



LCAAP Modernization

LCCM's Program to Reduce Risk of Interrupted Supply

Presented to:

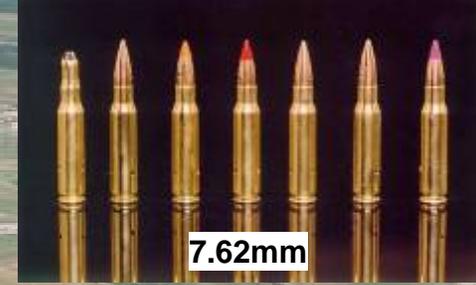
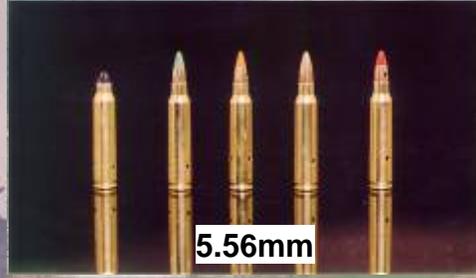
NDIA Armaments Conference
Karen Davies
ATK Lake City Ammunition

13 June 2007





Lake City Delivered Its First Round 65 Years Ago **ATK**



- Senator Harry Truman broke ground Dec. 1940.
- Started production Sept. 1941.



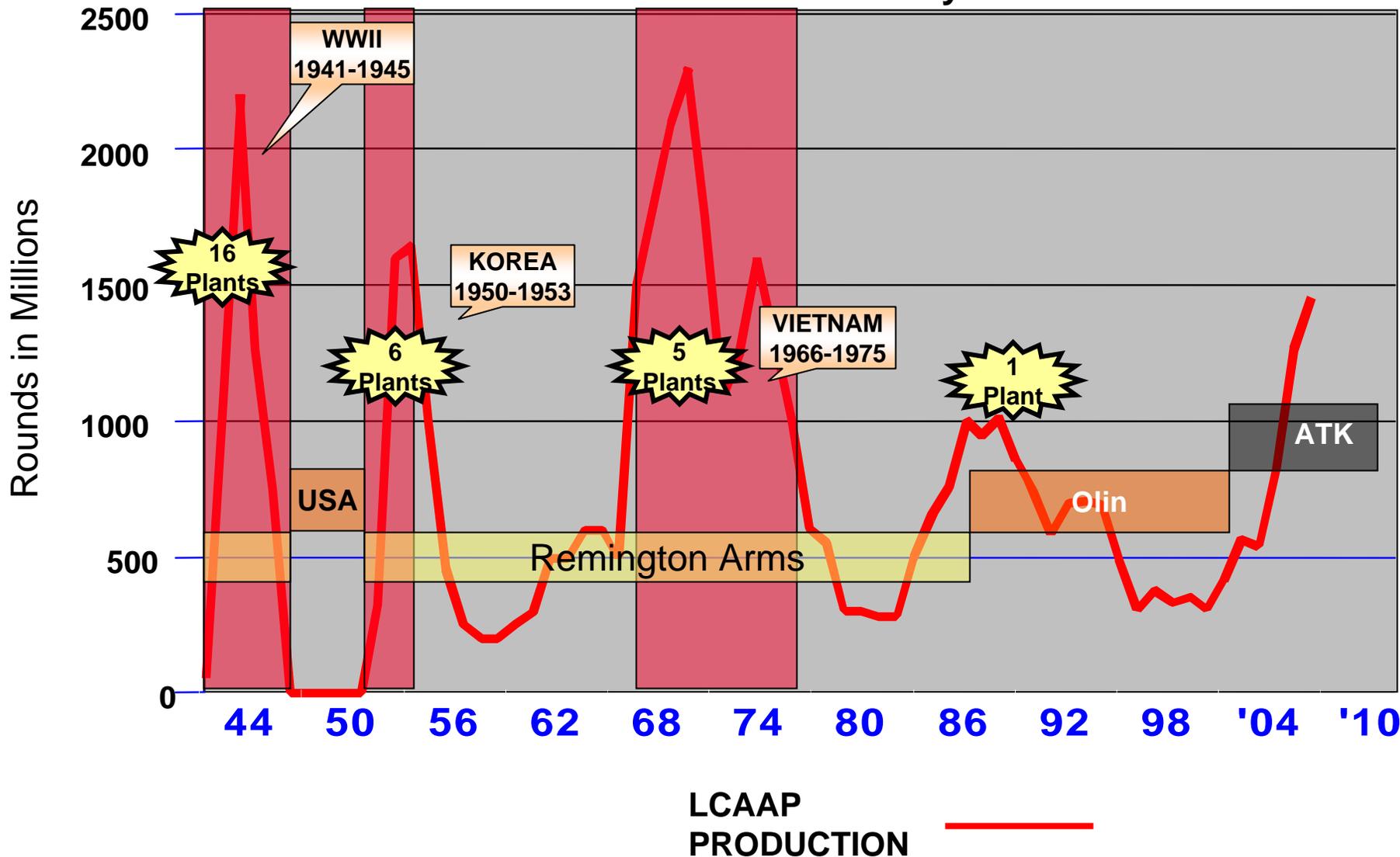
And most of the equipment is in use today!



