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NATIONAL SECURITY SPACE TRENDS IN THE GCC: A GUIDE FOR INDUSTRY

An AzurX White Paper

[SUMMARY REPORT]

IN COOPERATION WITH Atlantic Council

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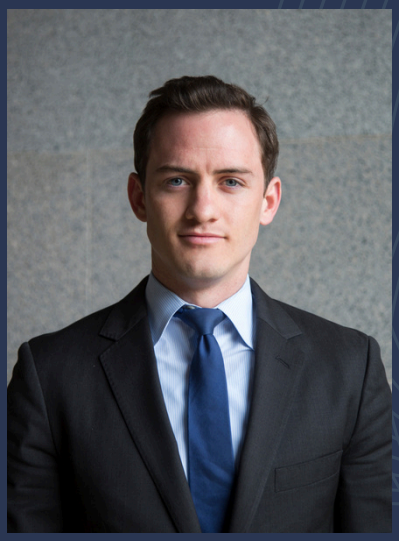
FOREWORD



Graham Brookie is the Atlantic Council's vice president for technology programs and strategy, as well as the senior director of the Digital Forensic Research Lab (DFRLab), based in Washington, DC.

What is happening beyond earth's atmosphere is essential to understanding today's geopolitical currents. The space industry – and broader innovation ecosystem – are increasingly shaping international economics, security, and partnership among growing constellations of governments and commercial actors. The pace of change is quickening. Shifting priorities, dependencies, industrial advantages, and technological breakthroughs introduce new power structures and require new partnerships. However, the need for enduring allies and partners remains fundamentally unchanged.

Going fast seldom means going alone. The rate of change in today's space landscape creates unique opportunities for growing Middle Powers. Advances in manufacturing, launch capabilities, and digital technologies have lowered barriers to entry, while rapidly diversifying applications of space assets drive a parallel boom in demand for orbital access. Member states of the Gulf Cooperation Council (GCC) today fulfill an important and growing role in the space economy, as national space programs and private companies launch ambitious missions that promise to transform life on Earth.

As AzurX reports, GCC countries are not new entrants in space exploration. Astronauts from member states have been orbiting our planet for decades, and space programs from Middle Eastern nations have been key collaborators on projects of grand scale. Earlier this year at the World Governments Summit, I had the opportunity to host regional – and, indeed, global – leaders in space. Space programs that didn't exist fifteen years ago are helping to map Mars today. Perhaps more importantly, in a world where our attention shifts by the second, they are building plans that look centuries ahead.

This report is an essential read for those seeking to understand the growing impacts of the governments and companies of the Middle East in the space ecosystem. The authors paint a clear picture of the region's space activities and applications, its innovative technological advances of exploration and development, and the far-reaching implications for geopolitical relationships and security frameworks. Contributions from experts like this help us to stay grounded and take tangible steps as we look to the stars.

PREFACE

Dr. John B. Sheldon is a recognized authority on space and security policy, with deep expertise in the intersection of national security, strategy, and emerging space capabilities. Based in Abu Dhabi, he is a senior partner at AzurX and advises governments and industry across the Middle East and globally.

Anna Hazlett is a leading advisor on strategic space technologies and investments in the Middle East. She is the founder of AzurX, a UAE-based space advisory and investment firm focused on building sovereign space capabilities and commercial partnerships in emerging space markets.

The Gulf Cooperation Council (GCC) is rapidly emerging as a dynamic player in the global space domain, with national security increasingly driving the region's strategic investments in space capabilities. As regional governments advance sovereign ambitions, ranging from satellite communications and Earth observation to resilient infrastructure and counterspace awareness, the demand for industry collaboration, innovation, and alignment with national priorities has never been greater.

This white paper, National Security Space Trends in the GCC: A Guide for Industry, offers a nuanced examination of the evolving threat landscape, policy trajectories, and procurement trends shaping the GCC's national security space posture.

Written for industry leaders, investors, and stakeholders seeking to engage with and support the region's ambitions, this guide distills complex regional dynamics into actionable insights. It also reflects AzurX's broader mission: to accelerate the growth of a thriving, sovereign, and secure space ecosystem in the Middle East.

