What Fighter Pilots' Mothers Never Told Them About Tactical Command and Control — and Certainly Should Have...

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CHAPTER 1

WHAT FIGHTER PILOTS' MOTHERS NEVER TOLD THEM ABOUT TACTICAL COMMAND AND CONTROL . . . . . AND CERTAINLY SHOULD HAVE

This paper deals with a subject that has confused, eluded, and annoyed civilian and military leadership for almost eighty years -- how do you control tactical airpower? Ever since the first aircraft roared across the carefully drawn battle lines of WWI and ran willy-nilly over the troops and tanks of friend and foe alike, military leaders have been trying to orchestrate and effectively use these swift and highly mobile assets.

There are several stakeholders in this game, chief among them, the Air Force. The Air Force has argued since its inception that tactical airpower must be commanded and controlled by Air Force personnel. They cite as reasons airpower's inherent flexibility, destructiveness, and relative scarcity. Tactical aircraft can fight well beyond the limits of the Army's largest fighting unit, the corps. It is not unusual, they argue, to have tactical aircraft support more than one corps commander on a single mission. To assign air control authority directly to a corps commander, they argue, would be to blunt the inherent flexibility of airpower.

Additionally, the Air Force claims counter-air, interdiction, and suppression of enemy air defenses (SEAD) as unique Air Force missions. These "unique" missions often compete for scarce air resources with the mission that is near and dear to the heart of every corps commander, close air support (CAS). This CAS area is one in which the Army becomes a major stakeholder in the issue of who controls airpower. CAS is the most visible form of air support to the corps commander. For many in the Army, the dearth or abundance of CAS missions is the yardstick by which Air Force support of the ground commander's objectives is measured.

To those forces fighting on the ground, it matters little that the air component commander (an Air Force officer), by re-rolling his fighters from the air-to-ground to the air-to-air role, secured air superiority during a critical phase in the battle and thereby allowed the troops to fight unharrassed from the air. The simple fact to the infantry men in a pitched fire-fight on the front line, or to the corps commander who put them there, is that they got no help from the Air Force to silence the gun emplacements and heavy artillery that cut their unit to pieces.

Despite the uneasy truce between the Army and Air Force doctrine folks who wrote and approved AIR/LAND BATTLE 2000, the joint doctrine manual that clearly acknowledges the "air component commander's" authority in matters dealing with airpower, the Army has been quietly working at giving their fighting commanders, the corps commanders, more control of the air. As of March 1991, with the exception of fixed wing aircraft, the Army owns **everything** that kills **anything** that flies. This includes all the short-range air defense systems (SHORAD) like the Chaparral, Vulcan, and Stinger, as well as the medium and high altitude systems like Hawk and Patriot.

In addition, the Army is putting together one of the largest air forces in the world. Their helicopter fleet is capable not only of inserting troops in combat, but also of running day or night interdiction missions deep into enemy territory. Some helicopters are being fitted with air-to-air missiles for use in a counter aircraft and counter helicopter roles. Despite the fact that these air vehicles are a significant part of the tactical airpower equation, they remain outside the purview of the air component commander and work instead, directly for the corps commander.

In terms of maneuver, tactics, and combat employment, the Army "fights" from the Corps level and below. The Air Force, however, perceives itself as fighting from the Wing level and below. This becomes particularly important when we compare the command and control mechanisms used to employ these combat elements tactically. The corps

is normally commanded by a three star army general who has at his disposal a comprehensive network of communication devices that link the corps commander to his units and allow him to "view" the battle and commit or withdraw forces as he deems necessary to achieve his objectives. On the other hand, the **tactical** Air Force element, the wing, is commanded at the colonel level.

Unlike the corps commander, this officer has neither the authority nor the communications devices necessary to direct forces in combat. He sees none of the fight unless he happens to be airborne in one of his aircraft on a particular mission. This is significant because it shows that the Air Force, unlike the Army, does not allow its largest fighting unit (the wing) to direct itself in combat. The wing commander's job is to ensure that the seventy or so aircraft at his airbase and under his command are able to launch and recover per the instructions of more senior Air Force leadership. Simply put, **the wing commander provides air resources that others direct.**

Under the current structure, it can be no other way. The Air Force fighting element is significantly smaller and narrower in scope and authority than the Army fighting element. The corps is comprised of approximately 80,000 men and an equal number of trucks, tanks, armored personal carriers, helicopters, missiles, rockets, and artillery. The wing has about 5000 people and 70 aircraft. Even when compared with the tactical maneuver element of the Navy, the carrier battle group (CVBG), the Air Force tactical element appears small. The average CVBG, comprised of one carrier and at least seven escorting ships, has over 100 aircraft, and 7,000 men. It is commanded by a flag rank naval officer (usually rear admiral, lower half) who reports to a three star (vice admiral) fleet commander.

Both the Army and the Navy fighting units (the corps and carrier battle groups) are self contained and fully capable entities. They can, under the direction of their general officer commanders, establish military objectives, devise plans of attack, and commit and withdraw forces from battle. The Air Force wings cannot. To find the Air Force

command equivalent of the Corps and CVBG commanders, we must look to an entirely separate structure that is established outside and above the wing level.

The next level of Air Force leadership is found at the numbered air force. He is normally a two or three star general who commands several air force wings to support the air battle. However, unlike the corps and the CVBG, the numbered air force is not a fighting, but rather an **administrative** entity. There is no "maneuvering" of numbered air forces or "committing" them to battle. Only when a numbered air force commander is designated an "Air Component Commander" (ACC) as part of a joint or combined command, is he authorized to commit his forces to battle.

The sophistication and effectiveness of the air force component commander's command and control mechanisms will vary depending on the part of the world in which he is working. There is little standardization or method for control of his air assets. In Japan he will employ his forces using a combination of greaseboards, HF radios, and high-speed data lines. In Korea he will have a large hardened facility with a "real-time"[1] air picture, automated decision aids, and a wide range of communications gear. In Europe he will fight from underground bunkers with a limited air picture, complex and over-loaded data lines, and inadequate secure communications. In the United States he will fight from well-appointed unsecure operations centers, which will likely disappear at the first nuclear exchange.

Why is this significant to Air Force control of tactical airpower? It is significant because the Air Force has no tactical structure from which it can mold, grow, and train rated (i.e. flying officers) in the art of tactical control of airpower. The "school" ends at the resource provider level (i.e. the wing).

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[1] "Real time" connotes an air picture that is assembled and displayed from fixed message sets sent over microwave and telephone cables. It is normally three to thirty minutes old and is limited in the number of air and land tracks it can display.

Unlike the Army and Navy who have corps and carriers on which to provide selected senior leadership with comprehensive training in battle management and the employment of air, land, and sea power, the Air Force has no such "hands on" training. While Air Force general officers may find themselves in the position of a numbered air force commander, only rarely will they function as an air component commander. And when they do, often for the first time in their careers, they will be seated in an underground bunker surrounded by non-rated types[2] telling them about things they do not understand.

[2] "Non-rated types" refers to those officers who are neither pilots nor navigators and consequently have no "rating" in any type aircraft. Although the bulk of the Air Force is made up of "non-rated" officers (over 75%) less than 3% of the general officer force is "non-rated". Virtually all the numbered air force, major command, and other senior officer positions are filled solely by "rated" officers.

CHAPTER 2

THE REASONS THEIR MOTHERS NEVER TOLD THEM (TOO COMPLEX) - AND WHY THEY CAN KNOW NOW (THEY'RE ALL A LOT SMARTER)

My intent is to sensitize senior Air Force leadership to the need for better, more credible, and responsive command, control, communications, and intelligence (C3I). It is worth noting that research houses like RAND and others have spent little time or money in the tactical C2 arena and consequently, have not factored C2 into their endless studies on what mix of aircraft, tanks, and rifles will most likely prevail in any given conflict. Perhaps the reason for their reticence is the fact that C2 is so hard to quantify. What is the killing power of a mobile radar system vice an F-16? What contributions do command and control systems make to the overall battle? What is the weight of influence of a control and reporting center (CRC) versus a squadron of F-15s? No one likes such questions, but inevitably they come up when the "models" are built and the data they generate is run on computers. The tendency is to simply ignore C2 equipment and procedures when building studies.

The consequences of ignoring these C2 questions and failing to factor them into Air Force long term war-fighting and acquisition strategy are enormous. In the tactical arena, whole weapons systems have been built, tested and delivered with little thought given as to how senior leadership will employ these forces effectively in battle. The current generation of fighter aircraft are marvels of advanced technology with their strong yet lightweight composite materials, mind-boggling avionics packages, and devastating firepower. For all of that, little thought and even less money has been spent on ensuring that Air Force tactical firepower can be brought to bear against a potential adversary where and when it is needed.

Put bluntly, the same Air Force leadership that brought us these incredible weapons of maneuver, speed, and destruction, has failed to give us the means to employ them coherently and effectively over a wide range of crisis-to-war situations. These leaders are themselves victims of what perhaps could be best described as, a "cockpit mentality".

Virtually all Air Force Major Command (i.e. SAC, TAC, MAC, SPACECOM, NORAD, PACAF, USAFE, etc.) commanders "grew up" in the front end of an aircraft. As pilots, they learned first-hand the ins and outs of flight, weapons delivery, and aircraft performance. Most had a taste of combat. From it they learned the hard lessons: flight discipline, standardization, the need for reliable aircraft and accurate weapons.

However, as they progressed in rank and authority, their view and experiences remained very closely tied to the cockpit and not to the overall employment of large numbers of weapons systems. The results were predictable; generation after generation of ever more powerful, sophisticated and capable aircraft, coupled to fragile, fragmented, and hopelessly inefficient command and control networks.

Why would Air Force leadership allow such a thing to happen? A portion of the answer lies in the cultural foundations of airmanship. Flyers are an elite group and their aviation skills are admired by almost every segment of society. Arguably, if there is a hierarchy among this group, then fighter pilots are at the top. The stereotypes associated with single seat airplane drivers, although exaggerated, do shed light on why tactical command and control is in such an abysmal state.

Fighter pilots are often characterized as aggressive, self-confident, extremely independent, and very capable flyers. Unlike their multi-engined bomber, transport, and tanker brethren whose training stressed the absolute necessity of inter-crew coordination and cooperation, the single seat drivers learned altogether different lessons. They learned to trust no-one but themselves and (in a pinch) their wingmen. They learned that Ground Control Intercept (GCI) folks charged with bringing the fighters into contact with the adversary were often clueless and could only be counted on to ask for fuel states in the middle of an engagement at the absolutely most inappropriate times. They learned in Vietnam and other places that the intelligence and airborne control folks who promised so much in peacetime, delivered so little in war.

Mission after mission they went into enemy territory with only a hastily drawn map and the sound of their own breathing for company. Surface-to-air missiles (SAM) and hostile fighters had to be defeated single handedly with little or no help from friendly radars or intelligence collection assets. They learned to trust only members of their own community (the fighter guys) and view all "outsiders" as suspect. In part, it is this mystique of the "lone eagle", the idea that the fighter pilot has only himself and his aircraft to rely on that has enfeebled any attempt to put together a capable command and control system.

Another equally important reason for the sorry state of tactical C2 is the bureaucratic quagmire at the Pentagon and elsewhere that purports to speak for the development and implementation of command and control systems. There are almost as many offices claiming "C2" in their charters as there are doors in the Pentagon. Although unkind, it is not inaccurate to characterize them all as a colony of ants adrift on the twig of C2, each convinced that his or her directorate is firmly in charge of where the twig is headed.

For these reasons and others, I have elected a somewhat radical approach to the subject matter. The accepted method used to describe C2 arrangements is a series of complex graphs and charts loosely held together by all-encompassing words such as "command info-flow", "air-ground interface devices", and other words slightly more esoteric in nature. I have rejected this approach. Such terms often leave the reader confused and not at all better apprised of the C2 problems confronting battle commanders. Instead, I used a conflict scenario, and viewed the events of the "war" as they unfolded through the eyes of a number of stakeholders. It appeared reasonable to do this, in light of the difficulties associated with making clear the tenuous and fragile systems that provide modern battle commanders with the means to implement their strategies and influence the outcome of conflicts.

This scenario is by no means an attempt to duplicate or predict actual events. It is simply a convenient vehicle for illustrating the myriad problems associated with tactical command and control. **Function, not form**, is the focus of this piece.

CHAPTER 3

THE BUNKER

The bunker had been "sealed" for two days and already it stunk from overcrowding. Paper cups and plastic trash overflowed the waste baskets and people still managed to find ingenious ways to contribute more to the load, some, by balancing half-filled coke cans on the edges of dirty plates. In the "battle cab", a dingy 4'x12' glassed in corridor that overlooked the operations room, it wasn't so bad. A dour looking young airman was sent in periodically to attend to the general's needs and to keep the place picked up. Still, Major General P. J. "Pete" Smith detested the bunker. It was a monument to inefficiency and ran counter to everything he had ever done or known professionally.

Smith was a fighter pilot with over 26 years of service and almost 5000 hours in fast movers. He started out in F-100's and later did two combat tours in Vietnam in F-4's. On one of his runs to Hanoi, Smith was hit by an SA-2 surface-to-air missile (SAM) and both he and his back seater were forced to spend the better part of a year as prisoners of war. After Vietnam, he returned to the States, did a tour at the Pentagon and a stint at the Air War College. Smith was then sent to Bitburg Airbase, where after a year, he took over as the 36th Tactical Fighter Wing Commander.

