# Auditing Your GIS:
Evaluating Quality Management, Consistency, & Mitigating Risk

2016 EPUG
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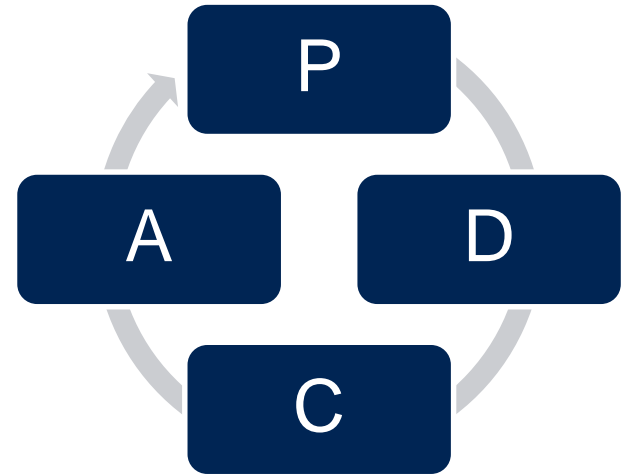
DCF
Subsea

# Overview

# Overview

- What is "Auditing your GIS"?

  - Development

  - Execution

  - Reporting

- Why should we audit?

- How can we identify & mitigate risk?

# Background

- Technical SME Only
  - BA, MS, GISP
  - Key Functions, Tasks, and Procedures

- DOF Subsea
  - ISO9001:2015 – Quality Management System

# What is a GIS Audit?

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Did the Analysis or Model produce a reliable and correct result?
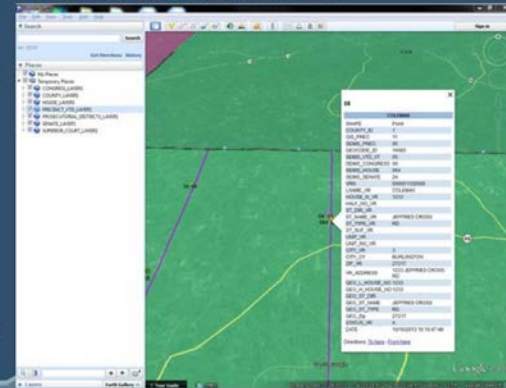
- Ex. Voter Districting given Legislative Requirements

