



THE UNITED STATES AIR FORCE TEST PILOT SCHOOL

SCIENTIA EST VIRTUS
"KNOWLEDGE IS POWER"

U.S. Air Force T&E Education



Col Ryan Blake
Commandant, USAF Test Pilot School

Approved for public release; distribution is unlimited. 412TW-PA-19538



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Air Force Test Center approach to:

Workforce Development

T&E Challenges for Global Threats

U.S. Air Force T&E Education



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- **The USAF has varying levels of education for its T&E workforce**
 - *Defense Acquisition University*
 - *Air Force Institute of Technology*
 - *Unit/Base level training*
 - *Test Pilot School*
- **Test Pilot School is the USAF graduate school for T&E**
 - *Accredited Master of Science in Flight Test Engineering*
 - *TPS fuses graduate-school academics and research with hands-on T&E*
 - *Our graduates perform T&E across all domains*

Mission:
**Produce highly-adaptive critical-thinking
flight test professionals to lead and
conduct full-spectrum test and evaluation
of aerospace weapon systems**

Vision:
**Be the world's premiere institution for
flight test education, training, and research**

USAF TPS Evolution



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1940 1950 1960 1970 1980 1990 2000 2010 2020

- 1944**
- Established at Wright Field as the Flight Test Course
 - Based on 2 Phases: Performance and Flying Qualities

