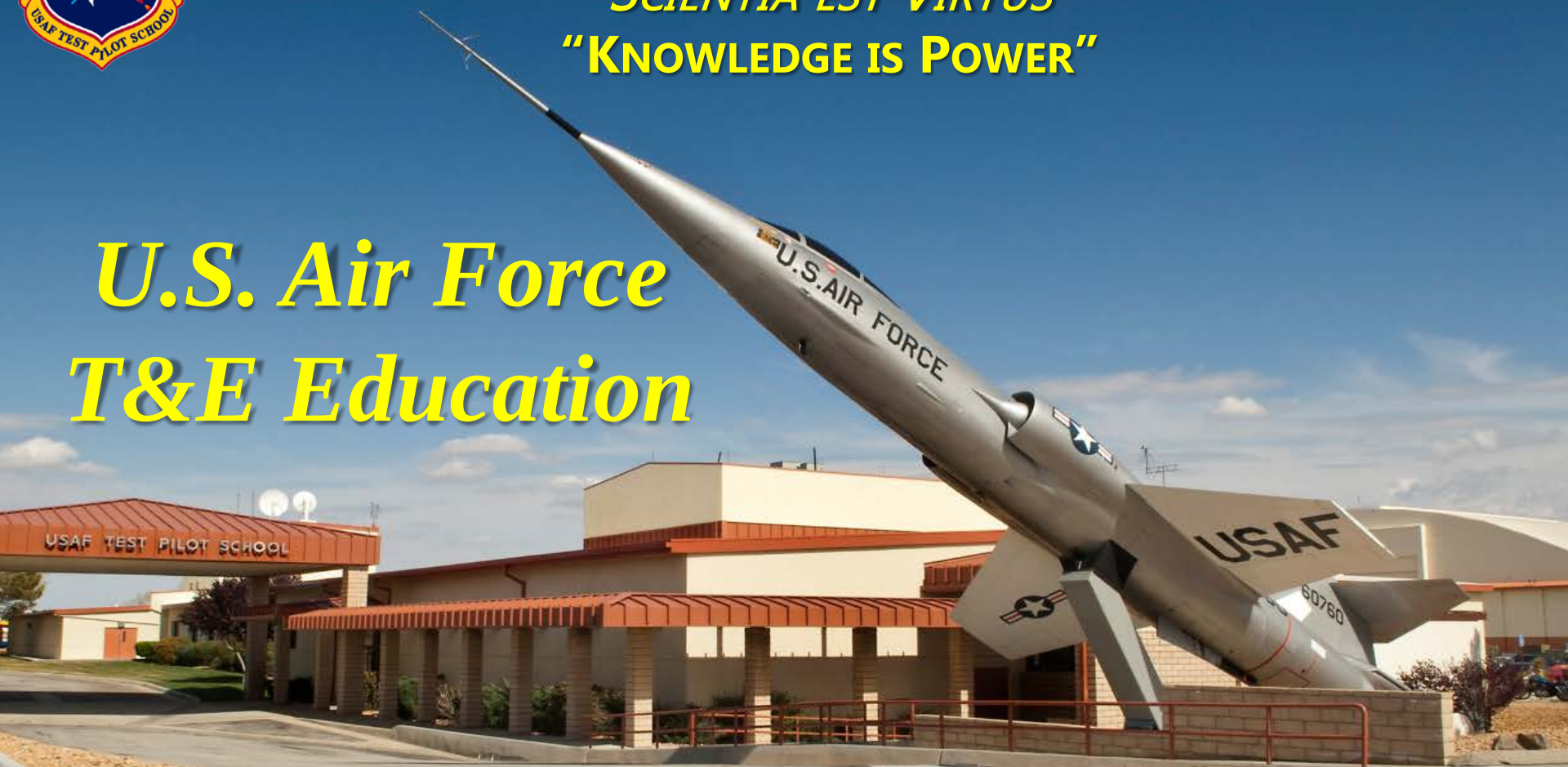




THE UNITED STATES AIR FORCE TEST PILOT SCHOOL

SCIENTIA EST VIRTUS
"KNOWLEDGE IS POWER"

