



# เอกสารวิจัยส่วนบุคคล

เรื่อง

Preparing War Ready Fighter Pilots During Times of Peace  
to be Ready for Future Challenges and Conflicts

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## หนังสือรับรอง

คณะกรรมการเอกสารวิจัยโรงเรียนเสนาธิการทหารอากาศได้ตรวจและรับรองว่า เอกสารวิจัยส่วนบุคคล เรื่อง Preparing War Ready Fighter Pilots During Times of Peace to be Ready for Future Challenges and Conflicts ของ นาวาอากาศตรี ซี เหว่ยเฉียง เจร์ลด์ นายทหารนักเรียนโรงเรียนเสนาธิการทหารอากาศ รุ่นที่ ๖๘ เป็นส่วนหนึ่งของการศึกษาตามหลักสูตร เสนาธิการทหารอากาศ โรงเรียนเสนาธิการทหารอากาศ กรมยุทธศึกษาทหารอากาศ ประจำปีการศึกษา ๒๕๖๗

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## บทคัดย่อ

เอกสารวิจัยเรื่อง	Preparing War Ready Fighter Pilots During Times of Peace to be Ready for Future Challenges and Conflicts
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การวิจัยนี้จัดทำขึ้นเพื่อศึกษาวิธีการฝึกอบรมของนักบินขับไล่ของกองทัพอากาศสาธารณรัฐสิงคโปร์ (RSAF) โดยมีวัตถุประสงค์เพื่อระบุและแก้ไขช่องว่างผ่านการวิเคราะห์เปรียบเทียบระหว่างวิธีการฝึกอบรมนักบินขับไล่ของกองทัพอากาศสาธารณรัฐสิงคโปร์ในปัจจุบันกับวิธีการฝึกอบรมนักบินขับไล่ประเทศอื่น โดยใช้วิธีการวิเคราะห์ช่องว่างใน ๔ ด้านที่สำคัญ ได้แก่ (๑) จำนวนซอร์ตี้และการเปิดรับเหตุการณ์ (๒) การประเมินประสิทธิภาพ (๓) การฝึกอบรมและประเมินความพร้อมทางจิตวิทยาและ (๔) การพิจารณา X-Factor

ผลการวิจัยนี้เสนอข้อเสนอแนะเพื่อเพิ่มประสิทธิภาพการฝึกและความพร้อมให้กับนักบินขับไล่กองทัพอากาศสาธารณรัฐสิงคโปร์(RSAF)โดยการปรับเทียบข้อกำหนดการเรียงลำดับใหม่เพื่อให้สอดคล้องกับการเตรียมพร้อมรบที่เหมาะสมที่สุดใช้ประโยชน์จากเครื่องจำลองสำหรับการฝึกอบรมตามสถานการณ์จริงควบคู่ไปกับความพร้อมทางจิตวิทยาและการฝึกอบรมด้านจริยธรรมภายในหลักสูตรคุณสมบัติความเป็นผู้นำและความรักชาติยังพบว่าเป็นองค์ประกอบสำคัญในการส่งเสริมกองกำลังที่ยืดหยุ่นและพร้อมรบ

ประโยชน์ของการวิจัยนี้สามารถนำไปใช้กับฝูงบินอื่นๆนอกจากฝูงบินขับไล่ RSAF ซึ่งอาจเป็นประโยชน์ต่อหน่วยอื่นๆภายใน RSAF การวิจัยนี้มีจุดมุ่งหมายเพื่อสนับสนุนการปรับปรุงวิธีการฝึกอบรมเพื่อให้มั่นใจว่า RSAF ยังคงอยู่ในระดับแนวหน้าของความพร้อมทางทหารในภูมิภาคที่ตนโลกที่กำลังพัฒนา

## Abstract

<b>Research Title</b>	Preparing War Ready Fighter Pilots During Times of Peace to be Ready for Future Challenges and Conflicts
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<b>Research Consultant</b>	Lieutenant Colonel Loyld Lin
<b>Research Advisor</b>	Wing Commander Akkarawat Kanlayanamit

This study investigates the training methodologies of Republic of Singapore Air Force (RSAF) fighter pilots, aiming to identify and address gaps through a comparative analysis with other training pedagogies. Investigating concerns regarding the irrelevance of current training methods due to prolonged peace time. This research will use a gap analysis approach to reveal significant findings in four critical areas: (1) Sortie count and event exposure, (2) Performance Assessment, (3) Psychological Readiness training and assessment, and (4) X-Factor considerations.

Based on these findings, recommendations are proposed to enhance training effectiveness for readiness in RSAF fighter pilots. These include recalibrating sortie requirements to align with optimal combat preparedness, leveraging simulators for realistic scenario-based training, alongside psychological readiness, and ethical training within the curriculum. Leadership qualities and patriotism are also found to pivotal components in fostering a resilient and combat-ready force.

The implications of this study extend beyond RSAF fighter squadrons, potentially benefiting other units within the RSAF. By addressing the identified gaps and implementing the suggested strategies, this research aims to contribute to the enhancement of training methodologies, ensuring the RSAF remains at the forefront of military readiness in an evolving global landscape.

## Preface

It is with great privilege and dedication that I present this research paper, aimed at reimagining the training methods for RSAF fighter pilots. As fighter pilots of the Republic of Singapore Air Force (RSAF), we stand at the forefront of aviation excellence, entrusted with safeguarding our nation's skies and interests in an ever-evolving global landscape.

The impetus for this research arose from a recognition of the pressing need to address the challenges of the future proactively. With rapid advancements in technology, shifts in geopolitical dynamics, and emerging threats, the traditional approaches to fighter pilot training risk becoming obsolete. Failure to adapt to these evolving realities could not only jeopardise the operational effectiveness of our pilots but also undermine the RSAF's position as a credible force in the region.

This research serves as a starting point for innovation and transformation within our training ecosystem. Drawing upon insights from diverse military institutions and leveraging best practices from around the world, I have explored alternative training pedagogies that try to enhance the proficiency, adaptability, and resilience of our pilots. It is my sincere hope that this research ignites a sense of urgency within the RSAF leadership to relook at how we do things. By embracing the findings and recommendations presented within this research, we have an opportunity to chart a course towards a future-ready training program that allows our pilots to excel in the face of adversity.

Major

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# Chapter 1

## Introduction

### 1. Importance and Origin of Research

The title of this thesis can be broken down into 2 main questions. (1) How does peace time affect the readiness of our soldiers and (2) Are the current training methodologies used in the SAF/RSAF sufficient to train soldiers and leaders to take on future challenges and conflicts still relevant.

