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**Fighter Maintenance and Total Force Integration: Current Active  
Duty Manpower Implementation Practices and the Impact on  
Deployment Capability**

by

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In Partial Fulfillment of the Graduation Requirements

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**Total Force Integration (TFI) initiatives are on going across the total force. This paper examines how Air Force TFI manpower implementation practices combine with the legal limitations of deploying reserve members to impact the ability of active duty fighter maintenance units to meet full Unit Type Code (UTC) deployment taskings. Current TFI manpower practices for active duty units in classic associations with a reserve unit result in a reduction of active duty maintenance positions for full-time, non-supervisory reserve positions. This practice fails to account for the legal limitations of deploying reserve members. These limitations combine with active duty maintenance manpower reductions to place at risk the ability of a unit to fulfill Unit Type Code (UTC) deployment taskings if required. Unless mobilized, reservists must volunteer for deployments. As a result, reserve units in associate relationships cannot commit to filling a specific number of UTC positions for Air Expeditionary Force taskings. The active duty unit must be able to fill all its UTC taskings without assistance from its reserve associate in the event there are few or no reserve volunteers. A manpower analysis of two TFI fighter maintenance units was conducted to illustrate the impact of active duty manpower reductions on the capability of these units to meet all UTC requirements without assistance from the reserve associate unit. Analysis revealed that neither active duty unit is able to meet UTC taskings without assistance from the reserve associate unit. Each TFI initiative must be evaluated individually to ensure the remaining active duty maintenance manpower can fulfill its UTC taskings without reserve assistance to make certain expeditionary capability is available when needed.**

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*Preface*

Fiscal realities are forcing the Air Force to seek new ways to become more efficient and stretch dwindling resources to meet new mission requirements. Total Force Integration (TFI) is a centerpiece of that strategy. This paper analysis two fighter maintenance units to determine the impact of the legal limitations on deploying reserve members and TFI manpower practices on the ability of those units to meet full Unit type Code deployment taskings. TFI is spreading across the force and understanding the impacts of these initiatives to expeditionary combat capability is extremely important. While this is only a small piece of the puzzle as the Air Force moves forward to leverage all resources across the total force, I hope this project illustrates the importance of understanding and considering impacts to all aspects of the mission before pushing forward with force structure changes.

Many people made this project a reality. I would like to thank my research advisors Lieutenant Colonel Lance Mathews and Major Joe Dene for great advice, direction and feedback. This would not have been possible without the contributions of many experts from the field who are putting forth great effort to make TFI a success. Special thanks go to Chief Master Sergeant Wade Shaw from the 477<sup>th</sup> Maintenance Group, Senior Master Sergeant Jeff Workman from PACAF/A1, Mr. Chris Bodziony from the 3<sup>rd</sup> Maintenance Group and Master Sergeant Bryan Claxton from the 388<sup>th</sup> Aircraft Maintenance Squadron.

*Abstract*

Total Force Integration (TFI) initiatives are on going across the total force. This paper examines how Air Force TFI manpower implementation practices combine with the legal limitations of deploying reserve members to impact the ability of active duty fighter maintenance units to meet full Unit Type Code (UTC) deployment taskings. Current TFI manpower practices for active duty units in classic associations with a reserve unit result in a reduction of active duty maintenance positions for full-time, non-supervisory reserve positions. This practice fails to account for the legal limitations of deploying reserve members. These limitations combine with active duty maintenance manpower reductions to place at risk the ability of a unit to fulfill Unit Type Code (UTC) deployment taskings if required.

Unless mobilized, reservists must volunteer for deployments. As a result, reserve units in associate relationships cannot commit to filling a specific number of UTC positions for Air Expeditionary Force taskings. The active duty unit must be able to fill all its UTC taskings without assistance from its reserve associate in the event there are few or no reserve volunteers. A manpower analysis of two TFI fighter maintenance units was conducted to illustrate the impact of active duty manpower reductions on the capability of these units to meet all UTC requirements without assistance from the reserve associate unit. Analysis revealed that neither active duty unit is able to meet UTC taskings without assistance from the reserve associate unit. Each TFI initiative must be evaluated individually to ensure the remaining active duty maintenance manpower can fulfill its UTC taskings without reserve assistance to make certain expeditionary capability is available when needed.

## Part I

### Introduction

Total Force Integration (TFI) is the Air Force organizational concept for the future. It is one of many vehicles the Air Force is using to gain efficiencies and stretch limited resources. The 2008 Air Force Posture Statement highlights the prominence of TFI in the Air Forces vision for the future by stating, “TFI will be critical to meeting the challenges of competing resource demands, an aging aircraft inventory and organizing, training and equipping for emerging missions.”<sup>1</sup> The Total Force Integration Office (AF/A8XF) amplifies that statement and characterizes TFI this way, “Total Force Integration is a fundamental element of Air Force transformation. Comprised of two major components - 2025 Force Structure and new organizational constructs - TFI will create efficiencies, retain invaluable human capital, and, above all, increase the capabilities of all the Air Force components. Total Force Integration (AF/A8XF), working closely with the Air National Guard and AF Reserve, will develop and use a range of innovative organizational constructs and personnel policies to maximize combat capability and optimize force structure.”<sup>2</sup> It is imperative that Air Force members from top to bottom understand the implications of TFI and how it will change the planning and execution of future operations.



The Air Force has embarked on TFI initiatives across the spectrum of Air Force missions. TFI is in full swing impacting the active, reserve and guard components. According to the Air

Force Reserve Vice Commander, Major General Allan R. Poulin, as of September 2008, there were 43 TFI initiatives involving just the Air Force Reserve and USAF active duty units.<sup>3</sup> To quote from his briefing at the Air Force Association Conference on 16 September, 2008, “This is the way ahead. We’re not going to back off from TFI...”<sup>4</sup> Clearly the Air Force views TFI as fundamental to how it will organize and prepare to meet the challenging fiscal and mission demands of the future. Implemented smartly, it will produce cost savings and efficiencies across the force.

