

The art of war owns certain elements and fixed principles. We must acquire that theory, and lodge it in our heads—otherwise; we will never get very far.

Frederick the Great



Understanding the Combined Air Operations Centre

CAOCC

By Major Ken Craig, CD

One of the inescapable truths regarding the conduct of any successful air campaign is the requirement to establish a command and control (C2) system that can effectively translate operational-level guidance from the air component commander (ACC) to the tactical-level pilot and crews conducting the flight missions. Without such a system an air campaign runs the risk of misemploying limited resources, possibly resulting in unnecessary loss of life and prolonging military operations. An air force traditionally uses an air operations centre (AOC) as the means to execute C2 during national and multinational air campaigns. An AOC staffed with properly trained, qualified, and experienced personnel, equipped with interoperable information technology architecture, and empowered by a functional planning process, is essential for the C2 of air operations.¹ These truisms were recently on display at the combined air operations centre (CAOC) supporting Operation (Op) UNIFIED PROTECTOR, the North Atlantic Treaty Organization (NATO)-led imposition of an arms embargo, enforcement of a no-fly zone, and protection of civilians from attack or threat of attack in Libya. Given that future Canadian Forces (CF) operations will most likely be conducted in a coalition environment, an understanding of how the Op UNIFIED PROTECTOR CAOC was configured for success with trained personnel, robust infrastructure, and a deliberate planning process, may offer important insight for Royal Canadian Air Force (RCAF) personnel assigned to support coalition air campaigns.

Following a popular uprising against the Gadhafi regime in Libya, the United Nations (UN) passed Resolution 1970 imposing an arms embargo, and Resolution 1973 authorizing a no-fly zone over Libya. In early March 2011, NATO deployed airborne warning and control system (AWACS) aircraft and alliances to the central Mediterranean. Allied aircraft began enforcing the no-fly zone on 19 March 2011, as part of a coalition task force

led by the United States Africa Command (AFRICOM) under Op ODYSSEY DAWN. On 25 March 2011, NATO assumed command from AFRICOM, enforcing the no-fly zone and arms embargo under the auspices of Op UNIFIED PROTECTOR. At its peak, Op UNIFIED PROTECTOR employed approximately 8,000 military personnel, 260 aircraft, and 21 naval assets. During the seven-month air campaign, NATO forces and partner nations flew over 26,500 sorties, including over 9,700 strike sorties. These sorties destroyed more than 5,900 military targets, including over 400 artillery or rocket launchers and over 600 tanks or armoured vehicles.² Op UNIFIED PROTECTOR was terminated on 31 October 2011, shortly after the Libyan National Transitional Council announced that Libya had been fully liberated.

The RCAF contribution to Op UNIFIED PROTECTOR is well documented, consisting of approximately 400 personnel



CF Photo: Cpl Marc-André Gaudreault

supporting CF188 Hornet fighters, CC150 Polaris tankers, CC130J tankers, CP140 Aurora maritime patrol aircraft, and CH124 Sea King maritime helicopters. The RCAF footprint in Italy was comprised of Task Force Libeccio Headquarters in Naples, an air coordination element in Poggio Renatico, Italy, the Sicily Air Wing operating from Trapani Air Base and Naval Air Station Sigonella, and maritime helicopter detachments operating from Task Force CHARLOTTETOWN and then Task Force VANCOUVER.³ Less well known is the RCAF contribution to the Op UNIFIED PROTECTOR CAOC located at Poggio Renatico, where a small cadre of Canadian personnel were assigned to NATO crisis establishment positions. Most RCAF personnel were sourced from units across Canada, although a few were assigned from their peacetime establishment positions while on overseas postings with NATO entities in Europe. Experience levels varied greatly, from those with familiarity in prior NATO-led air campaigns, to those only months removed from wings training.

To facilitate effective C2 during an air campaign, a functioning AOC must consist of three fundamental elements: personnel, infrastructure, and processes. Each element can be tailored to suit the particular operating environment (political, environmental, and national), but they must work in harmony with one another for the AOC to be successful. In this regard, the Op UNIFIED PROTECTOR CAOC was no different.

