

North Korea's New Launch Facility Almost Complete

By Joseph S. Bermudez, Jr. and Tim Brown

North Korea is in the final stages of completing a new missile and space launch facility. Located on the west coast of North Korea several kilometers southwest of the village of Tongch'ang-dong, the base has been under construction for the past 8 years and will be capable of launching the both the Taepodong 2 ballistic missile and the Taepodong 2 Space Launch Vehicle. The facility also has a rocket engine test stand, which is capable of supporting test firings of all known North Korean rocket motors.



Figure 1. Location map

While the official national designator of this facility is unknown, it is common practice to name such facilities by using the name of the closest populated place. In this case it could be either the small village of Pongdong-ni or Kwi-gol, both of which were partially demolished during the construction. The designation Pongdong-ni Missile and Space Launch Facility is used here for readability. Other names sometimes suggested include Tongch'ang-dong and Dongchong-ni.

The installation is small by Western standards, but large by North Korean standards. The launch facility consists of a movable launch pad, and ten-story tall umbilical tower capable of supporting North Korea's largest ballistic missiles and space launch vehicles. About one kilometer south of the launch pad there is a rocket engine test stand, which is very similar to the Shahid Hemmat test facility outside of Tehran, Iran. The North Korean and Iranian governments have been collaborating on ballistic missile programs since the early 1980s. A recent example of this was Iran's use of a Safir

(Messenger) space launch vehicle to launch its Omid (Hope) satellite. The Safir is closely based upon North Korea's indigenous Nodong missile.

North Korea's older missile test facility at Musudan-ni is small, of limited capabilities and has seen only intermittent use over the last few years. This, coupled with the apparent lack of modern missile launch and engine test facilities, had led some non-governmental experts to conclude that North Korea had a declining ability to pursue an indigenous missile research and development program. Consequently, it had outsourced this to Iran, which has greater resources and a larger research and development base. The discovery of this new facility, however, negates such conclusions and demonstrates that North Korea remains actively engaged in an ambitious ballistic missile program and is committed to launching satellites into space.



Figure 1a. Comparison of the Pongdong-ni and Musudan-ni Facilities. (Credit GeoEye)

While the United States and North Korea have negotiated over dismantling its nuclear weapons program, North Korea's ballistic missile and space programs have continued unabated.

