Employing the Management Internal Control Toolset (MICT) Across the Enterprise

GRADUATE RESEARCH PROJECT

Shanon E. Anderson, Major, USAF

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DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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Shanon E. Anderson, MBA

Major, USAF

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Shanon E. Anderson, MBA

Major, USAF

Approved:

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Jeffrey A. Ogden, PhD (Advisor)	Date

Abstract

This Graduate Research Project first determines the Management Internal Control Toolset's (MICT) utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution. Then, it determines how MICT's capabilities can best be leveraged to improve efficiency and effectiveness in the new Air Force Inspection System (AFIS) and enable future, desired transformations. Methodologies employed include inferential and descriptive statistics, surveys, and interviews to answer the following research questions: 1) Does MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution warrant mandatory, enterprise-wide employment? 2) Which MICT capabilities (if any) should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation? 3) How should MICT key capabilities (if any) be leveraged to maximize efficiency and effectiveness in the new AFIS and to enable future desired transformation of the AFIS? 4) Which MICT key capabilities should software developers enhance to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation of the AFIS? The three methodologies produced results that strongly supported research hypotheses presented in the introductory chapter.

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Shanon E. Anderson

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Employing the Management Internal Control Toolset (MICT) Across the Enterprise

I. Introduction

General Issue

In May of 2010, former Defense Secretary Gates launched a Defense Efficiencies Initiative to reduce overhead costs and eliminate redundant functions in order to improve the effectiveness of the DOD enterprise (Gates, 2011:1). In January 2012, President Obama and Defense Secretary Panetta released further guidance, "Sustaining U.S. Global Leadership; Priorities for 21st Century Defense" in the wake of further fiscal constraints. President Obama stated, "The fiscal choices we face are difficult ones, but there should be no doubt – here in the United States or around the world – we will keep our Armed Forces the best-trained, best-led, best-equipped fighting force in history" (Obama, 2012:4). Moreover, Secretary Panetta provided the following as two of six steps to develop the Joint Force of 2020:

- We are determined to maintain a ready and capable force, even as we reduce our overall capacity. We will resist the temptation to sacrifice readiness in order to retain force structure, and will in fact rebuild readiness in areas that, by necessity, were deemphasized over the past decade. An ill-prepared force will be vulnerable to corrosion in its morale, recruitment, and retention. Unless we are prepared to send confident, well-trained, and properly equipped men and women into battle, the nation will risk its most important military advantage –the health and quality of the All-Volunteer Force. (Panetta, 2012:17)
- The Department must continue to reduce the "cost of doing business." This entails reducing the rate of growth of manpower costs, finding further efficiencies in overhead and headquarters, business practices and other support activities before taking further risk in meeting the demands of the strategy. (Panetta, 2012:17)

Accordingly, during 2010 and 2011, the Secretary of the Air Force, Office of the Inspector General, began reengineering the Air Force Inspection System (AFIS) to improve efficiency while ensuring a ready force. The Inspector General reports to the Secretary and Chief of Staff of the Air Force on matters concerning Air Force effectiveness, efficiency, and the military discipline of active duty, Air Force Reserve and Air National Guard forces (USAF website, 2012). The Inspector General provides inspection policy, and oversees the inspection and evaluation system for all Air Force forces; oversees counterintelligence operations and chairs the Air Force Intelligence Oversight Panel; investigates fraud, waste and abuse; oversees criminal investigations; and provides oversight of complaints resolution programs (USAF website, 2012).

On 23 March, 2012, the new AFIS was released in a substantially revised Air Force Instruction (AFI) 90-201, "The Air Force Inspection System." The redesigned inspection system reduced, integrated and synchronized an AFIS that had seemingly grown out of control. The new AFIS does not remove any compliance or readiness responsibility, but rather reduces higher-headquarters (HHQ) inspection footprints. Ultimately, the new AFIS attempts to shift Airmen's time and efforts from cyclical inspection preparation to a more developed culture of localized, steady-state compliance and readiness. This shift requires greater unit-level self-assessment responsibility and effectiveness. Accordingly, "Commanders' Inspection Responsibilities" were afforded their own chapter within the new *AFI 90-201*.

This new chapter explicitly reaffirms unit-level commanders' responsibilities to effectively self-assess all functional areas, track and trend all deficiencies, and ensure quality deficiency resolution at the appropriate level. It also provides a paragraph that

describes an AFIS "desired state" in which wing commanders will be provided manpower, training and guidance to create an organic inspection capability. This wing-level inspection capability is expected to develop into a mature, trusted component of the AFIS. The trust will allow MAJCOM/IGs to increasingly shift their focus away from Compliance Inspections (CI) to Unit Effectiveness Inspections (UEI). As opposed to traditional CIs that evaluate a unit's compliance with policy in many functional areas, UEIs focus on validating and verifying a unit's own ability to self-assess, and trend, report, and resolve deficiencies. (*AFI 90-201*, 2012:74-77)

However, further AFIS transformation to the desired state is only considered possible due to the perceived capabilities of an Information Technology (IT) enabler called the Management Internal Control Toolset (MICT). SAF/IG expects MICT to fill critical gaps and considers it essential for a successful AFIS transformation (Hyde, 2012). The most significant gap was relative to HHQ leadership oversight. Under the new AFIS and desired state, increased reliance is placed on unit-level commanders for compliance and readiness assurance. In both the new AFIS and the desired state, MAJCOM and HAF command chains are still responsible for subordinate-unit compliance and readiness. Without MICT and with fewer external inspections, these command chains would either have to trust their units' self-assessment and deficiency resolution effectiveness or employ new methods of compliance and readiness oversight and deficiency trending. The former would be potentially dangerous to the mission and the latter could negate many efficiencies created by the new AFIS. Finally, without MICT, the AFIS capacity for quantified, higher-level deficiency trending, while already minimal, would be reduced.

Fortunately, during the AFIS reengineering effort, a key information-technology (IT) tool began gaining momentum for USAF-wide employment that could provide these oversight and trending solutions along with other compliance and readiness efficiencies. An Air Force Reserve Command (AFRC) computer program, the Management Internal Control Toolset (MICT), offered a standard, efficient tool for achieving, maintaining and reporting USAF compliance and readiness. AFRC originally developed MICT to enable efficient unit compliance management by reducing the time required to find and accomplish checklists. However, years of continuous improvement enabled by quarterly programmer/user working groups yielded an IT solution designed to do much more. MICT now offers a platform to manage consolidated checklists, accomplish checklists, build Corrective Action Plans (CAP), provide commander oversight, and enable trending at multiple command levels for scaled resolution (Morgenstern, 2012:1). In 2011, MICT capabilities regained the attention of senior USAF leadership and funding was allocated for enterprise-wide employment as a key enabler of the new AFIS (Hyde, 2012).

The directive for MICT employment across the enterprise was provided in the new *AFI 90-201*. The AFI clearly specified new checklist management procedures, but only provided guidance on how and when to employ a few MICT capabilities (*AFI 90-201*, 2012). This was, in part, because no formal research had been performed to validate MICT's utility relative to other tools or to determine which of its capabilities should be leveraged to improve efficiency and effectiveness in the new AFIS. As more is learned about MICT capabilities, future versions of *AFI 90-*201 are expected to further specify which and how MICT capabilities will be standardized across the enterprise (Hyde,

2012). In the interim, various opinions will continue to surface about how best to employ MICT.

At one end of the spectrum, some Airmen believe that full utilization of all MICT's capabilities should be standardized across the enterprise to enable an even more dramatic transformation of the AFIS. Until now, no standard tool or process has existed in the USAF to provide Airmen an efficient means to measure effectiveness, or track, trend and resolve deficiencies. Airmen have attempted to identify deficiencies with only AFIs and incomplete checklists. Then, when deficiencies were self-identified or by formal HHQ inspections, Airmen would begin resolution efforts with no vision on the history of the deficiency and were left wondering:

1. When was this deficiency last identified and resolved by my unit?
2. How did we resolve it?
3. Why did the resolution not last?
4. How can I communicate the "real" solution with my chain-of-command?
5. How can we share the best solution with other units?
6. Is there a best solution already validated by other units?
7. Do other units currently share this deficiency?
8. If so, should the deficiency be resolved at a higher level (Wing, Joint Base, MAJCOM or HAF)?

MICT's potential capability to answer these questions causes some Airmen to believe the AFIS should fully employ all MICT's capabilities for a more efficient and effective USAF. (305 AMW, 2011)

At the other end of the spectrum, some Airmen are expected to be less optimistic and fear inefficiencies that often accompany mandatory IT tools. Expected concerns include: reduced AFIS efficiency and/or effectiveness, man-hour costs, deficiency transparency, low quality of data, high training requirements, and inadequate leadership buy-in. This research will validate or dispel these concerns, evaluate MICT's capabilities, and recommend a way forward for MICT employment in the AFIS.

Problem Statement

This Graduate Research Project will first determine MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution. Then, it will determine how MICT's capabilities can best be leveraged to improve efficiency and effectiveness in the new AFIS and enable future, desired transformations.

Research Objectives/Questions/Hypotheses/Methodology

The primary objective of this research project is to deliver the following substantiated recommendations on further AFIS transformation and MICT employment across the enterprise for the Chief of Staff of the Air Force and the Inspector General:

1. Research Question 1: Does MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution warrant mandatory, enterprise-wide employment?

Research Hypothesis 1: Inferential and descriptive statistics, surveys, interviews and literature review will show MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and resolution **does** warrant mandatory, enterprise-wide employment.

2. Research Question 2: Which MICT capabilities (if any) should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation?

   Research Hypothesis 2: Surveys, descriptive statistics, interviews and literature review **will** identify many key capabilities that should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation.

3. Research Question 3: How should MICT's key capabilities (if any) be leveraged to maximize efficiency and effectiveness in the new AFIS and enable the future desired transformation of the AFIS?

   Research Hypothesis 3: Surveys, descriptive statistics, interviews and literature review **will** indicate how best to leverage key MICT capabilities to achieve required paradigm shifts to enable the future, desired transformation.

4. Research Question 4: Which MICT key capabilities should software developers enhance to improve efficiency and effectiveness in the new AFIS and enable the future desired transformation of the AFIS?

   Research Hypothesis 4: Surveys, descriptive statistics, interviews and literature

review **will** show which key capabilities should be enhanced to maximize AFIS effectiveness and efficiency.

The secondary objectives of this research project are to:

1. Provide the above substantiated recommendations on MICT employment across the enterprise for MAJCOM IGs, Functional Area Managers and Program managers
2. Offer insight on MICT's current capabilities and limitations for users at all levels
3. Provide future development recommendations for MICT software developers
4. Provide impetus for future research on MICT capabilities and limitations

Research Focus

The focus of this Graduate Research Project was initially on the validation of MICT's capabilities, but was ultimately weighted more towards determining the right investment in those capabilities. A significant risk exists in over-investing time and effort in MICT's advertised capabilities without proper validation. However, since the validation of at least some of MICT's capabilities was highly likely, more of this research project's focus was shifted to determining which capabilities are most beneficial to the new AFIS and how to best employ and develop them.

Accordingly, research was focused more on qualitative assessments of MICT's current and future capabilities rather than quantitative data analysis. Additionally, data limitations existed due to MICT's relatively young age. Only a small number of active-duty units were using MICT and all to varying degrees. Another data limitation was caused by the inherent time requirements in the utilization or evaluation of some of

MICT capabilities. For example, a unit cannot perform historic trending until several years after implementation. Finally, in many cases, MICT's capabilities are new and have no basis for comparison.

Investigative Questions

Investigative questions were framed around the research questions. With limited data available, inferential statistical analysis was focused on evaluating the utility of MICT's most fundamental capability and answering Research Question 1. Qualitative methodologies were focused on evaluating the utility of MICT's other capabilities to answer the other three research questions. Specific investigative questions, by methodology, are presented below.

Inferential Statistics:

Does MICT enable a unit to find more deficiencies than a unit not using MICT (with a 95% confidence interval)?

If so, can a linear regression model forecast the difference?

Survey Questions:

The following survey questions were administered to MICT basic users, MICT Wing Program Managers (PM), and various Major Command (MAJCOM) Functional Area Managers (FAM):

1. What percent of your units are using MICT?
2. What were they using before MICT?
3. How long has your unit been using MICT?

4. Before employing MICT, how effective was your office at managing your unit's compliance checklist maintenance and accomplishment in accordance with associated AFIs?
5. Before employing MICT, how efficient was your office at managing your unit's compliance checklist maintenance and accomplishment in accordance with associated AFIs?
6. After employing MICT, how effective is your office at managing your unit's compliance checklist maintenance and accomplishment in accordance with associated AFIs?
7. After employing MICT, how efficient is your office at managing your unit's compliance checklist maintenance and accomplishment in accordance with associated AFIs?
8. Before employing MICT, how effective was your office at managing your unit's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?
9. Before employing MICT, how efficient was your office at managing your unit's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?
10. After employing MICT, how effective is your office at managing your unit's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?

11. After employing MICT, how efficient is your office at managing your unit's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?
12. Before employing MICT, how effective was your office at identifying your unit's critical and minor deficiencies?
13. Before employing MICT, how efficient was your office at identifying your unit's critical and minor deficiencies?
14. After employing MICT, how effective is your office at identifying your unit's critical and minor deficiencies?
15. After employing MICT, how efficient is your office at identifying your unit's critical and minor deficiencies?
16. Before employing MICT, how effective was your office at tracking your unit's critical deficiencies through closure?
17. Before employing MICT, how efficient was your office at tracking your unit's critical deficiencies through closure?
18. After employing MICT, how effective was your office at tracking your unit's critical deficiencies through closure?
19. After employing MICT, how efficient was your office at tracking your unit's critical deficiencies through closure?
20. Before employing MICT, how effective was your office at managing your unit's critical and significant corrective action plans?
21. Before employing MICT, how efficient was your office at managing your unit's critical and significant corrective action plans?

22. After employing MICT, how effective was your office at managing your unit's critical and significant corrective action plans?
23. After employing MICT, how efficient was your office at managing your unit's critical and significant corrective action plans?
24. Before employing MICT, how effective was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
25. Before employing MICT, how efficient was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
26. After employing MICT, how effective is your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
27. After employing MICT, how efficient is your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
28. Before employing MICT, how effective was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
29. Before employing MICT, how efficient was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?

30. After employing MICT, how effective is your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
31. After employing MICT, how efficient is your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified throughout your unit?
32. Before employing MICT, how effective was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?
33. Before employing MICT, how efficient was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?
34. After employing MICT, how effective was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?
35. After employing MICT, how efficient was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?
36. Before employing MICT, how well were trends used to identify AFSO21 Event areas for focused improvement?
37. After employing MICT, how well are trends used to identify AFSO21 Event areas for focused improvement?

38. Before employing MICT, how would you rate the fidelity of your office's compliance/readiness reporting for unit/CC oversight?
39. After employing MICT, how would you rate the fidelity of your office's compliance/readiness reporting for unit/CC oversight?
40. Before employing MICT, how would you rate your office's effectiveness in fostering a culture of compliance?
41. After employing MICT, how would you rate your office's effectiveness in fostering a culture of compliance?
42. Before employing MICT, how would you rate your office's ability to recognize new process and procedural innovations for improved efficiency?
43. After employing MICT, how would you rate your office's ability to recognize new process and procedural innovations for improved efficiency?
44. In your estimation, how many man-hours does MICT save your office per year? (indicate waste with a negative sign)

Interview Discussion Points

The following discussion points were used during interviews administered to a Wing Commander, MAJCOM MICT Program Manager, MAJCOM IG representative, and SAF/IG representative:

1. What percent of the units you work with are using MICT?
2. How long have you been using MICT?
3. What were you using before MICT?
4. How well does MICT help your Airmen accomplish the following tasks?

Self-Inspection Program/Compliance checklist management/Self-assessment efficiency/continuity

Readiness/exercise checklist management

Deficiency identification

Deficiency tracking

Deficiency corrective action plan development

Deficiency trending (historical and point-in-time)

Scaled Resolution

AFSO21event selection

Commander oversight

Culture of compliance

Innovation for new efficiencies

5. Do you think MICT, employed as an IT solution, bridges an AFIS trending process technological feasibility gap and accordingly, warrants a complete reengineering of the process?
6. Do you think MICT can adequately provide MAJCOM and HAF leadership oversight for assessments accomplished by the wings?
7. How feasible are the following paradigm shifts implicit within the new AFIS and associated desired state?
    a. More reliance on more comprehensive checklists attached to all AFIs
    b. Increased FAM ownership of functional areas, checklist management, trend identification, scaled corrective action, and evaluated by IG (management inspection)

c. Enterprise deficiency transparency to enable FAM trending and improved L2 sharing
d. General shift of HHQ prioritization on a unit's ability to self identify and resolve deficiencies rather than the traditional formal inspection snapshot

Assumptions & Delimitations

Assumptions:

1. Funding for MICT will continue as forecast (see Literature Review chapter)
2. Data sets used for quantitative and qualitative analysis are representative samples (see Methodology chapter)
3. The new software programming team can continue MICT's reliability, and maintainability (see Literature Review)

Delimitations:

1. Software programming limitations that could adversely impact MICT capabilities (see Recommendations for Future Research)
2. Opportunities for MICT employment in a Joint environment or across the DOD (see Recommendations for Future Research)
3. More capable and/or cheaper toolsets do not exist outside of those researched (see Literature Review chapter)

Implications

Implications of this research project are twofold. There are significant implicit effects of both under and over-utilizing MICT without adequate research. If MICT is underutilized, significant efficiencies could be lost in direct violation of aforementioned

senior-leadership guidance. More specifically, without the employment of some of MICT's oversight capabilities, MAJCOM and HAF senior leadership may employ new methods of ensuring subordinate-unit compliance and readiness, thus eliminating the efficiencies expected with the SAF/IG's new inspection system's reduction-consolidation-synchronization effort. This could ultimately lead to reversion to the previous AFIS and no gained effectiveness or efficiency.

If MICT is over-utilized without validating its capabilities, new inefficiencies would likely be imposed on the USAF. Again, this would be contrary to senior-leadership guidance. MICT might offer a false sense of security with respect to compliance and readiness assessments. This could lead to mission failure and/or reversion to the previous AFIS. Finally, continued MICT employment without validation could be a barrier to discovering a different toolset that possesses desired capabilities.

Preview

The literature review supported all research hypotheses. Three articles written about MICT and the new AFIS supported how MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution warranted mandatory, enterprise-wide employment. The articles also identified trending and oversight as key MICT capabilities that should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation. Finally, one article presented four USAF paradigm shifts required to realize key MICT capabilities.

Inferential statistics supported the first research hypotheses and provided evidence supporting the enterprise-wide MICT implementation. Hypothesis testing was conducted using simulated data sets generated from a wing's compliance statistics before and after implementing MICT. The following large-sample test of hypothesis for (μ_1- μ_2) at α = .05 provided evidence that MICT enables a unit to identify more deficiencies with 95% confidence level (Equation 1).

Equation 1. MICT Deficiency Identification Hypothesis Testing

One-tailed test

$$H_0: (\mu_{n1} - \mu_{n2}) = D_0 = 0$$

$$H_a: (\mu_{n1} - \mu_{n2}) > D_0 = 0$$

$$\text{Test statistic: } z = \frac{(\bar{x}_1 - \bar{x}_2) - D_0}{\sqrt{(\frac{s_1^2}{n1} + \frac{s_2^2}{n2})}} = \frac{(.036193994 - .01648514) - 0}{\sqrt{(\frac{.001221}{50} + \frac{.000274}{50})}} = \frac{.019709}{.00546809} =$$

$$3.60437 \qquad \textbf{(1)}$$

$$\text{Rejection region: } z > z_\alpha = z_{.05} = 1.645$$

Conclusion: Since the Test Statistic z is in the rejection region, there is sufficient evidence to reject $H_0: (\mu_{n1} - \mu_{n2}) = D_0 = 0$ *so* $\mu_{n1} > \mu_{n2}$.

Likewise, backwards linear regression provided a model to predict a unit's ability to identify deficiencies with MICT as compared to when using a leading, existing tool. The fitted model is below (Equation 2).

Equation 2. MICT Deficiency Identification Backwards Linear Regression Model

$$DefRatio =$$

$$-.004 - 1.086E-5(UnitTotal) + .213(CklstNA) + .021(MictMon) -$$

$$3.763E-5(MictTotal) - .393(MictNA) + .150(MictFlying) +$$

$$.227(MictOSS) + .162(MictStaff) + .187(MictA/MXS) + .208(MictMOS) + .112(MictAPS) \quad \textbf{(2)}$$

The dependent variable, DefRatio, was the number of deficiencies expected to be found divided by the total number of checklist items.

The independent variables were:

1. Mict—whether the unit is using MICT or the S-I website
2. Flying, MX, MOS, OSS, Staff, or APS—type of squadron
3. UnitTotal—number of checklist items assigned to the unit
4. CklstNA—percentage of assigned items that were scored N/A
5. Mon—rank of self-inspection monitor
6. Mict*—variables 2-6 above when associated with variable 1 above

The model had an adjusted $R^2 = .643$ and $F = 4.736$ and was fairly useful in predicting the value of MICT in deficiency resolution by squadron type. When the model was applied, it suggested that a typical squadron could expect to find approximately 53 more deficiencies per 1000 checklist items using MICT than it would without.

Analysis of data provided by surveys supported all hypotheses. It also provided MICT capabilities considered more effective and efficient by different types of sampled populations. However, the survey sample size was relatively small and therefore only provided descriptive statistics. That being said, survey responses were from many different units and MAJCOMs and an overview of the responses below illustrates an unmistakable trend (Figure 1). This survey response chart illustrates MICT users' perception of their ability to perform critical compliance and readiness tasks before and after MICT implementation. The drastic improvements across the board indicate MICT

capabilities may revolutionize USAF compliance and readiness effectiveness and efficiency. Furthermore, varying degrees of improvement highlight areas that warrant extra attention during enterprise-wide implementation. Further explanation of the survey questions, charts, associated descriptive statistics and implications are provided in the Methodology, Results and Conclusions chapters.

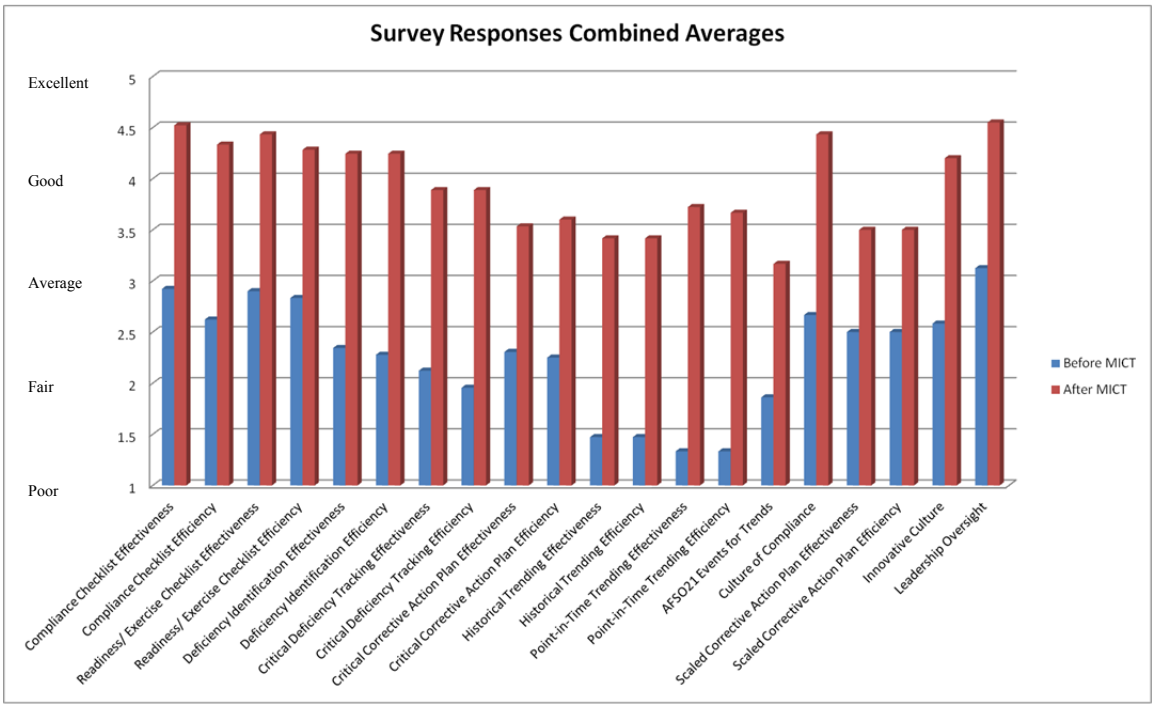


Figure 1. Survey Responses Combined Averages

Interviews were conducted with individuals in key leadership positions that are knowledgeable about MICT and are directly affected by the new AFIS and desired state. These interviews supported the previous data and all hypotheses by providing a balanced perspective of how MICT's key capabilities can best be leveraged now and in the future to enable the desired transformation of the AFIS. Most importantly, they provided strategies to achieve four critical paradigm shifts required for optimized MICT employment and a successful transition to the AFIS desired state.

Finally, application of the research conclusions to four common business process models provided support for the third research hypothesis. For example, when research conclusions were viewed through the lens of Hammer and Champy's Business Process Reengineering (BPR) model, a customer and process-focused evolution of the Air Force Inspection System (AFIS) emerged and is presented below (Figure 2). Further explanation of this process reengineering is provided in the Conclusions chapter.

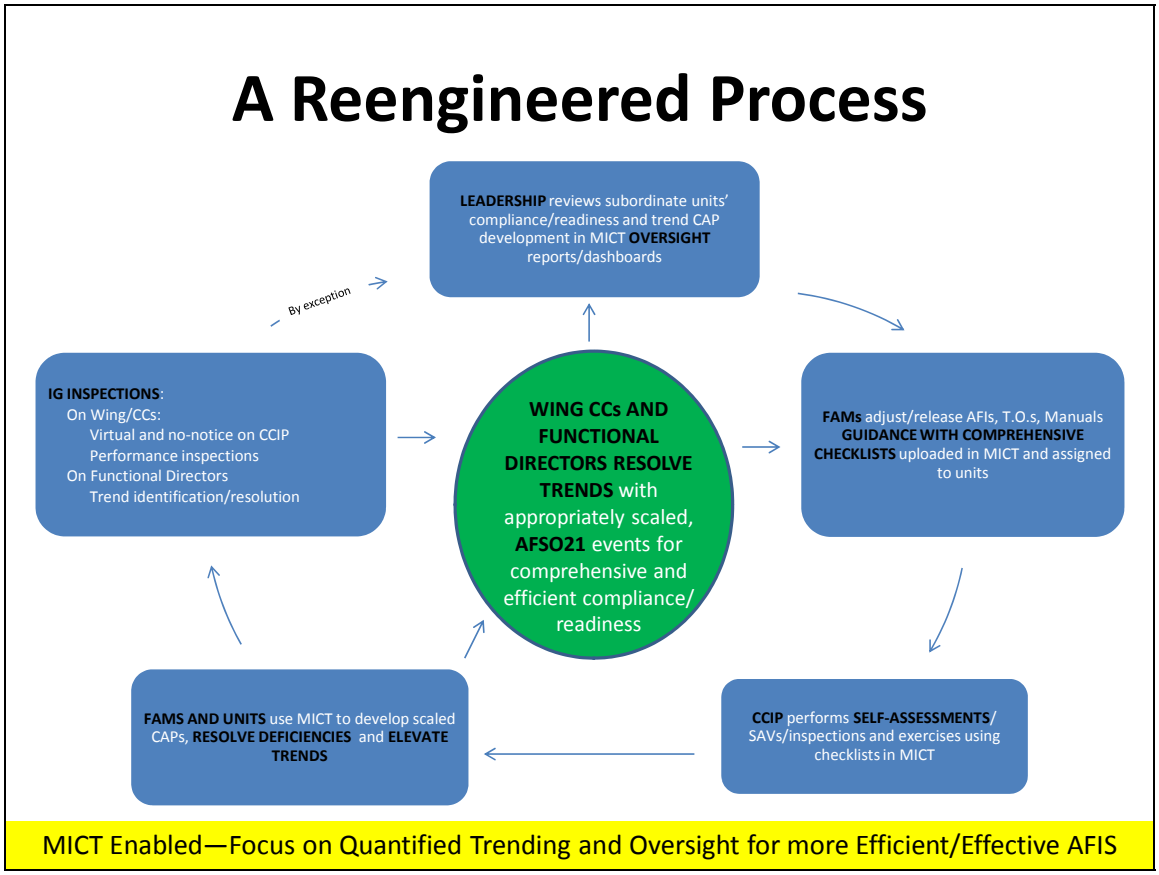


Figure 2. Reengineered AFIS Process

II. Literature Review

Chapter Overview

This chapter will first utilize existing literature to expand upon background information and significance of research provided in the introductory chapter. Next, three articles written about MICT are presented to further describe its capabilities. Each article supports all research hypotheses, and survey and interview results to be presented in chapter four. They identified trending and oversight as key capabilities that should be leveraged to improve efficiency and effectiveness in the new AFIS and enable future desired transformation.

Next, the new AFIS and desired state are further explained in a comparison of the 2009 and 2012 versions of *AFI 90-201*. Problems existing under the old AFI are highlighted and the new AFI's solutions are examined. Additionally, further explanation of the difference between the new AFIS and desired state is also provided.

The next section of this chapter explores other relevant research relating to MICT to include an ongoing RAND study on the AFIS, enterprise framework requirements, software maintainability and reliability, and similar commercial information-technology (IT) tools. These reviews provide some valuable perspectives, considerations and areas for future research. Finally, this chapter concludes with a review of four common business process models, which will be used to explore the conclusions of this research in the Conclusions chapter.

Significance of Research

As mentioned in the introductory chapter, the USAF has been working to reduce overhead costs and eliminate redundant functions to improve the effectiveness and efficiency of the DOD enterprise for several years (Gates, 2011:1). President Obama and Defense Secretary Panetta's guidance for "Sustaining U.S. Global Leadership; Priorities for 21st Century Defense" further fortified the need to operate the USAF more efficiently due to increasing fiscal constraints (Obama and Panetta, 2012:4, 17). Excerpts from this guidance provided in the introductory chapter clearly indicate their resolve to maintain a capable but more efficient Department of Defense (Obama and Panetta, 2012:4, 17). However, the task of identifying the new efficiencies and cost reductions clearly belongs to the service branches. Accordingly, USAF Airmen have been working through the tasks of identifying new efficiencies and determining how to employ them.

Shortly after taking command of the 18th Air Force in September of last year, Lt. Gen. Mark F. Ramsay discussed this very challenge in an interview with the Airlift/Tanker Quarterly Magazine. During his interview, he spent much time directly engaged on this subject. He stressed that the USAF needs to leverage the innovation of our Airmen to find more effective and efficient ways to operate. This would allow us to be as lean as possible while maintaining our effectiveness and trying to get better. When asked to address specific goals for the 18 AF, Gen Ramsay stated, "Success requires that we be both transparent and flat…creating an environment in which we can share our challenges and work together to solve them by leveraging innovation and expertise present throughout the enterprise." (Ramsay, 2011:14-17)

Articles about MICT presented below suggest that it could be an exemplary IT solution that makes the AFIS much more efficient and effective. Accordingly, MICT capabilities described in the articles seem to be directly aligned with General Ramsay's vision for 18 AF transparency, information sharing, teamwork, innovation, efficiency, and effectiveness. According to the articles, MICT can: 1) reduce the man-hours required to accomplish compliance checklists, perform HHQ inspections, and report results, 2) allow Airmen from different units to share deficiencies, resolutions and lessons-learned, 3) provide lower-ranking Airmen a voice to offer and find solutions that they normally would not have, 4) provide MAJCOM and HAF leadership enough compliance and readiness oversight to virtually assess subordinate unit commanders' self-assessment programs. This research is aimed at determining if such tremendous capabilities exist and if so, how they can be realized.

Descriptions

The Management Internal Control Toolset (MICT)

Very little literature has been written on MICT to date. However, its popularity is undoubtedly growing and the Secretary of the Air Force, Office of the Inspector General has just made its use mandatory across the USAF. This section will further describe MICT using three articles and a user's-perspective presented by the 305 AMW/CC and AMC/IG at the 2011 AMC Rally Conference.

The first of three articles found specifically about MICT was a short Air Force Reserve Command (AFRC) article acknowledging MICT's Air Force Best Practice Award during the 2008 Chief of Staff Team Excellence Award ceremony. The AFRC

team that developed MICT was awarded for their systematic approach for enhancing mission capability, improving operational performance and achieving sustained results while maximizing efficiency. While the program was only in its infancy, specific MICT capabilities noted in the article included deficiency identification, inspection tracking and analysis, and automated commander oversight of unit compliance effectiveness and trending. It also stated that MICT is a time and cost-saving inspection analysis system and will be employed across AFRC in one year. (The Official Website of Air Force Reserve Command, 2008:1)

In 2009, C. Abalo wrote an article about an early version of MICT. This article described how MICT was designed, implemented and developed in AFRC over the past several years to improve unit self-inspection program efficiency, commander oversight and deficiency trending capabilities. AFRC hired programmers to write a software program that provides accurate and timely information through an automated process. It was designed to monitor, evaluate and report organizational compliance with both AFRC and USAF directives. Originally, the targeted user was USAF wings, but the program has been developed to provide Functional Area Managers (FAMs) and other HHQ leaders the ability to revise checklists and focus resolution efforts according to identified trends. MICT development is guided with quarterly, user and programming working groups. MICT consolidates all checklists and checklist deficiencies on a backed-up central server and is accessible through the AF Portal. (Abalo, 2009:22-23)

Abalo then explains how MICT allows users to assign points of contact, track deficiencies and assign taskings with suspense dates. It also uses emails to notify users when a checklist is modified that they are assigned to. He pointed out that the first

challenge faced was resistance to change. However, this challenge was quickly overcome because of the tool's superior utility. Then the second challenge was satisfying requests to upload all major inspection checklists into MICT. (Abalo, 2009:22-23)

Next Abalo explained the benefit of accountability. MICT drove a cultural change toward improved accountability and defined responsibility. This responsibility has grown above the wing level to FAMs for improved historic and point-in-time trending. This trending enables better-focused AFSO21 improvement events and appropriately scaled resolution. FAMs will also be required to keep current checklists updated in MICT and change notification is automated to users. Also, deficiency resolutions can be better managed with archived corrective action plans and the ability to attach resolution documentation such as AFSO21 8-step worksheets. Finally, commander oversight is greatly enhanced with by-unit, quantified, deficiency and compliance reports with drill-down capability. The tool maintains a historical, roll-over record of how units comply with each item and compliance data can be used to validate the commander's yearly statement of assurance. (Abalo, 2009:22-23)

Abalo then addressed MICT's fiscal impact by stating the program saved $452K in the first year while producing an annual 38.7% improvement. Additionally, if implemented Air Force-wide, he estimated efficiencies could easily top $100M annually. As his bottom line, Abalo stated:

> Implementing a broad-based management program creates enhanced resource utilization at all levels while providing command leadership with visibility of internal compliance. Commanders and inspectors now have a robust tool capable of providing detailed analysis of a substantial volume of data, thereby significantly improving the decision-making process. (Abalo, 2009:22-23)

The third article found was written in 2012 by the MICT program manager in the inspector general's office at HQ AFRC. Major Heather Morgenstern's article was titled, "The Management Internal Control Toolset: Take a closer look at the program that is helping AFRC improve compliance, productivity, efficiency and communication." Morgenstern's article specifically addressed how key MICT capabilities were realized in AFRC by overcoming four paradigm shifts. (Morgenstern, 2012)

Morgenstern began her article by listing benefits of MICT to include: more efficient resource management, boosted unit culture health and performance, fact-based decision making, and improved compliance, productivity, efficiency and communication. The first paradigm shift towards deficiency transparency was captured in a quote by the AFRC self-inspection program functional manager, Lt Col Lisa Craig:

> A key component for fitting unit self-assessment into the greater Air Force goal of continuous improvement and 'smart operations' is fostering a culture of compliance throughout all levels of the enterprise. Most units are fully embracing this cultural shift, opening their books and sharing information across the spectrum. (Morgenstern, 2012)

Morgenstern's second paradigm shift was for more Functional Area Manager (FAM) involvement and responsibility in deficiency resolution. Another quote from Lt Col Craig stated, "Our total force and associated unit structure was devised to capitalize on efficiencies…Through its inherent information-sharing capabilities, MICT gives these units and commanders one more tool in their toolbox to cooperate and make the most of these relationships." She also provides an example of process owners incorporating MICT and Air Force Smart Operations for the 21st Century (AFSO 21) events to resolve deficiencies. She explains how FAM training is underway and includes techniques to solve deficiencies that are trended across several units. Also, FAMs also are empowered

by MICT's checklist management features. With MICT, FAMs are able to easily update all units' checklists while automatically notifying all users via system generated emails. In fact, new improvements to MICT reduce checklist and question redundancy, support long-term trending and allow FAMs to monitor units' self-assessment. (Morgenstern, 2012)

Morgenstern also addressed a third paradigm shift. This paradigm shift entails the AFIS placing more value on a unit's self-assessment and deficiency-resolution ability rather than how many deficiencies a unit has. She explains how honest assessment is required for MICT to produce meaningful information for leadership. As such self-identification and resolution of deficiencies should be rewarded rather than punished. AFRC units are now focused on self-identifying deficiencies, applying the right resources and corrective actions and focusing on mission accomplishment rather than hiding deficiencies for good inspection scores. (Morgenstern, 2012)

Morgenstern also addressed a fourth required paradigm shift towards virtual inspections. Virtual inspections are inspections conducted through MICT without physical presence at the inspected location. Many inspection items can be conducted by viewing documentation or proof of compliance as captured in documentation in MICT. These virtual inspections not only save money by reducing inspection team footprint, but they also improve the quality of data stored in MICT and system-wide fidelity. She explains how AFRC has already conducted virtual inspections (VI) with good results. Inspectors only see supporting documentation and not the self-assessed scores. Morgenstern stated, "Brig. Gen. Derek Rydholm, AFRC inspector general, said he expects virtual inspections to be a win-win for the unit and the IG." (Morgenstern, 2012)

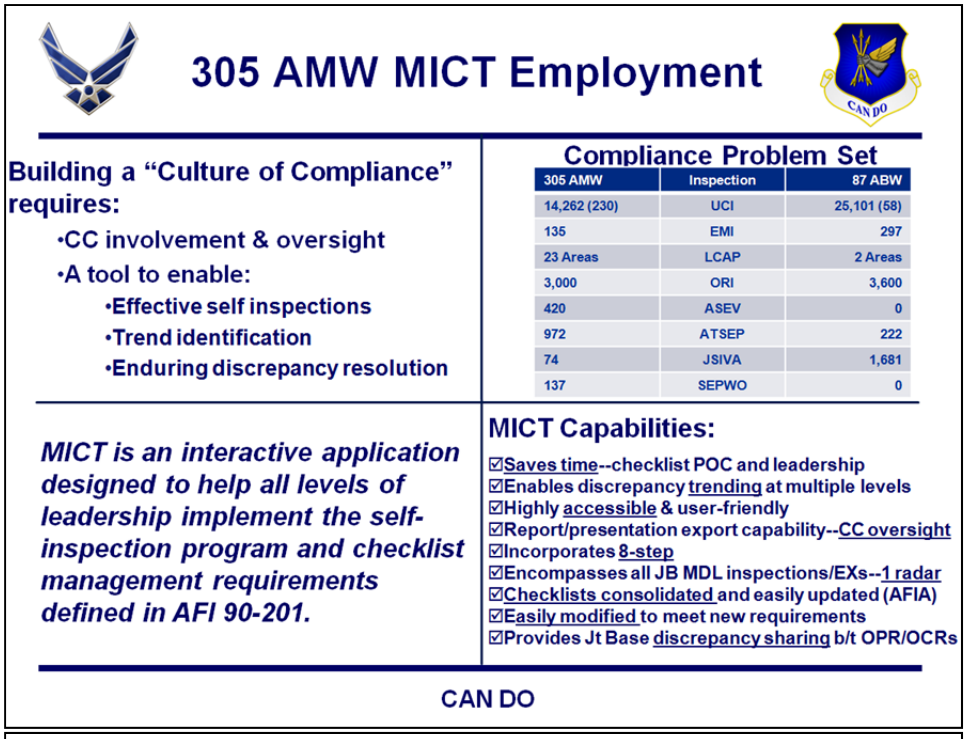
Likewise, Air Mobility Command (AMC) is currently developing an AMC VI Concept of Operations. Their goal is to "beta-test the virtual compliance inspection process through an IT breakthrough, the Management Internal Control Toolset" (Molnar, 2012).

