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North Korea's Missile Success Is Linked to Ukrainian Plant, Investigators Say

By [WILLIAM J. BROAD](#) and [DAVID E. SANGER](#) AUG. 14, 2017

[North Korea's](#) success in testing an intercontinental ballistic missile that appears able to reach the United States was made possible by black-market purchases of powerful rocket engines probably from a Ukrainian factory with historical ties to [Russia's](#) missile program, according to an expert analysis being published Monday and classified assessments by American intelligence agencies.

The studies may solve the mystery of how North Korea began succeeding so suddenly after a string of fiery missile failures, some of which may have been caused by American sabotage of its supply chains and cyberattacks on its launches. After those failures, the North changed designs and suppliers in the past two years, according to [a new study](#) by Michael Elleman, a missile expert at the International Institute for Strategic Studies.

Such a degree of aid to North Korea from afar would be notable because President Trump has singled out only China as the North's main source of economic and technological support. He has never blamed [Ukraine](#) or Russia, though his secretary of state, Rex W. Tillerson, made an oblique reference to both China and Russia as the nation's "principal economic enablers" after the North's most recent ICBM launch last month.

Analysts who studied photographs of the North's leader, [Kim Jong-un](#), inspecting the new rocket

motors concluded that they derive from designs that once powered the Soviet Union's missile fleet. The engines were so powerful that a single missile could hurl 10 thermonuclear warheads between continents.

Those engines were linked to only a few former Soviet sites. Government investigators and experts have focused their inquiries on a missile factory in Dnipro, Ukraine, on the edge of the territory where Russia is fighting a low-level war to break off part of Ukraine. During the Cold War, the factory made the deadliest missiles in the Soviet arsenal, including the giant SS-18. It remained one of Russia's primary producers of missiles even after Ukraine gained independence.

The White House had no comment when asked about the intelligence assessments.

Last month, Yuzhmash denied reports that the factory complex was struggling for survival and selling its technologies abroad, in particular to China. Its [website says](#) the company does not, has not and will not participate in "the transfer of potentially dangerous technologies outside Ukraine."

American investigators do not believe that denial, though they say there is no evidence that the government of President Petro O. Poroshenko, who recently visited the White House, had any knowledge or control over what was happening inside the complex.

On Monday, after this story was published, Oleksandr Turchynov, a top national security official in the government of Mr. Poroshenko, denied any Ukrainian involvement.

"This information is not based on any grounds, provocative by its content, and most likely provoked by Russian secret services to cover their own crimes," Mr. Turchynov said. He said the Ukrainian government views North Korea as "totalitarian, dangerous and unpredictable, and supports all sanctions against this country."

How the Russian-designed engines, called the RD-250, got to North Korea is still a mystery.

Mr. Elleman was unable to rule out the possibility that a large Russian missile enterprise, Energomash, which has strong ties to the Ukrainian complex, had a role in the transfer of the RD-250 engine technology to North Korea. He said leftover RD-250 engines might also be stored in Russian warehouses.

But the fact that the powerful engines did get to North Korea, despite a raft of United Nations sanctions, suggests a broad intelligence failure involving the many nations that monitor Pyongyang.

Since President Barack Obama ordered a step-up in sabotage against the North's missile systems in 2014, American officials have closely monitored their success. They appeared to have won a major victory last fall, when Mr. Kim ordered an end to flight tests of the Musudan, an intermediate-range missile that was a focus of the American sabotage effort.

But no sooner had Mr. Kim ordered a stand-down of that system than the North rolled out engines of a different design. And those tests were more successful.

American officials will not say when they caught on to the North's change of direction. But there is considerable evidence they came to it late.

Photo

Leon Panetta, the former C.I.A. director, said on CBS' "Face the Nation" on Sunday that the North Korean drive to get workable ICBMs that could be integrated with [nuclear weapons](#) moved more quickly than the intelligence community had expected.

“The rapid nature of how they’ve been able to come to that capability is something, frankly, that has surprised both the United States and the world,” he said.

It is unclear who is responsible for selling the rockets and the design knowledge, and intelligence officials have differing theories about the details. But Mr. Elleman makes a strong circumstantial case that would implicate the deteriorating factory complex and its underemployed engineers.

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“I feel for those guys,” said Mr. Elleman, who visited the factory repeatedly a decade ago while working on federal projects to curb weapon threats. “They don’t want to do bad things.”

[Dnipro has been called](#) the world’s fastest-shrinking city. The sprawling factory, southeast of Kiev and once a dynamo of the Cold War, is having a hard time finding customers.

American intelligence officials note that North Korea has exploited the black market in missile technology for decades, and built an infrastructure of universities, design centers and factories of its own.

It has also recruited help : In 1992, officials at a Moscow airport [stopped a team](#) of missile experts from traveling to Pyongyang.

That was only a temporary setback for North Korea. It obtained the design for the R-27, a compact missile made for Soviet submarines, created by the Makeyev Design Bureau, an industrial complex in the Ural Mountains that employed the rogue experts apprehended at the Moscow airport.

But the R-27 was complicated, and the design was difficult for the North to copy and fly successfully.

Eventually, the North turned to an alternative font of engine secrets — the Yuzhmash plant in Ukraine, as well as its design bureau, [Yuzhnoye](#). The team’s engines were potentially easier to copy because they were designed not for cramped submarines but roomier land-based missiles. That simplified the engineering.

Economically, the plant and design bureau faced new headwinds after Russia in early 2014 invaded and annexed Crimea, a part of Ukraine. Relations between the two nations turned icy, and Moscow withdrew plans to have Yuzhmash make new versions of the SS-18 missile.

In July 2014, [a report](#) for the Carnegie Endowment for International Peace warned that such economic upset could put Ukrainian missile and atomic experts “out of work and could expose their crucial know-how to rogue regimes and proliferators.”

The first clues that a Ukrainian engine had fallen into North Korean hands came in September when Mr. Kim supervised a ground test of a new rocket engine that [analysts called](#) the biggest and most powerful to date.

Norbert Bröggge, a German analyst, [reported](#) that photos of the engine firing revealed strong similarities between it and the RD-250, a Yuzhmash model.