

# The 3<sup>rd</sup> Generation RSAF: Managing Transformational Tensions

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## Introduction

The transformation to the 3<sup>rd</sup> Generation RSAF is an exciting time for the organisation. It is a time of fundamental re-evaluation and change from first principles. The coming years will usher in a particularly critical transitional period as the organisation embarks on concrete steps towards realising the 3<sup>rd</sup> Generation RSAF. The transformational tensions that will inevitably arise during this period of inter-generational transition should be properly managed in order that the transformation process can proceed unimpeded. This article explores the evolution of the RSAF over different

generations since its inception in order to contextualise the current 3<sup>rd</sup> Generation transformation effort. It then identifies the key tensions that will arise from the current inter-generational transition, and discusses possible ideas and initiatives to manage these tensions as we evolve to the 3<sup>rd</sup> Generation RSAF.

## Making Inter-Generational Transitions

Organisations need to evolve continuously to overcome the prevailing set of pressures imposed on them from internal organisational forces and the external environment. However, the

pace of an organisation's evolution is not necessarily uniform. In fact, the myriad transitions that take place along this continuous evolutionary process may vary greatly in scale, from minor adjustments to far-reaching organisational transformations. The current transition that the RSAF is embarking on is especially crucial because it is a major transformation that entails a generational shift in the whole organisation. As this article shall later elaborate, a transition of such magnitude imposes enormous stresses, or tensions, on the organisation. These tensions need to be properly managed in order that the transition may be accomplished seamlessly.

Inter-generational transitions are not new to the RSAF. Even over its relatively short history, the RSAF can be said to have undergone significant cross-generational transformations. These have occurred when the excellence achieved in current competencies became inadequate to accommodate emerging challenges or exploit new opportunities. A process of fundamental renewal would then be necessitated to ensure that the organisation remained vital, relevant and refreshed. An examination of the evolution of the RSAF will illustrate the process of inter-generational transition with greater clarity, and should also provide useful insights into the impetus and challenges in the current transition to the 3<sup>rd</sup> Generation RSAF.

The 1<sup>st</sup> Generation RSAF, which can be roughly dated from 1968 to 1985, was primarily directed by the need to establish a credible air defence capability. This necessitated the birth of

the Air Force in September 1968 with the formation of the Singapore Air Defence Command (this officially became the RSAF in 1975). The following decade saw the RSAF operationalising existing British platforms like the Hunter aircraft and Bloodhound missiles, and assimilating more advanced platforms like the A-4s, till air defence vocational and functional competencies were firmly established. However, by the early 1980s, a good air defence capability was by itself increasingly inadequate to provide support for operations with the developing Army and Navy. Furthermore, the SAF began considering the requirement for new capabilities in the light of changing developments in the strategic environment, and in the region in the late 1970s. These internal and external pressures paved the way for a cross-generational transition to the 2<sup>nd</sup> Generation RSAF.

If the 1<sup>st</sup> Generation RSAF was concerned with building up air defence, the 2<sup>nd</sup> Generation RSAF focused on establishing air superiority so as to secure the airspace for the Army and Navy to operate unimpeded. This 2<sup>nd</sup> cycle of growth can be said to have lasted from about 1985 till recent years, with the operationalisation of new platforms like the F-5s, E-2Cs, and later the F-16s, and the organisational re-configuration of the RSAF according to Airbases with more clearly separated Command and Staff functions. By the late 1990s, the RSAF's vocational and functional competencies and ops readiness had achieved a level of excellence well recognised by advanced air forces around the world. However, the early 2000s, especially after 9/11, saw the rise of a new threat environment

