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The Carrier Battle Group Force: An Operator's Perspective

ABSTRACT

Since the end of World War II, Carrier Battle Groups have been used as an instrument of U.S. foreign policy. Over the years, they have evolved to provide the National Command Authority with a wide choice of response options. This evolutionary process, facilitated by the normal personnel rotations and capability upgrades that occur between deployments, allows a Battle Group to become essentially a "new and improved" version of itself for each successive deployment.

The Theodore Roosevelt Battle Group (TRBATGRU), a product of this process, successfully participated in two combat operations during deployment: Operation Allied Force/Noble Anvil and Operation Southern Watch. This paper highlights TRBATGRU's experience with integrating operators and systems to meet a dynamic set of operational requirements. Specifically discussed are two systems that had significant operational impact: SIPRNET (a secure shipboard Internet-like information network) and PGMs (precision guided munitions). The operator's perspective on system development and usage is examined in order to identify insights into new system development and design considerations.

INTRODUCTION

Carrier Battle Groups are a naval force designed to conduct prolonged overseas deployments. During a single deployment, a battle group might be tasked to execute a variety of operational missions to include training, humanitarian assistance, diplomatic exchanges, and even combat. To continue to fulfill its mission, the battle group must undergo a series of upgrades and improvements to keep current with technological and doctrinal changes. Upgrades/improvements are manifested through equipment replacement or modifications and through personnel rotation or training. These upgrades occur prior to every deployment. The net result is a Carrier Battle Group that has a time dependent, dynamic nature with regards to capabilities and leadership. This phenomenon presents a particular challenge for fleet commanders as they try to anticipate a deploying Carrier Battle Group's behavior and performance characteristics.

Operators and Systems

As with all military units, Carrier Battle Groups can be described in terms of operators and systems. A battle group's behavior and performance characteristics are dependent on its operators, its installed systems, and interactions between the two (Figure 1). Operator/system interactions play a large role in determining a battle group's ability to control its actions and communicate with the outside world. In many ways, these external interactions are the only means by which a battle group's Chain of Command can evaluate performance and gauge reputation. As a result, Battle Group Commanders place high value on performance characteristics such as operator proficiency, system

robustness, and command presence. Much emphasis and attention is devoted to improve operator/system interactions.

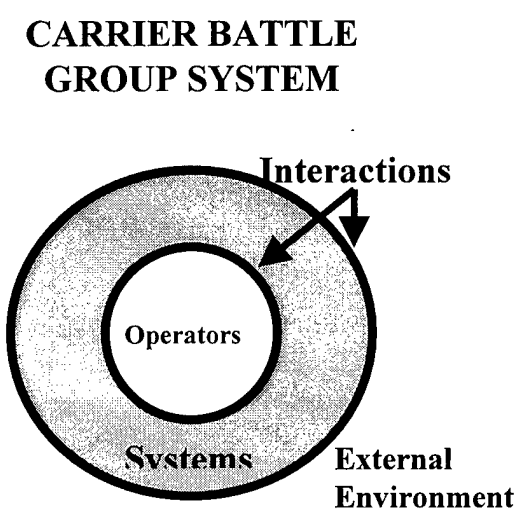

FIGURE 1. Components of a Carrier Battle Group System.

Systems are not just equipment and software, but are also a reflection of the people who design and sponsor them. Therefore, system designers and program sponsors can have a profound effect on a battle group's operator/system interaction. The net result is that two groups of people, operators and system designers/sponsors, are directly responsible for a battle group's ability to perform its mission. Each group works in the Battle Group's best interest, but provides a different perspective to the situation as described by Clare and Holden (1999).

Perspective

The operator's perspective is influenced by the practice of rotating the majority of key Battle Group leadership positions every deployment cycle. This practice allows personnel to meet career goals, to have better sea/shore rotation, and to implement innovative ideas. The impact is that operators view their deployment as the most critical event for that Battle Group. During their deployment, a battle group will be expected to operate at peak performance and must be prepared to perform combat duties. These operators will be tasked to achieve this expectation with whatever condition the Battle Group finds itself in.

