



FIELDING BETTER COMBAT HELMETS TO DEPLOYING WARFIGHTERS



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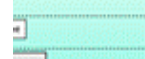
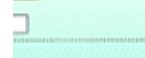
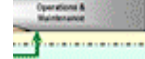
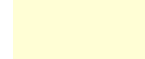
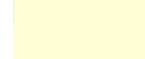
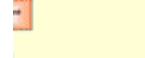


See a national illustration of the DoD and how it relates to the integrated defense acquisition technology and logistics life cycle management framework. The information is in the form of the Integrated Defense Acquisition Technology & Logistics Life Cycle Management Framework.

Phase →

of performance requirements and of its total life cycle (span of the entire life cycle).

Sustainment Disposal



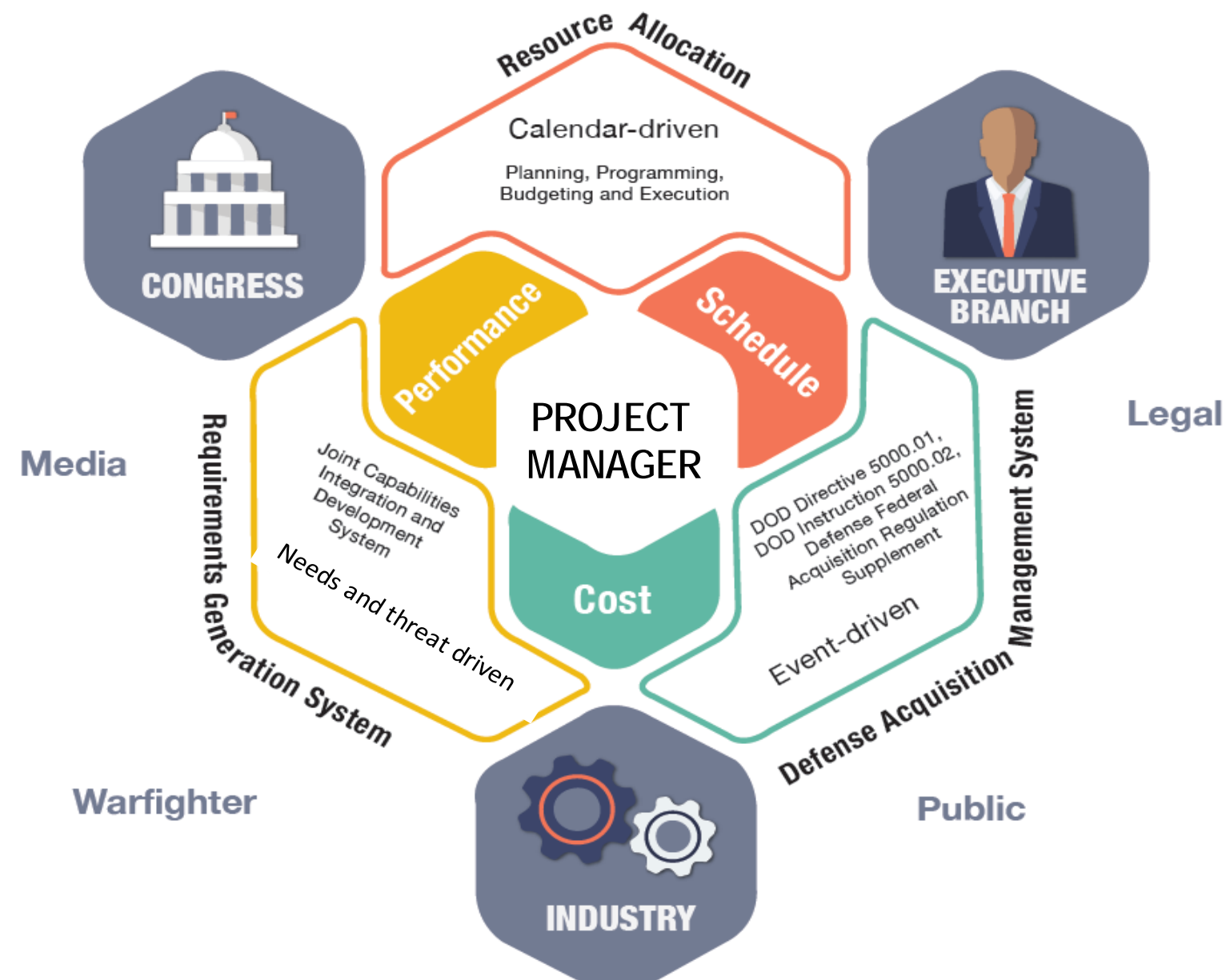
Joint Capabilities Integration & Development System
(need driven)

