The Commonwealth of Massachusetts

Report

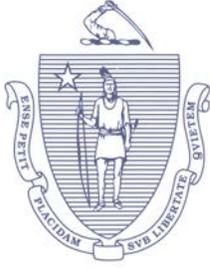of the

SENATE COMMITTEE ON
POST AUDIT AND OVERSIGHT

entitled

Massachusetts Information Technology Projects:
Looking Back, but Moving Forward

(under the provisions of Section 63 of Chapter 3
of the General Laws, as most recently amended by
Chapter 557 of the Acts of 1986)

April 17, 2014

The Commonwealth of Massachusetts

MASSACHUSETTS SENATE

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April 15, 2014

Mr. William F. Welch, Clerk of the Senate
State House, Room 335
Boston MA 02133

Dear Clerk Welch:

Pursuant to M.G.L. Chapter 3, Section 63, as most recently amended by Chapter 557 of the Acts of 1986, the Senate Committee on Post Audit and Oversight respectfully submits to the full Senate the following report: *Massachusetts Information Technology Projects: looking Back, but Moving Forward.*

This report is based on research by the Senate Committee on Post Audit and Oversight. The Committee held three public hearings on this issue and conducted interviews with a wide variety of stakeholders involved with procurement, development, and the implementation of information technology ("IT") projects recently undertaken by the Commonwealth of Massachusetts, as well as with industry experts.

The report presents findings and recommendations to improve the way the Commonwealth procures, develops, and implements large IT systems. It is our belief that if the Committee's findings and recommendations are followed for all major IT projects in Massachusetts, the citizens of the Commonwealth can expect fewer problems, better outcomes, and more-productive online interactions with their government in the future.

Respectfully filed by the Senate Committee on Post Audit and Oversight,

Senator Cynthia Stone Creem, Chair   Senator Gale D. Candaras

Senator Eileen M. Donoghue   Senator Benjamin B. Downing

Senator Michael O. Moore   Senator Robert L. Hedlund

Massachusetts Information Technology Projects:
Looking Back, but Moving Forward

**A Report of the
Senate Committee on Post Audit and Oversight**

April 2014

Massachusetts Senate
The Honorable Therese Murray
Senate President

Senator Cynthia Stone Creem, Chair
Senator Gale D. Candaras
Senator Eileen M. Donoghue
Senator Benjamin B. Downing
Senator Michael O. Moore
Senator Robert L. Hedlund

Senate Committee on Post Audit and Oversight

Senator Cynthia Stone Creem, Chair

It shall be the duty of the Senate Committee on Post Audit and Oversight (established under Section 63 of Chapter 3 of the General Laws) to oversee the development and implementation of legislative auditing programs conducted by the Legislative Post-Audit and Oversight Bureau with particular emphasis on performance auditing. The Committee shall have the power to summon witnesses, administer oaths, take testimony and compel the production of books, papers, documents and other evidence in connection with any authorized examination or review. If the Committee shall deem special studies or investigations to be necessary, they may direct their legislative auditors to undertake such studies or investigations.

Senate Post Audit and Oversight Bureau

EXECUTIVE SUMMARY

Key Findings and Recommendations

- On both the MASSTAX2 Project of the Department of Revenue ("DOR") and the QUEST Project of the Department of Unemployment Assistance ("DUA"), there was a failure by the vendor (in both cases Deloitte Consulting LLP) and the agency to communicate and work constructively together to move these information-technology (IT) projects forward on schedule and produce the optimal product. The Commonwealth's organizational structure for these IT projects was too decentralized to provide the comprehensive support, oversight and direction needed to ensure the success of the projects.

  ⇨ The Commonwealth's IT organizational structure should be reorganized, in order to enhance scrutiny, oversight, and consistency of IT development initiatives – including greater centralization of IT development oversight in the Information Technology Division ("ITD"), a larger role for the Operational Services Division ("OSD"), and a much stronger role for project managers working out of a new Project Management Department.

- Since most agencies take on major IT initiatives very infrequently, the Commonwealth does not have IT-development knowledge comparable to that of IT vendors.

  ⇨ ITD must act as a clearinghouse for information about previous IT projects, assisting agencies with due diligence, conducting exit interviews with all parties, retaining artifacts from each project so that later IT projects will not need to "reinvent the wheel," and formally documenting lessons learned, best practices, and other insights gained.

- The Commonwealth needs greater consistency in the procurement and contracting of IT projects.

  ⇨ Through a new IT Contract Management Unit, ITD must play a greater role in providing structure and guidance for IT projects by enforcing across-the-board adherence by agencies to ITD policies and procedures. Contracts must be reviewed to ensure the Commonwealth's interests are protected.

- DUA and DOR failed to do adequate and thoughtful planning before and during their IT initiatives.

  ⇨ Before undertaking a large-scale IT initiative, it is imperative for a government client to prepare a written "business case," fully documenting the reasons for the project, any perceived risks, and methods for mitigating them. Essential goals – and metrics to determine success in reaching those goals – must be well-defined from the start and kept in mind throughout the project.

- Problems arose in testing on the DUA and DOR projects that should have been anticipated. DUA, DOR, and Deloitte all failed to take sufficient care in planning and conducting the various forms of testing for the development of their projects.

    ⇨ Testing protocols must be prepared as early as possible and carefully designed. ITD should take an active role in formulating and reviewing testing protocols, and the Project Manager needs to have a guiding role as well.

- Project planning was inadequate on the DUA Quest Project. DUA and Deloitte did not:
    o properly prepare for "go-live" of UI Online on July 1, 2013, resulting in many problems for claimants;
    o fully recognize, in advance of the go-live of UI Online, the types of problems that claimants would encounter in attempting to use the new system; or
    o correctly anticipate the demands that would be put on its website and phone lines after the UI Online go-live, nor the large number of claimants who encountered difficulties filing for benefits online or who failed to receive expected benefits in a timely manner.

    ⇨ Agencies must improve their planning for go-live of new IT systems, especially those designed to be used by persons outside of the agencies, such as consumers or businesses. They also need to prepare better for dealing with practically-inevitable user and staff challenges and increased usage, deploying additional staff and other resources and establishing back-up plans and workarounds.

- The Committee did not see evidence that some agency leaders on the DUA and DOR projects remained apprised of their projects' key goals.

    ⇨ Conducting a robust return-on-investment (ROI) analysis at various stages throughout development and creating a clearly-defined set of measurable goals at the outset of a project will each assist leadership in determining whether termination of a contract is in the Commonwealth's interest.