The system designer/program sponsor perspective is also concerned with a battle group's current deployment, but also places much more emphasis on long term capability development to meet the requirements of future deployments. Their decisions are based on military requirements, technology maturity, programmatics, and budget. In essence, they plan for a battle group's long term life. Their goal is to give every battle group during every deployment the ability to perform its mission with the best tools that are available and affordable at the time.

Conflicts between these two perspectives usually arise as a battle group prepares for deployment. A change in the Battle Group's training plan may not coincide with a new system installation schedule or an installed system may not meet operator performance expectations. Also, some installed systems may not reach full maturity until after the current deployment. A communications system, for example, might be installed, but may lack the shore or satellite support to make use of all of its operating modes. Operators want their Battle Group to deploy with the most user-friendly, reliable, and robust systems available, however they are also leery of installing systems that interact poorly with existing systems. Any shortcomings must be compensated through doctrinal and tactical modifications. Fortunately, a process currently exists that resolves these conflicts early in a battle group's training cycle.

Crisis Situations

Eventually, the dynamic forces that create a deployable battle group come together to allow it to respond to crisis situations or combat. Under these circumstances, the operator is required to exercise innovative behavior during a short yet critical time period. Humans, who are very success oriented (particularly during combat), will seek out solutions and systems that satisfy the immediate requirement. Thus, operator/system interactions will have a large impact on a battle group's success or failure. Systems that do not readily contribute to success will not be used. This behavior repeats itself over and over as more situations are encountered and the importance of achieving success becomes greater.

TRBATGRU's Experience

This paper describes the dynamic nature of a Carrier Battle Group as it prepares for and completes an overseas deployment. The *Theodore Roosevelt* Battle Group's (TRBATGRU) experience during its 1999 deployment will be highlighted. This deployment included combat experience from air operations over Kosovo and Iraq. Training that stressed operator/system interaction, in almost every occasion, foretold actual problems encountered during deployment. TRBATGRU's operational experience bears out this observation.

During TRBATGRU's deployment, two key systems achieved technological maturity in time for use in Kosovo during Operations Noble Anvil and Allied Force. The first was a high speed, classified, Internet-like, communication network called SIPRNET. It revolutionized how Battle Group units and staffs interacted in order to conduct mission planning, information exchange, and mission execution. Unfortunately, not all TRBATGRU ships were SIPRNET capable so older communication methods were used in its place. The second was precision guided munitions (PGMs) which were employed almost exclusively during the Kosovo air campaign. These weapons were chosen because of their ability to selectively hit targets with high precision. Tomahawk missiles and laser-guided bombs were among the PGMs used in Kosovo. When coupled with high-speed data links to pass targeting information, PGM technology offered the best results as a high precision, quick reaction strike weapon.

BATTLE GROUP OPERATIONS

Carrier Battle Groups are currently integrated into a Joint Task Force (JTF) organization during crisis situations. A JTF might consist of air, maritime, land, or special forces components, depending on mission requirements (Figure 2). This type of military organization provides the flexibility to add or delete military forces as necessary to resolve a crisis situation. The JTF forces work together and share resources to complete the mission. For instance, the Maritime Component Commander, usually the Carrier Battle Group Commander, will control all forces required to execute the maritime control mission. However, the Battle Group's strike assets such as Tomahawk missiles and carrier-based aircraft may be under the control of the Air Component Commander who plans and executes strike operations. As a result, close coordination and reliable communications are required to prevent resource allocation conflicts.

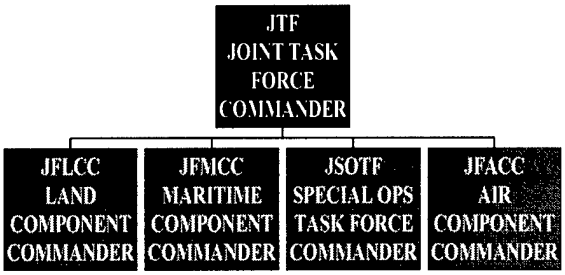

FIGURE 2. Typical Joint Task Force Organization.