THE PERSONNEL

The Op UNIFIED PROTECTOR air campaign was led by the combined forces air component commander (CFACC), Lieutenant General (Lt Gen) Ralph J. Jodice, a United States Air Force (USAF) officer who at the outset of operations was serving as NATO's commander, Allied Air Component Command Headquarters Izmir, Turkey. As CFACC, he set the tone for the CAOC, focusing efforts on a daily basis to achieve campaign objectives that were captured

in operational-level guidance. Lieutenant General Jodice understood clearly that each nation's contributions were important to the success of the CAOC, no matter how minor. Although only eight nations conducted the majority of the strike missions, all NATO nations and coalition partners were represented in the CAOC.⁴ The CFACC regularly acknowledged the contributions of all personnel, no matter their rank or what national flag they represented. Lieutenant-General Jodice continually communicated direction to the staff during the many opportunities that presented themselves through the course of the daily battle rhythm, such as the commander's update briefing, the joint targeting working group, the air tasking order (ATO) release brief, and the twice daily shift-over briefs. These were important opportunities for the staff to understand and appreciate operational-level concerns that were having a direct impact on tactical-level flight operations. Of interest, there was discussion at the outset of Op UNIFIED PROTECTOR that perhaps the CFACC need not be co-located with the CAOC. However, Op UNIFIED PROTECTOR showed the importance of placing the CFACC in close proximity to the CAOC, whereby he could best influence planning activities in a timely manner and obtain



LT GEN R. J. JODICE

an unfiltered sense of the varied national liaison element concerns. The CFACC's ability to engage in open and transparent dialogue with his senior staff permeated all levels of the CAOC, resulting in a highly motivated and focused staff.

Two examples of the CFACC's ability to effectively guide CAOC efforts were seen in the later stages of the air campaign, one related to CAOC staff attitude, and the second to how operational-level guidance positively affected the outcome of strike operations. First, shortly after Tripoli fell to the rebels in late August 2011, there might have been a tendency for CAOC personnel to relax, as there was an expectation that the air campaign would soon end. The CFACC anticipated this potential change in attitude and kept staff focused on the mission of protecting civilians as he reiterated that the mission only ended when the North Atlantic Council (NAC) deemed it complete. Second, compared to other coalition air campaigns, there were few reported cases of civilian casualties and civil infrastructure damage resulting from Op UNIFIED PROTECTOR actions. Although this facet of the campaign design was motivated by both political and military concerns, much of the credit for the deliberate targeting plan can be attributed to the manner in which Lt Gen Jodice managed strike activities. Throughout the campaign, he continued to reiterate three fundamental steps when conducting offensive operations: apply the rules of engagement (ROE), understand the collateral damage estimate process, and ensure positive identification before striking targets. Effective leadership always starts at the top—clear direction from the CFACC and senior staff guided all CAOC activities, resulting in a successful air campaign.

Properly trained and qualified personnel are an important element in the CAOC weapon system. Fundamental to this is an understanding of the six-step air tasking cycle that traditionally consists of strategy,