U.S. Air Force *T&E Education*



Col Ryan Blake
Commandant, USAF Test Pilot School

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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*

The background image shows the USAF Test Pilot School building, a large, modern structure with a prominent entrance. In the foreground, a large aircraft, possibly a fighter jet, is displayed on a pedestal. The aircraft has "USAF" and the number "60760" visible on its side. The sky is clear and blue.

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

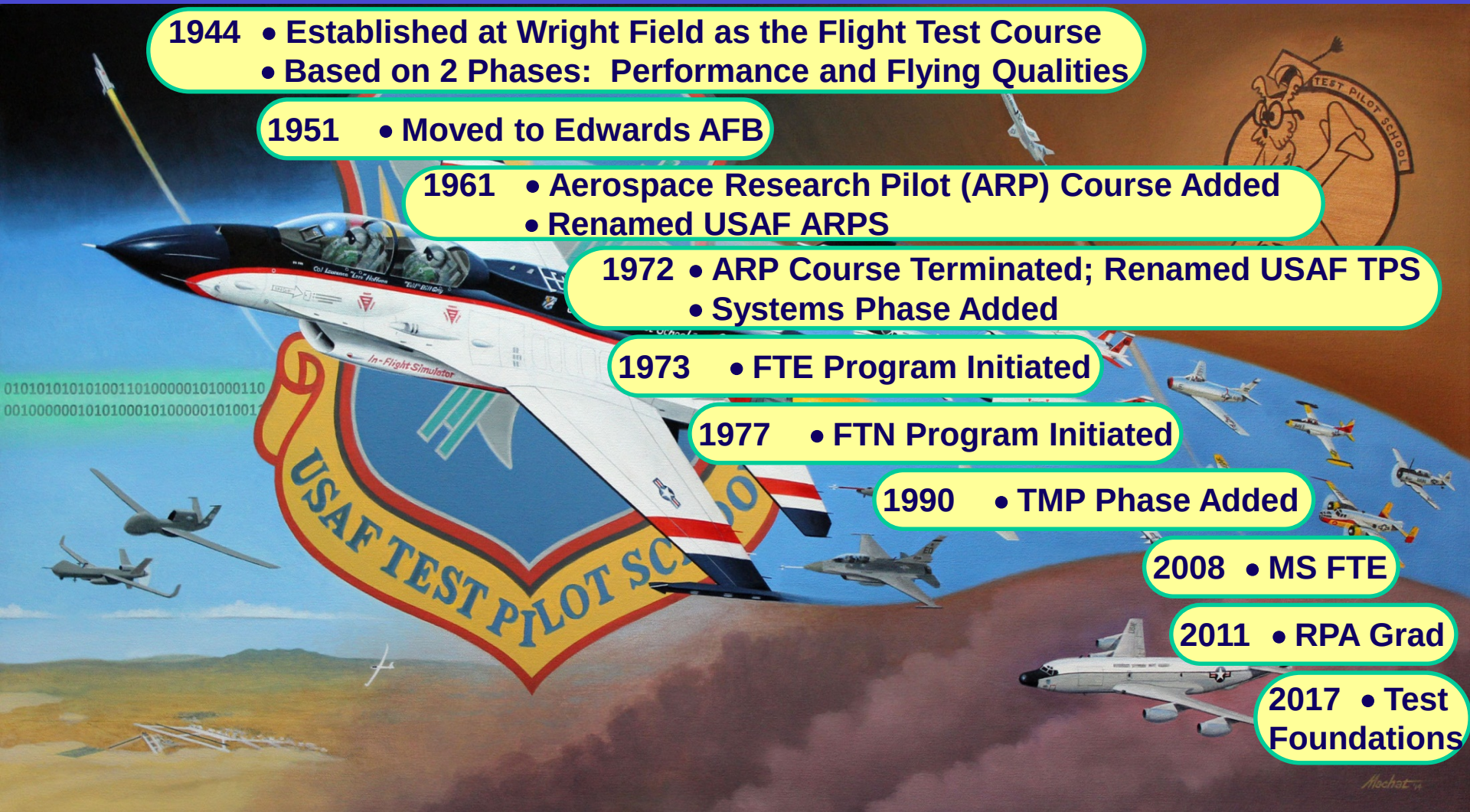
- 1977**
- FTN Program Initiated

- 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