In addition to the challenging fiscal outlook for the future, three realities are driving the Air Force to find new, innovative ways to achieve efficiencies and cost-savings. At the top of this list is the much needed recapitalization of an aging aircraft fleet. With the exception of the unmanned aerial vehicle fleet, the Air Force fleet is old and war weary from 18 years of constant, high tempo operations. The F-15C/D fleet is an average age of 25 years old<sup>5</sup> and the KC-135 fleet’s average age is over 42 years old<sup>6</sup>. These are but two examples of a tired fleet of aircraft that cannot be flown forever. Tough choices must be made to find the resources necessary to replace these aging weapons systems.

Second, the Air Force must posture itself for new mission areas and to expand its capabilities to meet future challenges. The post 9/11 national security reality and the resulting new capability requirements demand the Air Force invest in new mission areas like unmanned aerial vehicles and cyber operations. Additional resources must also be directed to expand special operations capabilities as we continue to fight the Long War against global terrorism. Aircraft recapitalization and emerging capability requirements have driven the Air Force to seek out innovative cost-saving strategies.

Finally, in addition to aircraft recapitalization and expanding mission sets, the current economic crisis will create fiscal pressures on the federal government. Projected federal budget deficits foretell at minimum stagnant if not declining defense budgets over the near and midterm. These realities require the Air Force to re-examine how it conducts business. TFI is one centerpiece of this new strategy.

Manpower efficiencies produced by TFI initiatives free-up active duty positions associated with traditional missions allowing excess positions to flow into new and expanding mission areas. There are, no doubt, efficiencies and synergies that can be realized by leveraging the capabilities and manpower provided by the reserve and active component team. But what is the impact to operations at the tactical level for active duty fighter maintenance units in these TFI associations?

This research suggests current TFI manpower implementation practices will prevent active duty fighter maintenance units from consistently and reliably meeting full Unit Type Code (UTC) deployment taskings without reserve volunteers or involuntary mobilization of some reserve component members. While the manpower requirement for these UTCs has not diminished, the active duty manpower available will have decreased due to current TFI manpower implementation practices. The result is that some active duty units will find it difficult, if not impossible, to meet some deployment taskings without the assistance of the associate reserve component unit.

### **Overview**

The fiscal pressure to stretch the Air Force budget into new missions and new capabilities is a reality that will likely get more challenging over the coming years. It is this fiscal pressure

that is driving the Total Force Integration vision. In a 2005 Air Force Times article, Brig. Gen. Allison Hickey, the Air Force's Future Total Force directorate's interim director stated that an objective for TFI is achieving "efficiency" in manpower and force structure.<sup>7</sup> The article added that, "moving Guard and Reserve personnel onto active-duty bases and vice versa would allow the Air Force to eliminate redundancies."<sup>8</sup> This allows the active and reserve force to more efficiently utilize base operating support. The equation changes when considering fighter units that fly and maintain the same fleet of aircraft. The redundancies referred to by Brig. Gen. Hickey are in manpower, equipment and aircraft.

One example, on October 13<sup>th</sup>, 2007 the active duty 1<sup>st</sup> Fighter Wing and 192<sup>nd</sup> Fighter Group of the Virginia Air National Guard officially joined in a classic associate relationship at Langley Air Force Base to fly the F-22 Raptor.<sup>9</sup> Air Force Instruction (AFI) 90-1001 defines a classic associate relationship as "an integration model in which a Regular Air Force component unit retains principal responsibility for a weapon system or systems, which it shares with one or more reserve component units."<sup>10</sup> Prior to their new mission, the 192<sup>nd</sup> Fighter Group flew 15 F-16 aircraft (single squadron) from the Richmond International Airport. The Richmond based F-16s and all associated equipment are now gone and they now share the 1<sup>st</sup> Fighter Wing's 40 F-22 Raptors (two squadrons) with their active duty counterparts. So, we have essentially taken three fighter squadrons and told them to share two squadrons of aircraft. This scene is playing out across the Air Force, Air Force Reserve and Air National Guard. In the process, active duty manpower is being replaced by full-time reservists in an effort to reduce redundancies and become more efficient.

Major Command Directorate of Manpower and Personnel (A1) offices see TFI as a vehicle to stretch limited active duty manpower positions. They are using the full-time reserve

manpower now maintaining active duty aircraft in these TFI relationships to justify active-duty manpower position reductions on the active duty maintenance side of the TFI equation. Currently, some active duty maintenance units are losing (or being decremented) one manpower position for each full time, “non-supervisor” air reserve technician (ART).<sup>11</sup> ARTs form the backbone of the reserve force. They make up the full time cadre that carry the mission during the week and train the traditional reservists on weekends. According to Air Force Reserve Command Instruction (AFRCI) 36-501, an ART is defined as:

“A full-time civilian employee who is required, as a condition of employment, to maintain active reserve membership in the unit in which employed. In addition to his or her civilian assignment, he or she is assigned to equivalent positions in the reserve organization with a reserve military rank or grade. The Air Force Specialty Code (AFSC) authorized on the Unit Manpower Document (UMD) for the civilian (Part A) and the military (Part B) counterpart position must be equivalent.”<sup>12</sup>

This active duty manpower strategy allows the Air Force to move manpower authorizations from TFI fighter maintenance units to new mission areas such as Unmanned Aerial Vehicles (UAV) and cyberspace. In a peacetime, in-garrison environment, this concept has merit and can indeed produce cost savings both in terms of dollars and manpower by eliminating duplicate capabilities. But the realities of executing this manpower policy and its impact on deploying these fighter units cannot be overlooked. This manpower strategy relies on reserve component volunteers to fill UTC shortfalls resulting from active duty manpower reductions driven by TFI.