The articles presented above clearly provide a description of MICT's capabilities from the perspective of the AFRC leadership and program administrators. While interview results presented in later chapters will provide SAF/IG, MAJCOM FAM, MAJCOM IG and Wing Commander perspectives, an active-duty wing perspective will be provided next to round out a description of MICT's capabilities.

One of the first active-duty wings to employ MICT was the 305th Air Mobility Wing at Joint Base McGuire-Dix-Lakehurst, NJ. The 305 AMW discovered MICT in the summer of 2010 during a Joint Base McGuire-Dix-Lakehurst AFSO21 Rapid Improvement Event (RIE) championed by the 305 AMW/CC, Col Paul Murphy. The team was comprised of compliance/readiness leads from five local USAF wings. The team's goal was to find a tool to make compliance/readiness checklist accomplishment easier and deficiency trending possible across the Joint Base. Weeks of research identified a single option that met all of the team's desired capabilities, and it was the AFRC's MICT. The 305 AMW implemented MICT in six weeks, fully employed MICT capabilities and documented them for the AMC/IG. (305 AMW, 2011)

305 AMW reports showed MICT was more than just a checklist management tool and suggested MICT's additional capabilities warrant a complete AFIS process reengineering. These sited capabilities included an unprecedented degree of commander oversight, deficiency tracking, corrective action plan development, trending, and

resolution at all command levels. The 305 AMW suggested the ability to provide deficiency and trend information to Functional Area Managers (FAMs) and HHQ leadership introduced new concepts such as virtual inspections, FAM trending, and large-scaled corrective action. MICT was initially the result of an AFRC AFSO 21 event and discovered by the 305 AMW during a separate AFSO 21 event. However, 305 AMW proposed that it should, in its current state, now be used to determine which trended deficiencies warrant future AFSO 21 events. Figure 3 below illustrates the 305 AMW vision for MICT enterprise-wide employment in March, 2011. The first slide illustrates the 305 AMW's problem set and approach to achieve a culture of compliance. They paired commander involvement and oversight with MICT. Then they outlined MICT's capabilities. On slide two, they presented their solution set and a chart to show how the wing was able to identify and resolve 600 deficiencies during a semi-annual self inspection period. Finally, they reemphasized the implications of the tool's oversight and trending capabilities on the AFIS. (305 AMW, 2011)



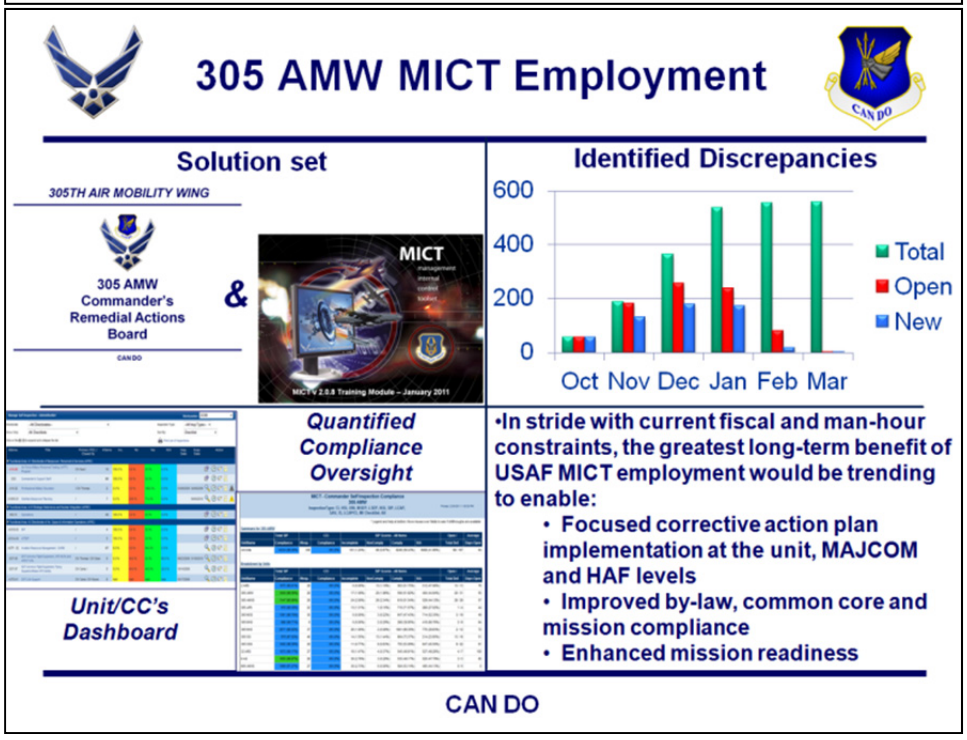


Figure 3. 305 AMW Rally Slides (2011)

Air Force Inspection System

SAF/IGI has been working on a major transformation of the AFIS over the past few years. A new *AFI 90-201; The Air Force Inspection System* was released on 23 Mar 2012 outlining the first major steps in the desired transformation. This revision addressed several major problems with the old AFIS.

One was the enormity of the problem set for wing commanders. The 17 Jun 09 *AFI 90-201* charged wing commanders with establishing self-inspections programs to ensure compliance with applicable AFIs (*AFI 90-201*, 2009:para 2.4). However, to the wing commander, that problem set consists of 11,055 AFIs requiring direct wing evaluation or action (Hyde, 2012). That is not counting all of the MAJCOM supplements, Air Force Manuals, or Technical Orders compounding the problem set (Hyde, 2012). Within which, a wing commander is looking at 200,000+ compliance checklist items and an unreasonable problem set (Hyde, 2012). The new desired AFIS puts the responsibility on AFI offices of primary responsibility to generate checklists by level of responsibility for their AFIs and upload them into MICT (*AFI 90-201*, 2012:para 6.3.2.4 and 6.3.2.4.2.1.1). This directive ensures wings will not be unknowing of requirements and will have a reasonable means of ensuring compliance. The new AFIS also reduces, consolidates and synchronizes inspections to allow units to focus on the mission while building a continuous culture of compliance (AMC/PA, 2011).

Another major problem with the old AFIS was that quantified trending capacity did not exist. There is no mention of MAJCOM and HAF trending for appropriately scaled resolution in the old *AFI 90-201*. However, with MICT, this capacity for huge efficiencies is realized in the new *AFI 90-201* and FAMs are required to:

> 6.3.2.1. Monitor and assess MICT data from wings to maintain situational awareness of potential problem areas.
> 6.3.2.2. Employ AFSO21 tools for large-scale corrective actions. AFSO21 tools can be found in the AFSO21 playbook or on the AFSO21 AF Portal website.
> 6.3.2.3. Perform periodic reviews of AF Best Practices, MAJCOM Benchmarks, Continuous Process Improvement Management Tool (CPI-MT) and Joint Lessons Learned Information System (JLLIS) to identify and employ Enterprise or MAJCOM standards when appropriate. (*AFI 90-201*, 2012)

Most importantly, this new AFI contains a paragraph outlining the intended path for the AFIS. The new *AFI 90-201* states:

> 6.4.1. In Nov 2011, CSAF directed SAF/IG and COMUSAFE to develop and implement a new inspection system across USAFE, for possible AF-wide implementation at a later date. The guidance for this new system is contained in a separate Guidance Memorandum and is for USAFE only. The USAFE system will give wing commanders manpower, training and guidance to create an organic inspection capability. As this wing-level inspection capability is developed into a mature, trusted component of the AF Inspection System, MAJCOM/IGs will increasingly shift their focus away from Compliance Inspections to Unit Effectiveness Inspections (UEI), validating and verifying the wing's own ability to find, fix, report and track deficiencies to closure. (*AFI 90-201*, 2012:77)

Transformation from the "new" AFIS to the "desired state" is already underway. The Air Force Inspector General, Lt Gen Marc Rogers visited Aviano Air Base, Italy in October of 2011. He announced:

> We would like the wing to inspect units according to the Exemplary Conduct Law, Title 10 U.S. Code 8583, that requires all commanders, supervisors, and others in authority to inspect their subordinates. Additionally, headquarters teams must limit the number of wing inspections. So if a commander has a squadron checklist and conducts self-inspections, he or she can watch their trend lines to improve overall performance and ultimately increase the wing's effectiveness. (Weaver, 2011)

He has selected Aviano to become the test base for the new "wing-driven" inspections schedule. (Weaver, 2011)

Relevant Research

RAND Project AIR FORCE (PAF)

No relevant research was found specifically on MICT. However, in 2010, the Secretary of the Air Force, Office of the Inspector General asked RAND Project AIR FORCE to support the AFIS transformation by collecting new primary data on the inspection system. Unfortunately, their document is currently only in draft form, not available for public release, and cannot be used as source for this research project. MICT is one of the expected areas of analysis in their research. (Hyde, 2012)

Enterprise Frameworks Requirements

Other related, relevant research exits to include M. Fayad's "Enterprise Frameworks Characteristics, Criteria and Challenges." In this research, Fayad outlines several requirements for an Enterprise software framework. This is an important consideration with MICT, but beyond the scope of this research project. As such, this section will deviate from the format of a traditional literature review and attempt to evaluate MICT against Fayad's requirements as a USAF enterprise software framework. However, this evaluation is solely based on superficial research and is largely the opinion of the researcher. Accordingly, this is a topic recommended for future research in the Conclusions chapter.

MICT's estimated ability to satisfy Fayad's requirements for an Enterprise software framework:

1. Mature runtime functionality—Allowance for high-level objects, representing the major abstractions found in the problem domain to mature within the framework.

    a. This is precisely the focus of this project. MICT is an outstanding checklist accomplishment tool, but it is seems to be flexing to meet major abstractions to the domain for which it was originally designed.
    b. MICT as an enterprise framework seems to meet this requirement.
2. Support for extensibility, tailorability and customizability
    a. This has been outstanding over the past several years as the MICT programmers led by Mr. Aaron Carta have evolved the software to meet new desires of its users.
    b. Future ability to meet these demands is yet to be seen. The new software developers are currently busy getting the entire Air Force up and running and haven't tackled new updates. According to Mr. Eric Mendenhall from AFMC ELECTRONIC SYSTEMS CE/HIBI, future modifications should not be a problem.
3. A catalog of business objects and enduring business themes—Not applicable to MICT
4. A workflow management metaphor and enduring business processes—The notion that enduring business processes should negate the requirement for software frameworks
    a. Continuity provided by MICT archives of deficiencies, resolutions and completed checklists present an incredible opportunity for the USAF due to high workforce turnover.
    b. MICT seems to meet this requirement
5. Achieving software stability

a. MICT currently has a strong record of reliability and maintainability (discussed in the next section).
b. MICT's ability to meet this requirement is yet to be seen given the new 400,000 users currently being added to the system.
c. This is an area recommended for future research.

6. A model for distributed objects and scalability and integration of multiple application frameworks and legacy components
    a. MICT and IGEMS are already undergoing modification for compatibility and inter-network communication.
    b. This is not expected to be a problem for MICT. However, eventually the task of linking in all other L2 systems and possibly joint systems may pose new challenges.
7. Platform independence or portability
    a. MICT is currently accessed through the AF Portal and is highly independent and portable.
    b. MICT seems to meet this requirement.
8. Mature framework documentation—Ensures reuse and maintainability through design and implementation standards
    a. To date, MICT seems to meet this requirement (see survey results)
9. Support for the role object pattern and ease of use—Intuitive and easy to understand
    a. MICT seems to meet this requirement (see survey results)
10. Web and E-business-ready—N/A; no transactions required

11. Support for separation of concerns
    a. MICT seems to meet this requirement as all checklist results are easily sorted while generating reports by a multitude of filters.
12. Sound investment: Framework economics
    a. MICT is currently funded under the TIGERS funding allocation. As an in-house software program, escalating costs are less likely than a contracted program such as Q5, AQD or Q Pulse (see below).
    b. Recommended area for future research in Conclusions chapter.

(Fayad, 2000: 39-46)

Maintainability and Reliability

Like, the previous section, MICT maintainability and reliability is an assumption of this research project. However, its importance warrants a brief discussion. Again, while beyond the scope of a traditional literature review, below is an attempt to superficially evaluate MICT's maintainability and reliability. This is an area recommended for future research in the Conclusions chapter.

The MICT development team closely tracks reliability and maintainability. Given the relatively young age of the program and its ongoing enterprise-wide implementation, historical reliability and maintainability data is limited. Likewise, not enough data exists to accurately forecast such characteristics. That being said, MICT reliability and maintainability seems to be strong thus far. MICT baseline is particularly low with only 5% of users having to call the helpdesk and the average response time + closure time of those calls is only ~70 minutes. Likewise, in 2011 MICT reliability and maintainability did not decline despite the fact that users doubled to 50,000 with no increase in helpdesk

manning and three major version releases. As seen below in Table 1, reliability was measured by recording the system downtime (failure rate) and number of helpdesk calls and maintainability was measured by recording the average helpdesk call closure time (Table 1).

Table 1. MICT Reliability and Maintainability

Month (2011)	Distinct Logins	Helpdesk Calls	Response time Avg (min)	Closure time Avg (min)
Jan	10,200	Unavail	Unavail	Unavail
Feb (update)	10,200	Unavail	Unavail	Unavail
Mar	11,400	Unavail	Unavail	Unavail
Apr	10,300	Unavail	Unavail	Unavail
May (update)	9,600	Unavail	Unavail	Unavail
Jun	9,800	Unavail	Unavail	Unavail
Jul	7,800	Unavail	Unavail	Unavail
Aug (update)	11,140	636	46.03	11.23
Sep	10,200	689	57.28	10.03
Oct	11,700	903	44.75	10.88
Nov	13,740	696	59.75	9.83

(all data provided by MICT help center)

In the future, maintainability and reliability will have to be closely tracked as users are expected to increase up to 400,000 as the program is employed across the enterprise. If maintainability begins to decline, the Air Force must be quick to augment the MICT helpdesk and/or programming team. Once fully employed, MICT reliability can be expected to follow the typical software, revised-bathtub curve (Pan, 1999). The failure rate can be expected to increase as upgrades are released and then gradually decline as the bugs are worked out (Pan, 1999).

Commercial Versions of MICT

Like, the previous two sections, evaluation of commercial IT tools comparable to MICT is a delimitation of this research project. However, its importance warrants a brief

discussion. Again, while beyond the scope of a traditional literature review, below is an attempt to superficially compare MICT against similar commercial IT tools. This is another area of recommended future research in the Conclusions chapter.

Not surprisingly, Corporate America is also interested in maintaining standards, compliance and oversight with the help of software programs. Leading providers include Q5, AQD and Q-Pulse. These companies have been providing a service very similar to MICT to thousands of businesses for several decades. Below is a brief synopsis of what each commercial version offers.

AQD Integrated Safety Management System is more safety oriented but also integrates quality and risk management and covers accident/incident reporting, risk assessment, compliance, analysis and investigation through to auditing and corrective action tracking. It focuses on root causes of quality and safety deficiencies, and ensuring an ongoing focus on corrective actions to minimize or eliminate these negative factors. It combines Quality Assurance with Flight Safety concepts to systematically apply corrective actions. It boasts easy-to-use, yet comprehensive and effective tools to manage the process of risk assessment, analysis, allocation of actions, follow-up and reporting to achieve the desired improvement in performance. (AQD, 2012)

The Q-Pulse Quality Management Solution is a software application designed to help organizations manage quality, safety and risk effectively. It provides all employees with a central focal point for all compliance data, materials and activities. It makes management aware of areas in need of attention to maintain compliance. It provides a suite of integrated modules including: document control, issues and corrective preventative action, audits and findings, mandatory reporting system, staff competency

and development, and other specialized modules, including asset, customer and supplier management. (Q-Pulse, 2012)

Q5AIMS safety audit software offers design and conduct audits, inspections, and assessments, corrective actions management, and quality, security, and safety audit software. Q5AIMS quality, security and safety audit software attempts to simplify and streamline management processes to better manage the complexity of an ever-changing business environment. Q5AIMS offers visibility with quality, security, environmental, health and safety audit software. It helps determine key areas of risk and concern, implement the necessary measures to prevent future incidents, and help companies achieve both internal and external compliance to standards and regulations. Q5 AIM serves many major companies such as Northwest Airlines, Southwest Airlines, and FedEx. (Q5, 2012)

After briefly researching, speaking with representatives, and receiving virtual tours from these service providers, two major conclusions were drawn by the researcher. First, the USAF is quite late in pursuing this type of IT enabler. Second, after a superficial evaluation of these software providers, MICT may have been worth waiting for. These providers seem to grasp the value of leadership oversight but are lacking in the ability to trend for scaled deficiency resolution. Additionally, their ability to be flexible and responsive to the needs of the USAF is questionable. Finally, the "ballpark" price-tag provided way-exceeded what the USAF is likely to ever spend on an in-house MICT.

Relevant Business Process Models

This section will describe four common business process models that will be later utilized in the conclusions chapter to provided context for discussion of research conclusions.

Business Process Reengineering (BPR)

In their book, *Reengineering the Corporation*, Michael Hammer and James Champy define a process as, "a collection of activities that takes one or more kinds of input and creates and output that is of value to the customer" (Hammer and Champy, 2003:38). They describe customers as internal or external and stress the importance of their perception of value. They identify process dysfunction indicators to include extensive information exchange, excessive buffers, high ratio of checking to value adding, rework and iteration, and complexity (Hammer and Champy, 2003). When dysfunction is present, they provided four conditions to satisfy before beginning process reengineering. They are relative importance, and technological, cultural and economical feasibility (Hammer and Champy, 2003)

Organizational Change

In the 14th edition of *Organizations: Behavior, Structure, Processes*, authors Gibson, Ivancevich, Donnelly and Konopaske's explain how managing people, structure and processes in organizations is a challenging, compelling a crucial set of tasks (Gibson, 2012:488-519). In their seventeenth chapter, they address managing organizational change and learning (Gibson, 2012:488-519).

Gibson et al. begin be discussing external, internal and external-internal change agents (Gibson, 2012:488-519). They then discuss why people resist change by

explaining parochial self-interest, trust, different assessments and tolerance for change (Gibson, 2012:488-519). Next, they identified important methods for reducing resistance to change including education, participation, facilitation, negotiation, manipulation and coercion. (Gibson, 2012:488-519). Finally, they provide a seven-step model for the management of organizational change (Figure 4) (Gibson, 2012:488-519).

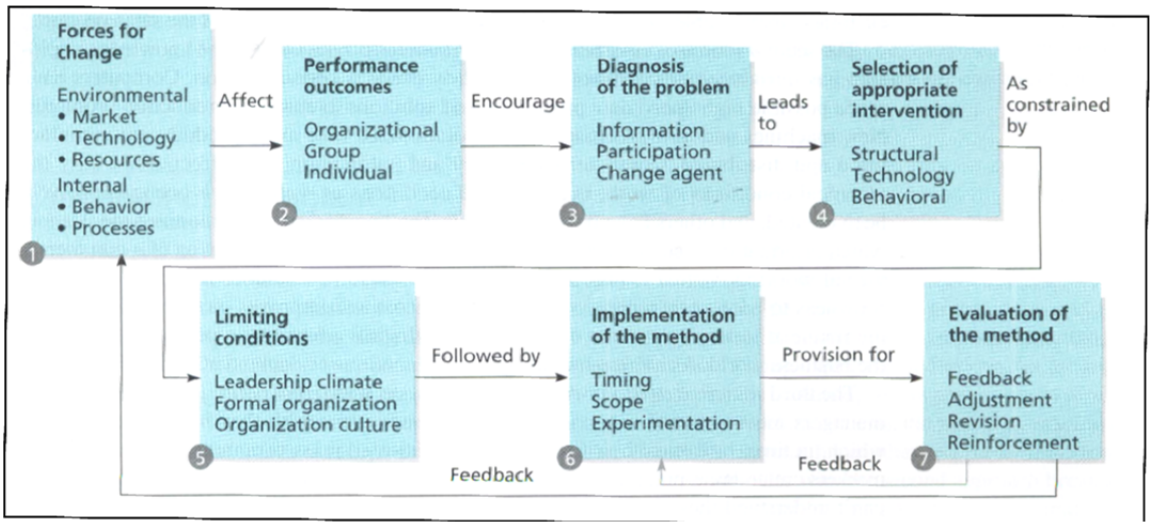


Figure 4. Seven-Step Model for the Management of Organizational Change

In step one, environmental forces for change include market, technology and resources and represent forces that most likely spark organizational change (Gibson, 2012:488-519). Internal forces include behavioral and process problems and usually result in breakdowns in decision making and communication (Gibson, 2012:488-519). In step two, performance outcomes include those at the organizational, group and individual levels. In step three, diagnosis begins with the change agents gathering, interpreting and presenting data (Gibson, 2012:488-519). In diagnosing the problem, Gibson et al. suggest three questions:

- What is the problem as distinct from the symptoms of the problem?

- What must be changed to resolve the problem?
- What outcomes are expected from the change and how will those outcomes be measured? (Gibson, 2012:488-519)

In step four, Gibson et al. describe the approaches for selection of the appropriate intervention as structural, behavioral and/or technological and how their utility varies given the nature of the problem (Gibson, 2012:488-519). For step five, Gibson et al. describe limiting conditions as the leadership climate, formal organization and the organizational culture and how they can temper the selection of a change technique (Gibson, 2012:488-519). Finally, Gibson et al. describe how the results of the change implementation can hinge on the timing and scope selected (Gibson, 2012:488-519).

Service Quality Management

In the 7th edition of *Service Management; Operations, Strategy, Information Technology*, authors James and Mona Fitzsimmons explain the role of services in an economy, how to compete with a service enterprise, the management of day-to-day service operations and quantitative service management models. In Chapter 6, "Service Quality," Fitzsimmons explained statistical process control to enhance service quality (Fitzsimmons, 2011:130-135). They describe how a control chart can be used to plot average values of a measure of performance over time to determine if the process remains in control (Fitzsimmons, 2011:131). The control charts determine confidence intervals from sample means given a normally distributed population under the limits of the central-limit theorem (Fitzsimmons, 2011:131). They showed how variable and attribute charts are used depending on the unit of measure (Fitzsimmons, 2011:132). Variable control charts include X-bar and R-charts and detect changes in the process mean and

process dispersion, respectively. Attribute control charts are used when the unit of measure is "good" or "bad" (Fitzsimmons, 2011:134).

The Fitzsimmons also provide a Service Quality Gap Model and explain how it can be used to improve service quality (Figure 5) (Fitzsimmons, 2011:117). Below, the gap between customer expectations and perceptions is GAP 5 and customer satisfaction is dependent on minimizing the other four gaps.

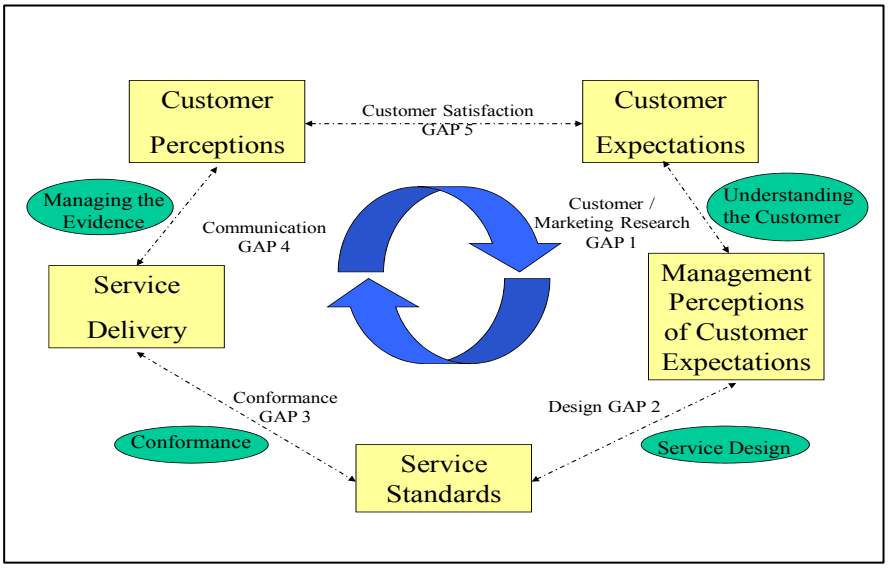


Figure 5. Service Quality Gap Model

Risk Management

In *Transportation; A Supply Chain Perspective*, authors John Coyle, Robert Novack, Brian Gibson and Edward Bardi provide a perspective of risk management as applied to transportation. They explain how most transportation companies associate risk with piracy, weather, pandemics, labor unrest and terrorism (Coyle, 2011). Within a supply chain, these risks have varying degrees of adverse impact and probability (Coyle, 2011). It is this probability and impact that drives the extent to which the company

should invest in risk management. They define risk management as, "the variety of activities undertaken by an organization to control and minimize threats to the continuing efficiency, profitability and success of its operations" (Coyle, 2011).

Transportation risk management involves risk identification, risk assessment, risk management strategies and risk review and monitoring (Coyle, 2011). General techniques for transportation risk identification include brainstorming, interviews, surveys, historical data and documented knowledge (Coyle, 2011). Associated merging risk categories include product loss, product damage, product contamination, delivery delay, supply chain interruption and security breach (Coyle, 2011). Risk assessment involves assessing probability and impact of potential risks (Coyle, 2011). Risk management strategies generally include avoidance, reduction, retention and transfer (Coyle, 2011). Reduction strategies include hedging postponement and buffering (Coyle, 2011). Risk review and monitoring is usually accomplished through controlled and surprise tests (Coyle, 2011).

Summary

This literature review supported the all research hypotheses. Research Hypothesis 1 was that MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and resolution does warrant mandatory, enterprise-wide employment. Articles written about MICT and the new AFIS described how MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency,

commander oversight, deficiency identification, corrective action plan development, trending, and resolution warranted mandatory, enterprise-wide employment.

Research Hypothesis 2 was that key capabilities could be identified that should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation. The articles also supported survey data and identified checklist improvement, trending and oversight as key capabilities that should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation.

Research Hypothesis 3 was that the surveys, descriptive statistics, interviews and literature review would indicate how best to leverage key MICT capabilities to achieve required paradigm shifts to enable the future, desired transformation. Morgenstern's article discussed the required paradigm shifts and provided recommendations for how to employ MICT key capabilities accordingly.

Research Hypothesis 4 was that the surveys, descriptive statistics, interviews and literature review would show which key capabilities should be enhanced to maximize AFIS effectiveness and efficiency. Relevant research provided some areas for future research to ensure MICT meets enterprise framework, maintainability and reliability requirements as measured against commercial competitors.

However, this literature review also highlights how little research has been performed on MICT or how to best employ it across the enterprise. The following chapter will present the three methodologies this research project will employ to do so.

III. Methodology

Chapter Overview

This chapter will explain this research project's methodology. Three primary methodologies were employed to answer the research questions. In the previous chapter, the literature review supported the research hypotheses by describing the significance of research, MICT, the AFIS, and relevant research. This chapter will describe three methodologies employed to prove or disprove the hypotheses: inferential statistics, descriptive statistics on survey data, and interviews.

Quantitative Methodology

Inferential statistics were used to determine MICT's utility relative to existing processes and tools in the area of deficiency identification. This measure was selected for two reasons. First, a unit's ability to identify deficiencies is the fundamental task in a self-assessment. Second, it was the only measure for which enough data could be obtained for inferential statistical analysis. Two databases of identified deficiencies were collected from a wing that had recently employed MICT. One database was from before MICT implementation and one was after. The inferential statistical analysis was planned to measure MICT's ability to assist the wing in the identification of deficiencies as measured against their previous self inspection tool. The previous tool was a web-based checklist management system called "Self-Inspection Website" tool. Contact was made with six other wings to determine if the Self-Inspection Website tool was commonly employed. All of the wings were using tools inferior to the Self-Inspection Website tool

or no tool at all. Accordingly, the Self-Inspection Website tool appeared to be an above average tool to measure against.

The common measure of performance was the number of self-identified deficiencies per checklist item during one semiannual self-inspection period. In other words, the common measure of performance was the number of self-identified deficiencies divided by total number of checklist items scored in one semiannual inspection period (Oct 2009 for the SIP website and Feb 2010 for MICT).

This measurement was selected because each program has features that encourage and/or discourage deficiency identification. The data collected and analyzed included deficiencies identified during the wing's Spring 2010 semi-annual self-inspection cycle with the Self-Inspection Website Tool and deficiencies identified during the Fall 2010 cycle with MICT. These are real-world processes, each currently in use by various units for self-inspection/assessment and deficiency resolution. These are stationary processes when analyzed as one self-inspection cycle only. Of course, as deficiencies are resolved over time, parameters such as mean and variance would ideally decrease. Consequently, the processes are stochastic only in the context of a single self-inspection cycle. However, if the data is skewed due to the interaction between the inspection cycles, MICT performance would look worse than it actually is, because it followed the previous inspection's deficiency resolutions.

The data sets are presented below (Tables 2 & 3). Unit-identifiable information is masked. In both figures, two columns were used: non-compliant items and total items. The former divided by the latter produces our dependent variable called "DefRatio."

Table 2. Data Set 1; Oct 2009 Self-Inspection Website Tool Data

	Total Items	N/A	N/C	Critical N/C	C/C	Not Comp		Compliant	Not Applicable	Non-Compliant	Critical Non-Compliant	Compliant w/ Comments	Not Completed
	549	82	19	0	23	0		425	82	19	0	23	0
	49	5	6	0	4	0		34	5	6	0	4	0
	255	27	0	0	2	0		226	27	0	0	2	0
	203	50	0	0	2	0		151	50	0	0	2	0
	42	0	13	0	15	0		14	0	13	0	15	0
	Total Items	N/A	N/C	Critical N/C	C/C	Not Comp		Compliant	Not Applicable	Non-Compliant	Critical Non-Compliant	Compliant w/ Comments	Not Completed
	2605	244	22	0	56	76		2207	244	22	0	56	76
	250	17	4	0	16	19		194	17	4	0	16	19
	534	67	2	0	26	19		420	67	2	0	26	19
	534	62	5	0	3	0		464	62	5	0	3	0
	531	45	10	0	0	19		457	45	10	0	0	19
	756	53	1	0	11	19		672	53	1	0	11	19
	Total Items	N/A	N/C	Critical N/C	C/C	Not Comp		Compliant	Not Applicable	Non-Compliant	Critical Non-Compliant	Compliant w/ Comments	Not Completed
	5892	1153	41	2	69	27		4602	1153	39	2	69	27
	49	6	0	0	0	0		43	6	0	0	0	0
	3985	932	2	0	0	0		3051	932	2	0	0	0
	544	71	17	1	40	0		416	71	16	1	40	0
	377	27	0	0	0	27		323	27	0	0	0	27
	494	99	20	1	15	0		360	99	19	1	15	0
	443	18	2	0	14	0		409	18	2	0	14	0
	Total Items	N/A	N/C	Critical N/C	C/C	Not Comp		Compliant	Not Applicable	Non-Compliant	Critical Non-Compliant	Compliant w/ Comments	Not Completed
Total	**9046**	**1479**	**82**	**2**	**148**	**103**	Total	7234	1479	80	2	148	103
By Law	1273	122	12	0	36	652	By Law	451	122	12	0	36	652
SII	1206		1	0		926	SII	279	0	1	0	0	926
Total	11525	1601	95	2	184	1681		7964	1601	93	2	184	1681

Table 3. Data Set 2; Feb 2010 MICT Data

Filters:

MICT - Commander Self Inspection Compliance

InspectionType: CI, HSI, ORI, MSEP, LSEP, NSI, ASEV, SIP,

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* Legend and help at bottom. Move mouse over fields to see if drillthroughs are available

Summary for

	Total SIP		CCI	SIP Scores - All Items				Open /	Average
UnitName	Compliance	#Insp.	Compliance	Incomplete	NonComply	Comply	N/A	Total Def.	Days Open
All Units	14941 (99.34%)	363	0/0 (0%)	52 (0.35%)	47 (0.31%)	8639 (57.44%)	6302 (41.90%)	47 / 637	88

Breakdown by Units

	Total SIP		CCI	SIP Scores - All Items				Open /	Average
UnitName	Compliance	#Insp.	Compliance	Incomplete	NonComply	Comply	N/A	Total Def.	Days Open
	1099 (100.00%)	29	0/0 (0%)	0 (0.00%)	0 (0.00%)	587 (53.41%)	512 (46.59%)	0 / 25	0
	1099 (98.57%)	30	0/0 (0%)	12 (1.08%)	4 (0.36%)	576 (51.66%)	523 (46.91%)	4 / 27	104
	1208 (99.83%)	31	0/0 (0%)	0 (0.00%)	2 (0.17%)	676 (55.87%)	532 (43.97%)	2 / 109	75
	1017 (99.90%)	24	0/0 (0%)	0 (0.00%)	1 (0.10%)	748 (73.48%)	269 (26.42%)	1 / 33	10
	1368 (100.00%)	31	0/0 (0%)	0 (0.00%)	0 (0.00%)	652 (47.66%)	716 (52.34%)	0 / 89	0
	772 (100.00%)	9	0/0 (0%)	0 (0.00%)	0 (0.00%)	273 (35.36%)	499 (64.64%)	0 / 13	0
	2622 (99.96%)	39	0/0 (0%)	0 (0.00%)	1 (0.04%)	1847 (70.42%)	775 (29.55%)	1 / 70	11
	903 (98.05%)	48	0/0 (0%)	14 (1.52%)	4 (0.43%)	689 (74.81%)	214 (23.24%)	4 / 68	86
	1489 (97.77%)	35	0/0 (0%)	0 (0.00%)	34 (2.23%)	840 (55.15%)	649 (42.61%)	34 / 140	144
	1110 (100.00%)	29	0/0 (0%)	0 (0.00%)	0 (0.00%)	582 (52.43%)	528 (47.57%)	0 / 27	0
	1073 (97.55%)	29	0/0 (0%)	26 (2.36%)	1 (0.09%)	551 (50.09%)	522 (47.45%)	1 / 20	13
	1181 (100.00%)	29	0/0 (0%)	0 (0.00%)	0 (0.00%)	618 (52.33%)	563 (47.67%)	0 / 16	0

First, the means and standard deviations were determined for each data set. Comparison of the two provided a means for comparison. However, in order to build a confidence interval around the notion that MICT better enables a unit to self-identify their

deficiencies, two, equal sized, large-sample, simulated, random data sets were generated in Microsoft Excel. (seeds 193,261) They reflected the same means and variances as provided by their respective data samples.

Both samples of data were plotted on the same time-series plot, along with the two expected values of each series (means). The plots depicted random data samples throughout. Then histograms and Q-Q plots were analyzed to ensure the data sets had tendencies toward normal distributions. (McClave, 2011)

Finally, a hypothesis test was performed using the simulated data sets (Equation 1).

Below is the large-sample test of hypothesis for (μ_1- μ_2) at α = .05. In other words, research determined if one can be 95% confident that MICT enables a unit to identify more deficiencies than the S-I website.

Conditions:

- ✓ The two samples are randomly selected in an independent manner from the two target populations.
- ✓ The sample sizes, n_1 and n_2 are both large (>30).

One-tailed test

H_0: (μ_{n1}- μ_{n2}) = D_0 = 0

H_a: (μ_{n1}- μ_{n2}) > D_0 = 0

$$\text{Test statistic: } z = \frac{(\bar{x}_1 - \bar{x}_2) - D_0}{\sqrt{(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2})}} \qquad \textbf{(1)}$$

Rejection region: $z > z_\alpha = z_{.05} = 1.645$

The test results were then verified using Microsoft Excel.

Then, the possibility of type I or type II errors was acknowledged. A type I error occurs if the researcher rejects the null hypothesis in favor of the alternative hypothesis when, in fact, H_0 is true. A type II error occurs if the researcher accepts the null hypothesis when, in fact, H_0 is false.

Obviously, the primary disadvantage of simulated data is that it is only as good as the sample used to create it. If the sample is misleading, inaccurate or too small, the products of the inference based on the simulated data will be wrong and possibly more detrimental than if the inference was not even attempted. On the other hand, simulated data is critical in modern statistics to perform statistical inference to estimate or predict something about a population based on information contained in a sample. Inferential statistics has five elements: the population of interest, one or more variables to be investigated, the sample of population units, the inference about the population based on information contained in the sample, and a measure of reliability for the inference (McClave, 2011). This latter element is the key to the usefulness of the inference and is driven by its reliability. In this analysis, all inferences were made with a reliability of 95%. In other words, all inferences were made and accepted as likely truth with a 5% probability of Type I error. While not perfect, it's easy to see how this inference could be incredibly useful when sampling is difficult, expensive or impossible on a desired larger scale. In this case, the lack of data warranted the use of simulated data.

Next, backwards linear regression was used to see if a useful model could be produced to show how many more deficiencies a squadron could expect to find during each semi-annual self-inspection cycle if it switched to MICT. Given, the same data set

was utilized, the model would likely only be useful to similar wings. The goal was to build a model that contrasts the two IT, self-assessment tools. Again, the common measure of performance (Dependent Variable) was be the number of a unit's self identified deficiencies divided by total number of checklist items scored in one semiannual inspection period (Oct 2009 for the SIP website and Feb 2010 for MICT).