Based on the observations from recent conflicts such as Israel-Hamas, it is evident that technological advantage does not guarantee a victory or peace and security. This is clearly shown when the Israeli Airforce (IAF) was fully surprised when attacked by Hamas. Even though they held a superior technological advantage and had more robust training Israel suffered a major loss. Could long standing peace have been a factor to their complacency?

Drawing some lessons learnt from the Vietnam-US war, where although the US forces were superior in all aspects, they were ultimately unable to overcome the Viet-Congs. What mentality did the Viet-Congs possess and how can we systematically infuse/ingrain such a mentality into our current generations of soldiers (fighter pilots).

Expect challenges, and types of conflicts for the future is ever changing. This research would also assess if the values, training systems and leadership model within the SAF/RSAF is still relevant to developing RSAF fighter pilots to be ready for future conflicts and challenges.

Based on my experience in the Squadron working as an Officer Commanding of 143 Sqn, I have found that the motivation and values of the newer generation of fighter pilots to be profoundly different. I will also take the opportunity to research different approaches in training methodologies to adapt to the newer generations of pilots.

### 2. Objectives of the research

2.1 To prove that if not careful, extended peace time can lead to soldiers who are not ready for war.

2.2 To find gaps in today's training, leadership model of RSAF fighter pilots to ensure they remain ready for future conflicts of Singapore.

2.3 To propose solutions which can be implemented to keep our RSAF fighter pilots ready for war.

### 3. Research Questions

The title of this thesis can be broken down into 2 main questions. (1) How does peace time affect the readiness of our soldiers and (2) Are the current training methodologies used in the SAF/RSAF sufficient to train soldiers (fighter pilots) and leaders to take on future challenges and conflicts. The approach to this research paper will be broken down into four main parts as shown below.



Figure 1 - 1 Step by step approach

### 4. Scope of Research

This research paper will focus on the context of Singapore. It will also be focused on the training of the fighter pilot within the RSAF to narrow the scope of the research. This research paper will also evaluate the focus and the future challenges of Singapore and RSAF. This research paper will also try and provide suggestions at the national level and how the nation can make policy changes to help develop future leaders for the RSAF.

### 5. Research Methods

The analysis will be based on the US Army's Readiness Guidance which is broken down into 4 parts (1) manning (2) training (3) equipping (4) leader development. Data from surveys and reports conducted in Singapore will be used to analyse the current readiness state of our fighter squadrons. (1) PRQ, OCS, MPCON, TLCON, SATR are some

indicators to determine readiness of our pilots. (2) Data, theories, and journals from other Air forces will be used to determine effectiveness of other frameworks and training programs to determine suitability for implementation as well. The Ready Aircrew Program and RAND model will also be referenced and compared with the RSAF's model.



Figure 1 - 2 Fine balance required

## 6. Expected benefits

I will propose some solutions within this research paper by implementing models and training methods proposed in this thesis when I become a commanding officer. All fighter squadrons within the RSAF will also be able to benefit from this research.

The RSAF will also be able to benefit through this research as it will increase awareness of the short comings to our current training system. There will be some broad suggestions on the national level such as education and national policies within the research paper.

## 7. Definition of terminology

Operational Climate Survey (OCS) : This is a yearly survey done for all squadron to help understand the current feelings and working environment. It also gives opportunity for subordinates to give anonymous feedback to their direct superiors. This allows for commanders to quickly address issues and adapt their leadership styles accordingly.

Psychological Readiness Questionnaire (PRQ) : This is a yearly survey done for all personnel within the Airforce. This survey targets to understand the mental readiness of its soldiers.

Manpower Condition (MPCON) : This is a report which measures the number of soldiers required to go to war and compares it to the number of soldiers it currently has, to have an indicator of the percentage of manpower readiness.

Training Level Condition (TLCON) : This is a report which measures the training readiness of its soldiers. It is based on the specific skill sets which each soldier requires in war and has measurement of the level of skill which each soldier possess currently. This gives direct feedback to the amount of training required to meet war readiness.

Semi Annual Training Requirement (SATR) : This is a requirement like the RAP model by the USAF which determines to amount and type of sorties each pilot needs to fly to achieve combat readiness.

Standards Audit Office (STANDO) : This is an office which reports directly to the Chief of Airforce regarding the basic flying and tactical standards of each squadron within the Airforce.

Research and Development (RAND) : This is a research organization in the United States which is commonly engaged by the USAF to do research and come up with solutions for its issues.

## 8. Conceptual Framework

The proposed framework used to analyze the current training system will be (1) manning (2) training (3) equipping, and (4) leader development. Show below are the approaches and models which will be used in this thesis.

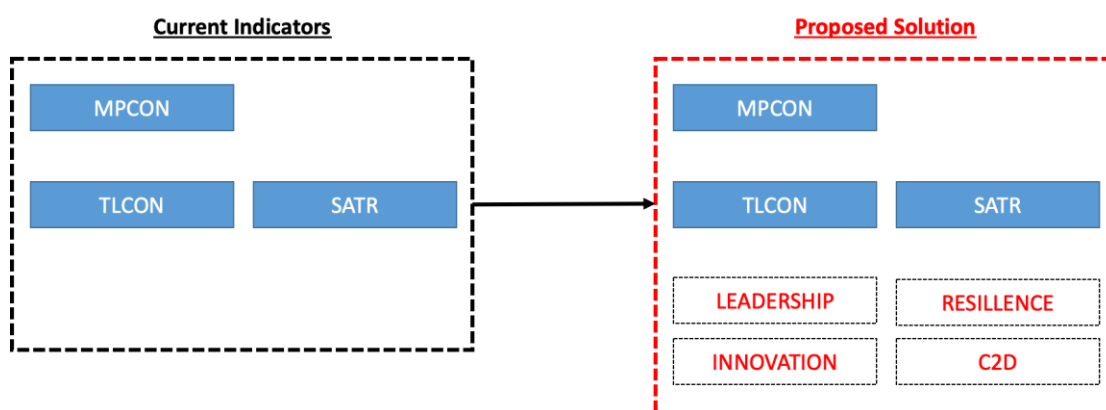


Figure 1 - 3 Conceptual Framework (Indicators)