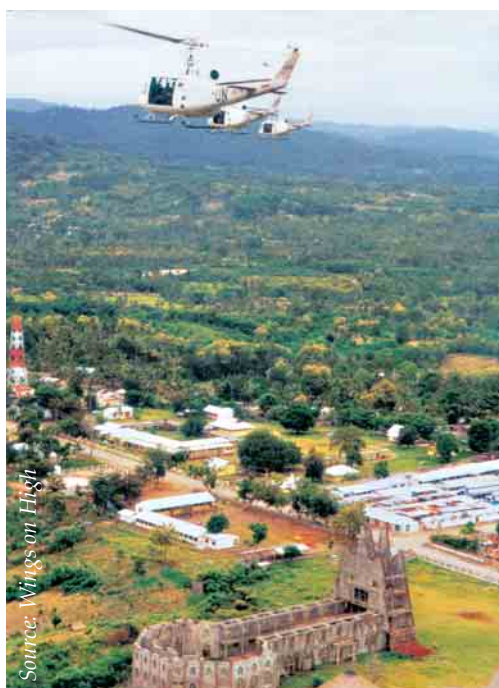
characterised by asymmetrical threats and LICs (Low Intensity Conflicts). This has since necessitated a process of self-renewal in the RSAF, motivated by the recognition that the organisation needs to transform in order to effectively tackle the security challenges ahead. Therefore, over the last few years, the RSAF has been engaging in a process of consolidation and a host of system reviews in order to facilitate the next cross-generational transition, or the transformation, to a 3<sup>rd</sup> Generation fighting force.

## Transiting to the 3<sup>rd</sup> Generation RSAF

Going forward, the 3<sup>rd</sup> Generation RSAF is expected to move beyond air defence and air superiority to become a full-spectrum integrated force, capable of dominating the ground and sea from the air. Although wars are traditionally won on the ground, they need not be won from the ground alone. Operations Enduring Freedom and Iraqi Freedom, for example, were wars that were won on the ground, but in large part also from the air. Airborne precision weapons and UAVs clearly played a decisive role in decimating the Taliban and Iraqi ground forces. In order to harness the potential of these 3<sup>rd</sup> Generation cross-domain capabilities to shape surface battles, the RSAF needs to achieve enhanced integration across functions (ops-int-log, plans-control-execution) and Services (air-land-sea), and more broadly, to engage in integrated warfighting with the other Services and Joint.

However, conventional “hot” wars form only one part, albeit a key part, of an increasingly diverse range of

threats emerging from today’s global security environment. There will be a growing need for the RSAF to conduct operations across the whole peace-to-war continuum, ranging from Operations Other Than War (OOTW) like Peace Support Operations (PSO), Humanitarian Assistance and Disaster Relief (HADR) and counter-terrorism, to LICs and HICs. This will require the RSAF to be an effective full-spectrum force capable of being calibrated to the requirements of different campaigns.



*RSAF's UH-1Hs (in UN colours) supported UNMISET in Timor Leste from 15 Nov 02 to 22 Oct 03.*

Additionally, the needs and potential of a new generation of people in the RSAF provides the impetus for developing 3<sup>rd</sup> Generation RSAF people. The RSAF will need to capitalise on the improving educational profile of its current and prospective employees by maximising their potential, and in so doing, meet their heightened job

expectations and feed their passion for a military career. Moreover, the RSAF will require better trained and more technologically-savvy people who are able to operate advanced cross-domain warfighting systems, execute complex ops concepts and thrive in task-oriented and integrated organisational structures. Only with 3<sup>rd</sup> Generation personnel can the RSAF properly fulfil the heavy demands imposed on it by the need to undertake integrated and full-spectrum operations.

## Managing the Transformational Tensions

It is evident that the RSAF is now at a critical juncture of its development as it transforms across generations. The key challenge of this period lies in the need to manage the transformational tensions arising from this inter-generational transition. These tensions are unavoidable not simply because of the sheer magnitude of the transition taking place, but also because of the differential rates at which different parts of the organisation are developing and transforming. Understanding these tensions will help the RSAF to better manage the potential conflicts in priorities, which could emerge under such circumstances, and thus ensure that the transformation towards the 3<sup>rd</sup> Generation RSAF is safe and successful.

