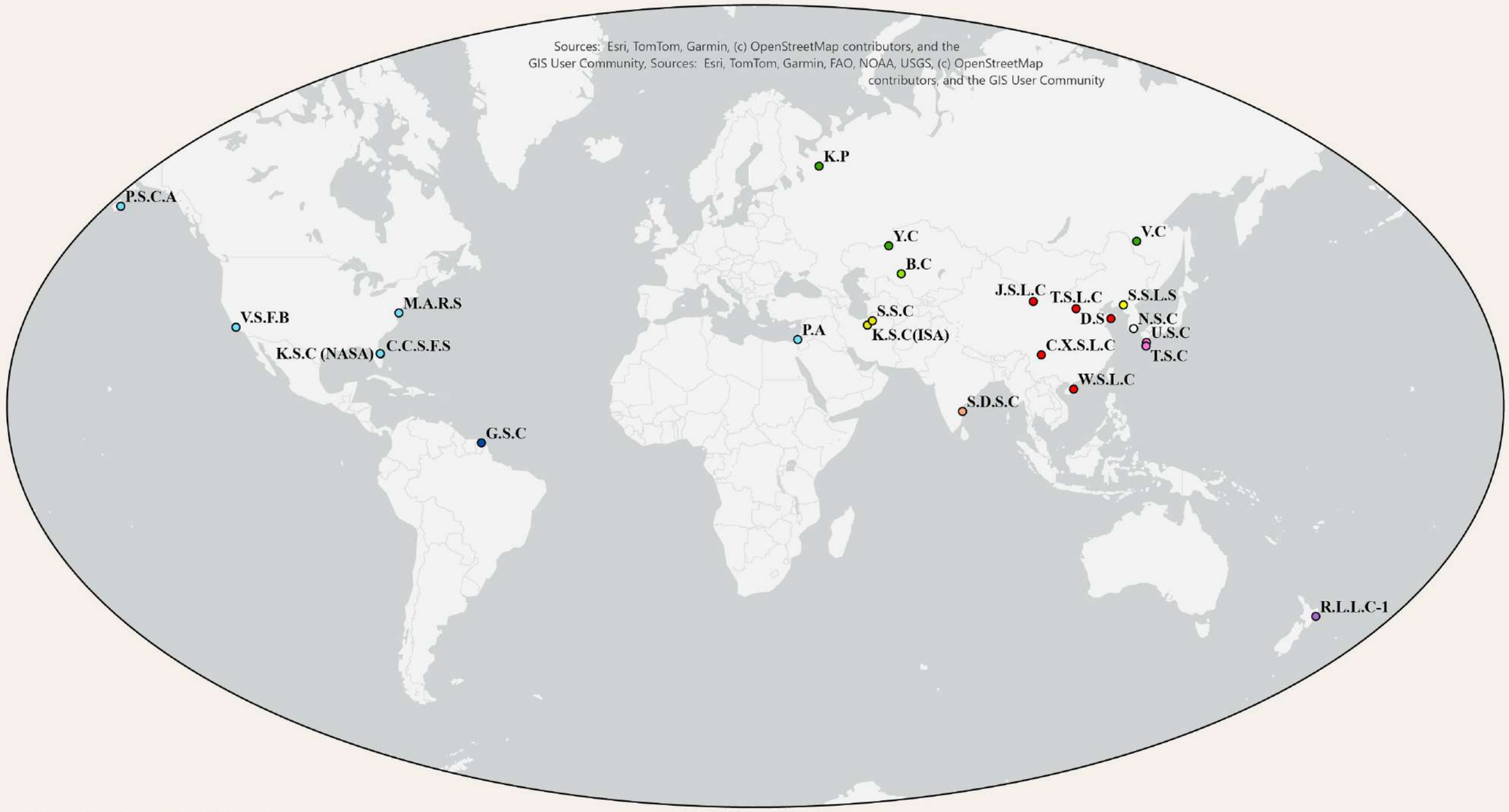
# SPACEPORT SERIES

*A facility-by-facility assessment of the world's primary orbital launch infrastructure.*




Created by A. Wurfbain

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**SPACEPORT SERIES**
**VOLUMES 01 – 24**

*Primary spaceports are those currently active in delivering payloads into orbit.

# BAIKONUR COSMODROME

Roscosmos (leased from Kazakhstan) · Baikonur, Kazakhstan

SPACEPORT SERIES · VOL. 01 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•Baikonur is the sole operational gateway for crewed Soyuz missions to the ISS, making it indispensable to the current ISS-centered space architecture.

•Russian MoD use of Proton heavy-lift for military payloads qualifies the facility as a legitimate military objective under IHL.

•A kinetic strike risks degrading ISS crew safety, raising serious proportionality concerns under international humanitarian law.

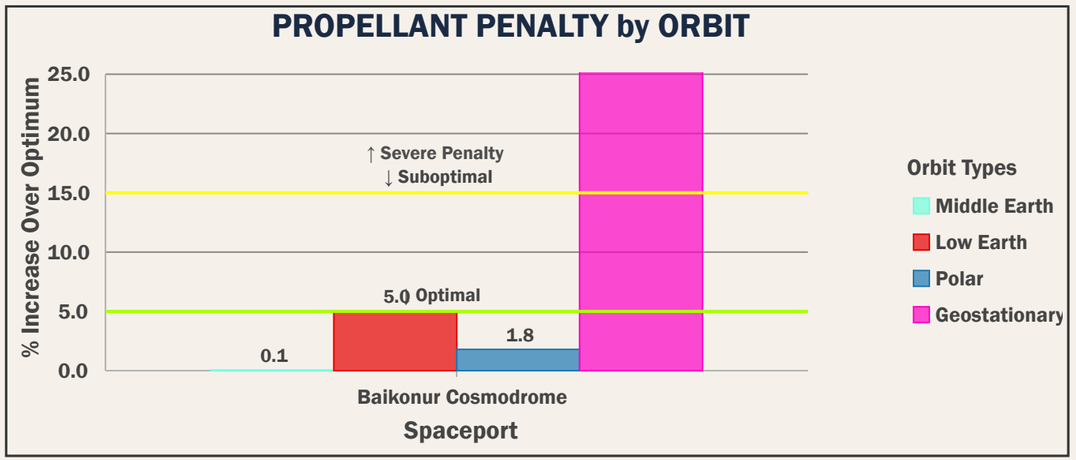
## FACILITY OVERVIEW

Baikonur Cosmodrome is the world's first and largest operational space launch facility, located in the desert steppe of Kazakhstan and jointly managed by Roscosmos and the Russian Aerospace Forces.[1] Russia leases the site through 2050 at a fixed US$115 million per year, a figure Kazakh officials reaffirmed in 2025 after Kazakhstan had received over US$3 billion across the life of the lease.[2] It remains the only operational spaceport capable of dispatching crewed Soyuz missions and Progress cargo vehicles to the International Space Station (ISS).[3] Under a long-standing NASA–Roscosmos integrated-crew arrangement, US astronauts fly aboard Soyuz from Baikonur in exchange for Russian cosmonaut seats on US commercial spacecraft.[3]

## STRATEGIC IMPLICATIONS

The Russian Ministry of Defense has historically used Baikonur's heavy-lift Proton family to launch military communications, ocean-surveillance, and electronic-intelligence payloads, although the Proton line is being retired.[1] While the facility meets the legal criteria of a military objective, a kinetic strike would raise acute proportionality concerns given the threat to ISS continuity and crew safety. Its status as leased Kazakh territory deep within a non-belligerent state further constrains targeting: no strike could occur without simultaneously implicating Kazakh sovereignty.

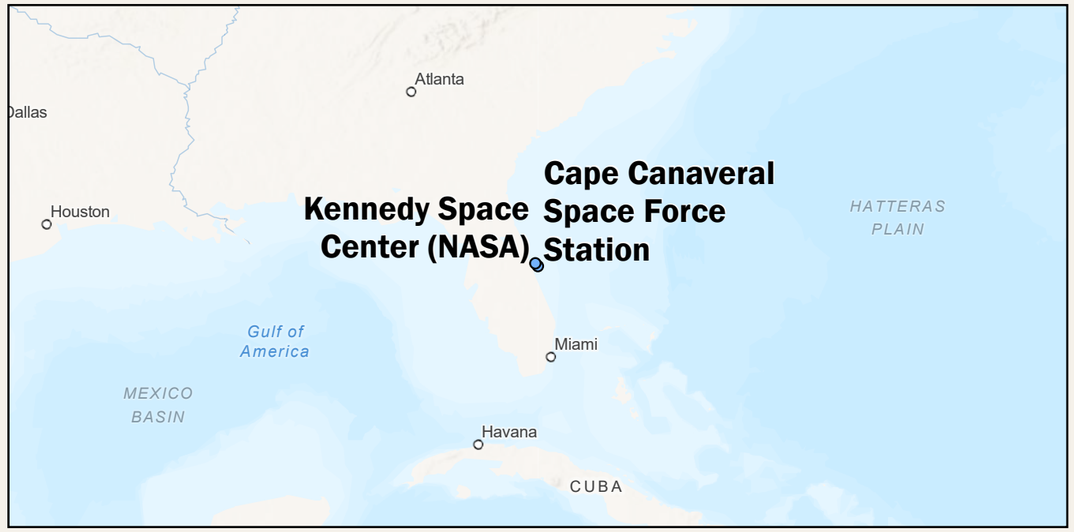
## PROPELLANT PENALTY by ORBIT



# CAPE CANAVERAL SPACE FORCE STATION

United States Space Force · Cape Canaveral, Florida, United States

SPACEPORT SERIES · VOL. 02 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

- CCSFS is the primary US gateway for national-security space launches and heavy-lift commercial missions.
- The facility is a high-value target in peer conflict but sits within heavily defended US homeland airspace.
- Any strike would constitute a direct attack on US territory, dramatically escalating beyond strikes on leased or partner facilities.

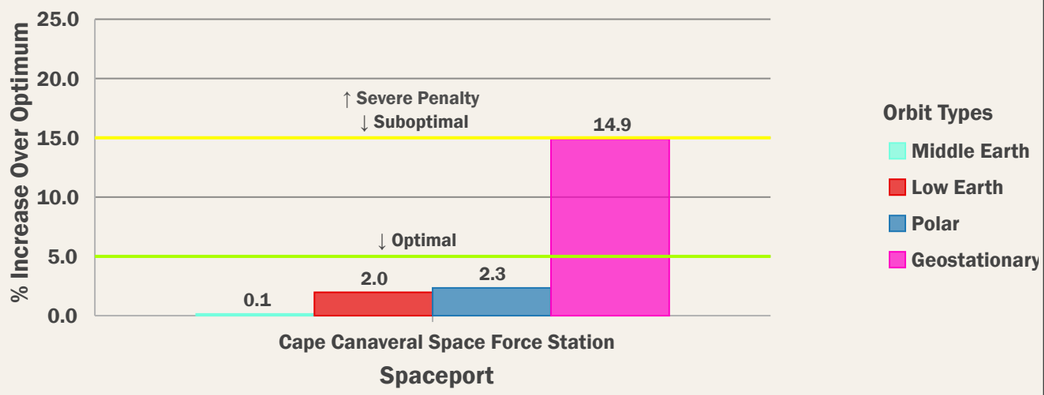
## FACILITY OVERVIEW

Cape Canaveral Space Force Station (CCSFS) is America's premier eastern launch site, operated by the US Space Force through Space Launch Delta 45, which manages the Eastern Range.[4] Adjacent to NASA's Kennedy Space Center, it is the critical hub for national-security launches and heavy-lift vehicles, hosting SpaceX at SLC-40, ULA's Atlas V and the newly certified Vulcan at SLC-41, and Blue Origin's New Glenn at LC-36.[5][6] The range supported a record 109 launches in 2025, surpassing the previous year's total before the end of November.[4]

## STRATEGIC IMPLICATIONS

CCSFS operates as a military, commercial, and scientific nexus within a well-defended domestic environment, and its extensive dual-use infrastructure makes it a high-value target in any peer-level conflict. The US Space Force has begun fielding counter-drone defenses across the Eastern Range, reflecting a recognized threat to launch infrastructure.[7] However, any attack on CCSFS would constitute a direct strike on the US homeland, elevating escalation risk far beyond the legal and geopolitical complexity associated with leased foreign facilities.

## PROPELLANT PENALTY by ORBIT



# CHINA XICHANG SATELLITE LAUNCH CENTER

People's Liberation Army (PLA) · Liangshan, Sichuan, China

SPACEPORT SERIES · VOL. 03 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•XSLC is China's primary GEO and deep-space launch facility, anchoring the Beidou navigation constellation and the Chang'e lunar program.

•Direct PLA management as the 27th Test and Training Base establishes the site as a legitimate military objective under IHL.

•The inland location combined with UDMH and nitrogen-tetroxide propellant stores creates significant civilian-harm potential under proportionality analysis.

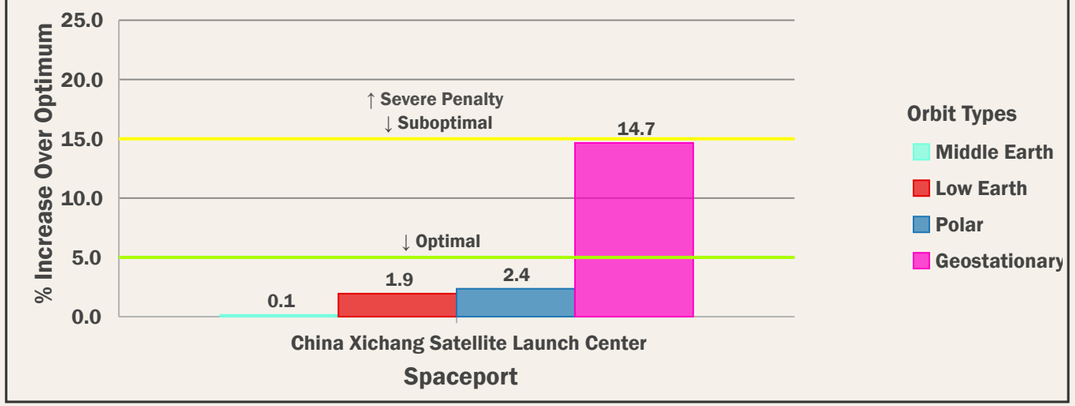
## FACILITY OVERVIEW

The Xichang Satellite Launch Center (XSLC) is managed directly by the People's Liberation Army as the 27th Test and Training Base.[8] Located in Sichuan Province, it is China's primary facility for launching payloads into Geostationary Earth Orbit and deep space, and serves as the launch hub for the Beidou navigation system and the Chang'e lunar exploration program through high-frequency Long March 3-series deployments.[8]

## STRATEGIC IMPLICATIONS

XSLC functions as a core military asset, deploying classified signals-intelligence, electronic-warfare, and secure military-communications satellites for the PLA, which under international humanitarian law renders it a legitimate military objective.[8] Under the law of proportionality, however, the site presents uniquely dangerous civilian-harm potential owing to its inland location and the hypergolic propellants used by Long March rockets: unsymmetrical dimethylhydrazine is a probable human carcinogen and nitrogen tetroxide is acutely toxic.[9][10] Ignition of large fuel stores could generate a toxic chemical plume across the inland valleys.

