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Armaments for the Army Transformation: Industry Perspective

The Path Ahead for FCS Armaments

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Outline

- Purpose
- Defense Industry Interests
- Current Situation
- Perspective on Armaments
- The Path Ahead for FCS Armaments
- Actions Needed
- Summary

Purpose

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- **To Present an Industry Perspective on FCS Armaments:**
  - *Geared to the acquisition process*
  - *Highlighting need for practical, business-sense approach*
  - *Providing a Path Ahead*

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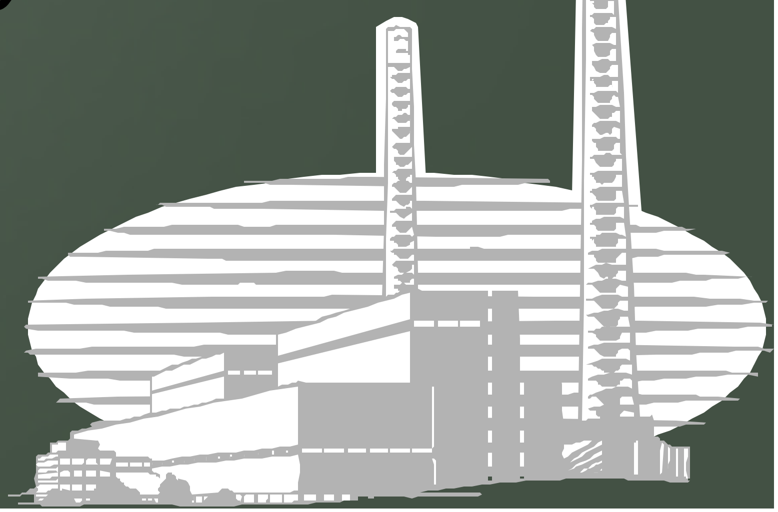
Defense Industry Interests

- **Increase Enterprise Value**
  - ***Growth, profitability, cash flow***
  - ***Sufficient ROI***
  - ***Customer satisfaction***
  - ***Attracting and retaining talent***
- **Invest Resources Wisely…*Pursue activities where the basics are clearly understood:***
  - ***Vision***
  - ***Accomplishment criteria***
  - ***The Path Ahead***