- 1951**
- Moved to Edwards AFB

- 1961**
- Aerospace Research Pilot (ARP) Course Added
 - Renamed USAF ARPS

- 1972**
- ARP Course Terminated; Renamed USAF TPS
 - Systems Phase Added

- 1973**
- FTE Program Initiated

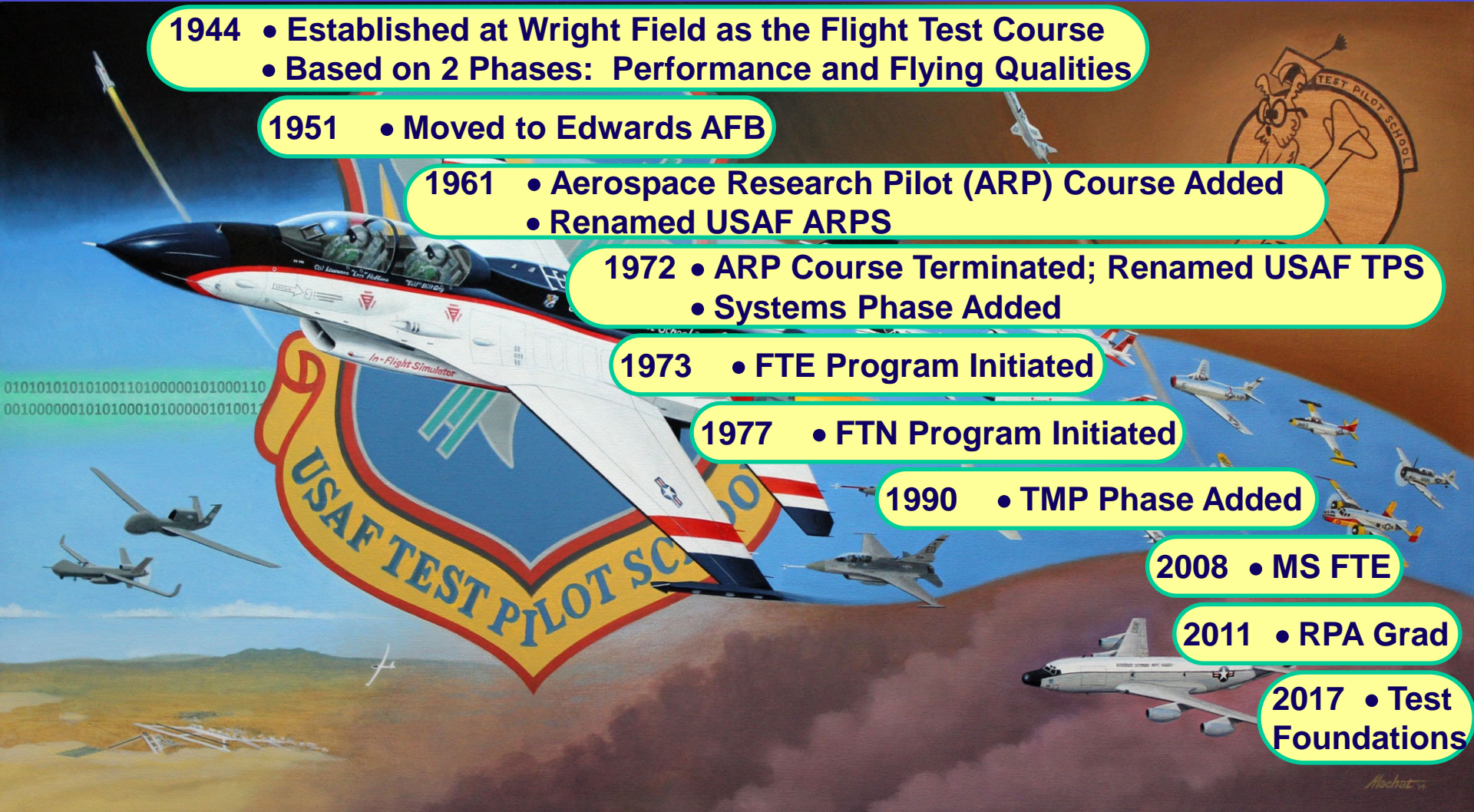
- 1977**
- FTN Program Initiated

- 1990**
- TMP Phase Added

- 2008**
- MS FTE

- 2011**
- RPA Grad

- 2017**
- Test Foundations



USAF TPS Overview



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- **48-week Program, MS Degree in Flight Test Engineering**
- **2 classes per year (24 students per class)**
 - *A Class (Jan – Dec)*
 - *B Class (Jul – Jun)*
- **4 integrated courses**
 - *Manned Aircraft Pilot*
 - *Combat System Officer*
 - *Remotely Piloted Aircraft Pilot*
 - *Flight Test Engineer*




TPS Approach to T&E Education



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- **Student selection**

- *Our students are already expert operators/engineers*
- *We teach these operational experts how to be test experts*

Course	Time in Service	Education	Experience
PILOT 	< 9yr, 6 Mo	BS in Engr, Math or Physics (≥3.0 GPA)	IP or ≥ 750 / 1000 hours total time* ≥ 12 months AC
RPA/CSO 	< 9yr, 6 Mo	BS in Engr, Math or Physics (≥3.0 GPA)	RPA: IP or ≥750 hours total time* CSO: IN or ≥500 hours total time
ENGINEER 	< 8yr	BS in Engr, Math or Physics (≥3.0 GPA) Technical MS highly desired	≥ 2yr experience in: 13XX, 14NX, 21AX, 21CX, 21LX, 21MX, 33SX, 61SX, 62EX, 63AX (civ: ≥ 2yr in T&E)



TPS Approach to T&E Education



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- Student selection
 - *Our students are already expert operators/engineers*
 - *We teach these operational experts how to be test experts*
- Instructor cadre
 - *Hand-picked instructors*
 - *6 full-time PhDs on staff*
 - *Multiple guest PhD instructors*

TPS Approach to T&E Education



Scientia est Virtus

- **Student selection**
 - *Our students are already expert operators/engineers*
 - *We teach these operational experts how to be test experts*
- **Instructor cadre**
 - *Hand-picked instructors*
 - *6 full-time PhDs on staff*
 - *Multiple guest PhD instructors*
- **Two complementary identities**
 - *Accredited academic institution*
 - *Formal flying course*
- **Hands-on exercises and research projects are key**

Hands-On Exercises



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Hands-On Exercises



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Simulators



Control Rooms

Research Platforms



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NF-16D VISTA



Variable Stability Learjet





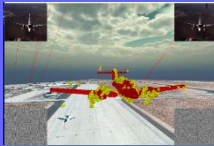
Test Management Projects



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Have Double Vision :

- Determined accuracy of a stereovision relative positioning algorithm with applications toward passive automated aerial refueling in covert combat environment
- Collected massive dataset for future research and development of machine imagery processing algorithms



Have Good Vibes:

- Investigated limit cycle oscillation of a unique F-16 missile loadout with aft mountable AIM-9 missiles for varying center of pressure
- Collected data of complex non-linear interactions to be used by AFSEO for improvements to modeling and prediction of LCO



Have FLEX:

- Investigated accuracy and utility of eight different low-cost GPS devices by comparing to the current generation of highly accurate differential GPS reference sources
- Evaluated utility of devices for contingency operations, providing safety-critical recommendations towards their use in operational and training units