The first tension, which is between progress and consolidation, refers to ensuring that the relevant 2<sup>nd</sup> Generation competencies are not being eroded in the course of transformation. This

would be detrimental to the RSAF's ability to conduct complex operations across the peace-to-war spectrum. In particular, even as the RSAF is operationally prepared to respond swiftly and decisively for peacetime operations such as HADR, as it did with Ops Flying Eagle (OFE) in 2004, this should not erode its competencies to conduct operations in open conflict. Also, harnessing new concepts and technologies cannot be done at the expense of safety. It is important that these fundamentals are maintained to serve as a sound-footing from which new innovative ventures can be launched.

The second tension, between risks and yields, occurs most during the exploration of new ideas and concepts, when it is unclear whether the risks taken will commensurate with the desired outcomes reaped, especially given the uncertainty that surrounds these activities. This tension is most visible in the exploration of the use of new and complex cross-domain systems, as well as attempts of greater and better integration both within the RSAF and with the wider SAF. While these cutting-edge developments have the potential to yield tremendous benefits to the war-fighting abilities of the RSAF and wider SAF, they are also undertakings that carry a higher level of risks than endeavours on beaten path. The RSAF must therefore effectively calibrate the risks it undertakes as it pushes these new boundaries.

The third tension, between learning and “un-learning”, affects the vital flows of information supporting the



whole transformation effort. This tension is manifested most clearly in the ‘people’ dimension of the RSAF. At present, different people may be at different stages of the 3<sup>rd</sup> Generation learning curve, or at different stages of “un-learning” 2<sup>nd</sup> Generation mindsets that have been outmoded. New task-oriented and cross-functional work processes, for example, may clash with existing type-centric and uni-vocational mindsets. A sound system of knowledge acquisition, management and exploitation is needed to enable learning and un-learning to proceed simultaneously, and more generally, to redress the differential levels of knowledge and understanding among RSAF personnel. Without this, neither the balance between consolidation and progress nor the calibration of risks can be achieved. All in all, it is important that the three tensions are viewed and treated holistically, considering that any one tension, if not properly managed, can potentially derail the entire transition from the 2<sup>nd</sup> to the 3<sup>rd</sup> Generation RSAF.

In sum, the management of the three tensions can be represented as follows:

- Rapid progress needs to be made, but not at the expense of consolidating foundational competencies;
- Desired yields need to be maximised while potential accompanying risks need to be minimised;
- Learning and un-learning needs to take place simultaneously, in a non-conflicting and effective manner.

## **Balancing Act 1 – Managing the Tension between Progress and Consolidation**

One of the main challenges posed by the transition from the 2<sup>nd</sup> to the 3<sup>rd</sup> Generation is the need to ensure that rapid progress towards the 3<sup>rd</sup> Generation RSAF does not take place at the expense of retaining the excellence achieved in 2<sup>nd</sup> Generation competencies, or vice versa. There is no doubt that making rapid progress in new ventures is critical to realising the 3<sup>rd</sup> Generation vision. As the organisation forges ahead with transformation, the journey will be lined with opportunities to implement new ideas and initiatives. Underestimating and under-investing in new, potentially high pay-off ideas can cost us the chance to secure best-case future scenarios, or worse, result in future failure. A classic illustration is the colossal misjudgement by Kenneth H. Olsen, who, as the President of Digital Equipment Corporation, announced in 1977 that “there is no reason for any individual to have a computer in their home”.<sup>1</sup>

However, as the RSAF keeps its options open to innovation, it is important that fundamental competencies are continually strengthened, as they form the foundation from which new ventures can be launched. A good example from the commercial arena is the Federal Express Corporation’s (FedEx) launch of its overnight-delivery service. By consolidating its strong foundational competencies in providing door-to-door mail-and-package delivery service, and

applying them in a new context, FedEx's strategy opened up a new market that forced the industry incumbents like United Parcel Service (UPS) to play catch-up.<sup>2</sup> Therefore, retaining and consolidating strong fundamentals in the RSAF is vital in providing foundational stability for the organisation as it makes inroads into new and potentially turbulent frontiers.

