Innovation in Defense Acquisition Oversight: An Exploration of the AT&L Acquisition Visibility SOA

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Agenda

- Acquisition Visibility Purpose
- Project History – AT&L AV SOA
- Architecture
- Data Elements and Programs included to date
- Implications for Academic Research

Acquisition Visibility

- The Department of Defense and others have noted deficiencies in the Department's ability to manage its $1.6T portfolio of Major Defense Acquisition Programs.

- Undersecretary of Defense for Acquisition Technology & Logistics is addressing these deficiencies by focusing on Acquisition Visibility (AV)

Acquisition Visibility

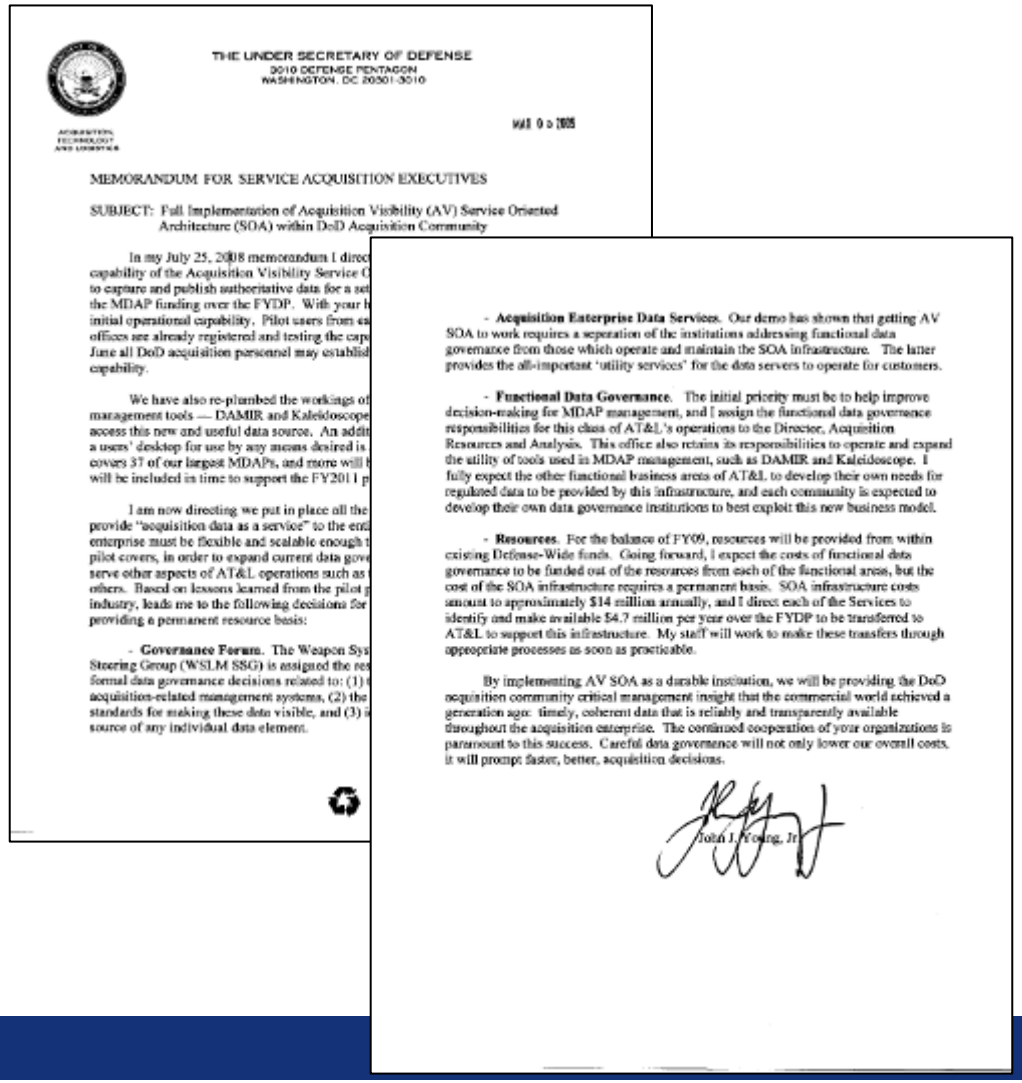
Timely access to accurate, authoritative, and reliable information supporting acquisition oversight, accountability, and decision making throughout the Department for effective and efficient delivery of warfighter capabilities

Project History – AT&L AV SOA

- **Demo:** February 2008 demonstration of data governance and Service Oriented Architecture to support major weapons system decision making. Completed in ~45 days.
  - Included 61 data elements (Earned Value Management and Unit Cost) for 12 Major Defense Acquisition Programs (MDAPs)—4 from each Military Service

- **Pilot:** 2008-2009 pilot to solidify governance and technical approach.
  - In December 2008, provided acquisition oversight decision-making information for 37 MDAPs, totaling ~$1.2T in program value, ~75% of the FYDP.
  - In fall 2009, provided 103 MDAPs and other major programs totaling ~$1.6T
  - ~148 data elements (Earned Value Management, Program Administration, Unit Cost, Science and Technology, Milestones, Budget/Current Estimate)

AT&L AV SOA – Full Implementation Approval
March 5, 2009



THE UNDER SECRETARY OF DEFENSE
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MAR 0 5 2009

MEMORANDUM FOR SERVICE ACQUISITION EXECUTIVES

SUBJECT: Full Implementation of Acquisition Visibility (AV) Service Oriented Architecture (SOA) within DoD Acquisition Community

In my July 25, 2008 memorandum I direc
capability of the Acquisition Visibility Service C
to capture and publish authoritative data for a set
the MDAP funding over the FYDP. With your h
initial operational capability. Pilot users from six
offices are already registered and testing the capa
June all DoD acquisition personnel may establis
capability.