*http://slideplayer.com/slide/7288223/*

# What is a GIS Audit?

Using GIS as a tool for accountability and transparency

- Ex. Ensuring proper flow of international aid using GIS

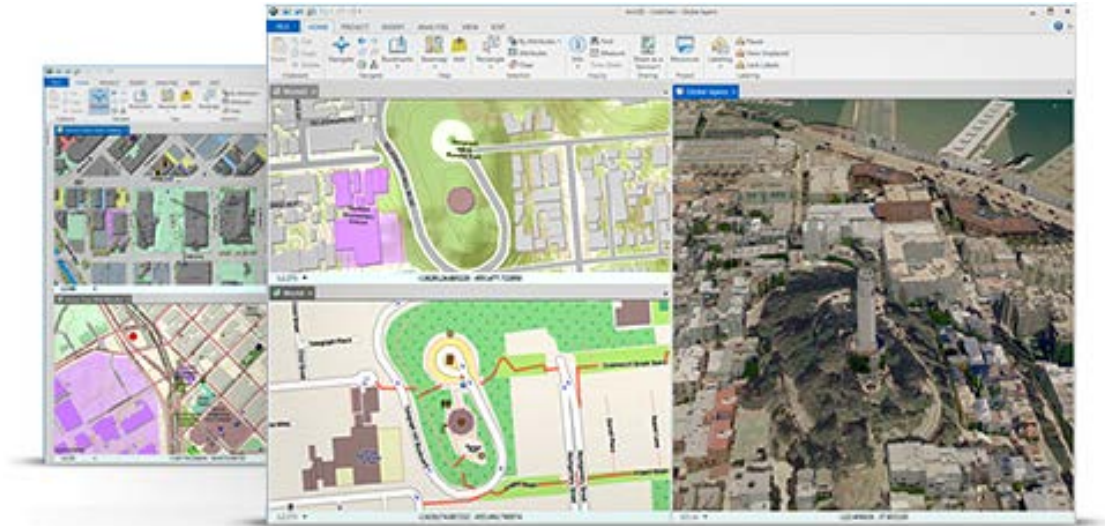*http://www.esri.com/news/arcnews/summer10articles/using-gis.html*
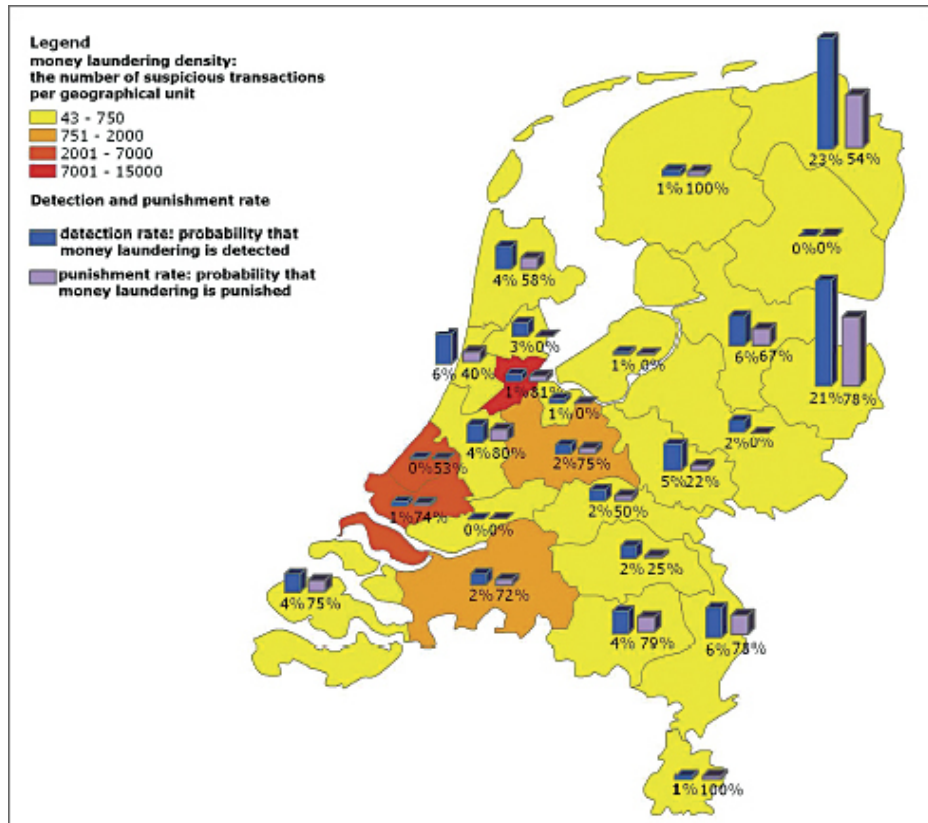
# What is a GIS Audit?

Is the data in your GIS fit for use or purpose?

- Are we collecting the data we need?

- Is the data and its use up to industry standard?



*http://www.esri.com/~/media/Images/Content/Software/arcgis/arcgisonline/graphics/whats-new-103/asset1*

# What needs to be audited?

- Data?
    - Against what standards?

- Procedures?
    - Quality Management System?

- Personnel?
    - What is the accepted GIS competency schema?