Within the operational control of the Carrier Battle Group, operations might be executed in accordance with the Combined Warfare Commanders (CWC) organization per U.S. Naval doctrine. Under this organization, the Battle Group Commander has overall command with his subordinates assigned duties as the various warfare commanders (Air Warfare Commander, Sea Combat Commander, etc). This type of organization allows the Battle Group Commander to exercise decentralized control and command by negation.

Comms and Coordination

Communication and coordination are required within the JTF or CWC organization to allow it to function effectively. This may take the form of general operating orders, instructions and operational task messages (OPORDS, OPGENS, and OPTASKs). This guidance provides reporting procedures, warfare organization, tactical information, terminology, and assignment responsibilities. In essence, these documents provide the framework on how the Battle Group will conduct business for the long term. Daily guidance and instructions are provided in the Battle Group Commander's or Warfare Commander's intentions messages. They provide unit disposition instructions, task assignments, and an update on the tactical and strategic situation.

The Process

The JTF and CWC organization and its associated communication network provide the Carrier Battle Group with structure, information flow and direction. However, it is the Battle Group's processes and procedures that provide operational effectiveness and the ability to adapt to a changing environment. As a result, procedures are promulgated to ensure that important information is disseminated, decisions are made, and orders are executed. Feedback loops and metrics are also utilized to gauge performance and determine areas for improvement. These concepts are brought together into a process called the battle rhythm. The battle rhythm establishes a routine for the organization, allowing it to meet reporting and decision deadlines.

Battle Rhythm

The battle rhythm is usually set on 24-hour cycle (Table 1). However, it can be adjusted to meet timeline requirements of the current operations. It generally starts with morning briefs on the previous day's activities. The Battle Group Commander is briefed on the weather, current operations, intelligence, and readiness. This is followed by briefings to the JTF Commander, covering the entire operation and usually conducted via video teleconference (VTC). Next, a Warfare Commander's Coordination Board (WCCB) is convened to review the Battle Group's planned actions for the next 4 to 5 days. During this meeting, resources are allocated, strategies identified, and focus established. This information is used as input to the various planning meetings that follow. Output from the planning meetings is used to generate the aircraft carrier's air

plan and the Commander's Intentions message. The information is then disseminated to the Battle Group by early evening and the process begins again early the next morning.

TIME	EVENT
0500	Receive unit operational reports
0800	Brief Battle Group Commander
0900	Brief JTF Commander
1000	WCCB
1300	Planning Cell Meetings
1800	Release Commander's Intentions and Situational Report messages
2000	Units receive Commander's Intentions message
0000	Units release operational reports

TABLE 1. Typical battle rhythm cycle

In order for the Battle Group to support the battle rhythm, it is important that operator/system interactions do not have an adverse effect on communications and information flow (i.e. communications are reliable and stable, minimum downtime for maintenance, information can be easily gathered and dispersed, etc). Delays will seriously impact the planning process and could impede the Battle Group's ability to respond quickly in a combat situation.

BATTLE GROUP TRAINING

Training provides a battle group an opportunity to operate as a team and prepare for deployment. In terms of the operator/systems model, training allows operators time to practice using their systems and systems time to operate in a rigorous maritime environment. System technicians also get an opportunity to troubleshoot and repair their systems as they degraded from usage. An operator/system interaction can therefore be described in terms of a battle group's ability to reliably operate and repair that system. A good interaction produces positive impact and means that operators are well trained, systems perform reliably with minimum downtime, and technicians can quickly troubleshoot and perform repairs with onboard assets. A poor interaction produces negative impact and could be caused by insufficient training, unavailable repair parts, or poor design (i.e. single point failures, lack of redundancy, etc). Operator/system interactions have the potential to heavily impact a battle group's ability to perform its mission. Thus, a goal of any training process should be to expose poor operator/system interactions so that they may be remedied prior to deployment.