Backwards linear regression was performed to build a model to predict the value of employing MICT in a unit. The independent variables to be tested were:

1. Whether the unit is using MICT or the S-I website
2. What type of squadron it is (Flying, MX, MOS, OSS, Staff, APS)
3. Number of checklist items assigned to the unit
4. Percentage of assigned items that are scored N/A
5. Rank of Self-Inspection Monitor above O-3 if officer or E-7 if enlisted
6. Variables 2-6 above associated with variable 1 above

Backwards Linear Regression Model was produced by SPSS with Alpha for removal of 0.15.

Next, residual analysis was conducted for the model to check the assumptions on epsilon (the error in the system). Residual plots were generated to check for curvilinear trends and ensure all data was random. Then, the residual plot were then analyzed to check for outliers with respect to the standard deviations. Next, Histograms and P-P plots were built to ensure no major departures from normality existed. Finally, model evaluation was performed by observing adjusted R^2 and F. Additionally, the model was used to compare two point estimates in an attempt to demonstrate some degree of usefulness. With all other independent variables held constant the model was run twice

with and without MICT to show how many more deficiencies a particular squadron could expect to find with and without MICT.

Qualitative Methodology

Qualitative analysis conducted to generate evidence to support or disprove research hypotheses included surveys and interviews. Additionally, descriptive statistical analysis was performed on the survey results. Examples of administered surveys and interview talking points are provided in Appendix C.

Survey questions, presented in chapter one under investigative questions, captured some background data on the survey participant but largely focused on their perspective of MICT's capabilities relative to what they used before MICT. Inferential analysis of survey results using an independent samples t-test was considered. However, it is not a valid procedure to use with this set of data because the assumption of independent samples in invalid (McClave, 2011). The before-and-after survey responses by capability are linked by the individual surveyed. To unlink the samples, the sample size would either have to have grown or the descriptive statistics would have been sacrificed. In this case, a comparison of the descriptive statistics was more valuable.

Surveys were administered to three types of MICT users: basic users, wing MICT Program Managers (PM), MAJCOM Functional Area Managers (FAM). Surveys were sent to random MICT users, PMs and FAMs as provided by MICT administrators. Given the small population of users above the basic-user level and limited numbers of units experienced in using MICT, the survey sample was kept below twenty individuals and a survey control number was not required. Fifteen survey responses were received with a

survey response rate of 60% for basic users, 33% for wing program managers, 56% for MAJCOM functional area managers. Survey descriptive statistics included analysis of:

1. Overall response "before-and-after MICT implemented" mean scores by AFIS task
2. Response Means/Medians/Modes/Variance by AFIS task and type surveyed
3. Percentage of responses indicating that the task is not accomplished with MICT
4. Optional comments provided by survey participants

Interviews were administered to individuals in key leadership positions that were familiar with MICT. Interviewees were selected with the help of MICT administrators and included a wing commander, MAJCOM FAM, MAJCOM IG representative, and SAF/IG representative. As presented in chapter one, the interviews targeted the interviewees' background and perceptions of MICT capabilities like the surveys. Additionally, the interviews attempted to validate and assess the four paradigm shifts proposed in the Literature Review for achieving the AFIS desired state. In doing so, the interviews addressed all four research questions.

Summary

This project's research methodology consisted of three approaches to collectively address the four proposed research questions. First, inferential statistics employed hypothesis testing and linear regression to show MICT's utility as compared to another leading tool in the area of deficiency identification. Second, surveys were administered to basic users, wing PMs and MAJCOM FAMs to determine their collective perception

of MICT's capabilities relative to other tools. Finally, interviews were administered to a wing commander, MAJCOM FAM, MAJCOM IG representative and SAF IG representative. These interviews were designed to capture the same data as the surveys, and validate and assess the four paradigm shifts proposed in the Literature Review for achieving the AFIS desired state.

IV. Results and Analysis

Chapter Overview

This chapter will provide the results of the all of the employed methodologies. Then it will provide analysis of the same. This chapter will not repeat description and explanation of methodologies. All unit-identifiable information is masked.

Results of Inferential Statistical Analysis

A quick comparison of their means and variances highlighted in red in Table 4 suggest MICT is a better tool in identifying deficiencies. MICT users were able to identify over three times as many deficiencies on average with a double standard deviation.

Table 4. Means & Standard Deviations of MICT & S-I Website Tool Data Sets

MICT

Unit	Deficiencies	Total items	C/D
	25	1099	0.02274795
	27	1099	0.02456779
	109	1208	0.09023179
	33	1017	0.03244838
	89	1368	0.06505848
	13	772	0.01683938
	70	2622	0.02669718
	68	903	0.07530454
	140	1489	0.09402283
	27	1110	0.02432432
	20	1073	0.01863933
	16	1181	0.01354784
Total	637	14941	
		Mean	0.04203582
		Std Dev	0.03011224

WEBSITE

Unit	Deficiencies	Total items	C/D
	19	549	0.03460838
	4	250	0.016
	2	534	0.00374532
	5	534	0.0093633
	10	531	0.01883239
	1	756	0.00132275
	0	49	0
	2	3985	0.00050188
	18	544	0.03308824
	0	377	0
	21	494	0.04251012
	2	443	0.00451467
Total	84	9046	
		Mean	0.01370725
		Std Dev	0.01531416

However, in order to build a confidence interval around the notion that MICT better enables a unit to self-identify their deficiencies, the following two, equal sized, large-sample, simulated, random data sets were generated in Microsoft Excel (Table 5). (seeds 193,261) They reflect the same means and variances as provided by their respective data samples.

Table 5. Simulated Random Data Sets

Simulated Random Data Set	
MICT	Website
-0.019569	-0.01576
0.0452519	0.029422
0.0754193	0.037246
0.0678894	0.023597
-0.018628	0.010879
0.0411338	0.019064
0.0486786	-0.01206
0.0617765	0.020413
0.0473791	0.028637
0.0598348	0.041322
0.0268887	-0.03628
0.0061953	0.001273
0.0367603	0.008745
0.039366	0.02668
0.029302	0.009401
0.0500836	0.017006
0.0195951	0.031752
0.0283509	0.016046
0.076559	0.020584
-0.034029	0.027965
0.0768585	0.016239
0.0113769	0.004794
0.0028531	0.003631
0.0044216	0.020128
0.0475946	0.031495
0.0139423	-0.00394
0.0333464	0.017819
0.0048401	0.005617
0.011373	0.032623
-0.007232	0.007967
0.0623367	0.044391
0.0428778	0.008788
-0.000694	0.048069
-0.007497	0.0107
0.089957	0.023446
0.07292	-0.006
0.070617	-0.00638
0.0969673	0.008099
0.0304368	0.029738
0.0161189	0.036035
-0.022091	0.005482
0.0892827	-0.00778
0.0064837	0.015693
0.0741217	0.021144
0.0932684	-0.00994
0.0746095	0.027897
0.051819	0.022036
0.0074993	0.016256
-0.04945	0.033741
0.0387062	0.005376
0.0642279	0.039401
Mean	
0.0420358	0.013707
Std Dev	
0.0301122	0.015314

Below, both samples of data were plotted on the same time-series plot, along with the two expected values of each series (means). As depicted on the plots, the data represents random samples throughout (Figure 8).

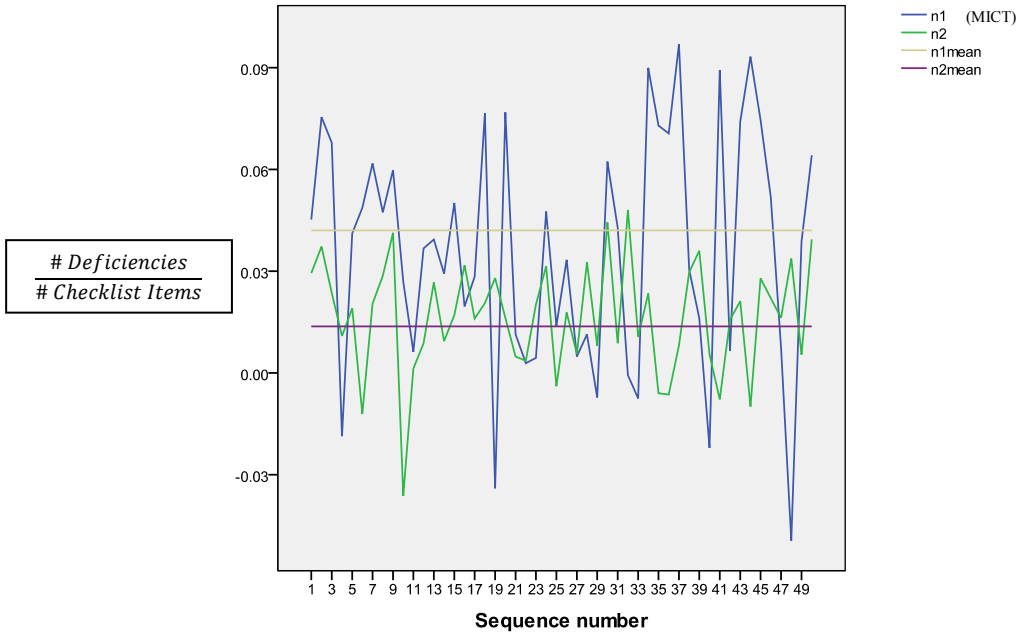


Figure 5. Time Series Plot of Simulated Random Data Sets

As seen below, both data sets' histograms and Q-Q plots at least have tendencies toward a normal distribution (Figures 9-12).

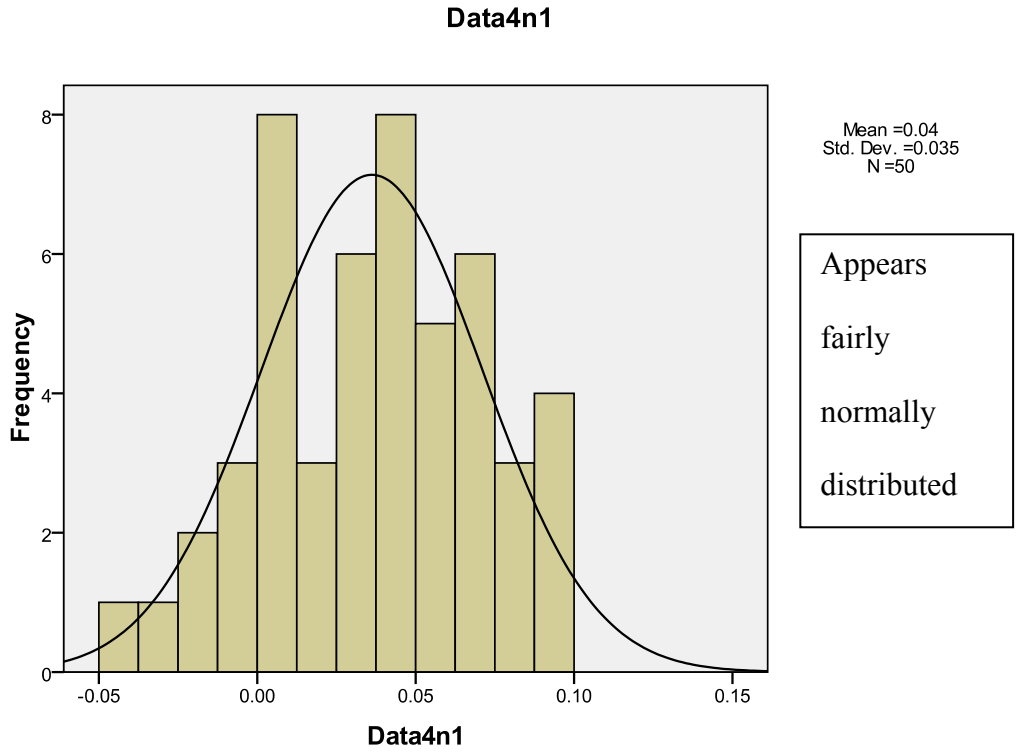


Figure 6. MICT Simulated Random Data Set Histogram

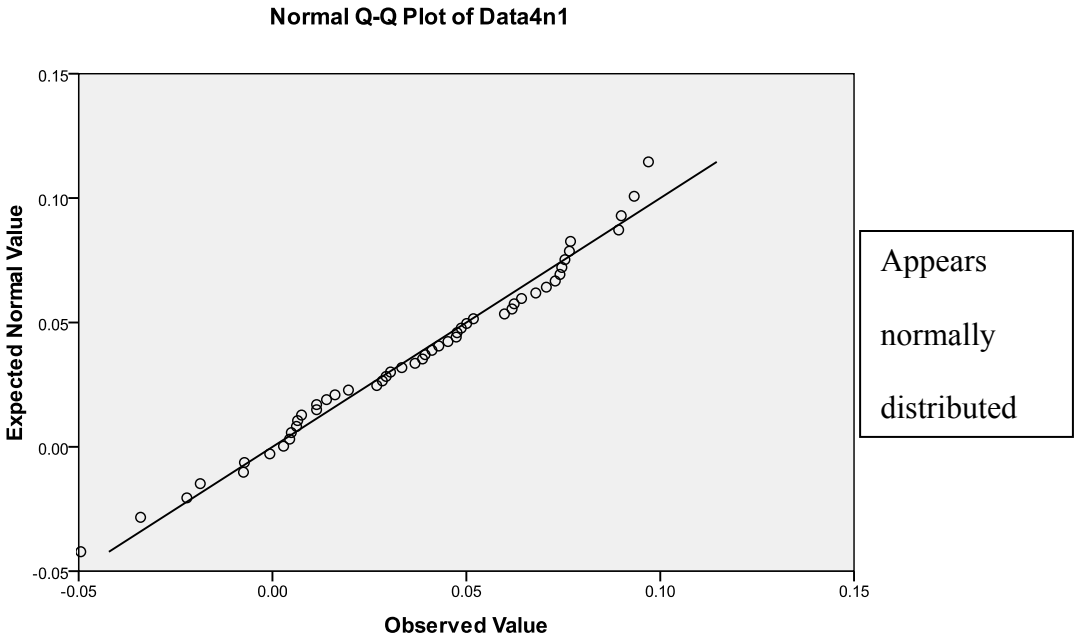


Figure 7. MICT Simulated Random Data Set Q-Q Plot

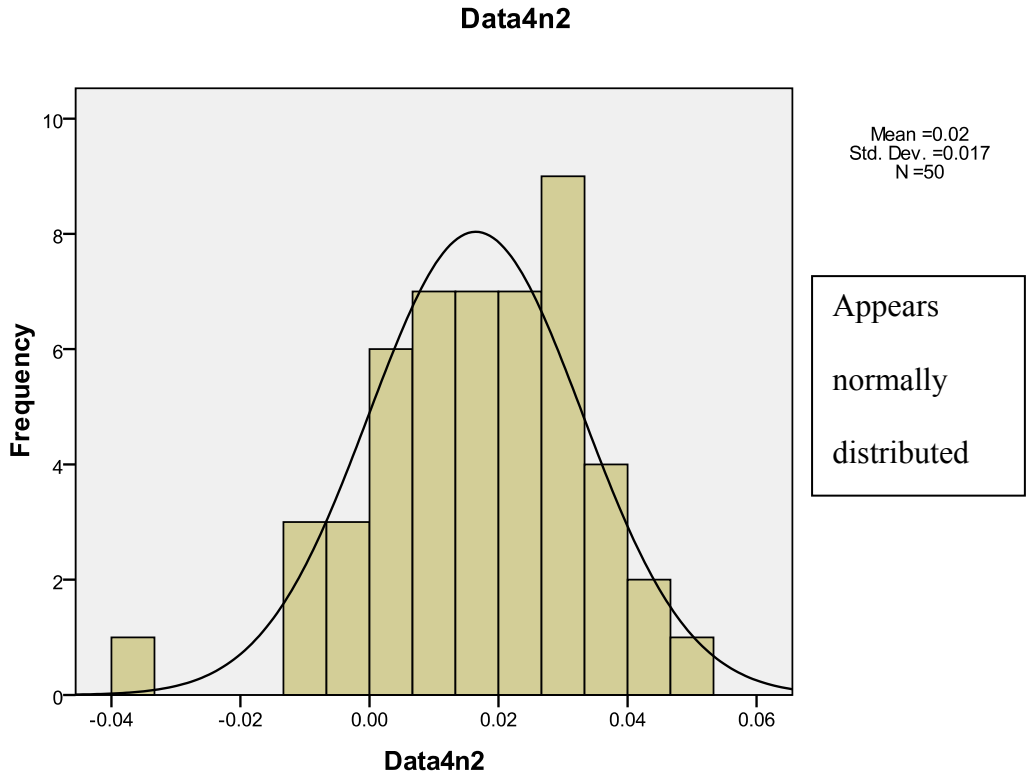


Figure 8. S-I Website Tool Simulated Random Data Set Histogram

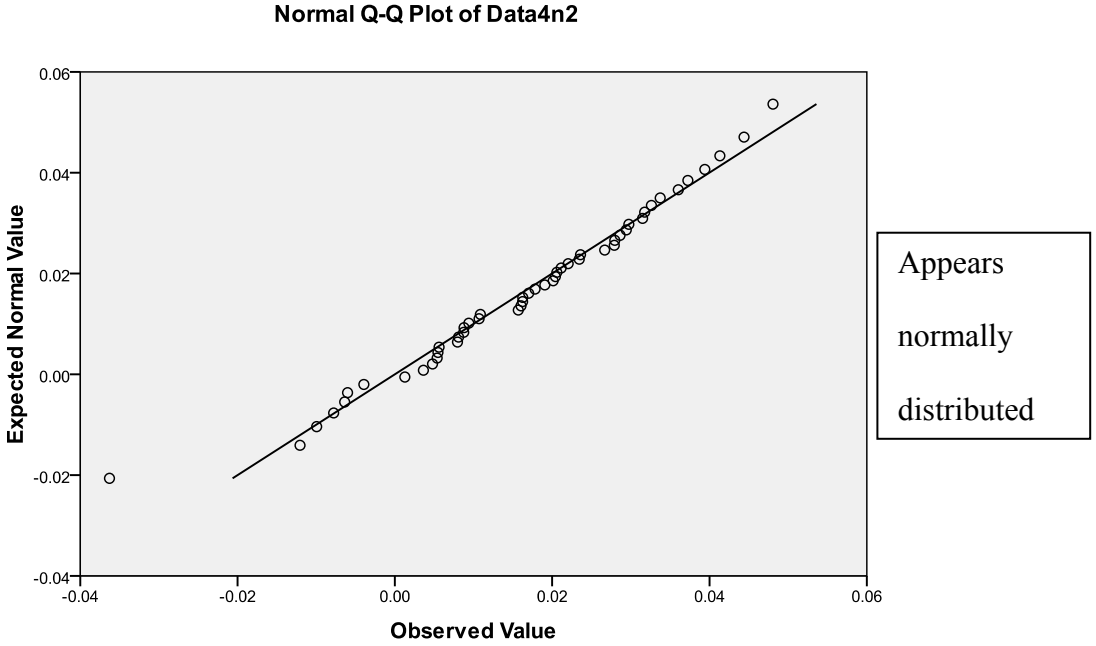


Figure 9. S-I Website Tool Simulated Random Data Set Q-Q Plot

Finally, a hypothesis test was performed using the simulated data sets generated above. Both required conditions were met: the two samples were randomly selected in an independent manner from the two target populations, and the sample size, n_1 and n_2, were both large (>30). Below is the large-sample test of hypothesis for $(\mu_1 - \mu_2)$ at $\alpha = .05$. In other words, it determined if one could be 95% confident that MICT enables a unit to identify more deficiencies than the S-I website (Equation 1).

One-tailed test

H_0: $(\mu_{n1} - \mu_{n2}) = D_0 = 0$

H_a: $(\mu_{n1} - \mu_{n2}) > D_0 = 0$

Test statistic: $z = \frac{(\bar{x}_1 - \bar{x}_2) - D_0}{\sqrt{(\frac{s_1^2}{n1} + \frac{s_2^2}{n2})}} = \frac{(.036193994 - .01648514) - 0}{\sqrt{(\frac{.001221}{50} + \frac{.000274}{50})}} = \frac{.019709}{.00546809} = 3.60437$ **(1)**

Rejection region: $z > z_\alpha = z_{.05} = 1.645$

Conclusion: Since the Test Statistic z is in the rejection region, there is sufficient evidence to reject H_0: $(\mu_{n1} - \mu_{n2}) = D_0 = 0$, so $\mu_{n1} > \mu_{n2}$. In other words, one can be 95% confident that MICT enables a unit to identify more deficiencies than the S-I website.

This determination was confirmed by Microsoft Excel as presented below in Table 6.

Table 6. Hypothesis Testing Verification by Excel

z-Test: Two Sample for Means		
	Variable 1	*Variable 2*
Mean	0.036193994	0.01648514
Known Variance	0.001221	0.000274
Observations	50	50
Hypothesized Mean Difference	0	
Z	3.604340221	
P(Z<=z) one-tail	0.000156473	
z Critical one-tail	1.644853627	
P(Z<=z) two-tail	0.000312947	
z Critical two-tail	1.959963985	

A type I error occurs if the researcher rejects the null hypothesis in favor of the alternative hypothesis when, in fact, H_0 is true. This is a possibility but unlikely given the confidence interval. A type II error occurs if the researcher accepts the null hypothesis when, in fact, H_0 is false. This, of course, is not applicable.

Next, backwards linear regression was used to build a model to predict how many more deficiencies a squadron could expect to find during a semi-annual self-inspection cycle using MICT than without. Relevant independent variables were selected from available data and are listed in the top row of Table 7 below.

Table 7. Consolidated Data and Independent Variables

Unit	ID'd Def/Total Items	MICT/SIP	Mon rank>O3/E7	Unit total items	Unit Cklst N/A / Total	Flying	OSS	Staff	A/MXS	MOS	APS	MICT*Mon	MICT*Total	MICT*N/A	MICT*Flyi	MICT*OSS	MICT*Staf	MICT*A/M	MICT*MO	MICT*APS
	0.003745318	0	1	534	0.125468165	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.022747953	1	1	1099	0.465878071	1	0	0	0	0	0	1	1099	0.4658781	1	0	0	0	0	0
	0.009363296	0	0	534	0.116104869	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.024324324	1	1	1110	0.475675676	1	0	0	0	0	0	1	1110	0.4756757	1	0	0	0	0	0
	0.018832392	0	0	531	0.084745763	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.018639329	1	0	1073	0.486486486	1	0	0	0	0	0	0	1073	0.4864865	1	0	0	0	0	0
	0.001322751	0	0	756	0.07010582	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.094022834	1	1	1489	0.435862995	0	1	0	0	0	0	1	1489	0.435863	0	1	0	0	0	0
	0.016	0	0	250	0.068	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	0.07530454	1	0	903	0.236987818	0	0	1	0	0	0	0	903	0.2369878	0	0	1	0	0	0
	0.04048583	0	1	494	0.200404858	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	0.06505848	1	1	1368	0.523391813	0	0	0	0	1	0	1	1368	0.5233918	0	0	0	0	1	0
	0.00501882	0	1	3985	0.233877039	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	0.026697178	1	1	2622	0.295575896	0	0	0	1	0	0	1	2622	0.2955759	0	0	0	1	0	0
S	0.03125	0	1	544	0.130514706	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
S	0.090231788	1	1	1208	0.440397351	0	0	0	1	0	0	1	1208	0.4403974	0	0	0	1	0	0
S	0	0	0	377	0.071618037	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
S	0.013547841	1	0	1181	0.476714649	0	0	0	1	0	0	0	1181	0.4767146	0	0	0	1	0	0
	0.004514673	0	1	443	0.040632054	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	0.032448378	1	1	1017	0.264503441	0	0	0	0	0	1	1	1017	0.2645034	0	0	0	0	0	1
	0	0	0	49	0.12244898	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	0.016839378	1	0	772	0.646373057	0	0	1	0	0	0	0	772	0.6463731	0	0	1	0	0	0
	0.034608379	0	0	549	0.149362477	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	0.024567789	1	1	1099	0.47588717	0	0	1	0	0	0	1	1099	0.4758872	0	0	1	0	0	0

Expanded description of independent variables:

- "MICT/SIP" dummy variable--1 means the unit was using MICT, 0 for Self-Inspection Website tool
- "Mon rank>O3/E7" dummy variable--1 means the unit Self-inspection Monitor or Self-assessment PM was above the rank of O-3 or E-7 if a NCO
- "Unit Total Items"--the total number of checklist items assigned to the unit
- "Unit Chklst N/A / Total"--the ratio of unit checklist items marked N/A over "Unit Total Items"
- "Flying, OSS, Staff, A/MXS, MOS and APS" dummy variables--indicate the type of squadron/unit meaning flying squadron, Operational Support

Squadron, Group or Wing Staff, Maintenance Squadron, Maintenance Operational Support Squadron and Aerial Port Squadron, respectively.

- All independent variables again with MICT dummy variable as an interaction term (colored orange above)

SPSS results of a backwards linear regression with 0.15 Alpha for removal are provided in Appendix B. The fitted model is presented below (Equation 2).

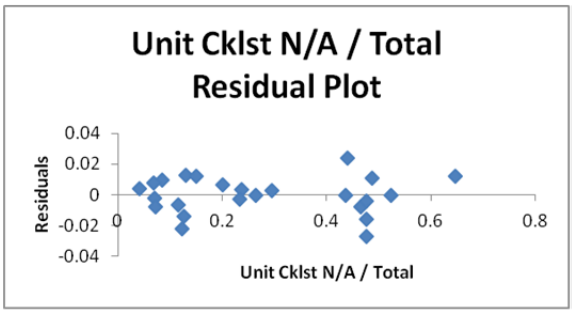
$$\begin{aligned}\text{DefRatio} = {} & -.004 - 1.086E\text{-}5(\text{UnitTotal}) + .213(\text{CklstNA}) + .021(\text{MictMon}) - \\ & 3.763E\text{-}5(\text{MictTotal}) - .393(\text{MictNA}) + .150(\text{MictFlying}) + .227(\text{MictOSS}) + \\ & .162(\text{MictStaff}) + .187(\text{MictA/MXS}) + .208(\text{MictMOS}) + .112(\text{MictAPS}) \end{aligned} \quad \textbf{(2)}$$

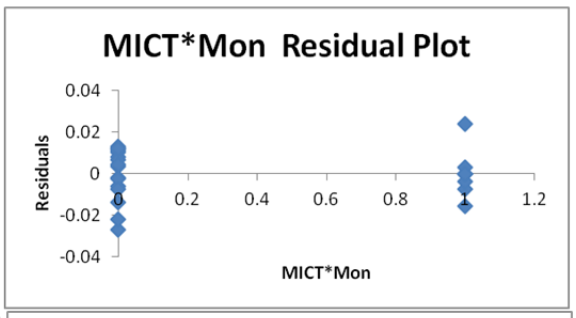
In the generation of this fitted model, SPSS clearly indicated that MICT has a positive effect on units' ability to identify deficiencies. Generally speaking, SPSS determined the best model utilizes MICT as an interaction term with all of the other independent variables rather than any as their single independent variables. By noting the sign of the β's it seems if any of the units use MICT, their ratio of deficiencies to total checklist items is expected to increase.

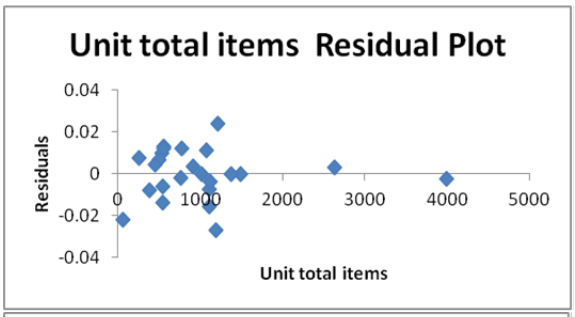
Next, residual analysis was performed on the model.

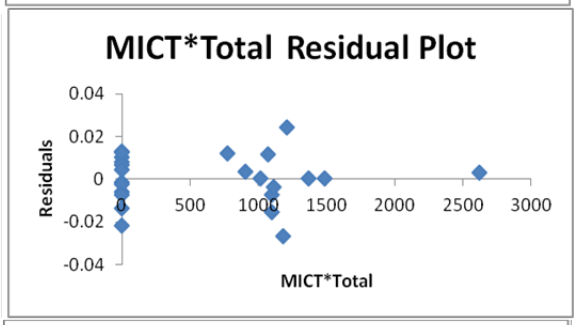
Step 1: Checking for a misspecified model (McClave, 2011:710)

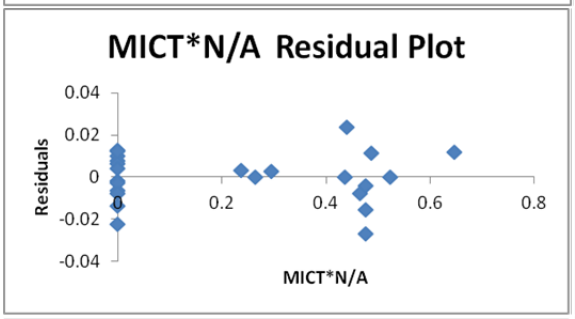
As seen below, no curvilinear trends are apparent and all data seems to be random (Figure 13).

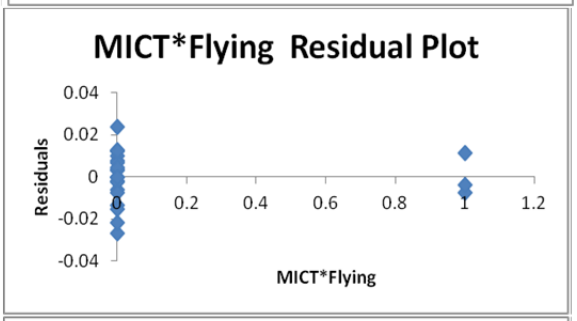

Unit Cklst N/A / Total Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
0.2
0.4
0.6
0.8
Unit Cklst N/A / Total

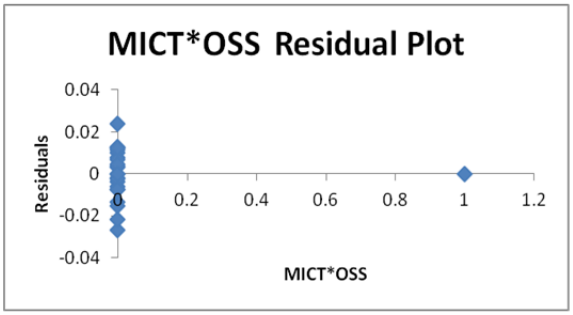

MICT*Mon Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
0.2
0.4
0.6
0.8
1
1.2
MICT*Mon

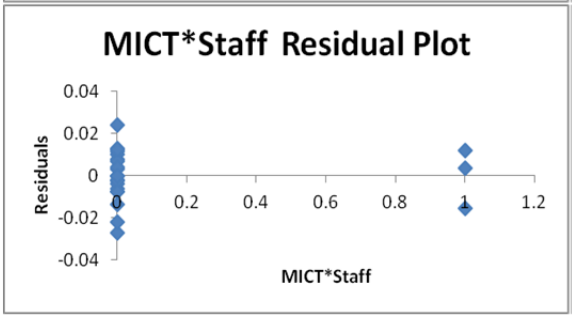

Unit total items Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
1000
2000
3000
4000
5000
Unit total items

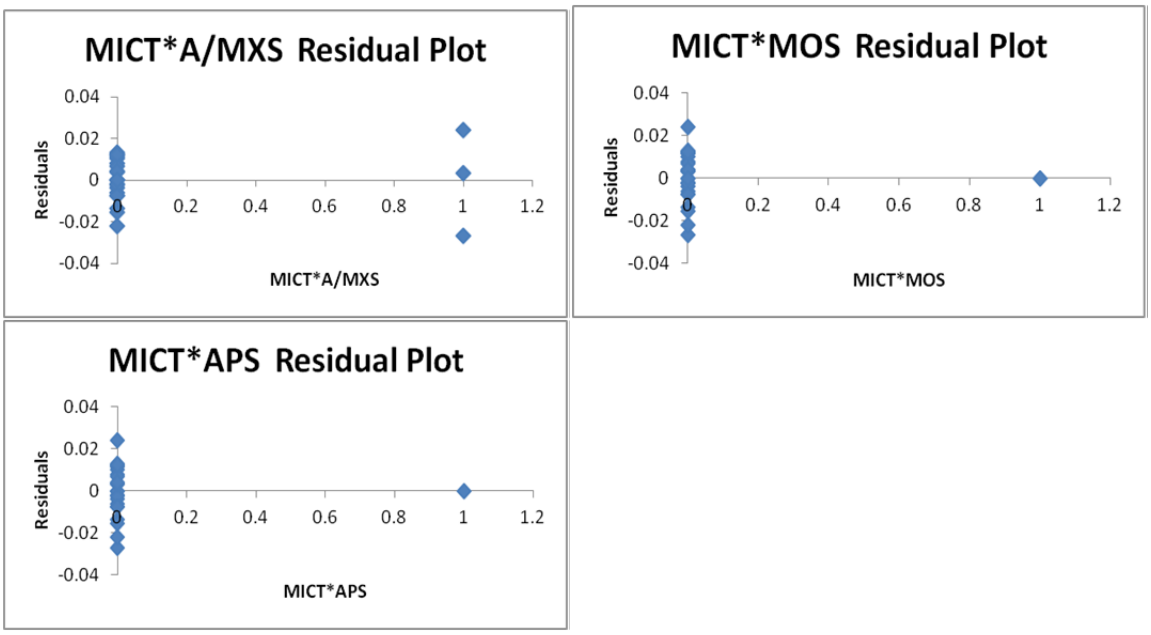

MICT*Total Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
500
1000
1500
2000
2500
3000
MICT*Total


MICT*N/A Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
0.2
0.4
0.6
0.8
MICT*N/A


MICT*Flying Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
0.2
0.4
0.6
0.8
1
1.2
MICT*Flying


MICT*OSS Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
0.2
0.4
0.6
0.8
1
1.2
MICT*OSS


MICT*Staff Residual Plot
Residuals
0.04
0.02
0
-0.02
-0.04
0
0.2
0.4
0.6
0.8
1
1.2
MICT*Staff



Scatterplot

Dependent Variable: DefRatio

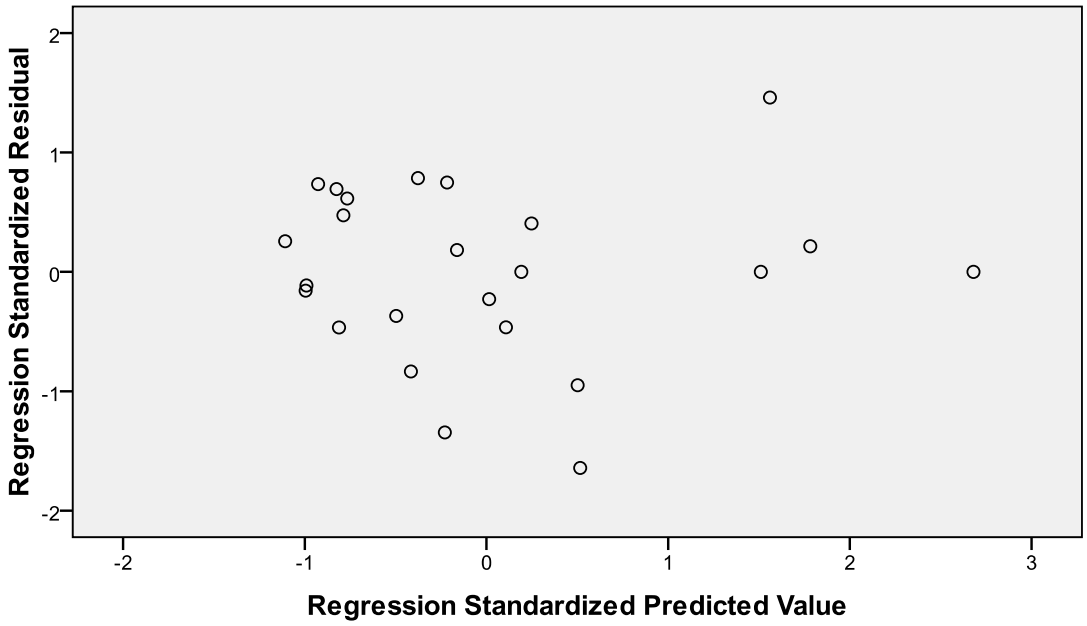


Figure 10. Residual Plots for Model

Step 2: Examine the residual plots for outliers (McClave, 2011:710)

As seen in the below standardized residual plot, no outliers exist as all points are within 2 standard deviations (Figure 14).

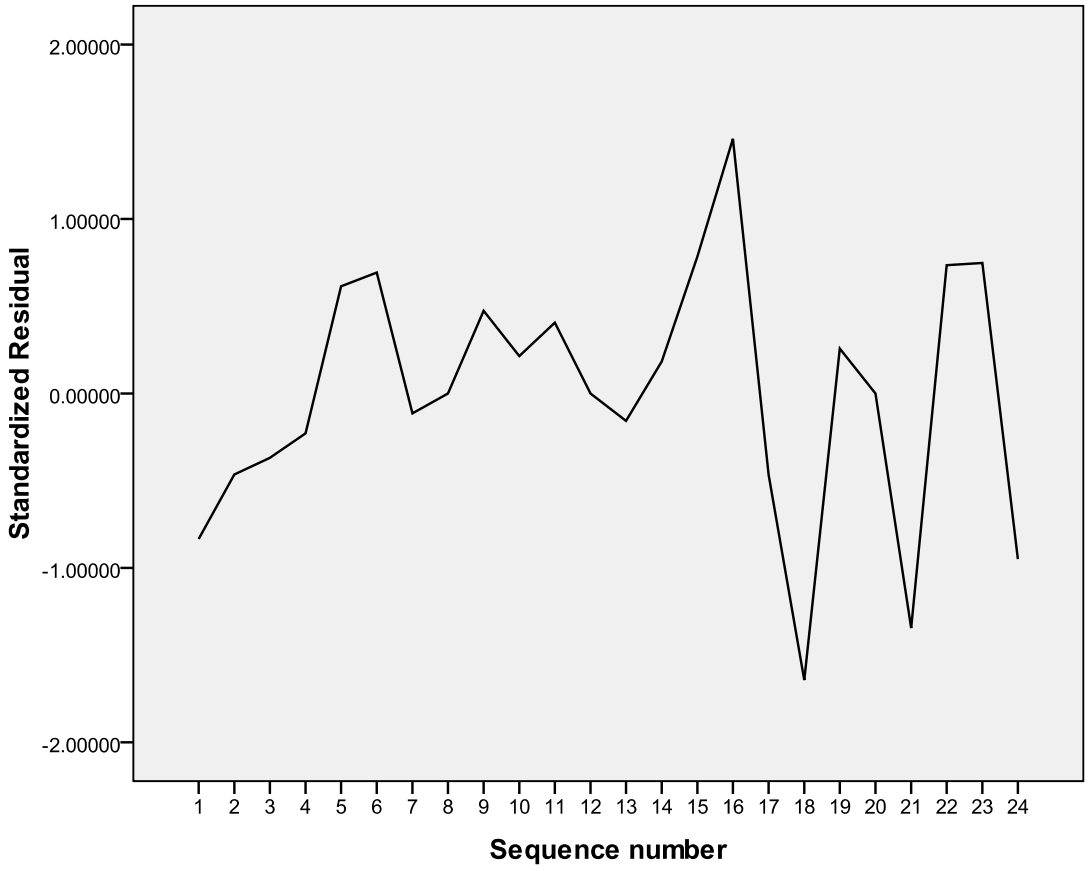


Figure 11. Standardized Residual Plot for Model

Step 3: Check for non-normal errors (McClave, 2011:710)

As seen in histogram and P-P plot below, no major departures from normality exist (Figures 15 & 16).