- **What are the contractual requirements?**

# Executing Your Audit

- ## Developing Technical Scope

*What is industry best practice?*

*vs.*

*What are the contractual requirements?*

Management of Third Party Contractor Data (Applicable for each Use/Area)
- a. Data Standards Documentation
  - i. Applicable Data Model Documentation
    1. ArcGIS Version
    2. Horizontal Datum Info
    3. Vertical Datum Info & +/- Convention
    4. Dataset Nomenclature Requirements
    5. Feature Class Overview
    6. Feature Data Dictionary
    7. Raster Data Standards
    8. Metadata Standards
  - ii. Applicable Data Model Template
  - iii. Data Retention Policy
- b. Data Transfer Protocols
  - i. Data Format & Transfer
  - ii. Data Security Minimums
  - iii. Chain of Custody
- c. Data Integration Procedures
  - i. Data QC & Acceptance
  - ii. Data Integration into Client architecture
    1. Integration of contractor GIS deliverables
    2. Storage Plan for Raw and Processed Data
       a. Geophysical
       b. Visual
    3. Cataloguing data
       a. Location
       b. Contractor
       c. Date
       d. Type
       e. Original media
       f. Backup location
- d. Data Export to Third Party
  - i. Written Procedure
    1. Contractor Data/Information Request Process
    2. QA/QC of Data to Contractors
    3. Security of transfer media
  - ii. Data Chain of Custody Tracking

# Executing Your Audit

- Conducting the Audit

Purpose: to verify requirements have been met and identify areas for improvement.

We don't want you to view this audit committee as being in any way confrontational…
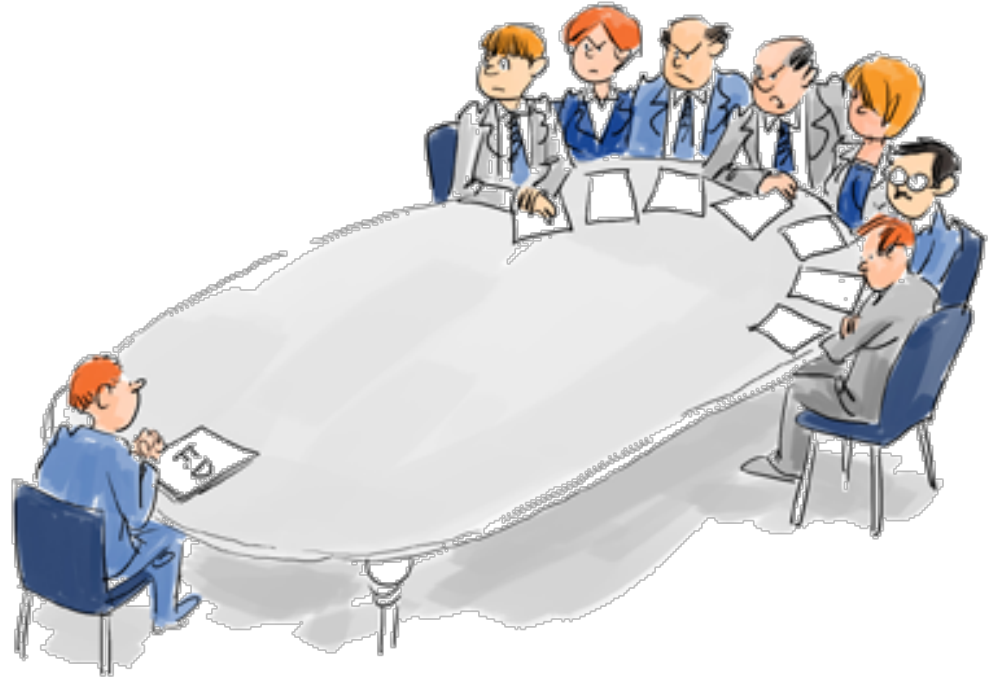


*http://orig06.deviantart.net/19b4/f/2015/011/4/1/t_ias_161_cartoon _audit_confronterend_by_cartoonartservices-d8dgxjd.png*

# Executing Your Audit

- Reporting

  - Examples of Industry Best Practice

  - Specific Contractual References

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**AUDIT - DESCRIPTION**

| Document No: Insert no. | Document Title: Insert no. | Version No: No. | Date: dd.mm.yyyy |
| Audit class: ☐ Internal ☐ Supplier (External) (Tick off) | Project No: Insert no. | Audit No: Insert no. |