TRBATGRU's Training

OPERATORS

TRBATGRU began its battle group training in mid October 1998 with a Staff and Warfare Commanders' planning conference and training session at Tactical Training Group Atlantic (TACTRAGRULANT). In preparation, each Warfare Commander prepared OPTASKs and other related procedural documents. The training reinforced the planning process, task force infrastructure, battle group tactics, and crisis scenario development. Key TRBATGRU team members also had an opportunity to meet face-to face, creating strong team-building relationships.

Prior to Mid-October, the ships and Air Wing had trained individually. *Destroyer Squadron 28* (*DESRON 28*) conducted a group sail where their ship's participated in multi-ship operations and honed their warfare, shiphandling, and underway replenishment skills. *Carrier Air Wing 8 (CVW 8)*, the embarked air wing on *Theodore Roosevelt*, had recently completed tactical and strike warfare training in Fallon, Nevada. The TACTRAGRULANT training allowed these operators, skilled in their

areas of expertise, to practice Battle Group decision making and procedural skills.

SYSTEMS

Systems underwent a similar process that brought each unit to a specified level of readiness prior to the start of the underway portion of the Battle Group training exercises. By October 1998, most of TRBATGRU's deployment configuration for command and control, communications, computers and information systems (C4I) were installed and in the process of completing system operability and validation tests (SOVTs). The Target Configuration Date (TCD), the time by which all installations and systems testing would be completed, was scheduled for late November. Any installations after that time would require approval by the Battle Group Commander. This process allowed TRBATGRU to maintain control over the deployment C4I configuration so that changes would not adversely impact the Battle Group's ability to operate its current configuration. From the operator's perspective, operability is rated higher than having the "newest toys on the block".

COMPTUEX

TRBATGRU's Comprehensive Task Unit Exercise (COMPTUEX) commenced in mid-November. In preparation, *Theodore Roosevelt* conducted *CVW 8* carrier qualifications and *DESRON 28* conducted undersea warfare training enroute to the training site in the Puerto Rico Operating Area. Carrier Group Four, who is responsible for conducting and evaluating Carrier Battle Group training, was embarked onboard *Theodore Roosevelt* for the exercise. At the completion of COMPTUEX, Carrier Group Four certified TRBATGRU as qualified to conduct open ocean flight operations and ready to perform the basic duties of a deployable Carrier Battle Group.

COMPTUEX consisted of a series of short warfare (Air, Surface, Undersea, and Strike) exercises, culminated by a 3-day multi-warfare crisis scenario. Support activities such as underway replenishments, logistic helicopter transfers, Carrier Onboard Delivery (COD) flights, mail delivery, repair parts re-allocation (MATCONOFF), and Battle Group assisted repairs (BGIMA) were also accomplished in order to sustain TRBATGRU at sea. The exercises stressed operator/system interactions with the goal of identifying training and system deficiencies. Deficiencies could then be evaluated and a plan devised and implemented to reduce or eliminate their impact prior to deployment.

COMPTUEX afforded TRBATGRU an opportunity to use their warfare reporting, management, and decision-making procedures. In particular, the exercise focused on the importance of maintaining an accurate air and surface track database. An accurate track picture prevented "blue on blue" engagements (i.e. shooting down our own forces) and ensured that Battle Group resources were adequately employed to meet the threat. SIPRNET did not play a major role in battle group coordination during COMPTUEX since *Theodore Roosevelt* had the only functioning SIPRNET system at the time. In lieu of SIPRNET connectivity, the Sea Combat Commander was embarked onboard *Theodore Roosevelt* in order to form a more direct working relationship between the Battle Group and DESRON Staffs.

In summary, COMPTUEX solidified TRBATGRU's leadership and tested its operating procedures. Operator/system interactions were high and their overall positive. However, systems that were not highly utilized, such as SIPRNET, VTC,

and other key SHF (super high frequency) and EHF (extremely high frequency) reliant systems, could not be fully evaluated and their weaknesses exposed until the next battle group training exercise, the Joint Task Force Exercise (JTFEX).