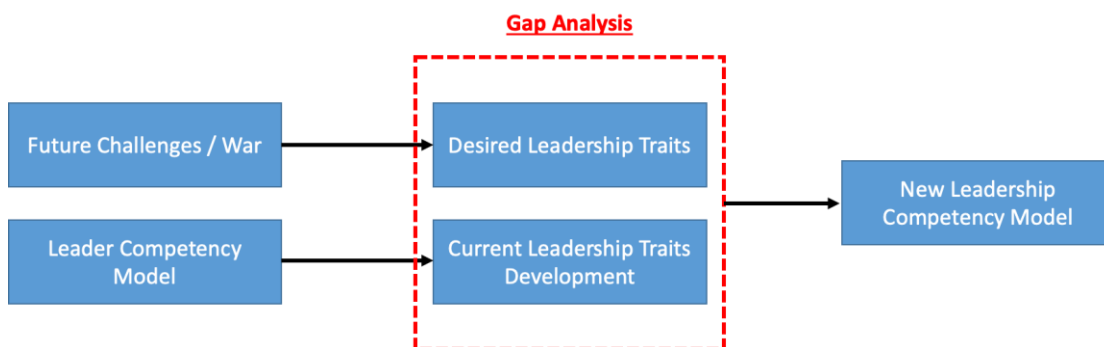


Figure 1 - 4 Conceptual Framework (Gap Analysis of Leadership model)

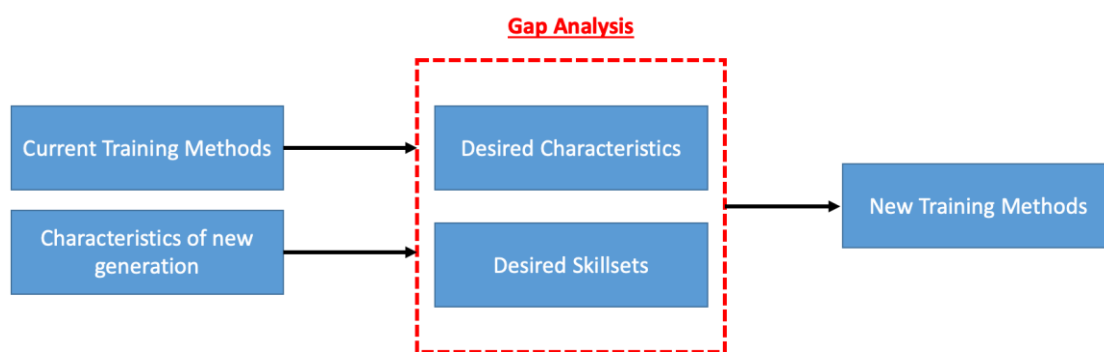


Figure 1 - 5 Conceptual Framework (Gap Analysis of Skillsets)

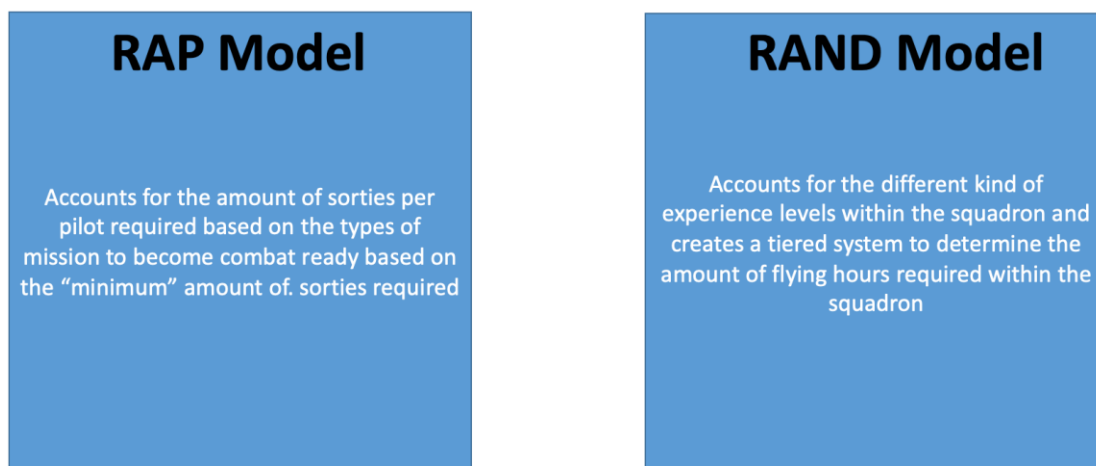


Figure 1 - 6 Conceptual Framework (Rap Model vs RAND Model)

## Chapter 2

### Related Literature Review

The subject of preparing war ready soldiers during times of peace is a very broad topic. To help scope the topic further, the reference of soldier would be in relation to the Republic of Singapore Airforce fighter pilot.

This topic can be broken down into a couple of parts. First the subject of war ready soldiers. What is a war ready soldier? What is the definition of a war ready soldier? How can we train and measure the effectiveness of training for a war ready soldier? Next, why does training in peace pose a challenge to being ready for war? And lastly, what are future challenges and conflicts a RSAF fighter pilot is expected to face and how can we ensure the training we are conducting today provides the relevant skills sets needed.

#### 1. What is a War Ready Soldier?

The concept of a war ready soldier can vary drastically depending on the context. So, to further breakdown this concept let us first look at what is the meaning of readiness? There are many literatures which talks about the readiness of a force and the readiness of a unit but very few talks about the readiness of the soldier.

In the United States Marines, they test war readiness using a Battle Skills Test which ensures their soldiers possess the necessary skills, knowledge, and physical fitness to effectively perform in combat situations (Marine Corps Order 3502.6A). However, I argue that measuring just the technical ability of a soldier is insufficient to ensure war readiness. Even more so if these tests are administered and reduced to a check box in a power point slide. (Douglas, 2001) There are also psychological and emotional aspects that contribute to being a war-ready soldier which needs to be considered.

Doctrinally, the U.S. Army determines the readiness of company-sized and battalion-sized units by assessing them in four areas: personnel, equipment on hand, equipment serviceability, and training to meet mission-essential tasks (USAF Readiness Framework (AFI10-201) James C, 2023).

**Readiness** is the ability of forces, units, weapons systems, or equipment to deliver their designated outputs. This includes the ability to deploy and employ these forces without unacceptable delay. (Douglas, 2001)



**Ready** on the other hand, is defined as "in a suitable state for an activity, action, or situation; fully prepared." (Oxford Languages, 2024)

To apply this definition to a war ready soldier, it means that a war ready soldier is an individual who is fully prepared and is in a suitable state for the activities and actions required of him in warfare.

To determine if an RSAF fighter pilot is war ready, several factors must be considered. Leadership, teamwork, technical proficiency, physical fitness, mental resilience, ethical thinking is some of the essential components of the war readiness of a fighter pilot.

Additionally, in a study conducted by Andrew J. Ricciardi and Michael D. Matthews titled "The Role of Psychological Readiness in Enhancing Soldier Performance: A Review and Integration of the Literature", they found that psychological readiness, which includes factors such as motivation, mental toughness, and resilience, is of critical importance in enhancing soldier performance and preparedness for combat.