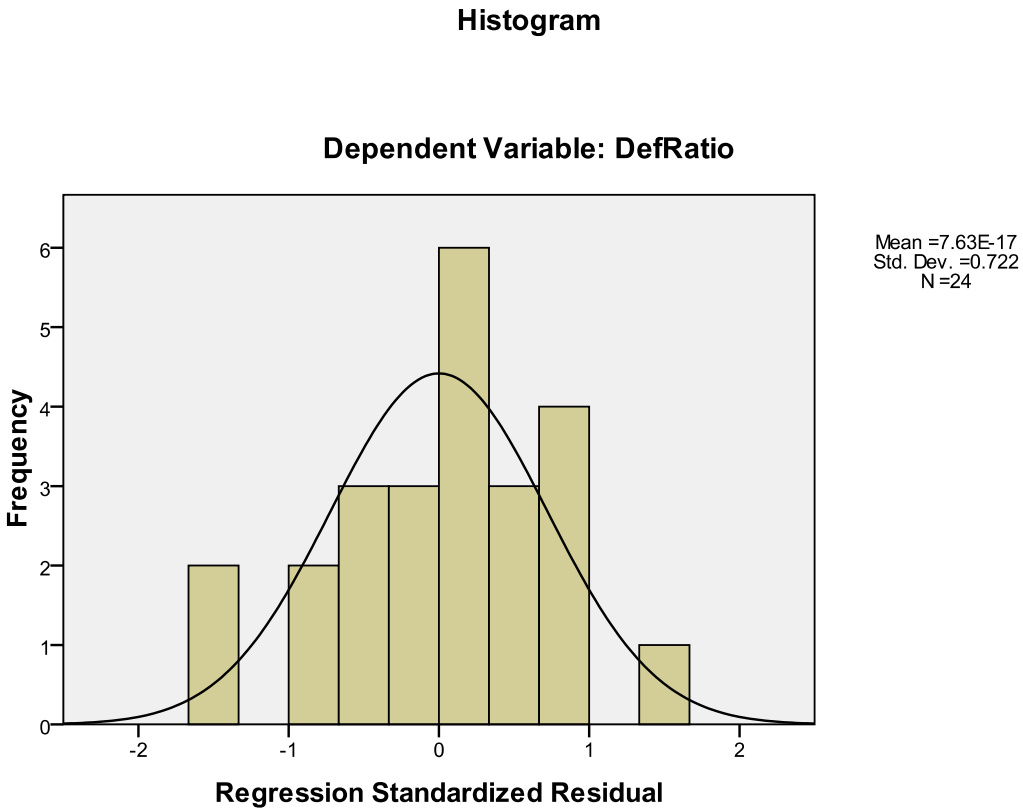


Figure 12. Frequency Distribution of Residuals Histogram

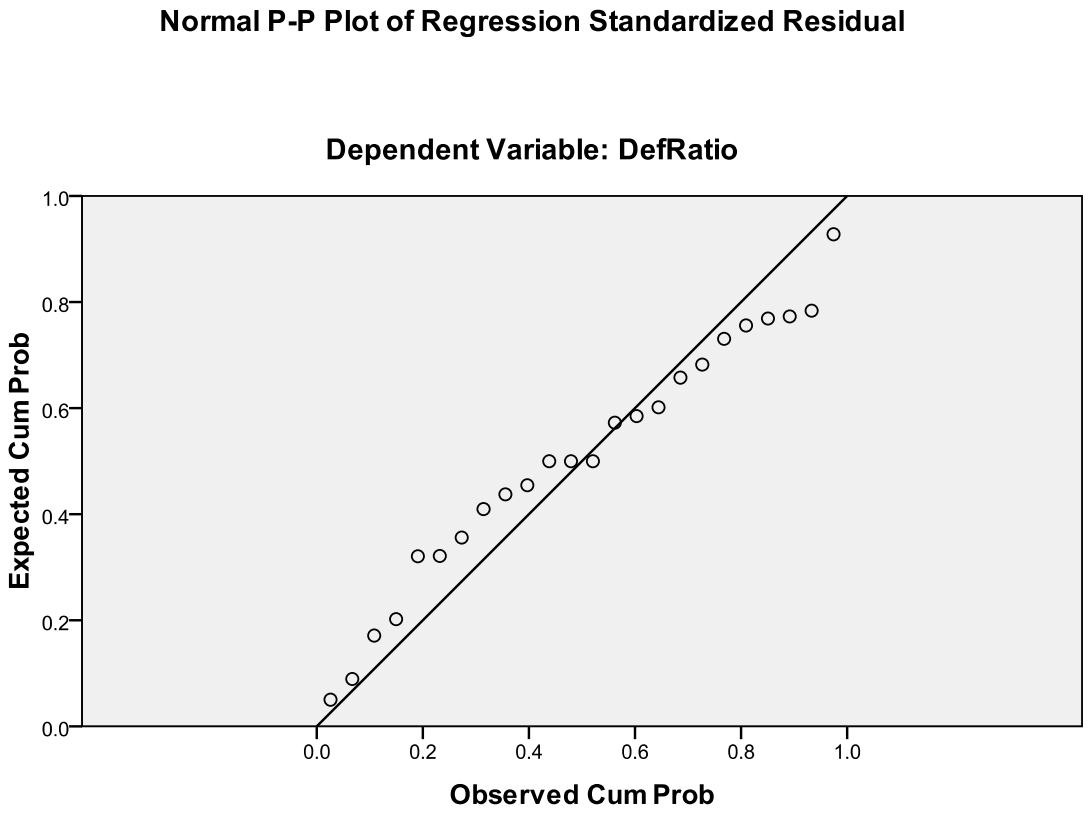


Figure 13. Frequency Distribution of Residuals P-P Plot

Step 4: Check for unequal error variances (McClave, 2011:710)

As seen in the scatter plot below, unequal error variances are not apparent. There is no obvious pattern (Figure 17).

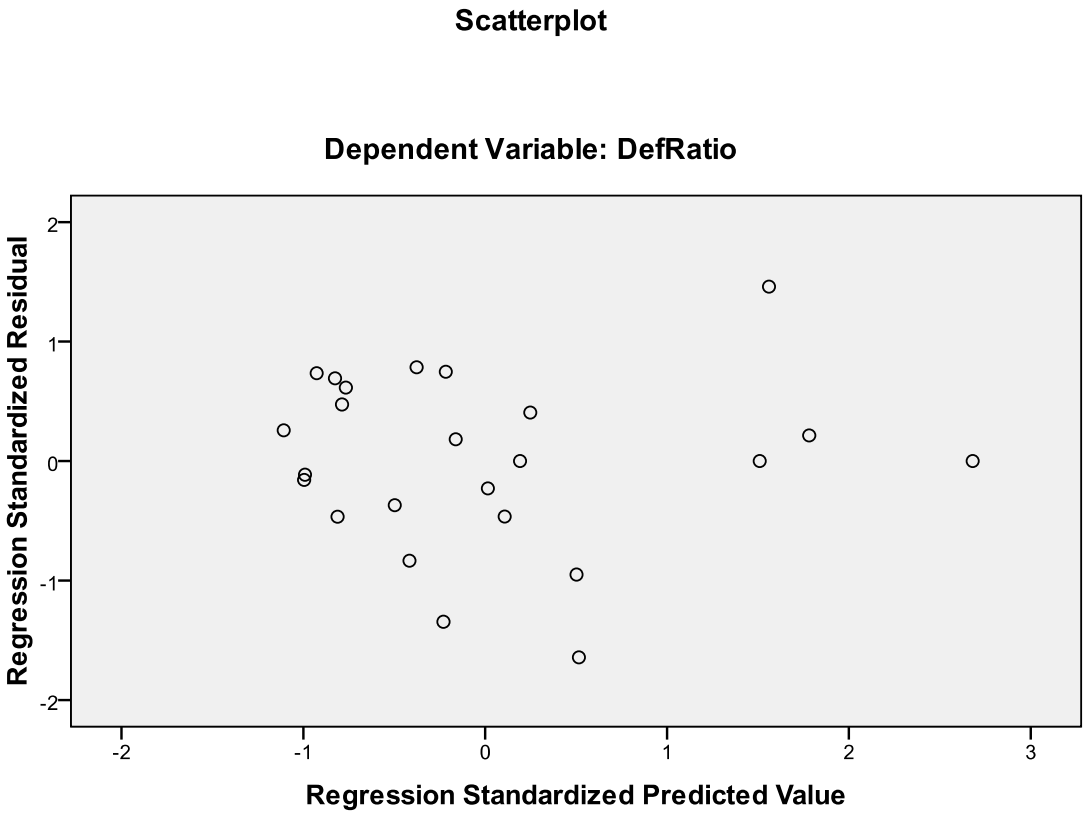


Figure 14. Model Residuals versus Predicted Value Scatter plot

Model evaluation:

The model has an adjusted R^2 = .643 and F = 4.736 and as seen below, the model seems to be fairly useful in predicting the value of MICT in deficiency resolution by squadron type (Figure 18).

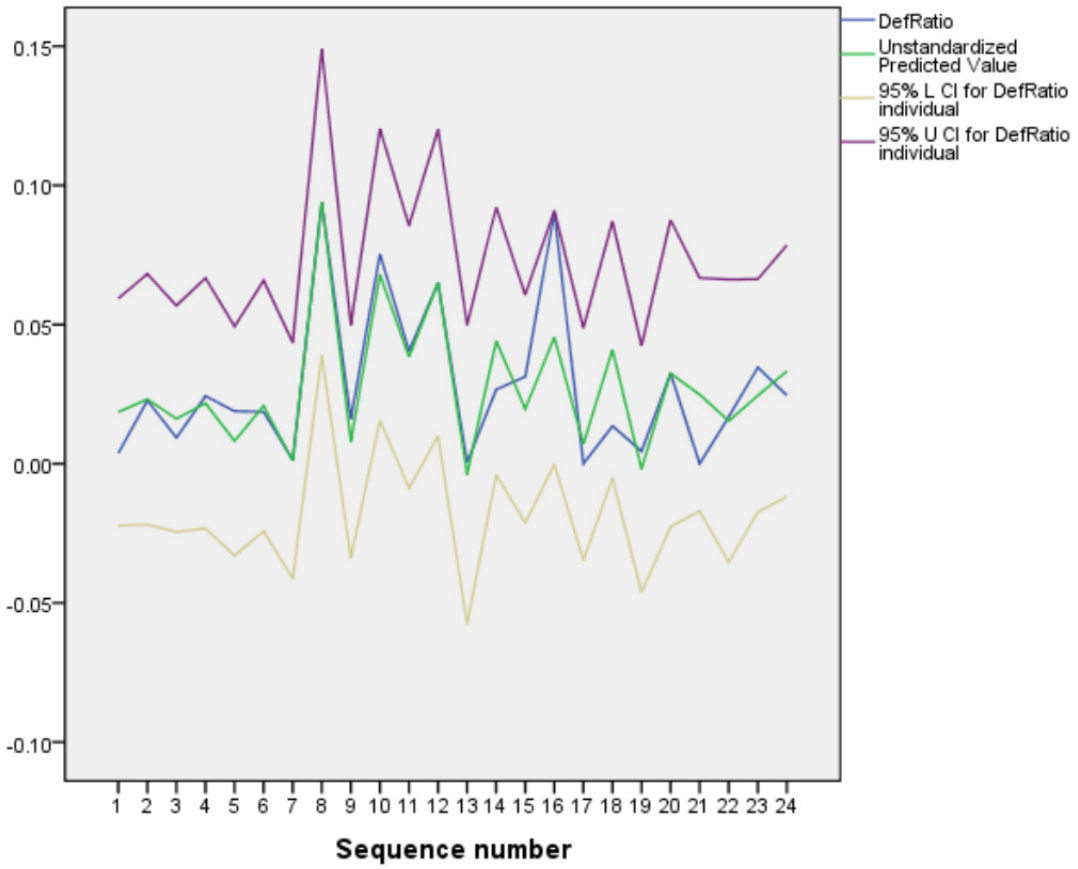


Figure 15. Model Accuracy Chart with 95% UCL/LCL

Next, the model was used to compare two point estimates in an attempt to demonstrate some degree of usefulness. Consider an Operations Support Squadron (OSS) commander that wants to determine the predicted impact of switching to MICT from the S-I website for deficiency self identification. Without MICT, his expected deficiency identification rate per checklist item is given by:

DefRatio = -.004-1.086E-5(UnitTotal(1000)) + .213(CklstNA(.4) + .021(MictMon(0)) - 3.763E-5(MictTotal(0)) - .393(MictNA(0)) + .150(MictFlying(0)) + .227(MictOSS(0)) + .162(MictStaff(0)) + .187(MictA/MXS(0)) + .208(MictMOS(0)) + .112(MictAPS(0)) = .07034 **(2)**

And with MICT is given by:

DefRatio = -.004-1.086E-5(UnitTotal(1000)) + .213(CklstNA(.4) + .021(MictMon(1)) - 3.763E-5(MictTotal(1000)) - .393(MictNA(.4)) + .150(MictFlying(0)) + .227(MictOSS(1)) + .162(MictStaff(0)) + .187(MictA/MXS(0)) + .208(MictMOS(0)) + .112(MictAPS(0)) = .12351 **(2)**

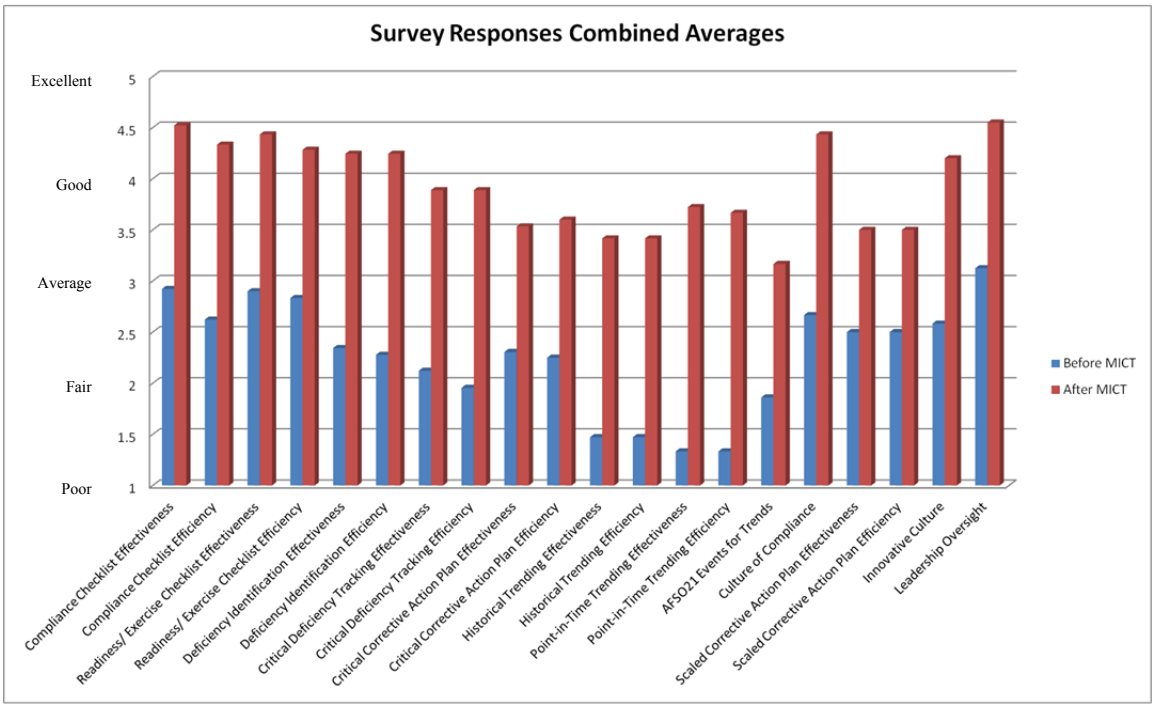
This means that before MICT, your unit is finding about 70 deficiencies per 1000 checklist items scored and with MICT it would find about 123. This means that 53 deficiencies would go unidentified without MICT. Given that 53 deficiencies may be by-law or critical, a commander could reasonably use this model to justify implementation of MICT in his/her unit.

Results of Surveys

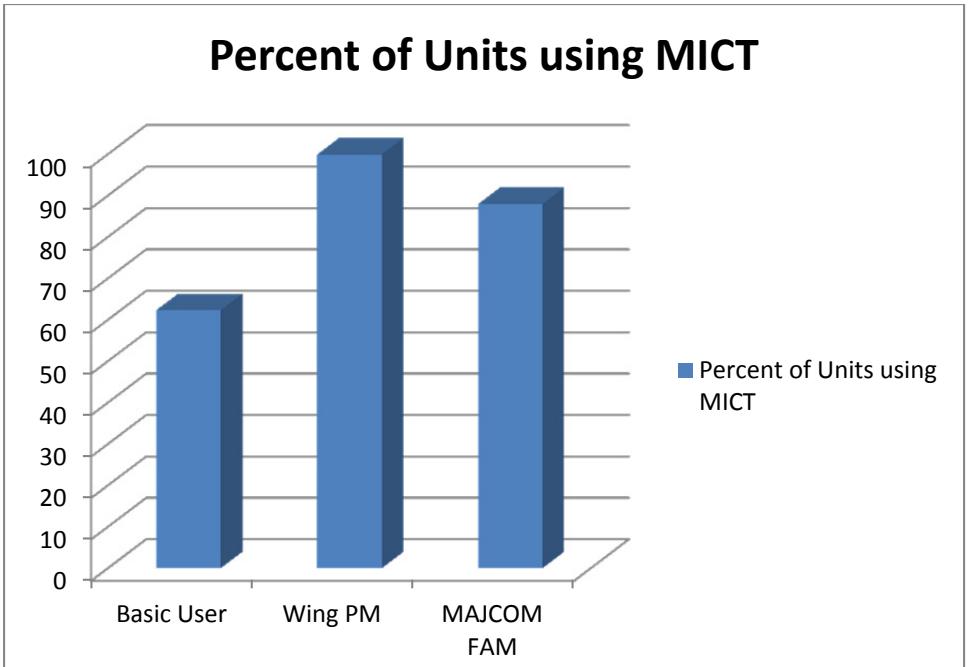
All survey data supported the research hypotheses. One outlier was identified after the initial results were collected. The individual was asked to confirm answers and an error was identified and corrected.

Each chart in Figure 19 below represents survey question responses. Each chart is afforded its own page and most are followed by additional comments, descriptive statistics and a brief analysis. Charts associated with AFIS tasks indicate the mean survey scores based on a scale from one to five:

Five = Excellent
Four = Good
Three = Average
Two = Fair
One = Poor

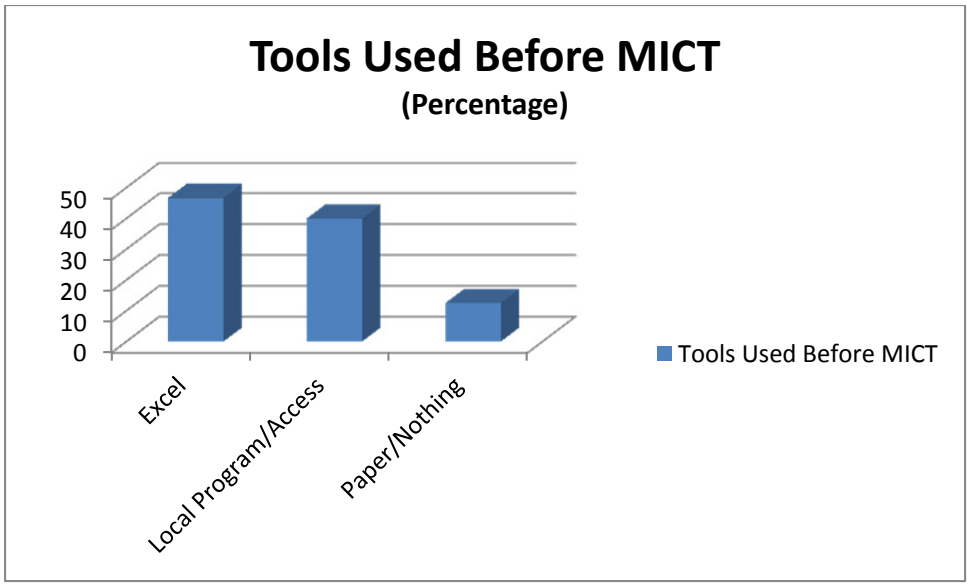


This chart above averages all responses by task. The users' perspective of their ability to perform AFIS tasks after implementing MICT clearly improved across the board. According to the surveyed individuals, MICT capes the USAF should initially focus on would be historical and point-in-time trending because of their poor-to-average "before MICT" scores. Additionally, the critical CAP tracking capability should be emphasized due to the seriousness of critical deficiencies. Lowest improvements were in scaled CAP development and as such could be an area for future attention after initial implementation. However, improvement was still one whole score from fair-to-average to fair-to-good and this task improvement could yield huge efficiencies.

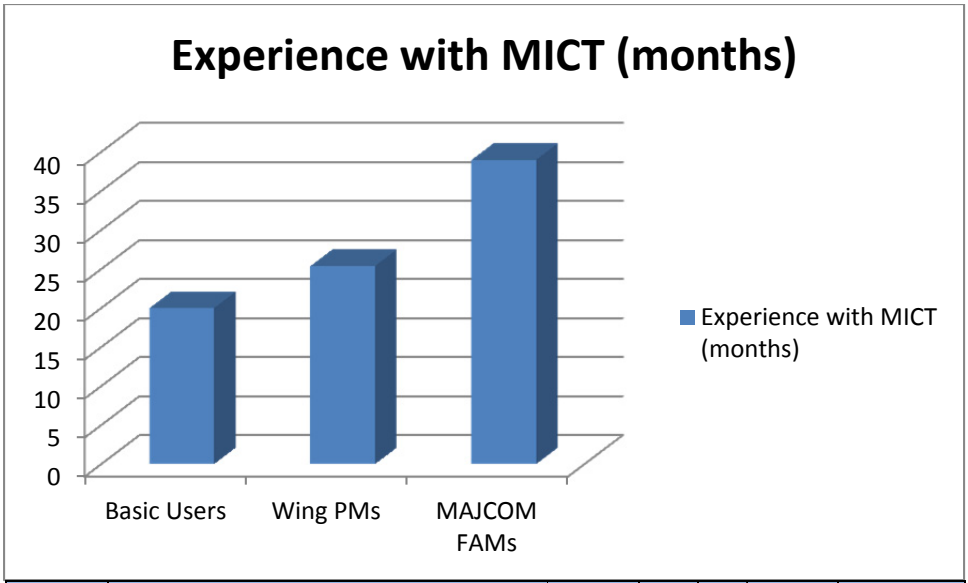


Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User		62.33	75.00	100.00	43.55	N/A
Wing PM		100.00	100.00	100.00	0.00	N/A
MAJCOM FAM		88.00	100.00	100.00	20.78	N/A

According to attached comments, the basic-user utilization average would have been higher, but some responded with the percentage of individuals that actually work in MICT rather than a percentage of their unit offices that use MICT. Percentage of utilization reported by MAJCOM FAMs indicates that even in these MAJCOMs selected due to MICT familiarity, full implementation is not complete yet.

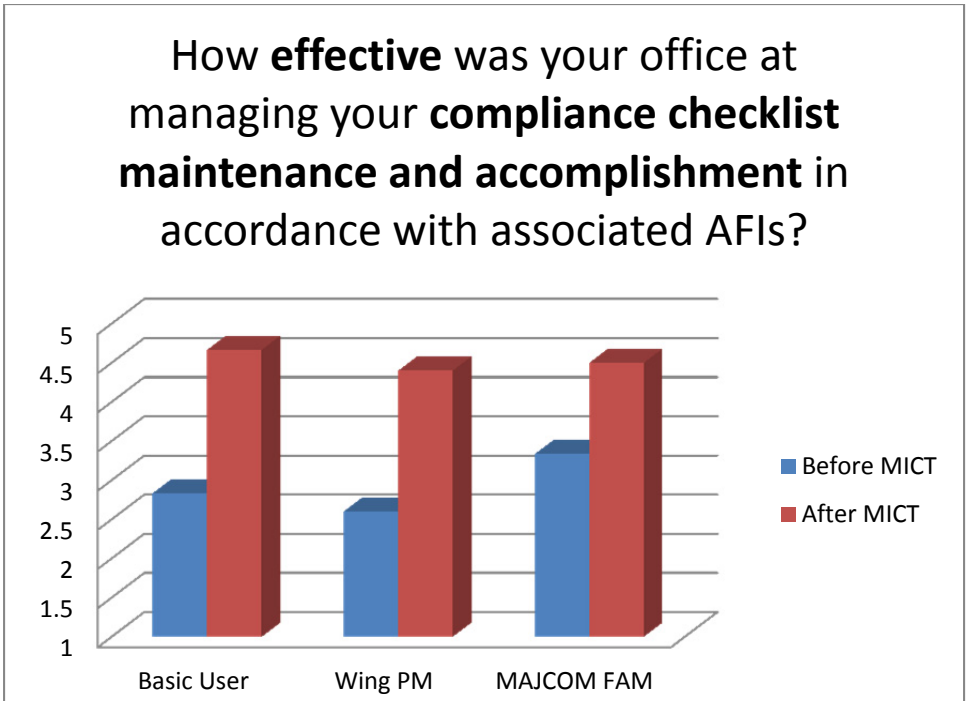


This chart illustrates that most units were using very basic tools to manage AFIS tasks prior to MICT.



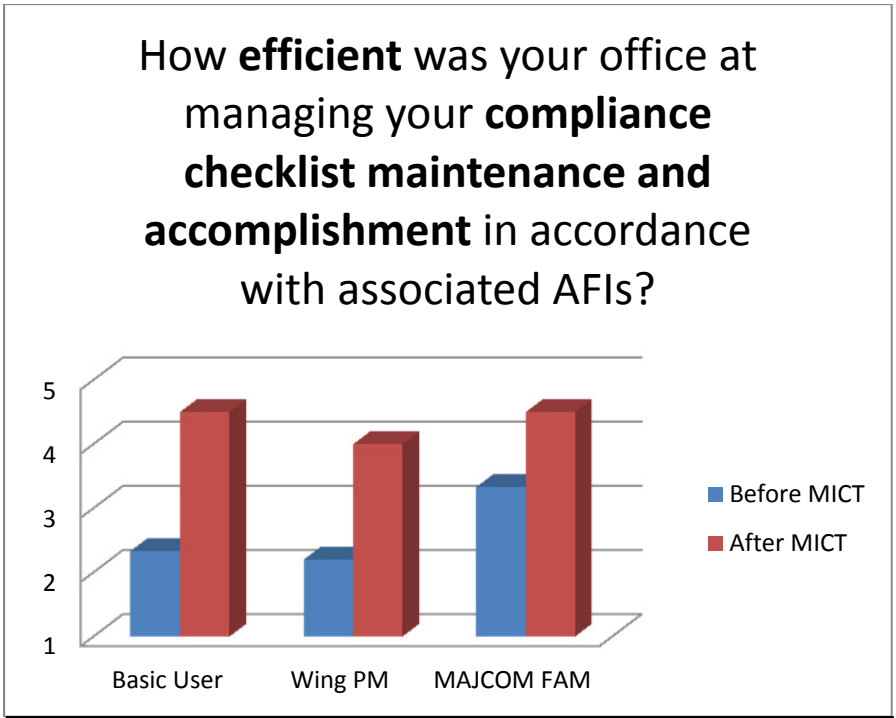
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User		20.00	18.00	18.00	9.03	N/A
Wing PM		25.40	24.00	#N/A	11.17	N/A
MAJCOM FAM		39.00	36.00	36.00	6.00	N/A

This chart and its small standard deviations indicates that the surveyed individuals have been working with MICT long enough to understand its initial impact on their units.



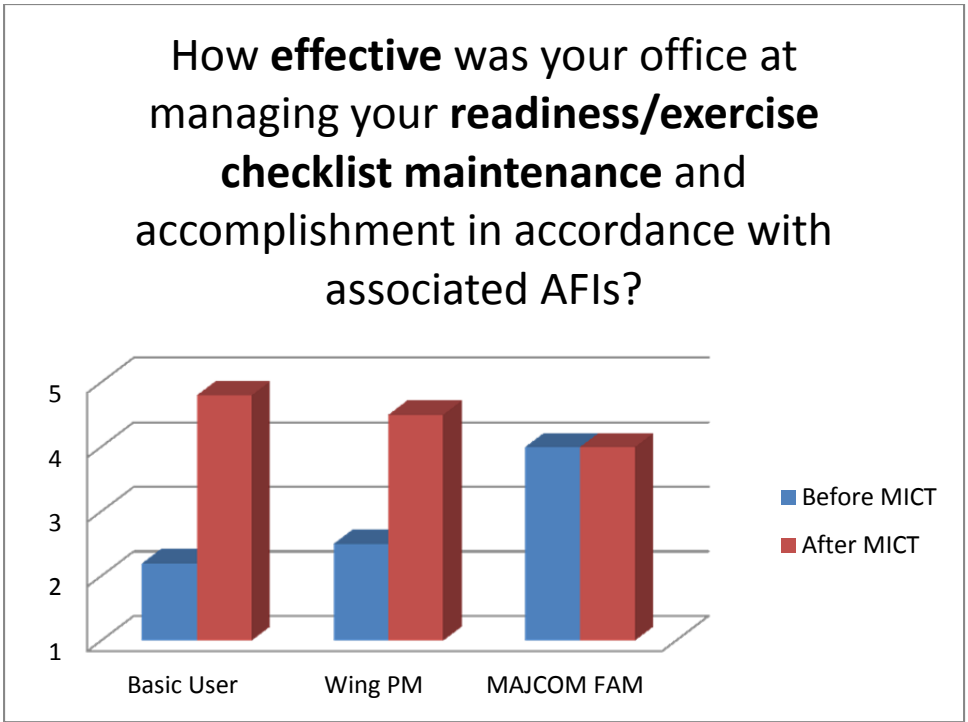
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before		2.83	2.50	2.00	1.47	N/A
Basic User After	Lastest status was caputred in real time with tracking ability down to the POC level. Furthermore, control was in place to ensure proper corrective action taken prior to Wg/CC agree to close item and it was in-complaince	4.67	5.00	5.00	0.52	0.00
Wing PM Before		2.60	3.00	3.00	0.55	N/A
Wing PM After		4.40	4.00	4.00	0.55	0.00
MAJCOM FAM Before		3.33	4.00	4.00	1.15	N/A
MAJCOM FAM After	Fielding MICT (as a tool) has formalized the self inspection process. Knowing that leadership is using the data will force wing level functional managers to seek clarity on compliance checklists and conversely forces MAJCOM functionals to maintain logic based checklists. Future state--Excellent	4.50	4.50	5.00	0.58	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. These scores and utilization rates were expected as this is a fundamental capability of MICT.



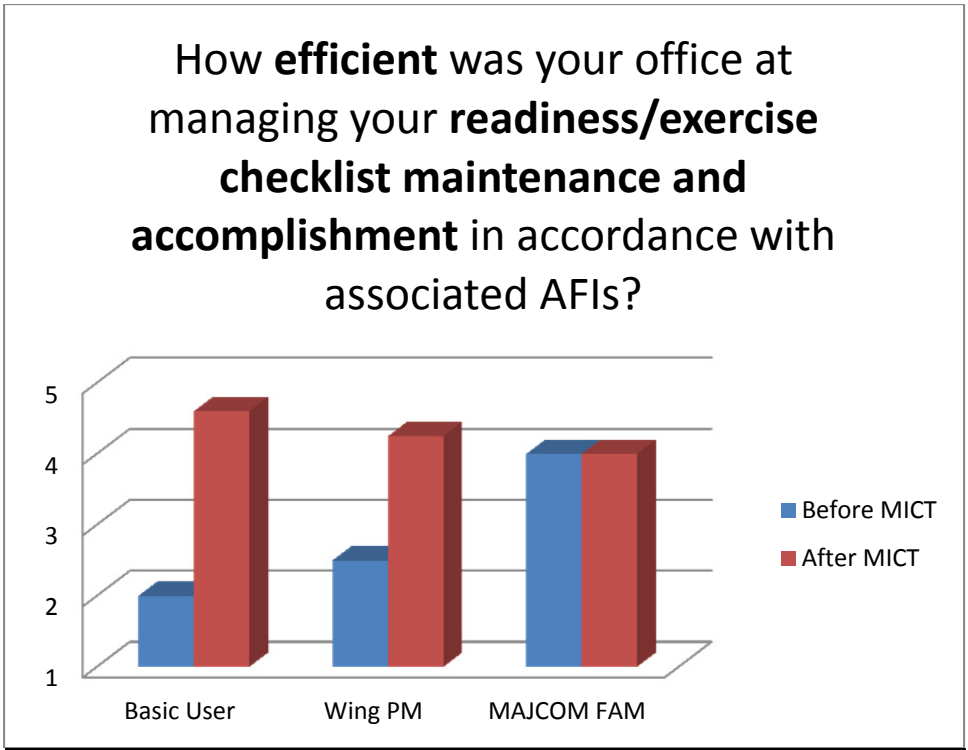
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Every checklist had to be printed or pulled up and bumped against the new checklist and revision would have to be made if something changed or out of date. Insofaras "efficient" means well-organized & without waste, adverse issues presented because the checklists were not "pushed" by the MAJCOM-OPR	2.33	2.00	2.00	1.37	N/A
Basic User After	New checklists were automatically pushed to accounts with no need to update individual checklists. However, if checklist are pushed wrong to the MICT system duplicate questions/checklists were capture, thus skewing numbers and compliance ratings. Note: Many questions throughout the MICT product are not broken down into sections as they were on the IG checklist paper copies. Overall, it is a good program, but can be bettered by simplifying each checklist starting with the titles, breaking down to sections, and staying away from redundency that creates quick "clicking" to just a "get it done" mentality. The best thing that comes out of this program is that the big item issues are seen by O 6 commanders and are pushed quicker.	4.50	4.50	5.00	0.55	0.00
Wing PM Before		2.20	2.00	3.00	0.84	N/A
Wing PM After	More AMC FAMs need to upload checklists for this to fit into the excellent category	4.00	4.00	4.00	0.00	0.00
MAJCOM FAM Before		3.33	4.00	4.00	1.15	N/A
MAJCOM FAM After	Future state--Excellent	4.50	4.50	5.00	0.58	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment. The scores and utilization rates were expected as a fundamental capability. Basic users' scores indicate easier checklist accomplishment. FAM improvement was surprising given the new checklist maintenance requirements placed on FAMs and comments suggest expected improvement as the implementation continues.



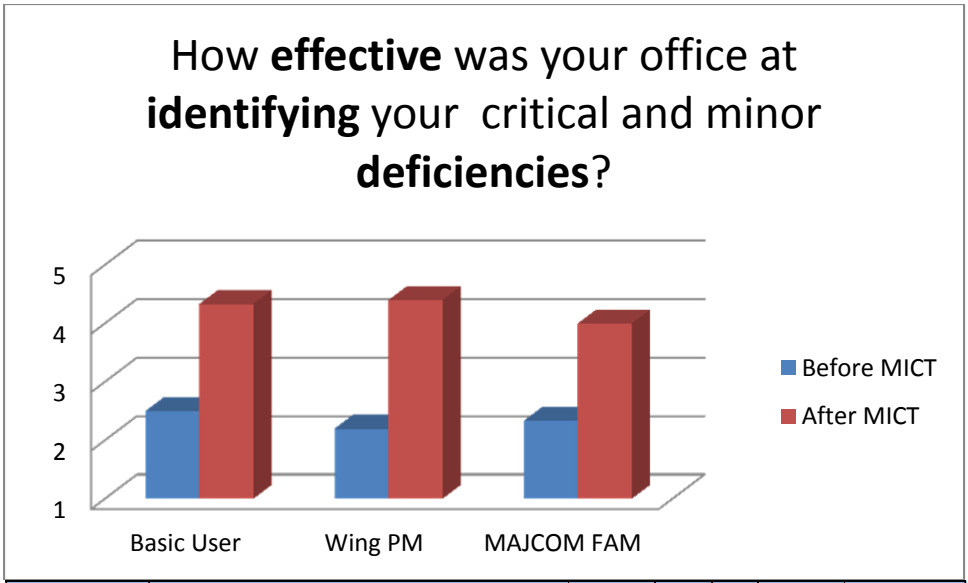
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Unique checklists for Anti-terrorism, emergancy mgmt were never really captured to cross check with owning agency for compliance. And our roles were not very clear based on knowledge and existing regs	2.20	2.00	2.00	1.64	N/A
Basic User After	All item were covered and address that were required to be addressed at the unit level. No requirement to build own checklist or dig in regulations to build/updated a new checklist.	4.80	5.00	5.00	0.45	17.00
Wing PM Before		2.50	2.50	3.00	0.58	N/A
Wing PM After		4.50	4.50	5.00	0.58	80.00
MAJCOM FAM Before	I manage and maintain the checklist now and prior to MICT	4.00	4.00	4.00	0.00	N/A
MAJCOM FAM After	Future state--Excellent	4.00	4.00	4.00	0.00	50.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Additionally, there is an extremely high percentage of respondents that don't use MICT for this capability. As such, this seems to be a capability that basic users recognize as a capability but Wing PMs and MAJCOM FAMs haven't developed. This would be a MICT capability to develop in the future after all units are using effectively for compliance.