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*

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

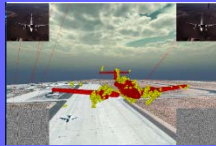


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Have Double Vision :

- 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



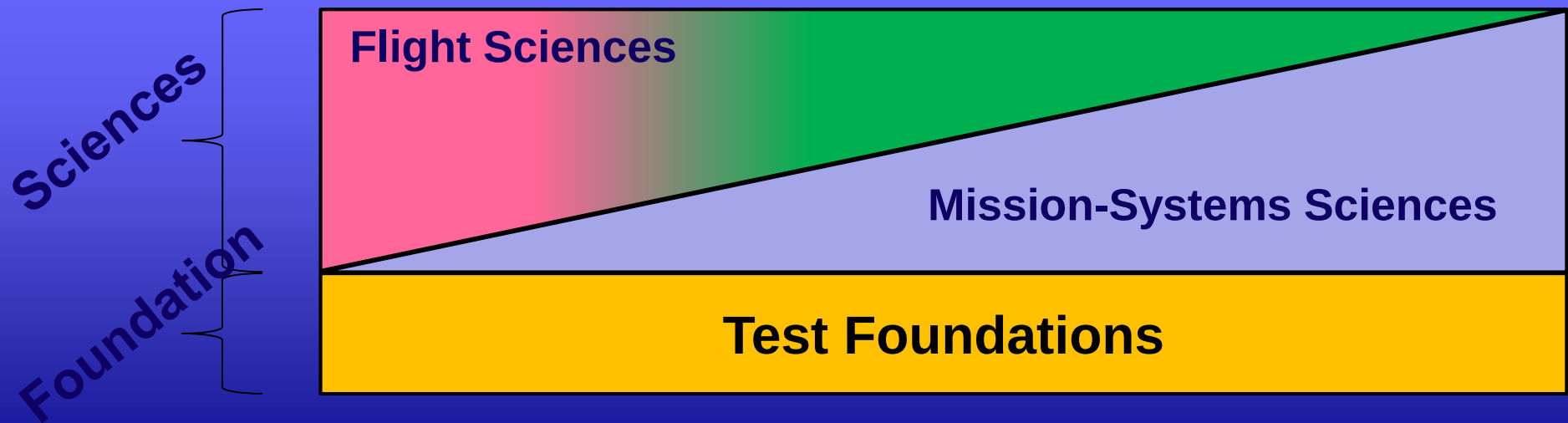
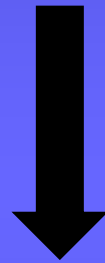
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- **Three interdependent learning areas:**
 - *Skillset*
 - *Test Execution*
 - *“Flight Training” aspect*
 - *Theoretical Depth*
 - *Science, technology, research*
 - *“Graduate School” aspect*
 - *Mindset*
 - *Defining and approaching complex problems*
 - *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