target development, master air operations plan, ATO production, combat operations, and post-mission assessment.⁵ This academic knowledge must be coupled with experience working in either exercise or operational CAOCs. The RCAF personnel assigned to the Op UNIFIED PROTECTOR CAOC fulfilled roles in strategy development, ATO coordination, special instructions (SPINS), joint personnel recovery, air-to-air refuelling (AAR), targeting, combat operations, and intelligence, surveillance and reconnaissance (ISR) management. As mentioned earlier, RCAF experience levels varied greatly, highlighting the need for continual attention to the development of staff officers with experience in joint and coalition AOC planning activities. Numerous training opportunities are available to develop expertise in CAOC operations, such as the USAF's Exercise BLUE FLAG, and the United States Navy's Rim-of-the Pacific (RIMPAC) exercise, both of which employ a fully stood-up CAOC. During Exercise RIMPAC 12 to be held this year, the RCAF will hold the CFACC position for the first time, a responsibility that includes staffing nearly 50 positions in the 300-strong CAOC. Operating from the USAF 613 AOC located at Hickam Air Force Base, Hawaii, Exercise RIMPAC 12 is an excellent opportunity to advance RCAF knowledge and expertise in AOC activities. Training and experience in AOC battle procedures should be considered an essential element in the professional development of RCAF aviators and can be likened to maintaining good flight skills. Development of these skills takes practice, both at an individual level by attendance on courses such as the ACC collective training seminars offered at the Canadian Forces Aerospace Warfare Centre (CFAWC), and collectively through command-post and live-fly exercises. The RCAF must continue to strive to build an experienced cadre of CAOC-trained personnel so that we are prepared to hold key CAOC leadership positions in future coalition air campaigns.

Another facet of the personnel element that is commonly overlooked is the role of the national and component command liaison teams assigned to the CAOC. During Op UNIFIED PROTECTOR, the numerous liaison representatives (including their support elements) together were almost as large as the 300-person CAOC. For the RCAF, the Air coordination element at Poggio Renatico served as the functioning liaison between the CFACC, Task Force Libeccio Headquarters in Naples, and the deployed RCAF flying units. To be truly effective the liaison elements must be involved in all facets of the CAOC planning cycle, and they need to communicate regularly with both the CAOC staff and their nationally assigned flying units. This was certainly the case during Op UNIFIED PROTECTOR, when liaison elements, including the combined force maritime component commander (CFMCC) representatives, were encouraged to attend all CAOC briefings and actively engage staff throughout the planning cycle, commencing at strategy and concluding with mission assessment. These liaison elements possessed the authority to represent their respective nations on critical issues, and they had the responsibility of presenting national perspectives and considerations affecting combined air operations planning and execution. The ability of the CAOC and the national elements to function in a synergistic fashion became readily apparent in the later stages of the Libyan air campaign when deliberate targeting became difficult due to the ever changing situation on the ground. To address this issue, the CFACC initiated a dynamic deliberate targeting meeting at 1900 local time each day that involved combat operations, combat plans, and the national liaison elements. The purpose of the meeting was to discuss and assign target lists that had the potential to be struck within the next 12 hours. The capacity to coordinate complex strike issues within these shortened planning times was only possible due to the cooperative relationship that had developed between the CAOC, the national liaison teams, and the

tactical flying units. One key to the success of Op UNIFIED PROTECTOR was the ability to integrate the numerous national air force contributions into a cohesive force, an achievement only possible by establishing a CAOC that worked effectively with actively engaged and fully empowered national liaison elements.

THE INFRASTRUCTURE

The second fundamental element of a successful CAOC weapon system is the need for adequate infrastructure to support air operations planning activities. From outward appearances, the Op UNIFIED PROTECTOR CAOC was less than impressive, consisting of temporary modular trailers, relocated from Vicenza, Italy, where they had previously been used to support NATO air operations in the Balkans, initially over Bosnia-Herzegovina and later Kosovo. Despite the temporary feel of prefabricated buildings, the CAOC was functional and comprised all necessary elements to plan, direct, and control air operations. Communication systems enabled chat, phone, two-way secure radio, internet websites, streaming video, email, and video-conferencing, all of which are necessary in modern AOCs. The system architecture was interoperable with NATO allies and partner nations, and just as importantly, the system proved robust and reliable over the course of many months operating around the clock. It must be stated that the Op UNIFIED PROTECTOR CAOC benefited from outstanding host nation support from the Italian Air Force. Situated adjacent to NATO's standing CAOC 5 at Poggio Renatico, the Op UNIFIED PROTECTOR CAOC was able to enjoy service support that might not otherwise have been available at an austere location.

