



38 NORTH

Informed analysis of events in and around the DPRK.

JANUARY 11, 2011

The Yŏn- p'yŏng-do Incident

By Joseph S.
Bermudez Jr.

38 NORTH

38 North is a web-based initiative that harnesses the experience of long-time observers of North Korea and others who have dealt directly with Pyongyang in producing high quality analysis of events north of the 38th parallel.

38 North is a program sponsored by the U.S.-Korea Institute at SAIS and managed by Joel Wit and Jenny Town.

The views expressed are those of the authors and do not necessarily reflect official USKI positions.

Questions and feedback regarding **38 North** should be directed to: thirtyeighthnorth@gmail.com.

Visit www.38north.org.

THE YŎNP'YŎNG-DO INCIDENT, NOVEMBER 23, 2010¹

The Yellow Sea—known as the West Sea to Koreans—along the west coast of the Korean Peninsula has been the scene of numerous naval incidents between the Democratic People's Republic of Korea (DPRK) and the Republic of Korea (ROK) since the signing of the Korean War Armistice Agreement on July 27, 1953.² The most numerous and violent of these incidents have occurred in the relatively confined waters surrounding the five islands of Paengnyŏng-do, Taech'ŏng-do, Soch'ŏng-do, Yŏnp'yŏng-do and U-do. There are a profusion of reasons for this; however, the common underlying factor is the Northern Limit Line (NLL), which the DPRK has repeatedly decried as illegally drawn.³

In October 1999, based upon its claims of 12 nautical miles of territorial waters, the DPRK unilaterally declared a new

maritime line-of-control significantly further south than the current NLL. This has subsequently resulted in a number of significant and sometimes violent incidents. During the past twelve months alone these have included: a naval engagement on November 10, 2009 in which a Korean People's Navy (KPN) Shanghai II class patrol vessel was heavily damaged; a January 27, 2010 Korean People's Army (KPA) coastal defense artillery exercise near the ROK islands in the West Sea and overlapping the NLL; the March 26, 2010 torpedoing of the ROK Navy corvette *Cheonan* by a KPN midget submarine near the island of Paengnyŏng-do; a August 9, 2010 KPA coastal defense artillery exercise in the area of Yŏnp'yŏng-do; and most recently the November 23, 2010 artillery attack on Yŏnp'yŏng-do.

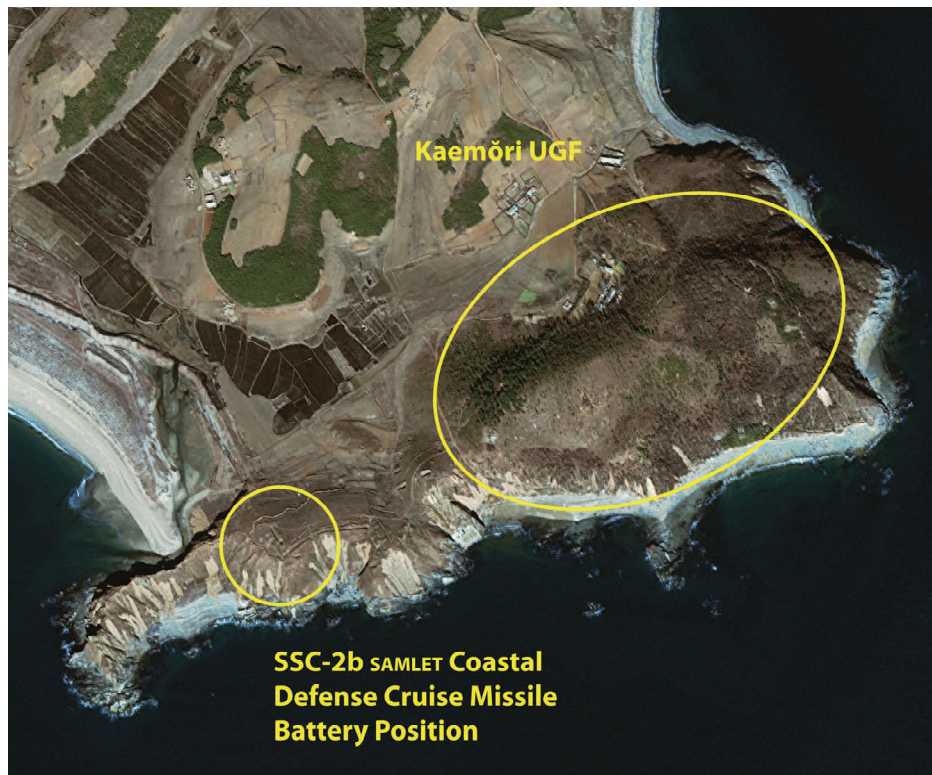
Joseph S. Bermudez Jr. is an internationally recognized analyst, award winning author and lecturer on North Korean defense and intelligence affairs and ballistic missile development in the Third World. He is concurrently a senior analyst and author for Jane's Information Group and editor of "KPA Journal." He can be reached at kpajournal@gmail.com.

A notable feature in both the January and August artillery exercises was that the KPA employed “time-on-target” tactics where rounds from different units, at varying distances, arrive at the same time on the same target. In addition to these larger exercises a number of smaller artillery exercises were held throughout the year across Hwanghae-namdo including several immediately north of Yŏnp’yŏng-do.