## **2. How do we measure the war readiness of our soldiers?**

Since readiness is a capability and not a tangible asset, it is difficult to proactively track and manage. However, there are several approaches written in literatures on how to measure war readiness.

One concept of measuring war readiness of soldiers is through measuring the soldier's Readiness for when? How long to [maintain a] "ready" [state]? Readiness for what? "Ready" to perform what tasks? Readiness for where? "Ready" for what theatre or combat environment? (Douglas, 2001)

How does the RSAF measure war readiness of its fighter pilots then? Currently the RSAF defines the number of fighter pilots required based on war time scenario and measures the amount of trained and qualified pilots available. This is called Manpower Condition (MPCON) and is tiered into MPCON 1/2/3 which determines the level of manning in each squadron. Next the RSAF measures the experience level of each pilot by determining the types of missions (Training Level 1) and mission skillsets (Training Level 2) that each pilot must achieve to be consider experienced and ready for war. This is called Semi Annual Training Requirement (SATR) which helps to assess the readiness levels of each fighter pilot. To ensure the effectiveness of the training conducted within the squadron, the pilots are required to undergo a yearly annual flying evaluation check which assesses their basic flying skills sets and tactical capabilities based on their experience levels. This is called standards audit check and is conducted by the RSAF standards audit team. To measure the psychological and

mental readiness of our fighter pilots, Personal Readiness Questionnaires are conducted yearly to determine the confidence and mental state of our pilots.

### **3. Innovative Approaches to War Readiness Training**

In his paper "Readiness: A Commander's Responsibility", Douglas A. Furst, Major, USAF argues that there are 7 factors for enabling readiness.

- 1) Mindset
- 2) Intensity
- 3) Standardised Process
- 4) Accountable
- 5) Train
- 6) Status
- 7) Evaluate

He also found that mindset and intensity were the two factors that played the most important role to developing readiness in soldiers and writes that leaders within the organization are responsible for ensuring those two factors are met. I'll write a little bit more about leadership in the later part of this literature review.

In another literature by (MCMaster, 2011) titled "Moral, Ethical and Psychological preparation of soldiers and units for combat" the author emphasises that "Tough realistic training builds confidence and cohesion that serve as "psychological protection" and bulwarks against fear and psychological stress in battle" Essentially there is a theme amongst multiple literatures which states that tough and realistic training is essential to training war ready soldiers.

How can we leverage technology in preparing our warriors? One such way is to leverage on the realism and flexibility of virtual reality. In the United States military, a simulation tool called Topscene is used to prepare soldiers and leaders for battle. Over the last three decades, sophisticated computer modelling and graphics, faster processor speeds and advances in artificial intelligence have gone into building simulation technology that can create a reality that stops just short of war. (Michael M, 2002) Additionally, the use of virtual reality training systems has been found to enhance situation awareness and improve decision-making skills.

However as much as technology has advanced in the modern ages, technology is not the be all end all to this problem. Many believed that technologies would completely transform war. They called this a "revolution in military affairs". This definition of armed conflict war is divorces from its political nature. It tried to simplify the problem of future war to a targeting effort. All we had to do was target the

enemies' conventional forces. This approach did little to prepare them for the challenges the US subsequently faced in Iraq and Afghanistan. (MCMaster, 2011). What they US did not realise back then, what that other important aspects of war readiness such as moral, ethical, and psychological preparation was just as important to prepare soldiers for the dilemmas they would have to face in war.

#### **4. Why is ethics important in a warrior?**

Because our enemy is unscrupulous, some argue for a relaxation of ethical and moral standards and the use of force with less discrimination, because the ends (defeat of the enemy) justify the means employed. To think this way would be a grave mistake. The war in which we are engaged in demands that we retain the moral high ground despite the depravity of our enemies.

Units experiencing the confusion and intensity of battle for the first time in actual combat are susceptible to fear. Fear can cause inaction or, in some cases might lead to an overreaction that harms innocents and undermines the mission. (MCMaster, 2011)

For one to truly be a warrior, it requires that there be a war. While for many people, this claim will appear to amount to a little more than an obvious and ultimately un-insightful truism. For many soldiers, such a claim can be deeply perplexing if not troubling. This is precisely because to fully accept this truism seems to require of soldiers that they simultaneously hold two seemingly contradictory propositional attitudes, namely: (1) a desire that there be peace (and therefore that one not be used nor needed) (2) A desire that one be useful and needed (which requires that there be a war) (Robillard, 2018)

With that you can see why ethics can be important in our soldiers, as without it they would be more susceptible to trying to prove their "worth" as warriors by engaging in unethical behaviours or excessive force.

#### **5. How does leadership affect combat readiness?**

"If your men trust you, they will follow you into any situation" (Sweeney, 2007) It is evident that leadership plays a crucial role in the combat readiness of soldiers. It is the glue which ties all the elements of combat readiness together. Strong leadership is also the biggest factor that ensures that soldiers are given the required training and confidence during peace time to face future challenges and conflicts.

It is also stated that majority of soldiers indicated that they reconsidered trust in their leaders, to some extent prior to combat operation in Operation Iraqi Freedom I. In addition, research data indicated that a soldier's concerns about their leaders' competence to meet role requirements in the new context of combat (going to war)

was the primary reason for reconsidering trust in their leaders. (Sweeney, 2010) This suggests the importance of technical capabilities and strong leadership within the unit. Leaders who demonstrated technical and tactical expertise, good decision making or judgment, and/or handled stress well during deployment and pre-combat operations enhanced the level of trust with their followers, whereas leaders who failed to demonstrate any of these abilities decreased the level of trust. (Sweeney, 2010)

Results revealed that for over half of soldiers, the reconsideration of trust in their leaders resulted in either no change or only a small change in the levels of trust they had in their leaders prior to going to war. This finding seems to suggest that the trust leaders built with their soldiers in a peacetime environment was somewhat stable and appeared to carry over to the combat environment. (Sweeney, 2010)

Leaders are needed to set the conditions prior to combat, influence their soldier's moral during combat and assess and adapt methods after a fight to ensure success in the next battle. Two areas most often named as motivating and sustaining soldiers in combat: (1) the perceived quality of relationships among soldiers in the small unit, primary group, and (2) the perceived confidence and competencies of their leaders. (Griffith, 2006)

Knowing how important leadership is to the development and maintenance of combat readiness, it is important to re-examine the SAF's leadership model and analyses its effectiveness to the future context.

