MINDEF
SINGAPORE

SPEECH

KEYNOTE ADDRESS BY MAJOR-GENERAL (NS) NG CHEE KHERN, PERMANENT SECRETARY (DEFENCE DEVELOPMENT) AND SECOND PERMANENT SECRETARY (HEALTH) AT THE INTERNATIONAL NAVAL ENGINEERING CONFERENCE ON 20 MAY 2015, 1425HRS, CHANGI EXHIBITION CENTRE

Chief of Navy Rear-Admiral Lai Chung Han,

Chief Executive of the Defence Science and Technology Agency Mr Tan Peng Yam,

Distinguished Guests and Delegates,

Ladies and Gentlemen,

Good Afternoon,

INTRODUCTION

1. Welcome to the International Naval Engineering Conference 2015 or INEC in short. I am pleased to be here this afternoon to deliver the keynote address.

2. The theme for today's conference is "Adapt and Transform - Flexible Capability in an Uncertain Environment". Many of the world's militaries have recognised the need to transform, to stay relevant in this fast-changing world. But which approach one should take to adapt and transform will depend on each country's unique set of challenges and their operating environment. So allow me to share my thoughts on the challenges faced by the Singapore Armed Forces (SAF), and how we approach technology to overcome our challenges.

CHALLENGE #1: LACK OF MANPOWER RESOURCES

3. First, as a small country with limited manpower, our challenge is to achieve mission outcomes with less manpower resources. Technology has enabled us to do more, with less people.

4. For example, our Army deploys only three men to fully operate the High Mobility Artillery Rocket System, as compared with about 12 men needed for most other artillery systems. The Republic of Singapore Navy also leverages on automation technologies to operate our Formidable-class frigates with a lean crew of 70 men compared to typical crew strength of about 140 men for a ship of similar size.

5. The manpower challenge will get tougher as Singapore's birth rate continues to be low. So when we build platforms or weapon systems in future, we would have to be asking how we can operate it with less people, and to do it more effectively. We are shifting our perspective, from 'Supporting the Design' to 'Designing the Support'. In the past, we packed all the capabilities that we wanted into our platforms, and then tried to figure out how to support the design. Now, supportability is a key design principle that is featured centrally and off-stream in the design process. Through 'Designing the Support", considerations such as operator workload, equipment reliability and support requirements are analysed during the early phases of design, when decision can have a profound effect on follow-on support.

6. In this regard, the Republic of Singapore Navy (RSN)'s latest Littoral Mission Vessel (LMV) has been designed for support. The ship will include features to optimise manpower, such as equipment automation and intelligent sensors that monitor systems health. A new mast design will allow most of its active components to be easily accessible at sea or alongside in harbour. This reduces the downtime of defects by more than 80 percent by eliminating the need for yard work. While some of these features may require a higher initial implementation cost, this will be outweighed by the improved performance and reduction in maintenance cost over the long term.

CHALLENGE #2: LACK OF STRATEGIC DEPTH

7. The second challenge in Singapore, that we use technology to overcome, is the geographical realities of Singapore. As a small island state, we do not have the strategic depth. This means that we are short of the physical space and time to make political and military decisions and to take proper actions and responses. Therefore in order to defend ourselves, we have to design our systems to help us see faster and project our firepower further, and also be able to decide faster and make better decisions. We need to design for speed.

8. The SAF's suite of sensors and air defence systems has been designed to help us to speed up response time and deal more effectively with aerial threats. Key to building this effective multi-layered air defence system is our ability to leverage on technology to network existing and new sensors, ground-based air defence weapons, and command and control systems to speed up the sensor-to-shooter cycle.

9. In the same way, our Information Fusion Centre, located in Changi Naval Base, makes use of information technology to facilitate information-sharing and collaboration between participating navies and agencies to enhance maritime security. Through the speedy sharing of information, it facilitates timely and effective responses from partner

countries against maritime security incidents.