Defense Acquisition System
(event driven)

PMO Budget Estimate
PMO PDM Input

Planning, Programming, Budgeting, & Execution Process
(biennial calendar driven)

Recommendations to improve this chart are encouraged and may be sent to csd@doe.mil





Combat Helmets

**Why are
stakeholders so
passionate
about helmets?**



Force Protection of Soldiers – Army Top Priority!



Enhanced Combat Helmet (ECH) Case Study

- **General Approach:** Use the ECH program to enhance critical thinking, decision making, and document lessons learned
- **Applicability:** primary target is Defense Acquisition professionals (PMs, BMs, engineers, logisticians) as well private sector PMs
- **ECH Specific Learning Objectives:** Critical thinking in decision making under VUCA conditions for project initiation and procurement/fielding; and stakeholder management



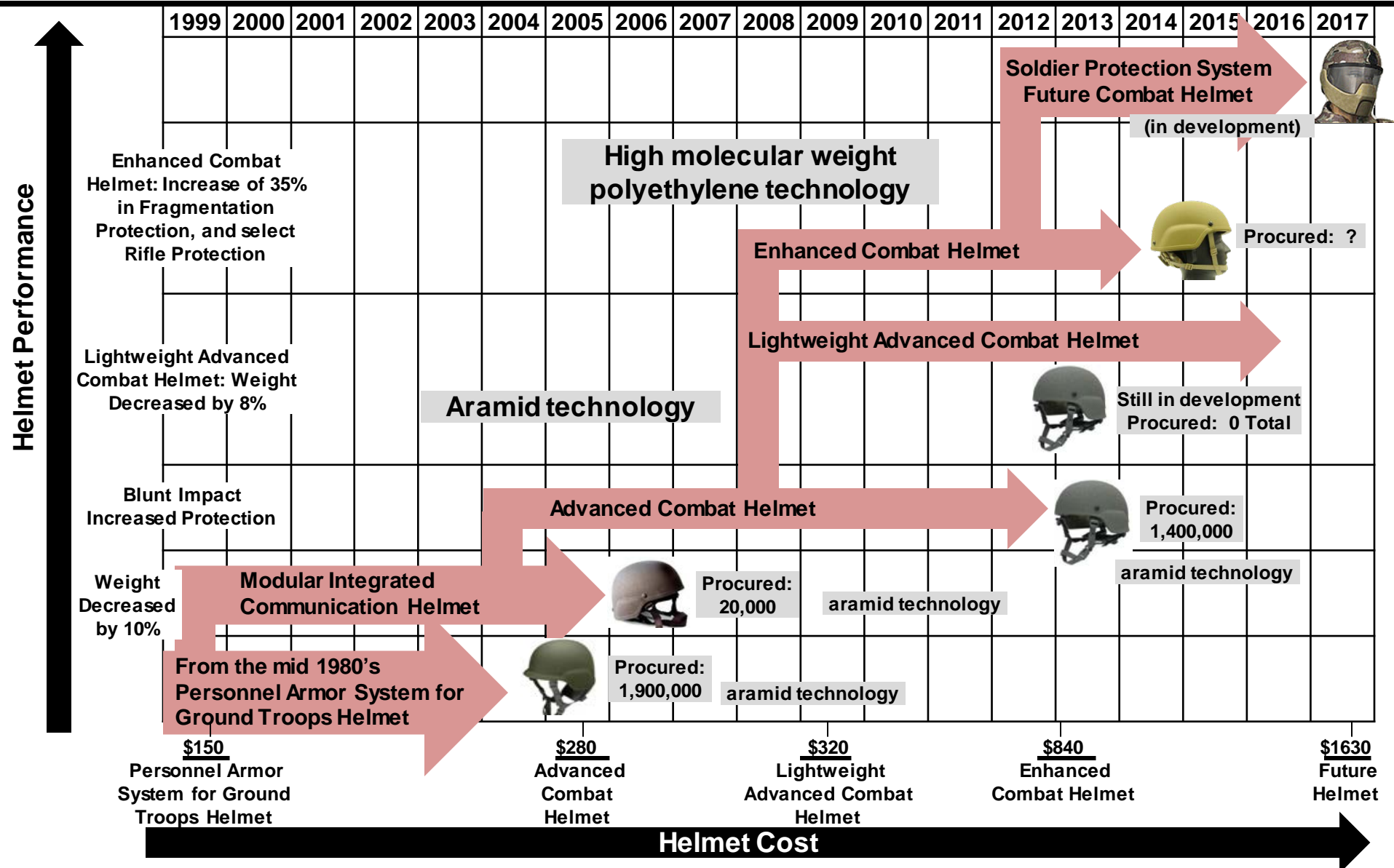
ECH Case Study

Learning Objectives

- Develop the ability to critical analyze a project at key decision points—**critical thinking**.
- Identify key stakeholders—**stakeholder management**.
- Develop alternative recommended strategies—**decision making with uncertainty or ambiguous data**.
- Compare alternative strategies and identify decision criteria—**decision making with uncertainty or ambiguous data**.
- Identify second-order considerations of the recommended strategies—**strategic leadership**.



Army Combat Helmet Evolution





ECH Case Study

Part 1: Project Initiation Decision

- **Urgent Warfighter Need:**
 - Improved ballistic protection
 - Rifle protection (address the 7.62mm threat)
 - Increased 9mm protection
 - Improved fragmentation protection requirement
- **Constraints: helmet weight**
- **Technology Opportunity:**
 - Advancements in technology
 - Ultra high molecular weight polyethylene (UHMWPE)
- **Dilemma: Deliberate or Rapid Requirements/Acquisition/Funding?**