As a result of this TFI manpower strategy and the resulting active duty manpower reductions, some units may find it very difficult or impossible to fill Air Expeditionary Force (AEF) UTC taskings without the assistance of their associated TFI partner. Although the reserves deploy and have been a large part of the global fight, they cannot substitute for the

flexibility and persistence of active forces. The legal limitation of deploying a reserve component member significantly reduces the deployment options available to commanders until involuntary mobilization occurs. The simple fact is that reserve personnel must *volunteer* to deploy unless otherwise directed by some type of involuntary activation. The reserve half of the TFI team cannot firmly commit to filling a specific number of deployment positions on a “volunteer” basis. The reserves consider each deployment tasking individually and their participation will vary from one to the next. Due to these limitations, one full time reserve member does not equal one active duty member with respect to deployments. According to ACC/A4RX, if units do not get enough reserve volunteers to fill UTC holes created by active duty manpower reductions, the plan is to source active duty manpower from other units to make the mission happen. One can imagine the impact this could have on the units tasked to fill UTC line numbers for a shortfall at another active duty unit. Short of reserve mobilization this is the current risk mitigation plan.<sup>13</sup>

This paper will explore the effect of TFI manpower reductions on deployment capability of active duty fighter maintenance units. First, it is essential to understand the legal restrictions and limitations for the deployment of reserve component members. This paper will spell out the legal limitations and requirements for deploying reserve component members. Then, two TFI fighter maintenance units will be analyzed to evaluate the active duty maintenance manpower structure resulting from current TFI implementation. This manpower structure will be compared to UTC requirements to determine how TFI has affected the units’ ability to fill deployment requirements without reserve component participation or mobilization. Finally, recommendations for “smart” TFI implementations will be discussed.

The TFI relationships analyzed in this paper are those in which the reserve component possesses no aircraft. In these cases, all aircraft are “owned” by the active duty but flown and maintained by both the active and reserve personnel. This allows the Air Force to save operations and maintenance money by reducing the number of fighter aircraft in the overall inventory. One obvious question is how can a fleet of aircraft originally sized for two squadrons support the operations and match the capability of three squadrons? This question as it relates to aircraft availability, service life and capability are not the focus of this paper. However, these are all subjects worthy of additional research. Instead, this paper will focus on the impact of TFI implementation on active duty manpower and the resulting deployment capability of these active duty fighter maintenance units.

## Part II

### Deploying the Reserve Component: Legal Limitations and Considerations

Title 10 of the United States Code (10 U.S.C) is the primary law that governs active duty and reserve armed forces. To quote from the Title 10 Preface, “Title 10, United States Code, contains the organic law governing the Armed Forces of the United States and providing for the organization of the Department of Defense, including the military departments and the reserve components.”<sup>14</sup> This law serves as the basis for defining the legal restrictions of placing reserve members on active duty. Reserve members may be activated by volunteering or as a result of involuntary orders.<sup>15</sup> AFI 10-402V1 states “Until involuntary activation authority has been approved, volunteerism is the only means for bringing ARC (Air Reserve Component) forces on AD (Active duty) to support an operational contingency.”<sup>16</sup> Authority to place reserve members on active duty by way of volunteerism is contained in 10 U.S.C 12301: “At any time, an authority designated by the Secretary concerned may order a member of a reserve component under his jurisdiction to active duty, or retain him on active duty, **with the consent of that member.**”<sup>17</sup>

Although involuntary activations can take many forms, three in particular, form the basis for involuntary call up to active duty. According to the Commanders Integration Guide, the three primary forms of involuntary activation are Presidential Reserve Call Up (PRC), Partial Mobilization (PM) and Full Mobilization.<sup>18</sup> For planning purposes, it is important for TFI units to understand the difference between volunteerism and involuntary activation. The following table summarizes the principal differences between these activation methods.

	<b>Mandatory Activation</b>	<b>Maximum Tour Length</b>	<b>Activation Authority</b>
<b>Volunteerism</b>	No	Indefinite	Secretary Designate
<b>Presidential Reserve Call-Up (PRC)</b>	Yes	≤ 365 Days	President
<b>Partial Mobilization</b>	Yes	≤ 24 Consecutive Months	President or Congress
<b>Full Mobilization</b>	Yes	Duration of National Emergency Plus 6 Months	President and Congress

Table 1  
Reserve Activation Summary<sup>19</sup>

Involuntary activation may occur under three primary conditions. First, reserve members can be placed on active duty by Presidential Reserve Call-Up (PRC). This allows the President to activate up to 200,000 reservists in case of emergency or operational mission for a maximum of 365 days.<sup>20</sup> Next, Partial Mobilization gives the President or Congress authority to activate up to 1 million reservists for not more than 24 months in event of war or other national emergency.<sup>21</sup> Finally, Full Mobilization authorizes the President and Congress to activate all reserve members to support a war or other national emergency for contingency length plus six months.<sup>22</sup>

Volunteerism is the primary mechanism used when reserve components deploy as part of a TFI association during peacetime. This method of activation has several limitations that must be considered during deployment planning. First, the number of reserve volunteers for a given deployment varies from one to the next. Although reserve units estimate voluntary participation based on historical data, there can be no blanket commitment for a hard and fast number of volunteers. Funding must also be considered when activating reserve members. All voluntary activations are funded using Military Personnel Appropriation (MPA) funds.<sup>23</sup> The Air Force must account for its MPA funding requirements in each annual budget. TFI units pose a

challenge to this budgeting process as these units will have to estimate the annual MPA requirement based known deployments and historical reserve volunteer rates. Projecting deployment requirements 18 to 24 months in advance to ensure the budget contains adequate MPA funding is an inexact science that produces the real possibility of MPA funding shortfalls. It is voluntary participation of reservists that will be relied upon in TFI units to fulfill Air Expeditionary Force (AEF) deployments during peacetime.