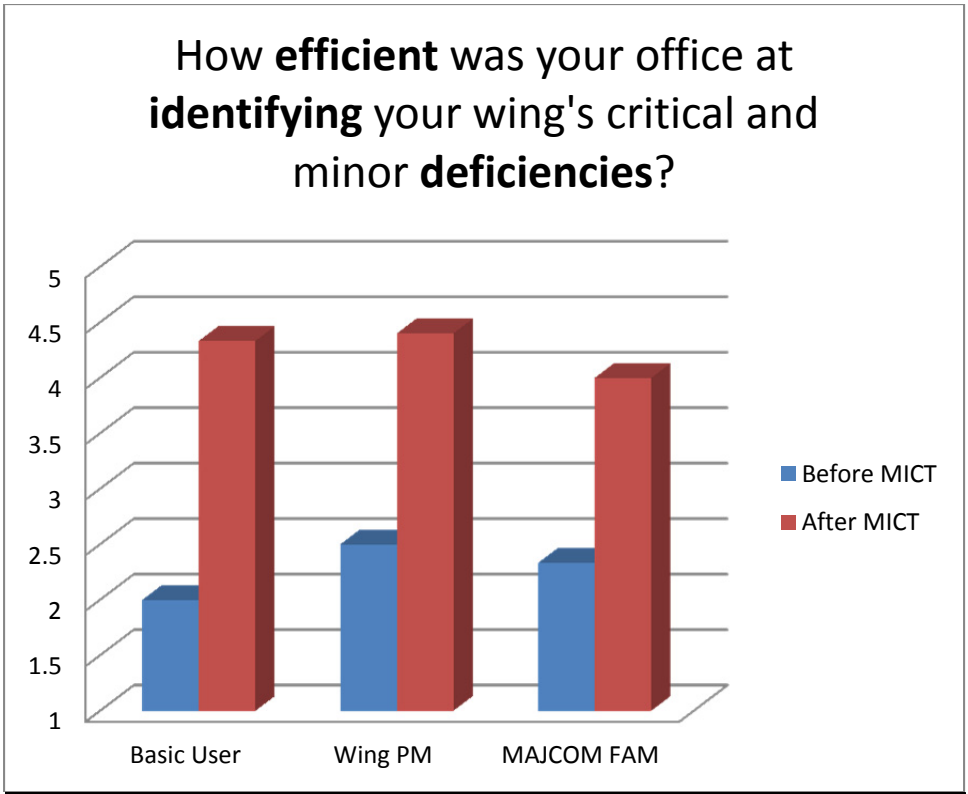
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	individuals would have to dig through numerous regulations to find changes updates	2.00	1.00	1.00	1.73	N/A
Basic User After	Checklists were pushed into MICT, however, not every item was tailored specifically to units. So a lot of answers would contain N/A. If doing it multiple times then it would become easier with pulling old checklists to see applicability if someone really documented and determined that the item was not applicable.	4.60	5.00	5.00	0.55	17.00
Wing PM Before		2.50	2.50	3.00	0.58	N/A
Wing PM After		4.25	4.00	4.00	0.50	20.00
MAJCOM FAM Before		4.00	4.00	4.00	0.00	N/A
MAJCOM FAM After	Future state--Excellent	4.00	4.00	4.00	0.00	50.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. However, FAMs have not recognized this MICT capability like the units have. Additionally, comments indicate that checklists still need to improve to optimize this MICT capability. This would be a capability to develop after all units are effectively using MICT for compliance.



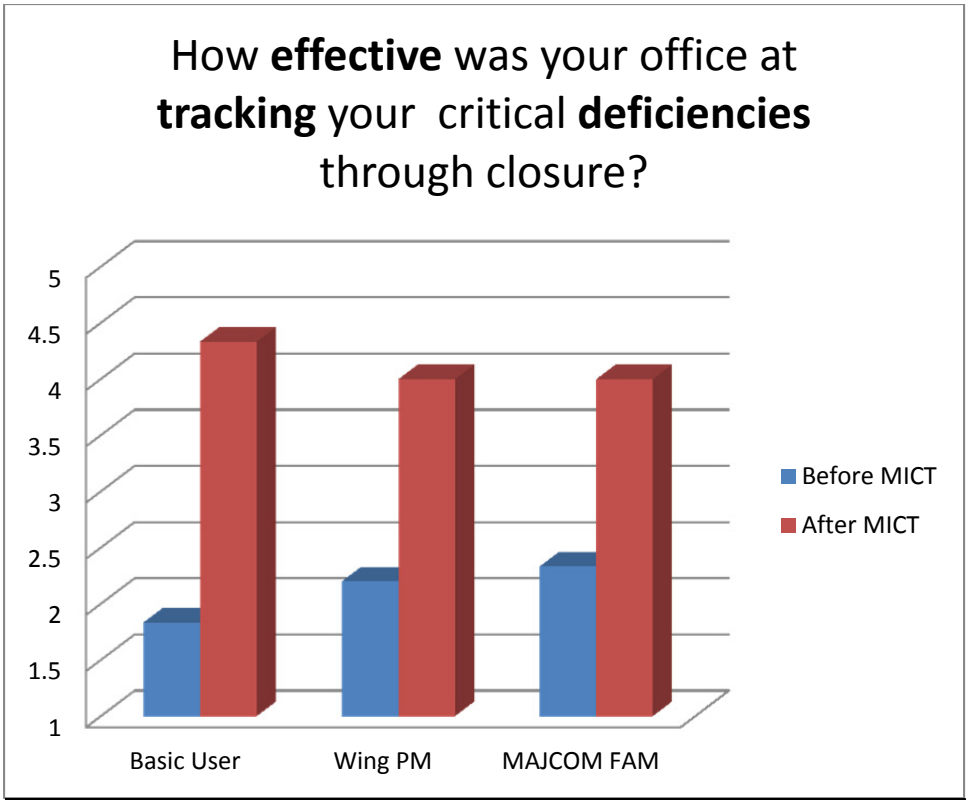
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Could not pinpoint all aspect right away. Need to run checklists and hope they were up to date with current regulations. Identifying convention was not built into the database we were using	2.50	3.00	3.00	0.84	N/A
Basic User After	Critical were designated in MICT. Minor deficiencies were addressed as well. Pinpoint to what deficiencies were found last time during inspections so you can ensure no repeat writeups without having to dig through reports since inspection writeups were written up and input into MICT and tracked through the wing process till adequate closure criteria was met	4.33	4.50	5.00	0.82	0.00
Wing PM Before		2.20	3.00	3.00	1.10	N/A
Wing PM After	Getting better but takes some pushing from the group level on the squadrons	4.40	4.00	4.00	0.55	0.00
MAJCOM FAM Before		2.33	2.00	#N/A	1.53	N/A
MAJCOM FAM After	Future state--Excellent	4.00	4.50	5.00	1.41	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. This effectiveness seems to validate the "user-friendly" description the 305 AMW used to describe the tool. Given the importance of this capability, this should be emphasized during all initial training.



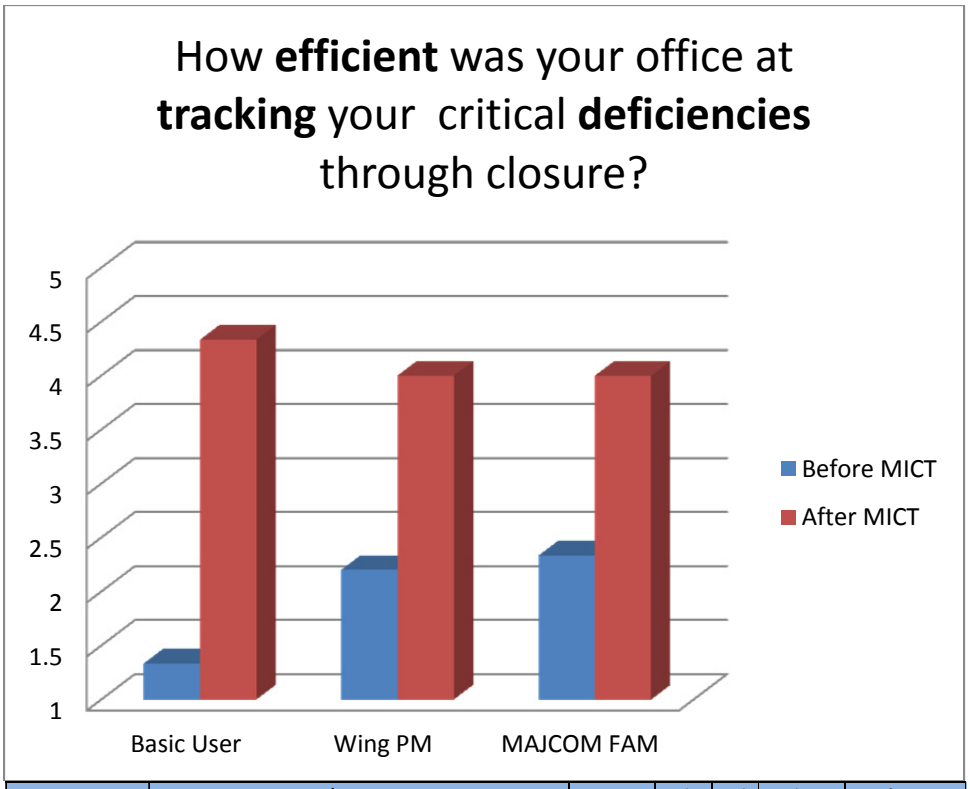
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	required a lot of digging into regulations to update checklists. Identifying convention was not built into the database we were using	2.00	2.00	3.00	0.89	N/A
Basic User After	MICT enabled quick look at critical items prior to diving into minors. If short notice inspection I would review Critical items first then minors. However, We continuously used MICT to track and monitor status on compliance.	4.33	4.50	5.00	0.82	0.00
Wing PM Before		2.50	3.00	3.00	1.00	N/A
Wing PM After		4.40	4.00	4.00	0.55	0.00
MAJCOM FAM Before		2.33	2.00	#N/A	1.53	N/A
MAJCOM FAM After	Future state--Excellent	4.00	4.50	5.00	1.41	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. As expected, the basic users indicated the highest efficiency improvement as they are the individuals actually running the checklists. Given the importance of this capability, this should be emphasized during all initial training.



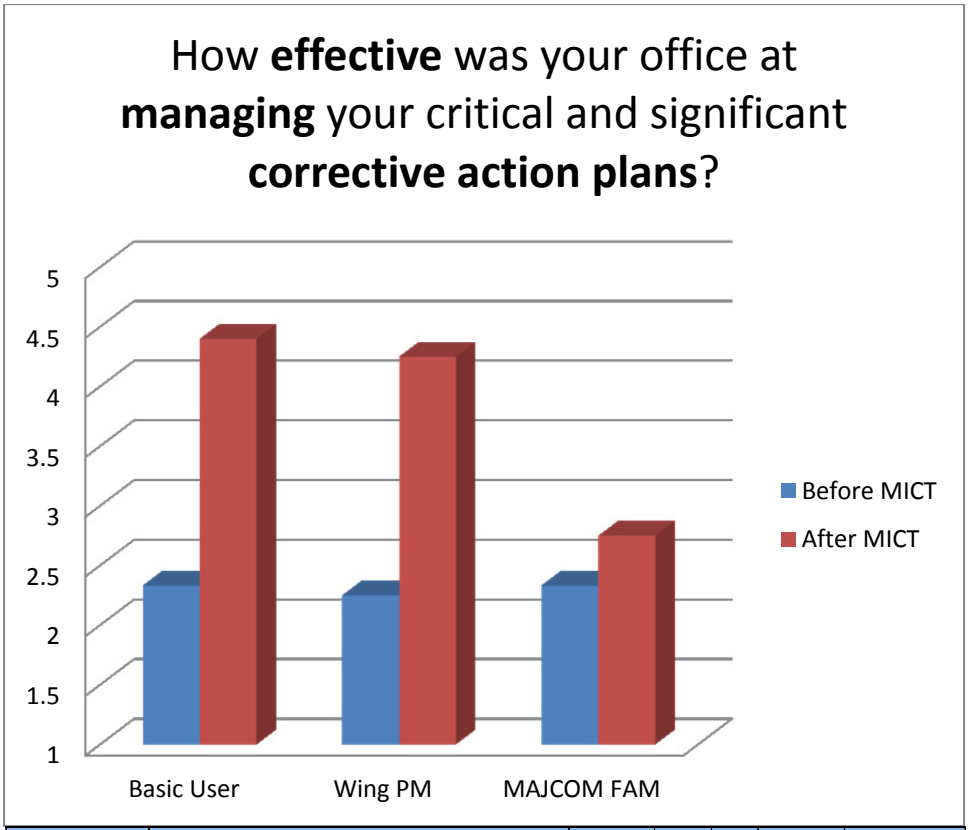
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Deficiency tracking was based on last exercise and input into powerpoint for 8 step process Inadequate tracking conventions existed prior	1.83	2.00	2.00	0.75	N/A
Basic User After	MICT made this into a simplistic task were anyone could pick up the item and see where its at and track till closure. Wing and Group has "eyes on"	4.33	4.00	4.00	0.52	0.00
Wing PM Before		2.20	2.00	1.00	1.30	N/A
Wing PM After		4.00	4.00	4.00	0.82	20.00
MAJCOM FAM Before		2.33	2.00	#N/A	1.53	N/A
MAJCOM FAM After	Future state--Excellent	4.00	4.50	5.00	1.41	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Wing PMs were expected to have the greatest improvement, but surprisingly, basic users again saw the greatest increase in effectiveness. More surprisingly, some Wing PMs indicated that they don't yet use MICT in this capacity; one of MICT's most fundamental capes. This indicates a need for improved Wing PM training especially given the importance of this AFIS task.



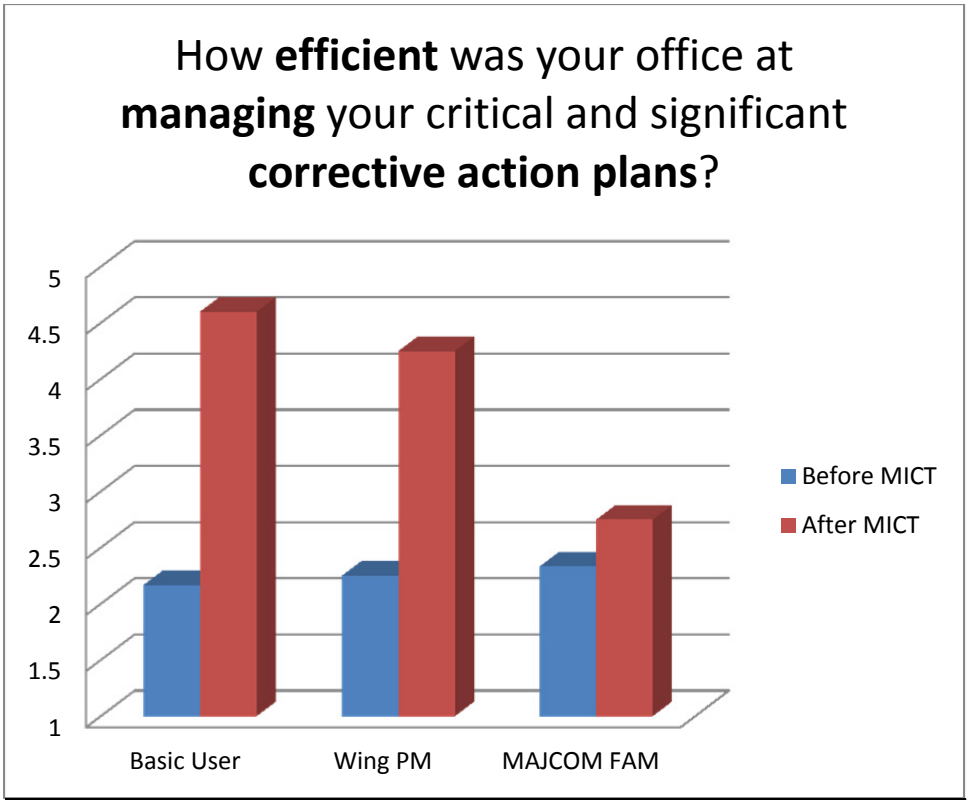
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Once complete item would not be revisited for future inspections. Fix and forget type of method. Inadequate tracking conventions existed prior & waste was produced via looking /filtering; lack of automation	1.33	1.00	1.00	0.52	N/A
Basic User After	Again, this is excellent if deficiencies are uploaded. Uploading deficiencies were not hard just cut and past into excel and sent to someone for upload into MICT. Wing and Group has "eyes on"	4.33	4.00	4.00	0.52	0.00
Wing PM Before		2.20	2.00	1.00	1.30	N/A
Wing PM After		4.00	4.00	4.00	0.82	20.00
MAJCOM FAM Before		2.33	2.00	#N/A	1.53	N/A
MAJCOM FAM After	Future state--Excellent	4.00	4.50	5.00	1.41	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Comments also speak to the impact of leadership oversight provided by MICT. Surprisingly, some Wing PMs indicated that they don't yet use MICT in this capacity; one of MICT's most fundamental capes. This indicates a need for improved Wing PM training especially given the importance of this AFIS task.



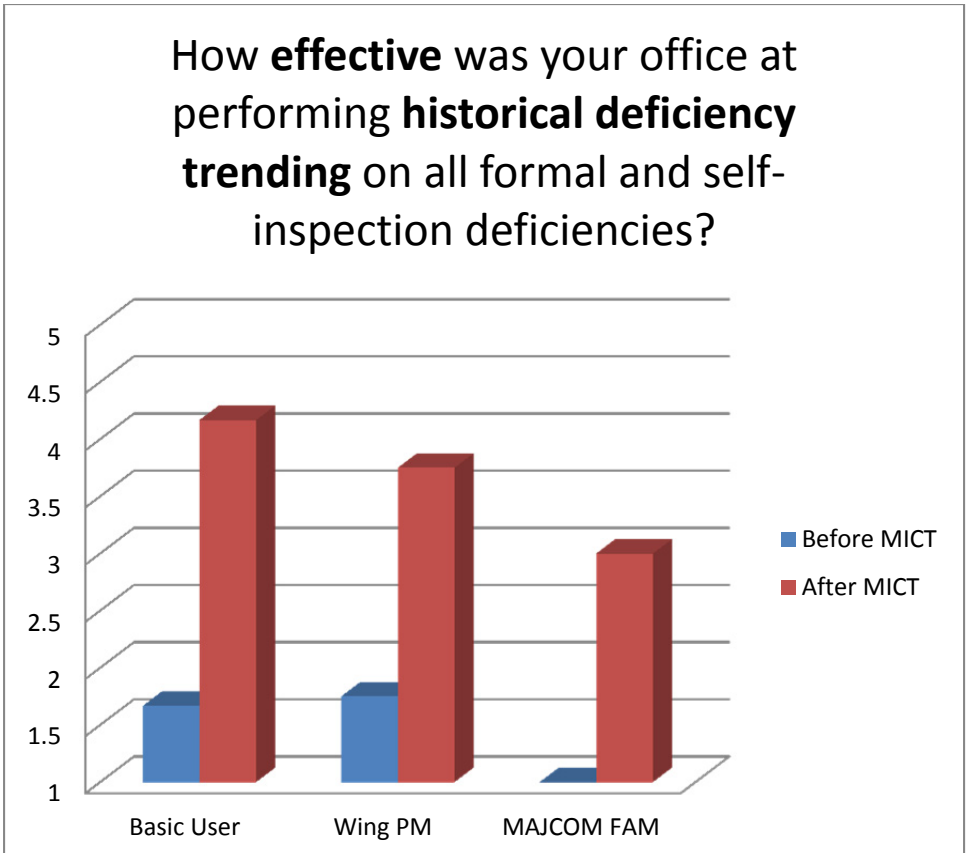
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	used template in Powerpiont for 8 step Inadequate tracking conventions existed prior	2.33	2.50	3.00	1.21	N/A
Basic User After		4.40	4.00	4.00	0.55	17.00
Wing PM Before		2.25	2.50	3.00	0.96	N/A
Wing PM After		4.25	4.50	5.00	0.96	20.00
MAJCOM FAM Before		2.33	2.00	#N/A	1.53	N/A
MAJCOM FAM After	Future state--Excellent	2.75	3.00	4.00	1.50	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. However, a small FAM improvement indicates that they are not yet using the tool to manage critical CAPs. Additionally, some Wing PMs indicated they didn't use this important MICT cape. This should be emphasized during Wing PM and FAM training to ensure proper oversight of these critical CAPs for appropriate resource allocation and timely resolution.



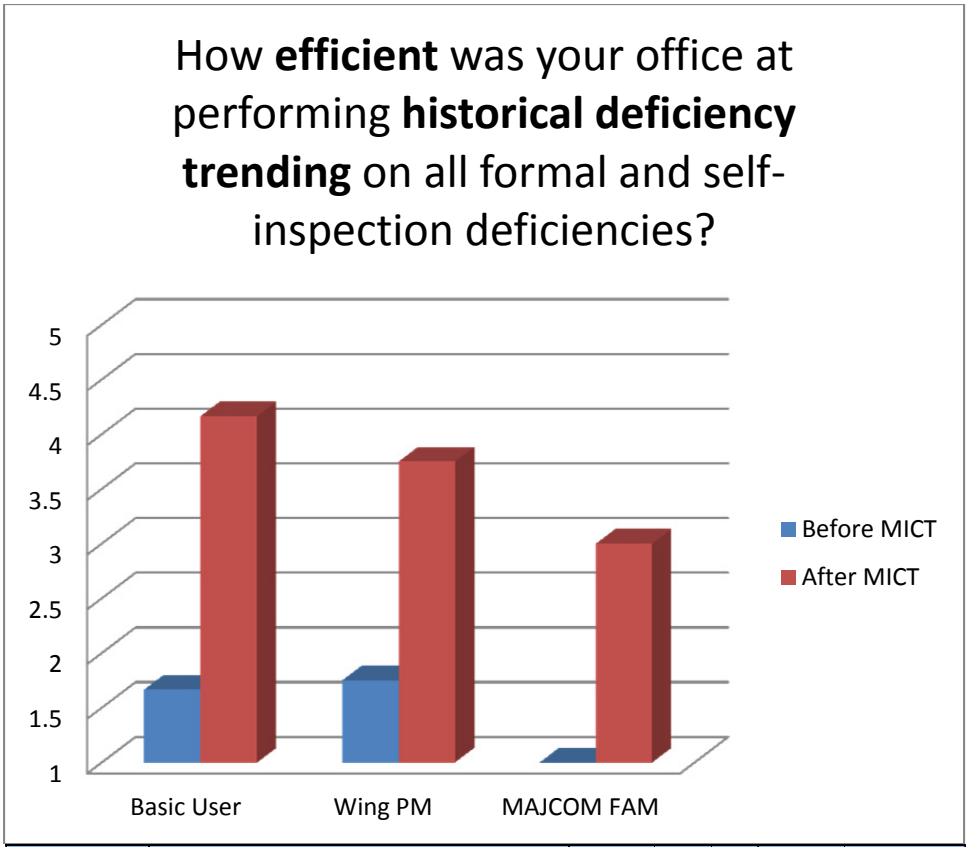
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	limited by users, no more than 1 at a time. Otherwise you would have multiple slides and would have to combine at the end. Inadequate tracking conventions existed prior & waste was produced via looking /filtering; lack of automation	2.17	2.50	3.00	0.98	N/A
Basic User After	unlimited users plus, would be nice for MICT to be searchable across AF to see other units corrective actions to see if they would work for your writeup.	4.60	5.00	5.00	0.55	17.00
Wing PM Before		2.25	2.50	3.00	0.96	N/A
Wing PM After		4.25	4.50	5.00	0.96	20.00
MAJCOM FAM Before		2.33	2.00	#N/A	1.53	N/A
MAJCOM FAM After	Future state--Excellent	2.75	3.00	4.00	1.50	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. However, a small FAM improvement indicates that they are not yet using the tool to manage critical CAPs. Additionally, some Wing PMs indicated they didn't use this important MICT cape. This should prioritize Wing PM and FAM training to ensure proper oversight of these critical CAPs for appropriate resource allocation and timely resolution.



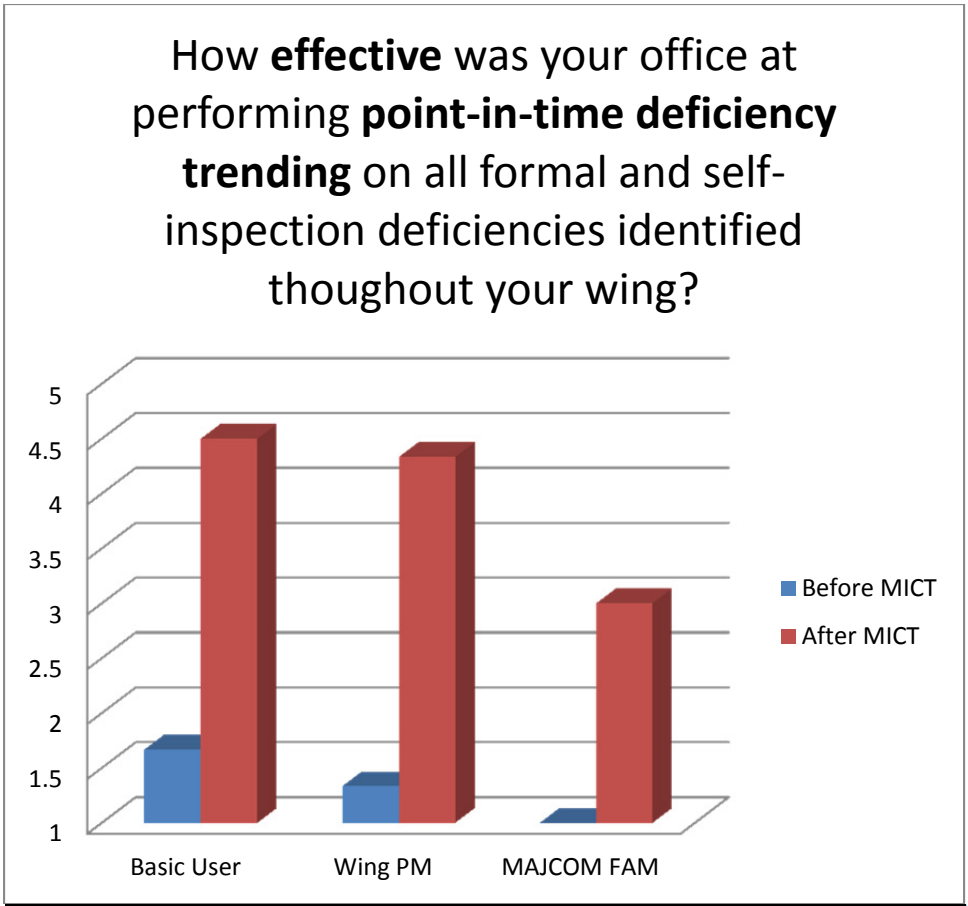
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Non-existent Trending was a challenge because of lack of automation	1.67	1.00	1.00	1.03	N/A
Basic User After	MICT will allow you to trend information, however, historical information would have to be uploaded into the MICT to ensure you can trend.	4.17	4.00	4.00	0.75	0.00
Wing PM Before		1.75	2.00	2.00	0.50	N/A
Wing PM After		3.75	4.00	4.00	1.26	20.00
MAJCOM FAM Before		1.00	1.00	1.00	0.00	N/A
MAJCOM FAM After	Future state--Excellent Was not aware of this capability. With some modification, this tool will be excelent way to identify deficiencies throughout the command and implement targeted mishap prevention initiatives.	3.00	3.00	#N/A	1.83	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Clearly, historic trending was taken from nearly non-existent to average-to-good. Additionally, this capability takes time to develop given the required historical data. Accordingly, this capability should be prioritized early in MICT implementation.



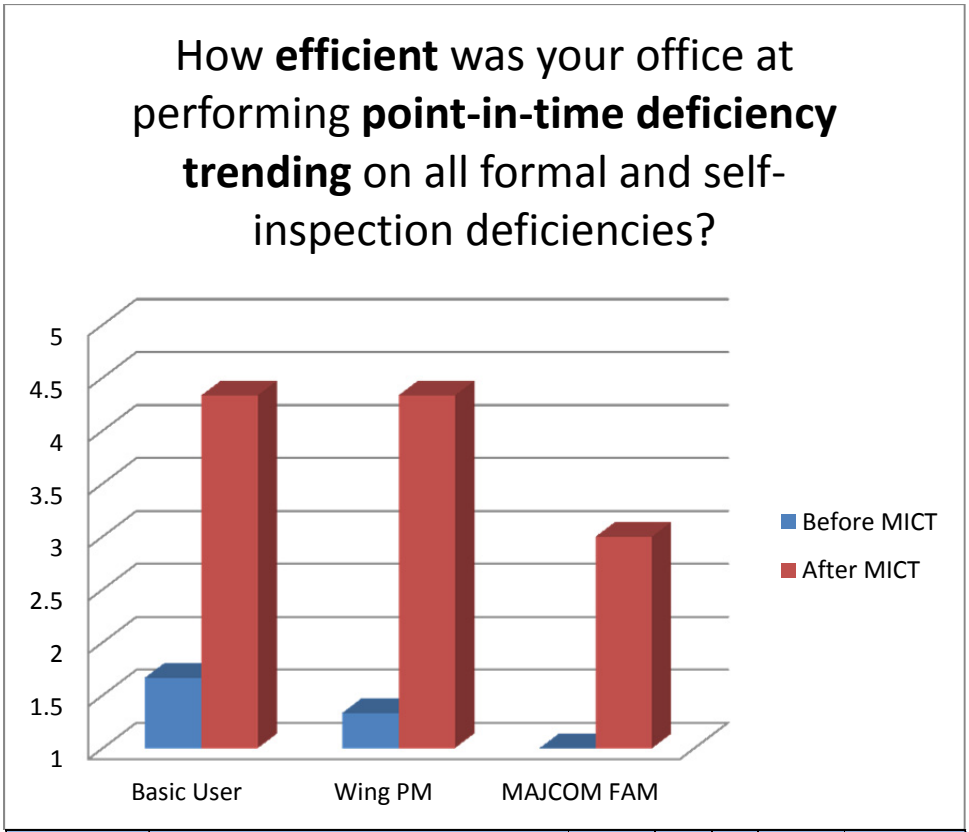
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Non-existent Trending was a challenge because of lack of automation	1.67	1.00	1.00	1.03	N/A
Basic User After		4.17	4.00	4.00	0.75	0.00
Wing PM Before		1.75	2.00	2.00	0.50	N/A
Wing PM After		3.75	4.00	4.00	1.26	20.00
MAJCOM FAM Before		1.00	1.00	1.00	0.00	N/A
MAJCOM FAM After		3.00	3.00	#N/A	1.83	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Clearly, historic trending was taken from nearly non-existent to average-to-good. Additionally, this capability takes time to develop given the required historical data. Accordingly, this capability should be prioritized early in MICT implementation.



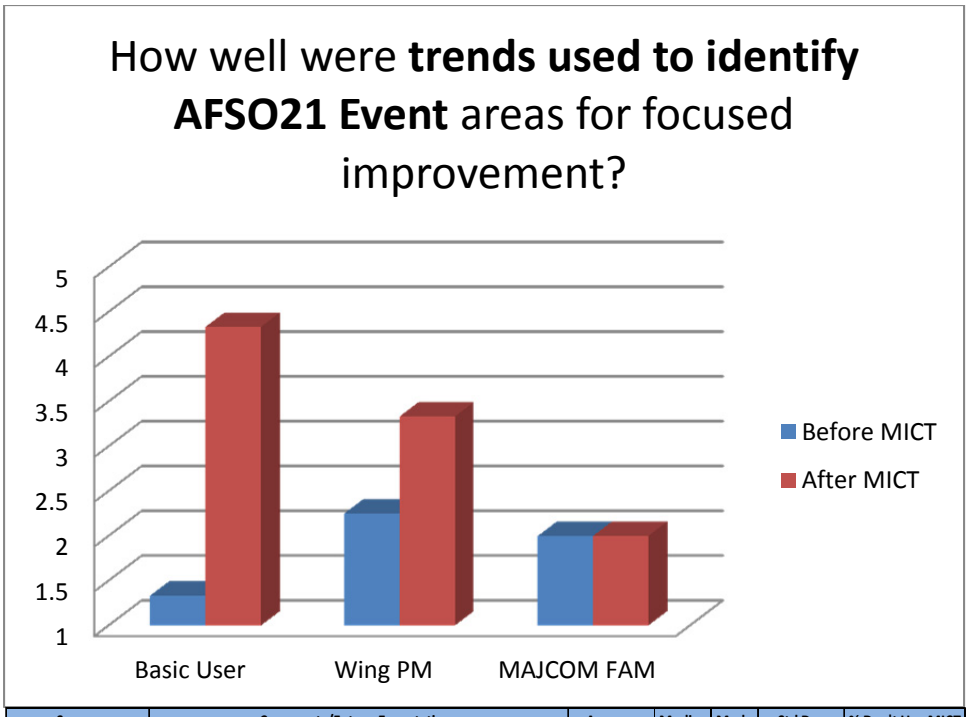
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Non-existent Trending was a challenge because of lack of automation	1.67	1.00	1.00	1.03	N/A
Basic User After	at any point in time you can pull up info to see you current status by unit/checklist/area	4.50	4.50	5.00	0.55	0.00
Wing PM Before		1.33	1.00	1.00	0.58	N/A
Wing PM After	MXG is 24 months ahead of the rest of the wing, the 131/509 wings are in their infancy still.	4.33	4.00	4.00	0.58	40.00
MAJCOM FAM Before		1.00	1.00	1.00	0.00	N/A
MAJCOM FAM After	Future state--Excellent Was not aware of this capability. With some modification, this tool will be excelent way to identify deficiencies throughout the command and implement targeted mishap prevention initiatives.	3.00	3.00	#N/A	1.83	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Interestingly, FAMs indicated most improvement in this area, suggesting an increased capacity for scaled deficiency resolution. However, some FAMs and wing PMs did not know the capability existed, so training should ensure this capability is taught.



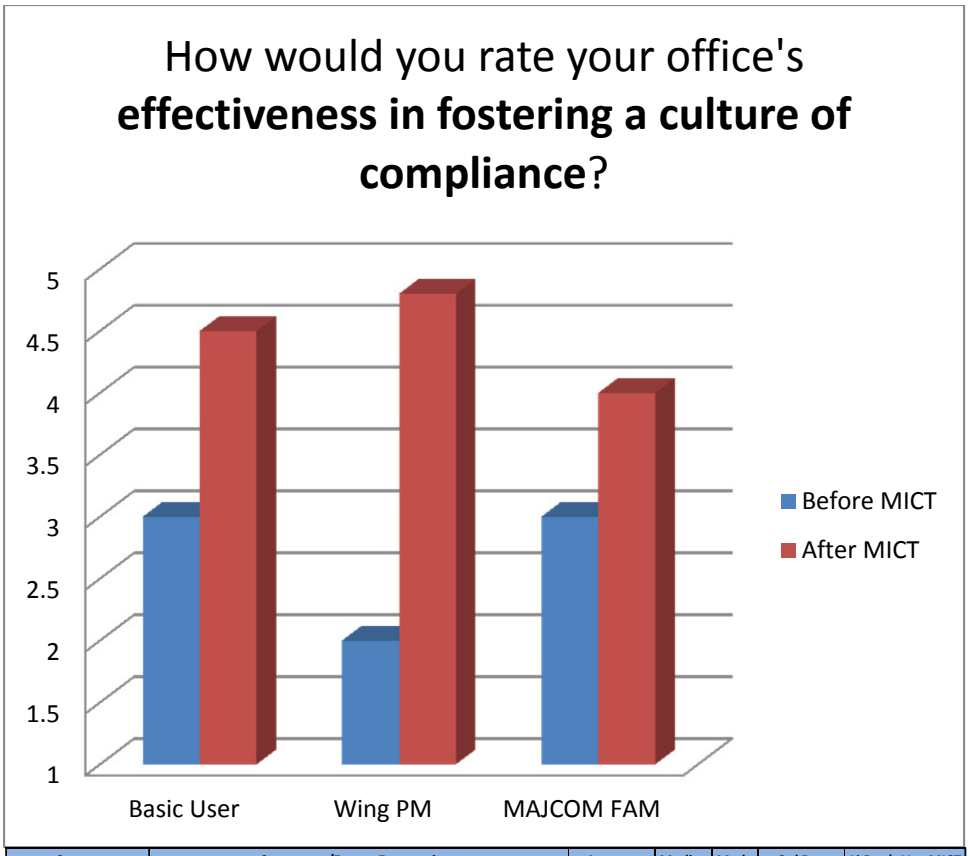
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	Non-existent Trending was a challenge because of lack of automation	1.67	1.00	1.00	1.03	N/A
Basic User After	Instead of calling, I could sit at my desk and pull up current status for the entire group all the way down to seciton and individual to determine current status and if they were working to resolve issues.	4.33	4.00	4.00	0.52	0.00
Wing PM Before		1.33	1.00	1.00	0.58	N/A
Wing PM After		4.33	4.00	4.00	0.58	40.00
MAJCOM FAM Before		1.00	1.00	1.00	0.00	N/A
MAJCOM FAM After	Future state--Excellent Was not aware of this capability. With some modification, this tool will be excelent way to identify deficiencies throughout the command and implement targeted mishap prevention initiatives.	3.00	3.00	#N/A	1.83	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. Interestingly, FAMs indicated most improvement in this area, suggesting an increased capacity for scaled deficiency resolution. However, some FAMs and wing PMs did not know the capability existed, so training should ensure this capability is taught.



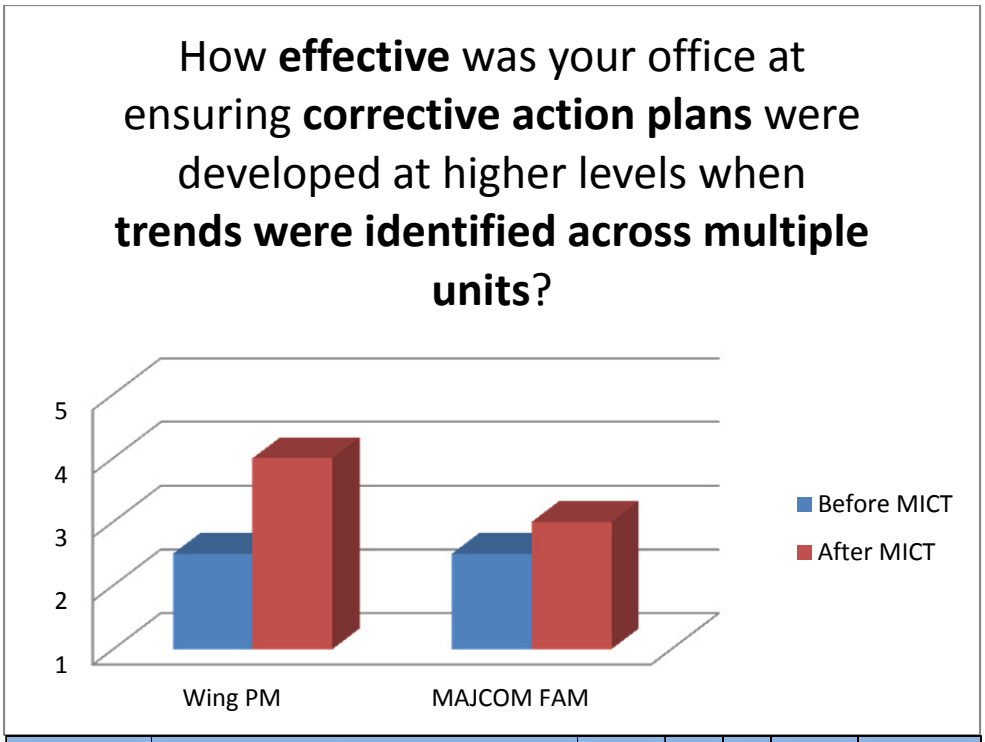
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	AFSO21 based on issues we saw day to day, not from trending data	1.33	1.00	1.00	0.58	N/A
Basic User After		4.33	4.00	4.00	0.58	50.00
Wing PM Before		2.25	2.00	2.00	0.50	N/A
Wing PM After		3.33	3.00	3.00	0.58	40.00
MAJCOM FAM Before		2.00	2.00	2.00	0.00	50.00
MAJCOM FAM After	Future state--Excellent	2.00	2.00	2.00	0.00	N/A

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. About half of respondents did not use MICT for this capability, but those that did showed significant improvement except for FAMs. Given the training required to utilize this MICT task, this may be one for future development.



