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CHALLENGES FOR THE OPERATIONAL LEADER INTEGRATING CIVIL
AND MILITARY AIR TRAFFIC DURING OPERATIONS OTHER THAN WAR

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Maritime Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

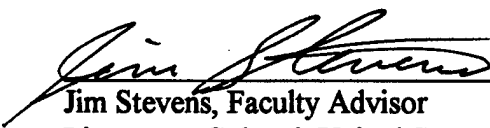
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Abstract of

**CHALLENGES FOR THE OPERATIONAL LEADER INTEGRATING CIVIL AND
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Air traffic control must be fully integrated in a theater of operations to enable an operational commander to most effectively achieve tactical, operational, and strategic aims. The international aviation environment is increasingly complex and unreceptive to military operations perceived as jeopardizing safety or infringing on airspace access. Integrating air traffic during operations other than war (OOTW) is particularly problematic due to the high volume and complexity introduced by civil aircraft in a more permissive environment. Aircraft mishaps involving civil aircraft are so visible that a single incident can damage the credibility of the United States and legitimacy of an operation. A global movement led by the International Civil Aviation Organization, affiliated with the UN, is aggressively addressing international aviation safety problems—including the perceived dangers and intrusiveness of military aviation. A lack of understanding and focus on air traffic functions contributed to the Black Hawk fratricide incident during Operation Provide Comfort, resulted in inadequate situational awareness during Operation Desert Storm, and inadequately prepared AWACS to handle the complex and evolving airspace over Bosnia-Herzegovina. Fully integrating military and civil air traffic in a theater of operations can improve the operational commander's ability to shape the battlespace, achieve unity of effort, reduce fratricide, respond more effectively to evolving conditions, and positively influence international opinion.

CHALLENGES FOR THE OPERATIONAL LEADER INTEGRATING CIVIL AND MILITARY AIR TRAFFIC DURING OPERATIONS OTHER THAN WAR

Introduction

Today's international aviation environment is one ripe for turning tactical events into strategic problems--aviation mishaps are magnets for world attention, scrutiny, and lawsuits--baggage that an already burdened operational commander does not need. Exigency would seem to subjugate civil aircraft to military necessity and make deconflicting air traffic in an area of operations a "non-issue." This is largely the case when hostilities are so dangerous that civil air traffic is virtually excluded as happened in Operations Desert Storm, Provide Comfort, and Southern Watch. The permissive environment of operations other than war (OOTW) makes air traffic management more complex while requiring more restraint--all in a fishbowl where even a tactical event can appear on CNN and suddenly take on strategic importance.

Unfortunately, the tragic mishap on 3 February 1998 in Cavalese, Italy where a US Marine Corps EA-6B Prowler sliced through a wire and killed 20 people illustrates this all too clearly. During his homily for the Cavalese mishap victims, Rev. Lorenzo Caserotti captured world sentiment saying "The skies are for everyone, not only for the powerful and arrogant who believe themselves to be the masters of the lives of others."¹ His comment illustrates the increasing visibility of individual actions of US forces and the lack of tolerance in the international community, even among our staunchest allies, for the perceived irresponsible and callous use of power. The intense and visceral backlash of this mishap spawned mistrust and a crisis in relations between the United States and Italy.² Low altitude training, essential to maintaining combat skills for the area, has been curtailed; legal claims are already being discussed; and politicians are demanding that all seven US bases in Italy be closed.³

¹Vera Haller, "Italian Town's Deaths Stir Bitterness, Demands for Answers," *Washington Post*, 6 Feb 1998, p. 38.

²William Drozniak, "Cable Car Disaster Strains U.S.-Italy Relations," *Washington Post*, 6 February 1998, p.1.

³Ibid.

Much attention is focused on the pilot who might have been "hot-dogging", but every area impacting flight safety will be scrutinized during the investigation--including air traffic control that designed and maintains the low level training route where the mishap occurred. Just as a lack of emphasis on air traffic functions was a contributing factors to the "Ron Brown" crash in Dubrovnik by failing to identify an incorrectly constructed instrument procedure, negligent air traffic oversight may also have contributed to the Cavalese mishap by failing to ensure safety and accuracy. Civil air traffic will be there whether we like it or not and with it comes the expectation that world's superpower will responsibly prevent "collateral" damage in the air.

