

**United States Air Force
Scientific Advisory Board**



**Quick Look
Report on**

USAF Battelabs

SAB-TR-00-04

August 2000

Cleared for Open Publication

This report is a product of the United States Air Force Scientific Advisory Board Committee on *USAF Battelabs*. Statements, opinions, recommendations, and conclusions contained in this report are those of the committee and do not necessarily represent the official position of the U.S. Air Force or the Department of Defense.

**United States Air Force
Scientific Advisory Board**



U.S. AIR FORCE



**Quick Look
Report on**

USAF Battelabs

SAB-TR-00-04

August 2000

Cleared for Open Publication

(This Page Intentionally Left Blank)

Table of Contents

| | |
|---|------------|
| Table of Contents | iii |
| Chapter 1: Executive Summary..... | 1 |
| Chapter 2: Background | 7 |
| Chapter 3: USAF Battlelab Vision and Scope | 9 |
| Chapter 4: Thoughts on Innovation and Criteria for Battlelab Evaluation..... | 15 |
| Chapter 5: Observations..... | 19 |
| Chapter 6: Findings | 23 |
| Chapter 7: Alternative Solutions | 25 |
| Chapter 8: Recommendations..... | 29 |
| Appendix A: Terms of Reference | A-1 |
| Appendix B: Acronyms and Abbreviations | B-1 |
| Appendix C: Agencies and Their Responsibilities Associated with the Air Force Battlelab Process..... | C-1 |
| Appendix D: SAB Contemporaneous Summary of Activity | D-1 |
| Appendix E: Battlelab Written Responses to SAB Queries | E-1 |
| Appendix F: List of Completed Battlelab Initiatives | F-1 |

List of Figures

| | |
|--|-----------|
| Figure 3-1. USAF Battlelab Organization | 11 |
| Figure 3-2. Participating Agencies | 13 |
| Figure 3-3. Initiative Life Cycle | 13 |
| Figure 7-1. The “Mixing Bowl” Process..... | 27 |

List of Tables

| | |
|---|-----------|
| Table 5-1. Fielded Initiatives | 20 |
|---|-----------|

(This Page Intentionally Left Blank)

Chapter 1

Executive Summary

A hiatus exists between inventors who know what they could invent, if they only knew what was wanted, and the soldiers who know, or ought to know, what they want, and would ask for it if they only knew how much science could do for them. You have never really bridged that gap yet.

-Winston Churchill

1.1 Introduction

The words of Churchill ring as true today as when they were written in 1916. The history of warfare is replete with examples of successfully “bridging the gap” between warfighter and technologist; e.g. the introduction of the German ME262 jet towards the end of World War II. At the beginning of the war, German and English development of the turbojet engine was about equal. But in this case, the Germans bridged the gap and the Allies did not as quickly. As a result, the ME262 shot down approximately 150 Allied aircraft with a loss of only eight. Air Force Battlelabs are one means of bridging the gap. Air Force Battlelabs were created in 1997 under the direction of then Air Force Chief of Staff (CSAF) Ron Fogleman. He created the Battlelabs as part of a three-pronged approach to bring innovation to the warfighter: 1) war games (Global Engagement), 2) annual exercises, and 3) Battlelabs.¹

Innovation has always been the hallmark of the United States Air Force (USAF). The charge General Hap Arnold gave to Theodore von Karman in 1947 that resulted in the classic study “Toward New Horizons” and the formation of the Scientific Advisory Board is ample evidence of this hallmark. There remains a considerable, but perhaps decreasing, level of innovation in today’s Air Force. A continuing challenge is ensuring awareness of that innovation at higher levels and a way to make it available to the warfighter – a “breakout scheme.” Clearly, the Battlelabs are intended to be such a breakout scheme. The chartering document (AFI 10-1901, dated 1 Oct 97) contains phrases like “creating an environment where innovative ideas are rapidly harvested and evaluated – leading to swift fielding of proven concepts” and “rapidly identify and prove the worth of innovative ideas ---.” So the notion of innovation tied to accelerated evaluation and application is clearly evident.

This study resulted from direction by the Air Force Chief of Staff who asked, “Is the current Air Force Battlelab structure and architecture meeting Air Force needs?” “Should the Air Force Battlelabs change course, organization/structure, or focus?” and finally, “What process should be used to establish/disseminate Air Force Battlelabs?” In answering these questions, we visited all six existing Air Force Battlelabs and had a thorough briefing and discussion with all Battlelab personnel based on a series of detailed common questions provided to each Battlelab in advance.² In addition, we visited the Air Mobility Command Battlelab Cadre as well as a number of “Battlelab-like” cells in other Air Force commands. We also visited the Army

¹ Interview with former CSAF, Ronald R. Fogleman, General, USAF (R), 8 May 00

² The study TOR, questions to the Battlelabs, and their written responses are contained in the appendices to this report

Mounted Maneuver Battlelab at Ft. Knox, KY, the Army Battlelab staff at Training and Doctrine Command (TRADOC), the Air National Guard (ANG)/Air Force Reserve (AFR) Test Center (AATC) and were briefed by the Marine Corp Warfighting Lab and the Navy Maritime Battle Center. An important input to our study was the interviews we conducted with senior Major Command (MAJCOM) commanders or vice commanders.

1.2 Current Status

Today the six Air Force Battlelabs each consist of no more than 25 personnel, commanded by an O-6, and sharing equally in the available funding which has typically been about \$5M annually for each Battlelab. The Battlelabs receive and/or generate ideas that are screened and selected to be initiatives, which, in turn, are executed over a maximum 18-month period. If successful, these initiatives should then transition into an operational capability. Major initiatives are labeled “Mitchell” and more modest ones “Kenney.” Mitchell initiatives have turned out to be beyond reach, so that all 90 initiatives have been, and are, Kenney. Of the 90 initiatives, 40 are still in work, and 50 are complete (all 50 are shown in the report). With some exceptions it takes from 3 to 6 months to get an idea approved into an initiative so that with the 18-month execution phase, the lifetime of an initiative is on the order of two years. Five of the Battlelabs report to Warfare Centers with the sixth reporting to an operational Wing. It is rare for a Battlelab to have exposure to a senior general (3 or 4 star).

We were pleased by the enthusiastic reception we got at each Battlelab. We found dedicated personnel under responsible leadership with an abundance of ideas gathered from many sources clearly making contributions to solving near-term warfighter needs. But there are problems. Battlelabs, in general, have not found it possible to take on critically important tasks nor have they been directed to. We feel the Battlelabs could be doing so much more with the resources they have. What are the problems and possible solutions? That is the meat of our study.

1.3 The Transition Obstacle

If an initiative is successful and requires funding, it must compete in the Program Objectives Memorandum (POM) process for inclusion in the budget. All Battlelabs find this extremely difficult to do. Only three initiatives out of the 50 completed have been successful in the POM. This obstacle is pervasive throughout the Battlelab environment. There are low expectations of successfully transitioning initiatives that must compete in the POM. These low expectations affect new initiative selection and make it unattractive to select initiatives that are most important to do in favor of those that are easier to transition. This, in turn, reduces the impact the Battlelabs have on major USAF problems. Therefore, senior officer interest is understandably reduced with these results of marginal importance. The reduced senior officer interest is felt at the Battlelabs and may result in even further reluctance to tackle the more important tasks. It is very hard for us to document this vicious cycle, but it was confirmed verbally at most of the Battlelabs.

Clearly the harsh budget environment of today is the root cause of this problem. But there are process problems as well. There is no requirement in the Battlelab regulations that require any action to be taken on Kenney initiatives; only Mitchell initiatives must be acted on by the Air Force Requirements Oversight Council (AFROC) (and there are no Mitchell’s). Therefore, the AFROC has been reviewing Kenney initiative results for information only, and thus, there is no

decision process to rack and stack Battlelab initiatives for transition action unless some action is taken at the MAJCOM level. This problem must be solved if Battlelabs are to become a vehicle for producing enhanced Air Force capabilities.

1.4 Findings

A short statement of the findings of this study follows:

1. Mitchell initiative idea has proven to be unachievable.

The funding availability and time frames preclude compliance. As a result the Mitchell/Kenney distinction is not useful and creates unrealistic expectations.

2. Battlelabs have sufficient people for developing and managing initiatives at the current level, but they are not priority manned nor career enhancing.

Personnel are not chosen based on a record of innovation.

3. A number of *ad hoc* “Battlelabs” exist because of a need.

Battlelabs or “Battlelab-like” cells have been established at several commands. In general, these activities are prospering without being tied to the approved Air Force Instruction (AFI) structure. They typically have senior officer (at least 3-star) involvement and are attacking some important issues. Their “turn-on” time can also be very short (days instead of months).

4. The USAF has no process for Kenney Battlelab Initiative transition.

5. The Battlelabs are not effectively coupled to Air Force Materiel Command (AFMC).

The single Air Force Research Laboratory (AFRL) representative at four of the six Battlelabs is inadequate to serve as a conduit for the diverse AFRL technologies, which should be routinely identified and made available to the Battlelabs.

6. No Battlelab has been given the specific responsibility of assessing or improving the effectiveness of force application.

7. Return on Investment (ROI) is too early to specify.

1.5 Alternatives

The study examined several alternative architectures. Three of these are presented in the report with pros and cons. They are summarized here:

Alternative 1: Maintain/Fix Current Structure

The current structure can be strengthened by taking action in personnel management, senior officer review (Corona), and funding priorities. Also, the Air Mobility Battlelab should be added to the existing Battlelabs. This alternative requires minimal effort to implement, but also yields minimal improvement.

Alternative 2: Establish a Single Battlelab

Building upon the Marine and Navy models, a single Battlelab would signal a high corporate identity to the Battlelab process. It should be commanded by a General Officer reporting to the Chief or Vice Chief of Staff with Corona serving as a Board of Directors. Such a Battlelab should focus on the

Expeditionary Aerospace Force (EAF) implementation and associated problems. While having many desirable features, this alternative has the possible disadvantage of diminishing or eliminating the MAJCOM role. Also, the creation of a new agency and assignment of a General Officer may have practical difficulties in today's environment.

Alternative 3: Create MAJCOM-Centric Battlelabs

We find this alternative to have several attractive features. It gives the MAJCOMs the capability to create Battlelabs specific to their needs. It improves the probability of senior officer involvement in guiding the Battlelab and makes establishment and disestablishment of a Battlelab more practical. We think the MAJCOM Commanders should brief Corona periodically to encourage "big" thinking and provide some cross-fertilization. This alternative may blur the corporate image of Battlelabs whose health would now clearly be dependent on MAJCOM Commander interest.

1.6 The Warfighter/Technologist Team

The alternatives listed above all have a common shortcoming. They provide little improvement to the lack of meaningful interface between the warfighter, the Battlelab, and the technologist in AFMC. This is a serious problem that we have given a lot of thought. We believe that it is not feasible to reorganize either the Battlelabs or the AFRL Directorates to achieve this. Rather, we believe there is an *ad hoc* procedure which would go a long way to providing this interface. For lack of a better name, we call this the "Mixing Bowl." The "Mixing Bowl" could and should be applied to any of the three alternatives.

This proven concept envisions a close intermixing of several types of mid-level officers (O-3 to O-5) to solve a particular operational task or mission. Flight crew/operators, with recent combat experience, describe in considerable detail the planning and execution of a mission or operational task to an appropriate audience of Battlelab, technologists, development engineers, etc. This process will take several days per month for several months to get the language straight and break down the communication barriers. This is not a requirements process – it precedes that. It concentrates on "wish we had/wish we could" capabilities. From this process will come a multitude (perhaps over one hundred) of ideas, both long-term and near-term, that could lead to solutions.

The next phase of the "Mixing Bowl" process is to prioritize or "rack and stack" the ideas into the most important to receive further study. When this process is finished (say a couple of months), the "Mixing Bowl" process is finished and all participants return to their home units. Now action items can be assigned to proper organizations for further study and/or implementation. For example, those with near term potential could be assigned to the appropriate Battlelab to become an initiative with known warfighter support while long-term programs would be channeled to the appropriate AFMC activity.

The "Mixing Bowl" studies should not be expensive (a few hundred \$K for Temporary Duty (TDY) and administrative support) and there could be several (perhaps 3 or 4 annually) proceeding simultaneously. Tasks to be studied can come from many sources; from the senior leadership, or war games and exercises, to technical breakthroughs, etc.

To repeat, our experience with this process requires an appropriate "mixing" time. It does not occur at the first or second meeting. It also requires actual "hands on" operators with recent

operational experience. We are convinced that this is an environment in which innovation can thrive.

1.7 Recommendations

The recommendations of the study are now summarized:

- 1. Adopt a MAJCOM-Centric approach to Battlelab organization.**
- 2. Adopt a “Mixing Bowl” process to cause intense multiple and frequent interaction between Operational, Battlelab, and AFMC (AFRL) personnel.**
- 3. Strongly support the Warfighter Rapid Acquisition Process (WRAP) idea to start those initiatives that will be incorporated into the POM at the right time.**
- 4. Establish procedures to ensure Battlelab CC’s access to MAJCOMs CC and CSAF.**
- 5. Eliminate Kenney/Mitchell distinction.**
- 6. Eliminate 18-month execution limitation; “near term” is sufficient.**

We believe that the adoption of these recommendations will result in Battlelabs that will make a major contribution to important and critical Air Force problems. The time is ripe to seize this opportunity.

1.8 Thoughts on innovation

We were asked verbally our thoughts on the overall issue of innovation in the Air Force, of which the Battlelabs are a part. We believe that innovation is an environment, not a process. It cannot be managed as an acquisition program with milestones, schedules, etc. It also cannot be mandated or channeled as part of the requirements process. It can and should be stimulated, focused, encouraged, and energized. We would be very wary of those who claim otherwise!

1.9 Study Panel Membership

Donald L. Lamberson, Maj Gen (Ret), PhD, Chair
John Corder, Maj Gen (Ret)
George B. Harrison, Maj Gen (Ret)
O’Dean P. Judd, PhD
Gene H. McCall, PhD
Robert Rankine, Jr., Maj Gen (Ret), PhD
Harold W. Sorenson, PhD
Capt Daniel D. Garber
Capt Julie M. Olson

(This Page Intentionally Left Blank)

Chapter 2

Background

2.1 Introduction

The United States Air Force Scientific Advisory Board (USAF/SB) was asked by the USAF Chief of Staff to look into USAF Battlelabs and report back to him by June 2000. This report covers the results of this activity. A summary of the Terms of Reference (TOR) used to guide this report and an overview of this report follows.

2.2 Terms of Reference Overview and Study Panel Members

CSAF asked the SAB Battlelab Study Panel the following questions:

- Are the existing AF Battlelabs:
 - Performing as intended?
 - Have sufficient resources?
 - Delineated properly?
- Should the existing AF Battlelabs change course, organization/structure, or focus?
- What process should be used to establish/disestablish AF Battlelabs?
 - What is the right number of Battlelabs?
 - What criteria/rationale can be used to establish/disestablish a Battlelab?
 - Should a sponsor start an innovation cell/flight/group and interact with an existing Battlelab for a specified period of time?
 - Should a nomination to establish/disestablish a BL go before Corona?

With these key questions, CSAF asked the Study Panel to determine the best structure for AF Battlelabs to prove innovative operations and logistics concepts to advance AF core competencies and drive revisions to AF Doctrine, Organization, Training, Requirements, and Acquisitions. He further asked the Panel to propose rationale and criteria for establishing and/or disestablishing Battlelabs as well as provide some insights of how much innovation the Air Force can afford. The formal TOR, which provides the study charter and products to be delivered by June 2000, are contained in Appendix A. Study Panel members are listed as follows:

- Donald L. Lamberson, Maj Gen (Ret), PhD, Chair
- John Corder, Maj Gen (Ret)
- George B. Harrison, Maj Gen (Ret)
- O'Dean P. Judd, PhD
- Gene H. McCall, PhD
- Robert Rankine, Jr., Maj Gen (Ret), PhD
- Harold W. Sorenson, PhD
- Capt Daniel D. Garber
- Capt Julie M. Olson

2.3 Places and People Visited

The Panel visited the following places and people during the study. Activity during these visits are contained in Appendix D.

- 15 Feb 00: Aerospace Expeditionary Force (AEF) Battlelab
- 16 Feb 00: Space Battlelab/Space Warfare Center (SWC)
- 24 Feb 00: Unmanned Aerial Vehicle (UAV) Battlelab
- 25 Feb 00: Command and Control (C2) Battlelab
- 6 Mar 00: TRADOC/Battlelab Directorate
- 7 Mar 00: Army Mounted Maneuver Battlelab
- 28 Mar 00: Information Warfare (IW) Battlelab/
 - Air Intelligence Agency (AIA)/
 - Air Force Information Warfare Center (AFIWC)
- 29 Mar 00: Force Protection Battlelab/Security Forces Center (SFC)
- 30 Mar 00: Air National Guard (ANG)/Air Force Reserve (AFR) Test Center (AATC)
- 7 Apr 00: Air Mobility Battlelab/Air Mobility Warfare Center (AMWC)
- 2 May 00: Marine Corps Warfighting Lab
- 2 May 00: Navy Maritime Battle Center
- General Fogleman
- General Babbitt
- General Jumper
- General Lyles
- General Martin
- General Myers
- Lt Gen Marcotte
- Lt Gen McIlvoy
- Et al

2.4 Study Overview

This report will begin by reviewing the vision and scope under which the Battlelabs were formed. Next, some thoughts on innovation and criteria for evaluation relevant to the study will be presented. Observations, findings, and alternative solutions will then follow. The study will conclude with recommendations deemed to be appropriate.

Chapter 3

USAF Battlelab Vision and Scope

3.1 Background

The USAF established six Battlelabs in the summer of 1997 to identify innovative ideas and to measure how well these ideas might contribute to the mission of the USAF.³ The Concept of the Battlelab emerged from the Air Force's long range planning effort and the publication "Global Engagement: A Vision for the 21st Century Air Force." The original vision maintains that with a permanent cadre of 15-25 personnel each, the Battlelabs would work together and with other agencies to generate and coordinate the plans necessary to demonstrate and measure the worth of promising concepts.

The Battlelabs differ from the Air Force's existing laboratories in that the Battlelabs focus on innovative operational concepts which exploit mature technologies, while the research laboratories concentrate on identifying and developing new technologies to meet the full spectrum of performance challenges inherent in the conduct of air and space operations. The Battlelabs are to draw upon the expertise of the Air Force research laboratories to generate rapidly any technical capabilities needed to demonstrate and to measure the worth of promising operational concepts.⁴

Innovative concepts, relatively straight forward to plan and to execute, and funded within programmed-levels concepts, are classified as Kenny Battlelab Initiatives⁵ (KBIs, after Lt Gen Kenny who adapted equipment and tactics to help turn the tide in the Pacific during the early days of World War II), and are pursued under the sponsoring operating command's direction. Ideas that are revolutionary, complex to plan and to execute, or significantly cut across Battlelabs' areas of responsibility and are resource intensive, are classified as Mitchell Battlelab Initiatives⁶ (MBIs, after Brig General Billy Mitchell who used the rapid integration of available components to demonstrate the lethality of Air Power), and are promulgated into a "Campaign Concept." The sponsoring Command presents these MBI Campaign Concepts for decisions on course of action, resourcing, and cross-command tasking to the USAF Board of Directors (the USAF Vice Commanders and Vice Senior Staff Officers). The operational, test, wargaming, doctrine, training, modeling, simulation, research and development communities are to provide resourcing for Mitchell and Kenney Battlelab initiatives. The accomplishment of these demonstrations used to measure the worth of promising concepts draw from, on a temporary basis, necessary talents, existing capabilities, and other re-prioritized resources from across the Air Force.

The sponsoring operating commands will then present the results of their Battlelab initiatives to the Air Force Board of Directors. The Board will then assess the worth of the demonstrated concept and identify actions necessary to integrate proven concepts into ongoing organize, train, and equip programs. Successfully demonstrated and incorporated concepts will then be

³ USAF News Release, 9 January 1997

⁴ Ibid

⁵ Air Force Instruction 10-1901, dated 1 October 1997, paragraph 1.4.1

⁶ Ibid, paragraph 1.4.2

⁷ USAF News Release, 9 January 1997

introduced to the Commander in Chiefs and their Components through exercises, wargaming, and other opportunities⁸.

Finally, a Battlelab Integration Division exists within the Air Staff Deputy Chief of Staff for Operations, under the Directorate of Operational Requirements, which was transferred to the Directorate of Command and Control in early 2000. This division oversees Battlelab policy and serves as a Secretariat and coordinating body as initiatives made their way through the review process by the Air Staff and the Air Force Board of Directors.

3.2 Battlelab Composition and Organization

The AF established six Battlelabs in the summer of 1997. They were deliberately organized to be small, focused, and relied on field innovation to identify potential ways to advance the Air Force's newly defined core competencies: Air and Space Superiority, Global Attack, Precision Engagement, Information Superiority, Rapid Global Mobility, and Agile Combat Support.

Air Combat Command (ACC) established three of the Battlelabs under various agencies. Their designation and locations are as follows:

- The Air Expeditionary Battlelab at Mt Home AFB, Idaho.
- The Command and Control Battlelab at Hurlburt Field, Florida.
- The Unmanned Air Vehicle Battlelab at Eglin AFB, Florida.

The Space Battlelab was located at what was then Falcon, now Schriever AFB, Colorado and operates under Air Force Space Command.

The remaining two Battlelabs operate under the direction USAF Field Operating Agencies (FOAs). Their designation and directing FOAs are:

1. The Force Protection Battlelab, under the then newly established Air Force Protection Group at Lackland AFB, Texas.
2. The Information Warfare Battlelab under the Air Intelligence Agency, at Kelly AFB, Texas.

Figure 3-1 below shows the organization of the Battlelabs within the USAF Organizational structure. It should be noted that only the Force Protection Battlelab works directly for an organization that creates and defends a Program Objective Memorandum (POM). This idea will be discussed later.

