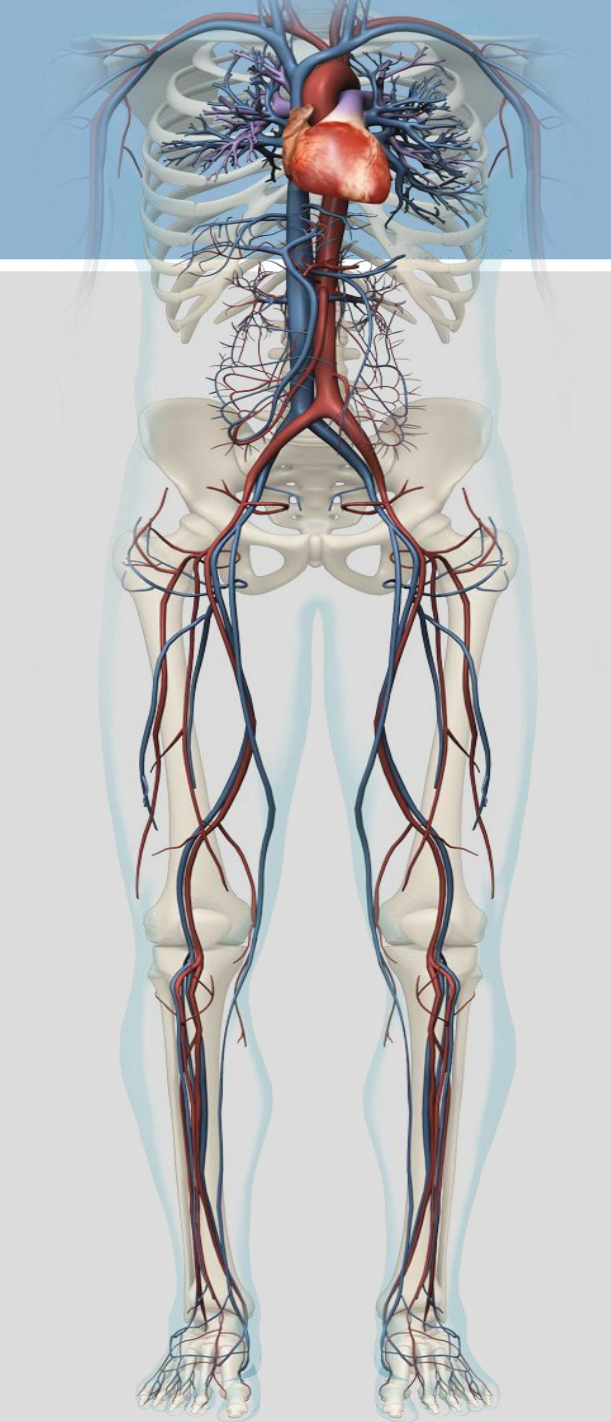
# COOK's Future

- Fundamental understanding of biology & disease pathophysiology
  - Improve device outcomes – treat disease
  - Disseminate to others
- Augment instead of altering biology
  - Biologic or drug-combo therapy
  - Leave nothing behind
  - Cellular Therapies



# COOK's Future

- Personalized therapy
  - Advanced imaging & planning
  - Patient/disease specific designs
- Partner ethically with the medical community to improve patient care at a lower cost.