While at Bitburg, he was nominated for his first star and sent to Headquarters United States Air Forces Europe, as Director of Plans. He worked especially hard while Plans Director at getting the collocated operating base (COB) program on its feet. With this program fully functional, fighters based in the States, theoretically, were able to arrive in Europe ready to fight from a pre-planned location with armament, fuel, shelters, and communications.

Looking back on it, Smith remembered he must have crossed the "pond" at least fifty times that year trying to convince the Air Staff and

Congress of the need for such a program. His "reward" was another assignment at the Pentagon, this time as a Major General in the Directorate of Operations. Only the promotion of his long-time friend, and mentor, Lt Gen Martin Ernst, to four star rank as Commander of United States Air Forces Europe (USAFE) saved Major General Smith from an interminable stay in the basement of the five sided "puzzle palace".

Four months after arriving in theater, General Ernst sent for Pete Smith. He wanted Smith to take over the job of Commander, 17th Air Force, and the two North Atlantic Treaty Organization (NATO) warfighting duties that went with it, Commander, Sector Operations Center Three (SOC-3), and Commander, Allied Tactical Operations Center (ATOC) Sembach. Major General Smith jumped at the chance. This was a fighter pilot's dream! To be in command of virtually all the US fighter aircraft in Europe's Central Region. To be able to fly F-15s as well as F-16's and even A-10's if he wanted. To make certain that the COBs program he fought so hard to make a reality when he was a one star in USAFE, actually worked. These were things worth having!

Nor did Smith dismiss the two NATO titles he would inherit with the 17th Air Force job. As Commander, SOC-3, Major General Smith would be responsible for **defensive** air operations over a large portion of Central Europe. As Commander, ATOC-Sembach, he would be responsible for **offensive** air operations over a similar area. Interestingly, of all the Air Force general officers stationed in Europe, only Smith and Ernst would hold NATO warfighting general officer billets. Everyone else had only national **support** billets.

The importance of his distinction as a "NATO warfighter" was not lost on Smith. From his previous assignments in Europe he knew that only flag officers with such a designation would be allowed to command NATO forces. All other general officers would be reduced to support roles for their own "national" forces, regardless of how many stars they had on their shoulders or stripes on their sleeves. Pete Smith had no intention of counting dixie cups and toilet paper rolls when the balloon went up, no matter how important such jobs were to the overall war

effort. He had trained and fought to lead aircraft and men into battle and that's what he would do. Or at least that's what he thought he would do until he spent a few days getting acquainted with his war-fighting facility buried underneath the rolling hills of Germany...

The first weeks on the job had been exciting for Pete Smith. He renewed acquaintances with many of his old European friends and met many more new ones. The COB program was as strong as he dared hope and the wing commanders at his units were competent, careful men. During those initial days he traveled so much, visiting bases and units, that he had little time left to look over his own headquarters facilities.

Now, sitting in the battle commander's high-backed leather chair in the oppressive and stinking bunker, Smith cursed himself and his luck for not having looked at his own set-up earlier. How could he have known that the "Peace dividend" of the 90's would turn bloody so quickly? Since the end of 1989, events simply outpaced actions. Germany's rapid "reunification" was matched in speed and progress only by the "disintegration" of the Soviet Empire, and the conflagration of the Middle East.

At first it seemed the Soviets would have the energy and the will to help the West with the German issue. However, because of deteriorating conditions in the Baltic and Azerbaijan, the Soviets were forced to pull out many of the troops stationed in what had been East Germany to bolster forces elsewhere.

The United States and other allies suffered similar reductions in troop and equipment strength when Saddam Hussein and his Iraqi army invaded oil rich and notoriously OPEC[3] uncooperative Kuwait. With United Nations approval, the West began an expensive and protracted military build-up in the region in an attempt to convince the Iraqi government to withdraw its forces from Kuwait.

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[3]OPEC- Organization of Oil Petroleum Exporting Countries

Ironically, as the West and Middle Eastern powers pulled together in an unprecedented alliance against Iraq, the Soviet Union began to collapse and disintegrate in front of the world's eyes. As missiles rained down on Israeli neighborhoods and incredibly, were met only with strong resolve and no retribution by the Israeli government, the great empire of the Soviet Union splintered over shortages of cash, bread, and vodka. Gorbachev and most of his cronies were swept away in a wave of nationalism and economic frustration. Not long after, the Baltic exploded, the rest of the Soviet Empire went with it.

Now, while a glimmer of hope for a meaningful and lasting peace showed its face in the Middle East, a civil war fought with modern weapons was tearing through Europe and parts of Asia. Whole armies were in the field fighting "nationalist" forces that had declared themselves independent of Soviet authority. German borders had been breached by Soviet units. Despite strong protests from NATO and all Western governments, the Soviets continued their offensives through and in German territory.

Interestingly enough, it was Germany who took the lead, mobilized her forces, and demanded other NATO members fulfill their obligations under Article V of the NATO Charter[4]. Once begun, the new Soviet government misread the NATO mobilization as a threat and launched a full-scale "counter-offensive" with the troops she had remaining.

The part that amazed Smith the most, was how little he had to work with. Over the years, he had flown many fighters, all of which had been marvels of technical and engineering genius. Somehow, he had assumed that the favorable design and performance factors he had experienced on the flying side of the Air Force had also transferred to the command and control side. They hadn't. In fact, unlike the flying side of the Air Force, with its long term aircraft improvement programs, and life cycle costs and replacement reviews, Air Force C2, for the most part, was

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[4] Article V requires all NATO members to respond to an attack on a member's territory as an attack on their own.

hobbling along with tactical control equipment that was designed in the 1950's and fielded in the 1960's. And here he was, betting the lives of his people and the success of his mission on this very same stuff.

Smith's command and control equipment, like those of Air Force tactical commanders elsewhere in the world, was a rag-tag collection of equipment, some old and some new, put together by well-intentioned technical and operational types, but without shape or singleness of purpose. His plans room was crammed full of computers, crypto gear, pc's, phones and more tangled cable than anyone could unsnarl. Most of it was incompatible. The "Force Level Automated Planning System" (FLAPS), which was designed to help planners figure the best way in and out of the target area, could not "talk" with the intelligence system that gave it the data base it needed to make its calculations. Instead, an airman had to "fat finger" the information from the intelligence system into the FLAPS system. This was too slow to be of much use. The Tactical Air Planning System (TAPS), a derivative of a system BDM Corporation built for the Army, was to have accomplished the same mission, but the sergeant who knew how to run it had transferred over a year ago, and no-one could get the thing going.

Other examples of duplication and incompatibility abounded. The only "bright spot" in the plans section was the bumbling, hopelessly inefficient, but compatible EIFEL[5] information exchange system. Through it, General Smith was linked to other Allied Tactical Operations Centers and Sector Operations Centers, as well as the fighter bases under his control. The premise behind EIFEL was that each American fighter wing[6]

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[5]EIFEL is a German designed and built computer network that links the Central Region air defense and air offense systems to the fighter bases. Roughly translated, the letters stand for "Electronic Information System for the German Air Force." Other participants in the network are the United States, Belgium, the Netherlands, and Canada. France maintains a liaison office which relays air tasking orders from the French Tactical Air Force (FATAC) into the EIFEL system for dissemination and coordination purposes.

[6] By agreement, American fighter wings, not squadrons link to EIFEL. American squadrons communicate with the wing through the Wing Information Control System (WICS). Unfortunately, as yet, no interface

and every German, Dutch, Belgian, and Canadian squadron would update the status of their aircraft, weapons loads, and fuel in the system so that the air component commanders (like General Smith) would know what was available and what was not. Armed with that information, Major General Smith and his staff would prepare and send out the Air Tasking Order (ATO) on the very same system.

The problem with EIFEL was that it was often unreliable and very difficult to learn how to operate. German computer operators made it look easy because they had used the system for years. American operators had not. In addition, American squadrons communicated this same information to their respective wings through the Wing Information Control System (WICS). Because of security problems, as yet there was no direct interface between WICS and EIFEL. All the information was "fat fingered" from one system to the other.

The air defense side of Smith's operation wasn't in much better shape. The entire Central Region command and control structure was based on an unsecure network of telephone lines that passed the "recognizable air picture" (RAP) between radar sites and command bunkers. Except for the "unsecure" part, it didn't seem like such a bad idea to Smith when he first heard of it.

Each radar site, working under the direction of his Sector Operation Center (SOC) would relay their radar picture up and down the network, sharing information with adjacent sites and coordinating engagements between fighters and surface-to-air missile units (SAMS). Even the Airborne Warning and Control System (AWACS) aircraft and the mobile tactical control units belonging to the US could enter the network when they used an interface module called a message processing center or "MPC". Like the rest of the tactical ground equipment, these modules were old and very few in number.

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exists between WICS and EIFEL so all of the information must be transferred by hand between systems.

The whole network was dependent on these decrepit little arrangements of tents and trailers (MPCs) for bringing in intelligence as well as radar information into the network. Unfortunately, because the command network was unsecure, valuable bits of information from both the AWACS and the ground radar and intelligence sites had to be "scrubbed" before they could be released into the net by the people working in the MPC.

In an attempt to overcome this shortfall, the Allies had spent millions of dollars creating direct linkage between the radar sites and the AWACS aircraft, but again, because the information derived from the aircraft was classified, it could not be shared between sites. Each of the seventeen fixed radar sites under Smith's control had to establish and maintain a link with the AWACS. Their lives depended on it.

The important part of all of this that the old fighter pilot, Major General Smith, couldn't assimilate until it was too late was that the "recognizable air picture" that flickered and danced on the large display screen in front of him was not real at all. Instead of radar paints[7] he was seeing "symbology", i.e. a representations of the plot and passive information data individual radar sites were receiving. Consequently, "air truth" never quite made it into the command bunker. Track load and system design made it impossible for Smith or any of the other Sector Commanders to see and directly influence the air battle as it unfolded. What Smith stared at was composite messages, transmitted at regular intervals, on fast moving aircraft and missiles. Often, they bore no correlation to reality. Headings were off, raid sizes were wrong, and aircraft were not anywhere near where they were shown.

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[7]"paints"- actual radar returns from the primary site tracking the targets

To have digitized and transmitted the actual radar and passive returns from each sensor device under Smith's control would have overwhelmed the fragile and very limited capacity defense network. Even with symbology, the track load of Smith's entire network was far less than one thousand tracks. One AWACS, if allowed to transmit its entire picture into the network, would cause it to overload and shut down. Consequently, surveillance "executives" on Smith's staff, carefully monitored the network to make certain no single source took up too much room. Areas were divided to make certain double reporting (two units reporting the same track) did not occur.

When Major General Smith began to understand how poor a system he was working with, he asked his technical people why they didn't just eliminate the ground radars and take all the data from the orbiting AWACS. Their response was predictable. They explained that the band-width required to transmit the actual radar plots seen by the aircraft was too great and that symbology and track messages were a much better, more efficient means of sharing an air picture. Unfortunately for Smith, it was far too inaccurate a representation of "air truth" to allow him to do anything constructive with the surface-to-air missile units under his control.

The missiles, all the Patriots, Hawks, Chaparrals, and Stingers were owned and operated by the Army. Oh yes, doctrinally they all came under the purview of the air component commander (Major General Smith) but he lacked the means to control and employ them in real time. Smith's unsecure air picture could not link directly with the Army missile units. American Army systems had to be "buffered" into the air defense network. They received the track messages at their brigade and battalion headquarters and then forwarded track assignments to the missile fire units. In reality, **Army** commanders ordered **Army** missile units to fire at targets. It could be no other way. Whether by design or accident, the Army had created a missile network that was completely incompatible with the air component commander's command and control network.

Smith was incredulous at the early stages of the battle, when he was told that missile engagement and missile availability status were not accessible on his command network. Smith and his staff could "nominate" targets for SAM units based on the air picture, and assign them electronically to the Army, but neither he nor his staff would have any way of knowing what the status was on the engagement until it was over and the hostile track was removed from the system.

In retrospect, General Smith had to admit the Army had done a much better job than the Air Force did of organizing and implementing an operational structure that was favorable to immediate and accurate control of missile assets. Over the years, the Army had spent a good deal of money procuring downlink terminals with the AWACS aircraft. Air Force leadership at the time hailed the expensive and extensive Army buys of AWACS downlink equipment as positive moves towards "jointness". And they were. For the first time, Army SAM units were receiving deep threat and intelligence information without ever having to bring their own radars up. They could sit silent and wait for the enemy to come into firing range, confident that the AWACS would detect, track, and report any intruder.

Unfortunately, the Air Force didn't get any compensation for providing their Sister Service with such valuable information. Instead, any compelling reason (i.e. warning) the Army had for linking with the air defense network evaporated with the first AWACS tracks sent directly into Army missile control centers.

CHAPTER 4

THE AWACS

The last of the four-ship Fencer formations had just lifted off from their airfield in eastern Poland when the beleaguered US Airborne Warning and Control System (AWACS) aircraft arrived on station at Point Charlie. Tail #0028 had flown non-stop the day before from its home base at Tinker Air Force Base, Oklahoma, to its forward deployed location at Ramstein Air Base, Germany. The crew was tired.