To direct air operations, the Op UNIFIED PROTECTOR CAOC utilized NATO's integrated command and control (ICC) software to generate airspace control orders (ACOs), joint target nomination lists,

ATOs, air tasking messages (ATMs), and to display a common operating picture (COP). The advantage of ICC was its widespread use and acceptance in previous NATO operations, thus minimizing staff training requirements at the commencement of Op UNIFIED PROTECTOR. Nevertheless, not all CAOC staff reported for duty with working knowledge of ICC, necessitating on-the-job training and formal training sessions before personnel were employable. There are many similarities between ICC and the National Aerospace Planning Process Integration Capability (NAPPIC) and Theatre Battle Core Management System (TBMCS)—C2 systems familiar to RCAF personnel. As a result, RCAF personnel experienced in NAPPIC and TBMCS should be able to seamlessly transition to future NATO-led operations that employ ICC.

THE PROCESSES

Processes in the AOC sense are generally defined as the means by which guidance originating from the CFACC is disseminated to tactical flying units to support command-driven objectives. There are a number of different processes employed to develop operational guidance but they generally follow similar steps that involve decision statements, objectives, alternatives, comparisons, and decision analysis. The CF and NATO both use the operational planning process (OPP) consisting of initiation, orientation, course of action (COA) development, plan development, and plan review. The end result of this deliberate planning process is an approved air operation plan (OPLAN). The Op UNIFIED PROTECTOR air component OPLAN was a collaborative effort between the CFACC and the commander combined task force (CCTF) planning staffs. Although the development of the CFACC OPLAN was limited to senior CFACC staff, the OPLAN was an important reference document for all CAOC divisions as it accomplished the following objectives, described how combined air capabilities and forces were to be integrated, identified objectives and tasks (to include an indication of the air capabilities necessary to

achieve air objectives), identified measures of success, accounted for potential pro-Gadhafi courses of action, and ensured CFACC air operations supported the overarching CCTF plan. It is important to note that the Op UNIFIED PROTECTOR CFACC utilized a formal planning process to develop an OPLAN that subsequently guided all air activities.

Based on the CFACC OPLAN, the CAOC daily planning process was regimented and fully synchronized with CCTF planning activities to ensure that CFACC actions were maximized to achieve both political and military objectives. At the CAOC level, the OPP culminated in the release of the air operations directive (AOD). The AOD ensured that coalition air operations effectively supported CCTF objectives while retaining flexibility to adjust to the normal range of air operations by apportioning effort in response to the dynamic changes taking place on the ground in Libya, especially following the fall of Tripoli in late August 2011. Although the CAOC strategy division was the primary focus for operational planning activities, the entire CAOC staff was reminded of CFACC intent through the continual refinement and subsequent briefing of changes to the AOD. The CFACC raised awareness of the AOD by ensuring that amendments were briefed during ATO release briefs and the daily shift-over briefs. Consequently, planning staff referred to the AOD on a daily basis as they built the air battle plans to ensure that priority of effort matched CFACC intent. This became extremely important in the later stages of the air campaign after pro-Gadhafi forces retreated to the towns of Bani Walid, Sirte, and Sabha, and attempted to flee westward to neighbouring countries. A current and relevant AOD assisted planning staffs in apportioning and prioritizing limited unmanned aerial vehicles (UAV), AAR, and ISR resources to the various tasks and providing staff with an understanding of the level of risk the CFACC was willing to accept when placing these assets in Libyan airspace

during the later stages of the air campaign. The AOD enabled the CAOC to match action with intent, thus ensuring that the CFACC's objectives were continually being achieved.