We extend our gratitude to the Atlantic Council for their thoughtful contribution to the foreword of this paper and for their continued partnership. As a leading voice in global policy and strategy, their engagement underscores the importance of the themes explored herein, and we look forward to building on this collaboration through future joint publications.

We invite you to explore this paper not only as a snapshot of current trends but as a strategic lens through which to anticipate opportunities, forge partnerships, and contribute meaningfully to the future of space security in the GCC.

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EXECUTIVE SUMMARY

National Security Space Trends in the GCC: A Guide for Industry

The Gulf Cooperation Council (GCC) region is undergoing a strategic transformation in its approach to national security through space. Across the Arabian Peninsula, space-based systems have become indispensable to defense planning, intelligence gathering, and military operations. Governments are now prioritizing localization, downstream applications, and technology transfer as part of broader national visions. For space and defense companies, the GCC represents one of the most dynamic and strategically significant growth markets globally. Success in this landscape will depend on understanding both the technical requirements and long-term strategic ambitions of the region's emerging space powers.

This white paper provides an in-depth analysis of the broad operational requirements of GCC nations - particularly the UAE, Saudi Arabia, Oman, and Qatar - using the development of dual-use space programs to support core national security objectives.

Driven by regional missile threats, extant electronic warfare, and the global diffusion of space technologies, Gulf countries are investing heavily in satellite communications, Earth observation, positioning and navigation systems, and early warning architectures. These capabilities are no longer aspirational - they are operational. National space agencies, military forces, and commercial actors are working in tandem throughout the region to build resilient space infrastructure spanning orbital platforms, secure ground networks, and skilled personnel.

The paper outlines the strategic rationale behind these investments and examines how evolving threat environments - from hypersonic missile proliferation to cyber and electronic warfare - are accelerating the region's demand for sovereign space capabilities. It also explores the expanding market for international collaboration, where Gulf states seek not just procurement, but long-term industrial partnerships focused on capability development, localization, and workforce training.

This white paper serves as a practical guide for industry leaders, policymakers, and strategic partners aiming to navigate and contribute to the future of national security space in the Gulf.

INTRODUCTION

Military satellite systems have evolved from the exclusive domain of great powers to a global strategic necessity. Today, space-based assets form the backbone of military operations, intelligence gathering, and national security infrastructure worldwide. While the United States maintains the most extensive military satellite network, countries across Europe, Asia, Middle East, and Africa are rapidly developing similar capabilities, recognizing these systems as critical force multipliers in modern warfare.

The dissemination of satellite technologies has accelerated due to their dual-use nature. Countries like India, Japan, and EU states expand their satellite constellations citing civilian and commercial needs, while simultaneously enhancing military capabilities. Even smaller countries now access space-based military applications through partnerships or commercial satellite services.

This diffusion of space power is reshaping strategic calculations globally, influencing strategic debates, and raising urgent questions about space security. As the orbital environment becomes increasingly congested, the international community faces mounting challenges in managing space traffic, mitigating debris risks[1], while at the same time utilizing the space domain for geopolitical advantage and security.

A VIEW OF THE EARTH FROM SPACE AT NIGHT. CREDIT:UNSPLASH

1

MISSILE TECHNOLOGIES AS A REGIONAL DRIVER FOR MILITARY SPACE SYSTEMS

The global proliferation of ballistic, cruise, and hypersonic missiles is transforming the strategic landscape, compelling states - including those in the Middle East - to adapt their military capabilities to high-speed warfare - or 'hyperwar' - realities. This shift drives increased reliance on satellite systems as critical enablers for operations in this compressed-time environment.

Modern precision strike missiles require equally precise reconnaissance and targeting information. Earth observation satellites with high-resolution optical and synthetic aperture radar (SAR) sensors can identify and track mobile missile launchers and command centers in denied areas where traditional reconnaissance proves ineffective or too risky. Meanwhile, navigation satellites - whether GPS, Galileo, or Beidou - provide essential guidance for precision munitions.

Satellite communications enable real-time command and control across vast distances, facilitating rapid decision-making and coordinated responses when minutes matter. These secure, high-bandwidth links allow instantaneous data sharing between forces and command centers, crucial when confronting regional ballistic and hypersonic threats where launch-to-impact times compress to mere minutes.

