"LESS is, in fact, MORE!" – 60% Paper Reduction Using an Enterprise-Wide Process Framework

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General Dynamics Advanced Information Systems (GDAIS)

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Agenda

- GDAIS Overview
- Good News! Bad News!
- GDAIS Vision - Joint Strategic Solutions
- Answer - Enterprise Process Architecture
- Results Exceeded Expectations
- Documentation Reduction
- Maintenance Staff Reduction
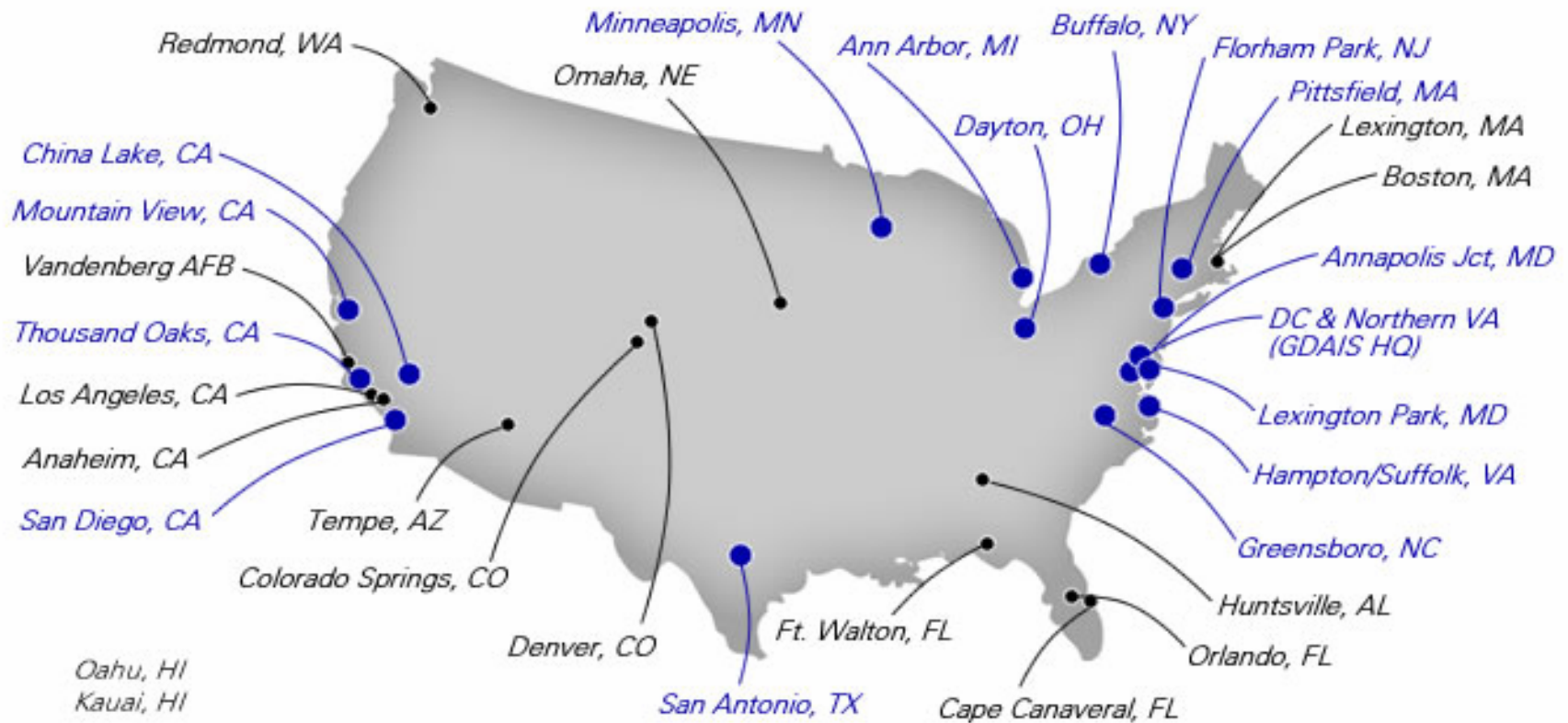- Success Proven Through Results