- Smaller, shorter projects would be less likely to fail, more likely to attract more bidders, and more flexible and better able to react to newly-imposed statutory and regulatory changes, problems with the vendor, changes in agency leadership and other staff turnover, and other unforeseen circumstances.

    ⇨ Large IT projects should be broken down to smaller-scale projects. Unless there are compelling reasons for doing otherwise, the Commonwealth should divide traditionally-large IT projects into smaller-scale functional projects.

- The current procurement system unnecessarily narrows the field of IT project bidders acceptable to the Commonwealth, meaning the Commonwealth may pay more for a project, and may be presented with less-optimal solutions, than if there had been more competition.

⇨ More vendors should be encouraged to bid on the Commonwealth's IT projects, by measures such as simplified proposal requirements.

- The Executive Office of Labor & Workforce Development ("EOLWD") hired an employee of its vendor on the ongoing DUA QUEST Project for a leadership role at DUA, giving rise to a perception of conflict of interest.

    ⇨ ITD should develop protocols regarding the hiring of vendor employees for management positions in which they may be required to directly oversee the work of that same vendor, especially on the same project.

INTRODUCTION

This report presents case studies of three information technology ("IT") projects recently undertaken by the Commonwealth of Massachusetts: the MASSTAX2 Project of the Department of Revenue ("DOR") the QUEST Project of the Department of Unemployment Assistance ("DUA"), and the recently-begun Modernization Project of the Registry of Motor Vehicles ("RMV"). Acting on behalf of the Senate Post Audit and Oversight Committee, the Senate Post-Audit and Oversight Bureau ("Post-Audit Bureau") has examined these three projects in depth. This examination sought to discover what led to the difficulties experienced with the QUEST and MASSTAX2 projects, as well as what efforts the RMV is taking to avoid such difficulties in conducting its own IT initiative and ideas about how to do better in the future.

As part of this examination, the Committee held three public hearings, on October 28, 2013; November 14, 2013; and February 11, 2014.[1] The Committee also delivered information requests to Deloitte Consulting LLP ("Deloitte"), the vendor for these projects, and several state agencies. In addition, Committee staff met with numerous individuals and agency representatives who were involved in the development, implementation, or use of these IT projects, as well as industry experts. The Committee and Post-Audit Bureau staff also reviewed news reports and other accounts of other IT projects – successful and unsuccessful – as well as literature on the causes of IT project failure.
This report is based on the Committee's findings from the information, testimony, and interviews developed during its examination.

THREE CASE STUDIES

1. DUA QUEST PROJECT

In 2006, DUA began an initiative to replace its computer system and change its business processes.[2] On June 21, 2006, DUA issued a request for quote ("RFQ") for what DUA named the "QUEST Project." Only three vendors submitted bids in response to the RFQ: BearingPoint, Deloitte Consulting LLP, and IBM. The selection committee determined that BearingPoint was the only vendor to meet their scoring requirements.[3]

In May 2007, BearingPoint and DUA executed a Statement of Work ("QUEST SOW") containing the fundamental terms of their agreement.[4] In February 2009, however, BearingPoint filed for bankruptcy protection.[5] Shortly thereafter, Deloitte announced that it had agreed to purchase BearingPoint's North American public-services unit, and in May 2009 Deloitte took over the QUEST Project, assuring DUA that it would keep the same key people on the project.[6]

The revenue (employer) side of the DUA website was rolled out in December 2009, with some problems that were addressed fairly quickly. The benefits (claimant) side of the project, called "UI Online," was originally supposed to be completed by April 2011, but had

to be postponed several times due to problems with design and implementation. Ultimately, after DUA insisted on a contract amendment providing for $10,000 in liquidated damages for each day the benefits side was overdue, past July 1, 2013,[7] it was declared completed, and UI Online went live on that date.

Claimants have had problems with many aspects of the new system,[8] resulting in their being denied benefits, in their benefits being held up for weeks, if not months, and in claimant confusion – all of which have heightened the stress of an already difficult situation for the unemployed. UI Online is currently offered only in English. Lack of Internet access or computer proficiency has also made the system difficult for some claimants. UI Online also seems geared to people with broadband Internet access, which is less common in the western parts of the state and among lower-income residents. In addition, many people who tried to reach DUA shortly after go-live had excessively-long waits, an average of *over an hour* in July 2013, according to DUA.[9] Some claimants have also received notices informing them that they owe DUA for overpaid benefits, sometimes in extremely large amounts. Some claimants received multiple daily notices of their overpayment status and/or were warned that their income tax refunds would be intercepted to recoup the alleged overpayments.[10]

DUA claims that, "at the time of the [UI Online] launch, there were roughly 100-300 claimants that were impacted by data conversion [problems] on a weekly basis,"[11] which they imply is a small number in comparison to the over-100,000 people filing for benefits weekly.[12] But if we assume that these 100 to 300 claimants were all first-time users of the website, then – based on Post-Audit Bureau staff's estimates that no more than 3,000 initial claims were filed through UI Online each week – the actual proportion of claimants affected by data-conversion issues alone may have been as high as 10%.

Many of these problems may be due to defects in the QUEST system discovered before and after go-live. According to a spreadsheet produced to the Committee by Deloitte, there remained, as of March 6, 2014, approximately 100 fixes to UI Online that were yet to be resolved by Deloitte, from among the 214 found by DUA prior to the October 31, 2013, contractual deadline for seeking changes at no additional cost to the Commonwealth.[13] The Committee also saw documents reflecting serious concerns at DUA about the project's progress and Deloitte's lack of cooperation with DUA personnel.[14]

2. DOR MASSTAX2 PROJECT

In 2004, DOR started considering development of an integrated tax system to be known as MASSTAX2. DOR's vision for MASSTAX2 was a system that would integrate the full scope of tax administration functions, while remaining scalable to meet increased demand for services, and flexible to remain efficient while implementing new technologies into the system.[15]

On February 20, 2009, DOR issued an RFR (request for response) for the new tax system. Two bidders were disqualified due to problems with their responses.[16] These

disqualifications left as finalists only Accenture and Deloitte, which had proposed a COTS (commercial off-the-shelf) approach using software by SAP.