## **6. Why is resilience important when training war ready soldiers?**

Building resilience in soldiers is crucial to preparing them for future challenges and conflicts. According to a report, service members reported positive family relationships as a source of resilience and problems at home as a source of stress and interference (Mental Health Advisory Team 6, 2009)

In the RSAF there is very little being done to address the family relationships of our fighter pilots. RSAF fighter pilot traditionally must deploy overseas for approximately 6-7 months of the year, leave their families in Singapore. It is thus important to see what can be done to ensure our servicemen are able to maintain strong family relationships and minimise the stress and interference it may cause. The requirements to be posted overseas for 2-3 years at a time, having to uproot their family and children from their familiar environment, and the constant separation can take a toll on their overall mental health as well.

## **7. What does the future challenges of the RSAF fighter pilot entail?**

While it is difficult to foresee what the future might entail, there are definitely a few evergreen characteristics we would look for in our future warriors. Things such as adaptability, resilience, critical thinking skills, and the ability to work collaboratively in diverse and rapidly changing environments are likely to be important for RSAF. In addition, future challenges for RSAF fighter pilots may include evolving technology and weaponry, and more reliance on technology for decision making.

As such, it is imperative that our fighters are equipped with the right skills, morals and ethics which will help guide them in their decision-making process as technology seeks to take on a larger role in combat operations.

## Chapter 3

### Research Methodology

In this chapter the researcher will describe the research process, plans and data collection and data analysis methods. Details are as follows:

#### 1. Research Phase

Prove that peace time creates “Weak Men”. To prove that peace time creates “Weak Men” the researcher would be required to find examples of situations in history which has shown that countries in peace would have soldiers / men who would be not ready for war. Theories or thesis written about this subject would also be relevant and should be cited.

#### 2. Definition of the ideal war ready soldier

The definition of a war ready soldier would be hard to define as there is no written document which states all the requirements / characteristics of a war ready soldier. It would also probably change over time as the face of war changes of the course of time. I’ve decided to breakout the definition of a war ready soldier into 4 main parts namely (1) Flying Aspect (2) Performance assessments, (3) Psychological Aspect, (4) X-Factor.

Flying Aspect (Individual Technical Skillset). The individual flying capability of our fighter pilots are a crucial determining factor to their war readiness. It can be further broken down into (1) Knowledge, (2) Flying capabilities. I’ll first go through the model which the RSAF uses called Semi Annual Training Requirement (SATR) as a baseline definition for the flying aspect.

Psychological Aspect (Mental). The mental aspect of our RSAF fighter pilots is currently measured with a tool called Psychological Readiness Questionnaire. I’ll go through the questions currently stated in the questionnaire and determine the relevance of these questions. Documents and references should be cited to determine if there are ways to determine the psychological readiness of soldier. Things such as willingness to go to war, mental capability to cope with the effects of war and how these can be effectively measured should be looked at as well.

Performance Assessment. I'll research on how the RSAF does performance assessment and compare it with research papers to look for gaps on how the RSAF conducts performance assessment when assessing war readiness of our fighter pilots.

X-Factor. The last aspect I've decided to include is the X-Factor. It is alluding and is hard to define. It the determination of the soldier to continue to fight when faced with overwhelming circumstances. I'll research into the soldiers during Vietnam war and the characteristic they possessed to continue to fight and win the war, even when faced against a far greater and advanced adversary.

### **3. Perform a Gap Analysis**

Once the definition of a war ready soldier has been clearly defined, I'll perform a gap analysis against the current tools, training, measurements methods and standards currently used in the RSAF and look for gaps with which can be improved. Of note, some of things I intend to look at are (1) Fighter pilot selection model, (2) Training to include amount of training, simulation training, uncertainty training and realism training (3) SAF leadership model.

Models such as the Semi-Annual Training Requirement (SATR), Training Level 1 (TL1), Training Level 2 (TL2) which are currently written in the Singapore Airforce directives helps to determines what being an operational pilot would entail. A comparison of the Singapore model (SATR) and the United States Airforce (USAF) model called RAP & RAND model will be used as a starting point to point out any gaps in the Singapore model. Regarding the psychological aspect of the fighter pilot, the RSAF utilize a survey called Psychological Readiness Survey to determine the mental aspect of our pilots. I will use personal experience and thoughts to provide suggestion on how these can be improved. Research documents will be cited to provide further guidance on what and how psychological readiness can be achieved

## Chapter 4

### Data Analysis Results

This chapter discusses the analysis of research found and the results of the gap analysis. The results of this study can be used to improve the selection, training pedagogies used in the RSAF to ensure fighter pilots of the future are able to continue to maintain their war readiness to ensure peace and security in Singapore.

#### **1. Prove that peace time creates “Weak Men”.**

It is inherently clear that peacetimes will force soldiers, especially fighter pilots to train with a mindset prioritising safety. Fighter flying is a dangerous profession which requires split second decisions and a small lapse in attention could very quickly escalate to undesirable consequences. As such, when lives and multi-million dollars aircraft are at stake, you can easily see why pilots would rather err of the side of safety rather than push the boundaries and exploring the full capabilities and tactical abilities of oneself and aircraft.

Safety infringements in a bid for excellence has previously led to severe consequences to a pilot's military progression. For example in the RSAF, safety infringements during training or operations have led to disciplinary actions, removal from command position and much more. The analysis of research found that during peacetime, fighter pilots may develop a mindset prioritising safety over pushing the boundaries and exploring the full capabilities of themselves and their aircraft in a bid to ensure a steady career progression and avoid any negative consequences.

These findings highlight the potential negative impact of prolonged peace time on the development of fighter pilots. When an entire generation of fighter pilots who adopts a safety first mindset, there is a risk of creating a culture of complacency and mediocrity leading to a spiral down in flying standard over time. The analysis of research and gap analysis results suggest that there is a need to address this issue in order to maintain the war readiness of fighter pilots in the RSAF.

Complacency affect an entire organisation as a whole. According to (Carter, 2000) there are 4 main areas which are affected by complacency. (1) Strategy, (2) Defense systems, (3) Organization & management, (4) Trends in industrial and technology.



- i. Strategy. During peace time it is common to place immediate intervention in minor conflicts over a “Preventive Defense” strategy focused on basic, long-term threats to security.
- ii. Defense System. Defense systems and programs need to adapt to the mission of “Preventive Defense” to ensure a coherent long-term strategy to address the threats of the future. It is thus important that these priorities be reflected in the budget.
- iii. Organization & Management. Having entered the 21st century, the United States with a defense establishment whose basic structure was determined a half-century ago to deal with a challenge, the Cold War, that is now a decade in the past. Here complacency has taken the form of assigning new tasks to the old structure in incremental fashion, rather than undertaking basic renovations. The result is a growing list of new missions that finds themselves institutionally homeless. Is this true for the RSAF as well? The RSAF need to continue to assess its organization and management of its missions to adapt and transform as required to fit the missions of the future.
- iv. Trends in industrial and technology. The fourth challenge results not from changes in the spectrum of military threat, but from trends in the industrial and technology base that provides the distinctive U.S. technological edge in military affairs. The trends of commercialization and globalization, if embraced and adapted to by a military, can act to the benefit of its military capabilities in the future. But the reverse is also true: persisting in old innovation and procurement habits in the face of the new trends will both erode the technological edge and open new vulnerabilities. (Carter, 2000)

## 2. Definition of the ideal war ready soldier

Based on my research, the definition of war readiness of an RSAF fighter pilot can be broken down into 4 parts. (1) Sortie count and event exposure, (2) performance assessments, (3) Psychological readiness, (4) X-Factor.