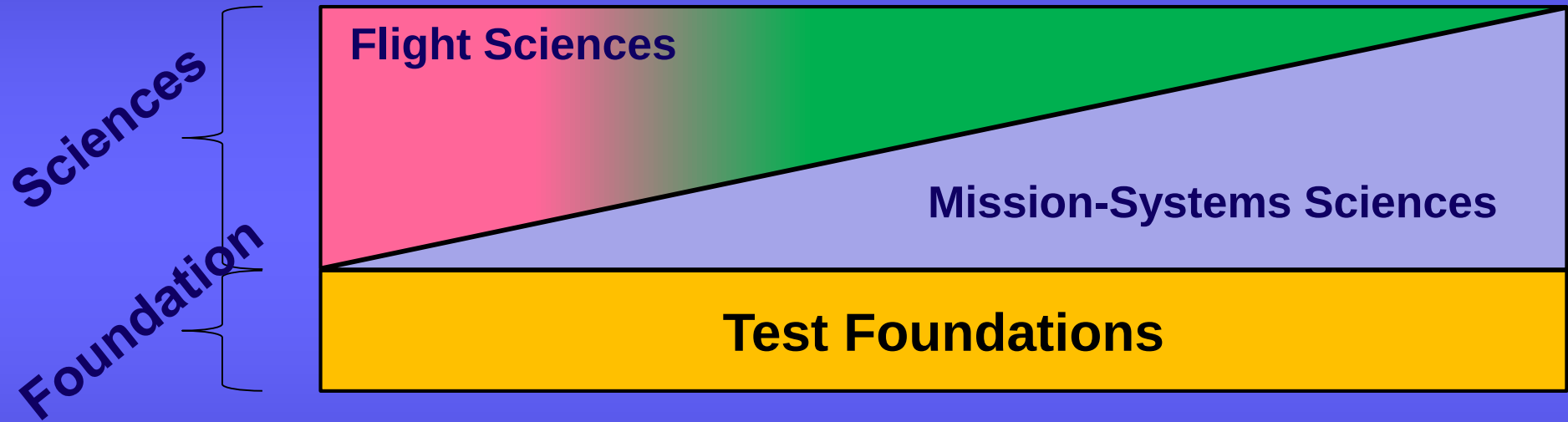
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Generalized T&E Education



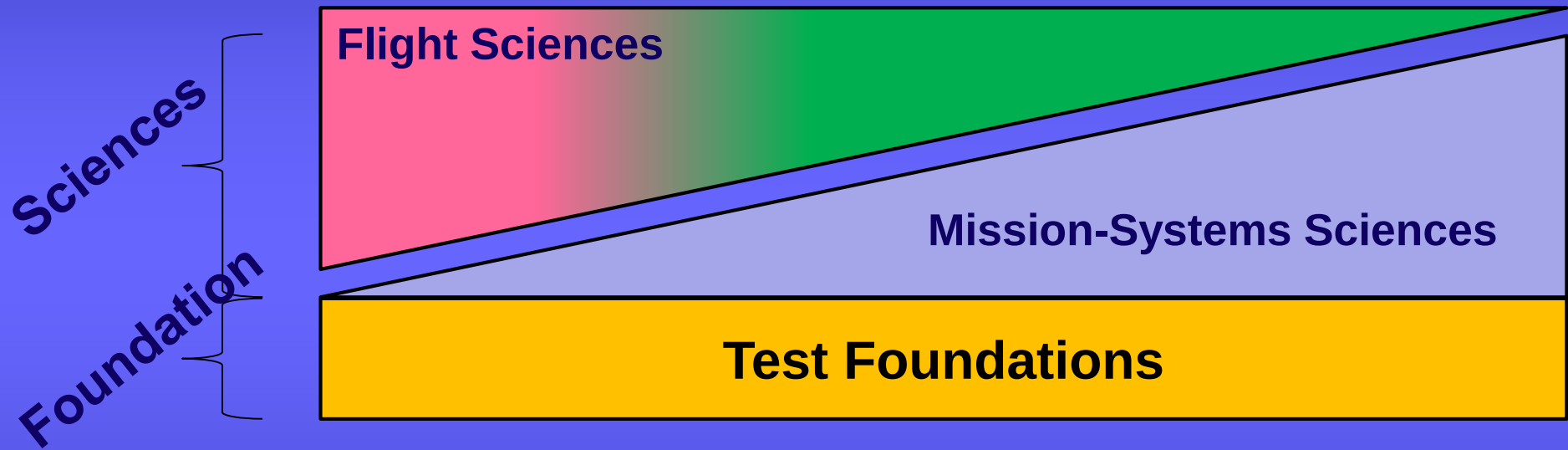
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Generalized T&E Education



