Framework for Grant Oversight

INTERNATIONAL WORKSHOP ON ACCOUNTABILITY IN SCIENCE AND RESEARCH FUNDING
JUNE 18-20, 2012

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Assistant Inspector General for Audit
National Science Foundation
Overview

• Overview of Financial Assistance in the U.S.

• Framework for Grant Oversight

• Federal Grant Reform Initiatives
$550 billion in awards
- 88,000 awardees and 26 Federal grant making agencies
- Project and research, block, and formula

Outcomes are designed to promote public good

Challenges
- Limited visibility of how Federal funds are spent by awardees
- Support for funding requests much less than for contracts

- $840 billion of assistance to stimulate the economy
- Greater accountability and transparency over spending than ever

Opportunities to enhance oversight with less
- Automated oversight
# Grants Differ From Contracts

<table>
<thead>
<tr>
<th>GRANTS</th>
<th>CONTRACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promote services for the Public Good</td>
<td>Specified deliverables (Goods and Services)</td>
</tr>
<tr>
<td>• Merit review (competitive)</td>
<td>• Competitive bid process</td>
</tr>
<tr>
<td>• Multiple awardees</td>
<td>• One awardee</td>
</tr>
<tr>
<td>• Award budget</td>
<td>• Contract Price</td>
</tr>
<tr>
<td>• No government ownership</td>
<td>• Government ownership</td>
</tr>
<tr>
<td>• Grant payments</td>
<td>• Contract payments</td>
</tr>
<tr>
<td>• Summary drawdowns</td>
<td>• Itemized payment requests</td>
</tr>
<tr>
<td>• No invoices for claims</td>
<td>• Invoices to support claims</td>
</tr>
<tr>
<td>• Expenditures not easily visible</td>
<td>• Detailed costs</td>
</tr>
<tr>
<td>• Salary percentages</td>
<td>• Salary hourly rates</td>
</tr>
</tbody>
</table>
OMB Circular A-133 Single Audit Act

- Annual audits of grantees with expenditures of $500,000+
  - Compliance and financial testing
  - Internal controls evaluated
  - Sample of award costs tested
  - Institution arranges for CPA firm to conduct audit
- A-133 reports are submitted annually
  - Federal Audit Clearinghouse (electronic report)
  - NSF OIG uses report data for risk assessments
- Offices of Inspectors General (OIGs) have oversight of the CPA firm’s audit quality
- A-133 is primarily a management oversight tool
- 40,000 of 88,000 award institutions subject to A-133
Framework for Grant Oversight

- Data analytics-driven, risk-based methodology for improving oversight
  - Identify institutions that may not use Federal funds properly
  - Techniques to surface questionable expenditures

- Life cycle approach to oversight
  - Mapping of end-to-end process to identify controls
  - 100% review of key financial and program information
    - Statistical sampling is limited
  - Focus attention on award and expenditure anomalies

- Complements traditional oversight approaches
  - Techniques to review process and transactions are similar
  - Transactions for questionable activities are targeted
Audit Capacity to Award Universe

88,000 Recipients of Grant Funding

40,000 are Subject to A-133 Single Audit

200 OIG Audits

Framework for Grant Oversight focuses limited resources on highest risk activities
End to End Process for Grant Oversight

PRE-AWARD RISKS
- Funding Over Time
- Conflict of Interest
- False Statements
- False Certifications
- Duplicate Funding
- Inflated Budgets
- Candidate Suspended/Debarred

ACTIVE AWARD RISKS
- Unallowable, Unallocable, Unreasonable Costs
- Inadequate Documentation
- General Ledger Differs from Draw Amount
- Burn Rate
- No /Late/Inadequate Reports
- Sub-awards, Consultants, Contracts
- Duplicate Payments
- Excess Cash on Hand/Cost transfers
- Unreported Program Income

AWARD END RISKS
- No /Late Final Reports
- Cost Transfers
- Spend-out
- Financial Adjustments
- Unmet Cost Share