"Band Box, this is Sentry 01 on station", called Captain Margaret Jennings, air surveillance officer (ASO) for Sentry 01. She had been trying to establish contact with the Message Processing Center (MPC), code named "Band Box", since shortly after the fuel laden AWACS aircraft clawed its way into the gray German sky. So far, no luck.

Without MPC Band Box or one of the other three such mobile ground units, Jennings knew the AWACS would have difficulty linking up electronically with the air defense nets in the Central Region. The 1960's vintage MPC's (the manufacturer had quit making spare parts for the thing in the early 80's) still played a vital role in getting track data and intelligence information through the networks. The ancient and slow computer in the MPC was able to translate and forward track information into several different systems. Nothing else could do that.

Captain Jennings was counting on the MPC to translate the classified AWACS data into a bit stream and format that the US ground Tactical Air Control System (TACS) could use in their own computers. Very important, considering the TACS sites would be controlling some of the fighters that would be protecting Sentry 01. Additionally, the MPC could filter out classified tracks sent down by AWACS and others and share them with North Atlantic Treaty Organization (NATO) fixed radar installations that used an unsecure data system format. Jennings knew this was doubly important because the flag rank battle commanders were all at NATO

facilities and much of what they would see of the air battle depended on their receiving information from her aircraft and others like it.

As the young captain readjusted her radios and tried to contact Band Box once again, she had to admit it was somewhat ironic that both NATO and the US had funded and designed replacement systems that would have allowed the old MPC's to retire gracefully. But with funding cuts and a growing public interest in the "Peace Dividend", money for hardware procurement and software development lagged far behind. Only the US had managed to actually build a replacement. A new device called (rather unimaginatively) Modular Control Equipment[8] (MCE) had been produced and tested in limited numbers, but none of it had been approved or funded for early shipment to Europe.

"Sentry 01, this is Band Box. How do you read?", asked a wavering voice in Margaret Jennings' headset.

"You're weak but readable Band Box."

"Roger Sentry 01, Band Box is ready to initialize."

"Band Box, authenticate CHARLIE HOTEL", asked Margaret as she moved in her seat and reached over to tap an airman on the shoulder who had been having an animated discussion on the merits of German women and beer with a sergeant that looked even younger than he did. "Tell Lt. Col. Beyers that we are linking up with Band Box now."

"Yes Ma'am", answered the airman. He punched a button on his console and waited for the call to go through.

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[8] Modular Control Equipment (MCE) is the result of a twenty year program started by the Marine Corps and joined by the Air Force in the mid-seventies, to design, develop, and procure ground tactical control equipment. The Air Force wanted to find a replacement for their aging 407L Mobile Control Equipment, which even in the seventies was approaching the end of its useful life cycle. The new MCE "modules" would automate and standardize the entire command and control process from the flight to the squadron (under 407L, only squadrons were automated, the flights "voice told" all track information). Additionally, each MCE module would have the capability of handling all the functions currently done by the Message Processing Centers (MCE).

Lt. Col. Burt Beyers was Margaret Jennings' boss on Sentry 01. As a matter of fact he was everyone's boss on Sentry 01. As Mission Crew Commander (MCC) he was responsible for the tactical employment of this $160 million dollar weapons platform. He was responsible for the fighter controllers on board and well as all the surveillance people. It was up to him to see that the whole operation functioned smoothly and effectively.

The only people on board Burt Beyers **didn't** have direct control over were the "front enders", the pilots and navigators that actually flew the plane. These four or five folks lived in a different world up there and had little to do with what went on in the back of the plane. However, they cheerfully endured the endless hours spent making figure eight patterns over strange parts of the world as the Sentry collected, disseminated, and exchanged radar data with US and Allied Navy, Marine, Army, and Air Force units. Occasionally the pilots went back to watch the action but never stayed long. The "front enders" knew they were responsible for the safety and operation of the plane. Burt Beyers knew he was responsible for the mission. Both parties were content with their lots.

Band Box's authentication was valid and Margaret began the complicated process of linking up Sentry 01's computers and radios with those on the ground. Her assistant, Tsgt. Emil Johnson, watched intently the various monitors at his position in the radio compartment. Johnson, a quiet spoken man from Southern Alabama, was a wizard at making the big bird "talk".

"Capt'n Jennings, ma'am, I'm gettin' a fairly steady pong from Band Box. I think we're all about ready ta ship data now."

The "pong" Tsgt. Johnson referred to was the synchronization of the elaborate crypto devices between Sentry 01 and the primary ground station (Band Box). To the uninitiated, the whole thing sounded like a very slow game of ping pong, when actually, thousands of bits of data were being exchanged every few seconds. This crypto "handshake" between aircraft and ground station ensured that only friendly units got the benefit of AWAC's eyes and ears.

"Sorry to interrupt Ma'am", said the young airman, but Colonel Beyers wants to see you right away."

The ASO unstrapped from her seat and made her way towards the center of the plane. Captain Margaret Jennings, long legged and very athletic, did things for a flight suit that made anyone wonder how it ever came to be called a "bag". Five years out of the Air Force Academy, a nationally ranked volleyball player, and tenth in her graduating class, Jennings was one of Tinker's best young surveillance officers. She came into the Airborne Warning and Control System (AWACS) after spending two years at M.I.T. getting an advanced degree in computer science. She learned fast at Tinker (home base for the US AWACS) and quickly built a reputation as a solid performer.

Margaret stopped at a row of control consoles and bent down to talk with a graying Lieutenant Colonel who had a headset stuck in each ear. His reddened face and squinting eyes were inches from the scope, almost as though he was looking for a small crack in the screen from which to crawl inside and get a better view of the action. Bad eyes and a mild case of forgetfulness prevented Lt Col. Beyers from wearing the glasses he needed so desperately for close work. The screen he stared at was a mass of scribbles indicating missile engagement zones, drop zones, corridors, and check points. He was busy.

"Goddammit Ernie, you tell Strawbasket[9] that we want those fighters under our control right now or I'm going to take this airplane all the way back to Tinker!" Lt. Col. Beyers became more agitated as he listened to his weapons assignment officer's response.

"Look, you tell that asshole at Strawbasket to give us those goddamn airplanes for our self-defense or we're pulling back in one minute. Got it?

"Sir?"

The Colonel seemed startled by Captain Jennings' sudden appearance. He glanced at her and then turned his attention back to the screen.

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[9]"Strawbasket"- German Control and Reporting Center (CRC) in the central part of Germany. A large, fixed radar facility responsible for defensive aircraft and surface to air missile operations.

"Oh yeh, Margaret, what's the surveillance configuration for our area?"

"Well sir, Teapot[10] assigned us reporting responsibility on everything ten thousand feet and below in front of the FEBA[11]."

"Expect a change Margaret", he said brusquely. "I talked to the Sector Controller at Teapot and he tells me they've lost comm on the three fixed radar sites in Charlie area about five minutes ago. You can bet all hell is gonna break loose and I need you to give me the best radar picture you can put together."

Beyers took off his headsets and ran a hand through his sparse hair before he put them both on again. "Margaret, I know you won't forget, but double check everything. None of us are going to get a second chance in this one, okay? Make sure the filters are set, watch for the jamming, and don't let us get blindsided. You keep those young surveillance kids' heads in the scope. No picking noses, no coffee breaks, nothing except a sweet picture for our controllers. And for Christ's sake make certain Band Box and the fixed sites and those goddammed Army surface to air missile (SAM) units on the net get good track data on the fast movers coming across the FEBA. I don't want the distinction of being the first MCC to lose a crew in combat."

"Yes sir", answered Captain Jennings slowly as she rose to walk back to her position at the front of the plane. She hadn't really thought about the danger before. About the possibility of ending up as a small piece of charred flesh in an even larger fireball of aircraft and missiles. So this is what they meant by being some Foxbat pilot's wetdream...

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[10]"Teapot"- code name for the Sector Operations Center (SOC) that the AWACS was working with. SOC's are responsible for all the surveillance and defensive fighters and missiles in their area. They monitor all air activity, missile and fighter engagements, and data flow through the air defense network. In Central Europe, AWACS are assigned to these agencies.

[11]FEBA- Forward Edge of the Battle Area. The line of activity where troops meet in combat.

"Jennings", Lt. Col. Beyers called to her. She turned around to see him with a smile on his face. He always looked so much younger when he smiled or joked with the crew members, which wasn't too often. "Don't look so serious. It scares the hell out of me!" For some strange reason, Margaret felt better.

CHAPTER 5

LOSSES

"Teapot" was the code name for General Smith's air defense center. The cramped operations room was awash in people and billowing clouds of strong smelling cigarette smoke. None of the Americans (with the exception of an overweight Major) were smoking, but the Germans, Dutch, and Belgians were more than making up for it.

Captain Stan Carter, a pale, fleshy, rumpled looking man in his mid-thirties, was the duty surveillance executive. He had almost ten years enlisted time in the ground tactical air control system (TACS) and could spot big trouble when he saw it.

"We're fucked", he said to no-one in particular as he drew range rings around the spots on his scope where the three missing sites in Charlie area were no longer radiating. The hole they left in the forward area was almost a hundred miles wide. Carter had nothing to plug it with.

"Why are we fucked, sir?", asked his doleful looking assistant.

"Because unless we come up with a miracle solution to plug this hole fast, the bad guys can give us a Flogger/Foxbat/Fulcrum/Blackjack enema anytime they want."

"Do you think they're going to come across?"

"No. I think they took out the Charlie sites because the damned things were interfering with their reception of the Donahue show and they just wanted a better picture." He completed drawing the last ring and glanced up at the computer to check the track count. It had dropped by almost 300 since the forward sites went out. To look at the screen, one might think that air activity across the forward edge of the battle area (FEBA) had stopped. The "hot line" to the Sector Controller buzzed but Carter took a drink of cold coffee before hitting it.

"Surveillance here."

"Carter, what the hell's going on with the air picture?"

"It sucks."

"I know that. What are you doing to fix it?"

"Nothing right now."

"Well do something quick because General Smith just ripped my head off and threatened to shit down my neck if I didn't get him a good air picture. What about the AWACS? I just talked with Sentry 01's MCC and he is aware of the Charlie outage. Isn't he on station?"

"Yes sir, he's on station all right, but if I open up the tell ports and let him bring in all his tracks, the data rate for the whole system is going to climb out of sight[12]. We'll have double tracks and triple tracks and the picture General Smith gets will be so out of whack it won't be worth anything."

"Figure something out Carter and do it before Smith makes both you and I morts[13] in this war."

Stan Carter had a real problem. If he opened up the AWACS coverage he would severely overload the link between Sentry 01 and Band Box. The AWACS with its long-range sensors was a giant eye in the sky. It saw and processed many more tracks than it ever shipped over its data links to waiting ground stations like Band Box. Most general officer battle commanders never understood that. They falsely assumed that because the AWACS was up and operating, that they in their underground bunkers were "seeing" what the AWACS "saw". It simply wasn't true.

Carter laughed at the imaginary briefing he would like to give General Smith on AWACS integration with fixed and mobile ground systems. It wouldn't look at all like the fancy slides and charts he saw the fair-haired headquarters boys pass off as **"CENTRAL REGION COMMAND AND CONTROL CAPABILITIES"**. No sir, it would be a lot simpler and more to the point.

"General Smith", he'd say as he sauntered over to the board. "Having a couple of AWACS up and operating in your area of responsibility (AOR)

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[12]AWACS are normally given a "reporting area" and send track messages only on the tracks within that area. Routinely, they are asked to handle low level and deep surveillance type taskings.

[13]Morts- slang for "casualties" in combat.

is like being given a huge reservoir with all the POL[14] you'll ever need to fight the war, and ---- a soda straw to suck it out with. Now you don't want to be ungrateful for that reservoir but common sense tells you if you only got a straw to suck it out with, you better suck out the best stuff first. And that's exactly what we do. We take all the low level tracks, the bad guys just breaking ground, the enemy formations using terrain masking, the cruise missiles, the stuff that our ground sites can't possibly see, and we have AWACS tell those tracks to us down that little soda straw of a communications pipe.

Now if you want General, we'll plug that straw into the bottom of that big POL tank and let her drain. You'll get everything alright. In time. But it won't mean much. Data rates will go from seconds to minutes. Know what that means General? It means instead of revisiting and updating a track every ten seconds, we'll revisit every ten **minutes** or so. How far do your jets travel in a minute? Eight miles? Nine? Maybe more if they're dodging a missile. It won't be pretty. The software won't handle it and tracks will go into "lost" status and float through the system endlessly. Your air picture will become a mass of unintelligible symbols, of no use to you or anybody else."

Carter winced as he imagined the verbal tongue-lashing he would get for such candor. "Don't blame me General. I didn't make the system, I just operate it. Whoever those boys were in Washington and elsewhere when all this crap was being built should have given a little more thought as to how guys like you, begging your pardon sir, how the **battle commanders** were going to run this show. Seems to me, nobody much gave a shit as to how all this stuff would play together."

