United Technologies Corporation

Internal Audit Department (IAD) Case Study:

A Case Study of the UTC ACE Operating System

George Roth
groth@mit.edu

Lean Advancement Initiative
Massachusetts Institute of Technology
292 Main Street – Bldg E38 Room 624
Cambridge, MA 02142

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This case study provides an example of managerial and organizational changes that have accumulated into significant performance improvements. It is one of a series of case studies undertaken by researchers at the Lean Advancement Initiative (LAI) at the Massachusetts Institute of Technology. LAI focuses on developing, testing and studying the application of lean and other management principles in the aerospace industry. LAI’s sponsors, and their improvement initiatives, have created a natural laboratory for studying lean enterprise efforts. The case studies in this series report on effective, interesting and novel applications of lean methodologies at enterprise levels in LAI-sponsoring and other organizations.

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Internal Audit Department (IAD) Case Study

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Internal Audit Division Case Study

United Technologies

Achieving Competitive Excellence
The United Technologies Operating System

Introduction
To a person studying management, a case study of accountants or auditors is unlikely to invoke images of vibrant and innovative change. These functions are typically seen as a part of the control system of an organization, ensuring ethical and accurate performance records. People expect an auditing department to be an example of stability. This study of United Technologies Corporation’s Internal Audit Department (IAD) examines how stability and change are important factors in how this department functions and improves. IAD is a leader in the adoption of United Technologies Corporation’s (UTC’s) continuous improvement methods in non-production settings. IAD has achieved and maintained significant improvements in quality, on-time delivery, customer satisfaction, employee satisfaction, and productivity from 2001 to 2007.

Lean production and process improvements methods are often thought of with respect to manufacturing operations. In manufacturing, competitive challenges require producing a desirable product reliably and efficiently, with high and consistent quality. Although work details differ, these achievements are sought-after in all business functions. Viewing business as a system with interconnected and interdependent units suggests that all of its elements – from concept development, design, engineering, production, operations, finance, marketing, sales, to service – be aligned around creating and adding customer value. Applying a process improvement method across a corporation, beyond its manufacturing units, is consistent with an overall business system concept. However, to people in other functions it is not apparent whether these improvements concepts can be apply to work. This case study describes the application of UTC’s Achieving Competitive Excellence (ACE) business operating system and its results in the corporate auditing department. (Other case studies examine the application of ACE concepts in manufacturing, as well as engineering and cross-functional organizational settings.)

Background
IAD was formed in the mid-1990s when compliance and financial auditing groups in different UTC companies merged into one corporate unit. The new department reported to both the Auditing Committee of the UTC Board of Directors and the UTC Chief Financial Officer. IAD
aids the Board of Directors in meeting its fiduciary responsibilities by ensuring that its companies operating across the globe are properly reporting their results and have an adequate internal controls system. As UTC has grown, it has acquired companies and set up operations in many different countries. UTC has gone from fewer than 300 auditable companies in 2001 to over 600 auditable companies in 2007. Each of these companies has to be regularly audited. In the wake of high profile accounting scandals, such as Enron, Sarbanes-Oxley legislation, and some internal issues, UTC’s board started a policy in 2003 requiring audits at least every three years. Previously, IAD was performing audits based on a risk assessment with a five to seven year cycle.

![Image of the Internal Audit Department](image)

**Figure 1 Internal Audit Department (picture taken at annual meeting)**

**Auditors’ Work**

Auditors do most of their work in the field, but make efforts before arriving on site to ensure that the audit will proceed according to everyone’s expectations. When they visit the companies they collect the necessary data, interact with leaders, and observe operations. Notice with data requests is sent approximately forty-five days in advance of fieldwork to company leadership. IAD maintains a twelve month rolling plan of audits, so these notice letters should not surprise audited companies. Prior to their visit, the audit team meets with various stakeholders and scopes the upcoming audit based upon risk assessment of the company’s various business processes. Once on site, auditors meet with the company’s management team and its financial and IT professionals. These meeting are used to review and test internal controls and financial reporting accuracies. Financial audits cover expenditures (from purchasing to disbursements), revenue (from orders to cash received), production controls, inventory costing, treasury procedures, compliance with corporate policy, segregation of duties, and financial reporting. IT (Information Technology) audits focus on the use and maintenance of computer systems, telecommunications networks, operating controls, and security procedures. Depending on the risk assessment, IAD occasionally does simultaneous financial and IT audits. A combined audit takes more resources but increases the audit teams’ efficiency and effectiveness.

Auditors follow a standard approach to document internal control systems and perform tests on the data that they collect. Depending upon the audited company’s complexity and size, auditors collect data at different levels of detail. A typical audit is done by a team of two to four auditors who spend between two and four weeks on site. An audit of a sizeable corporation might require four to five auditors and take up to five weeks. The auditors’ visit concludes with a presentation of their report to the company management team, which provides an opportunity for the company leaders to comment, get clarifications, or request corrections. The team issues its audit
report to the corporate parent and UTC board after it has made any revisions and, if needed, reviews by IAD’s audit managers or directors.

A source for UTC’s financial management talent

When it was consolidated in the mid-1990s, IAD became a rotational organization. Its auditors were expected to stay for two years and its managers for three years, before moving to finance positions in UTC companies. IAD became an important source for developing future corporate leaders. UTC is a diversified conglomerate, managing its companies to high standards of operational and financial performance. Auditing skills translate well into financial management responsibilities and, as a department, IAD placed financial professionals in UTC.

Most auditors in IAD are hired with outside experience. Their UTC audit position provides them with an overview of UTC’s businesses, and their exposure helps in placing them in subsequent management positions. One-third to one-half of IAD’s auditors rotates into new positions each year. The IAD headcount, when studied in 2006, fluctuated between 80 and 100 people, representing 21 nationalities and 30 languages. IAD has offices in Hartford, Paris, Romania, New Delhi, Singapore and Shanghai. The auditors have an average of 10 years financial management experience, with nearly one-half having professional certifications (such as a Certified Public Accountant or its equivalent in other countries) and one-third having university masters degrees.

Figure 2 IAD office locations
IAD Performance Changes

ACE became a UTC-wide focus in 1998, leading to some initial efforts at IAD. Significant activities that gathered momentum and produced results from ACE began in 2002. Before 1998, IAD had also implemented changes, but they were not carried out with the focus that ACE brought. IAD’s efforts from 2002 to 2007 are noteworthy. People in the department attributed ACE efforts as producing improvements across the board for the business, customers, and the people involved. These significant, cumulative changes are summarized in Table 1.

- **Quality**: Improvements in measures, tools and processes for auditing companies
  - Developing business processes and standard work for
    - One standard audit process
    - Work programs
    - Audit planning
    - Small entity audit
    - Hiring and placement
    - Obtaining director concurrence on audit rating
  - Development and enhancements to Auditor Assistant software to support business processes, generate metrics, manage process feedback, and capture improvement suggestions
  - Awarded distinction of “Best In Class” ranking by external audit peer review group

- **Customer Satisfaction**: Measured by surveys to audited entities starting in 2003 (after numerous improvements were implemented, increased from not being measured to 6.0 in 2003, to 6.3 in 2006 (on a seven-point scale).