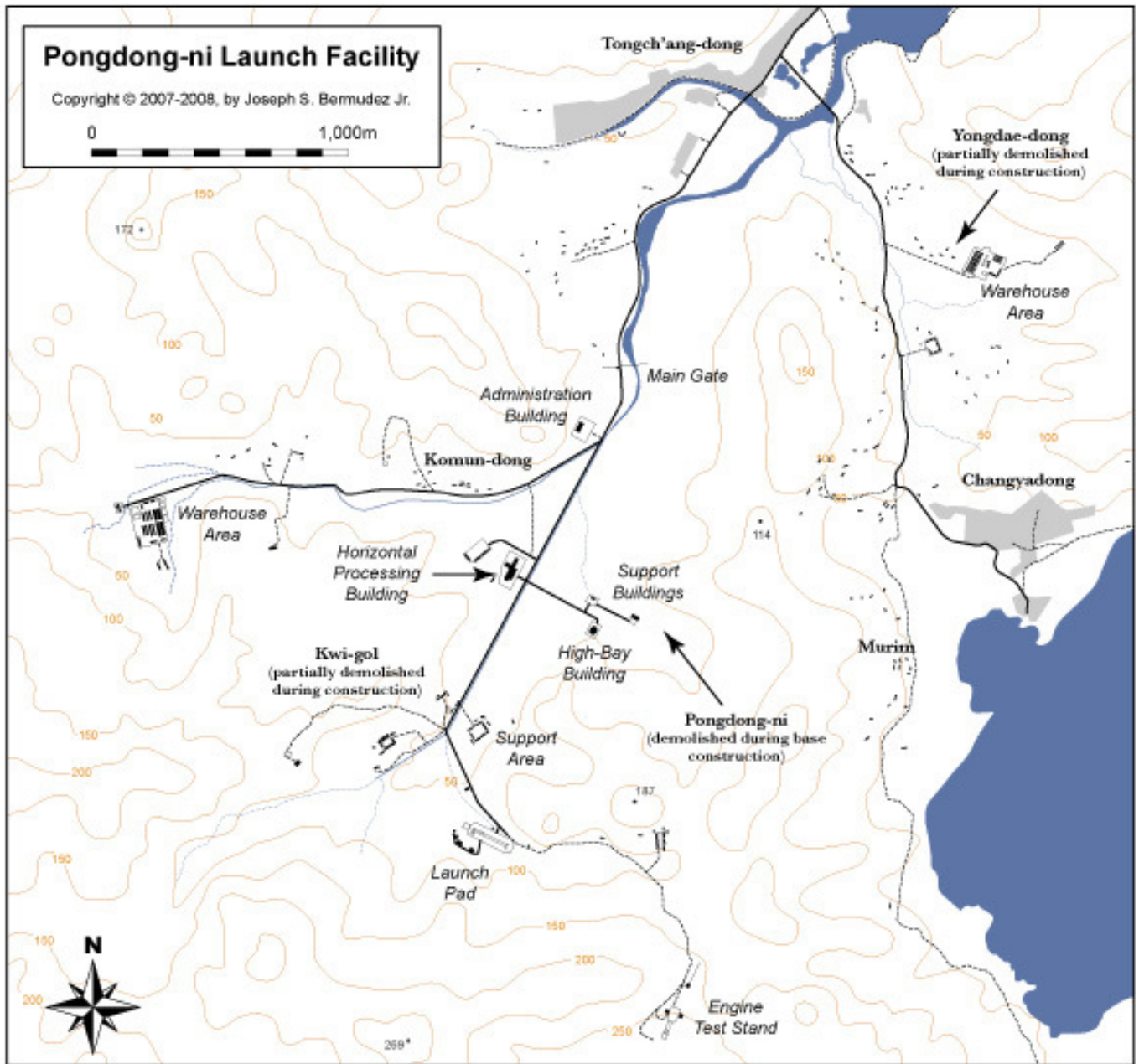


Figure 2. Map of Pongdong-ni Missile and Space Launch Facility



Figure 3. Negation imagery from 1 June 1992 and 14 September 2001 showing ground scars and the beginning of construction (credit: Global Land Cover Facility - Landsat)



Figure 4. Imagery from 1 April 2006, Shows the progress of construction activity. (credit: DigitalGlobe)

Launch Area

The launch area consists of a 40 meters tall umbilical tower adjacent to rail served movable launch pad measuring 10 by 13 meters. The rails extend about 140 meters from what may be the site of a

future vertical assembly building. Available imagery suggests that the launch facility achieved an emergency launch capability in 2006. In addition, there are buried pipelines from underground fuel and oxidizer storage buildings 70 meters from the launch pad. A concrete flame bucket measuring about 25 meters long and 13 meters wide, diverts exhaust during launch. A possible tracking building is located 800 meters to the west and has only recently been constructed.





Figure 5. Overview of the Launch Facility as of 22 June 2008. (credit: DigitalGlobe)

Engine Test Stand

A static engine test stand is located approximately one kilometer south of the launch pad on the edge of a canyon facing south. A concrete support pad measures 35 by 50 meters while the concrete engine test pad measures 15 by 25 meters. The engine test stand is supported by four concrete piers. There is an apparent steel support tower measuring 10 by 10 meters.



Figure 6. Construction sequence at the engine test stand. (credit: Left image- GeoEye. Center and right images - DigitalGlobe)

The site is supported by a semi-buried fuel and oxidizer building measuring 10 by 15 meters. This is connected to the test pad by a buried conduit running 190 meters. An above ground conduit runs 95 meters away from the semi-buried fuel building and is of unknown purpose.

The static engine test stand is of similar size and design with that observed at the Shahid Hemmat facility East of Tehran, Iran. The similarities between the two facilities should not be surprising given the long standing missile related cooperation between North Korea and Iran.