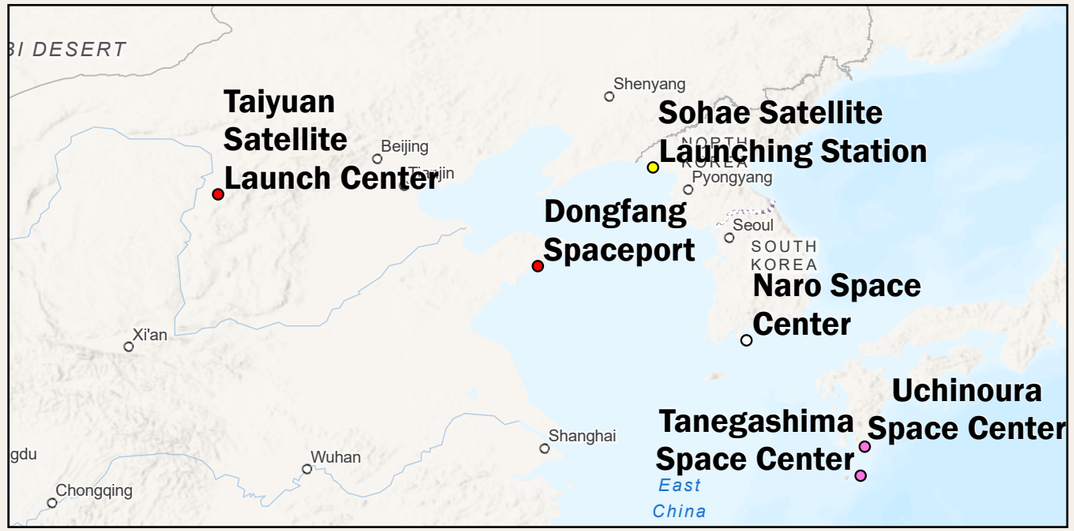
## PROPELLANT PENALTY by ORBIT



# DONGFANG SPACEPORT

China Aerospace Science and Technology Corp · Haiyang, Shandong, China

SPACEPORT SERIES · VOL. 04 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

•Dongfang is China's only dedicated maritime launch hub and a strategic complement to the inland launch network.

•Mobile sea-launch operations create targeting ambiguity that constrains adversary calculus under proportionality norms.

•Sea-launch capability lets China bypass inland range congestion and accelerate mega-constellation deployment.

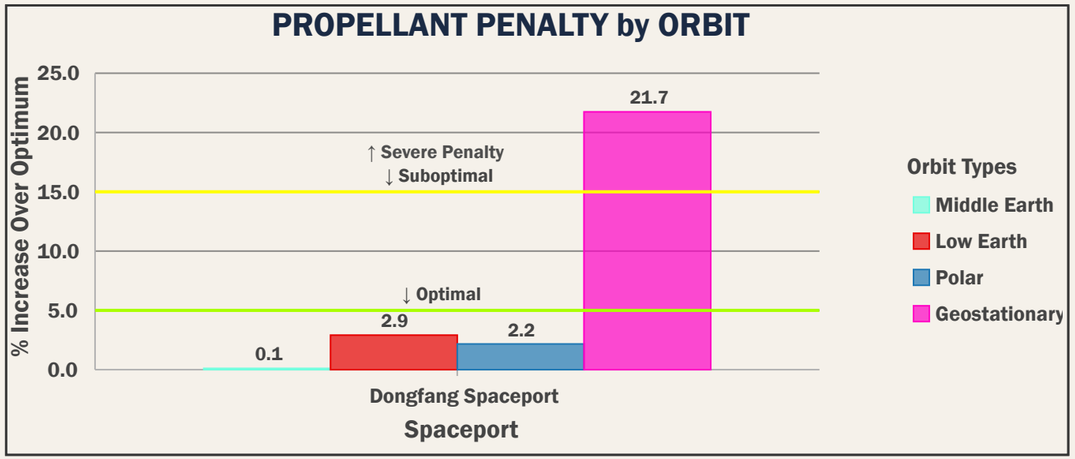
## FACILITY OVERVIEW

The Dongfang Spaceport, officially the Oriental Maritime Space Port (OMSP), is China's dedicated maritime launch complex at Haiyang in Shandong Province.[11] It integrates rocket manufacturing with mobile ocean-going deployment, supporting solid-propellant launches such as the Long March 11 and the Gravity-1, the latter built by the commercial firm Orienspace and currently the world's most powerful solid-fuel commercial rocket.[11][12] Gravity-1 flew its maiden mission from a barge off Haiyang in January 2024 and its second flight in October 2025, the latter among roughly twenty offshore launches the port has supported.[12]

## STRATEGIC IMPLICATIONS

While the port brands itself as a commercial enterprise, the PLA retains strategic oversight of Chinese launch activity, and the site's reliance on mobile launch vessels and specialized support ships alters the calculus of military targeting under proportionality.[11] Because launch events occur from floating platforms within coastal waters or the Exclusive Economic Zone, a strike on an active launch asset would avoid dropping kinetic debris onto populated mainland communities but would shift the engagement into contested maritime space.

## PROPELLANT PENALTY by ORBIT



# GUIANA SPACE CENTRE

CNES / European Space Agency (ESA) · Kourou, French Guiana

SPACEPORT SERIES · VOL. 05 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•CSG is Europe's exclusive gateway to space and the single most critical facility for European strategic autonomy.

•The near-equatorial location maximizes payload efficiency for geostationary transfer orbits.

•The site is the sole launch venue for Ariane 6 heavy-lift and Vega-C light-lift vehicles.

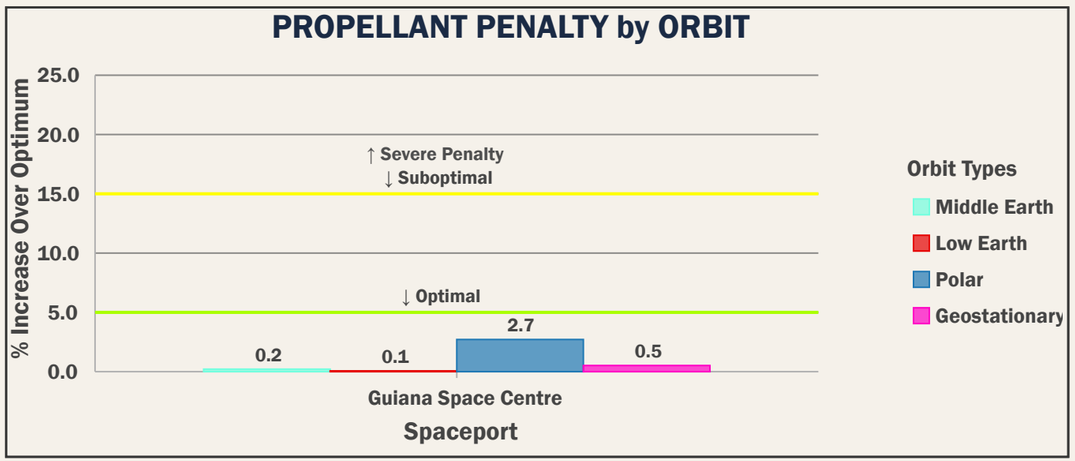
## FACILITY OVERVIEW

The Guiana Space Centre (CSG), also known as Europe's Spaceport, is Europe's primary gateway to orbit and a central pillar of its strategic autonomy, managed jointly by the French space agency CNES, the European Space Agency, and Arianespace.[13] Its near-equatorial position roughly five degrees north of the equator maximizes efficiency for placing heavy payloads into geostationary transfer orbit. CSG is the exclusive launch venue for Europe's flagship Ariane 6, which flew its inaugural mission in July 2024, and the light-lift Vega-C, deploying sovereign European assets including Galileo navigation and Copernicus Earth-observation satellites.[13]

## STRATEGIC IMPLICATIONS

As Europe's only operational gateway to orbit, the Guiana Space Centre stands as the single most critical facility for European independent access to space. Joint CNES, ESA, and Arianespace management distributes operational risk across European partners, but the single-site concentration of European launch capability remains a strategic vulnerability.

## PROPELLANT PENALTY by ORBIT



# JIUQUAN SATELLITE LAUNCH CENTER

People's Liberation Army (PLA) · Ejin Banner, Inner Mongolia, China

SPACEPORT SERIES · VOL. 06 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•JSLC is China's oldest spaceport and the sole site authorized for crewed Shenzhou and Tiangong space-station missions.

•Direct PLA management as the 20th Test and Training Base establishes unambiguous military-objective status under IHL.

•The site is a strategic-weapons testing range and the launch facility for the Yaogan military remote-sensing constellation.

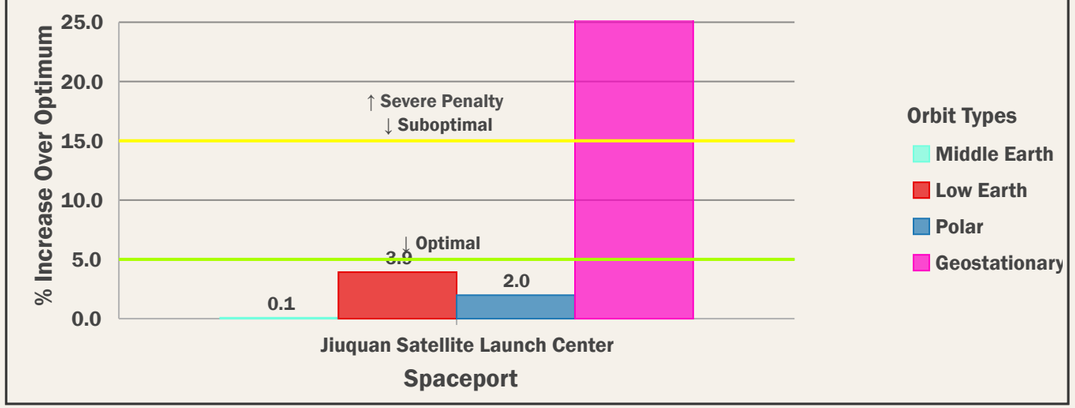
## FACILITY OVERVIEW

The Jiuquan Satellite Launch Center (JSLC), militarily designated the 20th Test and Training Base and informally known as Dongfeng Aerospace City, is China's oldest spaceport, founded in 1958, and is managed directly by the PLA.[14] It is China's only site authorized for crewed orbital missions, serving as the exclusive launch venue for the Shenzhou crewed program and Tiangong space-station crew rotations aboard the human-rated Long March 2F.[14] The complex also hosts a Dongfeng commercial pilot zone where private providers including LandSpace, i-Space, and CAS Space operate, with LandSpace's improved Zhuque-2E returning to flight in May 2026.[15]

## STRATEGIC IMPLICATIONS

JSLC constitutes a core military objective under international humanitarian law owing to its role as a strategic-weapons testing range; it supports intercontinental ballistic missile development and launches the Yaogan military remote-sensing constellation.[14] Direct PLA management — paralleling Xichang and Taiyuan under the same launch authority — leaves no ambiguity regarding combatant status. The inland desert position is a tactical advantage, as the surrounding territory absorbs debris from launch failures or strikes without significant civilian exposure, unlike Xichang and Taiyuan, whose downrange paths cross populated valleys.

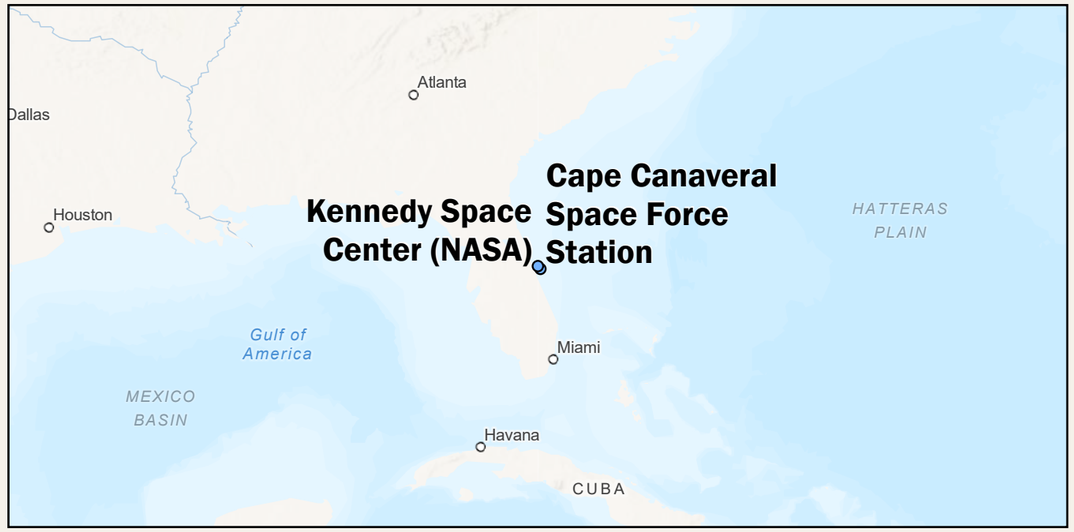
## PROPELLANT PENALTY by ORBIT



# KENNEDY SPACE CENTER (NASA)

National Aeronautics and Space Admin. (NASA) · Merritt Island, Florida, United States

SPACEPORT SERIES · VOL. 07 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

- KSC anchors US civil, commercial, and human spaceflight and is the launch site for the Artemis lunar program.
- Its civil mandate and global scientific footprint make any kinetic targeting highly problematic under proportionality.
- A strike on KSC would affect multinational scientific endeavors and non-belligerent nations worldwide.

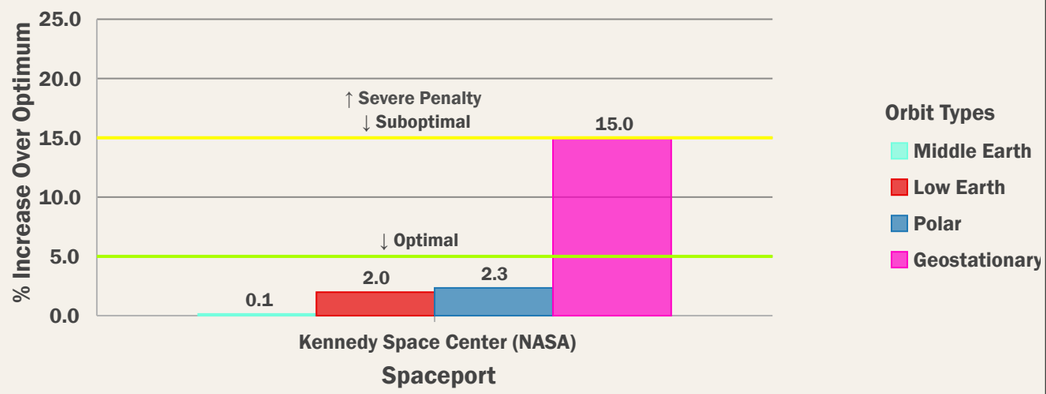
## FACILITY OVERVIEW

The Kennedy Space Center (KSC) is America's premier gateway for civil, commercial, and human space exploration, managed by NASA on Merritt Island, Florida.[16] It is the launch site for NASA's Artemis lunar program using the Space Launch System from LC-39B, and hosts SpaceX Falcon 9, Falcon Heavy, and Crew Dragon missions at LC-39A, leased to the company since 2014.[16][17] The crewed Artemis II mission launched from KSC on 1 April 2026 and returned safely on 10 April, the first crewed lunar flight of the program.[16]

## STRATEGIC IMPLICATIONS

Operating under a fundamentally civil mandate, KSC's footprint is nonetheless intertwined with national defense through shared infrastructure with the adjacent Cape Canaveral Space Force Station and dual-use commercial logistics. Any kinetic targeting of KSC would be highly problematic under proportionality: as a hub of global civil space operations, a strike would affect multinational scientific endeavors and non-belligerent nations worldwide, and as an iconic symbol of the American homeland would cross an extreme escalatory threshold.

## PROPELLANT PENALTY by ORBIT



# KHOMEINI SPACE CENTRE

Iranian Space Agency · Semnan Province, Iran

SPACEPORT SERIES · VOL. 08 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

- The Khomeini facility is Iran's primary site for liquid-fueled satellite launch vehicles, including Simorgh and Safir.
- US intelligence assesses the Simorgh SLV could serve as a test bed for ICBM technologies, embedding the site in Iran's strategic-delivery development.
- The dual-use overlap classifies the base as a legitimate military objective under IHL.

