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Aeronautical University

DEPARTMENT of Flight / COLLEGE of Aviation

# Next Steps in Aircraft Maintenance Unleashing the Power of Technology Enablers

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# INTRODUCTION



T I T L E

## **Power of Technology Maintenance Training**

Enablers Unleashed

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# The End Game

- Safety
- Efficiency
- Precision



# First Principles



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- Apply the fundamentals
  - troubleshooting techniques.
  - recognize maintenance problems
  - recommend solutions.
- Demonstrate FAA AP practical examination preparation
- 18 Credits

## First Principle

# Aviation Maintenance Technology Part 65

# First Principle -- Extended

## Aviation Maintenance Technology SkillBridge Program for Transitioning Military



- Nine-week technical coursework,
- Committed aerospace industry hiring partners
- ERAU Career Services

# The VRevolution...



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# VR, AR, MR and XR Technologies

## → → Augmented World Experience (AWE) ← ←

AWE devices bring remote diagnosis and repair while minimizing travel costs and dependence on skilled technicians to be onsite.

AWE custom software boosts service operations by increasing technical response time and faster return to service time.

**Moving from observation to immersion**

**Industry is at “ground zero,”**

**Immersive content will be more personalized—but at a cost**

**Sovereignty of personal data**

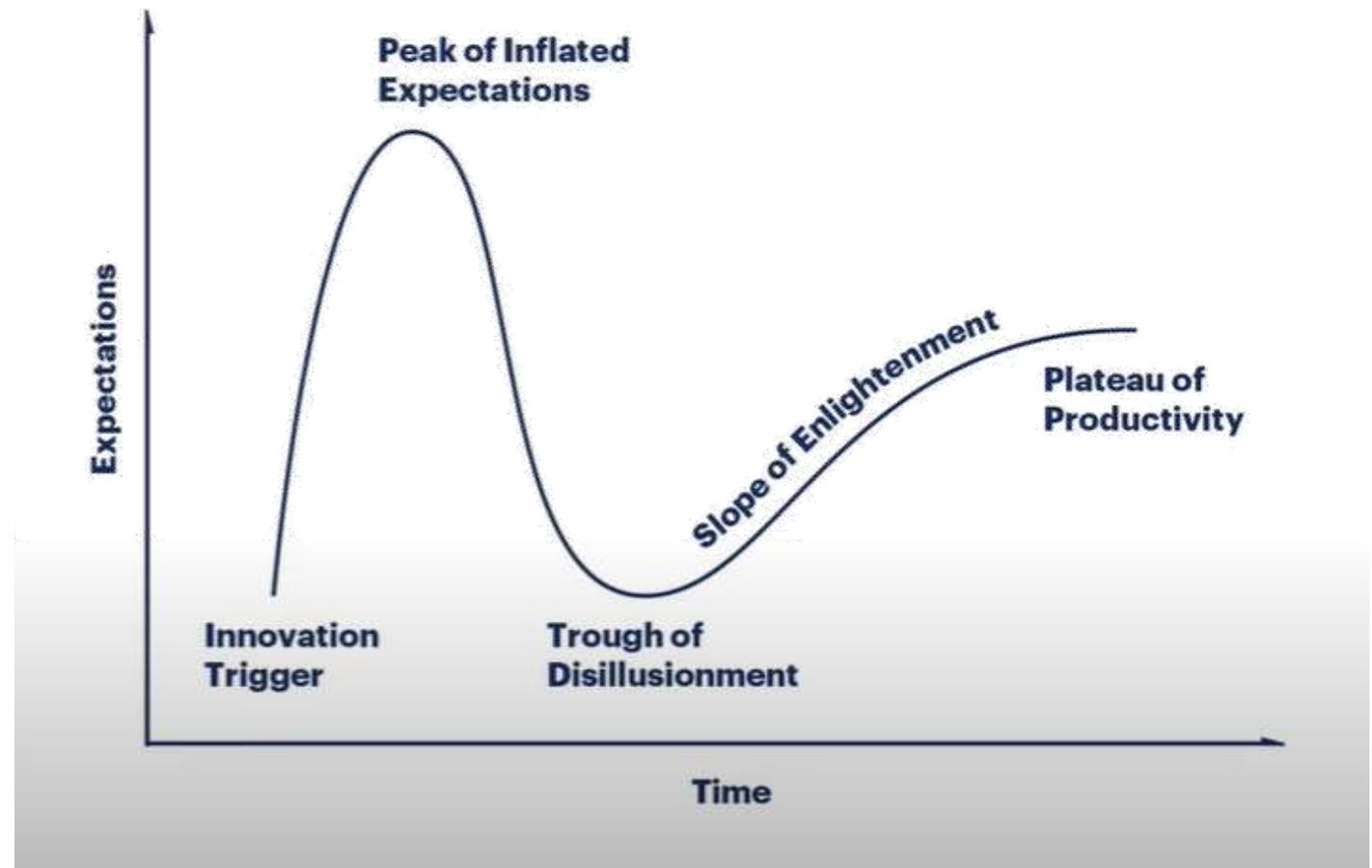
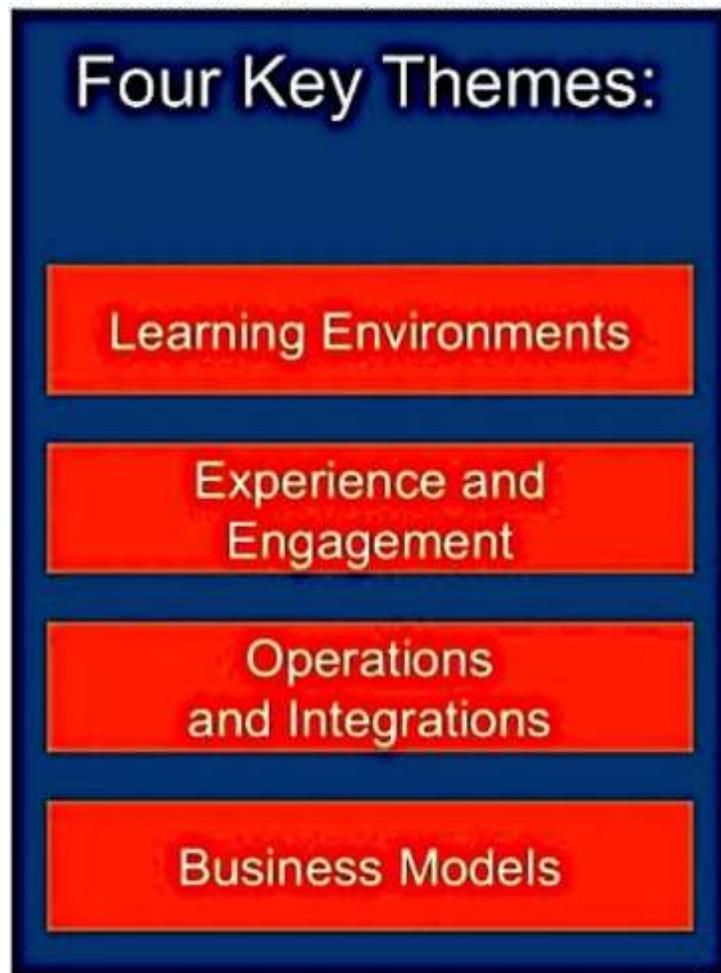
**Rethinking success metrics for digital technology**