We have also re-plumbed the workings of
management tools — DAMIR and Kaleidoscope
access this new and useful data source. An addit
a users' desktop for use by any means desired is
covers 37 of our largest MDAPs, and more will b
will be included in time to support the FY2011 p

I am now directing we put in place all the
provide "acquisition data as a service" to the enti
enterprise must be flexible and scalable enough t
pilot covers, in order to expand current data gove
serve other aspects of AT&L operations such as
others. Based on lessons learned from the pilot p
industry, leads me to the following decisions for
providing a permanent resource basis:

- **Governance Forum.** The Weapon Sys
Steering Group (WSLM SSG) is assigned the res
formal data governance decisions related to: (1)
acquisition-related management systems, (2) the
standards for making these data visible, and (3)
source of any individual data element.

- **Acquisition Enterprise Data Services.** Our demo has shown that getting AV SOA to work requires a separation of the institutions addressing functional data governance from those which operate and maintain the SOA infrastructure. The latter provides the all-important 'utility services' for the data servers to operate for customers.

- **Functional Data Governance.** The initial priority must be to help improve decision-making for MDAP management, and I assign the functional data governance responsibilities for this class of AT&L's operations to the Director, Acquisition Resources and Analysis. This office also retains its responsibilities to operate and expand the utility of tools used in MDAP management, such as DAMIR and Kaleidoscope. I fully expect the other functional business areas of AT&L to develop their own needs for regulated data to be provided by this infrastructure, and each community is expected to develop their own data governance institutions to best exploit this new business model.

- **Resources.** For the balance of FY09, resources will be provided from within existing Defense-Wide funds. Going forward, I expect the costs of functional data governance to be funded out of the resources from each of the functional areas, but the cost of the SOA infrastructure requires a permanent basis. SOA infrastructure costs amount to approximately $14 million annually, and I direct each of the Services to identify and make available $4.7 million per year over the FYDP to be transferred to AT&L to support this infrastructure. My staff will work to make these transfers through appropriate processes as soon as practicable.

By implementing AV SOA as a durable institution, we will be providing the DoD acquisition community critical management insight that the commercial world achieved a generation ago: timely, coherent data that is reliably and transparently available throughout the acquisition enterprise. The continued cooperation of your organizations is paramount to this success. Careful data governance will not only lower our overall costs, it will prompt faster, better, acquisition decisions.

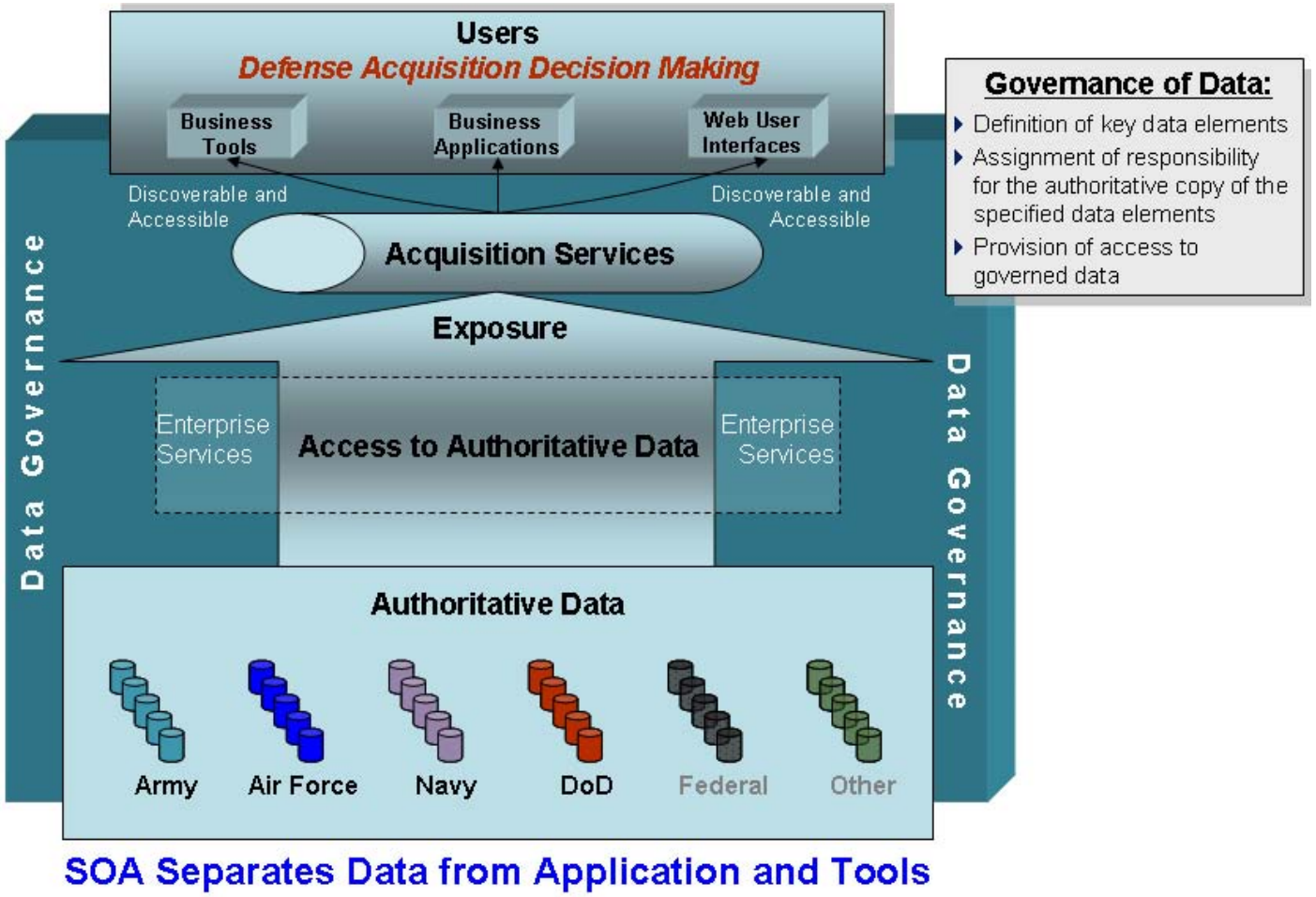
John J. Young, Jr.