Kangnyŏng-bando

The Kangnyŏng-bando (i.e., Kangnyŏng Peninsula) is a jagged peninsula that extends south and west of the port city of Haeju-si, Hwanghae-namdo, into the West Sea. It is named after Kangnyŏng—the major city on the peninsula and is of strategic importance to the KPA due to the close proximity to the South, especially the island of Yŏnp’yŏng-do. As with most coastal areas adjacent to the ROK, the Kangnyŏng-bando has numerous small KPA bases, fortified positions, pre-surveyed artillery firing positions and underground facilities (UGF)—including specialized coastal defense artillery installations—scattered throughout it. Two of the more significant of these are the coastal defense artillery installation at Kaemŏri and what is believed to be a coastal defense missile battery one kilometer southeast of Sanjigol on the tallest peak in the area.⁴

Figure 1. Kaemŏri Underground Facility, November 29, 2010 (DigitalGlobe)



In addition to the KPA positions on the Kangnyŏng-bando, the KPA maintains a small garrison and coastal defense installation on the island of Mu-do, approximately 12 km (6.5 nm) to the northwest of

Yönp'yöng-do. The underground facility is located within a 45 m high hill on the east side of the island and houses a 76.2 mm artillery battery.⁵

Yönp'yöng-do

Located approximately 67 km (36 nm) northwest of the port city of Inch'ön, the ROK island of Yönp'yöng-do (a.k.a., Daeyeonpyeong-do), in Inch'ön-gwangyöksi, is 12 km (6.5 nm) south of the DPRK coast and only 3 km (1.6 nm) south of the NLL. The island encompasses an area of approximately 7.3 square km (2.8 square miles) and is home to 1,780 civilians and a ROK Marine unit of approximately 1,000 troops.⁶

The primary mission of the Marines is to defend the island against a KPA amphibious assault.⁷ The unit is augmented by various intelligence components and two artillery batteries. The first artillery battery is equipped with six 105 mm towed howitzers; the second with six 155 mm K-9 self-propelled howitzers and a number of K-10 armored ammunition resupply vehicles. Over the years the island has been fortified with numerous underground bunkers, hardened artillery sites, beach defenses, POL storage facilities, three helicopter pads, C4ISR facilities, fortified fighting positions and a number of other military related facilities.

Pre-Attack Activities

On November 16, 2010 the ROK Joint Chiefs of Staff (JCS) announced that it planned to conduct the annual Hoguk training exercise during November 22-30. As is routine for these exercises, the DPRK

Figure 2. Map of Kangnyöng-bando - Yönp'yöng-do Area



denounced them as “simulating an invasion of the North” and demanded that they be cancelled.⁸ The ROK rejected these demands since the Hoguk exercise had been held annually since 1996.⁹

According to statements by National Intelligence Service Director (NIS) Won Sei-hoon and MND spokespersons, ROK intelligence detected the movement of a KPA 122 mm MRL battalion south of the village of Kaun-gol on Kangnyŏng-bando “...two days before...” (i.e., November 21) the attack upon Yŏnp’yŏng-do.¹⁰ This battalion may have been from the IV Corps’ 33rd Infantry Division which is deployed to defend the southwest section of Hwanghae-namdo.¹¹ The information concerning the movement of the 122 mm MRL battalion does not appear to have been passed to the Marines stationed on Yŏnp’yŏng-do.¹²

Satellite imagery shows that each of the battery positions followed KPA standards, consisting of six individual

“U” shaped revetted positions.¹³ Adjacent to the individual positions was a small crew dugout (although these were not completed in many of the satellite images available). Given the dimensions of the prepared firing positions and the size of the vehicles themselves, it would appear that the battalion was equipped with the M-1985, M-1992 or M-1993 multiple rocket launcher (MRL).¹⁴

Figure 3. Map of Deployment, (Joseph S. Bermudez Jr.)



Figure 4. Northern Battery Firing Position near Kaun-gol, November 29, 2010 (DigitalGlobe)



Figure 5 (left). M-1992 122 mm MRL (KPA)



Figure 6 (right). M-1993 122 mm MRL, October 10, 2010 (KCTV)

At approximately 08:20 hours (local time) on November 23, 2010 the DPRK sent a telegram to the ROK stating that it would not “...sit idly by and watch if South Korea fires at North Korean waters during the military training.” According to then ROK Minister of National Defense (MND) Kim Tae-young this warning was dismissed since the ROK Marine exercise, a component of the unit’s monthly training cycle, was unrelated to the ongoing annual *Hoguk* exercise. Furthermore, the designated impact area within ROK territorial waters had been previously announced in internationally accepted *Notices to Airmen*.¹⁵

Somewhat later in the day, ROK artillery units on the islands of Yönp’yöng-do and Paengnyöng-do (a.k.a., Baeknyeong-do)—both in Inch’ön-gwangyöksi—commenced their routine monthly live-fire training exercise. The designated impact area for the exercise was 20-30 kilometers southwest of Yönp’yöng-do (i.e., within the waters now claimed by the DPRK).¹⁶

At approximately the same time, the 60th Air Regiment at Pukch’ang-ni Air Base, in P’yöngan-namdo, launched a flight of five MiG-23ML flogger g fighters. These aircraft flew southwest and assumed a patrol pattern over Hwanghae-namdo. Meanwhile, Korean People’s Navy (KPN) coastal defense missile units went on alert and a number of patrol vessels sortied from their bases on the West Sea. Additionally, some IV Corps long-range artillery units reportedly moved to pre-surveyed firing positions.¹⁷

Attack on Yönp’yöng-do

At 14:34 hours on November 23 the southern 122 mm MRL battery located 1.2 km south of Kaun-gol conducted an unprovoked surprise “time-on-target” artillery attack upon the ROK island of Yönp’yöng-do. It is possible that either one, or both, of the 76.2 mm coastal defense batteries at Kaemöri and on Mu-do participated in the attack.¹⁸

The initial barrage continued from 14:34 to 14:46 hours and consisted of an estimated 150 rounds. Approximately 60 rounds fell on Marine positions (including three helipads) and the small villages of Songnim-myöñ and Yönp’yöng-ni, while 90 rounds impacted in the surrounding waters. This barrage sent civilians racing to communal shelters and subsequently to the docks at Yönp’yöng-ni on the south side of the island to evacuate. Marines raced to their combat positions, while their artillery—still positioned to the southwest for the earlier live firing exercise—moved to hardened firing positions. At 14:47 hours the Marine 155 mm K-9 battery commenced counter-battery fire and continued until approximately 14:55 hours. The K-9 battery, however, faced some significant challenges. Only four of its six K-9 self-propelled howitzers were combat ready and the fire control center experienced trouble with its AN/TPQ-37 Fire Finder counter-battery radar. This forced the Marine K-9s to execute pre-planned counter-battery fire against “...command posts and barracks...” on Mu-do. Approximately 50 rounds were fired at targets on Mu-do before the AN/TPQ-37 Fire Finder was repaired and identified the 122 mm MRL battery south of Kaun-gol. Approximately 30 rounds of counter-battery fire were then directed against that position. After the initial KPA barrage there was a 15-minute pause then at 15:10 hours a

second barrage commenced. This lasted until 15:41 hours. The entire exchange lasted approximately one hour. The MND estimates that during the engagement the KPA fired approximately 170 rounds while the ROK Marine K-9s expended 80 rounds.¹⁹

