CENTRE for AEROSPACE & SECURITY STUDIES

Aerospace Power and Technological Development In The Region: Trends and Trajectories

Analysis Report

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INTRODUCTION

The modern era has redefined the nature of power, where aerospace capabilities have become pivotal not only in national defence but also in economic and technological advancement. In an age where technological innovation is reshaping global competition, aerospace power serves as both a measure of national strength and a driver of strategic influence. The seminar ***"Aerospace Power and Technological Development in the Region: Trends and Trajectories"*** was convened to explore the evolving dynamics of aerospace technologies, their implications for regional security, and the pathways available for Pakistan to secure its strategic future.

The early 21st century has witnessed aerospace transition from a traditional support arm of warfare to a decisive domain that integrates space-based assets, drones, artificial intelligence (AI), hypersonic, and advanced surveillance systems. India and Pakistan, in their pursuit of technological edge and deterrence credibility, are deeply engaged in this competitive trajectory. Meanwhile, Iran's steady progress in indigenous UAVs, missile systems, and space-launch capabilities—despite sanctions and isolation—adds a significant dimension to the broader regional aerospace landscape. This unfolding race underscores the dual reality of opportunities and risks: the promise of economic and technological dividends on one hand, and the threat of instability and conflict escalation on the other.

As South Asia navigates an environment shaped by rivalries, shifting alliances, and aspirations for global relevance, the growth of aerospace power presents both challenges and opportunities. For Pakistan, the task lies not only in avoiding strategic vulnerabilities but also in leveraging aerospace innovation to enhance deterrence, secure economic benefits, and strengthen its overall security posture. Bringing together defence experts, policymakers, technologists, and academics, the seminar served as a platform for a critical dialogue on regional trajectories, technological trends, and policy directions. The aim was to generate a comprehensive understanding of aerospace power as a cornerstone of security, stability, and sustainable development in the years ahead.

EXECUTIVE SUMMARY

In his *Welcome Remarks*, President CASS, ***Air Marshal Javaid Ahmed (Retd)*** underscored the volatile regional environment and Pakistan's unique geostrategic position alongside China, Afghanistan, and Iran. He noted that two intense conflicts in the past five months highlight the urgency of tracking emerging trends. With cutting-edge advancements in aircraft, satellites, and unmanned aerial vehicles (UAVs), the region is witnessing a rapid buildup of aerospace assets reshaping warfare. He further observed that India, after recent setbacks, is reassessing its aerospace posture and investing heavily in new capabilities. Combined with developments in the Middle East, such as the employment of air power in Qatar, these shifts underscore the evolving nature of aerospace control and its implications for Pakistan.

In his brief *Opening Remarks*, Director CASS, ***Air Vice Marshal (Retd) Nasser ul Haq Wynne*** noted that aerospace power has become a decisive element of national strength, with emerging technologies—such as fifth-generation aircraft, UAVs, hypersonics, AI-enabled networks, and space-based systems—reshaping doctrines and deterrence worldwide. He emphasised that in South Asia, where rivalries converge with new alignments, the pace of aerospace modernisation is particularly significant. India and Pakistan are both advancing their capabilities, while Iran's indigenous drive adds another dimension. He underlined the need for Pakistan to objectively assess these evolving trajectories, ensuring not only security and deterrence but also economic and industrial gains from aerospace development.

In his address, ***Air Vice Marshal (Retd) Imran Saif***, PAF Veteran, evaluated the evolving landscape of aerospace power in South Asia, focusing on the impact of emerging technologies on regional military capabilities. He emphasised that aerospace power—defined as a nation's ability to conduct and influence operations through air and space—is being reshaped by rapid advancements in AI, robotics, quantum computing, hypersonic missiles, and drone warfare. Citing recent Indo-Pak confrontations, AVM Saif highlighted a marked shift toward non-contact warfare, with drones, cruise and ballistic missiles, and electronic systems playing a central role. He expressed concern over the growing militarisation of air and space domains and the increasing reliance on high-end, tech-driven force projection tools by both India and Pakistan.

AVM Saif provided a comparative overview of the technological trajectories of India and Pakistan, outlining developments in fifth-generation fighter programs, drone technologies, hypersonic weapons, counter-drone systems, and space-based assets. India's progress in indigenous aerospace and missile development, particularly in the domains of hypersonics and space, was noted as a clear advantage. However, Pakistan's response—marked by collaboration with China and Turkey, and focus on AI integration and indigenous drone programs—was seen as a promising path forward. The speaker concluded by stressing the need for Pakistan to commit to indigenous R&D, strategic investments in its defence industry, and the establishment of a secure digital ecosystem to ensure long-term technological sovereignty in the aerospace domain.