Strategic early warning systems now depend heavily on space-based sensors to detect launches and track trajectories. Satellites equipped with infrared sensors can identify missile heat signatures almost instantaneously, providing vital warning time for defensive measures. Constellations in various orbits offer persistent, global coverage that ensures no launch goes undetected, regardless of origin - particularly important when countering mobile land-based systems that can strike from unexpected locations.

As Middle Eastern countries continue deploying advanced missile systems, regional reliance on space-related assets for deterrence, defense, and strategic operations will only intensify, underscoring satellites' critical role in modern security frameworks.[2]

ILLUSTRATION OF MISSILE-TRACKING SENSOR SATELLITES. CREDIT: L3HARRIS TECHNOLOGIES

RADAR FOR SPACE SITUATIONAL AWARENESS. CREDIT: FRAUNHOFER FHR / ANDREAS SCHOEPS

2

THE RISE OF REGIONAL SPACE PROGRAMS

The space programs of the UAE, Saudi Arabia, Oman, and Qatar have emerged as significant factors in the Middle East's strategic landscape, and Bahrain and Kuwait continue to develop foundational technologies for future space capabilities. While primarily civilian in nature, these programs carry profound implications for regional competition, stability, and potential military applications.

United Arab Emirates: The Regional Space Leader

The UAE has established itself as the Arab world's leading space power through remarkable achievements like the 2021 "Hope" Mars orbiter mission and MBZ-SAT the most advanced satellite in the region that provides high-resolution Earth-observation images and data to users worldwide. These space initiatives form part of a broader strategy to diversify the economy and position the UAE as a technology leader.

Beyond its internationally acclaimed civil and commercial space accomplishments, the UAE, with support and assistance from international partners, is strategically developing dual-use capabilities with national security applications, especially in satellite communications and optical and synthetic aperture radar (SAR) satellites. The UAE effectively leverages commercial satellite technologies for national security purposes, utilizing commercially-sourced systems with dual-use capabilities to serve defense requirements.[3]

Saudi Arabia: Ambitious Development

Saudi Arabia has significantly developed its space capabilities in recent years, launching several satellites and establishing the Saudi Space Commission (2018) which later evolved into the Saudi Space Agency (SSA) in June 2023. These initiatives align with Vision 2030's economic diversification goals. The Kingdom's vast financial resources and strategic partnerships, particularly with the United States, position it to become a major regional space player, potentially shifting regional power dynamics. Several initiatives are underway to develop dual-use space systems that have national security applications in both the Saudi armed forces and in the private sector.[4]

Oman: Strategic Positioning

Oman entered the space domain with its first satellite, Aman-1, in late 2023, and is pursuing indigenous capabilities for small satellite design and production. The Sultanate is developing downstream applications for agriculture, urban planning, and environmental monitoring as part of its economic diversification strategy, all of which also have national security applications. Oman is also developing its geostationary communication satellite that will also be used by the Omani armed forces.[5]

A cornerstone of Oman's space ambition is the planned Etlaq spaceport near Duqm, strategically positioned to support various orbital insertions including equatorial and sun-synchronous orbits. This facility could give Oman a unique role in the regional space landscape, potentially offering launch services to domestic, regional, and international customers.

Qatar: Focused Development

Despite its small size, Qatar meets its satellite needs through Es'hailSat, its national provider operating two geostationary communication satellites (Es'hail-1 and Es'hail-2), with plans to start building Es'hail-3 by the end of 2025. Reports suggest Qatar is seeking a dedicated military communications satellite, while Es'hailSat has considered developing Earth observation capabilities.[6] Qatar also hosts significant U.S. space assets, with the U.S. Space Force's component command to U.S. Central Command based at Al Udeid Air Base.[7]

Bahrain: Strategic Maturation

Bahrain has recently taken a bold step in advancing its national space ambitions with the establishment of the Bahrain Space Agency (BSA), which now supersedes the former National Space Science Agency (NSSA). This institutional upgrade reflects a growing commitment to embedding space within the Kingdom's strategic and technological agenda. In early 2025, Bahrain marked a major milestone with the launch of Al Munther, an AI-enabled Earth observation satellite designed to support environmental monitoring and urban planning.