Have KNIGHT:

- Characterized human recognition and identification model performance using a Litening Advanced Targeting Pod on C-12J
- Evaluated the operational utility of retro-reflective airfield coatings which can save the Air Force and civil aviation community millions of dollars



TPS Approach to T&E Education



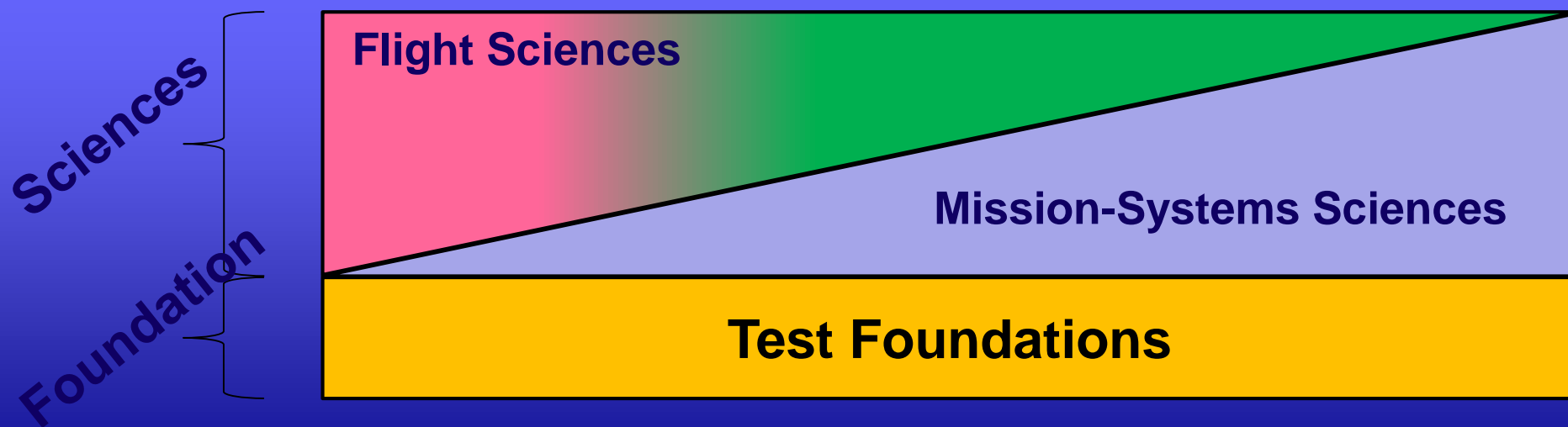
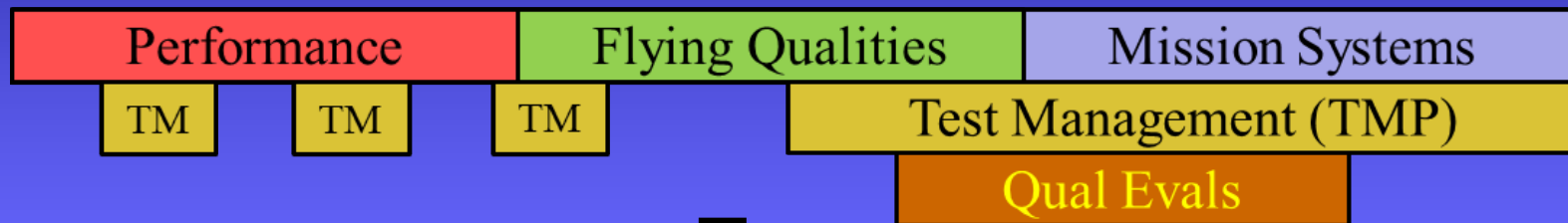
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- **Three interdependent learning areas:**
 - ***Skillset***
 - *Test Execution*
 - *“Flight Training” aspect*
 - ***Theoretical Depth***
 - *Science, technology, research*
 - *“Graduate School” aspect*
 - ***Mindset***
 - *Defining and approaching complex problems*
 - *Decomposing requirements*
 - *Keeping the big picture in mind during test conduct*
 - *Sciences evolve, but the mindset is what keeps the education continually relevant*