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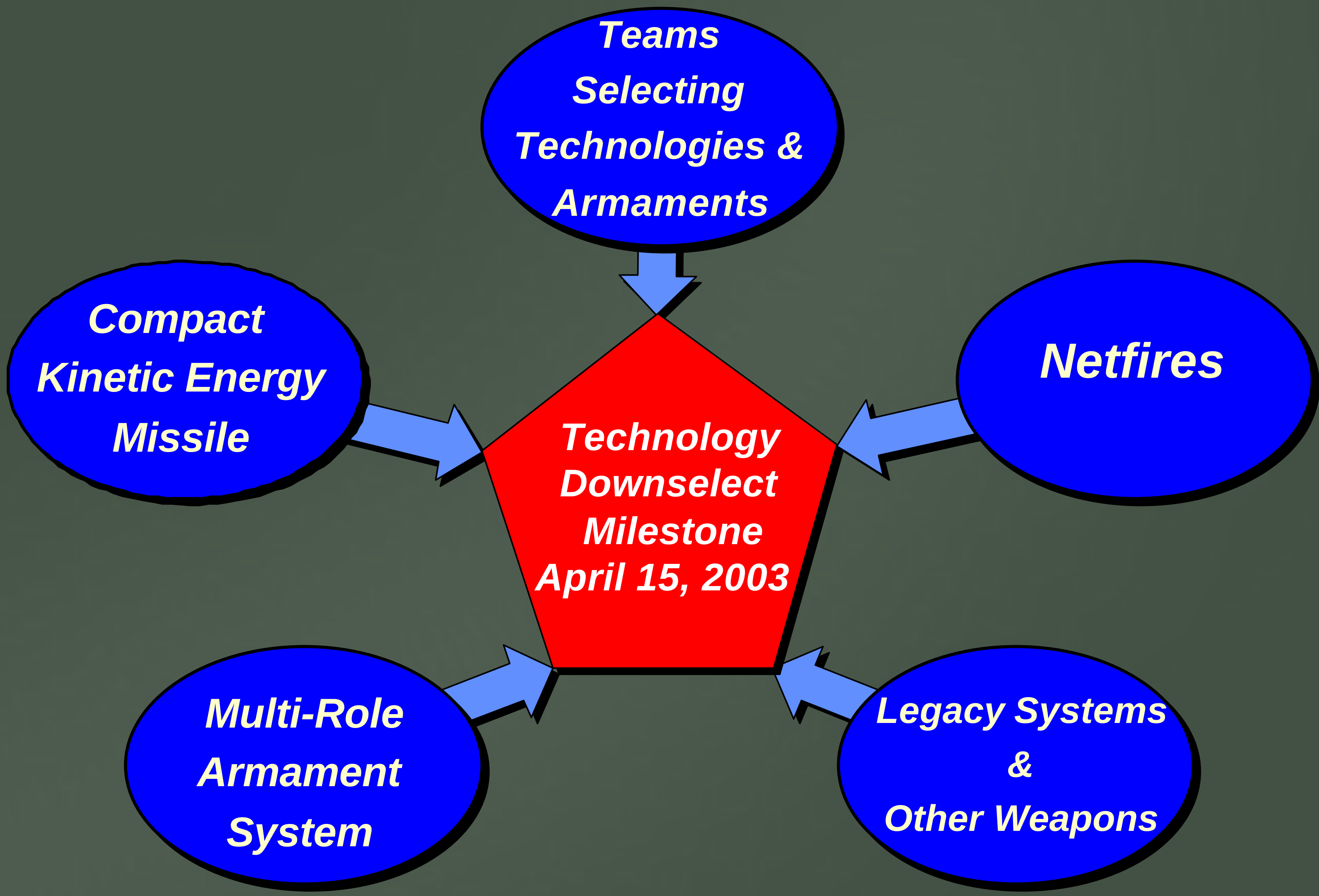
Current Situation



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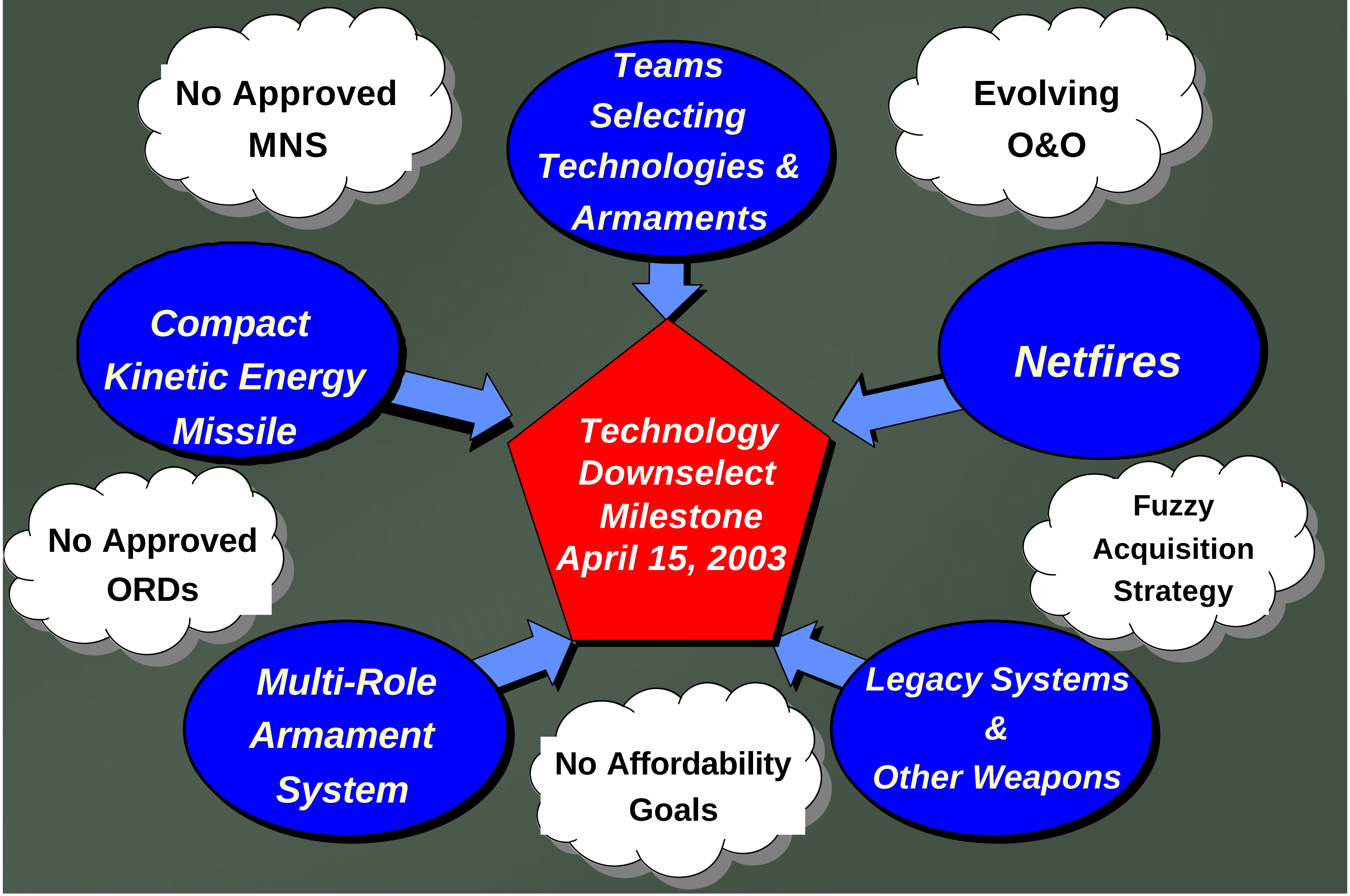
Current Situation