⁸ Ibid

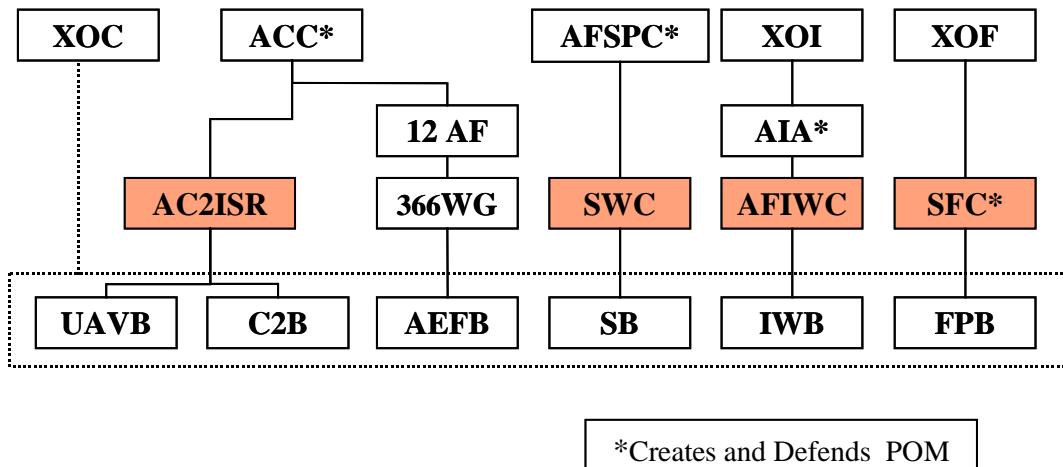


Figure 3-1. USAF Battlelab Organization

3.3 The Battlelab Vision⁹

The Air Force views the Battlelabs as "...creating an environment where innovative ideas are rapidly harvested and evaluated – leading to swift fielding of proven concepts." The Air Force claims to be committed to using the Battlelabs to foster a vigorous program of experimenting, testing, exercising, and evaluating new concepts for the advancement of air and space power.

3.4 Air Force Battlelab Guiding Principles

The Air Force expects the Battlelabs to change paradigms and create new ones.¹⁰ Battlelab Guiding Principles and Responsibilities state: It is Air Force policy for the Battlelabs to focus on rapidly identifying and proving the worth of innovative and revolutionary operations and logistics concepts.¹¹ The Air Force expects the resulting Battlelab efforts to provide opportunities to reach investment decisions more quickly and to organize, train, equip, and program more effectively.¹² With this expectation in mind, the Air Force operates the Battlelabs under the following guiding principles and fundamentals.

3.4.1 Technology Push--The AFMC/AFRL Battlelab Relationship

The USAF intended for AFMC/AFRL to be an equal partner with the Battlelabs and through continuous interaction push technology into combat capability. Air Force Policy Directive 10-19, dated 1 October 1997, charges AFMC/AFRL with the following responsibilities concerning USAF Battlelabs:

- Provide expertise and capabilities
- Assist in selection, investigation, or execution of initiatives

⁹ Ibid, paragraph 1.5.

¹⁰ Air Force Instruction 10-1901, dated 1 October 1997, paragraph 1.1.

¹¹ Air Force Policy Directive 10-19, dated 1 October 1997, paragraph 1.

¹² Ibid.

- Input emerging technologies to the Battlelabs
- Assess ongoing initiatives to assist transitions

3.4.2 Battlelab Fundamentals

Four Fundamentals govern the Air Force Battlelabs:¹⁶

Lean. The Battlelabs are composed of a permanent cadre of no more than 25 people, augmented by temporary duty experts and operating with a limited infrastructure, seeking to borrow or lease - not buy.

Unique. The Battlelabs are to evaluate ideas and concepts; differing from research labs or warfare centers, which manage systems, programs, and projects.

Focused. The Battlelabs are to identify, plan, and lead innovation; leveraging existing expertise, technology, and contracts.

Innovative. The Battlelabs are to prove operational and logistics concepts which will advance Air Force core competencies and drive revisions to doctrine, organization, training, requirements and/or acquisition.

3.4.3 The Battlelab Mission and Output¹⁷

The Air Force Battlelab mission is to “...rapidly identify and prove the worth of innovative ideas which improve the ability of the Air Force to execute its core competencies and Joint Warfighting.” The overarching objective is to generate high pay-off initiatives with minimum cost and investment. The operational and logistic output are those concepts whose worth has been proven that create opportunities for the Air Force to impact organization, doctrine, training, requirements, and/or acquisition. This output is to be produced in two forms, which are KBIs and MBIs.

3.4.4 Responsibilities From “Idea to Reality”

The following list of Air Force agencies play a responsible role in the transition of an idea to a realized combat capability for air and space power.¹⁸ Please refer to Appendix C for the details of the part the following organizations play. With some exceptions, an idea must navigate, in the sequence shown, its way through the organizations listed to be finally realized into a combat capability for the Air Force.

¹³ Excerpt from “Global Engagement”, page 9

¹⁴ Air Force Instruction 10-1901, dated 1 October 1997, paragraph 1.2.

¹⁵ Ibid, paragraph 1.1.

¹⁶ Ibid, paragraph 1.3

¹⁷ Ibid, paragraph 1.4.

¹⁸ Ibid, Chapter 2.

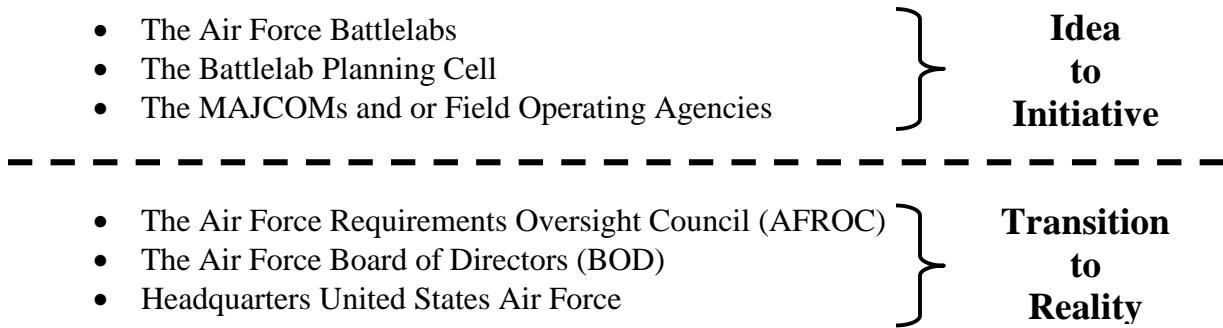


Figure 3-2. *Participating Agencies*

3.4.5 The Initiative Process

The following figure outlines the approximate life cycle time dimensions for conversion of an idea to a USAF combat Capability. The process to get from an idea to a completed initiative is about two years under the current process. Except for one, all completed initiatives are in the Kenney Class where there is currently no process for transition.

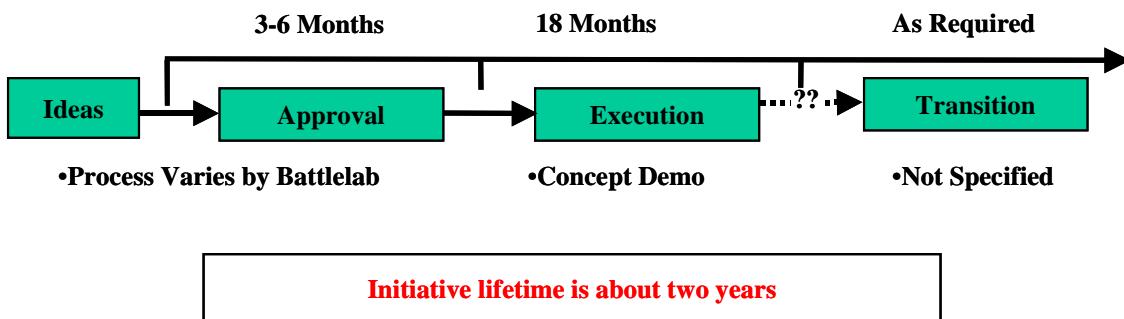


Figure 3-3. *Initiative Life Cycle*

3.4.6 Initial Battlelab Vision Background

The initial motivation for the establishment of Battlelabs in the USAF is rooted in criticism from Congress and comparisons with other services concerning in place USAF mechanisms for innovation. The Battlelabs came to be a part of a process that employs substantive top-level war games and annual experiments to identify big challenges/problems that would be handed to the Battlelabs to be worked as initiatives. Those who founded the Battlelabs expected that the Battlelabs' activity would be conducted with minimum bureaucracy.¹⁹

¹⁹ Interview with former CSAF, Ronald R. Fogleman, General, USAF (R), 8 May 00

(This Page Intentionally Left Blank)

Chapter 4

Thoughts on Innovation and Criteria for Battlelab Evaluation

4.1 Background

This chapter responds to the Study's Terms of Reference, numbers 1. a. & 3. b., which asks for criteria for measurement of the Battlelabs' contributions, and also, to be used to decide to establish or disestablish Battlelabs within the Air Force.²⁰ The United States military, in general, and specifically the USAF, prides itself in being innovative in its approach to providing effective combat capability for the nation. This chapter will examine briefly some examples of innovation within and without the USAF to determine their fundamental enabling characteristics. These enabling characteristics will then be cataloged into a set of criteria that might be used to compare with what was learned from the close look taken at the Battlelabs during this study to arrive at some judgments about what to recommend to CSAF of the matter. We shall begin next with some examples of innovation and why they succeeded.

4.2 Innovation

The Air Force believes that "...the key to insuring today's Air Force core competencies will meet the challenge of tomorrow is *Innovation*. Innovation is part of our heritage as Airmen."²¹ The Air Force believes it must take advantage of the rapid pace of technology by exploring new ideas and fostering innovative technologies that will improve its core competencies. They further believe that new ways of thinking and doing will expand boundaries and break old molds. The Air Force goal, through use of Battlelabs, is to create an environment where operations and logistics concepts (the way they want to fight/drive their investment in technology) pull on the technology base.²² In summary, the Air Force expects the Battlelabs to change paradigms and create new ones.²³

Webster defines innovation as "...the introduction of something new – idea, method, or device." This definition becomes important because the USAF views innovation in the context of ideas only while innovation also includes methods and/or devices.

4.3 Thoughts on Innovation

The Panel believes that innovation results from an environment, not a formal process. Innovation cannot be scheduled or managed like an acquisition program, although the Panel was briefed on attempts to do it that way. The Panel is convinced that there is considerable innovation being attempted in the Air Force. This innovation should be encouraged. What is missing is awareness at higher levels and robust "breakout schemes." Battlelabs are intended to provide a breakout scheme. The warfighter and technologist members of the Battlelab Study Panel unanimously agree with these ideas about innovation.

²⁰ See Appendix A of this report, Terms of Reference

²¹ Excerpt from "Global Engagement", page 9

²² Air Force Instruction 10-1901, dated 1 October 1997, paragraph 1.2.

²³ Ibid, paragraph 1.1.

4.4 Innovation Examples

A hiatus exists between inventors who know what they could invent, if they only knew what was wanted, and the soldiers who know, or ought to know, what they want, and would ask for it if they only knew how much science could do for them. You have never really bridged that gap yet.

-Winston Churchill

The ME262 was a good example of Churchill's comment and of technological surprise. The Germans were not ahead of the British, and even the Americans in the development of turbine engines for aircraft at the beginning of WWII, but the Allies dawdled around until after the Germans had demonstrated the concept. Although it was only in service for a few months, it was difficult to fly, and the German pilot corps was nearly destroyed, the ME262 shot down approximately 150 Allied aircraft with a loss of only eight. Those eight were mostly destroyed while landing or taking off, i.e. flying slowly. Two of the eight were at the hands of the "Tuskegee Airmen." A single German Ace, Heinz Bauer, had 16 kills in the 262. The 262 had a 100-knot advantage in speed over the P-51, and the bomber machine guns could not track fast enough to follow it. There was actually an American jet flown in WWII. The P-80 was delivered to Italy to intercept highflying German Recon aircraft in 1945 a month or two before VE Day. The aircraft never engaged a German aircraft, however. No one is sure why Italy was chosen so late in the war unless the Air Force just did not believe in the utility of jets despite the shocking performance of the ME262. The bottom line here is that the engineers knew what to do, but they never got the new weapon into the hands of the user.

The following examples of innovation within the Air Force that are now incorporated as part of its combat capability give those both inside and outside the Air Force a warm glow of pride and accomplishment. As will be pointed out later, they all came in time of war. There are no good examples of innovation like these accomplished during peacetime.

- The rapid creation of the GBU-28 4000 pound bomb during Desert Storm.
- “Puba’s Party” of unmanned aerial decoy vehicles employed in the first minutes and hours of Desert Storm to deceive enemy surface to air missile systems and make them vulnerable to the F-4G Wild Weasel. This capability is now being fielded as the miniature air launched decoy (MALD) program.
- The incorporation of the Electronic Warfare Towed Decoy on fighter aircraft after the shoot down of Captain O’Grady in Bosnia.
- The rapid incorporation of the laser range finder/position locator on the Predator unmanned reconnaissance vehicle during the Kosovo operation.

4.5 Innovation Enabling Characteristics

The following summarizes innovation enablers flowing from the examples just discussed:

- They all occur during times of war/crisis
- None/few occur during normal peace time
- A clear and present need
- Tolerance for failure
- Highly motivated cradle to grave idea and make it happen people

- Process protection/support from the very top
- Short lines of authority with power to proceed
- Capital/resource are immediately made available
- When innovation is attempted in austere peacetime, the highly disciplined Air Force bureaucracy will become upset and block innovation with senior officer discrediting accusations of “hobby shopping,” and through blockage of access to, or at, the relevant budget tables.
- Crosscutting functions during periods of austerity with no central sponsors are orphans in peacetime. Examples are C2, Surveillance, and Reconnaissance and Electronic Warfare.
- Innovation is an investment and not a cost

4.6 Evaluation Criteria

The Study Panel developed and used the following questions as a criteria for evaluating the Observations, Findings, and Alternatives presented in the next three chapters that formed the basis for the Study Panel Recommendations presented at the end:

- Are they meeting USAF expectations as articulated? (Air Force Instruction 10-1901, dated 1 October 1997)
- Do they deal with USAF core competencies/are they chartered properly?
- Is thinking and innovation happening?
- Is the thinking/innovation at the right level?
- Are they making a contribution?
- Is the thinking and innovation changing anything?
- Are they manned and funded properly?
- Is their contribution worth the investment?

(This Page Intentionally Left Blank)

Chapter 5

Observations

5.1 Background

The Panel developed a number of observations during its work. These observations are provided as follows.

5.2 Battlelab Contribution and Resources

The Battlelabs are making important contributions to solving near term warfighter needs in the Air force. We found that the Battlelabs are staffed with dedicated and motivated people, they have competent and responsible leadership, and they have an abundance of ideas and innovations. All Battlelabs are resourced equally with about \$29 million per year distributed over 150 people. The total expenditure for the three years FY97, FY98, and FY99 was \$106 million. They seem to have sufficient resources for what they have to do. At no time during our Battlelab visits did any Battlelab commander or staff indicate that they did not have sufficient funding to do their job.

5.3 Battlelab Initiatives Audit

They have generated and are performing a large number of initiatives. As an example, over the last cycle, their solicitation resulted in 1679 ideas of which 90 were carried forward as initiatives, of which 50 were completed. Of the 50 completed initiatives, 19 resulted in equipment/software fielded, three resulted in Tactics, Techniques, and Procedures (TTP) modified, three that were incorporated into the POM (Compact Air Transportable Hospital; Combined AGE; and Signal Analysis Mapping), 14 were awaiting POM action, five were made part of follow on initiatives, and six did not work out and consequently were not adopted. The 19-fielded initiatives are summarized as follows:

Table 5-1. Fielded Initiatives

| Initiative | Status |
|--|------------------------------------|
| Hill ATO Defragger | Kosovo, USAFE, 7 Wings at ACC |
| Integrated Planning and Execution Capability | Kosovo |
| Collaborative Tools | Kosovo |
| Ground Based Radar Site Protection (Op Geese) | 3 sites-South America |
| Space Environment Network Display | 55th SWS |
| Sensor Guard | 820th SFG |
| Network Attack Visualization | AFCERT |
| Reduced Hardware Footprint | AFSOC, F117, 8th AF, 1st MEF |
| Food & Water Antiterrorism | CENTAF, CENTCOM |
| Enhanced SA Tool | Cheyenne Mtn, FBI |
| Diagnostic Emulator | Classified Customer |
| Voice Optimal Interrogation | Classified Customer |
| Enhanced Linked Virtual Information System | GCCS, TBMCS 1.0.2 |
| Miniaturized GPS Jammer | GPS JPO NAVWAR Tool |
| ATO Visualization & Assess | Master Air Ops Planner |
| Commercial Applications for Combat Effectiveness | Operation Northern Watch |
| EOC Enroute | Residual Capability: 2 KC-135R's M |
| Software Agent System for OPSEC | SWC Red Team |
| IW (SCI) Reach Back | USAF, USA |

It should be noted that many of the about 19 completed initiatives were often a “Demo Left Behind” capability only and not necessarily incorporated USAF wide.

5.4 The Transition Problem

Of all of the issues with Battlelabs, transitioning successful initiatives into the POM process is the most pervasive problem endemic to all Battlelabs. The past low transition rate and expectations affects future initiative selection. This results in a Battlelab strategy of “easy to sell vs. important to do.” This, in turn, marginalizes Battlelab impact on longer range and more difficult/important USAF problems. In short, the current Battlelab activity may be “tinkering at the periphery,” and not addressing the really important problems facing the Air Force, which was the original intent of the Battlelabs.

5.5 Bureaucratic Overload

Working the POM process consumes inordinate Battlelab leadership and staff time. Part of this is due to the lack of access of Battlelab commanders have to senior officer attention. This low impact of the Battlelabs with senior AF leadership then results in low senior officer interest, which results in an unproductive cycle. In addition, the Kenny initiatives are reviewed at the AFROC without a requirement for them to take any action. In essence, no one at senior leadership levels is required to address the transition to the POM.

5.6 The Personnel Situation

Within the current environment, it is hard to attract good people consistently. Priority manning has ceased. Lack of transition to the POM discourages even the best of folks. The assignment is not career enhancing. We found only one Below Primary Zone (BPZ) selection, a STEP (Stripes for Exceptional Performers), and we noted some passovers. In addition, meaningful follow-on assignments are problematic.

The Battlelab delineations are inconsistent. There is no clear taxonomy -- some Battlelabs focused on Core Competency, some on Mission, and others on Platform.

5.7 Kenney/Mitchell Distinction Utility

The “Kenney/Mitchell” distinction provides little to the process and may create unrealistic expectations. As originally conceived, the Kenney initiatives are to be quick, easy to do problems that could be performed in an 18-month time period. The Mitchell initiative involves a revolutionary concept, a more complex problem in terms of concept and/or execution, or one that requires a number of resources that cut across Battlelabs. The Mitchell is still targeted for an 18-month completion, however. We found that the 18-month Battlelab horizon and large resource base required essentially precluded any meaningful Mitchell initiatives. In our review of the Battlelabs, we found only one Mitchell is proposed.

(This Page Intentionally Left Blank)

Chapter 6

Findings

6.1 Introduction

The following findings are respectfully provided and form the background and basis for the alternative solutions and recommendations, which will follow.

6.1.1 Finding 1

The Mitchell initiative idea has proven to be unachievable.

The funding availability and time frames preclude compliance. As a result the Mitchell/Kenney distinction is not useful and creates unrealistic expectations.

6.1.2 Finding 2

Battlelabs have sufficient people for developing and managing initiatives at the current level, but:

The USAF Battlelabs are no longer being manned on a priority basis. Assignment to Battlelabs is not seen as career enhancing.

6.1.3 Finding 3

A number of *ad hoc* “Battlelabs” exists because of a need.

Battlelabs or “Battlelab-like” cells have been established at several commands. In general these activities are prospering without being tied to the approved AFI structure. They typically have senior officer (at least 3-star) involvement and are attacking some important issues. Their “turn-on” time can also be very short (days instead of months).

6.1.4 Finding 4

The USAF has no process for Kenney Battlelab Initiative transition.

6.1.5 Finding 5

Battlelabs are not effectively coupled to AFMC.

The single AFRL representative at four of the six Battlelabs is inadequate to serve as a conduit for the diverse AFRL technologies, which should be routinely identified and made available to the Battlelabs. Most Battlelabs employ AFRL representative as an action officer, not as a conduit to the lab.

6.1.6 Finding 6

No Battlelab is given specific responsibility of assessing or improving effectiveness of force application.

6.1.7 Finding 7

Return on Investment (ROI) is too early to specify: Potential is there; not yet realized.

(This Page Intentionally Left Blank)

Chapter 7

Alternative Solutions

7.1 Introduction

In the course of this study, three alternative organizational structures are identified for consideration. These three alternatives are as follows:

- Maintain the current lab structure and make minor adjustments to enhance functionality.
- Merge current Battlelabs into a single structure with directorates at various locations. This Battlelab would ideally be commanded by a General Officer and would report to the Air Staff.
- Restructure Battlelabs, placing them under direct command of a cognizant MAJCOM. This MAJCOM-centric solution would remove the Air Staff from the process except for a single action officer and would feature annual accomplishment reports to Corona by the MAJCOM Commander.
- In addition to the above, the identified enhancement, applicable to all alternatives, is a means of stimulating interaction between Battlelabs and the Air Force R&D community. This would be a series of structured seminars, chaired by a retired four-star, which would bring together middle-grade operators (O-3/O-4) and working level researchers/scientists to identify solvable problems and develop solution methodologies.

An additional “Mixing Bowl” idea was developed along with the three alternative organizations mentioned above aimed at improving operator/technologist interaction within the USAF. The three alternatives will be considered first followed by a discussion on “Mixing Bowl” idea.