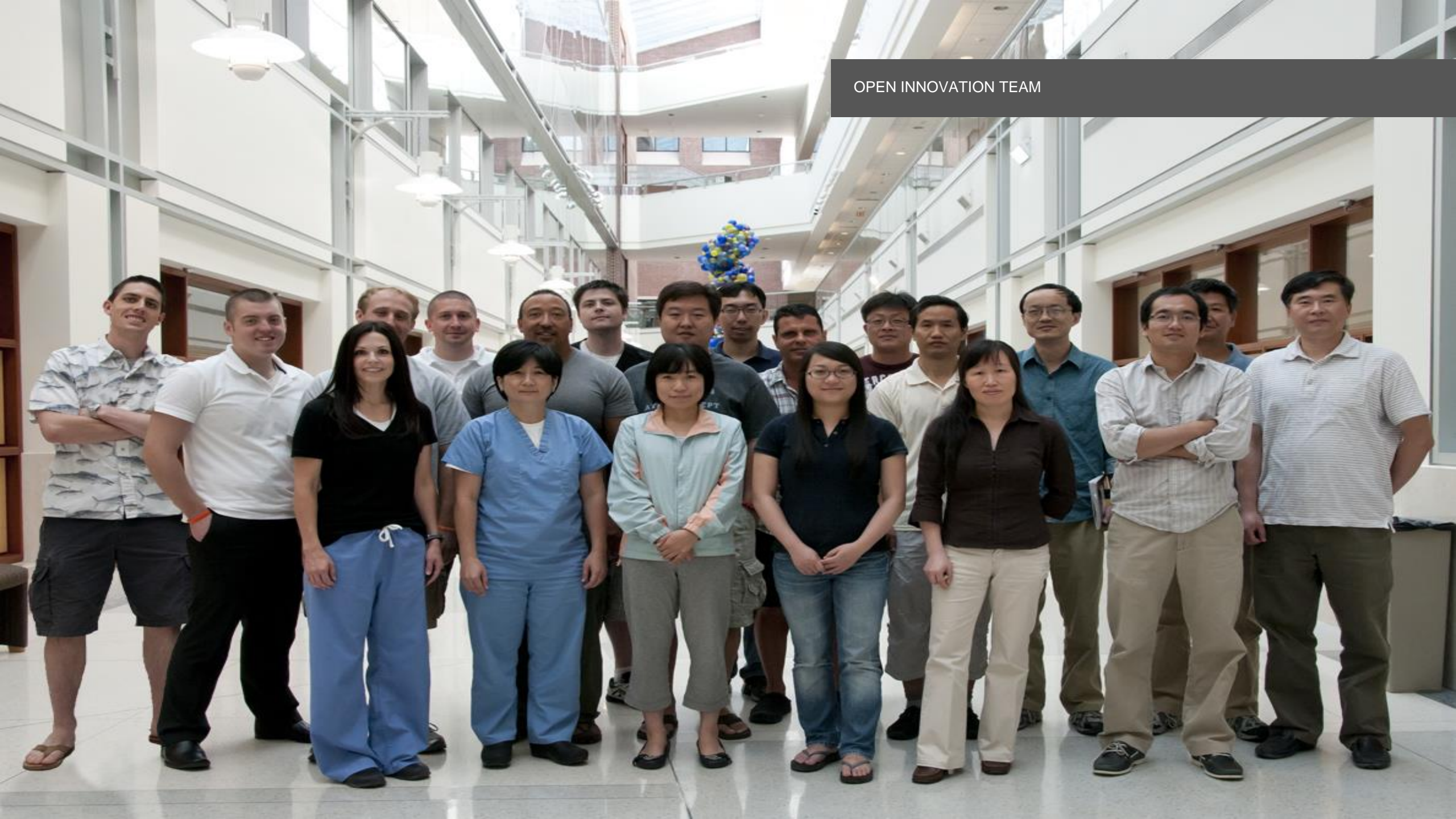




# Open Innovation Collaborations

- California Medical Innovations Institute
- 3DT Holdings, LLC
- NIH
- Battelle Laboratories
- Wyss Institute at Harvard
- University of Akron

OPEN INNOVATION TEAM



# Medical Device Innovation Consortium

- Public-private partnership innovation ecosystem
- Targeted mission to improve regulatory science
- Forum for collaboration, strategic investments, and tools to drive innovation
- Clear goals; good leadership
- Collaborative **volunteer** working groups
- Executives on loan
- **Competitors** working together in the precompetitive space on common problems