JTFEX

The JTFEX is the final exercise before deployment. The objective is to subject a battle group to the rigors of a crisis scenario that deteriorates to open conflict. Fortunately, TRBATGRU had the opportunity to conduct JTFEX with the participation of the *Kearsarge* Amphibious Readiness Group (KSGARG), a Netherlands Task Force, the Standing Naval Forces Atlantic (SNFL) NATO Task Force, and other non-U.S. forces (Figure 3). Commander Second Fleet played the role of JTF Commander and evaluated the exercise. Per battle rhythm, the JTF Commander received a daily VTC brief from TRBATGRU, KSGARG, and the other subordinate commanders to discuss the previous day's progress and to comment on future plans. As a result, continuous SIPRNET, POTS (Plain Old Telephone System) telephone, and VTC communications were required in order to meet reporting/coordination requirements.

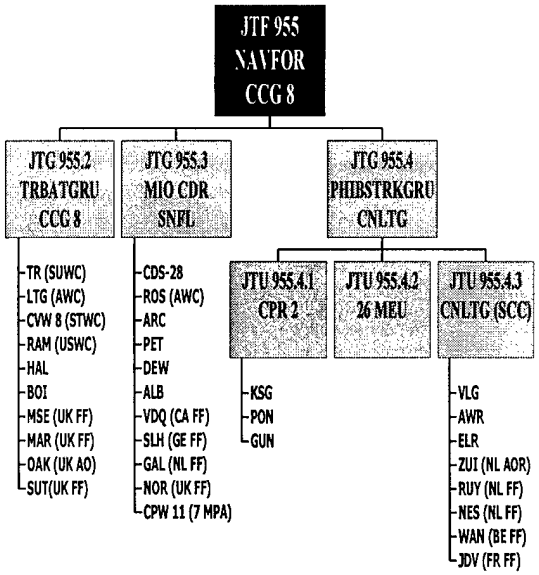

FIGURE 3. Naval Force organization for TRBATGRU's JTFEX.

The JTFEX scenario was structured such that the naval forces were separated by over 1000 miles at the beginning of the exercise and brought together at the end. TRBATGRU had an opportunity to work in close proximity with KSGARG and its escorts, the Netherlands Task Group. The SNFL Commander, RADM Hoch, directed Maritime Intercept Operations (MIO) with *DESRON 28* and operated in a different location than TRBATGRU and KSGARG. As the conflict intensified, the forces moved closer together and the SNFL and DESRON staffs embarked onboard *Theodore Roosevelt.* During the exercise, a series of simulated aircraft and Tomahawk strike operations were conducted. An afloat JFACC (Joint Force Air Component Commander) was established on *Theodore Roosevelt* (with Air Force participation) and later moved ashore to be headed by the Marine Corps. As a result, joint U.S. and NATO force participation exposed TRBATGRU to a wide range of operating procedures and communication configurations. As it turned out, JTFEX mirrored many of the situations TRBATGRU would face during deployment.

In summary, JTFEX demonstrated the reliance of the Battle Group Commander on SHF communications to support VTC, SIPRNET, and POTS communications. These systems were vital to reliable coordination and information flow required of the battle rhythm. As a result, operator/system interactions in communications, sensor, and track management systems produced the greatest operational impact. When these systems failed or when operators failed to perform at the required proficiency, the net result was reduced information flow and lack of data confidence, causing delays in the decision

making and action execution process. Such occurrences could give an enemy an advantage and allow them an opportunity to react faster than the Battle Group could respond.

LESSONS LEARNED

JTFEX provided many learning opportunities and allowed TRBATGRU time to devise repair and technical support strategies prior to deployment. However, only those systems that were used during JTFEX would benefit from this process. For example, after JTFEX a form of SIPRNET was installed in the remaining TRBATGRU ships after TCD. Due to the proven advantages of SIPRNET during JTFEX, TRBATGRU approved the TCD waiver and the installation was accomplished via the INMARSAT B system. Although the installation did not provide all the amenities of the system installed on *Theodore Roosevelt*, it did provide these ships with a secure e-mail capability. However, the configuration on *Ross*, due to a high-speed data (HSD) upgrade, gave *DESRON 28* POTS and SIPRNET web browsing capability. The additional capability kept the Sea Combat Commander in direct contact with the Battle Group and Fleet Commanders. Without this capability, *DESRON 28* would have been severely handicapped as a Task Force Commander in the absence of *Theodore Roosevelt*. This deficiency would not have been recognized had it not been for JTFEX.