- USD AT&L issued AT&L AV SOA full implementation memo on March 5, 2009
- Directs AT&L to put in place all the elements of a durable solution to provide "acquisition data as a service" to the entire acquisition community.
  - Full Acquisition community access by June 09
  - All Major Defense Acquisition Programs (MDAPs) in time to support the FY 2011 program/budget review
- Separates data governance and SOA infrastructure responsibilities
- Weapon System Lifecycle Management Senior Steering Group to make all formal governance decisions
  - Director of Acquisition Resources and Analysis responsible for functional data governance for MDAP management
  - Other functional business areas to develop functional data governance to meet their decision-making information needs

Defense Acquisition Visibility via SOA

- **AV SOA Solution:** Apply Service Oriented Architecture and data governance to create shared services

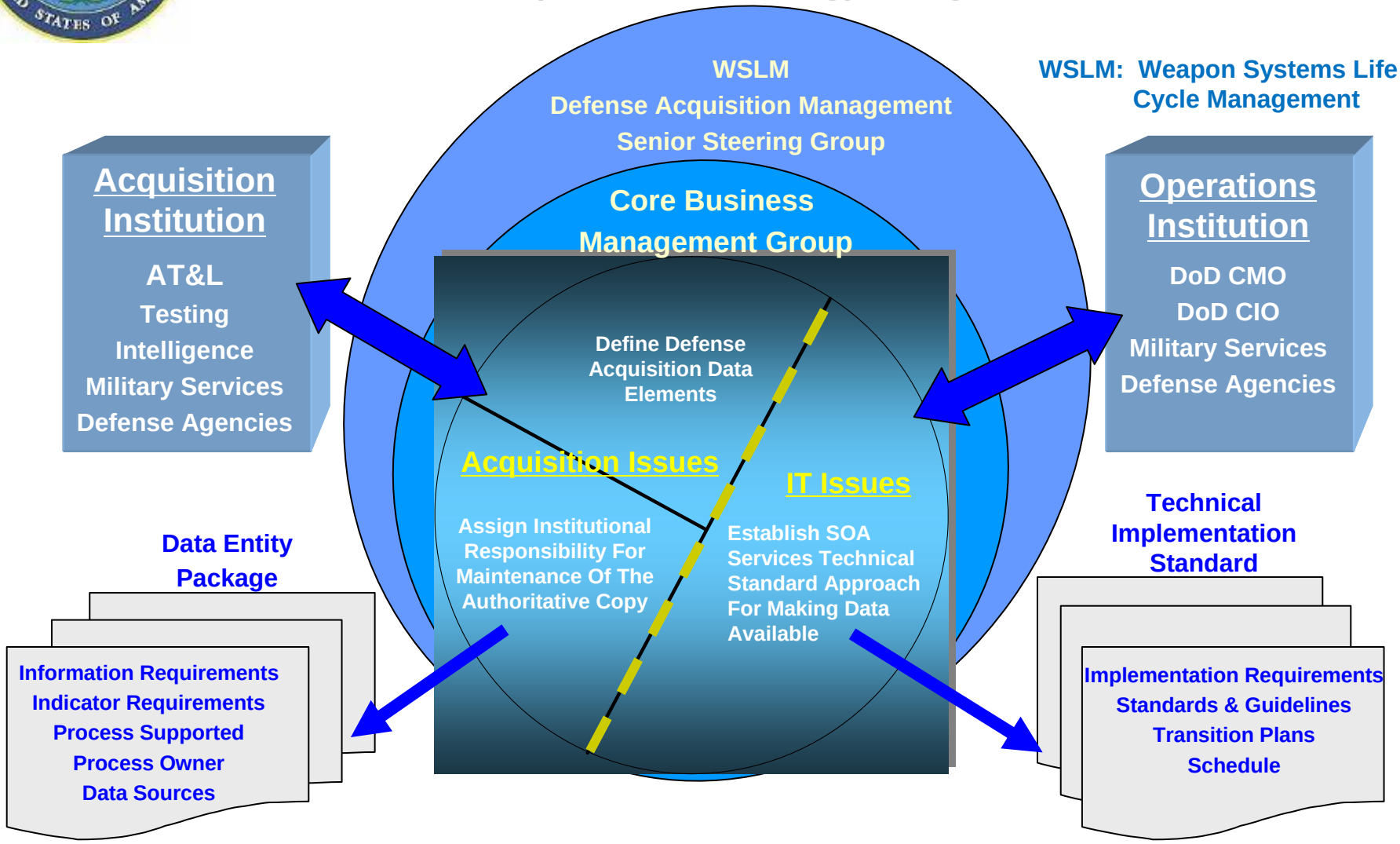
- **Results:**
  - Defense acquisition information transparency across the Department
  - Access to up-to-date, reliable data via any authorized application or analysis tool
  - An extensible platform available for Department-wide use