7.2 Discussion of Alternatives

7.2.1 Alternative 1

If the current structure is maintained, certain enhancements are needed to revitalize the Battlelab structure. First, the XO should be responsible for presenting a periodic (annual) review of Battlelab activity and accomplishment to Corona. This would provide continuing focus on the Battlelabs and would result in greater MAJCOM attention to the Battlelabs. Second, the Battlelab-funding scheme should be adjusted. All Battlelabs do not merit equal funding and staffing priority. Third, the cognizant Air Staff office (XOC) must build a relationship with the WRAP office to provide a path to compete for WRAP funding. Naturally, current funding and transition paths must be maintained. Fourth, the Air Staff should permit and encourage the development of *ad hoc* Battlelabs as required to meet MAJCOM needs. This would not necessarily imply Air Staff funding of these *ad hoc* Battlelabs, but would imply cognizance of their activities. Fifth, the Air Mobility Battlelab, in particular, should be given recognition as an Air Force Battlelab with funding provided from the current Battlelab fund. Sixth, priority staffing must be restored to the Battlelabs to ensure their vitality.

If this alternative is chosen, the existing structure will be improved with minimal effort. Conversely, transition of initiatives to implementation remains problematic and, barring MAJCOM sponsorship, will continue to be problematic. Further, Battlelabs will continue to “tinker on the margin” of Air Force problems, with questionable return on investment. Further,

this is not likely to enhance the AFRL/operator interface, and development of a Mitchell-class initiative is highly unlikely.

7.2.2 Alternative 2

A second alternative is to merge all current Battlelabs into a single entity, focused on the EAF, commanded by a General Officer, reporting to AF/CC or AF/CV, and consisting of directorates at various operating locations. These directorates should not be collocated with MAJCOMs but should be located, as at present, in areas where technology and operational focus can come together. These directorates should cut across MAJCOMs and FOAs and Corona would serve as the Board of Directors. In addition to replacing the current Air Staff Battlelab function, the Battlelab commander would be responsible for developing and advocating the transition path for successful initiatives.

This alternative would enhance the Air Force corporate commitment to Battlelab as well as their corporate identity, provide direct access to senior leadership, replace six commanders with one, and provide the flexibility to establish/diseestablish directorates and shift Battlelab focus in response to changing conditions. Conversely, this creates a new Air Staff agency, diminishes the MAJCOM role in Battlelabs, and requires reallocation of a General Officer slot. Also, absent other action, the operator/R&D interface remains weak.

7.2.3 Alternative 3

The third alternative involves refocus of the entire Battlelab structure to a MAJCOM-centric approach. In this approach, current funding and staffing (\$29 million and 150 personnel) would be equally apportioned to MAJCOMs according to current Battlelab distribution, including AMC. The MAJCOM/CC would provide oversight, determine the number and charter of their Battlelabs, provide additional resources as required, advocate transition of successful initiatives, and most importantly, report annually to Corona regarding progress and accomplishments. A single action officer to track and catalogue Battlelab status would replace the Air Staff Battlelab office.

This alternative provides multiple four-star guidance and oversight and encourages Battlelab establishment/diseestablishment in line with MAJCOM needs. The requirement to brief Corona should encourage “big” thinking and is most likely of all the alternatives to result in a Mitchell-class initiative. MAJCOM involvement reduces the problems associated with transition and eliminates a large Air Staff function. Conversely, this alternative blurs the Battlelab corporate image and eliminates central control of Battlelab activity. Additionally, MAJCOM/CCs could choose to use funding on non-Battlelab activities although accountability at Corona would mitigate this possibility.

7.3 Establish The Warfighter/Technologist Team (The “Mixing Bowl”)

7.3.1 Alternative Shortcoming

The alternatives listed above all have a common shortcoming. They provide little improvement to the lack of meaningful interface between the warfighter, the Battlelab, and the technologist in AFMC. This is a serious problem that we have given a lot of thought. We believe that it is not feasible to reorganize either the Battlelabs or the AFRL Directorates to achieve this. Rather, we believe there is an *ad hoc* procedure which would go a long way to providing this interface. For

lack of a better name, we call this the “Mixing Bowl.” The “Mixing Bowl” could and should be applied to any of the 3 alternatives.

7.3.2 The “Mixing Bowl” Concept

This concept, as shown in Figure 7-1, envisions a close intermixing of several types of relatively junior officers (O-3 to O-5) to solve a particular operational task or mission. Flight crew/operators, with recent combat experience, describe in considerable detail the planning and execution of a mission or operational task to an appropriate audience of Battlelab, technologists, development engineers, etc. This process will take several days per month for several months to get the language straight and break down the communication barriers. This is not a requirements process – it precedes that. It concentrates on “wish we had/wish we could” capabilities. From this process will come a multitude (perhaps over one hundred) of ideas, both long-term and near-term, that could lead to solutions.

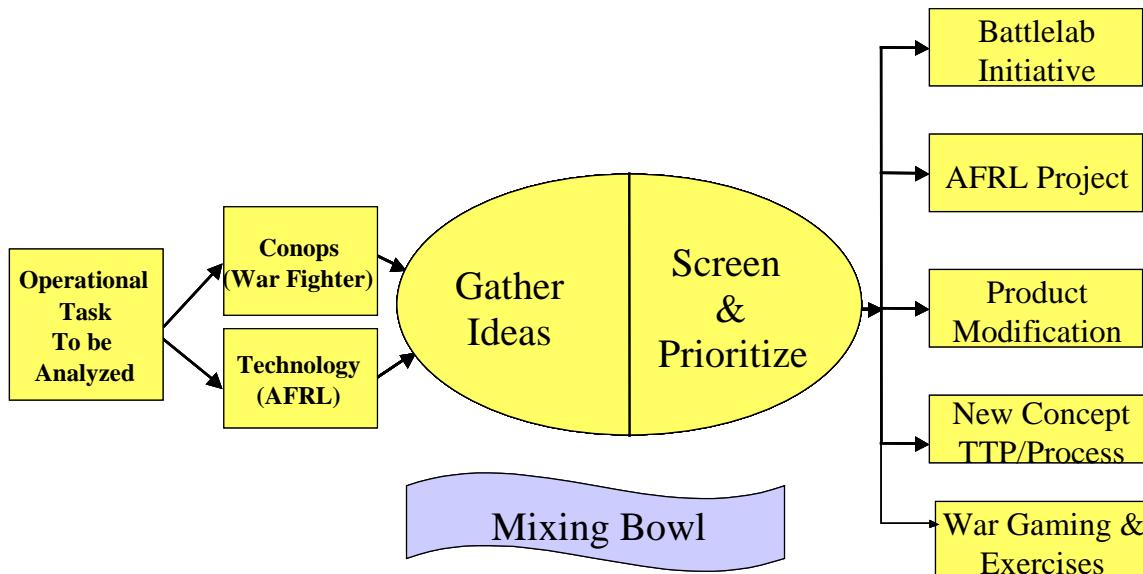


Figure 7-1. The “Mixing Bowl” Process

The next phase of the “Mixing Bowl” process is to prioritize or “rack and stack” the ideas into the most important to receive further study. When this process is finished (say a couple of months), the “Mixing Bowl” process is finished and all participants return to their home units. Now, action items can be assigned to proper organizations for further study and/or implementation. For example, those with near term potential could be assigned to the appropriate Battlelab to become an initiative with known warfighter support while long-term programs would be channeled to the appropriate AFMC activity.

The “Mixing Bowl” studies should not be expensive (a few hundred \$K for TDY and administrative support) and there could be several (perhaps three or four annually) proceeding simultaneously. Tasks to be studied can come from many sources from the senior leadership, or war games and exercises, to technical breakthroughs, etc.

To repeat, our experience with this process requires an appropriate “mixing” time. It does not occur at the first or second meeting. It also requires actual “hands on” operators with recent operational experience.

7.3.3 The “Mixing Bowl” Concept is Proven

The Laser Mission Study, the Lasers and Space Optical Systems (LASSOS) study, and the Directed Energy Applications for Tactical Airborne Combat (DE ATAC) study all successfully employed the “Mixing Bowl” concept. These studies addressed major USAF problems or far reaching technology opportunities. These studies were all mentored by a Senior Retired Air Force Officer and implemented as follows.

7.3.3.1 “Mixing Bowl” Implementation

The first step in implementation of the “Mixing Bowl” concept (Figure 7-1 above) is determining the task or problem to be analyzed. There are many sources from which these tasks or problems may be determined. A few are outlined as follows:

- Senior Leadership
- War Games
- Experiments
- War Time lessons learned
- Technical breakthroughs
- Operator/Technologist mission interchange

Three or four tasks might be identified each year from these above and other sources. Some examples include the following:

- Air Vehicle Survival
- Point of Use Aerial Delivery
- Precision Attack In Urban Warfare

Members from the warfighter/Battlelab and AFRL S&T communities then meet (as described in paragraph 7.3.2 above) three days per month for about four months. A distinguished retired Senior Officer Mentor, who is assisted by a Senior Advisory Group of Mentors, chairs the meetings. Next, with about a meeting per month for the next two months, the ideas are “racked and stacked” and down selected to arrive a doable and affordable list of prioritized initiatives.

Finally the prioritized list of affordable initiatives is reviewed and acted upon by a General Officer Oversight Council for assignment for action (long term vs. short term) (as shown in Figure 7-1).

7.3.4 The “Mixing Bowl” Implications

The “Mixing Bowl” Concept is a proven way of establishing an environment for innovation. If three or four of the most pressing Air Force problems or technology breakthroughs are put through the “Mixing Bowl” process each year, we are convinced that the **“Mixing Bowl” environment will permit innovation to thrive and in so doing will enable the most important problems and technologies associated with the Air Force to be recognized and worked.**

Chapter 8

Recommendations

8.1 Background

A hiatus exists between inventors who know what they could invent, if they only knew what was wanted, and the soldiers who know, or ought to know, what they want, and would ask for it if they only knew how much science could do for them. You have never really bridged that gap yet.

-Winston Churchill

To reiterate, with the above words of Sir Winston Churchill in mind and based on the Findings and Alternative Solutions presented earlier, the Study Panel respectfully submits the following recommendations.

8.1.1 Recommendation 1: Adopt a MAJCOM-centric approach to Battlelabs (Alternative 3).

- MAJCOM funded and operated
- Number/type decided by MAJCOM
- MAJCOM CCs present Battlelab initiatives to CORONA

8.1.2 Recommendation 2: Supplement Recommendation 1 above with a “*Mixing Bowl*” process. Intent is to cause intense multiple and frequent interaction between operational, Battlelab and AFRL personnel.

- Dream, create, identify, and prioritize solutions to specific, critical warfighting needs (CONOPS) (wish I had/wish I could).
- Assign important initiatives to Battlelabs, AFRL, or other existing organizations for action/transition.
- This process should identify ways to improve existing capability or discover totally new warfighting capabilities.

8.1.3 Recommendation 3: Strongly support the WRAP process to transition initiatives to the POM.

8.1.4 Recommendation 4: Establish procedures to ensure Battlelab commanders’ access to MAJCOM/CCs and CSAF.

8.1.5 Recommendation 5: Eliminate the Kenney/Mitchell distinction.

8.1.6 Recommendation 6: Eliminate the 18-month limitation concerning initiatives and specify only “near term.”

8.2 Concluding thoughts on Innovation

We were asked verbally our thoughts on the overall issue of innovation in the Air Force, of which the Battlelabs are a part. We believe that innovation is an environment, not a process. It cannot be managed as an acquisition program with milestones, schedules, etc. It can be

stimulated, focused, encouraged, and energized. We would be very wary of those who claim otherwise!

Appendix A

Terms of Reference

1.0 Background

Is the current Air Force Battlelab structure and architecture meeting AF needs? CSAF 2 Aug 1999 letter to AMC/CC, provided the following study guidance:

“I am directing a SAB study to review the current Battlelab structure and its performance in addressing Air Force needs. The study will also help to propose rationale and criteria for establishing and/or disestablishing Battlelabs as well as provide us some insights of how much innovation the Air Force can afford.”

The study will determine the best structure for AF Battlelabs to prove innovative operations and logistics concepts to advance AF core competencies and drive revisions to AF Doctrine, Organization, Training, Requirements, and Acquisitions.

1.1 Study Products

Briefing to SAF/OS & AF/CC in May 2000. Publish report in June 2000.

1.2 Charter

Based on this guidance, the study will accomplish the following tasks:

1. Compared to the original Battlelab intent and niche (as described and approved by the CSAF on 2 Feb 97), are the existing AF Battlelabs:
 - a. Performing as intended (e.g., what criteria/metrics can be used to measure a Battlelab's return on investment?)?
 - b. Have sufficient resources (funding, staff, etc.)?
 - c. Delineated properly (i.e., Air Expeditionary Force (AEF), Command & Control (C2), Force Protection (FP), Information Warfare (IW), Space, Unmanned Aerial Vehicle (UAV))?
2. Should the existing AF Battlelabs change course, organization/structure, or focus?
3. What process should be used to establish/disestablish AF Battlelabs?
 - a. What is the right number of Battlelabs?
 - b. What criteria/rationale can be used to determine when to establish/disestablish a Battlelab?
 - c. Should a sponsor (MAJCOM, FOA, DRU, etc.) start an innovation cell/flight/group and interact with an existing Battlelab for a specified period of time?
 - d. Should a nomination to establish/disestablish a Battlelab go before CORONA?

(This Page Intentionally Left Blank)

Appendix B

Acronyms and Abbreviations

| | |
|----------------|---|
| AATC | ANG/AFR Test Center |
| ACC | Air Combat Command |
| AEF | Aerospace Expeditionary Force |
| AFI | Air Force Instruction |
| AFIWC | Air Force Information Warfare Center |
| AFMC | Air Force Materiel Command |
| AFRL | Air Force Research Laboratory |
| AFROC | Air Force Requirements Oversight Council |
| AIA | Air Intelligence Agency |
| AMWC | Air Mobility Warfare Center |
| ANG/AFR | Air National Guard/Air Force Reserve |
| BOD | Board of Directors |
| C ² | Command and Control |
| CC | Commander |
| CENTAF | Central Air Forces |
| CENTCOM | Central Command |
| CSAF | Chief of Staff of the Air Force |
| DE ATAC | Directed Energy Applications for Tactical Airborne Combat |
| EAF | Expeditionary Aerospace Forces |
| FOA | Field Operating Agency |
| IW | Information Warfare |
| LASSOS | Lasers and Space Optical Systems |
| MAJCOM | Major Command |
| MALD | Miniature Air-Launched Decoy |
| POM | Program Objectives Memorandum |
| SFC | Security Forces Center |
| STEP | Stripes for Exceptional Performers |
| SWC | Space Warfare Center |
| TDY | Temporary Duty |
| TOR | Terms of Reference |
| TRADOC | Training and Doctrine Command |
| TTP | Tactics, Techniques, and Procedures |
| UAV | Unmanned Aerial Vehicle |
| USAF | United States Air Force |
| WRAP | Warfighter Rapid Acquisition Process |

(This Page Intentionally Left Blank)

Appendix C

Agencies and Their Responsibilities Associated with the Air Force Battlelab Process

1.0 The Air Force Battlelabs

Each Battlelab will pursue innovation in its specific mission or functional area and will operate in concert whenever broader cross-cutting innovations are identified. Air Force Battlelabs will review, evaluate and nominate BI proposals as KBIs, or MBIs. Battlelabs will not certify equipment or systems for operational use. Battlelab Commanders will be responsible for identifying, planning, leading, and reporting Battlelab products in accordance with this instruction and AFPD 10-19 Air Force Battlelab Policy. Battlelabs will present KBIs to responsible MAJCOM or FOA for review, approval, and allocation of funds from programmed KBI budget.

2.0 The Battlelab Planning Cell

The BPC consists of colonels representing each Battlelab, the Air Force Doctrine Center (AFDC), HQ USAF/XORBB, HQ USAF/ILXX, and MAJCOMs or FOAs as desired based upon agenda. The BPC has three main functions: (1) ensure ideas proposed as BIs are innovative and focused on operations and logistics concepts; (2) build synergy between the Battlelabs and prevent redundancy; and (3) serve as the planning staff to assist development of MBI Campaign Concept. MBI Task Force Directors executing MBIs can use the BPC for planning and coordination. The BPC will review all proposed initiatives initially and then periodically on an “as needed” basis to make recommendations supporting the rapid coordination, planning, and execution of KBIs and MBIs. The BPC will draw upon the expertise of AFMC to rapidly generate and leverage existing technical capabilities. To rapidly generate funding alternatives to execute MBIs and assimilate proven concepts, the BPC will draw upon the expertise of the Deputy Chief of Staff for Installations and Logistics (HQ USAF/IL), the Deputy Chief of Staff for Plans and Programs (HQ USAF/XP), the Assistant Secretary of Air Force Acquisition (SAF/AQ) and the Assistant Secretary of Air Force Financial Management, Comptroller (SAF/FM).

3.0 The MAJCOMs and or Field Operating Agencies

MAJCOMs and FOAs will: (1) manage and oversee Battlelab identification, planning, and execution of KBIs and MBIs; (2) sponsor candidate MBIs and after initiative reports for MBIs and KBIs for AFROC and BOD review; and (3) appoint Task Force Directors to lead MBIs approved by the BOD.

4.0 The Air Force Requirements Oversight Council (AFROC)

The AFROC will review all after initiative reports as well as MBI Campaign Concepts to ensure candidates offer innovative operations or logistics concepts with a clear Demonstration Mission Statement. The mission statement must fully develop alternative courses of action and funding as well as illustrate the organizations and resources required, and demonstrate a high probability of completion within 18 months. In addition, the AFROC will prioritize candidate MBIs.

5.0 The Air Force Board of Directors (BOD)

The BOD will review the MBI Campaign Concept and approve candidate MBIs by: (1) selecting a specific course of action; and (2) selecting a funding option from the alternatives presented. The BOD will review after initiative reports on all KBIs and MBIs forwarded from the AFROC and recommend follow-on actions to the Chief of Staff of the Air Force and the SECAF such as: (1) revising doctrine, training or tactics; (2) developing a Combat Mission Needs Statement and implementing by way of rapid acquisition effort; (3) modifying requirements and/or ongoing acquisitions; (4) establishing an Advanced Concept Technology Demonstration (ACTD) or Joint Test Program Initiative; (5) developing new requirements and a new acquisition program; or (6) identifying another appropriate approach.

6.0 Headquarters United States Air Force

The Directorate of Operational Requirements (HQ USAF/XOR), will serve as the focal point for all Air Staff coordination. Any Air Force agency and DoD Service organization may provide resources in support of BIs, to include services and equipment, however the transfer of funds requires prior approval by HQ USAF/XOR. Battlelab activities with non-Air Force organizations are governed by MOA or MOU and require HQ USAF/XOR approval, unless an existing MOA or MOU (wing or base level) is in place and is suitable.

Appendix D

SAB Contemporaneous Summary of Activity

1.0 Background

The Panel visited all six USAF Battlelabs during the course of this study. The Panel conducted a comprehensive review of each Battlelab's past accomplishments and current activity.

Additionally, the Panel reviewed the Air Mobility Warfare Battlelab and the Air Education and Training Command's Training Innovation Flight. Before each visit, the Battlelabs responded to a series of background questions and their responses are at Appendix E. Following each visit, Panel members recorded their contemporaneous impressions of each Battlelab.

All Battlelabs are busily and productively engaged in initiative identification, evaluation, and execution. To date, all initiatives have been Kenney Class. The Panel does not believe that a successful Mitchell Class initiative will emerge from the current structure. The Kenney Class initiatives completed to date all have value and appear to represent good return on invested dollars. The Panel saw no case of frivolous initiatives or wasted funds. Clearly, not all initiatives have, nor should they have, a successful outcome, but the selection process appears to have universally and appropriately focused on military utility given a successful outcome.

2.0 Organization

All of the Battlelabs are subordinated to a Center, except for the Air Expeditionary Force (AEF) Battlelab, which is subordinated to the 366th Wing. General Officer involvement above the two-star level is rare. We noted that no initiative was the result of a referral from a MAJCOM Commander. We also noted that the autonomy of the Battlelabs varied considerably with the AEF Battlelab experiencing the least day-to-day oversight and the Force Protection Battlelab receiving the most detailed direction from the General Officer level. By the same token, no standard or routine process for moving initiatives from identification through completion exists. The Battlelabs have developed procedures which are appropriate to their operating environment and have each ensured that internal Battlelab procedures are not an impediment to innovation.

We further noted that a shortage of ideas and material for Battlelab attention is not a problem. At the current funding level, each Battlelab must reject numerous ideas to focus on those deemed most productive. The current Air Staff funding approach assumes that each Battlelab has equal functional importance since equal funds are assigned to each Battlelab. Given that each Battlelab is overseen by a Center and usually by a MAJCOM, the value added by Air Staff oversight is not apparent.

3.0 Findings and Issues

The most pervasive issue faced by the Battlelabs relates to transition of successfully demonstrated technologies and concepts to production or operational implementation. Simply stated, the U. S. Air Force has no viable mechanism, short of the POM process, for providing program funding. Absent funding, there is no program. This means that when an initiative is briefed to the AFROC, absent a personal champion willing to commit funds, the initiative will at worst die and at best will not be implemented until the two-year POM process can function.

The Panel believes that the 1996 Battlelab founders (Fall Corona '96) envisioned an additional function for the Battlelabs. We suspect that these founders saw the Battlelabs as a bridge between the Air Force operational communities and Air Force research activities. Our review shows no such link. Most initiatives come from industry, operational forces, or the innovative minds of Battlelab personnel. AFRL has assigned a liaison person to four of the six Battlelabs but there is no evidence that this has resulted in any new approaches by the Battlelabs. If the Battlelabs are to perform this technology insertion function, they must receive additional resources or be directed to redirect their efforts within current resources. In this connection, we reviewed the Air Force Materiel Command AF Battlelab Support Handbook (Draft). Although we applaud the effort, we note that the Handbook contains few actionable responsibilities and provides no controls or milestones to either measure or ensure compliance.

