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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



TITLE

Power of Technology Maintenance Training

Enablers Unleashed

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

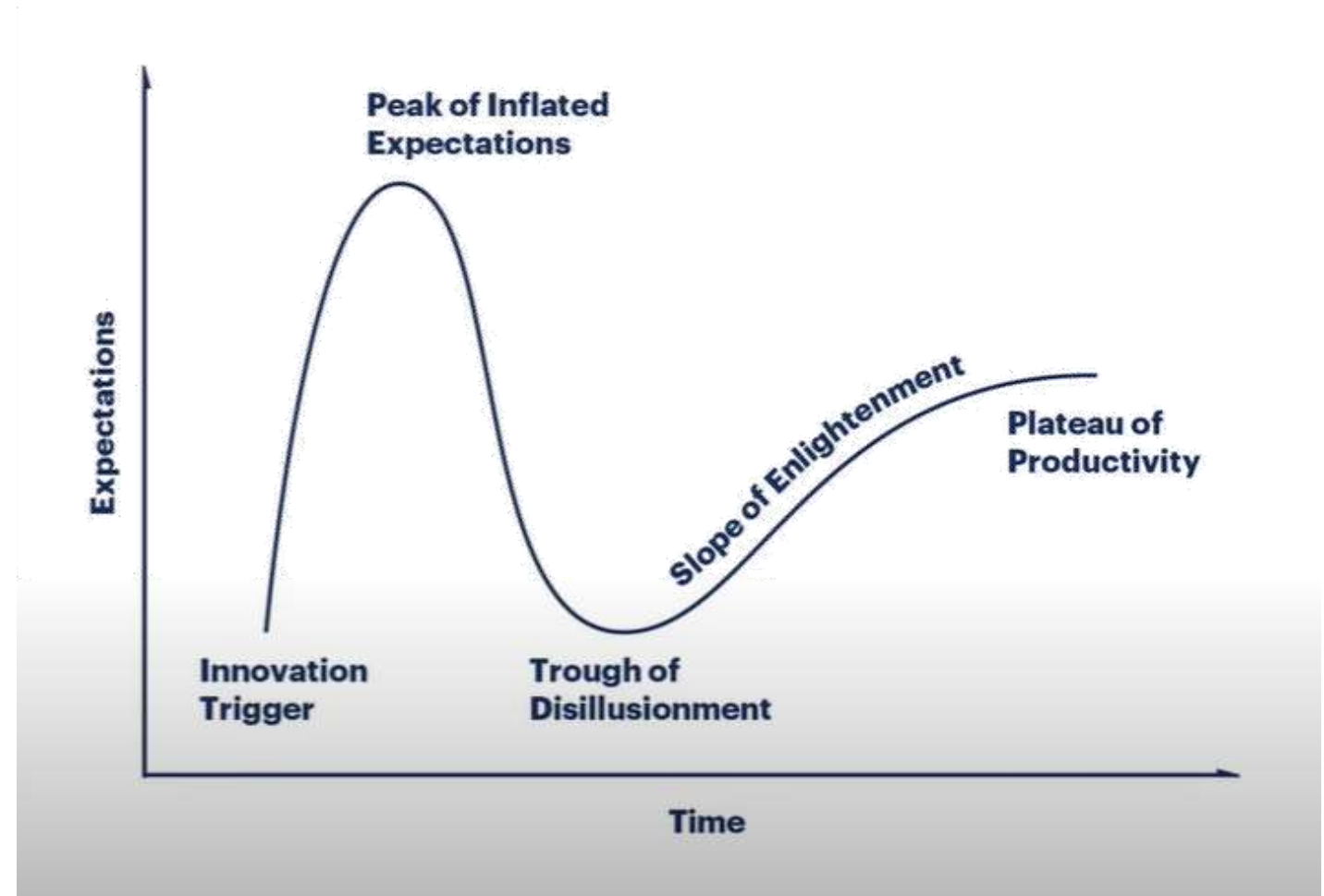
Rethinking success metrics for digital technology



