

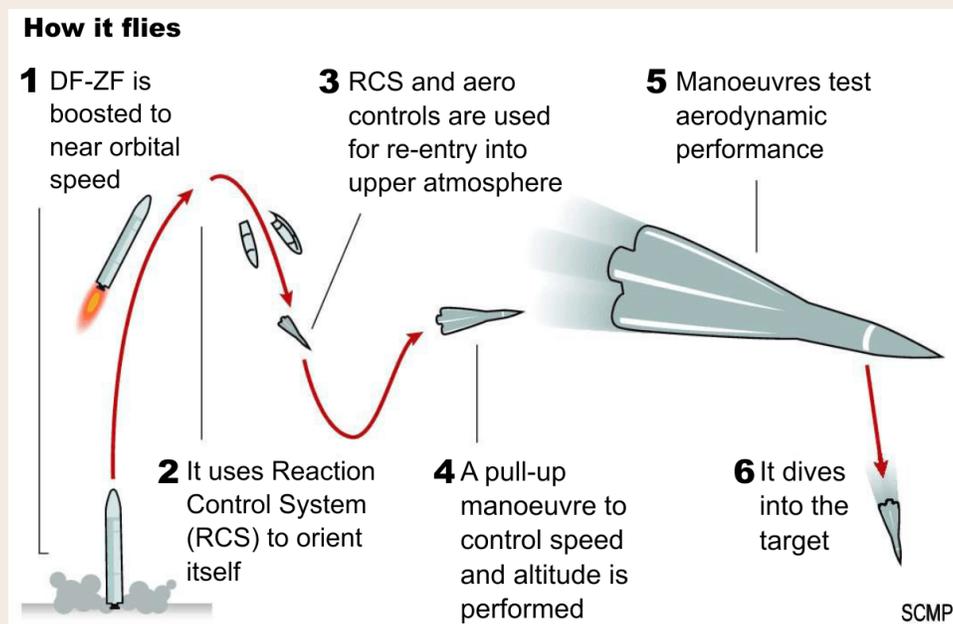
## WHAT I LEARNED THIS WEEK

Excerpt from March 29, 2018

### 2 The balance of power is starting to shift to China and Russia as the military-technology arms race escalates.

China and Russia are aggressively pursuing innovative weapon systems for asymmetric advantage. The U.S. is no longer guaranteed future military-technology supremacy, as Western high-tech leadership erodes and China and Russia close the gap, indicates a new study from the International Institute for Strategic Studies (IISS).

In *WILTW* November 16, 2017, we warned that **the “hypersonic” arms race was the most disruptive new technology since “stealth.”** Since then, the hypersonics race has intensified. Russia is beginning to deploy hypersonic missiles, while China is actively testing its DF-ZF (DF-17) hypersonic boost-glide vehicle (HGV) missile, with speeds of up to Mach 10—possibly becoming the first HGV to enter service.



Source: South China Morning Post

**In response, the U.S. is more than doubling its hypersonic missile budget to catch-up, but operational systems may not be functional until after 2022.**

General John E. Hyten, Commander of the U.S. Strategic Command recently admitted that the U.S. has no real defenses against hypersonic weapons, apart from the threat of a nuclear response. There is a growing risk that it may be too little too late for the U.S.

**China has two to three times more hypersonic development facilities than the U.S. and has conducted 20% more hypersonic missile tests in recent years.**

China is also building the world's most-powerful hypersonic wind tunnel, capable of testing airplane models at speeds of up to Mach 25—10 times faster than existing tunnels. China has already designed a hypersonic plane, dubbed the "I Plane" that **can travel from Beijing to New York in two hours**. A report from *Futurism.com* indicates that China is testing a ship-mounted hypersonic railgun that propels projectiles above Mach 5—suggesting it may be ahead of the U.S. (see *WILTW* August 4, 2016).

**Russia is deploying its Mach 6 Zircon missile as early as this year, which is twice as fast as modern aircraft carrier missile defense systems.**

In 2019, Russia is expected to deploy its Mach 20 Avangard hypersonic strategic boost-glide nuclear missile. Russia is also testing its Mach 10 Kinzhal air-launched missile from MiG-31 supersonic fighter jets, which is designed to counter U.S. missile defenses and/or attack aircraft carriers. Russia's hypersonic Sarmat ICBM, which has no range restrictions, is expected to be deployed by 2020. However, in a recent speech, Russian President Vladimir Putin indicated it has already been initially deployed in the southern region of the nation.

**But, hypersonics are just the tip of the iceberg.**

Consider the following:

- **The emergence of submarines that can launch aircraft and undersea drones will disrupt warfare.** China, Russia and the U.S. are all pursuing development of "underwater aircraft carriers," notes an analysis in *The National Interest*. Drones have the potential to be better at tracking and destroying submarines, notes *NextBigFuture.com*. They can also operate

more quietly and remain submerged for greater lengths of time. Last March, China released 12 unmanned drones, called gliders, into the South China Sea, where its Haiyi (i.e. “Sea Wings”) drone set a world record for deepest depth.

China is also building an “Underwater Great Wall” with sensors and drones on the seafloor up to 3,000 meters below the surface to listen for enemy submarines. This sensor network may have already been deployed near the Chinese Navy base at Sanya, Hainan Island in the South China Sea. A network of autonomous underwater drones can locate and track enemy submarines and can also be launched out of a torpedo tube, enabling it to act as a “force multiplier.”