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Data Sources

- Internal
  - Proposals: budgets, panel scores
  - Agency award systems, recipient reporting

- External
  - Excluded Parties List System (EPLS)
  - Central Contractor Registration (CCR)
  - Dun and Bradstreet risk scores
  - Tax filings and public records
  - OMB A-133 Single Audit Act reports

- Recipient financial system records
  - General ledger and subsidiary ledger
  - Property
  - Travel and purchase card
Risk Assessment and Identification of Questionable Transactions

**Phase I**
Identify High Risk Institutions

- **Agency Award Data**
  - Award proposals
  - Quarterly expense reports
  - Cash draw downs

- **Data Analytics**
  - Continuous monitoring of grant awards and recipients

- **External Data**
  - A-133 audits (FAC)
  - D&B, Recovery Board
  - CCR, and EPLS

**Phase II**
Identify Questionable Expenditures

- **Agency Award Data**
  - Award proposals
  - Quarterly expense reports
  - Cash draw downs

- **Awardee Transaction Data**
  - General ledger
  - Subsidiary ledgers
  - Subaward data

- **Data Analytics**
  - Apply fraud indicators to GL data and compare to Agency data

- **External Data**
  - A-133 audits (FAC)
  - D&B, Recovery Board
  - CCR, and EPLS

Refer Questionable Transactions for Review

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Data Analytics Helps....

- Determine reliability data fields
  - Shape of the data (statistics)
  - Completeness of transactions and fields

- Show anomalies....
  - within a database
  - between databases
  - and changes in behavior over time

- Develop risk profiles for comparisons
  - Awardee profiles
  - Award-type profiles
  - Program profiles
**Identification of Higher Risk Institutions and Transactions**

### Agency Award Data (Grant Level)

<table>
<thead>
<tr>
<th>Institution ID</th>
<th>Award ID</th>
<th>Proposal Score</th>
<th>Award Amount</th>
<th>Grant Expiration Date</th>
<th>Expenses To Date</th>
<th>Grant Extensions</th>
<th>Risk Score</th>
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<tbody>
<tr>
<td>XXXX01</td>
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<td>51</td>
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<td>06/28/12</td>
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</table>

### Risk Flags (Grant Level)

- PI S&D Flag
- Burn Rate Flag
- Spend Out Flag
- Extension Request Flag
- Special Payment Flag

### Agency Institution Data (Summarized Award Data at Institution Level)

<table>
<thead>
<tr>
<th>Institution ID</th>
<th>Active Awards</th>
<th>Dollars</th>
<th>Number Of Draws</th>
<th>Special Payment Status</th>
<th>ELPS</th>
<th>D&amp;B</th>
<th>ROC</th>
<th>FAC</th>
<th>990</th>
<th>Risk Score</th>
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<tr>
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<td>15,120,963</td>
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<td>XXXX02</td>
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<td>34,361,394</td>
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<td>XXXX03</td>
<td>45</td>
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<td>Yes</td>
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<td></td>
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<td>5</td>
</tr>
</tbody>
</table>

### External Data (Institution Level)

### Risk Flags (Institution Level)

- Draw Spike Flag
- Spend Out Flag
- ELPS Match Flag
- FAC Findings Flag
- Special Payment Flag

### Institution’s General Ledger Data (Transaction Level)

<table>
<thead>
<tr>
<th>Award ID</th>
<th>Source Code</th>
<th>Award Expiration Date</th>
<th>Transaction Date</th>
<th>Dollars</th>
<th>Data Entry Staff Code</th>
<th>Comment Field</th>
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<tr>
<td>X11</td>
<td>PAY</td>
<td>12/31/11</td>
<td>2/15/11</td>
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<tr>
<td>X11</td>
<td>AP</td>
<td>12/31/11</td>
<td>9/13/11</td>
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<td>Equip</td>
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<tr>
<td>X11</td>
<td>AP</td>
<td>12/31/11</td>
<td>9/16/11</td>
<td>22,541</td>
<td>TRAV</td>
<td></td>
</tr>
</tbody>
</table>