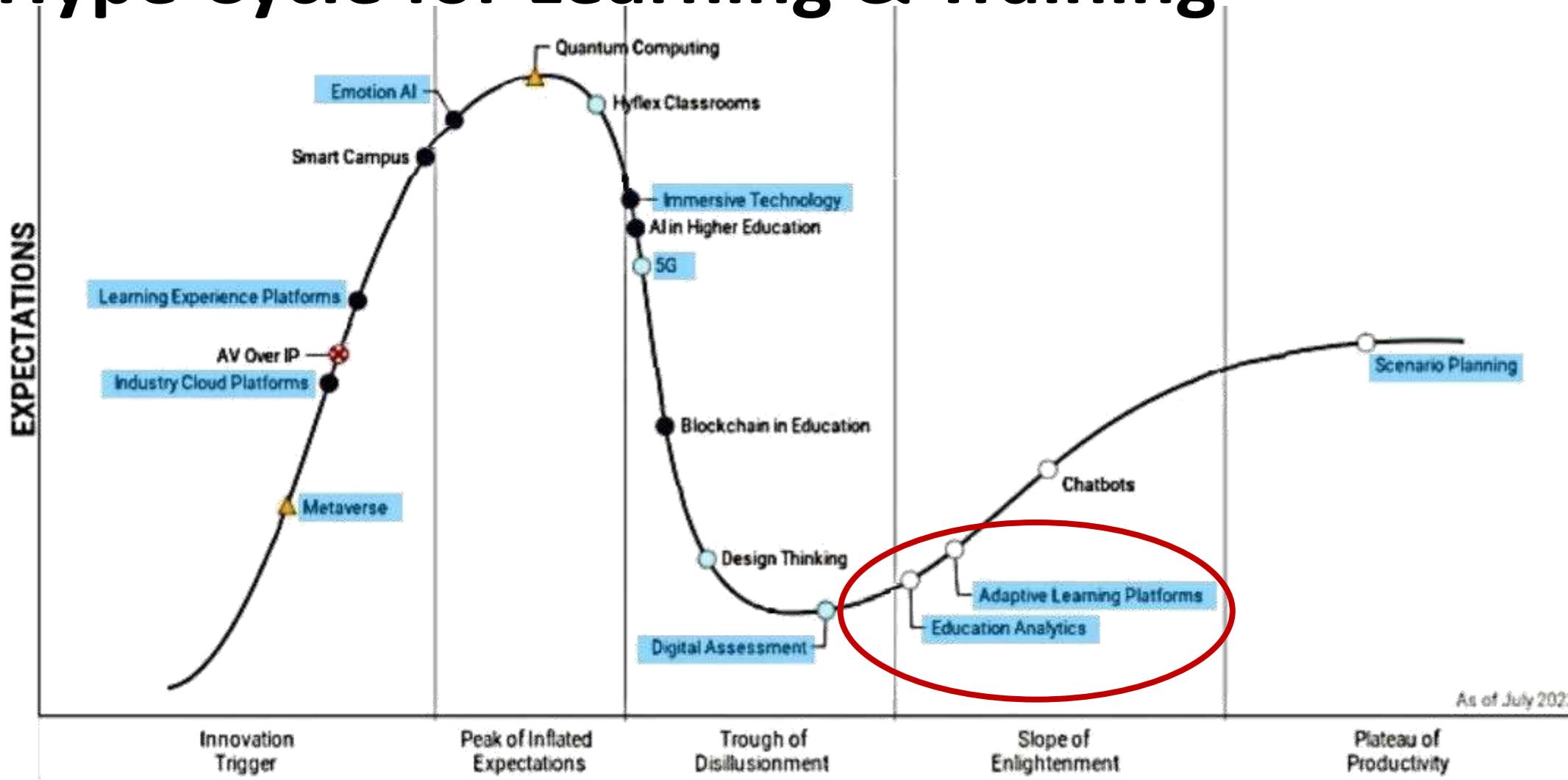
**Training ← → Tools**

# VR, AR, MR and XR Technologies

## Gartner Hype Cycle



# Hype Cycle for Learning & Training