"I reject the idea that the federal government cannot innovate." – *Vivek Kundra, Federal CIO*

Balancing Functional and Technical Equities

Acquisition Technology & Logistics



Definition of Success

Demonstrating Data Governance

- Define selected Defense acquisition data elements to be exchanged
- Identification of authoritative sources
- Assign institutional responsibility for maintenance of the authoritative copy of each data element within a system

Demonstrating Data Definition Consistency

- Availability of data defined as requested by AT&L
- For the demo, the bar is low: primarily EV- and Nunn-McCurdy-related data

Demonstrating Data Access

- Implementing the SOA infrastructure

AV SOA Data Categories

- *EVM* – Contract elements included in DAMIR's "Contract Data Point" and/or reported on the Contract Performance Report (CPR) to track progress
- *Unit Cost* – Current estimate vs. APB (current and original) at total-appropriation level (RDT&E, Procurement, MILCON, O&M), by fiscal year for comparison, to support risk identification
- *Budget* – Current President's Budget and POM/BES submission, by appropriation and fiscal year, for identifying changes in budget positions
- *Milestone* – Program milestones as agreed upon in the APB, to provide a reference point for tracking progress
- *Science & Technology* – Compare Key Performance Parameters, thresholds, and objectives to current measurement and to identify critical technologies
- *Program Administration* – To organize/view information by program, sub-program, budget activity, program element, budget line item, and/or project code

AV SOA Data Elements – 148

Program Administration
Program Name
Program Number (PNO)
Program URI (Uniform Resource Identifier)
Sub-Program URI
Sub-Program Name
Budget Activity Identifier
PE (Program Element)
Budget Line Item (formerly Procurement Line Item(PLI))
PM Management Reserv e
Project Code

Unit Cost
Current Baseline (APB): Total Procurement Cost
Current Baseline (APB): Total MILCON Cost
Current Baseline (APB): Total O&M Cost
Current Baseline (APB): Total Development Quantity
Current Baseline (APB): Total Procurement Quantity
PAUC (Program Acquisition Unit Cost) - Current Estimate
APUC (Average Procurement Unit Cost) - Current Estimate
Estimate Type
Base Year - Original APB
Base Year - Current APB
Original APB Date
Current APB Date
Program Completion Year
Escalation Index
Department Regular Code
Main Account Code
Appropriation FY (Fiscal Year)
Current Estimate - Research, Development, Test & Evaluation (RDT&E) costs
Current Estimate - Procurement Costs
Current Estimate - Military Construction (MILCON) Costs
Curremt Estimate - Operation & Maintenance (O&M) Costs
Current Estimate - Development Quantity
Current Estimate - Procurement Quantity
Original Baseline (APB): Total RDT&E Cost
Original Baseline (APB): Total Procurement Cost
Original Baseline (APB): MILCON Cost
Original Baseline (APB): O&M Cost
Current Estimate - RDT&E (BY) - Total for all years
Current Estimate - Procurement (BY) - Total for all years
Current Estimate - MILCON (BY) - Total for all years

Unit Cost (cont'd)
Current Estimate - O&M (BY) - Total for all years
Current Estimate - Development Quantity
Current Estimate - Procurement Quantity
Original Baseline (APB): Development Quantity
Original Baseline (APB): Procurement Quantity
Current Baseline (APB): Total RDT&E Cost

