Demil Research & Development Integrated Product Team

Global Demil Symposium

and Exhibition – Reno, NV

15 May 2007

Larry Nortunen
DRD IPT Lead
Defense Ammunition Center
918.420.8093

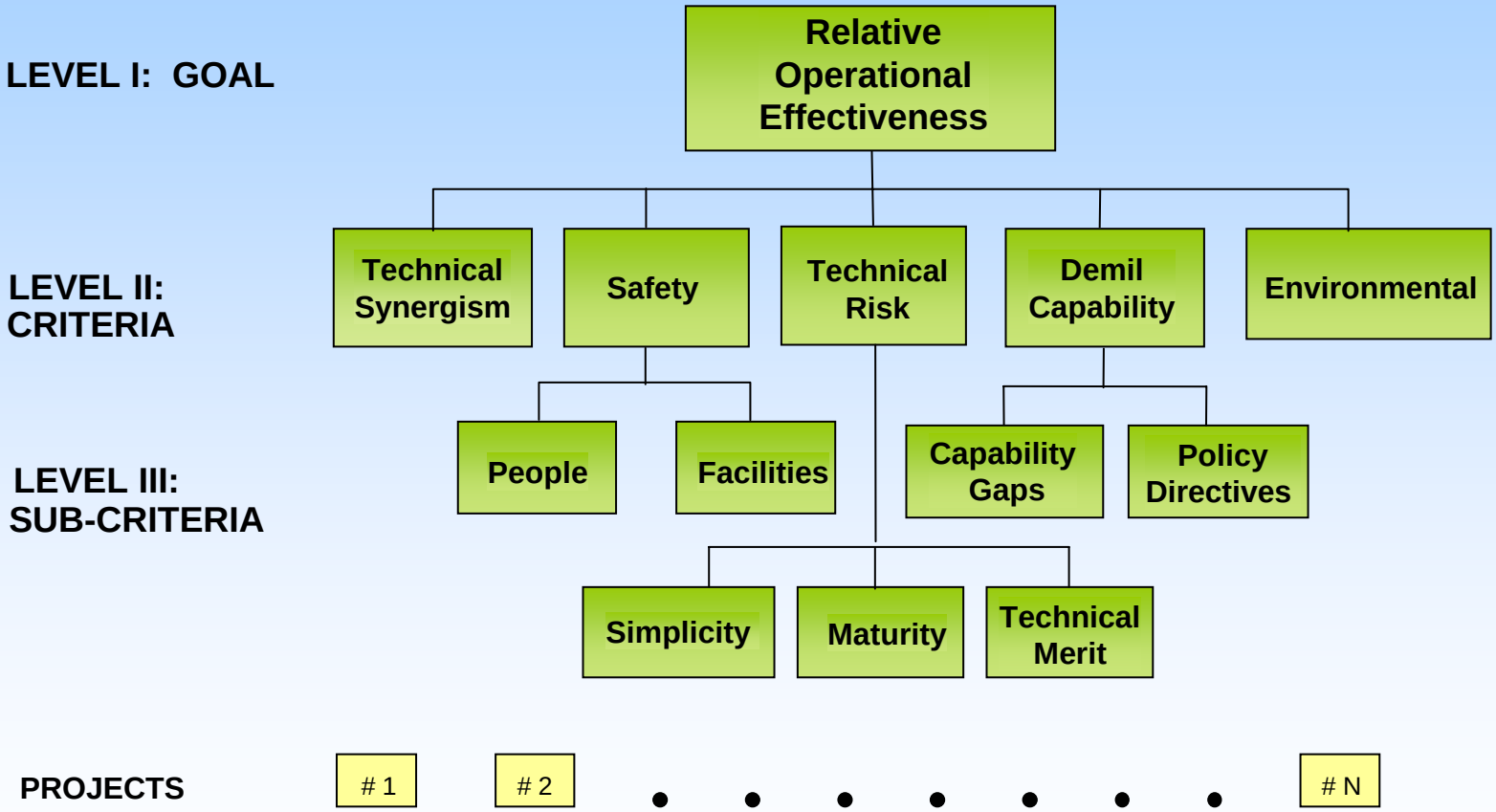
Outline

- DRD IPT Charter
- Evaluation Process
- Evaluation Results
- Demil R&D Master Plan
- Schedule
- Metrics
- Summary

DRD IPT Charter

- Purpose – make recommendations to the PM Demil for obtaining and allocating resources to support selection of Demil R&D projects
- Team Taskings:
  - ✓ Develop and document a project prioritization process; integrate with POM process
  - ✓ Develop a Demil R&D Technology Master Plan (update annually)
  - ✓ Develop a R&D project performance measurement process
  - ✓ Serve as an advisory body to PM Demil
  - ✓ Identify R&D solutions to Demil Capability Gaps
- Team Guidelines:
  - ✓ Focus on customer requirements
- Revised 25 April 2006

DRD Decision Hierarchy Using AHP



Level I and II Definitions

Level I: Goal Definition

Determine relative effectiveness of Demil R&D Technology Projects to maximize stockpile reduction capability within the constraints of environmental regulations, environmental stewardship, and safe demil work conditions while mitigating technical risks and promoting technical synergism.