# Collaborative Approaches: MDIC

Open innovation in the precompetitive space





Global World Headquarters, Bloomington, IN

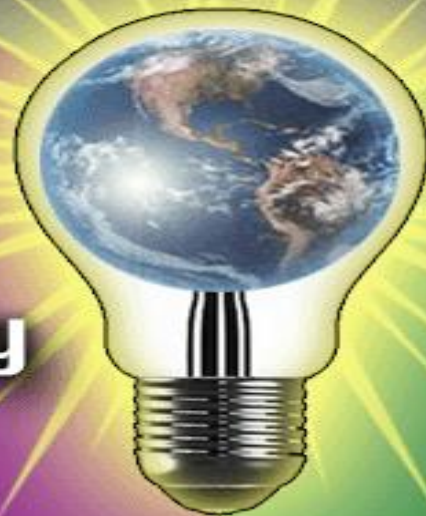


**Defense**

**University**

**Industry**

**Eric Matteson, GE Aviation**





**Defense**

**University**

**Industry**

**Dr. John Matlik, Rolls-Royce**

# Innovation & Advanced Manufacturing ... from a Aerospace Industry Perspective





# Cornerstones of a healthy innovation culture ...

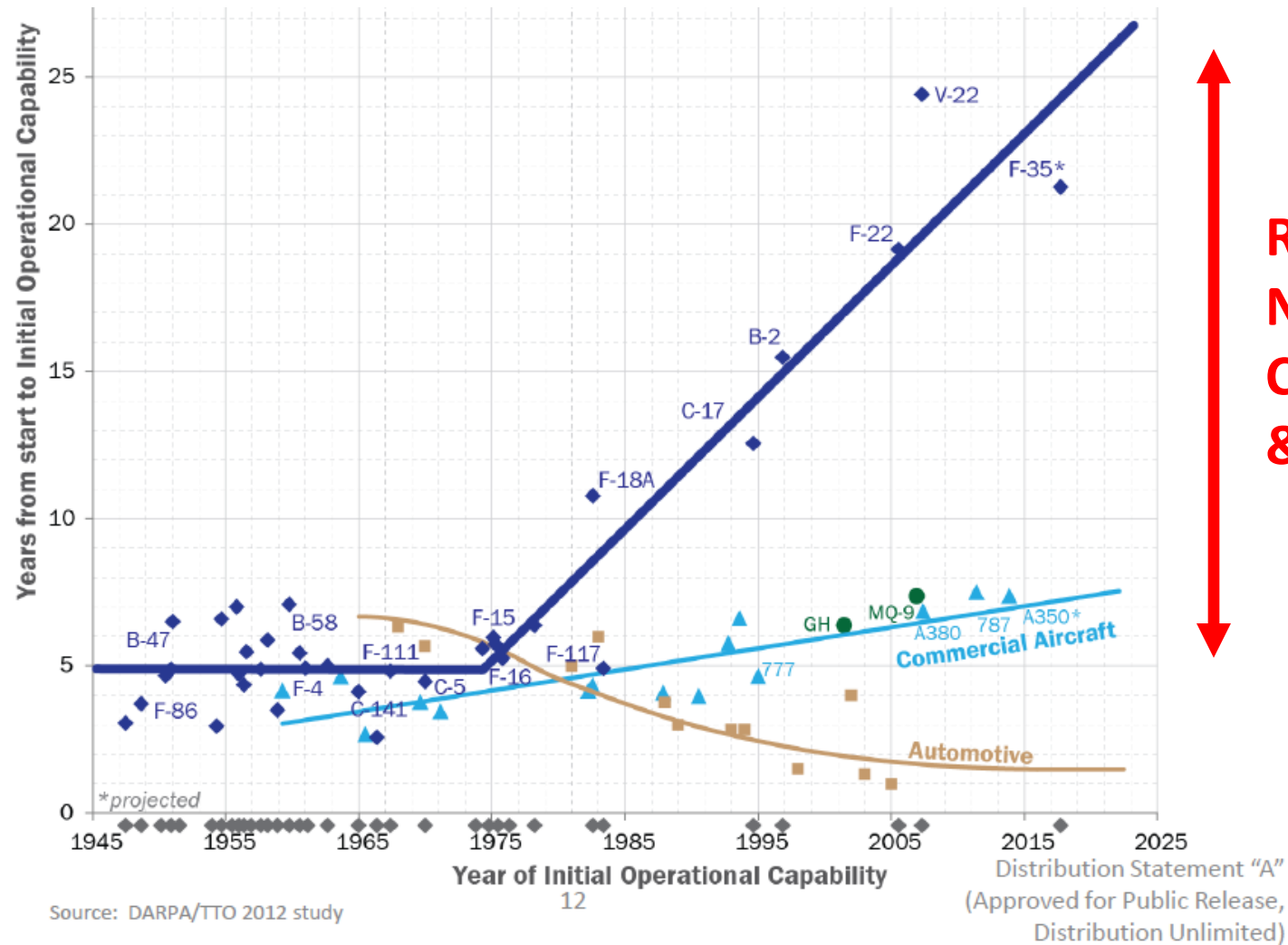
- 
- Focus on value
  - Systems integration
  - Collaboration & communication
  - Risk (& uncertainty) management