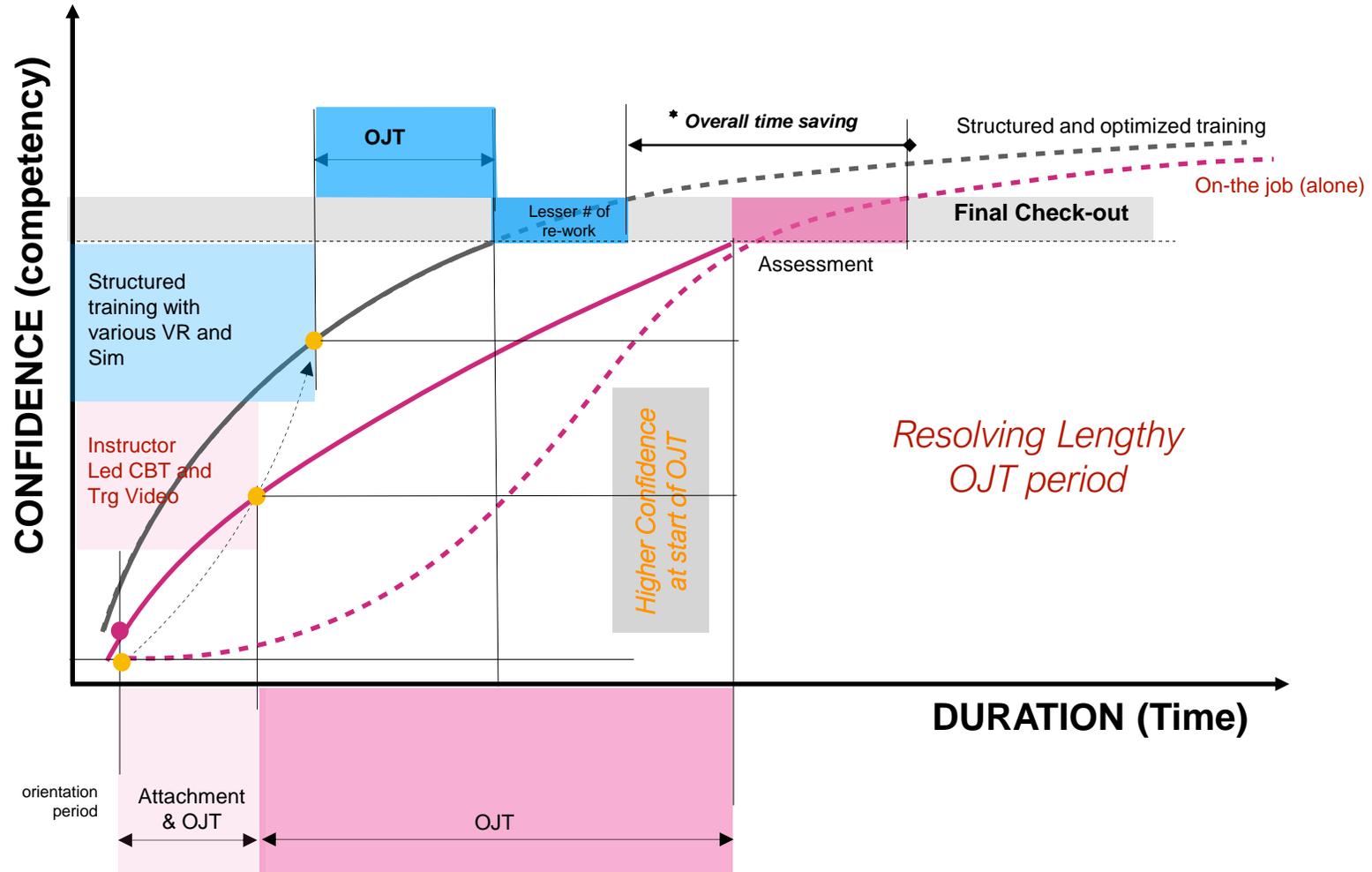


As of July 2022

Plateau will be reached: ○ <2 yrs. ● 2-5 yrs. ● 5-10 yrs. ▲ >10 yrs. ⊗ Obsolete before plateau