Level II: Criteria Definitions

Technical Synergism: The degree to which a project enables, enhances, or provides flexibility to other technologies or demilitarization operations.

Safety: With regard to fielded technologies, the degree to which a project minimizes the risk to people or facilities.

Demil Capability: The degree to which a project applies to a portion of the stockpile that currently does not have a technological solution.

Environmental: With regard to fielded technologies, the degree to which the proposed project addresses environmental constraints.

Technical Risk: The degree to which technical merit, maturity and complexity impact implementation.

Level III: Sub-Criteria Definitions

Safety
People: The enhancement of personnel safety through the reduction of the probability of injury or death (with regard to fielded technologies).
Facilities: The enhancement of protection through the reduction of the probability or the consequences of mishaps to facilities, equipment or assets (with regard to fielded technologies).
Technical Risk
Simplicity: The number of subsystems and linkages between subsystems within the project.
Maturity: Technology Readiness Level
Technical Merit: The degree to which the project is supported by sound scientific and engineering principles and experimental data.
Demil Capability
Policy Directives: e.g., CDT%, Demil Enterprise Strategic Plan, Long-Term Goal, Congressional Edicts, Mines, International Agreement, State/Region Influence
Capability Gaps: Current inability to execute a requirement

Demil Capability Gap Defined

- Demil Capability Gap: Current inability to execute a requirement
  - ✓ Cost
  - ✓ Rate
  - ✓ Environmental
  - ✓ Safety
  - ✓ Risk

Demil Capability Gaps

Capability Gap	MIDAS Family	Stockpile RRDA sTons	Stockpile Field Service sTons	Gap Challenge	Current Capability
Ammonium Perchlorate (AP) Propellant	HM	6,383	52,095	Throughput	Limited commercial incineration
White Phosphorus (WP) Felt Pads	CPC	4,823	8,758	Destruction	OB/OD not allowed. Requires modification to APE 1400
Red Phosphorus	CSGX	885	1,272	Destruction	OB/OD not allowed - Requires wet scrubber testing for incineration
Plasticized White Phosphorus	CPZ	341	9	Removal/ Destruction	OB/OD not allowed - requires testing for APE 1400 treatment
40mm HEDP Grenades	HCPS	790	2,630	Safety	OB/OD not allowed. No closed disposal alternative
Depleted Uranium	DU	13,715	41,477	Cost	Hazardous waste landfill
Pressed Energetics	HC, HM, HP, HT	21,143	30,109	Removal	Limited organic capability Requires modification
Cast-Cured Energetics	HB, HM, HP	602	21,504	Removal	No closed disposal alternative
1310-00-039-1104-B560, Ctg, 40MM,AA, HEIT-DI-SD	HCCSI	1,540	0	Removal	No closed disposal alternative
1345-00-598-5207-K866, Smoke Pot, HC, ABC-M5	CHS	66	167	Destruction	OB/OD not allowed. Too large for PODS