- **Russia is creating a 100-megaton nuclear tsunami drone that could wipe out Florida and coastal U.S. cities.** The drone could dive deeper than U.S. subs and move faster than torpedoes. Detonating the weapon in shallow waters off a coastline could generate a tsunami hundreds of feet high. To counter it, the U.S. would need better, more comprehensive sonar underwater monitoring networks, as well as interceptor submarines and drones to prevent it from reaching within 400 to 1,000 miles of a coastline.
- **The U.S. is beginning to deploy directed energy/laser weapon systems at scale.** On the same day that Putin revealed new hypersonic missiles, the U.S. Navy awarded Lockheed Martin a \$150 million contract to develop a high-powered laser system to integrate it with a destroyer by 2020. A truck-mounted Raytheon laser recently took out 45 drones—up to three simultaneously.
- **The intensifying arms race is driving the militarization of space.** U.S. Air Force Lt. Gen. Steve Kwast has warned that America is at risk of falling behind China in the space race. China is developing a “Space Force” within the People’s Liberation Army, and its 50-year plan includes nuclear-powered shuttles and satellites, electronic warfare and space planes.

**China is launching a GPS network 10 times more precise than America’s, “accurate to within millimeters,”** notes *The South China Morning Post*. Last

fall, China launched two Beidou-3 satellites, with 30 more planned through 2020, providing global coverage.

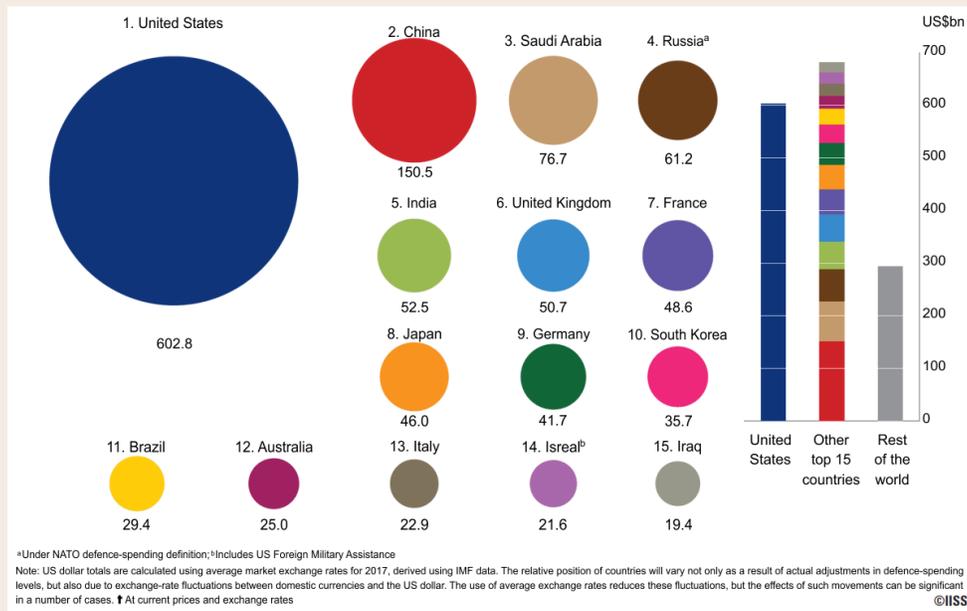
**The near-term focus in the U.S. is on protecting satellites and spacecraft from cyber warfare and missile attack.** The concern is that an adversary using a swarm of anti-satellite weapons could leave America’s military “blind, deaf and lost,” notes a recent report in *The Wall Street Journal*. Consequently, the U.S. is pursuing 22 new GPS satellites that are built to resist jamming and electronic interference.

China, on the other hand, is aggressively pursuing anti-satellite weapons to counter U.S. military reconnaissance, navigation and communications in case of war in the South China Sea or on the Korean Peninsula. China has long been acquiring ground-based satellite jammers and has spent over a decade working on anti-satellite technology.

**China is also pursuing “co-orbital” anti-satellite capabilities,** in which a Chinese satellite maneuvers through orbit until it is close enough to strike an enemy satellite to take-it out either through kinetic energy or with explosives. Russia has also sent micro-satellites into space, covertly maneuvering them close to commercial satellites, according to CNBC. The small satellites could be used to either ram another satellite, hack it for data collection or jam it.

For the U.S., Michael Griffin, undersecretary for R&D, ultimately wants **America to deploy laser weapons from space to blind imagery satellites or high-power microwave guns to knock out circuitry on targeted satellites.**

**Military spending is rising worldwide.** The U.S. increased defense spending 10.7% to \$686 billion in 2019, the highest level of investment since 2011, notes *The FT*. Similarly, China raised its official defense budget by 8.1% to \$175 billion, up from a 7% rise last year.



Source: IISS via The Military Balance 2018 Report

China is leading in the integration of AI into missiles, rapidly growing its fighter plane and stealth fighter capabilities, and has developed competitive air-to-air missile capabilities. The recent deployment of China's new J-20 stealth fighter signals that the U.S. has lost its monopoly on operational-stealth-combat aircraft.

**The NYSE Arca Defense Index (DFI) is within 5% of an all-time high, as global tensions rise.** Defense sector valuations could climb with the appointment of hawkish John Bolton as National Security Advisor and the unfolding military technology arms race. **Defense stocks could also act as portfolio insurance in the event of an international crisis.** Yet, the DFI is trading at 11.6 times consensus EV/EBITDA, below its long-term trailing average of 12.3 times.



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