GDAIS Overview

- Vision: Leader in transformational C4ISR mission solutions
- Mission: Provide superior transformational systems & services for defense, intelligence & homeland security customers
- Employees: 10,000+ employees, 70% hold security clearances
- Locations: Headquartered in Arlington, VA with more than 100 major locations in the US & overseas
- Background:
  - ↗ Created January 2002
  - ↗ Doubled in size mainly through acquisitions in mid-2003
- But, two key challenges…
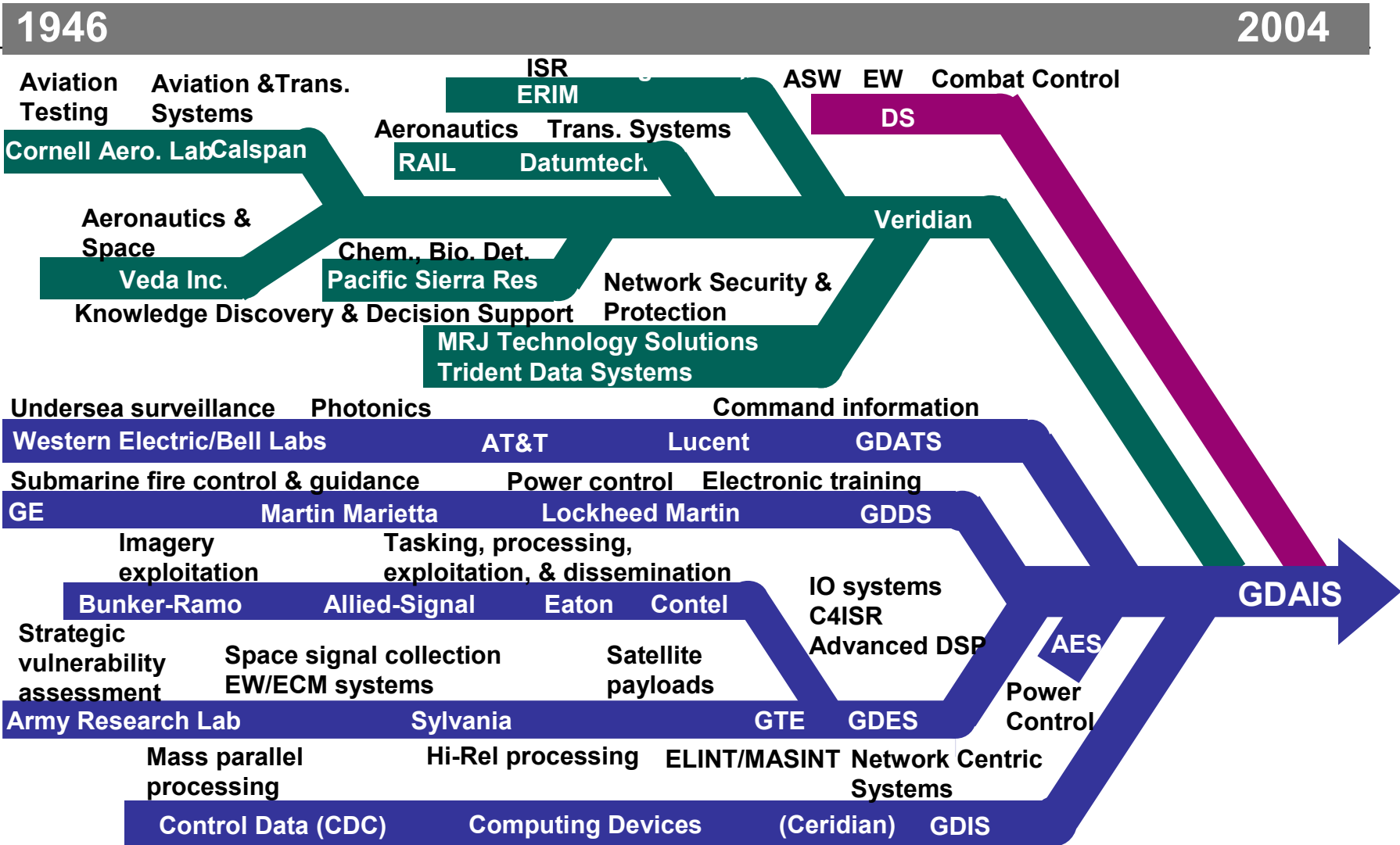 - ↗ …many sites
  - ↗ …many cultures