The Panel noted that the Air Mobility Battlelab appears to be very successful in addressing Air Mobility problems even though their funding level, from AMC internal sources, is only 15% of individual Air Force Battlelab funding. We also noted that AETC is successfully pursuing several innovative initiatives using internal AETC funds. Significantly, the initiative review and approval process seemed to be somewhat more rapid and less bureaucratic than at the Air Force Battlelabs.

We also noted that the Air National Guard and Air Force Reserve Test Center (AATC) functions as a de facto Battlelab for the Reserve Components. The AATC, like the Air Mobility Battlelab, is innovative, productive, successful, and funded by its parent organization. AATC is unique in that transition of initiatives appears to be less problematic than is the case in Battlelabs.

Another significant finding relates to selective personnel assignment. When the Air Force Battlelabs were formed, they received priority attention in staffing. All Battlelabs report that they are now staffed through the normal process with no particular priority. The Air Mobility Battlelab, however, reports that AMC has continued to afford them priority in staffing. We should also note that assignment to a Battlelab is not seen as career enhancing by either field-grade officers or senior NCOs. There is no Air Force-wide system for capturing and exploiting the unique perspectives and experience of Battlelab veterans. Finally, we noted that there are no initiatives in any Battlelab related to the delivery of lethal fires from manned aircraft. This lack of focus on force application is predictable, given the structure of Air Force Battlelabs.

Appendix E

Battlelab Written Responses to SAB Queries

1.0 Air Expeditionary Force Battlelab

1. What is the source of your initiatives? At the AEF Battlelab, our ideas for initiatives and demonstrations come from many sources. We take input from the field via our web page, or from ideas brought to us directly from someone in the field who is looking for a forum or stage to display some good product or process that is “homegrown.”

We also solicit ideas from commercial vendors through our Broad Agency Announcement, which is carried in the Commerce Business Daily on a recurring semi-annual basis.

We also take input for concept demonstrations or initiatives from traditional AF sources, for example AFCA, or ASC/SM (PRAM) Following is a short list of sources for some of the initiatives we have run or are running at the AEFB:

- Compact Air Transportable Hospital (CATH) from the 366th Med Gp and ACC/SG
- Self-Regulating Anti-G Ensemble (SAGE) from industry
- EOC Enroute originated in the AEF Battlelab
- Common Boresight from the 12th AF/CC
- Integrated Planning and Execution Capability (IPEC) was at the request of USAF/ILX
- Combined Aerospace Ground Equipment (CAGE) from ACC/LG and the ASC/SM PRAM office
- Wireless AEF Communications from AFCA
- Digital X-Ray from 93rd ACW Robins AFB

2. How do you generate the experiment in the first place (planning) and how do you get it going/approved (execution)? (internal process and external process) There are four broad phases that an idea or concept must pass through:

1. Idea (meets an internal Idea Screening Board (ISB) & is *advanced, forwarded, linked, or deferred*)
2. Concept (meets an internal Concept Evaluation Board/Murder Board...a designated subject matter expert, or team presents, idea is scored using recently revised model, needs vote of ¾ of AEFB members, Concept is advanced, killed, or deferred/on hold)
3. Commander’s Evaluation Board (CEB): At the conclusion of the Murder Board, all Initiatives meet a CEB. The CEB is the commander’s opportunity to ensure that the initiative is executable in terms of technology, time-line, and funding. It is also the Concept Evaluation Team’s opportunity to appeal unfavorable Murder Board results, and adjudicate any differences arising between panel members of the Murder Board and the Concept Evaluation Team. If it passes the CEB, it becomes a Draft Initiative.
4. Draft Initiative meets a Commander’s Review board (CRB), if the draft initiative passes, it is then scheduled for a presentation to the Battlelab Planning Cell (BPC). The BPC consists of the Commanders of the other six AF Battlelabs and the Director of the Battlelab Integration Division (XORB) and his/her staff. The briefing is primarily a context review to ensure that the hypothesis is properly stated and that at least some of the measures of evaluation are understood. Once past the BPC the KBI is finalized and staffed for approval. In the case of the AEF Battlelab, staffing and approval takes place through ACC/XR. The finalized Battlelab initiative lays out in a macro or executive format how an initiative will be conducted or phased.

3. If an initiative is successful, how do you transition it to the acquisition process or operational use? Transition of successful initiatives has been the most difficult part of the Battlelab activity. Transition to the acquisition process is not in the Battlelab's original charter; internal OI; AF Policy Directive, or AFI. At best, a casual transition strategy exists at the MAJCOM. The intention of the AFI is to hand successful demonstrations off to corporate AF sponsors to enter the acquisition process. The difficulty has been defining where one really is after a successful Battlelab demonstration, when measured against the traditional acquisition milestones.

Since, there is not a formal transition process at the MAJCOM; Battlelab after initiative briefings should remain tied to the formal AF requirements process, which means that initiative outbriefings should continue to go to the AFROC.

Preparing a briefing for the AFROC generates pressure within the MAJCOM's requirements community to be attentive to results and recommendations.

This doesn't mean that the MAJCOM is not attempting to address the transition issue. Recent steps at ACC to speed coordination of AEF Battlelab initiatives to the XR's desk for approval appear to be successful. As the process matures, and the various ACC staff agencies become more familiar with the AEF Battlelab's mission, it should become easier to build consensus for a transition strategy.

Recent USAF/XO and SAF/AQ activities to find avenues to transition the results of the experimentation process should facilitate not only the transition of Battlelab initiatives, but initiatives from the overall experimentation processes as well.

4. To what extent do you tolerate failure in initiative execution? The AEF Battlelab goal is to validate the concept, or demonstration objectives. However, failure to achieve the objectives or prove the concept is one of the valid outcomes of a Kenney-class or Mitchell-class Battlelab initiative. The real difficulty in dealing with a failure is in determining why a failure occurred. In determining the causes of failure, we must determine if the available technology was not yet mature, or inappropriately applied. We must also look at the human element; was the CONOPS poorly crafted or poorly executed. Or, were the measures of merit incorrectly defined. Generally, failure to achieve a positive evaluation in an initiative is not considered failure per se (the point of the demonstration is to ascertain just that).

We strive to remember that in most instances:

- Ideas don't fail, processes or facilitating technologies do
- During the course of an initiative we make course corrections as required
- We learn from mistakes
- Mitigate risk as much as possible before the start of an initiative
- And, we add resources or expertise so long as we remain within the scope of the original objective

5. To what extent are you guided by long range planning (JV2010, AF Vision, AF campaign plans, etc.)? JV2010, AF Vision: Although the AEF Battlelab goals of Reduced Support Structure, Reduce Response Time, and Increase Combat Capability were derived from

an internal focus effort these goals go hand in hand with the long-range plans, particularly the Air Force Vision. The AEFB goals cut across all the AF Core Competencies All the initiatives we undertake are graded based on the impact to our AEF Battlelab goals.

One of the questions each initiative team or subject matter expert is required to answer at an ISB is whether an idea or concept addresses a user need identified in a MNS, ORD, CRD, Roadmap, Mission Area Plan, Mission Thrust, or Top 40 list of modernization needs. If it does, so much the better, if not, we may still continue to pursue the initiative based on the merits of the idea or concept alone.

6. What is your contribution to military worth? Our contribution to military worth is to exploit the use of COTS & GOTS technology to rapidly bring new operations and logistics concepts into the AEF. We do this by using the expertise of people who have hands-on experience in operations and logistics. They know where improvements need to be made to help the AEF become lighter, leaner, and more lethal.

The resulting Battlelab efforts will provide the Air Force opportunities to reach investment decisions more quickly and organize, train, equip, and program, more effectively (AFPD 10-19)

7. What initiatives started in your Battlelab have transitioned to the USAF? CATH, IPEC, E-EOC,. Although not a USAF program, the technology could be considered as transitioned if the USAF (366th) is using it operationally.

8. What did you try to transition to the USAF, but it did not make it and was abandoned? Common Boresight (reevaluation by congressional direction/ funding insert)

9. Do you feel your results get a fair hearing (by AF leadership and/or the general public)? AEF Battlelab efforts get an extremely fair hearing and adequate exposure to AF leadership at the start of an initiative. However, when the initiative results are briefed up through the MAJCOM they do not get a fair hearing by AF leadership, or, adequate exposure to AF leadership, to gain sufficient advocacy to impact the MAJCOM's budget activity or POM process.

As discussed in question #6, the reengineered ACC/XR staff is aware of this and attempting to address the issue. Initiative approval as well as transition processes and strategies for successful AEF Battlelab demonstrations are still maturing. The largest obstacle to overcome is the organizational resistance that exists because the all the Battlelabs work outside the accepted requirements process.

10. What initiatives are being worked today? Advanced Time Critical Targeting, Bi-Level Loading, Common Core Power Production, Broadband Wireless System, DEDS-A, CASS-V, Digital X-Ray, DPART, EHPE, IFO, NGMT, SAGE, Wireless AEF Comm, Warfighter Gateway

11. Where do you see your Battlelab going in the future? In the near-term, there is a transition from USAF/XOR to USAF/XOC. All the AF Battlelabs will become more closely associated with the AF experimentation process further distancing Battlelab results from the corporate AF requirements process. In addition, we see a slowly growing effort to bridge from a successful demonstration to rapidly fielded acquisition. We see a change in how Battlelab successes are propagated throughout the corporate Air Force. In the near future, we see Battlelab initiatives that affect requirements remaining AFROC interest items. But those initiatives that do

not directly affect requirements will be sponsored by XOC to some other corporate activity in the Pentagon.

We see a maturing relationship with our MAJCOM advocates and we see an improving relationship with the ACC/XO community. ACC/XOD has proposed that they become our advocates within the XO staff.

In our technology process:

- Our first two years were a search for success (low hanging fruit)
- Now we are raising our sights to pursue longer range, higher risk horizons.
- We also see an increasing association with other services Battlelabs and an effort to work joint initiatives

Lastly, we see strengthening partnerships with R&D organizations like:

- DARPA to explore/demonstrate leading-edge technology concepts such as ATCT.
- AFRL for mutual benefit. AEFB wins by having direct link to AFRL's world and learning more about their new technologies. AFRL wins by using AEFB as a venue to "showcase" and rapidly demonstrate technology projects that could otherwise remain orphaned. AFRL also helps AEFB establish links with industry and academia (i.e., C2P2)
- Work with other service's BLs via the Alliance of All Service Battlelabs to find opportunities for mutual support, and to avoid duplication of efforts.
- Broadening of educational partnerships (Civilian, Military institutions)

12. Is a tour in the Battlelab perceived as career enhancing? Generally yes. The fact that the AEF Battlelab is organized at the wing-level has introduced some difficulty. Generally, the personnel system reacts to Battlelab requirements as if it was a wing-staff organization, which it is not. We compete for awards and decorations, and promotion recommendations against folks assigned to operational units—the playing field isn't level, because we rarely impact wing mission.

Factors like time-in-grade can play a negative role (i.e., a Major 2 yrs BTZ to LTC may actually get hurt by coming to AEFB. The AEF Battlelab is a flat, matrixed organization. Leadership opportunities and supervisory opportunities are gained during the conduct of an initiative as a Team Leader—an unrecognized supervisory billet in a "staff" organization assigned to an operational wing.

All in all, it can be a good career move. Personnel assigned to the AEF Battlelab are employed in a center of excellence for innovation. People come straight from the "field" and use their operational background to bring new technology to the AEF--that's new and challenging--a learning experience. Personnel learn skills that have the potential for significant application in other AF jobs.

13. Is there adequate funding for the Battlelab? Greater funding would allow better use of available manpower.

- All Battlelabs have constrained manpower allowances by AFI
- With greater funding, more of the support functions can be contracted out, i.e., comm, information management, graphics, PR,

- Greater funding will change the face of initiatives
- Allow us to accept more risk, and include higher dollar projects
- Allow more initiative through-put

14. Describe the process from cradle to grave of a successful and a non-successful initiative (from an AO, Lieutenant or Captain). Successful Initiative—Compact Air Transportable Hospital (CATH)

- CATH based on a 366 Med Gp idea to streamline the smallest deployable medical package, the Air Transportable Hospital
- July '97, AEFB hosted medical experts for ACC, AMC, AFSOC, and 366 WG.
- Conclusion—No AEFB initiative required, just a redesign of the UTC
- UTC redesign reduced medical pallets from 10 to 3; reduced personnel from 60+ to 24
- Based on a healthy population not engaged in combat ops.
- Redesigned UTC briefed to USAF/SG and endorsed
- USAF/SG redesignated UTC as Expeditionary Medical Support (EMEDS)
- USAF/SG designated 366 Med Gp as pilot unit for UTC
- Jul '98 AEFB revived CATH initiative because of perceived shortfalls in the EMEDS package—mainly no resuscitative surgery capability on arrival in a combat environment.
- The challenge was to remain within USAF/SG imposed limitations of 24 personnel and 3 pallet positions for deployment
- From Aug '98 through Dec 98 AEFB matured concept and appointed initiative lead—Lt Col Don Diesel
- In Feb'99 AEFB conducted a comparative demonstration between available COTS and GOTS hardware
- COTS—Advance Surgical Suite for Trauma Care developed for US Marine Corps
- GOTS—medically modified Alaska tents, a product of the Small Shelter System SPO (AAC/WMO)
- Demonstration conducted at Nellis AFB in Feb '99
- Medically modified Alaska tents preferred option by both medical and civil engineer communities
- Medical modifications included in Family of Small Shelter Systems ORD—Mar '99
- USAF/SG concurred with findings and provided immediate funding for contractor modifications of Alaska tents and procured 5 EMEDS sets—Apr '99
- SG provided follow-on funding for acquisition of 70 medically modified Alaska tents per year into foreseeable future—May '99
- Results briefed to ACC/XR and AFROC—Jun '99 (Information Only Briefing—no AFROC action required)

Unsuccessful Initiative—Common Boresight

- 12 AF/CC tasked AEFB to conduct evaluation of contractor proposal for a Common Boresighting Instrument, Jul 97
- Contractor premise was that a single, multi-platform boresighting instrument would enable an AEF to be more combat effective.
- Due to HHq tasking, AEFB process was truncated

- AEFB conducted a demonstration using 366 WG assets employing a laser boresighting instrument although another COTS option was available that used gyros. Team leader was Capt Paul Meserve
- AEFB concluded that a common boresighting instrument could support multi-platform harmonization of radar, HUD, and 20MM cannon. Further, for the F-15E, common boresighting instrument supported LANTIRN harmonization requirements
- AEFB also concluded that the limited boresighting requirements of the KC-135 and B-1B were also supported
- However, boresighting of any type while deployed/employed in combat ops is rarely accomplished (poor premise and poor demonstration CONOPS)
- Common Boresight was mainly an in-garrison, quality of life enhancing convenience
- Common Boresight instrument proved to be easier and faster to use than equipment provided by aircraft SPOs and authorized in TOA
- Mx personnel would be happy to have and use the common boresighting instrument, but not at the cost of acquiring the instruments when SPO provided tools essentially come free
- Results briefed to AFROC in May '98
- AFROC concurred with AEFB conclusion that payback was too far into the future for fighter aircraft only application
- AFROC tasked AFMC to conduct further investigation into boresight requirements for all AF owned aircraft. AFMC research results passed to AFROC in Oct '98 (suspense was Jan '99)
- AFMC conclusion was that boresight requirements for most other AF owned aircraft was very limited, and that payback timeline could not be significantly shortened

Common Boresight was set aside due to minimal impact on AEFs

15. What things do you think are working with your Battlelab? A small, focused organization with a streamlined process to bring innovation to the AEF. Already paying off with CATH, IPEC, and EOC, CAGE and NGMT, plus others in the pipeline.

- There is no directive or policy that limits autonomy or limits ability to build the required network to conduct my demonstration

16. What things would you do to improve your Battlelab's contribution? Create a “less than Kenney” category of initiatives that would enable the Battlelab Commander to procure and experiment with a certain number/amount of small items/concepts without having to seek HQ ACC approval

- Shorten the KBI coordination cycle. We are currently working with ACC/XR to achieve rapid coordination through ACC’s CAFROC process (<30 days)
- AF needs to establish a solid transition “process”
- AEFB’s AFMC liaison has helped greatly. Suggest AFMC consider assigning liaisons at other Battlelabs too.
- Establish name recognition in the AF

2.0 Space Battlelab

1. What is the source of your initiatives? The Space Battlelab (SB) takes inputs from anywhere. Specific examples include web site submissions, direct contact with theater warfighters, SWC, AFSPC, AFRL, Weapons School Space Division, AFMC, AFOTEC, referrals from other Battlelabs, national labs and national agencies.

2. How do you generate the [demonstration] experiment in the first place (planning) and how do you get it going/approved (execution)? (internal process and external process)

Idea Enrichment

Process Discussion

Screen Idea.

Objective: Gather information to present to Concept Development Branch.

The Research Officer (RO) collects the initial information from the idea submitter. This information is entered on the “Idea Screening Questions” form. For an idea to be accepted for further consideration, it must first meet certain criteria.

Support Core Competency – Concept meets at least one of the Air Force Core Competencies (Air & Space Superiority, Precision Engagement, Information Superiority, Global Attack, Rapid Global Mobility, Agile Combat Support)

Space System Link – Idea linked in some manner to a space system

Rapid Demonstration – Concept demonstrated / final report completed within 12-18 months of execution approval

Affordable Demonstration – Total SB cost less than \$500K

Technology Available – Required technology available within demonstration window

No Development Required – SB not involved in research or development

No Acquisition Program – Concept cannot require normal acquisition program

After collecting the required data (including contact information), the RO presents it to the branch for a consensus. Every idea submitted (no matter how off-the-wall) must be presented at the Branch Review.

Branch Review.

Objective: Members provide a “sanity check”; recommend other research avenues.

Once the idea passes the initial criteria, the RO presents it to all members of the Concept Development Branch. Issues to address include:

- Is idea feasible with current technology?
- What is the value added to the warfighter?
- Is there an opportunity to collaborate with other Battlelabs?

The branch chief will decide whether to pursue the idea further. If deferral is recommended, the RO contacts the idea submitter. (See next discussion session, “Inform Submitter.”) If the idea is accepted for further research, the RO inputs all collected information into the Idea Database. The branch chief may request additional written information from submitter (white paper, etc.). Additionally, the RO ensures a security check is accomplished by the SB Security Manager; this information is also entered into the database.

Inform Submitter.

Objective: Tell submitter why idea wasn’t accepted.

If the idea is deferred, the RO should contact the idea submitter to say why. If adequate reasons are given, the submitter may be able to resubmit the idea once changes are made. If the idea was received in written format, the reply should also be written. However, if the idea was received via a phone call, the reply can also be via phone (and e-mail with e-mail).

Research Concept/Maintain Record.

Objective: Conduct further research; maintain folder for future reference.

The RO conducts further research based on recommendations from the Concept Development Branch Chief and other branch members. This research is maintained in a record (folder) for future reference. The RO should also informally score the concept using the Value Model.

Value Model Scoring.

Objective: Evaluate proposed concept.

The concept is brought before other SWC directorates (DO, XR, AE) and the SB as a whole for its official scoring. This session allows a “gathering of the minds” – i.e., a chance to garner opinions from many areas of expertise; more recommendations for further research may result. The RO should be prepared to defend his/her scoring rationale; i.e., the RO should have a good understanding of how the idea relates to each part of the Value Model. The final score is used to compare one concept with another and aids SB staff in determining which ones to pursue.

Branch Chiefs’ Review.

Objective: Identify issues needing further consideration.

The branch chiefs review the record and determine if all possible areas have been researched. Questions to consider include:

- Has anything been overlooked?
- Is the concept approach logical?

Commander’s Review/Recommendation.

Objective: Continuation decision.

Once the branch chiefs have reviewed the concept and its approach, they make a recommendation to the Space Battlelab Commander. SB/CC then makes a go/no-go decision. If deferral is recommended at this stage, the same rules should be applied as in the “Inform

Submitter” section above. If more research is recommended, the process reverts back to that area in the flow chart. Otherwise, SB/CC and the demonstration branch chief choose an action officer to take over the idea; the idea officially becomes an initiative.

DEMONSTRATE MILITARY UTILITY

Process Discussion

Identify Champion.

Objective: Identify advocate willing to seriously consider adopting new concept if demonstration is successful.

Finding an advocate (champion) for implementing the concept is critical. The champion many times is an end-user; the AO should return to the Idea Database to determine if research located strong advocates. As a minimum, the AO should identify which agency/office would make the decision to implement the concept.

TERMINATE. If no champion can be found, the idea will most likely be shelved for future consideration. Sometimes, it's just a matter of time until the right agency is contacted; however, SB/CC will likely set a time limit for the champion search.

Build Campaign Concept.

Objective: Outline general aspects of the proposed concept demonstration.

The initial demonstration approach is discussed in this document; the following outline should be used.

1. Demonstration Mission Statement
 - a. Problem
 - b. Objective(s) and Measures of Merit
 - c. Time Required
2. Course of Action
 - a. Strategy to Achieve
 - b. Methods of Measurement
 - c. Schedule and Risk
 - d. Funding Required
 - e. Expertise Required
 - f. Organizational Support
3. After Initiative Report

Battlelab Planning Cell (BPC).

Objective: Review proposed concept; advise/recommend.

The AO orchestrates specific details for the demonstration (cost, schedule, performance, etc.). Some issues to address include:

- What are the projected life-cycle costs?
- Is there a champion ready to procure this idea if the demonstration is successful?

Once such questions have been answered, the AO presents the concept to the other AF Battlelabs at the BPC. The BPC is another “sanity check”; the AO may receive more points of contact or may collect other issues needing consideration. However, it is important to note the BPC is merely an advisory board, not an approval board; SB/CC may choose to proceed with an initiative regardless of BPC comments.