It is also essential that air traffic control services be fully integrated within the combat airspace zone to provide freedom of action while concurrently reducing fratricide. Had there been a crewmember on board the AWACS over northern Iraq with air traffic control skills, the tragic shootdown of two Black Hawk helicopters could have been averted. Operational commanders must understand both the international environment and the pervasive role of air traffic in a theater of operations to ensure that it is an integral part of planning and execution. Only then will the operational commander be able to use this unique part of air command and control to shape the battlespace, synchronize operational functions, increase unity of effort, reduce fratricide, be more responsive to evolving enemy and friendly conditions, and favorably influence international opinion.

The International Air Traffic Picture

Whether conducted in domestic or international airspace, complete integration of civil and military air traffic is necessary during OOTW. The integration of air traffic in domestic airspace (i.e., sovereign airspace of the United States) during military contingencies is firmly regulated with standing procedures and centralized oversight courtesy of the Federal Aviation Administration (FAA). This environment effectively segregates participating and non-participating aircraft and automatically provides the operational commander with unity of effort, flexibility, and safety of flight. While the domestic and international air traffic environments share

many similarities, some aspects of the global air traffic environment are unique and make planning and executing combat airspace in OOTW problematic for operational commanders.

Air traffic systems and regulations vary with each foreign state. The International Civil Aviation Organization (ICAO), affiliated with the UN, was established after World War II to standardize aviation procedures worldwide in the interest of safety and commerce, but no consensus could be reached to require compliance.⁴ ICAO provides international standards and policy for aviation, but its charter is not binding and provides no regulatory authority. The result is that no two countries have identical "rules of the road" for air traffic systems, not even among the current 185 ICAO members, including the United States.⁵ The resultant conflicts, inconsistencies, and inadequacies that have developed over the years are becoming more apparent as cross-border involvement and air traffic increases worldwide.

Safety varies significantly with the country or region; for example, third world nations operate only 12% of the world's air carrier fleet but have an accident rate ten times higher than that of developed nations.⁶ One-fourth of all nations evaluated in a recent ICAO study do not have an aviation authority and, of those that did, only half were considered to be effective.⁷ To add to the problems of the struggling global air traffic system, the volume of air traffic continues to increase at 8% annually; over 10,000 aircraft are in flight at any given time today.⁸ Regions of Africa, Asia, and the Pacific Rim have the highest increases in annual traffic volume--up to 120%--yet they have the least capable air traffic systems and are among the most unprepared areas to handle the increases.⁹

⁴James Ott, "Open Skies Haunts Chicago Convention," *Aviation Week and Space Technology*, 31 October 1994, p. 46.

⁵James Ott, "ICAO Stresses Safety Compliance," *Aviation Week and Space Technology*, 2 June 1997, p. 35.

⁶James Ott, "Civil Aviation Directors to Explore Expanded Safety Role for ICAO," *Aviation Week and Space Technology*, 18 August 1997, p. 41.

⁷Ibid.

⁸James Ott, 31 October 1994, p. 46.

⁹James Ott, "ATC Upgrade Mapped for Africa," *Aviation Week and Space Technology*, 2 June 1997, p. 35.

In 1995, ICAO realized that the global aviation environment had serious safety problems and began an aggressive campaign, the Safety Oversight Program, to address these concerns.¹⁰ Since the inception of this program, international concern has been substantially heightened for any area that could impact the safety of civil aircraft. The varying abilities of countries' air traffic systems to effectively integrate the volume and complexity of a military operation within their sovereign airspace coupled with the increased international sensitivity toward the inherent dangers of doing this increases the difficulty and risk for an operational commander in establishing a combat airspace zone.

In the past, the lack of enforced international standards gave US armed forces almost complete discretion in shaping combat airspace and interface with civil authorities. However, this is no longer the case. Today's international aviation environment demands that military operations have the least impact on non-participants, particularly when vital interests are not perceived to be at stake. Yet, neither the global environment nor the potentially strategic impact of air traffic functions in combat airspace is fully understood by operational commanders. Recent incidents where US armed forces inadequately addressed air traffics issues contributed directly to the world-wide decrease in tolerance for military operations perceived as dangerous to civil aviation.