DEPLOYMENT

As the deployment date, 26 March, approached, it became obvious that TRBATGRU would be involved in strike operations in Kosovo. During the transit to the Mediterranean, the Air Wing received day and night flight training while the Battle Group, Air Wing, and DESRON staffs finalized their preparations. TRBATGRU had to be ready to quickly step into the established battle rhythm and reporting requirements of Operations Allied Force and Noble Anvil which supported the crisis in Kosovo. Operators and systems had to perform flawlessly with positive operator/system interaction.

Kosovo

MARITIME OPERATIONS

Upon reporting to Sixth Fleet, the lead elements of TRBATGRU (*Ross* with *DESRON 28* embarked and *Vella Gulf*) reported immediately to the Adriatic Sea in preparations for Tomahawk missile strike operations. *Theodore Roosevelt* was placed in the Ionian Sea, rather than the Adriatic. This allowed *Theodore Roosevelt* sufficient sea/air space to conduct prolonged flight operations without interference from the high density commercial shipping, surface ship operations, and military/commercial air traffic experienced in the Adriatic at that time. For example, upon TRBATGRU's arrival, a French Task Group with the aircraft carrier FOCH, the Standing Naval Forces Mediterranean Task Force, and *DESRON 18*'s (Enterprise Battle Group) ships were already operating in the Adriatic. The placement of *Theodore Roosevelt* in the Ionian Sea and *DESRON 28* in the Adriatic Sea allowed the aircraft carrier to be removed from any possible Serbian naval threat and *DESRON 28* to be in a central location to direct naval operations in the Adriatic. SIPRNET played a major role in allowing the DESRON to provide quick, high-density information flow to the Battle Group Commander. Once the ships were in place, data links, communication networks, logistic routes, surveillance areas, and Tomahawk missile launch areas were quickly established.

AIR OPERATIONS

The Combined Air Operations Center (CAOC) in northern Italy controlled all strike and air operations. The COAC assigned *CVW 8* their missions and generated the daily Air Tasking Order (ATO). Close COAC coordination via on-site liaisons, SIPRNET, and POTS lines was critical to successful mission planning. Due to the political sensitivities regarding collateral damage, strike operations were almost exclusively executed with PGMs such as laser-guided weapons and Tomahawk missiles. However, weather played a major role in determining which strike weapons could be used. Laser-guided weapons only work best in clear weather. Finally, EA-6 aircraft using HARM missiles were used repeatedly to suppress Serbian air defenses. Their presence allowed strike aircraft to proceed to their targets with zero losses.

COMMS AND COORDINATION

During the early stages of Operations Allied Force and Noble Anvil, TRBATGRU had two major military objectives: 1) gain air superiority over Kosovo and 2) prevent the Serbian naval forces from leaving port. The battle rhythm, Rules of Engagement, and operating procedures were tailored to meet those mission objectives. SIPRNET, VTC briefings, and POTS lines became the main communication path between TRBATGRU and the Fleet Commander, the CAOC, and the intelligence community. Also, logistics and support coordination would have been more difficult without SIRPNET and POTS because shore facilities rely heavily on these systems for secure communications. As in JTFEX, SHF communications played a dominant role, so system reliability had to remain high for prolonged periods. EHF communications were essential because of their support of Tomahawk strike operations. Tomahawk launch flexibility resulted in faster response times and more reliable execution.

COMMAND STRUCTURE

TRBATGRU's involvement in operations supporting Kosovo continued from 4 April until 10 June. During that time over 200 Tomahawk missiles and over 1200 laser-guided weapons were expended. To assist with future planning, TRBATGRU initiated a series of Commanders' Conferences with the French, British, NATO, Italian, and other European forces participating in the operation. A working relationship was established until a more formal command structure could be implemented. On 2 June, all naval forces were consolidated under NATO Command, a first time for a U.S. aircraft carrier. KSGARG was also present in the Adriatic to support humanitarian efforts in Albania and later sent Marines ashore to support Kosovo occupation.