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Benefits and Risks

- **Benefits of Industry Teams' Development of Organizational Designs, Concepts, and Technologies**
  - *Technology innovation*
  - *Creativity in concepts development*
  - *System of systems optimization*
- **Risks**
  - *Lack of warfighter buy-in of concepts, doctrine, and technologies*
  - *Not requirements-based*
  - *Compressed timeline for adjudication of requirements, concepts, technologies*

Perspective on Armaments

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- FCS is Part of the Total Force
  - *Unit of Action has Organic Fires*
- FCS Armaments Must Consider All Fires and Effects Available to the Total Force
  - *Requirements for and capabilities of Organic Fires depend on Non-Organic Fires available*
- Adequacy and Sufficiency of FCS Armaments Must Be Subject to Mission and Requirements Analyses
  - *Capabilities and technology-based solutions may not be adequate or may be an overkill*

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The Path Ahead for FCS Armaments

- Establish Program Affordability
- Define the Acquisition Approach for System of Systems and the System Elements
- Plan For Early Systems Integration
- Establish Criteria and Process for Selecting FCS Armaments
- Announce Basis for FCS Technology Down-Select in Apr ‘03
- Develop Systems Requirements, Capstone Requirements Document
- Conduct Mission and Requirements Analyses
- Establish the Supporting and Reinforcing Fires Available

FCS Armaments

Supporting and Reinforcing Fires

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Plan for FCS Armaments Must Consider Available Non-Organic Fires in order to:

- **Allow for mutual support**
- **Not drive toward costly, redundant capabilities**

Mission and Requirements Analyses

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- **Capabilities and Technologies-Based S&T Programs Must Still Sustain the Rigors of Mission and Requirements Analyses**
- **Essential Elements of Analyses:**
  - ***The missions***
  - ***The characteristics of the targets***
  - ***The desired effects***
  - ***How long the effects are to be sustained***
  - ***Under what constraints must the effects be delivered***
  - ***Risk***
  - ***Cost***

Systems Requirements

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- Capabilities in S&T Programs Have Not Been Approved or Validated by the Requirements Authority
  - *Sub-optimization could occur without early knowledge of systems context*
- Validated ORD Required Prior to Entering System Development and Demonstration
- Capstone Requirements Document (CRD) Appropriate for System of Systems
- Early Preparation of Draft ORD and CRD Would Facilitate Planning and Program Execution
  - *Without ORD and CRD, no basis for trade-offs*