TPS Approach to T&E Education



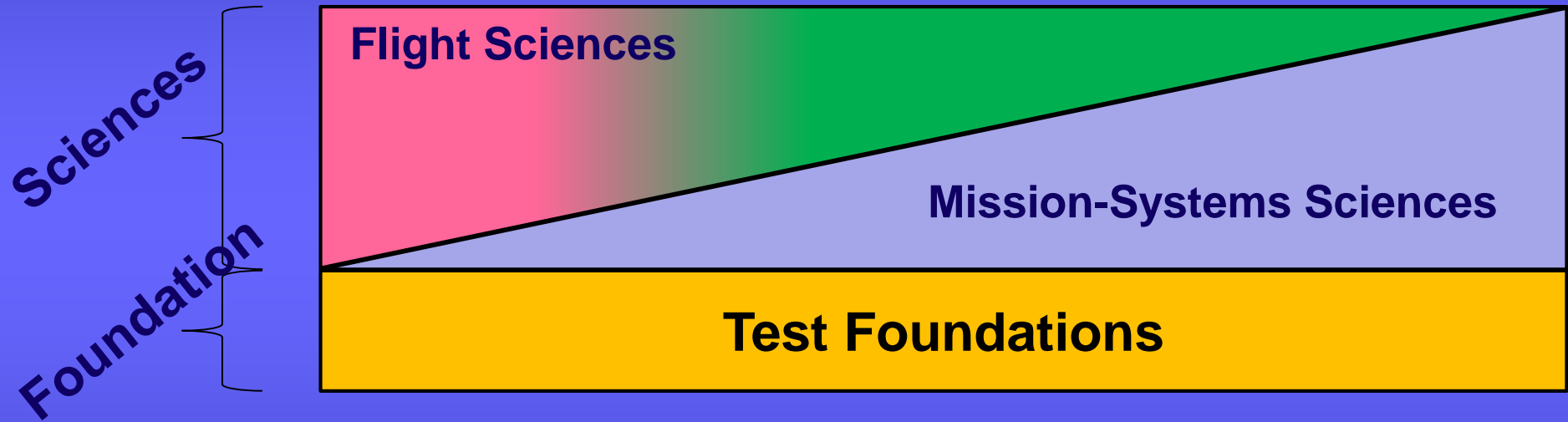
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Generalized T&E Education



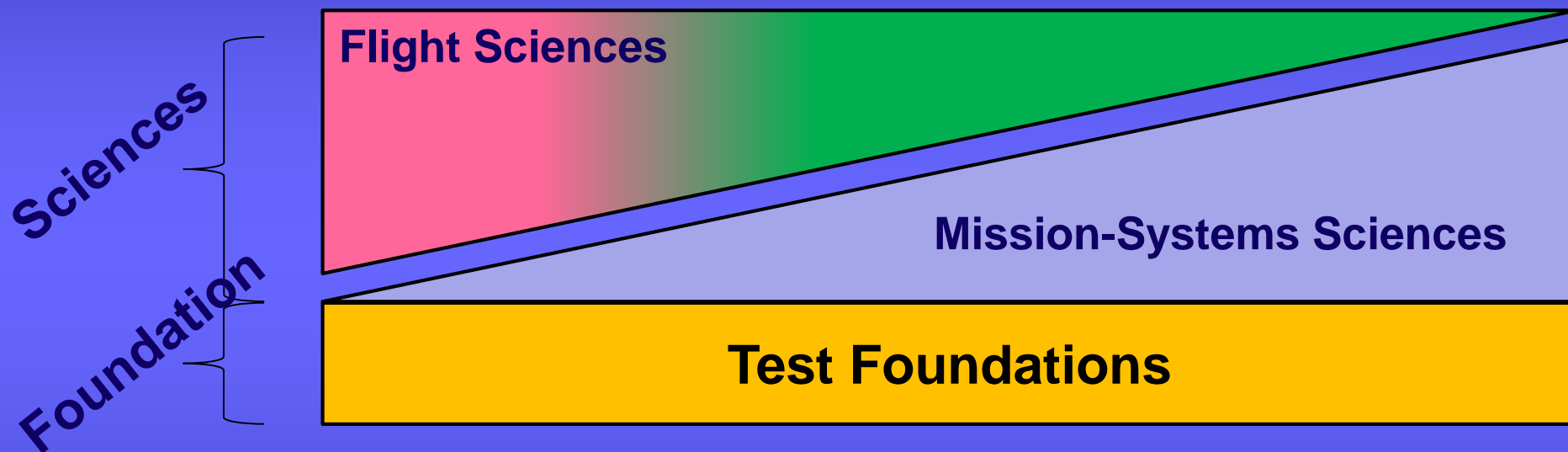
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Generalized T&E Education