*So what does this look like ...*

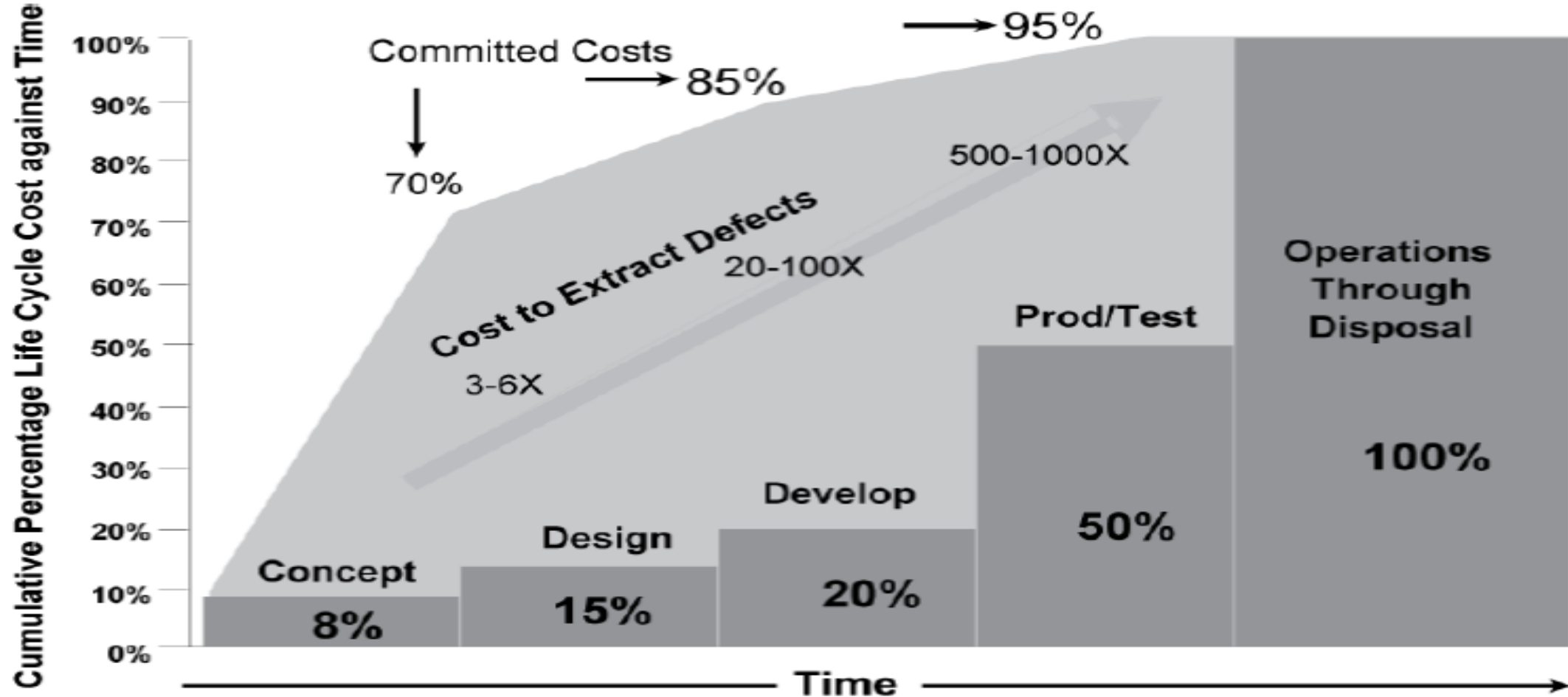
*... from an Aerospace Industry perspective?*