Budget
Original Quantity
Current Quantity
Scheduled Quantity
Delivered Quantity
Budget Fiscal Year
OTB (Over Target Baseline) - Date
OTB - BAC Adjustment ($)
OTB - SV Adjustment ($)
OTB - CV Adjustment ($)
NCC - Original
NCC (Negotiated Contract Cost) - Current
Target Price - Current
Target Price - Original
Estimated Price - Contractor
Estimated Price - PM
Ceiling Price - Current
Ceiling Price - Original
Ceiling Price - Contractor's Estimated
Ceiling Price - PM's Estimated
Completion Date (w hen BCWS = BAC)
TAB (Total Allocated Budget)
ACWP (Actual Cost of Work Performed)
Current President's Budget RDT&E Submission
Current President's Budget Procurement Submission
Current President's Budget MILCON Submission
Current President's Budget O&M Submission
Current President's Budget Development Quantity Submission
Current President's Budget Procurement Quantity Submission
RDT&E POM/BES Submission
Procurement POM/BES Submission
MILCON POM/BES Submission
O&M POM/BES Submission
POM/BES Development Quantity
POM/BES Procurement Quantity

AV SOA Data Elements – 148 (cont'd)

Earned Value
Contract Number
Contract Modification Identifier
Contract Modification Date
Contract Type Code
Contractor Name
Contractor Division
CAGE Code (Commercial And Government Entity Code)
Contractor Location - City
Contractor Location - State
Contractor Location - Zip Code + 4
Contractor Location - Province
Contractor Location - Country
Contract Award Date
Contract Definitization Date
Contract Effort Number
Contract Effort Name
Contract Effort Start Date
Contract Effort Completion Date
Report Type
Reporting Period End Date (formerly Report Date)
PM Estimates - Reporting Period End Date
Government-Contractor Share
System Name
System Phase
IBR (Integrated Baseline Review) Date
ECD (Estimated Completion Date) - Contractor
ECD - PM
ECD - PM Significant Effort Completed
ECD - Original PM ECD
PAUC (Program Acquisition Unit Cost) - Original APB
APUC (Average Procurement Unit Cost) - Original APB
PAUC (Program Acquisition Unit Cost) - Current APB
APUC (Average Procurement Unit Cost) - Current APB
BAC - Contractor (Budget At Completion)
BAC - PM
BCWP (Budgeted Cost of Work Performed)

Earned Value (cont'd)
BCWS (Budgeted Cost of Work Scheduled)
CBB (Contract Budget Base)
EAC - Contractor (Estimate At Completion)
EAC - Contractor Best Case
EAC - PM
EAC - Contractor Worst Case
MR (Management Reserve)
VAC (Variance At Completion)
% VAC
PM VAC
% Complete
TCPI (To Complete Performance Index)
TCPI - CPI
% Schedule
CPI (Cost Performance Index)
SPI (Schedule Performance Index)
CV (Cost Variance)
% CV
SV (Schedule Variance)
% SV

Science & Technology
Critical Technology Element(s)
Key Performance Parameter (KPP) URI
Key Performance Parameter (KPP) Name(s)
Key Performance Parameter (KPP) - APB Threshold
Key Performance Parameter (KPP) - APB Objective
Key Performance Parameter (KPP) - Actual Measurement
Key Performance Parameter (KPP) - Actual Measurement Date

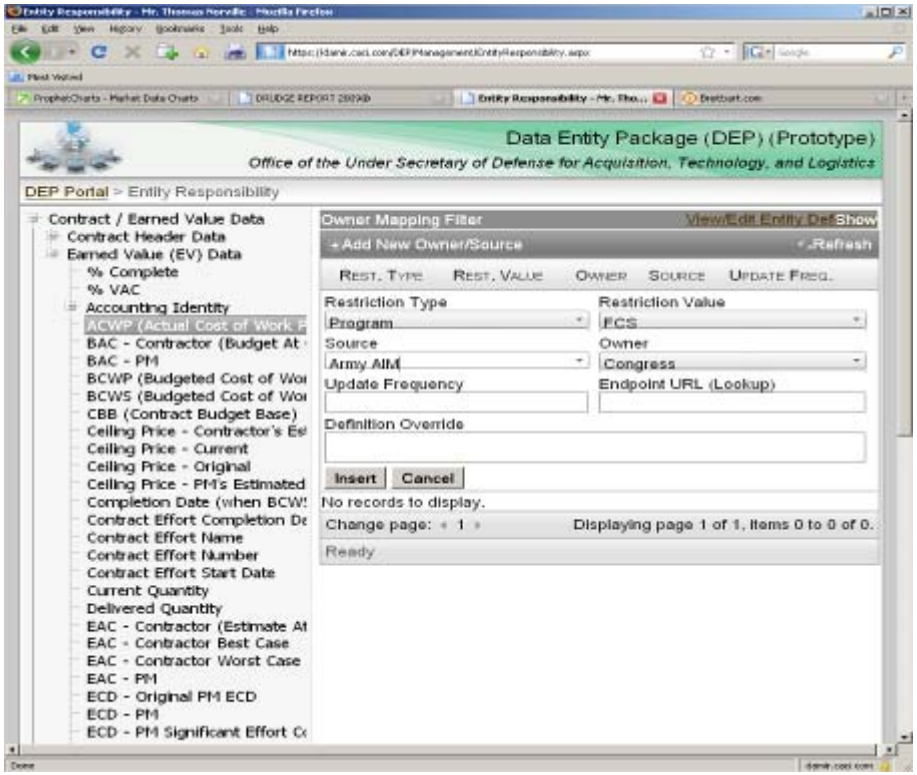
Milestone
Milestone Identifier
Milestone Name
Milestone Estimated Date
Milestone Date - Objective
Milestone Date - Threshold