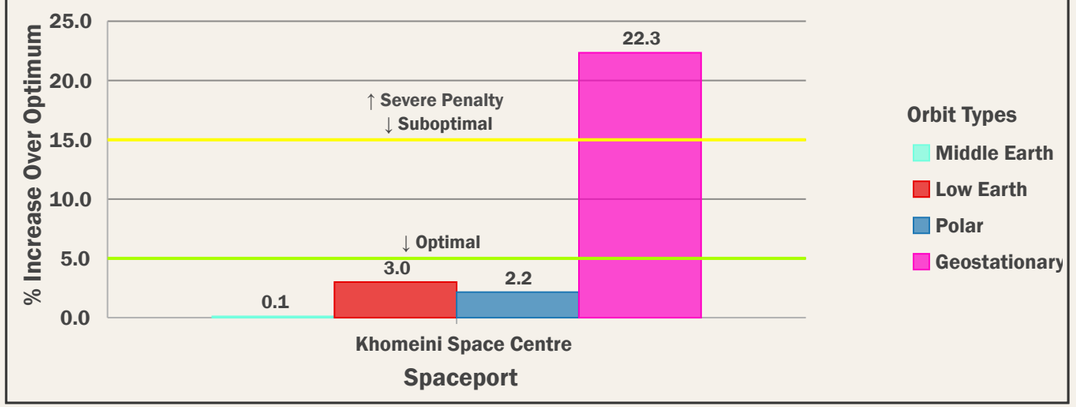
## FACILITY OVERVIEW

The Imam Khomeini Space Center in Semnan Province is Iran's primary site for liquid-fueled Satellite Launch Vehicles, operated by the Iran Space Agency under the Ministry of ICT.[18] It is the principal national site for launching the multi-stage Simorgh and Safir rockets, the latter derived from the Shahab-3 medium-range ballistic missile, to deploy domestic communication and Earth-imaging payloads.[18]

## STRATEGIC IMPLICATIONS

Although Tehran asserts its space program is purely civilian, the US National Air and Space Intelligence Center assesses that the two-stage Simorgh "could serve as a test bed for developing ICBM technologies," since space launch vehicles use inherently similar technologies, and the IISS judges the Simorgh to be based on North Korean designs.[19][20] This dual-use overlap classifies the base as a legitimate military objective under international humanitarian law. Iranian space-launch and research facilities were struck during Operation Epic Fury, the joint US–Israel campaign of 28 February to 5 May 2026, with US Central Command stating it degraded Iran's space-command equivalent.[21][22] The IRGC's decentralized, mobile launch doctrine could nonetheless allow continued satellite launches.

## PROPELLANT PENALTY by ORBIT



# KOSMODROM PLESETSK

Russian Aerospace Forces · Mirny, Arkhangelsk Oblast, Russia

SPACEPORT SERIES · VOL. 09 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•Plesetsk is Russia's most active military spaceport, operated by the Russian Aerospace Forces.

•Its high latitude makes it specialized for polar and sun-synchronous orbit deployments, though Andøya now contests its northernmost status.

•Colocated active ICBM silos raise extreme escalation concerns for any kinetic strike.

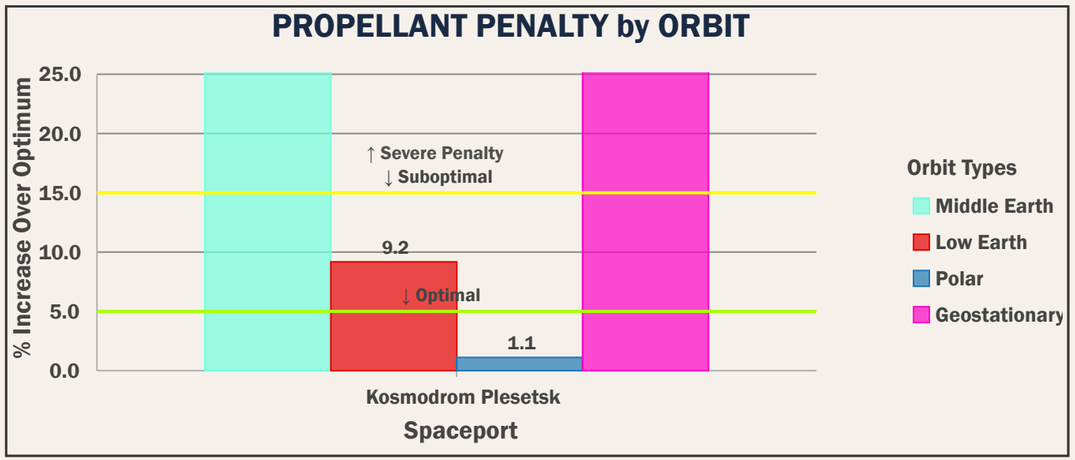
## FACILITY OVERVIEW

Plesetsk Cosmodrome is Russia's most active military spaceport and missile-testing facility, located roughly 800 kilometers north of Moscow in Arkhangelsk Oblast and operated by the Russian Aerospace Forces.[23] It is the world's northernmost major orbital cosmodrome, specialized for polar and sun-synchronous launches — though Norway's Andøya Spaceport, further north at 69°N, conducted continental Europe's first orbital launch attempt in March 2025. The complex includes silos and road-mobile ICBM training grounds for systems such as Yars, alongside its space-launch complexes.[23] In March 2026 a Soyuz-2.1b launched the first 16 operational satellites of Russia's state-backed Rassvet constellation — a sovereign Starlink alternative built by Bureau 1440 — from Site 43.[23][24]

## STRATEGIC IMPLICATIONS

Operated by the Russian Aerospace Forces rather than a civilian entity, Plesetsk is Russia's core northern hub for space-based and land-based warfare capabilities, making it a valid military objective; it has already been targeted by drone attacks during the war in Ukraine. Because the complex also functions as a strategic-forces site holding active ICBM silos, precision is imperative: any strike on an active nuclear silo would constitute a major escalation.

## PROPELLANT PENALTY by ORBIT



# MID-ATLANTIC REGIONAL SPACEPORT

Virginia Commercial Space Flight Authority · Wallops Island, Virginia, United States

SPACEPORT SERIES · VOL. 10 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

- MARS provides resilient US east-coast launch capacity supporting Space Force and AFRL responsive-launch missions.
- Heavily integrated civilian and military infrastructure raises significant collateral-damage potential.
- The facility supports NRO and Space Force reconnaissance launches via Rocket Lab and Northrop Grumman.

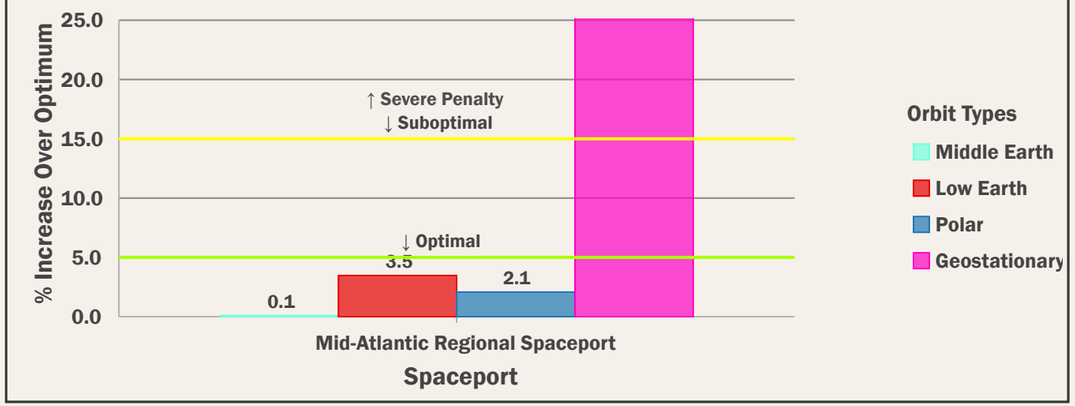
## FACILITY OVERVIEW

The Mid-Atlantic Regional Spaceport (MARS) is a commercial launch facility on Wallops Island, Virginia, operated by the Virginia Commercial Space Flight Authority and sharing infrastructure with NASA's Wallops Flight Facility.[25] Its pads include 0A for Northrop Grumman's Antares, 0C (Launch Complex 2) for Rocket Lab's Electron, and 0D (Launch Complex 3) for the developmental Neutron, whose facility opened in August 2025.[25][26] The site supports US Space Force and Air Force Research Laboratory responsive-launch missions and National Reconnaissance Office payloads.[25]

## STRATEGIC IMPLICATIONS

MARS possesses significant and growing military integration, making it a high-value military objective. The principal risk is that its civilian installation is so closely integrated with military operations that a strike would likely produce civilian collateral damage; its volatile propellant stores and proximity to major East Coast population centers compound that risk, and its coastal exposure creates vulnerability to sea-launched precision attack.

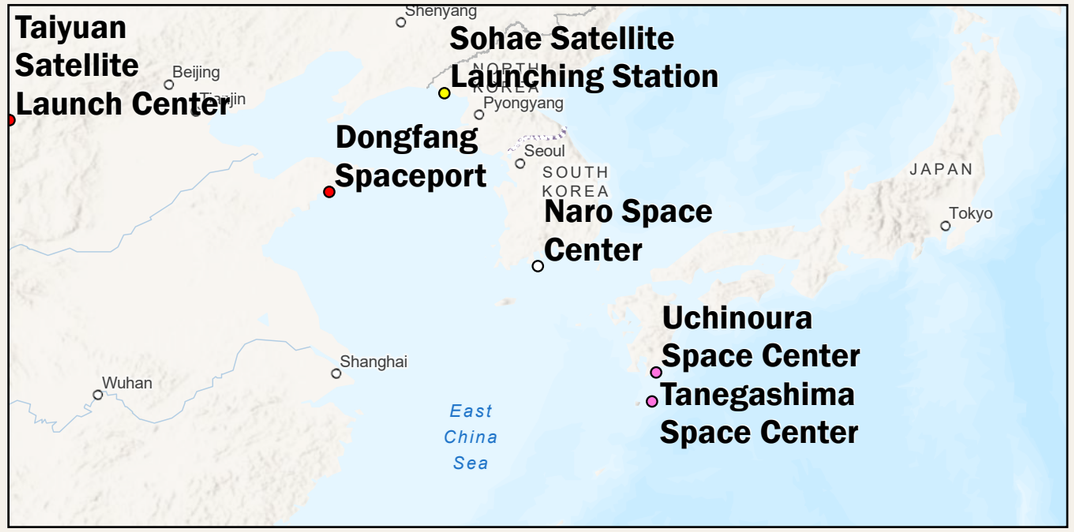
## PROPELLANT PENALTY by ORBIT



# NARO SPACE CENTER

Korea Aerospace Research Institute (KARI) · Goheung, South Jeolla, South Korea

SPACEPORT SERIES · VOL. 11 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

•Naro is South Korea's sole spaceport, operated by KARI under the KASA aerospace administration established in 2024.

•The site is the exclusive launch venue for the Nuri (KSLV-II), whose fourth flight succeeded in November 2025.

•KASA's founding mandate emphasizes civil-military cooperation, tying the site to sovereign defense space goals.

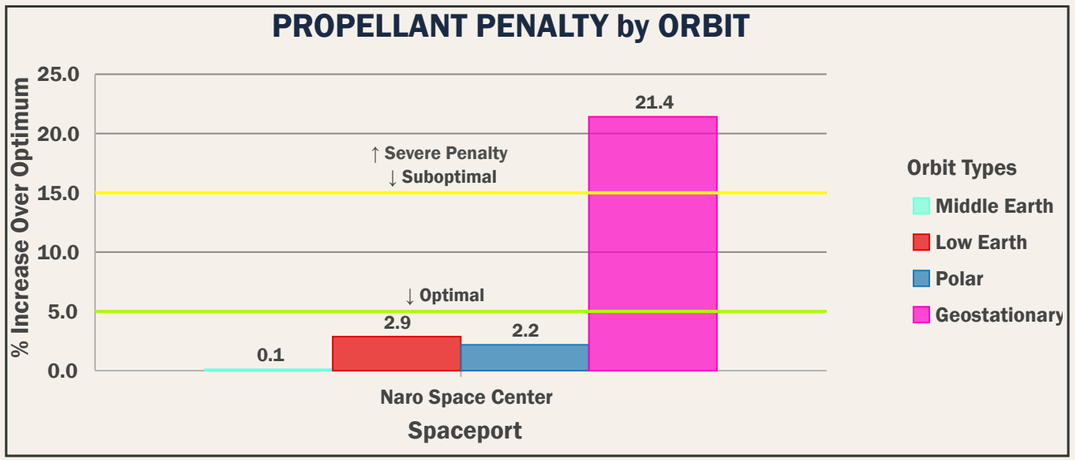
## FACILITY OVERVIEW

The Naro Space Center is South Korea's primary spaceport, on Oenaro Island in Goheung, operated by the Korea Aerospace Research Institute under the Korea AeroSpace Administration, which was established in May 2024.[27][28] It is the exclusive launch pad for the Nuri (KSLV-II) rocket, whose fourth flight in November 2025 successfully deployed the CAS500-3 satellite and twelve cubesats.[27] Nuri technology was transferred to Hanwha Aerospace under a contract signed in July 2025, marking the program's shift toward commercial operation.[27]

## STRATEGIC IMPLICATIONS

As a dual-use facility, Naro is a legitimate military objective in wartime, and KASA's founding mandate explicitly emphasizes civil–military cooperation in space.[29] Its position as far south as possible within South Korea improves lift capacity for lighter payloads and provides additional warning time in a conflict. The facility was built on the assumption that it would be a target, with launch-pad infrastructure constructed as hardened, partially buried structures.

## PROPELLANT PENALTY by ORBIT



# PACIFIC SPACEPORT COMPLEX ALASKA

Alaska Aerospace Corporation · Kodiak Island, Alaska, United States

SPACEPORT SERIES · VOL. 12 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•PSCA is one of the world's most strategically significant high-latitude launch facilities.

•The site supports US Missile Defense Agency hypersonic testing and joint US–Israeli Arrow 3 interceptor trials.

•Its direct national-security role establishes the facility as a legitimate military objective under IHL.

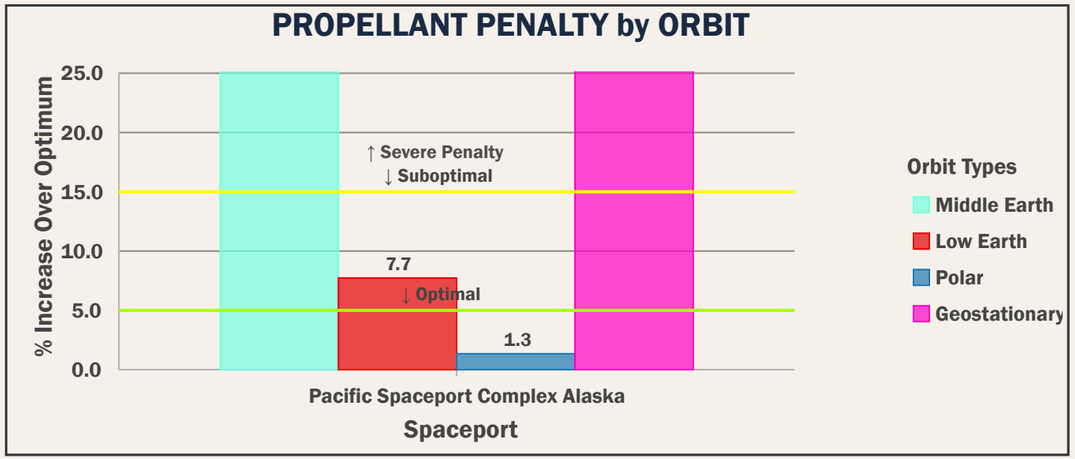
## FACILITY OVERVIEW

The Pacific Spaceport Complex – Alaska (PSCA), formerly the Kodiak Launch Complex, is a commercial and military spaceport on Narrow Cape, Kodiak Island, owned and operated by the state-owned Alaska Aerospace Corporation.[30] It is one of the most strategically significant high-latitude launch facilities in the world, specializing in low-cost responsive vertical launches of light-lift and commercial rockets to polar and sun-synchronous orbits.