First production helmet designed to protect against a rifle threat



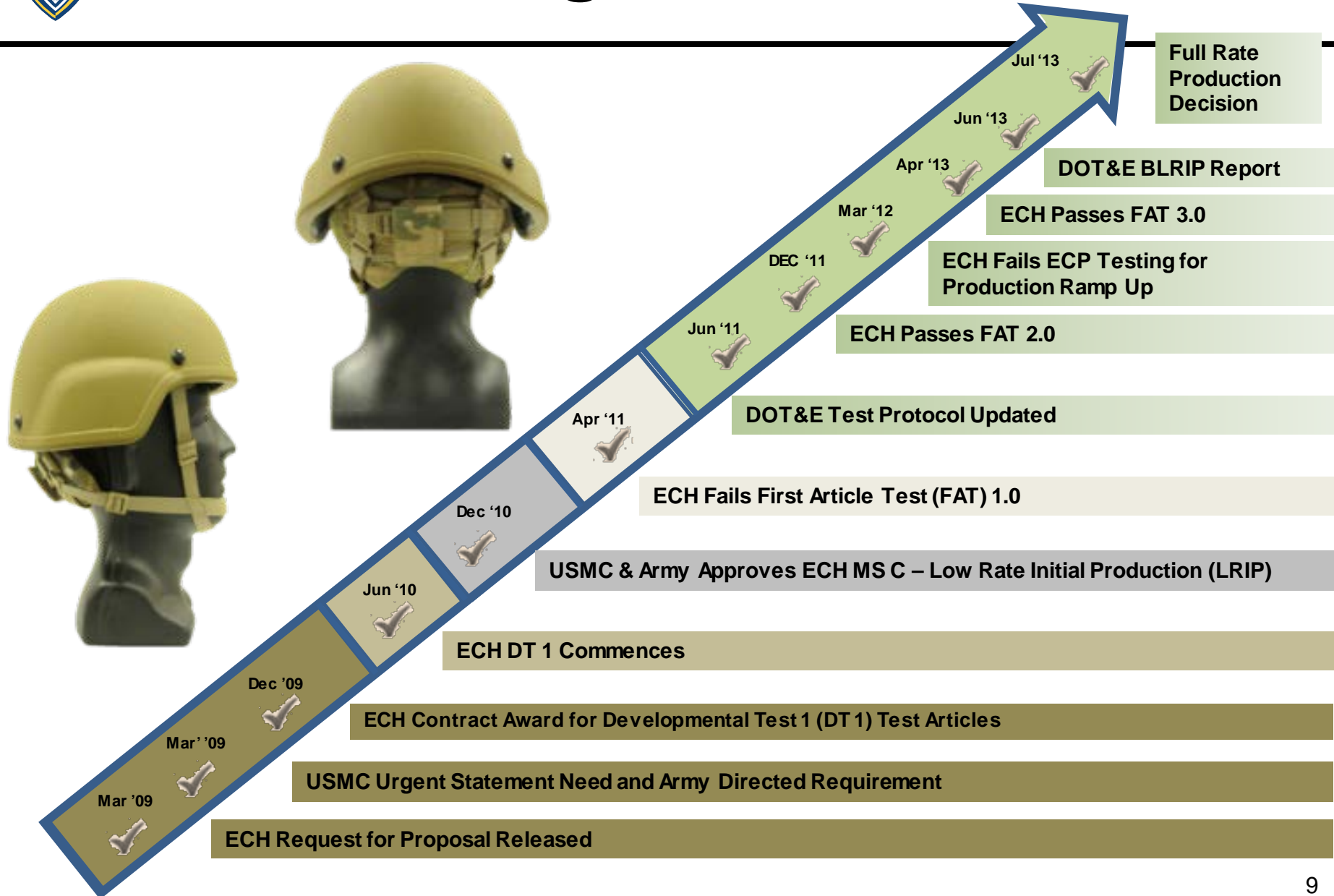
ECH Case Study

Part 1: Project Initiation Decision

- Who are the key stakeholders and how does the PM manage expectations?
- “Technology push” or “capability pull” program?
- ECH requirements? Should increased protection or weight reduction be emphasized?
- Testing protocols for the ECH prior to development and manufacturing of a helmet based on a new technology?