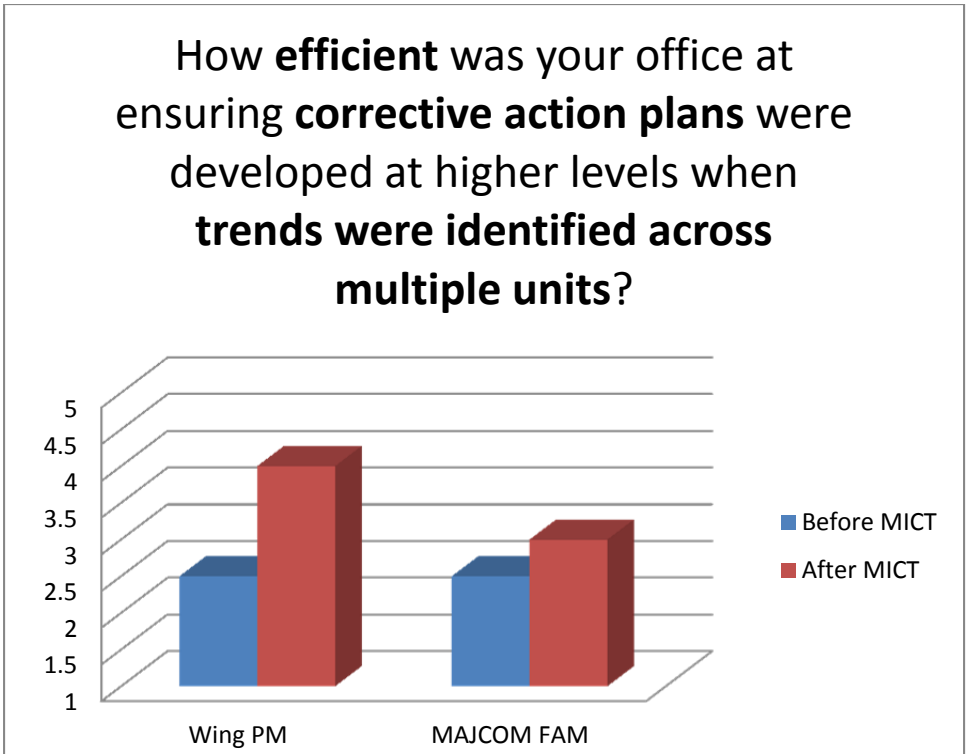
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	We were committed to doing the right thing, however, no idea about trends, and additional items outside normal day to day operations that we would need to address or look at as a trend.	3.00	3.00	3.00	1.41	N/A
Basic User After	Constant monitoring and input from different inspections allowed up to date and continous tracking/resolution of issues plus trending information. Formalized action item closure by Wg/CC employed compliance in day to day operations.	4.50	4.50	5.00	0.55	0.00
Wing PM Before		2.00	1.00	1.00	1.41	N/A
Wing PM After	we also created a ISO 9000 based internal auditing plan can have more involved and better use of MICT	4.80	5.00	5.00	0.45	0.00
MAJCOM FAM Before		3.00	3.50	4.00	1.41	N/A
MAJCOM FAM After	Future state--Excellent MICT is still in it's infancy and does not appear to be forcing a culture of compliance yet.	4.00	4.00	4.00	0.00	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. This speaks to the relative utility of the tool as a whole.



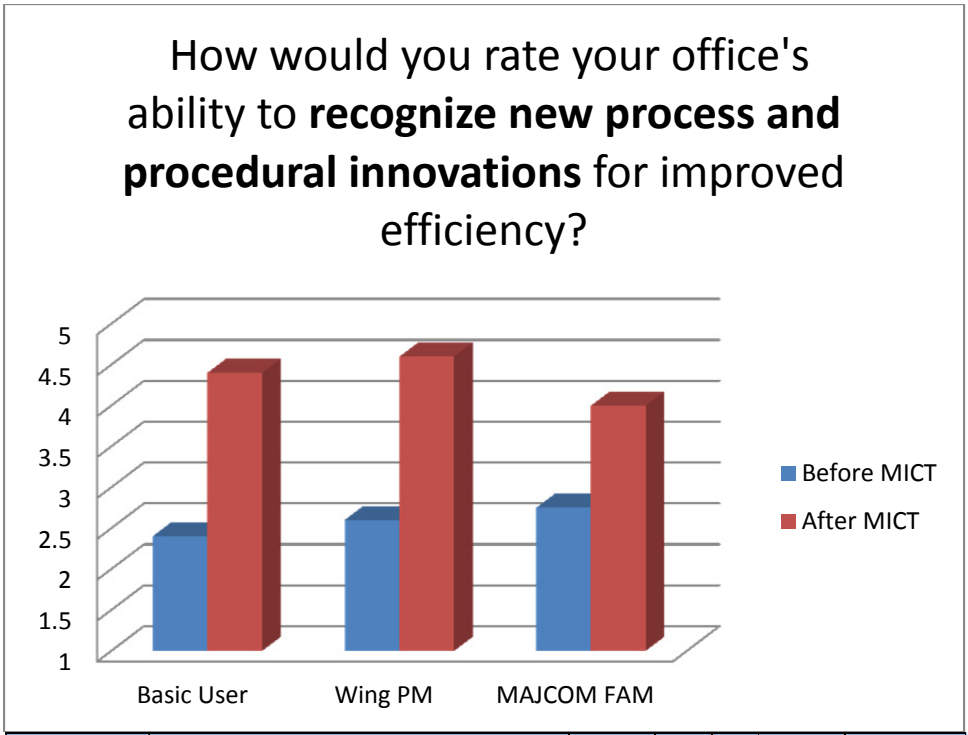
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Wing PM Before		2.50	2.50	#N/A	1.29	N/A
Wing PM After	Time & Attendance tracking--in progress	4.00	4.00	3.00	1.15	20.00
MAJCOM FAM Before	Corrective action plans for formal inspection findings (UCI, Program Evaluations, ESOHCAMP, LCAP) were tracked outside of MICT and trended quire effectively, (Reactive) however, self inspection data has not been tracked/trended (Proactive).	2.50	2.50	#N/A	2.12	N/A
MAJCOM FAM After	Future state--Excellent	3.00	3.00	#N/A	1.41	50.00

This chart and associated comments illustrate an improvement in AFIS task accomplishment after units implemented MICT. However, half of the FAMs did not know the capability existed which is contrary to the previous trending question results. As a potentially huge opportunity for man-hour savings, this should be a priority of in Wing PM and FAM training.



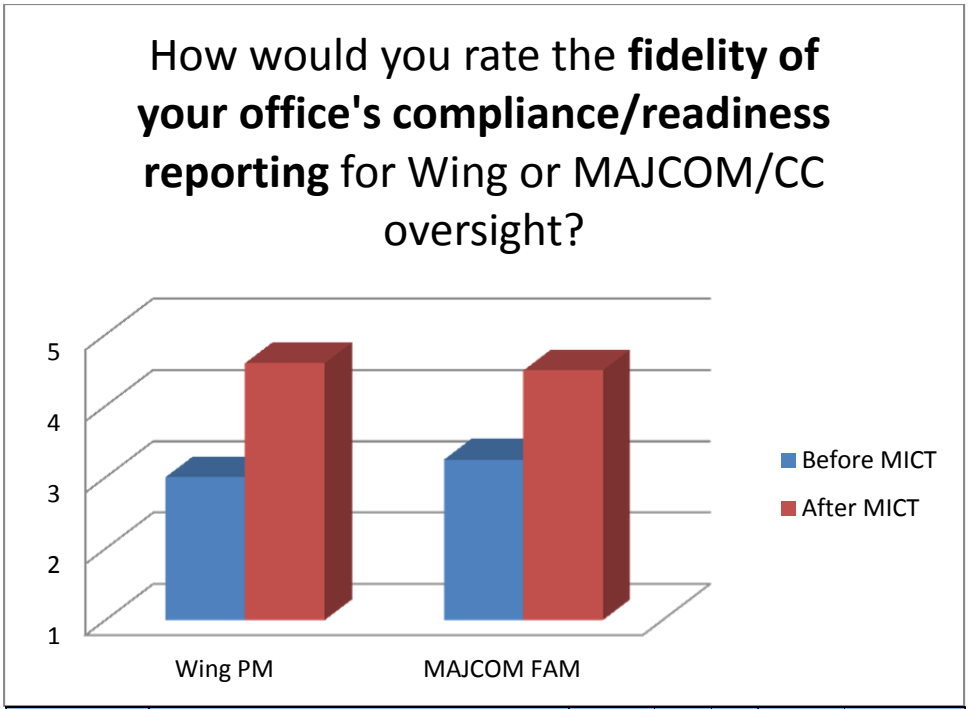
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Wing PM Before		2.50	2.50	#N/A	1.29	N/A
Wing PM After	Havent really done this except with LCAP reports (NSI, etc) Time & Attendance tracking--in progress	4.00	4.00	3.00	1.15	20.00
MAJCOM FAM Before	Corrective action plans for formal inspection findings (UCI, Program Evaluations, ESOHCAMP, LCAP) were tracked outside of MICT and trended quire efficiently, (Reactive) however, self inspection data has not been tracked/trended (Proactive).	2.50	2.50	#N/A	2.12	N/A
MAJCOM FAM After	Future state--Excellent	3.00	3.00	#N/A	1.41	50.00

This chart and associated comments illustrate an improvement in AFIS task accomplishment after units implemented MICT. However, half of the FAMs did not know the capability existed which is contrary to the previous trending question results. As a potentially huge opportunity for man-hour savings, this should be a priority of in Wing PM and FAM training.



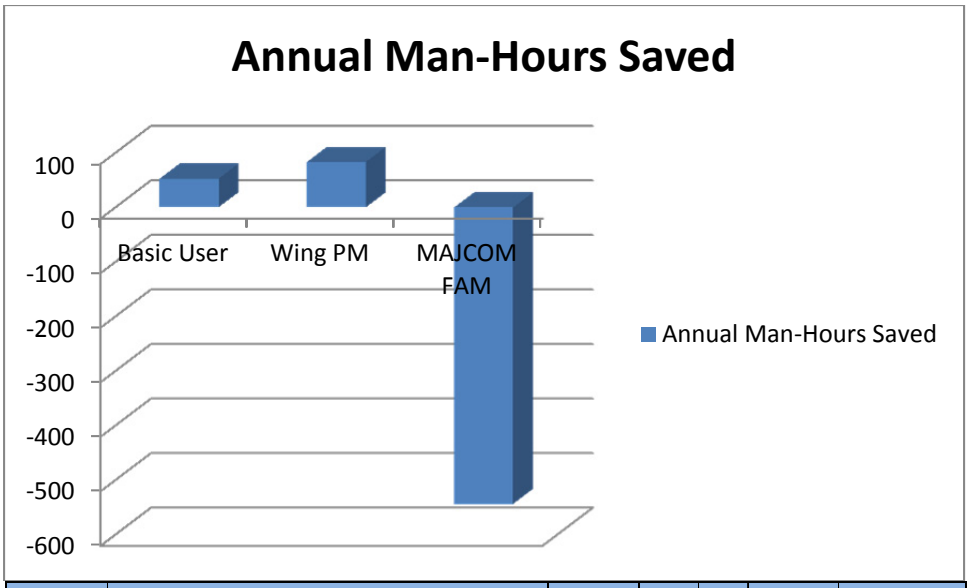
Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User Before	slow to identify broken/inefficent process. MICT helps trend those making it easier	2.40	3.00	3.00	0.89	N/A
Basic User After	still need the crossflow of best practices in my opinion to make it worthwhile. If MICT could do this, it would be excellent.	4.40	4.00	4.00	0.55	17.00
Wing PM Before		2.60	3.00	3.00	1.14	N/A
Wing PM After		4.60	5.00	5.00	0.55	0.00
MAJCOM FAM Before		2.75	3.00	3.00	1.26	N/A
MAJCOM FAM After	Future state--Excellent MICT is still in it's infancy and has not engaged MAJCOM's functionals with all it's capabilities.	4.00	4.00	4.00	0.00	0.00

This chart and associated comments illustrate an obvious improvement in AFIS task accomplishment after units implemented MICT. These results suggest that MICT encourages innovation for new efficiencies.



Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Wing PM Before		3.00	3.00	3.00	0.82	N/A
Wing PM After	Monthly reports due to the Grp/CC, also we developed a joint OI for SIP signed by both groups, guard and active. We now have the entire base energized, MXG is gradually handing the wing program over to plans. However, we are deep enough into MICT that we have over 25 local checklists, for example.	4.60	5.00	5.00	0.55	0.00
MAJCOM FAM Before		3.25	3.50	#N/A	1.71	N/A
MAJCOM FAM After	Future state--Excellent	4.50	4.50	5.00	0.58	0.00

This chart and associated comments illustrate an improvement in AFIS task accomplishment after units implemented MICT. Accordingly, it suggests their mean commander's oversight improved from average to good. This would likely have to improve to excellent in order to enable the AFIS desired state. This is an area for program developers to enhance in support of research hypothesis 4.



Source	Comments/Future Expectations	Average	Median	Mode	Std Dev	% Don't Use MICT
Basic User	Good product; redundency needs attention this would fluctuate depending on inspection level, would be higher if CI/LCAP prep instead of self inspection. Saviving are realize because we don't have to search for right checklist or refernces; archived answers are still available I would say it saves about 1 hour per checklist per year.	52.60	30.00	#N/A	61.15	N/A
Wing PM	Takes some time to implement about 3 months	83.33	100.00	100.00	28.87	N/A
MAJCOM FAM	MICT has introduced a new process for evaluating self inspection data. It is value added time (not wasted) and efficiencies will be better measured once the full capabilities are implemented. Overall MICT has greatly improved compliance withAFI/AFMAN. Units at all levels have a system to self-inspect, track, trend,identify weakness and strengths. The Emergency Management flights that use it regularly have very good programs.	-543.75	-97.50	#N/A	976.01	N/A

Initially, this chart seems to indicate a huge cost of man-hours for MICT's new and developed capabilities for the AFIS. However, there are significantly more than ten-times as many basic users and wing PMs than FAMs indicating a man-hour savings. Additionally, comments made by FAMs indicate a worthwhile investment of their additional man-hours requirements.

Figure 16. Expanded Survey Results

Results of Interviews

To fairly present the data gained from the interviews, this section will provide interview responses only. Interpretation and application to research questions and hypotheses will be reserved for the Conclusions chapter.

Wing Commander Interview

1. What percent of the units you work with are using MICT? 100%
2. How long have you been using MICT? 17 Months
3. What were you using before MICT? The Self-Inspection Website Tool. This tool was completely inadequate. While it could consolidate checklist responses, each checklist score took 4 seconds to process. 25,000 checklist items later we're looking at 100,000 seconds or 27 hours of my Airmen staring at computer screens waiting for them to move on to the next checklist item. Furthermore, we had to upload current checklists into the program which took several weeks. Then the conversion of the data into useful information for commanders took a few days. Finally, the program had no trending or resolution capabilities. MICT corrects all this.
4. How well does MICT help your Airmen accomplish the following tasks:
    a. Self-Inspection Program/Compliance checklist management/Self-assessment efficiency/continuity? Excellent; still somewhat limited by the quality of HAF and MAJCOM checklists. To be clear, these are not MICT problems. They are growing pains as the Air Force spins up to capitalize on this new IT system. Checklists will necessarily improve under the new AFIS.

b. Readiness/exercise checklist management? Excellent; although we have to load readiness checklists deficiencies locally to track deficiencies to closure. While above-the-wing trending capability is not yet mature in AMC, conversations with AMC/IG indicate they are making great progress in this area.

c. Deficiency identification? Excellent; my wing's culture of compliance values full disclosure of deficiencies. Open deficiencies in a unit that can find and resolve them are more preferred to a fully "compliant" unit that cannot.

d. Deficiency tracking? Excellent; we track and trend every deficiency to closure with monthly Remedial Action Boards (RAB) where commanders discuss corrective action plans and I approve deficiency closure. Commander-echelon ownership ensures we employ MICT capabilities to focus on important problems and opportunities for efficiency and mission effectiveness.

e. Deficiency corrective action plan (CAP) development? Excellent; we discuss all CAPs at the RABs to ensure unity of effort on shared deficiencies.

f. Deficiency trending (historical and point-in-time)? Excellent; we conduct trend analysis both at the wing level with deficiency reports sorted by item. We also look back in history archives for historical trending. However, this function needs to be more automated within MICT with

some threshold algorithms and automatic email notifications when exceeded.

g. Scaled Resolution? Excellent; at the wing level, we use MICT to identify AFSO 21 RIE problems but it's still nonexistent above the wing level. We would like to support the same at the MAJCOM level with all the FAMs.

h. AFSO21event selection? Excellent, see above.

i. Commander oversight? Excellent; we use compliance reports to provide the Wing corporate structure the appropriate level of quantified oversight while avoiding micromanagement. Subordinate commanders are only asked to use the tool to identify their unit's ability to identify, track, trend and resolve their deficiencies. One of MICT's best capabilities is its inherent one-stop-shopping for commanders. We now have a dashboard of all compliance and readiness from which we can sort our strengths and weaknesses. In fact, these dashboards may likely overtake common ad hoc metrics reporting systems.

j. Culture of compliance? Excellent; with no exaggeration, I believe my leadership team has utilized this IT solution in a way that exemplifies the new *AFI 90-201*'s "desired state" of the AFIS.

k. Innovation for new efficiencies? Excellent; Airmen feel empowered to identify broken or inefficient processes and are empowered to team up to fix them. We are working to achieve a fully mature level of maintenance to mitigate the traditional compliance sine wave.

5. Do you think MICT, employed as an IT solution, bridges an AFIS trending process technological feasibility gap and accordingly, warrants a complete reengineering of the process? Yes, but only when paired with effective leadership.
6. Do you think MICT can adequately provide MAJCOM and HAF leadership oversight for assessments accomplished by the wings? It depends on what the MAJCOMs do with MICT. I think it should, but will require some changes. The reduction of inspections may force the issue.
7. How feasible are the following paradigm shifts implicit within the new AFIS and associated desired state?
    a. More reliance on more comprehensive checklists attached to all AFIs. Mandatory for efficient use of MICT.
    b. Increased FAM ownership of functional areas, checklist management, trend identification, scaled corrective action, and evaluated by IG (management inspection). Again, this is up to the MAJCOMs.
    c. Enterprise deficiency transparency to enable FAM trending and improved L2 sharing. Tough one given the threat of units attempting to cook the books in fear of reprisal. Expectation management from the top down, outlining HHQ expectations of what they expect to see in MICT at any given time should help. I would be willing to share my deficiencies with anyone in order to enable higher level trending for effective lesson sharing.

d. General shift of HHQ prioritization on a unit's ability to self identify and resolve deficiencies rather than the traditional formal inspection snapshot. Already stated in the new *AFI 90-201*, but time will tell if all the pieces fall together to make the "desired state" of the AFIS a reality.

MAJCOM MICT Program Administrator Interview

1. What percent of the units you work with are using MICT? 15%
2. How long have you been using MICT? 3 years, but only test wings
3. What were you using before MICT? Nothing. Units were using home-grown systems. They just got our checklists off our websites in Excel format.
4. How well does MICT help your Airmen accomplish the following tasks:
    a. Self-Inspection Program/Compliance checklist management/Self-assessment efficiency/continuity? Future state--Excellent
    b. Readiness/exercise checklist management? Future state--Excellent
    c. Deficiency identification? Future State-- Good
    d. Deficiency tracking? Future state--Excellent
    e. Deficiency corrective action plan development? Future state--Excellent
    f. Deficiency trending (historical and point-in-time)? Not sure. Trending is big, will require training so that local checklists don't hinder higher level trending within the MICT construct.
    g. Scaled Resolution? Potential Future State-- Good
    h. AFSO21event selection? Future State-- Good
    i. Commander oversight? Future state--Excellent
    j. Culture of compliance? Future state--Excellent

k. Innovation for new efficiencies? Hope so. This new generation of Airmen help, but must be driven by leadership and that is personality driven.

5. Do you think MICT, employed as an IT solution, bridges an AFIS trending process technological feasibility gap and accordingly, warrants a complete reengineering of the process? MICT is not an all-in-one solution. The cultural change must accompany. HAF core and other supplemental checklists must still improve.
6. Do you think MICT can adequately provide MAJCOM and HAF leadership oversight for assessments accomplished by the wings? In theory, yes, but will take time. Realistically, it'll be 2013 before we have all our basic users loaded, 2014 before everybody's using it and maybe 2015 before we're fully functional.
7. How feasible are the following paradigm shifts implicit within the new AFIS and associated desired state:
    a. More reliance on more comprehensive checklists attached to all AFIs? This one's a catch-22. IG's traditionally haven't been keen on this, but I think it's doable at least for tier-1 (critical/significant) items.
    b. Increased FAM ownership of functional areas, checklist management, trend identification, scaled corrective action, and evaluated by IG (management inspection)? Yes, MICT finally puts the onus on FAMs. They are now exposed as checklist owners with all the basic users breathing down their necks for better checklists.

c. Enterprise deficiency transparency to enable FAM trending and improved L2 sharing? Possibly. Sounds great. Would probably have to work both sides with IGEMS. Sounds like A9 should be heavily involved.

d. General shift of HHQ prioritization on a unit's ability to self identify and resolve deficiencies rather than the traditional formal inspection snapshot? Incentive programs have always been there, but so have fears. MICT offers better opportunities than ever before, but it will depend on commanders at all levels. Commanders must be comfortable to expose flaws without fear of scrutiny.

MAJCOM/IG Representative Interview

1. What percent of the units you work with are using MICT? 30% today, getting close to 100% by 31 May 12 (using); fully functioning by 31 Dec 12 IAW MAJCOM HQ offered and AFIA accepted/mandated timeline. All MAJCOM wings and stand-alone groups have appointed Wing Administrators (WA). 15 of 20 are trained (75%); remaining 5 are all scheduled for AMC/A6-led training on 27 Apr, driving MAJCOM to 100% trained. Per our draft VI CONOPS, 31 May 2012 is the IOC suspense for MICT. MAJCOM Initial Operating Capacity (IOC) criteria are that in all wings:
   - WAs have been trained (by MAJCOM/A6)
   - WAs have loaded unit PASCODE hierarchies in MICT
   - WAs or commanders have identified group and squadron MICT administrators
   - Wings have developed MICT implementation schedules

- WAs have updated unit POC MICT permissions
- Wing Commanders have published MICT/Self-inspection program (SIP) policy letter or Operating Instruction
- WAs have loaded local self-assessment checklists in MICT

31 December 2012 is this MAJCOM's Full Operational Capability (FOC) suspense for MICT. In addition to meeting IOC criteria, all units will use MICT as Self-inspection (SIP) tool, all HQ IG inspectors are trained on MICT, and HQ IG accomplishes VIs using MICT.

2. How long have you been using MICT? Informally 1.5 years at HQ level with Division Chief investigations beginning October 2010. Formally 1-year; accepted as the Self-assessment program of choice March 2011 for MAJCOM at Phoenix Rally.
3. What were you using before MICT? Each unit was using ad hoc, off the shelf program, and some were using a MAJCOM/A6 supported homegrown legacy program.
4. Do you think MICT, employed as an IT solution, bridges an AFIS trending process technological feasibility gap and accordingly, warrants a complete reengineering of the process? Yes gives leadership at all levels visibility/oversight of unit SIPs. It enables the MAJCOM FAMs to resolve issues on the policy level versus inspection. However, there needs to be better connectivity between MICT and IGEMS. Like a membrane using osmosis, only some things should get through and some should only be one way for trending

purposes. For example, I'd have checklists flow from MICT to IGEMS, so inspectors are asking the same Q's that wing personnel used to prep.

5. Do you think MICT can adequately provide MAJCOM and HAF leadership oversight for assessments accomplished by the wings? Yes, we are including MICT in a NAF dashboard that includes not only the unit's self-assessment results, but also FAM review of the same data. Given varying degrees of wing-level MICT employment, MAJCOM IGs could grant inspection "credit" for CIs and RIs.
6. How feasible are the following paradigm shifts implicit within the new AFIS and associated desired state:
    a. More reliance on more comprehensive checklists attached to all AFIs? Completely feasible. From an aircrew perspective, there is nothing strange about the concept of a comprehensive checklist that is always 100% accurate and is as much of a source document as an AFI or T.O. In fact our MAJCOM is moving in this direction with aggressive MAJCOM supplement checklist reviews. Our IG would like to eliminate the disclaimer that checklists are only a guide. While they will have to refer to expanded text in AFIs at times, checklists have their own advantages. Checklists are easier to change, distribute (with MICT), and communicate change.
    b. Increased FAM ownership of functional areas, checklist management, trend identification, scaled corrective action, and evaluated by IG (management inspection)? Completely feasible. MICT has great capabilities in conjunction with the new *AFI 90-201*. It's all about responsibility, authority and

accountability. Commanders are finally informed and FAMs and Directors are finally engaged without time-consuming, costly SAVs. Trends can now be identified and be addressed at the appropriate level, commanders and directors. Before, deficiencies, not trends, were handled between the OICs and FAMs. Under the desired state and CCIP construct, commanders are inspected rather than the programs. As such, MICT is necessary to arm the commanders with oversight. Fortunately, we're providing the tool before the policy.

c. Enterprise deficiency transparency to enable FAM trending and improved L2 sharing? Completely feasible. IGs and FAMs must have full access to all data. Rule sets must be used to ensure honesty. Units must understand deficiencies, trending and solid corrective action plans are expected. 100% compliant units are not expected. Furthermore, the way to fail is to perform poor self-assessments and corrections as validated by no-notice inspections. These no-notice inspections will likely be driven by units that look too good. When a problem area exists, the IG should be able to observe the FAM taking notice and working with the commander for resolution. We must develop the desired inspection/assessment culture. For instance, on Joint Bases or in Air Groups we need senior leadership engaged and talking about common challenges to ensure maximum efficiency in operations. In fact, all commanders should probably receive efficiency-focused training to blend higher level MICT and AFSO 21 capabilities. Currently, the USAF Expeditionary Center is exploring training options.

d. General shift of HHQ prioritization on a unit's ability to self identify and resolve deficiencies rather than the traditional formal inspection snapshot? Completely feasible. In fact, after full utilization, MICT should enable IGs to focus on rewarding best practices, exceptional self-assessments and CAP resolutions rather than punishment for hidden deficiencies. The culture of compliance is a continuous state of compliance, monitored by all for problem area identification and resolution. Again, this requires full IG and FAM access to all data, all the time. Additionally, deficiencies that are self-identified and have strong CAPs should not be gradable during HHQ inspections.

SAF/IG Representative Interview

1. What percent of the units you work with are using MICT? Working towards 100% under the direction of the 23 Mar 12 *AFI 90-201*.
2. How long have you been using MICT? Various MAJCOMs have been using MICT for various lengths of time over the past few years, but AFRC has the most experience.
3. What were you using before MICT? No standard tool. Most functionals simply provided checklists in Microsoft Excel format as tools to comply with AFIs. IGs inspected off AFIs.
4. Do you think MICT, employed as an IT solution, bridges an AFIS trending process technological feasibility gap and accordingly, warrants a complete reengineering of the process? Yes and no. The new AFIS is a reengineering

effort that would happen without MICT. However, further transformation to the AFIS desired state requires MICT's capabilities.

5. Do you think MICT can adequately provide MAJCOM and HAF leadership oversight for assessments accomplished by the wings? Yes, and this will be important to the success of the new AFIS. MICT can provide a degree of oversight to these leaders without having to do more inspections during wing commanders' calendar white space.
6. How feasible are the following paradigm shifts implicit within the new AFIS and associated desired state:
    a. More reliance on more comprehensive checklists attached to all AFIs? This is now directed at the HAF level with *AFI 90-201*. Hopefully MAJCOMs follow suit.
    b. Increased FAM ownership of functional areas, checklist management, trend identification, scaled corrective action, and evaluated by IG (management inspections)? Increased FAM ownership is inevitable with MICT. The trick will be ensuring they have the proper training to maximize MICT efficiencies.
    c. Enterprise deficiency transparency to enable FAM trending and improved L2 sharing? Ideally yes, but we have to wait for the USAF culture to adjust to the new AFIS. The transparency required for the desired state will be something to work towards once everybody's up and running with MICT.

d. General shift of HHQ prioritization on a unit's ability to self identify and resolve deficiencies rather than the traditional formal inspection snapshot? As stated in *AFI 90-201*, this is the desired state of the AFIS. However, significant cultural change like this takes time and requires a more incremental approach.

Research Questions Answered

1. Inferential and descriptive statistics, surveys, and interviews validated MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution. As such, its mandatory, enterprise-wide employment was warranted.
2. According to surveys and their descriptive statistics, and interviews, MICT capabilities that should be leveraged now to improve efficiency and effectiveness in the new AFIS include:
    - Compliance checklist maintenance
    - Identification of critical and minor deficiencies
    - Tracking critical deficiencies to resolution
    - Managing critical deficiency CAPs
    - Historical deficiency trending
    - Point-in-time trending
    - Encouragement of culture of compliance
    - Encouragement of new innovations

- Enabling of leadership oversight via MICT reports

3. Surveys, descriptive statistics, and interviews indicated the best way to leverage key MICT capabilities to overcome required paradigm shifts to enable the future, desired transformation:
    - Leadership at all levels must foster a culture of change
    - Proper leadership, FAM and Wing PM training must accompany its implementation to realize most capabilities
    - Role of checklists:
        - Increasing reliance is inevitable with MICT
        - Under this new AFIS--100% Tier-1 (critical) comprehensive
        - Under AFIS desired state—entire checklist must be comprehensive (with references to source documents)
    - A9 might best take role of trend analysis to remove adverse effects of external transparency
    - MICT timing with a new generation of innovative, tech-savvy Airmen must be capitalized upon
    - With FAM increase in responsibility, the USAF must carefully consider additional manning in FAM offices to capitalize on MICT efficiencies
    - MICT may be more of a “critical/essential” enabler than “key” to the new AFIS and desired state

- Trending must be proactively addressed by FAMs until automated code sends emails from MICT
- Benefits of MICT's commander oversight requires proper training for its associated efficiency realization

4. According to surveys and their descriptive statistics, and interviews, MICT capabilities that should be developed to improve efficiency and effectiveness in the future AFIS desired state include:
    - Continuously improved dashboards to meet the needs of all commanders to raise oversight to excellent
    - Full transparency is necessary for the desired AFIS transformation. The IGs and FAMs must be able to continuously trend against a visible steady state of compliance
    - MICT should be fully up and running before CCIP is employed so commanders are armed with the tool prior to being evaluated
    - Virtual inspections should be utilized where appropriate to redirect FAMs efforts from on-site visits to MICT oversight and trending
    - Standardized, scaled, enterprise-wide training should be used to maximize benefits of MICT
    - Readiness deficiency identification/tracking/trending/ resolution
    - CAP development above wing level when multi-wing trends identified (scaled resolution)
    - AFSO 21 RIE linkage with trended deficiencies at all levels
    - Joint base deficiency trending

V. Conclusions and Recommendations

Chapter Overview

This chapter will provide conclusions of research, a discussion of conclusions applied to common business and process models, recommendations for action, recommendations for future research, and a final summary.

Conclusions of Research

The literature review supported all research hypotheses. Three articles written about MICT and the new AFIS supported how MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution warranted mandatory, enterprise-wide employment. The articles also identified trending and oversight as key MICT capabilities that should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation. Finally, one article outlined four major paradigm shifts that must accompany MICT employment for full realization of its capabilities.

As supported by the interviews, these four paradigm shifts represent required cultural changes in the USAF. The first is unit self-inspection transparency. Unit commanders must be willing to disclose all deficiencies real-time for effective, higher-level trending. The second is to value the strength of a unit's compliance/readiness process more than traditional formal inspection snapshot assessments. The third is a partial shift of compliance/readiness ownership and responsibility from commanders to FAMs and functional area directors. The fourth is an IG transition from traditional

formal inspections to virtual MICT inspections when appropriate. These paradigm shifts are critical to full realization of MICT's capabilities and associated efficiencies.

Inferential statistics supported the first research hypotheses and provided evidence in support of enterprise-wide MICT implementation. Hypothesis testing was conducted using simulated data sets generated from a wing's compliance statistics before and after implementing MICT. Large-sample test of hypothesis for $(\mu_1 - \mu_2)$ at $\alpha = .05$ provided evidence that MICT enables a unit to identify more deficiencies with 95% confidence level (Equation 1). Likewise, backwards linear regression provided a model to predict a unit's ability to identify deficiencies with MICT as compared to when using another popular, competing tool (Equation 2). When the model was applied, it suggested that a typical squadron could expect to find approximately 53 more deficiencies per 1000 checklist items using MICT than it would without.

Analysis of data provided by surveys supported all research hypotheses. It also provided MICT capabilities considered more effective and efficient by different types of sampled populations. An overview of the responses in Figure 1 illustrated an unmistakable trend of drastic improvement in AFIS task accomplishment with MICT. Furthermore, varying degrees of MICT use and improvements perceived after employing MICT highlighted areas that warrant extra attention and training during enterprise-wide implementation. The breakout of these areas is provided in the Research Questions Answered section in chapter 4 and again in the Recommendations for Action presented below.

Interviews were conducted with individuals in key leadership positions that are knowledgeable about MICT and are directly affected by the new AFIS and desired state.

These interviews supported the previous data and all hypotheses by providing a balanced perspective of how MICT's key capabilities can best be leveraged now and in the future to enable the desired transformation of the AFIS. Most importantly, they confirmed the four critical paradigm shifts required for optimized MICT employment and a successful transition to the AFIS desired state. Finally, interview results offered proposed strategies for achieving the paradigm shifts. In the next section, these strategies and other research conclusions will be viewed through the lenses of four organizational and process models to provide context for recommendations for action and future research.

Conclusions Applied to Relevant Business Process Models

Before providing recommendations for action and future research, these conclusions will be viewed through four lenses described in the Literature Review. Business Process Reengineering (BPR), Organizational Change, Service Quality Management and Risk Management will provide perspectives on how best to leverage and develop MICT's capabilities in the AFIS. Additionally, they will utilize interview strategies for achieving the paradigm shifts required to enable the future, desired AFIS transformation.

Business Process Reengineering (BPR)

Application of Hammer and Champy's *Business Process Reengineering* (BPR), as described in chapter two, outlines shortfalls of the old AFIS compliance/readiness process in the areas of checklists, trending and oversight. It also highlights solutions provided by MICT and the new AFIS. The USAF compliance/readiness process has two internal customers, the unit commander and the Chief of Staff of the USAF (CSAF), and

one external customer, the Combatant Commander. Relative to compliance and readiness, all three customers desire a USAF that is legal, compliant and ready to meet the needs of the Combatant Commanders.

Conclusions of this research suggest the old AFIS process by which the USAF attempted to ensure compliance and readiness was inefficient and ineffective. FAMs at DOD, HAF, MAJCOM, Base and Wing levels produced T.O.s, AFIs, AFMANs and associated supplements to place compliance/readiness requirements and standardization on USAF units. Most, but not all of these instructions and manuals were converted to some type of checklist by Subject Matter Experts (SME) at various levels. Units worked towards compliance and readiness using these checklists during self-inspections and occasional staff-assisted visits (SAVs). Finally, Inspector General (IG) teams visited units to sample all areas to evaluate compliance and readiness. Although the inspections were not comprehensive, IG inspection results were used as a measurement of unit effectiveness and unit readiness/compliance for the commander, CSAF and Combatant Commander.

Significant problems existed within the old AFIS compliance/readiness process in the areas of checklist quality, trending and oversight. Improper checklist management had made inspections and deficiency resolution difficult and inadequate. Checklists were not comprehensive and usually did not identify critical items. They were difficult to find, accomplish and validate, wasting many man-hours. They lacked timely updates because they were not directly attached to their associated T.O.s, AFIs and manuals. Tools used to accomplish checklists were not directly linked to AFSO21deficiency resolution tools or existing lessons-learned tools such as JLLIS, CPIMT, MAJCOM benchmarks and

USAF best practices. Finally, checklist results were not consolidated in a single database for HHQ trending. The new *AFI 90-201* attempts to resolve these problems by providing new checklist management procedures. It directs HAF Functionals to develop and publish a Self-Assessment Checklist (SAC) in MICT with unit-level compliance requirements for each AFI and MAJCOM FAMs to supplement HAF SACs when required (*AFI 90-201*, 2012:76). Unit Commanders may also supplement MAJCOM supplements, but SACs must be approved by the next higher HQ FAM (*AFI 90-201*, 2012:76). Furthermore, all SACs must indicate the degree of criticality for each self-assessment item (*AFI 90-201*, 2012:76). Finally, the new 90-201 provides a timeline for the initial checklist updates and subsequent reviews (*AFI 90-201*, 2012:76).

Trending was required under the old *AFI 90-201*, but was never effectively accomplished because no tool existed to do so above the wing level. Without trending, continuous improvement is not likely as many man-hours are wasted on inadequate corrective action plan (CAP) development caused by a lack of historical vision. Moreover, Airmen across the USAF were simultaneously trying to resolve shared deficiency trends, all reaching different solutions, with few achieving lasting resolution. Obviously, the approved solution would be identifying the trend at a higher level and employing an AFSO21 event for timely, standardized, scaled deficiency resolution. Before MICT, some point-in-time trending was possible by reviewing existing discrepancies within a particular unit, but historic trending much more difficult. Most units failed to enter deficiencies into a database or could not effectively sort for trends. Furthermore, trending above the wing level was virtually nonexistent where corrective action could often be best employed to achieve accelerated, large-scale continuous

improvement across a Joint Base, functional area, MAJCOM or the entire enterprise. Fortunately, the 2012 *AFI 90-201* took a significant step in the right direction by directing FAMs to monitor and assess MICT data from wings to maintain situational awareness of potential problem areas, and employ AFSO21 tools for large-scale corrective actions (*AFI 90-201*, 2012:75). Additionally, they are now required to perform periodic reviews of AF Best Practices, MAJCOM Benchmarks, Continuous Process Improvement Management Tool (CPI-MT) and Joint Lessons Learned Information System (JLLIS) to identify and employ Enterprise or MAJCOM standards when appropriate (*AFI 90-201*, 2012:75). However, specific trending methods and directives are not yet in place.