2.1 Sorties count and event exposure. The RSAF has a model called Semi-Annual Training Requirement (SATR) which states that each pilot is required to fly a certain number of sorties every six months. These sorties are further broken down into

different types of missions (Training Level 1) depending on the squadron they are currently in and its role in times of war. Event exposure (Training Level 2) such as Air-Air refuelling, Air-Air gunnery etc. are also being tracked to ensure that each pilot are exposed sufficiently to specific skillset every six months to continue to maintain proficiency in these various combat skillsets. How does this compare to the RAP & RAND model of the USAF?

The Ready Aircrew Program (RAP) model was designed in 1997. It specifies details about the minimum number and types of sorties to be flown by fighter pilots. It has been documented that the USAF fighter squadrons have had a very difficult time meeting all the RAP requirements during each training cycle. (Levy, 2006) In addition, according to a report by Research and Development (RAND) corporation, "The concern over how to allocate very scarce resources is only one of the reasons for lack of readiness. At the heart of the issues lies the problem of determining when readiness has sunk below an acceptable standard, and there is increasing suspicion that much of the US military recently crossed that threshold" (Levy, 2006)

Some of the reasons for not being able to meet the RAP requirements were, (1) lack of available aircraft due to deployment, (2) workup training for upcoming operations such as Operation Iraqi and (3) excessive number of days where it was too hot to fly safely.

The SATR model replicates the RAP model very closely, and even though the number of sortie requirements and event required are not exactly the same, the same issues which plagues the USAF affect the RSAF as well. With a limited amount of fighter aircraft in a small Airforce such as the RSAF, it is crucial to ensure that the available aircraft are used efficiently and effectively to maintain pilot proficiency and readiness. The RSAF also participates in multiple exercises overseas and locally. Thus, workup training to ensure task proficiency, takes the focus away from accomplishing the requirements of SATR. In addition, Singapore being a tropical climate also succumbs to an excessive number of days where the weather is not suitable for flying, accounting for approximately 15% of sorties planned each year.

One other issue that the USAF faces is the fact that higher HQ only allocates funding to support flying based on the minimum requirement of RAP. This in turn would result in their pilots flying an average of 8 to 10 sorties a month. However, research have shown that fighter pilots require an average of 13 sorties per month to be combat ready. (Levy, 2006) The RSAF on the other hand disassociates the SATR minimum requirements from the actual operational needs of the pilots and attempts

to fund a minimum of 15hours per fighter pilot which is relatively close to the 13 sorties per month stated in the RAND research.

Based on personal experience and feedback from experience RSAF pilots, when it comes to determining the minimum number of sorties each pilot should fly each month, 13 sorties / 15 hours stated by the RSAF is just the tip of the iceberg. Ensuring that these 13 sorties / 15 hours provide high quality learning value is just as important as achieving the minimum sortie count itself. This includes balancing additional workload outside of flying such as administrative task and meetings, as an overload in this area would inevitably force pilots to reduce mission complexities or lose focus in debrief sessions causing a lost in learning value from the missions flown

Furthermore, following a fixed set of SATR sortie requirements may not always fall in place nicely with the different type of operational taskings and exercises which pilots have to participate in. To add to the complexity of tracking SATR, RSAF fighter pilots move from one squadron to another squadron frequently and thus tracking these requirements further exacerbates the challenges of ensuring that the minimum sortie requirements align with the pilots' operational needs and training objectives.

One way to ensuring high standards in pilots is called an adaptive training system. In one research, an adaptive training proved to be more effective in producing the gold standard in flying. (Ericsson, 2009) With adaptive training, continual assessment of an individual's skill proficiencies is conducted, and the greatest skill deficiencies compared to a referenced standard are identified and fed back into the training system to train that individual more efficiently (i.e., a closed-loop system). This would allow for better use of resources as it is focused on developing the deficiencies of each individual pilot rather than based on a fixed set of sorties and events determined arbitrary.

**Suggestion:** Based on the research and analysis conducted, it is suggested that the RSAF consider the following actions to improve the SATR model.

- i. Evaluate and adjust the minimum sortie requirements for fighter pilots to align with the research finding of 13 sorties per month for combat readiness.
- ii. Implement a more flexible approach to sortie requirements, considering different operational taskings and exercises that pilots may be involved in by increase the Semi-annual training requirements to an Annual Training Requirement.

- iii. Ensure that the quality of the sorties is prioritised, not just the quantity, by providing sufficient time for debrief sessions and self study whilst reducing other administrative tasks.
- iv. Consider the specific training needs and objectives of pilots when making squadron assignments for exercises and operational taskings.
- v. Develop a robust tracking system to measure individual pilot's skillsets to allow for adaptive training

2.2 Performance Assessment. With everything said about sortie and event count, I argue that even if pilots meet the minimum SATR requirements set by the RSAF, it does not necessarily guarantee their overall combat readiness and proficiency. Individual pilots performance is highly based on each individual capability, thus meeting the SATR requirements does not ensure proficiency. Yearly performance assessments are crucial to ensuring that pilots meet the required standards. The RSAF employs a Standards Audit team which focuses on auditing each squadron on a yearly basis. This would involve evaluating the squadron's overall readiness, including the performance and proficiency of individual pilots base on their basic aircraft handling (emergency handling) and tactical abilities

This assessment is the most accurate way to gauge the true combat readiness and proficiency of our RSAF fighter pilots. However it is time consuming and resource intensive to audit every single pilot every year. Thus the RSAF needs to consider leveraging on the capabilities of the simulator to perform assessment efficiently. The simulator also provides for an excellent opportunity for uncertainty training. This involves exposing pilots to various scenarios with unexpected challenges or uncertainties, such as equipment malfunctions or changing weather conditions which cannot be easily replicated in real flight. This allows the testing of their decision making skills and ability to adapt in high-pressure situations.

The ability to provide realistic training (e.g. actual war scenarios and potential operating areas) which accurately simulate the challenges and conditions that pilots may face in real combat situations would enhance their war readiness significantly. (Macedonia, 2002)

The gaps identified in the research suggest several recommendations to improve the performance assessment for RSAF fighter pilots..