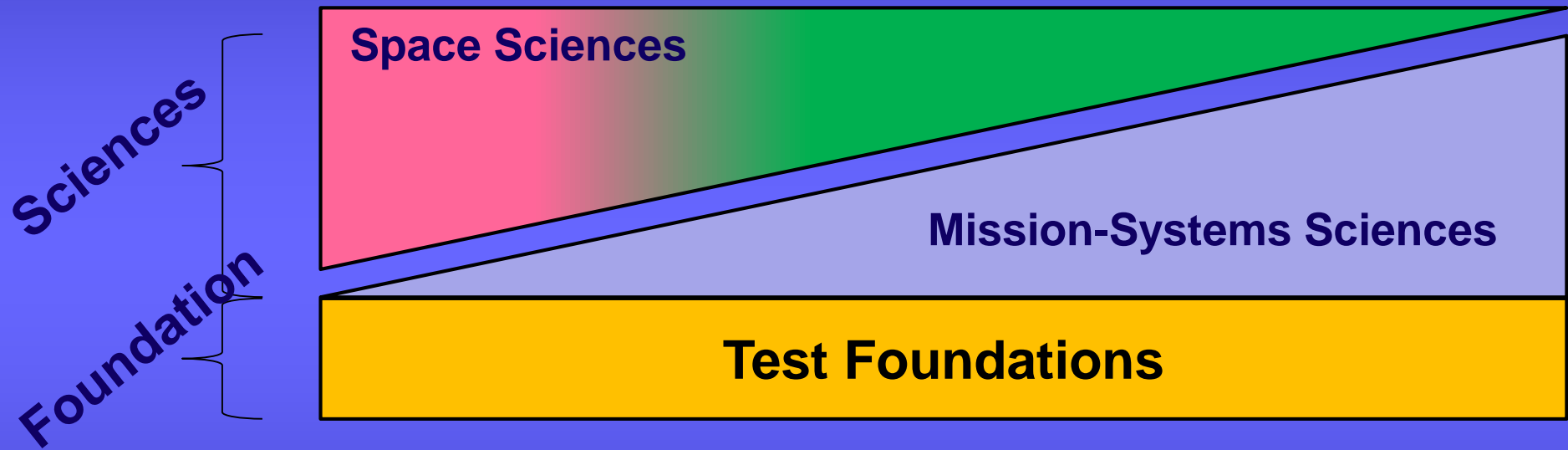
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Generalized T&E Education



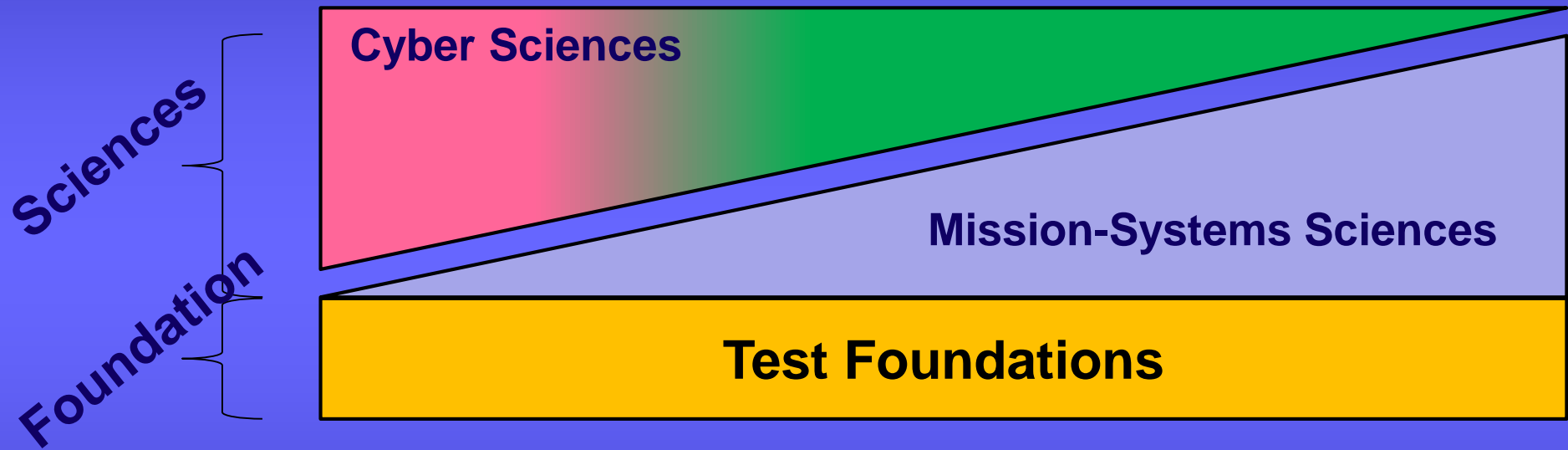
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Generalized T&E Education