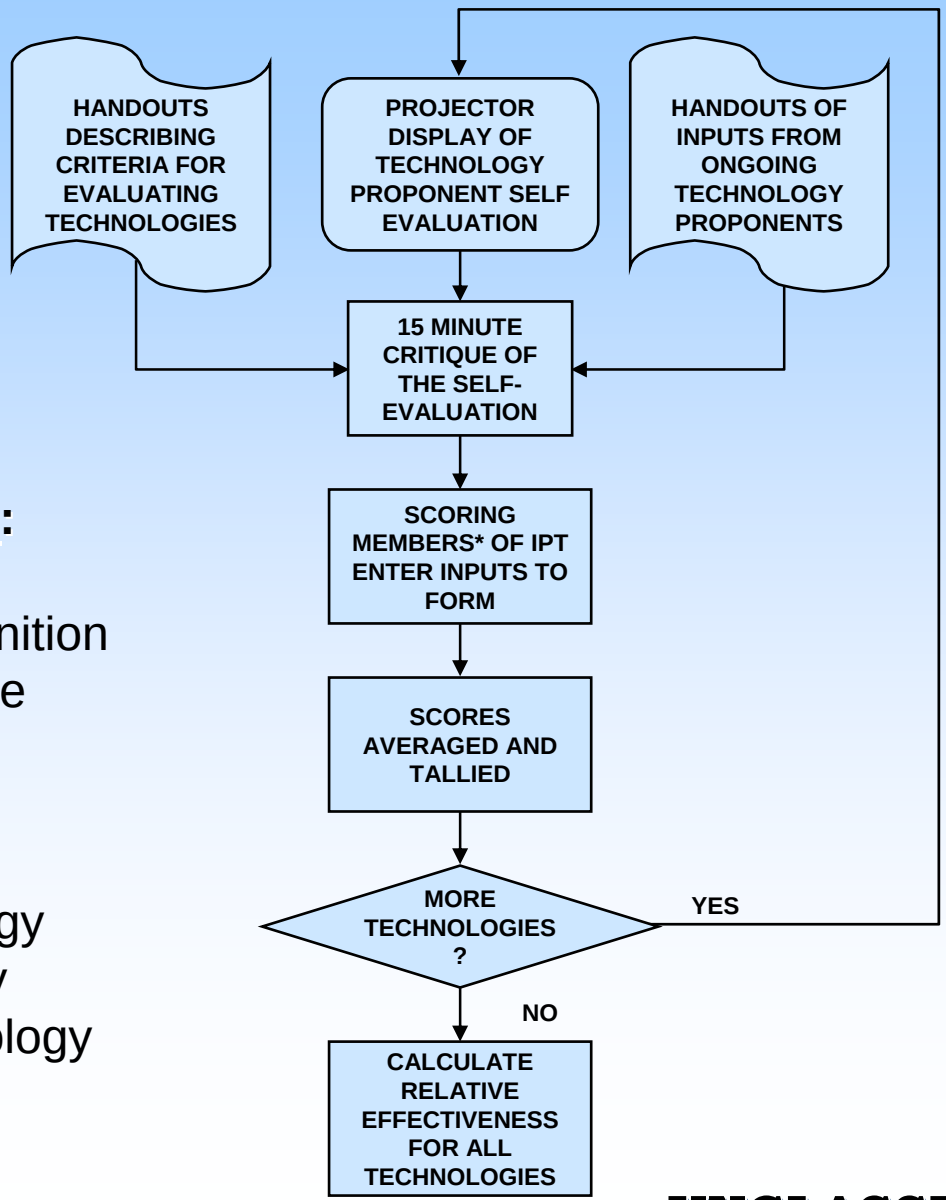
Technology Data Call

Technology Project Information Workbook:

- Technology Description / Proponents
- Operations and Schedule
- Technology Effectiveness*
- R&D Cost Summary
- Facilitization Cost
- Cost Savings

