



Transformative

Aeronautics Concepts Program

2017 LEARN Technical Seminar

Koushik Datta
ULI Coordinator
September 6, 2017
www.nasa.gov



NASA Aeronautics Research Mission Directorate (ARMD)

NASA Aeronautics Research Six Strategic Thrusts

- Safe, Efficient Growth in Global Operations**
 - Enable full NextGen and develop technologies to substantially reduce aircraft safety risks
- Innovation in Commercial Supersonic Aircraft**
 - Achieve a low-boom standard
- Ultra-Efficient Commercial Vehicles**
 - Pioneer technologies for big leaps in efficiency and environmental performance
- Transition to Low-Carbon Propulsion**
 - Characterize drop-in alternative fuels and pioneer low-carbon propulsion technology
- Real-Time System-Wide Safety Assurance**
 - Develop an integrated prototype of a real-time safety monitoring and assurance system
- Assured Autonomy for Aviation Transformation**
 - Develop high impact aviation autonomy applications

MISSION PROGRAMS

Airspace Operations & Safety

AOSP

Safe, Efficient Growth in Global Operations

Real-Time System-Wide Safety Assurance

Advanced Air Vehicles

AAVP

Ultra-Efficient Commercial Vehicles

Innovation in Commercial Supersonic Aircraft

Transition to Low-Carbon Propulsion

Integrated Aviation Systems

IASP

Flight research-oriented, integrated, system-level R&T that supports all six thrusts

X-planes/ test environment

SEEDLING PROGRAM

Transformative Aeronautical Concepts

TACP

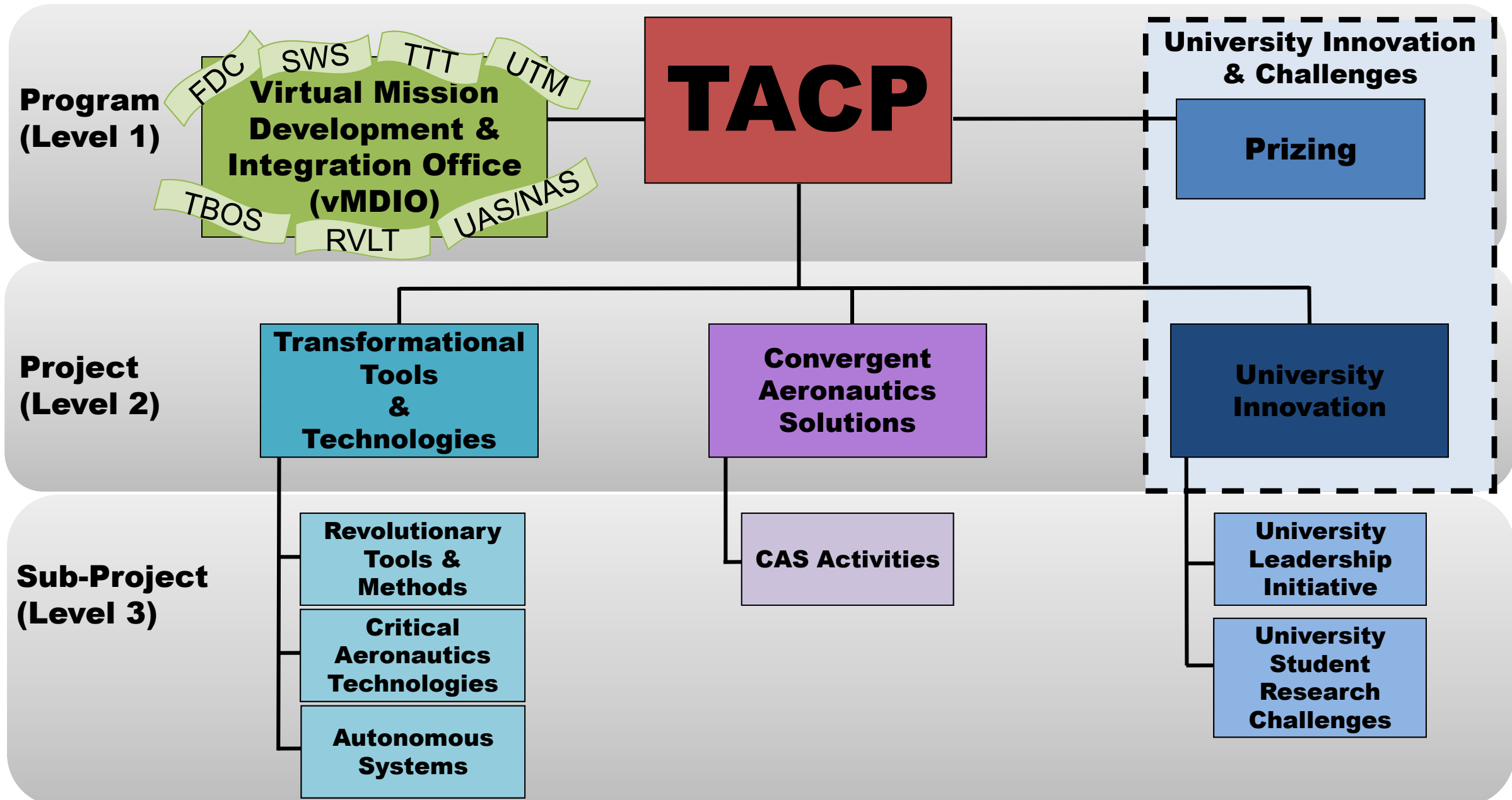
High-risk, leap-frog ideas that support all six thrusts