### **Manpower/Unit Type Code (UTC) Analysis Methodology and Assumptions**

This paper uses two TFI associations to analyze maintenance manpower implications and the impact of TFI active duty manpower reductions fulfilling UTC requirements. The first analysis looks at the 3<sup>rd</sup> Wing (active duty) and the 477<sup>th</sup> Fighter Group (reserve) classic association in support of F-22 operations at Elmendorf Air Force Base, Alaska. Next, analysis is conducted on the classic association of the 388<sup>th</sup> Fighter Wing (active duty) and the 419<sup>nd</sup> Fighter Wing (reserve) at Hill Air Force Base, Utah supporting F-16 operations.

This paper compares active duty end-strength maintenance manpower after TFI to UTC requirements to determine if active duty units can fulfill UTC requirements without reserve component participation. Both associations are analyzed assuming each unit is stabilized at post-integration active duty manpower authorizations. This analysis was conducted using two manpower data points. First, authorized active duty manpower positions were compared to UTC requirements. Second, estimated manning percentages were used to estimate available manpower. This estimates how many actual bodies are in the unit that can be tasked. This number was also compared to UTC requirements. Not all maintenance AFSCs required to support F-22 and F-16 operations were analyzed. Only the core maintenance AFSCs for each were considered.

### 3<sup>rd</sup> Wing/477<sup>th</sup> Fighter Group Maintenance Manpower/UTC Analysis

On October 1<sup>st</sup>, 2007 the 477<sup>th</sup> Fighter Group activated at Elmendorf Air Force Base, Alaska as the reserve component of a classic association with the 3<sup>rd</sup> Wing in support of the F-22 flying mission. The two units share the flying, maintenance and support activities and responsibility for the operation and employment of Elmendorf's 40 F-22 aircraft. Elmendorf's F-22 operation consists of the 90<sup>th</sup> and 525<sup>th</sup> Fighter Squadrons. The 477<sup>th</sup> Fighter Group consists of the 302<sup>nd</sup> Fighter Squadron and supporting maintenance and civil engineering squadron. The 302<sup>nd</sup> Fighter Squadron and supporting maintenance squadrons will split resources to support flying and maintenance activities for both active duty F-22 fighter squadrons. The 477<sup>th</sup> Fighter Group will continue to grow into the year 2012 when it will have reached its manpower end-strength.

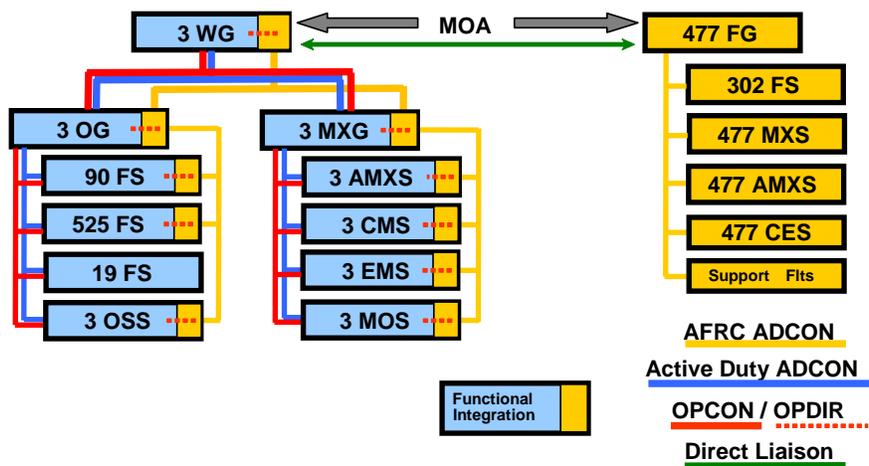


Figure 1  
Elmendorf AFB Classic Association Organizational Construct<sup>24</sup>

Each active duty squadron is required to support a 12-ship deployment package with a follow-on 6-ship package. Thus, each squadron could be tasked to deploy 18 of their 20 assigned aircraft. The 3<sup>rd</sup> Maintenance Group is tasked with maintenance UTCs to support both the 12-ship and the 6-ship aircraft UTCs. 3<sup>rd</sup> Maintenance Group Unit Manning Document (UMD) to UTC comparison reveals active duty manpower shortfalls with regard to filling UTC requirements in the absence of reserve component volunteers. The following chart compares active duty maintenance manpower and UTC requirements to support UTCs for a single F-22 squadron. The manpower authorization numbers used are projections from the 4<sup>th</sup> Quarter of Fiscal Year 2011 UMD. This projection accounts for all active duty maintenance manpower reductions due to TFI implementation as the 477<sup>th</sup> Fighter Group grows its full-time reserve manpower to final end-strength.

