

16 NOVEMBER 2021

THE FINAL FRONTIER FLASH SPECIAL REPORT

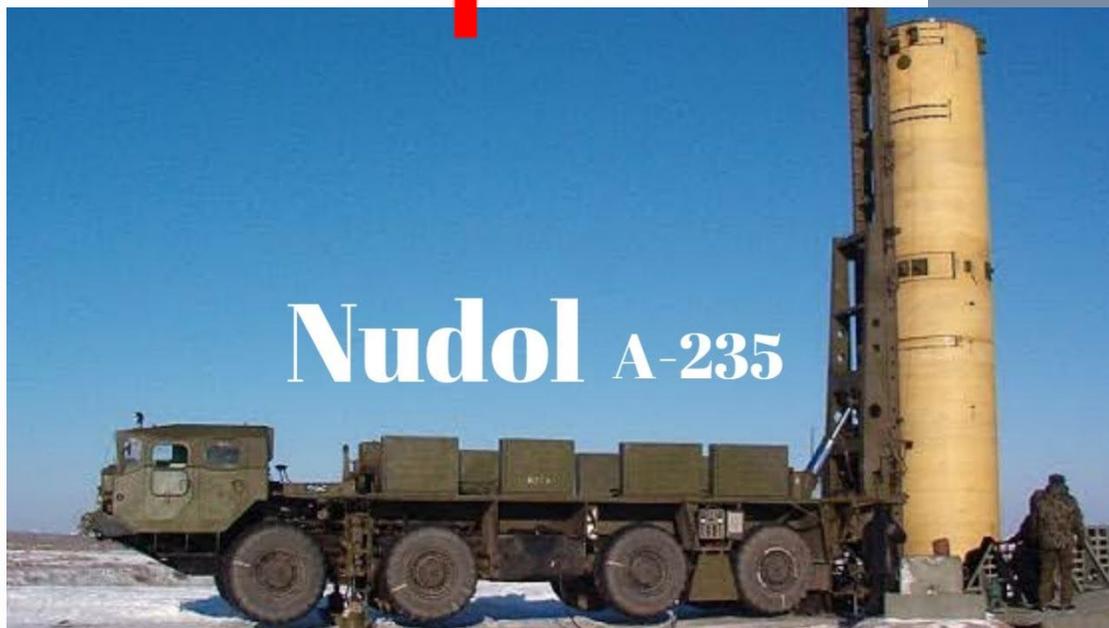


ISR UNIVERSITY

Russia Destroys Tselina-D
ELINT Satellite in Low Earth
Orbit. ASAT Test from
Plesetsk Likely Cause

Event Background: The
Nudol Weapon System

Event Background: The
Target, Kosmos-1408



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[Catalog](#)

Russia Conducts Kinetic ASAT Test, Debris Threatens International Space Station

15 November 2021: Russia carried out an antisatellite missile test and obliterated one of its own satellites (Kosmos-1408) in orbit. The test created a vast cloud of debris that continues to orbit Earth, and some of the material loomed dangerously close to the International Space Station, forcing astronauts to take shelter for hours in a pair of spacecraft capable of returning them to Earth.

- U.S. Space Command stated the test generated 1,500+ pieces of trackable debris...and will remain in orbit for years and potentially for decades, posing a significant risk to the crew on the International Space Station and other human spaceflight activities.

- Russia issued a airspace closure notice for 15 November corresponding to the Plesetsk Launch Facility outside of Moscow.

- Plesetsk has been the site of previous tests of the Nudol direct ascent ASAT weapon system. Video of previous Nudol test.

- The missile struck the satellite, named Cosmos 1408, blowing it to pieces.

- Initial analysis suggests the intercept was generally in the same direction as the satellite velocity vector, rather than against it, minimizing relative velocity but increasing overall inertial velocity of the debris field.