Ammunition Demand History is Cyclical

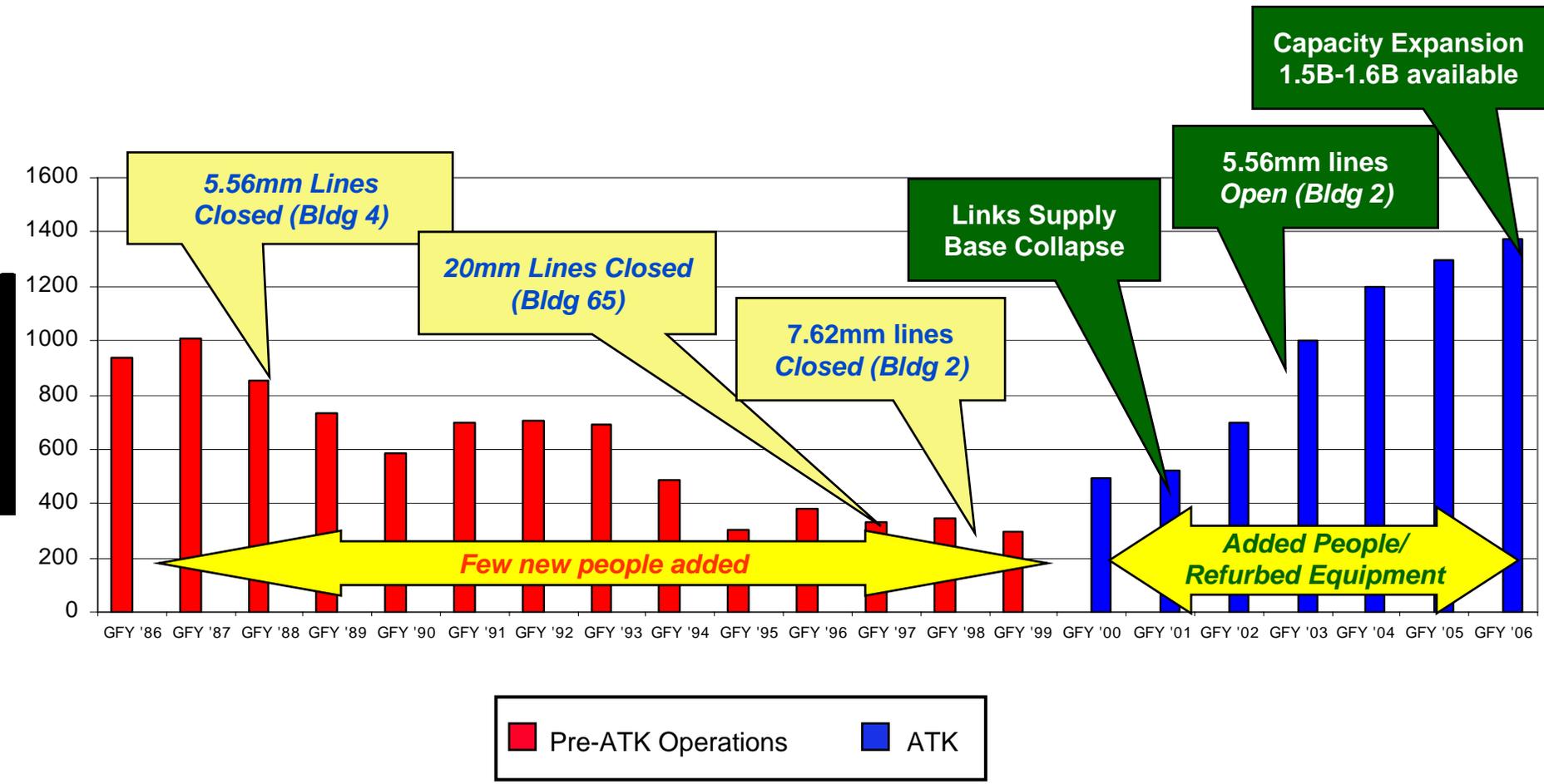


LCAAP Production History





“Investment” During 1990s Reduced Capacity



Production at Vietnam Era levels with smaller footprint



Vintage Equipment Creates Risk



- **5.56mm High-Speed Production--SCAMP**
 - 1970s Electronics and Mechanical Parts
- **7.62mm and .50 Cal. Production**
 - 1940s Equipment - No Feedback to Operators
 - Complicated Process Flow
 - Capacity Consolidation in 1990s
- **“Anti-Lean”**
 - No Flexible Manufacturing Capability
 - Cumbersome Material Handling
 - Batch and Cue Operations