Maintenance AFSC	TFI Position Decrement	FY11/4 Authorized Positions	Estimated Manning %	Est Actual Manpower	12-Ship UTC Req't (Δ)	18-Ship UTC Req't (Δ)
Crew Chief 3-Lvl	-2	15	85%	13	11	13
Crew Chief 5-Lvl	-3	37	85%	31	35	46 (9)
Crew Chief 7-Lvl	-1	19	85%	16	18	22 (3)
Avionics 3-Lvl	-3	4	80%	3	9 (5)	12 (8)
Avionics 5-Lvl	-3	19	80%	15	18	21 (2)
Avionics 7-Lvl	-1	8	80%	6	5	7 (1)
Weapons 3 -Lvl	0	12	85%	10	11	15 (3)
Weapons 5-Lvl	-2	23	85%	20	22	27 (4)
Weapons 7-Lvl	-2	4	85%	3	7 (3)	9 (5)
Structures 3-Lvl	-3	5*	80%	4	7 (2)	10 (5)
Structures 5-Lvl	0	21*	80%	17	13	16
Structures 7_Lvl	-2	4*	80%	3	4	5 (1)

\* Equipment Maintenance Squadron positions have been divided in half to reflect support for both F-22 squadrons  
 Δ Delta equals UTC shortfalls when compared to FY11/4 Authorized Positions

Table 2  
 Elmendorf Single Squadron F-22 Manpower to UTC Comparison<sup>25, 26, 27</sup>

As depicted in the chart, manpower to UTC analysis reveals many active duty shortfalls. Although not all maintenance AFSCs required to support these UTCs are depicted, these four AFSCs form the core of F-22 maintenance activities. That said, it is clear to see that in all four AFSCs spanning nearly all skill levels there is a shortage of personnel required to fill both the 12-ship and follow-on 6-ship UTC deployment requirements. This active duty manpower shortfall creates a mission risk if the reserve associate unit does not step up to fill the gap. Even more fundamental is evidence that the 3<sup>rd</sup> Maintenance Group UMD prior to the TFI induced manpower reductions is inadequate to meet potential UTC taskings. This analysis shows that even if active duty maintenance manpower positions are not decremented due to TFI, the 3<sup>rd</sup> Maintenance Group lacks the manpower to fill UTC requirements across all four AFSCs.

Analysis of the 3<sup>rd</sup> Maintenance Group F-22 UMD and UTCs shows inadequate manpower for crew chiefs, avionics specialists, weapons specialists and structures specialists. Manning levels for just one of three crew chief skill levels are sufficient to meet all UTC taskings. Only 3-Level crew chief manning will meet both the 12-ship and 6-ship follow-on UTCs. Based on this analysis, both 5-level and 7-level crew chief manning fall short of UTC requirements. Further, even if the TFI driven manpower decrements do not occur, the current UMD manpower authorizations are not adequate to meet the 6-ship follow-on UTC package.

Estimated avionics manning levels are not much better than crew chiefs. Authorized positions following TFI manpower cuts for all avionics skill levels will not meet the UTC requirement to support the follow on 6 ship UTC. Further, authorized positions for 3 levels do not meet the UTC requirement for the initial 12 ship UTC. While not clearly illustrated in the above chart, avionics manpower authorizations prior to TFI reductions fall short of meeting UTC

requirements. The F-22 is an avionics centric aircraft that requires robust avionics maintenance. These shortages make mission accomplishment a real challenge.

The pattern continues with weapons specialist manpower. Authorized weapons positions do not meet the requirement for any skill level for the follow on 6 ship UTC. Authorized positions for 7 levels fail to meet the requirement for either UTC. Again, even if TFI manpower reductions do not occur, manpower authorizations do not provide the required number of weapons specialists required for either UTC.

Structures technicians maintain the low observable (LO) system on the F-22. LO is a key system that is currently the high driver for maintenance man-hour requirements on the aircraft. It is critical that structure manpower levels are formulated and filled properly. This analysis shows that structure technicians have adequate manpower to fill the 12-ship UTC but are short a total of 7 personnel to fill the 6-ship follow-on UTC. Low observable maintenance requirements have proven more demanding than anticipated. Initial workload assumptions used to determine manpower authorizations for low observable structures technicians have led to undermanned units based on actual workload. Although this analysis shows that manpower authorizations are sufficient to meet the 12 ship UTC, most maintenance leaders in the field would jump at the chance to debate the adequacy of these manpower authorizations.

This maintenance manpower and UTC analysis of the 3<sup>rd</sup> Wing and 477<sup>th</sup> Fighter Group TFI association for F-22 operations shows many active duty maintenance manpower disconnects. PACAF/A1 based the active duty maintenance UMD on the Logistics Composite Model (LCOM). LCOM is a simulation model which uses logistics resource input variables (manpower, spare parts, and support equipment) to determine maintenance manpower

authorizations required to generate a determined number of sorties.<sup>28</sup> LCOM is normally based on home station training sortie requirements. Using the LCOM model to determine maintenance manpower requirements is short sighted when UTC requirements are not considered. This resulted in F-22 maintenance UMD manpower authorizations prior to the TFI active duty manpower reductions that were short of UTC requirements in many areas. Once TFI active duty manpower reductions are implemented the UTC shortfalls get worse. One additional consideration is that most maintenance AFSCs are not manned at 100 percent of authorized. Most are manned at between 80 and 90 percent of authorized. This reality further exacerbates the problem of meeting UTC manpower requirements. As a result, the 3<sup>rd</sup> Maintenance Group is forced into the position of relying on reserve volunteers to fill UTC shortfalls during deployment taskings.

### **388th Fighter Wing/419th Fighter Wing Maintenance Manpower/UTC Analysis**

During the summer of 2007 the active duty 388<sup>th</sup> Fighter Wing and Air Force Reserve 419<sup>th</sup> Fighter Wing at Hill Air Force Base formed a classic associate relationship as part of on-going TFI initiatives. The two units share the flying, maintenance and support activities and are responsible for the operation and employment of Hill's 72 F-16 aircraft. The organization chart below depicts the relationship between the two units as outlined in the agreed to concept of operations for the TFI association.