Challenge: Many GDAIS Sites (US)

Redmond, WA
Minneapolis, MN
Omaha, NE
Ann Arbor, MI
Buffalo, NY
Florham Park, NJ
Pittsfield, MA
Dayton, OH
Lexington, MA
Boston, MA
China Lake, CA
Mountain View, CA
Vandenberg AFB
Annapolis Jct, MD
Thousand Oaks, CA
DC & Northern VA (GDAIS HQ)
Los Angeles, CA
Lexington Park, MD
Anaheim, CA
Hampton/Suffolk, VA
San Diego, CA
Tempe, AZ
Greensboro, NC
Colorado Springs, CO
Huntsville, AL
Denver, CO
Ft. Walton, FL
Orlando, FL
Oahu, HI
Kauai, HI
San Antonio, TX
Cape Canaveral, FL

Blue City Names = 200+ Employees

GDAIS is a very geographically dispersed organization

Challenge: Many GDAIS Cultures

1946 — **2004**

ISR ASW EW Combat Control

Aviation Testing · Aviation &Trans. Systems

ERIM

Cornell Aero. Lab · Calspan

DS

Aeronautics · Trans. Systems

RAIL · Datumtech

Aeronautics & Space

Veridian

Veda Inc.

Chem., Bio. Det.

Pacific Sierra Res

Network Security & Protection

Knowledge Discovery & Decision Support

MRJ Technology Solutions
Trident Data Systems

Undersea surveillance · Photonics · Command information

Western Electric/Bell Labs · AT&T · Lucent · GDATS

Submarine fire control & guidance · Power control · Electronic training

GE · Martin Marietta · Lockheed Martin · GDDS

Imagery exploitation · Tasking, processing, exploitation, & dissemination

Bunker-Ramo · Allied-Signal · Eaton · Contel

IO systems
C4ISR
Advanced DSP

AES

Strategic vulnerability assessment · Space signal collection EW/ECM systems · Satellite payloads

Power Control

Army Research Lab · Sylvania · GTE · GDES

Mass parallel processing · Hi-Rel processing · ELINT/MASINT · Network Centric Systems

Control Data (CDC) · Computing Devices · (Ceridian) · GDIS

GDAIS

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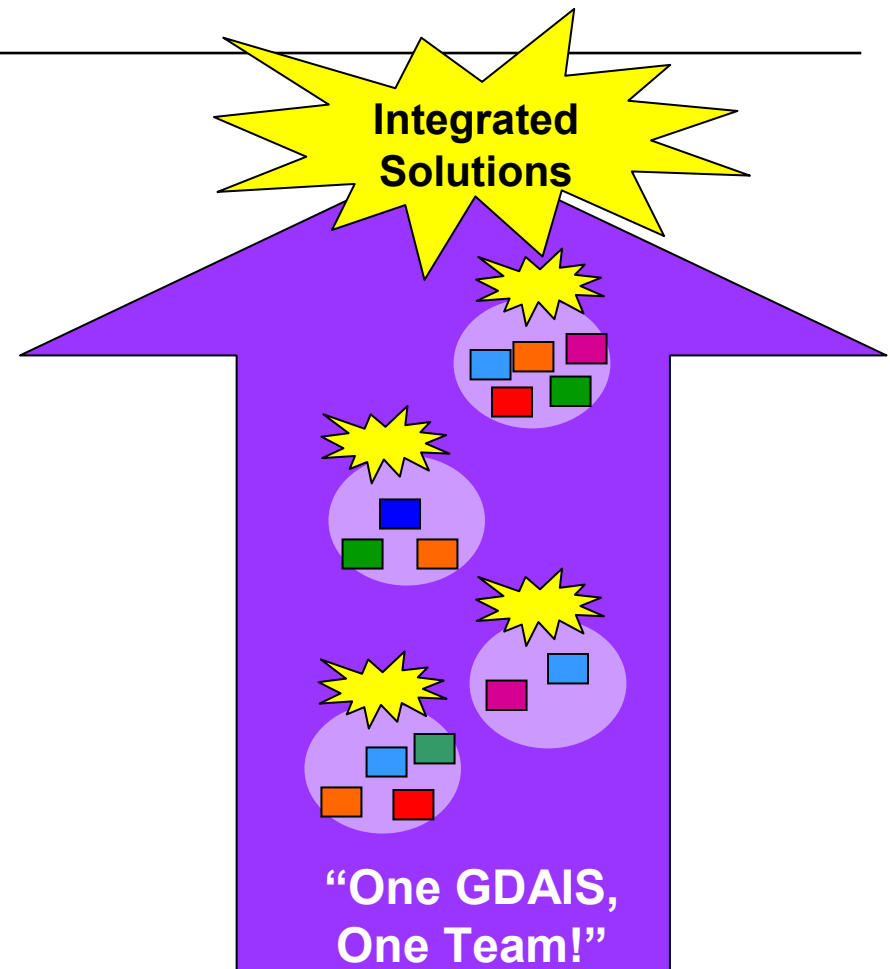
Good News! Bad News!

