AGA 1: Missiles and Hypersonic Weapons

Time: Wednesday 14:00–16:00 Location: AGA-H19

Invited Talk AGA 1.1 Wed 14:00 AGA-H19

Missile Hype: Modelling the Performance of Hypersonic Boost-Glide Weapons — •Cameron Tracy[1] and Wright David[2] — [1]University of Stanford — [2]MIT, Boston

Hypersonic weapons comprise an emerging class of missile technologies*maneuverable vehicles that carry warheads through the atmosphere at more than five times the speed of sound. They have recently garnered a great deal of interest due to claims of their advantages over existing missiles, including ostensibly unmatched speed and the ability to evade early warning sensors and interceptors. But absent rigorous, independent technical assessment, their precise capabilities remain uncertain and controversial. To elucidate the performance of these weapons, we report the results of computational modelling of hypersonic missile flight. Our analysis shows that the fundamental physics of hypersonic flight (including extreme atmospheric drag and aerothermal heating) severely constrain the performance of these missiles. Comparison with the performance of existing ballistic missiles reveals that many claims regarding the purported advantages of hypersonic weapons lack a clear technical basis.

Invited Talk AGA 1.2 Wed 14:45 AGA-H19

Hypersonic Weapons in North Korea - A Game Changer? — •Markus Schiller — ST Analytics GmbH, München, Germany

With its launch of what it called the "Hwasong-8" on September 14, 2021, North Korea apparently joined the exclusive club of countries that already demonstrated a hypersonic weapons capability. This presentation will offer some insights into the definitions and technical basics of hypersonic weapons in general, with a special look on North Korean developments, and some thoughts on the political and strategic consequences. Additionally, a general update on recent developments in regard to the North Korean missile program will be given.

AGA 1.3 Wed 15:30 AGA-H19

Small and Very Small Missiles - Military-Technology Assessment and Preventive Arms Control — •Jürgen Altmann and Dieter Suter — Exp. Physik III, TU Dortmund University

After our purview of small and very small aircraft (https://url.tu-dortmund.de/pacsam-db) we have created a database of small (diameter $<$ 69 mm) and very small ($<=$ 40 mm) missiles. It contains 50 types, many are decades old; 11 types were developed after 2000. Many have ranges below 1 km, but up to several kilometres occur, in particular with air launch. Guidance has increased over the decades, now even possible for very small missiles. Warhead masses are between 0.4 and 3 kg; high explosive and fragments are used with all sizes, while anti-armour shaped charges occur above 1 kg. New types could be used against drones or for defence against incoming bigger missiles. Weapon effects are limited, but smaller missiles could be produced in high numbers, and attacks against soft spots or in swarms / salvoes could be militarily relevant. Vertical and horizontal proliferation could endanger military stability and international security; considerations about preventive arms control are needed.