Under the old AFIS, insufficient trending was further exacerbated by inadequate commander, FAM and IG oversight. Other than IG formal inspections and occasional SAVs, IGs, FAMs and commanders had no tool in place to quantify readiness, compliance or associated trends within a particular unit or the entire enterprise. Commanders generally only received oversimplified, qualitative reports on compliance and readiness. Additionally, no single dashboard existed for commanders to compare functional areas of various exercises, formal inspections and self-inspections. FAMs only had acrobat-reader reports of formal inspections and SAVs that could not be sorted for trending. Similarly, even the IG's Inspector General Evaluation Management System (IGEMS) was unable to capture comprehensive trending and was unable to assess any type of compliance or readiness data outside formal inspections. This drove an extensive, expensive formal inspection program to provide the CSAF a measure of fidelity for USAF compliance/readiness. Last and potentially most important, Airmen were unable

to use the same kind of oversight for unit level trending, deficiency resolution, continuity or focused AFSO21 resolution. The new *AFI 90-201* directs utilization of MICT but does not specifically spell out expectations of employment to enable above oversight capabilities. While this provides flexibility to the wings to employ the tool to best fit the needs of their mission, it unfortunately hinders the higher-level trending capabilities. Checklist, trending and oversight problems in the old AFIS are presented in an AFIS process model presented below (Figure 20).

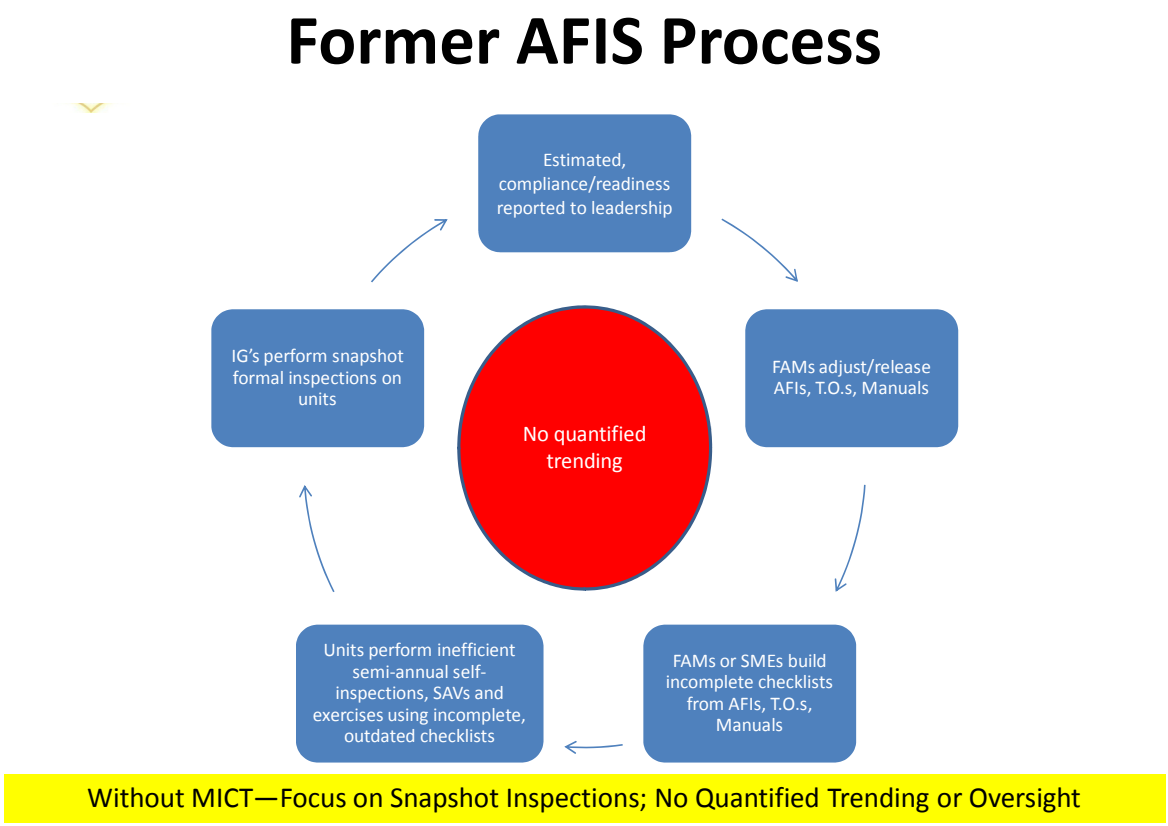


Figure 17. Former AFIS Compliance Checklist, Trending & Oversight Process

MICT could have been employed as an enterprise tool for checklist accomplishment without reengineering the entire compliance/readiness process, but most

of its utility would be wasted. While this would undoubtedly save man-hours in checklist accomplishment, improvement would likely stop there.

Obvious indicators of the old AFIS process dysfunction included extensive information exchange, excessive buffers, high ratio of checking to value adding, rework and iteration and complexity (Hammer and Champy, 2003). These were apparent in the multitude of L2 sharing initiatives, inspection reports, redundant checklists and inspections, and independent self-inspection tools. In determining whether to reengineer a business process, one must ensure it is important and technologically, culturally and economically feasible (Hammer and Champy, 2003). In this case, importance was unquestionable in that compliance and readiness are fundamental to the USAF mission set. Technological feasibility was provided by MICT. Economic feasibility was provided by the 2012 budget with funding allocated through FY 17. Additionally, SAF/IG is pushing to get a wedge placed into the POM to fund the manpower required for Wings to effectively run a MICT program (Molnar, 2012). However, cultural feasibility could still be a challenge if the new process is not properly implemented and employed consistent with the AFIS desired state. Associated MAJCOM 90-201 supplements will play a big part in cultural feasibility of this process reengineering.

Once again, advancement in technology has presented a dramatic opportunity for improvement for the USAF. However, MICT is another example of how the USAF needs to carefully consider how it treats new technology. It's easy to treat new IT as an opportunity to improve an existing process. It's a bit more difficult, but essential to consider how it can reengineer the current process into a something that works completely different, but clearly better. SAF/IG has taken a tremendous step in this

direction by presenting a desired state of the AFIS compliance/readiness process (Figure 21). Additionally, survey and interview results indicate less cultural resistance than expected. Figure 21 below presents a reengineered AFIS process built from the *AFI 90-201* desired state, and survey and interview results. When compared with the old AFIS process in Figure 20, the changes in checklists, trending and oversight are obvious and their impact on the process is significant. Figure 21 illustrates a much more effective and efficient AFIS process.

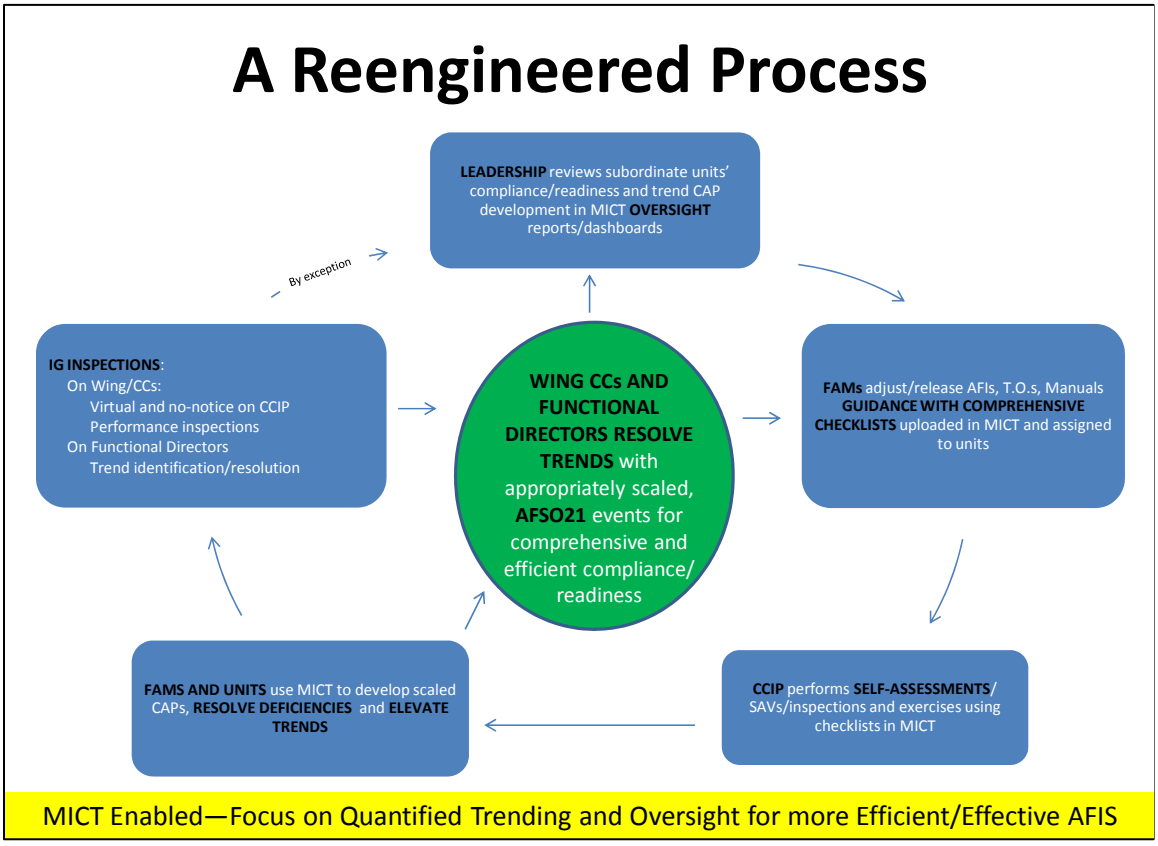


Figure 18. A Reengineered USAF Compliance, Trending & Oversight Process

Organizational Change

Next, organizational change is revisited relative to research conclusions to determine if this process reengineering is culturally feasible. Gibson's chapter on organizational change, as presented in the Literature Review, is directly applicable to several aspects of MICT implementation across the enterprise.

Gibson et al. begin by discussing external, internal and external-internal change agents (Gibson, 2012:488-519). As applied to MICT employment, USAF internal change agents are most significant. They can be any MICT user that uses MICT to identify, track, trend, and resolve identified deficiencies whether at the flight, squadron, group, wing, MAJCOM or HAF level. Survey and interview data suggests early training will be critical to empower these change agents. The data indicated varying degrees of MICT use across various units and MAJCOMs. Accordingly, standardized, mass training is necessary to enable stronger trending capabilities and encourage cultural change. This could be accomplished with computer-based training to achieve greater efficiency and standardization than a train-the-trainer approach.

Gibson et al. then discuss resistance to change (Gibson, 2012:488-519). Leadership will also require effective training to successfully meet significant HAF paradigm shifts in the USAF compliance/readiness process. Parochial self interest may surface as commanders lose some control in management of their respective compliance and readiness. Most assuredly, MICT will replace programs already in use that are deemed adequate. Additionally, commanders that misunderstand SAF/IG's intent in the desired state may pose a significant hurdle. However, they will eventually have to provide full transparency of self-assessed deficiencies for the good of higher-level

trending. Quality of self-assessment data may initially suffer, but should dispel as HAF and MAJCOM IGs begin virtual inspections and spot inspections on CCIPs. Finally, tolerance to change might be severely limited due to current resource constraints and the initial resource investment required in implementation. However, this tolerance should increase as leaders are made aware of the resource management advantages MICT offers. In summary, MICT implementation and employment must include: education and communication, vertical participation and involvement, facilitation and support, negotiation and agreement, manipulation and cooptation and explicit and implicit coercion (Gibson, 2012:488-519).

Gibson et al. also provide a seven-step model for the management of organizational change (Gibson, 2012:488-519). These steps for the management of organizational change apply to the implementation of MICT across the enterprise as a critical enabler of the new compliance/readiness process.

Environmental forces for change include market, technology and resources (Gibson, 2012:488-519). The largest environmental force for change is resources (Gibson, 2012:488-519). The USAF has *usually* been able to maintain an acceptable level of compliance and readiness given an archaic, paper self-inspection and AFIS. However, given significant fiscal constraints, the USAF will be forced to discover what less to do with fewer resources. Without comprehensive trending across the enterprise, FAMs cannot efficiently determine what requirements should be cut. The largest technological force is MICT. Finally, a slight market force exists in the eyes of the taxpayer. Most major corporations have either contracted or developed complex deficiency identification, tracking, trending and resolution software programs for

leadership oversight. The USAF cannot accept a perception that it is severely lagging behind Corporate America in a similar function.

Internal forces include behavioral and process problems (Gibson, 2012:488-519). As previously discussed, the old USAF compliance/readiness process lacked vertical communication and problems were rewarded for being well hidden. All the while, the USAF invested great energies in continuous process improvement efforts. However, little resolution synergy existed above the wing level. In the end, the old USAF compliance/readiness system required tremendous effort in the way of difficult unit self-assessments and expensive HQ inspections. However, the system performance outcomes were insufficient for aforementioned reasons.

Gibson et al. explain diagnosis begins with the change agents gathering, interpreting and presenting data (Gibson, 2012:488-519). Some of this has already occurred, to include this research project. The Inspection System Improvement Tiger Team (ISITT) led by SAF/IGI, gathered data on the current USAF inspection system and MICT capabilities. MICT teams are organizing training plans, and FAMs are undergoing training and balancing MICT capability against their manpower constraints. In diagnosing the problem, Gibson et al. suggest three questions:

- What is the problem as distinct from the symptoms of the problem?
- What must be changed to resolve the problem?
- What outcomes are expected from the change and how will those outcomes be measured? (Gibson, 2012:488-519)

The problem is to determine how MICT's capabilities can best be leveraged to improve efficiency and effectiveness in the new AFIS and enable future, desired

transformations. What must be changed is the four paradigm shifts. The new AFIS with MICT will be evaluated by its ability to create a culture of compliance and improve the efficiency and effectiveness of the USAF and AFIS.

Gibson et al. describe the approaches for selection of the appropriate intervention as structural, behavioral and/or technological (Gibson, 2012:488-519). In this case, the appropriate intervention for implementation will entail all three. Structural intervention has begun in new responsibilities outlined in the new *AFI 90-201*. Behavioral intervention will accompany in the form of the four paradigm shifts. Finally, technological intervention is provided by MICT capabilities.

Gibson et al. describe limiting conditions as the leadership climate, formal organization and the organizational culture (Gibson, 2012:488-519). Resistance to MICT was expected in all of these areas. Many leaders, focused on mission accomplishment with minimal resources, have adopted the back-to-basics approach. Formal organization in the way of allocated responsibilities within the AFIS has a lengthy heritage and is not considered "broke" by some. Finally, the organization culture is much more focused at the wing, group and squadron level. The USAF has not traditionally been inclined to feel a shared sense of culture above the wing level. MICT capabilities are clearly contrary to this cultural tendency. However, if the paradigm shifts occur, the aforementioned limiting conditions should not be insurmountable.

Gibson et al. describe the two dimensions of implementing and evaluation change as timing and scope (Gibson, 2012:488-519). Timing is when to make the change and scope determines how it is phased. The timing of MICT implementation is immediate. The CSAF directed SAF/IG to implement the IT solution for an improved compliance

and readiness process. As such, MICT teams are working to implement as quickly as possible. Before SAF/IG could begin directing the implementation, a waiting list for the program developed. MAJCOM/IGs began to sequence the implementation of their wings according to current inspection timing (Molar, 2012). Furthermore, as presented in the conclusions, timing is critical to ensure all commanders are fully utilizing MICT before being subject to the CCIP inspections. The scope of implementation has been determined as enterprise wide.

As described by Gibson et al., feedback is critical (Gibson, 2012:488-519). The SAF/IG and each MAJCOM IG program managers must closely evaluate the implementation of MICT across their respective units. Implementation guidance, lessons-learned and new training aids must be immediately shared with SAF/IG and MICT programmers. This feedback from USAF units is crucial to streamline implementation and further develop the training as required. Later, feedback will be essential in planning the future development of MICT capabilities.

Service Quality Management

The significance of this research's conclusions can also be viewed through service quality management. The U.S. military services' primary missions are to organize, train and equip their assigned forces so they are ready to employ advertised capabilities and functions when directed by a Combatant Commander. While seemingly adequate for top-cover, the old AFIS lacked all quantifiable trend analysis. Deficiency data from these inspections were generally captured in a report format and archived. As such, the data was never combined for statistical analysis of trends. Without statistical analysis for point-in-time and historic trending, an inspection system merely evaluates a single unit.

However, with statistical analysis, an inspection system can identify growing and recurring problems before they impact the mission.

Fortunately, SAF/IG is reengineering the USAF inspection system. The desired state replaces the HHQ snapshot inspections and unit self-inspections with transparent unit-level self-assessments armed with a new technology. With this new enterprise-wide database of compliance and readiness performance, associated quantitative analysis, statistical process control and focused improvement efforts are finally possible.

With quantified compliance and readiness data, FAMs and HHQ commanders can ensure mission effectiveness by monitoring MICT trends with attribute and variable control charts. Attribute charts can be employed with MICT by analyzing the number of non-compliant scores in a functional area. Variable control charts can be employed to determine the upper and lower control limits (UCL/LCL) of historic averages of compliance and readiness averages (Fitzsimmons, 2011:130-135). These charts could determine whether a particular unit or functional area is out of control before it significantly impacts mission accomplishment. While control chart generation is not currently an automatic function within MICT, the tool's report export capability can easily create a Microsoft Excel worksheet with all of the identified deficiencies within a unit and/or functional area over any chosen period of time. This data can be easily sorted to create an attribute chart (number of deficiencies found per time period) or variable chart (percent of items scored non-compliant per time period). From which p-bars, x-bar-bars, standard deviations, standard errors, and upper/lower control limits can be established (Fitzsimmons, 2011:130-135). For example, if a unit problem within a functional area drove the observed deficiencies out of limits, leadership could be notified

for timely resolution. Likewise, the same process applied at the MAJCOM FAM level could identify areas for AFSO21 event resolution and units that have developed benchmark programs. The former would be when all units are exceeding a deficiency UCL for a particular task. The latter would be when a particular unit is able to consistently maintain below the MAJCOM LCL in a task area.

Focused improvement efforts are old business for the USAF. Throughout the past several decades, the USAF has invested efforts in continuous improvement initiatives to include Total Quality Management, Balanced Scorecard, and AFSO21. Each of these initiatives focused more on how to fix broken or faulty processes and less on how to identify which need attention first. Currently, AFSO21 is the premier avenue for USAF continuous improvement, and each wing commander has a requirement to champion a certain number of events per year. However, most units do not have an effective way of selecting processes that most need an improvement event. As previously mentioned, MICT can provide this insight.

Other continuous improvement challenges lie in L2 sharing. Many similar or identical AFSO21 Rapid Improvement Events (RIEs), HHQ Formal Inspection CAPs, and unit self-inspection CAPs are accomplished concurrently across the USAF, wasting many man-hours. Several L2 sharing IT solutions have been developed to overcome this inefficiency to include AF Best Practices, MAJCOM Benchmarks, JLLIS, and CPIMT. However, they are rarely utilized as designed because they are not well known, easy to use or individually comprehensive. MICT can fix this in a few different ways. First, developers could add links to the other L2 search engines on the CAP development page within MICT so that they are at the fingertips of Airmen. Second, the historical database

captures all previous occurrences of the deficiency, associated CAPs and AFSO21 RIE 8-step documentation to alleviate redeveloping CAPs. Finally, FAM oversight should ensure that the RIEs are held at the appropriate level. If an RIE aims to correct a deficiency that has been identified at more than one wing, the FAM may be the more appropriate host for more efficient, comprehensive, and standardized resolution.

Potential benefits of aforementioned tools, methods and paradigm shifts in step with the new SAF/IG inspection system can be explained with the Service Quality Gap Model (Figure 22) (Fitzsimmons, 2011:116-119).

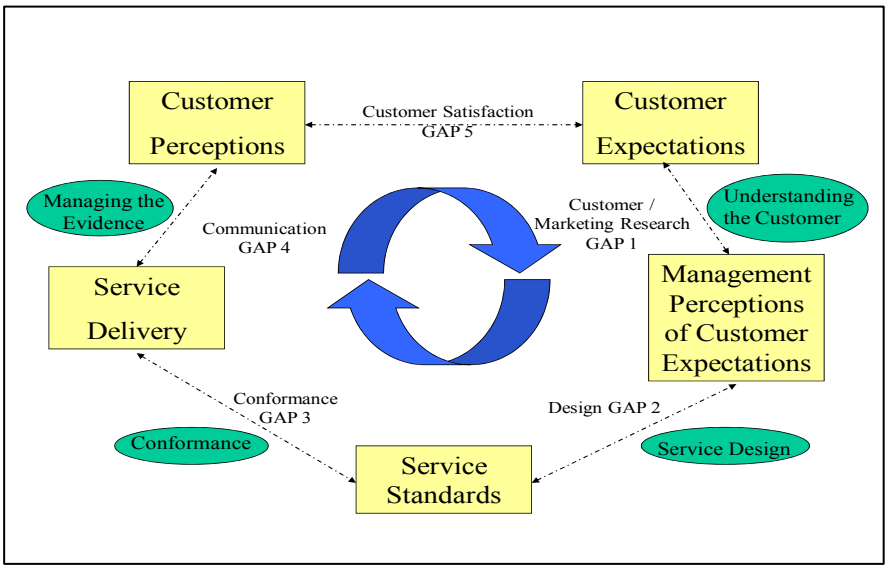


Figure 22. Service Quality Gap Model

For the USAF, the primary customer is the Combatant Commanders and MICT most directly fills the gap 3 illustrated above as "Conformance." As previously discussed, MICT offers new capabilities that ensure more efficient and effective conformance. However, MICT affects other gaps as well. MICT could easily be expanded to contain customer-identified deficiencies and metrics (gap 4). This direct

feedback with effective results would also improve gap 5, customer satisfaction. Gap 1, understanding the customer, will be greatly affected by MICT as the USAF works through current fiscal and manpower constraints. The USAF will have to do less with fewer resources and MICT will highlight some of the best tasks to streamline or consider terminating. These decisions must be blended with customer expectations to ensure the USAF not only knows the customer, but the customer knows the USAF and our future capabilities. Finally, gap 2, service design, will also be guided by MICT. As the USAF decides what it will be forced to do without, this will have to be reflected in official USAF guidance. As these AFIs, T.O.s, AFMANs and associated supplements are revised, so will their MICT checklist counterparts. Feasibility of planned cuts while still maintaining USAF functional capability will be immediately available in MICT as second, third and fourth-order effects are trended and highlighted to leadership. The Service Quality Gap Model demonstrates the impact MICT could have on the USAF service quality, but MICT must be properly employed to do so.

Risk Management

Finally, the conclusions of this research are also applicable to USAF risk management. This approach will be narrowed slightly to better highlight applicability. The impact of MICT on one MAJCOM, AMC, will be viewed by focusing on its primary function, transportation. Transportation risk management in Air Mobility Command (AMC) is only slightly different than large civilian transportation companies. Piracy is countered with airfield security and anti-hijacking training. Terrorism is countered with anti-terrorism measures. Weather is countered with detailed weather forecasting, analysis and routing and sometimes evacuations. Conversely, labor unrest is not a concern. As

managed over the past several decades, risk has seemingly been reasonably mitigated. However, given these research conclusions, AMC's transportation risk management is not effectively managed. The most significant reason is because no reliable, comprehensive system is employed to identify, assess, manage and monitor risks. Fortunately, MICT can greatly improve AMC's transportation risk management.

MICT is an IT solution that could make risk management more efficient and effective. The AFIS desired state would foster a culture of compliance that makes risk identification and mitigation more efficient and effective. If properly employed across the enterprise, MICT will greatly improve AMC Transportation Risk Management in each of the four steps of the Risk Management Process (Coyle, 2011).

The first way MICT enhances AMC's transportation risk management is in risk identification. General techniques for transportation risk identification include brainstorming, interviews, surveys, historical data and documented knowledge (Coyle, 2011). Currently in AMC, common knowledge, brainstorming, self-inspections and supply chain failure occurrences are the primary means of risk identification. While unit self-inspections and Higher-Headquarters (HHQ) formal inspections offer the greatest potential of risk identification, AMC does not have a standardized system to track and trend historical data. As such, risk identification captures only local point-in-time trends and is more reactive than predictive. MICT enables better AMC transportation risk identification by enabling units, commanders, and FAMs to efficiently identify deviations from AFIs, AFMANs and T.O.s in all ways that can adversely affect COCOM supply chains.

The second way MICT enhances AMC's transportation risk management is in risk assessment. Risk assessment involves assessing probability and impact of potential risks (Coyle, 2011). In an attempt to assess risk, AMC, like the rest of the USAF, assesses the impact of risks at the FAM level and attempts to mitigate them with guidance and requirements outlined in T.Os, AFIs and AFMANs. However, assessing the probability of occurrence is not adequate in AMC. Self-inspections and HHQ formal inspections do identify some point-in-time trends in transportation risk, but no means exists for historic trending. Historic trending is usually a better indicator of risk event probability and as such is necessary for real AMC transportation risk assessment. With MICT, FAMS, commanders and units will be able to better assess identified risks because risk event probability will be quantified through historic trending and highlighted on MICT reports and dashboards (305 AMW Rally Slides, 2011). Additionally, MICT's inherent reliance on checklists for transportation risk management will necessarily drive improved and more comprehensive checklists (305 AMW Rally Slides, 2011).

The third way MICT enhances AMC's transportation risk management is by providing a quantified risk management strategy. Risk management strategies generally include avoidance, reduction, retention and transfer (Coyle, 2011). Reduction strategies include hedging postponement and buffering (Coyle, 2011). Within AMC's transportation risk management strategy, MICT is a key tool for buffering. Buffering is the use of an additional resource to reduce risks related to capacity shortages or performance problems. Clearly, MICT is exactly that in its capacity for improved unit self-assessment, Corrective Action Plan (CAP) development, FAM trending,

appropriately scaled resolution, and virtual IG formal inspections (305 AMW Rally Slides, 2011).

The final way MICT enhances AMC's transportation risk management is by providing an efficient means of risk review and monitoring. Risk review and monitoring is usually accomplished through controlled and surprise tests (Coyle, 2011). Currently, AMC relies on units' self-assessments and HHQ inspections for transportation risk review and monitoring. As no real trending is enabled (other than point-in-time trending at the unit level), risk review and monitoring is inadequate. MICT will provide quantified historic trending for accurate risk probability assessment and highlight the information for all commanders, FAMs and units (305 AMW Rally Slides, 2011). Additionally, HHQ formal inspections will be largely replaced with cheaper, more accurate, MICT-enabled virtual inspections (305 AMW Rally Slides, 2011). With virtual inspections, HHQs will continually monitor transportation risks across the command for risk avoidance, reduction, and transfer to the appropriate command level for CAP development and resolution (305 AMW Rally Slides, 2011). Physical inspections will only be required when a unit's MICT utilization is substandard or performance-based evaluations are required. Finally, the new AFIS desired state with CCIPs may provide more comprehensive risk monitoring yet.

In summary, MICT seems to be a critical enabler as AMC attempts to effectively manage existing and emerging transportation risks. Leadership and research has specifically called for IT system implementation and process improvement for better transportations risk management (McNabb, 2011). MICT enables better AMC transportation risk identification by enabling units, commanders, and FAMs to efficiently

identify deviations from AFIs, AFMANs and T.O.s in all ways that can adversely affect AMC's supply chain. With MICT, FAMS, commanders and units will be able to better assess identified risks because risk event probability will be quantified through historic trending and highlighted on MICT reports and dashboards. MICT as a buffering tool presents a capacity for improved unit self-assessment, Corrective Action Plan (CAP) development and management, FAM trending, appropriately scaled resolution, and virtual IG formal inspections. Finally, MICT will provide better transportation risk monitoring and review through virtual inspections, quantified historic trending for accurate risk probability assessment and dashboards that highlight the information for all commanders, FAMs and units. Clearly, MICT is a new process-reengineering enabler for critical AMC transportation risk management development.

Summary

These business models provided context to the research conclusions to illustrate the significance of MICT and the AFIS desired state. BPR of the AFIS process was finally possible with the removal of the last constraint, technological feasibility. Organizational change must be deliberate and carefully managed as MICT capabilities are unveiled in concert with incremental progression towards the AFIS desired state. The service quality management perspective highlighted how MICT trending capabilities can be further developed to produce deficiency and benchmark trends with standardized upper and lower control limits. Finally, the execution of the USAF mission requires precise risk management, and MICT in the AFIS desired state can provide the means.

Recommendations for Action

1. Continue with full, enterprise-wide employment of MICT to enable the AFIS desired state
2. The following MICT capabilities require standardized and scaled leadership, FAM and Wing PM training and should be leveraged during implementation to improve the efficiency and effectiveness of the new AFIS:
    a. Compliance checklist maintenance
        i. Increased role of checklists must be universally understood
        ii. Increasing reliance is inevitable with MICT
        iii. Under this new AFIS--100% Tier-1 (critical) comprehensive
        iv. Under AFIS desired state—entire checklist must be comprehensive (with references to source documents)
    b. Identification of critical and minor deficiencies
    c. Tracking critical deficiencies until resolution
    d. Managing critical deficiency CAPs
    e. Historical deficiency trending
        i. Trending must be deliberately accomplished by FAMs and wing PMs until MICT is developed to automatically trend and send email notification
        ii. With the FAMs' increase in responsibility, the USAF must carefully consider additional manning in FAM offices to capitalize on MICT efficiencies
    f. Point-in-time trending

g. Leadership oversight via MICT reports and dashboards

3. The best way to leverage key MICT capabilities to achieve cultural change and overcome required paradigm shifts include:
    a. Progress towards the AFIS desired state and beyond:
        i. Use virtual inspections and MAJCOM trending as stepping stones to full transparency
        ii. Use full transparency as bridge to complete leadership oversight
        iii. Use full leadership oversight as quantified evidence supporting more reliance on Wings for compliance/readiness
        iv. Use this reliance to rationalize a transition to valuing a wing's self-assessment, trending and resolution capabilities more than the traditional snapshot count of open deficiencies
    b. Leadership at all levels must foster a culture of change and innovation as the means to achieve a culture of compliance and readiness
    c. Continuously improve dashboards to meet the needs of all commanders
    d. Utilize full transparency to enable IGs and FAMs to continuously trend against a steady state of compliance
    e. Only the CAPs of self-identified deficiencies should be gradable during HHQ formal inspections
        i. The deficiencies themselves should be un-gradable unless the criticality and inadequacy of the CAP dictate otherwise
        ii. This will encourage deficiency identification and CAP strength

f. MICT should be fully up and running before CCIPs are employed so commanders are armed with the tool prior to being evaluated

g. Virtual inspections should be utilized where appropriate to redirect FAMs efforts from on-site visits to MICT oversight and trending

h. CAPs should be developed above wing level with AFSO21 RIEs when multi-wing trends are identified (scaled resolution)

i. Consider employing A9 in trend analysis to remove adverse effects of external transparency until desired state achieved

4. MICT capabilities that programmers should consider enhancing after initial enterprise implementation to improve efficiency and effectiveness in the new AFIS and desired state include:

a. Improve dashboards for excellent commander oversight

b. Develop automatic deficiency and benchmark trending in MICT with upper and lower control limits. Then use MICT's automatic email notification function to automatically send deficiency and benchmark trend notifications

c. Add readiness/exercise checklists for deficiency identification/tracking/ trending/resolution

d. Integrate MICT with other L2 information systems to include IGEMS, CPIMT, JLLIS, AF Best Practices, and MAJCOM benchmarks

e. Explore integration with other services' tools or checklists for improved joint-base effectiveness and efficiencies

Recommendations for Future Research

1. Specific software programming limitations and opportunities
    a. Maintainability and reliability studies
    b. Commercial tools
        i. Other capabilities to develop in MICT
        ii. Contracting opportunities and costs (Q5, AQD and Qpulse)
2. Standardized joint MICT employment opportunity and implications
3. Compare this research project's conclusions with that of the AFIS RAND study when released.
4. Reassess the second, third and fourth research questions in five years when MICT has accumulated historical data for statistical analysis and users have more knowledge for perspective reassessment
5. Validation and analysis of MICT's effects on units that have looked to maximize its utilization in pursuit of a culture of compliance
    a. 305 AMW exemplary application of MICT at the wing level
    b. AMC/IG's visionary initiatives and accelerated implementation timeline
    c. SAF/IG's continued, remarkable progress toward the desired state of the AFIS

Summary

MICT and the AFIS reengineering efforts are multifaceted, ongoing and impressive. These research conclusions provide an interpretation of the desired AFIS transformation that is best described with Steven Kerr's "An Academy Classic; On the

folly of rewarding A, while hoping for B." In his article, Kerr explains the folly with several examples. His summary states:

> Whether dealing with monkeys, rates or human beings, it is hardly controversial to state that most organisms seek information concerning what activities are rewarded, and then seek to do (or at least pretend to do) those things, often the virtual exclusion of activities not rewarded. The extent to which this occurs of course will depend on the perceived attractiveness of the rewards offered, but neither operant nor expectancy theorist would quarrel with the essence of this notion. Nevertheless, numerous examples exist of reward systems that are fouled up in that the types of behavior rewarded are those which the rewarded is trying to discourage, while the behavior desired is not being rewarded at all. (Kerr, 1995:7)

Kerr did not use the old AFIS as one of his examples, but it exemplified his point. The ultimate goal of the AFIS is compliance and readiness for effective and efficient mission accomplishment. The old AFIS rewarded units that received positive scores during formal inspections. Positive scores were rewarded to the units with fewer and/or undiscovered deficiencies. No reward was directly given for self-identification of deficiencies and their resolution. If a unit disclosed numerous self-identified deficiencies and on-going CAPs to inspectors at the beginning of an inspection, their grade would have likely suffered. As such, they were generally hidden and rarely shared above the unit. The old AFIS process did not effectively or efficiently ensure compliance and readiness.

However, the new desired state of the AFIS corrects this error by shifting focus from a unit's existing deficiencies to its capacity to identify, share and resolve deficiencies. Again, the glaring problem for MAJCOM and HAF leadership is accountability. They are still responsible for the compliance and readiness of their subordinate units. However, without inspections they've lost a significant measure of

accountability, unless they have MICT providing commanders with adequate oversight. With proper employment of MICT, MAJCOM and HAF leadership can observe and evaluate their wings' self-assessment, deficiency identification, trending and resolution abilities. Likewise, they can shift focus towards their FAMs utilization of MICT for higher-level trending and resolution. As such, MICT should be considered a critical, essential enabler of the AFIS desired state.

To be clear, the new AFIS is still much different than the AFIS desired state as provided by the new *AFI 90-201*. The new AFIS does not completely correct the problems outlined by Kerr's folly, but AFIS desired state would. That being said, the new AFIS is the first of incremental steps towards the desired state. More importantly, this research indicated this first incremental transformation directed by the new AFIS precisely aligned with the USAF culture's tolerance for change.

This research project's focus was ensuring MICT's employment was validated and properly implemented to maximize effectiveness and efficiencies. Results and recommendations leaned heavily towards maximizing employment of MICT capabilities. In fact, despite three methodologies, very little negative data on MICT capabilities was identified. As such, the order and way capabilities should be implemented, and future research to monitor the tool and organizational change surfaced as key conclusions. Training for FAMs, wing PMs and leadership during implementation will be instrumental in realizing MICT's most critical capabilities, trending and oversight. Furthermore, these capabilities will be instrumental to enable the cultural changes required for optimized MICT employment and AFIS effectiveness and efficiency. If the maintenance and reliability of the tool unexpectedly fails, this research shows exploration of other tools

with similar capabilities is warranted. If limitations to organizational change halt progression toward the AFIS desired state, associated guidance must be flexible and responsive to achieve all feasible capabilities.