Backup

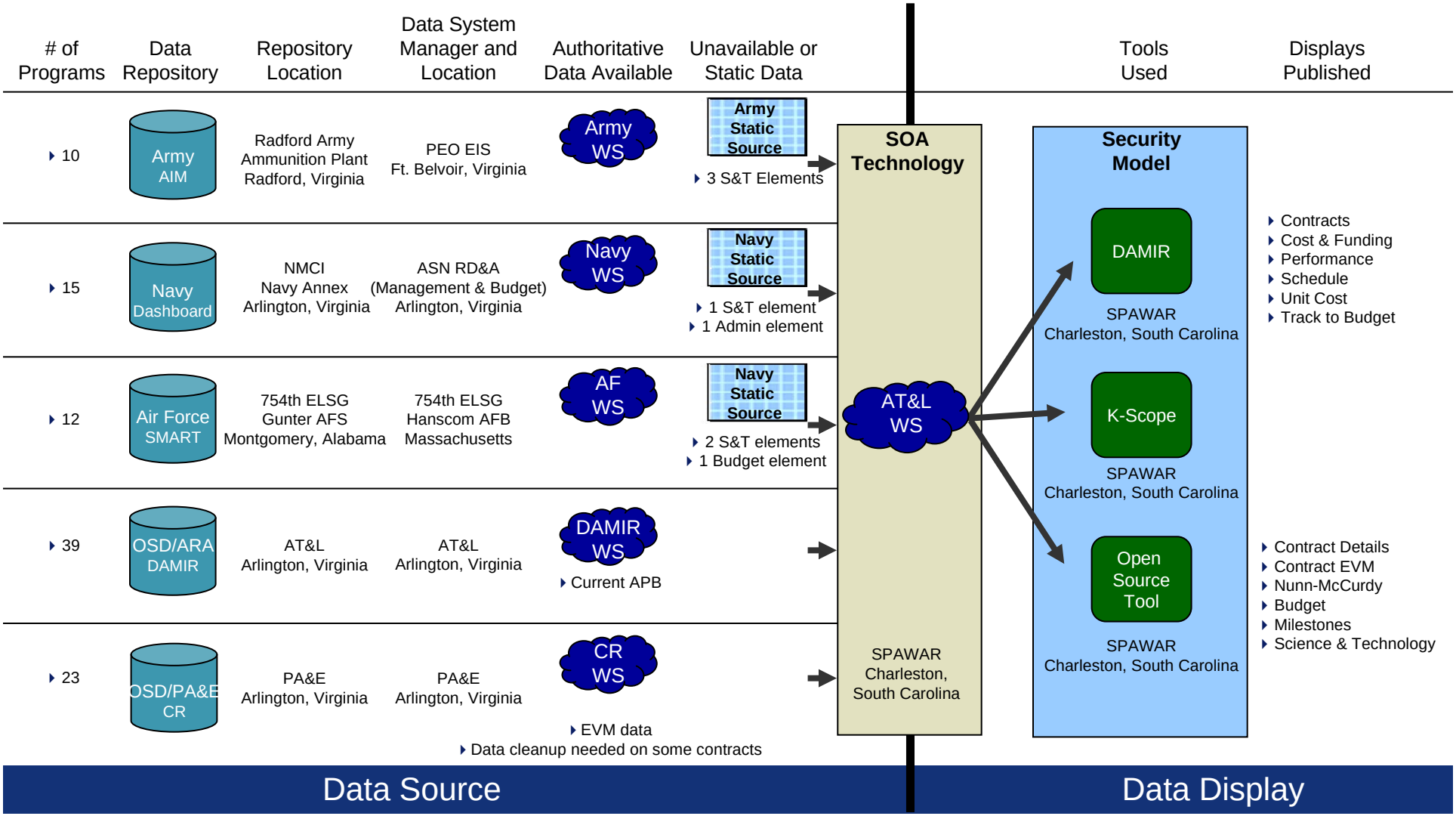
Defense Acquisition Data Governance: Enabling Acquisition Visibility

Data Entity Package

- Acquisition Technology & Logistics created an online tool, the Data Entity Package (DEP), for managing governance of Defense acquisition data
- For each element—by program—DEP specifies the data definition, authoritative source, individual responsible for maintaining the authoritative copy of that data element
- DEP is a 'contract' between players in the SOA environment
- Acquisition Technology & Logistics governance organization is the authority for establishing data priorities
- Having brought a new data element under governance, implementation requires technical integration to be included in the AV SOA