In this regard, the RSAF has in the past few years conducted a number of key reviews to consolidate our fundamentals. For instance, following the series of aircraft incidents and accidents that occurred after the 7.5-year period of zero accidents, the RSAF subjected itself to a rigorous regime of internal and external reviews at both the unit/formation level and the HQ level. This exercise proved valuable in furnishing the RSAF with a clearer picture of its strengths and deficiencies in the arenas of safety and operational readiness, and the operational standards that had to be emphasised in order to take the RSAF to a new level of operational excellence.

In the areas of force structuring and capability development, a similarly rigorous review has been conducted to get the fundamentals right for

transforming the RSAF. In order to create capacity for the realisation of new airpower employment concepts, the RSAF recognised the need to trade legacy capabilities with newer and more advanced ones. Hard decisions were taken to draw-down older platforms, such as the A-4s, while at the same time introducing new capabilities, such as the F-15SGs, in a phased and calibrated manner. As a result, over the past few years, the RSAF has improved its capabilities and enlarged its capacity to transform into a 3<sup>rd</sup> Generation Air Force.

As is apparent, such system reviews are vital for managing the tension between rapid progress and consolidation. They allow the organisation to map out its foundational baseline and to properly calibrate its progress. This will ensure that as the RSAF maximises emerging 3<sup>rd</sup> Generation opportunities, it also continues to consolidate and strengthen the 1<sup>st</sup> and 2<sup>nd</sup> Generation fundamentals that have enabled it to become a first-class Air Force. In view of this, it will be useful to conduct system reviews periodically, particularly at key transition phases along the 3<sup>rd</sup> Generation journey.



*RSAF's fighter aircraft – Past and Present*

## Balancing Act II – Managing the Tension between Risks and Yields

In the course of the transition from the 2<sup>nd</sup> to the 3<sup>rd</sup> Generation, the RSAF will have to introduce a host of new initiatives to enable the 2<sup>nd</sup> Generation components of the organisation to progress to the 3<sup>rd</sup> Generation, as well as to further advance those elements that have entered the 3<sup>rd</sup> Generation domain. In implementing these initiatives, it is crucial that the expectation of yields is balanced by an awareness of the possible risks.

However, the relationship between risks and yields is not as straightforward as one might initially assume. This is because the RSAF, like many large organizations, is what we may refer to as a complex system, which makes it susceptible to the so-called ‘Butterfly Effect’<sup>3</sup>: a butterfly flaps its wings in Tokyo, and sets in motion events that lead to tornadoes in California. Of course, this must be understood in conjunction with its converse: another butterfly flaps its wings, and nothing of meteorological consequence happens.<sup>4</sup> From this, it is evident that the various parts which constitute a complex system interact in a non-linear fashion.<sup>5</sup> So a small perturbation in a complex system may lead to unimaginably large consequences analogous to the ‘butterfly effect’. Conversely, a ‘big bang’ input may turn out to have little noticeable effects.

In practice, the unpredictable relationship between risks and yields can have serious implications on decision-making within the complex

system. An over-concern with the possibility of a ‘butterfly effect’ can lead to decision paralysis; while a “just do it” approach, on the other hand, may cause us to place misinformed big bets on initiatives that result in write-offs. To balance the tension between risks and yields, the RSAF needs to better understand the interactions of the various demand centres when new initiatives are introduced, so that changes can be effected in a more calibrated and integrated manner.

In this regard, experimentation, which arises from the Latin word ‘experiri’ (meaning ‘to try’), is vital. The RSAF should leverage on experimentation to ensure that the effects of intended changes are comprehensively and thoroughly examined in manageable slices before introducing them into the mainstream.<sup>6</sup> As a process, experimentation progressively creates knowledge pertaining to new concepts or current issues through exploring various possibilities and options. This in turn allows operators and decision-makers to spirally and collaboratively deliberate, decide and effect the changes in a manner that delivers the desired outcomes while mitigating the possible risks involved.