Describing the initial “time-on-target” artillery barrage on Yŏnp’yŏng-do Marine Corporal Park Tae-min said, “First, I saw one or two shells falling. Then immediately, a shower of dozens of shells blanketed the town. ...In an instant, buildings were lifted and flown around, and fires erupted all over.”²⁰

While the artillery engagement was in progress, at 14:50 hours, the ROK Air Force (ROKAF) launched F-15K and KF-16 aircraft in preparation both to conduct retaliatory strikes against KPA positions and engage the KPAF MiG-23s should they undertake hostile actions—the rules of engagement in place at the time required presidential approval before engaging KPA forces except for instances of self-defense. The F-15K and KF-16 were subsequently given Presidential authorization to attack KPA artillery positions should they commence a third artillery barrage. Ultimately the KPA didn’t conduct a third barrage and these aircraft did not launch any strikes or engage the MiG-23s. On November 24, ROK Defense Minister Kim Tae-young stated that the highly restrictive rules-of-engagement were being reviewed to possibly update them to require emergency reaction aircraft to immediately launch retaliatory strikes if ROK units are under attack.²¹

At 15:45 hours the ROK JCS ordered the intelligence watch status of the armed forces be upgraded from watchcon 3 to watchcon 2. The defense condition—defcon, however, remained unchanged. Several hours after the attack, the ROK Ministry of Land, Transport and Maritime Affairs ordered the cessation of all civilian maritime and air traffic to and around the island. International flights operating out of Inch’ŏn International Airport were not impacted but were warned to exercise additional caution in the area.²²

Estimates of the total damage and casualties inflicted upon the KPA by the Marine K-9 counter-battery fire are unknown at this time. A ROK Joint Chiefs of Staff spokesperson, referring to the Mu-do strike, stated that satellite images “...show our shells landed on a cluster of barracks in North Korea, so we presume there have been many casualties and considerable property damage.”²³

Total ROK casualties as a result of the attack are reported to be 2 Marines and 2 civilians killed and 15 Marines and 3 civilians wounded.²⁴ The KPA shelling caused moderate damage to ROK Marine positions, damaged fuel stores, began bushfires at numerous locations on the island and destroyed or damaged a number of civilian structures in and around the village of Yŏnp’yŏng-ni. Large numbers of firefighters and emergency personnel from Inch’ŏn were deployed to the island to contain the fires and assist with recovery operations.²⁵

Post-Attack

Shortly after the engagement ended, the five MiG-23MLs from the 60th Air Regiment which had been on patrol landed at Hwangju Air Base in Hwanghae-bukto rather than returning to their home station further north at Pukch'ang-ni Air Base. The assumption being that this was done because the MiG-23MLs are some of the KPAF's more modern aircraft and they were being kept in the area should the ROKAF conduct retaliatory strikes.²⁶

That evening the ROK commenced a propaganda campaign against the DPRK sending 400,000 leaflets north over the border using specially designed balloons. The balloons were launched from four separate locations in Kangwŏn-do and Kyŏnggi

-do. They floated in a generally northeast direction dropping leaflets at predetermined times. These operations were ongoing as of December 7.²⁷

Satellite imagery indicates that by late afternoon of November 24 the southern 122 mm MRL battery vacated its position and moved 1 km south to a new one located 200 m north of the village of Tae-gol. The eastern 122 mm MRL battery vacated its position and moved 300 m south to a position in an open field.

On November 26, three days after the attack, KPA artillery units deployed on Kangnyŏng-bando, likely

Figure 7. Map of Deployment, (Joseph S. Bermudez Jr.)



Figure 8. Southern Firing Battery Position, November 29, 2010 (DigitalGlobe)



the same units involved in the November 23 attack, conducted artillery exercises at 12:20 and 15:00 hours. No rounds from these exercises impacted south of the NLL.²⁸ Another artillery exercise was held on December 8 at about 09:04 hours. When KPA artillery units at "...a far distance from the maritime border..." were reported to be conducting "regular firing exercises." No rounds from the exercise impacted south of the NLL.²⁹

During the week that followed the attack both North and South reinforced their assets in the region. For example, additional 130 mm guns were deployed along the coast of Hwanghae-namdo. The KPAF moved additional SA-2 batteries to prepared positions within the province. These were used to track the increased aerial activity of the ROKAF over the islands and the joint U.S.-ROK exercises in the West Sea. KPN coastal defense missile units maintained a higher alert status with missiles reportedly on launchers and ready for combat.³⁰

Shortly after the attack the Marines on Yŏnp'yŏng-do were able to return the two previously unavailable K-9s to a combat ready status. By November 28, a second K-9 battery, along with a battery of Kooryong 130 mm MLRS, a battery of Chonma surface-to-air missiles and an Army ARTHUR counter-battery radar unit were deployed to Yŏnp'yŏng-do.³¹ Additional Marines were deployed to all five ROK islands along the NLL. Meanwhile the ROKAF increased the number of sorties over the islands.³² Concurrent with these developments, the Joint Chiefs of Staff and the Defense Acquisition Program Administration

received an emergency weapons procurement budget of ₩300.5 billion (US \$1= ₩1,156).³³ The money will be utilized to purchase weapons and equipment to supplement the defenses on the five West Sea islands.