- **Performance**: Improvements in operational activities in terms of on-time delivery, reliability, and efficiency.
  - On-time delivery of audit report (within 14 days) improved from 32% to 99%
  - 33% productivity improvements, from 2.1 to 2.8 reports per auditor annually
  - Development and use of process metrics and performance dashboard

- **Staffing**: meeting IAD staffing plans while supporting rotation of finance talent into UTC companies and reducing the use of recruiting firms for hiring from 60% to 25%

- **Employee satisfaction**: increase of survey satisfaction scores from 61% to 79%

- **Learning**: Continuing leadership attention along with auditor, and support staff participation in ACE and improvement initiatives.

**Table 1 Summary of IAD Improvements, 2002 to 2006**

A review of metrics provides quantitative data that confirms IAD’s consistent and steady improvement from 2002 (see Figure 3). Of note is that the graph shows an initial decrease in reports completed and auditor productivity. The improvement efforts required auditors to spend some of their time defining and establishing standard processes and work routines, agreeing to metrics, and developing feedback mechanisms (see Figure 4, ACE efforts over time). The most immediate and dramatic improvement came from on-time delivery (reports generated within 14 days of client meeting). Prior to ACE efforts, on-time delivery had not been a topic of concern and had not been measured. The delivery time improvement has been maintained, although results decreased slightly in the last year, from 99% in 2006 to 97% in 2007. IAD’s accomplishments reflect their attention to process and its metrics, and once established, employees working on improvement teams could reliably use ACE tools to implement changes that improved work processes.
A time line is helpful in providing a record of IAD’s changes (see Figure 4). There is a correlation between different ACE team initiatives and the qualifying, Bronze, Silver, Gold and Gold Recertification levels which were achieved and operational results. This time line also shows important capabilities developed prior to ACE, such as the implementation of the Lotus Notes-based Auditor Assistant software and electronic work papers for audit in 1999. Computer programs were also later enhanced to support process improvements developed through ACE initiatives. That technological infrastructure, along with the training and teaming, helped to diffuse improvements across IAD’s audit teams in its different office locations throughout the world.
1998 – ACE adopted across UTC

ACE Director

ACE Pilot

1999 - Audits done with electronic work papers

1998 – ACE adopted across UTC

ACE Events & Activities

Began to use ACE tools, three teams:
- Standard work & measurable impact
- Turnback tool
- Audited company survey

Annual planning process team:
- Standard work & measurable impact

Work program team:

- Robust hiring & placement processes
- Internal peer review process implemented
- Concurring director review process & ratings analysis tool
- Performance dashboards developed

External peer review validated IAD as “best in class”

Sarbanes-Oxley integrated to audit process

Revised small company audit process implemented

Pilot orientation & training improvements

Compliance & IS audit processes: tactical/strategic improvements – customer focused

$ 435 K saving in talent sourcing

$ 466 K in productivity savings

Passport process to sustain change

ACE qualifying

2/04 ACE bronze

12/04 ACE silver

11/05 Internal Audit a gold site

3/07 Internal Audit recertified as gold site

CFO: ACE level improvement

Keith Rivers

Tom Miller

David Scott-Walton

Ray Gandy

Peter Correia

Timea Ujfalusi

Emma Gilli

Mike Mangiameli

Stephanie Lundstrom

Peter Correia

Emma Gilli

Mike Mangiameli

Stephanie Lundstrom

Figure 2 Time line of IAD’s leaders, ACE Milestones, Events and Activities

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IAD ACE Case Study Themes

The focus of this case study is IAD’s change process. Data has been taken from interviews, observation of IAD ACE Gold recertification assessment, and data collection that took place between March and November of 2007. Whenever possible, people were interviewed face-to-face, often in their current UTC company location. Internationally-based IAD personnel were interviewed by telephone. An analysis of data, presentations, and eighteen interviews led to the development of six themes for describing IAD’s changes. The theme titles are shown in Table 2 and described in the sections that follow.

Table 2 IAD ACE Case Study Themes

1. Improvements before 2002 create a foundation
2. Systematic examination identifies opportunities and priorities
3. Increases in commitment enables a collective focus
4. Points of resistance are encountered and addressed
5. Turning points are indications of significant progress
6. Ongoing challenges remain to be addressed

Improvements before 2002 create a foundation

In the midst of a dynamic external business environment, IAD has undergone a set of internal changes. The department was formed in 1994 by consolidating auditing personnel from seven departments in different UTC companies into one corporate department. Keith Rivers joined UTC from General Dynamics as a manager in the new department. He left IAD in 1997 to become Sikorsky’s controller and returned in June of 1999 to become IAD’s director. His objective at the time was to establish a “continuous improvement agenda” for the department. With staff rotating every two or three years, it is important that everyone contribute improvements. Also, with auditors in offices across the globe, UTC’s executives want audits to be done in a more consistent and standard way. “Audit reports and how companies are rated is an extremely sensitive matter,” Rivers noted, and “one that is important to do consistently” because the presidents of these businesses also sit on the UTC corporate audit committee.

At the end of 1999, IAD introduced an “Auditor Assistant” program that included electronic work papers. Auditor Assistant is Lotus Notes software based application that manages audit process steps and audit report creation. Prior to Auditor Assistant, auditors used and modified paper-based forms or Microsoft Word documents to create audit reports. Each audit was “heavily customized,” and auditors worked from different locally-established starting points. With electronic work papers all auditors started from the same templates, which they then altered to fit specific audit needs. Auditor Assistant was the software program designed to manage templates and create documents, but more standardization in developing the templates was still needed. The implementation of Auditor Assistant was, however, a technological basis for future process standardization and enhancements efforts.

In 1998, UTC corporate began to promote ACE across all of its companies, including corporate staff departments, as the approach to improvement. In 2001, when Rivers had completed hiring
new regional directors, the directors all attended a one-week Ito University ACE course. The common ACE course experience was followed up with regular discussions at the directors’ quarterly face-to-face meetings. The initial topic was how to approach and prioritize IAD’s process improvement efforts. Each regional director led a team and efforts were made to collect data on audit processes. One of these teams that was headed by a regional director and staffed by auditors specified details for Auditor Assistant. Another one of the teams focused on IAD’s audit process. This team used the Quality Clinic Process Charting (QCPC) method to collect metric and examine its steps.

QCPC is a five-step process that specifies how a team is to collect data to develop and prioritize its work process improvement projects. The QCPC method begins with forming a team and having its members use standard symbols (input, operation, decision, measurement and output) to draw process flow diagrams on their work. The team then uses the flow diagram to develop a QCPC Summary Chart. The summary chart provides a framework to collect data, including time taken, frequency, and “turnbacks” on each process step as well as on overall process performance. UTC uses the word “turnback” for any condition that hinders the flawless completion of a step, such as quality problems, unclear instructions, incomplete paperwork, lateness, or machine troubles. Once data is collected, the QCPC second step is to display process information and turnback data in graphical form. The third QCPC step is analysis, such as the development of Pareto charts for turnbacks. The analysis leads to the fourth step, which is the formation and prioritization of improvement projects. The improvement projects focus on corrective actions for turnbacks. Finally, the fifth QCPC step is to take action, followed by documenting results and a team success celebration. The QCPC process is intended to engage people; all steps are to be collectively carried out. People learn while doing, as teams are often taught, facilitated, and helped through these steps by experience experts.