Toward the end of the evaluation process, the project's Selection Committee undertook a Best and Final Offer ("BAFO") round. Deloitte's BAFO represented a reduction of *more than 20%* from its original bid and more than 20% below Accenture's final bid.[17] Prior to the BAFO, Accenture had held a scoring advantage over Deloitte.[18] After the BAFO, however, Deloitte held the scoring advantage because its slashed bid had improved its score significantly.[19]

Although Deloitte was deemed the apparent successful bidder, the recommendation report cautioned that Deloitte's responses to the architectural requirements, which were expected to have the greatest impact on the success or failure of the MASSTAX2 project, *barely met the minimum thresholds established by DOR*.[20] As a result of these concerns, the Selection Committee was unable to reach a consensus on whether Deloitte's proposal would provide the Commonwealth and DOR with the best overall value.[21] Nevertheless, DOR signed a contract with Deloitte for the MASSTAX2 project on December 30, 2010.[22] Work on the MASSTAX2 Program was initiated in January 2011.

In order to meet the March 2013 go-live date for the MASSTAX2 initial deployment, user-acceptance testing ("UAT")[23] began in September 2012. The projected duration for UAT had been eight weeks with a cost of $1.8 million, but it actually lasted 39 weeks at a cost of $4.4 million – that is, *nearly five times longer and nearly 2½ times more expensive than expected*.[24] In addition, UAT revealed more than 1,000 defects within the system.[25]

This was not the first inkling of problems. DOR also had ongoing issues with Deloitte's performance and disagreements about Deloitte's responsibilities over a long period of time.[26] Relatively early in the project, in December 2011, DOR had raised concerns with Deloitte about the parties' different understandings of the training plan, Deloitte's inability to make an agreement with Oracle about use of Oracle software, and the number of IBM software licenses required.[27] In an Executive Steering Committee meeting on December 20, 2011, the parties also noted their recognition of risks from "[u]ncovering significant fit issues late in program development" and "SAP's ability to meet DOR's needs most notably in the areas of P&I [penalties and interest] and Payments" – the latter referring to the late discovery that, apparently because of incorrect assumptions made by Deloitte and DOR, the SAP program could not be made to conform to the Commonwealth's method of calculating penalties for non-payment.[28]

As soon as the UAT process was underway, DOR ceased making payments to Deloitte, based on a determination that the system would not live up to DOR's vision for the MASSTAX2 system.[29] Shortly thereafter, in August 2013, DOR opted to terminate its contract with Deloitte – after paying $55 million on the project, including $45 million in payments – and instead seek a new vendor to complete the project.[1][30]

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DOR determined that it would be advisable to move forward with a company called Fast Enterprises, which had previously bid on the project, as its new vendor. DOR therefore issued a Notice of Intent to Accept a Best Value Offer, which offered competitors the opportunity to provide a comparable or better offer than Fast Enterprises,[31] but no bidders responded. The Committee understands that DOR executed a contract with Fast Enterprises in January 2014 for the new system.

3. RMV (ALARS) Modernization

The ALARS modernization initiative of the RMV was launched in March 2009. The RMV's legacy computer system had become "an increasingly complex application that [was] at the end of its useful life," and "the available workforce that [was] familiar with the aging technology [was] shrinking at an increasing rate."[32] Online traffic for the RMV site was also growing by about 8% per year.[33] In addition, "[t]he RMV's ability to respond to legislative, regulatory and general business efficiency changes in a timely and/or cost-effective manner [was] severely hampered and it [was] unlikely that this situation [was] going to change."[34]

The RMV therefore determined that it was necessary to "replace the original ALARS and modernize RMV business processes."[35] The goal of the ALARS modernization is to enable online transactions and to reduce visits to RMV branch offices, providing cost savings to consumers in the form of avoided travel to the RMV.[36] On November 7, 2011, the RMV posted a Request for Proposal for the ALARS system modernization to Comm-PASS, the state's online procurement record system at the time.[37] Only two proposals were received, one from Deloitte, which partnered in its bid with Hewlett Packard, and the other from MorphoTrust USA.[38] The final review by the Selection Committee stated, however, that "after careful Technical Evaluation it was determined that MorphoTrust USA is NOT a viable technical solution."[39] A third-party analysis conducted by Gartner Group, a national research organization, reached the same conclusion.[40] In essence, therefore, Deloitte was the only ostensibly qualified and interested bidder for the RMV Modernization project. On March 7, 2013, the Massachusetts Department of Transportation ("MassDOT"), parent agency to the RMV, and Deloitte Consulting LLP signed a Master Development and Implementation Agreement. The contract amount was approximately $77 million.[41]

According to a recent status report provided by Deloitte, the RMV Modernization Project is currently on schedule,[42] and it appears from documents provided to the Committee that both the program advisory board and management teams have benefited from the experiences and best practices derived from challenges in other statewide IT contract implementations. As of the end of February 2014, Task Order 1 of the project (out of five task orders) was reportedly 89% complete with an expected end date in April 2014.[43]

FINDINGS AND RECOMMENDATIONS

ORGANIZATIONAL AND MANAGEMENT ISSUES

FINDING 1: On both the DOR MASSTAX2 Project and the DUA QUEST Project, there was a failure by the vendor (in both cases Deloitte) and the agency to communicate and work constructively together to move the projects forward on schedule and produce the optimal product. The Commonwealth's organizational structure for these IT projects was too decentralized, and did not provide the comprehensive support, oversight, and direction needed to ensure the success of the projects.

Despite the requirements for monthly status reports on IT projects to be submitted to ITD, the Committee has seen no evidence that either ITD, DUA, or DOR leadership quickly took measures necessary to get the QUEST and MASSTAX2 projects on a more successful path – even though ITD and agency leadership were apprised that the projects were going off-track and that Deloitte, the vendor, was not deploying sufficient resources to get the job done. Both DUA and DOR regularly provided status assessments to ITD and agency leadership, which showed that these projects had repeated problems from early on.

In March 2011, the DUA QUEST Project Manager informed the DUA Director and ITD that "the Quest Benefit project is behind schedule and at risk of not being completed in [time] because Deloitte has not had the appropriate number of resources working this project, and has been having a serious attrition problem."[44] At various times in 2012, the monthly status reports provided to ITD also noted the following concerns on the part of DUA:[45]

- "DUA Project Mgmt. is not sufficiently included in Deloitte's review ... and does not have a clear assessment of the current project status" (June 2012).
- "[Deloitte] disregards DUA management and behaves autonomously ... [M]onetary penalty to [Deloitte] should be considered as an incentive to eradicate plan slippage ... Deloitte's dismissive behavior towards DUA requests ... and their procrastination ... lend itself to further project delays ... Deloitte does not adhere to new project plan and continues to miss deliverables ... Deploy[ment] delays may cause DUA [non-compliance] with Fed. programs" (October 2012).
- "Deloitte impeding DUA's IT ability to complete enhancements" (November 2012).
- "[Deloitte] attempting to dilute quality measures on ... testing" (December 2012).