### Risk Flags (General Ledger Transaction Level)

- Draw Spike Flag
- Burn Rate Flag
- Spend Out Flag
- Travel Expenses Flag
- Cost Transfer Flag

---

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AIGA. NSF-OIG
## Awardee Profile – Burn Rate

<table>
<thead>
<tr>
<th>Award</th>
<th>Amount ($K)</th>
<th>Expended ($K)</th>
<th>% Expend</th>
<th>Total Days</th>
<th>Days Active</th>
<th>% Total Days</th>
<th>Burn Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10,000</td>
<td>9,000</td>
<td>90%</td>
<td>1095</td>
<td>769</td>
<td>70%</td>
<td>+28%</td>
</tr>
<tr>
<td>2</td>
<td>5,000</td>
<td>4,000</td>
<td>80%</td>
<td>1095</td>
<td>524</td>
<td>48%</td>
<td>+67%</td>
</tr>
<tr>
<td>3</td>
<td>2,000</td>
<td>1,500</td>
<td>75%</td>
<td>1095</td>
<td>404</td>
<td>37%</td>
<td>+103%</td>
</tr>
<tr>
<td>4</td>
<td>1,000</td>
<td>995</td>
<td>99%</td>
<td>366</td>
<td>200</td>
<td>77%</td>
<td>+30</td>
</tr>
<tr>
<td>5</td>
<td>20,000</td>
<td>12,000</td>
<td>60%</td>
<td>1826</td>
<td>500</td>
<td>27%</td>
<td>+122%</td>
</tr>
<tr>
<td>6</td>
<td>10,000</td>
<td>7,000</td>
<td>50%</td>
<td>1826</td>
<td>1600</td>
<td>88%</td>
<td>-43%</td>
</tr>
</tbody>
</table>

| Awardee Totals | 48,000 | 34,495 | 72% | 7,303 | 3,997 | 47% | +53% |

- **Awardee Profile – Burn Rate**
- **Award Amount ($K)**
- **Expended ($K)**
- **% Expend**
- **Total Days**
- **Days Active**
- **% Total Days**
- **Burn Rate**

- Award 1:
  - Amount: $10,000
  - Expended: $9,000
  - Expenditure: 90%
  - Days: 1095
  - Days Active: 769
  - % Days Active: 70%
  - Burn Rate: +28%

- Award 2:
  - Amount: $5,000
  - Expended: $4,000
  - Expenditure: 80%
  - Days: 1095
  - Days Active: 524
  - % Days Active: 48%
  - Burn Rate: +67%

- Award 3:
  - Amount: $2,000
  - Expended: $1,500
  - Expenditure: 75%
  - Days: 1095
  - Days Active: 404
  - % Days Active: 37%
  - Burn Rate: +103%

- Award 4:
  - Amount: $1,000
  - Expended: $995
  - Expenditure: 99%
  - Days: 366
  - Days Active: 200
  - % Days Active: 77%
  - Burn Rate: +30%

- Award 5:
  - Amount: $20,000
  - Expended: $12,000
  - Expenditure: 60%
  - Days: 1826
  - Days Active: 500
  - % Days Active: 27%
  - Burn Rate: +122%

- Award 6:
  - Amount: $10,000
  - Expended: $7,000
  - Expenditure: 50%
  - Days: 1826
  - Days Active: 1600
  - % Days Active: 88%
  - Burn Rate: -43%

- **Awardee Totals**:
  - Total Amount: $48,000
  - Total Expended: $34,495
  - Average Expenditure: 72%
  - Total Days: 7,303
  - Total Days Active: 3,997
  - Average Days Active: 47%
  - Burn Rate: +53%
Awardee Burn Rate Profile Comparison
Normal drawdown pattern

Extinguishing Remaining Grant funds (before expiration)

(after expiration)

