Advancing Compliance Using Analytics in the Audit Function

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Agenda

- **Audit Data Analytics Strategy and Approach**
- **Developing Analytic Capabilities and Tools**
- **Case Studies:**
  - **International Operations Analytic Audits**
  - **Robotic Process Automation**
- **Lessons Learned and Keys to Success**

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Data Analytics Vision

- **Develop a standardized secure data and technology architecture**
- **Integrate Advanced Analytics into the Audit function**
  - Identify Key Performance Indicators (PKIs)
  - Self service dashboard reporting
  - On-going schedule compliance testing
- **Implementing an automated control and process testing in line with International Standards for the Professional Practice of Internal Auditing to ensure robust coverage of key business risk.**
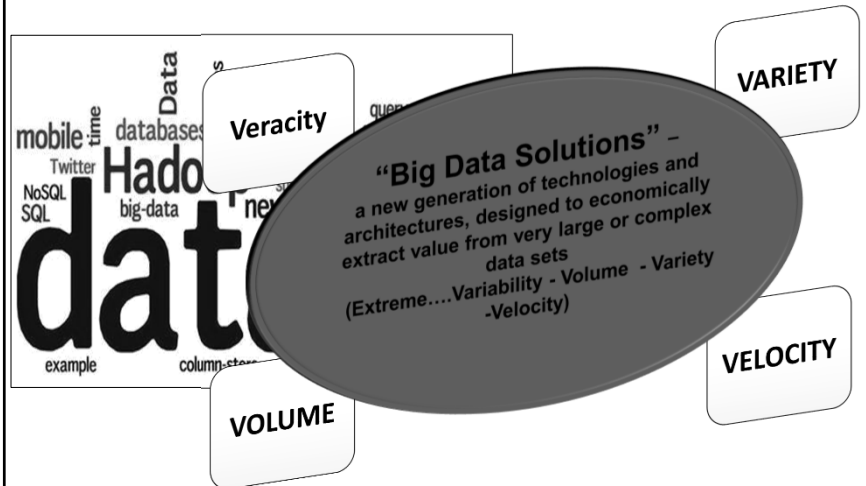
Increase the Strategic Value to the Corporation

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Data Analytic Strategic Tenants

- *Optimized Workforce:*
  - **Leveraging Business Intelligence analytic solutions to allow users access to the right data at the right time in the right format. Utilize employee skills to solve business challenges through innovation and collaboration.**
- *Risk Reduction and Compliance:*
  - **Implementing an automated control and process testing in line with International Standards for the Professional Practice of Internal Auditing to ensure robust coverage of key business risk.**
- *Agility:*
  - **Maintaining a flexible infrastructure and workforce model to quickly adapt to a dynamic business environment. Aggressively positioning technology and resources to support the business strategy.**

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What's New?

VARIETY

Veracity

"Big Data Solutions" –
a new generation of technologies and
architectures, designed to economically
extract value from very large or complex
data sets
(Extreme….Variability - Volume - Variety
-Velocity)

VELOCITY

VOLUME

Addressing the Analytics Gap

(Predictive)

Scale-Out

**Advanced
Data
Analytics**

Leverage for large-
scale analytics and
data mining

Modeling & Forecasting

Complexity

Integrate / Absorb

Extend

Business Intelligence &
Data Warehousing

Big Data & NoSQL

(Hadoop Ecosystem)

(Forensic)

(Low)

Data Volume

(High)

Big Data Workflow

Data Analytics Lifecycle

1 Discovery

2 Data Prep

3 Model Planning

4 Model Building

5 Communicate Results

6 Operationalize

Do I have enough information to draft an analytic plan and share for peer review?

Do I have enough good quality data to start building the model?

Do I have a good idea about the type of model to try? Can I refine the analytic plan?

Is the model robust enough? Have we failed for sure?

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Continuous Audit Roadmap

Ad hoc Audit Support	Operational Risk Assurance	Embedded Data Analysis	Predictive analysis	Continuous Assurance
Enhance the assurance and coverage of testing	Reduce testing time and increase audit coverage	Exception based auditing focused on underlying data of key processes	Identify business risk to inform business decisions	Continuously monitor critical areas
•**People** •Resources with basic scripting knowledge •**Technology** •Basic scripting tools	•**People** •Resources with basic scripting knowledge •Initial business process mapping •**Technology** •Basic scripting tools •Indirect access to data	•**People** •Resources with advanced scripting knowledge •SMEs for specific business processes •**Technology** •Basic scripting tools •Direct access to data •Analytic library •Exception reporting and dashboards	•**People** •Resources with advanced scripting knowledge •SMEs for specific business processes •Advances mathematics •**Technology** •Basic scripting tools •Direct access to data • Advanced Analytic toolkits •Exception reporting and dashboards •Data Warehouse	•**People** •Resources with advanced scripting knowledge •SMEs for specific business processes •**Technology** •Advanced analytic tools •Direct access to data •Advanced Analytic toolkits •Exception reporting and dashboards •Data Warehouse