- NASA Administrator Bill Nelson stated he had "reason to believe" that Roscosmos officials were not aware that Russia's Ministry of Defense had been planning to launch an antisatellite missile. Roscosmos leader Dmitry Rogozin will talk with NASA about space debris 16 November 2021.

Russia's strike on Monday created the largest new field of space junk since 2007, when China launched a missile at one of its old weather satellites. That weapon test created a swarm of roughly 2,300 pieces of debris.

The United States conducted its own weapon test in 2008, which created an orbital cloud of about 400 pieces. An Indian weapon test in 2019 left about as many pieces of debris as the 2008 American test.

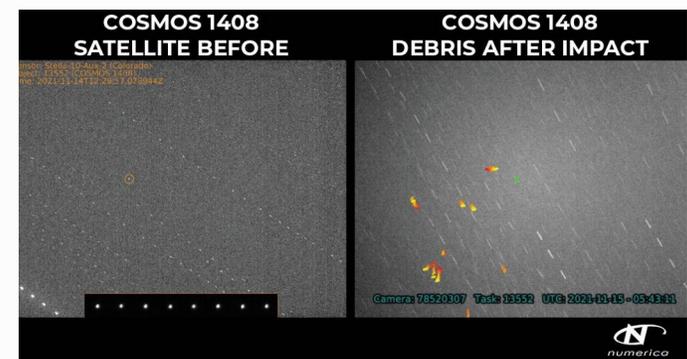
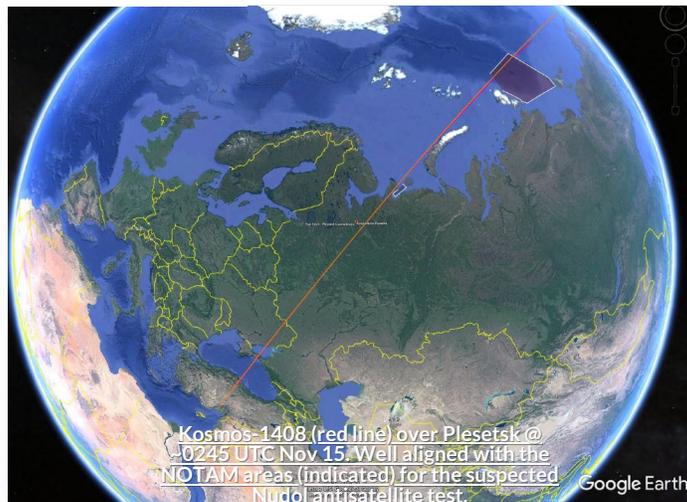
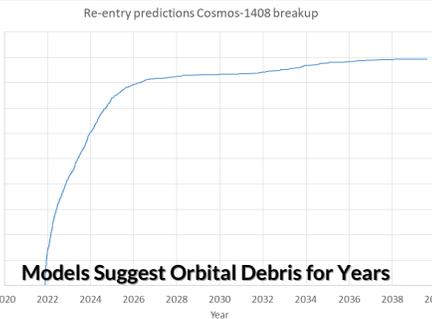
Airspace Closure Notification

HYDROARC 316/21
BARENTS SEA.
RUSSIA.
DNC 22.
1. HAZARDOUS OPERATIONS, ROCKET LAUNCHING,
0200Z TO 0500Z DAILY 15 AND 17 NOV
IN AREA BOUND BY
68-33.1N 047-36.2E, 68-20.3N 048-45.3E,
67-01.4N 046-43.0E, 67-13.0N 045-51.0E,
67-53.1N 046-50.3E.
2. CANCEL THIS MSG 170600Z NOV 21.//

Authority: NAVAREA XX 187/21 101728Z NOV 21.
Date: 101800Z NOV 21
Cancel: 17060000 Nov 21