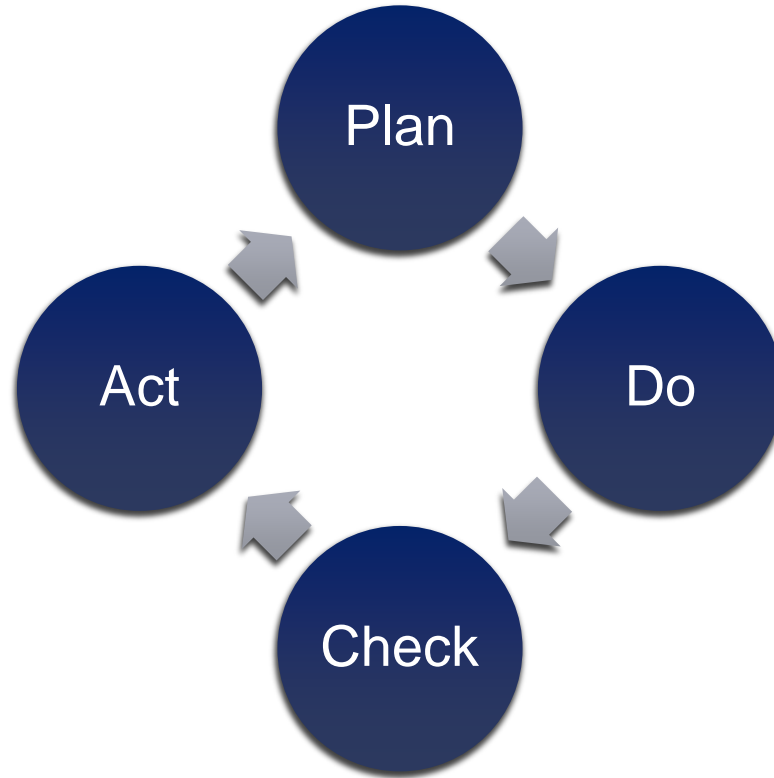| AUDIT ORGANISATION: Insert organisation | DATE(S) OF AUDIT: Insert date(s) |
| AUDIT LOCATION: Insert location (address) | REPRESENTATIVE OF AUDITED ORGANISATION: Insert name and position (title) |
| REFERENCE DOCUMENTS: Insert document no. and title | DISTRIBUTION: Insert name, position (title) and company |

**AUDIT CRITERIA:** (Tick off the criteria used)
- ☐ ISO 9001
- ☐ ISO 14001
- ☐ OHSAS 18001
- ☐ ISO 20000
- ☐ ISO 27002
- ☐ Laws and regulations
- ☐ Business Management System
- ☐ Purchase Orders
- ☐ Frame Agreements
- ☐ Client Contracts
- ☐ Financial Standards
- ☐ Best practice
- ☐ Other criteria: specify:

**AUDIT OBJECTIVE:** Insert description of audit objective

**AUDIT TEAM:**
- Insert audit team members (identify lead auditor)

**PARTICIPANTS:**
- Insert participants name and position (title)

**AUDIT – general impression**
➢ Insert key points of overall impression from audit

**AUDIT – RESULTS**

| No. of NCR's: | No. (No. Major / No. Minor) |
| No. of Observations: | No. |
| No. of Noteworthy efforts: | No. |

High 5 ☐ — MAIN FINDINGS (Main NCR's and Observations): ➢ Insert main findings
4 ☐
3 ☐ — POSITIVE INDICATORS (Main Noteworthy efforts): ➢ Insert main positive indicators
2 ☐
Low 1 ☐
Degree of control

**Legislation and Other Requirements - Compliance**
➢ Insert positive or non-compliance findings

**AUDIT – INSTRUCTIONS FOR CLOSURE**

| Deadline for feedback: | dd.mm.yyyy (See also attached findings list) |

Required feedback on non-conformities (Major / Minor):
➢ Corrective action and implementation plan to be presented.
Feedback on observations;
➢ Response requires comments or intention of follow-up. Area can be subject for next audit.

