Russia's Burevestnik Nuclear-Powered Cruise Missile

1. Recent Development

- Russia has successfully completed the final test of the Burevestnik (9M730), a nuclear-powered cruise missile.
- President Vladimir Putin described it as a "unique creation" that no other country currently possesses.
- The test marks a **significant advancement** in Russia's weapons programme amid **ongoing tensions over Ukraine**.

2. Technical Overview

(a) Name and Classification

- Russian Name: Burevestnik (meaning Storm Petrel).
- Russian Designation: 9M730.
- NATO Code Name: SSC-X-9 Skyfall.

(b) Type

Nuclear-powered, nuclear-capable cruise missile.

(c) Key Feature

 Uses a miniature nuclear reactor for propulsion → gives it theoretically unlimited range and long-duration flight capability.

3. Working Mechanism

(a) Launch System

- Initially propelled by a **liquid-fuel booster rocket** to reach cruising speed.
- After reaching desired velocity, the **nuclear propulsion system activates**.

(b) Propulsion Design

- Air enters through an **air inlet**, gets **compressed** by a **compressor**, and passes through a **turbine**.
- The nuclear reactor heats the air, creating high-speed exhaust gases for thrust.
- Cooling airflow prevents overheating of the system.
- The setup allows continuous flight without refuelling.

(c) Warhead Options

• Can carry both nuclear and conventional warheads, making it a dual-use missile.

4. Performance Highlights

- In the October 21, 2025 test, the missile:
 - Flew for 15 hours.
 - Covered **14,000 km** (still not the maximum range).
- Designed for global reach, low-altitude flight, and unpredictable manoeuvres to evade radar and missile defences.

5. Strategic and Geopolitical Significance

(a) Strategic Impact

- Unlimited range + nuclear propulsion = ability to strike any target on Earth.
- Low-altitude flight makes detection by missile defence systems extremely difficult.
- Challenges existing **global missile defence frameworks**, especially those led by the **US and NATO**.

(b) Military Implications

- Enhances Russia's strategic deterrence capability.
- Reflects Moscow's commitment to maintaining parity with Western powers

despite sanctions and the Ukraine war.

• Infrastructure for **deployment and operational readiness** has been ordered by President Putin.

6. International Reactions and Concerns

- The missile's development has **renewed global fears** of an **arms race** involving nuclear-powered systems.
- Raises **environmental and safety concerns** due to potential radiation risks from crashed or malfunctioning missiles.
- Seen as a response to U.S. missile defence systems and NATO's technological advances.
- Adds complexity to global arms control negotiations and non-proliferation efforts.

7. Exam-Oriented Facts Summary

Feature Details

Missile NameBurevestnik (9M730)NATO Code NameSSC-X-9 Skyfall

Type Nuclear-powered cruise missile

Power Source RangeMiniature nuclear reactor
Theoretically unlimited

Launch System Assisted by a liquid-fuel booster

Warheads Nuclear or conventional

Test Flight (2025)15 hours; 14,000 km covered **Operational Status**Infrastructure under construction

Strategic Importance Can evade missile defence; deterrence

against the West

Key Concern Nuclear safety, arms race, destabilization of

deterrence balance

8. Broader Context (UPSC Mains Relevance)

- GS Paper II (International Relations):
 - Impact on global arms control regimes like New START and INF Treaty (withdrawn).
 - Russia-US relations and strategic stability.
- GS Paper III (Science & Technology / Defence):
 - Example of nuclear propulsion technology in weapon systems.

• Ethical and environmental concerns of **nuclear-powered armaments**.

9. Conclusion

The Burevestnik missile symbolizes a new phase in strategic weapons development — combining nuclear propulsion, stealth, and endurance. While it enhances Russia's deterrence capabilities, it also intensifies global security risks and complicates the pursuit of nuclear arms control and non-proliferation.

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