
**CONCLUDING OBSERVATIONS AND
SUGGESTED ACTIONS**

Interoperability not only supports U.S. national security and U.S. military strategies but also fosters and enables allied support for coalition operations. It can increase the effectiveness and efficiency of U.S. and allied forces in such operations.

The United States and its partners have many shared interests and concerns. Thus, it is important that these countries' forces are able to operate effectively and efficiently in coalitions to achieve common goals. This is especially critical in air power, where the speed of operations dictates close harmonization of effort to achieve maximum impact on the battle outcome. Interoperability at the technological, tactical, and operational levels is key to achieving this close harmonization. In some cases, coalition support (e.g., access to allied air space, en route bases, and infrastructure support) is required for the United States to conduct successful military operations. In such cases, interoperability at the strategic level is required.

RECENT OPERATIONS

Our review of recent coalition operations indicates that interoperability has multiple and complex dimensions—political and economic as well as military—that may manifest themselves at strategic, operational, tactical, and technological levels. Further, the impact of interoperability problems is not isolated within the level at which they are observed. Strategic-level interoperability problems can have operational and tactical implications, and technological interoper-

ability problems may reverberate in the opposite direction. For example, the political and economic goals of individual nations to support national industries can lead to development of air power systems (e.g., fighters, weapons, airborne surveillance and control assets) that have different capabilities and require extensive workarounds to be employed in coalition operations. Similarly, the lack of interoperable communications and combat identification systems and procedures could result in the attrition of coalition aircraft to enemy defenses or, through unfortunate Blue-on-Blue engagements, cause the partner to leave the coalition. This suggests that interoperability issues should be considered in the context of each level.

Political support, access to allied infrastructures and airspace, landing rights, and forward basing are essential to bringing U.S. air power to bear effectively in certain regions of interest. Specifically, allied support for and participation in coalitions help U.S. decisionmakers garner and maintain the public support necessary to conduct military operations in regions of the world that are of national interest (e.g., SWA and the Balkans). Moreover, as seen in recent Allied Force Balkan operations, access to allied airspace and availability of infrastructure in close proximity to areas of operations minimized flight time to air patrol stations and targets and provided flexibility to conduct attack operations from more than one approach azimuth.

The factors above are sometimes overlooked when potential contributions of individual allies are measured solely in terms of the number of aircraft made available or sorties flown in specific operations. While it is true that in recent SWA operations (e.g., Desert Storm, Desert Fox) the United States provided the vast majority of air missions, in some Balkan coalition operations—particularly those not involving precision strike operations (e.g., air surveillance, airspace control, and no-fly-zone enforcement)—allies provided more than half of the aircraft and missions flown. Further, it is important to recognize that providing the preponderance of air assets to coalition operations helped the United States rationalize its smaller ground force contributions in Bosnia and Kosovo operations.

The above notwithstanding, allied contributions to recent strike operations in the Balkans have been limited because of the lack of sufficient PGWs that can be delivered day or night in any weather

conditions. A number of U.S. allies are developing plans to expand their holdings of PGWs, including those that are guided by GPS. It is critical that these be implemented, since future crises can be expected to require the use of PGWs to minimize casualties and collateral damage and the use of standoff weapons to minimize the risk of attrition of coalition aircraft to more sophisticated enemy air defenses.

Another future concern is the allies' limited capabilities (e.g., force readiness, airlift) to rapidly deploy forces to out-of-area operations. The allies have made great strides in their ability to deploy and support operations outside their borders to the periphery of Europe, but more improvement is needed if they must rapidly deploy combat forces to non-European theaters. Thus, without improvements to existing capabilities, the combat value of allied air forces is likely to decrease in the future.

CASE STUDIES

The case studies examined suggest that the following areas offer the best leverage for achieving acceptable levels of interoperability in future coalition operations: (1) common or harmonized doctrine for the planning, execution, and execution monitoring of CJTF operations in general and air campaigns in particular; (2) compatible or adaptable concepts of operations and procedures for airborne surveillance and control in support of air-to-air and air-to-ground missions; (3) common information-sharing standards and compatible tactical communication systems; and (4) expert personnel who understand the capabilities of coalition partners and who hone their expertise in combined operations and exercises.