Tactical results, strategic vision

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Staffing Strategy

- Dedicated Analytics Group
- Skills Strategy
  - Migrated to a Technical Staffing Approach
  - Audit Knowledge Still Useful
- Team Roles and Responsibilities
  - Operations, Developers, Data Scientists
- Internal Training
  - Traditional Audit Training
  - Supplemented with Analytics Specific Training
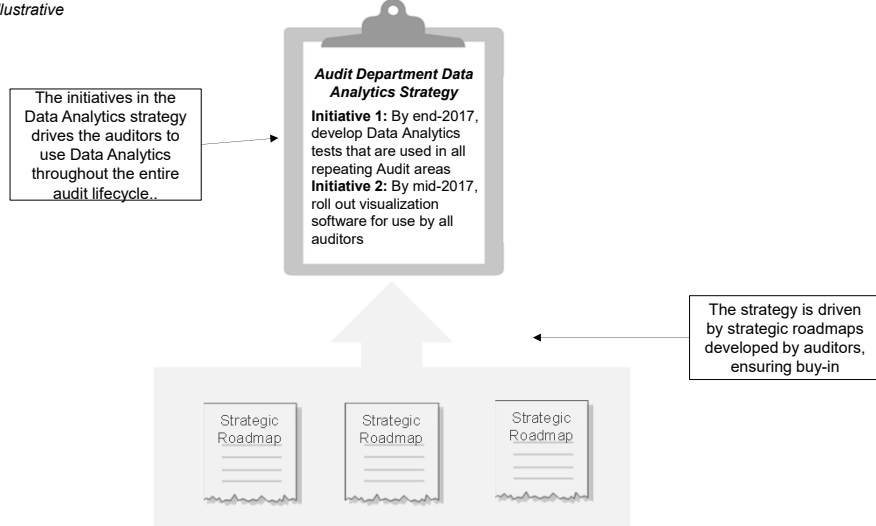- Remove Barriers to Access Systems / Data

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Infrastructure Process Maturity

- Document Concept of Operations and Roles and Responsibilities
- Robust tool strategy and inventory
  - Hardware Configuration Definition
  - Software and Licensing
- Solid processes and procedures
  - Data Standards
  - Data Protection Plans
  - Configuration Management and Quality Standards
  - Sustainment plans

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Bottom-Up Strategy Creation

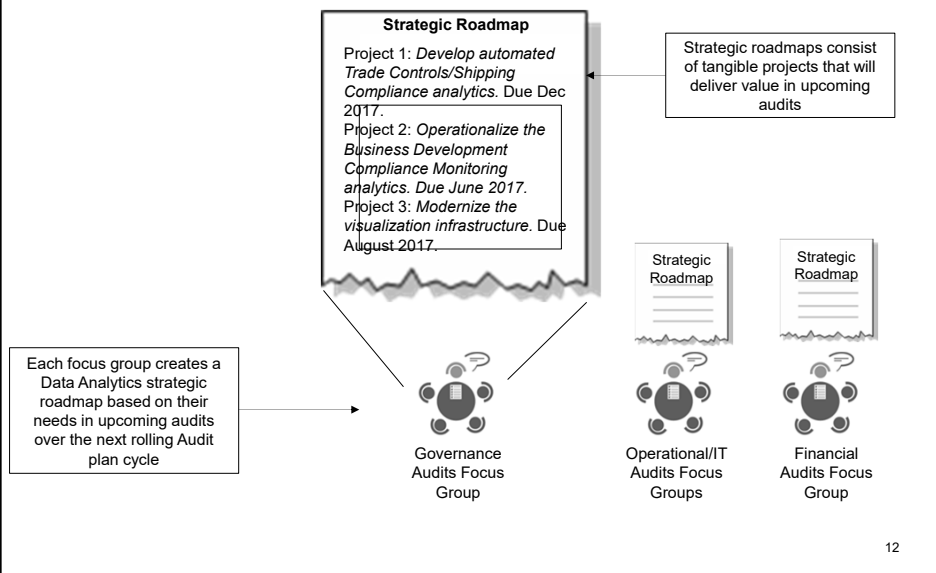Lockheed Martin's Audit department Data Analytics strategy
Illustrative

The initiatives in the Data Analytics strategy drives the auditors to use Data Analytics throughout the entire audit lifecycle..

