Engineering Options to Intercept "A House of Dynamite" Attack.

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An informal essay proposing possible engineering options that could help the United States intercept a single missile rogue nuclear attack like that presented in the 2025 Netflix motion picture film *A House of Dynamite*. Theoretical modern technology designs are presented that the United States Department of Defense and advanced military armament and space organizations can consider for possible near-term and future platforms including *Golden Dome* proposals.

"Invincibility lies in the defense"
-- Sun Tzu, The Art of War

"Ants, fighting together, will vanquish the lion."
-- Saadi

In the 2025 Netflix motion picture film *A House of Dynamite* the public is made aware of the challenges with intercepting even a single ICBM armed with a nuclear warhead. The film does a great job in stressing a key challenge and obstacle - the limited amount of time to intercept and react. In a world of random events and daily chaos of human life, the odds of all systems, communication, monitoring, and processes working instantly or as expected in any given 30-minute window, is very small. Thus, beyond a vast investment in anti-ballistic missile (ABM) defense systems, we have a real-world problem and dangerous threat. The existence of submarine based SLBMs guarantees the threat of retaliation by the United States so even a failure to intercept does not require, per se, an immediate response as somewhat insinuated in the film; a single Ohio class nuclear submarine has enough warheads on its Trident missiles to destroy any nation.

But perhaps there are designs and strategies with modern technology that can reduce the massive spending requirement from an ABM system, like the initial proposals for an American *Golden Dome* defense system, based on the deployment of massive quantities of interceptor missiles. Of course technologies like *artificial intelligence* (A.I.) have their place here, but a larger benefit is likely from the miniaturization of satellites and drones and both technologies using A.I. for *swarm coordination* that enables an extremely fast response time. This is of particular importance given the additional threats that now exist with even less reaction time from an attack using cruise missiles and hypersonic cruise missiles that never travel above earth's atmosphere. Theoretical designs are proposed that may help that United States, or any technologically advanced nation, optimize modern astronautical systems to address the threat of a rogue ICBM attack.

As a black widow spider spins a web to immobilize its victim, we can label a platform a *white widow* that resembles an umbrella approach to warhead interception. When it begins to rain, we don't attempt to stop each rain drop, we use an umbrella. With new extremely fast and lightweight microprocessors, SpaceX has advanced maneuvering small rocket thrusters built to the technological level of landing large rocket boosters on floating platforms in the ocean and, as they return to earth after a launch, being caught by the "arms" of its launch site tower. This level of miniaturization and precision are needed to overcome the challenge, as literally noted in the film's dialog, of "hitting a bullet with a bullet."

Thus, let us imagine a swarm of at least three small satellites, akin to Starlink sized devices, in a fleet that always has at least three over the United States at any given time. This fleet is also stacked resembling a "layer cake" with a fleet at various altitudes orbiting the planet, perhaps even dozens of fleets or more at various altitudes (Figure 1). If an ICBM or MIRV re-entry warhead approaches any United States territory, or even the territory of its allies or forward deployed forces anywhere on the globe, we can imagine high-powered lasers creating a *full mesh* "web" between each satellite - at least three satellites as a minimum but up to a much larger number of satellites given the amount of time another satellite in the swarm has to reach its maximum distance to join the mesh. This occurs separately at each altitude in this "layer cake" approach.

The lasers in this vision need to be powerful, but not beyond current technology as the satellites can maneuver using the aforementioned modern rocket thrusters to "catch" the warhead in their mesh "web," akin to a baseball outfielder catching a pop fly baseball in their glove. The warhead is destroyed as the laser

overheats or cuts the projectile as it passes through the laser beam mesh. If the first attempt fails, another micro-swarm is already beneath it at a lower altitude creating a “stack” of more and more "webs" in a vertical cylindrical shaped “tunnel” along the re-entry path of the warhead.

For suborbital attacks, we can imagine a new *Looking Glass* style fleet of 24x7 aircraft in flight, ships, or even an assortment of tall towers containing swarms of drones ready to deploy in a similar manner but within our atmosphere. As seen in the ongoing war between Ukraine and Russia, these drones can be armed with small explosives and even with a reasonably sized swarm, would create a very high percentage kill success rate. Early detection, as always, is essential in any of these scenarios.

Another option is a single satellite or drone that deploys lasers akin to a spinning fan for a similar destructive effect. A satellite, with a nuclear device in it, may be able to spread a flat stream of high-powered X-rays in a horizontal blanket or pancake-shape to destroy, damage, or divert any incoming projectile.

Note how all of these designs do not require the creation of new ultra-high powered lasers like a *Star Wars* “Death Star” aiming at the single incoming warhead. Also note that the total cost of these platforms would likely be much less than a vast fleet of ground based interceptor (GBI) missiles and much faster and with a higher success rate of interception.

We can compare this approach to evolutionary optimization seen in the ant kingdom. A *sweet spot* is found between the strategies of using a large quantity of soldier ants and of using groups of ants with *specialization* or specific focused abilities, to overcome a threat regardless of its speed or size. Many of these design concepts are likely already being considered, but all possible methodologies should be considered when working to solve a problem of such existential importance.

Figure 1.
A proposed “white widow” platform using a full-mesh of lasers based on A.I. coordinated swarms of small satellites at various orbital altitudes, akin to a “layer cake,” to ensure successful interception and destruction of any rogue missile ICBM attack.