## STRATEGIC IMPLICATIONS

The complex operates under contracts with the US Missile Defense Agency and serves as a testing ground for advanced military systems, including hypersonic-weapon evaluations and the joint US–Israeli Arrow 3 interceptor trials that successfully intercepted medium-range targets over the Pacific in 2019.[31] Its direct role in testing and deploying national-security architectures renders it a legitimate military objective under international humanitarian law. Owing to its isolation from population centers and oceanic proximity, there is little threat of collateral damage from an attack.

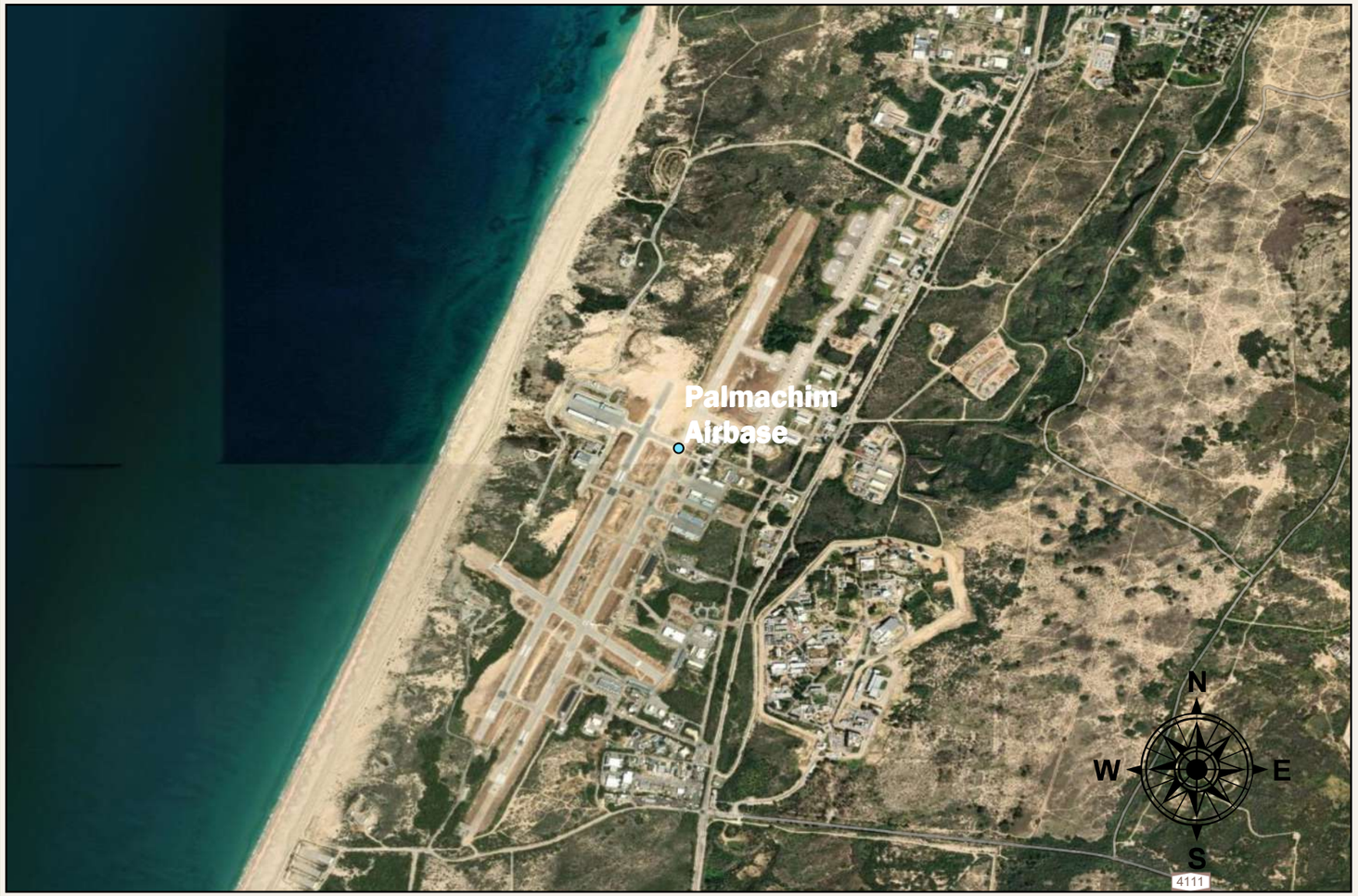
## PROPELLANT PENALTY by ORBIT



# PALMACHIM AIRBASE

Israeli Air Force · Palmachim, Israel

SPACEPORT SERIES · VOL. 13 ·
25 MAY 2026 · A. WURFBAIN





## KEY JUDGEMENTS

•Palmachim is Israel's sole independent satellite-launch site, deploying Shavit-launched Ofeq reconnaissance payloads.

•The site is associated with Arrow missile-defense and Jericho ballistic-missile development.

•Hybrid IAF and ISA operations consolidate Israel's aerospace gateway with offensive and defensive capabilities.

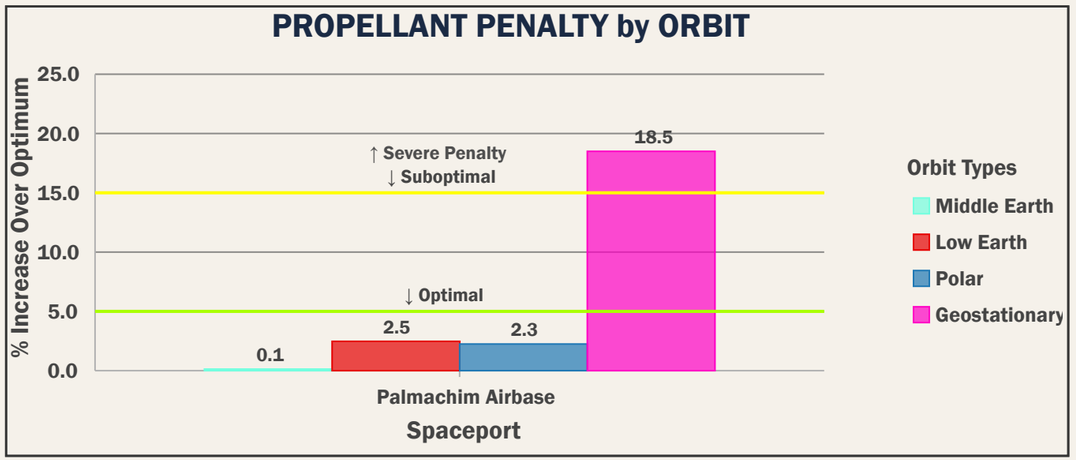
## FACILITY OVERVIEW

Palmachim Airbase is a strategic military installation and spaceport jointly operated by the Israeli Air Force and the Israel Space Agency, on the Mediterranean coast south of the Gush Dan metropolitan area.[32] It is Israel's sole independent satellite-launch site, using the Shavit rocket to deploy Ofeq reconnaissance payloads; the Shavit launches westward over the Mediterranean for safety, a retrograde trajectory that imposes roughly a 30 percent payload penalty.[33] The most recent reconnaissance launch was the synthetic-aperture-radar satellite Ofek-19 in September 2025.[34]

## STRATEGIC IMPLICATIONS

Palmachim is a high-value military objective owing to its integration into Israel's defensive and offensive capabilities: it is associated with Arrow missile-defense and Jericho ballistic-missile development.[32] In March 2026, Iranian state media claimed drone strikes against the base; Israel did not comment on the claim and no damage has been independently verified.[35]

## PROPELLANT PENALTY by ORBIT



# ROCKET LAB LAUNCH COMPLEX 1

Rocket Lab · Mahia Peninsula, New Zealand

SPACEPORT SERIES · VOL. 14 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•LC-1 is a privately operated commercial spaceport with two pads, FAA-licensed for up to 120 launches annually.

•Extensive US Space Force, NRO, and MDA contracts qualify the dual-use facility as a legitimate military objective.

•The site complicates New Zealand's traditional diplomatic neutrality during any US-involved conflict.

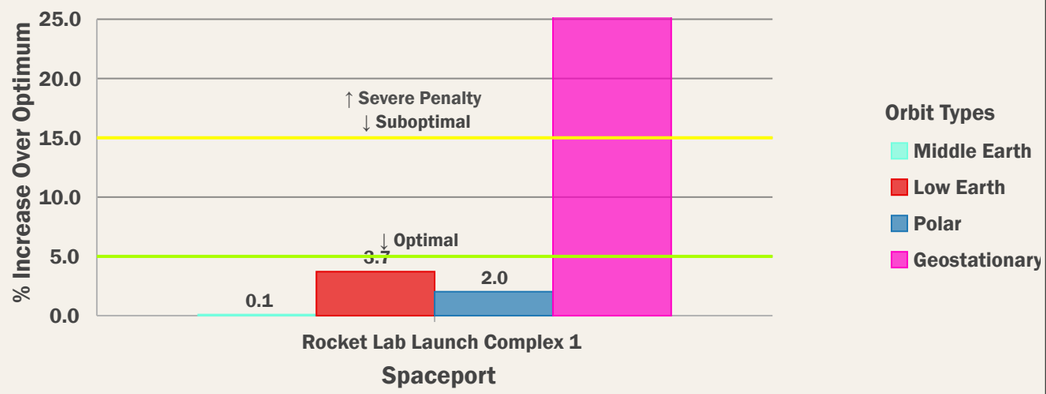
## FACILITY OVERVIEW

Rocket Lab Launch Complex 1 (LC-1), on the Māhia Peninsula of New Zealand's North Island, is the world's first private orbital launch site and the primary high-frequency facility for Rocket Lab's Electron light-lift vehicle.[36] It operates two independent pads, LC-1A and LC-1B, the latter first used in February 2022, and is FAA-licensed for up to 120 launch opportunities annually.[36][37] The site routinely flies missions for the US Space Force, the National Reconnaissance Office, and the Missile Defense Agency.[38]

## STRATEGIC IMPLICATIONS

Though situated in a state without a domestic military space program, LC-1 is a critical dual-use facility owing to Rocket Lab's extensive defense contracts. Because it facilitates deployment of tactical defense communications, space-domain-awareness sensors, and military-intelligence architectures, it constitutes a legitimate military objective under international humanitarian law during armed conflict. Its principal defense, like New Zealand's, is geographic isolation sufficient that it may not register as a worthwhile target.

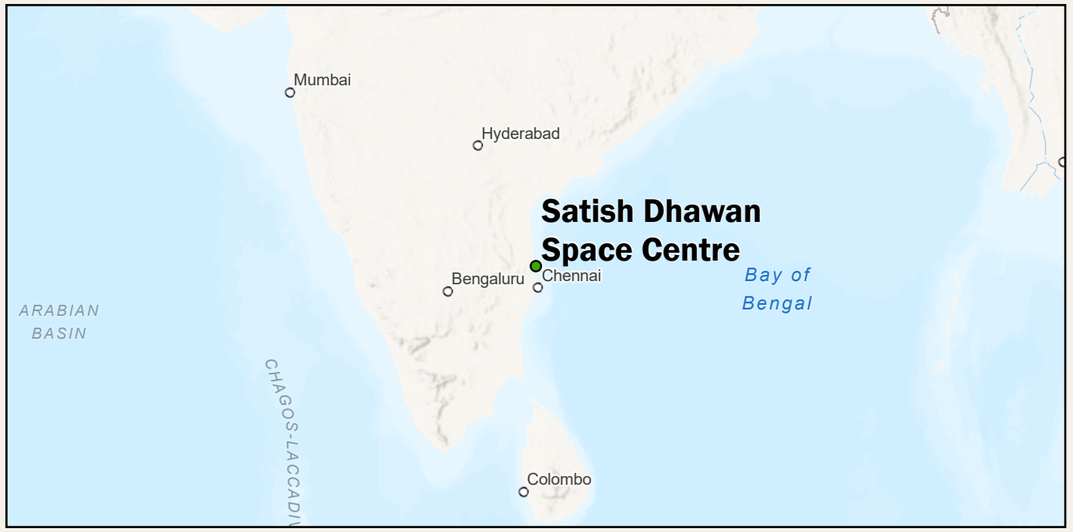
## PROPELLANT PENALTY by ORBIT



# SATISH DHAWAN SPACE CENTRE

Indian Space Research Organisation (ISRO) · Sriharikota, Andhra Pradesh, India

SPACEPORT SERIES · VOL. 15 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

•SDSC is India's sole operational orbital launch facility, anchoring PSLV, GSLV, and LVM3 operations and the upcoming Gaganyaan crewed program.

•The facility launches Cartosat, RISAT, and military GSAT and NavIC satellites supporting Indian Armed Forces ISR and navigation requirements.

•Dual-use civil and military integration establishes the site as a legitimate military objective under Additional Protocol I.

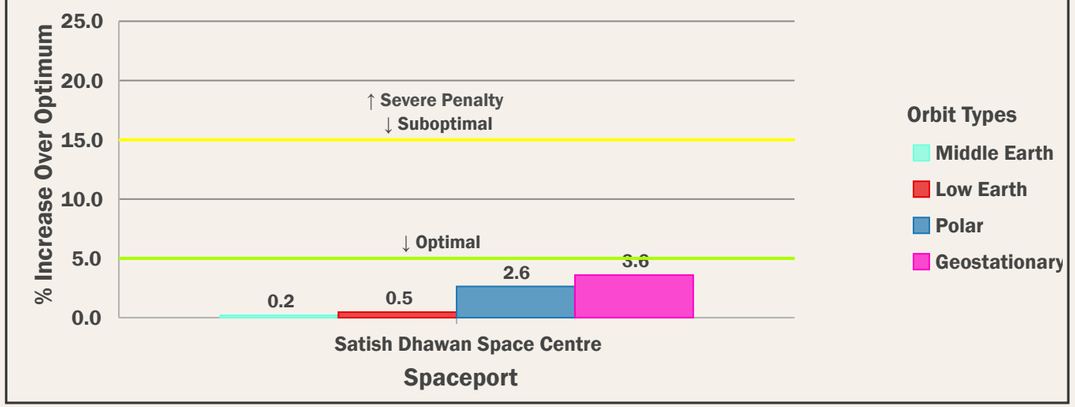
## FACILITY OVERVIEW

The Satish Dhawan Space Centre (SDSC), also known as SHAR, is India's primary spaceport on Sriharikota Island off the Andhra Pradesh coast, operated by the Indian Space Research Organisation.[39] Its First and Second Launch Pads support India's full orbital fleet — the PSLV, GSLV, and heavy-lift LVM3, renamed from GSLV Mk III in 2022 — and have launched flagship missions including Chandrayaan-3, which landed on the Moon in 2023.[39] In January 2025 the Union Cabinet approved a Third Launch Pad, budgeted at ₹3,984.86 crore, to support next-generation launch vehicles and human-rated Gaganyaan flights.[39]