Preferably, the concept is presented to the BPC before GOAG #1. However, if scheduling does not allow this, it can be presented after (thus the coinciding routes on the flowchart).

Brief Goag #1.

Objective: Obtain permission to proceed with detailed planning.

The first concept presentation to the General Officer Advisory Group (GOAG) is based on the Campaign Concept but does not include cost or schedule.

SB/CC Review.

Objective: Identify any problems/vulnerabilities; determine where to re-enter process.

SB/CC and the team directors will review any comments made by the generals during the GOAG. If the generals did not support idea continuation, SB/CC will decide on the next course of action.

Build Detailed Campaign Plan.

Objective: Details plans for concept demonstration.

This document contains much of the same information as the Campaign Concept but elaborates on the demonstration schedule and associated costs. The schedule should be as firm as possible, and all costs should be nailed down and identified by category.

Establish Agreements.

Objective: Establish written understanding between SB and other agencies.

If support is required from an agency within the SWC, an in-house memorandum will generally suffice; this letter should outline the responsibilities of all offices involved and should be signed by each. If support is required from an agency outside the SWC, a memorandum of agreement/understanding is appropriate.

Brief Goag #2.

Objective: Resource allocation (obtain execution approval).

The second concept presentation to the GOAG includes the same information as the first briefing but also includes in-depth detail about cost and schedule, as well as an implementation strategy. Value Model charts are also included. The AO asks permission for initiative execution; if granted, the required funding will be released shortly after GOAG conclusion.

EXECUTE DEMONSTRATION. The AO prepares for demonstration execution under the branch chief’s supervision. Demonstration specifics will vary and thus will not be discussed here.

Prepare After Initiative Report (AIR).

Objective: Identify what was done, why it was done, how it was done, the results, and executable recommendations.

The AIR should be completed 30 days after demonstration

3. If an initiative is successful, how do you transition it to the acquisition process or operational use? SB addresses this in the earliest phases of concept development. We strive to identify a champion (sponsor/advocate) even before a campaign plan is developed. Throughout the entire process we continually cultivate relationships with appropriate organizations to identify a transition path.

4. To what extent do you tolerate failure in initiative execution? SB does not tolerate poor project management that would result in failure to execute the demonstration. However, if a properly executed concept demonstration fails to meet expectations, a level of success is still achieved. The results don't define whether a demo was a success or a failure; a successful demo is one that fully explores the concept.

5. To what extent are you guided by long-range planning (JV2010, AF Vision, AF campaign plans, etc.)? Minimal; while we always consider these elements in the background, we are more focused on what we can provide the warfighter today.

6. What is your contribution to military worth? We feel the SB's worth is in identifying space opportunities and deficiencies that would have otherwise been overlooked or undervalued.

7. What initiatives started in your Battlelab have transitioned to the USAF?

- **Space Surveillance Network Optical Augmentation (SOA).** **Status:** Transitioned. Currently unfunded at HQ AFSPC under the new program name Small Aperture Telescope Augmentation (SATA). Currently one of the two ideas that are being reviewed to meet deep-space metrics tracking mission.
- **Hyperspectral Collection Upon Pikes Peak (HICUPP).** **Status:** Transitioned. Handed off to national organizations as a tactics, techniques, and procedure concept.
- **Commercial Applications for Combat Effectiveness (CACE).** **Status:** Transitioned. Military units are purchasing Iridium handsets in accordance with DoD policies.
- **Space Environmental Network Display (SEND).** **Status:** Transitioned. SMC refocusing \$9.2M of sensor upgrades to operationalized SEND technologies in FY00.
- **Doctrine.** **Status:** Transitioned. While the product SB received was unusable for its original purpose, the space doctrine demonstration had far-reaching effects. It became a catalyst for HQ SWC to re-evaluate its mission and has led to HQ AFSPC/CC approval of a SWC reorganization to include the development of an Aerospace Tactics School which will write space doctrine.

8. What did you try to transition to the USAF, but did not make it and was abandoned?

The only SB initiative to be abandoned so far has been Space Doctrine. This was abandoned because the product was totally unusable. However, because the SB helped identify a shortfall in space doctrine, HQ SWC and HQ AFSPC have taken steps to alleviate the issues surrounding space doctrine.

Another of our initiatives is on the HQ AFSPC unfunded list. STAR was originally accepted by HQ AFSPC/DOY, but is now on indefinite hold.

9. Do you feel your results get a fair hearing (by AF leadership and/or the general public)?
Absolutely! We are satisfied with the level of support.

10. What initiatives are being worked today?

a. In Reporting Phase:

- Modified Atmospheric Density Model (MADM). Demonstrate the ability to generate improved accuracy orbit predictions for low-earth orbit (under 800 km altitude) satellites by using enhanced atmospheric density calibration techniques.
- Space Object Identification (SOI) in Living Color (SILC). Demonstrate the use of multi-color photometry to identify deep-space satellites.

b. Initiatives Under way:

- Warfighter Gateway. Demonstrate the ability to place near real-time information into the cockpit using a KC-135 as a communications relay.
- Satellite Tracking of Re-entry Vehicle (RV) Convoys (STORC). Demonstrate the use of GPS to automate tracking of RV convoys' & maintenance teams' locations throughout a missile complex.
- Commercial-off-the-shelf AFSCN Scheduling Tool (CAST). Demonstrate commercial-off-the-shelf (COTS) programs can augment the existing AFSCN.
- BIA Reach-back Involving Space Collectors (BRISC). Use space assets to relay bomb impact information from the Joint Air-to-Surface Stand-off Missile (JASSM) to the Air Operations Center.
- Infrared Cloud Monitor (IRCM). Demonstrate that an infrared cloud sensor can enhance optical sensor site scheduling.
- Hawkeye. Demonstrate tactical utility of hyperspectral technology by producing timely and accurate products in an operationally realistic setting.
- GPS Availability to Overcome Resistance (GATOR). Part One: Demonstrate you can geo-locate GPS jammers. Part Two: Assess vulnerabilities of GPS dependent operations.
- Commercial Antenna Network Evaluation (CANE). Demonstrate dynamic command and control of multiple satellite classes by commercial providers.

11. Where do you see your Battlelab going in the future? Right now, the SB enjoys an exceptionally good working relationship with its host unit as well as its MAJCOM. Assuming this relationship continues into the future, we see our focus expanding into space warfare as opposed to just bringing space to the warfighter.

12. Is a tour in the Battlelab perceived as career enhancing? No, unfortunately it's looked at just like any other assignment.

13. Is there adequate funding for the Battlelab? Yes. The Space Battlelab could spend more money, but the funding we do have forces us to leverage and collaborate in order to achieve our goals. We have found that this teaming results in a higher level of success.

14. Describe the process from cradle to grave of a successful and an unsuccessful initiative (from an AO, lieutenant or captain). A successful demonstration is one that comes from the warfighter as a need, and we are able to find a solution quickly. That initiative would go through all the wickets outlined in question number two to validate its value. Once the value is validated, we execute as soon as possible, all the time pushing for a successful transition.

An unsuccessful demonstration would be one that we are told to do no matter what. This would be considered "hobby shopping."

15. What things do you think are working with your Battlelab?

- Exceptional relationship with host unit and MAJCOM
- Good esprit de corps and internal communication
- We are warrior focused
- Good internal procedures and processes

16. What things would you do to improve your Battlelab's contribution? Not just for our Battlelab, but for all Battlelabs, better marketing and exposure of what Battlelabs are and what they can contribute.

Improved assignment continuity, controlled tour lengths and by-name/special duty assignment selection authority for the Battlelab commander.

3.0 C2 Battlelab

- 1. What is the source of your initiatives?** AFRL, Industry, Staff (AC2ISRC/ACC/Air Staff), MAJCOMs/NAFs, AFCA, and internal
- 2. How do you generate the experiment in the first place (planning) and how do you get it going/approved (execution)?** (internal process and external process) When an idea comes in it goes to the Research Division. Research relates it to our vision documents and ties it to the AC2ISRC Capstone Requirements Document and specific end states & objectives. They assess the technical feasibility and check to see what other agencies are doing to solve the same problem. If the idea fits the C2B charter, is feasible and does not duplicate ongoing work by other agencies, it goes into a rack & stack of initiative candidates. The most promising candidates that meet the needs of the MAJCOMS and fit the AC2ISRC roadmaps are chosen for execution. A formal proposal is drafted and staffed through the BPC and AC2ISRC staff for approval by the AC2ISRC/CC.
- 3. If an initiative is successful, how do you transition it to the acquisition process or operational use?** By developing a transition plan with the AC2ISRC staff. There is guidance drafted and awaiting approval at the AC2ISRC that codifies a parallel transition planning process. Successful Battlelab initiatives compete for transition funding along with JEFX initiatives and ATDs.
- 4. To what extent do you tolerate failure in initiative execution?** We have a high tolerance for failure, but the nature of or selection process tends to drive selection of initiatives with high potential for success.
- 5. To what extent are you guided by long range planning (JV2010, AF Vision, AF campaign plans, etc.)?** As discussed in question #2 we tie all ideas to our vision documents. While we are not constrained by the documents (ideas can be vision creating) we have yet to receive an idea that is not supportive of the long range vision documents.
- 6. What is your contribution to military worth?** It is measured by each initiative – in fact the objective of an initiative is to measure the military worth of ideas.
- 7. What initiatives started in your Battlelab have transitioned to the USAF?** Collaborative tools (IWS is in the field), ELVIS – fielded through DISA, model site established at 9th AF, Hill ATO DeFrager – being fielded; USAFE complete, PACAF next, Hardware footprint Reduction – equipment listed on the ACC way web site and available for purchase by AF units requiring reduced footprint ADP systems
- 8. What did you try to transition to the USAF, but it did not make it and was abandoned?** ATO Visualization in TBMCS
- 9. Do you feel your results get a fair hearing (by AF leadership and/or the general public)?** Yes
- 10. What initiatives are being worked today?** Joint Applications for Speech Technologies, JFACC Information Viewing Environment, Federated Assessment & Targeting Enhancements,

ISR Battlemanagement, Dynamic Re-Planning, DARPA JFACC, Warfighter Gateway, Airborne Communications Relay

11. Where do you see your Battlelab going in the future? Continue to improve the relative worth and relevancy of our initiatives and improve our transition planning

12. Is a tour in the Battlelab perceived as career enhancing? Depends on the AFSC – for rated, no, for intel, engineers & space, maybe

13. Is there adequate funding for the Battlelab? Yes

14. Describe the process from cradle to grave of a successful and a non-successful initiative (from an AO, Lieutenant or Captain). Not sure of the scope of this question. Successful initiatives make it through the rack & stack process, are executed within the planned budget and time, make specific recommendations that are embraced and carried out by the corporate airforce. Along the way an initiative can fail due to execution (not enough funds, technology immature or inadequate). A successful initiative can still fail by the corporate air force failing to enact the recommendations.

15. What things do you think are working with your Battlelab? Idea selection and Initiative Execution

16. What things would you do to improve your Battlelab's contribution? Transition Planning to include finding funding and marketing results

4.0 UAV Battlelab

- 1. What is the source of your initiatives?** Initiative ideas result from a variety of sources. There is no single specific source or method of gathering ideas. Battlelab action officers obtain ideas from discussions with UAV operators, headquarters staffs, air operations centers, research facilities, industry experts, and open literature, to name a few. The Battlelab is also involved with a variety of working groups for both UAV platforms and imagery exploitation and dissemination. Field visits to CINC staffs and their components and lessons from contingency operations are additional sources of warfighting ideas. The collection of ideas is a continuous grass roots process. The Battlelab develops the most promising ideas into initiatives.
- 2. How do you generate the experiment in the first place (planning) and how do you get it going/approved (execution)? (internal process and external process)** The UAV Battlelab review board guides the development and selection of ideas that become Kenney or Mitchell class initiatives. The Battlelab Commander chairs the Review Board which meets monthly to review ongoing and new initiative ideas. Selection criteria includes, but is not limited to the following: cost, time, impact, sponsorship, risk, Battlelab goals and objectives, AC2ISRC priorities, and Air Force core competencies. When an idea is selected as a potential initiative, more extensive research is conducted to include cost and schedule. Once the initiative is approved by Battlelab commander, it goes forward to the Battlelab Planning Cell and then to the AC2 & ISR Center Commander for final approval.
- 3. If an initiative is successful, how do you transition it to the acquisition process or operational use?** Results of Battlelab initiatives are provided to the appropriate MAJCOM or equivalent for implementation, as appropriate. The Battlelab mission is to identify and prove the military worth of innovative concepts. The Battlelabs are not postured or resourced to conduct transition execution. Battlelab results are not limited to just the acquisition process, but can also impact Air Force organization, training, tactics and procedures.
- 4. To what extent do you tolerate failure in initiative execution?** The Battlelab is reasonably risk tolerant in execution. It's the selection of initiatives that tends to be risk averse. The expectation to produce near-term results that can be "transitioned" to operational use drives the selection process to be more conservative. It also lengthens the time to coordinate with all the stakeholders in the process.
- 5. To what extent are you guided by long range planning (JV2010, AF Vision, AF campaign plans, etc.)?** The primary linkage for Battlelab initiatives is to Air Force core competencies. Below that, the Battlelab uses mission needs statements, operational requirements documents, integrated priority lists and other declarations to support its initiatives. The Battlelab normally tries to tie recommendations to roadmaps, as appropriate.
- 6. What is your contribution to military worth?** The Battlelab contributes to military worth through the operational experience of its personnel. As a result, the Battlelab contributes the ability to develop sound concept of operations founded in an understanding of service doctrine and warfighting principles in which to demonstrate new ideas and technologies or to solve problems for operational commanders. That is why it's crucial for the Air Force to keep the Battlelabs filled with the right mix of operational expertise.

7. What initiatives started in your Battlelab have transitioned to the USAF? Precision targeting technology with Predator was a Battlelab initiative that was simultaneously introduced into operations during ALLIED FORCE. Residual capability was left in place at Beale AFB and the Joint Analysis Center, RAF Molesworth, UK. Headquarters Air Force, XOI, is in the process of transitioning this capability, now called Enhanced Precise Positioning Integrated Capability, into Distributed Common Ground Stations and Theater Battle Management Core System.

- At the request of USCENTAF, the Battlelab developed a microwave and X-band satellite dissemination system for Predator video that uses military instead of commercial KU-band satellite equipment.
- The Battlelab demonstrated the value of UAV video integrated onboard JSTARS. The JSTARS requirements document is scheduled to be revised with a need to receive video from off-board sources.
- The Global Hawk requirements document includes items for both a traffic collision and avoidance system, as well as a Joint terminal Information Dissemination system. The Battlelab conducted initiatives with both of these technologies and recommended they be included into Global Hawk.

8. What did you try to transition to the USAF, but it did not make it and was abandoned? Nothing to date has been totally abandoned. That said, the Battlelab conducted a demonstration that used an off-the-shelf laser illuminator mounted on a UAV. The purpose was to mark targets at night for aircraft equipped with Night Vision Goggles conducting close air support or air interdiction. Subsequently, USAFE developed a combat mission needs statement for a laser designator to be installed on Predator. While the illuminator concept is still under consideration, it is a secondary a priority.

9. Do you feel your results get a fair hearing (by AF leadership and/or the general public)? The Battlelab chain of command has given all the UAV Battlelab initiatives a fair shake. In fact, one senior leader went against the advice of his own staff and approved the Real Time Imagery to Decision-makers initiative despite his staff's objections. It's the staff bureaucracy that tends to resist change and to be an impediment to Battlelab ideas.

The briefing process beyond the MAJCOM is broken. Without MAJCOM sponsorship and funding, Battlelab initiatives become information briefings and are of marginal interest to the AFROC and beyond.

10. What initiatives are being worked today? Current UAV Battlelab Initiatives:

Mission: Rapidly identifies and proves the worth of innovative ideas that improve the ability of the Air Force to execute its core competencies and joint warfighting.

Active Initiatives: Five active KBIs:

- *Active SEAD:* Approved Mar 98. Designed to determine whether UAVs can decoy, detect, identify, jam, and/or target threat systems either independently or in support of a strike package, allowing control of the payload from fighters and C2 platforms, in addition to the ground payload operator. Flight demonstration scheduled for May 00.
- *Combat Identification (CID):* Approved Jul 99. Determine the added military value of using a UAV to assist in the locating and identification of friendly forces. Demonstrate how a UAV

integrated with a Situational Awareness Data Link (SADL) can be used to provide theatre forces with timely and accurate ability identify and locate blue forces. Flight demonstration to be conducted during All Service Combat Identification Evaluation Team, 28 Feb 00 to 10 Mar 00.

- *GPS Airborne Pseudolite (GAP)*: Approved Jul 99. Enhance navigation warfare capabilities by using an unmanned aerial vehicle to protect and prevent the use of satellite navigation systems. Demonstrate how a UAV coupled with satellite navigation technology can be used to mitigate hostile use of satellite navigation by unfriendly forces while ensure unimpeded us of GPS for US and Allied forces. Flight demonstration at Ft Huachucha in May 00.
- *Predator Moving Target Indicator (Stingray)*: Approved Oct 99. Enhance Predator's operational capability to detect, identify and track moving targets using the Tactical Endurance Synthetic Aperture Radar (TESAR) in Moving Target Indicator (MTI) mode. Modify the existing Predator TESAR to enable the MTI mode and determine the added military value of using MTI to cue existing EO/IR sensors to locate, identify and track ground and maritime moving targets. Phase 1 is a radar characterization using a manned platform scheduled for Apr 00 at Eglin AFB.
- Video Over Low bandwidth (VOLB): Approved Jul 99. Determine the added military value of using tactical X-band satellite terminals as a means of disseminating UAV video. Effort requested by USCENTAF who is currently restricted from distributing Predator video in theater via commercial means. Battlelab performed demonstration at Langley AFB reachback site that indicated Predator video can be compressed to 350 Kbps and still provide useable situation awareness quality video. Implementation expected during next Predator deployment to USCENTCOM area of operations.

11. Where do you see your Battlelab going in the future? The UAV Battlelab needs to more involved with the operational aspects of flying and maintaining unmanned aerial vehicles. To date, both Predator and Global Hawk have been relatively unreachable in getting access to platforms and associated equipment. The Battlelab needs access to Air Force UAVs in order to drive new tactics, techniques, and procedures as well as payload integration. This includes access to an air operations center for dynamic battle control and test ranges for future UAV weapons integration.

12. Is a tour in the Battlelab perceived as career enhancing? No.

13. Is there adequate funding for the Battlelab? Battlelab funding is adequate to continue initiatives that deal with UAV data and imagery processing. However, flight operations and air vehicle modifications are inherently more expensive. The Battlelab is not postured with sufficient resources to tackle the truly revolutionary concepts such as the development and demonstration of new unmanned vehicles and payloads (i.e. combat air vehicles and hyperspectral imagery). Battlelab resources limit demonstrations to more evolutionary types improvements to UAVs and information dissemination.

14. Describe the process from cradle to grave of a successful and a non-successful initiative (from an AO, Lieutenant or Captain).

Regardless of success, the following are the common items to all initiatives:

- Extensive research to include travel to potential users, headquarters, acquisition agencies and research agencies to build support for a concept
- Develop initiative scope and objectives
- Obtain Battlelab approval to proceed

- Gather resources to conduct the initiative
- Find surrogate UAV (if applicable)
- Determine cost and schedule
- Find major exercise to join/convince exercise planners to task UAV
- Find a range for testing with support units nearby
- Find partners to share in cost of initiative and have a stake in the outcome
- Obtain AC2ISRC approval
- Get contract support started
- Find contract vehicle
- Negotiate contracts for equipment and support
- Conduct the initiative
- Frequently follow up with contractors (at least monthly, usually weekly)
- Travel to contractor facilities on a regular basis
- Travel to users and staffs to keep momentum and interest for transition support
- Visit contractors at each integration milestone
- Complete after initiative report and coordinate final recommendations
- Execute public affairs plan for articles and briefings at conferences

The following two items separate the successful from the less successful initiatives:

- Sponsorship: without a sponsor at the beginning, successful transition when the initiative is over will be difficult, at best.
- Technical performance: if the contractor doesn't come through with the planned performance, then the initiative suffers and runs the risk of becoming a protracted development program.

15. What things do you think are working with your Battlelab? The most important thing the Battlelab has working for it are motivated people who believe in Battlelabs and in the future of unmanned aerial vehicles. The action officers work together as a team. The Battlelab also has three people assigned from AFMC: one person from the Air Armament Center and two from the Aeronautical Systems Center. These personnel, in particular, have great networks established in the acquisition community that have been extremely valuable since most of the Air Force UAV programs are still in development.

16. What things would you do to improve your Battlelab's contribution?

1. Obtain greater access to Air Force UAVs—predator and global hawk
2. Put UAV experienced operators and maintainers in the Battlelab
3. Increase funding appropriately

5.0 Information Warfare Battlelab

1. What is the source of your initiatives? Since standing up in March of 1997, the Information Warfare Battlelab (IWB) has always considered its self as a “do tank” rather than a “think tank.” With rare exception, all of our initiatives have started as concepts submitted by outside agencies. The main source of our concepts (approximately 70 percent) is industry. Most come to us as a result of our Broad Agency Announcement (BAA), which the IWB maintains in the Commerce Business Daily, 365 days a year. The announcement is a call to industry to submit 3-page white papers on innovative ideas/technologies pertaining to information warfare. The IWB expends a fair portion of its operating budget on implementing its marketing plan, which includes attending and speaking at various symposia, briefing operational units, participating in “industry days”, etc. To date, the IWB has received 240+ concepts from 141 separate organizations from AF field units (including the guard and reserves), DoD/Joint organizations, academia, and industry. The break out is as follows:

| <u>Different Orgs</u> | <u>Concepts</u> |
|------------------------------|------------------------|
| Industry | 100 |
| AF units | 30 |
| AF Guard/Reserves | 2 |
| DoD/Joint | 6 |
| Academia | 3 |
| TOTAL | 141 |
| | 249 |

2. How do you generate the experiment in the first place (planning) and how do you get it going/approved (execution) (internal process and external process)? The IWB executes operational demonstrations, not experiments per se. To get a good information warfare (IW) idea going/approved to execution and reporting is relatively easy. Our process to receive new ideas, sift through them to find that “nugget,” and execute demonstrations is visible, dynamic, and responsive to the submitter as well as the Air Force. In fact, the submitter is the key player in the initiative planning, execution, and report of findings.