- What are the advantages and disadvantages of various acquisition approaches for the development of the ECH? What are the criteria used to compare the alternative approaches?



ECH Program Timeline



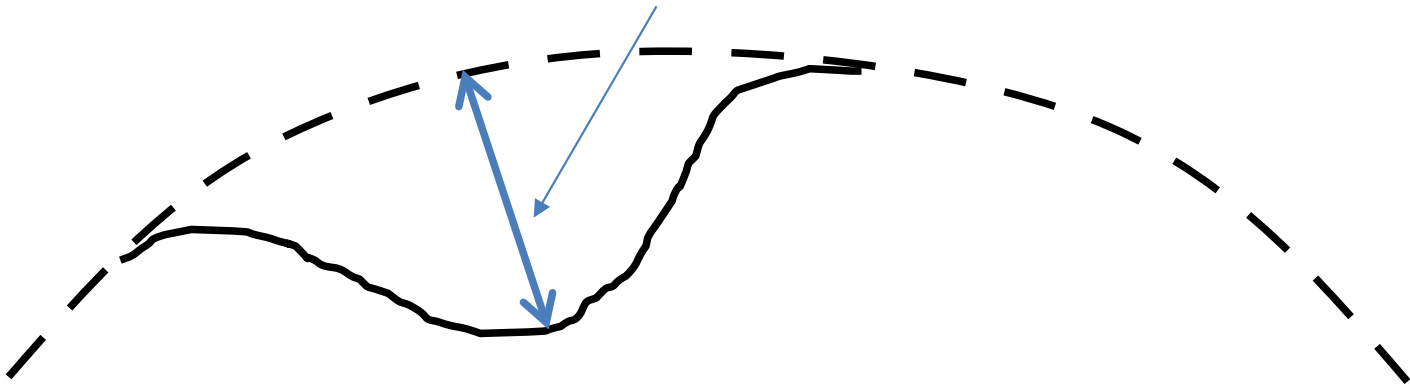


ECH Case Study

Part 2: Procure and Field Decision

- **Dilemma:** Testing Community (DOT&E) and Medical Community (TOSG) both recommend the Army and USMC not procure and field the ECH
 - Rifle Threat creates a deformation of 30-48mm
 - This is Deeper than the 9mm Requirements of 25.4mm and 16mm

