STUDY NOTES · BASIC CONCEPT

F-22 Raptor vs J-20 vs Su-57 — Major Differences

International Relations

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F-22 Raptor — The Ultimate Air Superiority Fighter

The F-22 Raptor, developed by Lockheed Martin, is considered the most advanced air superiority fighter in the world. It combines unmatched stealth technology with supercruise capability, allowing it to fly at supersonic speeds without using afterburners. Its advanced avionics and sensor fusion system provide pilots with complete battlefield awareness, enabling them to detect and engage enemies before being detected. In combat scenarios, the F-22 excels in beyond-visual-range (BVR) engagements, making it extremely lethal. However, its high cost and limited production numbers remain its biggest limitations.

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Chengdu J-20 — The Long-Range Strategic Challenger

China’s J-20, developed by Chengdu Aerospace Corporation, is designed primarily as a stealth interceptor focused on long-range engagements. Unlike the F-22, it prioritizes range, stealth, and missile capability over close combat maneuverability. The aircraft is believed to carry advanced long-range air-to-air missiles, allowing it to target high-value assets such as AWACS and refueling aircraft from a distance. While the J-20 has made rapid technological progress, questions still exist regarding its engine performance and real-world combat effectiveness, as it has limited operational combat experience.

Sukhoi Su-57 — The Agile Multi-Role Fighter

The Su-57, developed by Sukhoi, is Russia’s most advanced stealth fighter, designed for multi-role operations. It focuses heavily on maneuverability, thanks to thrust-vectoring engines that give it exceptional agility in dogfights. Unlike the F-22, which emphasizes stealth above all, the Su-57 balances stealth with aerodynamic performance and versatility. It can perform both air-to-air and air-to-ground missions effectively. However, delays in production and limited numbers have slowed its deployment, and its stealth capabilities are generally considered less refined compared to the F-22.

Key Differences in Combat Philosophy

The three aircraft reflect very different combat philosophies. The F-22 is built around the concept of “first look, first shot, first kill,” relying on stealth and advanced sensors to eliminate threats before they even realize its presence. The J-20 focuses on long-range dominance, aiming to neutralize critical enemy assets from a safe distance. Meanwhile, the Su-57 prioritizes maneuverability and flexibility, making it highly effective in close-range dogfights and diverse mission profiles.

Strengths and Weaknesses

Each fighter jet has its own strengths and limitations. The F-22 leads in stealth, sensor fusion, and combat-proven capability but is limited by its small fleet size. The J-20 offers strong range and missile capability, making it a future strategic threat, though it lacks combat validation. The Su-57 stands out in agility and multi-role versatility but trails in stealth and large-scale deployment.

Final Verdict — Who Rules the Skies?

At present, the F-22 Raptor remains the most dominant air superiority fighter due to its unmatched combination of stealth, speed, and combat experience. However, the Chengdu J-20 is rapidly evolving and could challenge this dominance in the future, while the Sukhoi Su-57 remains a formidable contender in agility-focused combat scenarios.