In his daydream, Carter self consciously hitched up his sagging pants, straightened his shoulders, and faced General Smith squarely. "Why I bet General, you got a great orientation flight on a Sentry aircraft before you came over here and took command. Everyone does. The AWACS is the crown jewel of tactical control. The people who work

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[14]POL- petroleum, oil, and lubricants

on those birds are the cream of the crop. They are professionals who try very hard to give us the best information available. But the way we use that airplane now, it's a thousand watt amplifier hooked to a ten watt speaker. And any hot shot briefer in a well pressed uniform with fancy ribbons and a short haircut who tells you different, who tells you all this stuff- the AWACS, the Ground TACS, and the fixed NATO sites work together in a coherent and effective way is pounding huge amounts of sand up your ass, sir. Begging your pardon."

"Captain Carter, the Sector Controller is on the line. Captain Carter!" Stan Carter snapped out of his reverie and took the phone from his technician.

"Yes sir?"

"Carter, what about the coverage out there in the forward area?" By now the low level tracks from Sentry 01 were starting to show up in the system and already the eastern side of the FEBA was getting filled with numbers and symbols that indicated a large raid was building.

"It's coming sir, just give me a few minutes."

"We might not have a few minutes Carter. Do it now." The phone went dead. Carter reached for the microphone and switched to the secure channel for Sentry 01...

CHAPTER 6

THE GAME

It couldn't be as bad as it looked. General Smith watched the large screen display as hundreds of angry red dots and lines poured through the gap left by the damaged radars in Charlie Sector. The red dots symbolized the enemy aircraft that at this moment were headed towards the heart of the NATO warfighting machinery. Blue dots with four digit numbers out to their sides represented the friendly fighters that were airborne and prepared to meet them. The blue dots were few in number and miles back from the FEBA. This was intentional. General Smith had ordered all the Hawk and Patriot surface to air missile systems (SAMS) in the forward area to a "weapons free" status. That meant the missile crews could engage and destroy anyone that didn't meet friendly criteria.

The General knew it was going to be hard on the F-16, F-111, and Tornado crews that had launched on interdiction missions at daybreak and would be fighting their way back through enemy territory right about now. He knew that some of them would fall victim to friendly SAMS because they were unable to perform the proper maneuver or squawk the right code. But what option did he have? The goddamn command and control system he was stuck with gave him no real control over SAM engagements. He could "order" a target taken out with a SAM or a fighter, but the data he based that order on was nowhere near accurate or timely enough to be of any tactical use. Smith's air picture was an **approximation** as opposed to a faithful representation of what actually was happening up there. He was fighting almost blind. Considering that, it was the best he could do. Unfortunately, it wasn't good enough.

"General Smith, the Sector Controller[15] is on the line." Smith picked up the phone.

"Go ahead."

"Sir, over half the remaining surface to air missile (SAM) units in Charlie Sector are winchester[16]. So far we've lost seven Patriot and eleven Hawk batteries."

General Smith looked at the classified piece of paper his deputy shoved under his nose. It was a "sitrep" or "situation report" for VII Corps. They were under heavy attack all along the Corps forward lines and requesting as much close air support (CAS) as could be mustered in the next twenty four hours. The message was addressed to the four star Central Army Group (CENTAG) Commander with Major General Smith at the Allied Tactical Operations Center (ATOC) as info copy only. Just when things couldn't seem to get any worse...

"General Smith, I need your permission to pull back the AWACS. If we don't, I think we'll lose him."

"Where do you suggest we send him?"

"Belgium. My Surveillance Exec says we could put him in an orbit west of the Ardennes. From there, the Bitburg guys (F-15s) could still provide the Sentry with topcover."

"Christ, what will that do to our radar coverage?"

"We'd lose the low level forward area coverage but we could still get decent medium and high altitude returns from him."

"What would that mean for the forward area SAMS?"

"They would have to radiate all the time sir, in order to maintain an air picture."

"Can't risk it Colonel. I need those SAMS if we're going to stop this raid."

"General, you need that AWACS if you intend to keep any kind of reasonable air picture going. TAC (Tactical Air Command) or the NATO

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[15]Sector Controller- The senior ranking controller, responsible for all aspects of the Sector Operations Center. He reports directly to the Sector Commander (Gen Smith). He is a non-rated officer with considerable experience in air defense and air offense operations.

[16]Winchester- out of ammunition

guys at SHAPE (Supreme Headquarters, Allied Powers Europe) aren't going to send us any more if we let them get shot out of the sky."

General Smith paused for almost a full minute before replying in a slow, controlled voice. "Colonel, I'll worry about TAC and SHAPE. You worry about keeping the AWACS alive **and** providing a decent air picture for all of us. Now here's what I want you to do." He stabbed his finger at a point on the sixteen inch display screen to his right that mimicked everything that was on the large screen display. (The small console had been put in next to the commander's table, when one of Smith's more vain but visually impaired predecessors complained about not being able to read the large screen at the far end of the room.) "You move that AWACS about sixty miles back and to the left of his current orbit position and tell him that's his new station."

"But sir", the Sector Controller complained, "that's smack in the middle of a missile engagement zone."

"Goddamn right it is Colonel!", he snapped. "And you tell your SAMA[17] to make certain the Army puke who runs it knows that if he shoots down my AWACS or lets it get shot down by some MIG, I'm going to personally lead a four ship over his control van and drop **YOU and the SAMA** in a burlap sack along with a couple of two thousand pounders[18] on his head. Got it?"

"Got it sir."

"Good. Let's make it happen."

Smith turned to his deputy, a grizzled old colonel with only a few strands of strategically placed gray hairs left on his head. They had flown together on both of Smith's Vietnam tours as well as at Bitburg in '88. "Well Harry", said the General, "do you think we got the young Lt. Colonel's attention?" "You know what I always say General", as he

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[17]SAMA- Surface to Air Missile Assistant stationed at the air defense center, responsible to the Sector Controller for advice on missile engagements and movements. Position is normally filled by an Army major or lieutenant colonel. Has communications with missile battalions operating in the field and in garrison.

[18]Two thousand pounders - 2,000 pound, high explosive, low drag bombs. Normally carried on the inboard pylons of US fighter/bombers.

took a big bite out of an apple that had just been left for Smith by the anemic looking aide, "grab their balls, and their hearts and minds will certainly follow."

CHAPTER 7

THE WING

It was 2300 local time, and Colonel Ted Sturman had never been so busy, or so tired. As Commander of the 50th Tactical Fighter Wing at Hahn Air Base in Germany, he had been under constant pressure for almost four days to keep his airplanes flying and his base alive. The sudden increase in alert status and subsequent shooting war couldn't have come at a worse time. The conflict in the Gulf had slowed his spares deliveries to almost zero and a good third of his maintenance men and security police had not yet returned from duty in Saudi Arabia. Thank God he'd convinced General Smith that sending some of his pilots over there was a bad idea (most had volunteered). As it was, he was critically short handed, and he knew it.

Surprisingly, Colonel Sturman's command post and other underground shelters had held up quite well despite the pounding they had taken from Soviet air and missile attacks. Of Sturman's three squadrons, only the 313th (unlucky) was completely out of action. The operations building had taken a direct hit the second morning of the war. A pair of Flankers had gotten through the hastily thrown up shield of Army short range air defense missiles (SHORAD) and dropped four very large, shaped explosive charges that leveled the place and killed almost everyone inside. Fortunately, the 313th Squadron Commander and several key members of his unit were out flying at the time and escaped injury. Colonel Sturman ordered the remaining elements of the 313th to work out of the 10th Squadron's shelter until other arrangements could be made. It was crowded but workable.

A haggard looking Senior Master Sergeant carrying a thick wad of computer paper made his way to the dais, where Colonel Sturman and the rest of the battle staff were sitting. "Air Tasking Order (ATO) is in sir." He held the paper in front of Sturman as though he were expecting the Colonel to be able to assimilate it all by just touching the weak blue ink on the outer pages.

"Well?"

"Everybody wants a piece of us sir. the ATO shows the 10th going north to work battlefield air interdiction (BAI) with the Second Allied Tactical Air Force (2ATAF) under control of ATOC Kalkar[19]. The 497th is supposed to re-role for air defense only missions and work mixed CAP[20] with the Bitburg F-15's under SOC-3 direction. And then Headquarters wants us to take what's left of the 313th and load em up with a mix of clusters[21] and hard bombs for CAS missions in 7th Corps' area."

"Jesus Christ, Boss, somebody's got to tell those guys at headquarters that our jets don't magically upload and download themselves at the push of a button!" It was Colonel "Sunny" Curtis speaking, the Wing's maintenance officer. He had just come back from making the rounds to all the squadrons and his fatigues smelled vaguely of oil and aviation fuel. In trying to "second guess" the ATO before it was released, the Wing, under the direction of Colonel Sturman, had uploaded all the aircraft with a mix of air-to-air and air-to-ground munitions. Many of the planes would have to be changed out in order to meet the new "frag" (short for "fragmentary order", or that part of the Air Tasking Order that applies to the wings).

"And while were at it, Boss", said Curtis, who was busy rearranging for at least the tenth time, the webbed belt that held his gas mask and atropine injections, "we might want to remind them that this Wing hasn't seen a cluster bomb since the Soviets blew up the 313th and leveled the North Ammo dump."

He was right. There had been no cluster munitions at the 50th Wing for almost 48 hours. It wasn't as though the "Loggies" (logistics personnel) hadn't tried to get some. Curtis' folks had scrounged everywhere with no luck. Additionally, they had reported the shortage

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[19]Kalkar - one of four Allied Tactical Operations Centers (ATOC's) in Europe's Central Region. Responsible for <u>offensive</u> air operations, the underground command facility is located not far from Germany's industrial center at Cologne.

[20]CAP - combat air patrol. Searching out and destroying enemy bombers and fighters in the air.

[21]"clusters"- slang for anti-personnel bomblets

through the logistics network that tied all the U.S. aircraft requirements into a single support center, run by a USAF three star general. Unfortunately, the Air Force three star and his all-American staff had no direct lines of communication (voice or data) with the **Allied** command centers that actually planned the missions and fought the war. Consequently, the planners on the Allied staffs (Major General Smith of Allied Tactical Operations Center-Sembach for example) often planned missions using aircraft and munitions that didn't exist.

To the uninitiated, this situation appears to be a glaring example of military inefficiency, poor planning, and sheer stupidity. It was. However, there are mitigating circumstances. Each nation involved in the alliance reserves for itself the right to protect certain pieces of information concerning its readiness, its intentions, and its intelligence capabilities from its enemies **and** its allies. To do this, it builds and uses systems that are unique, with access codes and key lists that make it difficult for other nations to "break in" and "steal" the information.

Any attempts to link these "national" systems with "allied" systems are viewed with great suspicion by the cryptological community that monitors and administers the security aspects of these systems. There is great fear (some of it justified) among this group that access to national data bases by a foreign government, however limited, is extremely dangerous, and could result in the compromise of national interests. The "buffer" most acceptable to this community is not some fancy modem or interface device that allows the rapid and free flow of information from one system to another, but a rather tired and overworked human that has the unenviable task of "fat fingering" legitimate information from one system into another. In the case of the 50th Tactical Fighter Wing, that interface device consisted of a rather frightened twenty-three year old senior airman from San Diego named Ricky Downs.

Ricky had spent the last fourteen hours shuttling between the US only "WICS" system and the allied "Eifel" system. The fleshy young man

disliked both systems but he reserved his real hatred for the awkward and bulky Eifel terminal.

"Ernie", Ricky said rather urgently into the mouthpiece that was dangling closer to his shirt collar than to his mouth. "Ernie, for the tenth time, I need the tail numbers of the birds your squadron has ready to launch or Sergeant Schroeder is going to kick my ass!"

"Hey Dickwad, it's not like I can go out and count the bastards for you! Our guys are trying to tear half the shit we spent all night puttin' on the birds, **off**, so they can go do somethin else. Gimme a break!" Unlike Ricky Downs, Sra[22] Ernie Dressik had not been glued to a computer terminal but, as a 10th Fighter Squadron member, he had been lugging bombs and missiles across gaping holes in the tarmac and struggling to get them into the hardened shelters where the aircraft waited for their next mission. Pyles' **additional** duty was to punch into the squadron WICS terminal the status of the aircraft and munitions. Considering what he had been through in the last several days, it didn't have a real high priority. Consequently, he needed a lot of prodding to get the information up to Wing level and out through the system.

"Ernie, just give me the information as soon as you can okay?"

"Yeh, okay, okay." The line went dead and Downs wasn't certain he'd been cut off or just hung up on. The headset had no tone in it. He re-adjusted it several times with no luck. Downs punched the direct line to the 313th Squadron and an instant later remembered that the squadron facility that the line connected to was no more. "Christ it was awful"' he thought. One minute he was talking to Lionel Perkins, the only friend he had at the squadron and the next minute, nothing.

"Downs, you got those tail numbers for us yet?" Senior Master Sergeant Schroeder's voice startled him and he almost spilled the coke can that he had hidden under the console (drinks and food were not allowed near the work stations).

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[22]Sra- senior airman

"No Sarge, I called the squadrons and they don't have them ready yet."

"Downs, you shouldn't have to call them. They should be putting the information in as the airplanes come up on status."

"I know Sarge, but they don't do it unless I remind them." Downs tried to look busy by half-heartedly typing some commands into the Eifel terminal in the hopes that the Sergeant would go away. He didn't.

