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Analysis of Russian Airpower in the 21st Century

John Gerlach

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Image : Soukhoï Su-57

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Abstract

Russia intends on utilizing its airpower to conduct offensive power projection in neighboring countries and to defend itself from Western encroachment. This concept of airpower falls in line with Russia's national objectives, which are to regain worldwide recognition as a great power, reclaim and secure Russia's influence over former Soviet controlled nations, and to portray itself as a regional powerbroker in order to regain credibility so it can rewrite the liberal global order and counter US influence. Additionally, Russia is in the process of acquiring fifth-generation fighter aircraft and advanced Unmanned Aerial Vehicles (UAV) for reasons of supporting its military industrial complex and keeping pace technologically with its Western competitors. Despite acquisition of this advanced technology, trends in combat operations and training exercises suggest Russia will utilize these advanced platforms in traditional mission sets.

Résumé

La Russie souhaite utiliser sa puissance aérienne pour mener des projections de puissance offensives dans les pays voisins et pour se défendre de l'empiètement occidental. Ce concept de puissance aérienne s'inscrit dans le cadre des objectifs nationaux de la Russie, à savoir retrouver la reconnaissance mondiale en tant que grande puissance, reprendre et assurer l'influence de la Russie sur les anciennes nations contrôlées par l'Union soviétique, et se présenter comme une grande puissance afin de regagner une crédibilité internationale pour réécrire l'ordre mondial libéral et contrer l'influence américaine. En outre, la Russie se dote d'avions de chasse de cinquième génération et des véhicules aériens sans pilote avancés (UAV) pour soutenir son complexe militaro-industriel et suivre le rythme technologique de ses concurrents occidentaux. Malgré l'acquisition de cette technologie de pointe, les tendances dans les opérations de combat et les exercices d'entraînement suggèrent que la Russie utilisera ces plates-formes avancées dans les ensembles de missions traditionnels.

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The views expressed in this article reflect solely the author's opinion.

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Analysis of Russian Airpower in the 21st Century

The purpose of this research note is to better understand Russia's strategic thinking concerning the use of airpower in the 21st Century. General observations concerning Russia's tactics and an analysis of its national strategic goals are first discussed in order to provide a contextual understanding of the intended utilization of airpower. This intended use is supported by an analysis of trends observed during military operations starting from the Russo-Georgian war of 2008 through the current Syrian conflict. These conflicts highlight Russian airpower's role as a defensive measure and a means of local power projection. Major annual combat exercises are also analyzed to provide further support to this intended use of airpower. Both analyses highlight Russia's objective of freely projecting their influence and deterring other global powers from encroachment along their border region. Finally, this paper explains the motivations behind Russia's desire in acquiring advanced aerospace technology given its local geographical ambitions. Fifth generation fighter aircraft and advanced Unmanned Aerial Vehicles (UAV) have more to do with economically supporting Russia's military industry and allowing for keeping technological pace with adversaries than they do with increasing Russia's military capability.

Understanding Russia's thinking behind the use of airpower is important because Western military analysts and planners have a tendency to apply a misguided lens to an adversary's capability. In terms of aircraft, this often equates to analyzing every piece of equipment and then developing a plan on how these aircraft would be utilized by a Western air force. This has the potential to produce operational plans that misuse vital resources. It also could allow for the acceptance of unnecessary risk to forces. For example, pitting fifth generation aircraft against each other might not be the most efficient allocation of forces. This is especially true if the opposing side's aircraft have serious technological flaws, essentially reducing these aircraft to a lower generation's status. Furthermore,

the adversary may only intend to use their advanced aircraft in a very specific role. In these instances, military planners can more appropriately allocate forces across the spectrum of conflict.

Russia understands there is a capability gap in a head to head matchup with Western air forces. They currently lack proficiency in conducting aerial refueling, airlift, and intelligence missions in a contested environment. Their fighter aircraft are also at a technological and skill disadvantage. Russia counters this by primarily relying on hybrid warfare tactics in order to disrupt adversaries before open conflict is reached. Russia can then focus its airpower as a show of force or on surgical applications within regions associated with its desired sphere of influence. These local applications are characterized primarily by defensive counter air and strike missions. If tensions were to erupt into open conflict, Russia would then focus on a war of attrition rather than a Western style of employment. Russian fighters would fill the gaps created by their Integrated Air Defense System (IADS) and try to inflict as much damage as possible within their reach. All of this is not to say that Russia is not an extremely capable opponent with respect to its air forces. It simply means Russia understands their position and will overcome its disadvantages by creative force employment and tactical innovation.

Russian Tactics and Strategic Goals

It is imperative that we first analyze overall Russian tactics and national strategy in order to understand how Russia intends on using airpower. While extremely effective in certain circumstances, airpower is merely one tool at Russia's disposal. The overwhelming military might of the United States (US) has forced Russia to adopt other means in which to engage its primary adversary. This has shifted the weight of emphasis within the Russian military from conventional to more asymmetric means. The following section will provide insight into Russia's primary military strategy as well as what it hopes to achieve on a strategic level.

General Observations

Over the past decade, three major observations have arisen as a result of military actions taken by Russia. The first of these observations is characterized by a utilization of both conventional military and non-military means. The aim of this hybrid strategy is to engage Russian adversaries, namely NATO, just below the threshold of open conflict. Russia understands the complexity in responding to such actions and hopes for a weakened NATO response with respect to Article 5. The subsequent loss of credibility of NATO would give Russia exactly what it needs to achieve its strategic goals.