Audit Department Data Analytics Strategy

Initiative 1: By end-2017, develop Data Analytics tests that are used in all repeating Audit areas
Initiative 2: By mid-2017, roll out visualization software for use by all auditors

The strategy is driven by strategic roadmaps developed by auditors, ensuring buy-in

Strategic Roadmap

Strategic Roadmap

Strategic Roadmap

Making Strategy Tangible

Lockheed Martin's Auditor Focus Groups Creating Strategic Roadmaps
Illustrative

Strategic Roadmap

Project 1: *Develop automated Trade Controls/Shipping Compliance analytics.* Due Dec 2017.
Project 2: *Operationalize the Business Development Compliance Monitoring analytics. Due June 2017.*
Project 3: *Modernize the visualization infrastructure.* Due August 2017.

Strategic roadmaps consist of tangible projects that will deliver value in upcoming audits

Strategic Roadmap

Strategic Roadmap

Each focus group creates a Data Analytics strategic roadmap based on their needs in upcoming audits over the next rolling Audit plan cycle

Governance Audits Focus Group

Operational/IT Audits Focus Groups

Financial Audits Focus Group

Results: Embedded Data Analytics

Impact of Co-Created Strategy
Illustrative

Number of Data Analytics requests

~12

~30
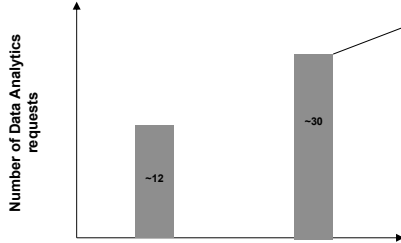
Lockheed Martin's Data Analytics team is receiving a higher volume of requests that are more focused on the needs of the audit teams.

"Today, Data Analytics is completely embedded in how the auditors work"
Garry Gaylord, Director, Corporate Internal Audit

Direct costs	• None
Time Investment	• Leadership time: Creation of Strategy: 1-2 days/year • Staff time: Focus groups time in creating roadmaps: 2 hours/month • Data analytics team of 8 full-time to build out the analytic projects identified.
Intangible Costs	• None
Estimated Time to implementation	• Setting up focus groups and organizing roadmap creation session takes a few months.
Payback Period	• After 3 months, first Data Analytics projects were completed and the audit staff was utilizing the new capabilities.

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International Operation Analytic Audits

Project and Results

Opportunity
Develop an automated approach for conducting the annual International Office Audits using data analytic techniques. The new approach will result in the following:
- Enhanced overall risk coverage
- Real-time reporting of risk areas
- Minimized travel associated with International Office audits

Solution
- Real-time analytic coverage for more than 20 Regional Field Offices
- Allows 100 percent coverage of international offices
- Quarterly analysis and reporting
- 10 objective areas are considered per audit
- Travel Dollars - Savings

Talent
- Internal Audit analytic developers

Technology
- Continuous Auditing
  - Tableau
  - SQL

Time
- 2 resources for data modeling, development, testing, and deployment.
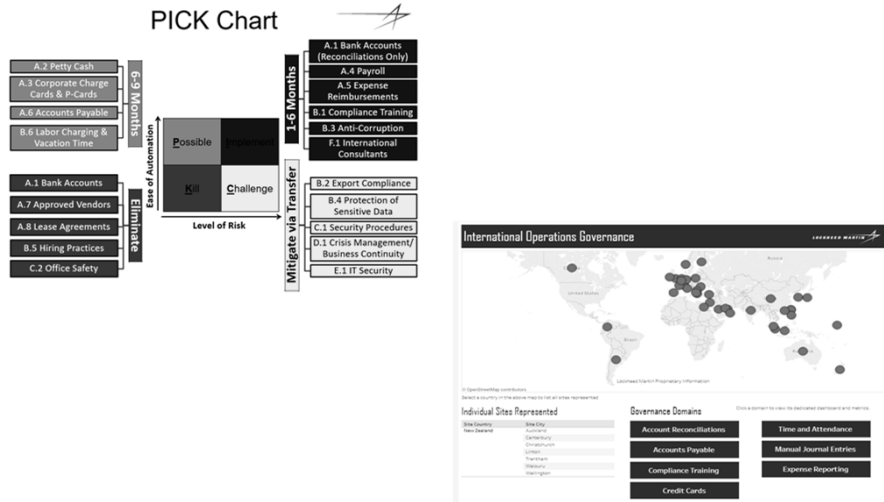
Process

Risk Drivers

Categories	Risk Drivers
A.1 Bank Accounts	Cash control; Number of bank accounts, Balance of cash accounts
A.2 Petty Cash	Balance of petty cash account
A.3 Corporate Charge Cards & P-Cards	Unauthorized use; Fraud; Number of travel cards / p-cards at field site
A.4 Payroll	Fraud; Use of external payroll providers
A.5 Expense Reimbursements	Travel policy compliance
A.6 Accounts Payable	Duplicate payments; PO-Invoice match
A.7 Approved Vendors	Vetting practices; competitive bids
A.8 Lease Agreements	Terms & Conditions; Approvals
B.1 Compliance Training	Policy Compliance; Productive & Informed Workforce
B.2 Export Compliance	Fines, penalties, loss of export privileges, or debarment from doing business with the U.S. Government

Risk Drivers Cont.