In each of those months, project status – using "traffic light" designations of green, yellow, and red – was "red" for Executive Action, Issues Management, Risk Management, and overall Project Assessment. Deloitte was aware of DUA's concerns about its handling of the project.

DOR, too, had ongoing concerns about Deloitte's performance and disagreements about its responsibilities in the DOR MASSTAX2 Project over a long period of time.[46]

These problems were allowed to persist too long.

RECOMMENDATION: The Commonwealth's IT organizational structure should be reorganized on the following lines, in order to enhance scrutiny, oversight, and consistency of IT development initiatives:

a. **Greater centralization of IT development oversight in ITD,** including procurement and implementation processes. The Commonwealth Chief Information Officer ("CCIO") and his or her IT Development staff should oversee the planning and progress of all IT projects costing more than a certain amount, as determined by ITD.

b. **Creation of an IT Development Department** within ITD, whose duties would be to advise and assist agency and vendor IT staff on the development of new IT systems. The IT Development Department should include:
   1. An **IT Contract Management Unit** to assist agencies in preparing requests for proposals, selecting vendors, drafting contract terms and any necessary amendments, and reviewing contracts to ensure the Commonwealth's interests are protected.
   2. **A Project Management Department**, staffed with experienced project managers who could be assigned to agencies to manage particular IT projects and/or other types of capital projects.

   Project Managers should:
   - **Take an active role in governing the vendor,** so the vendor does not control the process, and **protect the Commonwealth's interests.**
   - **Help new executive sponsors** (agency heads) get up to speed on an inherited project – and insist that any sponsor take ownership of the project and remain actively engaged.
   - **Facilitate and mediate communications among agency, IT, and vendor staff.**
   - Ensure that the design development team is **in regular contact with:**
     o **Future end-users** of the system;
     o **IT staff who handle ongoing IT operations** and who will become responsible for maintaining the system once it goes live and is handed off to them; and
     o **Customers** (the agency's clientele) and their representatives.
   - During design and implementation, be **co-located with the vendor's employees and agency staff** delegated to the project in order to develop a more cohesive and productive work environment.
   - **Challenge the agency and vendor to carefully consider all assumptions underlying both parties' positions and determine whether they are realistic.**
   - **Coordinate with the CCIO** and solicit his or her help when deemed necessary.

- Step in and **take decisive action to redirect a project** headed in the wrong direction, or alternatively assist with the decision on whether to **terminate a contract**.

c. **Engagement of an experienced independent verification and validation ("IV&V") consultant for all large IT projects**, those over a certain amount, as determined by ITD.[47]
IV&V involves an independent third-party organization mainly to ensure that the product is structurally sound and built to the required specifications.[48]

d. **Enforcement of consistent and timely status reports**
ITD should require agencies to produce status reports on all ongoing IT projects on a monthly basis (or, more frequently, if insufficient progress is occurring) in a standard format that includes traffic-light color designations.

e. **A greater role in IT projects for the Operational Services Division ("OSD")**, including:
- Coordinating more closely with ITD and assisting in the development of guidelines and protocols for all IT projects
- Enforcing consistent rules, and
- Conducting audits, to be shared with ITD, after projects are completed

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FINDING 2: Since most agencies take on major IT initiatives very infrequently, the Commonwealth does not have IT-development knowledge comparable to that of IT vendors.

Most individual agencies take on major IT initiatives very infrequently – sometimes only once in several decades – whereas, for vendors, such activities are their primary line of work. Any learning that agency staff gain from such an endeavor is essentially lost to the Commonwealth if they never again work on such a project. But if that IT experience is instead concentrated within ITD, its staffers will regularly handle IT projects and gain expertise that can be applied to future projects, thus building a talent pool and shoring up institutional knowledge.

The Commonwealth also has no mechanism to gather and retain, for the benefit of future projects, the particulars of an IT project's history and/or an agency's experience with a particular system integrator or software vendor. This information can be a powerful learning tool to help understand why projects were successes or failures.

RECOMMENDATION: ITD must also create and maintain a clearinghouse for information about previous IT projects to:

(i) **Assist with agencies' due diligence** – learning about prospective vendors' past performance for other public and private entities, including discussions with other states, where relevant – before a contract is signed.

(ii) **Conduct exit interviews** with all parties and gather all other relevant information, including documentation, after a project's completion.

(iii) **Retain artifacts** (analyses, programs, etc.) that are created for each project so that later IT projects will not need to "reinvent the wheel."

(iv) **Formally document lessons learned, best practices, and other insights**, so that an agency undertaking a new IT initiative is not starting from scratch and acting alone.

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CONTRACT MANAGEMENT

FINDING 3: The Commonwealth needs greater consistency in the contracting of IT projects.

The Commonwealth does not have a single agency or department with the responsibility for oversight of designing, managing, and implementing new state IT projects. ITD, with its focus on IT systems and operations statewide, is in the best position to handle this task, by taking on greater ownership, responsibility, and accountability.

Because of this lack of consistency, state agencies have entered into IT contracts containing terms that are detrimental to the Commonwealth on intellectual property ("IP"), contradicting or undercutting the IP provisions of the state's Standard Contract Form, which provides that the Commonwealth shall own any IP created expressly for the Commonwealth pursuant to contract.[49] For example, a provision in DUA's contract with BearingPoint for the DUA QUEST project obligates the Commonwealth to pay for development of the system, but then BearingPoint, using the institutional knowledge gained through that work, can develop a similar system with only nominal changes and sell or license it to another state – without having to pay the Commonwealth any royalties.[50] Yet the Committee is not aware of evidence justifying the deviations from the standard contract provisions in this instance.