*Note: All NCRs and observations to be closed out in Docmap.*

# Why should we audit?

# Objective: Continuous Improvement

# GIS Risks?



**Production**
- Maintenance
- Repair
- Survey

**Development**
- FEED
- Installation
- As-Built

**Transmission**
- MAOP
- Taxation
- ILI Data

**Finance**
- Insurance
- Tax Liability
- Sales & Trading

**Exploration**
- Seismic
- Drilling
- Survey

**HSEQ**
- QA/QC
- Competency
- Training
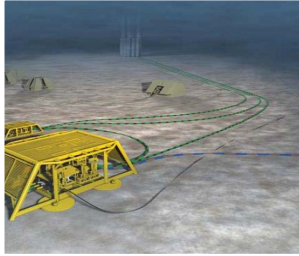
**Operations**
- Logistics
- Planning

# Propagating Risk


Geohazard


Engineering


Construction


Rework


Project Delays
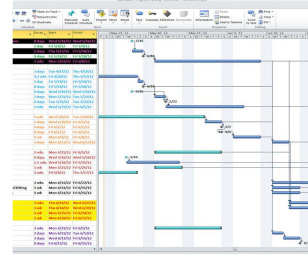
# How did we audit?

# What did we do?

- Technical / Industry "Best Practice" Audit

  - Pre-FEED

    - Pre-Engineering Survey Data

  - Technical Capacity Only

- Develop, Execute, & Report

  - Identify Areas for Improvement

  - Standards Recommendations

# What did we do?



Land of Make Believe

- Execution

  - Procedures & Processes

  - Review Data Management Plan

  - Determine Record & Archiving

- Results

  - Technical Audit Was Successful

    - Designed to Report on & Provide Constructive Feedback

  - Minor areas for Improvement
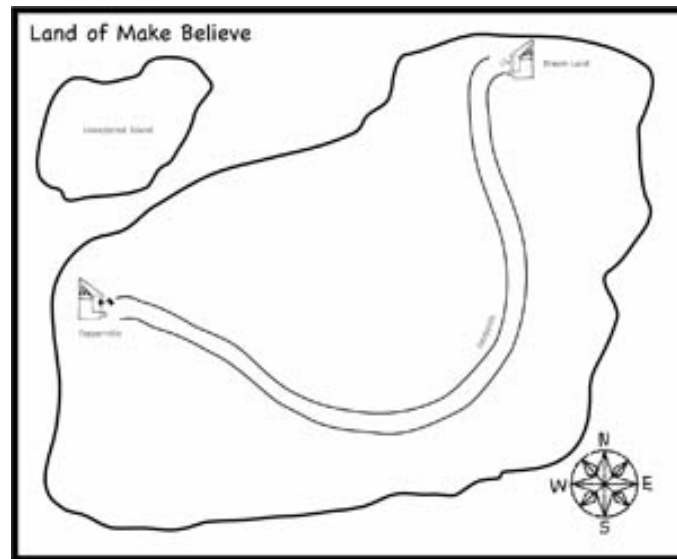
# Identifying Success & Mitigating Risk

# Identifying Success

- Client
  - ID'ed areas for improvement
  - Better defined expectations
  - Identify and Mitigate Risk
- GIS Dept
  - Improved processes
  - Better understand expectations to deliver
- Technical SME
  - Use internal Quality & Data Management standards
  - Lessons learned for our own group