Comments

A number of aspects concerning the KPA's Yŏnp'yŏng-do attack warrant further comment and strongly suggest that the January and August 2010 coastal defense artillery exercises were in preparation for the Yŏnp'yŏng-do attack:

- The KPA's deployment of a Multiple Rocket Launcher (MRL) battalion to prepared firing positions on Kangnyŏng-bando, the DPRK's issuing of a warning early on November 23,³⁴ the dispatch of five MiG-23ML fighters at approximately 14:30 hours from Pukch'ang-ni Air Base in the north to patrol over Hwanghae-namdo in the south, and the deployment of KPN patrol vessels into the West Sea, are clear indications of a high degree of inter-service coordination and a considerable level of planning. Such operations could only have been achieved with the knowledge and permission of Kim Jong-il and the National Defense Commission.³⁵
- The initial barrage appears to have been conducted using time-on-target tactics. When done correctly such an attack provides for a high degree of surprise and has the potential to inflict more casualties since the troops receiving the attack have little time to seek shelter. The KPA's January 27-29, 2010 artillery exercise along the NLL and the August 9, 2010 artillery exercise conducted in the area of Yŏnp'yŏng-do, employed time-on-target tactics.³⁶
- Since the ROK Marine artillery was a known and observable quantity, it is probable that the KPA timed its attack, in part, to catch the K-9s outside of their hardened positions.
- Despite the reported use of radar, the accuracy of the attack was poor. MND sources state that the KPA fired approximately 170 rounds at Yŏnp'yŏng-do. Of these, 90 (53%) impacted in the waters surrounding the island. While 80 (47%) impacted on the island. Although inconclusive, the poor accuracy suggests that despite their pre-attack planning and exercises, KPA artillery troops—at least those in the IV Corps—are in need of greater training.
- The Yŏnp'yŏng-do attack demonstrated that the KPA possesses a realistic appreciation of ROK communications intelligence (COMINT) capabilities. In apparent preparation for the attack, the KPA laid new buried communications cable from the Kaemŏri UGF north to what appears to be a small communications center 700 m northwest of Sanji-gol. The freshly dug trench for this cable is clearly visible on satellite imagery and was apparently done with a high priority since it was obviously dug with a mechanized trencher and the route taken shows little concern for existing infra-

structure and terrain. Interestingly the northern MRL battery position, 460 m southeast of Kaun-gol, straddles the trench. That these measures were effective was confirmed by the NIS. Director Won Sei-hoon stated that “it was difficult to intercept further North Korean military communication before and on the day of attack because the North used landlines rather than wireless communication to carry out operations.”³⁷

Figure 9. Communications Cable Trench, November 29, 2010 (DigitalGlobe)



- Given the above comments, it is very likely that the Kaemōri UGF was used by artillery forward observers during the attack.
- The large number of “dud” rounds impacting the island is interesting. MND sources state that of the 80 rounds that impacted on the island, approximately 20 (25%) (12% if the total of 170 is taken into consideration) failed to detonate. This high failure rate suggests that some DPRK-manufactured artillery munitions—especially MRL rounds—suffer from either poor quality control during manufacture or that storage conditions and standards are poor.
- There were repeated reports during the days immediately following the attack that at least some of the 122 mm MRL rockets mounted thermobaric warheads.³⁸ These are incorrect and what they are most likely referring to are high-explosive warheads—possibly with an improved explosive with higher concentrations of aluminum or other components.³⁹

- To those outside the ROK, no great significance is attached to reports that recovered 122 mm rocket fragments contained handwritten numbers on their casings, since artillerymen throughout the world often write on artillery rounds. Within the ROK, however, there is considerable significance to these numbers in relation to the sinking of the *Cheonan* early this year. There are numerous skeptics within the country who believe that the *Cheonan* sinking was fabricated by the ROK Government, U.S. Government or both. A key item of their “evidence” is that the handwritten “No. 1” found on the remains of the CHT-02D torpedo that sunk the *Cheonan* could not have survived the high temperature explosion. Therefore it “must” have been fabricated. Some believe that the fact that similar types of marking were found on the exploded 122 mm rocket casings on Yŏnp’yŏng-do will help to silence these conspiracy theorists.⁴⁰

With regard to the ROK side, there are a number of observations:

- MND and NIS officials on a number of occasions have stated that they possessed detailed knowledge of the movement of the 122 mm MRL battalion on Kangnyŏng-bando, general knowledge of an impending attack, aware of the deployment of MiG-23ML fighters, etc.⁴¹ That this was not properly conveyed in a timely manner to the local Marine commander on Yŏnp’yŏng-do suggests that there are institutional problems in the ROK’s C⁴ISR system. This is especially true in light of the numerous incidents in the area during the past year.⁴²
- On December 1, 2010 press reports stated that NIS Director Won Sei-hoon had informed members of the National Assembly’s Intelligence Committee that in August, COMINT had revealed that the KPA was planning an attack against one of the ROK’s five West Sea islands. This naturally set off a public outcry over a perceived lack of intelligence and combat readiness. It now appears, however, that Director Won’s comments were taken out of context. The following day a spokesperson for the Joint Chiefs of Staff denied the press reports stating that “It’s not true that there was intelligence indicating North Korea might attack the five islands in the Yellow Sea,” and that Director Won’s remarks were incorrectly reported. The spokesperson went on to emphasize that the “...intelligence in August was on the North Korean military’s order to fire artillery against our military drill” (i.e., the Marines on Yŏnp’yŏng-do conducted artillery exercises on August 6 and 8. The KPA responded by conducting an artillery exercise on August 9).⁴³
- Given both its strategic location and the heightened tension along the NLL since 2009 Yŏnp’yŏng-do is clearly a frontline position. It is therefore difficult to justify the fact that two of the six K-9s were not combat ready and the AN/TPQ-37 Fire Finder counter-battery radar was not fully operational. According to a ROK politician, the Marines on the five West Sea islands operate two AN/TPQ-37 Fire Finder counter-battery radars—one based on Yŏnp’yŏng-do and the other on Paengnyŏng-do.⁴⁴ Both radars were acquired from the ROK Army, which purchased them from the U.S. in

1996 and 1998. The radars were deployed to the islands in February 2010 but have frequently been out of service for repairs. The AN/TPQ-37 on Yŏnp'yŏng-do suffered an antenna failure on April 16, a transformer and power supply failure on May 28, faulty wiring problems on July 21 and an unknown problem on November 23. The AN/TPQ-37 radar on Paengnyŏng-do had a problem with its signal receivers on February 21. That these maintenance problems were allowed to persist is likely a function of defense budgetary constraints, as well as a ROK military culture that views the Marines as the “red-headed stepchild” of the armed forces, rather than an indictment of the Marine units on the island.