Examining Audit Processes

IAD’s QCPC team that focused on their audit process struggled. IAD’s audit processes were not only not well specified, but also varied significantly in each region. Based on historical developments tailored to local preferences, auditors in each region of the world conducted audits and reported results differently. UTC board members and company presidents wanted similar reports for each of their audit entities. Audit process improvements languished in the face of these challenges. When, in 2002, then UTC CFO Dave Fitzpatrick put forth the challenge that all the organizations reporting to him would improve by one ACE level, it reinvigorated IAD’s efforts. Rivers thoughts at that time were as follows:

ACE was the perfect opportunity for us to do many of the things that we want to do. It took us two years to get that organized and get it in place and get it to a point where people were comfortable with it. But it was something that we had to do regardless of whether or not we had an ACE program. We already had many initiatives going, and why not get credit for those? It allowed us to wrap many of the things that we wanted to do under the ACE initiative, and then start our process for [ACE] qualification.

Rivers wanted one of the “high-potential” auditors to become their ACE Pilot. After a discussion in the next regional directors’ meeting, Peter Correia was picked for this job. His manager, Tom Miller, one of the regional directors, became IAD’s ACE Director. As his manager, Miller ensures that Correia had the training and support needed to lead IAD’s ACE efforts. As the ACE Pilot, Correia reviewed activities and reported progress at the regional
directors’ quarterly meetings. Correia noted that it was an honor to be selected as the ACE Pilot, and it provided him with an opportunity to work directly with the regional directors. River’s leadership style was to be inclusive and to delegate responsibility. IAD’s strategies were developed and discussed by all the regional directors before one was put in charge of implementation. These factors, which included department history, previous standardization efforts, Auditor Assistant implementation, UTC’s ACE focus, leadership by regional directors, and a dedicated ACE Pilot set the stage for IAD’s next steps.

**Systematic examination identifies opportunities and priorities**

IAD’s five regional directors (directors were responsible for financial audits in US, Europe and Asia, IT audit, and aerospace compliance audit) collectively discussed what affected performance and hence what their major opportunities were for improving quality and productivity. Their discussions helped to align their thinking and communicated this information to the auditors and managers in the department. They prioritized and sequenced improvement efforts which enabled IAD to put in place initial improvements and extend them with additional initiatives. The following section describes the cumulative nature of these efforts.

**Setting Priorities**

In reflecting on their ACE efforts, what regional directors, managers, and auditors all mentioned that helped their progress was a distribution of leadership responsibilities. The regional directors’ involvement in discussing options created alignment amongst each other as they set goals and priorities. The highest priority was in developing a common audit process. The planning of audits was the second priority. Differences in how audits were done regionally resulted in varied report formats, making it difficult to exchange people, which then complicated making and achieving annual plans. The third priority involved building on capabilities enabled by the Auditor Assistant software. They had the computer system in place, but it needed more comprehensive “work programs.” Although work programs, which are the instructions for conducting audit steps, were stored and accessible on Auditor Assistant, each region had its own “pet steps” used locally. These three priorities were interrelated and collectively affected audit performance and quality. Once they had selected and set priorities, the regional directors sought people from their regions to lead and staff ACE teams.

**Team Efforts**

One of the ACE efforts was for “the standard audit process” team. The kickoff meeting included two to three people from Europe, Asia and the Americas. Each individual was experienced and knowledgeable on how they conducted audit processes locally. The team initially met and worked together for two weeks outside Hartford, Connecticut, in January, 2003. An auditor at the time, who would become the next ACE Pilot, Timea Ujfalusi, commented on her participation.

*We were assigned for a two week off site project, meaning that none of us had audit responsibility for that time. For those two weeks we went to the US office. We had ten people, from IT as well as financial, operational, and compliance auditors, from staff to senior auditors, and from different regions. The mix of the group was good, and every aspect of audit process was covered. Peter [Correia] was the leader. We mapped out our processes, and identified differences, opportunities, and parking lot items. We had many items on each. Also, we mapped out a future audit process. First was the ‘as is’
then the next step was the ‘to be’ map. We were using the process mapping tool as we would use in an audit, which was an advantage, that we had a process thinking background in our group.

After the two weeks in the US, we defined the ‘to be’ process, documented our internal procedures, what is required at every single step of the process. During the ‘to be’ process mapping we defined key metrics to measure the new process. We had pilot runs in different regions; I was leading one in Europe, using the new audit process. We got initial feedback, pulled together training and rolled out the new audit process.

Facilitated by Correia, the first week involved people creating a detailed map of their audit process and examining their process map relative to audited company feedback. By combining elements of the three geographical audit process maps, the team collectively developed a proposed standard audit process by the second week. Several team members worked together for a third week. They presented their findings to the regional directors at their quarterly meeting, and gained their agreement for what would become IAD’s standard audit process. This effort – assigning auditors for two or three weeks and taking a week of their own time – was an example IAD leadership’s commitment to supporting ACE improvements.

Implementing Improvements
With the regional directors’ agreement on a standard audit process, Correia led a team over the next four to five months in developing details, testing, and then preparing for June and July training sessions which would introduce the standard audit process. This standard audit process became the baseline process that subsequent ACE teams would continue to work from. Ongoing ACE teams collect audit process statistics, customer feedback data, and turnback reports to evolve the standard audit process.

Correia replicated this approach – gathering a team of people, having them collect process data, mapping out their current processes, defining a new process, collecting process metrics, examining customer feedback, and using turnback reports and improvement suggestions – to facilitate subsequent ACE teams tasked with improving IAD’s annual planning efforts and creating better work program instructions. Applying ACE tools and methods – Quality Control Process Clinics (QCPC), process mapping, using customer feedback (using an approach called Market Feedback and Analysis (MFA)), and doing turnback data analysis using Pareto Charts and Relentless Root Cause Analysis (RRCA) – were the methods that they used. These methods were applied to the standard audit process, annual planning process, and work programs. Based on these efforts, IAD achieved ACE Qualifying status in 2003 and ACE Bronze status in February, 2004. The criteria for these ACE achievement levels include demonstration of awareness, education, activities, and an appropriate use of tools and methods.

Building a Foundation
Establishing the foundation for continuous improvement is neither an easy nor a simple task. It involves assigning individuals to a team, defining processes and measures, collecting performance, customer feedback, and turnback data, and implementing changes. In the process of these activities, individuals must learn new methods, collect data, conduct analyses, and propose improvements. These improvement activities take place while the organization strives to maintain its output and team members face pressures do their normal work. IAD’s
improvement progress was aided by the department and regional directors’ involvement and each making ACE a priority.

What helped IAD adopt ACE methods was the consistency between the approach and an auditor’s mindset and experience. For example, auditors use process mapping tools in audit. There are philosophical similarities between audit and ACE values, such as an acceptance of benefits from following standard procedures. The initial thoughtful and systematic planning of the directors also helped the people in IAD embrace ACE. David Scott-Walton, one of IAD’s regional directors, commented on the initial ACE efforts.

Within Internal Audit, we had done a very good up front job defining our processes: Where were they in terms of impact and maturity and making good decisions as to the order to approach those processes. A lot of people get to ACE Bronze and only then put together a road map for how they will get to Silver and Gold. When I look back, we had the roadmap to Gold when we started. We knew that we needed to standardize our audit and our annual planning processes. We got those, continued to improve them through Silver and Gold, with the metrics, tracking and continuous improvement that we had from the start.