April 2003 Technology Down-Select

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- Standards and Criteria for Technology Maturity Should be Announced for the Technology Down-Select (not seeking source selection info)
- Uniform Standards Required Across Technologies for:
  - Extent of modeling and simulation
  - Hardware testing and demos
  - Firings down-range
- Consistency of Measuring Technology Readiness Levels Essential
- Need to Reconcile April 2003 Technology Down-Select with Contractor Team Down-Select for Detailed Design at End of 2d Qtr FY 03

Criteria/Process for Armaments Selection

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- Path into Systems Acquisition Begins with Examining Alternative Concepts to Meet a Stated Mission Need
- Evaluation Strategy Required for Alternatives
- Criteria for Analysis of Alternatives Critical
- Clarification Needed on Process for Armaments Selection
  - Government or Industry

Early Systems Integration

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- Current S&T Programs Address Technologies and Subsystems, Not System Integration
- Performance, Weight, Risk, Cost, Space Claims, Compatibility, and Interfaces all Affect Trade-offs Required
- Maximum Use of Modeling and Simulation is Critical to Enable System Integration
- Early Determination of Government/Industry Roles for System Integration Essential

Acquisition Approach

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- Current S&T Programs are Subsystems
  - Under government direction and control
  - Could evolve to elements of the system of systems
  - Are competitive developments
- Not Clear on How the Subsystems will be Acquired
  - By each contractor team, GFE, directed source?
  - Likely situation of insufficient assets to support multiple contractor teams
- Systems Integrator = Super Prime that Buys All Elements of System of Systems?

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Program Affordability

- System of Systems and Optimization of the Force are Desirable Needs
- Demise of Armored Family of Vehicles, Heavy Force Modernization and Armored Systems Modernization Based on Affordability
- Industry Investments and Interests are Based on Program Viability, Cost Realism, Program Affordability, and Business Case Established

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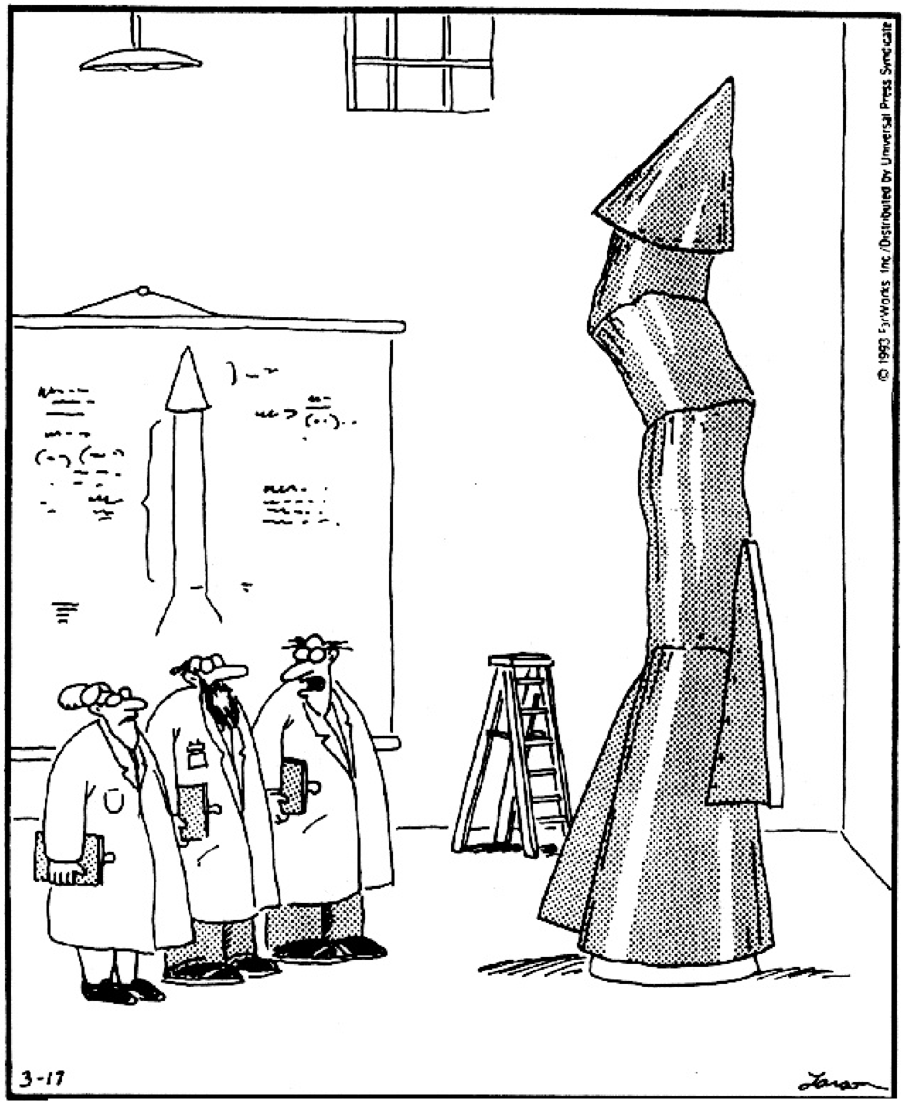
Actions Needed