- On the surface, it would appear to have been a serious failing that the Marine K-9s were not immediately available to return fire. This, however, would be a shortsighted assessment. At the time of the attack the Marine artillery was deployed for the live-fire exercise to the southwest of the island and not in position to return KPA fire. That the K-9s were able to redeploy, reload, obtain firing data and commence counter-battery fire within thirteen minutes—all while under enemy fire—demonstrates a high level of individual training and professionalism not to mention superior local command leadership.
- The extent to which ROK counter-battery fire of approximately 80 rounds thwarted a more intense third artillery barrage of Yŏnp'yŏng-do and the damage inflicted upon the KPA is a hotly debated issue.
 - * Of the 80 rounds fired by the Marine K-9s 50 (63%) were targeted against facilities on Mu-do and 30 (37%) against the 122 mm MRL battery south of the village of Kaun-gol. Available satellite imagery clearly shows at least 14 rounds impacted within 50-130 m of the 122 mm MRL battery position south of Kaun-gol, but none on the position itself. Approximately 15 rounds impacted on Mu-do, all within 130 meters of the island's underground facility and barracks. Several of these rounds appear to have impacted on a barracks and support building. Thus, a total of 29 (36%) of the rounds fired by the K-9s impacted within the general areas of the intended targets. ROK press reports state that a total of 30 rounds impacted “...in Kaemori,” by which they are referring to the Kangnyŏng-bando. This can't be confirmed with the available satellite imagery. If these 30 rounds are substituted for the 14 confirmed rounds, this would yield a total of 45 (56%) rounds that impacted within the general areas of the intended targets. None of these figures are particularly good and are likely the result of the AN/TPQ-37 Fire Finder counter-battery radar failure and being under attack at the time.⁴⁵
 - * Available satellite imagery provides no evidence (e.g., scorch marks from fire, craters from explosions, wrecked vehicles, ground scarring, etc.) that any of the 122 mm MRLs were

destroyed. While the same imagery shows damage to the barracks and support buildings on Mu-do, the UGF does not appear to have suffered any significant damage.⁴⁶

- * Rather than being a result of Marine counter-battery fire, the fact that there was no third barrage could simply have been that there was none planned. If a third barrage had been planned and the first MRL battery and the Mu-do UGF been neutralized, than either of the two remaining MRL batteries or the artillery battery at the Kaemōri UGF could have easily conducted the fire mission.⁴⁷

Figure 10. Central Firing Position near Kaun-gol, Showing Impact Craters from ROK Counter-battery Fire, November 29, 2010 (Digital Globe)



*** The author would like to thank Daniel Allmacher, Michael Madden, Dwight Rider and the many other unnamed individuals who were extremely generous with their time and expertise during the preparation of this report. A special thanks goes to the people at DigitalGlobe for their generosity in allowing me to use their imagery.*

¹ This account of the November 23, 2010 KPA attack upon the ROK island of Yōnp'yōng-do has been written with information available in the four short weeks following the attack. Readers are cautioned that, as with any account written so close to the event it is describing, it is likely that many important details are presently unavailable or incomplete.

² The Korean War is known as the “Fatherland Liberation War” within the DPRK. Aside from identifying the Yellow Sea as the West Sea, both Koreas also refer to the Sea of Japan as the East Sea.

³ This is the most basic of explanations of the Northern Limit Line and there is considerable debate concerning the actual date of its establishment. Readers interested in a more comprehensive understanding of this fascinating subject are advised to begin with the following sources: Central Intelligence Agency. *The West Coast Korean Islands*, BGI RP 74-9, January 1974 [Declassified 2000/04/18], <http://www.kpajournal.com/declassified-documents-old/The%20West%20Coast%20Islands%20January%201974.pdf>; Kotch, John Barry; Abbey, Michael. “Ending naval clashes on the Northern Limit Line and the quest for a West Sea peace regime,” *Asian Perspective*, Vol. 27, No. 2, pp. 175-204, <http://www.asianperspective.org/articles/v27n2-f.pdf>; Moo, Col. Bong Ryoo. *The Korean Armistice and the Islands*. Carlisle Barracks: U.S. Army War College, March 11, 2009, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA500904&Location=U2&doc=GetTRDoc.pdf>; *Text of the Korean War Armistice Agreement*, July 27, 1953, <http://news.findlaw.com/wp/docs/korea/kwarmagr072753.html>; and Van Dyke, Jon. *The Maritime Boundary Between North & South Korea in the Yellow (West) Sea*. Washington, DC: 38 North, U.S.-Korea Institute, Johns Hopkins University School of Advanced International Studies, July 29, 2010, <http://38north.org/2010/07/the-maritime-boundary-between-north-south-korea-in-the-yellow-west-sea/>.

⁴ Interview data acquired by Joseph S. Bermudez Jr.

⁵ Ibid.

⁶ ROK MND Statement November 29, 2010; and “S. Korea Deploys More Artillery, Rockets on Yeonpyeong Island,” *Yonhap*, November 29, 2010.

⁷ “Seoul to Bolster Marine Corps as Elite Force,” *Korea Herald*, December 4, 2010; “S.Korea 'Outgunned' in West Sea,” *Chosun Ilbo*, November 25, 2010, http://english.chosun.com/site/data/html_dir/2010/11/25/2010112501264.html; and McDonald, Mark. “‘Crisis Status’ in South Korea After North Shells Island,” *New York Times*, November 23, 2010, <http://www.nytimes.com/2010/11/24/world/asia/24korea.html?emc=tnt&tntemail0=y>.