- i. Provide ad-hoc and no notice performance assessment
- ii. Leverage on simulators to provide realistic and challenging scenarios efficiently

2.3 Psychological Readiness. The RSAF utilises the Psychological Readiness Questionnaire (PRQ) to determine the readiness of our pilots. However till date, the RSAF have not implemented any specific training or support programs to address psychological readiness among fighter pilots.

In a research done by (Castro et al., 2006) it was found that over 15% of Soldiers and Marines returning from combat duty in Iraq met screening criterion for post-traumatic stress disorder (PTSD). Over 15% of Soldiers reported that they were interested in seeing someone for an alcohol, stress, family or emotional problem, but only about 40% of those who screened positive for a mental health problem actually sought help, due primarily to psychological stigma and organisational barriers associated with receiving mental health support. (Castro et al., 2006)

I've listed the key components in the resiliency training used by the US Army also called Battlemind Training. It is broken into 3 modules specific groups of people. In each module it focuses on tough facts and actions each soldier can take to address them.

**Table 4 - 1** Battlemind Training Framework (Castro et al., 2006)

<b>Leader Training</b>	<b>Soldier Training</b>	<b>Helping Professional Training</b>
Fear in combat is common	Combat is difficult	Many soldiers enter the military with problems
Unit members will be injured or killed	The combat environment is harsh and demanding	Soldiers are reluctant to admit they have a mental health problem
Combat impacts every member both physically and mentally	Fear in combat is not a sign of weakness	Burnout and compassion fatigue are common
Soldiers are afraid to admit that they have mental health problems	Soldiers are afraid to admit that they have a mental health problem	Helping professionals have two masters
Soldiers frequently perceive failures in leadership	Deployments place a tremendous strain upon families	Deployments are professional fish bowls
Breakdown in communication are common	Unit cohesion and team stability are disrupted by combat	Soldiers expect helping professionals to fix organisational problems
Deployments place a tremendous strain upon families		There is no such thing as "One" in the Army of One

**Table 4 - 1 (Continued)** Battlemind Training Framework (Castro et al., 2006)

The combat environment is harsh and demanding		Mental health doctrine is frequently ignored
Unit cohesion and stability are disrupted by combat		Conducting behavioural outreach is dangerous
Combat poses moral and ethical challenges		Leaders frequently overlook helping professionals except in times of crisis
		Sometimes helping professionals must deliver bad news

One important aspect of developing psychological readiness is through exposure. It's been said that Commanders can make a significant difference in strengthening their Soldiers through exposure by creating training environments that resemble the battlefield. Conducting live-fire exercises using man-shaped targets and including Initiative-Oriented training can achieve this effect. Commanders must also expose Soldiers to the carnage of combat to include blood and guts - Live-Tissue Training . (Love, 2011) How much of this relates to the training of a fighter pilot in the RSAF is yet to be seen. However, one thing is for sure, increased exposure to realistic training will increase psychological readiness.

Even if it were the enemy, humans have an inherent resistance to kill their own kind, as observed in various studies and research. (Love, 2011) To overcome this resistance to kill, Army marksmanship training was changed from firing at targets with bullseye to using man-shaped silhouette pop-up targets that fell when hit. By pairing both the firing of the weapon with the image through operant conditioning, the reduction in the fear response that influences the primitive, midbrain processing of a frightened human being is achieved. (Love, 2011)

One very clear relevance to the RSAF fighter pilot is the scenario where a fighter pilot is instructed to fire against an hijacked civilian airliner carrying hundreds of innocent passengers. Would the pilot be willing to push the button knowing that his action would directly result in the cause of hundreds of deaths? How can we condition our fighter pilots through operant conditioning to reduce this fear?

Training military personnel through habits involves instilling routines and behaviours that become automatic responses in various situations. Some methods of operant conditioning in the military are (1) repetition and practice, (2) behavioural conditioning. (Duhigg, 2012)

- i. Repetition and practice. Military training often involves repetitive drills and exercises to ensure that specific actions become ingrained habits. By practising tasks repeatedly, soldiers develop muscle memory and automatic responses to certain stimuli.
- ii. Behavioural Conditioning. Techniques such as positive reinforcement for desired behaviours and consequences for undesired actions can help shape habits in military personnel. By associating specific actions with rewards or punishments, habits can be reinforced or modified.

The US Army also conducts leadership development courses which includes how they can be more responsible and more knowledgeable in this area. This is something the RSAF have not paid enough attention to, as currently leadership development courses in the RSAF does not include psychological readiness training.

Another aspect of reducing the aspect of Post Traumatic Stress Disorder (PTSD) is ethics training. It has been found that many ethical/unethical decisions made on the battlefield are discovered by the individual after the fact to be against what he or she believes is right. In addition, soldiers exposed to traumatic events, either by deliberate malicious acts or accidental disaster, may lack a fully developed ethical framework to process and deal with the events. Both actions can potentially lead to instances of Post Traumatic Stress Disorder. (Wead, 2010)

Ethics play a big role both in victory and survivability in war. On the aspect on victory, it's been documented that during World War I Germans were advised and more willing to surrender as they expected and were given "good treatment" by the Americans. (Wead, 2010) On the aspect of survivability, ethics is what keeps the spiritual soul intact. The reality is that many soldiers die spiritually in combat due to the atrocities of war. It is what leads to suicides, drug abuse and alcoholism. (Wead, 2010)

Due to enhancements of virtual reality, simulation and artificial intelligence, technology can also be used to enhance psychological readiness. Simulation breaks out from the restrictive nature of live training. It provides the opportunity for soldiers to train in the expected operating areas, be exposed to the realities of war at a fraction of the cost. It is this constant exposure to war scenarios which allows soldiers to increase their confidence in their abilities and thus increase their psychological readiness. (Macedonia, 2002)

The gaps identified in the research suggest several recommendations to improve the psychological readiness training and assessment for RSAF fighter pilots.

- i. Institute some form of psychological readiness training (e.g. Battlemind training) during route of advancement (ROA) courses to increase awareness
- ii. Institute ethics training as part of ROA courses
- iii. Leverage on simulators to increase exposure to real time war scenarios and aid in behavioural conditioning

2.4 X-Factor. The "X-Factor" refers to the intangible qualities or attributes that make a fighter pilot exceptional. The X-Factor can include qualities such as resilience, will to fight, adaptability, problem-solving skills, and the ability to remain calm under pressure.

Stringent selection criteria is key to ensuring that fighter pilots with which the RSAF produces, possess the qualities or have the highest chance of developing these qualities over time. Currently fighter pilot selection focuses heavily on their flying abilities and is assessed at a very early stage of their careers. X-Factor assessments should play a bigger role when determining if a flying cadet is suitable to be a fighter pilot.

