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1. With DRDO successfully testing India's first long-range hypersonic missile, all you need to know about the weapon**Introduction**

India's Defence Research and Development Organisation (DRDO) successfully flight-tested a long-range hypersonic missile off the coast of Odisha recently.

According to an official press release, the missile can carry various payloads for ranges greater than 1,500 km for the Armed Forces. It has been indigenously developed by

laboratories of the Dr APJ Abdul Kalam Missile Complex, Hyderabad, along with various other DRDO labs and industry partners.

What is a hypersonic missile?

The term "Hypersonic" refers to a speed at least five times the speed of sound (also called Mach-5). This comes down to around a mile per second. Another key feature of such missiles is manoeuvrability, setting them apart from a ballistic missile that follows a set course or trajectory.

The two types of hypersonic weapons systems are Hypersonic Glide Vehicles (HGV) and Hypersonic Cruise Missiles (HCM). The HGVs are launched from a rocket before gliding to the intended target while HCMs are powered by air-breathing high-speed engines or 'scramjets' after acquiring their target.

What are the advantages of hypersonic missiles?

According to the website of defence equipment manufacturer Lockheed Martin, hypersonic systems are a "game-changer" for national security.

A 2023 UK Parliament research briefing on the weapon said, "They fly at lower altitudes than ballistic missiles, which means that they may be harder to track at long distances with some surface-based sensors, such as certain radar."

Are there any disadvantages or challenges to hypersonic missiles?

The Lockheed Martin website says creating a system that is so fast means overcoming several difficult engineering and physics challenges. These include heat generated due to friction and

air resistance. The high speed also means it must be operated with "an incredible degree" of precise manoeuvrability.

Basic operations, like communications, also become a significant challenge during hypersonic flight. A system "must maintain connectivity to operators and decision-makers through communications and sensor systems," it added. They are also more costly to develop in comparison to ballistic missiles.

Where do countries stand on developing hypersonic missiles?

Russia and China are believed to be ahead in developing hypersonic missiles while the US is developing a range of such weapons under an ambitious programme. In May this year, the US Army awarded Lockheed Martin a \$756 million contract to deliver additional capability for the nation's ground-based hypersonic weapon system, the Long-Range Hypersonic Weapon (LRHW).

In 2022, the Russian Ministry of Defence announced it had used a hypersonic missile for the first time in the ongoing conflict with Ukraine.

Several other countries, including France, Germany, Australia, Japan, Iran, and Israel, are also pursuing projects to develop hypersonic missile systems.

Relevance: GS Prelims & Mains Paper II; International Issues

Source: Indian Express

2. Strengthening India-Nigeria Ties: A New Chapter in Strategic Partnership

Introduction

Prime Minister Narendra Modi's recent visit to Nigeria marks a pivotal moment in the six-decade-long relationship between India and the West African nation. This trip, the first by an Indian Prime Minister in 17 years, underscores the growing importance of Nigeria in India's foreign policy, especially as both nations seek to strengthen their partnership in defense, trade, and global governance.

Historical Foundations of India-Nigeria Relations

India and Nigeria share a long history of diplomatic and cultural ties, beginning even before Nigeria's independence in 1960. India established its Diplomatic House in Lagos in 1958, and bilateral exchanges at the highest levels have been consistent ever since.

During the formative years of Nigeria's independence, Indian teachers, doctors, and military trainers played a significant role, including the establishment of the National Defence Academy in Kaduna and the Naval War College of Port Harcourt. Over the years, the 60,000-strong Indian expatriate community in Nigeria has become the largest in West Africa, further cementing the bonds between the two nations.

In 2007, the relationship was elevated to a "Strategic Partnership" during former Indian Prime Minister Manmohan Singh's visit to Abuja, highlighting mutual goals in development and international cooperation.

Nigeria's Role in Africa and Global Affairs

Known as the "Giant of Africa," Nigeria boasts the continent's largest population and one of its fastest-growing economies. It is the fourth-largest economy in Africa and a major player in regional and global forums, including the African Union (AU), the United Nations, and OPEC.

Nigeria's influence extends beyond economics, as it is a founding member of the AU and a proponent of regional integration. Its inclusion as a permanent member of the G20, facilitated during India's G20 presidency in 2023, further highlights its global importance.

Deepening Bilateral Ties Amid Geopolitical Shifts

Prime Minister Modi's visit came at a time when India is intensifying its engagement with Africa, particularly in light of China's expanding influence across the continent. India's developmental assistance to Nigeria, including concessional loans worth \$100 million and capacity-building programs, complements the investments of over 200 Indian companies that have contributed \$27 billion to Nigeria's manufacturing sector.