The hybrid strategy employed by Russia is nothing revolutionary. It is the same employment of military, economic, and diplomatic tools that date back to the 18th Century.¹ The principal difference between then and now is Russia's reliance on modern technology. Cyber-attacks against civil and governmental structures, disinformation disseminated over social media, and military deception campaigns are the primary tactics used in this strategy. Utilizing these tactics, Russia targets those population centers with close cultural ties throughout Eastern Europe. The purpose is to cause friction between these groups and their respective governments. Subsequently, Russia uses this unrest to justify a conventional military action to support those with ethnic Russian ties.² This scenario would most likely occur concurrently with Russian large force military exercises along its western border. Conventional ground and air forces would be prepositioned to not only provide an intimidation factor but also be able to respond quickly with little notice. This mixture of disinformation, military deception, and conventional military force has already been utilized successfully in Russia's annexation of the Crimean peninsula.

The second general observation is Russia's growing geopolitical insecurity. This fear manifests

itself principally for two reasons. First, Russia views NATO enlargement as a threat to its ability to project and dominate regional influence. Notably, the accession of the Baltic states into the NATO alliance has put Russia and its adversary in direct contact with one another. Secondly, there is a lack of physical geographical barriers between it and Western Europe. The non-existence of natural impediments to invading forces combined with NATO's presence on Russia's western border describes a potentially dangerous situation for Russia. However, it must be noted that neither the political elite nor the Russian populace believe NATO will come charging over the border. Yet, tensions between the two are elevated creating a greater possibility for accidents to occur. This could trigger an open military conflict.

In addition to their physical safety, NATO's growing eastern presence threatens Russia's sphere of influence. Maintaining influence over former Soviet satellite states is a key step in Russia's return to a global power. Without this influence, Russia's credibility as a regional power broker is extremely reduced. Additionally, Russia also experiences a gravitational pull to Slavic based cultures. This results in a desire to support and protect these Slavic population centers; however, being under sovereign control of another nation impedes Russia's efforts.

The third general observation relates to Russia's desire to employ their hybrid warfare tactics on polarized societies. The simple reason being Russia understands their tactics are most effective when a given society is already under pressure from internal turmoil. Russia also understands a long drawn out conventional military confrontation with NATO is not in their favor. Therefore, they choose to reduce NATO's effectiveness by causing internal alliance stress through conducting hybrid operations across multiple domains.

Russian disinformation attacks on NATO are best demonstrated by what is currently ongoing in

¹Long, C. (2019, décembre 5).

² Chivvis C. "Understanding Russian Hybrid Warfare: And What Can Be Done About It." pg 3.

the Baltic States. In September 2019, Russian hackers and troll farms began to propagate a false news story stating German soldiers, in Lithuania as part of a NATO operation, had desecrated a Jewish grave site. This disinformation campaign coincided with a meeting between the Lithuanian president and the US Jewish community.³ The next month saw Russian hackers posting and promoting false stories stating the US was going to move its nuclear arms from Turkey to Lithuania. Hackers put out false tweets from the US Secretary of State Mike Pompeo as well as hacked into local Lithuanian news outlets. This disinformation operation came at a time when there was increased hostilities over Turkish actions taken in Syria. Additionally, the US was planning on deploying a tank battalion to Lithuania to counter Russian aggression. Russia's goal was to convince the Lithuanians they would become targets of a Russian nuclear counterattack, thus creating public opposition against the incoming US forces.⁴ This example demonstrates how Russia favors asymmetric means to constantly place pressure on NATO in order to cause internal division.

Russia's Goals under Putin

Russia's global strategy centers around three principal goals: to regain worldwide recognition as a great power, reclaim and secure Russia's influence over former Soviet controlled nations, and to portray itself as a regional powerbroker in order to regain credibility so it can rewrite the liberal global order and counter US influence.⁵ Taking these into account it becomes increasingly obvious why tensions between the West and Russia are highest in areas such as the Baltic states, Ukraine, and Syria. Understanding the motivations behind Russian strategy provides the necessary context for analyzing the role Russian airpower plays in meeting these national objectives.

Russia's desire to once again be identified as a great power is rooted in two main principles. The first is based on Russia's perception that the global geopolitical system consists of regional actors seeking a balance of power. The influence of each of these actors is measured by their economic, ideological, and military influence. However, Russia's perception is somewhat flawed in this instance. For example, both the US and EU, it can be argued, share roughly the same values and political principles, if not the same interests. Additionally, the US defense budget, in terms of expenditure, is equal to that of the next seven largest military budgets.⁶ Even China's military, despite having progressed in terms of size and capability, still lacks the ability project that power in a way comparable to the US. Therefore, while the EU can compete with the US in terms of economic influence, the US remains largely unchallenged across all three areas of influence. The global political system as a balance of powers is not necessarily a reality.

The second principle behind Russia's desired "great power" status originates from a historical standpoint. For nearly 300 years, Russia was the dominant power in Eastern Europe. Throughout the 18th and 19th centuries, Russia's territorial gains went largely unmatched. Additionally, it was able to repel invasions from both Napoleon and then later Nazi Germany. However, following the fall of the Soviet Union, Russia saw its territorial influence retreat eastward as satellite countries of the now former Warsaw Pact began to break away seeking military and economic support from both NATO and the EU. The current Russian political class elites long for these foregone borders and believe the only way to reestablish their influence throughout Eastern Europe is to be considered as one of the principal global powers.