# LEARNING CURVES COMPARED

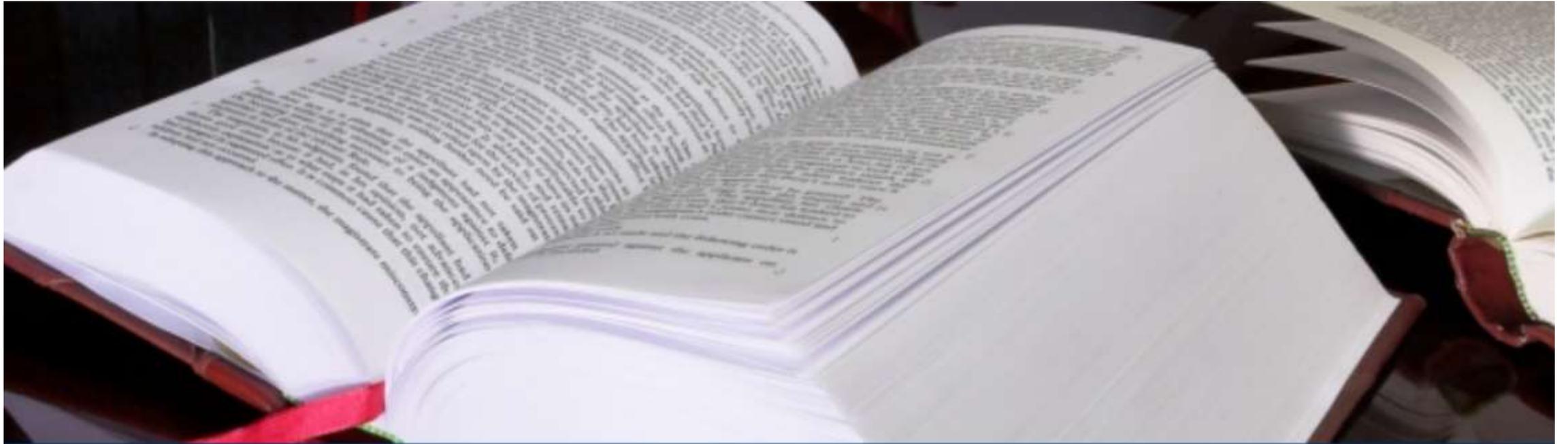
Optimized training for a steeper learning curve



# The “A” & The “I”



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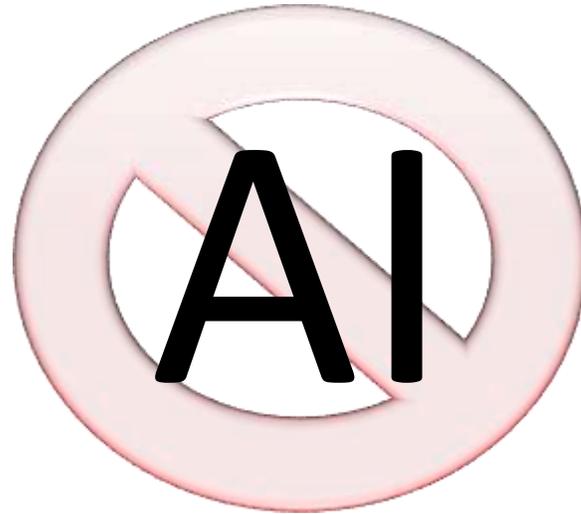


## Knowledge Base

# Knowledge

## The “A”

- Human Actions
  - Physical
  - Cognizant
  - Emotive
- System Operations
- Environment