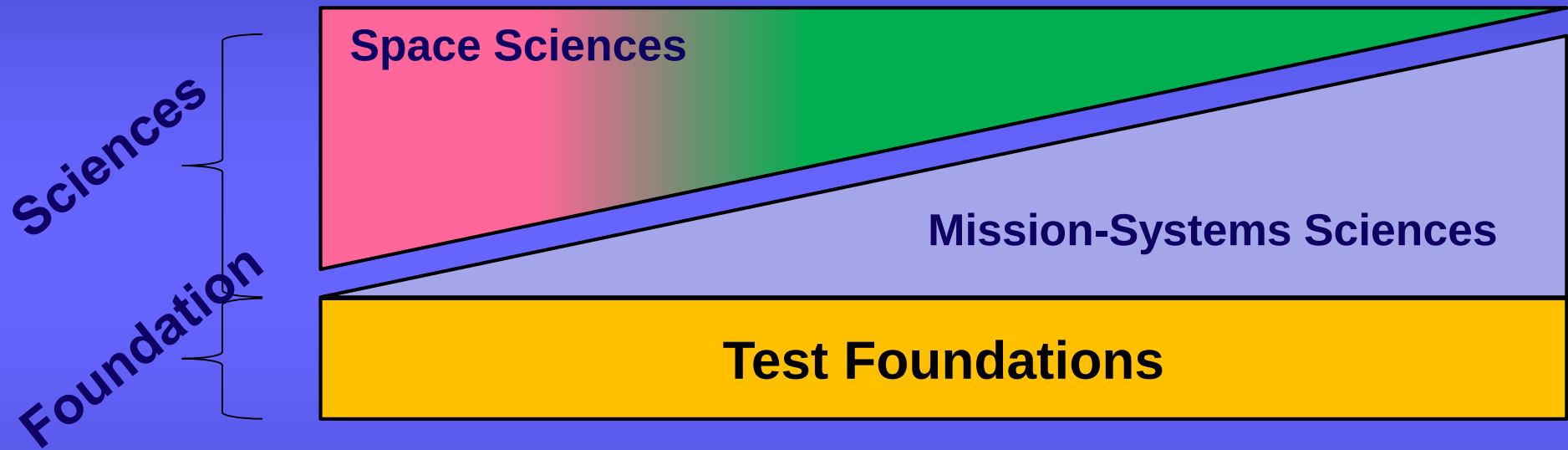
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Generalized T&E Education