## STRATEGIC IMPLICATIONS

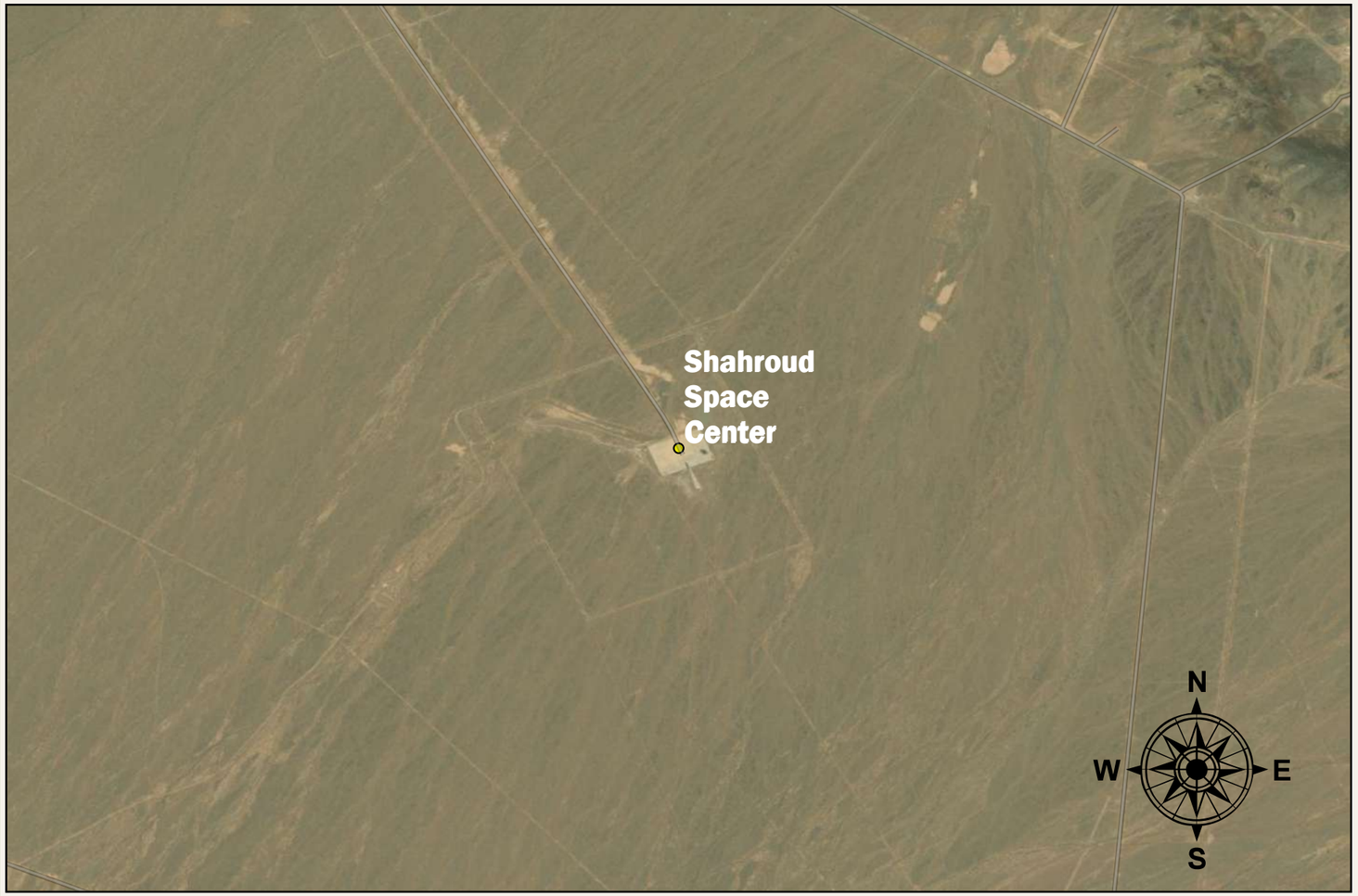
Although ISRO operates SDSC under a civilian mandate, the facility is integrated into India's national-defense space architecture, launching the Cartosat optical-reconnaissance constellation, the RISAT radar series, and the GSAT and NavIC navigation and military-communications satellites supporting the Indian Armed Forces. Under Article 52(2) of Additional Protocol I to the Geneva Conventions, this dual-use functionality establishes the site as a legitimate military objective. The single-site concentration of India's sovereign launch capability presents a strategic vulnerability, and proximity to the Bay of Bengal exposes it to sea-launched attack vectors.

## PROPELLANT PENALTY by ORBIT



# SHAHROUD SPACE CENTER

Iranian Space Agency · Semnan Province, Iran





## KEY JUDGEMENTS

•Shahroud is the IRGC's parallel military spaceport, specializing in solid-propellant SLVs including Qased and Qaem.

•Solid-fuel technology developed here is directly interchangeable with ICBM and MRBM development.

•Satellite imagery confirmed an Israeli strike destroyed a central solid-propellant building in late 2024.

## FACILITY OVERVIEW

The Shahroud Space Center, in the remote desert of Iran's Semnan Province, is managed directly by the Islamic Revolutionary Guard Corps Aerospace Force.[40] It is the hub of Iran's parallel military space program, specializing in the development, testing, and deployment of solid-propellant Space Launch Vehicles such as the Qased and Qaem series, with bermed assembly halls and static engine-test stands.

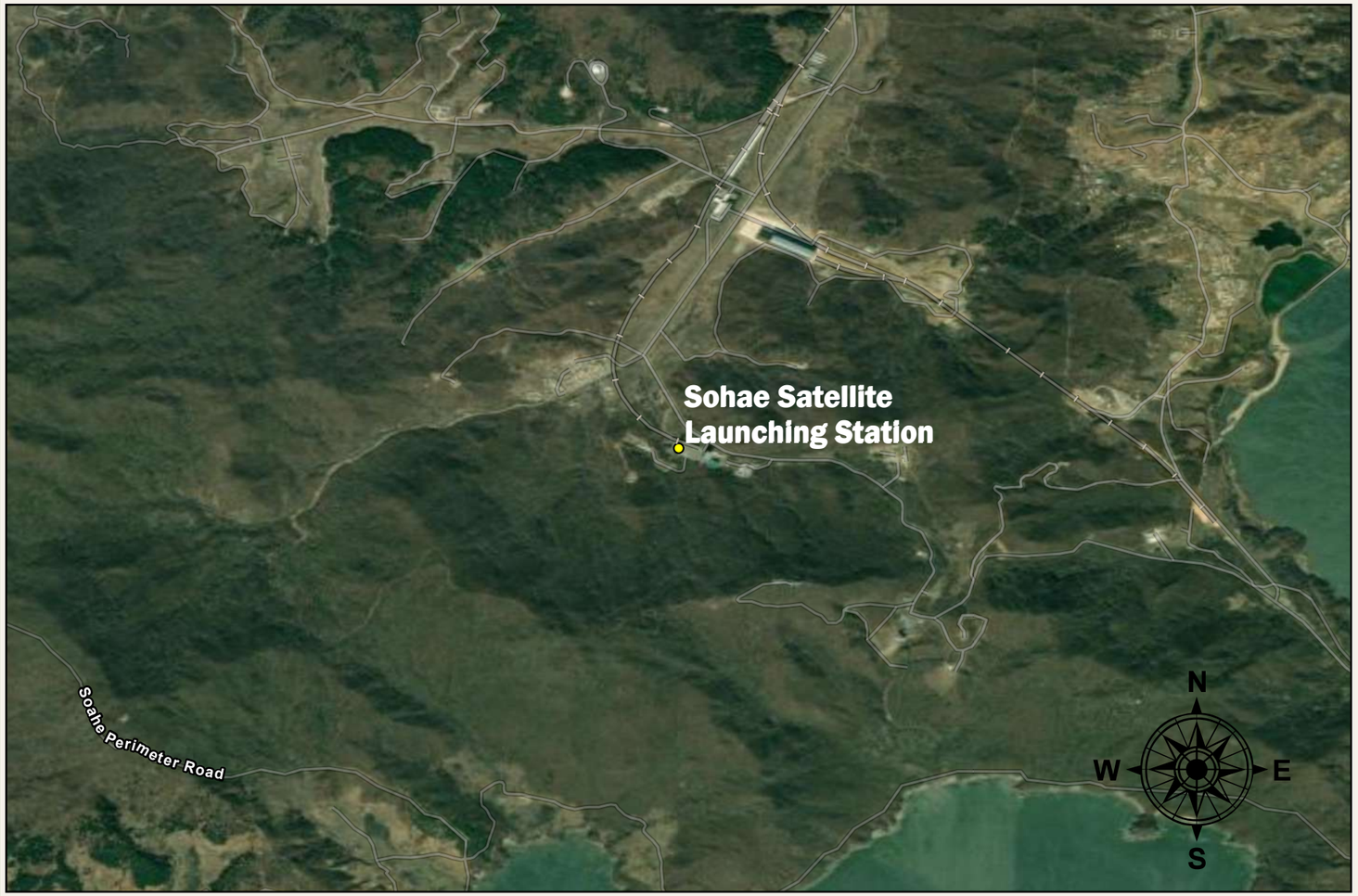
## STRATEGIC IMPLICATIONS

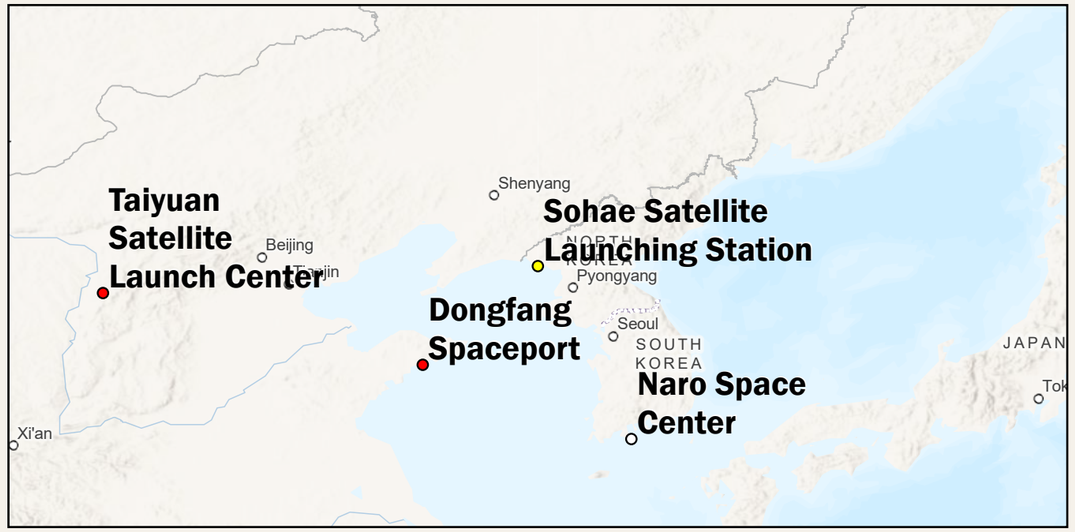
Shahroud is a high-value, legitimate military objective owing to its function as a dual-use missile facility, where solid-fuel technology is directly interchangeable with ICBM and medium-range ballistic-missile development.[40] High-resolution satellite imagery analyzed by the Associated Press confirmed that an Israeli strike in late October 2024 destroyed a central building at the site, which IISS missile expert Fabian Hinz assessed likely handled solid-propellant mixing and casting; further Israeli strikes on Iranian space infrastructure followed during Operation Epic Fury in 2026.[40][21] Its isolated location and limited volatile-fuel reserves make it a target with little spillover potential.

# SOHAE SATELLITE LAUNCHING STATION

National Aerospace Technology Admin. (NATA) · Cholsan County, North Pyongan, North Korea

SPACEPORT SERIES · VOL. 17 ·
25 MAY 2026 · A. WURFBAIN




## KEY JUDGEMENTS

•Sohae is North Korea's premier spaceport and a frontline ICBM development testbed.

•Engine test stands refine propulsion for nuclear-capable long-range missiles.

•Multi-phase modernization since 2022 has added a coastal launch pad and a new engine-test stand.

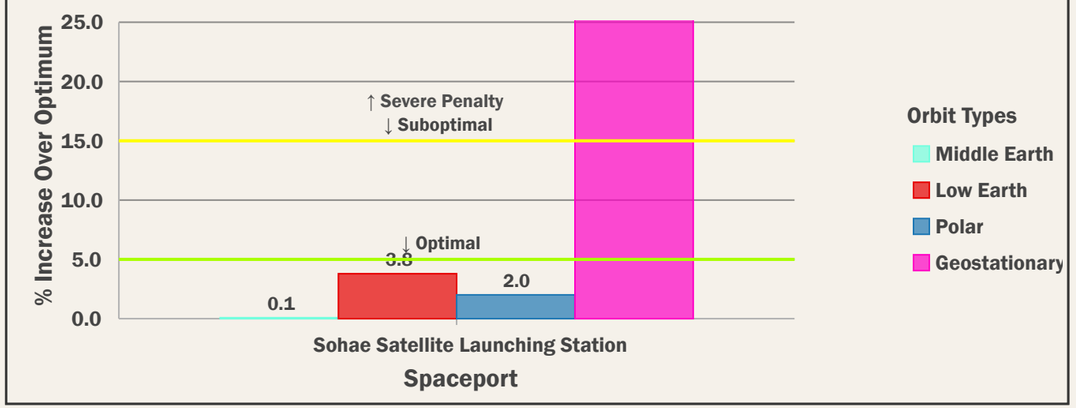
## FACILITY OVERVIEW

The Sohae Satellite Launching Station at Tongchang-ri in Cholsan County is North Korea's premier spaceport and long-range rocket-testing facility, managed by the National Aerospace Technology Administration with the Munitions Industry Department of the Workers' Party of Korea.[41] It launched the Malligyong-1 reconnaissance satellite aboard the Chollima-1 rocket from a new coastal pad, the last of four Chollima-1 launches between May 2023 and May 2024.[41] A multi-phase modernization announced after Kim Jong-un's March 2022 inspection added the coastal launch pad and a new horizontal engine-test stand, confirmed through satellite-imagery analysis.[41]

## STRATEGIC IMPLICATIONS

Sohae is a high-value, legitimate military objective under international humanitarian law. While Pyongyang claims its space program is peaceful, the facility acts as a frontline testbed for North Korea's ICBM program, with vertical and horizontal engine-test stands used to refine propulsion for nuclear-capable long-range missiles.[41] Neutralizing it would degrade North Korean strategic-delivery networks and reconnaissance assets. A key risk is that older, more volatile North Korean propellants could, on ignition, spill toxic fumes across the border into China and complicate escalation dynamics.