We used the ACE tools to support us in driving a continuous process focusing on improvement and standardization. The effort was to improve the process and get standardization throughout the department. When it came to the ACE assessment, we were not looking at the minimum criteria to pass. We didn’t approach it that way, like some of our audit clients often do. We attacked ACE with a passion to improve, and the ACE medals were just an outcome of pursuing improvement.

To set IAD’s accomplishment in context, Scott-Walton compared it with the ACE implementation in his current organization. Here the initial efforts to achieve ACE Bronze had not created the foundation needed for future progress. He had to “put everything that they had done for Qualifying and Bronze to one side and start all over again.” They did not do what IAD had done, which was a “good job of up front defining its processes, where they were in terms of impact and maturity, and making good decisions as to the order and approach these processes. When IAD started, they had the roadmap to Gold already.” Also, Scott-Walton’s current organization did not have an equivalent of Auditor Assistant and its work program library. The “one audit process” implemented in the Auditor Assistant helped to reinforce audit process standardization.

Feedback Foundation for Continuous Improvement

The systematic approach that characterized IAD’s early ACE efforts included collecting and using process information. Any time an auditor undertook a task that did not proceed as expected, he or she was asked to report a “turnback.” UTC defines a “turnback” as anything that prevents a process from delivering first-pass-through (100% completeness and accuracy) without delays or re-work in the shortest possible time. A turnback is also defined as “waste” and should be seen as a “golden nugget.” A turnback is waste because it does not add customer value, but instead inhibits accomplishing the desired outcome. A turnback is a “golden nugget”

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1 Details on turnbacks are taken from Achieving Competitive Excellence, United Technologies Operating System Booklet, in Quality Clinic Process Charts description, page 20, May 31, 2006 printing date.
because it provides information on the underlying process. An analysis of turnbacks determines why and how turnbacks occurred, and is used to improve the process that generated it.

Most employee feedback systems face two broad challenges. One challenge is getting employees to take the time to report problems, rather than work around or hide problems. IAD made reporting easy by embedding a reporting tool in Auditor Assistant. Auditors can quickly and easily log turnbacks as well as process improvement suggestions (a process improvement suggestion is different from a turnback in that it is not an error or impediment, but rather a suggestion for improving the current process). ACE teams conducted projects to simplify the process for generating as well as responding to turnbacks and process improvements. The second feedback challenge is the ability of the organization to respond in a timely and appropriate manner. Employees test feedback systems when making suggestions. If they do not get a timely response or get information for what happened to their suggestion, they do not get the motivation and confidence for making further suggestions.

IAD logs approximately 300 turnbacks and process improvements annually: 333 in 2004, 235 in 2005, 380 in 2006, and 370 in 2007. An ACE turnbacks team responds to turnbacks, allocates each to an appropriate ACE team (i.e. for work programs, planning, performance dashboards, recruiting, placement, and so on), and then tracks and reports turnback metrics. Submissions are acknowledged to originators in 24 hours, and they are later always given notification of what was done once the ACE team to whom it was allocated has completed its work. The turnback teams use process improvement methods, such as root cause analysis and Pareto charts, to determine and implement fixes. Turnbacks that are over 120 days outstanding were individually reviewed at each regional director’s meeting.

IAD began logging and tracking turnback and process improvements as part of its ACE efforts. Examining this data, which was available from 2004, provides quantitative information of IAD’s improvement efforts and employees’ engagement. The turnback and suggestions across different regions shows the involvement of people in all of its regions (Europe, Asia and Americas, and Information Systems (IS) auditors report as their own region; see Figure 3). From these

![Figure 3 Turnback and Process Improvement Suggestions by Region, 2004 to 2007.](image-url)
employee feedback numbers, it can be seen that the number of turnbacks and improvement suggestions changed over time. As shown in Figure 4a, there were many more turnbacks – items disrupting the completion of audit work – initially, in years 2004 and 2005. In 2006 and 2007, there were nearly the same or slightly more process improvement suggestions than turnbacks.

![Figure 4a Frequency Count for Turnback and Process Improvement Suggestions, 2004 – 2007.](image)

![Figure 4b Days Outstanding](image)

These numbers show that the changes made from turnbacks dominated improvement and change efforts initially, with there being more of a balance found later between responses to problems and suggestions for improvement. It is important to note that although there were initially fewer process improvement suggestions, the suggestions took considerable time to address, as shown by the average days outstanding in Figure 4b. These data show an improvement dynamic – initial change created problems which were more quickly resolved, and opportunities for process improvements, which took a longer period to address. During these times of change, there was a shift from resolving errors to making process improvements, and as errors were addressed, suggestions and activities shifted to process improvements. Over time, the abilities to more quickly respond and resolve errors and suggestions improved and these improved response times were sustained over time (see Figure 4b). Using an average of ninety employees, the reported errors and suggestions is roughly three per employee annually. While this average is reasonable for typical American firms, it is short of the one suggestion per employee per month proposed by some experts as indicative of good feedback systems.

**Increases in commitment enable a collective focus**

Learning and using ACE methods to improve performance required a deliberate effort by managers and employees. Auditors described their work as pressured by client schedules and complicated by ACE project time demands. In order to improve future working conditions, current actions had to be taken to improve, streamline, or automate processes. Every auditor was asked to participate on at least one ACE team. Teams with international members had a hard time convening meetings, even if only by phone. The typical conference call time was early morning in the US, which was afternoon in Europe and early evening in Asia. This timing required auditors in the US and Asia to extend their workdays. An ACE metric is employee

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satisfaction, which is measured in annual surveys. Asking people to do more work and be involved in improvement teams might create stress and declining satisfaction. This section describes what IAD did to accomplish performance, improvement, and job satisfaction goals, which seem to be a conflict in theory but in practice were correlated.

When UTC’s CFO asked each unit reporting to him to improve by one ACE level in 2002, IAD director Rivers put the challenge to the regional directors. He suggested that they not just “do” ACE, but use ACE to accomplish their goals. Until then, IAD efforts to develop standard work and use QCPC methods were difficult. IAD did not have a standard process, but many slightly different, customized processes. This customization was not valued by IAD’s key customers – company presidents and UTC’s board of directors’ auditing committee. What regional directors described as a “consensus-oriented management style,” Rivers required them to decide before they acted. Rivers was not driving ACE; he delegated these details to the regional directors acting as a team and working with their ACE pilot.

IAD’s ACE assessment for the Qualifying level, which took place in the middle of 2003, was based on examining what they had done to improve their standard audit process, work programs, and annual planning process. The assessor commented that IAD’s improvements were at the time already near the ACE Bronze level. The Qualifying criterion is based on achievements in awareness education as well as identifying, prioritizing, and eliminating waste from key processes. The next level, Bronze, requires additional training, greater employee involvement, an evaluation of tool applications in the examination of demonstrated process improvements.

**Worse before Better**

The ACE Bronze assessment took place in February, 2004. Audit report on-time delivery, measured by the percentage of audits closed within 14 days of the client meeting, improved from 32% in 2002 to 70% in 2003. During this time the number of audits conducted declined from 179 to 151, while auditor headcount increased from 86 to 89 people. IAD had bettered its processes and improved its on-time delivery, but its productivity had declined 18% (IAD is not capacity constrained; there were more audits that should have done in 2003). What was a worse-before-better result is not surprising given the time needed for people to learn to use ACE tools and establish new processes.