Military vs. Civil Traffic

Two incidents involving military forces shooting down a civil air carrier coalesced world opinion and prompted action to regulate the interface of civil and military air traffic during hostilities. The first incident was on September 1, 1983 when Korean Air Lines Flight 007 strayed into Soviet airspace and was shot down by a Soviet fighter plane, killing all 269 passengers and crew. An international flail with the highest visibility ensued over legitimacy, responsibility, and compensation that remains unresolved 15 years later.¹¹ As a result of a UN

¹⁰James Ott, "ICAO Stresses Safety Compliance", 2 June 1997, p. 35.

¹¹Sompong Sucharitkul, "Procedures for the Protection of Civil Aircraft in Flight," Loyola of Los Angeles International and Comparative Law Journal 16 (February 1994): 535.

sponsored investigation, ICAO amended its charter (Article 3 *bis*, also known as the Montreal Protocol of 1984) to forbid the use of military force against civil aircraft.¹² Although most states recognized that customary law already prohibited this action, the amendment is the first sign of unified action by the international aviation community addressing military action with regard to civil aircraft.

The second incident was on July 3, 1988 when the USS Vincennes shot down Iran Air Flight 655 (IR655) in the Persian Gulf with surface-to-air-missiles. Both the US Navy and ICAO investigations of the incident concurred that the *Vincennes'* captain perceived that IR655 displayed hostile intent and that he had acted in self-defense.¹³ The accident was caused by misidentification of the aircraft and much of the information that could have assisted in flight identification was routine air traffic control information (ATC).¹⁴ According to the Report of Investigation, IR655 was on its scheduled airway, flying a normal climb profile, and correctly squawking IFF code/mode.¹⁵

There was no coordination between United States warships and civil air traffic facilities responsible for services within the various Gulf area flight information regions.¹⁶ The only information shared with civil air traffic agencies were periodic "alert status" updates (normally, once or twice daily). On July 3, 1988 there was no red alert status in effect that would have suspended civil air traffic clearances temporarily; civil ATC units were unaware of any US Navy activities at sea.¹⁷ The flight was delayed approximately 20 minutes and the *Vincennes* was unable to determine that this had occurred using only the information on-hand. Flight progress information from the ATC system was not available to assist in identification. US ships were not equipped to monitor commercial ATC frequencies, the crew was unaware that most commercial

¹²Ibid, p. 518.

¹³"Excerpts from Report of ICAO Fact-Finding Investigation Pursuant to Decision of ICAO Council of July 14, 1988," *The American Journal of International Law*, Vol. 83 (1989), p. 335.

¹⁴Ibid, p. 334.

¹⁵Ibid, p. 335.

¹⁶Ibid, p. 334.

¹⁷Ibid, p. 333.

aircraft are not equipped to receive the UHF distress frequency on which they were attempting to hail IR655, and the flight did not respond on the VHF distress frequency.¹⁸ Although IR655 was on its assigned airway, the *Vincennes*' crew did not understand the actual airway dimensions and interpreted variance from centerline as being "off" the airway when it was not.¹⁹ Had there been direct communication between civil air traffic and military agencies or had the *Vincennes*' combat information center (CIC) had resident knowledge to correctly interpret what air traffic information they had in a timely manner, this tragedy could have been avoided.

The *Vincennes*' shootdown of IR655 was not the only incident where civil/military interface was a problem in the Persian Gulf, just the most visible. There were two other incidents in the Persian Gulf during the same month of the IR655 shootdown where civil air traffic was put in jeopardy. In both incidents, US. warships attempted to divert civil aircraft without first consulting the air traffic facility controlling the aircraft.²⁰ In one incident, the USS Halyburton attempted to divert a British Airways flight into Dubai without consulting the air traffic facility controlling the flight. If the flight had complied with the instructions, it would have turned directly into the flight path of a departing aircraft--a good way to ensure a midair.²¹

The IR655 incident was a tragedy for everyone involved. The United States suffered a loss of credibility and legitimacy and the incident solidified the international civil aviation community's effort to contain military actions that could jeopardize the safety of civil aircraft. ICAO again amended their charter, this time targeting "...military actions potentially hazardous to civil flight operations...".²² In this amendment, ICAO called on its member states to pursue optimum functioning of civil/military coordination, to include direct communication between military units and civil air traffic units for the exchange of real time flight progress information,

¹⁸Ibid, p. 334.