³ Tucker, P. (2019, décembre 3). Russian Trolls Are Hammering Away at NATO's Presence in Lithuania.

⁴ Ibid.

⁵ Petro, N. N. (2018). The Russian Orthodox Church. In A. P. Tsygankov (Ed.), Sergunin, A. (2017). Russian perceptions of

the Ukrainian crisis: From confrontation to damage limitation? In G. Besier, & K. Stokłosa (Eds.),

⁶ National Priorities Project. (s. d.). U.S. Military Spending vs. the World.

Regaining its lost influence throughout Eastern Europe forms the second pillar of Russian global strategy. Motivation for this goal is more than just increased power. Russia believes it has a predestined moral obligation to protect the Slavic culture. Throughout more than 1,000 years, Slavic cultures developed strong ties among their different communities.⁷ This has led to a system where each community supports the other both ideologically and monetarily.⁸ The Russian Orthodox church, in addition to playing a key role in Russia's nuclear security, provides political support to the Kremlin's protection efforts of the Slavic groups residing throughout Central and Eastern Europe. The Kremlin also receives political support from the Russian Orthodox Church in protecting the Slavic culture regardless of where they are currently residing. Russian support to certain Slavic groups in the Crimean peninsula, Georgia, and the Baltic states are some of the more notable examples of Russia trying to meet this strategic objective.

Russia's third strategic goal focuses on becoming a key regional powerbroker. By mediating regional disputes, Russia can increase its economic, military, and political credibility. In doing so, Russia will be able to influence the liberal world order with the ultimate goal of reducing US global influence. A reduced US presence would allow Russia to freely wield its power and influence throughout Eastern Europe. In order to accomplish this goal, Russia uses the hybrid warfare tactics described above. Principally, Russia seeks to undermine democracy through disseminating misinformation, tampering with elections, and supporting separatist movements throughout Eastern Europe. Russia, by utilizing these tactics, hopes to prove its belief that democracies are inherently unstable; thus, reducing US influence.

Analysis of Russian Strategy and Tactics

Taking into account both the observations concerning Russia's tactics as well as its strategic goals, one can easily surmise that Russia is primarily focused on its self-preservation. This is not only true for the nation itself, but also true of the Putin regime. Protection of national interests and providing security against domestic and foreign threats is of vital importance to any nation. The difference with respect to Russia is how they perceive and plan to counter these threats.

When examining Russian tactics and strategic goals from a macro point of view, it becomes clear that its intentions are to create a buffer zone between itself and NATO countries. In order to accomplish this, Russia relies primarily on asymmetric warfare to disrupt nations and alliances internally while utilizing conventional forces for defense and localized power projection. This is in contrast to the national strategies of the US and other major NATO allies where they focus more on an expeditionary mindset, engaging their adversaries closer to their origins. Operation Inherent Resolve is an example where the 30 member nations of NATO are contributing forces to liberate parts of Iraq and Syria from ISIS forces.

In a sense, Russia is trying to establish its own "Monroe" doctrine. It wants to have complete control over countries residing under its sphere of influence.⁹ This does not mean that Russia intends to absorb these countries and create something similar to the Soviet Union. On the contrary, it wants to benefit from its freedom of influence while not having to provide governmental functions over these areas.¹⁰

Russia's major military operations over the past decade reflect this notion of establishing a buffer zone. Notable examples are the Russo-Georgian

⁷ Lamoreaux, J (2019) Russian Activities in Europe. In *Russia Strategic Intentions* (pp. 49-50).

⁸ Ibid.

⁹ Peterson N. (2019) Russian Activities in Europe. In *Russia Strategic Intentions* (pp. 49-50).

¹⁰ Hill, Fiona. (2015). *This is What Putin Really Wants*.

War in 2008, annexation of the Crimean peninsula in 2014, and their continued military operations in Syria. Each of these operations involve areas of population with strong ties to Russia and all involve, to varying degrees, direct opposition to NATO strategy. These operations also provide insight into how Russia views the role of airpower. The following section will analyze each of these conflicts as well as major Russian military exercises. This analysis will provide a better understanding on how Russia intends to use airpower to support its national objectives.

Russian Military Operations in the 21st Century

As noted in the previous section Russia's focus is on the establishment of a buffer zone. Through this zone, Russia can act without contest from other global powers. Establishing this zone also signifies that Russia's military is more concerned with defensive operations by supporting pockets of Russian population located in close proximity to its border. This defensive mindset has influenced Russia's view on airpower. This section will analyze each of Russia's major military operations and training exercises over the past two decades to demonstrate how airpower has evolved to support Russia's national objectives.

Russo-Georgian War

Beginning on 7 August 2008 and lasting for only 5 days, the Russo-Georgian War was the first time Russia utilized its military outside of its own borders since the fall of the Soviet Union. This brief war began as a result of Georgian forces invading the Russian supported areas of South Ossetia and Abkhazia over claims that Russia had shot down a Georgian unmanned aerial vehicle. Russia responded with an overwhelming force spearheaded by the 58th Army and included armor, artillery, and air defense units. Additionally, 120 combat aircraft and 70 helicopters were involved.¹¹ The severity and lack of restraint by the Russian

forces not only caught Georgian forces off guard but surprised the international community. Following the conflict, Georgian forces retreated and the areas of South Ossetia and Abkhazia subsequently declared their independence. Diplomatic relations between Georgia and Russia have remained tense ever since as Russia continues to occupy the two zones in violation of the ceasefire agreement.