- Initial GDAIS creation Jan '02
  - ↗ Good News! All 4 companies were SEI CMM® L3 & ISO 9001 certified; all had plans to achieve CMMI® L3
  - ↗ Bad News! All 4 companies were SEI CMM® L3 & ISO 9001 certified; all had plans to achieve CMMI® L3
  - ↗ Each were mature; each had their own way of operating
- Doubling GDAIS through acquisitions mid-2003
  - ↗ Good News! Strategically added key services that complimented existing development base
  - ↗ Bad News! Few formal processes in service-based work
- Challenges never end ---
  - ↗ Compliance with external standards is important to our customers (e.g., ISO 9001, CMM®/ CMMI®, ISO 14001, etc.)
  - ↗ Continual improvement is critical to our success

GDAIS Vision - Joint Strategic Solutions

Mission Solutions

Senior Mgmt. Staff

C2S

SRS

IO

IS

DSR

Ver.
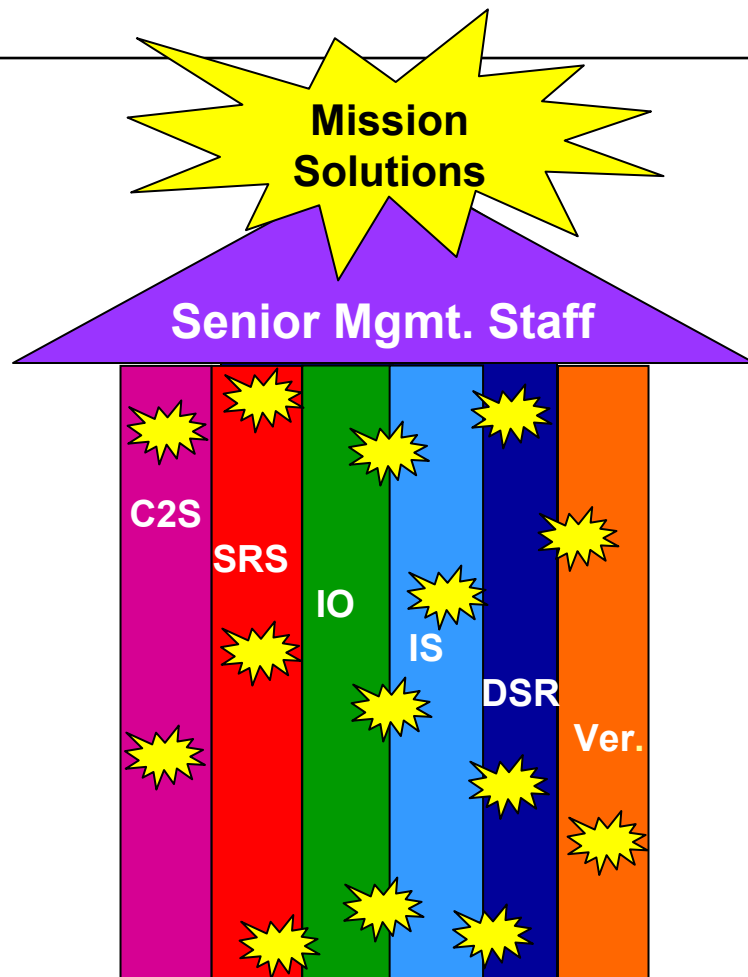
Legacy: Synchronized solutions
De-conflicted SBU operations

Integrated Solutions

"One GDAIS, One Team!"