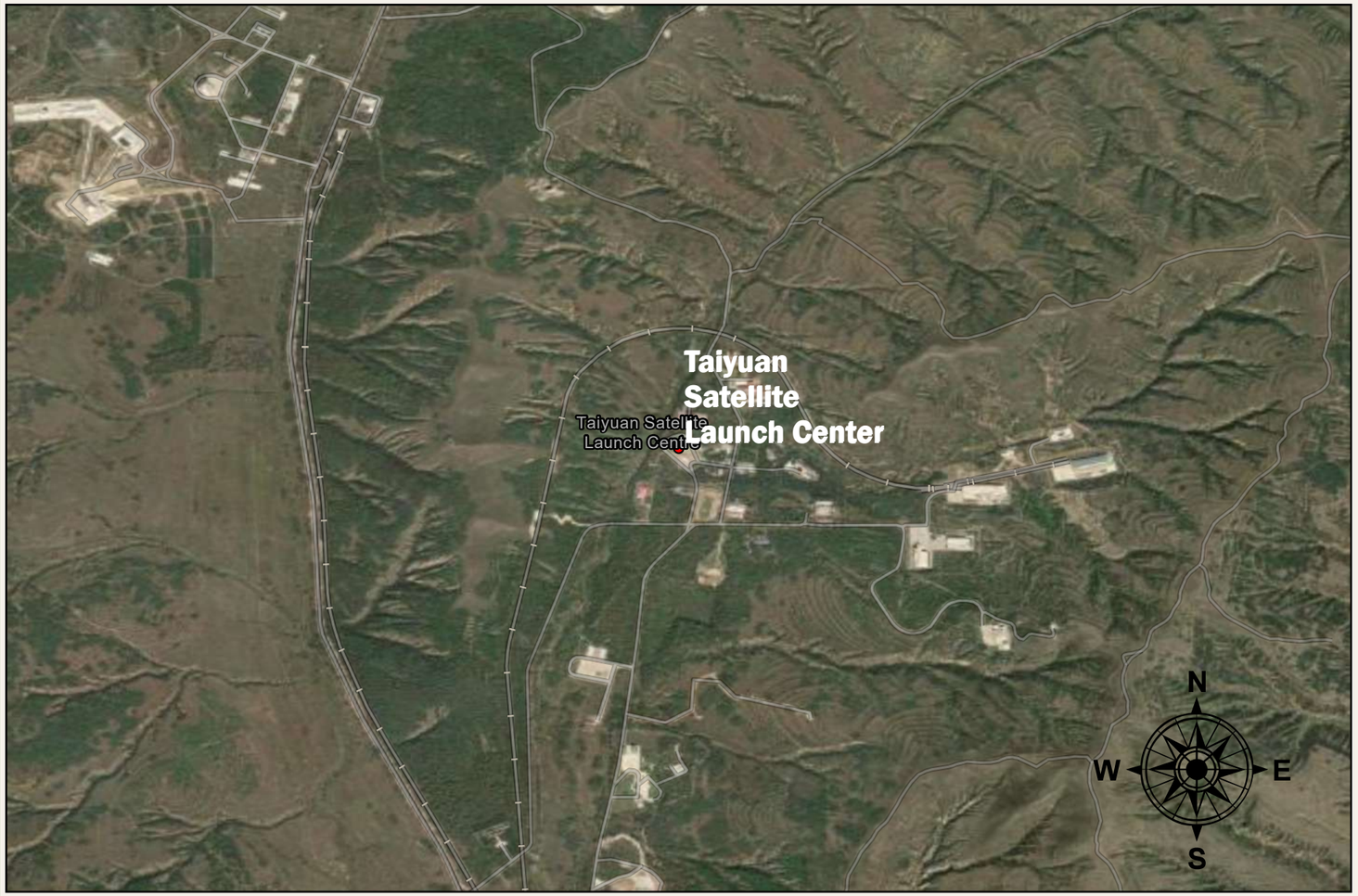
## PROPELLANT PENALTY by ORBIT



# TAIYUAN SATELLITE LAUNCH CENTER

People's Liberation Army (PLA) · Kelan County, Shanxi, China

SPACEPORT SERIES · VOL. 18 ·
25 MAY 2026 · A. WURFBAIN





## KEY JUDGEMENTS

- TSLC is China's primary hub for sun-synchronous and low Earth orbit deployments, including mega-constellations.
- The site functions as an ICBM and over-land SLBM testing range under its Base 25 designation.
- Its inland location means a kinetic strike on active rockets would generate debris arcs over rural populations.

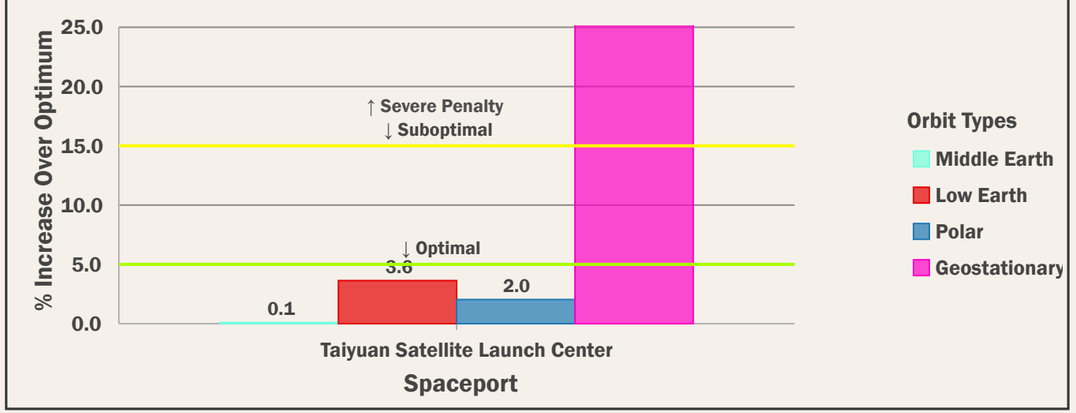
## FACILITY OVERVIEW

The Taiyuan Satellite Launch Center (TSLC), militarily designated the 25th Test and Training Base, is an inland spaceport in the Lüliang Mountains of Kelan County, Shanxi Province, established in 1966 and historically referred to in Western intelligence as the Wuzhai Missile and Space Center.[42] It is China's primary hub for sun-synchronous and low Earth orbit deployments and a critical pipeline for civil and commercial mega-constellations; in May 2026 a Long March 6A launched 18 Qianfan (Thousand Sails) satellites from Launch Complex 9A, the constellation's eighth group, raising its total to 144 spacecraft.[43]

## STRATEGIC IMPLICATIONS

TSLC is a frontline, high-value military objective owing to its integration into China's strategic-weapons enterprise, functioning as a testing range for intercontinental ballistic missiles and over-land submarine-launched ballistic missiles and launching the Yaogan military remote-sensing arrays.[42] Like its sister base at Xichang, TSLC launches directly over the Chinese mainland, so a strike on active rockets or assembly hangars would generate debris arcs affecting downrange rural populations.

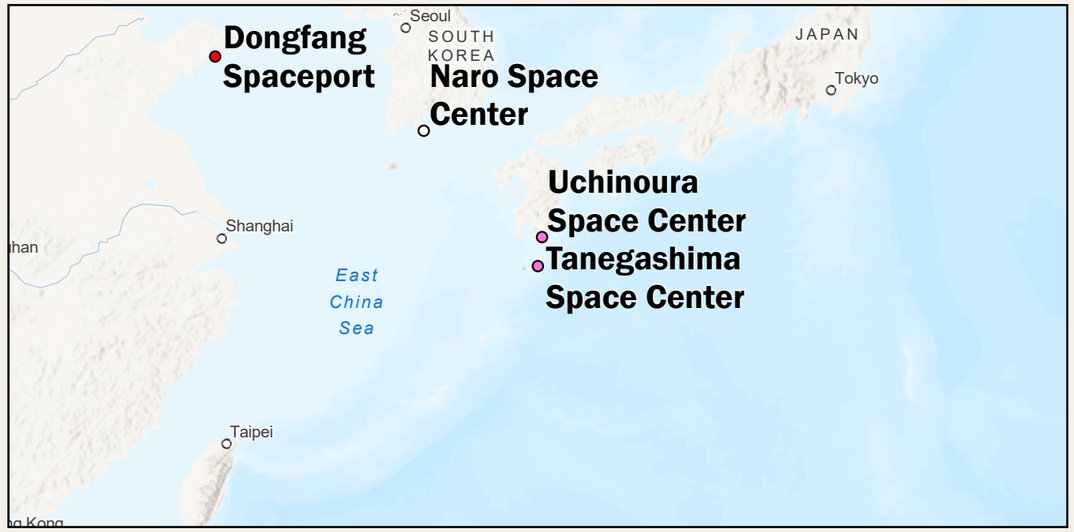
## PROPELLANT PENALTY by ORBIT



# TANEGASHIMA SPACE CENTER

Japan Aerospace Exploration Agency (JAXA) · Tanegashima, Kagoshima, Japan

SPACEPORT SERIES · VOL. 19 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

•TNSC is Japan's primary heavy-lift orbital launch facility, having transitioned from the retired H-IIA to the H3.

•The site sustains Japan's Information Gathering Satellite constellation for military intelligence.

•IGS payloads provide ballistic-tracking and missile early-warning data to the Ministry of Defense.

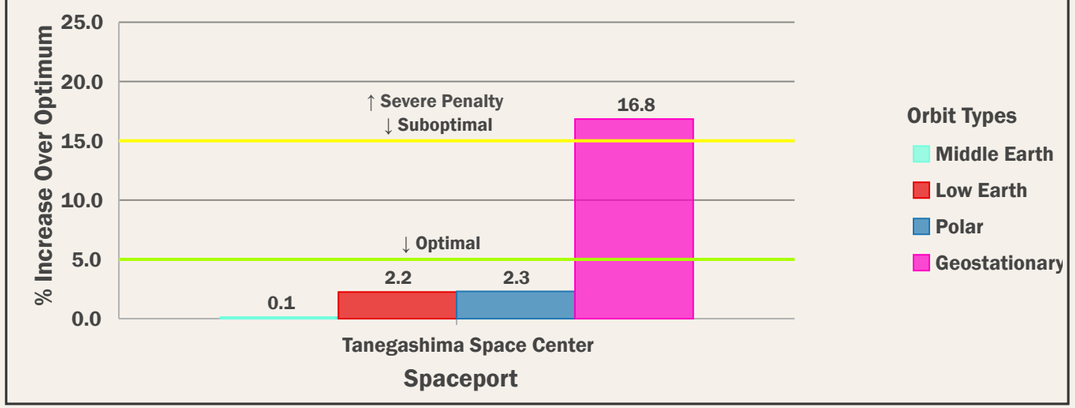
## FACILITY OVERVIEW

The Tanegashima Space Center (TNSC) is Japan's largest aerospace launch complex, managed by the Japan Aerospace Exploration Agency on the southeastern coast of Tanegashima Island.[44] Its Yoshinobu Launch Complex deployed the H-IIA, which flew its 50th and final flight in June 2025 after 49 successes, and the next-generation H3, which reached first success in February 2024.[44][45] The center launches Japan's Information Gathering Satellites for military intelligence, including IGS-Radar 8 in September 2024.[45]

## STRATEGIC IMPLICATIONS

While Japan maintains a strictly defensive posture, TNSC is a critical dual-use facility because it launches and sustains the nation's Information Gathering Satellites — classified radar and optical spacecraft providing military intelligence and missile early-warning data to the Ministry of Defense.[45] Because neutralizing the spaceport would cut off Japan's capacity to replenish its national intelligence-gathering fleet during a conflict, the facility constitutes a legitimate military objective under international humanitarian law.

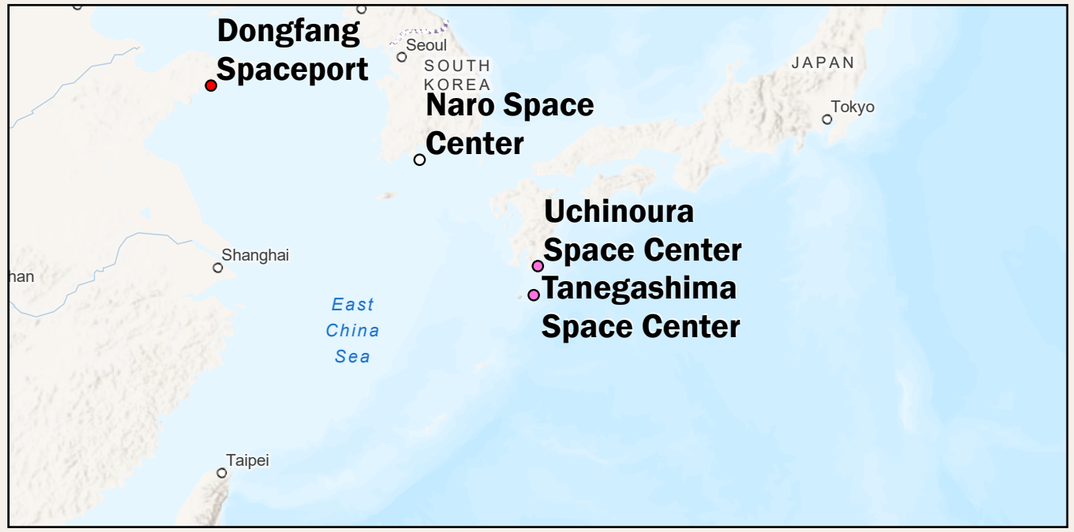
## PROPELLANT PENALTY by ORBIT



# UCHINOURA SPACE CENTER

Japan Aerospace Exploration Agency (JAXA) · Kimotsuki, Kagoshima, Japan

SPACEPORT SERIES · VOL. 20 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

•Uchinoura is the primary home of JAXA's Epsilon solid-fuel light-lift program.

•Solid-propellant technology mirrors ballistic-missile mechanics more closely than liquid-fueled systems.

•Responsive launch capability could provide surge replacement for neutralized military space assets.

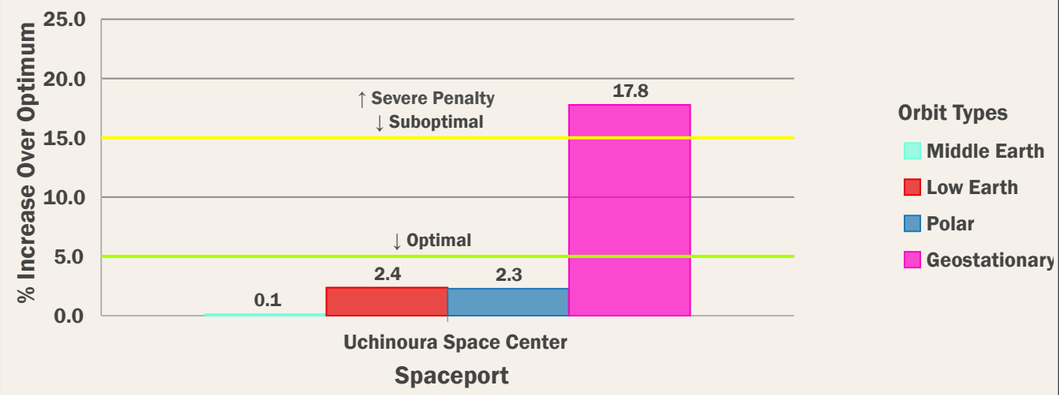
## FACILITY OVERVIEW

Operated by the Japan Aerospace Exploration Agency, Uchinoura sits along the Pacific coast of Kimotsuki in Kagoshima Prefecture, with assembly structures, telemetry facilities, and parabolic antennas distributed across flattened mountain plateaus carved into the hillside.[46] It handles scientific payloads, sounding rockets, and low Earth orbit satellites, and is the primary home of the Epsilon solid-fuel light-lift program, the successor to the M-V.[46]

## STRATEGIC IMPLICATIONS

Although managed by a civilian agency, Uchinoura is a critical dual-use facility because solid-propellant technology mirrors ballistic-missile mechanics more closely than liquid-fueled systems, making its engineering pipelines strategically significant. Development has not been without setbacks: an Epsilon S second-stage motor exploded during a static-fire test in November 2024, the second such anomaly.[46] The platform's automated, responsive launch capability could nonetheless provide surge replacement of military reconnaissance or communication satellites if primary assets were neutralized, rendering the site a legitimate military objective under international humanitarian law.

## PROPELLANT PENALTY by ORBIT



# VANDENBERG SPACE FORCE BASE

United States Space Force · Lompoc, California, United States

SPACEPORT SERIES · VOL. 21 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•VSFB is the primary US gateway for polar-orbit satellite deployment, leveraging Pacific overflight geometry.

•Direct USSF management under Space Launch Delta 30 establishes unambiguous military-objective status.

•The site is integral to the Ground-Based Midcourse Defense system architecture.