The investment of time in ACE efforts represented a significant percentage of the department’s work capacity. Examining auditors’ time sheet data, ACE projects represented 600 and 800 annual man-days (the number of auditors ranged between 67 and 75 people, and these number do not include the efforts of regional managers, operations, and administrative personnel). Subtracting overhead (auditors average 38 weeks of audit work per year after subtracting vacation, sickness, meetings, and training), ACE efforts consume 4.5 to 6.5% of IAD’s work capacity, depending on the year. Audit managers were more active, ranging between 3.5 and 4.5 weeks per year, while audit staff ranged between 1.2 and 2 weeks per year between 2004 and 2007 (see Figure 4). These figures are averages; some people were more active than others (IAD went from 75% to 100% participation from 2002 to 2007). Records of ACE activity were unavailable before 2003, however, when people would have spent even greater portions of their time on the initial ACE projects. One former auditor commented that he regularly spent four to six hours per week on these projects. His involvement often entailed conference calls, which were in the early morning, so they were not included in his time sheet (auditors report 40 hours per week, but they regularly work additional hours). It is likely that the numbers taken from

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auditors’ time sheets are conservative, suggesting that improvement effort might have been even greater. This data shows that ACE represented a significant investment and commitment for IAD.

Figure 4 ACE efforts over time by audit managers and staff

From Requiring Participation to Promoting Contribution

What brought about a psychological commitment to ACE in IAD? Several factors were described by people in the department. The current 100% participation in ACE is because people are now asked to either choose or be assigned to an ACE team. This requirement makes participation mandatory and everyone involved in improvement efforts has become IAD’s accepted way of working. Gaining this acceptance has been aided by the department’s rotational character. New people regularly join the department, ACE participation expectations are communicated, and everyone’s involvement is visible. These newcomer gain immediate benefits from the straightforward ways that work is conducted, deriving from standard audit processes, work programs, turnback reporting, process improvement suggestions, visual workplace, and other past improvement projects. The new auditors benefit from a legacy of process improvements and it is expected that they to contribute to new improvement activities.

Leaders’ consistent actions have created this positive attitude in ACE. ACE activities started with Rivers’ leadership; he and his management team attended ACE training and regularly took time in their monthly meetings to discuss ACE efforts. As a team they planned the department’s activities, set priorities, selected projects, assigned people, and themselves led efforts.
Improvement Started by Satisfying Customers

A change in the intensity of ACE efforts began in 2004. After four years as IAD director, Rivers took a promotion to become Hamilton Sundstrand’s controller. Deb Carreau, who had joined UTC as a controller for Carrier in 1998, became the new IAD director. While at Carrier she had taken the week long Ito University course covering ACE basics. At the time, the course was manufacturing-focused and difficult to apply to financial work. In the last three years she had managed UTC’s Shared Business Services Department. Shared Business Services was created in 1999 to consolidate accounts payable, payroll, and travel processing functions for UTC companies. The people who did these functions from Sikorsky, Carrier, Otis and Chubb were reassigned to Shared Business Services. The 250 people now in one department, however, maintained their original company ways. Customers were unhappy and many considered going to outside firms for these functions. With these troubles, the department manager had left and his position was vacant for six months.

When Carreau took over as department manager, she recalled the situation as follows. “I don’t want to say it was a disaster, but it was chaotic.” The payroll manager had to go before the UTC’s president’s council to address their problems (the department processed payroll for 75,000 employees). With companies ready to pull out, and scrutiny from UTC executives, immediate action was needed. Morale was low, many regular employees had quit, and 40% of the payroll department was staffed by temps. The premise for merging these functions from different companies into one department had been cost savings. The former department manager’s focus was almost exclusively on reducing people and costs. Carreau’s focus was different, “nothing matters more than making your customer satisfied.” Her thinking was as follows:

If we can do satisfy our customers, then we can begin standardizing, improving our processes, and lowering costs... ACE methodology, and just the philosophy of ACE, begins with your customer. It was so key to what we needed to accomplish at Shared Business Services. We had extensive training in ACE. Instead of trying to find a person responsible for a mistake, we started talking about root cause analysis, about doing a fishbone, or about doing the five whys.

From what she had seen in ACE classes, it all applied to payroll; “instead of manufacturing a widget, my department was producing payroll checks for 75,000 employees.” Using these methods, payroll performance and other Shared Business Services functions rapidly improved. In explaining these changes, Carreau said, “It wasn’t me alone. Frankly, there were two-hundred-and-fifty great people working with me that led this turnaround.” In two years, Shared Business Services progressed through ACE Qualifying, Bronze and Silver levels.

Previous Experience enables Future Commitment

Carreau came into IAD with a “hands on” leadership style. Rivers was, in the words of employees, “a bit relaxed, going at his own pace,” or “driving toward consensus,” Carreau was “goal and delivery oriented.” She had ideas, clearly set targets, and she practiced a direct yet participative management style. People credited Carreau with “accelerating the journey.” In her own words, she said:
IAD had passed the ACE Bronze assessment and set its targets on ACE Silver, initiating a new set of ACE projects. These new projects were to improve personnel process (hiring, orientation, and placement), develop a performance dashboard, and specify a standard process for peer audit reviews. To make ACE efforts less centered on the corporate United States office, Europeans would lead the next phase. Timea Ujfalusi was selected as the ACE Pilot. She had joined UTC in November 2000 as a senior auditor in the United Kingdom office and was promoted to audit manager at the end of 2002. Her goal was to achieve ACE Silver. The regional director for Europe, Ujfalusi’s boss, David Scott-Walton, became IAD’s ACE Director.

In the February 2004 Bronze assessment, assessors told that IAD it was already close to Silver level. Given their progress, Ujfalusi was assigned half-time on ACE and half-time on audit. Ujfalusi had made process improvement suggestions and been on the standard audit and work program ACE teams. She recalled spending twenty to thirty percent of her time on these two ACE projects. She accepted the ACE Pilot role, not realizing the time commitment that it would require.

### Increased Improvement Activities

The number of improvement activities increased as IAD moved toward ACE Silver. For Qualifying and Bronze levels, the focus was on establishing controls for IAD’s major processes. IAD’s major processes were standard audit process, work programs, and annual planning. To meet the ACE Silver requirements seven teams each worked on concurrent projects – 1) achieving audit plan, 2) hiring and placement, 3) Sarbanes Oxley, 4) peer review, 5) productivity improvement, 6) turnback improvement, and 7) customer survey improvement. There were also three “sustaining” ACE teams for standard audit process, work programs, and annual planning, along with 6S activities (cleaning, organizing, documenting, and assessing workplaces). Each ACE teams had a designated leader, was championed by a regional director, and included team members from each geography. Ujfalusi recalled her role as ACE Pilot shifting from what she had done previously in working on projects to finding people to just be on projects. Her time was spent keeping all these projects running. She was not leading any projects per se, but was a member of each team. She traveled regularly to the United States but, in retrospect, she said that should have spent even more time at headquarters. It was not easy to communicate or get decisions made from Europe; whereas in the US she could have done this by walking down the hall to talk with people.