Another example is that, in the DOR project, a dispute arose over the training plan. DOR described Deloitte as proposing to deliver what DOR expected to be training classes as "Knowledge Transfer" (i.e., informal transmission of information) and that "Deloitte claim[ed] that the number of class hours is the number of total 'attendee hours', not 'instruction hours."[51]

> **RECOMMENDATION: ITD, through the IT Contract Management Unit, must play a greater role in providing structure and guidance for IT projects by enforcing across-the-board adherence by agencies to ITD policies and procedures. Standard contracts should be the default for all IT projects**, under

the supervision of a newly-created IT Contract Management Unit (which can also assist with procurement generally). All of this contract language should be periodically reviewed and updated by the ITD Contract Management Unit and should **cover at a minimum, the following areas:**

a. **Protection of the Commonwealth's intellectual-property rights**
   o Whenever an IT contract includes a provision that allows a contractor to use IP developed for the Commonwealth for subsequent clients, **the contract price should be substantially diminished or the Commonwealth should receive just compensation in the form of payments akin to royalties, and the contract should spell out the justification** for the deviation from the Standard Contract Form **and the compensation provided to the Commonwealth**.

b. **Clear, functionally-oriented deliverable-acceptance criteria**, and time periods for review of deliverables that allows flexibility for extensions when necessary

c. **Testing that is comprehensive** enough to fully probe the new system's functionality in handling all foreseeable scenarios

d. **Payment method involving a "true up" at completion of each functional milestone**
   o Contracts should provide for periodic (e.g., monthly) incremental payments with true up only when it is clear that a component of the system is working properly as intended and that sufficient progress is being made.[52]

e. **Training for agency staff**, including both end-users and IT operations staff
   o Contracts must require specific, unambiguous requirements for the vendor to provide training for agency end-user and IT staff, based on the number of class-hours to be given, and should include a requirement that the contractor will present additional classes or training upon the Project Manager's request at specified hourly rates.

f. **A warranty period of at least 9 to 12 months**

g. **Financial penalties** to the vendor for delays

h. Specific **provisions allowing for termination of the contract** if deemed necessary or beneficial by the client

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CONTRACT IMPLEMENTATION AND TESTING

FINDING 4: DUA and DOR failed to conduct adequate and thoughtful planning before and during their IT initiatives.

In the case of DOR, the Committee has seen no evidence that, before accepting Deloitte's bid on MASSTAX2, DOR either investigated whether the SAP software Deloitte would be using could work – or could easily be customized to work – in a state with tax laws like those in Massachusetts or inquired whether SAP was willing to change the software to accommodate Massachusetts requirements.

Deloitte, as an experienced system integrator, should have investigated the compatibility of the SAP software with Massachusetts tax requirements and determined any steps needed to make it compatible prior to presenting its proposal to the Commonwealth. The Committee has also seen no evidence that Deloitte, before signing the contract with DOR, looked into whether either SAP or the Commonwealth would make the accommodations necessary to allow SAP's software to work for Massachusetts.

DUA should also have made sure that Deloitte conducted more-careful conversion of data from its legacy system and tested the converted data thoroughly. Although the Committee does not believe that data conversion is the cause of all of the problems claimants experienced with UI Online, DUA admits that it led to 100 to 300 claimants each week having problems with their claims.[53]

> **RECOMMENDATION: Project development for a large-scale IT initiative should begin with a thorough planning process in which the essential goals of the project are well-defined by subject-matter experts and conveyed to agency leaders and the vendor. Before undertaking such a project, a government client must prepare a written "business case," fully documenting the reasons for the project, any perceived risks (including any need for conversion of data from the legacy system), and methods for mitigating them.**
>
> **Essential goals – and metrics to determine success in reaching those goals – must be well-defined from the start and kept in mind throughout the project.**
>
> The business case must include a comprehensive analysis of the anticipated return on investment ("ROI") – that is, the benefit that a project is expected to produce. ITD's new ROI-calculation tool, called C.A.S.E., appears to be a valuable tool for this purpose, if it is used properly and performs as promised. At reasonable intervals after go-live of the project (e.g., one, two, five, and ten years), the Commonwealth should also compare actual ROI to the C.A.S.E.-predicted ROI, in order to verify the tool's accuracy.
>
> Agencies should also consider phasing in new IT systems (when appropriate) by applying the system to a smaller population (e.g., by residence, age, etc.) to test

whether it operates as intended, and fix any problems before rolling it out to the entire subject population.

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FINDING 5: Problems arose in testing on the DUA and DOR projects that should have been anticipated. DUA, DOR, and Deloitte all failed to take sufficient care in planning and conducting the various forms of testing for the development of the QUEST and MASSTAX2 projects. Testing is an area that may receive less than its due – initially, when a vendor is trying to reduce its bid, and later, if a project starts to run long and over-budget, especially with increasing pressure to "go live."

On the MASSTAX2 Project, Deloitte and DOR failed to allow sufficient time for user-acceptance testing ("UAT"), creating a substantial delay, and the large number of problems discovered during the lengthy UAT period led DOR to terminate its contract with Deloitte.[54]

On the QUEST Project, DUA concluded that Deloitte was "attempting to dilute" the testing plan,[55] and a lack of adequate testing by Deloitte and DUA likely contributed to the many problems experienced by users of DUA's new UI Online system in filing their initial claims. Notwithstanding efforts by Deloitte and DUA, in the aftermath of a troubled roll-out, to downplay claimants' troubles with UI Online, up to 10% of initial claimants may have had trouble with their claims due to data conversion issues alone.

> **RECOMMENDATION: Testing protocols must be prepared as early as possible and carefully designed**. **ITD should take an active role in formulating and reviewing testing protocols, and the Project Manager needs to have a guiding role as well.** For each phase of testing, the details of the testing must be spelled out at the beginning of the project. Particularly in the case of user-acceptance testing and parallel testing,[56] the parties must allocate sufficient time and resources for testing, in order to have time to work out any problems that may arise.

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FINDING 6: DUA and Deloitte did not properly prepare for go-live of UI Online, resulting in many problems for claimants.

The agency and vendor did not fully recognize, in advance of the go-live of UI Online, the types of problems that claimants would encounter in attempting to use the new system.

DUA and Deloitte did not correctly anticipate the demands that would be put on the website and phone lines after the UI Online go-live on July 1, 2013, nor the large number of claimants who encountered difficulties filing for benefits online or who failed to

receive expected benefits in a timely manner.[57] Not enough thought was given to the demands the initial roll-out would place on people, business processes, and technology, and DUA staff were not adequately trained in how to help claimants address the issues with which they were confronted under the new system.

As a result, an apparently unanticipated – although thoroughly foreseeable – flood of claimants sought help from DUA customer-service representatives, either by phone or in person, but were unable to obtain assistance in a timely manner or at all.

> **RECOMMENDATION: Agencies must improve their planning for "go-live" of new IT systems**, especially those designed to be used by persons outside of the agencies, such as consumers or businesses.
>
> **Agencies need to prepare better for dealing with practically-inevitable user and staff challenges and increased usage** that will occur in the early weeks and months of any new system implementation, as customers interact with it for the first time. Such planning should consider **deploying additional staff and other resources** (including phone-line capacity) to deal with website problems and respond to callers and visitors,[58] establishing **back-up plans and workarounds** to minimize disruptions to the agency's overall mission, and anticipating the needs of all users – especially those who cannot (or will not) conduct business online, have limited reading skills in English, or are hard to reach through traditional outreach channels.