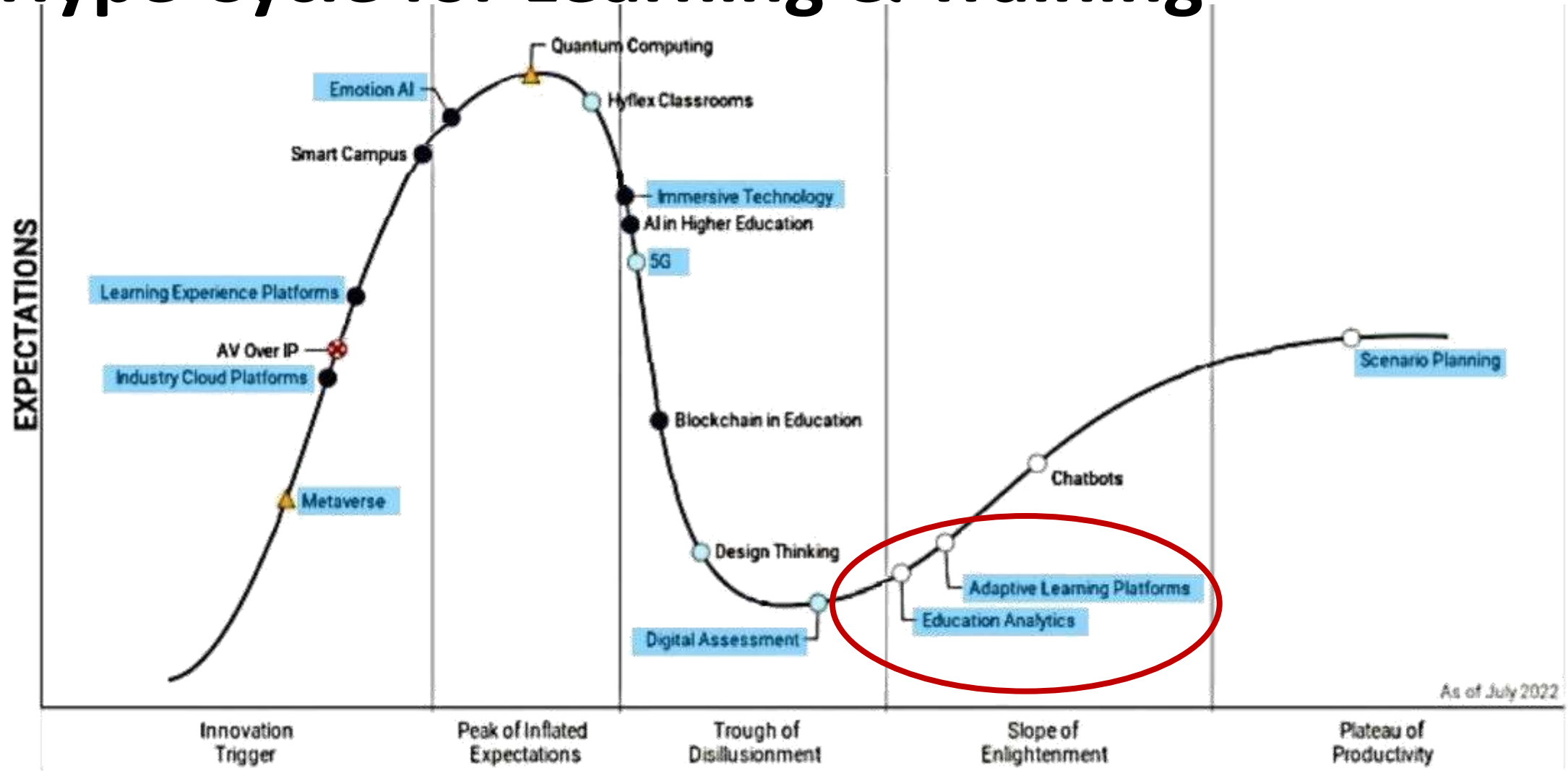
Training ← → Tools

VR, AR, MR and XR Technologies

Gartner Hype Cycle



Hype Cycle for Learning & Training

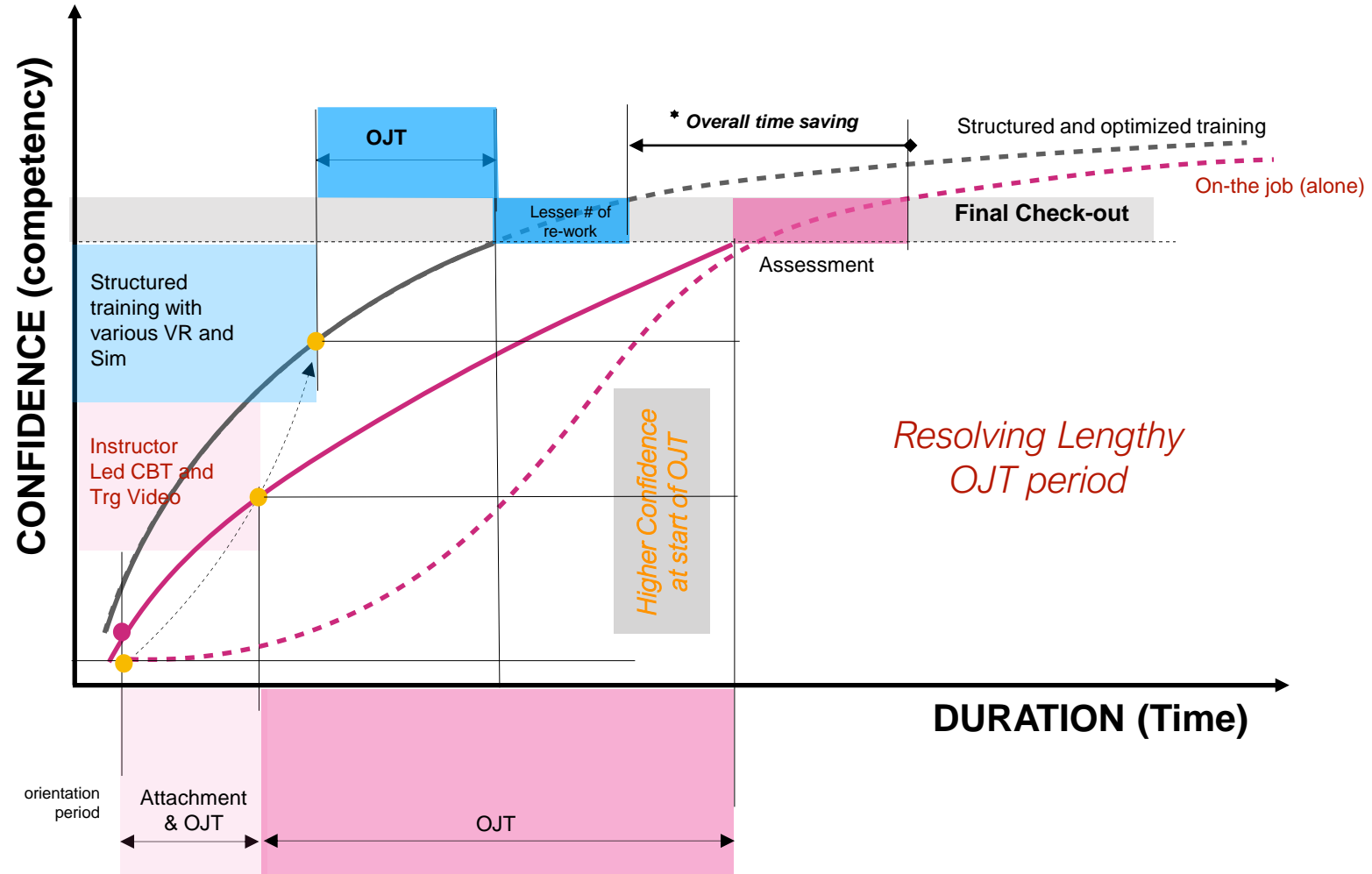


As of July 2022

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