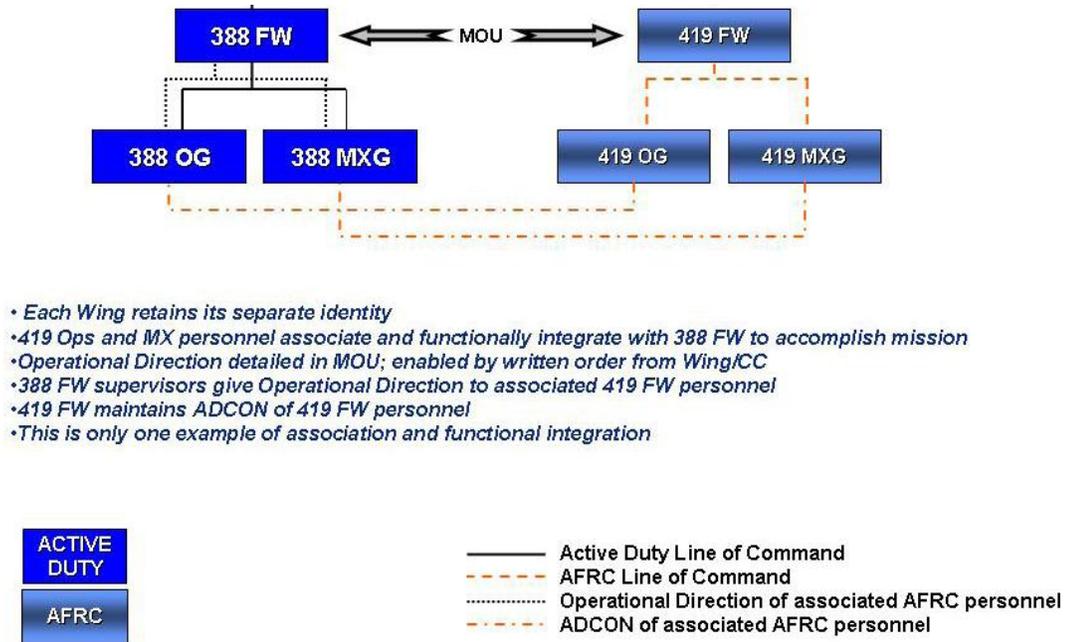


Figure 2  
 Hill AFB Classic Association Organizational Construct<sup>29</sup>

The 388<sup>th</sup> Fighter Wing consists of three active duty F-16 squadrons...the 4<sup>th</sup>, 34<sup>th</sup> and 421<sup>st</sup> Fighter Squadrons. Each squadron is tasked to support a 12-ship deployment and 2 follow-on 6-ship packages. Thus, each could be tasked to deploy all 24 assigned aircraft. The 388<sup>th</sup> Aircraft Maintenance Squadron, specifically each aircraft maintenance unit with support from the other maintenance squadrons, is tasked with maintenance UTCs to support the 12-ship and both 6-ship aircraft UTCs. A single aircraft maintenance unit UMD to UTC comparison was conducted to determine if active duty manpower could fill the required UTC for a complete 24 ship UTC tasking. This comparison reveals some active duty manpower shortfalls with regard to filling UTCs without reserve component volunteers. The following chart compares maintenance manpower from a single aircraft maintenance unit to its UTC requirements in support of one F-16 squadron. The manpower authorization numbers used are from the 4<sup>th</sup> Quarter of Calendar Year 2008. Unlike Elmendorf, active duty manpower reductions due to TFI have already been

executed. Thus, the authorized position numbers reflected in the chart are current authorizations, not projected like the Elmendorf UMD.

Maintenance AFSC	CY08/4 Authorized Positions	# World-Wide Fill %	Estimated Actual Manpower	12-Ship UTC Req't	18-Ship UTC Req't (Δ)	24-Ship UTC Req't (Δ)
Crew Chief 3-Lvl	20	85%	17	7	12	12
Crew Chief 5-Lvl	49	85%	42	26	37	45
Crew Chief 7-Lvl	25	85%	21	16	<b>29 (4)</b>	<b>33 (7)</b>
Avionics 3-Lvl	17	80%	14	4	6	7
Avionics 5-Lvl	39	80%	31	9	13	15
Avionics 7-Lvl	9	80%	7	6	8	<b>11 (2)</b>
Weapons 3 -Lvl	22	85%	19	13	16	18
Weapons 5-Lvl	47	85%	40	26	36	38
Weapons 7-Lvl	12	85%	10	13	<b>20 (8)</b>	<b>23 (11)</b>
Propulsion 3-Lvl	2	85%	2	1	1	1
Propulsion 5-Lvl	14	85%	12	6	9	10
Propulsion 7_Lvl	3	85%	3	3	<b>4 (1)</b>	<b>4 (1)</b>
E&E 3-Lvl	4	80%	3	0	2	2
E&E 5-Lvl	6	80%	5	6	<b>7 (1)</b>	<b>9 (3)</b>
E&E 7-Lvl	4	80%	3	2	3	4

# World-Wide Fill Percentage is only an estimate

Δ Delta equals UTC shortfalls when compared to CY08/4 Authorized Positions

Table 3  
Hill Single Squadron F-16 Manpower to UTC Comparison<sup>30,31,32,33</sup>

While not as significant as Elmendorf manpower shortfalls, Hill maintenance manpower to UTC comparison reveals several discrepancies. Based on authorized positions and estimated manning percentages, analysis shows that active duty maintenance could execute a 12 ship UTC tasking without assistance from 419<sup>th</sup> Maintenance Group reserve manpower. However, several active duty shortfalls exist in both 6 ship follow on UTCs. Reserve volunteers would be required to meet manpower requirements for these follow on UTCs.