## The “I”

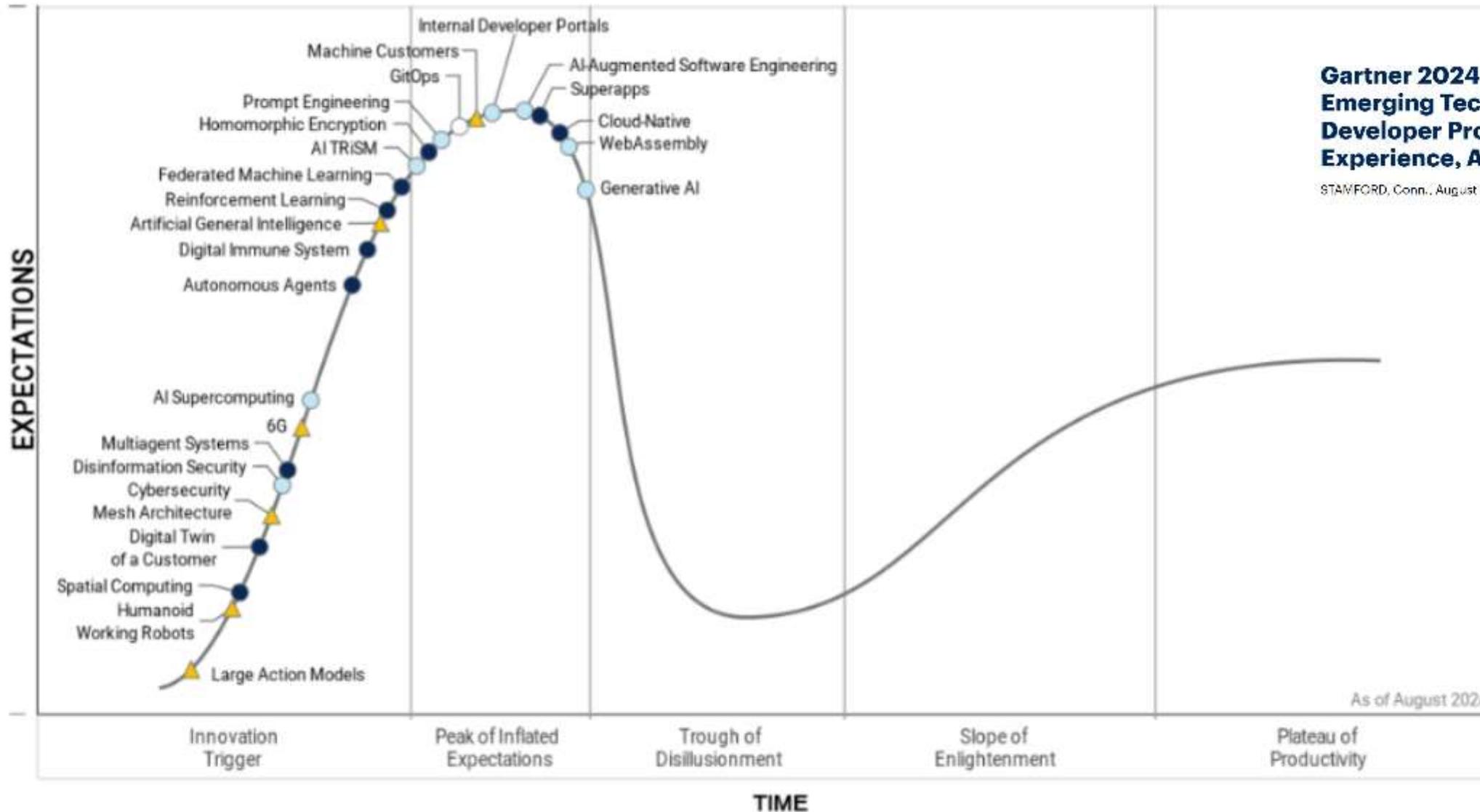
- Basis for Intelligence
- Validation
- Creation
- Assurance
- Value -- Ethics

If Knowledge is King, then is Application Queen?