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Scalable T&E Education



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Test Foundations

SURVEYED SCIENCE

Test Foundations

IN-DEPTH
SCIENCE

Test Foundations

SCIENCE
1

SCIENCE
2

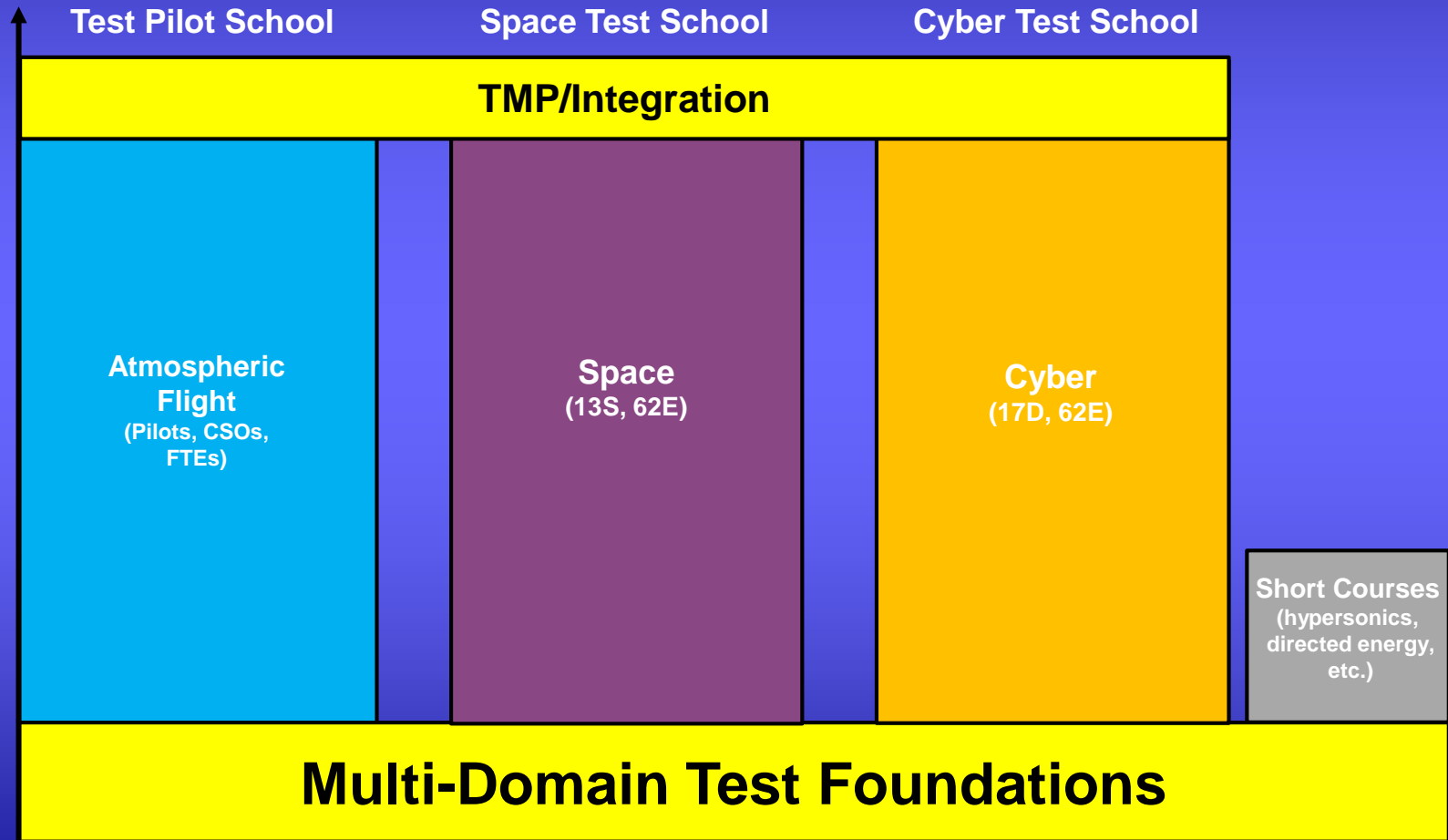
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Test Foundations