# Why we must care ... time



# Why we must care ... cost



INCOSE Systems Engineering Handbook, v. 3.2.1



Rolls-Royce

# Rolls-Royce - Our businesses

**Civil Aerospace**  
**Defence Aerospace**  
**Power Systems**  
**Marine**  
**Nuclear**





# Rolls-Royce in Indiana



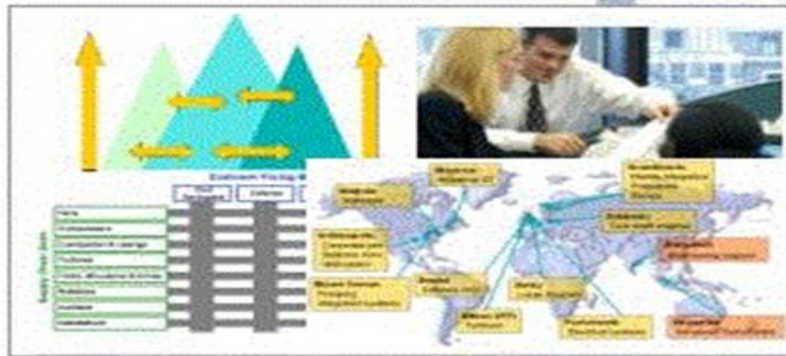
- 2015: Our Centennial Year (20-years as R-R)
- Recently committed nearly \$600 million in Indy Operations
- Located across 12 Central Indiana locations



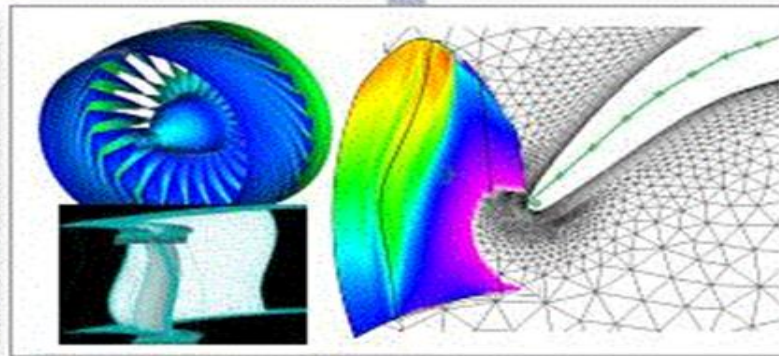
**Approximately 4000 Employees in Indiana**



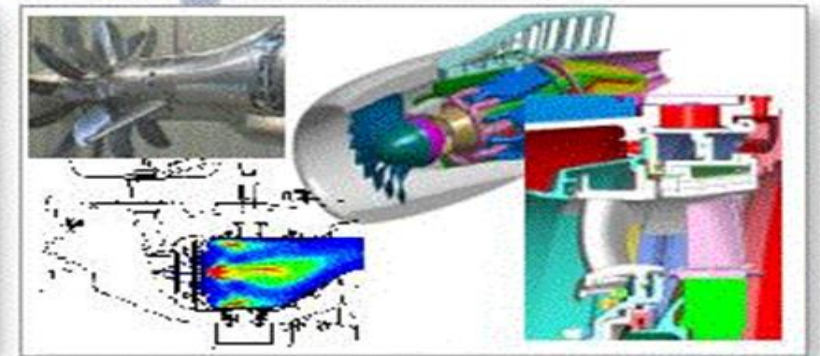
# The building blocks of future product systems