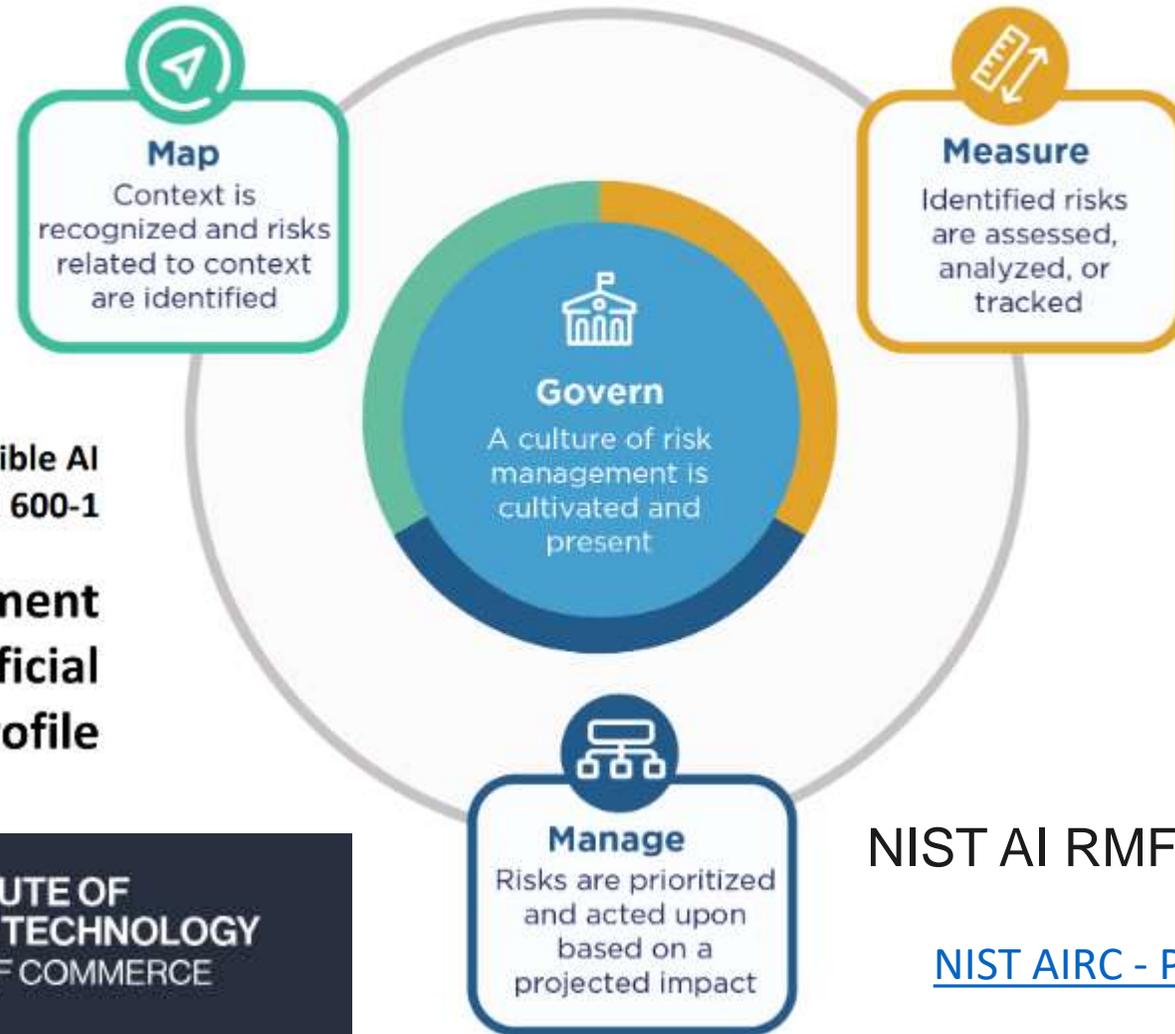
# AI Risks Differ from Traditional Software Risks