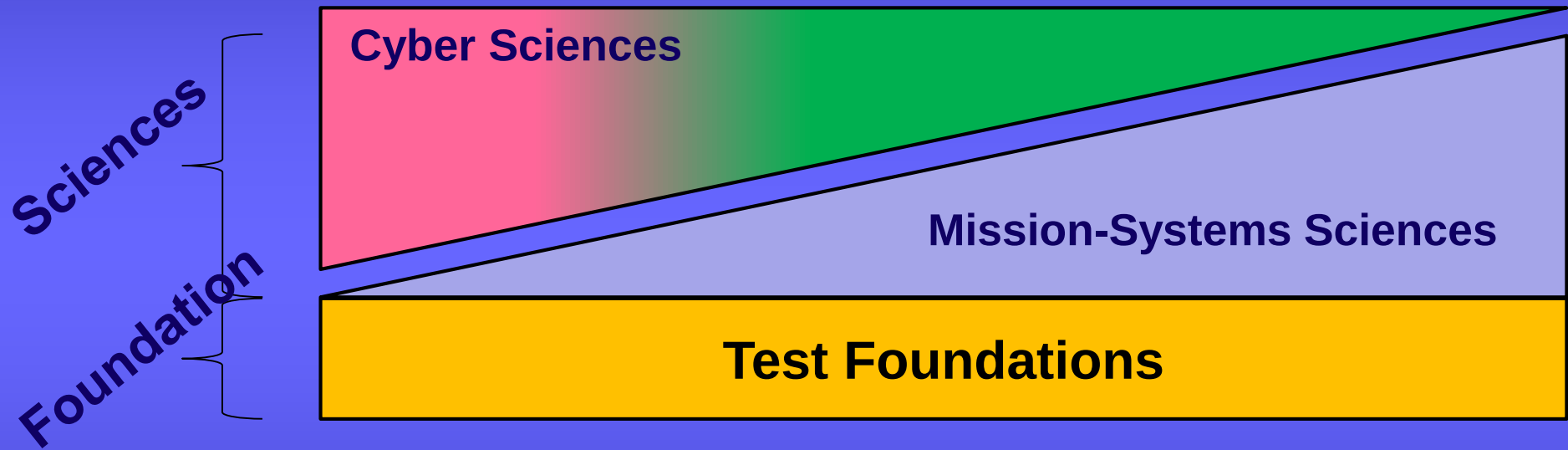
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Generalized T&E Education



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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

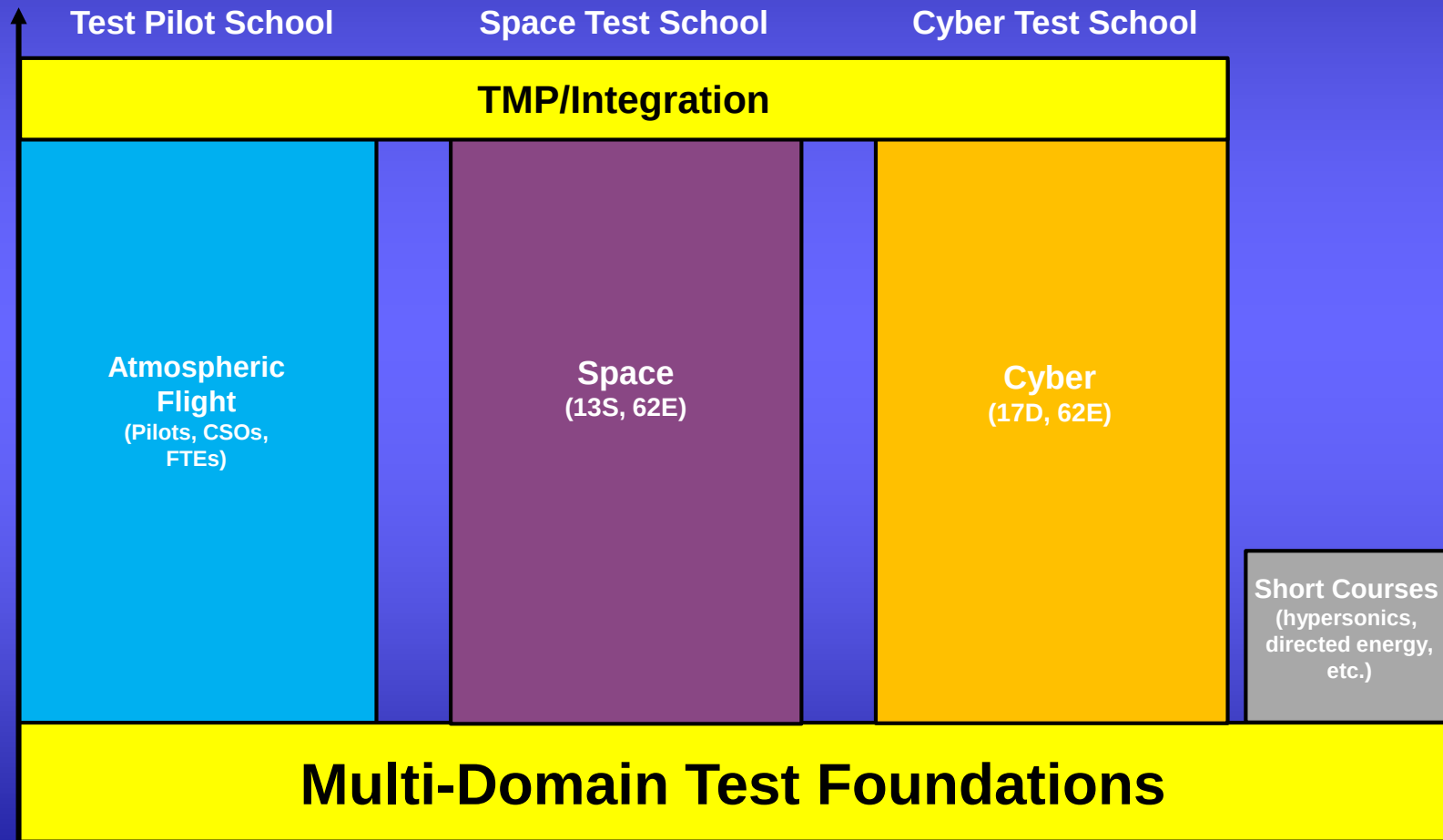
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Test Foundations