LEARNING CURVES COMPARED

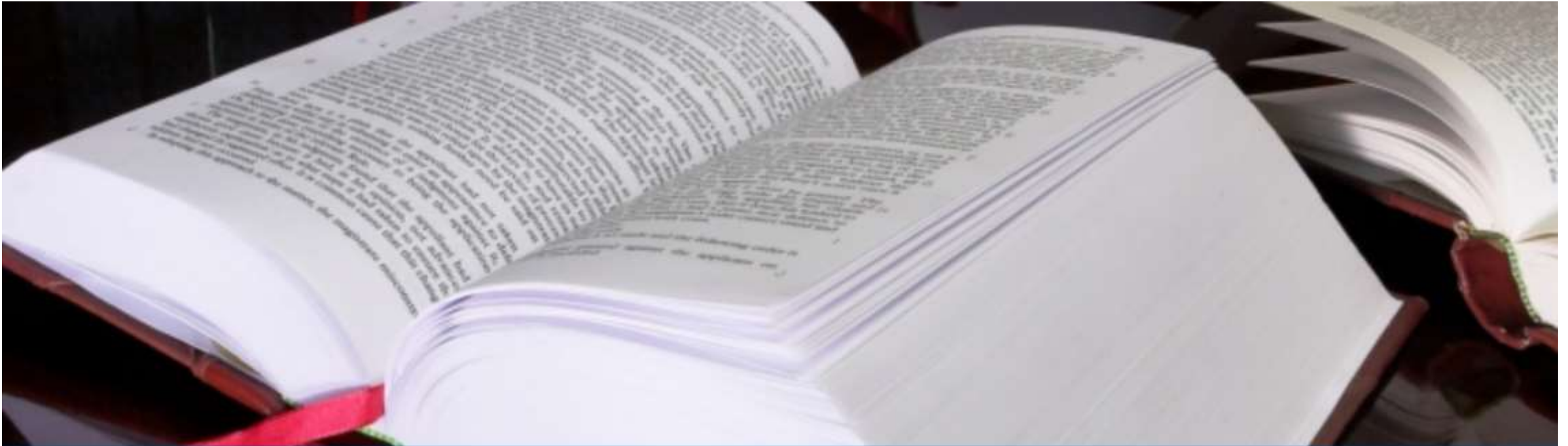
Optimized training for a steeper learning curve



The “A” & The “I”



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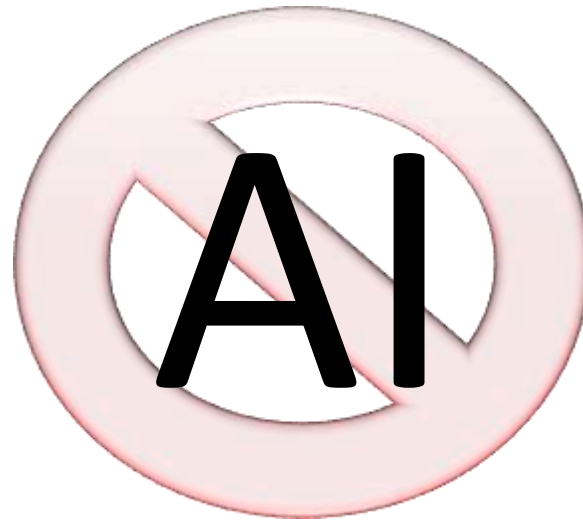


