The theory of the Revolution in Military Affairs (RMA) has significantly influenced the doctrine and future planning of the United States military, but has perhaps been most influential in the minds of the United States Air Force. Exemplifying this line of thought is the conception and production of the United States’ next multi-role fighter aircraft – the F-35 Joint Strike Fighter. Unlike the F-22 Raptor (which can perform maneuvers no human pilot can survive), the F-35 is not a significant leap forward in pure aerial performance; rather, the F-35 possesses significant advances in areas such as communications and networking capability. The F-35 is designed from the ground up with the ideas of the RMA in mind, and its effectiveness (or lack thereof) will ultimately be a judgment on RMA theory.

Discussion of the RMA and the role of air power must first address the nature of the theory itself. The fundamental underpinning of RMA theory is the idea of “strategic paralysis” – the ideal state in which one can achieve victory on the battlefield without a strategy of attrition or annihilation. Rather, a commander seeks to strike at an enemy’s centers of gravity in order to slow the decision making process until their decisions become ineffective and they lose the will to resist. Much of this theory is rooted in the work of John Boyd and John Warden, particularly John Boyd’s OODA loop. Developed initially as an understanding of dogfighting, the OODA loops breaks down decision making into four steps – observe, orient, decide, act. When dogfighting, the pilot who is able to make decisions quicker is able to seize render his opponent’s decisions ineffective and seize a decisive advantage. The theory of strategic paralysis scales up these ideas from a single engagement to an entire conflict; by attacking command and control centers and other strategic points one can reduce or eliminate the enemy’s ability to make timely and therefore effective decisions, eventually resulting in the loss of the will to fight and capitulation.

This theory is especially attractive to airpower theorists, as
airpower plays a crucial role; it is by far the most efficient way in which to strike at enemy centers of gravity. In fact, the advent of precision guided munitions is one of the crucial technological developments credited with enabling this type of warfighting. Gulf Wars I and II are often cited as primary examples of the power of this type of warfare – in both conflicts (but especially Gulf War II) precision guided munitions and strikes at Iraqi centers of gravity severed lines of communication and supply, and rendered most of the Iraqi army strategically ineffectual. The result appeared to be a reounding success for strategic paralysis as a method of waging war. As military planners envisioned future war, strategic paralysis played a central role, and thus significantly informed the design and development of the F-35 Joint Strike Fighter. The F-35 is from the ground up designed to operate in a capacity consistent with the tenets of RMA theory. In fact, the F-35 is even billed as the “first complete OODA loop aircraft;” advanced sensors greatly enhance observation, automatic target tracking eases orientation, sensor fusion aids in decision making, and the ease of control allows the pilot to focus on acting. F-35s are heavily networked, and tap in to not only their own advanced sensors but also those of other F-35s and the entire in-theater sensor and communications network. In this way, the F-35 attempts to tighten the OODA loops of both individual pilots and the force as a whole and gain a significant decision making advantage versus the enemy.

While the F-35 possesses some of the most advanced computer systems ever placed in a fighter aircraft, compromises in the design could pose problems in terms of performance vis a vis peer competitor craft. While the exact performance standards and technology present in the Russian T-50 and Chinese J-31 are unknown, it is speculated that both could potentially outperform the F-35, mainly due to the constraints the STOVL (Short Takeoff Vertical Landing) capability of the F-35B put on the design and construction of the airframe. The F-35’s STOVL capabilities necessitated a bulkier and lower performing fuselage and the lift fan blocks rear vision from the cockpit. The removal of some parts to save weight increased the vulnerability of the aircraft to enemy fire by 25%. Reductions to the F-22 program mean that the F-35 will be expected to shoulder a much greater share of air-to-air combat responsibilities going forward. This could prove problematic if the next-generation fighters of the United States’ potential rivals significantly outclass the F-35. Some simulations, including one in 2008 by the RAND Corporation, suggest that the F-35 will be wholly outclassed in air to air combat by enemy aircraft; in one simulated exercise pitting the F-35 versus Russian Sukhoi aircraft (presumably their next generation fighters), the F-35s were “clubbed like baby seals.”

However, constructing next generation fighter aircraft is no simple task, and it is certainly possible the other countries next-gen fighters are saddled with their own share of issues. In fact the Indian Air Force has had significant complaints about the performance of the T-50’s engine, radar, and poor construction. Much more secrecy surrounds the T-50 and J-31 than the F-35 due to the nature of the societies in which they are produced - it is possible that they are significantly less capable than Western defense planners project. Building stealth aircraft requires significant engineering capability and manufacturing processes with virtually no margin for error, capabilities the Russian and Chinese defense industries may currently lack. However, it is far from prudent to base defense planning on assumptions about lack of capability from rivals, and next generation stealth aircraft are certainly no exception.

Ultimately, the F-35 is not a major step forward in aircraft performance – many test pilots and projections place it as roughly equal in that regard to the F/A-18 Super Hornet, an aircraft dating to 1995. The true advances present in the F-35 are the advanced stealth, avionics, and communication technologies; all of which play important roles in tightening one’s own OODA loop while disrupting the enemy’s. While the F-35 may struggle to out-climb or out-maneuver Russian or Chinese fighters, it is hoped that it will not have to – rather, its advanced stealth and information gathering capabilities will give it a decisive advantage over enemy aircraft. Thus, whether the historical record will judge the F-35 as a failure or success will ultimately hinge on whether a revolution in military affairs has truly occurred.

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