The planning phase is fast paced. The project officer (PROJO) looks at what the initiative seeks to accomplish, the maturity and risk associated with the idea, what resources are currently available, and what resources must be made available. Then, based on that data, he/she determines what is the best venue and audience for the operational demonstration.

In planning an operational demonstration, the PROJO and the submitter will look to the Air Force Information Warfare Center (AFIWC), the Air Intelligence Agency (AIA), MAJCOMs, Air Force Research Labs, developmental/operational test and evaluation (D/OT&E) organizations, and sister services, to find additional expertise and valuable resources—including additional/alternate funding. Once found, the PROJO will prepare the necessary documentation and briefing materials for submittal to the IW Battlelab commander's executive committee (EXCOM).

The EXCOM racks and stacks exciting ideas based on military worth, breadth of application, maturity and risk, time to execute and of course cost. The commander then empowers the PROJO to prepare initiative approval documentation for the AFIWC/CC and AIA/CC. The

approval process normally includes briefing to the AFIWC commander and key staff members and a staff package with the concept plan included to the AIA commander. The review process also includes a briefing to the Battlelab Planning Cell, ensuring that proposals are innovative and focused on operations and logistics concepts in accordance with AFI 10-1901.

Once AIA/CC says go, the PROJO is empowered to pull the identified resources together and execute the operational demonstration. The execution often involves a contracting phase, which frequently highlights funding and contractual issues.

The above is the “normal” method for generating demonstrations. As we move into the Joint arena, we have become more involved with the other service Battlelabs through the Federated Battlelab (FBL). In the near future, the FBL process may provide a significant amount of funding (between \$1-6 million/year) for Battlelab (BL) projects. The process for FBL project submissions is as follows:

- a. From the AFIWC/AIA approved list of initiatives, we select candidate FBL concept demonstrations that can be briefed to the FBL Senior Steering Group (SSG). Projects must provide a benefit for the submitting service (AF, Army, Navy) as well as the Joint services as a whole. This is where the IWB uses Joint Vision 2010 as a guide for project submissions.
- b. Prepare briefing package(s) and submit the briefing and a short project summary paper to AF/XOCW for review and approval.
- c. AF/XOCW submits approved packages to USJFCOM/FBL for inclusion in proposed concept briefing line-up.
- d. Brief to FBL/SSG. SSG score projects on several criteria to include technical maturity (can be fielded in 18-24 months) and Joint applicability.
- e. One project is picked for each service to lead. SSG allocates tentative funds against each selected concept demonstration.
- f. The project leaders (AF, Army, Navy) then conduct meetings and research efforts over the next 2 months to finalize the demonstration plans and determine exact funding requirements.
- g. The final concept demonstration plans are presented to and approved by the SSG. Final funding is disbursed. The IWB received \$273K for FY00. This amount could be as high as \$6 million in the next four years.
- h. Work with project lead to coordinate and conduct actual concept demonstration using multi-service and Unified Command resources.
- i. Conduct actual demonstration. Final results of concept demonstration, recommendations and JCONOPS are then briefed to the Joint Requirements Oversight Council (JROC). Some JCONOPS actually will be ready to implement if approved by JROC or SecDef. Global Positioning System (GPS) Interference Situational Awareness (ISA) falls in this category since it is actively being worked with AFSPC, SPAWAR, USSPACECOM/J330 and others.
- j. Cycle begins again for the next fiscal year.

3. If an initiative is successful, how do you transition it to the acquisition process or operational use? This is the most difficult challenge the Battlelabs have faced. We have approached it by emphasizing the importance of working closely with potential users throughout the initiative selection and demonstration process. We have always placed considerable importance on operator involvement from the start and feedback during the demonstration, and on finding user support for an initiative during the transition phase. We have routinely scheduled a pre-briefing for the appropriate major command and other interested users before taking the after initiative briefing to the Air Force Requirements Oversight Council (AFROC). In this way, we hope to have some advocates for transition who are willing to endorse the concept at the AFROC. In an ideal situation, the success of the concept demonstration would be compelling enough to cause user commands to press for transition and support an AFROC reallocation of funds to get the program started. This has actually been the case for a few of our initiatives, but has not been the rule.

The Battlelab is now working more closely with AIA to identify promising initiatives early enough to have them identified in the AIA POM development process. Although we have not yet completely institutionalized this process, our ongoing efforts have produced some specific successes, which should lead to new POM initiatives. This has promise for those mission areas specifically assigned to the AIA, but less promise for those assigned to the MAJCOMs or other Field Operating Agencies.

4. To what extent do you tolerate failure in initiative execution?

Bottom line: The IWB process is very tolerant of a demo whose system fails to reach its goal. The IW Battlelab emphasizes the question, “how open is our process to *taking risks* in the course of a demonstration?” One of our MITRE experts, says it best, “We need to keep checking the back yard—if there aren’t any broken pieces lying around from things that didn’t work, we’re not trying hard enough.” Fortunately, that spirit pervades our process for choosing concepts; that kind of failure is tolerated quite openly.

For us, a “successful demonstration” is not just a demo where the concept works. A “good” demo is any one that determines the military value of the proposed innovation. So, a “good” demo may show that the concept is not worth pursuing as an Air Force acquisition. In that instance, while the *concept* may have “failed,” we would still call that activity a successful demonstration. Our chain of command has been very accepting of demonstrations which may not live up to their original promise.

We are fully prepared to go to the AFROC or any other senior leadership forum and recommend a particular “innovation” shouldn’t be pursued—we would still consider that a valuable contribution. Part of our Initiative Selection Group weighted criteria, which we use to rack and stack potential initiatives, addresses technical maturity and risk. In order to score well, a concept needs to have fairly mature technology. We will tolerate some integration of the technology, but we are not in the business of doing pure research and development.

In the end, we have a robust selection process that maximizes the chances of a demonstration actually taking place. At the same time, the process truly explores the military worth of innovative ideas (as advertised!), naturally allowing for the reported worth to be “not valuable” if that is what the demonstration shows. This process lets us take well-considered innovation risks in well-planned demonstrations.

5. To what extent are you guided by long range planning (JV2010, AF Vision, campaign plans, etc)? Long-range planning certainly provides a key reference for the IWB as it selects the concepts for investigation and demonstration. While the charter for this organization focuses it on the near term, any near-term operational and tactical initiatives should certainly contribute to and complement DoD, Joint and Air Force efforts to achieve our future vision and capabilities.

The IWB is not, however, totally constrained by current statements of long range-plans. With a stated mission of assessing and demonstrating innovative concepts with the promise of enhancing warfighter effectiveness in the near term, the IWB places a priority on near-term capabilities. The Battlelab sees a very real opportunity to impact long-range vision through demonstrating innovative ideas and improving current operational effectiveness. There are current mission shortfalls, which call for immediate solutions, some of which might not be addressed with long-range vision guidance. One of the roles of the Battlelab is to identify focused innovations to solve some of these shortfalls, even if those solutions might be temporary in nature. Certainly, in doing so, the Battlelab is directly contributing to the ultimate attainment of the long-range vision, especially as it depends upon the future maturation of emerging technologies.

We realize the Air Force Battlelab concept was born out of Global Engagement (GE): A Vision for the 21st Century Air Force. GE identifies the Air Force Core Competencies. Our Battlelab was specifically designed to advance the Core Competency of Information Superiority. Joint Vision 2010's "Full Spectrum Dominance" through dominant maneuver, precision engagement, full-dimensional protection, and focused logistics is "assured by information superiority." JV 2010 is our guiding document, as we become more involved in Joint experimentation. As members of the Federated Battlelabs and the Alliance of All-Service Battlelabs, we are increasingly involved in initiatives that have joint applicability.

6. What is your contribution to military worth? The Battlelab makes contributions to military worth in four fundamental ways.

First, the IWB provides an AF focal point for new ideas in the realm of information warfare. The Battlelab aggressively markets and networks with key defense officials and organizations, industrial partners, joint services, and operational commands to mine for new ideas with promise for enhancing warfighter effectiveness. Some of the most valuable Battlelab contributions involve finding a home for new ideas. In the role of an "idea broker," the IWB brings ideas and potential users together. The value added may or may not directly involve a Battlelab concept demonstration. For instance, the IWB is currently working on a concept that is rapidly working to create the National/Joint GPS Analysis and Warning Architecture that will be used by both the civilian and military command authorities. The IWB is directly coordinating with USSPACECOM, AFSPC, SPAWAR and the NIPC to get their input into making the proposed system work and be useful to all. We have succeeded in selling and getting buy-in from these organizations and are currently working with CIA and NSA to include even more capabilities in the final system. The overall system includes detection assets that include overheads, air-breathers and ground mounted detectors. Bottom line--the IWB is directly steering this effort due to our leadership and ability to sell as well as get buy-in from potential users in the GPS community.

Second, the Battlelab serves as a central AF clearing house for new ideas. It collects, compiles, and assesses new ideas for future reference. As a result, it effectively helps identify public and private sector centers of excellence and expertise in the realm of information warfare. It provides a disciplined and structured methodology for assessing these ideas in order to identify those with the most promise.

Third, the IWB provides concept demonstrations for potential organizational users to review and assess. Through hands-on experience with new innovations, the warfighter can provide feedback to help the Air Force make appropriate decisions as to future investments in new concepts.

Fourth, the Battlelab provides meaningful conclusions and recommendations to the Air Staff with regard to further development, implementation, and transitioning of new ideas into the operational Air Force.

7. What initiatives started in your Battlelab have transitioned to the USAF? The Battlelab has successfully chosen and transitioned nine concepts to the USAF.

The **IW Reachback** initiative successfully demonstrated a capability to establish an affordable communications link for SCI data, which can be rapidly deployed with an Air Expeditionary Force (AEF) in the first few day of a conflict, well prior to the integral communications infrastructure. Prototype systems have been acquired and are now available to the US Army, the USMC, and Air Combat Command.

The **Cyberwarrior** initiative successfully demonstrated the military value added of a three-dimensional visualization tool to assist information warfare operators in visualizing the IW battlespace and analyzing the effects of friendly and enemy attacks on the C³I infrastructure. It has been incorporated into the Information Operations Planning Tool being developed by AFIWC for Air Force operational use. (A CENTCOM sponsored ACTD).

The IWB demonstrated two initiatives under the umbrella of a special access program known as **Panther Den**, which have been transitioned to the Air Force Electronic Systems Center for future development.

The **Network Attack Visualization** initiative successfully demonstrated the value of applying state-of-the-art visualization technology to the Air Force mission of real-time computer network protection against unauthorized and hostile intrusion. A three-dimensional display system which enhances the analysts' ability to assess sources and progress of network attacks throughout the Air Force network is now available within the Air Force Computer Emergency Response Team.

The **Signal Analysis Mapping** initiative demonstrated the military value of providing an online reachback resource to assist aircrews and mission planners in predicting anomalous radar warning receiver indications during the mission prior to takeoff. This initiative was able to do this by merging existing friendly neutral, and threat emitter databases via a server installed online in the AFIWC. A tactical electronic intelligence collection capability was incorporated into the operational aircraft systems for the first time in order to improve the process of resolving RWR anomalies and reprogramming aircraft systems in the field. The server is now installed in the AFIWC, and tactical ELINT cards are now being procured by ACC for installation in operational aircraft use as a direct result.

The **Reprogrammable Electronic Warfare Avionics Parts** initiative demonstrated the power of new field-programmable gate array technology to replace current circuit card components in electronic countermeasure pods with cards capable of being configured in the field. This capability can help address supportability issues of vanishing vendors as well as operational issues regarding changing threat electronic counter measure (ECM) techniques. The Warner Robins Air Logistics Center and the 53rd Electronic Warfare Group are now using the demonstration results and the prototype components as they assess the next step in integrating this new technology into our electronic warfare (EW) systems.

The **IW Enhanced Situation Awareness Tool** initiative successfully demonstrated the application of a government-owned, commercially-available tool for analyzing textual reports and displaying their source and substance on a geographic display. This tool has now been made available to HQ AF/XOC and AFSPC for incorporation into command center applications worldwide, and can be extremely useful in the GPS interference situation awareness visual displays.

The **Miniaturized GPS Jammer** initiative demonstrated the effectiveness of employing a commercially available miniature jammer to deny the enemy ground forces the use of the civilian code of the global positioning system while processing the military code for friendly use. The 746 Test Squadron now has the prototype jammer equipment for future test and/or operational mission employment.

8. What did you try to transition to the USAF, but it did not make it and was abandoned?
The **Network Early Warning System** initiative successfully demonstrated one system's approach to using archived network intrusion behavior patterns to proactively identify unauthorized access attempts early enough to take appropriate reactive measures to prevent mission impact. However, the contractor demonstration was done on a very small closed computer network. The Battlelab was unable to recommend direct transition into the operational Air Force without some significant additional development. While not technically "abandoned," this initiative needs DARPA and the Electronic Systems Center to now accomplish that additional work.

9. Do you feel your results get a fair hearing (by AF leadership and/or the general public)?
Yes, but the currently established process does not provide the proper forum to support effective concept transition. The AFROC does not currently make resource decisions based upon Battlelab recommendations. If AFROC briefings do not call for signing a mission-needs statement or operational requirement document, they are, by definition, called "information briefings."

While Battlelab conclusions get a fair hearing, there is no mechanism for smoothly transitioning them into an acquisition program for fielding.

10. What initiatives are being worked today?

Four Panther Den Initiatives

Status: Two completed awaiting AFROC briefing and two on-going.

Description: Pursuing information operations (IO) strategies for the Air Force.

AIMPOINT

Status: Phase I demo completed, final demo scheduled for early Apr 00.

Description: Demonstrate the cohesive ability to detect and process ultrawide band signals using a variety of assets.

Correlated Noise

Status: Completed. Preparing After Action Report and AFROC briefing.

Description: Demonstrate that a High Pulse Repetition Frequency source can produce lower effects thresholds on target systems.

Microglider

Status: Phase I JEFX demonstration complete.

Description: A 22-inch long, low cost, expendable, GPS guided, battle damage assessment tool with a 4-pound payload capacity. The glider, with a BDA sensor, could be launched from a strike aircraft, an unmanned aerial vehicle (UAV), or other support aircraft to navigate autonomously to the target area. It can then circle to the ground taking and transmitting back detailed imagery for real-time review.

PDID

Status: Demo completed. After Action Report being written and AFROC briefing assembled.

Description: Use frequency domain analysis, combat identification and selective emitter identification algorithms, and commercial off-the-shelf hardware components integrated with existing receiver and antenna systems to provide positive pulse doppler ID in current radar warning receiver (RWR) size system replaceable units to demonstrate unambiguous pulse doppler identification in combat environments.

SAFO

Status: Demo completed. Preparing After Action Report and AFROC briefing.

Description: Employ software agents to search for information across multiple web sites which, when correlated, could make the information sensitive. It will assist the user in performing Web-based OPSEC assessments.

131 Diagnostic Emulator

Status: Demonstration completed. Preparing after action report and AFROC briefing.

Description: Demonstrate the ability to quickly and accurately emulate changes to threat parameters and data characteristics in the ALQ 131 ECM pod in order to meet current and emerging hostile environments. The ALQ 131 diagnostic emulator will directly and accurately support operational flight programs, emitter identification data tables, and selectively improved flagging techniques engineering activities.

VOICE

Status: On-going.

Description: Use existing SPAWAR Speech Sentinel (audio gisting tool) to rapidly focus the OPSEC analyst on audio intercepts. Will also perform limited language recognition and speaker identification.

GPS Anomalies Monitoring Equipment Suite

Status: On-going.

Description: Distributed network of unattended ground sensors to detect, characterize, locate, and alert users of intentional or unintentional GPS interference within an area of responsibility (AOR).

11. Where do you see your Battlelab going in the future? The current state of technology and system vulnerabilities will demand that the IWB be heavily involved in concepts relating to information systems protection for the foreseeable future. This mission area will probably always be a large area of emphasis for us. We also expect to continue to be engaged in joint operations, exercises, and experiments, and expect that this activity will grow as the Alliance of All-Service Battlelab collaborative efforts mature.

We anticipate, and will actively seek, additional opportunities within the information warfare arena for offensive operations. Some of our current initiatives are already investigating these opportunities, and we see this as a promising future trend. We see these as ways to shape a more effective and lethal force through the incorporation of some of these new offensive capabilities.

The IWB will continue to emphasize the importance of electronic warfare and the fundamental challenges of aircraft survivability. This also promises to be an area of mission growth.

The Battlelab anticipates further mission growth in the realm of information operations, especially as it relates to the application of more capable information systems to correlate huge quantities of data and display it in a readily understandable fashion so that wartime decisions can be more effective and timely.

The IWB should continue to mature in both the breadth and depth of initiatives it explores. We expect that we will continue to devote considerable effort to investigating concepts in our core mission areas of information protection and electronic warfare. However, we expect to broaden our focus to explore other information warfare mission areas as well.

The IWB is also actively seeking opportunities for IW to have revolutionary impacts on our warfighting capabilities. Growing beyond what might be termed a series of point solutions to narrowly focused niche missions, we hope to develop initiatives which have much broader application. One example of this is our current Microglider initiative.

12. Is a tour in the Battlelab perceived as career enhancing? That depends a great deal on who answers the question. Strictly based on promotion recommendations and selections, no one in the IWB has been In-the-Zone to see what promotion boards think about IWB's career value. Similarly, we haven't faced the scenario where an In-the-Zone IWB member competes for a 'definitely promote' recommendation, at the local level, with other command members who've been more directly involved in deployments or day-to-day operations.

In general, though, we have a lot of evidence to suggest the answer is YES. Many officers with exceptional records continue to actively seek assignments in the IWB. Moreover, senior leaders (to include prior AIA commanders) have recruited stand-out talent to fill IWB billets.

Without exception, IWB members concur that the opportunities offered by IWB activities allow sufficient impact on the Air Force mission to support promotion at any level. While it is true the limited-to-nonexistent opportunities for supervisory roles in IWB can be a difficult environment

for an otherwise promotable major, the opportunities for technical team leadership, across numerous government and civilian organizations, more than compensate.

For the record, there have been individuals who believed that the lack of IWB supervisory opportunities would be a terminal roadblock to their career progression. It remains to be seen whether promotion boards will share that “in the box” perspective of the IWB mission.

However, until proven otherwise, we will remain convinced that no other Air Force assignment offers comparable opportunities for an individual to truly lead innovation and make a difference in how the Air Force operates.

We also have evidence that the IWB enhances career opportunities for civilians. Prime example: Mr. Jackowski, our Technical Director, arrived at the IWB on a borrowed civilian billet for a short-term Career Enhancement Program. His position here, and the experience, made him competitive for the Technical Director position and will take him from GS-13 to GS-15 within the year.

13. Is there adequate funding for the Battlelab?

The current funding level is certainly adequate for conducting the number of demonstrations with which we are currently engaged. Historically, the most significant limiting factor on IWB productivity has been project officer time. More funding might certainly make it easier, but might not accelerate the process of proper collaboration and thorough investigation. Additional contract support might be useful in this investigative process, but would probably not have led to a significant increase in the number of initiatives demonstrated. Fortunately, our current manning level is the best it has been since Battlelab standup, significantly increasing our capacity for initiative demonstration. Should this manning level persist, additional funds would certainly lead to more and higher quality concept demonstrations. Taking on additional initiatives might also lead to pursuing some proposals with higher risk. Certainly, additional funding would provide for more thorough demonstrations, a higher quality product and leave behind, and potentially smoother transition for good ideas.

14. Describe the process from cradle to grave of a successful and a non-successful initiative (from an AO, Lieutenant or Captain).

The IWB process starts with the submitter. An idea, from an individual or a corporation via the annual Broad Agency Announcement, is received and assigned a project number and a project officer. This generally takes a couple of days. The PROJO will then personally contact the submitter to confirm the idea was received.

Once in the process, the PROJO is empowered to start initial investigation of the idea. Preliminary goals seek to ferret out what the submitter really wishes to accomplish, with what technologies, at what locations, and within what time frame and costs. Based upon this preliminary information, the PROJO prepares a one-slide presentation for the Concept Working Group (CWG).

The CWG is a panel of very senior personnel with a myriad of operational backgrounds, skills, education, and experience which meets approximately every 6 weeks. The CWG is not comprised of only Air Force personnel. National Security Agency, CIA, DIA, FBI, JIOC, AIA, AFIWC, and MAJCOMs participate either on-site or via our new classified web-site. The goal

of the CWG is multifaceted. Here the PROJO gains valuable knowledge on: Is the idea duplicative? Has this idea been done? Who is doing like work? Who are the technology experts? Gain resource availability and venue ideas. Is the idea a bad idea, or a very exciting and innovative approach to problem solving? The CWG provides valuable written feedback and a non-weighted score from 1 (low, not innovative or compelling) to 6 (very innovative and very compelling). The CWG is not told who submitted the idea or the cost. The PROJO then takes the appropriate next step – proceed with more in-depth investigation, or advise the submitter that the idea, as presented, will not be pursued.

A good idea has great military value, a broad breadth of application, is low risk with mature technology, and meets the Battlelab's time restrictions. The next step is to dig deeper into the idea.