* Self Evaluation

Scoring Process for DRD Projects



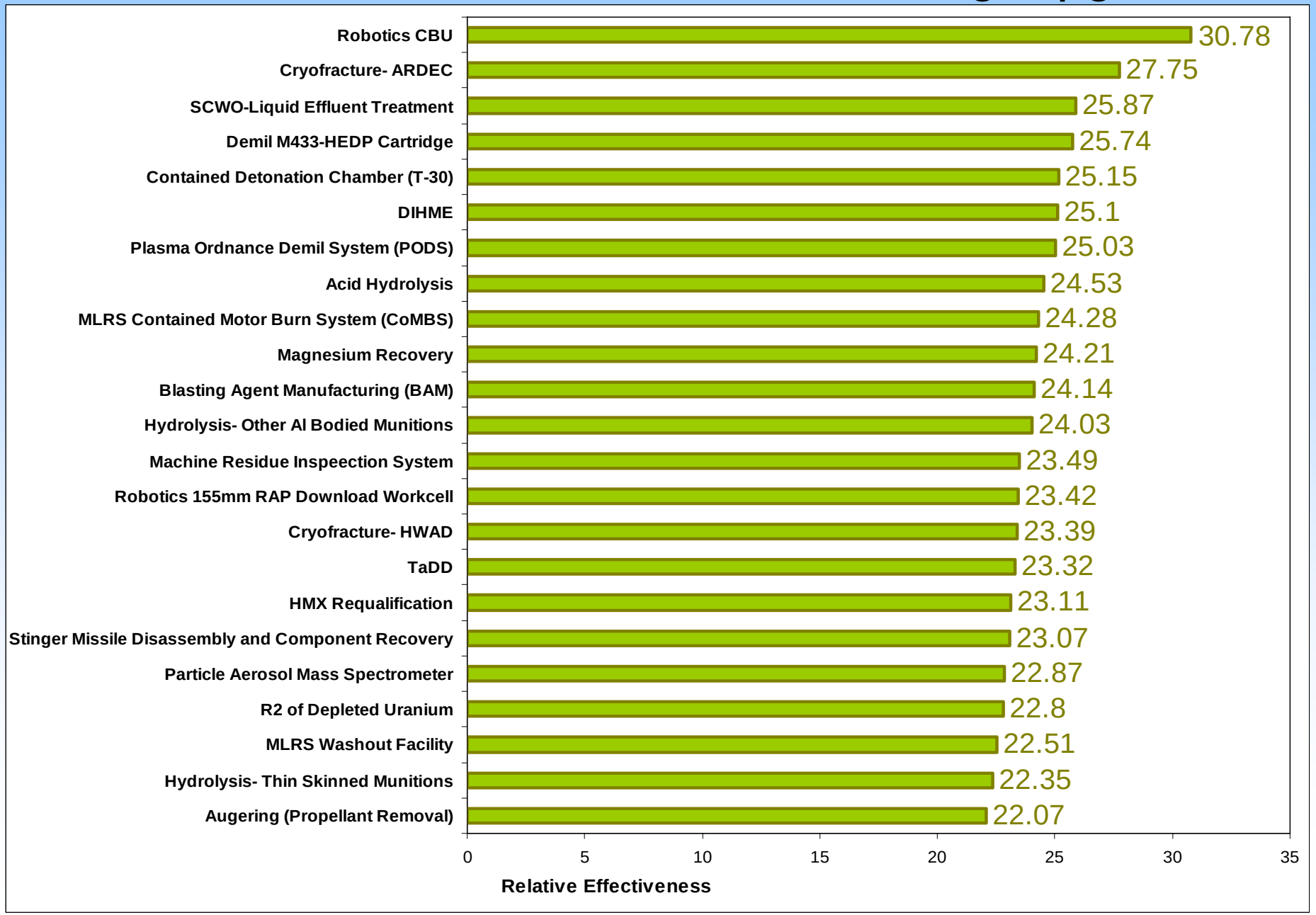
*** <u>Scoring Members</u>:**

- Environmental
- Technical Ammunition
- Technical Science Advisor
- D51 Technology
- F24 Technology
- Missile Technology
- Navy Technology
- Air Force Technology
- SMCA Execution