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FINDING 7: The DUA and DOR projects offer case studies in how an agency handles major problems that arise during development of a new IT system. In each case, agency leadership explored the option of terminating their respective contracts with Deloitte and turning the project over to a new vendor. However, while DOR chose to take that course, DUA ultimately decided to stay with Deloitte, albeit with amendments to the contract terms.[59] The Committee uncovered no evidence that a cost-benefit analysis was ever conducted on the question of whether DUA should have severed ties with Deloitte when communications between client and vendor broke down.

The Committee did not see evidence that agency leaders on the DUA and DOR projects remained apprised of their projects' key goals. The Committee has seen no evidence that the EOLWD Secretary at the time of the UI Online go-live was aware of the performance metrics created to evaluate the success of the DUA QUEST Project and whether the system designed by Deloitte performed well on those metrics.[60]

> **RECOMMENDATION**: Conducting a robust ROI analysis at various stages during project development and creating a clearly-defined set of measurable goals at the outset of a project will each assist leadership in determining whether termination of a contract is in the Commonwealth's interest.

Agencies should not be overly cautious about deciding, in conjunction with ITD, when to terminate a failing project and find a new vendor to bring the agency's plan to fruition.

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FINDING 8: Large IT projects are more likely to fail.

Large IT projects are much more likely than small projects to fail,[61] and the longer a project is scheduled to last, the more likely it is to run over-time and over-budget,[62] and to end up outdated by the time it is implemented. All three of the IT projects that were studied most closely for this report were developed and bid as large, unified projects, which increased the chance they would ultimately not succeed.

The DUA QUEST Project and the DOR MASSTAX2 Project also followed a "waterfall" approach to development, meaning that the entire project would come together – and be tested – only at the end, rather than being built piece by piece with functional testing, reevaluations of the scope and concept, and software updates at each step, as would be the case using an "agile" development approach. The vendors – first BearingPoint and then Deloitte on the DUA project, and Deloitte throughout the DOR project – used this approach in spite of its inflexible nature and high costs for adaptive modifications over a project's life.

Using an agile development approach, smaller, shorter projects with functional deliverables, smaller, shorter projects would be less likely to fail and would be more flexible and better able to react to:[63]
- ***Newly-imposed statutory and regulatory changes***
  On the DUA QUEST Project, both agency and vendor cited major changes in federal laws on unemployment benefits as sources of difficulties with implementing the project.[64]
- ***Problems with the vendor***
  If problems arise, it will be easier to switch to a new vendor, or even terminate the contract.
- ***Changes in agency leadership*** *and other staff turnover*

There were **transitions in leadership** of each of these agencies – EOLWD, DUA, DOR, and RMV – as these projects proceeded from conception to implementation, and some of the problems with both the DUA QUEST and DOR MASSTAX2 projects undoubtedly resulted from these changes, as new state leaders were expected to take over sponsorship of projects without having been involved from the start or fully informed about the genesis of the projects.

Smaller, shorter projects delivered in functional increments can alleviate the problem of staff turnover in government, at all levels. A new executive who "inherits" a

project may not share his or her predecessor's understanding of the rationale, goals, and history of the project, nor share the same passion for, and commitment to, the project. But a shorter project will experience less turnover in participants, and a simpler one is more readily understood by new leadership and staffers.

Smaller, shorter projects would be more likely to attract a larger number of bidders – including those capable of handling only parts of a project.

> **RECOMMENDATION: Large IT projects should be broken down to smaller-scale projects.** Unless there are compelling reasons for doing otherwise, **the Commonwealth should divide traditionally-large IT projects into smaller-scale** (meaning under a standard level, as determined by ITD) **functional projects.**

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FINDING CAPABLE I.T. VENDORS

FINDING 9: The current procurement system unnecessarily narrows the field of IT project bidders acceptable to the Commonwealth and can result in the selection of a bidder about which the selection committee harbors serious doubts, as with the DOR project. Our current method of selection can also, unfortunately, create a situation where only one contractor appears willing and able to meet the agency's requirements, as occurred with the RMV Modernization Project.[65] Either way, **the Commonwealth may pay more for a project, and may be presented with less-optimal solutions, than if there had been more competition among vendors**.

> **RECOMMENDATION:** More vendors should be encouraged to bid on the Commonwealth's IT projects, by methods including the following:
>
> a. **Proposal requirements should be simplified** to make it easier and less expensive for smaller vendors and companies that are not parties to statewide contracts to submit proposals.
> b. **Scoring criteria should be kept under wraps** to discourage bidders from structuring a bid to take advantage of the scoring system. Selection procedures should allow more leeway for selection committees to select a bidder other than the high scorer, if they have legitimate, articulable concerns about the high scorer's ability to accomplish the project properly.
> c. The selection committee for an IT project should **look warily on any major reduction in a vendor's bid** during the procurement process, because such a reduction calls into question whether the vendor will make corresponding reductions in testing, staffing, quality of staff, or other resources devoted to the project.

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CONFLICTS OF INTEREST

FINDING 10: EOLWD hired an employee of its vendor on the ongoing DUA QUEST Project for a leadership role at DUA, giving rise to a perception of conflict of interest.

While DUA and its parent agency EOLWD were working with Deloitte – successor to BearingPoint – on the QUEST project, EOWLD hired a former employee of both BearingPoint and Deloitte for a leadership position at DUA. This hiring created the perception of a conflict of interest.

> **RECOMMENDATION: ITD should develop protocols regarding the hiring of vendor employees for management positions in which they may be required to directly oversee the work of that same vendor, especially on the same project**. Although such individuals may bring with them a unique understanding of the vendor and the project, any such benefit may be outweighed by the perception of possible partiality. The Commonwealth must be aware of this potential issue in making all hiring decisions.

CONCLUSION

With more and more essential government operations being conducted online – and more and more of citizens' interactions with their government occurring through a computer screen, rather than face-to-face or over the phone – information technology is now, by necessity, a critical function for the public sector, and one in which government must establish a level of competency which it has often not demonstrated to date.

Having examined the procurement, development, and implementation of three IT systems by the Commonwealth, the Committee concludes that the lessons learned from the three projects it studied in-depth are universal.

Among them:

- Stronger, consistent, and centralized oversight is required to develop projects and to keep them on track.
- Large projects should be broken into smaller pieces, whenever possible, to enhance flexibility and to increase the likelihood of success.
- More attention must be paid to contract language and to testing of new systems as they are developed.