Figure 7. Comparison of the engine test pads in Iran on the left and North Korea on the right. 23 May 2002, and 1 April 2006 (credit: DigitalGlobe)

Vehicle Processing Building

The vehicle processing building provides missile and space launch vehicle pre-launch preparation. The main hall measures about 15 by 65 meters. A new hall has been added sometime between 2006 and 2008 measuring about 15 by 33 meters.



Figure 8. The horizontal processing building at Pongdong-ni. (credit: DigitalGlobe)

High Bay Processing Building

The high bay processing building measures 10 by 20 meters and is probably used for vertical integration and dynamic testing of the rocket stages. The access road has a ten-meter radius, wide enough to support rocket and missile stages and their transporters.

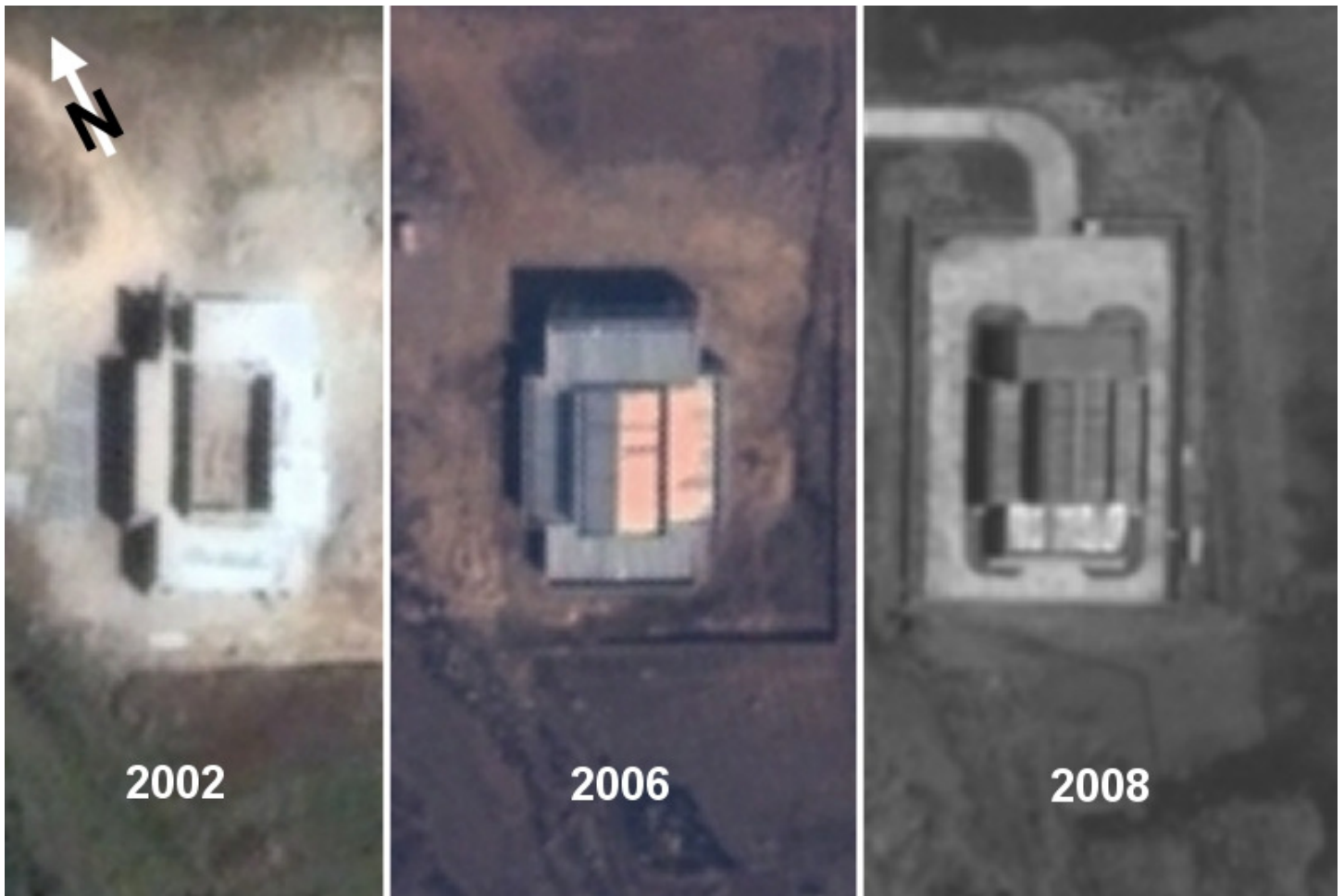


Figure 9. The high bay processing building at Pongdong-ni. (credit: DigitalGlobe)