During his visit, PM Modi emphasized India and Nigeria's shared commitment to tackling global challenges such as terrorism, piracy, separatism, and drug trafficking. Both nations also reiterated their mutual aspirations for permanent representation on the United Nations Security Council.

A Symbolic Recognition



In a historic moment, Prime Minister Modi was conferred with Nigeria's second-highest national honor, the Grand Commander of the Order of Niger, by Nigerian President Bola Ahmed Tinubu. The award, the first conferred on a foreign leader since 1969, recognized Modi's visionary leadership and significant contributions to strengthening India-Nigeria relations.

Moving Forward: Economic and Strategic Collaborations

Nigeria's strategic importance in Africa aligns with India's broader goals in the region. As the two nations explore avenues for collaboration, sectors such as energy, infrastructure, and defense remain key focus areas. India's pledge to provide relief supplies for flood-affected Nigerians and continued investments signal its intent to remain a steadfast partner.

Prime Minister Modi aptly concluded his visit by echoing an African proverb: "A friend is someone you share the path with." For India and Nigeria, this friendship promises a path paved with mutual growth and shared aspirations.

Relevance: GS Prelims; International Relations

Source: PIB, The Hindu and Indian Express

3. Can Fossil Fuels Be Regulated Like Nuclear Weapons?



A New Approach: Fossil Fuel Non-Proliferation Treaty (FF-NPT)

The Fossil Fuel Non-Proliferation Treaty (FF-NPT) is a bold proposal to regulate fossil fuels—coal, oil, and gas—akin to how nuclear weapons are controlled. Advocates believe this treaty is essential for phasing out fossil fuels, transitioning to renewable energy, and ensuring a just and equitable energy shift.

The initiative was conceptualized in 2016 and officially launched in 2019, inspired by the global treaties that addressed the threat of nuclear weapons decades ago. The FF-NPT aims to address the gaps left by the Paris

Agreement, which, despite its significance, does not mention fossil fuels directly.

Growing Support for the FF-NPT

The FF-NPT has garnered endorsements from various stakeholders, including former UN Secretary-General Ban Ki-Moon, indigenous communities, and several Small Island Developing States (SIDS). These island nations, such as Vanuatu, Tuvalu, and Fiji, are among the most vulnerable to climate change despite contributing minimally to global warming.

Recently, at COP29 in Baku, 10 more countries joined discussions on the treaty, and the Global Alliance for Banking on Values, representing 70 sustainable banks, announced its support, marking the first endorsement by financial institutions. Colombia, a major coal producer, also backed the treaty at COP28 in 2023.

The Case for Regulation

During COP29, Tzeporah Berman, Chair and Founder of the Fossil Fuel Non-Proliferation Treaty Initiative, highlighted alarming trends. Fossil fuel emissions in 2024 are projected to be 8% higher than in 2015 when the Paris Agreement was signed. Without drastic action, the planet is headed for a catastrophic 3°C of warming, far exceeding the 1.5°C target.

The treaty seeks to address this crisis through three key pillars:

- 1. Non-Proliferation:** Halting the expansion of fossil fuel production worldwide.
- 2. Fair Phase-Out:** Ensuring an equitable reduction in fossil fuel use, with nations historically responsible for emissions leading the transition.
- 3. Just Transition:** Promoting renewable energy and supporting workers, communities, and economies dependent on fossil fuels.

Financial and Implementation Challenges

One of the significant hurdles for the FF-NPT is financing. Many climate-vulnerable nations lack the resources to transition away from fossil fuels or protect themselves from climate impacts. Harjeet Singh, Global Engagement Director for the Fossil Fuel Treaty Initiative,

emphasized the need for robust financial support, which could come through mechanisms such as the New Collective Quantified Goal (a financial target post-2025) or Just Transition Work Programmes under the Paris Agreement.

India's Role

Although the FF-NPT has primarily focused on smaller nations in Asia, Africa, and Latin America, larger fossil fuel-dependent countries like India are seen as critical to its success. India, with rising fossil fuel emissions projected at 4.6% for 2024, stands to benefit significantly from the treaty. Advocates argue that India's participation could enhance global climate equity while supporting its transition to renewable energy.

The Path Ahead

The FF-NPT offers a comprehensive framework to address the dual challenges of climate change and energy justice. However, its success depends on collective global action, particularly from fossil fuel-intensive nations, and the availability of financial resources to support vulnerable economies. As discussions continue, the treaty holds the potential to reshape the world's energy landscape and mitigate the worst impacts of climate change.

Relevance: GS Prelims & Mains Paper III; Environment

Source: Indian Express