Knowledge Base

Knowledge

The “A”

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



The “I”

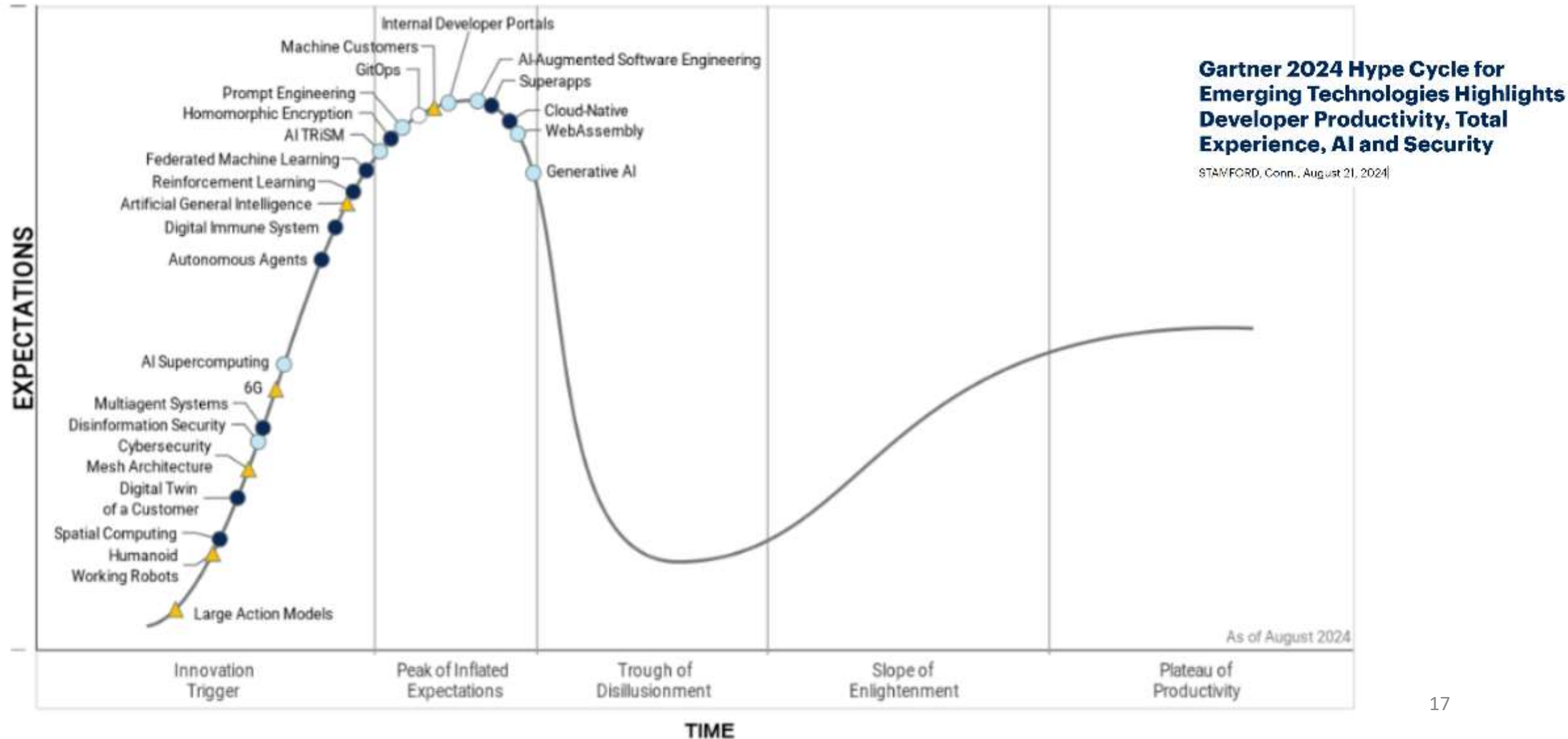
- Basis for Intelligence
- Validation
- Creation
- Assurance
- Value -- Ethics