¹⁹Ibid.

²⁰Davis Schulze, " Air Experts slam US Gulf action," *New Statesman and Society*, 22 July 1988, p. 7.

²¹Ibid.

²²Sucharitkul, p. 532.

delays, and non-scheduled flights.²³ Another significant action reflecting a shift in global opinion was ICAO's unanimous acceptance of their first strategic plan, which changed ICAO's role from simply recommending standards to that of enforcing them.²⁴ For an operational commander, this is a double edged sword. The aviation operating environment will probably be safer, but accompanied by more restraints and regulations that will be enforced by an international regulatory authority.

Reducing Fratricide

While the IR655 shootdown illustrates the impact of a lack of integration and understanding of civil air traffic in combat airspace, an examination of the shootdown of US Black Hawk helicopters in northern Iraq during Operation Provide Comfort (OPC) illustrates that these functions are also essential to reducing fratricide. On 14 April 1994, two Air Force F-15 fighters under the control of an Air Force airborne control plane (AWACS) accidentally shot down two US Army Black Hawk helicopters in northern Iraq, resulting in the loss of 26 lives. The Black Hawk mission was added late in the planning cycle and did not appear on the air tasking order (ATO).²⁵ When the mission checked in with AWACS it was, therefore, handled as an unscheduled mission. AWACS was the sole air control authority for civil and military aircraft in the Tactical Area of Responsibility (TAOR) over northern Iraq. Since there was no functioning air traffic system in the TAOR, they provided these services by default in addition to other aviation command and control functions. The lack of information exchange between crew members contributed to the mishap; AWACS crew members had been in contact with the Black Hawk mission using voice and IFF, but failed to coordinate between positions and lost situational awareness.²⁶

²³Ibid, p. 533.

²⁴Ott, "ICAO Stresses Safety Compliance," 2 June 1997, p. 35.

²⁵United States European Command, *Air Forces in Europe Aircraft Accident Investigation Board Report: US Army UH-60 Black Hawk Helicopters 87-26000 and 86-26060*, Vols. I, 27 May 1994, p. 2.

²⁶Ibid, p. 5.

The mission of the AWACS in OPC was identification, threat warning, and airspace control in and around the TAOR.²⁷ The crew had no air traffic experience, no related training was provided in theater, and no air traffic control personnel were on the crew.²⁸ This would not appear to present a problem since civil air traffic was greatly constrained by the threat situation. However, basic air traffic control (ATC) procedures and skills, such as a more crew oriented focus and the more exacting communication checks and balances of the positive control environment, would have created an environment less likely to have "lost" an aircraft under its control. Conditions required the AWACS to handle a hybrid mission performing diverse combat and peacetime traffic management functions without the benefit of training for both roles.

Subsequent examples demonstrate that air traffic is still not fully integrated to effectively attain objectives and ensure flight safety. Although more problematic during OOTW due to the higher volume of non-participating aircraft, integration of air traffic must be achieved in all operations. Desert Storm and Deny Flight (later, Joint Endeavor) in Bosnia both raise concerns over the adequacy of deconfliction of civil and military traffic in the combat airspace zone.

Integrating Air Traffic in the Combat Airspace Zone

In Desert Storm, US warships in the Persian Gulf received the air picture from ground control units such as the USMC Tactical Air Operations Center (TAOC), providing a less robust air picture than one from AWACS.²⁹ Naval ships in the Persian Gulf had no direct contact with civil air traffic agencies and developed their own picture of the commercial traffic flow by scanning ATC frequencies and matching information to tracks depicted in the CIC.³⁰ The tactical controllers aboard ship were creative in making the best with what they had, but the lack of direct

²⁷Ibid, Vol II, p. 8.

²⁸Ron Weigan, Operations Officer, 552nd Training Squadron, 552nd Air Control Wing, Air Combat Command, United States Air Force, Tinker AFB, telephonic interview, 29 January 1998.

²⁹Larry Di Rita, "Exocets, air traffic, and the Air Tasking Order," *U.S. Naval Institute Proceedings*, August 1992, p. 60.