The PROJO convenes a Concept Planning Working Group (CPWG). The CPWG mirrors the Test Plan Working Group in the OT&E community. The goal is to bring diverse experts together with the submitter to orchestrate the operational demonstration architecture. Here the PROJO identifies potential roles and responsibilities, resources, additional/alternative funding, timelines, and expectation of transition of the initiative into the Air Force. In some cases, the PROJO has immediate sponsorship of the MAJCOM/s or “user” early in the process. The next step is for the PROJO to brief the second process tier, the Initiative Selection Group (ISG).

The ISG is comprised of the IWB Commander and his entire staff. The ISG is fully briefed by the PROJO. In this forum the PROJO discusses the pros and cons of the concept, the vision of the operational demonstration, roles and responsibilities, costs and time. An exhaustive “murder board” is in place to ensure the concept meets the Battlelab mission and goals. Once all the “red team” questions are answered, the PROJO is tasked to prepare initiative approval documentation, briefing, and an operational demonstration plan for AFIWC/CC and AIA/CC approval. The plan contains those areas specified in AFI 10-1901.

The next step in the process is a briefing to the AFIWC Commander. This event is normally scheduled to include subject matter experts and AFIWC staff members to provide an AFIWC perspective on the proposal. Once the AFIWC Commander is comfortable with the proposal, he endorses a staff package to the AIA Commander, which includes the proposed concept plan. Face-to-face briefings to the AIA/CC are provided on request and in special circumstances. When AIA/CC approves the demonstration plan and expenditure of Air Force funds, the PROJO reconvenes the CPWG for contract negotiations (goal–reduce costs) and detailed planning. The team approach works extremely well. All members of the operational demonstration team are key holders working toward a successful demonstration.

IW demonstrations range from a one-day look at visualization of information, or a several week operational flight demonstration at remote sites. Security matters range from unclassified to SAR/SAP. Resources come from operational units, Air Force research labs, contractor facilities, or can be within the Battlelab(s). Operators always come from the active Air Force, Guard or Reserves. A successful Battlelab demonstration assesses the initiative’s potential to enhance the Air Force mission. Failure of the initiative to achieve the demo’s stated goal is still a successful Battlelab operational demonstration, as this may prevent additional investment in a questionable concept.

After the demonstration the PROJO reduces data products, reviews questionnaires, interviews Air Force operators, and draws conclusions. The PROJO and the CPWG next prepares the After Initiative Report (AIR) and briefings.

The AIR and briefing are prepared to highlight the operational demonstration goals and objectives. The report identifies the method of evaluation and findings and the IWB recommendation/s for transition. Once the after initiative briefing is approved by the AFIWC/CC it is shared with interested parties, MAJCOMs, and finally the AFROC and Air Force Board, if appropriate. The AIR includes the AFROC's decision, if any, and is forwarded to AIA/CC and HQ AF/XOCW.

15. What things do you think are working with your Battlelab?

- a. We have a dynamic flow of communications between different services and agencies. For example: Navy SPAWAR, Marine Corp BL, Army BL, NAIC, NSA, CIA, and FBI, are all agencies that wouldn't normally seek out each other, and they don't mind the Battlelab as a liaison.
- b. The level of interest and involvement is on the rise. We are seen not as a new wonder toy but an entity that can bring many beneficial tools to the warfighter. In briefings, DVs are requesting POCs for specific projects (JSTARS, FBI, and PSYOP wanted ESAT). We are getting calls from OSD and OASD to brief them (e.g. Microglider). The GPS JPO office has stated the IWB is vital to the success of their mission.
- c. Our initiative selection process is working: Project assignment, Concept Working Group, Initiative Selection Group, final initiative selection process, and approval. Going through the well developed process for selecting the initiatives that we pursue engenders confidence that the projects we select are valuable ones that have military value and would be an enhancement to our combat capability.
- d. The Battlelab's open process to receive ideas from the field and from industry is also working. The process is dynamic, easily understood and proven. The Battlelab goes to great length to protect proprietary data, so it has become a non-issue with our industry partners--they are anxious to work with us. This process has produced a large number of ideas which have generated a lot of interest throughout the IW community.
- e. The camaraderie within the Battlelab and the propensity of PROJOS and the leadership to share valuable knowledge and experience within PROJO disciplines are very important to our Battlelab successes. The continuity and cohesiveness provided by our MITRE Corporation members are also large contributions to this effort.
- g. The empowerment provided to PROJOS by the Battlelab directors is very important--the freedom that the project officers have in researching and developing the demonstrations and CONOPs for the projects we are assigned. When requested, advice is available to the project officers, but the executives do not dictate the direction of initiatives.
- h. The Battlelab is outstanding at aligning unconventional partners to collaborate on projects. Our ability to forego any political boundaries is "priceless". The Battlelabs do very well in the "Global Partnership" arena with commercial industry.

16. What things would you do to improve your Battlelab's contribution?

- a. Place an AFMC representative in each one of the Battlelabs! This AFMC representative is essential for getting mature, advanced technologies rapidly into the AF operational inventory. This day-to-day AFMC presence in the Battlelab has several significant benefits:
 - (1) Transition plans accomplished. AFMC can develop POM programs for future weapon systems. It also determines life cycle-costs, integrating items on the aircraft or in the inventory, and acquisition efforts. The AFMC representative may even be able to get some of our initiatives into the AFMC POM cycle. AFMC has a huge manpower pool to develop and sell the transition plans for BL initiatives.
 - (2) Involved in day-to-day discussion: The AFMC rep will be directly involved in discussions (from employment tactics to intense technical capabilities) that are key to AFMC being able to assessing the real worth of an initiative.
 - (3) Gives AFMC a look at future technologies that could get brought to the table today. AFMC can review all of our concepts on a daily basis. They can actively express their interest in certain concepts to the IWB staff as well as offering up monies directly from AFMC to rapidly demonstrate an initiative so AFMC can immediately take it to production.
 - (4) Range expert on-site: The AFMC rep must be experienced with AF and other DoD ranges. He/She can quickly assist the IWB PROJO on what range assets are available, where to go, and work directly with the range offices to make our initiatives happen. Also, because the AFMC rep has access directly to HQ AFMC, he/she can quickly resolve range clearance issues as well as ensure all the details of our demonstrations have been approved before our PROJOs even leave the office.
 - (5) Acquisition expert: Due to his/her acquisition experience he/she would be able to assist the BL in contracting initiative demonstrations, reducing range costs through coordination (charge us for actual range costs; not costs plus investment), and work with the PROJO on developing CONOPs and acquisition strategies.
 - (6) Better test results: AFMC rep would personally help the PROJOs set up the Test and Evaluation Management Plan (TEMP) for each initiative plus help the PROJO develop good testing criteria therefore producing credible test results (numerical and analytical).
 - (7) An AFMC rep would significantly help project officers in accomplishing a number of these necessary functions which consume a significant portion of their time.
- b. Selectively man and code our billets: Making key positions within the Battlelab special duty assignments, would give the commander an opportunity to participate in the assignment process through screening resumes and interviewing potential candidates. Battlelabs are, by charter, lean organizations. Since the IWB is part of AIA and AFIWC, our manning is influenced by their manning levels for each AFSC. For example, if the AF manning average for 12Fs is 68 percent, and AFIWC is already manned at 80 percent, the Battlelab must seek a replacement 12F from within AFIWC when a vacancy occurs. Bottom line—the Battlelabs need to be manned to 100 percent with the right kind of people.

- c. We need to address the problem with Special Access Programs. We currently have several projects to which only a limited number of Battlelab personnel have access. If the Battlelab takes on a project, as many members of the Battlelab as possible should be read in. This is a challenge we face on a regular basis.
- d. Transition assistance. The Battlelabs have been challenged to work the challenge of transition with minimal resources to do it.
- e. Additional financial resources would certainly lead to more initiatives and higher quality products.
- f. Confusion as to how Battlelabs are aligned and work within their parent organizations could certainly be addressed.

6.0 Force Protection Battlelab

1. What is the source of your initiatives? Force Protection Battlelab (FPB) initiatives come from a variety of sources, including the Director of Security Forces (HQ AF/XOF), Air Force major commands (MAJCOMs), numbered air forces (NAFs), national laboratories, and internally from personnel assigned to the FPB. Our first round of initiatives were internally generated to meet the needs of the warfighter and to address vulnerabilities manifested by Khobar Towers. Our second round of initiatives comes from a combination of internally and externally generated ideas. We used MAJCOM mission area plans (MAPs) and core competencies to validate the concepts.

2. How do you generate the experiment in the first place (planning) and how do you get it going/approved (execution)? (internal process and external process)

Before the first round of initiatives was undertaken, a message was sent to each MAJCOM soliciting initiative proposals. Initially, the FPB/CC, in concert with AF/XOF, selected several initiatives based on the perceived needs of the Air Force to answer specific force protection problems. Some initiatives were undertaken without external sponsorship. The second round of initiatives was handled differently. This time we coupled need with sponsorship. With limited resources, it is not practical to begin an initiative without a customer. We compiled a comprehensive list of ideas from numerous sources. Once the list was compiled, a group of actions officers examined the list to evaluate the suggestions against the sole criteria, “Is there a concept to be proven in this suggestion?” Once the list was pared down to concepts, the division chiefs and senior action officers ranked the initiatives. The ranking considered warfighter needs, ability to prove/disprove the concept within 18 months, funding constraints, etc. Once the ranking was established, the FPB commander provided recommendations to AF/XOF for final approval.

After completing the second round of initiatives, we have further refined the selection process. The initial evaluation of initiative proposals now occurs on a quarterly basis, instead of annually. A group of action officers evaluates proposals to identify concepts. After review by the division chiefs, submitters of proposals not meeting the initiative criteria are informed of the reasons why his/her proposal was not selected. The response may include a referral to a more appropriate agency. If a proposal appears to have a valid concept, an action officer does additional research. The research identifies other agencies managing similar programs, cost estimates, and potential customers. The action officer also performs market research using Commerce Business Daily (CBD) announcements and AF/XOCW’s contract with Concurrent Technologies Corporation. Once the research is complete, a team is assigned to draft an initiative proposal according to AFI 10-1901. The division chiefs and the commander evaluate this proposal. If approved, it is forwarded for formal approval or placed in a queue until funding and manpower availability permit it to be sent forward for approval.

3. If an initiative is successful, how do you transition it to the acquisition process or operational use? Transition is initiative dependent. Because of the importance of transitioning initiatives to the field, we have a Lt Col division chief whose primary focus is to oversee the transition of all initiatives. We have had great success in transitioning projects, whether they are urgent and compelling taskings, modeling and simulation experiments, or Kenney Battlelab Initiatives. Transitions are described in detail in the response to question 7.

4. To what extent do you tolerate failure in initiative execution? It's our job to prove or disprove the military worth of initiatives. Based on this, there is technically no failure for initiatives that don't pan out... failures occur only for concepts that fail to provide military worth. We have had one failed initiative because we were not able to demonstrate its military worth. This was the Hazard Assessment and Mission Enhancement of Resources (HAMER) initiative. We do not view the work on this initiative as a failure... military worth was not proven. Hence, we terminated our expenditure of resources on this concept and moved it to an agency who had similar interests, the Technical Services Working Group (TSWG). The TSWG is currently using this information for use in other projects.

5. To what extent are you guided by long range planning (JV2010, AF Vision, AF campaign plans, etc.)? We have numerous initiatives that address some of the goals outlined in Joint Vision 2010. Listed below are excerpts from JV 2010 and an explanation of how FPB initiatives may meet some end goals. We also use the Combat Air Forces Mission Area plan as a source of initiative ideas.

"The primary task of the Armed Forces will remain to deter conflict - but should deterrence fail, to fight and win our nation's wars. In addition we should expect to participate in a broad range of deterrent, conflict prevention, and peacetime activities."

"The ability to produce a broader range of potential weapons effects, from less-lethal to hard target kill, from sensor fused to directed energy weapons, will further enhance precision capability. Advances in target effects technologies will be integrated into existing weapons and give commanders greater flexibility."

One FPB initiative addresses both of these statements. The Directed Energy Weapons (DEW) initiative is not only investigating nonlethal technologies for other than war situations, such as peacekeeping operations and humanitarian relief operations; but, it is also examining concepts of operation for these technologies. Nonlethal capabilities will provide commanders another response option other than lethal firepower.

"Realistic and stressful training has been the primary way to keep readiness high and prepare our men and women to face the challenges of combat... From individual or crew served mission simulators, through full blown-field exercises at home or abroad, realistic, evaluated training is and must remain our best combat multiplier."

Our FPB modeling and simulation division has worked with numerous Air Force security forces squadrons, both CONUS and OCONUS, to refine their response techniques and improve overall force protection. We do this by providing empirical data to assist local commanders in making informed decisions to enhance force protection. Security forces squadrons at Minot AFB, Nellis AFB, Prince Sultan Air Base, Eskan Village, and Mildenhall AFB have all participated in modeling experiments to help refine their force protection operations. We are also scheduled to conduct similar experiments at Tinker AFB, Bolling AFB, and Aviano AB this year.

"Wider access to advanced technology along with modern weaponry, including weapons of mass destruction (WMD), and the requisite skills to employ it, will increase the number of actors with sufficient military potential to upset existing regional balance of power."

Three FPB initiatives respond to this challenge. Food and Water, Ruggedized Advanced Pathogen Identification (RAPID), and the surface to air missile (SAM) footprint mapping are concepts in being which serve to counter the threats deployed forces may face. The RAPID initiative provides the capability to quickly identify pathogens. The Food and Water initiative

resulted in a process which enhances the security and safety of the food and water served to deployed troops. The SAM footprint mapping capability uses visualization software that couples site specific topography with the effective range of SAMs to define the areas which security forces squadrons must search to deter/eliminate SAM threats.

“America’s strategic nuclear deterrent, along with appropriate national level detection and defensive capabilities will likely remain at the core of American national security.”

This deterrence is only credible if we can safeguard our nuclear stockpile. We have had two initiatives that have directly impacted the security of nuclear weapons. The Nellis Weapons Storage Area (WSA) Systems Effectiveness Assessment resulted in dramatic recommendations to improve overall site security. This assessment resulted in the reassessment of some of the requirements in DoDD 5210.41M, Security Policy for Nuclear Weapons. Security of Minuteman and Peacekeeper missiles will also be improved by the Remote Visual Assessment initiative. This initiative allows the missile alert facility personnel to see a real time image of the cause of launch facility alarms before dispatching response teams. This enables the security forces to send an immediate, and appropriately sized and equipped response force with full knowledge of the threat to be encountered.

“Improvements in information and systems integration technologies will also significantly impact future military operations by providing decision makers with accurate information in a timely manner... Forces harnessing the (information) capabilities potentially available from this system of systems will gain dominant battlespace awareness, and interactive picture which will yield much more accurate assessments of friendly and enemy operations within the area of interest.”

We have one initiative linked to this statement. The Combat Support Command and Control (CSC2) initiative fuses information from a variety of combat support sources and presents it as a single system, in order to provide combat support functions with the information they need. This initiative will also provide a capability to track individual security force members within the base environment and provide the ability to better direct response activities.

6. What is your contribution to military worth? Many of our efforts have been directly focused on supporting the field with real world force protection problems. As a result, we have had a positive impact on operational units and we continue to be a sought after source for force protection support. Listed below are some of the results.

1. Operation Geese provided the remotely located ground based radar (GBR) sites in Colombia and Peru, which support counternarcotics operations, with a detection and assessment system that increased situational awareness, enhancing site security. In this case, law enforcement patrol car thermal imagers were specifically modified for use in a static assessment role at the GBR sites. This modified equipment was added to the ESC/FD Tactical Automated Security System (TASS) contract and these fixed mounted thermal imagers are now in use at observation posts worldwide.
2. The FPB generated force protection draw-down plan increased Howard AFB’s ability to protect the base and apprehend intruders. Additionally, the lessons learned from this effort led to changes in the TASS training curriculum, better preparing students for operational deployments. A remote viewer for the Hand Held Thermal Imager (HHTI) was also created for use in Howard AFB’s force protection efforts, dramatically improving the usability of the HHTI.
3. Remote Visual Assessment allows missile field security forces to remotely assess alarms at unmanned launch facilities in real time. Missile alert security personnel will be able to dispatch an appropriately equipped and sized response force.

4. The Nellis AFB WSA systems effectiveness assessment provided a systems approach, performance-based analysis of the Nellis AFB WSA security system. The result was a fact-based, cost and performance analysis which may save ACC \$7M in security upgrades and may potentially double the security system's effectiveness.
5. Equipment fielded at Prince Sultan Air Base (PSAB), Saudi Arabia, as a result of the RAPID initiative, was used to identify a salmonella outbreak. As such, it identified the source 3-4 days faster than conventional testing methods, preventing up to 4,000 personnel from potentially becoming incapacitated with a food-borne illness. The outbreak was limited to 3% of the base population, preventing mission degradation.
6. Personnel from the FPB have created and taught a new block of instruction of the Air Force Institute of Technology (AFIT) Civil Engineer (CE) Flight Commanders' course and the Air Combat Command (ACC) Level II Force Protection/Antiterrorism (FP/AT) Course. This block of instruction focuses on explosives search strategy, blast dynamics, and fragment dispersion, providing valuable insight to the field on bare base planning and site layout. This addition to the AFIT CE course is a permanent change to the course curriculum and will be taught by FPB personnel until AFIT instructors are familiar with the material.
7. The Minot AFB WSA modeling initiative determined the optimum perimeter security system configuration upgrade. The results showed, that with minor changes to tactics and better use of existing technology, Minot AFB security forces could realize an increase in detection with fewer sentries.
8. Members of the FPB deployed to Bright Star 97 and assisted with the deployment of electronic sensors and explosives detection equipment. The explosives detection equipment was used as part of roving random antiterrorism measures, and the TASS proved its worth on several occasions.
9. Members of the FPB deployed to AEF V and helped with the deployment of electronic sensors and explosives detection equipment. This was the first time the equipment was set-up, operated, and maintained strictly by security forces personnel. The electronic security equipment and explosives detection equipment enabled a positive change in defense tactics.
10. Our EOD and engineering officers authored, published, and distributed the Vehicle Bomb Mitigation Guide (VBMG). This handbook provides lessons learned from explosive search concept of operations and blast/fragmentation mitigation tests in layman's terms. The objective was to provide a ready reference that could be easily implemented in the field. It provides general design guidance and specific construction requirements for entry control points.
11. The Vehicle Explosive Entry Search Strategy investigated explosives detection equipment and its application to searching vehicles at entry control points. The initiative provided an analysis of applying these technologies in different combinations and determined the associated probability of detection and false alarm rates for each combination of technologies. The results allow individual sites to tailor their specific search strategies based on threat, geographic location, and available resources.
12. The Airborne Force Protection Surveillance System allows the ground defense force commander to obtain the tactical "high ground" by providing him or her with a "bird's eye" view of the area of responsibility, thereby facilitating early detection and assessment of the ground threat. This, in turn, enhances the defense force's ability to engage, delay, deny, or destroy an adversary before friendly forces, facilities, and weapons systems are endangered.

13. Food and Water Antiterrorism is examining new approaches to ensure the safety and security of the food and water consumed by troops in the field. The goal of the initiative is to reduce the threat of an asymmetric attack which would use our food and water supplies as the means to attack our warfighters.

14. The Directed Energy Weapon initiative is designed to demonstrate the utility of employing nonlethal weapons in a force protection role. This will provide commanders with response options other than lethal force.

15. The FPB conducted a force protection assessment of Izmir Air Station, Turkey. The result was a series of recommendations which are currently being implemented by USAFE personnel.

16. Force Protection Command and Control provides ground defense force commanders a common tactical picture that integrates force protection information from a multitude of sources (e.g., tactical sensors, UAV imagery, thermal imagery, and intelligence sources) in a single display. The goal is to provide the commander with the right information in a timely fashion, so he or she can make an informed decision.

17. The Improved DoD Entry Control Point initiative investigated alternative methods of installation entry control. The study looked at technology, procedures, and the physical layout of entry control points. Throughput modeling analysis showed that modified electronic toll collection equipment could improve security and throughput at entry control points.

18. Mighty Guardian modeling evaluated Defense Threat Reduction Agency (DTRA) scenarios for accuracy and course of action before the Mighty Guardian III field exercise. The resulting data enhanced DTRA's ability to develop meaningful exercise scenarios and provided Ramstein Air Base defenders with ideas to increase the effectiveness of their force protection plan.

19. The general officers' quarters at Shaw AFB, South Carolina, were evaluated from a force protection viewpoint. The FPB recommended numerous "low-tech" ways to increase force protection as well as recommending the use of three dimensional video motion detection. The goal was to reduce the vulnerability of the general officers' quarters and to deter any potential attacks.

20. Prince Sultan Air Base and Eskan Village modeling experiments created a synthetic environment to test each site's base defense plan. The experiment validated local force protection plans and provided defenders the ability to make fact-based decisions on force protection tactics.

21. The Sensor Guard initiative was a deployable intelligence reachback capability that allowed users to access national and theater-level intelligence databases. This information could then be fused with local intelligence data for tactical analysis. The 820th Security Forces Group used the Sensor Guard initiative for intelligence and counterintelligence reach back capabilities during JTF-Shining Hope. Sensor Guard worked so well, the Task Force Counterintelligence Coordinating Authority (TFCICA) was dependent upon the 820th SFG/S2 for current intelligence information.

7. What initiatives started in your Battlelab have transitioned to the USAF? Urgent and compelling taskings and the modeling and simulation experiments provide the customer with results almost immediately. Therefore, there is no transition period or process for these projects. Listed below are the initiatives that are undergoing a transition process:

1. The Remote Visual Assessment (RVA) initiative is successfully finishing a year long operational test at Minot AFB. Headquarters Space Command has submitted a POM initiative to fund the installation of RVA at all unmanned launch facilities.