GDAIS: Cohesively joint solution
Synchronized SBU operations

Answer: Enterprise Process Architecture (1)

- An integration team was formed - plans and schedules set to bring the legacy companies together
  - ↗ Key theme was "One Team, One GDAIS!"
  - ↗ Goal - Total is greater than the sum of its parts
  - ↗ 80% of all mergers & acquisitions fail to meet their intended goals; GDAIS was determined to succeed
- Clearly, the best choice was to have a single set of enterprise common processes that
  - ↗ Are compliant to all external standards applicable to our business model
  - ↗ Are easily and quickly enhanced to address emerging new standards and models
  - ↗ Would reduce the amount of process documentation and maintenance costs by 50%-60% while, at the same time, doubling the size of GDAIS
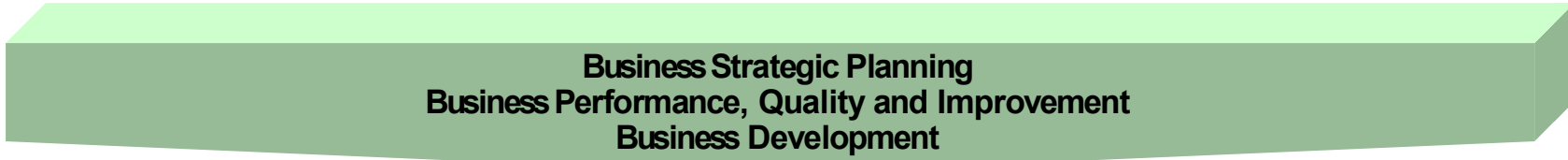
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Answer - Enterprise Process Architecture (2)

- Assessed & found the best practices across GDAIS
  - ↗ Baselined & capitalized on existing successes (e.g., CMM® L3 & ISO 9001)
  - ↗ Architected to ensure expandability/flexibility to comply with newer standards and models
  - ↗ Generated business model for "what next?"
    - CMMI® -SE/SW/IPPD/SS L3 initially, then L5
    - ISO 9001:1994 upgrade to ISO 9001:2000
    - ANSI/EIA-748 Earned Value Management Systems
    - AS9100 Aerospace Quality System
    - ISO 14001 Environmental Management System
    - OHSAS 18001 Health & Safety
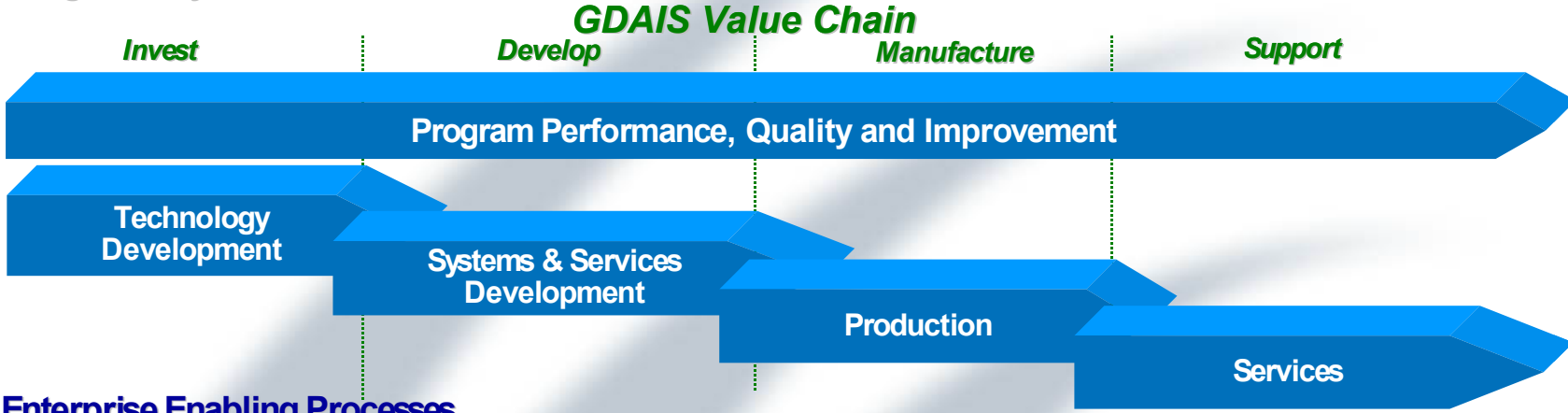   - Services-based product development