To this end, the RSAF has established dedicated agencies to develop concepts and validate them in virtual environments. For example, these agencies have been working with the SAF Centre of Experimentation (SCME) to explore network-centric concepts. Such efforts have enabled the RSAF to understand from first principles the workings of new ideas, which in turn minimises the risks of unintended

effects from changes. They have also provided a cost-effective way for the RSAF to test ideas, identify potential military benefits and the conditions under which the benefits can be reaped, before we commit more resources to further examine ideas in the physical domain.



*A CH-47D with a Pegasus howitzer underslung during Ex. Wallaby 05.*

The RSAF can also leverage on field experimentation to further explore new concepts and capabilities. Ex. Wallaby 05, the largest air-land integration exercise conducted in Australia by the SAF in 2005, was a good demonstration of how this can be achieved. In one experiment, RSAF Searcher drones were employed to use their cameras and sensors to hunt down and track the simulated enemy. Video images captured by the Searchers, through experimental systems, then helped artillery gunners

shell enemy positions with precision and gave tank commanders timely warnings of enemy movement. At around the same period, the RSAF also participated in Ex. Forging Sabre in Continental USA. In the exercise, experimentation was also conducted on the integration of RSAF systems, including the AH-64D Longbow attack helicopters, CH-47D Chinook helicopters, the UAVs and F-16 C/Ds, with the Army artillery systems and commandos as one integrated force.



*Ex. Wallaby 05, the largest air-land integration exercise conducted by the SAF in 2005.*

Such experiments are invaluable processes for the RSAF to test out new ideas, understand the complexities and intricacies of new operations, as well as uncover important issues pertaining to operational effectiveness and safety. As the RSAF ventures into cutting edge 3<sup>rd</sup> Generation domains such as Integrated Strike and Network-Centric Warfare, it is vital that systematic experimentation is carried out in order that these new initiatives can be expeditiously implemented to achieve the desired yields with minimum risks.



## Balancing Act III – Managing the Tension between Learning and ‘Un-learning’

The process of inter-generational transition calls for a great deal of simultaneous learning and “un-learning”, given that an organisation undergoing such change is straddling two generations of development. The processes of learning and un-learning can come into tension because the attention and resources devoted to one process can easily result in neglect of the other. At worse, this results in old mindsets co-habiting with and inhibiting the growth of new concepts or capabilities. To manage this tension, it is imperative that the RSAF develops the capacity to simultaneously negotiate the many learning and un-learning curves that will come with the transformational process.

One way of achieving this is by harnessing effective knowledge-management tools to facilitate the learning and un-learning processes. In this regard, the experience of the U.S. Army’s Opposing Force (commonly known as OPFOR) offers many useful insights. OPFOR is a 2,500-member brigade whose job is to help prepare soldiers for combat. It constantly confronts the Blue Forces (BLUFORS) in a variety of mock campaigns under a wide range of conditions. Although OPFOR is always smaller and less well-equipped than its opponents, it almost always wins.<sup>7</sup>

OPFOR’s consistent success is attributable in a large part to the way it effectively utilises the After Action

Review (AAR). Many organisations conduct elaborate AARs, but all too often still end up repeating the same kinds of mistakes, because they misperceive the AAR as a meeting, a report or a post-mortem of past failure.<sup>8</sup> Understanding AARs as such will cause the organisation to concentrate too much on the un-learning process at the expense of learning. Past mistakes may be identified, but future performance would not be enhanced. In contrast, OPFOR sees AARs as part of a cycle that starts before and continues throughout each campaign against BLUFOR.<sup>9</sup> Central to this idea is the fact that the cycle must not only correct things; it should also correct thinking. OPFOR conducts multiple AAR iterations at the earliest possible opportunity after the issue arises, so that capacity can be created for simultaneously un-learning, learning and applying in a progressive manner, and solutions can be tested and refined along the way. By OPFOR’s definition, a lesson is not considered ‘learned’ until it is successfully applied and validated.