1970s Electronics



WWII Final Inspection Equipment



Manual Primer Charging

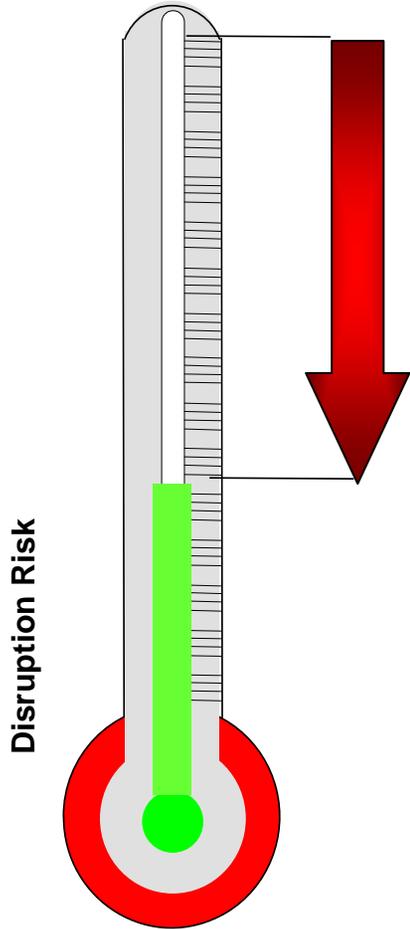


Wheelbarrows





LCMC Created Modernization Program to Address Supply Risk

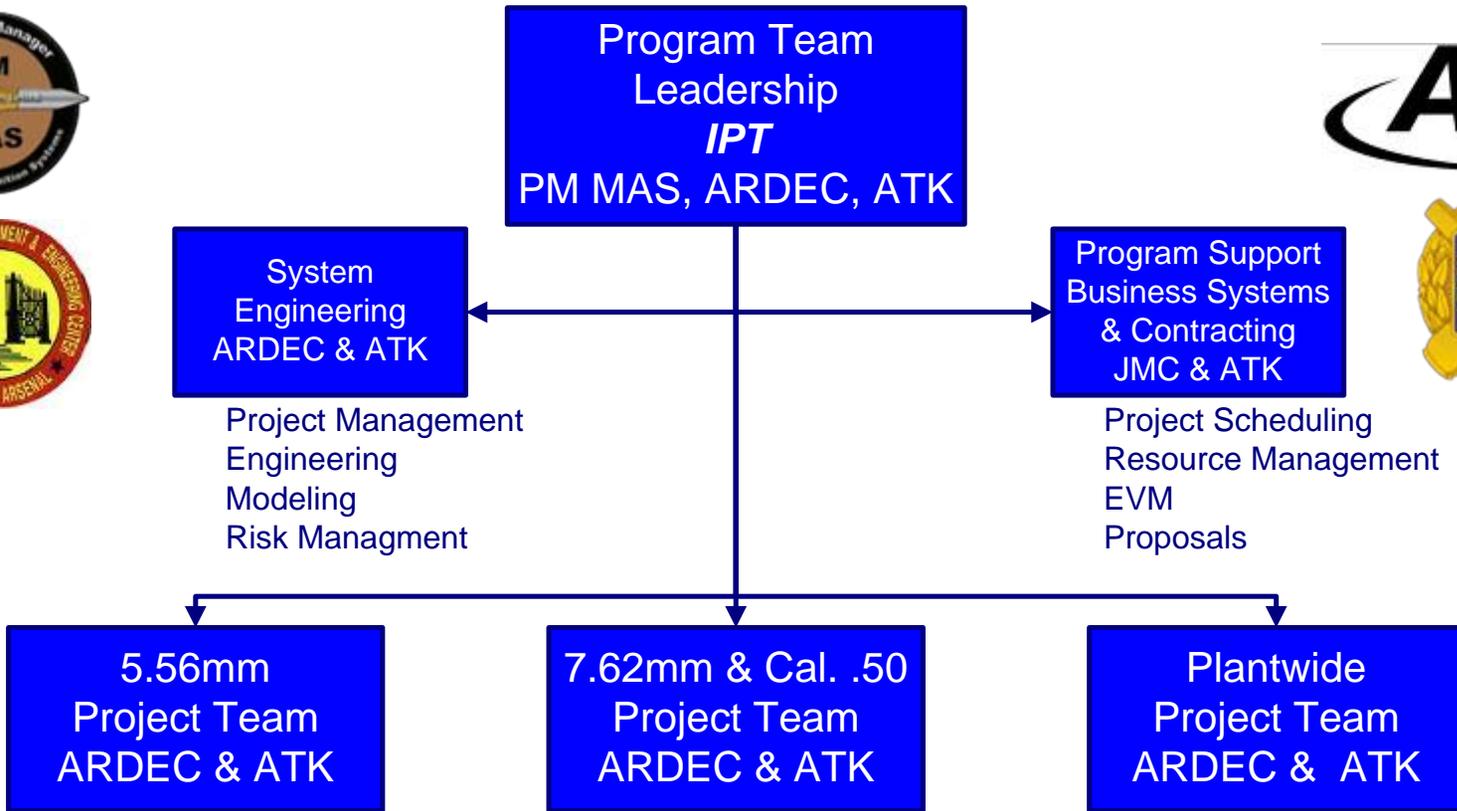


- Maintain capability to deliver 1.2 billion rounds per year
- Maintain deliveries during modernization execution
- Reduce single-point failures
- Increase reliability / availability / maintainability, productivity and quality