If the Committee's findings and recommendations are followed for all major IT projects in Massachusetts, the citizens of the Commonwealth can expect fewer problems, better outcomes, and more-productive online interactions with their government in the future.

ENDNOTES

Note: Most of the materials listed as sources are on file with the Committee, although some are also publicly available.

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[1] At those hearings, the Committee heard testimony from representatives of the Executive Office of Labor and Workforce Development, including its then-Secretary Joanne Goldstein and current Secretary Rachel Kaprielian, formerly the Registrar of Motor Vehicles; Celia Blue, current Registrar of Motor Vehicles; the Director of the Department of Unemployment Assistance, Michelle Amante; current DOR Commissioner Amy Pitter and former Commissioner Navjeet Bal; Commonwealth Chief Information Officer William Oates and then-CCIO John Letchford; Chief Procurement Officer Gary Lambert; Gerald McDonough, General Counsel to State Auditor Suzanne Bump; Margaret Monsell, Staff Attorney for the Massachusetts Law Reform Institute; Michael Krigsman, an independent industry analyst; and numerous representatives of Deloitte Consulting LLP ("Deloitte"). The Committee was assisted at the hearings by Senator Michael Barrett, Senate Chair of the Committee on Children, Families and Persons with Disabilities, and Senator Kenneth J. Donnelly, Senate Chair of the Committee on State Administration and Regulatory Oversight.

[2] EXEC. OFFICE OF LABOR & WORKFORCE DEV., RFQ DUA QUEST 06-06 SOLICITATION (Jun. 21, 2006).

[3] *See* ROBERT VELTEN, DUA QUEST RFR EVALUATION "VENDOR SCORE CARD EVALUATION WORKSHEET" (June 15, 2006).

[4] The QUEST SOW expressly provided that the agreement between the parties consisted, in order of precedence, of the Commonwealth's Standard Terms and Conditions, the Commonwealth's Standard Contract Form, RFR ITS23 (a request for response for a statewide contract for IT vendors), Bearing Point's response to RFR ITS23, the QUEST SOW, the RFQ for the QUEST system as amended plus Vendor Questions and Answers, and BearingPoint's response to the RFQ. *See* STATEMENT OF WORK BETWEEN THE DIVISION OF UNEMPLOYMENT ASSISTANCE AND BEARINGPOINT, INC., FOR THE DUA QUALITY UNEMPLOYMENT SYSTEM TRANSFORMATION (QUEST) PROJECT, § 1, at 4 (May 18, 2007) (hereafter "QUEST SOW").

[5] *Deloitte Agrees to Buy BearingPoint Unit*, N.Y. TIMES, Mar. 24, 2009, *available at* http://dealbook.nytimes.com/2009/03/24/deloitte-agrees-to-buy-bearingpoint-unit/.

[6] Letter from David Minkkinen, Principal of Deloitte, to Robert Velten, MASSTAX2 Project Manager (May 21, 2009).

[7] *See* QUEST SOW, supra note 4, at amend. 9, § 2.4.

[8] Many frustrated unemployment claimants contacted their legislators. Post-Audit Bureau staff also spoke to advocates for unemployment claimants about the problems experienced after the go-live of UI Online, and one of these advocates testified at the November 14, 2013, SPAO hearing. In addition, problems with UI Online have been the subject of a series of articles in the *Boston Globe* that also served as a resource to the Committee.

[9] Written Testimony of DUA Dir. Michelle Amante, at 4, Mass. S. Comm. on Post Audit & Oversight (Feb. 11, 2014) (hereafter "DUA Dir. Testimony").

[10] Although such interceptions are permitted under Massachusetts law, erroneous determinations by DUA could result in wrongful tax-refund interceptions.

[11] DUA Dir. Testimony, *supra* note 9.

[12] Written Testimony of EOLWD Sec'y Joanne F. Goldstein at 2, Mass. S. Comm. on Post Audit & Oversight (Oct. 28, 2013) (hereafter "EOLWD Sec'y Testimony").

[13] Spreadsheet, "Warranty Defects Report" (Mar. 11, 2014).

[14] *See, e.g.,* Memorandum from Cari Birkhauser to Judi Cicatiello & John Glennon (Mar. 29, 2011); Memorandum from Judi Cicatiello, John Glennon, & Cari Birkhauser to David Minkkinen & Michael Marino (Mar. 30, 2011) ("The Quest Benefits project is behind schedule and at risk of not being implemented in July 2011, in part, because Deloitte has not had the appropriate resources on this project."); *see also* document by unknown author entitled "Pains," listing such items as "[s]hifting priorities," "[t]oo many number one priorities," and "[n]ot enough time to get projects done."

[15] MASS. DEP'T OF REVENUE, RECOMMENDATION REPORT APPARENT SUCCESSFUL BIDDER MASSTAX2 at 6 (2010) (hereafter "DOR Recommendation Report").

[16] *Id.* at 13-14.

[17] *Id.* at 12.

[18] Excel Spreadsheet, "Evaluation Workbook (Post-BAFO)," May 17, 2010.

[19] *Id*.

[20] MASS. DEP'T OF REVENUE, RECOMMENDATION REPORT APPARENT SUCCESSFUL BIDDER MASSTAX2 at 6 (2010).

[21] *Id.* at 15.

[22] MASSTAX2 PROJECT, MASTER SOFTWARE DEVELOPMENT AND INTEGRATION AGREEMENT at 62 (Dec. 30, 2010) (hereafter "DOR Master Agreement").

[23] "User acceptance testing" is end user testing of the system to ensure both clean conversion of data and system functionality. In software development, UAT is one of the final stages of a project and often occurs before a client or customer accepts the new system. *Glossary of Terms, Abbreviations and Acronyms*, JAMES MADISON UNIV., http://www.jmu.edu/advancement/implementation/glossary.shtml (last visited Apr. 10, 2014).

[24] DOR RESPONSE TO SPAO INFORMATION REQUEST #14 (Dec. 6, 2013).

[25] Written Testimony of DOR Comm'r Amy Pitter at 2, Mass. S. Comm. on Post Audit & Oversight (Oct. 28, 2013) (hereafter "DOR Comm'r Testimony").

[26] *See* NTT Data, DOR Independent Verification and Validation (IV&V) Overall MASSTAX2 Program Assessment, July 2, 2013. This report, however, also places some responsibility on DOR for the difficulties with the project. *See id.* at 5. *See also, e.g.,* COMMONWEALTH OF MASS. DEP'T OF REVENUE MASSTAX2 PROGRAM, EXECUTIVE LEADERSHIP MEETING TOPICS – DISCUSSION DOCUMENT , June 5, 2012, at 11-14 (discussing points of contention at that time between DOR and Deloitte).