³⁰Ibid.

contact with ATC agencies did not provide a clear picture of the civil air traffic picture.³¹ Although there were no major incidents involving civil aviation, the lesson from IR655 of the necessity to fully integrate all air traffic in a theater of operations had evidently not been learned. Had there been an incident, such *deja vu* could have devastated national strategic interests such as maintaining coalition cohesion, public support at home, and legitimacy.

The airspace over Bosnia-Herzegovina is perhaps the best example of the difficulties faced in OOTW. Restrictions on the airspace increased from a general ban on military flights as a confidence building measure at the 1992 London Conference to a complete ban of all aircraft with authority to use ... "all necessary measures...to ensure compliance..." in UN Security Council Resolution (UNSCR) 816.³² While UNSCR 816 remains in effect, the airspace environment has become and will continue to become more permissive as national economic recovery accelerates. AWACS has been the sole authority controlling the airspace as threat conditions and traffic have changed.³³

Once again, airspace in the OOTW environment became a "hybrid" of combat and peacetime functions, arguably the most complex encountered to date. AWACS controllers experienced difficulty handling the diverse, dense mix of traffic that included combat search and rescue helicopters, tactical aircraft, and unarmed aircraft such as UN support flights. Once again, AWACS controllers discovered that they needed to integrate air traffic functions with tactical functions to maintain safety and respond to rapidly changing combat situations in this demanding environment.³⁴ Unexpected tactical events such as the downing of a friendly aircraft or UN PROFOR troops being fired on made it difficult for controllers to execute complex deconfliction

³¹Ibid.

³²Michael N. Schmitt, "Clipped Wings: Effective and Legal No-fly Zone Rules of Engagement," unpublished manuscript on file at the Naval War College, 1998, p. 11-12.

³³Cary Bragg, Director of Combat Airspace, Ninth Air Force, Air Combat Command, United States Air Force, Shaw AFB, South Carolina, telephone interview, 16 January 1998.

³⁴Jeffrey C. Alfier, "Out of the Labyrinth: Flight Safety Communication in Multi-National Operations," *The Combat Edge*, October 1995, p. 9.

tasks while still maintaining situational awareness over the entire no-fly zone.³⁵ AWACS does not have direct, real time communication with air traffic facilities and must coordinate through a ground command center that does not provide ATC services.³⁶ This delays reaction time in addition to not complying with UN policy.

Another problem integrating air traffic into international combat airspace is that Department of Defense air traffic controllers are not provided with either an adequate understanding of the international environment or a methodology to ensure US interests are represented in a standardized and thorough manner. For example, Ninth Air Force, Air Combat Command has been responsible for establishing and maintaining the airspace and air traffic liaison for all three US and allied no-fly zones (OPC, Southern Watch, and Deny Flight) yet there are no standard procedures or specialized training to ensure consistency and thoroughness.³⁷

Principles of Operations other than War

Operations other than war rely on the following six OOTW-specific principles as the underpinnings of mission success: objective, unity of effort, security, restraint, perseverance, and legitimacy.³⁸ Despite its highly focused role, air traffic is a theater-wide function providing the operational commander a unique means to effectively use these principles to achieve tactical, operational, and strategic success as discussed below.

By understanding strategic aims, setting objectives to achieve these aims, and understanding what constitutes mission success, actions that could terminate an operation before success is achieved can be derived. The potential for an aircraft incident to be a "show stopper" is inherently high and the operational commander must understand where, when, and how unintentional "collateral damage in the air" could most likely occur. The detailed, systems

³⁵Ibid, p. 10.

³⁶Bragg.

³⁷Bragg.

³⁸Joint Chiefs of Staff. *Joint Doctrine for Military Operations Other Than War* (Joint Pub 3-07) (Washington, DC: June 16, 1995), II-1.

approach of air traffic requires an understanding of a theater's geography, climate, established airspace parameters, obstructions to aerial navigation, airports, navigation aids, and all system users including aircraft and ATC facilities. Air traffic control is the bridge between civil and military aviation, providing a unique perspective by synthesizing all factors impacting flight safety. If an operational commander understands this, it can be a valuable tool in assessing and controlling risk.

