

## India Joins Global Competition to Detect Stealth Aircraft with Advanced Photonic Radar



India's Defense Research and Development Organisation (DRDO) has successfully developed the nation's first indigenous photonic radar, a significant technological breakthrough that positions India as a key player in the global race to detect stealth aircraft. This cutting-edge system, developed by the Electronics and Radar Development Establishment (LRDE) in Bengaluru, is designed to overcome the limitations of traditional radar technology, which is often rendered ineffective by modern stealth designs.

The photonic radar operates on a fundamentally different principle from conventional systems. Instead of using radio waves generated by electronic components, it uses light-based technology to create, process, and analyze signals. This allows for a much wider bandwidth, higher frequencies, and exceptional resistance to electronic jamming. The system, which operates with an 11 GHz bandwidth centered at 34 GHz, boasts an imaging resolution of 1.3 cm and can detect objects as small as 3x4 cm.

A key advantage of this technology is its ability to counter the advanced stealth features of aircraft like the Chinese J-20 or the American F-35, which are specifically optimized to evade conventional radar. Because photonic radars use optical frequencies, they are far more resistant to these stealth technologies. The system's use of Photonic Integrated Circuits (PICs) also

allows for rapid signal processing and a higher signal-to-noise ratio, enabling it to identify low-observable targets that would typically go undetected.

The successful development of this radar is a major step forward for India's self-reliance in defense technology. The DRDO is now preparing for extensive field trials of the system, which are expected to begin in late 2025. These tests will evaluate the radar's performance in various conditions, including high-altitude and coastal environments. If the trials are successful, the photonic radar could be integrated with existing platforms like the Sukhoi Su-30MKI, Rafale, and Tejas fighter jets.

India's entry into the photonic radar space underscores its commitment to technological innovation and its efforts to modernize its armed forces. This development provides a powerful tool to enhance India's air defense capabilities and strengthen its strategic position in the region.