⁸ McDonald, Mark. “‘Crisis Status’ in South Korea After North Shells Island,” *New York Times*, November 23, 2010, <http://www.nytimes.com/2010/11/24/world/asia/24korea.html?emc=tnt&tntemail0=y>.

⁹ “US Marine Won’t Participate in Exercise in West Sea,” *Korea Times*, November 18, 2010, http://www.koreatimes.co.kr/www/news/nation/2010/11/205_76555.html.

¹⁰ Interview data acquired by Joseph S. Bermudez Jr.; “Failure of Intelligence And Vigilance,” *Dong-A Ilbo*, December 3, 2010, <http://www.asahi.com/english/TKY201012030537.html>; and “Fumbling on Intelligence,” *JoongAng Ilbo*, December 3, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2929138>.

¹¹ Within the KPA, 107 and 122 mm MRLs are generally brigade and division level assets, while 140, 200 and 240 mm MRLs are typically Corps and Army level assets. The identification of the 33rd Infantry Division remains to be confirmed. Interview data acquired by Joseph S. Bermudez Jr.; Bermudez Jr., Joseph S. *The Armed Forces of North Korea*. London: I.B. Taurus, 2001, pp. 57-78; and “S.Korea 'Unlikely' to Have Damaged N. Korean Artillery Positions,” *Chosun Ilbo*, December 1, 2010, http://english.chosun.com/site/data/html_dir/2010/12/01/2010120101038.html. One ROK report describes the organization of the MRL battalion as being “...six 122-mm MLRS shells and later two batteries of 12 112-mm MLRS shells.” The reference to “112 mm MLRS” is in error. “Military Knew of N.Korean Artillery Move Before Attack,” *Chosun Ilbo*, November 26, 2010, http://english.chosun.com/site/data/html_dir/2010/11/26/2010112600954.html; and “The Devastating Power of N. Korea's MLRS Artillery,” *Chosun Ilbo*, November 26, 2010, http://english.chosun.com/site/data/html_dir/2010/11/26/2010112600744.html.

¹² “Military Knew of N.Korean Artillery Move Before Attack,” *Chosun Ilbo*, November 26, 2010, http://english.chosun.com/site/data/html_dir/2010/11/26/2010112600954.html.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ It should be noted that the DPRK Foreign Ministry and the Korean People’s Army routinely condemn and sometimes threaten war in response to large ROK or joint ROK-U.S. military exercises. Kim, Christine. “South Thwarts Even Bigger

Attack: Military Says Strike by Howitzers Took Out Equipment,” *Joongang Ilbo*, November 25, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928852>; “N.Korea Cites S.Korean Drill as Excuse for Attack,” *Chosun Ilbo*, November 24, 2010, http://english.chosun.com/site/data/html_dir/2010/11/24/2010112401004.html; McDonald, Mark. “‘Crisis Status’ in South Korea After North Shells Island,” *New York Times*, November 23, 2010, <http://www.nytimes.com/2010/11/24/world/asia/24korea.html?emc=tnt&tntemail0=y> and “N. Korea Threatens Additional Attacks, Accuses S. Korea of Provocation,” *Yonhap*, November 23, 2010.

¹⁶ “N. Korea Threatens Additional Attacks, Accuses S. Korea of Provocation,” *Yonhap*, November 23, 2010.

¹⁷ “ROK Defense Ministry Says DPRK Fires 170 Shells in Act of ‘Savagery,’” *Agence France Presse*, November 24, 2010.

¹⁸ During the past ten years a growing percentage of the KPA’s coastal defense artillery has been upgraded to 130 mm guns, with a range of 27 km. The unit at Kaemŏri, however, was still equipped with 76.2 mm guns with a range of 12 km. Interview data acquired by Joseph S. Bermudez Jr.; Kim, Christine. “N. Korea Fired Thermobaric Bombs,” *Joongang Ilbo*, November 26, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928905>; “ROK Defense Ministry Says DPRK Fires 170 Shells in Act of ‘Savagery,’” *Agence France Presse*, November 24, 2010; and “Navy Warns of Threat from N.Korea’s Coastal Artillery,” *Chosun Ilbo*, August 10, 2010, http://english.chosun.com/site/data/html_dir/2010/08/10/2010081000648.html.

¹⁹ There is some confusion over the number of combat ready K-9s. Most sources state three were combat ready, while another source places the number at four. According to Defense Minister Kim Tae-young the 105 mm guns were not employed to conduct counter-battery fire because the range was too short. He also stated that the 105 mm howitzers on the island would quickly be replaced by more modern and longer-ranged K-9 self-propelled systems. It should be noted that Minister Kim was compelled to tender his resignation on November 25th because of the incident. President Lee Myung-bak replaced him with Kim Kwan-jin, former Chairman of the Joint Chiefs of Staff. “Failure of Intelligence And Vigilance,” *Dong-A Ilbo*, December 3, 2010, <http://www.asahi.com/english/TKY201012030537.html>; Song, Sang-ho. “Spy Agency, Military Under Fire for not Dealing with N. Korea,” *Korea Herald*, December 2, 2010, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=20101202000986>; “S. Korea Names New Defense Minister,” *Yonhap*, December 4, 2010; “Military Pushes to Increase Budget For Defending Western Islands,” *Yonhap*, November 29, 2010; “Military Knew of N.Korean Artillery Move Before Attack,” *Chosun Ilbo*, November 26, 2010, http://english.chosun.com/site/data/html_dir/2010/11/26/2010112600954.html; Ser, Myo-ja. “Defense Minister Resigns After Heavy Criticism,” *Joongang Ilbo*, November 26, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928904>; Ser, Myo-ja. “Lee Appoints New Defense Minister: Former Head of Military to Boost Morale, Make Reforms,” *Joongang Ilbo*, November 27, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928933>; “S. Korea Considers Deploying ‘cave-busting’ Missiles on Border Islands,” *Yonhap*, November 25, 2010; Kim, Christine. “South Thwarts Even Bigger Attack: Military Says Strike by Howitzers Took Out Equipment,” *Joongang Ilbo*, November 25, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928852>; “Military Under Fire for Response to N. Korean Attack,” *Chosun Ilbo*, November 25, 2010, http://english.chosun.com/site/data/html_dir/2010/11/25/2010112500536.html; “ROK Defense Ministry Says DPRK Fires 170 Shells in Act of ‘Savagery,’” *Agence France Presse*, November 24, 2010; “S. Korea to Toughen Rules of Engagement Against N. Korean Attack,” *Yonhap*, November 24, 2010; “ROK To Deploy More Artillery on Island After Shelling,” *Agence France Presse*, November 24, 2010; “N. Korea Fires Artillery Onto S. Korean Island; Two Soldiers Killed,” *Yonhap*, November 23, 2010; Sanger, David E. and McDonald, Mark. “South Koreans and U.S. to Stage a Joint Exercise,” *New York Times*, November 23, 2010, <http://www.nytimes.com/2010/11/24/world/asia/24nkorea.html?emc=tnt&tntemail0=y> and “S. Korea Warns of ‘Stern Retaliation’ Against any Additional N. Korean Attacks,” *Yonhap*, November 23, 2010.