During this conflict, Russia's air campaign strategy was rudimentary. First, they sought to establish air superiority early in the conflict by destroying the Georgian air defense network while simultaneously protecting supply lines to forward stationed troops. Once air superiority was achieved, Russian attack aircraft targeted equipment, bases, and other fixed military installations. While the primary Russian objective was to help liberate the areas of South Ossetia and Abkhazia, they also had the secondary objective of destroying as much Georgian military equipment as possible. With their military capabilities severely reduced, Georgia's accession into NATO, at the time, would be jeopardized.

The Russo-Georgian War highlighted significant deficiencies of Russian airpower. First, Russian aircraft were unable to conduct strike missions at night. This extremely hampered their ability to remain visually undetected from Georgian anti-aircraft weapons. The ability to conduct night raids is a key measurement of an air force's capability to successfully wage an air campaign. Secondly, there were major communication deficiencies between ground commanders and support aircraft. This lack of communication meant there was little to no joint coordination between ground and air assets. Ground and air forces were essentially operating in isolation, which led to an inefficient allocation of assets. Additionally, a lack of communication coupled with the use of a similar Identify Friend or Foe (IFF) system to that of Georgia led to multiple losses of Russian aircraft as a result of friendly fire. It was not possible to effectively manage the airspace since Russian operators could not

¹¹ Air Power in Russia's Georgian Campaign. Pg. 1



SU-25 Frogfoot

distinguish between Russian and Georgian forces. In total, Russia lost six aircraft of which only two were shot down by Georgian forces.¹²

The actual strike missions themselves were also deemed unsatisfactory. The Russian air force relied on the SU-25 Frogfoot, which was designed as a close air support platform. These aircraft lacked sophisticated targeting equipment as well as smart weapons. They also were not equipped with appropriate countermeasures or weapons that could fire outside of the Georgian Surface to Air Missile (SAM) engagement zones. This added unnecessary risk to Russian aircraft as they were required to enter the SAM engagement zones in order to employ their air to ground ordnances.

Even though Russia was able to achieve its objectives during this conflict, the performance of its air force was extremely inadequate. The Russo-Georgian War signaled a severing of the remaining ties to an antiquated Soviet style of fighting. This

sparked a number of reforms across the military but most notably within the Russian Air Force. Under these reforms Air Force squadrons would report to the various military districts. This was done in an effort to streamline the chain of command as well as bolster joint integration with ground forces. In addition, Russia closed air bases, made cuts to both the officer and enlisted corps, and began numerous fleet rejuvenation programs to upgrade existing fighters to generation 4++. They also embarked on fifth generation fighter aircraft acquisition. These measures, while necessary to address the inadequacies brought to light during the Russo-Georgian War, were not revolutionary but rather a necessity. Russia simply became more effective at conducting defensive operations and very localized offensive engagements along its borders. Deficiencies in aerial refueling, airborne intelligence, and basing options outside of Russia still remained.

¹² Kofman, M. (2018, septembre 3). Russian Performance in the Russo-Georgian War Revisited.

Annexation of the Crimean Peninsula

Russia's annexation of the Crimean Peninsula marked a turning point in its "go to" military strategy. A mélange of military deception, disinformation campaigns, cyber warfare, and political interference characterized the hybrid warfare strategy utilized to illegally seize control of the Crimean Peninsula away from Ukraine. Unlike in Georgia years before, airpower was not the centerpiece of military operations in Crimea. Instead, airpower played a much smaller part in a long list of actors. Nevertheless, the role of airpower followed a similar pattern of localized missions near the Russian border in order to support a national strategy whose main goal was to deter NATO ambitions in the region.

Tensions between Ukraine and Russia had been rising ever since the Euromaidan protests began in November 2013. These series of protests were aimed at ousting President Viktor Yanukovich, a staunch supporter of Russian President Vladimir Putin. The protests reached the boiling point in February of 2014 when Yanukovich and his party members fled Ukraine and sought exile in Russia.

Days later, Spetsnaz troops along with airborne forces invaded the Crimean Peninsula from nearby bases. This was soon followed by naval blockades and the arrival of additional troop convoys. By 9 March, Russia had seized key areas around the peninsula.

Russian airpower played a very unique role in this operation. On 26 February, Putin ordered a snap inspection exercise of 150,000 troops from both the Western and Central Military Districts.¹³ This was not uncommon since exercises of this nature were becoming more frequent given the defense reforms enacted following the aftermath of the Russo-Georgian War. During this exercise, 40 IL-76 military transports were utilized to transport equipment and troops to Anapa, a staging base located east of Crimea.¹⁴ Russian fighter aircraft were positioned northward in Russia to create a diversion away from the airborne troop movements. On 28 February, Mi-8 transport helicopters and Mi-35M attack helicopters illegally crossed into Ukrainian airspace.¹⁵ The Mi-35M's attacked Ukrainian armor placements helping Russia to achieve localized air superiority over the Crimean Peninsula. In 2018, Putin deployed more



IL-76

¹³ Crane K. & Nichiporuk B. Trends in Russia's Armed: An Overview of Budgets and Capabilities. pg 26.