These selection criterion is akin to the process of becoming a Spartan where a new born is screened for imperfections that could impact the completion of the Spartan training. Those that did not meet the criteria would be thrown off the cliff of Mount Taygetus to die on jagged rocks. (Last Stand of the 300: The Legendary Battle at Thermopylae, 2022) Though such barbaric methods would not be accepted today, a stringent selection process is still relevant today when trying to build a resilient force.

There has also been a lot of research that states, current methods of selection from United States Pilot Training (UPT) do not necessarily ensure that the most promising candidates go into fighter pilot specialisation. There is some evidence that psychological profile characteristic tests might be useful in identifying those candidates who have the potential to become extraordinary fighter pilots. (DeLeon, 1977)

Another good example of resilience were of the Vietcong during the Vietnam war. They showed innovation, resilience, strong will to fight beyond measure. What was the driving force in these people? What was the X-Factor in them and how did they develop the X-Factor which allowed them to overcome what seemed to be an unsurmountable force of the United States Airforce? The Vietcong were fighting a revolutionary war, a war of national liberation. They had been fighting for the independence and freedom of their country for many years, first against the Japanese



during the Second World War, then against the French from 1946 to 1954, and now against the USA. (Why Were the Vietcong so Hard to Defeat?, 2022)

In my research of the Vietnam War, the resilience and strong will to fight of the Vietcong could be boiled down to two things (1) Loyalty to country, (2) Commitment to defence. It is this believe in the cause to reunite a country which continue to spurred the Vietcong to fight. How do we then instil loyalty to country and commitment to defence as part of our training in the RSAF?

Though school and teachers in Singapore have been tasked with the duty to drum up patriotism in Singapore, I believe that the RSAF play a crucial role in instilling loyalty to country in our soldiers as well.

“In the event of war, what would you do? If you stay on and fight, you are patriotic but if you take the next flight out, then you are not patriotic.” (Chua & Sim, 2017)

Learning our history and the struggles of the past is a good start in building patriotism. Knowing the efforts that previous generation have put to build the nation over the years will provide motivation to take arms if the need arises. It provides an appreciation of the sacrifices made and it provides a sense of continuity by tracing the historical event passed down through generations, creating a shared narrative that binds citizens together.

Building a community worth protecting. One of the main reasons people decide to stay and fight during war is because they have something to defend. It might be due to family, community or the memories and beliefs built over the years. Though much of this is part of nation building, the RSAF needs to continue to foster a strong “family” to ensure that it is something worth defending, if and when the time comes. In an interview on patriotism, a school teacher in Singapore said “I love this country because of the memories I have sown here, [the] people I’ve met and relationships I have established.” (Chua & Sim, 2017)

Leadership is another characteristic in the X-Factor which plays an important role in all aspects of war readiness. As previously mentioned, an organisation’s ability to adapt to trends in innovation and technology is crucial to remaining relevant to future challenges. Organizational psychologists agree that change readiness is an important element for successful organizational change (Sokol, 1997). Change readiness represents the precursor to either engaging in or resisting change initiatives (Armenakis et al., 1993) It thus rest on the shoulders of leaders of the RSAF to inspire change to remain relevant to ensure war readiness.

The gaps identified in the research suggest several recommendations to develop the X-Factor in our RSAF fighter pilots.

- i. Include X-Factor assessments during the selection process of fighter pilots
- ii. Include psychological profiles as part of assessment to be a fighter pilot
- iii. Provide increased effort in regards to loyalty to country (patriotism)
- iv. Appointing the right leaders (ones who possess transformational leadership qualities) who would inspire the men and inspiring change readiness

## Chapter 5

### Summary, Discussions and Recommendations

#### 1. Summary

In conclusion, though equipment and technology within the RSAF is advancing at a rapid pace, fighter pilot training today is still considered rudimentary and is based on methods of the past.

#### 2. Discussions

My research has shown that fighter pilot training in Singapore is still lacking in many aspects especially regarding soft skills. It's yet to be seen if the findings of my research will ensure RSAF fighter pilots will be able meet all the challenges of the future, however it is certain that without any changes, the RSAF fighter pilots will continue to lack many of the skillset to allow them to meet the challenges of the future.

#### 3. Recommendations

The table below summarises all the gaps and recommendations identified in this research paper. In addition to applying the suggestions from the findings of the gap analysis it is also crucial to institute some form of review to test the effectiveness of these new implementations.

**Table 5 - 1** Summary of recommendations and suggestions

Sortie count and event exposure	Performance Assessment	Psychological Readiness training and assessment	X-Factor
Evaluate and adjust the minimum sortie requirements for fighter pilots to align with the research finding of 13 sorties per month for combat readiness.	Provide ad-hoc and no notice performance assessment	Institute some form of psychological readiness training (e.g. Battlemind training) during route of advancement (ROA) courses to increase awareness	Include X-Factor assessments during the selection process of fighter pilots

Table 5 - 1 (Continued) Summary of recommendations and suggestions

Sortie count and event exposure	Performance Assessment	Psychological Readiness training and assessment	X-Factor
Implement a more flexible approach to sortie requirements, taking into account different operational taskings and exercises that pilots may be involved in by increase the Semi-annual training requirements to an Annual Training Requirement .	Leverage on simulators to provide realistic and challenging scenarios efficiently	Institute ethics training as part of ROA courses	Include psychological profiles as part of assessment to be a fighter pilot
Ensure that the quality of the sorties is prioritised, not just the quantity, by providing sufficient time for debrief sessions and self study whilst reducing other administrative tasks.		Leverage on simulators to increase exposure to real time war scenarios and aid in behavioural conditioning	Provide increased effort in regards to loyalty to country (patriotism)
Consider the specific training needs and objectives of pilots when making squadron assignments for exercises and operational taskings.		Leverage on simulators to increase exposure to real time war scenarios and aid in behavioural conditioning	Appointing the right leaders (ones who possess transformational leadership qualities) who would inspire the men and inspiring change readiness
Develop a robust tracking system to measure individual pilot's skillsets to allow for adaptive training			

The methods to measure the effectiveness of these recommendation will not part of the scope of this paper and future research should be done on it. Making drastic changes to a training system and pipeline is not an easy feat, and though this research has identified many shortfalls within today's RSAF training methods, it would take a large amount of manpower and time to implement these changes. In a bid to make strides in the future of training, RSAF senior leadership should consider restructuring the Air Training Department to look forward at training pedagogies to ensure focus to the implementation. Without this kind of focus when make large structural changes, the recommendations provided will not be able to be fully implemented.

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## Researcher Brief

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