People

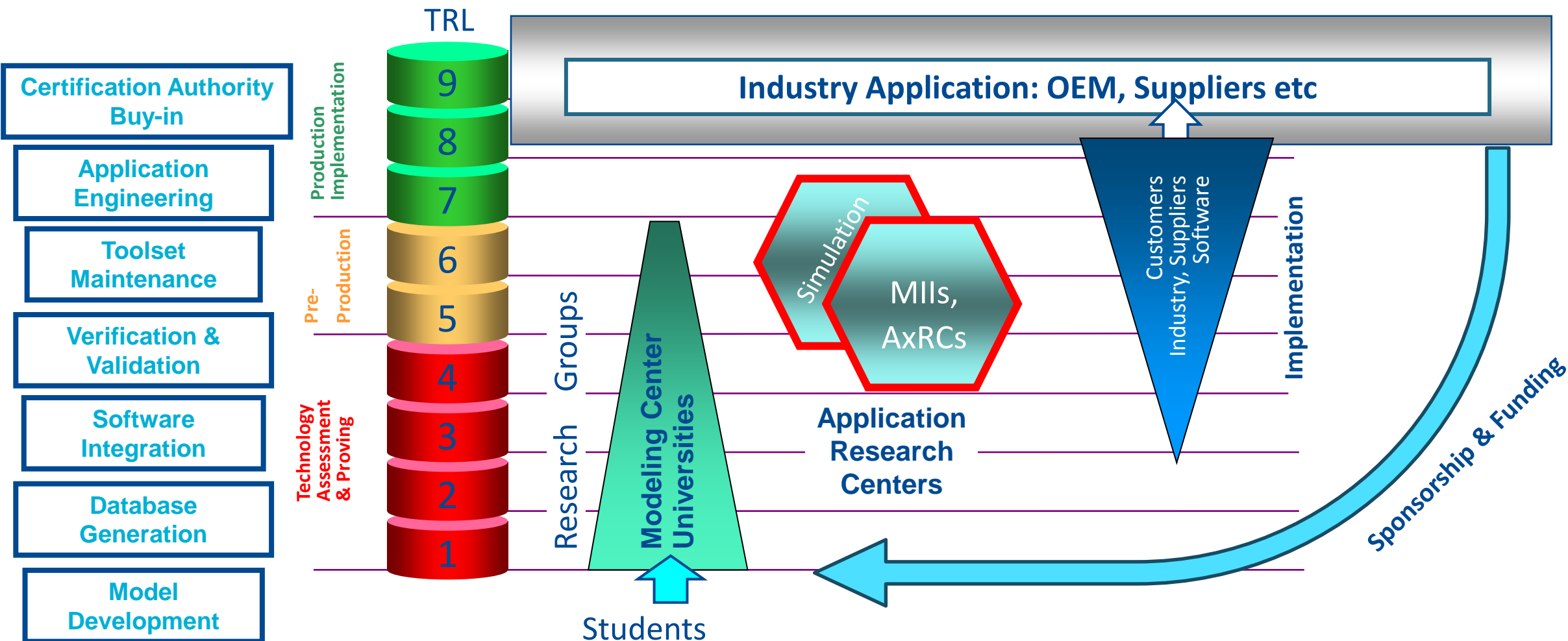


Toolset



Technology

# Collaboration – an innovation ecosystem





# VIRTUAL VALIDATION INSTITUTE



## the *OPPORTUNITY*

- To create an epicenter for Advanced Manufacturing in Indiana.
- Opportunity to create a community network of VVI members.
- A regional hub, with national collaboration and global reach
- Enable this generation's **MANUFACTURING REVOLUTION** - where models and analysis reduce costly design and experimentation cycles to optimize manufacturing processes and product performance.
- Collaborate within Manufacturing USA (formerly National Network of Manufacturing Innovation Institutes) across industries and agencies.



# Trusted to deliver excellence