¹⁴ Ibid.

¹⁵ Ibid.

than a dozen SU-27 and SU-30 aircraft to the peninsula as a way of tightening his military grasp on the region.

During this conflict, airpower was used in a very small role compared to other instruments of power, thus, highlighting a change in Russian military strategy. Nevertheless, Russia followed a similar pattern that was in line with its national priorities. Aircraft were employed from bases along the Russian border located in close proximity to areas vital to Russia's national interests. Their mission sets were also not of a complex nature. The military deception portion consisted of fighter aircraft establishing basic defensive patterns in Northern Russia. The IL-76 troop movements were conducted in an uncontested environment. The Mi-35M attack helicopters conducted basic strike missions against an opponent with a very weakened air defense system and a fighter aircraft inventory in disrepair. Of note, at Belbek airbase, located in southwestern Crimea, 4 to 6 out of 45 Ukrainian operated MiG-29 fighters were operational.¹⁶ The annexation of the Crimean peninsula supports the theory that Russia intends on using its airpower to support establishing a sphere of influence in former Soviet satellite states.

Military Operations in Syria

Russia's involvement in Syria highlighted a return to a more conventional military strategy. Beginning in September 2015, Russia responded to Syria's request for military support by conducting a series of airstrikes against the Syrian National Coalition, ISIS, and Al-Qaeda. Putin's decision to aid his close ally Bashar al-Assad was in line with the aforementioned Russian strategic goals. While not necessarily located within the intended sphere of influence Russia hopes to dominate, Syria does provide Russia strategic basing options in the

Middle East. This allows Russia to establish a foothold in the region where it can spread its influence complicating the ability for US and other NATO allies to impose their national objectives. This is important in the context of projecting airpower since Russia continues to lack appropriate amounts of force extension capabilities such as aerial refueling.

With respect to airpower, Syria is an important case study to analyze the effectiveness of Russia's reform measures following the Russo-Georgian War. Russia's aircraft inventory now included 350 new fighter aircraft, 1,000 new helicopters and updated air defense systems.¹⁷ Within the first month of the campaign, Russia carried out 32 combat sorties and struck 1,623 targets.¹⁸ SU-24, 25, and 34 aircraft were used as lightly equipped bombers employing mainly unguided munitions. The SU-34 has the capability to deliver satellite guided munitions; however, given the relatively low reserve numbers of these munitions they were most likely not used.

Previous coordination problems between ground and air forces seemed to be rectified. SU-25M's provided close air support (CAS) to Syrian troops fighting ISIS rather than executing pre-planned attack missions on infrastructure targets. They were able to operate successfully in this dynamic environment; however, their tactics and munitions were still rudimentary. The SU-25M's favored direct attacks while employing unguided rockets and guns.¹⁹ Mi-24P attack helicopters were also used in the CAS mission. Through the integration of Syrian ground forces and Russian CAS, the ISIS siege on Kveiris air base ended.²⁰

The SU-35S also made its operational debut in Syria. This was the first operational deployment of a true multi-role air superiority fighter. Their deployment to Syria came shortly after the

¹⁶ Ibid. pg 24

¹⁷ "Deliveries of combat aircraft to the Armed Forces of Russia in 2016,"

¹⁸ "Russian air group in Syria has destroyed more than 1,600 objects of terrorists in Syria in a month."

¹⁹ Lavrov A. "The Russian Air Campaign in Syria: A Preliminary Analysis". 5.

²⁰ Ibid.

shootdown of a SU-24 by a Turkish F-16. The SU-35s were needed for escort missions to ensure protection of Russian strike assets. Additionally, their deployment to Syria allowed for an evaluation of upgraded avionics and weapon systems, notably the newly improved AA-12, which is an active radar homing air to air missile. The SU-35S, flying defensive counter air missions, was also able to intercept multiple Israeli and Turkish aircraft forcing them out of Syrian airspace. Since intercept missions require close coordination between fighter aircraft and air controllers Russia demonstrated its improvement of airborne command and control capabilities.

Russia also successfully employed its strategic bomber force in Syria. The TU-160 and TU95MS carried out a combined total of 66 cruise missile strikes. Additionally, one TU-95MS sortie conducted a 7,000-kilometer range mission originating in Russia.²¹ This sortie included aerial refueling and was designed to test the strategic reach of the Russian bomber force. Despite the success of the more advanced TU-160 and TU-95MS, the majority of bomber missions utilized the TU-22M3 carrying unguided munitions. This decision to rely more on the TU-22M3 was most likely taken due to the lower operational costs of that particular aircraft and unguided munitions. In the end, the utilization of Russian bombers was considered a success, which rallied support for continued acquisition of TU-160s and a modernization effort of the TU-22M3.²²

The overall assessment of Russian airpower utilization in Syria is considered successful. However, this success did not come without challenges. First, the threat picture to Russian aircraft was relatively low. The majority of threats encountered consisted of small arms fire and shoulder launched Man Portable Air Defense Systems (MANPADS). These threats are easily

countered by flying above their maximum engagement altitudes. Of the six Russian aircraft that were lost during this conflict, four were due to accidents. Only one Russian fighter aircraft, a SU-25SM, was shot down by a MANPADS. The remaining aircraft loss was attributed to the shootdown by the Turkish F-16.