2. Military worth was not proven for the Hazard Assessment and Mission Enhancement of Resources (HAMER) initiative. However, several other agencies are attempting to develop similar risk management tools. Recognizing this, we provided lessons learned to the Technical Support Working Group (TSWG) for dissemination and continued evaluation/development by other appropriate agencies.
3. Based on the success of Force Protection Command and Control (FPC2) at Foal Eagle 99 and JEFX 99, Pacific Command is sponsoring an Advanced Concept Technology Demonstration (ACTD) called the Coalition Rear Area Security Operations Command and Control system. The capabilities of FPC2 demonstrated in JEFX 99 and Foal Eagle 99 at the base level will be expanded to link base clusters within an area of responsibility. Objectives in the ACTD include linking coalition force C2 nodes with US C2 nodes, multi-level security protocols allowing sharing of information across the theater (coalition and US) and situational awareness from the Joint Rear Area Operations Center down to individual bases within each base cluster.
4. As a result of the Ruggedized Advanced Pathogen Identification Device (RAPID) initiative, USAF Medical Readiness purchased RAPID systems to establish an initial biological detection capability at ten AF locations. Additionally, the first-ever AF Biological Augmentation Team has been formally activated at the 363 EMG, Prince Sultan Air Base, Saudi Arabia. Two new positions were requested and approved to accommodate this new medical capability.
5. The Vehicle Bomb Mitigation Guide has been transitioned to the Air Force Civil Engineer Support Agency (AFCESA). It will be officially published as AFH 10-222, Volume 13, Guide to Vehicle Bomb Mitigation in the summer of 2000.
6. The Airborne Force Protection Surveillance System (AFPSS) has been formally transitioned to Headquarters Air Force Security Forces Center Requirements Division (HQ AFSFC/SFOR) and the 820th Security Forces Group. The HQ AFSFC/SFOR staff is working with MAJCOMs to establish operational testbeds to refine some of the operational requirements before initiating a formal acquisition program.
7. Portions of "Force Protection for the 21st Century," an initiative focused on doctrine, have been incorporated in AFDD 2-4.1 and other sections of the white paper are in the process of being incorporated into AFDD 1, Air Force Basic Doctrine.
8. Several FPB action officers have created and taught a new block of instruction at the AFIT CE Flight Commanders' course and have taught at the ACC FP/AT Level II course. Teaching these courses is effectively institutionalizing information on explosives search strategies, blast/fragmentation mitigation, and site layout considerations.
9. Sensor Guard is currently used by the 820th Security Forces Group for deployments to remote locations, providing them with the ability to reach back and gather secure, real-time intelligence data from national intelligence sources.
10. For the evaluation of the Nellis AFB Weapons Storage Area, we initiated a new approach. The approach used the strengths of numerous organizations to perform a systems effectiveness assessment of the WSA. Headquarters Electronic Systems Center (HQ ESC), Sandia National Laboratories (SNL), the Air Force Security Forces Center (HQ AFSFC), Air Combat Command, and the FPB were all team members. The systems effectiveness assessment evaluated the physical layout of the area, the performance of the security system, and the procedures of the security forces to determine how these variables functioned together. The process allowed the FPB to provide the unit and the MAJCOM with empirical data showing how performance could be improved. Based on the success at Nellis AFB WSA, the systems effectiveness assessments are being institutionalized by HQ AFSFC

and HQ ESC. Once implemented, systems effectiveness assessments will be required prior to any security system installation or upgrade.

Note: There have been no FPB initiatives transitioned into a formal acquisition program.

8. What did you try to transition to the USAF, but it did not make it and was abandoned?

The FPB has not had an unsuccessful transition.

9. Do you feel your results get a fair hearing (by AF leadership and/or the general public)?

Yes. Force Protection Battlelab initiatives receive a fair hearing by Air Force leadership and the general public. However, the current process of review by the AFROC provides limited value. The AFROC generally takes initiative briefings for information only. Our best success has been with MAJCOM sponsorship and participation. Included below is a partial list of Air Force senior leaders who have been briefed on FPB initiatives

SECAF

CSAF

VCSAF

USAF/XO/XOC/XOI/XOF

PACAF/CC/CV

USAFE/CC

AFSPC/CC

CENTAF/CC/CV

CENTCOM/DCINC

AETC/CC

12AF/CC

7AF/CC

SOUTHCOM/CC

TIG and DIG

20AF/CC

ACC/CE/SG

AC2ISRC/CC

USFK/CS

OUSD for Personnel and Readiness

OASD for Strategy and Threat Reduction

10. What initiatives are being worked today?

Ruggedized Advanced Pathogen Identification Device

Food and Water Antiterrorism

Directed Energy Weapons

Modified Remote Visual Assessment (Shaw AFB)

Combat Support Command and Control

Mildenhall, Aviano, and Tinker flightline security enhancement programs

Air Force Intelligence Agency systems effectiveness assessment

Patriot Protector modeling

Space Command launch facility modeling
Bolling AFB waterfront operations

11. Where do you see your Battlelab going in the future?

With the growing threat of weapons of mass destruction, we look to expand our involvement in medical/readiness protection issues. Adding a medical cell to our Battlelab will provide a capability to address how we protect troops against these threats.

Force protection is a joint concern. It would be beneficial to have all services represented at the FPB. This would provide other services' perspective on initiatives and facilitate the dissemination of the initiatives' results across all services.

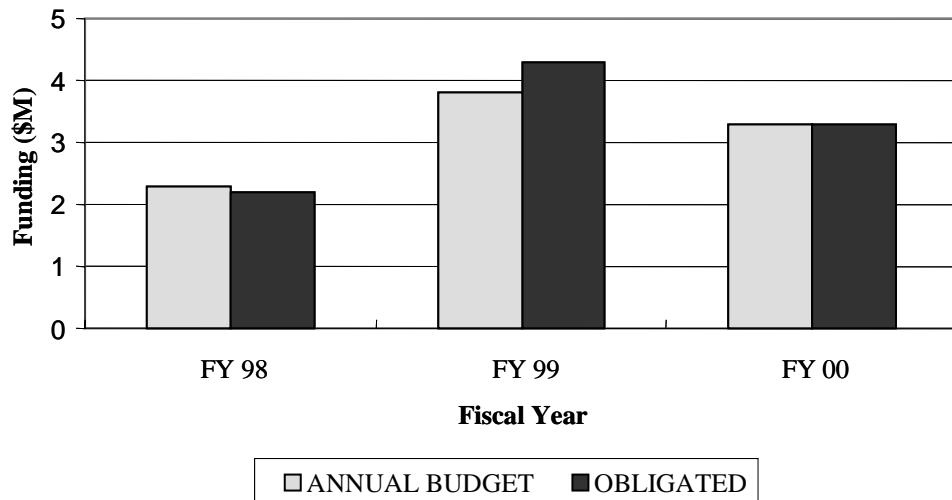
Our modeling division has provided a valuable service to Air Force force protection. As the only Air Force modeling function focused solely on force protection modeling, we fill a void, providing services that do not necessarily fall within the FPB charter. We have demonstrated the need for an Air Force modeling and simulation function to serve MAJCOM security forces units in systems effectiveness assessments and tactics, techniques, and procedures refinement.

12. Is a tour in the Battlelab perceived as career enhancing? We believe the Battlelabs are too new to make a blanket appraisal of whether or not an assignment here is career enhancing. Our success rate on promotions has been good for officers; but, the promotion rate is mediocre for enlisted personnel. We've had great success in placing officers, but several enlisted members have not received follow on assignments which were viewed as career progression.

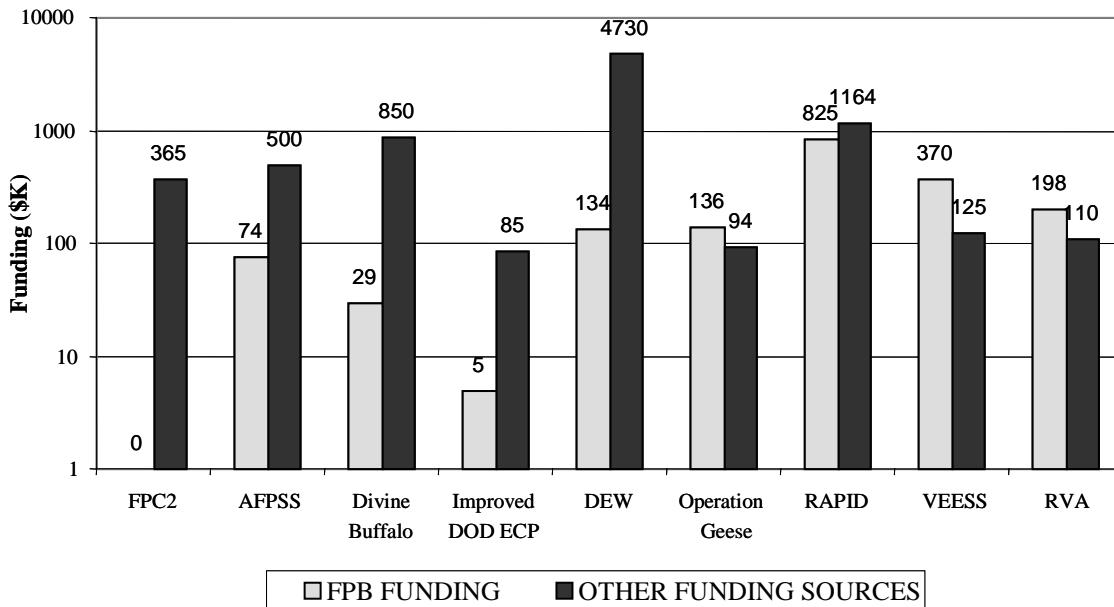
13. Is there adequate funding for the Battlelab?

We have adequate funding to manage our initiatives, but we also work very hard to generate funding from outside sources. Shown below are charts which outline our fiscal year funding for FY98 through FY00 as well the funding obtained from outside sources.

FPB Funding Profile



Initiatives with Additional Funding Sources



14. Describe the process from cradle to grave of a successful and a non-successful initiative (from an AO, Lieutenant or Captain). The Hazard Assessment and Mission Enhancement of Resources is an example of an initiative that did not prove its military worth, and the Airborne Force Protection Surveillance System is an example of a “successful” initiative. The after initiative reports (AIRs) for these two FPB initiatives are included as attachments to this report.

15. What things do you think are working with your Battlelab? We are having great success in transitioning initiatives to the field. Almost every initiative has either improved force protection in an operational environment or provided the warfighter with knowledge that helps improve force protection.

We have been successful in leveraging support from other agencies. Our involvement with other government agencies has led to additional funding sources for initiatives and the ability to tap into additional sources of information. We have also been able to “piggyback” on existing efforts to conduct tests of our own. For example, our personnel characterized the blast effects on expeditionary shelters during the Technical Support Working Group (TSWG) Divine Buffalo I explosive test. Our participation in the test was funded by TSWG and it allowed us to tap into a multi-million dollar experiment for a minimal cost. A second \$700K effort funded by Defense Threat Reduction Agency for the Federal Bureau of Investigation provided an opportunity to leverage \$60K of our own money to collect additional barrier fragmentation data.

We have had excellent opportunities to brief the senior leaders of the Air Force and members of the Office of Secretary of Defense.

Operating in actual field environments provides a better understanding of field requirements. Most of our initiatives have required us to work in the field. Working with the personnel actually performing the work has provided us with the ability to better understand the force protection challenges faced in the field.

Based on our success with urgent and compelling tasks, AF/XOF created a logistics flight at the Air Force Security Forces Center to handle the various urgent needs of the warfighter. The charter of the logistics flight is to provide force protection solutions for operational units.

Our chain of command permits us to help all customers by not being linked to a single MAJCOM. It also helps with quickly undertaking initiatives. The FPB commander's supervisor is the KBI approval authority. This ease of access allows the FPB to quickly obtain approval for initiatives and begin proving/disproving concepts.

Traditionally decisions regarding force protection issues have been made with subjective data. For example, many sites have constructed concrete blast walls to mitigate the effects of an explosion. However, after conducting tests at Divine Buffalo and Dipole Mite, we showed through empirical data that these walls do little to stop blast effects. Therefore, the goal of all our initiatives is to use a systematic methodology to provide quantifiable results to support our recommendations. This, in turn, makes it easier for the commander to make an informed decision.

16. What things would you do to improve your Battlelab's contribution? Battlelab commanders should be allowed to influence inbound and outbound assignments. To attract high caliber personnel, it is necessary to choose among the best, not just one or two people. Also, in order to make a Battlelab assignment attractive to the top people, the Battlelab commanders should have input into placing people, once their Battlelab tour has come to an end. This could allow the AF and DoD to benefit from the experience a top quality officer or SNCO has gained during a FPB tour. One suggestion for providing the commanders with more input is coding the Battlelab positions as controlled tours and special duty assignments.

Add a new initiative format to encompass urgent and compelling taskings and modeling and simulation initiatives. These urgent and compelling taskings are providing valuable support to the warfighters. It also serves to keep the Battlelab in tune with the problems experienced by the field. We believe the intent of the CSAF in establishing the Battlelabs was to quickly provide the field with the tools they need. To this point, the FPB has not distinguished between support and concepts. Our criteria for adopting an initiative has been, "Can we improve force protection?" If the answer was "yes," we did it. To date we have had great success. The Battlelabs need the freedom to examine a problem from an unencumbered viewpoint. The field views this as advantageous because they can receive feedback in a truly nonattributional atmosphere; get an assessment from someone outside their chain of command; and have a problem examined from a multi-functional perspective. Battlelabs become a repository of knowledge for their specific area, because they only focus on that area. By providing support to the field, the Battlelabs have the opportunity to use that knowledge base in solving real world problems. Adding a new initiative format, called the Warfighter Support Initiative, will ensure this mutually beneficial cycle continues.

Change the Mitchell Battlelab Initiative (MBI) criteria to facilitate the proposal of MBIs. The fact that no MBIs have been undertaken in 2 ½ years indicates there is something wrong with the process or the criteria. Mitchell Battlelab Initiatives should include a proposal criterion for initiatives that may be controversial. By revising the criteria, it may encourage Battlelabs to entertain concepts that normally would not be palatable to the Air Force or the chain of

command. The general officer appointed campaign manager should be an objective observer and wield sufficient power to ensure the initiative gets a fair hearing.

While the FPB has not transitioned any initiatives to the acquisition community, we have concerns with the process. The catalyst behind the Rapid Acquisition Program is a MAJCOM sponsor. Many force protection issues apply across the Air Force and are not MAJCOM specific. Sponsorship from the corporate Air Force may be required for some initiatives, especially with regard to policy or doctrine changes affecting the total force. In order for an initiative to successfully transition, the Battlelabs will have to find an initiative sponsor. Finding a sponsor has the potential to limit “out of the box” ideas because Battlelabs may lean towards taking on initiatives based on the interest of a MAJCOM versus selecting initiatives based on their potential military impact. Finding a sponsor will also force Battlelabs to market their initiatives better.

(This Page Intentionally Left Blank)

Appendix F

List of Completed Battlelab Initiatives

F = Fielded, T = Changed TTP, A = Awaiting Acquisition Process, P = In POM

| Battlelab | Initiative | Status |
|-----------|--|---|
| C2B | Hill ATO Defragger | F (Kosovo, USAFE, 7 Wings at ACC) |
| AEFB | Integrated Planning and Execution Capability | F (Kosovo), R (Crisis Action System) |
| C2B | Collaborative Tools | F (Kosovo), R (AC2ISRC) |
| FPB | Ground Based Radar Site Protection (Op Geese) | F (3 sites-South America) |
| SB | Space Environment Network Display | F (55th SWS) |
| FPB | Sensor Guard | F (820th SFG) |
| IWB | Network Attack Visualization | F (AFCERT) |
| C2B | Reduced Hardware Footprint | F (AFSOC, F117, 8th AF, 1st MEF) |
| FPB | Food & Water Antiterrorism | F (CENTAF, CENTCOM) |
| IWB | Enhanced SA Tool | F (Cheyenne Mtn, FBI) |
| IWB | Diagnostic Emulator | F (Classified Customer) |
| IWB | Voice Optimal Interrogation | F (Classified Customer) |
| C2B | Enhanced Linked Virtual Information System | F (GCCS, TBMCS 1.0.2) |
| IWB | Miniaturized GPS Jammer | F (GPS JPO NAVWAR Tool) |
| C2B | ATO Visualization & Assess | F (Master Air Ops Planner) |
| SB | Commercial Applications for Combat Effectiveness | F (Operation Northern Watch) |
| AEFB | EOC Enroute | F (Residual Cap: 2 KC-135R's M) |
| IWB | Software Agent System for OPSEC | F (SWC Red Team) |
| IWB | Information Warfare (SCI) Reach back | F (USAF, USA) |
| FPB | Vehicle Entry Explosives Search Strategy | T (Guide Published) |
| C2B | Tactical Sensor Integration | T (ASOC and BCC) |
| SB | Hyper spectral Imagery Collection Upon Pike's Peak | T (Training Changed) |
| IWB | Signal Analysis Mapping | P (ACC Current Purchase) |
| AEFB | Combined AGE | P (IOC Nov 01) |
| AEFB | Compact Air Transportable Hospital | P (AF/SG-Buying ~100/year) |
| SB | Space Surveillance Network Optical Augmentation | A (02 POM Candidate) |
| UAVB | JSTARS Battlespace Imaging | A (05 Implementation) |
| FPB | Remote Visual Assessment | A (02 POM Candidate) |
| FPB | Ruggedized Advanced Pathogen Ident Device | A (02 POM) |
| AEFB | Next Generation Munitions Trailer | A (ACC/DRW Writing ORD) |
| IWB | Pulse Doppler Identification | A (ECM Pods) |
| AEFB | Deployment Personnel Accountability Readiness Tool | A (Joint ORD) |
| C2B | Speech Recognition | A (AC2ISRC) |
| IWB | Network Early Warning System | A |
| IWB | Cyber Warrior | A |
| IWB | Re-configurable EW Avionics Parts | A |
| SB | Space Object Ident in Living Color | A |

List of Completed Battlelab Initiatives (continued)

F = Fielded, T = Changed TTP, A = Awaiting Acquisition Process, P = In POM

| Battlelab | Initiative | Status |
|-----------|--|-----------------------------------|
| UAVB | FAA Airspace UAV TCAS | A |
| IWB | Panther Den | A/Masked |
| C2B | TBMCS and ABCS Data Sync | Further Research |
| SB | Satellite Track using Ambient RF | Further Research |
| UAVB | SEAD Enhancement | Further Research |
| UAVB | Communication Relay | Further Research |
| UAVB | Spotter UAV | Further Research |
| AEFB | Common Bore Sight | Not recommended |
| AEFB | Harvest Phoenix | Canceled (redundant) |
| FPB | Virtual Tower | Canceled |
| SB | Space Doctrine | Canceled (not meeting objectives) |
| C2B | JFACC Project Phase 2 | Technology not mature |
| FPB | Hazard Assessment and Mission Enhancement of Resources | Technology not mature |

REPORT DOCUMENTATION PAGE

**Form Approved
OMB No. 0704-0188**

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and manipulating the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget Paperwork Reduction Project (0704-0188), Washington, DC 20503

| | | | |
|---|--|---|--|
| 1. AGENCY USE ONLY (Leave Blank) | 2. REPORT DATE | 3. REPORT TYPE AND DATES COVERED | |
| | June 2000 | Final, January 2000 – May 2000 | |
| 4. TITLE AND SUBTITLE United States Air Force Scientific Advisory Board Quick Look Report on USAF Battlelabs | | | 5. FUNDING NUMBERS |
| 6. AUTHOR(S) Donald L. Lamberson, Maj Gen (Ret), PhD; John Corder, Maj Gen (Ret); George B. Harrison, Maj Gen (Ret); O'Dean P. Judd, PhD; Gene H. McCall, PhD; Robert Rankine, Jr., Maj Gen (Ret) PhD ; Harold W. Sorenson, PhD ; Capt Daniel D. Garber, Capt Julie M. Olson | | | |
| 7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(ES) AF/SB Pentagon Washington, DC 20330-1180 | | | 8. PERFORMING ORGANIZATION REPORT NUMBER SAB-TR-00-04 |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) SAF/OS AF/CC Pentagon Washington, DC 20330-1670 | | | 10. SPONSORING/MONITORING AGENCY REPORT NUMBER |
| 11. SUPPLEMENTARY NOTES | | | |
| 12a. DISTRIBUTION/AVAILABILITY STATEMENT Cleared for Open Publication | | 12b. DISTRIBUTION CODE | |
| ABSTRACT (Maximum 200 Words) The United States Air Force Scientific Advisory Board (USAF/SB) was asked by the USAF Chief of Staff to look into USAF Battlelabs and report back to him by June 2000. By asking, "Is the current Air Force Battlelab structure and architecture meeting AF needs?" the CSAF tasked the Study Panel to determine the best structure for AF Battlelabs to prove innovative operations and logistics concepts to advance AF core competencies and drive revisions to AF Doctrine, Organization, Training, Requirements, and Acquisitions. He further asked the Panel to propose rationale and criteria for establishing and/or disestablishing Battlelabs as well as provide some insights of how much innovation the Air Force can afford. In answering these questions, the Panel visited all six existing AF Battlelabs and had a thorough briefing and discussion with all Battlelab personnel based on a series of detailed common questions provided to each Battlelab in advance. The Study Panel also visited interservice Battlelabs as well as "ad hoc" Battlelabs in order to formulate pertinent observations, findings, alternative solutions, and recommendations. This report covers the results of this activity. | | | |
| 14. SUBJECT TERMS Battlelabs, USAF Battlelabs, Innovation, Initiatives, C2 Battlelab, AEF Battlelab, IW Battlelab, Force Protection Battlelab, UAV Battlelab, Space Battlelab, Mixing Bowl, Warfighter/Technologist Team, Kenney/Mitchell Battlelab Initiatives | | | 15. NUMBER OF PAGES 92 |
| | | | 16. PRICE CODE |
| 17. SECURITY CLASSIFICATION OF REPORT Unclassified | 18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified | 19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified | 20. LIMITATION OF ABSTRACT None |

(This Page Intentionally Left Blank)