


UCF Modeling & Simulation: The Next Era

“Knight’s Digital Twin”

Dr. Grace Bochenek & Dr. Carolina Cruz-Neira

11/12/2021



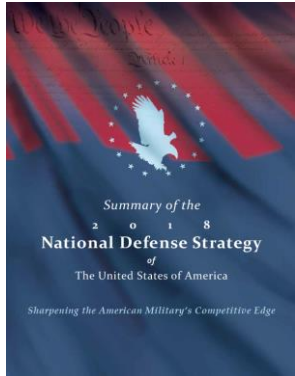
“The nature of innovation is changing—becoming dramatically more interconnected, turbulent and fast-paced. . .The bottom-line is simple—to compete in the next economy requires playing a new innovation game, one whose goal is to boost U.S. innovation tenfold: 10x.”

- Council on Competitiveness’s 2020 report,
“Competing in the Next Economy”

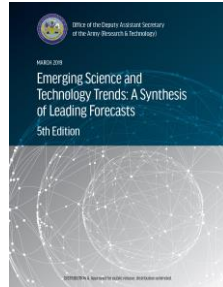
National Imperative

- New challenges of rapid and disruptive innovation
- Changes in our national innovation ecosystem
- Require new collaboration and partnership paradigms
- Capitalize on self-established M&S Enterprise thriving at UCF
- Drive novel approaches to skill-building addressing workforce market needs
- Expanding from Defense origins to multiple business sectors

Defense Strategic Plans



4-year planning cycle

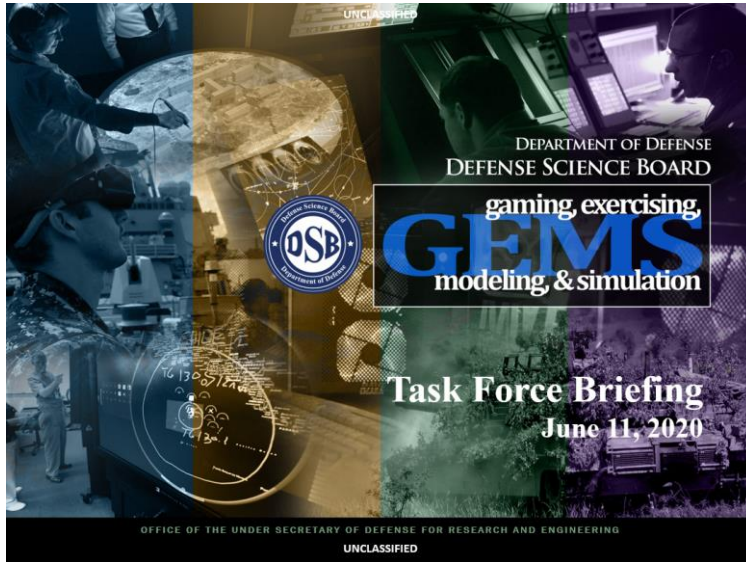


- Focused on driving Innovation in both Process & Research
 - Increased Partnerships
 - Building a culture of “increased competitiveness”
 - Reducing Time from Research to Commercialization
- Disrupting the traditional, sequential research and development processes
 - Increasing Applied Research
- Universities/Higher Education Playing a More Integral Role

Innovation, innovation, innovation!!

Source: *Summary of the 2018 National Defense Strategy of The United States of America*

