North Korea’s Rocket “Miracle”

Something momentous happened with North Korea’s space program on December 12, 2012: An Unha-3 (“Milky Way-3”) rocket successfully launched a Kwanmenson-3 (“Bright Star-3”) artificial earth satellite into orbit using a modified three-stage Taepodong-2 ballistic missile as the launch vehicle. A previous attempt to launch a similar rocket last April 13 met with failure. North Korean experts subsequently modified the satellite and its carrier vehicle.

Pyongyang has stated that the spacecraft is intended for mineral exploration and weather tracking. That lets us conclude that the satellite carries remote sensing equipment operating in the visible and radio wavelengths. American reports say the spacecraft is rotating and is not transmitting, suggesting it is non-operational.

The United States and its allies displayed heightened concern during preparations to launch the North Korean rocket and during the launch itself. They did not rule out shooting it down if it presented a threat. In reality, however, they pursued a different goal: collection of technical intelligence on the Unha-3 rocket in order to determine the actual status of the Taepodong-2 ballistic missile development program. That was the reason they ship carrying an SBX-1 multifunction sea-based radar traveled from the Alaskan coast to the coast of Korea. Other systems were used for the same purpose: the FBX-T forward-based radar on the Japanese island of Honshu and Okinawa-based RC-135S Cobra Ball reconnaissance aircraft.

Information systems belonging to US allies were also put on alert. South Korea put the Green Pine radar it had recently acquired from Israel into operation. It is capable of detecting ballistic targets at ranges up to 500 kilometers. South Korea also employed Peace Eye AWACS planes it had recently purchased from the United States.

The Japanese decided to protect themselves in case the Unha-3 launch was a failure by deploying a Patriot PAC-3 antiaircraft system in the south of the country. The unified command of US and South Korean forces on the Korean peninsula went to a higher level of alert.

Shortly after the Unha-3 launch, members of the South Korean Navy recovered the oxidizer tank and fragments of the rocket’s first stage from the bottom of the yellow sea. Five South Korean warships were engaged in the search. Divers used a Deep Submergence Rescue Vehicle for the operation. These efforts enabled a better understanding of the technological level of North Korean rocketry.

South Korean experts drew the following conclusions from an analysis of the data they obtained. First of all, the first stage rocket engines used a nitrogen-based oxidizer; nitrogen is a component of storable rocket fuel. In their opinion, liquid oxygen is preferred for use in a booster rocket. Second, the first stage was a cluster of four Nodong-B rocket engines, which are more advanced than those used in Nodong-1 single-stage liquid-fueled missiles. Third, a simulation of the rocket’s trajectory showed that it is technically capable of delivering a 500- to 600-kg warhead to a range of 10,000-12,000 kilometers. Fourth, the weld quality was poor, and imported components were used to manufacture the rocket’s airframe. That, however, did not violate the Missile Technology Control Regime.

In commenting on the significance of the accomplishment, I might mention that in February 2010 Iran showed the international community its Simorgh booster rocket, which is capable of putting a 100-kg satellite into low Earth orbit. Its first stage is powered by a cluster of four Nodong rocket engines, and a Qadr-1 missile is used for the second stage. The Simorgh and the Unha-3 are very similar. According to Western reports, Iran’s Simorgh rocket can deliver a 750-kg warhead to a range of 5000 kilometers if used as a ballistic missile. Reducing the warhead
weight to 500 kilograms gives it a range of 5400 kilometers. With its upgraded first-stage rocket engines, it can apparently be said that the range of a North Korean missile based on the Unha-3 booster could be as much as 6000 kilometers with a 500-kg warhead. However, these estimates require experimental verification.

In addition, an important characteristic of a missile system is its combat readiness. If a missile’s lengthy preparation time for launch means there is a high likelihood it will be destroyed by the enemy, its maximum range must be deliberately reduced to improve its combat readiness.

There is no doubt that the Unha-3 launch violates UN Security Council resolution 1874, dated June 12, 2009, which requires the Democratic People’s Republic of Korea to refrain from employing ballistic missile technology. That was confirmed in a statement by the President of the UN Security Council on April 16, 2012 demanding that North Korea’s leaders resume the moratorium on launching ballistic missiles. Pyongyang voluntarily introduced such a moratorium in 2000 and suspended it between 2006 and 2007.

UN Secretary-General Ban Ki-moon has condemned the launch of the Unha-3. He believes this “provocative act” may have negative consequences for peace and stability in the region. Seoul supported that point of view. The events evoked “deep regret” in Russia and China. US National Security Council spokesman Tommy Vietor said, “North Korea is only further isolating itself by engaging in such provocative acts.”

Nevertheless, not even the statement by the President of the UN Security Council was adopted. And the international community’s relatively mild reaction was to be expected because the Unha-3’s trajectory did not carry it over Japanese territory. No one in Pyongyang plans to launch a nuclear warhead rather than a satellite, especially since there is no evidence that one is being developed. North Korea’s improvement of its ballistic missiles is troubling, but it does not represent a real threat to surrounding countries. Like nuclear weapons, North Korea needs missiles only for defensive purposes. They guarantee that no one will overthrow the regime in Pyongyang by force.

Thus, the world perceives North Korea’s space program much the way it looks upon Tehran’s similar program: The international community sees it only has cover for development of its national missile program. North Korea has every right to space exploration of course, but that does not mean Pyongyang should violate UN Security Council resolutions demanding that it halt its missile program and reinstate the moratorium on launches of ballistic missiles.

North Korea is continuing to develop two-and three-stage Taepodong-2 class ballistic missiles under the cover of a space program. Depending on payload, their maximum range may be as much as 6000 kilometers with a circular error probability of 3.7-3.8 kilometers.

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