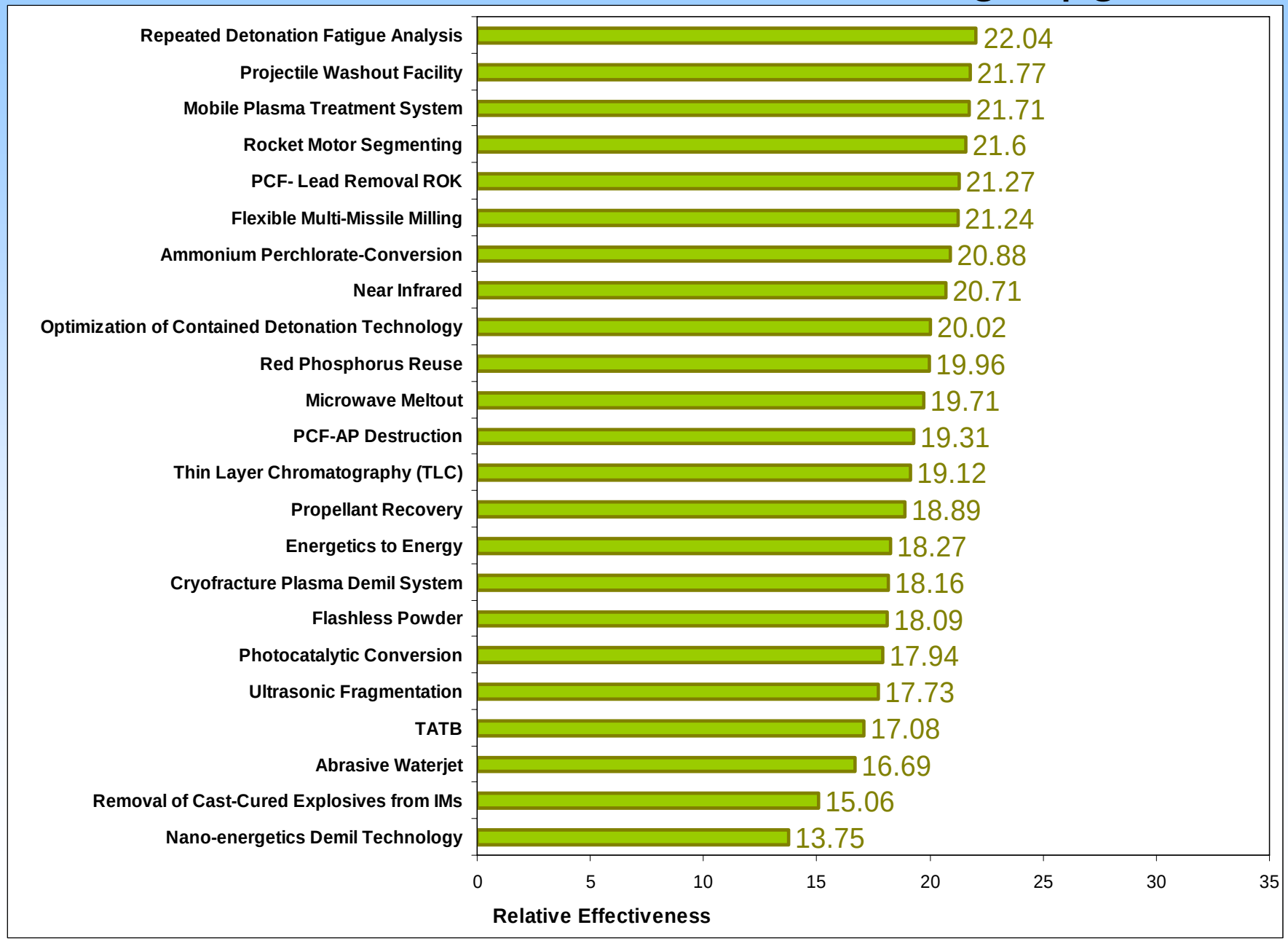
Technology Project List	Contract Agency/Prime Developer
Abrasive Waterjet	NSWC Crane/UMR
Acid Hydrolysis	Tyndall AFB/GA
Ammonium Perchlorate- Conversion	NSWC Crane/Gradient
Augering	AMRDEC/Amtec Corp
Blasting Agent Manufacturing (BAM)	NSWC Crane/El Dorado
Contained Detonation Chamber (T-30)	NSWC Crane/Demil International
Cryofracture Plasma Demil System	ARDEC/GA & MSE
Cryofracture- ARDEC	ARDEC/GA
Cryofracture- HWAD	NSWC Crane/GA
Demil M433-HEDP Cartridge	NSWC Crane/El Dorado Engineering
DIHME	NSWC Crane/El Dorado Engineering
Energetics to Energy	MCAAP/Franklin Engineering Group Inc.
Flashless Powder	NSWC Crane/TPL
Flexible Multi-Missile Milling	AMRDEC/Amtec Corp
HMX Requalification	NSWC Crane/TPL
Hydrolysis- Other Al Bodied Munitions	Tyndall AFB/GA
Hydrolysis- Thin Skinned Munitions	Tyndall AFB/GA
Machine Residue Inspection System	ARDEC/SAIC
Magnesium Recovery	ARDEC/TPL
Microwave Meltout	NSWC Crane/El Dorado Engineering
MLRS Contained Motor Burn System (CoMBS)	NSWC Crane/El Dorado Engineering
MLRS Washout Facility	NSWC Crane/ATK Thiokol
Mobile Plasma Treatment System	ARDEC/MSE

Technology Project List Cont'd.	Contract Agency/Prime Developer
Nano-energetics Demil Technology	ARDEC/Unknown
Near Infrared (NIR)	ARDEC/SAIC
Optimization of Contained Detonation Technology	NSWC Crane/CH2MHILL Demilitarization Inc.
Particle Aerosol Mass Spectrometer (PAMS)	DAC/Lawrence Livermore National Laboratory
PCF-AP Destruction	Huntsville/ARCTECH
PCF- Lead Removal ROK	Huntsville/ARCTECH
Photocatalytic Conversion	Hill AFB/OSU
Plasma Ordnance Demil System (PODS)	ARDEC/MSE
Projectile Washout Facility	NSWC Crane/Gradient
Propellant Recovery	ARDEC/Foster-Miller Corp
R2 of Depleted Uranium	ARDEC/SAIC
Red Phosphorus Reuse	NSWC Crane/Unknown
Removal of Cast-Cured Explosives from IMs	ARDEC/Battelle Memorial Labs
Repeated Detonation Fatigue Analysis	NSWC Crane/CH2MHILL
Robotics 155mm RAP Download Workcell	DOE/Sandia National Laboratory
Robotics CBU	DOE/Sandia National Laboratory
Rocket Motor Segmenting	AMRDEC/Amtec Corp
SCWO-Liquid Effluent Treatment	Tyndall AFB/GA
Stinger Missile Disassembly and Component Recovery	AMRDEC/Amtec Corp
Contained Burn for Tactical Missile Motors (TaDD)	NSWC Crane/El Dorado
TATB Production	DAC/Unknown
Thin Layer Chromatography (TLC)	DOE/LLNL
Ultrasonic Fragmentation	ARDEC/TPL