If Knowledge is King, then is Application Queen?

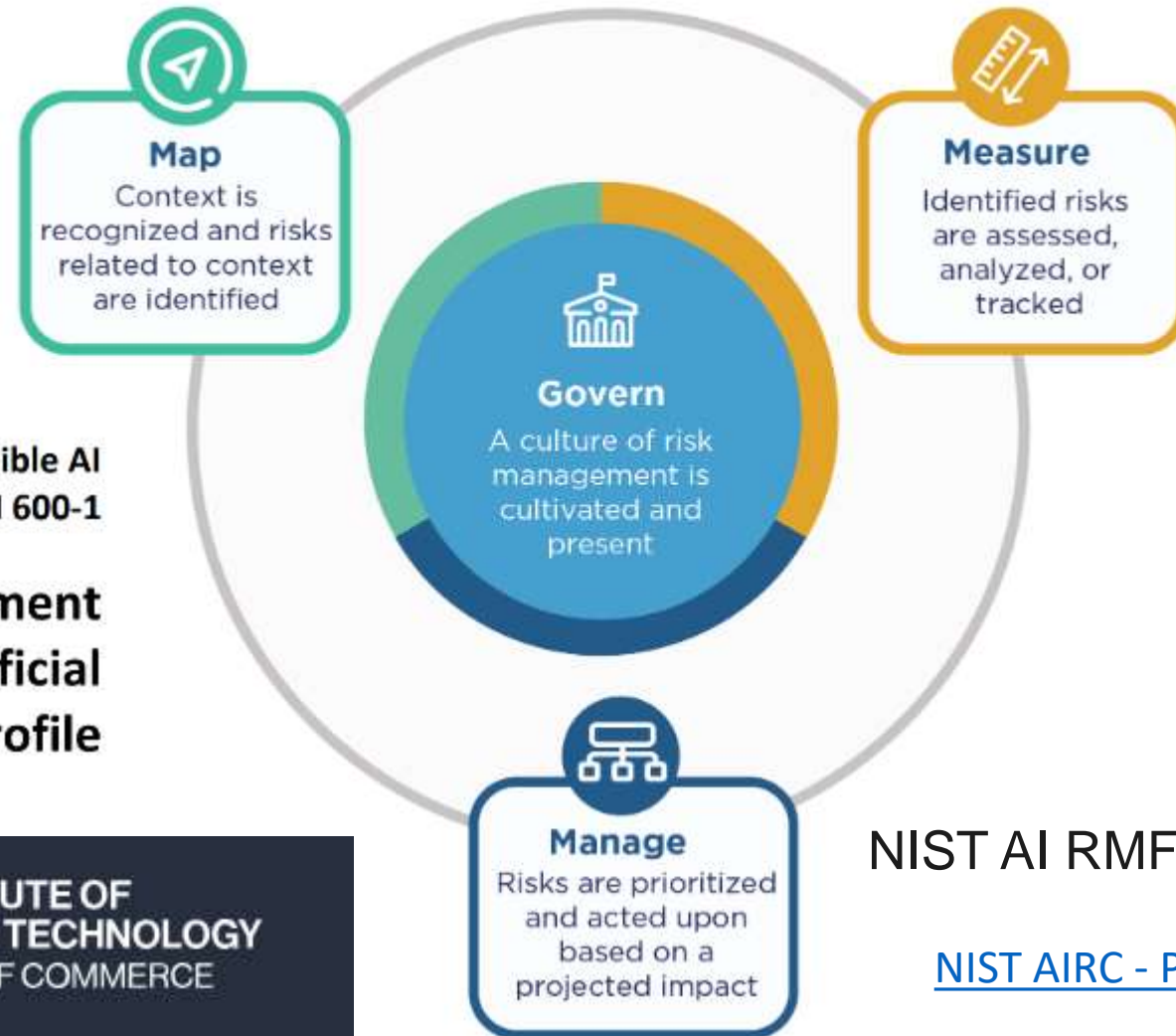
AI Risks Differ from Traditional Software Risks