- AI system source data
  - may not be a true or appropriate representation of the context or intended use of the AI system,
  - and the ground truth may either not exist or not be available.
  - Trustworthiness, which could lead to negative impacts.
- AI system dependency and reliance on data training
  - tasks, combined with increased volume and complexity typically associated with such data.
- Intentional or unintentional changes during learning
  - Regression Learning
- Stale Datasets
- AI system scale and complexity housed within more traditional software applications
- Deployment pre-trained & qualified models
- Higher degree of difficulty in *predicting failure modes*
- Privacy risk
- AI systems may require more frequent maintenance due to drift
- Increased opacity and determinism concerns
- Underdeveloped software testing standards and inability to document AI-based practices to the standard
- Difficulty in performing regular AI-based software testing, or determining what to test, since AI systems are not subject to the same controls as traditional code development.
- Computational costs for developing reliable AI systems

# Hype Cycle for Emerging Technologies



## AI Risk Management Framework



NIST Trustworthy and Responsible AI  
NIST AI 600-1

### Artificial Intelligence Risk Management Framework: Generative Artificial Intelligence Profile

NIST AI RMF Playbook

[NIST AIRC - Playbook](#)

# Human-AI Interaction

- **Human roles in decision making and overseeing**
  - AI systems need to be clearly defined and differentiated.
- **Design, development, deployment of AI decisions**
  - Reflect systemic and human cognitive biases
- **Human-AI interaction results vary**
- **Presenting AI system information to humans is complex**



please adapt to include



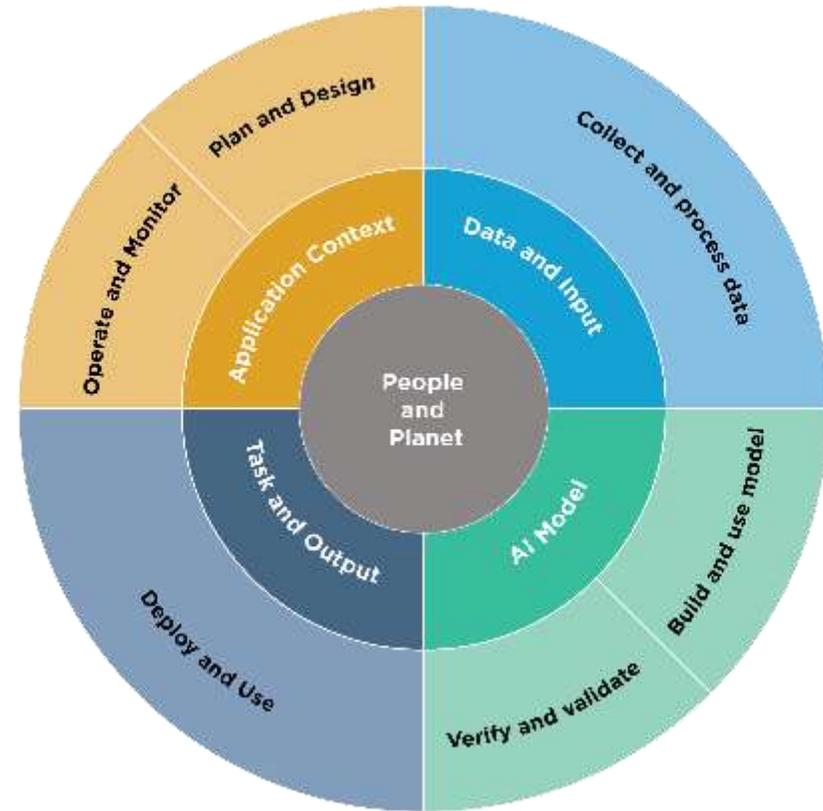
The image has been adapted to include a virtual reality (VR) maintenance hangar, highlighting various advanced technol

please enhance the VR experience



Periodically Evaluate

# Effectiveness of the AI Framework



# AI Risks and Trustworthiness





# References

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**QUESTIONS?**

# THANK YOU

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