Building on this success, the BSA is now collaborating with Omani firm, Oman Lens to co-develop a next-generation payload with similar capabilities. The agency's core focus lies in satellite data processing and analytics, areas that are key to unlocking the full value of space assets for national development. Internationally, Bahrain plays an active role as a member of the UN Committee on the Peaceful Uses of Outer Space (COPUOS), aligning its activities with global norms and fostering cooperative approaches to the peaceful use of outer space.

Strategic Implications

The dissemination of regional space programs presents a dual dynamic: potential for cooperation and economic development through shared services and scientific collaboration, alongside intensified technological competition that may exacerbate existing tensions. The inherent dual-use nature of space technologies means that advancements in civilian capabilities can directly translate to military applications, reshaping the regional security landscape.

3

REGIONAL SPACE OPERATIONAL REQUIREMENTS

Satellite Communications: The Invisible Backbone

Military communication satellites serve as the critical infrastructure underlying modern command and control systems across the Arabian Peninsula. The UAE, Saudi Arabia, Qatar, and Oman increasingly depend on these space-based assets to maintain situational awareness over vast territories and coordinate multi-domain operations. These networks enable real-time communication between headquarters and deployed units, supporting both routine operations and crisis response in a region characterized by evolving security challenges.

Electronic Warfare Resilience

The vulnerability of satellite systems and applications to electronic warfare has prompted Gulf militaries to invest significantly in protective technologies.[8] Modern threats include:

- Signal jammers that overwhelm satellite communications with noise[9]
- Spoofing attacks that transmit false positioning data, potentially misdirecting forces or precision munitions[10]

In response, military satellites serving these countries now incorporate sophisticated countermeasures:

- Frequency-hopping capabilities that continuously shift transmission frequencies
- Directional antennas that minimize signal interception
- Advanced signal filtering to maintain communications in contested electromagnetic environments
- Development of laser and quantum communications capabilities[11]

Saudi Arabia and the UAE have prioritized these defensive measures following demonstrations of electronic warfare capabilities in recent regional conflicts.

Physical Hardening and Cyber Protection

Space security for Gulf militaries extends beyond electronic warfare to include physical resilience and cyber protection. Modern military satellites must withstand:

- The harsh radiation environment of space
- Potential kinetic attacks from anti-satellite weapons
- High-altitude electromagnetic pulse threats
- Sophisticated cyber intrusions

Enhanced radiation shielding, system redundancy, and orbital maneuverability will become standard features in military communication satellites deployed by these countries. Qatar's recent satellite acquisitions reportedly incorporate multiple layers of physical and digital protection to ensure operational continuity during crises.[12]

Ground Infrastructure Security

Even the most resilient satellite becomes ineffective if its ground segment is compromised. Gulf states have developed comprehensive approaches to ground segment security:

- Hardened, distributed ground networks with redundant power systems
- Robust physical protection measures
- Advanced cybersecurity protocols

The UAE has pioneered mobile ground stations that can be rapidly relocated to avoid targeting,[13] while other regional countries also focus on geographic dispersion of fixed facilities to eliminate single points of failure in its command networks.

The Human Factor

Perhaps most crucial is the human element operating these sophisticated systems. Military personnel throughout Gulf countries undergo specialized training in:

- Communication security practices
- Encryption protocols
- Recognition of and response to electronic warfare tactics

Saudi Arabia has established dedicated training programs where operators practice maintaining command links during simulated jamming scenarios - acknowledging that even the most advanced satellite constellation is only as secure as the personnel operating it.[14]

As regional powers continue expanding their military satellite capabilities, this comprehensive approach to security - integrating space, ground, and human elements - will determine the resilience of their command and control systems in future conflicts.

This summary concludes here. For access to the complete version, please contact us using the details provided on the contact page at the end of this document.

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MIDDLE EAST REGION ON PLANET EARTH FROM SPACE. ELEMENTS OF THIS IMAGE BY NASA. CREDIT: ISTOCK

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