Pugwash Briefing Paper

Hypersonic Weapon Series

#3

What are the current Hypersonic Weapon development programmes?

Background

The Pugwash Foundation supported an international Pugwash workshop on hypersonic weapons, which took place in Geneva on 9 and 10 December 2019. The meeting brought together 30 international participants from various continents, including current and former government officials, scientists, engineers, academics and experts from think tanks and other non-governmental organisations.

The workshop aimed at fostering a constructive exchange of views on hypersonic weapons. Participants discussed factors driving the development, roles and purposes of hypersonic weapons, as well as the risks associated with their deployment and use.

Based on the workshop's discussions, the Pugwash Foundation produced a series of briefing papers on hypersonic weapons. The series covers the following themes:

- What is a hypersonic weapon?
- What technical challenges do hypersonic weapon raise?
- What are the current hypersonic weapon development programmes?
- Why do States develop hypersonic weapons?
- What are the roles and missions of hypersonic weapons?
- What are the risks associated with hypersonic weapons?
- How to mitigate the risks associated with hypersonic weapons?
- How to counter hypersonic weapons?

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What are the current hypersonic weapon development programmes?

Hypersonic programmes are not new. The U.S. and the Soviet Union did work, with some discontinuity, on hypersonic programmes during the Cold War. With very few exceptions, for example the X-15 (U.S.), those old programmes almost never materialized, but they informed and guided the current development of HCMs and HGVs.

It is public knowledge that countries, including China, India, Russia and the U.S., are working on hypersonic programmes. Those programmes vary in their developmental phase and include:

China

Tab.1 Overview of Chinese programmes

Name	Description
DF-17	ballistic missile capable of delivering a glider
DF-ZF	gliding vehicle that can be mounted onto ballistic missiles (possibly the DF-17, DF-21 and DF-31)
Starry Sky-2/Xingkong-2 Waverider	glide vehicle that can be mounted onto ballistic missiles
Lingyun-1	hypersonic cruise missile

DF-17 and DF-ZF have been reported as already operational. Other programmes are in their design or experimental and testing phase.

India

Tab.2 Overview of Indian programmes

Name	Description
BrahMos II	hypersonic cruise missile, jointly developed with Russia
Shourya	ballistic missile capable of delivering a glide vehicle

Indian programmes are all in their design or experimental and testing phase. They intend to produce operational prototypes but no procurement has been made yet.

Russia

Tab.3 Overview of Russian programmes

Name	Description
Avangard (also known as Objekt 4202/Yu-71/Yu-74)	glider that can be mounted onto ballistic missiles such as SS-19
RS-28/Sarmat	hypersonic ballistic missile
Kinzhal	air-launched ballistic missile
3M-22 Tsirkon	hypersonic cruise missile
Land-based intermediate range hypersonic programmes	rockets and platforms capable of delivering a glider
GZUR	hypersonic cruise missiles

Avangard and Kinzhal have been reported as already operational. Other programmes are in their design or experimental and testing phase.

USA

Tab.4 Overview of U.S. programmes

Name	Description
Advanced Hypersonic Weapon (AHW)	glider that can be mounted onto ballistic missiles such as Polaris A3/STARS
Falcon Hypersonic Technology Vehicles (HTV-1 and HTV-2)	gliders that can be mounted onto ballistic missiles such as Minautor IV
AGM-183A Air-Launched Rapid Response Weapons (AARW)	rocket boosters capable of delivering a hypersonic glider
Land-Based/Long-Range Hypersonic Weapons (LHRW)	rockets and platforms capable of delivering a hypersonic glider
Intermediate Range Conventional Prompt Strike Weapons (IRCPS)	rockets and platforms capable of delivering a glider
Air-launched Hypersonic Conventional Strike Weapons (HCSW)	hypersonic cruise missiles
Tactical Boost Glide (TBG)	gliding systems
Advanced Full Range Engines (AFRE)	aircraft propulsion systems that could operate over the full-range of speeds required from low-speed takeoff through hypersonic flight
Operational Fires (OpFires)	ground-launched systems enabling hypersonic boost glide systems
Hypersonic Air-breathing Weapon Concept (HAWC)	hypersonic cruise missiles
X-51A Waverider	hypersonic cruise missile

Those programmes are all in their design or experimental and testing phase. They intend to produce or have already produced operational prototypes, but no procurement has been made yet. The Missile Defense Agency (MDA) also started a Hypersonic Defense Programme.

Other development programmes

Other countries have also been reported as developing some hypersonic capabilities, including France, Japan, Australia and the EU.

Conclusion

It is public knowledge that certain countries are working on hypersonic programmes. However, only little information is available on their:

- Range
- Speed
- Types of payload
- Types of platform
- Deployment dates

That information is absolutely crucial for an accurate assessment of a country's hypersonic capability.

While some secrecy around hypersonic programmes is understandable, greater transparency would help correct erroneous assumptions and reduce dangerous misunderstandings.

Acknowledgements

The Pugwash Foundation and the Pugwash Conferences on Science and World Affairs would like to express their gratitude to the Ministry of Foreign Affairs of the Kingdom of the Netherlands for its generous financial support, which made this workshop possible. They are also grateful to the Federal Department of Foreign Affairs of Switzerland, the Permanent Mission of Canada to the United Nations in Geneva, and the British Pugwash Group for their assistance in the realisation of this workshop.