- Incorporate "Lean Thinking"
- Incorporate in-process inspection consistent with MIL-STD-1916
- Integrate improvements with ROI < 5 years
- Increase production flexibility between and within calibers
- Reduce potential for injuries & environmental emissions

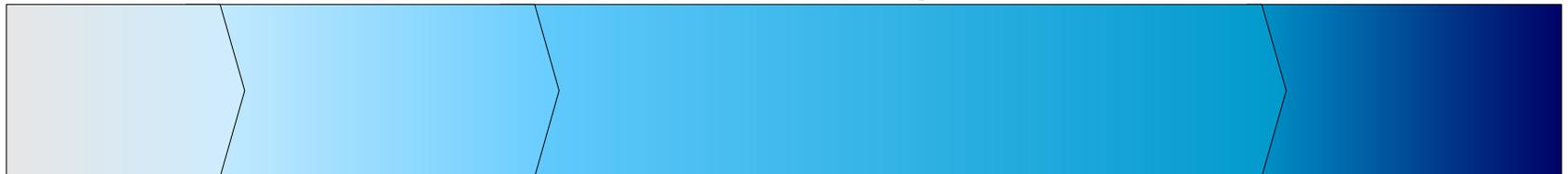
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	
Modernization Program		[Dark Grey Bar]		[Light Grey Bar]							
		▲	▲			▲		▲			
		Initiated		Completed to Date		Funding Ends		Complete			