TPS Plan for Generalized T&E Education



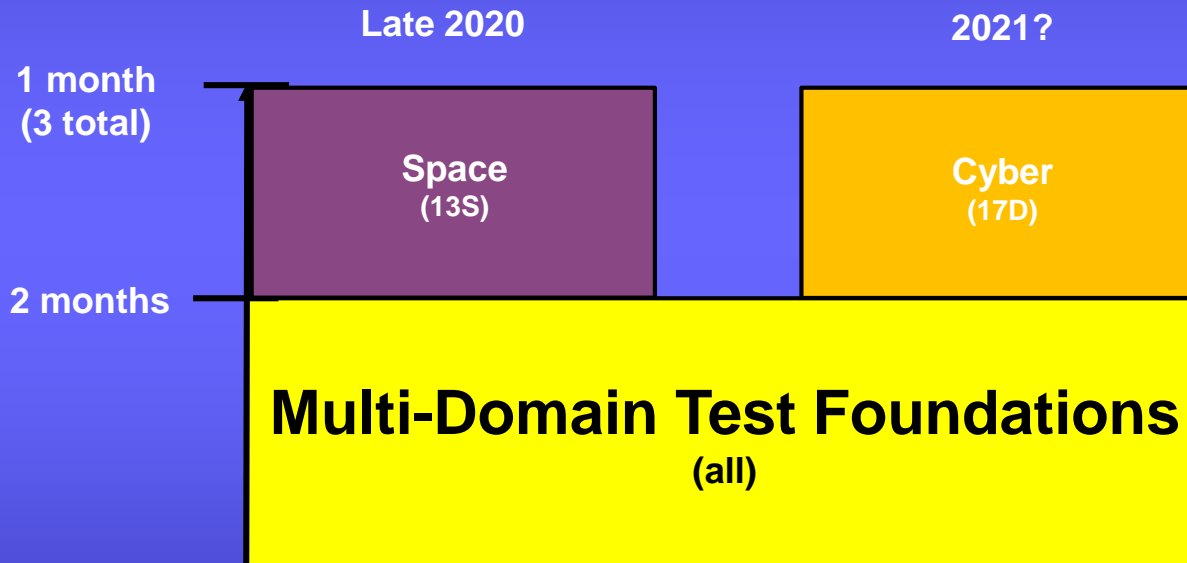
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First Step



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REPORT DOCUMENTATION PAGE				<i>Form Approved</i> OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 01-11-2019		2. REPORT TYPE Briefing Slides		3. DATES COVERED (From - To) 12 November 2019	
4. TITLE AND SUBTITLE U.S. Air Force Test and Evaluation Education				5a. CONTRACT NUMBER 12100	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Ryan D. Blake				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) AND ADDRESS(ES) USAF Test Pilot School 220 S. Wolfe Ave. Edwards AFB CA 93524				8. PERFORMING ORGANIZATION REPORT NUMBER 412TW-PA-19538	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) 412th Test Wing 195 E Popson Ave Edwards AFB CA 93524				10. SPONSOR/MONITOR'S ACRONYM(S) N/A	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release A: distribution is unlimited.					
13. SUPPLEMENTARY NOTES International Test and Evaluation Association Symposium / Kauai, HI / 12 Nov 19					
14. ABSTRACT This briefing is given by the Commandant of the United States Air Force Test Pilot School to the International Test and Evaluation Association Symposium. The briefing discusses the state of Test and Evaluation education within the Air Force, and it describes the Test Pilot School approach to teaching Test and Evaluation concepts. The briefing also discusses how this approach is being used to prepare for emerging warfighting domains and new global threats.					
15. SUBJECT TERMS Air Force Test Center, U.S. Air Force Test Pilot School, Test and Evaluation Education					
16. SECURITY CLASSIFICATION OF: Unclassified			17. LIMITATION OF ABSTRACT None	18. NUMBER OF PAGES 25	19a. NAME OF RESPONSIBLE PERSON 412 TENG/EN (Tech Pubs)
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code) 661-277-8615