SUMMARY

During the Kosovo operations, TRBATGRU encountered a mix of ARG, NATO, Allied, and European forces and had to implement communication and coordination strategies similar to those encountered in JTFEX. Training in a split operating geography with rapid conflict escalation allowed TRBATGRU to quickly adjust to the operating environment found in the Adriatic. However, two months of high tempo operations stressed the limits of ordnance and logistic sustainability.

Arabian Gulf

Theodore Roosevelt, *Leyte Gulf*, and *Arctic* departed for the Arabian Gulf in mid-July to relieve the *Kitty Hawk* Battle Group. The remaining TRBATGRU ships (with the exception of *Halyburton* who had been in the Arabian Gulf since April) stayed in the

Mediterranean for the remainder of the deployment. *DESRON 28* was assigned as Commander Task Force 60.

COMMAND STRUCTURE

Operation Southern Watch, which enforced the southern Iraqi no-fly zone, and MIO operations, which supported United Nations Sanction 986, were in effect. Middle East Force (MEF) deployers from the Pacific Fleet were already in the Arabian Gulf in company with British and Australian ships. *DESRON 50*, the destroyer squadron permanently assigned to the Arabian Gulf, operated from *Theodore Roosevelt* as the Sea Combat Commander and directed all MIO operations. *CVW 8* became a strike and surveillance resource for the Joint Task Force Commander - Southern Watch (JTF-SWA). TRBATGRU participated in these operations from 15 July to 26 August.

AIR OPERATIONS

The JTF-SWA operations required continuous monitoring of the airspace over southern Iraq and Saudi Arabia. *Theodore Roosevelt* and *Leyte Gulf* as Air Warfare Commander managed the air picture. As *CVW 8* aircraft departed *Theodore Roosevelt*, it was essential that secure communications and IFF (Identification Friend or Foe) systems were functional and reliable. Again, PGMs were exclusively in all strike operations. Daily SIPRNET and POTS communications with on-site liaisons at JTF-SWA was the normal means of coordinating activities. Although air operations were not as intense as in Kosovo, the summer heat and humidity created a harsh operating environment on the flight deck. Flight deck crews had to remain hydrated in order to stay alert and effective.

MARITIME OPERATIONS

MIO operations required close monitoring and, in some cases, boarding of commercial shipping in order to determine U.N. Sanction compliance. These operations required accurate intelligence, rapid information dissemination, and decisive response. One ship, a known U.N. Sanction violator, was carrying illegal cargo from Iraq. SEALs, via helicopter, conducted a night boarding of this vessel. Close coordination and reliable information flow resulted in this mission's success. Again SIPRNET, VTC, and POTS communications were used to pass and gather information. The high summer heat (95 degree sea water and air temperatures with 90% humidity) also impacted maritime operations. A/C plants were unable to produce sufficient amounts of cool air and chill water, resulting in electronic system failures and crew fatigue.

Deployment Summary

TRBATGRU's deployment closely matched the training experience encountered in JTFEX. SIPRNET, VTC, and POTS communications played a vital role during the Kosovo and Arabian Gulf operations just as they had during JTFEX. The deployment also demonstrated the value of PGMs because of their ability to accurately destroy targets with low collateral damage. PGMs were so successful that their increased usage placed a heavy burden on the logistics infrastructure in the Mediterranean. Most importantly, the deployment reemphasized the roles that operators, systems, and their interactions played during Battle Group operations. Operators provided the processes and procedures to manage the Battle Group. Systems assisted the operator with that function. Operator/system interactions determined the Battle Group's effectiveness and efficiency.

SYSTEMS

C4I systems and PGMs produced the greatest impact during TRBATGRU's deployment. Together these systems could also be used synergistically to produce more effective strike operations. C4I systems could provide faster targeting, allowing PGMs to be employed with greater accuracy and effectiveness.
Faster employment of PGMs could become the new trend in future operations as digital imagery, GPS (Global Positioning System) navigation, fast digital data links, and information display systems mature and become interconnected.