10. Looking ahead, emerging technologies in the domains of unmanned warfare, precision weapons, sensor, cyber and information systems will improve the Observe, Orient, Decide and Act (OODA) loop of those who are able to exploit these technologies. Commands will be faster and more precise. Reaction times between identification of a target to the delivery of an attack will be greatly reduced. Such advances in technologies to speed up decision making will be especially important to small nations such as Singapore.

CHALLENGE #3: UNCERTAIN ENVIRONMENT

11. The third challenge that we need technology to do for us is to build capabilities that are versatile. And will allow us to achieve future missions that we may not be able to envisage today. This is because we do not always know the sort of operational scenarios in which the SAF would be called into action.

12. This is why we try to build flexibility into the design of each platform, so that they can be rapidly reconfigured for different missions. For the RSN, our Endurance-class Landing Ships Tank have been designed to provide various means for the transport of equipment and personnel, via cranes, fast craft or helicopters. These features have served the RSN well in missions such as the humanitarian and disaster relief operations that they have engaged in.

13. However, the idea to design flexibility is not always straightforward in implementation. Multi-role platform designs would always be more expensive to build than purpose-built single-role capabilities. For example, missile gunboats or torpedo boats are cheaper and have been argued would be effective against capital ships, MiG-21s are cheaper and in sufficient numbers would overwhelm the much more expensive F-15s. Similarly for anti-tank missiles or guns against tanks. Lenin has been quoted as saying that "quantity has a quality all of its own." But in these specific areas, the more expensive multi-role platforms have proven themselves to be operationally very effective because over time they are more versatile than the single-roll systems. As we look at these platforms, especially not in a head-on one to one fight with the cheaper systems, but at higher levels of war, the multi-role platforms have in most cases outmanoeuvred and beaten the cheaper single-role less versatile systems. And if you would like a good read on this issue, you can read Edward Luttwak's book titled "Strategy" where he gave examples of this dynamic.

14. Unfortunately for us, it has not always been the case that the more multi-role system has beaten the single role weapon. A classic example of a single-role cost-effective weapon was the English Longbow used during the Hundred Years' War in the 14th to 15th century. The English defeated the armoured French cavalry with a single weapon system - the English Longbow. The English pursued a cost-efficient strategy by relying on a single technology that provided greater operational mobility with lesser resources. In response, the French adopted a resource-draining strategy that resulted in financial depletion and operational defeat. A single-role cost-effective weapon enabled England to defeat a more expensive army.

15. Hence, for defence planners, we need to have a well-thought strategy in designing for flexibility. The degree of flexibility and the cost involved are important design considerations that planners will have to answer depending on specific missions and circumstances. And it cannot be assumed that any particular multi-role or single-role, cheaper or more expensive platforms would be better.

CONCLUSION

16. To conclude, I have highlighted the three challenges faced by the SAF: (1) the lack of manpower resource, (2) the lack of strategic depth, and (3) the uncertain environment. I have also shared the approaches that we have taken to overcome the challenges by (1) designing for support, (2) designing for speed and (3) designing for flexibility in a cost-effective manner.

17. Choosing the right technology is tricky and never easy. Moreover, I believe that we are in the beginning stages of a potential Revolution in Military Affairs. The last one started in the 70s and 80s and had as its main thrust in precision warfare. This revolution has to do with exponential advances in cyber capabilities, information warfare, space, and robotics. Even if we can have the technologies, these technologies have to be productionalised into effective operational weapon systems that then requires the right concepts of operations, and shifts in the whole culture of our soldiers, sailors and airmen to use the systems in the right way.

18. This conference, filled with over a hundred naval technology experts offers an excellent opportunity for us to share thoughts on these difficult issues. And through my career, I believe that sharing thoughts on difficult issues can really make progress. So I hope the exchange of global perspectives; operational experiences and technology developments, today and similar conferences, will spur thought-provoking insights and push technological frontiers to the next higher level.

19. And in this light, I wish each and everyone a meaningful conference this year. Thank you.

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