AT&L AV SOA Pilot Architecture



AT&L AV SOA Pilot – Army Programs

PNO#	SERVICE	TITLE	LONG TITLE
182	ARMY	LUH	Light Utility Helicopter
202	ARMY	AB3	Apache Block III
219	**ARMY**	**ATIRCM/CMWS**	**Advance Threat Infrared Countermeausres / Common Missile Warning System**
260	**ARMY**	**GMLRS**	**Guided Multiple Launch Rocket System**
278	**ARMY**	**CH-47F**	**Cargo Helicopter**
294	**ARMY**	**FBCB2**	**Force XXI Battle Command Brigade and Below Program**
299	ARMY	STRYKER	Armored Vehicle
301	**ARMY**	**FCS**	**Future Combat Systems**
341	**ARMY**	**BLACK HAWK UPGRADE (UH-60M)**	**Utility Helicopter Upgrade Program**
346	**ARMY**	**WIN-T INCREMENT 1**	**Warfighter Information Network**
347	ARMY	GCSS ARMY	Global Combat Support System Army
349	**ARMY**	**WIN-T INCREMENT 2**	**Warfighter Information Network - Tactical Increment 2**
350	**ARMY**	**WIN-T INCREMENT 3**	**Warfighter Information Network - Tactical Increment 3**
366	**ARMY**	**EXCALIBUR**	**Family of Precision, 155mm Projectiles**
367	ARMY	HIMARS	High Mobility Artillery Rocket System
372	ARMY	JLENS	Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System
420	ARMY	ER/MP UAS	Extended Range Multi-Purpose Unmanned Aircraft System
531	**ARMY**	**PATRIOT/MEADS CAP**	**Patriot/Medium Extended Air Defense System Combined Aggregate Program**
601	ARMY	BRADLEY UPGRADE	Bradley Fighting Vehicle System Upgrade
746	**ARMY**	**FMTV**	**Family of Medium Tactical Vehicles**
831	ARMY	LONGBOW APACHE	Airframe Modifications on the APACHE Helicopter

Bolded programs were included in Pilot Phase 1

AT&L AV SOA Pilot – Navy Programs

PNO#	SERVICE	TITLE	LONG TITLE
101	NAVY	H-1 UPGRADES (4BW/4BN)	United States Marine Corps Mid-Life Upgrade to AH-1W Attack Helicopter and UH-1N Utility Helicopter
161	**NAVY**	**CVN 68**	**NIMITZ CLASS Nuclear Powered Aircraft Carrier**
178	**NAVY**	**TRIDENT II MISSILE**	**Sea Launched Ballistic Missile**
180	NAVY	DDG 51	ARLEIGH BURKE CLASS Guided Missile Destroyer
191	NAVY	MH-60R	Multi-Mission Helicopter Upgrade
197	**NAVY**	**DDG 1000**	**ZUMWALT CLASS Destroyer**
212	**NAVY**	**V-22**	**OSPREY Joint Advanced Vertical Lift Aircraft**
223	**NAVY**	**CVN 78**	**GERALD R. FORD CLASS Nuclear Aircraft Carrier**
238	NAVY	JPALS	Joint Precision Approach and Landing System
247	NAVY	JHSV	Joint High Speed Vessel
253	NAVY	VTUAV	Vertical Takeoff and Land Tactical Unmanned Aerial Vehicle (Fire Scout)
282	NAVY	MH-60S	Multi-Mission Combat Support Helicopter
286	NAVY	RMS	Remote Minehunting System
289	NAVY	TACTICAL TOMAHAWK	Follow-on to TOMAHAWK Baseline missile program
290	NAVY	NMT	Advanced Extremely High Frequency Navy Multiband Terminal Satellite Program
333	NAVY	LHA 6 - AMERICA CLASS	Amphibious Assault Ship
334	**NAVY**	**P-8A**	**Poseidon Program**
345	**NAVY**	**MUOS**	**Mobile User Objective System**
353	NAVY	JOINT MRAP	Joint Mine Resistant Ambush Protected Vehicles
364	**NAVY**	**E-2D AHE**	**E-2D Advanced Hawkeye**
365	NAVY	COBRA JUDY REPLACEMENT	COBRA JUDY REPLACEMENT
368	NAVY	AGM-88E AARGM	AGM-88E Advanced Anti-Radiation Guided Missile (AARGM) Program
373	NAVY	BAMS UAS	Broad Area Maritime Surveillance Unmanned Aircraft System
374	NAVY	LCS	Littoral Combat Ship
378	**NAVY**	**EA-18G**	**Airborne Electronic Attack Variant of the F/A-18 Aircraft**