The less defined command relationships found in OOTW make achieving unity of command untenable and commanders must direct all efforts to a common purpose to achieve **unity of effort**. The umbrella of air traffic is one mechanism to attain unity of effort by bringing parties in theater to consensus on a function in which they all have a vested interest. The common need to have a safe traffic flow is compelling, even during hostilities, and even the most disparate parties can usually find common ground.

Not only does air traffic promote safety and efficiency in military operations, but it also protects civilian lives and commercial interests. This duality of concurrently protecting military forces and non-participants points to unique contributions that air traffic can make in applying the principle of **security**. By enhancing freedom of action and situational awareness, air traffic facilitates more rapid responses to evolving conditions and protects non-participants as well as participants.

The very nature of the air traffic control function is to maintain the safest flying environment possible and prevent loss of life. This "protective" role contributes to the judicious use of force and the commander's ability to apply the principle of **restraint**. Significant military or political consequences can result from either a single act, such as the recent gondola incident, or a cumulative impact, such as negatively affecting economic or cultural norms and makes the prudent use of military capability imperative. Air traffic control is a proactive mechanism that can be employed at all levels to reduce fratricide, prevent mission failure, and avoid national embarrassment.

By ensuring that every possible impact on non-participants has been considered and acted upon to the extent practicable, the operational commander--and the United States and its allies--are perceived as acting responsibly. This perception that the actions of US forces are legal, moral, and right is essential to the legitimacy of the operation. Even actions not intended to harm can seriously threaten the legitimacy of current and future operations and must be avoided. The IR655 shootdown, the Black Hawk incident, and the gondola mishap were mistakes, but mistakes that raised the ire of the world to question how the most technologically advanced superpower could make such grievous errors. Rev. Caserotti's words depicting the US as "...the powerful and arrogant who believe themselves to be the masters of the lives of other..." could easily become an international sound bite inciting greater intolerance of US forces. Similar sentiments were echoed by Sompong Sucharitkul in his analysis of US actions in the IR655 incident:

The status of a state as a 'superpower' does not exempt that state from responsibility...for the peace and security of mankind, no military necessity is ever admissible that impairs the integrity and dignity of men or that interrupts the free and innocent passage of civil aircraft in flight through national and international airspace.³⁹

After the dust settles, emotions have calmed, and an investigation reveals that US forces acted responsibly by intentionally building protection for non-participants into operations, the US will be in the best position possible to weather criticism. Responsible action and the political, diplomatic, and informational gains that may come with it contribute to the perseverance of the operation. OOTW may require years to achieve desired results, therefore, legitimacy and perseverance are inextricably tied to each other and to the success of the operation.

Air traffic control is a highly effective mechanism to assist the operational commander effectively apply the six OOTW-specific principles. The unique perspective it brings can be a valuable tool in assessing and controlling risk, thereby preventing early termination of an operation before objectives are successfully accomplished. The compelling, common interest of

³⁹Sucharitkul, p. 535.

the parties in a theater of operations to have a safe and functional air traffic system can be used to achieve unity of effort by building consensus among disparate parties. As a proactive mechanism that protects non-participants as well as military forces, air traffic contributes to the principle of security. Perception brought about by this responsible action reinforces the legitimacy of the operation and contributes to perseverance by increasing the probability that US forces will be able to remain in a theater of operations until desired results are achieved.

Challenges of the Operational Commander

As air traffic increases world-wide and the global movement to contain military operations that could impact civil aviation expands, the role of this unique aspect of command and control will have greater impact. Effectively deconflicting civil and military air traffic and fully integrating air traffic throughout a theater of operations are both areas where US forces need to improve. Specific improvements and possible solutions to improve flight safety and integration of air traffic into a theater are provided below.

First, the operational commander needs to *understand the role of air traffic control in a theater of operations and include it as an integral, not peripheral, aspect of theater command and control*. Air traffic control, whether in peacetime or in combat, is an invisible asset--until there is a problem. When there is an incident, ATC is one of the first agencies put under the microscope. The only way to lessen the impact is for an operational commander to scrutinize his own airspace and air traffic before, not after, an incident. If a proactive approach is not taken in this most basic and universal of aviation safety functions, national credibility and legitimacy are on the line. Operational commanders should also understand that proactive, successful integration of air traffic is an issue that can easily be exploited to their advantage as an "incremental dividend" showcasing US and allied goodwill.