Russia's attack helicopters fared the worst in terms of losses. Twelve helicopters were lost by a combination of mortar attacks, MANPADS, and pilot error during night missions.²³ It was also noted that the helicopter countermeasure systems were inadequate. Additionally, most of the missions were conducted during daytime increasing their chances of detection. The reluctance to conduct night missions among all Russian air assets still signifies a lack of training and competence in that domain.

The Syrian conflict demonstrated the successful application of newly acquired weapon systems. It also allowed airmen to gain vital combat experience. Overall, 80 percent of fighter aircrew and 95 percent of helicopter aircrew flew between 100 and 120 combat sorties.²⁴ This success and experience will no doubt provide confidence in the reform measures taken. However, it also must be highlighted that Russian air assets, similar to Georgia and Crimea, faced a very weak opposition. Furthermore, Russian airpower only increased its capability in a small range of mission sets it had executed previously. They did successfully carry out cruise missile launch tests, but they only accounted for a very small percentage of total munitions used. Strike and CAS missions accounted for the vast majority of munitions expended. The following section will analyze major military exercises over the past decade, which provides further evidence to this notion.

²¹ Ibid, 23.

²² Ibid.

²³ Ibid, pg 21.

²⁴ Ibid, pg 26.

Table I. Russian Military Exercises 2012 – 2019 (created by the author)

Exercise Title:	Time Period:	Actors Involved:	Location:	Scenario:	Aircraft:	Notes:
Kavkaz	Sept 2012	Western Military District	Northern Russia	Joint operation to safeguard arctic/northeast passage	SU-24MR – recon MiG-25RB – recon SU-24M – strike MiG-31B/BM – defensive counter air SU-33D – fleet defense A-50 – ISR	First exercise following massive military reforms. (8,000 personnel)
Zapad	Sept 2013	All components of Russian Military	Arctic – South Western Russia	Suppression of well-trained extremist groups	IL-76 – airlift IL-78 – air refueling SU-24M/34 – strike SU-27 – defensive counter air SU-25 – close air support SU-24MR – ISR	Involved integration with Belarusian forces. Size comparable to Soviet Union level exercises (90,000 personnel)
Vostok	Sept 2014	Eastern Military District	Eastern Russia along Chinese Border	Defense against an eastern state actor (presumably China)	IL-76 – airlift IL-78 – air refueling Mi-8/24 – attack SU-24/25 – attack MiG-31 – intercept SU-27/30SM34/35 – intercept TU-22M3 – simulated adversary A-50 – ISR	Despite current close ties to China, this exercise demonstrated Moscow's lack of trust vis a vis China. (155,000 personnel)
Vostok	Sept 2018	Eastern Military District, China, Mongolia	Northern and Eastern Russia	Defensive operations against invading force	<u>Russia:</u> IL-76 – airlift AN-12 – airlift AN-26 – airlift Tu-95MS/22M3 – bomber SU-35S/30SM – defensive counter air MiG-31BM – defensive counter air SU-24M/25/34 - strike Ka-52 – attack Mi-24 – attack Mi-8/26 – transport <u>China:</u> JH-7A – strike Mi-171 - transport Z-9 - transport Z-19 – attack/recon	Exercise focused on the successful integration of Russian and Chinese forces. (100,000 personnel)
Tsentr	Sept 2019	Central Military District, China, Kyrgyzsta, India, Pakistan, Tajikistan, Uzbekistan	North Caucusto Western Siberia	Two stage: 1 st stage – suppression of terrorist actions 2 nd stage – conventional military operations focused on defensive counterattack	Detailed aircraft listing unavailable.	Exercise featured large scale utilization of Unmanned Aerial Vehicles (UAV) (128,000 personnel)

Major Military Exercises

As part of major military reforms, Russia developed a system of annual rotational military exercises. Each year the strategic level exercise rotates among one of the four military districts. The purpose behind these exercises is twofold. First, they allow for real world application of newly acquired military technologies and the evaluation of their newly developed command and control structure. Secondly, their scope and size is meant to influence potential adversaries. They are a critical element in helping Russia to achieve its national objectives. However, perhaps as an unintended consequence, Russia's military exercises also provide a window of analysis into how it intends to utilize airpower. Combined with analysis of significant Russian military operations, its exercises allow for continued trend analysis.

Table I represents a summary of Russia's annual exercises. Some years were omitted as they did not allow for a direct analysis of the use of airpower and instead were focused on improving command and control capabilities. However, the years in which airpower was a central focus highlighted interesting trends. First, each year Russia has increased its participation in terms of personnel, aircraft, and number of participating nations. Currently, the scale of exercises in terms of participants and number of aircraft is on par with those conducted under the Soviet Union. The Tsentr exercise in 2019 involved integrated military operations with six other central Asian nations. Secondly, behind the publicized scenario of each exercise lies a secondary conventional objective. Russia and partnered nations test their large-scale, high intensity warfare capabilities in defense against a technologically advanced peer nation. Finally, each exercise focuses on certain regions that are key to achieving Russian national objectives. Exercises conducted in the east not only allow for integration with Chinese forces but are also meant to test capabilities to ward off any future intrusion from China. Central and Western located exercises focus on the creation of the strategic buffer zone and are meant to intimidate any possible NATO enlargement objectives.