"What's Bitburg showing for status on Eifel?"

Downs froze. He couldn't remember the command to bring up another unit's status and the manual detailing how to do that, was about two feet thick, written in German and English, and so cumbersome he never could make it out. Not many other people could either.

"Downs, what's Bitburgs status on Eifel?"

"I don't know Sarge."

"Well bring it up for Christ's sake! I didn't ask you to memorize it."

"I can't." Ricky stared at the screen, his fingers resting lightly on the keyboard. The room seemed noisy and very unfriendly.

"Why not?" The Sergeant's voice had an edge to it.

"Because I don't remember the command. We never use Eifel except during exercises and it doesn't work half the time then."

Sergeant Schroeder's inclination was to bite the kid's head off, but he knew the young man was right. They didn't use Eifel every day. It simply wasn't an integral part of the unit operations. Until now. Sure, they sent people off to school to learn the ins and outs of the system, but a few months back on the base and these young computer operators forgot most of what they learned. "Figure it out and call me over when you get it." The lanky sergeant reached under Downs' console and pulled the hidden coke can out from behind the metal post. "Bad enough if we lose you during the next attack, we don't need to lose the terminal too." Schroeder walked off with the coke, shaking his head.

The rest of Ricky Downs' night wasn't much better. As the Wing battle staff worked to break the air tasking order into manageable chunks of missions, to be flown by each of the three fighter squadrons, Downs was required to send the tasking to each squadron via the Wing

Information Control System (WICS) terminal and then turn around and feed the same information into the Eifel network so the headquarters and other agencies would know that the tasking had been accepted. It was frustrating and busy work for the young man, but at least it kept Senior Master Sergeant Schroeder from harassing him.

Downs pushed back from his work station and tried to stretch and rub the sleep out of his tired young body. Secretly, he wanted to wake up and find he wasn't here. That the past 72 hours were all a dream. It still didn't seem real to him. He was at war. In a foreign country. In a hardened concrete bunker surrounded by concertina wire and men with automatic weapons and chemical gear. He hoped they all weren't as frightened as he was. That was one thing about his dead friend Lionel Perkins. He never seemed to be afraid or intimidated by anything. Not even Senior Master Sergeant Schroeder. Perkins was a tall, black, buck sergeant (three striper) from New York City. Although he had been in service almost exactly the same amount of time as Downs, he already outranked him. Now he was dead.

"I guess that means I finally outrank you Lionel", Downs mumbled to himself as he settled a little lower in the swivel chair. "I'm alive and you're not." Ricky remembered the first time he and Lionel were given the tour of the command post by Senior Master Sergeant Schroeder. It took all three of them to push open the concrete and steel blast doors that sealed the place off during an attack. As they made their way through the decontamination area and a series of air locks, Downs' stomach began to tighten and his breathing became shallow. He hated tight places. Locked places. It looked more and more like a tomb instead of some high tech command center promised them by Sgt. Schroeder.

"Chill out Downs! Ain't anybody gonna eat you down here!" Perkins hissed, and then gave the frightened airman a nudge as they turned the corner and stepped into the command post. The place was much smaller than he imagined it. Not at all like the things he had seen on TV as a kid. It was about the size of his home room in high school. And just

like it, there were smaller rooms off each corner where people could go and shut the door and not be heard but watched through large soundproof windows. Near the center of the room was a row of expensive looking chairs on a raised platform, all lined up neatly along a narrow formica table. They faced three large plexiglass boards that reached almost to the ceiling of the dimly lit place.

"Listen up guys. This is the nerve center of our whole wing operation." Sgt. Schroeder walked over to the table and rolled back the tall leather chair at the center and sat down. He motioned for Downs and Perkins to take the smaller chairs on either side of him. "Right from here", he said placing his hands on the table and reaching for one of several large secure phones in front of him, "is where Col. Sturman, our Wing Commander, directs the air war."

"What do all the lines on the boards in front of us mean?"

"Jesus Christ, Downs, don't tell me you've never even seen a mission status board before?" Sgt. Schroeder rifled through the storage tray underneath the table and pulled out what looked like a long black flashlight. He pointed it at the board and instead of a beam of light, it produced a clear, white arrow directly over the section marked 'MISSION #'. "This section tells him what part of the air tasking order is being flown. After that we get 'TOT', or 'TIME OVER TARGET'." Schroeder was moving the pointer across the board and talking quickly. "Here the Colonel can tell which of his airplanes is going to fly the mission, how long it's going to take, what weapons he's going to use on the target, who's gonna fly it, and whether or not they're ready to go."

Undaunted by Sgt. Schroeder's explanation, and a little carried away by the experience of sitting in the plush leather chair marked "DO" (it belonged to the wing operations officer) Ricky asked another question.

"Well how does the Wing Commander know what targets to hit? I mean how can he figure out which of the bad guys to get?"

"C'mon Downs, didn't they teach you anything at the basic course? He gets all that information on the air tasking order! Headquarters sends down the targets they want us to hit and we tell em which ones we can. It's simple." Schroeder pushed his chair back and stepped away from the table. "Let's get going guys. I can't sit here all day explaining this

shit to you. Besides, all you need to know how to do is operate the Eifel and the WICS systems. Leave the thinking to us old folks."

Perkins had been quiet the entire time. He sat studying the board as both Sgt. Schroeder and Ricky walked away. Schroeder was already talking about the Eifel system when he noticed Perkins wasn't with them.

"C'mon Perkins! I told you I didn't have a lot of time today. Get your ass over here!"

"Sarge, I think you're wrong." Perkins turned his gaze towards the aging Senior Master Sergeant.

"What are you talking about?"

"Col. Sturman running the air war."

"Perkins have you lost your mind? Get your ass over here and quit mumbling about shit you don't know about."

"Nobody runs the air war here Sarge. We just deliver the weapons where they tell us and hope we survive long enough to do it."

"Your ass, Perkins! We fight the war from here. Col. Sturman directs the aircraft, selects the targets, loads the ordnance. He's the warfighter even if you're not bright enough to understand that." By now Sergeant Schroeder had worked his way back to the table where Lionel Perkins was sitting. Ricky didn't like this at all. He knew Schroeder didn't tolerate being challenged, especially on things he considered himself to be an "expert".

"If that's true Sarge, tell me where he gets his information on what the enemy is doing. Where's the big screen that shows our aircraft and the bad guys? I've got some friends in the 94th ADA[23] Battalion and they tell me that they don't even coordinate with us when our guys are flying missions in peacetime. They say they don't expect to hear from us when the balloon goes up either. Where are the guys that talk to them Sarge? How can we even run the war if we can't see who's shooting who?"

"Perkins, you're talkin' shit."

"Maybe. But from what I've seen since I've been here, it looks to me like I'm not the only one talkin' shit. Looks like I got a lot of high

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[23]ADA- air defense artillery. Army owned and run. Consists of Vulcan cannons, Chaparral, Patriot and Hawk missile systems.

ranking enlisted and officer company that does a real good job at it too." Perkins was standing now and the two men glared at one another...

"Downs, for Christ sake answer your line!" It was Sergeant Schroeder. Good thing Schroeder was half-way across the room when he yelled or he might have noticed Downs dozing off. "Yeh", he thought, "if it hadn't have been for the confrontation between Lionel and Sgt. Schroeder way back at the beginning, Lionel might be alive now. Old Schroeder had him transferred to the 313th about a week after the command post tour. Word came back that he couldn't stand a 'smart ass' in his outfit. He only wanted people he could control. Well, he couldn't control Lionel, that was for sure." Ricky picked up the blinking phone.

"Fang 21 and 22 are airborne for point Charlie under Morpha control."

"Thanks Ernie. I'll update the system right away."

"No problem Dickwad. Tell the boss to keep sending us these air defense missions. I don't have to lift near as much shit as I do with those goddamn air to mud sorties!"

"Sure, I'll tell him first chance I get. Next time he stops by here to ask my opinion on what we should use to fight the war with, I'll tell him what you said."

"Your Mama. Hey fat boy, when you going to get off that little terminal of yours and come work with the rest of us? You afraid to get dirty?"

"Hey Ernie, I gotta go. If I don't update this Schroeder is going to kill me."

"Maybe he won't have to. Maybe the Russians will do it for him. Good luck Dickwad. Talk to you later."

Ricky hung up the receiver and stared at the big clock in the center of the room. It was almost dawn. Soon all the 50th Tactical Fighter Wing aircraft would be airborne and headed for targets with names he couldn't even begin to pronounce. And strangely enough, an enemy force would be headed his way, bound for targets with names he knew too well; Bitburg, Ramstein, Sembach, Hahn...

CHAPTER 8

FIGHTERS

"Morpha Control, Fang 21 flight up your freq for point Charlie." The two F-16's skirted the tops of the cloud cover in loose tactical formation. Captain Todd Blackburn and his wingman, Lt. Daryl Marks already had eight combat sorties and two "kills" apiece to their credit. Both men were surprised that they had drawn only air to air missions since the war began. They had expected to be re-rolled to ground attack much sooner even though all the old heads in the squadron kept telling them that until the NATO force had at least some control of the skies, most dual role aircraft would stay with the air superiority mission. Blackburn didn't much care which mission was handed to him, as long as he got one.

"Fang 21 Flight, Morpha's with you. Check arms hot, climb angels one five, set speed saunter." The voice was calm and very matter of fact. It was also female. Lt. Jeannie Rudolph had been in Europe almost as long as she had been in the Air Force. Her training consisted of a ten week course at Tyndall Air Force Base in Florida where she learned the basics about controlling. From there she was shipped to her unit in Germany. After several deployments into the countryside of Europe, she was pronounced "combat ready" and assigned to crew. It wasn't much time to learn all the things required of a controller at a tactical unit. But it would have to do.

"Hey Reindeer[24], is that you?" Todd Blackburn glanced over his left shoulder, imagining Jeannie sitting at a console thousands of feet below, watching his flight on radar.

"It's me." Lt. Rudolph couldn't help but smile when she thought of the dark haired pilot with the big nose flying above her. She met him during a cross-training trip to Hahn. They continued to see one another

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[24]"Reindeer"- personal call sign used by Lt. Rudolph

and although it hadn't developed into anything serious yet, they were attracted to one another. He wasn't cocky like a lot of the pilots she had met. He seemed sincere and willing to explain things like missile time out procedures and other information that she felt she needed to be a good controller.

It was obvious from the beginning that Todd Blackburn and the rest of the pilots all loved what they were doing. Not like the people at Morpha. Everyone here seemed to hate it. It was the same everywhere in the Air Force wherever there was a control unit. The only people who controlled fighters were the ones that had to. The lieutenants and junior captains mostly. As soon as you got some "rank" you quit controlling and did something else that didn't require you to spend endless hours chained to a console, waiting for airplanes to show up on your frequency, and knowing when they did, the poor radar and even worse radios would make it almost impossible to work with the pilots.

Unlike the flying side of the house where "old pilots" from general officers on down, came and flew with and talked to the new crews about flying, the controller side of the house had no such fraternity. Even Jeannie's commander, Lt. Col. Peavey, hadn't controlled an airplane in years. When Jeannie would do the stand up brief and complain about the poor radio reception and intermittent radar, Lt. Col. Peavey would frown and turn to the maintenance officer, a prior enlisted Major who hated all operational types with a passion, and ask what the problem was.

"Nothing sir. We couldn't duplicate the Lieutenant's problem and all the equipment checks out fine."

"Alright, let's look at it tomorrow and see what you come up with."

Jeannie knew it would be the same tomorrow. And the next day. She knew Col. Peavey wouldn't be there when the fighters she was controlling would drone out of the airspace while her scope was blank and her radios were inoperative. He wouldn't be there to watch the old and worn equipment blink back into operation just in time to see the fighters on a collision course with a couple of 747's headed into Frankfurt. Neither he nor the other "senior officers" with their non-ops jobs would

be anywhere around when all hell broke loose as the European Air Route Traffic folks diverted the jumbo jets and threatened death to the tactical control team that let the aircraft wander out of the practice area. The gut-wrenching fear of such incidents, repeated with altogether too much regularity, would not be part of the control unit commander's day. With luck, Jeannie and the other young controllers like her would merely have their airspace[25] revoked by Center and the fighters either sent home or sent to work only with EUROCONTROL (the air traffic agency). A violation[26] would mean disciplinary action and an efficiency report that would destroy any possibility for promotion. In addition, the nightmare of a possible mid-air collision between the fighters and "traffic" was a part of the deal for most tactical controllers. It simply came with the territory.

When Jeannie mentioned this to Todd Blackburn on one of their "dates" he refused to believe it.

"How can you guys learn anything if the squadron commander isn't out there doing the job with you?"

Jeannie explained that there wasn't enough sorties to allow people like the commander, and other "senior controllers" to get missions.

"Bullshit. If that's true Jeannie, none of the senior guys that fly with us would ever strap an F-16 on. We got people from the Wing, from Headquarters USAFE, and all over that come fly with us. Heck, just last week General Ernst, the four star, flew on my wing. Let me tell you, the old guy was good. I learned a lot from him."

"Well, say what you want Todd, but the highest ranking guy I ever saw control was a major, and that was back at basic school in Tyndall."