The ACE Silver assessment took place ten months after achieving Bronze certification, on December 1, 2004. The accomplishments IAD presented included consistently achieving audit plans, productivity savings from process improvements in small company audits estimated at $466,000 annually (11% improvement on companies up to $20 M turnover and 35% improvement on companies between $20 and $50 M turnover), talent sourcing savings from lower recruitment cost between 2001 and 2004 of $435,000, improvements in customer survey scores and survey response rates, and better delivery results in issuing audit reports and closing
databases. IAD’s Silver assessment presentation included other ACE-related activities: 6S activities, internal and concurring directors review processes, and performance dashboard evolution. The assessors commented, in granting ACE Silver certification, that IAD was already well positioned for an ACE Gold assessment. ACE Gold requires 12 months of consistent performance, along with reviews of process certification and improvement activities. Essentially, IAD had to demonstrate that it could be maintain performances established at the Silver level. A benchmarking project was also required to compare IAD’s performance relative to “world class” auditing. Figure 4 shows the slate of improvement projects that IAD initiated for each ACE level. These efforts were cumulative; they all built upon each other and created further improvements. As IAD’s productivity and quality improved (see Figure 1 for financial and operational metrics), auditors created the time needed for current and new ACE initiatives.

**Figure 5 IAD ACE Journey and Accomplishments**
(from 3/27/07 IAD Gold Recertification Presentation)

**Points of resistance are encountered and addressed**

At each level of ACE certification, IAD’s efforts seemed to have it poised for the subsequent step. It was not that IAD’s regional directors created an initial plan they continued to follow, but that they made initial choices to create a foundation that could be refined. That foundation was not in a specific plan or process, but in establishing shared responsibility and having ongoing discussions about current progress and future priorities for leading changes among regional directors. Progress and change, however, was not without resistance from auditors. ACE projects required significant effort in collecting data, analyzing it, and proposing changes. Benefits were not realized until changes were implemented, which required auditors to put in more time in creating documentation and training. Leaders’ involvements were essential not
only for planning improvement efforts and championing ACE teams, but as an active part of encourage auditors and keeping efforts on course.

**Dealing with time demands**

Shortly after Carreau became director in November 2003, IAD achieved ACE Bronze and focused on Silver and then Gold goals. For each new ACE level, existing project activities continued and new efforts were launched. For processes defined in Bronze (one audit process, work programs, annual planning, turnback tracking, hiring and placement, and audit review), sustaining teams responded to turnback reports and improvement suggestions. For Silver, new teams focused on projects specifying peer review, concurring director review, small company audit, project development (Passport method), and consulting processes. A regional director sponsored each ACE team, while auditors and managers staffed the teams that carried out the work. The ACE Pilots – Timea Ujfalsu for Silver, followed by Emma Gilli for Gold and Mike Mangiameli for Gold recertification – coordinated, facilitated, and supported team activities. All ACE teams followed a similar approach. They collected information to assess the current process or situation, developed proposals for alternative processes that would perform better, sought support and approval from regional directors their proposals, and, once approved, implemented changes and created the needed documentation and training. Carreau’s expectation was that everyone would be an active member of at least one ACE team. Team members that showed commitment and demonstrated skills were asked to step up to lead ACE teams as the current leaders rotated out of IAD into other UTC positions.

IAD’s regional directors were careful in their language when responding to auditors’ concerns about the extra work required. They did not emphasize increasing productivity or exclusively focus on metrics, but talked about what they wanted to accomplish in terms of desired behaviors. For example, faster report closings are the desired behavior. This behavior could be accomplished by improving methods and streamlining report issuing. In another example, instead of asking for an MFA (market feedback and analysis), managers asked if the team had talked to customers. Leaders dealt with auditors’ resistance by showing them how what they already did related to ACE. For example, process maps were used in audits. By going further with audit process maps, adding resource and lead time information, managers showed auditors that they were essentially creating value stream maps.

**Creating an ACE culture**

Audit work is time consuming and labor intensive. In compiling their reports, auditors go through a company’s books, make observations, and conduct interviews. During the audit, the auditors stay in a nearby hotel and work long hours. ACE efforts took additional time. Many of the auditors involved in ACE projects that took place between 2002 and 2004 were now in other UTC jobs, and could be interviewed. An auditor during that time, now a finance manager at an UTC company, recalled his IAD ACE experiences. He was on the Work Programs team, helping to develop a turnback reporting tool. At the time IAD was progressing to ACE Bronze. He recalled, “ACE was quite painful. It involved quite a bit of extra work, and it wasn’t clear what benefit that extra work provided.” The goal was to standardize work programs across the three regions, and someone from each region had to be involved to ensure that solutions locally. His team had regular conference calls, there was significant activity, which, he went on to say, was difficult because he did not have a vision for where they were going. They developed an Excel spreadsheet that enabled auditors to report and track turnbacks (turnback reporting has since been integrated into the Auditor Assistant system).
This auditor’s experience illustrated change dynamics. Initial efforts make some progress, and are built upon and improved, like turnback tracking, so that it becomes routine work. New people regularly rotating into the department, use tools, are assigned to ACE teams and, as a whole, people stay fresh and motivated. When a new auditor asks, “Why are we doing ACE?” it is a part of and not separate from your work. “Being on an ACE team is essentially improving the way you work and how you do your job,” is how an ACE Pilot expressed his response to this question. Another ACE Pilot recognized this challenge saying, “If you don’t ingrain the ACE culture and make it part of your processes, people will act as if it is a separate activity and see it as another job function.”

ACE training is one full day out of IAD’s one-week orientation program, and new auditors are soon members of an ACE team. A rotational department has an advantage in instilling a new culture, which Carreau described as follows.

Half the group is brand-new to UTC every year. So, they are not mired in the way things have been done. In fact, they come into the group with great new ideas, wanting to make a name for themselves, wanting to contribute, to lead, and to be part of a team. They are really open to change.

One of the ways people resisted ACE was by failing to report turnbacks. Without reporting disruptions, there is no feedback to guide improvement activities. Auditors working in other UTC companies often contrasted that situation with what they had experienced in IAD. In one example, an auditor described his current company’s ACE efforts. People were told to “pick a process and try to improve it.” The efforts were “very spotty,” in part because the boss told them what to, and in part because they had a focus to “do what you’re told by the assessor.” In this setting, ACE was “pretty much seen as added work.”

Turning points are indications of significant progress
Organizations can promote change and lessen resistance by bringing in new people. IAD regularly changed its people, thereby lessening any resistance. The leaders, IAD’s regional directors, had the longest tenure and as a team had bought into and led ACE efforts. Corporate UTC ACE efforts – including UTC executives’ involvement, an ACE office, and tools, methods, policies, web site resources, and training programs – encouraged IAD’s directors. The following section describes changes that took place – moving from a focus on activities to achieving results, improving IAD’s value stream for bringing financial talent into UTC, making ongoing change routine, and creating an approach for maintaining high performance.