HYDROARC 314/21
ARCTIC.
LAPTEV SEA.
RUSSIA.
DNC 27.
1. HAZARDOUS OPERATIONS, ROCKET LAUNCHING
150200Z TO 150500Z NOV, ALTERNATE
170200Z TO 170500Z NOV IN AREA BOUND BY
83-00N 099-00E, 83-00N 137-00E,
77-10N 137-00E, 76-00N 134-30E,
77-20N 121-40E, 77-50N 109-40E,
78-20N 106-50E, 78-40N 106-50E,
80-30N 099-00E.
2. CANCEL THIS MSG 170600Z NOV 21.//

Authority: NAVAREA XX 184/21 091732Z NOV 21.
Date: 091740Z NOV 21
Cancel: 17060000 Nov 21



Event Background: The Nudol Weapon System

The Nudol weapon system has been under development since at least 2014. It is a ground-launched ballistic missile designed to be capable of intercepting targets in LEO. The evidence suggests Nudol is being developed for the direct purpose of direct-ascent ASAT operations.

- Russian state-run press describes the system as a mobile, TEL-based “new Russian long-range missile defense and space defense intercept complex.” See [Video](#).
- Nudol flight tests suggest an orbital ballistic trajectory intercept rather than a mid-course missile intercept.
- There have been 11 known flight tests, 8 of which were likely successful, and two additional unconfirmed tests. None of the previous tests included a kinetic intercept.
- The first successful test flight occurred in November 2015.



- Little is known about the operational capabilities of the Nudol, and available estimates for maximum altitude vary from 50km to nearly 1,000km.

- Prior to November 2021, Russia's most recent test occurred at Plesetsk on 15 December 2020.

DATE	SYSTEM	LAUNCH SITE	PAYLOAD	APOGEE	NOTES
Aug. 12, 2014 ²²⁸	Nudol	??	?	X	Failed shortly after launch
Apr. 22, 2015 ²²⁹	Nudol	??	?	X	Failed at launch
Nov. 18, 2015 ²³⁰	Nudol	Plesetsk ²³¹	KKV	200 km?	First successful test of missile
May 25, 2016 ²³²	Nudol	Plesetsk	??	100 km?	
Dec. 16, 2016 ²³³	Nudol	“Central Russia” (Plesetsk? Kapustin Yar?)	Likely KKV	100 km?	
Mar. 26, 2018	Nudol	Plesetsk	Likely KKV	?	First test from a mobile launcher
Dec. 23, 2018 ²³⁴	Nudol	Plesetsk	Likely KKV	?	
Nov. 15, 2019	Nudol	Plesetsk	Likely KKV	?	
Apr. 15, 2020	Nudol	Plesetsk	Likely KKV	?	
Dec. 16, 2020	Nudol	Plesetsk	Likely KKV	?	

Nudol Launches 2014-2020

- For the December test event, Russia also issued a commercial closure area. Russia also posted a nearly identical hazard zone for a test in April 2020.

- Experts believe Nudol is a variant of the A-235 anti-ballistic missile system.

Event Background: The Target, Kosmos-1408

Kosmos 1408 was a Tselina-D electronic signals intelligence (ELINT) satellite launched on 16 September 1982 aboard a Tsyklon-3 rocket flying from Site 32/2 at the Plesetsk Cosmodrome.

- Also known as Ikar, Tselina-D satellites were the larger counterparts of the Soviet Union’s Tselina-O spacecraft.

- The Tselina-O spacecraft would identify and locate radio sources which would then be observed by the Tselina-D spacecraft.

- Tselina-D satellites had a mass at launch of approximately 2,000 kilograms.

- The design life of the spacecraft was only six months, with Kosmos 1408 having been long derelict by the time of its destruction.

- Kosmos-1408 was in an orbit about 630 kilometers above the Earth’s surface during its lifetime, although atmospheric drag from 39 years in orbit had considerably lowered this.

- Shortly before its interception, Kosmos 1408 was in a 472 by 498-kilometer orbit, inclined at 82.6 degrees to the equator.