PNO#	SERVICE	TITLE	LONG TITLE
390	**NAVY**	**CH-53K**	**Heavy Lift Replacement Program**
391	**NAVY**	**SM-6**	**Standard Missile-6**
418	NAVY	IDECM	Integrated Defensive Electronic Countermeasures
419	NAVY	EA-6B ICAP III	EA-6B Improved Capability (ICAP) III Program
515	**NAVY**	**EFV**	**Expeditionary Fighting Vehicle**
516	**NAVY**	**SSN 774**	**VIRGINIA CLASS submarine**
542	NAVY	LPD 17	SAN ANTONIO CLASS Amphibious Transport Dock Ship
549	**NAVY**	**F/A-18E/F**	**SUPER HORNET Naval Strike Fighter**
581	NAVY	AIM-9X	Air-to-Air Missile Upgrade
582	NAVY	CEC	Cooperative Engagement Capability
592	NAVY	T-AKE	LEWIS AND CLARK Class of Auxiliary Dry Cargo Ships
766	NAVY	JSOW (BASELINE/UNITARY)	Joint Standoff Weapon Baseline Variant and Unitary Warhead Variant

Bolded programs were included in Pilot Phase 1

Red bolded programs are off the FY2009 MDAP List but being maintained in AVSOA

AT&L AV SOA Pilot – Air Force Programs

PNO#	SERVICE	TITLE	LONG TITLE
166	USAF	NAVSTAR GPS	Global Positioning System
176	**USAF**	**EELV**	**Evolved Expendable Launch Vehicle**
185	USAF	AMRAAM	Advanced Medium Range Air-to-Air Missile
199	USAF	FAB-T	Family of Beyond Line-of-Sight Terminals
200	USAF	C-17A	GLOBEMASTER III Advanced Cargo Aircraft Program
210	**USAF**	**SBIRS HIGH**	**Space-Based Infrared System Program, High Component**
220	USAF	C-130J	HERCULES Cargo Aircraft Program
224	**USAF**	**B-2 EHF INCREMENT I**	**B-2 Advanced Extremely High Frequency SatCom Capability**
237	USAF	GBS	Global Broadcast Service
239	**USAF**	**NPOESS**	**National Polar-Orbiting Operational Environmental Satellite System**
248	**USAF**	**Minuteman III PRP**	**Minuteman III Propulsion Replacement Program**
252	USAF	GLOBAL HAWK (RQ-4A/B)	GLOBAL HAWK (RQ-4A/B)
261	USAF	AEHF	Advanced Extremely High Frequency Satellite Program
265	**USAF**	**F-22**	**RAPTOR Advanced Tactical Fighter**
271	USAF	PREDATOR	Unmanned Aircraft System
273	USAF	C-5 AMP	C-5 Aircraft Avionics Modernization Program
277	USAF	AWACS UPGRADE	AWACS Upgrade
292	USAF	GPS-IIIA	Global Positioning Satellite III
293	USAF	MP RTIP	Multi-Platform Radar Technology Insertion Program
298	**USAF**	**C-130 AMP**	**C-130 Aircraft Avionics Modernization Program**
326	USAF	WGS	Wideband Global SATCOM Program
327	**USAF**	**C-5 RERP**	**C-5 Aircraft Reliability Enhancement and Re-engining Program**
328	USAF	SBSS B10	Space-Based Space Surveillance Block 10
354	USAF	SDB-I	Small Diameter Bomb Increment I

PNO#	SERVICE	TITLE	LONG TITLE
357	USAF	LAIRCM	Large Aircraft InfraRed CounterMeasures Program
375	USAF	ASIP	Airborne Signals Intelligence Payload Program
376	**USAF**	**B-2 RMP**	**B-2 Radar Modernization Program**
387	USAF	KC-X	Tanker Replacement Program
394	**USAF**	**MPS INCREMENTS I - III**	**Mission Planning System Increments I - III**
424	USAF	REAPER	Unmanned Aircraft System
503	**USAF**	**JDAM**	**Joint Direct Attack Munition**
537	USAF	NAS	National Airspace System
555	**USAF**	**JASSM**	**Joint Air-to-Surface Standoff Missile**
560	USAF	JPATS	Joint Primary Aircraft Training System

Bolded programs were included in Pilot Phase 1

Red bolded programs are off the FY2009 MDAP List but being maintained in AVSOA

AT&L AV SOA Pilot – Joint Programs

PNO#	SERVICE	TITLE	LONG TITLE
183	JOINT	JCA	Joint Cargo Aircraft
198	**JOINT-USAF**	**F-35 Lightning II**	**Joint Strike Fighter (JSF) Program**
243	JOINT	CHEM DEMIL-ACWA	Chemical Demilitarization Program - Assembled Chemical Weapons Alternatives
284	JOINT	JTRS NED	Joint Tactical Radio System Network Enterprise Domain
285	JOINT	CHEM DEMIL-CMA	Chemical Demilitarization Program - Chemical Materials Agency Program
360	JOINT	JTRS GMR	Joint Tactical Radio System Ground Mobile Radio
362	JOINT	BMDS	Ballistic Missile Defense System Program
380	JOINT	AMF JTRS	Joint Tactical Radio System Airborne & Maritime/Fixed Station
385	JOINT	JTRS HMS	Joint Tactical Radio System Handheld, Manpack, and Small Form Fit Radios
554	JOINT	MIDS	Multi-Functional Information Distribution System

Bolded programs were included in Pilot Phase 1