US and allied forces should *recognize, plan, and train for the "hybrid" airspace found in operations other than war*. Anytime civil aircraft will be routinely present in a combat airspace zone, the dynamics require that air traffic services be present in some form. The pervasive nature

of air traffic in a theater of operations and the increased complexity, denser traffic, and specialized handling requirements found in OOTW airspace make it prudent to have air traffic skills resident in all command and control nodes, particularly AWACS.

Any command and control agency providing air traffic services should have *direct communication with all civil and military air traffic agencies* with which they exchange traffic. To accomplish the real-time exchange of information in the dynamic air environment, agencies must communicate directly since even a slight delay can impact safety of flight. Not only does this comply with UN policy, but direct communication can also provide a more responsive command and control system and a safer flying environment. Combat airspace in international operations should *comply with UN policy* when it does not compromise security or mission accomplishment. If the US failed to comply with UN policy knowingly, this is obviously an area where US legitimacy and credibility could suffer significantly--particularly if the UN policy could have prevented the accident.

The air traffic communities within the Department of Defense should be *adequately prepared to understand and operate effectively in the emerging global environment*. Despite changes in the international environment, preparation of US armed forces air traffic control personnel does not provide them with an adequate understanding of the international environment or the skills to adequately represent US interests. This reflects the past global environment where US and allied forces operated internationally with almost complete discretion and specialized training was not needed. Preparation of controllers should include an understanding of the changing global environment, the political and diplomatic implications of their actions, and how to deal with this environment.

Conclusion

The operational commander faces a changing aviation environment with increasing limitations due to the growing volume of air traffic world-wide and an international movement to limit the impact of military aviation on civil aircraft. The significant shortcomings of many air

traffic systems around the world and their subsequent difficulties in accommodating military aviation also increase complexity and risk, particularly in the permissive OOTW environment. To operate most effectively in international airspace today, civil and military air traffic should be fully integrated and air traffic functions should be a central part of theater command and control. Neither the changing, global environment nor the vital importance of air traffic in combat airspace is fully appreciated by operational commanders today.

A review of past aviation mishaps involving US forces, whether fratricide or involving civil aircraft, shows that inadequate recognition and integration of air traffic functions in combat airspace either contributed to or could have prevented the incidents. These inadequacies can have strategic implications due to the visibility of aviation mishaps, resulting in damaged credibility and legitimacy for the United States.

Air traffic control is a highly effective mechanism to assist the operational commander effectively apply the six OOTW-specific principles. The unique perspective it brings can be a valuable tool assist in assessing and controlling risk, thereby preventing early termination of an operation before objectives are successfully accomplished. The compelling, common interest in having a safe and functional air traffic system is a tool to contribute to achieving unity of effort by building consensus among disparate parties. As a proactive mechanism that protects non-participants as well as well as military forces, air traffic contributes to the principle of security. Perception brought about by this responsible action contributes to the legitimacy of the operation and contributes to perseverance by allowing US forces to remain in a theater of operations until desired results are achieved.

The operational commander faces many challenges integrating aviation assets into the complex and constraining global environment and within his own air command and control system. Improvements are needed in air traffic functions to improve flight safety, to make air command and control more responsive, and to integrate civil and military air traffic more effectively during international operations. First, the operational commander needs to understand the role of air traffic and include it as an integral, not peripheral, aspect of theater command and

control. Second, US and allied forces should recognize, plan, and train for the "hybrid" airspace that is emerging in OOTW. Third, any command and control agency providing air traffic services should have direct communication with all civil and military air traffic agencies. Finally, the air traffic communities with the Department of Defense should be adequately prepared to understand and operate in the emerging global environment.

Integrating and deconflicting civil air traffic in OOTW is of increasing necessity to the operational commander in order to shape the battlespace and accomplish the multi-faceted missions inherent in "not war." The complexity of this task is increasing and requires an understanding of the global air traffic environment in order to successfully operate in it. The operational commander must understand the potential benefits achieved by fully integrating civil air traffic in an OOTW theater of operations. By treating air traffic control as an important force multiplier, the commander can best achieve unity of effort, responsive command and control and flight safety--as well as preserving the credibility of the United States and legitimacy while operating abroad.

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