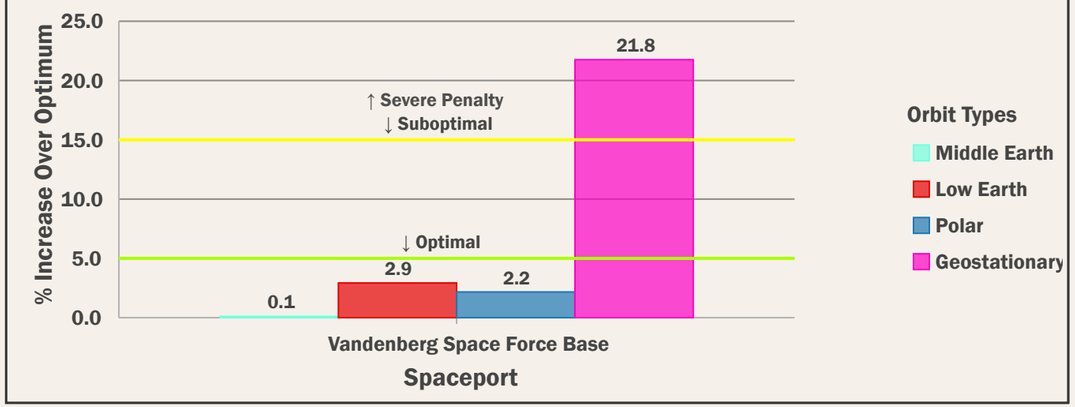
## FACILITY OVERVIEW

Vandenberg Space Force Base (VSFB) is a premier military spaceport on the central California coast, managed by the US Space Force under Space Launch Delta 30.[47] It is the primary US gateway for polar-orbit launches, its coastal geography permitting southward trajectories over the open Pacific, and it hosts SpaceX at SLC-4E and SLC-6 (leased in 2023), ULA's Vulcan at SLC-3E, and Firefly's Alpha at SLC-2.[47] SpaceX is expected to fly more than 100 Falcon 9 missions from Vandenberg in 2026.[48]

## STRATEGIC IMPLICATIONS

Unlike dual-use facilities, Vandenberg is an active military installation; under Article 52(2) of Additional Protocol I to the Geneva Conventions it constitutes a legitimate military objective. It is an expected target in any attack on US soil and is integral to American defensive infrastructure, hosting the Ground-Based Midcourse Defense system, from which an interceptor flight test was conducted in December 2023.[49]

## PROPELLANT PENALTY by ORBIT



# VOSTOCHNY COSMODROME

Roscosmos · Tsiolkovsky, Amur Oblast, Russia

SPACEPORT SERIES · VOL. 22 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

•Vostochny is Russia's most modern spaceport, engineered to reduce reliance on Kazakh-leased Baikonur.

•The Angara pad supports next-generation military reconnaissance, early-warning, and secure-communications satellites.

•Far East geographic isolation provides an operational buffer from the war in Ukraine.

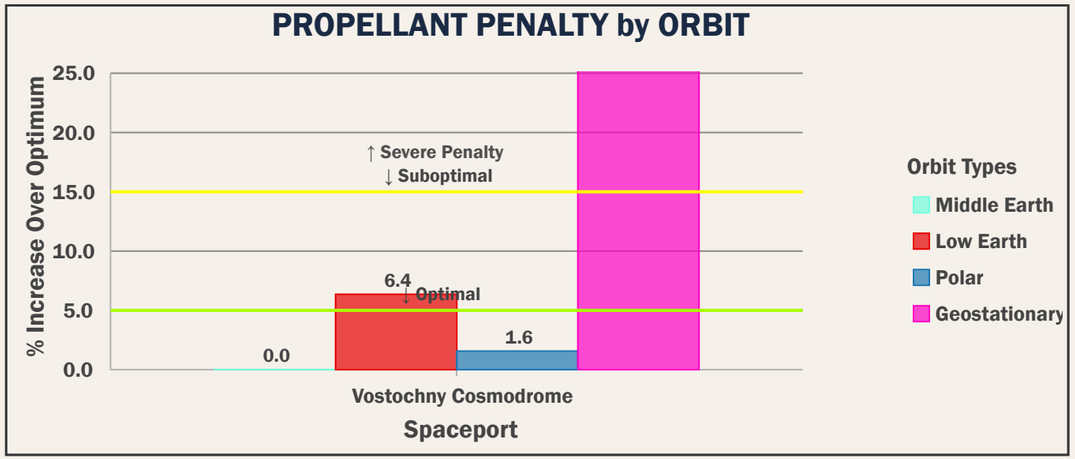
## FACILITY OVERVIEW

The Vostochny Cosmodrome is Russia's newest and most modern spaceport, engineered to reduce reliance on the Baikonur Cosmodrome in Kazakhstan and spanning over 700 square kilometers in Amur Oblast.[50] It operates a Soyuz-2 pad and an Angara pad, the latter having conducted its first Angara A5 launch from the site in April 2024; the Angara A5 lifts approximately 24.5 tonnes to low Earth orbit, with the larger 35-to-40-tonne figure applying only to the future, not-yet-operational A5V cryogenic variant.[50] Its remote eastern location permits eastward trajectories over the Sea of Okhotsk and the Pacific, minimizing booster-drop-zone risk over populated land.

## STRATEGIC IMPLICATIONS

Vostochny plays a pivotal military role through the Angara family, which is designed to deploy Russia's next-generation military reconnaissance, early-warning, and secure-communications satellites, rendering it a legitimate military objective under Article 52(2) of Additional Protocol I. Its distance from the war in Ukraine provides a buffer, but Operation Spiderweb in June 2025 — a covert SBU drone attack on Russian airbases — demonstrated that Ukrainian drones can reach deep into Russian territory; that operation's strike on the nearby Ukrainka Air Base in Amur Oblast failed when the drone-carrying vehicle ignited before launch, and the cosmodrome itself was not a target.[51]

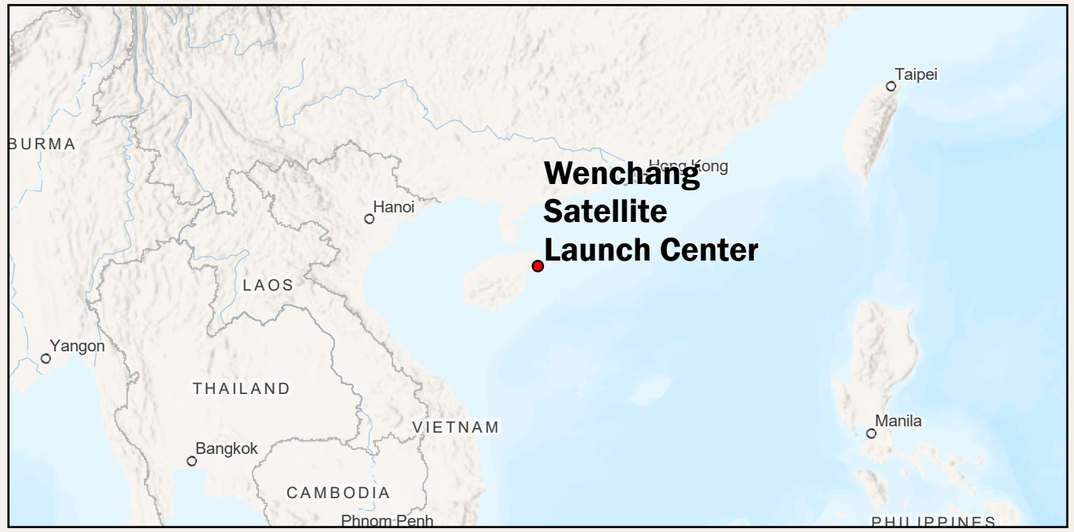
## PROPELLANT PENALTY by ORBIT



# WENCHANG SATELLITE LAUNCH CENTER

People's Liberation Army (PLA) · Wenchang, Hainan, China

SPACEPORT SERIES · VOL. 23 ·
25 MAY 2026 · A. WURFBAIN


## KEY JUDGEMENTS

- Wenchang is China's newest, southernmost spaceport, optimized by low-latitude rotational advantage for heavy payloads.
- The site is the primary hub for China's heaviest dual-use payloads, including geostationary military communications.
- Seaport-based component delivery bypasses the rail and tunnel constraints limiting inland Chinese spaceports.

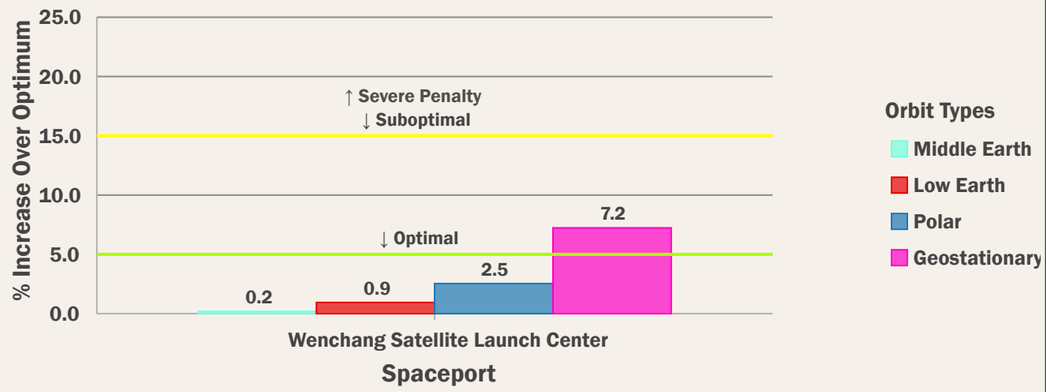
## FACILITY OVERVIEW

The Wenchang Spacecraft Launch Site is China's newest, southernmost, and most advanced spaceport, on the coast of Hainan Island at a low latitude of roughly 19°N that maximizes rotational assist for heavier payloads.[52] Its state-managed complexes use cryogenic liquid propellant to support the heavy-lift Long March 5 and medium-lift Long March 7, with large rocket components shipped directly to the island by sea, bypassing the rail and tunnel constraints that limit inland spaceports.[52] An adjacent commercial spaceport, the Hainan-operated Wenchang Commercial Space Launch Site, opened with the maiden Long March 12 flight in November 2024 and now launches Guowang and Qianfan mega-constellation satellites from dedicated pads.[53][54]

## STRATEGIC IMPLICATIONS

Although showcased as a green gateway for civilian science, the Tiangong space-station program, and deep-space exploration, Wenchang is deeply integrated into the strategic military and space-defense capabilities of the PRC, serving as the primary hub for China's heaviest dual-use payloads including geostationary military-communications networks and strategic reconnaissance assets. Under Article 52(2) of Additional Protocol I this structural overlap defines it as a legitimate military objective; disabling its seaside assembly structures or propellant pipelines would strip China of sovereign capacity to replace critical orbital tracking and communications architecture, and its position on Hainan places it at the center of China's southern military command.

## PROPELLANT PENALTY by ORBIT



# YASNY COSMODROME

Russian Strategic Rocket Forces · Yasny, Orenburg Oblast, Russia

SPACEPORT SERIES · VOL. 24 ·
25 MAY 2026 · A. WURFBAIN



## KEY JUDGEMENTS

- Yasny is a repurposed ICBM base operated by the Russian Strategic Missile Forces, launching from active silos.
- The base hosts the 13th Missile Division of Russia's nuclear triad.
- Two Avangard hypersonic-glide-vehicle regiments, each with six silos, are based at Dombarovsky.

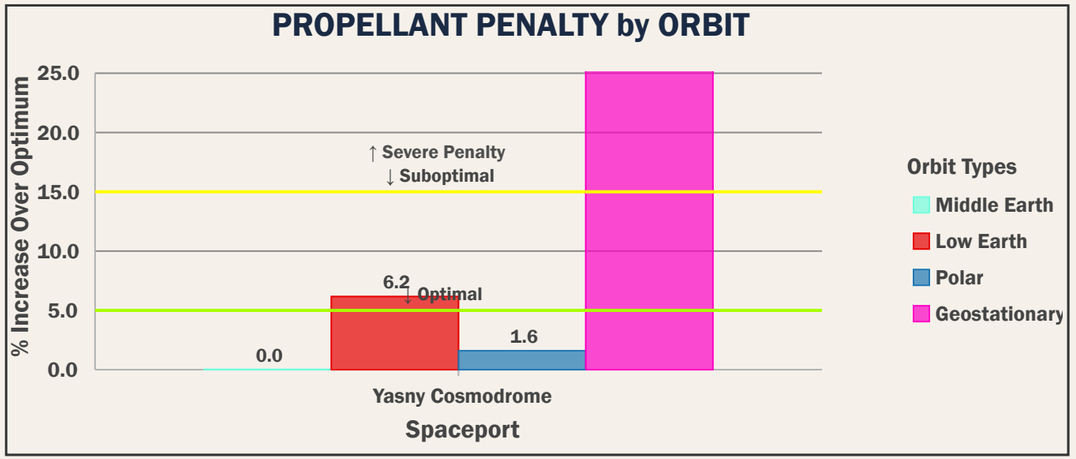
## FACILITY OVERVIEW

The Yasny Cosmodrome, also known as the Dombarovsky launch site, is a specialized spaceport in the steppes of Orenburg Oblast near the Kazakh border.[55] Unlike purpose-built civilian complexes, it is a repurposed military ICBM base operated by the Russian Strategic Missile Forces, launching from heavily fortified underground silos. Its capabilities were historically integrated with the commercial Dnepr program, a launch vehicle derived from converted, liquid-fueled R-36M (SS-18 Satan) heavy ICBMs through the Kosmotras consortium, though commercial flights have effectively ceased amid geopolitical isolation.[55]

## STRATEGIC IMPLICATIONS

Yasny's civilian persona overlays its primary function as the home base of the 13th Missile Division of Russia's nuclear triad; the division fields two Avangard hypersonic-glide-vehicle regiments at Dombarovsky, each with six silos, with rearmament reported complete by December 2023.[55] This makes it a clear legal target, but its role within Russia's nuclear infrastructure renders any strike one of extreme escalatory potential.

## PROPELLANT PENALTY by ORBIT



# Sources & Methodolgy

*How this series was researched, sourced, and qualified*

## SCOPE AND PURPOSE

This series profiles twenty-four orbital launch facilities worldwide, pairing a factual facility overview with an assessment of each site's strategic and legal significance under international humanitarian law.  It is a portfolio demonstration produced from open-source information only. It is not an operational intelligence product, carries no classification, and draws on no privileged or non-public material.  The classification banner is a stylistic convention marking the format; every page is unclassified and open sourced information.

## SOURCE OPEN METHOD

Each facility was analyzed using primary and authoritative secondary open sources, then cross-checked against independent reporting before any claim was retained. Priority was given, in order, to primary and official material — operating agencies such as NASA, the U.S. Space Force, Roscosmos, ESA, CNES, ISRO, JAXA, and KASA, together with government documents and official launch records; then to authoritative secondary analysis from bodies including the Center for Strategic and International Studies, the International Institute for Strategic Studies, the China Aerospace Studies Institute, the Federation of American Scientists, and the Bulletin of the Atomic Scientists; and finally to reputable specialist and wire journalism, including SpaceNews, NASASpaceflight, Janes, Reuters, the Associated Press, and Defense News, for news.