"No wonder your equipment is so screwed up. I'll tell you what, if your boss had to control a couple of sorties a week and he had a few of us spill out into the air routes because of bad equipment or radios, his concern about ops might take on a whole new flavor. Hell, I'll bet you

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[25]airspace- a geographically defined area where fighter operations are conducted to avoid civil air traffic.

[26]violation- formal notification from civil air traffic control authorities that a military controller, pilot, or agency contributed to an unsafe flight condition by not following established procedures.

my next month's pay that it wouldn't happen twice or that fungo maintenance officer would be looking for a new job!"

Jeannie dropped the discussion, but on her way home across the twisty roads of the Hunsrucke, she reflected on what Todd had said. Most pilots thought controllers were stupid. "Scope dopes" are what they called them. Jeannie remembered being called that at the officers club at Tyndall one Friday night by an F-15 pilot that had obviously had too much to drink. She told him off, but not before he got in a rather long list of reasons why he hated controllers. According to him, controllers didn't know the first thing about flying or air combat missions. He said that no controller ever made the rank of general (she found out later he was right on that one) and the only thing they were good for was asking stupid questions on the radios. When you could talk with a controller (which wasn't often according to this guy) all they would tell you was "stand by".

Truth was, active controllers by and large were much younger and certainly less well trained than their pilot counterparts. Most had never sat in a fighter aircraft, let alone flown in one. Even though the controllers were supposed to provide large scale battle management and guide individual fighter elements to their targets, most were ill equipped for the job. They simply didn't have the means or the money to train for it.

The money for command and control was drained off by the intelligence and communications "mafias" that had pathways to senior leadership positions. Controllers didn't get promoted to general, no matter how bright or talented they were. Not so in the intelligence community. There, people like Lt. General Lenny Perroots rose from the ranks to run the entire Defense Intelligence Agency and influence countless budget decisions before he retired. Communicators did the same thing. A firmly established pathway to senior leadership positions allowed the communications personnel to influence the budget process in ways that resulted in the procurement of expensive communication networks that,

unfortunately, did little to enhance tactical command and control combat capabilities.

This denigration of tactical command and control capabilities was not intentional on the part of either the intelligence or the communications communities. The truth was simply that both communities, with an ample supply of general officer positions, and hence powerful influence over the budget process, were able to take the bulk of the money earmarked for "command and control" and use it to their own ends. The tactical command and control community had no such senior leadership positions, and consequently, their voice in the struggle for scarce dollars was seldom ever heard. The relatively few career tactical controllers that managed to attain the rank of full colonel were usually farmed out as "base commanders" or stuck down in the bureaucracy of the Pentagon as assistants to assistants of assistants. They had no hope of going any further in their military careers, and accepted their fate as an inevitable consequence of having the bad luck of being made tactical controllers in the first place.

Jeannie Rudolph didn't know this. As a young lieutenant she had little care for the politics and pathways of senior leadership positions. She did know that the Airborne Warning and Control System (AWACS) controllers were even worse off than their ground based brethren. From going on rotation to Saudi Arabia and spending time with the AWACS guys she learned that the AWACS folks were lucky to see two live intercepts a quarter! That meant their proficiency was very low.

What she didn't know was that the lack of a coherent program for upgrading tactical command and control equipment and the abysmal state of training would leave her and her colleagues painfully vulnerable to attack and defeat, and would put at risk NATO's entire air machine.

By the time the war started most airborne controllers were content with giving a point out on a target to a fighter crew and hoping it would be enough to allow the aircraft to get a kill. Precision intercepts faded with the demise of large scale air defense systems like

the Semi-Automated Ground Environment (SAGE) System in the late 1970's. They would not come back.

"Fang 21, you are low level element of defense package on Charlie."

"Roger". Blackburn looked up and could see the F-15s performing lazy eight patterns above them. Every time the big twin engined jets turned, they stood out in the bright morning sky. "Better them than me", thought Blackburn.

The four dissimilar fighters would jointly cover the area around point Charlie and keep it free from intruders. At least that's how it was supposed to work. "Fang 21 flight, Sentry 01 your six o'clock, range 70." The AWACS was well beyond visual range, but Jeannie wanted the aircrews to know that it was there and working. No doubt the Soviets would try and take it out just like they had been doing the last two days. The SA-5's they launched at the Sentry aircraft seemed to move across the radar screen like the old SR-71's "spy planes" before the budget crunch condemned them to an early retirement. . . Fast. Real fast.

"Bandits bullseye, zero two zero, thirty, low, fast, many." Jeannie squirmed in her seat and readjusted her headset. Even though it was cold in the inflatable "rubber duck"[27] operations shelter at Morpha, a thin line of sweat was forming on her upper lip. Using a pre-arranged reference point to deny the enemy aircraft information on the location of her fighters, in case they were listening to her broadcast, Jeannie had just told Fang 21 flight and the Eagles working above them, that more than five targets ("many") were entering their area, that they were traveling at speeds in excess of .8 mach ("fast"), and that they were flying below three thousand feet ("low").

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[27]Rubber Duck- refers to the 407L tactical control system inflatable shelter. Consists of three detachable sections. When fully assembled, it measures approximately 60 x 30 feet, and houses the entire operations center of a tactical command and control squadron. When not in use, it folds up into packages that can be stored on large military trucks. Extremely labor intensive to set up and take down, the "duck" can be put together in about 12 hours with a full crew.

Her own radar had not yet picked up the inbound targets. They were too low and too far away for the ground based TPS-43E radar. But AWACS had tracked the Soviet aircraft since they had left their home field and had passed that information to Morpha through the Message Processing Center (MPC) unit that sat in a tent a few feet from where Jeannie Rudolph was controlling her fighters.

As she stared at the bright green symbol on her scope, her mind raced. What if the symbol was off by a few miles? Jeannie was not used to directing fighters with symbology only targets. In all her work prior to the war, she always had the luxury of a radar return to back up and confirm the target and fighter positions. Now she had nothing but a computer generated symbol which the surveillance personnel said was the location of some bad guys reported by AWACS. For all she knew, she might be driving Todd Blackburn and his wingman as well as the two F-15's on a wild goose chase. Or worse. During the past two days, the radar scopes were full of these "green demons" that appeared and disappeared at will.

"Morpha, Fang 21 flight engaging. Contact on the nose, range thirty". Todd pushed forward on the stick and watched as his speed increased to almost five hundred knots. Both he and his wingman were careful not to engage the afterburner. They might need it later. The F-16s were in loose tactical formation as they headed directly for the contacts called out by Jeannie.

"Bandits"..... The only thing Todd Blackburn could hear now was a loud buzzing sound in his headset.

"Two fo...eight". They were being jammed. The Soviets had found their frequency and were using bursts of electrical energy to disturb ground and air radio transmissions.

On Blackburn's situation display, the enemy aircraft looked like several small pencil marks on a sheet of graph paper. The three marks were all isolated in the upper right hand corner of his display. Todd used his thumb on the control stick to position his cursor over the

targets and "lock up" the first pencil mark. Instantly, the display "blossomed" as the range markers dropped down to a smaller size.

"I got the leader", said Fang 21 as he brought the nose of the F-16 up and pushed in the throttle.

"Roger One, I got the trailer". Fang 22 pulled slightly to the right to off center from his leader, and still hold a good radar picture on the targets. Both pilots, because of their close proximity to one another, could hear each other despite the intensive communications jamming. Suddenly, Fang 21's radar lock on began to deteriorate. 22 started losing his moments later.

"Shit". Todd Blackburn silently cursed his luck as the contacts on his display pulsed, and then simply disappeared.

"21 flight speak...easy now". It was Jeannie. She had given the aircrews the cue to switch to a different frequency in an attempt to elude the jammer station. They did so immediately.

"21's up".

"22's up".

"Morpha, bogey dope". Blackburn raked his jet around to the left in an attempt to reacquire the targets.

"Eagle 02 has contacts three zero, twenty". The F-15's had been moving into position since Jeannie first called out the low targets. They had been affected by jamming, but their more powerful radars were able to "burn through" and see the air situation more quickly.

"Eagle 02, contacts chicks. Targets three zero, eighteen." Jeannie wasn't really sure where the targets were at that moment, but from the way she had told the F-15 pilots that they had acquired the F-16's instead of the bad guys you would never have known. She had positive radar contact on the F-15's[28]. They were high enough that her own slow turning radar could pick them up. Seconds before their call, she had gotten one positive 'cut' on Todd Blackburn's jet. It checked, more or less, with what the F-15 crew called out as 'contacts'. The 'targets' she called out to the F-15 guys were nothing more than a floating piece of updating computer symbology. Jeannie hoped it was right.

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[28]"positive radar contact"- actual radar return from primary sensor in which the controller can distinguish aircraft under her control from all others.

"Fang 21, targets zero two zero, nine".

"Roger Morpha, Judy". Blackburn was telling her that he had responsibility for the intercept and needed no further assistance. Jeannie stopped talking.

"Morpha, bogey dope!" It was the F-15's. They wanted information.

"Bandits bullseye one two zero, fifteen. Chicks in the area". The sweat was running down the back of Jeannie's ears. It felt cold. She hated moments like these! She couldn't see anything on her radar, except the medium altitude F-15s. The whole fight was occurring below her coverage and yet she was supposed to know what's going on.

Ironically, Sentry 01, the AWACS circling at twenty-nine thousand feet, less than eighty miles from where Jeannie sat, had a complete picture of the engagement. The only one on board the Sentry aircraft who was directly concerned about it at the moment however, was a nineteen year old surveillance technician, whose boss had threatened him with everything short of death if he didn't keep a close watch on the low level AOR[29]. He saw the friendly aircraft closing with the targets, but knew from their track numbers, that they were not under the control of anyone on board the AWACS. The Sentry controllers, all five of them, had their hands full in the northeastern portion of the surveillance area. Even if the crew had wanted to, they didn't have the manpower or radios to control all the fighters against the targets the big bird was capable of tracking.

Long ago, the Air Force unilaterally made a decision to do away with data link control in favor of voice only intercepts. The rationale for such a decision centered around the fact that the new generation fighters were capable of much more autonomous operations than their predecessors. Where data link equipped F-106's, 101's, and 102's had small, limited capability radars and relatively inaccurate missile systems, the F-15's, 16's, and to a lesser extent, even the later model F-4's had much more powerful radar acquisition and fire control systems, along with vastly improved armament. Unfortunately, with the demise of

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[29]AOR- area of responsibility

data link, information that had once been passed silently and very quickly to Air Force interceptor aircrews via computer on relatively narrow frequency bands, was now sent by voice. The airwaves became hopelessly crowded as controllers and pilots tried to exchange information.

On the other hand, the Navy never abandoned the data link connection. Its F-18's and F-14's, all had data link systems on board and used them. With some Air Force reluctance, the Navy forced its sister service to equip AWACS aircraft with data link systems that allowed compatibility with Navy fighters and surveillance aircraft. But today, as the 'eye in the sky' circled eighty miles south of the fight, those data link systems were in stand-by mode and of no use to any of the participants in the air battle, least of all, Lt. Daryl Marks in Fang 22.

"Fang 21, fox two, kill, heading west. Say position Fang 22". Todd Blackburn was pulling almost six g's as he tried to get the nose of his aircraft pointed in the direction he thought the rest of the enemy formation was headed. He barely had time to watch the SU-24 he had just hit with a sidewinder missile start to disintegrate as fuel spilled out of the ruptured tanks and turned the wounded bird into a slow spreading blur of flaming metal and plexiglass.

"Fang 22, say your position". Blackburn twisted around in his seat looking for his young wingman. It wasn't like Daryl not to be camped right on Todd's wing. "Morpha, snap vector for 21 to 22 please."

Jeannie's voice came up weak and broken on the radio. "Fang 21, negative contact on 22." Jeannie hadn't seen either F-16 since they tangled with the Su-24's down in the weeds. She had been busy giving bullseye calls on a new package of medium altitude targets that had penetrated her area. The F-15's had already brought two of the intruders down with Sparrow missiles and were now in a turning fight with the MIG-29's that had been flying top cover for the penetrating bombers. Neither set of fighters had the advantage here, but the lead F-15 managed to get a snapshot gun kill on a MIG as the red pilot tried to 'bug out' of the fight and head back east. Things had not gone as well for Daryl Marks.

His F-16 had impacted the earth almost five minutes earlier. Daryl never saw the MIG-29 that killed him. He was busy trying to get up enough "smash"[30] to find a firing solution on an accelerating Fencer, and at the same time, keep an eye on his leader, when the MIG-29 made a clean, vertical conversion from eight thousand feet, and stuffed the young lieutenant and his $20 million dollar electric jet with a heat seeking missile. Days would pass before tapes taken from the AWACS would reveal the engagement in all its gory detail, and help explain the debacle that occurred at Morpha some nine minutes later.

"Morpha, Fang 21, we need SAR[31] eight miles west of Point Charlie. One Bravo, Charlie remaining, Bingo, plus four hundred." Todd Blackburn was telling her he had one heat seeking missile and 20mm ammunition remaining and that he was almost at minimum fuel. He wouldn't have much time to loiter at his present position.