²⁰ Kim, Sam. “S. Korean Marines Recount N. Korea’s Deadly Shelling of Yeonpyeong,” *Yonhap*, December 14, 2010.

²¹ “S.Korea ‘Was Ready to Strike’ North During Yeonpyeong Attack,” *Chosun Ilbo*, December 13, 2010, http://english.chosun.com/site/data/html_dir/2010/12/13/2010121300397.html; “Defense Minister Resigns After Heavy Criticism,” *Joongang Ilbo*, November 26, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928904>; “Military Under Fire for Response to N.Korean Attack,” *Chosun Ilbo*, November 25, 2010, <http://english.chosun.com/site/data/>

html_dir/2010/11/25/2010112500536.html; and “S. Korea to Toughen Rules of Engagement Against N. Korean Attack,” *Yonhap*, November 24, 2010.

²² “Seoul Bans Movement of Boats, Small Planes Near Attacked Island,” *Yonhap*, November 23, 2010.

²³ “‘Source’ Cites DRPK Official Saying DPRK Had Many More Casualties Than ROK,” *Kyodo*, December 4, 2010; “Military Suggests Counterfire Caused ‘Many Casualties’ in N. Korea,” *Yonhap*, December 3, 2010; and “S.Korea ‘Unlikely’ to Have Damaged N.Korean Artillery Positions,” *Chosun Ilbo*, December 1, 2010, http://english.chosun.com/site/data/html_dir/2010/12/01/2010120101038.html.

²⁴ The two Marines were Sgt. Seo Jeong-woo (22) and Pvt. Moon Kwang-wook (20). Kim, Sam. “S. Korean Marines Recount N. Korea’s Deadly Shelling of Yeonpyeong,” *Yonhap*, December 14, 2010; “Rival Parties Embarrassed By Blunders on Yeonpyeong Island,” *Yonhap*, December 1, 2010; “S. Korea to Toughen Rules of Engagement Against N. Korean Attack,” *Yonhap*, November 24, 2010 and McDonald, Mark. “‘Crisis Status’ in South Korea After North Shells Island,” *New York Times*, November 23, 2010, <http://www.nytimes.com/2010/11/24/world/asia/24korea.html?emc=tnt&tntemail0=y>.

²⁵ Yu, Kil-yong and Kim Mi-ju. “Island in Ruins After Shelling: With Homes Destroyed and Forests Burned, Hundreds of Residents Flee,” *Joongang Ilbo*, November 25, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928850>; “ROK Defense Ministry Says DPRK Fires 170 Shells in Act of ‘Savagery,’” *Agence France Presse*, November 24, 2010; and “Fire Crew Battles Fire on Yeonpyeong Island Mountains After N. Korean Shell Attack,” *Yonhap*, November 24, 2010.

²⁶ “ROK Defense Ministry Says DPRK Fires 170 Shells in Act of ‘Savagery,’” *Agence France Presse*, November 24, 2010.

²⁷ “Seoul Continues Sending Anti-Pyongyang Leaflets, Ready to Use Border Speakers,” *Yonhap*, December 7, 2010; Kim, Eun-jung. “Rights Panel Recommends Resuming Anti-Pyongyang Propaganda,” *Yonhap*, December 7, 2010; and “S. Korea Sent Propaganda Leaflets to N. Korea After Artillery Attack,” *Yonhap*, November 26, 2010.

²⁸ Moon Gwang-lip. “North Sets Off More Guns Ahead of Joint Drill,” *Joongang Ilbo*, November 27, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928932>; “North Korea Stages Apparent Artillery Drill, South Korea Not Hit,” *Agence France Presse*, November 26, 2010; and “Military: Artillery Sound From Within North’s Territory, No Shells Land in Southern Waters,” *Yonhap*, November 26, 2010.

²⁹ “Radar Monitors NK Artillery Drill in Yellow Sea,” *Dong-A Ilbo*, December 9, 2010; and “Sounds of Artillery Fire Heard in N. Korea, Military Official Says,” *Yonhap*, December 8, 2010.

³⁰ At least one source states that the KPAF also moved SA-5 SAMs to Hwanghae-namdo. This, however, seems unlikely since the SA-5s have the range to cover all of Hwanghae-namdo and most of the northern section of the ROK from their current locations. Interview data acquired by Joseph S. Bermudez Jr.; “N. Korea Deploys More Multiple-launch Rockets: Source,” *Yonhap*, December 3, 2010; Moon Gwang-lip. “North Sets Off More Guns Ahead of Joint Drill,” *Joongang Ilbo*, November 27, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928932>; and “Military: Artillery Sound From Within North’s Territory, No Shells Land in Southern Waters,” *Yonhap*, November 26, 2010.