Initial Relative Effectiveness Ranking – pg 1



Initial Relative Effectiveness Ranking – pg 2



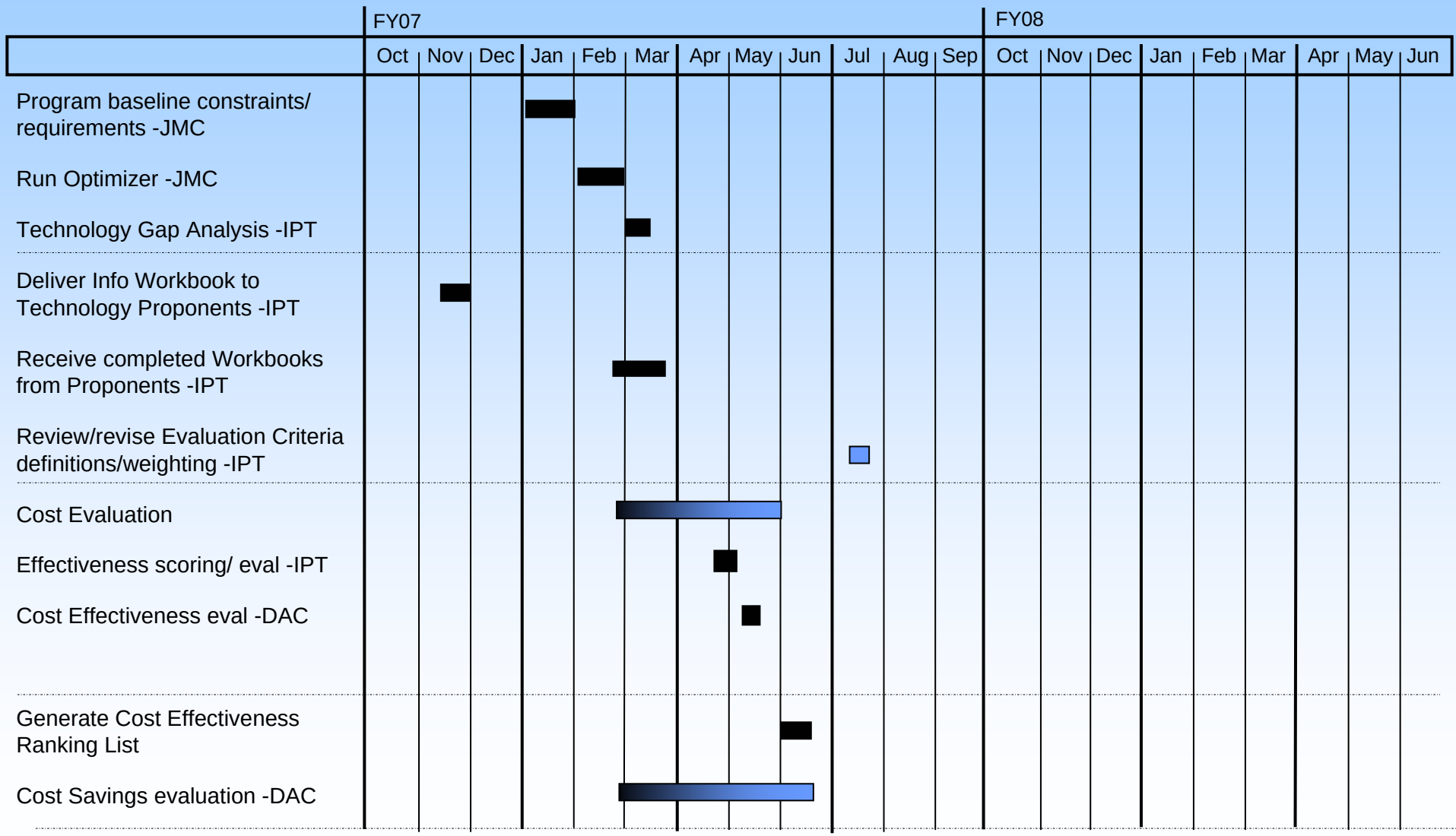
Evaluation Results

- Effectiveness measures how well projects perform relative to established criteria, independent of cost
- Cost-Effectiveness measures the cost of the project's effectiveness:
  - ✓ Cost-Effectiveness = (Net Present Cost of R&D and Facilitization) / Effectiveness
  - ✓ Units are cost per unit effectiveness
  - ✓ Cost-Effectiveness indicates how much "bang" for the "buck"
  - ✓ Because Cost-Effectiveness is a cost, smaller is better