Focus on results rather than activities
The corporate ACE commitments helped the “stick-to-it-ness” of IAD’s directors, both of which helped the ACE teams. Correia, the first ACE Pilot, said that initial activities involved a check-the-box approach: “We had ACE criteria; we looked at audit, our processes, and what can we improve upon?” The ACE criteria involved counting activities which led to checking boxes. Later, a change in ACE criteria supported an approach directed at achieving business benefits rather than just checking off activities. An Asia-based auditor involved in ACE projects recalls his initial experience and how it changed over time as follows:
At beginning ACE was pushed down to us... the calls in Asia were late at night, to accommodate the US and Europe, between 8 and 9 PM. At that time of day you were full with your daily work. You are back in the hotel, and just join the call, and they would be an hour to an hour and a half long. I’m not sure that participation was that intense. People would be quiet and share ideas. Sitting in conference calls, people were not that involved.

Reflecting on what changed over time, he made the following observation:

*It was progressive. For ACE Qualifying, it was mostly US people, international people were not that involved. As you moved to Bronze, you have to get a full force engaged, involve more of the regional people. When we went for Silver, it was more comprehensive. Everyone was involved. I don’t think at the early stages people got that much involved. Today everyone is part of an ACE team.*

What changed over time was that IAD developed a process-centric way of operating supported by an appropriate technical infrastructure. Once established, ACE teams were sustaining key processes by addressing turnbacks and process improvement suggestions to implement ongoing changes. There was a great deal of effort involved in establishing baseline processes, as this auditor comments, it is now “more of a routine type work and people are more engaged.” Initial performance and productivity gains enabled continued efforts. The productivity gains enabled auditors to work smarter, rather than harder. These changes were initially helpful to support continuing improvement and later became necessary to getting its work done.

In 2002, a significant issue was found at a small UTC company. The company where the issue occurred had not been audited, and the audit committee now wanted every UTC entity audited every three years. Adding to the demand for company audits was UTC’s acquisitions. The number of entities to be audited grew from 300 in 1999 to over 450 in 2003 (UTC had over 525 entities by 2006, and a doubling of corporate revenues since 1999). It was not possible in 2003, Rivers said, “to go to [UTC CEO] George David to say that he needed thirty more audit people; he would have thrown me out of the room!”

**Improving recruiting and hiring processes**

One of the reasons that ACE became routine and people became more engaged over time is that benefits from previous ACE efforts were immediately visible to new people. An auditor coming into IAD would immediately be exposed to processes improvement through ACE efforts. The processes by which a new auditor is hired, the new hire orientation process, as well as auditing and audit reviewing, have all been defined, assessed, and improved, and are still continually monitored by ACE teams. Given the department’s rotational nature, which meant regularly hiring of new auditors and routinely placing them into UTC company finance positions, the regional directors chose hiring, orientation and placement as a key IAD process. IAD had high recruiting costs because they relied on outside firms to recruit auditors from industry. As part of its mission, IAD provided UTC with talented financial people. The focus on recruiting, hiring and placement processes illustrated the application of ACE in IAD.

Gary Baylis had been an independent consultant, working for UTC’s Chief Information Officer on recruiting, succession management, and leadership development, before joining IAD in 2003. His role as IAD’s HR manager included heading up recruiting, hiring, and placement efforts. In
joining the department, Baylis recalled his impression that IAD was “fractured,” with each region acting autonomously. Carreau, new in place as IAD’s director in November 2003, spoke of efforts to make the group a “global operation.” Just as Baylis joined, there was a two-week global meeting on recruiting, orientation, and placement. He recalled the session as “something between a kaizen and a value stream mapping event.”

This meeting was facilitated by Ujfalusi, the ACE Pilot, and attended by all the regional directors. The group examined recruiting and placement processes in each region, asking what is common? What is different? What are the problems? How will we fix them? What do we want in the future? What does an auditor need to know before they are put on an audit? And, what do our customers say? The regional directors had different perspectives; there was “a lot of back-and-forth” before they came to a decision. What impressed Baylis was the commitment of five regional directors to work on these processes for two weeks. They all followed an agenda, had defined steps, did homework, and were well facilitated. This level of effort, Baylis said, “drives a process that gets you the outcomes you are looking for. ACE drives you to standard practices, 80% of your processes are common, and those 80% are best practices.”

The meeting outcome established three ACE teams. Baylis had a different role on each team. He was the lead on the Recruiting team, and like a project manager, responsible for getting work done and meeting targets. He was a member of the Orientation team, which was run by a lead out of Europe. And, he was the sponsoring executive for the Placement team, whose lead was an audit manager in India. Each team had representatives from the other regions. Recommendations were discussed at the regional directors’ monthly meetings, with drafts circulating and comments being made between the meetings, and each proposal going through two to three iterations. The teams that developed these proposals were then the ones that implemented changes.

**Continuous Changes becomes Routine**

The following auditor’s comment illustrates that ACE-initiated change became routine.

*People used ACE tools to solve issues. ACE raised the priority, provided resources, gave executive sponsorship, and enabled people to work on projects that affected how they did their work. Whenever an issue came up, people would say, ‘We need an ACE team for that.’*

People described a shift in IAD from initially only a few people involved to a way of working that had much greater participation. One manager noted when this shift occurred, “There was a critical juncture, and by the time Ujfalusi came in as the ACE Pilot, the culture had shifted. People came up with ideas and used tools and they could see the value and the benefits.” The change was not confined to inside IAD; it extended to customer relationships, as Carreau’s comment illustrates.

*ACE brings a consistent approach that is a good way to speak to customers, because they are also learning the language. We talk in this common set of principles. We brought customers in to help solve problems with us. Before ACE, it was a more of an adversarial relationship. We were always on the defensive about why we did something wrong, or because maybe they gave us something wrong. Then it became collaborative.*
We set up a working group with representatives from each UTC business unit. They helped us solve problems and we reported to them on the status of our ACE initiatives.

IAD’s tendency to respond to problems with ACE teams required a method to decide when to establish these teams. Passport, a stage gated product development decision-making process used in Pratt & Whitney engineering, was adapted for proposing and managing ACE projects. Adapting this Passport tool illustrated what one manager said was an IAD ACE tenet: “steal shamelessly from others.” The comment is based on the ideal that it is important to benchmark what others were doing and recreate what is works best as your own practice.

Maintaining high performance
ACE methods impacted individual behaviors, sometimes in ways that people were not prepared for. An auditor who joined IAD in 2006 remembered her surprise when her manager first visited her office. The manager said, “You better keep your office clean, because you’re going to be graded on it.” She thought the comment was a joke, but as she went through orientation, she learned that offices are inspected as part of the 6S method. She later realized benefits from applying 6S to her workplace, saying, “It really was easier to maintain and helps you organize.” The concepts were especially helpful for electronic filing and on her computer. She now uses 6S concepts on her home computer, where she does the bookkeeping for her husband’s small business.

In seeing what IAD had accomplished with ACE, this new auditor recalled being “frozen with fear.” When she was shown IAD’s dashboard, she noticed that all the metrics were green for many months. She said that she realized, “If I make a mistake, everybody is going to see it, and there will red on the board.” The visibility was daunting, but as she learned to use the tools, she found that she could achieve those standards, making the following comments.

While it was scary, I now see the benefits of operating this way. For example, if you close the database when you issue an audit report, the requirement to issue that report and close the database is a partner review. This review does not always happen in a timely way. Often the report was issued, and only then did a partner look at it, and if he had issues, you might have to go back to the client and make changes. Going back is awkward. Now, if a partner doesn’t do a timely review, it shows up as a turnback or an error, and gets flagged for everybody to see. It is better for people performing work, for customers, and for managers to have visibility into work processes and their status.