³¹ On November 30, 2010 Defense Minister Kim Tae-young informed the National Assembly that current reinforcement plans call for deployment of an additional 24 K-9 and K-55 self-propelled howitzers on Paengnyŏng-do and Yŏnp’yŏng-do. The ARTHUR (Artillery Hunting Radar) was developed by the Swedish firm Ericsson Microwave Systems during the 1990s. It is in service with the armed forces of the Czech Republic, Denmark, Norway, ROK, Sweden and the United Kingdom. Interview data acquired by Joseph S. Bermudez Jr.; “Radar Monitors NK Artillery Drill in Yellow Sea,” *Dong-A Ilbo*, December 9, 2010; “Gov’t Promises Tougher Rules of Engagement,” *Chosun Ilbo*, December 1, 2010, http://english.chosun.com/site/data/html_dir/2010/12/01/2010120100569.html; “S. Korea Deploys Missiles on Yeonpyeong Island,” *Yonhap*, December 1, 2010; “S. Korea Deploys More Artillery, Rockets on Yeonpyeong Island,” *Yonhap*, November 29, 2010; “N. Korea Deploys SA-2 Surface-to-air Missiles Near Yellow Sea Border,” *Yonhap*, November 28, 2010; and “N. Korea Keeps Rocket Launchers in Position,” *Dong-a Ilbo*, November 27, 2010, <http://english.donga.com/srv/service.php3?biid=2010112778288>.

³² *Ibid.*

³³ “The Best Weapons Are Useless If Strategy Is Inept,” *Chosun Ilbo*, December 1, 2010, http://english.chosun.com/site/data/html_dir/2010/12/01/2010120101069.html.

³⁴ “N.Korea Cites S.Korean Drill as Excuse for Attack,” *Chosun Ilbo*, November 24, 2010, http://english.chosun.com/site/data/html_dir/2010/11/24/2010112401004.html.

³⁵ It is difficult to assess the validity and relevance to the Yŏnp’yŏng-do attack of reports that Kim Jong-il, Kim Jong-un and various KPA officers (e.g., Generals Kim Myong-guk, Kim Yong-ch’ol, Kim Kyok-sik, etc.) visited sites in Hwanghae-namdo prior to, and on the day of, the attack. The DPRK has routinely manipulated such reporting for a variety of reasons. Interview data acquired by Joseph S. Bermudez Jr.; Jeong, Yong-soo and Kim, Christine. “Kim and Jong-un Ordered Bombardment,” *JoongAng Ilbo*, November 25, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928853>; Kim Jong-il, Son Visited Coastal Forces Before Yeonpyeong Attack,” *Chosun Ilbo*, November 25, 2010, http://english.chosun.com/site/data/html_dir/2010/11/25/2010112500724.html; and Kang, Hyun-kyung. “Kim Jong-il Approved Artillery Attack: Official,” *Korea Times*, November 24, 2010, http://www.koreatimes.co.kr/www/news/nation/2010/11/116_76884.html.

³⁶ Interview data acquired by Joseph S. Bermudez Jr., and Kim, Christine. “N. Korea Fired Thermobaric Bombs,” *JoongAng Ilbo*, November 26, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928905>.

³⁷ Ibid.; “Fumbling on Intelligence,” *JoongAng Ilbo*, December 3, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2929138>; and “Spies Intercepted Plans For Yeonpyeong Attack in August,” *Chosun Ilbo*, December 2, 2010, http://english.chosun.com/site/data/html_dir/2010/12/02/2010120200566.html.

³⁸ “N. Korea Presumed to Have Used 'High Explosives' in Attack,” *Yonhap*, November 27, 2010; Kim, Christine. “N. Korea Fired Thermobaric Bombs,” *JoongAng Ilbo*, November 26, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928905>; “The Devastating Power of N. Korea's MLRS Artillery,” *Chosun Ilbo*, November 26, 2010, http://english.chosun.com/site/data/html_dir/2010/11/26/2010112600744.html; and “N. Korea Presumed to Have Used 'Fuel-Air Bombs' in Attack,” *Yonhap*, November 25, 2010.

³⁹ Interview data acquired by Joseph S. Bermudez Jr.

⁴⁰ “Markings Connect Artillery Shells, *Cheonan* Torpedo,” *JoongAng Ilbo*, November 29, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2928974>.

⁴¹ “Fumbling on Intelligence,” *JoongAng Ilbo*, December 3, 2010, <http://joongangdaily.joins.com/article/view.asp?aid=2929138>; “Failure of Intelligence And Vigilance,” *Dong-A Ilbo*, December 3, 2010, <http://www.asahi.com/english/TKY201012030537.html>; and “Military Knew of N.Korean Artillery Move Before Attack,” *Chosun Ilbo*, November 26, 2010, http://english.chosun.com/site/data/html_dir/2010/11/26/2010112600954.html.

⁴² There has been some suggestion that the KPA was able to achieve the level of surprise that they did, because they had engaged in a deception plan which flooding ROK intelligence with numerous reports of activity along throughout the DPRK. Thereby, helping to mask the importance of the activity on the Kangnyŏng-bando. Interview data acquired by Joseph S. Bermudez Jr.

⁴³ Ibid.; “Military Denies Spy Chief's Remark on N. Korea's Attack Plan,” *Yonhap*, December 2, 2010; “Spies Intercepted Plans For Yeonpyeong Attack in August,” *Chosun Ilbo*, December 2, 2010, http://english.chosun.com/site/data/html_dir/2010/12/02/2010120200566.html; Song, Sang-ho. “Spy Agency, Military Under Fire for not Dealing with N. Korea,” *Korea Herald*, December 2, 2010, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=20101202000986>; and “South Korea spy Chief Says More Attacks Likely,” *Reuters*, December 1, 2010.

⁴⁴ “Yeonpyeong Artillery Warning System 'Was Old And Faulty',” *Chosun Ilbo*, December 3, 2010.

⁴⁵ Interview data acquired by Joseph S. Bermudez Jr.; Song, Sang-ho. “Spy Agency, Military Under Fire for not Dealing with N. Korea,” *Korea Herald*, December 2, 2010, <http://www.koreaherald.com/national/Detail.jsp?newsMLId=20101202000986>; and “Failure of Intelligence And Vigilance,” *Dong-A Ilbo*, December 3, 2010, <http://www.asahi.com/english/TKY201012030537.html>.

⁴⁶ Ibid.

⁴⁷ Ibid.