In his address, ***Air Vice Marshal Abrar Ahmad (Retd)***, PAF Veteran, focused on the evolving role of aerospace power, particularly the integration of space-based assets into national security strategies. He emphasised that aerospace power—defined as the combined capabilities of air and space—offers strategic advantages such as global reach, enhanced ISR, precise targeting, communication, and navigation, which collectively contribute to deterrence and national defence. He underscored that while space remains governed by the Outer Space Treaty of 1967, military developments—such as long-range standoff weapons and missile proliferation—have compelled nations to integrate space assets into defence architectures for survivability and strategic response.

AVM Abrar provided a comparative overview of Pakistan, India, and Iran's space programs. While India has emerged as a regional leader with a self-sustained space ecosystem, Pakistan remains reliant on Chinese collaboration, and Iran's influence is limited to its immediate Middle Eastern context. The speaker dismissed the notion of a China-India space race, stating that China is in strategic competition with the U.S., not India. He also discussed how the militarisation of space could challenge global stability in the future. For Pakistan, he recommended deeper international partnerships, enhanced private-sector participation, and permanent ISR and spectrum monitoring as essential steps toward ensuring aerospace sovereignty.

KEY TAKEAWAYS

Speaker 1: Air Vice Marshal (Retd) Imran Saif

- Aerospace power is increasingly defined by technological integration, particularly the fusion of air and space capabilities through AI, advanced sensors, and networked platforms.
- Modern conflicts are shifting towards non-contact warfare, where drones, precision-guided munitions, and cyber-electronic attacks are replacing traditional kinetic engagements.
- Fifth-generation and 4.5-generation fighter aircraft with stealth features, AESA radars, and high-connectivity systems are becoming central to air superiority in the region.
- Aerospace superiority now depends on integrated capabilities in UAVs, counter-drone systems, hypersonic weapons, and space-based assets. Both India and Pakistan are advancing in these domains, but India holds a lead in hypersonic and space surveillance, while Pakistan is focusing on AI-enabled drones and indigenous counter-UAV development.
- Electronic warfare and spectrum dominance are becoming crucial components of air operations, influencing command, control, and survivability in contested environments.
- Technological self-reliance is a strategic necessity, with indigenous R&D, manufacturing, and secure digital ecosystems being vital for long-term aerospace autonomy.

Speaker II: Air Vice Marshal (Retd) Abrar Ahmad

- Aerospace power is a fusion of air and space capabilities, offering amplified attributes such as global reach, continuous ISR, and precision targeting—making it superior to air power alone in terms of strategic utility.
- Space-based assets are no longer optional but a compulsion in modern defence, especially given the threat environment involving long-range precision weapons and the need for early warning and deterrence.

- Pakistan's space development relies heavily on Chinese cooperation, which is viewed as an efficient and economical path forward due to financial constraints and lack of indigenous capability.
- There is no India-China space race; China's space program is competing with the United States, with far more advanced, economical, and faster achievements in both civil and military space domains.
- Militarisation of space is expected to increase, despite treaties like the OST, with future warfare likely to involve satellite denial techniques like jamming, directed energy, and orbital interference.
- To reduce vulnerabilities, Pakistan must invest in persistent ISR coverage of its neighborhood and electromagnetic spectrum monitoring, supported by strategic partnerships, especially with China.
- Private sector involvement in space is critical for sustainability, with global examples like SpaceX demonstrating how commercialisation can reduce costs and increase access to space-based capabilities.

CONCLUSION

The seminar concluded on an insightful note, bringing into sharp focus the evolving dynamics of aerospace power and its strategic implications for the region. From cutting-edge technological advancements in air and space domains to the shifting contours of regional security and deterrence stability, the discussions offered a holistic view of challenges and opportunities for Pakistan. The deliberations underscored the urgency of investing in indigenous capabilities, strengthening partnerships, and fostering innovation in both military and commercial space sectors. With an eye on future trajectories and strategic foresight, the seminar provided actionable insights that are poised to inform national security planning and policy formulation.

ABOUT CASS

Established in 2018, the Centre for Aerospace & Security Studies (CASS) in Islamabad is a non-partisan think tank offering future-centric analysis on aerospace and security issues. CASS engages with thought leaders and informs the public through evidence-based research, aiming to influence discussions and policies at the national, regional, and global level, especially concerning airpower, emerging technologies, traditional and non-traditional security.

VISION

To serve as a thought leader in the aerospace and security domains globally, providing thinkers and policymakers with independent, comprehensive and multifaceted insight on aerospace and security issues.

MISSION

To provide independent insight and analysis on aerospace and international security issues, of both an immediate and long-term concern; and to inform the discourse of policymakers, academics, and practitioners through a diverse range of detailed research outputs disseminated through both direct and indirect engagement on a regular basis.

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