Start up costs

Drawdown Spike

Grant Award

Grant Expiration

Anomalous Grant Drawdown Pattern

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Example: Transfer of Payroll Charges 6 Months After the Grant Expired

<table>
<thead>
<tr>
<th>Expense SubCategory</th>
<th>Ledger Post Date</th>
<th>Expiration Date</th>
<th>No of Days</th>
<th>Financial Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYEE BENEFITS</td>
<td>3/4/2008</td>
<td>8/31/2007</td>
<td>186</td>
<td>11.21</td>
</tr>
<tr>
<td>EMPLOYEE BENEFITS</td>
<td>3/4/2008</td>
<td>8/31/2007</td>
<td>186</td>
<td>63.52</td>
</tr>
<tr>
<td>OVERHEAD</td>
<td>3/4/2008</td>
<td>8/31/2007</td>
<td>186</td>
<td>20,925.01</td>
</tr>
</tbody>
</table>

| Financial Amount    | 94,487.52        |

Resulted in $95k of Questioned Cost
### Example: Equipment Purchased at End of Award

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>DATE EQUIPMENT RECEIVED</th>
<th>LEDGER POST DATE</th>
<th>NSF AWARD EXPIRATION DATE</th>
<th>FINANCIAL AMOUNT</th>
<th>AMOUNT QUESTIONED</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-06-02</td>
<td>06/04/2010</td>
<td>08/11/2010</td>
<td>07/31/2010</td>
<td>$31,621.56</td>
<td>31,621.56</td>
<td></td>
</tr>
<tr>
<td>W-06-03</td>
<td>07/16/2009</td>
<td>09/10/2009</td>
<td>08/31/2009</td>
<td>$23,163.75</td>
<td>23,163.75</td>
<td></td>
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<tr>
<td>W-06-04</td>
<td>06/05/2009</td>
<td>07/08/2009</td>
<td>03/31/2010</td>
<td>$21,869.25</td>
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<tr>
<td>W-06-05</td>
<td>09/20/2010</td>
<td>11/05/2010</td>
<td>04/30/2011</td>
<td>$19,819.69</td>
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<tr>
<td>W-06-06</td>
<td>04/30/2009</td>
<td>06/05/2009</td>
<td>07/31/2009</td>
<td>$18,425.32</td>
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<td>-</td>
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<tr>
<td>W-06-07</td>
<td>02/18/2010</td>
<td>03/09/2010</td>
<td>07/31/2010</td>
<td>$18,117.75</td>
<td>18,117.75</td>
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</tr>
<tr>
<td>W-06-08</td>
<td>06/17/2009</td>
<td>08/12/2009</td>
<td>03/31/2010</td>
<td>$17,761.59</td>
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<tr>
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<td>03/17/2010</td>
<td>07/31/2010</td>
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<tr>
<td>W-06-11</td>
<td>06/22/2009</td>
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<td>07/31/2010</td>
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<td>W-06-12</td>
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<tr>
<td>W-06-13</td>
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<td>05/11/2009</td>
<td>12/31/2009</td>
<td>$11,152.67</td>
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<tr>
<td>W-06-14</td>
<td>01/20/2010</td>
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<td>02/28/2010</td>
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<td>10,260.27</td>
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<td>W-06-15</td>
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<td>06/30/2010</td>
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<tr>
<td>W-06-16</td>
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<td>W-06-18</td>
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<td>05/31/2010</td>
<td>$8,787.00</td>
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<td>09/26/2008</td>
<td>07/31/2008</td>
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<td>W-06-20</td>
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<td>06/05/2008</td>
<td>08/31/2008</td>
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<td></td>
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<td>$282,949.04</td>
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<td>54.0%</td>
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</table>
**Example: Unbudgeted Equipment Purchases**