Critical cross-cutting tool development

Assured Autonomy for Aviation Transformation

<https://www.nasa.gov/aeroresearch/strategy>

Transformative Aeronautics Concept Program Organization



University Leadership Initiative (ULI)

- Provides opportunity for universities to exercise their leadership and contribute to ARMD in a more strategic manner
- Define unique technical challenges to accomplish strategic thrust outcomes, and plan multi-disciplinary research activities to address those challenges
- Apply innovative teaming strategies to strengthen potential impact
 - Reach out broadly across entire educational community
 - Explore a range of partnerships with large/small companies, non-profits, non-traditional aerospace
- Maintain primary responsibility for assessing research progress and quality by establishing peer review mechanisms
- Promote education of the next generation of engineers
- Take on an entrepreneurial role – maintain connections with key stakeholders, understand their needs, and propose necessary course corrections to meet those needs

Leading Edge Aeronautics Research for NASA (LEARN)

- NASA Research Announcements for new concepts are in two phases – Phase I and Phase II
 - Phase I awards are one-year efforts to explore the overall viability, show proof of concept, address the highest risk elements of developing the concept into operations, and advance the technologies required of the concept to the point where the risks and rewards justify further investment.
 - The follow on Phase II work are also one-year efforts for continued development, demonstration and delivery of the concept. By end of Phase II a credible path should be defined to build a tangible product and to mature the concept into the ARMD research programs or to achieve practical application by the aeronautics community.
- Refer to each Phase I and II as a Round

	FY 2015					FY 2016					FY 2017				
	O	N	D	J	F	O	N	D	J	F	O	N	D	J	F
LEARN Round 1															
LEARN Round 2															
LEARN Round 3															
LEARN Round 4															
LEARN Round 5															

LEARN Research Activities in Today's Seminar

Round and Phase	LEARN Research Activities	Thrust 1	Thrust 2	Thrust 3	Thrust 4	Thrust 5	Thrust 6
Round 1, Phase II	Poptube Technology, Enabling Multifunctional Hybrid Composites for Next Generation Aircrafts			X			
Round 2, Phase II	Scalable Multifidelity Design Optimization: Next Generation Aircraft and their Impact on the Air Transportation System		X	X			
	A Framework for Turbulence Modeling Using Big Data		X	X			
	Electro-Thermally Active Seal for Fast Response Tip Clearance Control			X			
Round 4, Phase I	Safe Autonomy Flexible Innovation Testbed (SAFIT)						X
	Versatile Experimental Autonomy Research Aircraft Technology (VEARAT)						X