Russia's use of aircraft during these exercises also follows similar trends to that of its combat operations. In each exercise, Russian aircraft are focused on striking targets and conducting defensive counter air operations. Some strategic level training with aerial refueling and bomber aircraft is conducted; however, it is not often a central focus of the exercise. While this capability does exist, their proficiency is average given the low frequency of aerial refueling practice and aerial refueling capable assets. Further, Russia lacks a robust Intelligence, Surveillance, and Reconnaissance (ISR) network. This is in addition to the need for a more robust aerial refueling and airlift capability to create a more expeditionary minded air force. Analysis of Russia's military exercises suggests that Russia intends on improving their ability at conducting defensive operations rather than expending its capability to include additional mission sets. However, they are beginning to include more advanced technology such as UAVs and fifth generation fighter aircraft. The following section will outline the inclusion of advanced aircraft technology and how it will be used to support Russia's national strategy.

Advancements in Russian Aircraft Technology

This research paper has focused on Russia's utilization of airpower for localized power projection in former Soviet satellite countries and defensive operations. However, Russia has begun development and production of a fifth-generation fighter aircraft in addition to UAVs. Their desire to procure this type of technology suggests that Russia intends to exploit the full spectrum of capabilities these assets provide. The following section will analyze Russia's procurement of the SU-57 and advanced UAV technology to describe how these advanced systems will support Russian national objectives. Secondary effects associated with Russian aerospace defense expenditures will also be discussed.

Russia's Fifth-Generation Fighter – SU-57

The SU-57 is a single seat, multi-engine supersonic stealth fighter. It is comparable in

characteristics to the F-22 by incorporating super cruise, thrust vectoring, and stealth technology. The aircraft is being developed by PAK FA and a few initial models are already in operational use by the Russian Air Force. The intent is for the SU-57 to become the new air dominance fighter replacing both the MiG-29 and SU-27. The SU-57 will be able to carry both air to air and air to ground missiles making it a multi-role fighter. It is also rumored that it will carry the hypersonic R-37M missile.²⁵ Large scale acceptance of the SU-57 is expected to begin in 2020.

Even though Russia possesses operational models, there have been setbacks to the SU-57 program. Long delays are attributed to re-modification efforts of the Saturn Izdeliye 30 engines.²⁶ There are also issues concerning both the low observable stealth technology and aircraft sensor suite. These issues have resulted in the retrofitting of external hardpoints to carry munitions. This reduces the aircraft's stealth abilities making it more comparable to the previous

generation of fighter aircraft. A recent report from Beijing actually recommended the SU-57 be downgraded to a fourth-generation fighter. Additionally, India, an initial partner with Russia in developing the SU-57, has backed out of the deal.²⁷ The complications associated with the stealth technology and the apparent weakness of its engines is also reducing the fighter's range. The Russian government is still pressing forward with the project and continues to advertise its success.

In 2019, Russia performed its first deployment of the SU-57 albeit with prototype models. The purpose was primarily a show of force in order to signal to its adversaries Russia now possesses fifth-generation fighter aircraft. However, the SU-57s did not actually conduct any operational combat missions. Besides the flexing of airpower, the purpose behind the SU-57 deployment was to test infrastructure and logistical requirements.

In line with trends discussed above concerning military operations and training exercises, Russia

SU-57



²⁵ Report: Russia Has Developed Prototype of Air-to-Ground Hypersonic Missile for Su-57".

²⁶ Gady, F. (2019, juin 4). Russia to Procure 76 Su-57 Stealth Fighter Jets by 2028.

²⁷ McDermott, R. (2020, mai 20). Moscow Plans Additional Modifications to Its Fifth-Generation Su-57 Fighter.

intends to utilize the SU-57 in a defensive role. This is in spite of the fact the SU-57 contains stealth technology whose purpose is to help fighter aircraft maneuver their way through complex Integrated Air Defense Systems (IADS). This capability is typically utilized in offensive air operations. However, there are no indications that Russia possesses the capability to train against such a scenario. Additionally, the armament capabilities of the SU-57 favor more air to ground munitions than its F-22 competitor suggesting Russia intends to employ this aircraft in a similar manner to other aircraft already in its inventory. These facts highlight the difference between how Russia and Western air forces employ fifth-generation fighter technology.

Russian Advanced Unmanned Aerial Vehicles

Russia has also undergone procurement of advanced UAV technology. One example of this technology is the S-70 Okhotnik or "Hunter" heavy UAV. The S-70 was designed to accompany the SU-57 on strike missions. The S-70 will be capable of carrying six different air to ground payloads.²⁸ A typical mission set of the Hunter UAV will include penetrating enemy air defenses while the SU-57s remain safely out of their weapons engagement zones controlling the UAV from the rear. The S-70 has already made its maiden flight to include joint testing between it and the SU-57. Large scale production and acceptance is not scheduled until 2025.

In 2019, Russia also successfully tested its first high altitude UAV the Altius-U. The Altius-U was designed to provide similar capabilities to the US RQ-4. It will also be capable of conducting high altitude flights for a loiter time of approximately 24 hours.²⁹ This will allow Russia to obtain ISR capabilities above adversarial engagement zones. Once again, given the lack of appropriate training locations, Russia will most likely utilize this asset in

local engagements near Russia's area of interests. These regions also do not have advanced anti-aircraft weapons. Therefore, the Altius-U, similar to other Russian aircraft, will not be fully tested against near-peer technology.