Administration Building

A probable headquarters/administration building is in the early stages of construction 300 meters south of the main gate. The building, when completed will occupy between 1,500 and 2,400 square meters if it is two or three stories high. Construction began between 2006 and 2008.



Figure 10. A probable base headquarters/administration building in the early stages of construction as of 2008. (credit: DigitalGlobe)

Support Buildings

There are over 17 light-clad warehouse style support buildings 1.8 kilometers northwest of the launch pad, with a total of 5,500 square meters of floor space. The spacing of the buildings is probably too narrow to support missile and rocket airframes and are probably utilized as workshops or as a vehicle motor pool. There is an E-shaped building measuring 246 square meters.



Figure 11. Construction sequence of the support buildings at Pongdong-ni. (credit: DigitalGlobe)

Approximately 1.6 kilometers east of the main gate near the village of Yongdae-dong, and outside the general confines of the launch facility, is a new walled warehouse area that is probably related to the launch facility. There are 14 light-clad warehouse-type buildings, each measuring about 7 by 35 meters. There are two other buildings measuring about 7 by 30 meters. A headquarters/administration building is located in the center of the compound measuring about 10 by 25 meters. Four smaller buildings are located 250 meters to the east measuring about 5 by 15 meters. The total warehouse floor space of the compound is about 3,700 square meters.



Figure 12. Warehouse area east of the launch facility (credit: DigitalGlobe)

Tracking stations

An extensive visual examination has not yet revealed optical, or radar tracking sites. Such facilities have either yet to be constructed or North Korea will rely on mobile tracking including shipborne or other systems.

Air Defense

No fixed air defense sites were discovered after scanning the surrounding countryside. Either fixed air defense sites have yet to be constructed, or North Korea will rely on mobile air defense systems.

Musudan-ni vs. Pongdong-ni

The physical characteristics of North Korea's older launch facility at Musudan-ni precludes its use as a center for either sustained or year-round operations. Among these characteristics are its small size, lack of all-weather roads, limited access to the nation's rail and road networks, minimal housing and no all-weather support infrastructure. Additionally, this facility is openly exposed to a variety of foreign reconnaissance aircraft such as U-2S and RC-135S *Cobra Ball* aircraft as well as submarines which can loiter several miles off the coast with a direct line of site to all test and launch preparations. Missiles can therefore be tracked from the moment of launch and telemetry intercepted and analyzed.

Conversely, the launch facility at Pongdong-ni is moderately obscured from direct airborne and seaborne observation by nearby hills. The sea approaches are protected by extreme tidal fluctuations and extensive mud flats. While airborne reconnaissance is significantly impacted by the facility's location at the northern reaches of the Yellow Sea between North Korean and Chinese airspace. US policy makers would probably be reluctant to deploy U-2S and RC-135S *Cobra Ball* reconnaissance aircraft in this area due to the risk of shoot-down or another "EP-3E incident" (in early 2001, a Chinese interceptor collided with a US Navy EP-3E *Aries II* reconnaissance aircraft resulting in a forced landing on Chinese soil and a diplomatic stand-off to release the airplane and crew.)

Conclusions

The new missile and space launch facility at Pongdong-ni is approximately one to two years away from final first stage completion. The launch pad probably achieved an emergency launch capability in 2006, however, no launches are known to have been conducted to date. This facility clearly demonstrates that despite continued economic, political and social hardships North Korea continues to commit precious resources to the development of ballistic missile and space launch capabilities. The facility's location presents a challenge to US and foreign reconnaissance assets. While the United States is continuing to force an end to North Korea's nuclear program, its ballistic missile and space launch programs appear to be continuing without much public objection.