Develop Time-Phased Milestones to Transform The Path Ahead to Reality

FCS Armaments

- Establish the supporting and reinforcing fires available
- Conduct mission and requirements analyses
- Develop systems requirements, Capstone Requirements Document
- Announce basis for FCS technology down-select in Apr '03
- Establish criteria and process for selecting FCS Armaments
- Plan for early systems integration
- Define the acquisition approach for system of systems and for the system elements
- Establish program affordability



"It's time we face reality, my friends...We're not exactly rocket scientists."

Developing The Path Ahead

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- **Where Time-Phased Milestones for The Path Ahead Are Already Established**
  - *Announce them*
- **Where Responsibilities for Development of the Time-Phased Milestones Are Not Clear**
  - *Fix them, Government or Industry*
- **Where Resources Are Needed to Accomplish to The Path Ahead**
  - *Get them*
- **Where Program Decisions Need to be Made on The Path Ahead**
  - *Make them*

Summary

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- Industry Views the Importance and Need for:
  - Mission and requirements analyses
  - Requirements definition (CRD, ORDs)
  - Understanding of April 2003 Technology Readiness Decision
  - Criteria and process for FCS Armaments selection
  - Plan for early systems integration
  - Understanding systems acquisition approach
  - Program affordability
- Time-Phased Milestones for The Path Ahead Makes Practical Business-Sense

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Summary

- Industry Supports and Wants Army Transformation to Succeed
- Mutual Government/Industry Clarity on The Path Ahead Would
  - *Focus activities*
  - *Reduce risk*
  - *Enhance program success*

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BACK-UP

Technology Readiness Levels and Their Definitions

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1. Basic principles observed and reported.
   - Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.

2. Technology concept and/or application formulated.
   - Invention begins. Once basic principles are observed, practical applications can be invented. The application is speculative and there is no proof or detailed analysis to support the assumption. Examples are still limited to paper studies.

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Technology Readiness Levels and Their Definitions (cont'd)

3. Analytical and experimental critical function and/or characteristic proof of concept.
   - Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.

4. Component and/or breadboard validation in laboratory environment.
   - Basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in a laboratory.

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Technology Readiness Levels and Their Definitions (cont'd)

5. **Component and/or breadboard validation in relevant environment.**
   - Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting element so that the technology can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.

6. **System/subsystem model or prototype demonstration in a relevant environment.**
   - Representative model or prototype system, which is well beyond the breadboard tested for TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high fidelity laboratory environment or in simulated operational environment.

7. **System prototype demonstration in an operational environment.**
   - Prototype near or at planned operational system. Represents a major step up from TRL 6, requiring the demonstration of an actual system prototype in an operational environment, such as in an aircraft, vehicle or space. Examples include testing the prototype in a test bed aircraft.

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Technology Readiness Levels and Their Definitions (cont'd)

8. Actual system completed and "flight qualified" through test and demonstration.
   - Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.

9. Actual system "flight proven" through successful mission operations.
   - Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. In almost all cases, this is the end of the last "bug fixing" aspects of true system development. Examples include using the system under operational mission conditions.