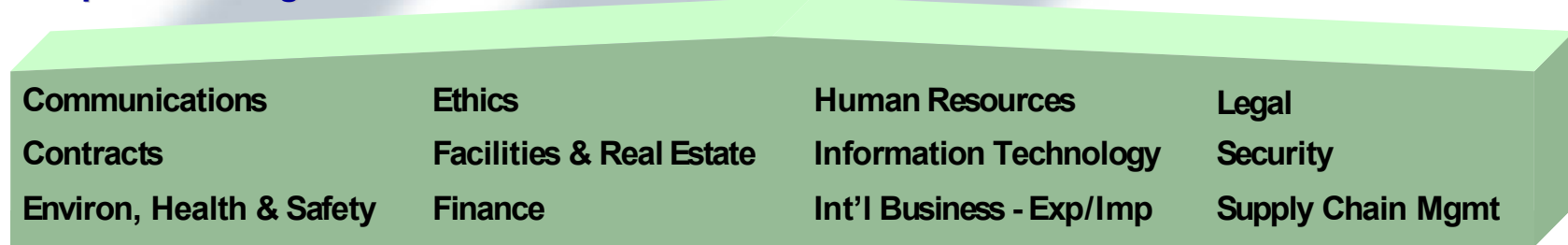# Answer: Enterprise Process Architecture (3) Enterprise Process Framework

Enterprise Business Processes

Business Strategic Planning
Business Performance, Quality and Improvement
Business Development

Integrated Systems & Services Realization Processes

GDAIS Value Chain

| *Invest* | *Develop* | *Manufacture* | *Support* |

Program Performance, Quality and Improvement

Technology Development

Systems & Services Development

Production

Services

Enterprise Enabling Processes

Communications	Ethics	Human Resources	Legal
Contracts	Facilities & Real Estate	Information Technology	Security
Environ, Health & Safety	Finance	Int'l Business - Exp/Imp	Supply Chain Mgmt

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Results Exceeded Expectations

- Goal - Reduce documentation by 50%-60%
  - ↗ Exceeded goal significantly, even with major expansion for CMMI®-SE/SW/IPPD/SS L3-L5 and other standards
  - ↗ It was determined that the most meaningful measure of "process documentation volume" was document counts; each policy, procedure, and instruction document was counted as a unit
- Goal - Reduce maintenance staff costs by 50%-60%
  - ↗ Exceeded goal, even while doubling the size of GDAIS in 2003
- This universal business language
  - ↗ Successfully unified GDAIS in 12 months (2002)
  - ↗ Quickly enhanced to address CMMI® L3-5 in 4 months (early 2003)
  - ↗ Facilitated, with minimal changes, the efficient integrations of DSR & Veridian in just 6 months (late 2003/early 2004)

Documentation Reduction: Cut by 84%!!!

Legacy Organization	Legacy PPI Counts		GDAIS	Phase #1 & #2 (12/12/02)	CMMI®(1) (11/26/03)(2)	DSR/Ver(3) (4/1/04)
DS	497		Policies	90	98	111
ATS	458		Procedures	256	280	299
IS + ES	558		Instructions	280	500	540
SRS	498		Total	626	878	950
DSR/Veridian	0(4)		% of Legacy			
Total	2,171		100%	28.8%	40.4%	43.8%
Headcount(5)			3,900	3,900	6,100	10,500
Doc/HC - %			0.56 – 100%	0.16 - 29%	0.14 – 25%	0.09 – 16%
Net Reduced				71%	75%	84%

NOTES:
1 – Includes CMMI® Levels 1-5 as well as other improvements between 12/12/02 and 11/26/03.
2 – CMMI® level 1-5 PPIs released 4/15/03; final doc. count not taken until completed first SCAMPI℠ Class A at MDS.
3 – Includes DSR & Veridian integration as well as other improvements between 11/26/03 and 4/1/04.
4 – Existing DSR & Veridian documentation was not common across their organizations prior to being acquired by GDAIS.
5 – Based on 2003/2004 Allocation spreadsheets from Finance.