# Why were we successful?



Review GIS Processes

Manage Risk from Data

Improve Quality Outputs
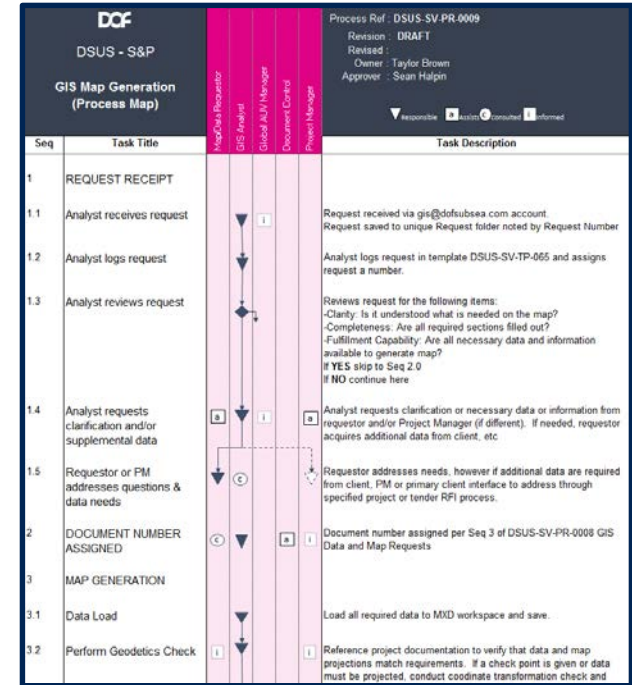
**Quality & Data Management System**

# Quality Data Management

- Benefits
  - Standardization
  - Risk Management
  - Data Continuity
  - Product Consistency

**Standards & Guidelines**

**Procedure / Process Map**

**Taskplan**

**Form, Checklist, Template**

# Managing (GIS) Risk



**Production**
- Maintenance
- Repair
- Survey

**Development**
- FEED
- Installation
- As-Built

**Exploration**
- Seismic
- Drilling
- Survey

**HSEQ**
- QA/QC
- Competency
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**Transmission**
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**Finance**
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# Acknowledgements

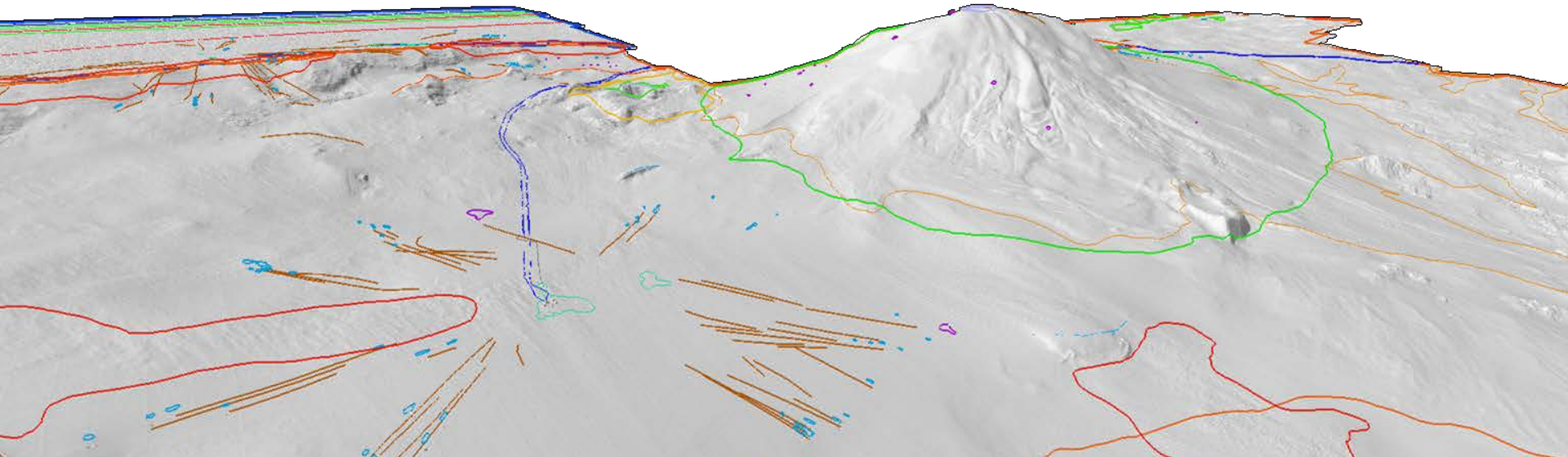# Acknowledgements

- DOF Subsea

  - Global AUV Group

  - HSEQ Department

- ESRI PUG

- IOGP SSDM Task Force

# Thank you!