Defense Science Board – GEMS Review



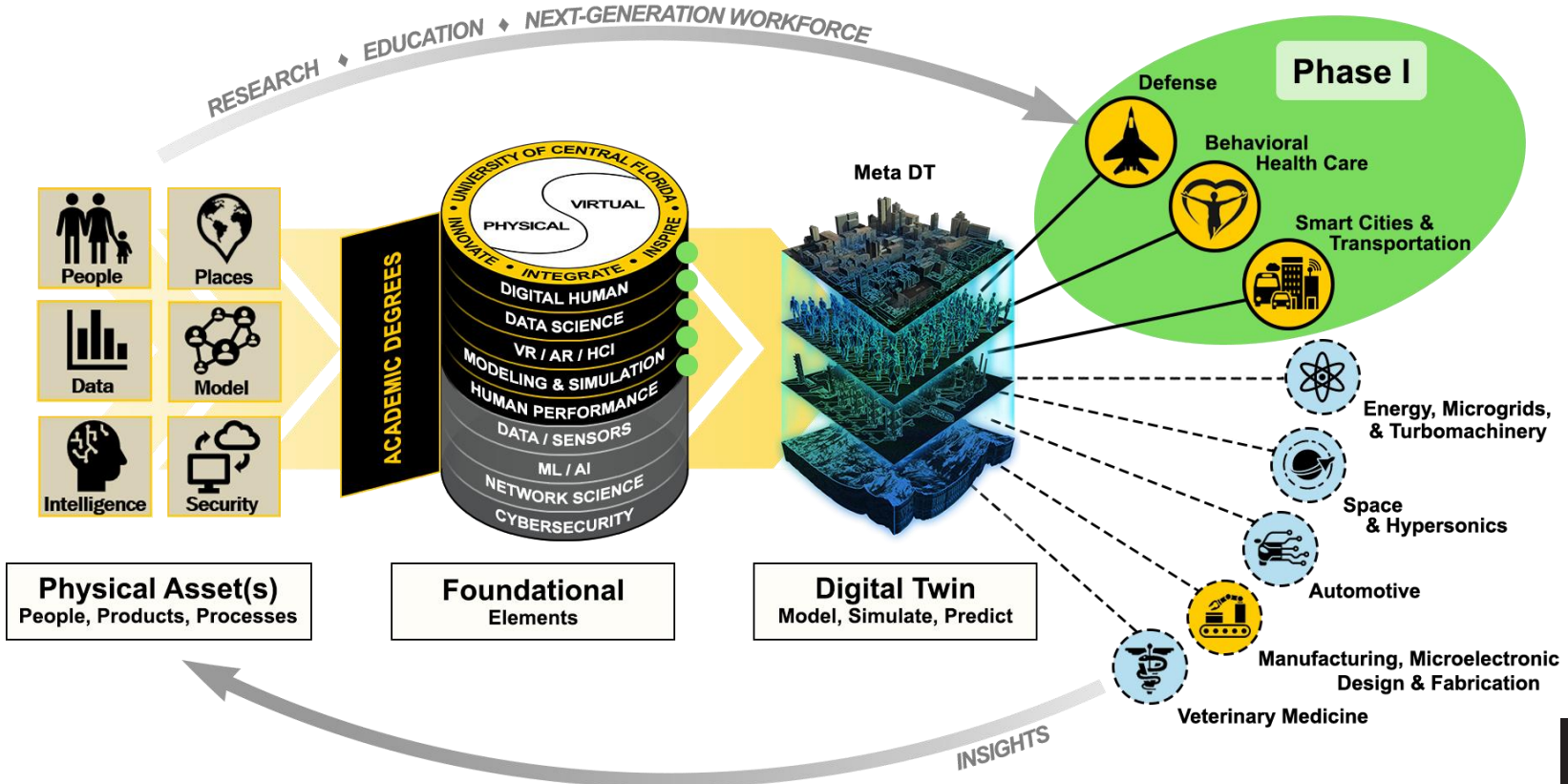
- Cost effective and innovative ways to test new concepts, design and prototype new systems, model military campaigns, conduct geopolitical analysis, and train to improve warfighter readiness and performance
- Increasingly important in today's highly competitive and dynamic strategic environment
- Focus on the five broad application areas: Digital Engineering; Training; Experimentation and Exercising; Campaign Modeling & Analysis; and Strategic Gaming
 - Digital engineering to support an enterprise-level strategy to promote effective adoption of GEMS tools

Our Vision

Modeling and simulation, the physical-virtual worldly representation known as a digital twin, is an innovation enabler, a force multiplier and should be considered an innovation engine driving advancement.

Today, UCF is the best positioned institution in the US to use this concept to create a new model to support and enhance US competitive leadership.

Knight's Digital Twin



Initial Core Technology Areas



Digital Human



Data Science



VR/AR/HCI



Modeling & Simulation



Human Performance

The Plan

- 20-30-year platform for leadership and growth
- Create Interdisciplinary institute for advancement of digital twin core capabilities with multiple sector applications
- Build a set of core foundational elements
- Establish target sector applications
- Develop nested digital representations of these complex, interdependent systems – a META-Digital Twin

Knight's Digital Twin Steering Committee

- Cross-University management structure
- 8-12 faculty, representing multiple UCF units
- Provide leadership aligned with the vision
- Develop operational structure to distribute & manage funds equitably
- Form faculty teams responsible for responding to large collaborative funding and partnership opportunities
- Provide guidance for campus-wide DT academic track



Return on Investment

- ROI estimated to be 5:1
 - \$5 of external funding for each \$1 of internal funding
 - Based on the 20-year historical average at SMST/IST.
- Address critical national priorities in Defense, Transportation, Energy, Health Care, and more
- Lead, convene, and drive national agenda in sector application areas
- Path for revenue generation with commercialization of UCF innovations
- Expanding facility and collaboration spaces

Contact Information



Dr. Grace Bochenek

SMST

(407) 882-1301

Grace.Bochenek@ucf.edu

Dr. Carolina Cruz-Neira

CECS

(407) 823-2341

carolina@ucf.edu