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Russia's Fast And Elusive TOPOL-M Ballistic Missile Is Scary As Hell

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The giant TOPOL-M road-mobile intercontinental ballistic missile is one frightening creation of mankind. It can hide in cities, forests, or even nuclear-attack hardened bunkers. It'll travel at over 15,000 MPH while taking evasive action and pumping out decoys on the way to its target.

TOPOL-M, known by NATO as the 'Sickle-B,' was the first ICBM created by Russia after the fall of the Soviet Union. Topol in Russian is the name for the White Poplar tree, which is very similar to the Aspen tree in North America.

First fielded in 1997 as an upgrade of the first generation TOPOL, this new system was originally designed in the 1980s, and then redesigned in the mid-1990s, with America's push for a ballistic missile defense shield in mind. Since its introduction, there have been about 80 TOPOL-Ms put into service, with close to a third of those being road-mobile versions and the rest being placed in highly fortified concrete silos. Another 170 older generation road-mobile TOPOL missiles remain in service to bolster the more modern TOPOL-M road-mobile fleet.

The TOPOL-M missile was designed to penetrate an American anti-ballistic missile shield by leveraging high-speed, a relatively small infrared signature during its boost phase, advanced decoys (as many as ten carried on a single missile), maneuvering mid-course capability, and maneuvering independently targeted reentry vehicles, of which it can carry up to six, although they are said to carry just one operationally.

The missile's high speed shortens the time anyone can react to it, and every second matters when it comes to ballistic missile defense. The rocket motors were designed for a short, very powerful boost stage so that American space-based infrared detection satellites (SBIRS, DSP) have less time to detect and track it. Its decoys make it hard for radar to adequately track the correct target, and its countermeasures are said to have been upgraded to fool infrared tracking systems, which are used for mid-course interception. The missile and reentry vehicles' ability to dynamically maneuver outside of their ballistic track makes producing an effective kill solution, or even predicting the TOPOL-M's target, problematic. All these features come together to make a missile that is probably outside of America's missile defense capabilities today, and the sheer number of them that exists makes the idea of defending against anything but a limited barrage totally invalid.

The missile itself is close to seventy feet long, made mainly out of carbon fiber and weighs just over 100,000lbs at launch. It can reach out to about 6,500 miles. Its three stages are solid fueled, so it can be ready to launch at a moment's notice, and can remain ready to fire for long periods of time.

The TOPOL-M is so powerful that it can also be used to put up to medium-sized satellites into low-earth orbit as its payload for ICBM operations can be as heavy as 2650lbs, although it usually carries a single 800 kiloton thermonuclear warhead. It is guided by an on-board inertial navigation system that is coupled with a GLONASS (Russian GPS) interface, giving the giant rocket a circular error probability (CEP) of around 600 feet, which is more than accurate enough for an ICBM.

Not only is the road-mobile TOPOL-M hard to hit once it is in the air, or at the edge of space for that matter, it is also very hard to find on the ground as they can hide pretty much anywhere. Its transporter-erector-launcher (TEL) is built in Belarus by heavy military vehicle makers MZKT, features sixteen wheels, and the front and rear pair of axles have independent steering, which is absolutely necessary for navigating the massive TEL on roads that were never built for something its size.

The MZKT-79221 is actually fairly capable off-road, and during a time of deployed operations that is where these vehicles end up, basically where you would not expect them to be. Forging streams, rumbling down muddy alpine tails and traversing dense snow are all within the TOPOL-M TEL's operating abilities. The missile and the TEL are also accompanied by a command and support vehicle, and in some cases a similar long-range communications vehicle for over the horizon connectivity.



Whereas America has its nuclear 'trident' consisting of silo-based, submarine-based and air-launched nuclear weapons, Russia has a four pronged approach with its road-mobile ICBMs that operate in a similar fashion to SSBN submarines. By dispersing a portion of its land-based nuclear arsenal throughout its great wilderness, Russia makes it very hard for the US to hit all of its nuclear emplacements during a 'first strike' scenario. This greatly enhances Russia's land-based nuclear arsenal's deterrence factor. Just the threat of a second-strike ability, not just from Russia's SSBN submarine force that America works very hard to track, but from road-mobile ICBMs, and very capable ones at that, makes Mutually Assured Destruction (MAD) a continuing reality.



The TOPOL-M is now out of production, and in its place is an improved missile that carries 'at least' four MIRVs. This new system is known as the RS-24 'Yars' and features an even higher speed than the TOPOL-M, and has a smaller CEP of only about 150 feet. More advanced decoys and countermeasures are also said to be fielded with this new missile, as well as enhanced mid-course and terminal phase maneuvering, all of which were developed specifically to counter anti-ballistic missile defense systems that have become operational in the US and that will soon be operational in Europe.



Russia is also working on deploying the RS-24 on trains as well as road-mobile TELs, something it stopped doing under the START II treaty by the end of the last decade. The new START III treaty, signed in 2011, does not limit train-based ICBMs, thus Russia is quickly developing such a system.

So sleep tight knowing there are hundreds of TOPOLs, TOPOL-Ms, and now RS-24s, prowling the Russian countryside, and soon to be clacking along Russia's never-ending railways as well, just waiting for the order to end the world as we know it.