The concept of continuous learning and un-learning as a knowledge management tool is not new. Many advanced armed forces have developed their own systems and processes to achieve this, of which OPFOR’s AAR is but one highly successful example. The RSAF has a well-established knowledge-management system, in the form of the Safety Information System (SIS), to rapidly and effectively document, share and implement lessons on safety at a systems level. Extending the SIS concept and experience, similar systems could be developed for the war-

fighters and force developers to rapidly document, share and implement lessons learnt through training, operations and capability developments. This will expand the RSAF's capacity to learn and un-learn concurrently across the wide array of technological, operational and organisational changes that will be introduced as part of 3<sup>rd</sup> Generation transformation. In this way, the RSAF will be able to reap the benefits of the U.S. Army's OPFOR experience at a larger scale but potentially at a lower cost.

Another way of developing the capacity to learn and un-learn simultaneously is to widen the participation base for information gathering and sharing. This can be effectively achieved through sharing, learning and applying lessons among peer working groups such as a 'Community of Practice' (CoP)<sup>10</sup>, which can augment the more formal functional and task-organised groupings in the RSAF. This idea has already been adopted in RSAF Formations and Airbases over the past few years. Working groups, including selected members from other Formations, Services and fields of expertise, have been set up to develop, experiment and implement selected ops concepts, capabilities and initiatives as part of 3<sup>rd</sup> Generation RSAF transformation. The cross-functional collaboration has been invaluable in facilitating an integrated perspective towards the sharing of new concepts and tactics, un-learning out-moded mindsets, and aligning disparate concepts to a common vision and end-state.

A similar CoP approach can be explored in other developmental areas of the RSAF, especially during this critical period of inter-generational change. A promising initiative in the RSAF is the recently launched CoP@RSAF, which aims to provide a one-stop, informal on-line forum for Commanding Officers (COs) and Officers Commanding (OCs) to exchange ideas, information and knowledge with their respective peer groups. Such exchanges are likely to provide more opportunities for accelerating the capacity and speed of learning and un-learning, as well as applying best practices quickly and effectively. These initiatives should be progressively extended to more peers, type and functional groups within the RSAF, as well as the wider SAF.

## Conclusion

Dealing with transition is an organisational fact of life. However, a transition can only be effectively managed if accompanying challenges are properly identified and tackled. This applies especially to the RSAF, which is at present undergoing a historic, and no doubt challenging, cross-generational transformation from a 2<sup>nd</sup> Generation to a 3<sup>rd</sup> Generation Air Force. This article has outlined the three main transformational tensions that confront the RSAF as it straddles the 2<sup>nd</sup> and 3<sup>rd</sup> Generation, and the broad measures required to deal effectively with these tensions. 🕒

## Endnotes

- <sup>1</sup> Courtney et al (1997), p4.
- <sup>2</sup> Ibid., p20.
- <sup>3</sup> Lorenz (1993), pp181 – 184. The origins of this much-used catch-phrase can be traced back to meteorologist Edward Lorenz who first analyzed the effect in a 1963 paper for the New York Academy of Sciences.
- <sup>4</sup> Lewin (1999), pp10 – 11.
- <sup>5</sup> A linear system is one that obeys the principles of superposition, i.e. the whole is the sum of its parts. Non-linear systems are those that disobey proportionality or additivity. They may produce disproportionately large outputs from disproportionately small inputs, or vice versa. They may also involve synergistic interactions in which the whole is not equal to the sum of the parts. Examples of non-linear phenomena include weather, biological evolution and the damping effect of atmosphere on a swinging pendulum. Beyerchen (1992/3), pp62 – 66.
- <sup>6</sup> Alberts et al (ed. 2002), p19.
- <sup>7</sup> Darling et al (July / Aug 2005), p1.
- <sup>8</sup> Ibid., p2.
- <sup>9</sup> Ibid., pp4 – 7.
- <sup>10</sup> A 'Community of Practice' can be defined as 'a group of people informally bound together by shared expertise and passion for a joint enterprise'. Examples are engineers engaged in deep-water drilling, consultants who specialised in strategic marketing, or frontline managers in charge of cheque processing at a large commercial bank. Wenger et al (2000), pp2 – 3.



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