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Maintenance Staff Reduction: Cut by 64%!!!

	Employees	Process Staff	Employees per Staff	Percent Improved
Pre-2002 GDAIS	3,900	35	111	---
2002 GDAIS	6,100	30	203	N/A*
2003-2004 DSR & Veridian Integration	10,600	34	312	281%

- 10,600/3,900 = 2.72 increase in staff ➔ Process Staff should have increased to 2.72 x 35 = 95.2; instead, Process Staff was reduced to 34 ➔ 34/95.2 = 36% of straight-line growth
  - ↗ Or, another way, the ratio of pre- versus post-integration (all six companies) Employees per Staff is 111/312 = 36%
- This represents a staff reduction of 64%

*Note – Retained higher Process Staff for DSR/Veridian Integration effort which delayed savings in reduced maintenance staff by one year

Success Proven Through Results (1)

- Success of the enterprise process architecture with expanded compliance to standards such as CMMI®-SE/SW/IPPD/SS can be demonstrated through:
  - ↗ Proven compliance on programs through audits and assessments
  - ↗ Improved productivity on programs
  - ↗ Enhanced customer satisfaction

Success Proven Through Results (2): Proven Compliance – Audits & Assessments*

Location	Orgn Scope	Bus.	Date	Standard	Std. Scope	Type
Pittsfield, MA	Site	MDS	Feb-03	SW-CMM V1.1	Level 5	CBA-IPI
Ann Arbor, MI	SS-SP/RF	SRS	Sep-03	SW-CMM V1.1	Level 3	CBA-IPI
Florham Park, NJ	Program	MDS	Nov-03	CMMI-SE/SW/IPPD/SS V1.1	Level 3	Class A
Pittsfield, MA	Site	MDS	Nov-03	CMMI-SE/SW/IPPD/SS V1.1	Level 5	Class A
Pittsfield, MA Greensboro, NC Florham Park, NJ	Site	MDS	Nov-03	CMMI-SE/SW/IPPD/SS V1.1	Level 3	Class A
Fairfax, VA	Site	DSR	Dec-03	SW-CMM V1.1	Level 3	SCE
Dayton, OH	Site	EDIS	Apr-04	AS9100	All	Registration
Bloomington, MN	MS	SRS	Jun-04	CMMI-SE/SW/IPPD/SS V1.1	Level 3	Class A
Annapolis Junction, MD Mountain View, CA Thousand Oaks, CA	SBU	IES	Jul-04	CMMI-SE/SW/IPPD/SS V1.1	Level 3	Class A
Pittsfield, MA	AIS	MDS	Aug-04	ANSI/EIA-748	All	Certification
Bloomington, MN	Site	SRS	Aug-04	ISO 14001/OHSAS 18001	All	Initial

