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The SAF After Next Incarnation

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SYNOPSIS

Singapore is gradually unveiling the contours of its future military modernisation paths for the Singapore Armed Forces (SAF) planned for the mid-21st century. Its trajectory will be shaped not only by adapting emerging critical technologies to new security requirements, but equally important, institutional agility to exploit new technologies.

COMMENTARY

According to Singapore's Ministry of Defence, Singapore's force modernisation priorities toward the Next-Generation SAF currently follows three lines of effort: (1) developing capabilities to counter 'hybrid' threats in the information and cyber domains; (2) expanding counter-terrorism capabilities, particularly by strengthening Island Defence and Special Forces; and (3) in the long-term, leveraging advanced emerging technologies such as artificial intelligence, data analytics, and robotics in nearly all aspects of defence planning and military operations. In this context, Singapore's defence planners envision the Next-Generation SAF to build upon existing conventional capabilities, while having the flexibility and robustness to employ novel operational and organisational concepts to exploit breakthrough technologies for national defence – all under conditions of increased strategic uncertainty.

To preserve its strategic deterrent, the SAF is in the process of acquiring advanced military technologies and platforms, which are designed to be linked together as a force package, and create an asymmetric advantage. The list of military acquisition programmes includes upgraded early warning systems such as coastal surveillance network and air defence systems; F35s and upgraded F15SG fighter jets, Multi-Role Tanker Transport and G550 Airborne Early Warning aircraft, new Unmanned Aerial Vehicles (UAVs); new classes of ships that include Joint Multi-Mission Ships and Multi-Role Combat Vessels (MRCVs); 218SG submarines and new types of Underwater Unmanned Vehicles (UUVs); and ultimately, military systems and platforms for more

protected and mobile Army, such as the Next-Generation Armoured Fighting Vehicles (NGAFV), Terrex Infantry Carrier Vehicles, upgraded Leopard tanks, multiple rocket launchers and howitzers.

Mosaic Warfare

At its core, Singapore's military modernisation reflects SAF's primary mission that remains unchanged: to deter any threats to Singapore's security, territorial integrity and sovereignty, enhance Singapore's peace and security through defence diplomacy, and if deterrence or defence diplomacy fails, enable a swift and decisive victory. To do so, the SAF envisions to be able to mix-and-match these diverse platforms – ships, submarines, aircraft, and unmanned systems all together across all warfare environments: air, land, sea, underwater, and cyber. For example, an unmanned aerial vehicle or ground robot would be able to spot an enemy tank or ship, send the coordinates to any available non-line-of-sight strike system in the rear, which in turn would be able to immediately launch its munitions on the target.

Essentially, the SAF aims to upgrade its network-centric warfare capabilities for joint operations, with corresponding changes in the organisational force structures and operational conduct to strengthen overall military effectiveness. Its force transformation trajectory can be viewed as a structured-phased approach: First, the SAF acquires new equipment and introduces progressively more capable systems coupled with the establishment of new units. Second, the SAF establishes new operational commands to deal with an expanded spectrum of operations, at home and overseas, and in doing so, focuses on widening its operational flexibility and responsiveness. And in third phase, the SAF aims to enhance its leadership and human capital through the revision of training and education, to maintain a steady-stream of capable and committed personnel.

Back to the Future

Implementing a network-centric type warfare has been a major strategic imperative of many advanced militaries since the early 1990s. The major problem back then, as it is now, is that many of these complex systems need to be linked together – not only technologically, but organisationally and operationally - as seen in the many PowerPoint slide illustrations of future battlefields that show lightning bolts as communication links between different military platforms and services.

For the next-generation SAF, as well as for any major military power, this is an ongoing challenge– the SAF must be able to effectively (in real-time) integrate the various sensor-to-shooter loops between the various services and platforms. This means effectively linking the various Air Force, Army, Navy, and Cyber battle management; command and control, communications and networks; intelligence, surveillance, and reconnaissance; electronic warfare; positioning, navigation, and timing; with precision munitions. At the same time, SAF operational commanders and National Servicemen have to trust these systems.

And herein lies Singapore's principal strategic strength and weakness. Singapore and the SAF have over the years demonstrated greater strategic focus on technological solutions given limited manpower resources, which has led to excellent systems-of-

systems engineering capabilities, but at the same time, invoked growing perceptions of "technological superiority" as the primary strategic determinant, enabler and catalyst, of Singapore's military effectiveness. Moreover, in a process that could be characterized as administrative, technocratic, and cost-effective defence management, Singapore's defense ecosystem has evolved into an adaptive "systems-integrator" rather than a "disruptive innovator."

Future Force Algorithms

As Singapore's future military modernisation will rely increasingly on robotics, artificial intelligence and learning machines, advanced smart materials, sensors, and many other advanced technologies – its implementation will depend on corresponding strategic, organisational and operational agility to exploit these technologies. Indeed, how these new technologies will integrate with current operational constructs and force structures is a matter of much debate in militaries across the world, including Singapore.

The level of human involvement in the future of warfare, the need to alter traditional force structures and recruitment patterns and in what domains force will be used are all matters that are being challenged by new technologies. Militaries are developing their own and often diverse solutions to these issues. As in the past, the pursuit of next-frontier defence innovations will therefore present a range of complex challenges for Singapore's defence planners, from identifying and prioritizing emerging technologies, to adopting and adapting them into new force structures using novel operational concepts, but ultimately, with the same strategic logic – to create viable defence options and political effects.

In this context, the key lesson from past military innovations is this: breakthroughs in technology alone will not guarantee successful innovation.

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