<table>
<thead>
<tr>
<th>TRANS NUMBER</th>
<th>EXPENDITURE AMOUNT</th>
<th>QUESTIONED AMOUNT</th>
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<tbody>
<tr>
<td>W-09-01</td>
<td>48,393.75</td>
<td>48,393.75</td>
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<tr>
<td>W-09-02</td>
<td>32,312.14</td>
<td>31,212.14</td>
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<tr>
<td>W-09-03</td>
<td>23,163.75</td>
<td>23,163.75</td>
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<tr>
<td>W-09-04</td>
<td>22,383.75</td>
<td>22,383.75</td>
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<tr>
<td>W-09-05</td>
<td>20,550.00</td>
<td>20,550.00</td>
</tr>
<tr>
<td>W-09-06</td>
<td>19,653.60</td>
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<tr>
<td>W-09-07</td>
<td>19,039.43</td>
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<td>W-09-08</td>
<td>18,425.32</td>
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<td>W-09-09</td>
<td>17,297.00</td>
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</tr>
<tr>
<td>W-09-12</td>
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<td>11,290.05</td>
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<tr>
<td>W-09-13</td>
<td>10,138.50</td>
<td>10,138.50</td>
</tr>
<tr>
<td>W-09-14</td>
<td>9,954.64</td>
<td>9,954.64</td>
</tr>
<tr>
<td>W-09-15</td>
<td>9,227.44</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>286,307.61</strong></td>
<td><strong>225,924.90</strong></td>
</tr>
</tbody>
</table>

*NSF OIG does not endorse any commercial software*
<table>
<thead>
<tr>
<th>GRANT ID</th>
<th>OBJECT DESCRIPTION</th>
<th>GRANT EXPIRATION DATE</th>
<th>TRANSACTION DATE</th>
<th>LEDGER POST DATE</th>
<th>FINANCIAL AMOUNT</th>
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<tbody>
<tr>
<td>XXXXX42</td>
<td>CONSTRUCTION AND ACQUISITION</td>
<td>09/30/2009</td>
<td>09/30/2009</td>
<td>10/06/2009</td>
<td>51,851.22</td>
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<td>XXXXX27</td>
<td>INVENTORIAL EQUIPMENT</td>
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<td>06/04/2010</td>
<td>08/11/2010</td>
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<td>07/16/2009</td>
<td>09/10/2009</td>
<td>23,163.75</td>
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</tbody>
</table>

TOTAL 106,636.53

*NSF OIG does not endorse any commercial software*
Methods of Data Mining

• Supervised Modeling
  ▪ Predict patterns in data based on patterns of known information
  ▪ Decision Trees
  ▪ Neural Networks

• Unsupervised Modeling
  ▪ Identify anomalies or outliers based on grouping of like transactions
  ▪ Kohonen Networks
  ▪ K-Means Clusters
Determine Business Problem to Address

Identify Data To Solve Business Problem

Assess, Clean, and Transform Data

Look for Needles in the Haystack

Score Models and Select Models to Deploy

Create Data Mining Models
Building A Forensic Capability

- Develop Organizational Capability
  - All audit staff should have basic skill with data analysis tools
  - Forensic audit units perform more sophisticated analyses
  - Targeted audits are more efficient in time and cost

- Phased Development
  - Hardware and software
  - Access to internal and external data
  - Staff: system savvy, analytical, business process knowledge
  - Training, then immediate application to work

- Very important component is tone at the top
Government-wide Grant Reform

- Government-wide effort to streamline the guidance for financial assistance oversight
  - Cost compliance
  - Administrative principles
  - Audit monitoring and follow-up

- NSF OIG leading audit community work group
  - Reducing burden on awardees is good, but maintain accountability

- Key reforms (proposed)
  - Single Audit threshold and testing
  - Annual time and effort reporting
  - Flat rate for indirect costs
  - Audit firm rotation
  - Improvements to A-133 information system
Future Opportunities For Automated Oversight

- Electronic invoices and receipts

- Debit Cards
  - Funding agency can a transaction charges
  - OIGs can run analytics on the digital data

- Continuous Monitoring
  - Grantee performs
  - Agency performs
  - Government-wide efforts
Questions?

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