Ongoing challenges remain to be addressed
The changes that IAD made were reported as positive for the people in the organization and the performance of the department. Everyone interviewed had a positive orientation and said good things about the leadership, ACE, and its implementation and benefits. Some people recounted their initial reluctance and skepticism, or complained about the initial amounts of work. These concerns are understandable and people’s abilities to express negative perceptions give credibility their subsequent comments. No one suggested in retrospect that any of IAD’s ACE efforts were folly. Interviews studies at other UTC sites found ACE benefits to be less clear and peoples’ attitudes were not as positive or consistent as those at IAD. Change invariably creates resistance from people who hold to the status quo. This section describes conditions that enabled change and then challenges in maintaining performance.
Audit work values process adherence and improvement

Why does ACE flourish in IAD? Several factors mentioned in interviews explain IAD’s ready and rapid ACE adoption. First, the work and occupational expectations of auditors lend themselves to using tools, doing analysis, proposing improvements, and implementing change. Improvement methods, such as value stream mapping, share common elements with process mapping in audit work. Auditors assess companies’ adherence to managerial and financial controls. Given these responsibilities, auditors have an intrinsic appreciation for systems that specify and control work. Secondly, the size of the department, which was an ACE site, was around one hundred people. With strong commitment and involvement from the IAD director and regional directors, their influence was personally experienced by everyone in the department. Also, in reporting to UTC auditing committee and CFO, they are close to top executives and influenced by their corporate ACE promotions. Third, IAD’s rotational character continually brings fresh people with new ideas into the department. When new people join a department with good organization, defined processes, and clear metrics, they get immediately guidance. Newcomers experience the benefits of previous process improvements. With regular turnover, it is difficult to pass on resistant or recalcitrant points of view. Past mistakes are quickly forgotten, and people’s positive comments might be a result of regularly rotating people. Fourth, audit work is project-based and carried out in teams. Field audits have a project cadence, from planning, being in residence, collecting data, and doing analysis to writing final reports. The pace of improvement projects is similar to that audit cadence. Auditors are accustomed to working on teams, which is also the basic organizational structure of ACE initiatives. Finally, success is a strong reinforcement of new behavior. Individuals experienced benefits in their work using ACE methods. Factors that determined the success of process improvements depended upon what auditors implemented for their own use. Feedback is direct and immediate; people can readily experience the benefits of the progress that they make.

When new auditors join now IAD, they immediately encounter its process improvement culture. Auditors are easily oriented to how audits are done in IAD as offices, desktops, and computer files are labeled and well organized. The message that comes through is that auditors are important because efforts have been made to improve working conditions. What was initially a novel way to operate becomes the normal and accepted way that IAD does its work.

Impact of audit work volume

In addition to many comments on ACE’s benefits, people described several drawbacks. The amount of work was consistently mentioned. The concern was ACE in combination with auditing work demands. Auditors’ ranks have remained constant while UTC’s corporate entities increased in number and the requirements expanded to audit every entity every three years. Eliminating waste and streamlining processes, particularly in small company audits, did reduce the workload. These “improvements” were not without risk, which one auditor explained as follows.

There is a danger in the small company audit approach. It focuses on specific areas, like disbursements, account reconciliation, revenue recognition and segregation of duties. In reality, you can have more issues in a small company. Lately, on a random basis, we decided to do a full audit, so that these companies focus on more than these known audit areas.
Process standardization, measurement and feedback are highly valued in process improvement activities. Several people mentioned that this can go too far and standardization can become a crutch. When most of their work is specified, auditors become accustomed to working with and within guidelines. Then, when there are no specified processes, auditors become unsure of what to do. Working to guidelines does not develop discernment, which was illustrated in the auditor’s concern that follows.

ACE overloads people with details and takes away their judgment. Some people, if they do not have a template for their work, just stop. They stop taking risks or using their judgment. They should not be afraid to use their judgment if something is not specified. They should go ahead, and perhaps issue a turnback that so what they did is incorporated into future work programs.

Another concern was that standardized methods inhibited creativity. Auditing is not commonly thought of as creative, but auditors do need to develop and act on intuition. An element of auditing is to follow hunches and investigate what might not seem quite right. Detailed process specification with a focus on efficiency and adherence to standards was said to discourage people from using intuition. An auditor commented:

The work programs are really comprehensive, covering all the things that we do in an audit process. Once you have that standard work, people just follow it. There might be things not addressed in the standard work, but with a culture and orientation to following it, it is pretty much what people are now oriented to doing.

Assumptions regarding process measures and audit quality

In manufacturing, adherence to process is a key determinant of product quality. The correlation between process measures and product attributes causes manufacturing managers to place great significance on process measures. These ideals have carried over into auditing processes. “What gets measured is what gets done,” commented one auditor, “the dark side of ACE is that these metrics are sometimes more important than the product.” Audit quality, that auditor noted, is not predicted by process metrics. For audit, the important questions are as follows: “How do you measure quality? It’s not just timeliness, it goes to issues that may come up later, that might or should have been picked up in the audit process.” When a company has weaknesses, its managers do not readily reveal them auditors, which is noted in the following quote.

There are companies that are open about their weaknesses and some that are not open. Depending on what is good or bad shape, people do not shoot themselves in their own leg. That is IAD’s true dilemma – how can we achieve productivity saving and yet do a good, reliable, quality audit?

Specifying and measuring audit processes ensured coverage of certain areas and at the same time constrained auditors’ abilities to diverge and to focus on other risks.

Continuous Change becomes Routine

ACE efforts, which included process standardization and continuous improvement activities, were novel for IAD when ACE began. ACE-associated initiatives changed IAD’s work processes. Auditors codified, measured, and repeatedly improved the department’s key
processes. Using improvement methods became routine. For example, one auditor recalled the following differences in how the ACE focus changed.

> When new work programs were developed, the core team provided training for other people. Initially, Rivers [IAD Director] came for some of that training. Then they used the ACE process to improve training. What was informal is now much more formal. Now, they have two weeks each year when there is training. People come and do the training, because if you don’t train people on the changes, you won’t get any changes.

An organization that develops a continuous improvement culture is expected to experience fewer problems because its people are engaged in noticing and addressing symptoms before they become problems. In actuality, fixing problems before they happen in organizations is difficult for many reasons. One reason is that people are not recognized or rewarded for preventing problems in the ways that they are when they tackle urgent troubles with heroic action.3 In an organization with maturing improvement activities, fewer problems should suddenly surface. What initially was an improvement journey that was guided by fixing problems no longer has these clear goals. As IAD’s ACE efforts progress, these issues came out in comparing ACE Gold certification with Gold recertification. Correia, once IAD’s ACE Pilot and now assistant director, commented on the challenges of making change routine.

> In some ways, recertification is harder. Once you get Gold, you have your metrics in place, and the question shifts to how do you keep it up? How do you get better when you already are best-in-class? People tend to get complacent and it is hard to keep the energy going.

ACE Gold requires showing a consistent 12 months record of metrics at or above plan. An operations person proposed a perspective on these criteria: “If the metrics are all green, then you’re not measuring the right things. Green month after month means that you are accomplishing goals, and that you are not pushing yourself to continuously improve.”

The vitality of ACE in IAD depends upon its people staying engaged and its leaders inspiring additional improvement while also sustaining performance.

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