## ASSESSMENTS VERSUS FACTS

*The facility overviews are statements of fact, each tied to a numbered source. The strategic-implications sections contain the author's analysis, including conclusions about targeting, proportionality, and escalation that are reasoned judgments rather than reported events. Forward-looking or hypothetical statements are written as assessments and should be read as analysis, not as fact. Legal characterizations of facilities as military objectives reflect the author's application of Article 52(2) of Additional Protocol I to the Geneva Conventions to open-source facts, not any determination by a government or court.*

## SOURCE QUALITY AND EXCLUSIONS

*Forums, wikis used as terminal sources, content farms, and anonymous blogs were excluded. Where a fact was confirmed against a primary source, that source is cited; where an encyclopedic entry was used as a convenience pointer, the underlying primary or secondary source was traced and cited in its place, and any citation still resting on a tertiary source is flagged for upgrade in the reference list. State media — including CGTN, TASS, IRIB, and KCNA — is cited only as an attributed claim of the relevant government, never as independently established fact.*

## ANALYTIC CONFIDENCE

*Confidence in the factual claims is highest where multiple primary sources agree, which is the case for most operator, location, vehicle, and program details. Confidence is lower for very recent 2025–2026 events that rest partly on a single specialist outlet, and for any figure originating with a government's own statement. Contested or single-source claims are attributed in-text to their originator. Several developing items — launch-vehicle certifications, the status of in-development rockets, and unverified strike claims — are expected to change and are flagged for revision in a future edition.*

## CITATION CONVENTIONS

*Citations follow Chicago notes-bibliography style. Bracketed numerals in the profiles correspond to the numbered reference list on the following pages. Where an individual author could not be confirmed, the publishing organization is listed as author. Currency of all sources is as of June 2026.*

# References

*Chicago notes-bibliography format.*


1. Eurasianet. "Kazakhstan: Russia to Keep Using Baikonur Until at Least 2050." 2021. https://eurasianet.org/kazakhstan-russia-to-keep-using-baikonur-until-at-least-2050.

2. "Russia Extends Lease of Space-Launch Site." NBC News, 2004. https://www.nbcnews.com/id/wbna3917623. Annual US$115 million figure reaffirmed in 2025; see "Kazakhstan Rules Out Changes to Baikonur Cosmodrome Lease with Russia," Caliber.Az, 2025, https://caliber.az/en/post/minister-kazakhstan-rules-out-changes-to-baikonur-cosmodrome-lease-with-russia.

3. Meginnes, Sarah. "Space Launch Delta 45 Breaks Records, Remains World's Busiest Spaceport in 2024." United States Space Force, January 2, 2025. https://www.spaceforce.mil/News/Article-Display/Article/4020171/.

4. U.S. Space Force / Space Systems Command. "Space Force Certifies ULA Vulcan for National Security Space Launch." March 2025. https://www.ssc.spaceforce.mil/Newsroom/Article-Display/Article/4136016/. See also Stephen Clark, "U.S. Space Force Certifies ULA's Vulcan Rocket," Spaceflight Now, March 27, 2025.

5. Space Launch Delta 45. "New Glenn Launch Signals New Era for Space Launch Complex 36." United States Space Force, January 16, 2025. https://www.spaceforce.mil/news/article-display/article/4031667/new-glenn-launch-signals-new-era-for-space-launch-complex-36/. On the conversion of SLC-37 to SpaceX Starship operations and the final Delta IV Heavy launch (NROL-70, April 9, 2024), see "SpaceX Starship Authorized for Operations at SLC-37," SatNews, December 4, 2025, https://news.satnews.com/2025/12/04/spacex-starship-authorized-for-operations-at-slc-37/.

6. "Space Force Ramps Up Counter-Drone Defense at Cape Canaveral, Eastern Range." Breaking Defense, December 10, 2025. https://breakingdefense.com/2025/12/space-force-ramps-up-counter-drone-defense-at-cape-canaveral-eastern-range/.

7. China Aerospace Studies Institute. The Oriental Maritime Space Port: China's Sea-Based Space Expansion. Air University, June 16, 2025. https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/Space/2025-06-16%20Oriental%20Maritime%20Space%20Port.pdf.

8. National Center for Biotechnology Information. "1,1-Dimethylhydrazine (CID 5976)." PubChem, U.S. National Library of Medicine. Accessed June 2026. https://pubchem.ncbi.nlm.nih.gov/compound/5976.

9. National Center for Biotechnology Information. "Dinitrogen Tetroxide (CID 25352)." PubChem, U.S. National Library of Medicine. Accessed June 2026. https://pubchem.ncbi.nlm.nih.gov/compound/25352.

10. Jones, Andrew. "Huge Commercial Chinese Solid Rocket Launches 3 Satellites from Barge in the Yellow Sea." SpaceNews, October 2025. https://spacenews.com/huge-commercial-chinese-solid-rocket-launches-3-satellites-from-barge-in-the-yellow-sea/.

11. European Space Agency. "Europe's Spaceport." Accessed June 2026. https://www.esa.int/Enabling_Support/Space_Transportation/Europe_s_Spaceport.

12. "Jiuquan Satellite Launch Centre" and "Taiyuan Satellite Launch Centre." China Space Report, 2016. https://chinaspacereport.wordpress.com/facilities/jiuquan/; https://chinaspacereport.wordpress.com/facilities/taiyuan/. On the Base 20 and Base 25 military designations, see GlobalSecurity.org, "Chinese Space Facilities," https://www.globalsecurity.org/space/world/china/facility.htm.

13. Jones, Andrew. "Landspace Launches Improved Zhuque-2E, Long March 6A Lofts New Qianfan Satellite Group." SpaceNews, May 2026. https://spacenews.com/landspace-launches-improved-zhuque-2e-long-march-6a-lofts-new-qianfan-satellite-group/.

14. NASA. "NASA Welcomes Record-Setting Artemis II Moonfarers Back to Earth." May 7, 2026. https://www.nasa.gov/news-release/nasa-welcomes-record-setting-artemis-ii-moonfarers-back-to-earth/.

15. NASA. "NASA Signs Agreement with SpaceX for Use of Historic Launch Pad." April 14, 2014. https://www.nasa.gov/press/2014/april/nasa-signs-agreement-with-spacex-for-use-of-historic-launch-pad/. See also "NASA Officially Leases Old Shuttle Launch Pad to SpaceX," SpaceNews, April 15, 2014, https://spacenews.com/40226nasa-officially-leases-old-shuttle-launch-pad-to-spacex/.

16. Center for Strategic and International Studies. "Simorgh." Missile Threat. Accessed June 2026. https://missilethreat.csis.org/missile/simorgh/.

17. National Air and Space Intelligence Center. Ballistic and Cruise Missile Threat. 2017. https://www.nasic.af.mil/.

18. International Institute for Strategic Studies. Ballistic-Missile Proliferation and the Rise of Middle East Space Programmes. December 2024. https://www.iiss.org/globalassets/media-library---content--migration/files/research-papers/2024/12/space-middle-east/iiss_mdi-middle-east-space-activity_122024__.pdf.

19. Harper, Jon. "U.S. Targeting Iran's Space Capabilities Early into Operation Epic Fury." DefenseScoop, March 5, 2026. https://defensescoop.com/2026/03/05/operation-epic-fury-targeting-iran-space-capabilities/.

20. Bingen, Kari A. "Epic Fury: The Campaign Against Iran's Missile and Nuclear Infrastructure." Center for Strategic and International Studies, March 5, 2026. https://www.csis.org/analysis/epic-fury-campaign-against-irans-missile-nuclear-infrastructure. The "70 percent" figure is from The White House, "Peace Through Strength: Operation Epic Fury Crushes Iranian Threat as Ceasefire Takes Hold," April 2026.

21. Janes. "Russia Conducts Yars Drills, Launches Rassvet Communications Satellites." April 2026. https://www.janes.com/osint-insights/defence-news/air/russia-conducts-yars-drills-launches-rassvet-communications-satellites.

22. Space Voyaging. "Russia Launches First 16 Rassvet Satellites, Starting Deployment of Its Starlink-like Internet Constellation." March 24, 2026. https://www.spacevoyaging.com/news/2026/03/24/.

23. "Wallops Officials Look for Growth in Launch Activity with Rocket Lab." SpaceNews, December 2022. https://spacenews.com/wallops-officials-look-for-growth-in-launch-activity-with-rocket-lab/. On pad infrastructure see NASA, Wallops Range User's Handbook, 2024, https://www.nasa.gov/wp-content/uploads/2023/09/wallopsrangeusershandbook-2024.pdf.

24. Rocket Lab. "Rocket Lab Opens Launch Complex 3, a Critical Milestone on the Path to Neutron's First Launch." August 28, 2025. https://rocketlabcorp.com/updates/rocket-lab-opens-launch-complex-3-a-critical-milestone-on-the-path-to-neutrons-first-launch/.

25. "Chronology of Major Events Leading to S. Korea's 4th Nuri Space Rocket Launch." The Korea Times, November 27, 2025. https://www.koreatimes.co.kr/southkorea/20251127/.

26. Korea AeroSpace Administration. Official website. Accessed June 2026. https://www.kasa.go.kr/eng/main.do.

27. "Aerospace Agency Boosting South Korea's Space Initiatives." Indo-Pacific Defense Forum, June 2025. https://ipdefenseforum.com/2025/06/aerospace-agency-boosting-south-koreas-space-initiatives/.

28. Alaska Aerospace Corporation. "Spaceports: Pacific Spaceport Complex – Alaska." Accessed June 2026. https://akaerospace.com/spaceports.

29. Judson, Jen. "US, Israel's Arrow-3 Missile Put to the Test in Alaska." Defense News, July 28, 2019. https://www.defensenews.com/pentagon/2019/07/28/us-israels-arrow-3-missile-put-to-the-test-in-alaska/.

30. Nuclear Threat Initiative. "Israel Aerospace Industries Ltd." Accessed June 2026. https://www.nti.org/education-center/facilities/israel-aerospace-industries-ltd/. On Jericho development and testing at Palmachim, see Center for Strategic and International Studies, "Jericho 3," Missile Threat, https://missilethreat.csis.org/missile/jericho-3/.

31. "Shavit." Encyclopaedia Britannica. Accessed June 2026. https://www.britannica.com/topic/Shavit.

32. "Israel Successfully Launches Ofek 19 Spy Satellite, an 'Eye on Our Enemies'." The Times of Israel, September 2025. https://www.timesofisrael.com/israel-successfully-launches-ofek-19-spy-satellite-an-eye-on-our-enemies/.

33. "Iran Says It Targets Israeli Bases, Accuses Israel of Targeting Hospitals." Al Jazeera, March 12, 2026. https://www.aljazeera.com/news/2026/3/12/.

34. Rocket Lab. "Rocket Lab Officially Opens Third Launch Pad, First Mission Scheduled to Launch Within a Week." February 23, 2022. https://www.businesswire.com/news/home/20220223005596/en. The first launch from Pad B (LC-1B) followed on February 28, 2022; see Rocket Lab, "Rocket Lab Successfully Launches Second Mission for Synspective," February 28, 2022, https://www.businesswire.com/news/home/20220228006162/en.

35. Rocket Lab. "Launch Experience." Accessed June 2026. https://rocketlabcorp.com/launch/launch-with-us/.

36. Rocket Lab. "Wise One Looks Ahead (NROL-162)." Accessed June 2026. https://rocketlabcorp.com/missions/launches/wise-one-looks-ahead/. On the NRO partnership with Australia, see "With Latest Rocket Lab Launch, NRO and Australia Strengthen Allied Cooperation," Breaking Defense, July 2022, https://breakingdefense.com/2022/07/with-latest-rocket-lab-launch-nro-and-australia-strengthen-allied-cooperation/.

37. Press Information Bureau, Government of India. "Cabinet Approves the Establishment of 'Third Launch Pad' at Satish Dhawan Space Centre, Sriharikota." January 16, 2025. https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2093360.

38. Gambrell, Jon. "Satellite Photos Show Israel's Iran Strike Likely Hit Key IRGC Missile Production Base." Associated Press / The Times of Israel, October 29, 2024. https://www.timesofisrael.com/satellite-photos-show-israels-iran-strike-likely-hit-irgc-missile-production-base/.

39. Bermudez, Joseph S., Jr., Victor Cha, and Jennifer Jun. "Engine Test Preparations and Modernization at Sohae Satellite Launching Station." Beyond Parallel, Center for Strategic and International Studies, 2025. https://beyondparallel.csis.org/engine-test-preparations-and-modernization-at-sohae-satellite-launching-station/.

40. Japan Aerospace Exploration Agency. "Tanegashima Space Center." Accessed June 2026. https://global.jaxa.jp/about/centers/tnsc/.

41. Jones, Andrew. "Japan Launches IGS Radar 8 Reconnaissance Satellite with Penultimate H-2A Rocket." SpaceNews, 2024. https://spacenews.com/japan-launches-igs-radar-8-reconnaissance-satellite-with-penultimate-h-2a-rocket/. H-IIA retirement and H3 debut per "Japan's GOSAT-GW Launches aboard Final H-IIA Rocket," NASASpaceFlight, June 2025.

42. Japan Aerospace Exploration Agency. "Establishment of the Investigation Team for the Combustion Anomaly during the Static Firing Test of the Epsilon S Second-Stage Motor." November 27, 2024. https://global.jaxa.jp/press/2024/11/20241127-1_e.html.

43. Space Launch Delta 30. "Space Launch Delta 30 to Lease Space Launch Complex 6 to SpaceX." United States Space Force, April 2023. https://www.vandenberg.spaceforce.mil/News/Article-Display/Article/3351366/.

44. "Vandenberg Announces Plan for New 'Super-Heavy' Launch Site." The Santa Barbara Independent, January 7, 2026. https://www.independent.com/2026/01/07/vandenberg-announces-plan-for-new-super-heavy-launch-site/.

45. "Ground-Based Interceptor Missile Launch from Vandenberg SFB a Success, Officials Say." KSBY, December 2023. https://www.ksby.com/news/local-news/.

46. GlobalSecurity.org. "Angara A1.2, A3, A5, A7 Design Series." Accessed June 2026. https://www.globalsecurity.org/space/world/russia/angara-origins.htm. The 24.5-tonne LEO figure — versus ~27 tonnes for the future A5M and a higher figure for the cryogenic A5V — reflects Roscosmos/Khrunichev specifications; see "Khrunichev Center Begins Production of Three Angara-A5M Rockets," TASS, June 6, 2025, https://tass.com/science/1969671.

47. Janes. "Operation Spiderweb: Ukraine's Covert Drone Strike Inside Russia." 2025. https://www.janes.com/osint-insights/defence-and-national-security-analysis/operation-spiderweb-ukraine-covert-drone-strike-inside-russia.

48. "China's Launch Sites and Launch Vehicles." China in Space, May 2025. https://www.china-in-space.com/p/chinas-launch-sites-and-rockets. On the 19°N siting and sea delivery of the Long March 5, see "Long March 7 Carrier Rocket Facility Prepares for Launch," People's Daily Online, June 25, 2016, https://www.globalsecurity.org/space/library/news/2016/space-160625-pdo01.htm.

49. Xinhua. "China's Seaside Commercial Spacecraft Launch Site Completes First Mission." December 1, 2024. https://english.news.cn/20241201/8e585e91141449e5852fbb26d68be5bc/c.html.

50. Jones, Andrew. "Long March 8 Launches Thousand Sails Satellites from Commercial Spaceport." SpaceNews, 2025. https://spacenews.com/long-march-8-launches-thousand-sails-satellites-from-commercial-spaceport/.

51. Kristensen, Hans M., Matt Korda, Eliana Johns, and Mackenzie Knight. "Russian Nuclear Weapons, 2025." Bulletin of the Atomic Scientists 81, no. 3 (2025): 208–237. https://www.tandfonline.com/doi/full/10.1080/00963402.2025.2494386.

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Satellite and aerial imagery via Esri World Imagery, with contributions from Maxar, Earthstar Geographics, and the GIS user community. Regional reference mapping uses the Esri Light Gray Canvas basemap (Esri, HERE, Garmin, FAO, NOAA, USGS, and OpenStreetMap contributors). Facility coordinates and labels were compiled by the author from open sources. Map projections and layouts were produced in ArcGIS Pro.

## DATA SOURCES

*Facility, vehicle, and program data were compiled from the primary and authoritative secondary sources enumerated in the preceding reference list, including operating space agencies, the China Aerospace Studies Institute, CSIS, IISS, the Federation of American Scientists, the Bulletin of the Atomic Scientists, and reputable specialist and wire reporting. Launch and orbital data reflect open reporting current as of June 2026.*

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