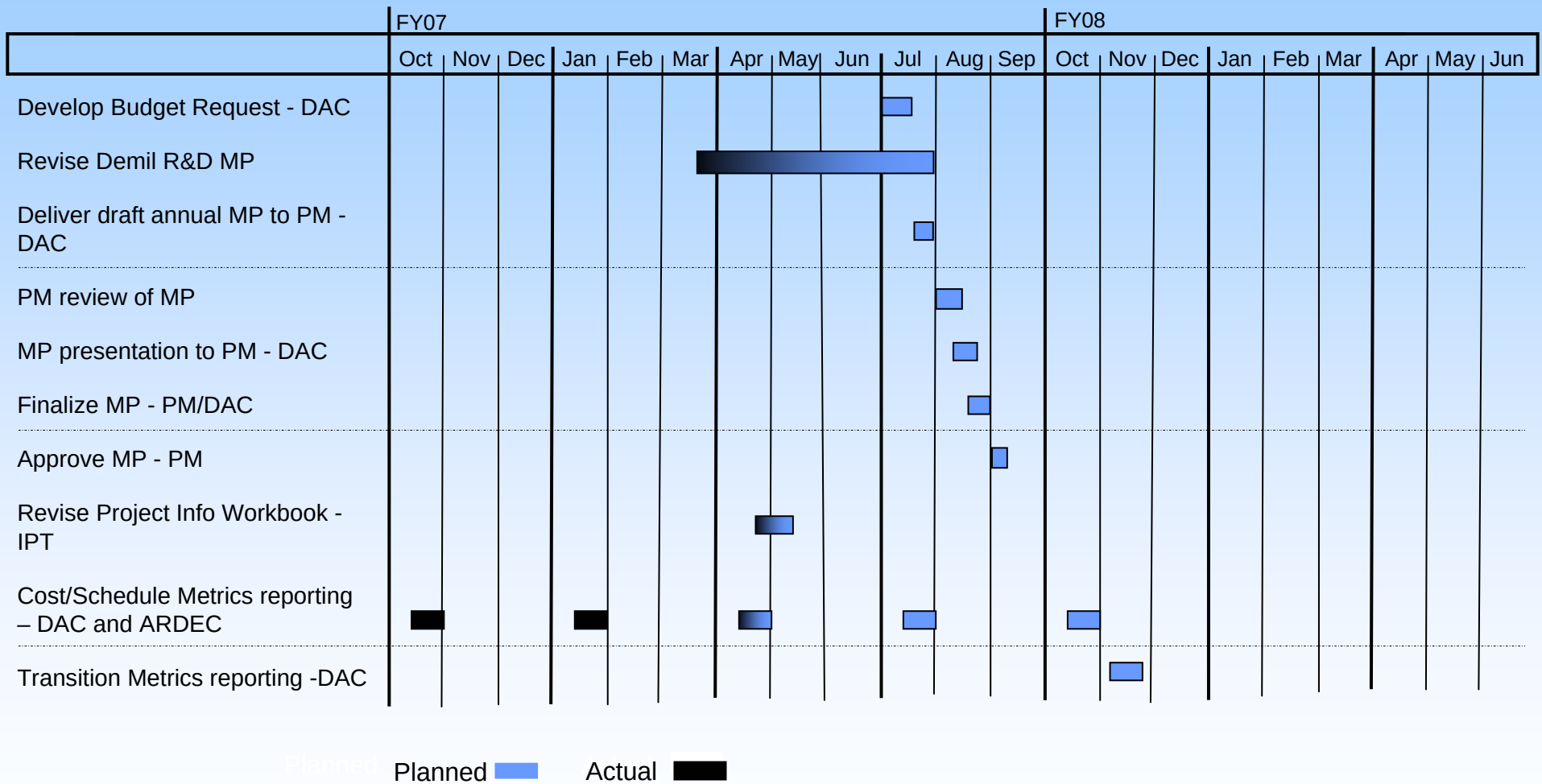
R&D Technology Master Plan

- Document a systems engineering approach to translate demil needs into requirements that result in a set of prioritized technology projects.
- Master Plan documents the process :
  - ✓ AHP criteria and evaluation process
  - ✓ Relative operational and cost effectiveness calculations
  - ✓ Project management
  - ✓ Cost savings methodology and metrics
- Proprietary Supplement contains :
  - ✓ Project information workbooks
  - ✓ Relative operational and cost effectiveness measures
  - ✓ Quantitative assessment tool
  - ✓ Cost savings analysis
  - ✓ Budget request