*Does NOT reflect the 70+ ISO 9001:2000 Surveillance and Registration Audits conducted successfully during this same period of time.
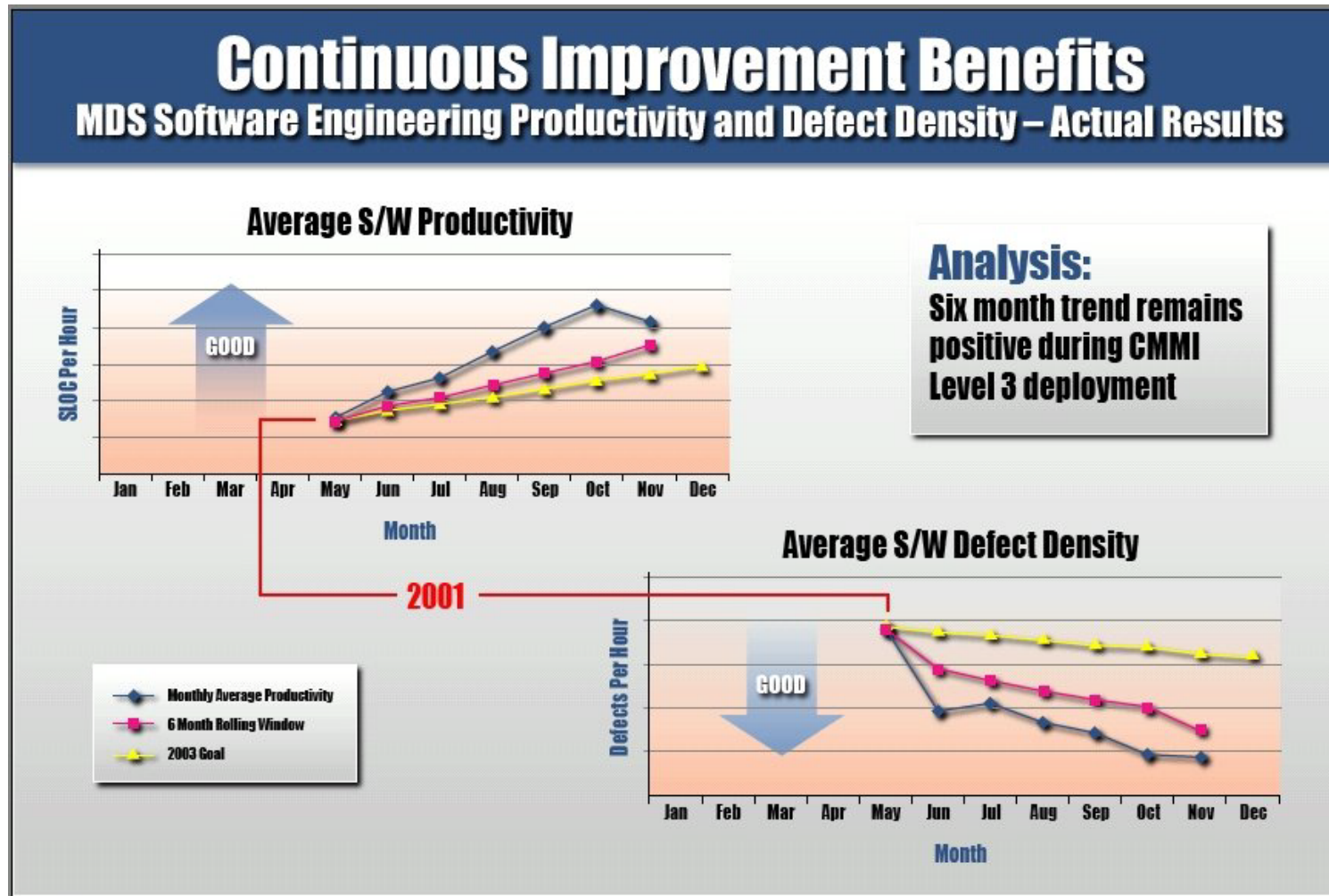
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Success Proven Through Results (3): MDS Productivity Gains/Defect Reductions

Continuous Improvement Benefits
MDS Software Engineering Productivity and Defect Density – Actual Results

Average S/W Productivity

GOOD

SLOC Per Hour

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month

Analysis:
Six month trend remains positive during CMMI Level 3 deployment

2001

Average S/W Defect Density

GOOD

Defects Per Hour

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month

Monthly Average Productivity
6 Month Rolling Window
2003 Goal

Success Proven Through Results (4): Enhanced Customer Satisfaction

From: (LCS Program Manager)
Sent: Friday, February 06, 2004 12:29 PM
To: (Communications)
Subject: RE: Need a quote from you....

The GDAIS LCS team is comprised of people from numerous physical locations and from varied business backgrounds. The GDAIS Common Processes gave us the tools to plan and execute the preliminary design phase of the LCS program in a very efficient manner. Our common understanding of the processes eliminated the communications issues that often arise when groups with different cultures work together as a team. The discipline of our team, operating at Level 5 CMMI, contributed heavily toward our outstanding performance during the preliminary design and is also reflected in the confidence of competitive bid for Flight 0 Final and Detailed Design and Construction.

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