TPS Plan for Generalized T&E Education



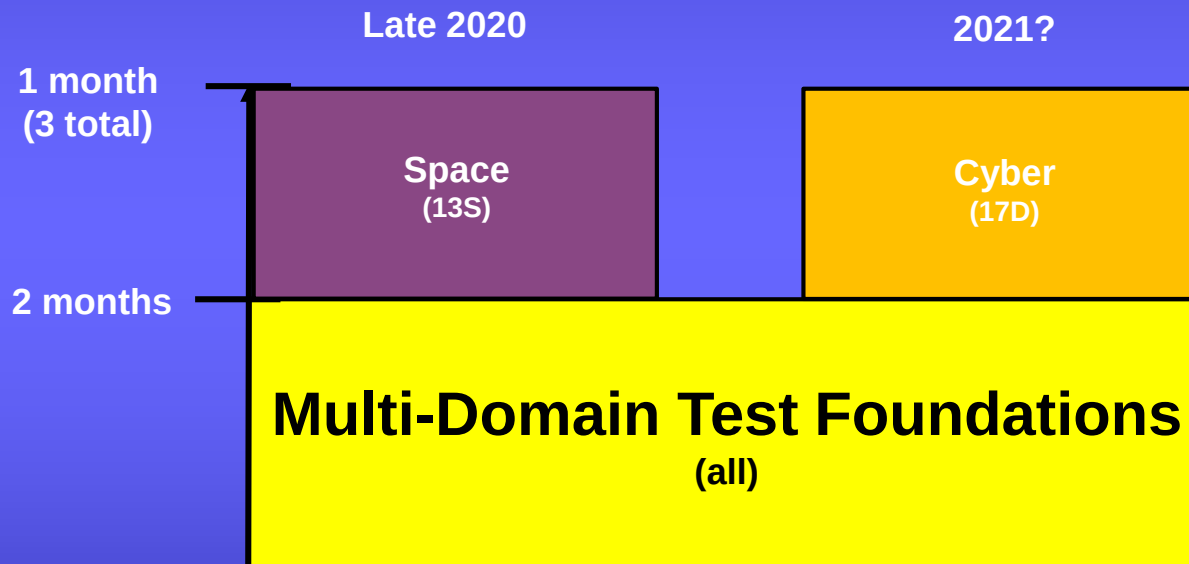
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First Step



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Questions?



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