Appendix A - Abbreviations and Acronyms

ACC – Air Combat Command
AETC – Air Education and Training Command
AFI – Air Force Instruction
AFIA – Air Force Inspection Agency
AFIS – Air Force Inspection System
AFMAN – Air Force Manual
AFMC – Air Force Material Command
AFRC – Air Force Reserve Command
AFSO 21 – Air Force Smart Operations for the 21st Century
AMC – Air Mobility Command
AMW – Air Mobility Wing
ANG – Air National Guard
ASEV – Aircrew Standardization and Evaluation Visit
ATSEP – Air Traffic System Evaluation Program
BPR – Business Process Reengineering
CAP – Corrective Action Plan
CC – Commander
CCIP – Commander's Inspection Program
CI – Compliance Inspection
COMUSAFE – Commander USAFE
CSAF – Chief of Staff of the Air Force
CPIMT – Continuous Process Improvement Management Tool
CUI – Consolidated Unit Inspection
DOD – Department of Defense
EMI – Emergency Management Inspection
FAM – Functional Area Manager
HAF – Headquarters Air Force
HHQ – Higher Headquarters
IG – Inspector General
IGEMS – Inspector General Evaluations Management System
ISITT – Inspection System Improvement Tiger Team
IT – Information Technology
JB – Joint Base
JLLIS – Joint Lessons-Learned Information System
L2 – Lessons Learned
LCAP – Logistics Compliance Assessment Program
LCL – Lower Control Limit
MAJCOM – Major Command
OCR – Office of Coordinating Responsibility
OPR – Office of Primary Responsibility
ORI – Operational Readiness Inspection
PA – Public Affairs
PM – Program Manager

POC – Point of Contact
MICT – The Management Internal Control Toolset
RI – Readiness Inspection
RIE – (AFSO21) Rapid Improvement Event
SAC—Self-Assessment Checklist
SAF – Secretary of the Air Force
SEPWO – Standardization and Evaluation Program for Weather Operations
S-I – Self-Inspection
SME – Subject Matter Expert
TIG – The USAF Inspector General (SAF/IG)
T.O. – Technical Order
UCI – Unit Compliance Inspection
UCL – Upper Control Limit
UEI – Unit Effectiveness Inspections
USAF – United States Air Force
USAFE – United States Air Forces Europe
USTRANSCOM – United States Transportation Command
WA – Wing Administrator

Appendix B – SPSS Backwards Linear Regression Model with 0.15 Alpha for Removal

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MonRank, MictMOS, MictOSS, Flying, APS, AMXS, CklstNA, MictMon, MictTotal, MictNA[a]	.	Enter
2	.	AMXS	Backward (criterion: Probability of F-to-remove >= .150).
3	.	MonRank	Backward (criterion: Probability of F-to-remove >= .150).
4	.	APS	Backward (criterion: Probability of F-to-remove >= .150).
5	.	OSS	Backward (criterion: Probability of F-to-remove >= .150).
6	.	Flying	Backward (criterion: Probability of F-to-remove >= .150).
7	.	MOS	Backward (criterion: Probability of F-to-remove >= .150).

a. Tolerance = .000 limits reached.

b. Dependent Variable: DefRatio

Model Summary[h]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.906[a]	.821	.315	.0226953099725	.821	1.622	17	6	.285	
2	.906[b]	.821	.413	.0210131339107	.000	.001	1	6	.979	
3	.906[c]	.821	.486	.0196645172603	.000	.006	1	7	.940	
4	.906[d]	.821	.543	.0185421791414	.000	.002	1	8	.966	
5	.905[e]	.820	.586	.0176544046140	-.001	.065	1	9	.804	
6	.905[f]	.819	.621	.0168854543252	-.001	.063	1	10	.807	
7	.902[g]	.814	.643	.0163895569513	-.005	.306	1	11	.592	1.731

a. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MonRank, MictMOS, MictOSS, Flying, APS, AMXS, CklstNA, MictMon, MictTotal, MictNA

b. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MonRank, MictMOS, MictOSS, Flying, APS, CklstNA, MictMon, MictTotal, MictNA

c. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, Flying, APS, CklstNA, MictMon, MictTotal, MictNA

d. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, Flying, CklstNA, MictMon, MictTotal, MictNA

e. Predictors: (Constant), MictAPS, UnitTotal, MOS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, Flying, CklstNA, MictMon, MictTotal, MictNA

f. Predictors: (Constant), MictAPS, UnitTotal, MOS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, CklstNA, MictMon, MictTotal, MictNA

g. Predictors: (Constant), MictAPS, UnitTotal, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, CklstNA, MictMon, MictTotal, MictNA

h. Dependent Variable: DefRatio

ANOVA[h]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.014	17	.001	1.622	.285[a]
	Residual	.003	6	.001		
	Total	.017	23			
2	Regression	.014	16	.001	2.011	.177[b]
	Residual	.003	7	.000		
	Total	.017	23			
3	Regression	.014	15	.001	2.449	.102[c]
	Residual	.003	8	.000		
	Total	.017	23			
4	Regression	.014	14	.001	2.951	.054[d]
	Residual	.003	9	.000		
	Total	.017	23			
5	Regression	.014	13	.001	3.500	.027[e]
	Residual	.003	10	.000		
	Total	.017	23			
6	Regression	.014	12	.001	4.139	.013[f]
	Residual	.003	11	.000		

	Total	.017	23			
7	Regression	.014	11	.001	4.763	.006[g]
	Residual	.003	12	.000		
	Total	.017	23			

a. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MonRank, MictMOS, MictOSS, Flying, APS, AMXS, CklstNA, MictMon, MictTotal, MictNA

b. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MonRank, MictMOS, MictOSS, Flying, APS, CklstNA, MictMon, MictTotal, MictNA

c. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, Flying, APS, CklstNA, MictMon, MictTotal, MictNA

d. Predictors: (Constant), MictAPS, UnitTotal, MOS, OSS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, Flying, CklstNA, MictMon, MictTotal, MictNA

e. Predictors: (Constant), MictAPS, UnitTotal, MOS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, Flying, CklstNA, MictMon, MictTotal, MictNA

f. Predictors: (Constant), MictAPS, UnitTotal, MOS, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, CklstNA, MictMon, MictTotal, MictNA

g. Predictors: (Constant), MictAPS, UnitTotal, MictStaff, MictFlying, MictAMXS, MictMOS, MictOSS, CklstNA, MictMon, MictTotal, MictNA

h. Dependent Variable: DefRatio

Coefficients[a]

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	Correlations	Collinearity Statistics

		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.005	.041		.125	.905	-.095	.105					
	MonRank	.002	.025	.035	.075	.943	-.060	.063	.313	.031	.013	.136	7.334
	UnitTotal	-7.943E-6	.000	-.239	-.529	.615	.000	.000	.104	-.211	-.091	.146	6.833
	CklstNA	.124	.373	.834	.331	.752	-.789	1.036	.406	.134	.057	.005	213.076
	Flying	-.004	.022	-.069	-.198	.850	-.058	.049	-.246	-.081	-.034	.242	4.134
	OSS	-.006	.034	-.066	-.188	.857	-.091	.078	.224	-.076	-.032	.237	4.219
	AMXS	-.001	.027	-.012	-.028	.979	-.068	.066	-.014	-.011	-.005	.154	6.506
	MOS	.013	.037	.130	.341	.745	-.078	.103	.281	.138	.059	.204	4.901
	APS	-.004	.054	-.041	-.074	.944	-.137	.129	-.104	-.030	-.013	.096	10.448

	MictMon	.019	.031	.329	.610	.564	-.056	.094	.522	.242	.105	.102	9.776
	MictTotal	-4.054E-5	.000	-1.057	-1.458	.195	.000	.000	.494	-.511	-.252	.057	17.666
	MictNA	-.303	.381	-2.610	-.794	.458	-1.236	.630	.433	-.308	-.137	.003	363.042
	MictFlying	.146	.064	1.794	2.281	.063	-.011	.302	-.082	.681	.394	.048	20.784
	MictOSS	.225	.068	1.675	3.310	.016	.059	.391	.515	.804	.571	.116	8.595
	MictStaff	.153	.065	1.884	2.348	.057	-.006	.312	.158	.692	.405	.046	21.618
	MictAMXS	.179	.068	2.202	2.623	.039	.012	.346	.222	.731	.453	.042	23.668
	MictMOS	.187	.091	1.390	2.061	.085	-.035	.408	.290	.644	.356	.065	15.273
	MictAPS	.107	.053	.799	2.012	.091	-.023	.238	.037	.635	.347	.189	5.297
2	(Constant)	.004	.030		.149	.886	-.066	.075					
	MonRank	.001	.019	.028	.078	.940	-.044	.046	.313	.029	.012	.205	4.884
	UnitTotal	-8.172E-6	.000	-.246	-.702	.505	.000	.000	.104	-.257	-.112	.208	4.796

CklstNA	.129	.297	.870	.433	.678	-.574	.832	.406	.162	.069	.006	158.041
Flying	-.004	.015	-.063	-.255	.806	-.040	.032	-.246	-.096	-.041	.415	2.411
OSS	-.006	.027	-.061	-.220	.832	-.070	.058	.224	-.083	-.035	.331	3.020
MOS	.013	.034	.132	.378	.717	-.067	.093	.281	.141	.060	.210	4.771
APS	-.003	.038	-.031	-.080	.939	-.092	.086	-.104	-.030	-.013	.171	5.855
MictMon	.019	.025	.336	.765	.469	-.040	.078	.522	.278	.122	.132	7.584
MictTotal	-4.031E-5	.000	-1.051	-1.638	.145	.000	.000	.494	-.526	-.262	.062	16.134
MictNA	-.308	.306	-2.655	-1.005	.348	-1.032	.417	.433	-.355	-.161	.004	273.390
MictFlying	.146	.058	1.798	2.509	.040	.008	.284	-.082	.688	.401	.050	20.122
MictOSS	.225	.063	1.676	3.598	.009	.077	.373	.515	.806	.575	.118	8.502
MictStaff	.154	.056	1.892	2.767	.028	.022	.285	.158	.723	.442	.055	18.319

	MictAMXS	.179	.063	2.202	2.834	.025	.030	.328	.222	.731	.453	.042	23.650
	MictMOS	.187	.082	1.394	2.285	.056	-.006	.381	.290	.654	.365	.069	14.575
	MictAPS	.107	.048	.797	2.211	.063	-.007	.222	.037	.641	.353	.196	5.092
3	(Constant)	.004	.027		.142	.891	-.058	.066					
	UnitTotal	-8.108E-6	.000	-.244	-.746	.477	.000	.000	.104	-.255	-.112	.210	4.773
	CklstNA	.137	.261	.925	.525	.614	-.464	.738	.406	.182	.078	.007	138.807
	Flying	-.004	.014	-.060	-.262	.800	-.036	.029	-.246	-.092	-.039	.426	2.348
	OSS	-.006	.025	-.061	-.236	.820	-.064	.052	.224	-.083	-.035	.331	3.020
	MOS	.013	.031	.136	.424	.683	-.059	.085	.281	.148	.063	.216	4.636
	APS	-.001	.028	-.013	-.045	.966	-.066	.064	-.104	-.016	-.007	.264	3.790
	MictMon	.021	.015	.363	1.353	.213	-.015	.056	.522	.431	.202	.311	3.212

	MictTotal	-4.038E-5	.000	-1.053	-1.754	.118	.000	.000	.494	-.527	-.262	.062	16.116
	MictNA	-.316	.270	-2.725	-1.171	.275	-.938	.306	.433	-.383	-.175	.004	242.056
	MictFlying	.146	.054	1.803	2.700	.027	.021	.271	-.082	.691	.404	.050	19.950
	MictOSS	.226	.058	1.681	3.886	.005	.092	.360	.515	.809	.581	.120	8.367
	MictStaff	.154	.051	1.900	2.999	.017	.036	.273	.158	.728	.448	.056	17.952
	MictAMXS	.179	.059	2.209	3.062	.016	.044	.314	.222	.735	.458	.043	23.283
	MictMOS	.187	.077	1.395	2.445	.040	.011	.364	.290	.654	.366	.069	14.564
	MictAPS	.106	.043	.789	2.449	.040	.006	.206	.037	.655	.366	.216	4.639
4	(Constant)	.003	.018		.167	.871	-.037	.043					
	UnitTotal	-8.344E-6	.000	-.251	-.934	.375	.000	.000	.104	-.297	-.132	.275	3.630
	CklstNA	.144	.187	.976	.774	.459	-.278	.567	.406	.250	.109	.013	79.947
	Flying	-.004	.013	-.058	-.275	.790	-.033	.026	-.246	-.091	-.039	.453	2.205

	OSS	-.005	.021	-.056	-.256	.804	-.054	.043	.224	-.085	-.036	.413	2.420
	MOS	.013	.027	.131	.469	.650	-.049	.074	.281	.154	.066	.255	3.923
	MictMon	.021	.014	.363	1.435	.185	-.012	.053	.522	.431	.202	.311	3.212
	MictTotal	-4.014E-5	.000	-1.047	-1.901	.090	.000	.000	.494	-.535	-.268	.066	15.257
	MictNA	-.324	.198	-2.790	-1.637	.136	-.771	.124	.433	-.479	-.231	.007	146.172
	MictFlying	.147	.049	1.812	3.005	.015	.036	.258	-.082	.708	.424	.055	18.290
	MictOSS	.226	.054	1.683	4.167	.002	.103	.349	.515	.812	.587	.122	8.213
	MictStaff	.155	.045	1.910	3.446	.007	.053	.257	.158	.754	.486	.065	15.465
	MictAMXS	.180	.052	2.220	3.453	.007	.062	.298	.222	.755	.487	.048	20.797
	MictMOS	.189	.066	1.406	2.864	.019	.040	.338	.290	.691	.404	.083	12.120
	MictAPS	.106	.040	.786	2.647	.027	.015	.196	.037	.662	.373	.226	4.433
5	(Constant)	.001	.015		.058	.955	-.033	.034					

UnitTotal	-8.955E-6	.000	-.269	-1.092	.300	.000	.000	.104	-.327	-.147	.297	3.371
CklstNA	.162	.165	1.093	.978	.351	-.207	.530	.406	.296	.131	.014	69.307
Flying	-.003	.012	-.049	-.250	.807	-.030	.024	-.246	-.079	-.034	.464	2.153
MOS	.012	.025	.119	.455	.659	-.045	.068	.281	.142	.061	.262	3.823
MictMon	.021	.014	.363	1.507	.163	-.010	.051	.522	.430	.202	.311	3.212
MictTotal	-3.953E-5	.000	-1.031	-1.979	.076	.000	.000	.494	-.530	-.266	.066	15.062
MictNA	-.341	.177	-2.940	-1.930	.082	-.735	.053	.433	-.521	-.259	.008	128.839
MictFlying	.149	.046	1.831	3.215	.009	.046	.252	-.082	.713	.432	.056	18.003
MictOSS	.223	.050	1.658	4.444	.001	.111	.335	.515	.815	.596	.129	7.729
MictStaff	.157	.042	1.936	3.729	.004	.063	.251	.158	.763	.501	.067	14.961
MictAMXS	.182	.049	2.245	3.713	.004	.073	.292	.222	.761	.498	.049	20.292
MictMOS	.192	.062	1.429	3.115	.011	.055	.329	.290	.702	.418	.086	11.687

	MictAPS	.108	.037	.801	2.896	.016	.025	.190	.037	.675	.389	.235	4.248
6	(Constant)	.000	.014		.027	.979	-.031	.032					
	UnitTotal	-8.536E-6	.000	-.257	-1.112	.290	.000	.000	.104	-.318	-.143	.310	3.231
	CklstNA	.156	.157	1.052	.995	.341	-.189	.500	.406	.287	.128	.015	67.827
	MOS	.013	.024	.135	.553	.592	-.039	.065	.281	.164	.071	.277	3.612
	MictMon	.021	.013	.363	1.576	.143	-.008	.049	.522	.429	.202	.311	3.212
	MictTotal	-3.995E-5	.000	-1.042	-2.098	.060	.000	.000	.494	-.535	-.269	.067	14.956
	MictNA	-.335	.167	-2.888	-2.001	.071	-.703	.034	.433	-.517	-.257	.008	126.430
	MictFlying	.146	.043	1.800	3.388	.006	.051	.241	-.082	.715	.435	.058	17.119
	MictOSS	.223	.048	1.662	4.660	.001	.118	.329	.515	.815	.598	.130	7.717
	MictStaff	.158	.040	1.942	3.915	.002	.069	.246	.158	.763	.503	.067	14.928
	MictAMXS	.183	.047	2.251	3.896	.002	.080	.286	.222	.761	.500	.049	20.259

	MictMOS	.191	.059	1.422	3.247	.008	.062	.321	.290	.700	.417	.086	11.638
	MictAPS	.108	.036	.805	3.046	.011	.030	.186	.037	.676	.391	.236	4.236
7	(Constant)	-.004	.012		-.298	.771	-.030	.022					
	UnitTotal	-1.086E-5	.000	-.326	-1.741	.107	.000	.000	.104	-.449	-.217	.442	2.264
	CklstNA	.213	.113	1.441	1.882	.084	-.034	.460	.406	.477	.234	.026	37.790
	MictMon	.021	.013	.363	1.623	.131	-.007	.048	.522	.424	.202	.311	3.212
	MictTotal	-3.763E-5	.000	-.981	-2.087	.059	.000	.000	.494	-.516	-.260	.070	14.229
	MictNA	-.393	.127	-3.384	-3.085	.009	-.670	-.115	.433	-.665	-.384	.013	77.499
	MictFlying	.150	.041	1.848	3.635	.003	.060	.240	-.082	.724	.453	.060	16.651
	MictOSS	.227	.046	1.691	4.941	.000	.127	.327	.515	.819	.616	.133	7.546
	MictStaff	.162	.038	1.991	4.201	.001	.078	.245	.158	.772	.523	.069	14.460
	MictAMXS	.187	.045	2.300	4.149	.001	.089	.285	.222	.768	.517	.051	19.792

	MictMOS	.208	.049	1.549	4.277	.001	.102	.314	.290	.777	.533	.118	8.443
	MictAPS	.112	.034	.834	3.320	.006	.039	.186	.037	.692	.414	.246	4.066

a. Dependent Variable: DefRatio

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.000300395564	.094022832811	.027710597208	.0247368931299	24
Residual	-2.6918817311525E-2	.0239217188209	.0000000000000	.0118384247716	24
Std. Predicted Value	-1.108	2.681	.000	1.000	24
Std. Residual	-1.642	1.460	.000	.722	24

a. Dependent Variable: DefRatio

Appendix C – Surveys and Interviews

Basic User MICT Survey			
Survey/interview responses will be used as supporting data for an AFIT Graduate Research Project. All completed surveys and interview notes will be immediately entered into an anonymous database, separated only by functional level, and then destroyed.			
#	Question	Response	Comments/Rationale/Future Expectations
1	What percent of your unit is using MICT?		
2	What did you use before MICT?		
3	How long has your unit been using MICT?		
	Compliance Checklist Management		
4	**Before** employing **MICT**, how **effective** was your office at managing your compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
5	**Before** employing **MICT**, how **efficient** was your office at managing your compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
6	**After** employing **MICT**, how **effective** was your office at managing your compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
7	**After** employing **MICT,** how **efficient** was your office at managing your compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
	Readiness/Exercise Checklist Management		
8	**Before** employing **MICT,** how **effective** was your office at managing your readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
9	**Before** employing **MICT,** how **efficient** was your office at managing your readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
10	**After** employing **MICT,** how **effective** was your office at managing your readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
11	**After** employing **MICT,** how **efficient** was your office at managing your readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
	Deficiency Identification		
12	**Before** employing **MICT,** how **effective** was your office at identifying your critical and minor deficiencies?		
13	**Before** employing **MICT,** how **efficient** was your office at identifying your critical and minor deficiencies?		
14	**After** employing **MICT,** how **effective** was your office at identifying your critical and minor deficiencies?		
15	**After** employing **MICT,** how **efficient** was your office at identifying your critical and minor deficiencies?		
	Deficiency Tracking		
16	**Before** employing **MICT,** how **effective** was your office at tracking your critical deficiencies through closure?		
17	**Before** employing **MICT,** how **efficient** was your office at tracking your critical deficiencies through closure?		
18	**After** employing **MICT,** how **effective** was your office at tracking your critical deficiencies through closure?		
19	**After** employing **MICT,** how **efficient** was your office at tracking your critical deficiencies through closure?		
	Corrective Action Plan Development		
20	**Before** employing **MICT,** how **effective** was your office at managing your critical and significant corrective action plans?		
21	**Before** employing **MICT,** how **efficient** was your office at managing your critical and significant corrective action plans?		
22	**After** employing **MICT,** how **effective** was your office at managing your critical and significant corrective action plans?		
23	**After** employing **MICT,** how **efficient** was your office at managing your critical and significant corrective action plans?		
	Historical Deficiency Trending		
24	**Before** employing **MICT,** how **effective** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies?		
25	**Before** employing **MICT,** how **efficient** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies?		
26	**After** employing **MICT,** how **effective** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies?		
27	**After** employing **MICT,** how **efficient** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies?		
	Point-in-time Deficiency Trending		
28	**Before** employing **MICT,** how **effective** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies?		
29	**Before** employing **MICT,** how **efficient** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies?		
30	**After** employing **MICT,** how **effective** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies?		
31	**After** employing **MICT,** how **efficient** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies?		
	AFSO21 Event Selection		
32	**Before** employing **MICT,** how well were trends used to identify AFSO21 Event areas for focused improvement?		
33	**After** employing **MICT,** how well were trends used to identify AFSO21 Event areas for focused improvement?		
	Culture of Compliance		
34	**Before** employing **MICT,** how would you rate your office's commitment towards a culture of compliance?		
35	**After** employing **MICT,** how would you rate your office's commitment towards a culture of compliance?		
	Innovation for New Efficiencies		
36	**Before** employing **MICT,** how would you rate your office's ability to highlight new process and procedural innovations for improved efficiency?		
37	**After** employing **MICT,** how would you rate your office's ability to highlight new process and procedural innovations for improved efficiency?		
	Man-hours		
38	In your estimation, how many man-hours does MICT save your office per year? (indicate waste with a negative sign)		
		Poor	
		Fair	
		Average	
		Good	
		Excellent	
		Unknown	
		Don't use MICT for this	

MAJCOM FAM MICT Survey			
Survey/interview responses will be used as supporting data for an AFIT Graduate Research Project. All completed surveys and interview notes will be immediately entered into an anonymous database, separated only by functional level, and then destroyed.			
#	Question	Response	Comments/Rationale/Future Expectations
1	What percent of your MAJCOM's wings are using MICT?		
2	What were they using before MICT?		
3	How long has your MAJCOM been using MICT?		
	Compliance Checklist Management		
4	**Before** employing **MICT**, how **effective** was your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
5	**Before** employing **MICT**, how **efficient** was your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
6	**After** employing **MICT**, how **effective** was your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
7	**After** employing **MICT,** how **efficient** was your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
	Readiness/Exercise Checklist Management		
8	**Before** employing **MICT,** how **effective** was your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
9	**Before** employing **MICT,** how **efficient** was your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
10	**After** employing **MICT,** how **effective** was your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
11	**After** employing **MICT,** how **efficient** was your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
	Deficiency Identification		
12	**Before** employing **MICT,** how **effective** was your office at identifying your MAJCOM's critical and minor deficiencies?		
13	**Before** employing **MICT,** how **efficient** was your office at identifying your MAJCOM's critical and minor deficiencies?		
14	**After** employing **MICT,** how **effective** was your office at identifying your MAJCOM's critical and minor deficiencies?		
15	**After** employing **MICT,** how **efficient** was your office at identifying your MAJCOM's critical and minor deficiencies?		
	Deficiency Tracking		
16	**Before** employing **MICT,** how **effective** was your office at tracking your MAJCOM's critical deficiencies through closure?		
17	**Before** employing **MICT,** how **efficient** was your office at tracking your MAJCOM's critical deficiencies through closure?		
18	**After** employing **MICT,** how **effective** was your office at tracking your MAJCOM's critical deficiencies through closure?		
19	**After** employing **MICT,** how **efficient** was your office at tracking your MAJCOM's critical deficiencies through closure?		
	Corrective Action Plan Development		
20	**Before** employing **MICT,** how **effective** was your office at managing your MAJCOM's critical and significant corrective action plans?		
21	**Before** employing **MICT,** how **efficient** was your office at managing your MAJCOM's critical and significant corrective action plans?		
22	**After** employing **MICT,** how **effective** was your office at managing your MAJCOM's critical and significant corrective action plans?		
23	**After** employing **MICT,** how **efficient** was your office at managing your MAJCOM's critical and significant corrective action plans?		
	Historical Deficiency Trending		
24	**Before** employing **MICT,** how **effective** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
25	**Before** employing **MICT,** how **efficient** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
26	**After** employing **MICT,** how **effective** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
27	**After** employing **MICT,** how **efficient** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
	Point-in-time Deficiency Trending		
28	**Before** employing **MICT,** how **effective** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
29	**Before** employing **MICT,** how **efficient** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
30	**After** employing **MICT,** how **effective** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
31	**After** employing **MICT,** how **efficient** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
	Scaled Resolution		
32	**Before** employing **MICT,** how **effective** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
33	**Before** employing **MICT,** how **efficient** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
34	**After** employing **MICT,** how **effective** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
35	**After** employing **MICT,** how **efficient** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
	AFSO21 Event Selection		
36	**Before** employing **MICT,** how well were trends used to identify AFSO21 Event areas for focused improvement?		
37	**After** employing **MICT,** how well were trends used to identify AFSO21 Event areas for focused improvement?		
	Commander Oversight		
38	**Before** employing **MICT,** how would you rate the fidelity of your office's compliance/readiness reporting for MAJCOM/CC oversight?		
39	**After** employing **MICT,** how would you rate the fidelity of your office's compliance/readiness reporting for MAJCOM/CC oversight?		
	Culture of Compliance		
40	**Before** employing **MICT,** how would you rate your office's effectiveness in fostering a culture of compliance?		
41	**After** employing **MICT,** how would you rate your office's effectiveness in fostering a culture of compliance?		
	Innovation for New Efficiencies		
42	**Before** employing **MICT,** how would you rate your office's ability to recognize new process and procedural innovations for improved efficiency?		
43	**After** employing **MICT,** how would you rate your office's ability to recognize new process and procedural innovations for improved efficiency?		
	Man-hours		
44	In your estimation, how many man-hours does MICT save your office per year? (indicate waste with a negative sign)		
		Poor	
		Fair	
		Average	
		Good	
		Excellent	
		Unknown	
		Don't use MICT for this	

MAJCOM MICT Program Manager Survey			
Survey/interview responses will be used as supporting data for an AFIT Graduate Research Project. All completed surveys and interview notes will be immediately entered into an anonymous database, separated only by functional level, and then destroyed.			
#	Question	Response	Future Expectations/Comments/Rationale
1	What percent of your MAJCOM's wings are using MICT?		
2	What were they using before MICT?		
3	How long has your MAJCOM been using MICT?		
	Compliance Checklist Management		
4	**Before** employing **MICT**, how **effective** was your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
5	**Before** employing **MICT**, how **efficient** was your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
6	**After** employing **MICT**, how **effective** is your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
7	**After** employing **MICT,** how **efficient** is your office at managing your MAJCOM's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
	Readiness/Exercise Checklist Management		
8	**Before** employing **MICT,** how **effective** was your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
9	**Before** employing **MICT,** how **efficient** was your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
10	**After** employing **MICT,** how **effective** is your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
11	**After** employing **MICT,** how **efficient** is your office at managing your MAJCOM's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
	Deficiency Identification		
12	**Before** employing **MICT,** how **effective** was your office at identifying your MAJCOM's critical and minor deficiencies?		
13	**Before** employing **MICT,** how **efficient** was your office at identifying your MAJCOM's critical and minor deficiencies?		
14	**After** employing **MICT,** how **effective** is your office at identifying your MAJCOM's critical and minor deficiencies?		
15	**After** employing **MICT,** how **efficient** is your office at identifying your MAJCOM's critical and minor deficiencies?		
	Deficiency Tracking		
16	**Before** employing **MICT,** how **effective** was your office at tracking your MAJCOM's critical deficiencies through closure?		
17	**Before** employing **MICT,** how **efficient** was your office at tracking your MAJCOM's critical deficiencies through closure?		
18	**After** employing **MICT,** how **effective** was your office at tracking your MAJCOM's critical deficiencies through closure?		
19	**After** employing **MICT,** how **efficient** was your office at tracking your MAJCOM's critical deficiencies through closure?		
	Corrective Action Plan Development		
20	**Before** employing **MICT,** how **effective** was your office at managing your MAJCOM's critical and significant corrective action plans?		
21	**Before** employing **MICT,** how **efficient** was your office at managing your MAJCOM's critical and significant corrective action plans?		
22	**After** employing **MICT,** how **effective** was your office at managing your MAJCOM's critical and significant corrective action plans?		
23	**After** employing **MICT,** how **efficient** was your office at managing your MAJCOM's critical and significant corrective action plans?		
	Historical Deficiency Trending		
24	**Before** employing **MICT,** how **effective** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
25	**Before** employing **MICT,** how **efficient** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
26	**After** employing **MICT,** how **effective** is your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
27	**After** employing **MICT,** how **efficient** is your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
	Point-in-time Deficiency Trending		
28	**Before** employing **MICT,** how **effective** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
29	**Before** employing **MICT,** how **efficient** was your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
30	**After** employing **MICT,** how **effective** is your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
31	**After** employing **MICT,** how **efficient** is your office at performing point-in-time deficiency trending on all formal and self-inspection deficiencies identified thoughout your MAJCOM?		
	Scaled Resolution		
32	**Before** employing **MICT,** how **effective** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
33	**Before** employing **MICT,** how **efficient** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
34	**After** employing **MICT,** how **effective** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
35	**After** employing **MICT,** how **efficient** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple wings?		
	AFSO21 Event Selection		
36	**Before** employing **MICT,** how well were trends used to identify AFSO21 Event areas for focused improvement?		
37	**After** employing **MICT,** how well are trends used to identify AFSO21 Event areas for focused improvement?		
	Commander Oversight		
38	**Before** employing **MICT,** how would you rate the fidelity of your office's compliance/readiness reporting for MAJCOM/CC oversight?		
39	**After** employing **MICT,** how would you rate the fidelity of your office's compliance/readiness reporting for MAJCOM/CC oversight?		
	Culture of Compliance		
40	**Before** employing **MICT,** how would you rate your office's effectiveness in fostering a culture of compliance?		
41	**After** employing **MICT,** how would you rate your office's effectiveness in fostering a culture of compliance?		
	Innovation for New Efficiencies		
42	**Before** employing **MICT,** how would you rate your office's ability to recognize new process and procedural innovations for improved efficiency?		
43	**After** employing **MICT,** how would you rate your office's ability to recognize new process and procedural innovations for improved efficiency?		
	Man-hours		
44	In your estimation, how many man-hours does MICT save your office per year? (indicate waste with a negative sign)		
		Poor	
		Fair	
		Average	
		Good	
		Excellent	
		Unknown	
		Don't use MICT for this	

Wing MICT Program Manager Survey			
Survey/interview responses will be used as supporting data for an AFIT Graduate Research Project. All completed surveys and interview notes will be immediately entered into an anonymous database, separated only by functional level, and then destroyed.			
#	Question	Response	Comments/Rationale/Future Expectations
1	What percent of your units are using MICT?		
2	What were they using before MICT?		
3	How long has your wing been using MICT?		
	Compliance Checklist Management		
4	**Before** employing **MICT**, how **effective** was your office at managing your wing's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
5	**Before** employing **MICT**, how **efficient** was your office at managing your wing's compliance checklist maintenance and accomplishment in accordance with associated AFIs?		
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8	**Before** employing **MICT,** how **effective** was your office at managing your wing's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
9	**Before** employing **MICT,** how **efficient** was your office at managing your wing's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
10	**After** employing **MICT,** how **effective** was your office at managing your wing's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
11	**After** employing **MICT,** how **efficient** was your office at managing your wing's readiness/exercise checklist maintenance and accomplishment in accordance with associated AFIs?		
	Deficiency Identification		
12	**Before** employing **MICT,** how **effective** was your office at identifying your wing's critical and minor deficiencies?		
13	**Before** employing **MICT,** how **efficient** was your office at identifying your wing's critical and minor deficiencies?		
14	**After** employing **MICT,** how **effective** was your office at identifying your wing's critical and minor deficiencies?		
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	Deficiency Tracking		
16	**Before** employing **MICT,** how **effective** was your office at tracking your wing's critical deficiencies through closure?		
17	**Before** employing **MICT,** how **efficient** was your office at tracking your wing's critical deficiencies through closure?		
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19	**After** employing **MICT,** how **efficient** was your office at tracking your wing's critical deficiencies through closure?		
	Corrective Action Plan Development		
20	**Before** employing **MICT,** how **effective** was your office at managing your wing's critical and significant corrective action plans?		
21	**Before** employing **MICT,** how **efficient** was your office at managing your wing's critical and significant corrective action plans?		
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23	**After** employing **MICT,** how **efficient** was your office at managing your wing's critical and significant corrective action plans?		
	Historical Deficiency Trending		
24	**Before** employing **MICT,** how **effective** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your wing?		
25	**Before** employing **MICT,** how **efficient** was your office at performing historical deficiency trending on all formal and self-inspection deficiencies identified thoughout your wing?		
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	Point-in-time Deficiency Trending		
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	Scaled Resolution		
32	**Before** employing **MICT,** how **effective** was your office at ensuring corrective action plans were developed at higher levels when trends were identified across multiple units?		
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	Commander Oversight		
38	**Before** employing **MICT,** how would you rate the fidelity of your office's compliance/readiness reporting for Wing/CC oversight?		
39	**After** employing **MICT,** how would you rate the fidelity of your office's compliance/readiness reporting for Wing/CC oversight?		
	Culture of Compliance		
40	**Before** employing **MICT,** how would you rate your office's effectiveness in fostering a culture of compliance?		
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44	In your estimation, how many man-hours does MICT save your office per year? (indicate waste with a negative sign)		
		Poor	
		Fair	
		Average	
		Good	
		Excellent	
		Unknown	
		Don't use MICT for this	

Wing Commander, MAJCOM FAM, MAJCOM IG, SAF/IG Interview Questions

- What percent of the units you work with are using MICT?
- How long have you been using MICT?
- What were you using before MICT?
- How well does MICT help your Airmen accomplish the following tasks?
    - Self-Inspection Program/Compliance checklist management/Self-assessment efficiency/continuity
    - Readiness/exercise checklist management
    - Deficiency identification
    - Deficiency tracking
    - Deficiency corrective action plan development
    - Deficiency trending (historical and point-in-time)
    - Scaled Resolution
    - AFSO21event selection
    - Commander oversight
    - Culture of compliance
    - Innovation for new efficiencies
- Do you think MICT, employed as an IT solution, bridges an AFIS trending process technological feasibility gap and accordingly, warrants a complete reengineering of the process?
- Do you think MICT can adequately provide MAJCOM and HAF leadership oversight for assessments accomplished by the wings?
- How feasible are the following paradigm shifts implicit within the new AFIS and associated desired state?
    - More reliance on more comprehensive checklists attached to all AFIs
    - Increased FAM ownership of functional areas, checklist management, trend identification, scaled corrective action, and evaluated by IG (management inspection)
    - Enterprise deficiency transparency to enable FAM trending and improved L2 sharing
    - General shift of HHQ prioritization on a unit's ability to self identify and resolve deficiencies rather than the traditional formal inspection snapshot

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Curriculum Vita

June 2012

SHANON E. ANDERSON, Major, USAF
Student, Advanced Study of Air Mobility
Mobility Operations School
United States Air Force Expeditionary Center
5656 Texas Avenue
Joint Base McGuire, Dix, Lakehurst, NJ 08640-5403

Email: shanon.anderson@us.af.mil
Voice: 609-754-7755 (DSN 650-7755)

EDUCATION:
Air Command and Staff College (correspondence), Maxwell AFB
Squadron Officer School (in residence), Maxwell AFB
Air and Space Basic Course (in residence), Maxwell AFB
MS, Business, Trident University International, CA
BS, Biology, United States Air Force Academy, CO

PROFESSIONAL HISTORY:

2011 - Present	IDE Student, ASAM; USAF Expeditionary Center, JB MDL NJ
2010 - 2011	Chief, Wing Plans and Programs; 305 AMW, JB MDL NJ
2009 - 2010	Commander, 817 EAS Detachment B; Manas AB, Kyrgyzstan
2009 - 2009	Assistant Director of Operations; 6 AS, JB McGuire-Dix-Lakehurst NJ
2008 - 2009	Wing Executive Officer; Laughlin AFB TX
2007 - 2008	Commander, B Flight; 85 FTS, Laughlin AFB TX
2006 - 2007	Assistant Commander, D Flight; 85 FTS, Laughlin AFB TX
2004 - 2006	Group Executive Officer, 305 OG; McGuire AFB NJ
2003 - 2004	Squadron Executive Officer, 32 ARS; McGuire AFB NJ
2001 - 2002	Stan/Eval Liaison Officer, 32 ARS; McGuire AFB NJ

AWARDS AND HONORS:
Meritorious Service Medal (1 OLC)
Air Medal (8 OLC)
Aerial Achievement Medal
Air Force Commendation Medal (1 OLC)
Air Force Achievement Medal (1 OLC)
305 AMW General Kenney Lessons-Learned Award Nominee, 2010
305 AMW Lance P. Sijan Leadership Award Nominee, 2009
Distinguished Graduate, C-17A Aircraft Commander Initial Qualification Course, 2009
85 FTS Instructor Pilot of the Year, 2008
Distinguished Graduate, KC-10 Instructor Pilot Upgrade Course, 2005
32 ARS Company Grade Officer of the Year, 2004
Summa Cum Laude, Trident University International, 2008

MEMBERSHIPS:
Airlift/Tanker Association (A/TA)

Employing the Management Internal Control Toolset (MICT) Across the Enterprise

Maj Shanon Anderson
Advisor: Jeffrey A. Ogden, PhD
Advanced Studies of Air Mobility (ENS)
Air Force Institute of Technology

Introduction

The Management Internal Control Toolset (MICT) is an IT tool with unique capabilities that are expected to enhance the Air Force Inspection System (AFIS). This Graduate Research Project first determines MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution. Then, it determines how MICT's capabilities can best be leveraged to improve efficiency and effectiveness in the new AFIS and enable future, desired transformations.

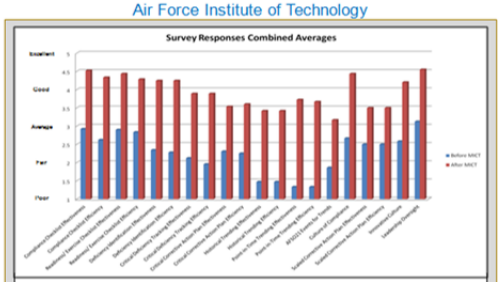
Motivation

Due to increasing resource constraints, senior military leaders have called for new efficiencies, innovation and process redesign. MICT could exemplify all three. However, the AFIS transformation enabled by MICT must be measured and deliberate to ensure new efficiencies are achieved and new inefficiencies are avoided.

Methodology

- Inferential statistical analysis—MICT's effect on a unit's ability to self-identify deficiencies
- Surveys—MICT's effect on individual and unit accomplishment of AFIS tasks
- Descriptive statistical analysis—description of survey results
- Interviews—to determine cultural implications of various ways to employ MICT

Sponsors—Col Robert Hyde, SAF/IGI &
Col Paul Murphy, 305 AMW/CC



Research Goals

This research determines how best to employ MICT across the enterprise by answering four questions:

1) Does MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and deficiency resolution warrant mandatory, enterprise-wide employment?
2) Which MICT capabilities (if any) should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation?
3) How should MICT key capabilities (if any) be leveraged to maximize efficiency and effectiveness in the new AFIS and to enable future desired transformation of the AFIS?
4) Which MICT key capabilities should software developers enhance to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation of the AFIS?

Application

Research conclusions specifically answered the research questions listed above and provided 25 specific recommendations for action for the CSAF and SAF/IG.

Additionally, four business models provided supporting context for research conclusions. Business Process Reengineering and Organizational Change provided a roadmap for successful MICT implementation. Service Quality Management highlighted areas to further develop MICT capabilities. Finally, Risk Management illustrated MICT implications on other USAF processes.

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Air Force Institute of Technology
Graduate School of Engineering and Management (AFIT/ENV)
2950 Hobson Way, Building 640
WPAFB OH 45433-8865

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9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Secretary of the Air Force, Office of the Inspector General
Director of Inspections, Robert D. Hyde, Colonel, USAF
1500 Wilson Blvd
Rosslyn, VA 22209-2404
DSN 425-1531, Comm (703) 588-1531, Robert.Hyde@pentagon.af.mil

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14. ABSTRACT

This Graduate Research Project first determines MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and resolution. Then, it determines how MICT's capabilities can best be leveraged to improve efficiency and effectiveness in the new Air Force Inspection System (AFIS) and enable future, desired transformations. Methodologies employed include inferential and descriptive statistics, surveys, and interviews to answer the following research questions: 1) Does MICT's utility relative to existing processes and tools in the areas of self-inspection efficiency, commander oversight, deficiency identification, corrective action plan development, trending, and resolution warrant mandatory, enterprise-wide employment? 2) Which MICT capabilities (if any) should be leveraged to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation; 3) How should MICT key capabilities (if any) be leveraged to maximize efficiency and effectiveness in the new AFIS and to enable future desired transformation of the AFIS? 4) Which MICT key capabilities should software developers enhance to improve efficiency and effectiveness in the new AFIS and to enable future desired transformation of the AFIS? The three methodologies produced results that strongly supported research hypotheses presented in the introductory chapter.

15. SUBJECT TERMS
MICT, Compliance, Readiness, AFIS, Trend, Oversight, Inspection, IT, BPR, Risk Management, Service Quality

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U	U	U	UU	178	19b. TELEPHONE NUMBER *(Include area code)* (937) 255-3636, x 4653 (Jeffrey.Ogden@afit.edu)