Categories	Risk Drivers
B.3 Anti-Corruption	Unlawful gifts, gratuities & business courtesies; Hospitality violations; Finance & accounting irregularities
B.4 Protection of Sensitive Data	Unauthorized disclosure of LM proprietary or 3rd party data; Violation of foreign data privacy laws
B.5 Hiring Practices	US and Foreign Labor Law compliance
B.6 Labor Charging & Vacation Time	US and Foreign Labor Law compliance; Mismanagement of Expats, LCNs & TCNs
C.1 Security Procedures	Harmful actions/attacks against LM employees
C.2 Office Safety	Dangerous working conditions; ESH violations
D.1 Crisis Management/ Business Continuity Plans	Business interruption; Employee safety
E.1 IT Security	Unauthorized access to information resources
F.1 International Consultants	FCPA violations; Reputational damage

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International Operation Analytic Audits

PICK Chart

International Operations Governance

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Robotic Process Automation

Project and Results

Problem
- Program audit team at the beginning of each project reviews and collects history of program performance (cost, schedule, quality). This is a manual task to search for, save, and create a summary of the program history.

Solution
- Opportunity to automate the program team's effort to summarize the program data by using robotic process automation.
- A requirement for Bot to access SharePoint and email.
- Final deliverable is a completed document emailed to requester.
- Bot enabled process completes in 5 minutes (manual process could take 1-2 hours)

Talent
- Internal Audit analytic developer trained in Blue Prism
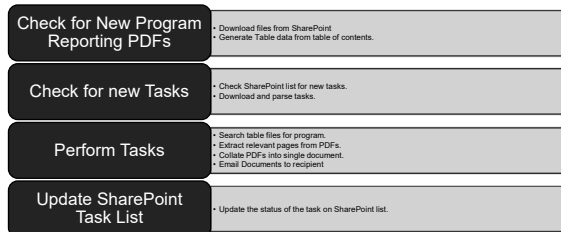- Blue Prism Infrastructure maintained by Enterprise IT

Technology
- Automation – Blue Prism

Time
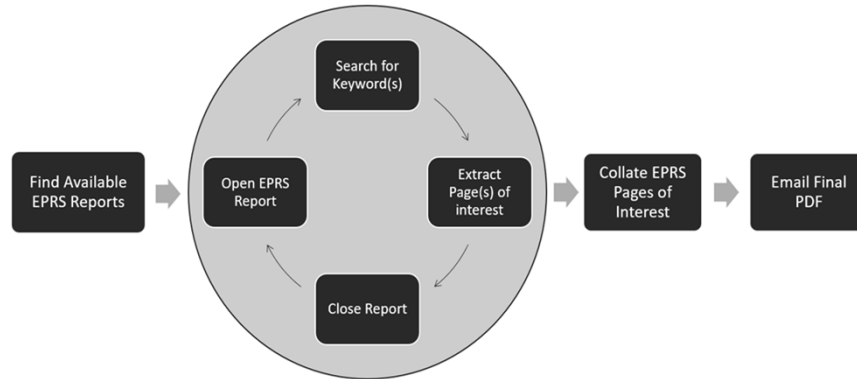- 1 resource for development, testing, and deployment.
  - ~ 400 hours

Process

Check for New Program Reporting PDFs	• Download files from SharePoint • Generate Table data from table of contents.
Check for new Tasks	• Check SharePoint list for new tasks. • Download and parse tasks.
Perform Tasks	• Search table files for program. • Extract relevant pages from PDFs. • Collate PDFs into single document. • Email Documents to recipient
Update SharePoint Task List	• Update the status of the task on SharePoint list.

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Robotic Process Automation

RPA WORKFLOW

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Best Practices and Lessons Learned

- **A solid infrastructure and foundation are key to managing a dynamic risk environment.**
  - **Diverse staffing profile**
    - **Technical – systems / software / database**
    - **Statistical – data modeling / statistical analysis**
  - **Solid training program**
  - **Mature tools and process**
- **Research and Testing**
- **Scalability (hardware, tools, storage)**
  - **Plan for evolving requirements & data growth**
- **Challenging to plan for future while living in the present.**

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