"Roger Fang 21, notifying SAR at this time." The realization that a jet under Jeannie's control had gone down hit her hard. "At least it wasn't Todd", she thought. "At least it wasn't someone I know", she mumbled to herself as she marked in grease pencil a spot on her scope at the approximate location Lt. Daryl Marks augured in[32]. Jeannie turned to her technician, a young, wide-eyed airman, not six months out of basic training, and said, "tell the senior director we've lost a bird and need SAR." It was the last words she ever uttered.

The 3000 kilogram high explosive bombs carried by the Fencer Lt. Marks couldn't quite catch, tore through the canvas and rubber control and reporting center, and in less time than it takes to blink an eye, obliterated it. The TPS-43E radar, located a quarter of a mile from the control center was knocked on its side from the concussion of ripple charges on the bombs. Everything was on fire, and a thick, black, acrid

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[30]"smash"- airspeed

[31]SAR- search and rescue

[32]"augured in"- Air Force slang for crashing into the ground.

smoke rose into the air from the combination of canvas, kerosene, ammunition, and flesh.

The destruction of the ground radar had been a lucky event for the bomber pilot. He had never intended to take out the radar. His target set included it only as a secondary priority. The real objective was the Message Processing Center or "MPC" as the Americans referred to it. The small cluster of two and one half ton trucks and innocuous tents that housed this critical NATO resource was something the Soviet authorities wanted destroyed. With Morpha and its MPC gone, the Americans would have only three remaining MPC's for worldwide use, and only one in Europe. This would drastically limit the exchange of air data and make the AWACS information almost unavailable to the earthbound NATO air commanders. With time and a little luck, the Soviet commanders could pick their way around the pockets of operational radar and intelligence units and exploit weaknesses in the air defense network. Divide and conquer. It worked before. The Soviets were confident it would work again.

CHAPTER 9

RECOVERY

"Colonel Beyers, we've lost the link with Morpha. We're trying to raise them on voice channels as well, but so far, no luck." Margaret Jennings brushed back a loose strand of hair and stared into the radar screen as she talked with the colonel. Things hadn't been going well since they took off this morning from Ramstein Air Base and made their way to the initial orbit point. Twice they had been pulled off station, and now Teapot had them camped over a Patriot missile engagement zone.

At least the link with the grunts manning those missile sites was up and running. Colonel Beyers told her to make that link her first priority and she did. He even detailed one of his controllers to establish voice contact with the Patriot fire direction center (FDC). Every time the AWACS made a heading or altitude change, the controller would tell the FDC, just to make certain the Patriot's software didn't mis-identify the Sentry as a "hostile" and automatically engage it.

That very thing had happened in the northern area at the outset of hostilities. A NATO E-3 was shot down by its own Patriot unit, despite the fact that the entire air defense network, including the unit that shot it down, was carrying the aircraft as a "friendly". Circumstances surrounding the shootdown were still a little fuzzy, but this much was known; when it destroyed the AWACS, the Patriot battalion was at full alert, hostiles had ingressed the area several minutes earlier, and the target acquisition system was in the "automated" mode. No satisfactory explanation of what caused the shoot-down had yet been given to the guys flying the line, but rumor had it that the E-3 was in a turn when it was shot down. Speculation was that the aircraft's antennas which sent out the coded selective identification pulses to interrogating radars were blocked just long enough for the Patriot software to mis-identify the big bird as an immediate threat, and automatically assign <u>two</u> missiles to take it out. In any case, to say that Lt. Col Bert Beyers wasn't

happy about being put in the middle of a Patriot engagement zone was to understate the obvious...

"Oh shit, some of Morpha's fighters just checked in on AICC[33]." Beyers kept talking, but was looking at the weapons sections as the controllers scrambled to accommodate the additional load. "It doesn't look good Margaret, but keep trying. I'll get a hold of Teapot and see if they know anything. Meanwhile, watch the Patriot link closely. It's getting real hot out there kiddo. Don't let us down." Beyers punched in the intercom and got the line to Teapot. It took a while before it activated, and once answered, he had to wait several more minutes for the Sector Controller to come on the line.

"Sector Controller here."

"Teapot, this is Lt. Col. Beyers, Mission Crew Commander, for Sentry 01. We've lost our link to Morpha and several of their fighters have checked in on our frequencies. Do you have any word on their status?"

"Nothing confirmed, but they're off the air. We don't even have them on the bat phone[34]. I suggest you pick up what you can of their fighter load and start shipping us your air picture, direct. We won't be able to send it anywhere, but at least the general will be able to see what's going on out there."

"Okay Teapot, I'll get my ASO working on the link right away. Have your folks ready. By the way, how many controllers can you give us to fight with?"

"Say again?"

"I said how many controllers can you give us to help with the fighter load? We can't possibly pick up Morpha's surveillance and weapons load and still handle our own stuff."

"Sentry, we don't have any control capability here. You're going to have to pick it all up. There isn't anyone else."

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[33]AICC- airborne intercept control common. A frequency used by fighters when they are trying to find a control site to work with but do not want to intrude on Guard channel.

[34]bat phone- slang for the four wire tactical phone network that links the mobile ground sites to each other as well as subordinate and higher headquarters.

Lt. Col. Beyers couldn't be blamed for not knowing that Teapot was unable to control fighters, or that they were entirely dependent on outside sources for an air picture. As an AWACS mission crew commander, he flew and operated all over the world. Since there was no such thing as a "standard command and control package" in any theater, he had gotten used to the hodgepodge set ups, and was content to merely "hook in" wherever the operations order told him to. Despite his expertise in the C2 arena, Burt Beyers, like many others in the tactical control business, was not aware how utterly fragile and limited most air defense networks really were. He, and his crew would soon find out.

TSgt. Emil Johnson threw down his headset in disgust. "These boys don't know about nuthin, and they sure don't know sheeit about linking up with us." The quiet Southerner seldom ever showed any kind of emotion, so his sudden outburst was a matter of immediate concern to all those around him.

"What's the problem Emil?", asked Captain Jennings. She had just finished talking with the weapons sections about opening up the radar for better coverage down low.

"Maa'm, I cain't get anyone down at Teapot who knows a damn thing 'bout link activation! Seems the only way those boys ever got our data before was through the message processing center (MPC) at Morpha or that other damn radar unit up in No'thin Germany. And the real frostin' on the cake is that the guy I'm talkin to now says that even if'n they cain get the link runnin', they cain't send it nowhere cuz the system they got is only one way. No transmit, no translation, no nuthin'. Now who 'cept the US government would be so dumb as to buy something like that?"

"Have him strip the cryptos on his end and re-key them twice before we send again. You do the same thing up here. If that doesn't work, let me know right away and I'll ask Col. Beyers for permission to send the air picture in the clear to them."

"In the clear, Maa'm? We cain't do that. It's not procedure."

"Sergeant Johnson, we'll do whatever it takes. Understand? Whatever it takes."

"Yes Maa'm." Emil stared at Captain Jennings as though he was seeing her clearly for the first time, and then turned and put his headset back on. "Teapot, this here's Sentry 01. Okay boys, let's re-key and..."

Major General Pete Smith, the Sector Three Commander, was not a happy man and he was not at all concerned who knew it.

"Geezuz Christ, you mean to tell me that we've lost the whole goddamn picture?"

"Yes sir", said the unlucky operations colonel whose job it was to keep the general informed on such matters.

"Well, when are we going to get it back?"

"I don't know sir, they're working on it now."

General Smith pushed his chair back from the table. It made a small scraping sound as the wooden table rubbed against the thick plate glass that lined the battle cab. Other than that sound, the room was quiet, despite the large number of people in it. The large screen display that showed the entire Central Region air situation was entirely devoid of tracks. The screen's brightly colored background maps seemed to make the moment even more intolerable and ludicrous.

"Tell me one more time why with all the hardware and people you have out there that you can't give me an air picture. Are all my ground sites destroyed?"

"No sir."

"Are my AWACS gone?"

"No sir."

"Is the comm out?"

"Some of it, yes sir."

"Is that the reason I don't have an air picture?"

Colonel 'Stitch' Yastraski, the operations officer, stared at the blank screen as though he hoped for some miraculous reappearance of the missing picture, while he organized his thoughts and fumbled for an answer. Truth was, he didn't have one. Like the general, Stitch was a command pilot with almost four thousand hours in F-4's. Until he was picked up on the Colonel's list two years ago, he couldn't spell 'tactical operations center'. Now he was in charge of one.

"General, my people tell me that when we lost the control and reporting center at Lauda two days ago, our direct link with NATO went with it. We were using the MPC at Morpha until it went out, and now we're in the process of establishing a direct link with the orbiting AWACS. Until it comes up, sir, we don't have an air picture." Colonel Yastraski stopped talking. Everyone in the room, including the General was staring at the display screen. A few tracks were starting to trickle into view. They all had AWACS track numbers. The link had been established. In a matter of minutes the track count had built up to almost a hundred and was still climbing when the General spoke.

"Okay, it looks like we're going to see this thing after all, but we still got big problems. What's the status on lane caps[35]?"

"Sir, the two German CRC's still operating are working fighters in the southern area. Here in the central part we have only one AWACS and he's about to go off station in less than an hour"...

General Smith stiffened, "Why is he going off station?"

"He will be at minimum fuel sir."

"Well goddamit, where is his replacement?"

Colonel Yastraski nervously fumbled through the sheaf of papers he had brought with him to the meeting, but said nothing to the General.

General Smith stood up and looked directly at the him. He spoke slowly and deliberately, without emotion. "Colonel, I have over five hundred aircraft airborne at this moment, with almost a third of them on offensive missions east of the FEBA[36]. Are you telling me that we can't maintain an air picture here to monitor those aircraft?"

"Sir, we're trying to get a relief bird, but..."

"Sir, Colonel Yastraski's right. We've been trying to get a replacement bird for Sentry 01 since he took off this morning, but unless you call the CINC it ain't gonna happen." All eyes turned to the back of the room, and focused on the overweight captain in baggy, sweat-stained combat fatigues, who had made the comment. "The Colonel's talked to everyone he could sir, but the truth is that unless you

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[35]"lane caps"- areas assigned to fighters for combat air patrol.

[36]FEBA- Forward Edge of the Battle Area. That area where the ground troops are in direct contact with enemy forces.

convince General Ernst that we need it, we don't have a spider's chance in hell of getting it."

"That's enough Captain Carter", said the Colonel in a low voice.

"Why wasn't I informed of this before?", asked the general.

"Because Sir, I didn't think it was important enough to warrant your attention. We had an air picture up until recently, and the team at SHAPE[37] assured me they were doing everything they could to get us a bird. Besides, I really don't think we need an air picture."

"What did you say, Colonel?", asked General Smith somewhat incredulously.

"Sir, with all due respect, I don't think you really need an air picture here. At least not one like you have now."

Smith looked as though he were going to say something caustic and sharp, but instead, changed his mind, and muttered, "continue".

"Sir, your operations are divided into offensive and defensive cells. My offensive counterpart, Colonel Sturk and his people never even look at the air picture, or consider it at all in their air campaign planning. Why not? Because they can't make heads or tails out of it that's why. They couldn't track outbound F-16's, Toronados, or F-111's anymore than fly to the moon! And we can't do it either, sir. If it was all together, if it was a real air picture with clearly marked aircraft and missile systems, it perhaps could be of some use to us, but not the way it is." The Colonel paused to look up at the air display and turned back to General Smith. "Sir, right now this thing shows one hundred ninety three tracks in the system. I know that's wrong and so do most of the operators in here. AWACS is probably painting a thousand tracks and simply can't get them down to us fast enough. And even if they did, what could we do with them? We don't have any control capability here. Our links with the SAM systems are so poor as to be useless. As far as control of the defensive air war sir, we're nothing more than a pimple on the ass of progress." Colonel Yastraski stood staring out into space, not looking at the general. He surprised himself with the candor of his speech and was awaiting the backlash.

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[37]SHAPE- Supreme Headquarters, Allied Powers Europe. Senior headquarters for NATO. Has direct control of "special assets", including those AWACS assigned to NATO.

"You done."

"Yes sir, I'm done."

"I'm only going to tell you this once, and I want you all to remember it. We're in a fight with an enemy that's every bit as intelligent and capable as we are. He knows many of our weaknesses and almost all of our strengths. It's stupid to fight him blind if we don't have to. Given a choice, I'll fight with one eye rather than none. But let's do it smart. Yastraski, I want your surveillance people to get with that AWACS and have it send us only the key tracks in any raid and any high speed tracks it detects. If I can't have the actual air picture, I want the **sense** of the air picture. Do you understand?" Various heads in the room nodded in unison. "Gezus Christ people, we've got to use what we have! The only friendlies I want displayed are those that are returning across the FEBA." The General pointed a finger at Colonel Yastraski. "You make certain that AWACS is downtelling to those missile batteries every returning friendly it sees." General Smith walked the length of his battle cab and stopped in front of the communications panel. He looked at the technician sitting there. "I want a secure link established between myself and that mission crew commander on board the AWACS. Think you can do that?"

"Yes sir".

The General turned around and looked to the back of the briefing room. "Captain Carter, don't worry about a replacement AWACS. I think General Ernst and I can work that one out."

A broad smile crossed Carter's face. "Thank you General. We'd sure appreciate that."

"Well then, what are you all standing around here for. Go make it happen!"