[27] COMMONWEALTH OF MASS. DEP'T OF REVENUE MASSTAX2 PROGRAM, EXECUTIVE LEADERSHIP MEETING TOPICS – DISCUSSION DOCUMENT (*INTERNAL MEETING*), Dec. 20, 2011, at 3-6.

[28] COMMONWEALTH OF MASS. DEP'T OF REVENUE MASSTAX2 PROGRAM, EXECUTIVE LEADERSHIP MEETING TOPICS – DISCUSSION DOCUMENT, Dec. 20, 2011, at 3.

[29] DOR Comm'r Testimony, *supra* note 25 at 2.

[30] This decision is documented by a fifth amendment terminating the DOR Master Agreement, *supra* note 22.

[31] MASS. DEP'T OF REVENUE, NOTICE OF INTENT TO ACCEPT A BEST VALUE OFFER BETWEEN THE DEPARTMENT OF REVENUE AND FAST ENTERPRISES, LLC, at 1 (2013).

[32] FY 12 ALARS Modernization Investment Brief (hereafter "ALARS IB"), at 5.

[33] *Id.* at 11.

[34] *Id.*

[35] *Id*. at 5.

[36] *Id.* at 15. Presumably it will also lower RMV customer-service personnel costs.

[37] Comm-PASS was recently replaced by a new system called COMMBUYS. *See COMMBUYS*, MASS.GOV (last visited Apr. 15, 2014), http://www.mass.gov/anf/budget-taxes-and-procurement/procurement-info-and-res/conduct-a-procurement/commbuys/ .

[38] RMV BD. OF DIRS., STAFF SUMMARY SHEET – CONTRACT FOR RMV MODERNIZATION, Nov. 5, 2012, at 11.

[39] *Id.* at 13 (emphasis in the original).

[40] *See id.* The Staff Summary Sheet indicated that the Gartner Group had "confirmed that the **MorphoTrust USA Inc. solution [was] not technically viable** for a high-volume transaction system of 7,000,000 transactions per day." *Id.* (emphasis in original).

[41] MASS. DEP'T OF TRANSP. & DELOITTE CONSULTING LLP, MASTER DEVELOPMENT AND IMPLEMENTATION AGREEMENT (Mar. 7, 2013).

[42] Overall Program Status Executive Summary 2/15/2014 – 2/21/2014 (Deloitte document DC 045750).

[43] *Id.*

[44] Memorandum from Birkhauser to Cicatiello & Glennon, *supra* note 14.

[45] ITD Capital PMO Monthly Status Reports for MASSTAX2 for June, Oct., Nov., and Dec. 2012.

[46] *See* Discussion Document, *supra* notes 27 and 28.

[47] Half of large IT projects, those which have an initial budget greater than $15 million, "significantly blow their budget and deliver less than half the value planned." Michael Bloch, Sven Blumberg, & Jürgen Laartz, *Delivering Large-Scale IT Projects on Time, on Budget, and on Value*, FIN. TIMES (Aug. 21, 2012), http://www.ft.com/cms/s/0/d34acf86-eba8-11e1-9356-00144feab49a.html#axzz2xq4Woovr.

[48] *Independent Verification and Validation (IV&V)*, JANALTA INTERACTIVE INC. – INVESTOPEDIA (last visited Apr. 15, 2014), http://www.techopedia.com/definition/24836/independent-verification-and-validation--iv&v.

[49] The current Standard Contract Form provides: "The Contractor certifies and agrees that the Commonwealth is entitled to ownership and possession of all 'deliverables' purchased or development with Contract funds. A Department may not relinquish Commonwealth rights to deliverables nor may Contractors sell products developed with Commonwealth resources without just compensation. The Contract should detail all Commonwealth deliverables and ownership rights and any Contractor proprietary rights."

COMMONWEALTH OF MASSACHUSETTS STANDARD CONTRACT FORM (updated Mar. 21, 2014). The previous version of this form (updated June 27, 2011) contained the same language. The 2007 form provided that "[o]wnership can not [sic] be conveyed after performance if the Commonwealth has paid for development of a deliverable with just compensation." COMMONWEALTH OF MASSACHUSETTS STANDARD CONTRACT FORM (updated June 8, 2007).

[50] QUEST SOW, supra note 4, sec. 7.4.4, at 15.

[51] Discussion Document, *supra* note 27.

[52] This is preferable to the current system of payment by deliverable, as the Committee's examination has shown that it is possible for a vendor to successfully complete each deliverable while still not satisfying the original intent of the project.

[53] DUA Dir. Testimony, *supra* note 9. DUA describes this group as a "*rolling* number of about 100-300 claimants impacted by data conversion issues weekly" (emphasis added). EOLWD, SUMMARY: CONVERSION PROCESS FOR UI ONLINE (Feb. 7, 2014).

[54] *See supra* note 1.

[55] *See* Status Reports, *supra* note 45.

[56] In parallel testing, the same procedures are run on the legacy system and the new system, and the results are compared.

[57] *See supra* discussion at p. 5.

[58] DUA hired additional claims-takers before the go-live of UI Online, but had to hire more shortly thereafter. *Deloitte & DUA/EOWLD Testimony: Hearing Before the S. Post Audit & Oversight Comm.*, 2013 Leg., 188th Sess. (Oct. 28, 2013).

[59] *See* QUEST SOW, *supra* note 7, at 5.

[60] She was not the Secretary, however, at the time the QUEST project was originally planned or when the contract with BearingPoint was executed.

[61] THE STANDISH GRP. INT'L, CHAOS MANIFESTO 2013 at 2 (2013). *See also infra* discussion at pp. 16-17, regarding advantages of small projects for attracting more bidders.
[62] MICHAEL BLOCH, SVEN BLUMBERG, & JÜRGEN LAARTZ, DELIVERING LARGE-SCALE IT PROJECTS ON TIME, ON BUDGET, AND ON VALUE (Oct. 2012), *available at* www.mckinsey.com (last visited Apr. 5, 2014).

[63] THE STANDISH GRP. INT'L, supra note 61, at 2.

[64] *Joint Deloitte & DUA/EOWLD Testimony: Hearing Before the S. Post Audit & Oversight Comm.*, 2013 Leg., 188th Sess. (Oct. 28, 2013).

[65] *See supra* discussion at p. 7.