C4I Systems

The development and implementation of a battle group's C4I configuration is key to success during deployment. TRBATGRU's experience indicated a greater failure rate of systems that were installed after TCD (Table 2). In particular, the INMARSAT B installation after JTFEX experienced several failures during deployment. Low crew experience and overseas technical support compounded the problem and resulted in longer downtimes than other systems that were better supported. Equipment installed before TCD had the benefit of being thoroughly tested during COMPTUEX and JTFEX.

SHIP	C4I CASREPS	C4I TCD BUSTING CASREPS	% C4I TCD BUSTING CASREPS
TR	59	12	20%
LTG	11	4	36%
VLG	6	2	33%
PET	11	3	27%
RAM	2	2	100%
ROS	5	2	40%
ELR	7	3	43%
HAL	9	3	33%
BOI	5	1	20%
ALB	6	2	33%
ARC	6	2	33%
	127	36	28%

TABLE 2. Summary of TRBATGRU's C4I equipment casualties.

Systems Summary

Systems that produced the greatest impact during TRBATGRU's deployment are as follows:

- Communications:

a. Classified (SIPRNET) and unclassified (NIPRNET) e-mail systems improved coordination between ships and with shore commands. Web pages improved information accessibility. E-mail made it possible to transmit video, graphics, and photos.

b. VTCs allowed senior commanders to participate in daily status and planning briefings in a real time, face to face format.

c. POTS allowed ships to achieve secure inexpensive direct phone service with shore commands. Vital for informal coordination and person to person contact.

- Command and Control:

The GCCS-M system in conjunction with Link 16 and Dual Channel Multi-frequency Link 11allowed track data to be shared over large distances and by a variety of platforms. This system vastly improved Battle Group situational awareness.

- PGM Weapons:

PGMs allowed strike operations capable of high accuracy with low collateral damage. Combined with fast targeting methods, PGMs could be quickly re-targeted in response to mission priority changes or more updated targeting information. More all-weather PGMs are needed to improve operational flexibility.

CONCLUSION

From the operator's perspective, people (the operators) run the Battle Group Force. They direct ship and aircraft movements based on mission goals and objectives. Operators devise the processes and procedures on how to mange the battle group's information flow, planning, decision-making, and reporting infrastructure. Systems make it possible for operators (who are on a ship located in the middle of the ocean) to be able to make an impact on the external world. Systems allow operators to control forces, execute orders, and create the destructive power necessary to conduct military operations. Operators and system are therefore interdependent and cannot exist without the other. As a result, operator/system interactions are a vital component to force effectiveness and efficiency.

A battle group must be prepared for combat operations during a deployment. The C4I configuration and the Battle Group training process are key components to deployment readiness. As a result, synergy and communication between operators, system designers, and program sponsors are essential for improved Battle Group performance.

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To all members of the TRBATGRU and KSGARG, their superb efforts under trying circumstances led to the success of this deployment. The lessons learned will serve the U. S. Navy for years to come.

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13. ABSTRACT *(Maximum 200 Words)*

Since the end of World War II, Carrier Battle Groups have been used as an instrument of U.S. foreign policy. Over the years, they have evolved to provide the National Command Authority with a wide choice of response options. This evolutionary process, facilitated by the normal personnel rotations and capability upgrades that occur between deployments, allows a Battle Group to become essentially a "new and improved" version of itself for each successive deployment.

The Theodore Roosevelt Battle Group (TRBATGRU), a product of this process, successfully participated in two combat operations during deployment: Operation Allied Force/Noble Anvil and Operation Southern Watch. This paper highlights TRBATGRU's experience integrating operators and systems to meet a dynamic set of operational requirements. Specifically discussed are two systems that had significant operational impact: SIPRNET (a secure shipboard Internet-like information network) and PGMs (precision guided munitions). The operator's perspective on system development and usage is examined in order to identify insights into new Battle Group system development and design considerations.

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