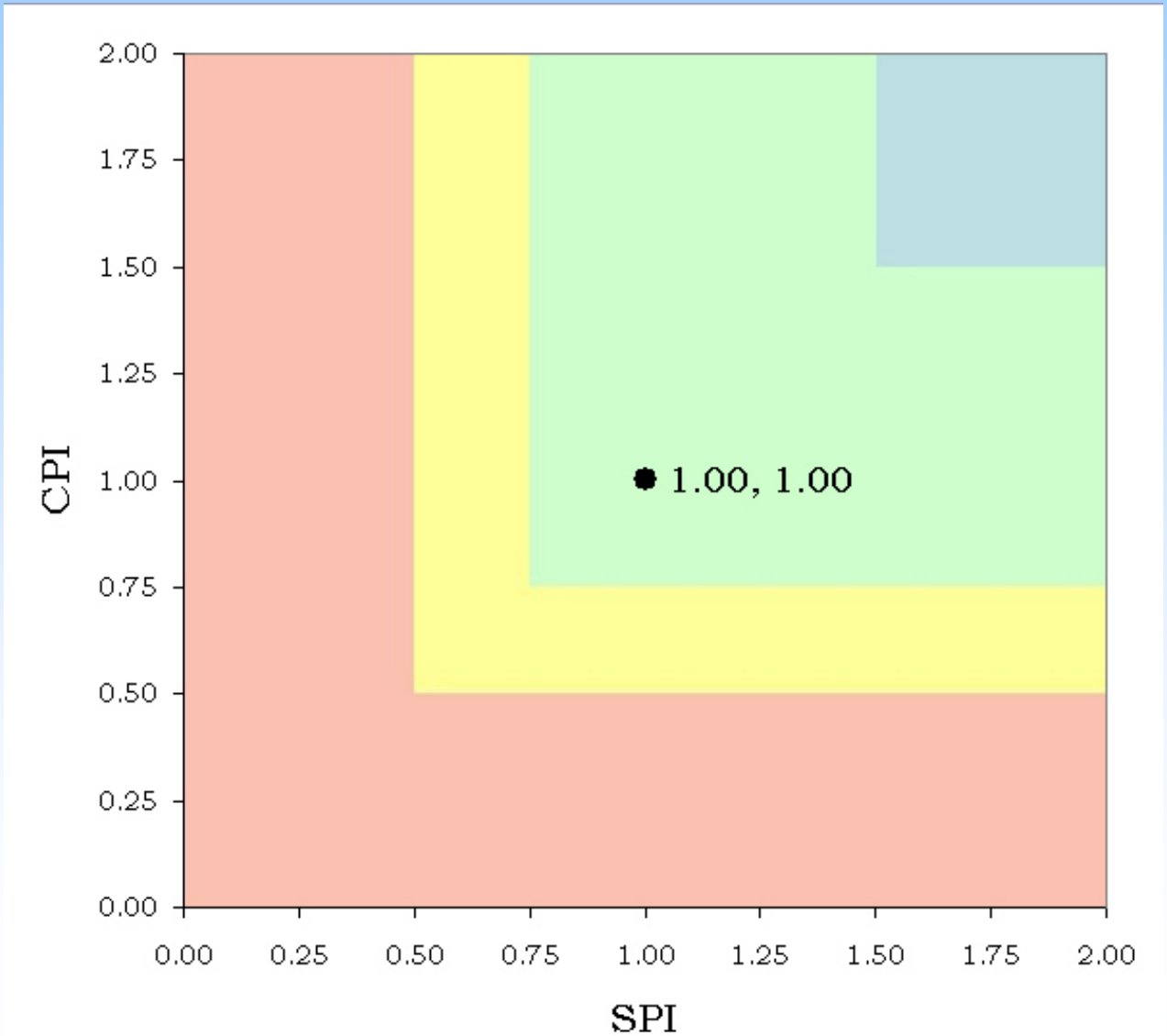
DRD Project Prioritization Schedule FY07



DRD Project Prioritization Schedule FY07



EVM Example


2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
CPI
1.00, 1.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
SPI

R&D Metrics

- **Standard Definitions (Phases)**
  - ✓ **Lab/Bench Scale**
  - ✓ **Subscale/Pilot Phase**
  - ✓ **Prototype Phase**
- **Goal: Establish Improved Metrics**
- **Core Members Agreed to:**
  - ✓ **Quarterly Cost and Schedule Reporting**
  - ✓ **Cost = Execution Year + Next Year**
  - ✓ **Schedule = Entire Project**
  - ✓ **Begins with New FY 06 SOWs**
- **Semiannual R&D Program Reviews (PRs)**

DRD IPT Summary

DONE

- Requirements Linked to Prioritization Process
- Revised Technology Project Information Workbook
- Completed Relative Effectiveness Evaluation for 46 FY08 Demil R&D Projects
- Executing Quarterly Project Cost, Schedule and Performance Reporting

TO DO

- Provide Evaluation Feedback to Project Leads
- Provide Master Plan to PM Demil in July to Justify Demil R&D Technology Funding Requirements
- Complete Capability Gaps Analysis LSS Project
- Reevaluate Scoring Criteria and Process

Thank You,
Any Questions?