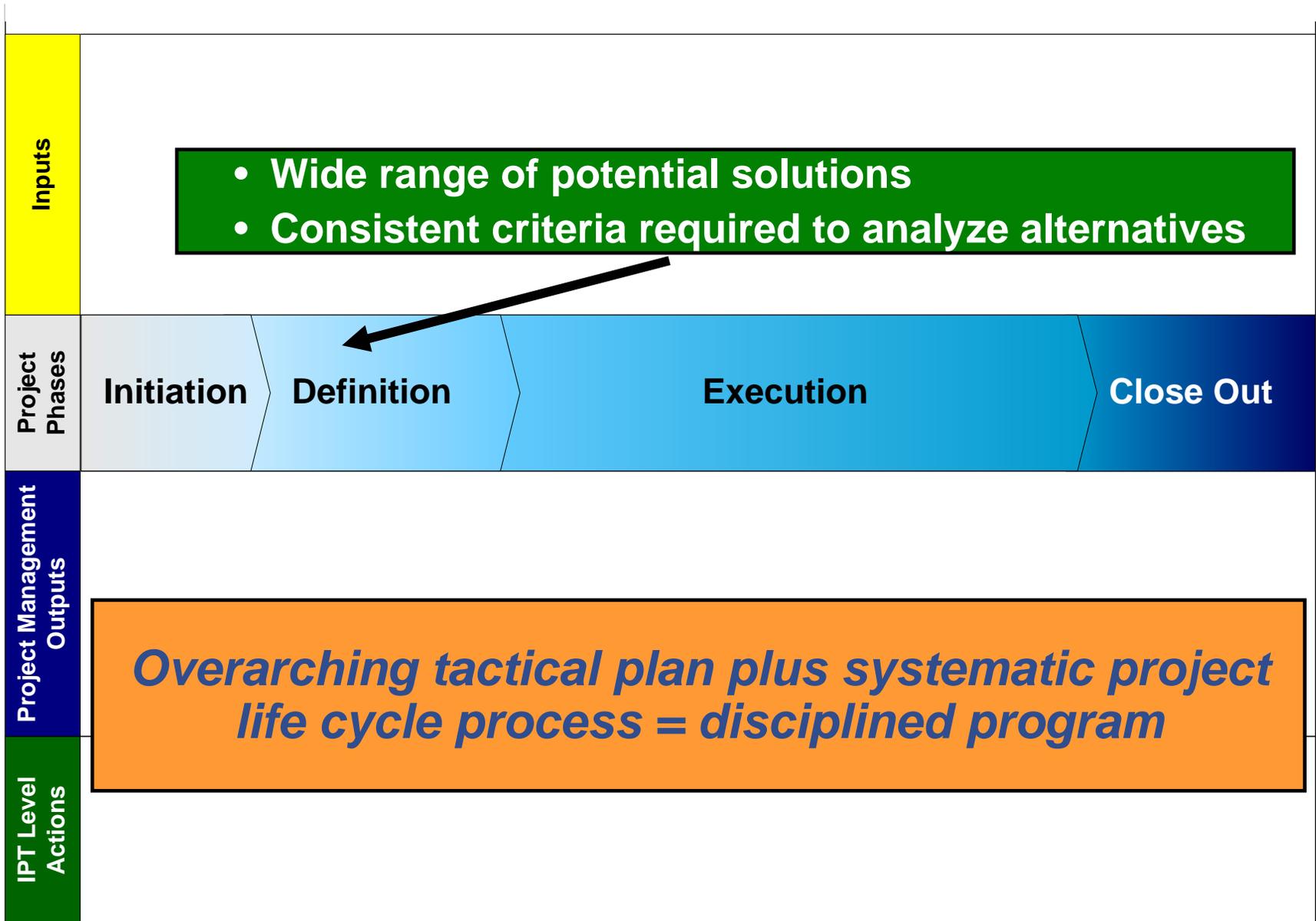


Strong Team Using Disciplined Systems



Systematic project planning and execution







➤ **Quality Function Deployment (QFD)**

- **Interactive process led by PM MAS**
- **Criteria taken from Modernization objectives**
 - **Criteria weighted against objectives**
- **Agreement on scoring weights and standards**
- **Mod IPT scored current and anticipated projects**