CONCLUSION

The effectiveness of a coalition air campaign depends on adequate system interoperability, commonality of doctrine and concepts of operation, shared strategic objectives and long-term investment in joint training and exercises brought together by mutually respected professional mastery.⁶

The Op UNIFIED PROTECTOR CAOC based at Poggio Renatico, Italy, was simply one small element in an international effort that successfully enforced UN Security Council Resolutions against Libya. The lessons for future AOCs established to support a coalition air campaign are clear: an understanding and focus on the people, infrastructure, and processes that comprise an AOC can lay the groundwork for effective results that support political and military objectives. Leadership in the Op UNIFIED PROTECTOR CAOC started at the top with a CFACC who understood the challenges inherent in coalition warfare, taking steps to effectively shape and develop his staff to address the myriad of issues that manifest themselves during a complex multinational air campaign. Operation UNIFIED PROTECTOR also reflected the fact that the infrastructure supporting an AOC can be established on a temporary basis as long as the tools to control, coordinate, and execute air operations are in place. Air warfare will continue to require an effective array of C2 information technology means, including chat, radio, internet, streaming video, and a software system to plan and execute air missions such as ICC, TBMCS, and NAPPIC. Finally, an AOC must incorporate clearly established and well documented planning processes that staffs at all levels can understand and employ to guide their respective planning activities.

To do otherwise risks introducing the element of surprise when political and military guidance demands caution, resolve, and results.

There can be no doubt that the NATO-led Op UNIFIED PROTECTOR was an immense success. Together with our NATO alliance and coalition partners, the RCAF and allied air forces delivered impressive results in seven short months, affording the Libyan peoples the opportunity to decide their own future free from the repression of a tyrannical regime. The majority of this success should be directed to the flight crews who operated in the Libyan airspace, ably supported by their maintenance crews at forward deployed bases. In some small measure the CAOC and national liaison elements located at Poggio Renatico, can be justifiably proud of the manner in which they supported the CFACC. The RCAF must continue efforts to develop personnel at all rank levels experienced in AOC processes through formalized training and multinational live-play exercise opportunities. The RCAF personnel armed with knowledge and experience in AOC activities will be able to seamlessly integrate with our coalition partners and eventually assume greater leadership positions in future air campaigns. 🌐

Major Ken Craig, CD, is an air navigator with over 3,000 flight hours in the CH124 Sea King. From July to November 2011, he was employed in the Op UNIFIED PROTECTOR CAOC located at Poggio Renatico, Italy, as an air tasking order coordinator. Major Craig is currently an Air Reservist working in Joint Task Force Pacific Headquarters as the J3 L and other government department liaison officer.

ABBREVIATIONS

AAR	air-to-air refuelling
ACC	air component commander
AFRICOM	United States African Command
AOC	air operations centre
AOD	air operations directive
ATO	air tasking order
AWACS	airborne warning and control system
C2	command and control
CAOC	combined air operations centre
CCTF	commander combined task force
CF	Canadian Forces
CFACC	combined forces air component commander
ICC	integrated command and control
ISR	intelligence, surveillance and reconnaissance
Lt Gen	Lieutenant General (US)
NAPPIC	National Aerospace Planning Process Integration Capability
NATO	North Atlantic Treaty Organization
Op	operation
OPLAN	operation plan
OPP	operational planning process
RCAF	Royal Canadian Air Force
RIMPAC	Rim of the Pacific (Exercise)
TBMCS	Theatre Battle Core Management System
USAF	United States Air Force

NOTES

1. See B-GA-401-000/FP-001, *Canadian Forces Aerospace Command Doctrine* (Interim Version), 2011.

2. North Atlantic Treaty Organization, "Operation UNIFIED PROTECTOR Final Mission Stats," 2 November 2011, http://www.nato.int/nato_static/assets/pdf/pdf_2011_11/20111108_111107-factsheet_up_factsfigures_en.pdf (accessed January 24, 2012).

3. Canada, Department of National Defence, "Operation MOBILE," <http://www.cfc.com.forces.gc.ca/pa-ap/ops/mobile/index-eng.asp> (accessed January 24, 2012).

4. *The Economist*, "NATO After Libya," 3 September 2011, 58–59.

5. United States Joint Publication 3-30, *Command and Control for Joint Operations*, 12 January 2010.

6. Kainikara, Sanu, and Bob Richardson. "The Air Campaign: The Application of Air Power," *Chief of the Air Force Occasional Paper No. 2*, April 2008.