. Analysis indicates a shortfall in authorized positions to fill follow on UTC requirements for crew chiefs, avionics specialists, weapons specialists, propulsion specialists, and

electrical/environmental specialists. Authorizations and estimated manning levels for just one of three crew chief skill levels meet UTC requirements across the board. Authorized positions for 5-level crew chiefs meet all UTC requirements. However, when estimated actual manpower is considered, 5-level crew chiefs fall an estimated 3 personnel short for the last 6 ship follow on UTC. Based on authorized positions and estimated actual manning, 7-level crew chiefs fail to meet manning requirements for both 6 ship follow on UTCs. With the total number of authorized positions being less than required for the UTC, the active duty unit has no chance to meet the requirement even with 100 percent manning.

While not as inadequate as crew chief manning, avionics specialists also have active duty shortfalls. Specifically, authorized positions for avionics 7-levels are 2 shy of the requirement to fill the second 6 ship follow on UTC. When estimated actual manpower is considered, avionics 7-level manning falls short of the first 6 ship follow on UTC requirement. In any maintenance organization, 7-levels provide the experience and expertise required for a smooth, efficient maintenance operation. Any shortfall of 7-levels impact the units' efficiency and operational capability.

Analysis of weapons specialist shows adequate active duty authorizations and estimated manning of 3 and 5 levels to fill all UTC taskings. However, weapons specialist 7 level shortfalls are concerning with just 12 authorized 7 level positions to fill 20 required positions for the initial 12 ship and first follow on 6 ship UTCs. The second follow on 6 ship UTC requires 3 additional weapons 7 levels resulting in a shortfall of 11 authorizations to fill the second 6 ship follow on UTC. When estimated actual manpower numbers are considered, 10 weapons 7 levels are on-hand to fill 20 and 23 required positions respectively for the two follow on 6 ship UTCs.

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This is concerning due to safety considerations. Safety is critical when weapons loading operations are executed. Experienced 7-levels are crucial to ensuring safe weapons handling operations are the standard. This shortfall is a concern from not only a production and capacity standpoint but also from a safety standpoint.

Propulsion and electrics/environmental AFSCs also have active duty shortfalls. Active duty propulsion 3 and 5 level authorizations and estimated actual manning are adequate to meet all UTC taskings. Again, 7 level propulsion authorizations fail to meet both follow on 6 ship UTC requirements. Additionally, electrics/environmental 5 level authorizations fail to meet UTC requirements. When estimated actual manning numbers are considered, electrics/environmental 7 levels are also shy of meeting the second 6 ship UTC requirement.

While the 388<sup>th</sup> Maintenance Group's UTC active duty manpower shortfalls are not as numerous as those at Elmendorf, this UMD to UTC comparison reveals several disconnects. Active duty manpower shortfalls occur in some form or fashion across all AFSCs analyzed. These disconnects create a risk that, if reserve volunteers do not volunteer to fill the shortfalls, the 388<sup>th</sup> Fighter Wing will not be able to meet its UTC taskings.

## **Part III**

### **Analysis and Recommendations**

Research of TFI manpower implementation practices and the maintenance manpower to UTC analysis of the F-22 TFI at Elmendorf Air Force Base and the F-16 TFI at Hill Air Force Base have given credence to several key concerns about TFI implementation within the fighter maintenance community. First, the two active duty units analyzed for this research cannot meet all UTC taskings without reserve volunteers, reserve mobilization or assistance from other active duty units. UMD manpower authorizations do not meet the number of positions required to fill UTC requirements. Exacerbating the problem is the fact that maintenance units are normally manned at between 80 and 90 percent depending on the specific AFSC. If the number of authorizations creates shortfalls, the 80 to 90 percent manning results in even fewer personnel on hand to fill UTC positions. While not the focus of this research, some AFSCs at Elmendorf could not meet UTC manpower requirements prior to the TFI manpower reductions. This fact is concerning and should be a topic of further research.

It is also apparent that in these two cases the risk of not being able to fill UTC requirements if reserve volunteers do not to fill UTC vacancies was either accepted, ignored or not fully considered. In the case of the F-16 TFI at Hill, this risk was identified in the official CONOPS agreement. It states that “contingency tasking that is not supportable with volunteerism will require mobilization.”<sup>34</sup> The official integration plan for the F-22 TFI at Elmendorf hints at the issue by stating “although Traditional Reservists can be asked to “volunteer” for deployments, they are not required to deploy unless mobilized.”<sup>35</sup> The risk of not

filling UTC requirements is addressed this way, “this risk is mitigated by clearly defining unit expectations to candidate Reservists desiring to serve in the 477 FG.”<sup>36</sup>

It is apparent that this risk was identified during the TFI planning process. But it is not clear that the risk was thoroughly vetted and considered. The current risk mitigation plan is to source maintenance manpower from other active duty units when one unit cannot meet its UTC tasking due to reduced active duty manpower and/or a lack of reserve volunteers. Hoping for reserve volunteers or relying on manpower from another active duty unit does not seem to be a recipe for an efficient, combat ready total force. The risk of fighter maintenance UTC shortfalls in the face of few or no reserve volunteers can be solved following a couple of simple recommendations.

First, the Air Force must understand and recognize that one full-time reservist cannot be considered the same as one active duty member with regard to deployment availability due to the legal limitations of deploying reserve members outlined in Title 10 of the United States Code. If not mobilized, reservists must volunteer for deployment. Additionally, assuming there are reserve volunteers for an Air Expeditionary Force deployment, individual reservists do not typically deploy for an entire 120 day Air Expeditionary Force rotation. Instead, a single tasking is normally split between three or four reservists; each deploying for 30 or 40 days. Logic then follows that it may take three or four reservists to fill a single 120 day tasking versus one active duty member. From a deployment standpoint, this is why one full-time reservist does not equal one active duty member.