Efforts to enhance interoperability solely through common or fully interoperable systems at the technological level are likely to be limited by political, economic, and security factors. Perhaps the most important factors are support of national industries, equitable burden sharing, and ensuring that the most advanced military capabilities are not compromised. From a technology and cost perspective, selected C3ISR initiatives appear to offer the best opportunities for interoperability enhancements.

SUGGESTED ACTIONS

Our review of recent coalition operations, the results of case studies, and the survey of allies' capabilities suggest a range of actions to foster interoperability and minimize divergence between U. S. and allied air forces. Because of the broad nature of interoperability and its implications to a wide range of stakeholders (e.g., other U.S. services and NATO partners), the Air Force has to address many interoperability issues in collaboration with such stakeholders. Some actions the Air Force can undertake directly include the following.

Collaborative Actions

In collaboration with DoD, other U.S. services, and NATO allies, the U.S. Air Force should

- Help NATO develop the CJTF CONOPS, associated processes, expert personnel, systems, and information-sharing protocols for out-of-area operations. In particular, the Air Force should ensure that the key doctrinal concept of centralized control and decentralized execution, which is inherent in U.S. joint-service air CONOPS, is institutionalized in the NATO CJTF concept.
- Help NATO define the desired level of information sharing and interoperability between planned U.S. and NATO force-level planning and execution-monitoring capabilities (organizations, procedures, personnel, and systems). At a minimum, a set of common messaging standards for information exchange should be defined for the U.S. Air Force's TBMCS and NATO's ICC and for the TBMCS and NATO's ACCS.
- Help NATO develop a coherent space policy and information sharing protocols that provide sufficient information to conduct key operations, while protecting sensitive equities. In some cases, bilateral agreements with selected NATO allies may be more appropriate.
- Continue to foster the interoperability of AWACS assets and standard AEW and control procedures, especially those needed in the presence of friendly and enemy stealth aircraft. The focus should be on ensuring that NATO, U.K., French, and U.S. AWACS modernization programs are synchronized.

- Develop the process and capabilities to receive and exploit ground surveillance information from the different airborne GMTI sensors that NATO members are developing. Support advanced concept demonstrations to determine the value of this capability and help select the most appropriate means to achieve it, including development of common GMTI data formats.¹
- Ensure that the MIDS EMD program is successfully completed and that the functional interoperability inherent in MIDS terminals is maintained through the production phase and then applied to future fighter data links.
- Continue to share fighter and weapon systems information to ensure adequate common understanding of individual coalition partners' air capabilities (technology, personnel, operations). In parallel, continue to develop operating protocols that permit the use of allied air assets in coalition operations and expand training exercises to emphasize out-of-area operations. Be prepared to employ workarounds.
- Encourage NATO allies' acquisition of advanced precision weapons and standoff weapons. Low-cost GPS-guided weapons are particularly promising. Although they are expensive, standoff weapons ensure platform survivability in a high-threat environment, and standoff antiarmor weapons enable more effective participation in the halt phase of a campaign.
- Increase opportunities for combined experiments and advanced technology demonstrations.
- Support the above suggested actions by actively participating in NATO's Defence Capabilities Initiative.

Direct Actions

In parallel with the preceding collaborative efforts, the U.S. Air Force should consider taking the following direct actions:

- Leverage its expertise and capabilities in planning and executing air and space operations in power projection missions by man-

¹These are appropriate actions given the uncertainties of the NATO AGS program.

ning key positions in the emerging deployable and key static CAOCs to reinforce the principle of centralized control and decentralized execution. Further, it should develop and maintain a cadre of experts who can provide support to higher NATO headquarters (if needed) to help develop air campaign plans and assist in execution monitoring.

- Explore opportunities to gain better visibility into the WEU Satellite Centre to determine if and how Centre assets might help satisfy some of the information needs in future NATO operations.
- Ensure that the AWACS RSIP program continues to be adequately funded and that appropriate NATO RSIP employment lessons learned are incorporated in future early warning and air control doctrine and tactics.
- Support advanced concept technology demonstration of multiple GMTI sensor data reception and exploitation capabilities in joint expeditionary force experiments.
- Strengthen Air Force visibility and management oversight in the MIDS production phase program to ensure that MIDS terminals are delivered as needed to U.S. fighter modernization programs, within budget constraints.

The collaborative and direct actions identified in this research, if successfully executed, are likely to improve the military performance of U.S. and NATO allies' air forces in future coalition operations or NATO Alliance operations.