Backface Deformation Measurement

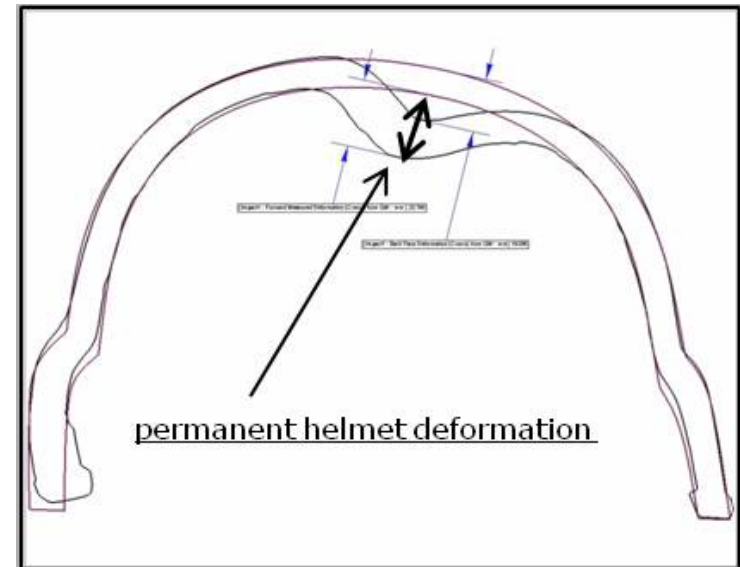




ECH Case Study

Part 2: Procure and Field Decision

- **77 useable Helmet engagements collected**
 - Resulting from Small Arms Fire
 - 31 WIA engagements
 - 45 KIA engagements



AVG PHD Depth
9.02mm

Ballistic Results	Total #	WIA	KIA	Fatality %
Partial Penetration	16	16	0	0%
Complete Penetration	61	15	45	73.7%



ECH Case Study

Part 2: Procure and Field Decision

- Key stakeholders, expectations and communications?
- Balance development test data versus field data from helmets that were battle damaged?
- Concerns of the testing and medical communities?
- What are the advantages, disadvantages, and second order implications of various courses of actions? What are the decision criteria?
- How do you quantify benefits such as saving a Soldier's life and compare these benefits with long-term, potential health problems like concussions or muscle-skeletal neck injuries from the weight of helmets?



Defense Acquisition and Program Management Lessons

- Beware of schedule–driven efforts.
- Stakeholder Engagement–early, often and continuously
- Interpretation of test data and operational relevance of test data leads to ambiguity in the decision-making.
- Cost and affordability constraints are hard to prioritize in schedule–driven projects with urgent requirements.
- Rigorous decision making process comparing alternatives against clearly defined criteria.
- PM’s unique position: understands the business side of the project (cost and schedule) and the engineering side of the project (technology, testing, and risks).



Battle Damaged ECH Recovered





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- 2018 Acquisition Research Symposium Paper and Presentation
- Technical Report for Acquisition Research Program: Enhanced Combat Helmet (ECH) Case Study, 26 July 2017, Report # NPS-AM-17-211. Available online at <http://my.nps.edu/web/acqnresearch/publications>
- Technical Report for Acquisition Research Program: Enhanced Combat Helmet (ECH) Case Study, Teacher's Edition, 26 July 2017, Report # NPS-AM-17-212. Available upon request.
- Mortlock, R.F., "Protecting American Soldiers: The Development, Testing, and Fielding of the Enhanced Combat Helmet (ECH)," ***Project Management Journal (PMJ)***, February/March 2018, Vol. 49, No. 1, 96-109.