- 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 | NATIONAL INSTITUTE OF
STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

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

please adapt to include VR into the picture



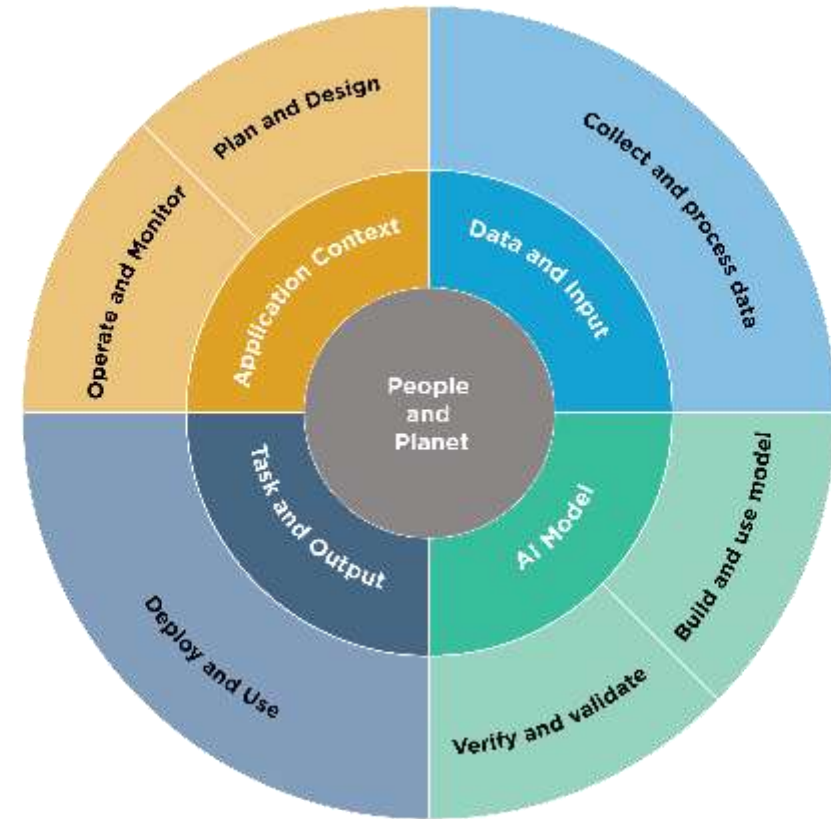
The image has been adapted to include a virtual reality (VR) maintenance hangar, highlighting various advanced technol

please enhance the VR experience



Periodically Evaluate

Effectiveness of the AI Framework



AI Risks and Trustworthiness





References

- (n.d.). NIST Technical Series Publications.
<https://nvlpubs.nist.gov/nistpubs/ai/NIST.AI.600-1.pdf>
- *Knowledge*. (n.d.). Spherea Technology. <https://www.spherea-technology.co.uk/Knowledge/Knowledge.htm>
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QUESTIONS?

THANK YOU

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