Pete Smith knew in his own mind that this "jury rigging" of the air picture would not substantially improve his ability to monitor, affect, and direct the air defense network. By now, he understood that the network was not a single, interwoven fabric as some had led him to believe. Instead, he knew it to be a highly fragmented network with many incompatible and unrelated pieces. More importantly, he knew the system was made up of different players, each having only partial

control of air assets. No-one had control over it all. Not him, not even General Ernst as Commander, Allied Air Forces Central Europe. "Damn", he thought to himself, "how could this have gone on so long? How could we end up with such a mishmash of equipment to direct our forces? On paper, everything looks fine. Neat little lines showing who's responsible for what. Christ, I'm supposed to be responsible for fifteen hundred aircraft at twenty-six different locations and a shitload of Patriot and Hawk missiles scattered all over the country side and I can't even order one engagement, let alone direct an entire air battle!" He rubbed his hands across his face. His skin was rough and dry from the stale air in the bunker. His fingers smelled faintly of diesel oil. The tired, old, fighter pilot closed his eyes and thought, "thank God the bean counters and technocrats hadn't been able to screw up the offensive operation as badly as they had the defensive one. It's the only thing that has kept me sane through all of this. Offensively we've done a good job. Hit the bastards where it hurts, every time. Even General Wiseheart, the Seventh Corps Commander has been singing our praises ever since we saved his boys asses up there in the northern sector. Ted Sturman and his guys at the 50th Tac Ftr Wing deserve a lot of the credit for that operation. Geezus, I gave them less than five hours notice to re-role all their aircraft from two of the three squadrons and they managed to pull it off! Talk about interdiction and close air support packages, we really did it that time... But Goddamit, I know how to do that! We all do! You brief, you fly the sortie, hit the target, and come back to do it all again. Here in this bunker, the whole air defense thing is smoke and mirrors! I can't lock up on anything! I can't kill anything! Shit, I can't even see anything most of the time! It's a charade. The whole goddamn thing is just a charade. Nothing more...

"General Smith, we have the AWACS mission crew commander on the line. Do you want to talk with him now? General Smith, sir?"

Smith shook himself out of his reverie and looked up at the earnest young sergeant and nodded. As he reached for the phone, he glanced at the air picture on the large screen display. It was markedly different from the one he had seen during the confrontation with Colonel Yastraski. Whereas the old picture had large numbers of tracks milling

about in allied airspace, and relatively few tracks to the east, this new picture had just the opposite. Hostile tracks, lots of them, all identified by bright red vector lines which varied in length according to the aircraft's speed, were intermingled with a hundred or so friendly "blue" tracks in enemy territory. Most everything was heading west.

"This is General Smith here, who am I talking to?"

"Lieutenant Colonel Burt Beyers, sir. I'm the mission crew commander on Sentry 01."

It struck Smith as odd that the senior officer on board the AWACS was only a lieutenant colonel, but he said nothing. "Beyers, how many tracks are you people carrying?"

"Seven hundred plus, sir. We've got a lot of activity east of your area and most of it is new."

"I see that, but I'm only showing half that many tracks on my screen."

"General, that's about all the link will handle without slowing way down. My surveillance people are prioritizing the down tell to your station and trying to send everything as raids versus individual aircraft. But to tell you the truth sir, I don't know how much longer we can do that for you. It's playing hell with the links we've established with the Hawks and Patriots."

"How much longer can you stay on station?"

"Sir, we're due off in less than an hour."

"I didn't ask that. I asked how much longer you could **stay** on station. There's a difference."

"Yes sir. Radar's good, my guys are a little tired, but if you could find us a tanker I think we could hang on for a few more hours."

"I'll see what I can do. In the meantime, keep those tracks rolling in. Good luck Colonel Beyers."

"Good luck to you General. Sentry One, out."

The air to ground patch went dead, and as Pete Smith hung the phone up with his right hand, he reached for the direct line to General Ernst with his left. "Pete here, General Ernst, I got a real problem...

General Ernst listened patiently to Pete Smith's plea for more AWACS and tanker support for his air defense operation. Truth was, despite

the empathy the old four star felt for his hard charging young subordinate, there wasn't anything he could do for him. "Pete, I don't have it to give to you. There are only have eleven birds in theater and with four in the north and two down south there simply isn't any to spare."

Smith was undeterred. "General, you understand this means the entire Central Region will be without any type of early warning and that I'll be forced to conduct the air battle without an air picture?"

"I understand that Pete, and I'm sorry, but that's the way it's going to be."

"I want to divert a tanker to give the Sentry I have on station a little more playtime. Can I do it?"

"Can you afford it?"

"Can I afford not to?."

"Then I guess you better do it."

"Thank you, sir."

There was a long pause on the line as the crypto gear that scrambled each syllable uttered by either man struggled to keep the link clean and free of distortion. General Ernst watched the people in his bunker rush about the place carrying thick sheaves of paper and handfuls of computer disks. For all the activity, the place was fairly quiet. The only screen available to the General was a thirteen inch tv screen with several "channels" to select different reports. He flipped it to the ground status update and looked at the symbols representing bridge crossings and enemy troop engagements. The FEBA had moved west by almost eighty miles in the last two days. The Soviets were exploiting breakthroughs in the northern area and forcing tanks and equipment into Western territory.

General Ernst knew that unless the allied ground units started to hold, the air forces would be under tremendous pressure to re-role large numbers of their aircraft to ground attack at a time when the could least afford to do it. No-one had yet succeeded in getting control of the air. But the army commanders were getting sick of hearing the cries for "air supremacy at all costs". They wanted support for the ground

forces. They wanted something they could see, touch, and smell, not just Air Force assurances that bombers and fighters were doing their part in the war effort. They wanted this, regardless of the cost...

General Ernst was in a tough spot and he knew it. On one hand, he had to be careful not to let the pressure for more CAS and BAI missions dilute the air supremacy effort. On the other, he had to make certain that the field commanders would not perceive him as 'insensitive' to their needs. The whole problem boiled down to too many targets, too many missions, and too few aircraft.

The line cleared and General Ernst started speaking again.
"Pete, you saw the report on LOCE[38] concerning the Soviet movement across the FEBA and the large deployment of surface to surface missiles up towards the front. Looks like were all going to get hit pretty hard. Be ready for it. The air directive my staff is preparing right now is going to task your folks to go after those troops and missile units over the next two days. Get your weasel packages together and augment them with the folks from the 50th."

"I'd rather absorb the missiles than re-role any of the 50th fighters to that mission. We gotta get control of the air or the enemy is going to pound the living shit out of my airfields and the grunts in the foxholes!".

"I know that Pete, but we've got to show the guys in green that we care, and I'm afraid it's going to take more than a few sorties to demonstrate our sincerity. Besides Pete, I'm not asking you, I'm **telling** you."

"Yes sir. I understand."

"I hope so Pete. I sincerely hope so."

General Ernst softly set the phone back in its cradle. An aide touched him on the sleeve, and said in a low voice, "Sir, they're waiting for you at the decision brief."

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[38]LOCE- Limited Operating Capability Europe. A secure intelligence distribution system used by NATO field commanders.

"Oh yes. Do you have my notes?" Ernst stood up and put his arms in the sleeves of the brown leather flight jacket the aide was holding for him. It was old, and smelled faintly of sweat and expensive aftershave.

"Yes, sir. They're right here", said the aide, pointing with his foot to a nearby briefcase.

General Ernst removed his glasses and carefully folded them. He reached down, snapped open the briefcase, put the glasses inside and closed it. The aide made a motion to pick it up but the general stopped him.

"No, I'll carry it myself."

"Should I take the brick[39], sir?"

"No. I'll take it. You stay here. I want to walk alone. Tell security."

The aide watched as the general made his way to the door. The old man, although tired, still walked with just a hint of swagger. In his flight suit, he looked much younger than his years. Only the tufts of thinning white hair sticking out from under his flight cap and the four glittering stars near its front hinted at the truth about this aging warrior.

"Security? General Ernst is on his way up. Advise your people..."

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[39]"brick"- portable two-way radio

CHAPTER 10

LESSONS LEARNED

United States Air Force tactical command and control can best be described as a conspiracy of ignorance. Over the years, good and great airmen alike have turned a deaf ear to the problems associated with establishing comprehensive tactical control of air assets. The fictitious Major General Pete Smith is not unlike many of the top notch fighter pilot generals serving in the Air Force today. They are the ones, the only ones, who will ever command fighter and tactical bomber assets in peacetime or war. With four thousand, five thousand, or maybe even more hours of flying time, they know a great deal about aircraft and guns, missiles, and bombs. But they often know next to nothing about the systems used to direct and control these weapons of war.

Generals are not lieutenants. Perhaps that's part of the problem. No-one is afraid to ask a question as a young lieutenant. Even a "stupid" question, although embarrassing, is asked when necessary. "What's the G limit with tanks? What happens if they won't separate from the aircraft? What can I do if all I've got left is one lima (heat seeking missile) and the guy I'm chasing disappears into a cloud bank?" Memories of thousands of questions asked hundreds of times, coupled with years of flying, make our fighter pilot generals aviation experts. It is not hard for them to separate truth from fiction in the flying world. They've been in the pattern long enough to know.

However, these men enjoy no such advantage when, as a theater or a tactical commander, they are faced with the daunting task of trying to understand and operate entire command and control networks. Probably one of the first things that strikes them (i.e. new theater and tactical commanders) is that despite repeated assurances from staff "experts" that everything is alright, no-one they talk to is an "expert" on the whole system. Everybody has a piece of the system, but no-one is responsible for understanding the operation of the whole thing. No-one

that is, except the brand new theater/tactical commander who has never dealt with anything like it before...

Why is that? **There can be no total system experts because there is no total system integration.** There are only independent and sometimes interrelated command and control, intelligence, and communications assets that are thrust together to form an amorphous bag of "C3I" tools for use by battle commanders and their staffs. The scenario attempted to illustrate this fact by showing how each piece of Major General Smith's command and control network operated with little knowledge of or connection with the other pieces in the network.

AWACS pumped out tracks to anyone whose cryptos linked up and fit on a distribution net. The fixed sites controlled fighters and "nominated" targets for surface to air missile units with which they had communications. The missile units took what they wanted and ignored the rest. The mobile radar units controlled fighters and exchanged data with other units only so far as those units could format data in a manner compatible with their equipment. Even people within General Smith's own facility fought two separate wars, one for the defensive battle (the Sector Operations folks) and one for an offensive battle (the Allied Tactical Operations Center folks). The point is that all these people were fighting the same war with significantly different understandings of what the air situation actually was.

Interestingly enough, the scenario pointed out that people with the greatest responsibility executing the war, often had the least information about it. The mission crew commander (a lieutenant colonel) on board the AWACS knew far more about the air threat than did the general in the ATOC. And as bad as the air picture was for the two star general in the ATOC, **at least he had an air picture.** His four star boss did not.

That is not to say that general officers in situations similar to those encountered by our fictitious Major General Smith did not attempt to change things and make them better. On the contrary, the Air Force

has littered the world with "theater unique" equipment stuck into every nook and cranny of control facilities everywhere. It is almost a rite of passage for these leaders. Every new theater commander makes it his business to "personalize" the C3I arrangements to suit his needs. The overwhelming urge to do so is understandable. As the "new guy" he is appalled at how poor his tools are to disseminate air tasking orders, to view the battle, to receive intelligence information. He is convinced he can fix it all, or at least get it moving in the right direction if only he can talk to a couple of his general officer counterparts that handle these kinds of support issues.

His first surprise is that when he calls on the Air Force Command and Control directorate, he finds a **communications** general in charge. Most of the folks on this general's staff don't know very much about tactical operations. Their specialty is long haul communications and base level automation. A more frantic look to turn someone up in the "brotherhood" to help him, leads to the intelligence folks. They lend a sympathetic ear and quietly explain that their business is quite different from his. They will support him through any number of interface devices and can give him even better information if only he will build additional sensitive compartmented information facilities (SCIF's) and hire on a few more intel types.

Of course the theater or tactical commander's problem is that he needs an integrated tactical command and control **system**, not just an intel node or a new set of secure telephones. He needs to find somebody that knows how to do those kinds of things. They aren't around. At least not in the general officer corps. The closest our theater commander can get is a worn out full colonel or lieutenant colonel weapons controller with lots of experience handling these kinds of issues and no budgetary power to change them. Normally however, the commander turns instead to his intelligence and communications friends in the "brotherhood", who promise help, and deliver lots of phones and computers instead...

The good thing for the individual theater or tactical commander is that his tenure at the war fighting facility is usually short and although he is often forced to live with whatever his predecessor dreamed up, he is content with the knowledge that someone else will benefit from his painstaking efforts to "improve" the system- however incompatible the computers, the phones, and the data they cycle...

The bad thing for all concerned, is there is no single "belly button" to push when it comes to tactical command and control. The theater and tactical commanders have no **one, authoritative, responsible, and competent person** to turn to on matters of tactical command and control. Instead, they are forced to piece the picture together for themselves. Usually with very poor results.

The ability to fashion a functional C3I network out of its many parts is more art than science. It requires people intimately familiar with the operational side of warfare and at the same time, knowledgeable about the hardware and software tools that make such warfare possible. What is sought here is not another garden variety technician, but rather an inspired and enlightened command and control problem solver, who like the fighter pilot theater commander he serves, is a bona fide warrior.