To mitigate the risk of insufficient reserve volunteers for a deployment tasking, active duty maintenance units must be manned to a level that allows the active duty unit to fill all UTC

taskings. This will ensure that the combatant commander will get the timely combat capability required. According to ACC/A4RX, Air Staff A1 is currently studying how maintenance manpower requirements are determined to make certain the correct assumptions are used and that expeditionary mission capability is not sacrificed.<sup>37</sup> Getting this right for TFI units by considering the legal differences between active duty and reserve members with respect to home station duty day and deployment restrictions is the critical step required to mitigate the risk identified by this research.

### **Conclusion**

Total Force Integration is an organizational and operational construct that has the potential to make our Air Force more efficient and effective. The benefits of combining active, reserve and guard units greatly outweigh the complexity of right sizing the force structure. Reserve and guard members in the maintenance community bring a wealth of experience and knowledge that can be utilized to train inexperienced active duty maintainers while working side by side on the flightline. Each component must realize the capabilities and limitations that the other brings to the fight so that planning and execution create the most efficient structure possible without sacrificing combat capability. If smartly implemented, it will allow the Air Force to more efficiently utilize personnel and equipment across the total force. Becoming more efficient across the force is critical at this time in history due to more constrained current and projected defense budgets driven by the current economic crisis and fiscal condition of the United States Federal Government. TFI is here to stay and must be implemented with an eye not just on dollars saved and efficiency but must balance efficiency and cost savings with expeditionary combat capability.

This analysis evaluated just two TFI initiatives out of the hundreds occurring across the Air Force. It reveals one very specific issue regarding fighter aircraft maintenance active duty manpower and the risk created by reducing active duty maintenance manpower due to the full time manpower brought to the fight by a reserve associate unit. In both of these cases, as a result of TFI active duty maintenance manpower reductions, the active duty maintenance squadrons cannot fill all UTC requirements without assistance from the reserve associate unit. While full UTC taskings in the absence of a contingency requiring reserve mobilization may seem remote, TFI manpower reductions should not put active duty fighter maintenance squadrons in a position to rely on reserve volunteers or Presidential mobilization to fill UTC taskings. Each TFI association should be evaluated individually to ensure the right mix of active duty and reserve manpower is achieved to ensure no loss of expeditionary combat capability.

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- <sup>1</sup> 2008 AF Posture Statement
  - <sup>2</sup> AF/A8XF, Total Force Integration Website, FAQ
  - <sup>3</sup> AFA Conference Reserve Issues Brief
  - <sup>4</sup> AFA Conference Reserve Issues Brief
  - <sup>5</sup> Barnes, “Air Force May Shrink Its F-15 Fleet” 1
  - <sup>6</sup> General Accounting Office, “Information on Air Force Aerial Refueling Tankers” 3
  - <sup>7</sup> Calaruso, “Personnel integration meant to ease pain of fewer airmen”, 1
  - <sup>8</sup> Calaruso, “Personnel integration meant to ease pain of fewer airmen”, 1
  - <sup>9</sup> 192 FW History webpage
  - <sup>10</sup> AFI 90-1001, *Responsibilities For Total Force Integration*, 7
  - <sup>11</sup> Workman, Telephone Interview by Author (2009)
  - <sup>12</sup> AFRCI 36-501, *AFRC Position Management and Classification Program*, 4
  - <sup>13</sup> Betsill, Telephone Interview by Author (2009)
  - <sup>14</sup> *Title 10, United States Code*, Preface (2004)
  - <sup>15</sup> AF/A8F, “Commanders Integration Guide”, 55
  - <sup>16</sup> AFI 10-402V1, *Mobilization Planning and Personnel Readiness*, 24
  - <sup>17</sup> *Title 10, United States Code*, Section 13301 (2004)
  - <sup>18</sup> AF/A8F, “Commanders Integration Guide”, 55
  - <sup>19</sup> AFI 10-402V1, *Mobilization Planning and Personnel Readiness*, 15
  - <sup>20</sup> *Ibid.*, 15
  - <sup>21</sup> *Ibid.*, 15
  - <sup>22</sup> *Ibid.*, 15
  - <sup>23</sup> *Ibid.*, 40
  - <sup>24</sup> PACAF/A3XF, *Integration Plan for the F-22A Classic Associate Unit at Elmendorf AFB, Alaska*, 8
  - <sup>25</sup> 3<sup>rd</sup> Maintenance Group Unit Manning Document, 6 January 2009
  - <sup>26</sup> Unit Type Code HFBA1
  - <sup>27</sup> Unit Type Code HFBAL
  - <sup>28</sup> Boyle, LCOM Explained, 1
  - <sup>29</sup> ACC/XPXT and AFRC/XPPP, *Concept of Operations for Associate F-16 Operations at Hill AFB, Utah*, 20
  - <sup>30</sup> 388<sup>th</sup> Maintenance Group Unit Manning Document, 4<sup>th</sup> Quarter 2008
  - <sup>31</sup> Unit Type Code HFKP1
  - <sup>32</sup> Unit Type Code HFKP2
  - <sup>33</sup> Unit Type Code HFKP3
  - <sup>34</sup> ACC/XPXT and AFRC/XPPP, *Concept of Operations for Associate F-16 Operations at Hill AFB, Utah*, 20
  - <sup>35</sup> PACAF/A3XF, *Integration Plan for the F-22A Classic Associate Unit at Elmendorf AFB, Alaska*, 19
  - <sup>36</sup> *Ibid.*
  - <sup>37</sup> Betsill, Telephone Interview by Author (2009)

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