Structured process used to rank projects



QFD Evaluation Used to Prioritize Between and Within Projects



System Level Requirements	Weight	B1 SCAMP Loading P&A		B1 556mm Bandoleer Replacement Program		B1 556mm Commercial Pack Improvements		B1 556mm Pallet Strapping System Replacement		B1 SCAMP Priming Mech & Elec Upgrade	
		9	90	1	10	1	10	3	30	9	90
Sustain 5.56mm production Capacity @ 997 million (long term readiness)	10	9	90	1	10	1	10	3	30	9	90
Sustain 7.62mm production Capacity @ 160 million (long term readiness)	10	0	0	0	0	0	0	0	0	0	0
Sustain 50 Cal production Capacity @ 60 million (long term readiness)	10	0	0	0	0	0	0	0	0	0	0
Risk of Single Point Failures	8	3	24	0	0	0	0	9	72	3	24
Improve production reliability through improvements in equipment Operational Availability	6	1	6	3	18	0	0	1	6	3	18
Improvement in process efficiency (lean)	5	0	0	9	45	3	15	0	0	0	0
Increase product quality (six sigma) (ex. Acceptance testing)	7	3	21	0	0	9	63	1	7	1	7
Decrease inherent scrap rate (Machine Scrap)	1	0	0	0	0	0	0	0	0	0	0
Increase production flexibility (type)	5	0	0	0	0	0	0	0	0	0	0
Reduce incremental staffing demands for changes in production requirements and reliance on special skills (scalability)	4	0	0	1	4	3	12	9	36	3	12
Improvement in ROI (\$)	5	1	5	3	15	1	5	1	5	1	5
Reduction or elimination of safety and environmental hazards	8	0	0	9	72	0	0	3	24	3	24
<i>Score Totals</i>		146		164		105		180		180	
<i>Additional Factor</i>		1		1		1		1		1	
Overall Scoring		146		164		105		180		180	
Ranking Within Family		11		9		14		6		6	
Overall Ranking		28		24		33		17		17	

Result = Prioritized List for Modernization Projects

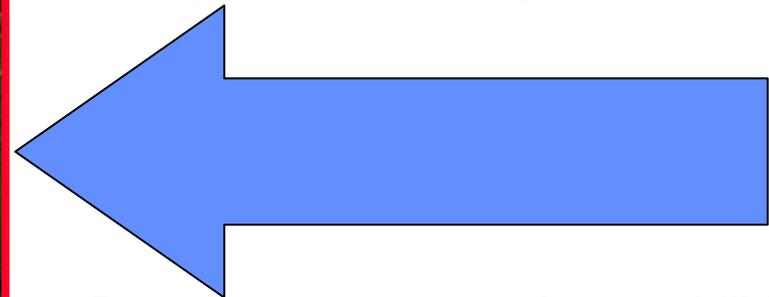


Modernization Upgrade 5.56mm SCAMP Equipment



- Upgrade to new electronic controls
- Foundation reconstruction
- Mechanical refurbishment

- Completed first of 5 priming lines



- Demonstrates upgrade capabilities



Caliber .50 and 7.62mm Modernization



- **Manufacturing modernization for 7.62mm & Caliber .50**
 - 60% new equipment
 - 40% refurbished equipment
- **Following Lean/Six Sigma principles**
- **Significant improvements to material handling**



Lean/Six Sigma Principles Driving Process Redesign



	Current	Reset Equip.	COTS Systems	Team Results
Distance moved (feet)	1,758	495	197	122
Cups/Cases in process	4,579,050	375,000	43,000	13,000
Operations	24	16	10	10
Handling	4	17	1	1
Transport	77	7	16	24
Inspection	0	0	1	3
Delay	1	2	3	2
Storage	16	8	0	0
Variation Paths	1,290,240	36	2	2
Cycle time (minutes)	6,185	1,562	179	52
Changeover time (hours)	NA	NA	16	

4.3 Days

3 Hours

New lines give greatest impact for long-term process, efficiency & quality improvement, and manufacturing agility.



Case Equipment--Taper/Final Trim

Before



After





Adding Key New Equipment



New 7.62mm/Caliber .50
Palletizer/Bander Machine



New Caliber .50
Final Wash System



Modernization Supports PEO Ammo Industrial Base Strategic Plan Objectives



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Single Manager for Conventional Ammunition (SMCA)

Industrial Base Strategic Plan: 2015

Industrial Base Strategic Goals and Objectives

Goal 1. Balance industrial base & acquisition management risk.

- Objective 1.1.a: Ensure critical core competencies and capabilities are available to meet requirements.
- Objective 1.1.b: Balance cost, schedule and performance with need to have capability.
- Objective 1.1.c: Establish right-sized ammunition industrial base.

Goal 2. Transform to meet current and future requirements.

- Objective 2.1.a: Optimize acquisition planning, industrial base preparedness, and logistics capabilities to support Joint and Expeditionary Warfighting requirements.
- Objective 2.1.b: Reduce GOCO/GOGO conventional ammunition facility operating costs/footprint and pursue use of or dispose of excess capacity.
- Objective 2.1.c: Develop and ensure manufacturing/logistics capability and readiness.

Goal 4. Modernize required manufacturing and logistics capacity.

Objective 4.1.a: Increase manufacturing and logistics readiness to meet current and future requirements.

Strat

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communications with all Services and

Lake City will be positioned for several decades