Russia is also interested in acquiring swarm technology. This entails a swarm of mini-drones each carrying a small explosive ordnance. These mini-drones, roughly one meter in size, are capable of vertical takeoff and landing allowing them to be employed in any location. They also are capable of ranges up to 95 miles.³⁰ This type of UAV technology can quickly overwhelm advanced radar systems, complicate targeting information, and be very difficult to counter with conventional weaponry. Mini-drones utilizing swarm technology would be a force enhancer in terms of defense. While still in conceptual phase with respect to large scale purchase and employment, multiple companies worldwide have already successfully built prototypes. Russia's desire to pursue this technology shows that it understands the importance of keeping up with advancements in technology. The drones capabilities are also in line with Russia's defensive combat strategy.

2nd Order effects of Military Modernization

Russia is currently the most capable it has ever been even compared to its military power under the Soviet Union. This is largely due to how Russia perceives its military industrial complex, which they believe is a cornerstone of Russian society. Therefore, it is of no surprise Russia is the fifth largest spender on defense when taking into account purchasing power parity (PPP).³¹ They are also on track to become the largest economy in Europe over the next five years. However, Russia's massive military spending is about more than increasing military capacity. Their defense expenditures are also necessary as a means to stay

²⁸ Ibid.

²⁹ Loanes, E. (2019, août 20). Russia's new high-altitude drone just flew for the first time, and they want to arm it with one ton of bombs.

³⁰ Strout, N. (2019, novembre 5). All aboard the Sea Train!

³¹ Connolly R. "Russian Military Expenditure in Comparative Perspective: A Purchasing Power Parity Estimate" pg 18.

competitive in the technology race and as an economic support mechanism.

Economic sanctions have forced Russia to become more reliant on its own military industrial complex. They are purchasing more internally and importing less. Additionally, the cost of producing military equipment is much cheaper in Russia compared to other countries. Referencing The Economist's Big Mac index, the popular sandwich costs \$5.74 in the US and only \$2 in Russia.³² Despite its simplicity, this economic comparison holds up well when analyzing the defense industry. For example, a single SU-57 is estimated at \$42 million.³³ Its US counterpart, the F-22, is estimated at \$150 million per aircraft.³⁴ Russia can purchase roughly four SU-57's for the cost of one F-22. This allows Russia, despite much economic waste and inefficiency, to stay competitive with peer adversaries in terms of total inventory of aircraft.

Additionally, the low cost of aircraft production allows Russia to better support its aerospace industry. Looking internally at Russia's allocation of the defense budget shows both the aerospace forces and Navy receive the largest shares; 24% and 25% respectively. This large allocation of the defense budget has resulted in, over the past 8 years, approximately 1,000 new and 200 upgraded helicopters, and 500 new and 500 upgraded aircraft.³⁵ While these numbers seem impressive in terms of capability, many of these purchases were motivated by supporting the aerospace industry rather than increasing capability. In fact, many of the new acquisitions were of existing platforms. Next generation fighter purchases account for a small fraction of the total numbers.³⁶

Finally, Russia's large defense budget is important for it to remain competitive by staying at

the leading edge of advanced technology development. Purchasing fifth-generation aircraft, developing hypersonic missiles, and investing in future drone swarm technology allows Russia to publicly state it possesses these capabilities even though their technology will not be fully utilized. They are more concerned with how aircraft can support national objectives instead of fully implementing the aircraft's capabilities.

Conclusion

Assuming Russia will utilize its aircraft capabilities in the same manner as Western air forces could prove fatal. Oftentimes, Western planners become overly focused on how technological advancements can expand the role of airpower in combat. Many Western exercises also assume adversaries will employ similar tactics. This is not necessarily true with respect to Russia. Russia has demonstrated, in major combat operations and training exercises, it intends to focus more on a generic tactical application of its aircraft rather than exploiting that aircraft's full range of capabilities. Furthermore, analysis of both military operations and training exercises indicates Russia will continue to focus improving upon the same mission sets. Indeed, they are becoming more proficient at joint integration of air and ground assets. However, they are not expanding the types of mission sets nor are they necessarily revolutionizing their employment methods. Russian airpower remains focused on combat operations in uncontested environments of former Soviet satellite nations.

This current focus also puts a spotlight on the reasoning behind Russia's pursuit of advanced technology. Their acquisition of fifth-generation aircraft and other advanced technology has as

³² Times, T. M. (2020, July 16). Big Mac Index Counts Ruble as Most Undervalued Currency.

³³ Tahar, A. A. (2019, mai 19). Russia's New Su-57 Fighters Cost Just \$35 Million Each; Are Fifth Generation Jets Really Cheaper than the Su-35?

³⁴ Ritsick, C. (2020, avril 28). F-22 Raptor vs F-35 Lightning | Cost, Performance, Size, Top Speed.

³⁶ "Future of the Russian Military: Russia's Ground Combat Capabilities and Implications for US-Russia Competition." pg 34.

much to do with that particular capability as it has to do with economically supporting industry and keeping pace technologically with peers. This falls in line with Russia's philosophy on airpower being heavily influenced by how it can help achieve national objectives as opposed to what is capable of being achieved.

In addition to Russia's acquisition of brand-new technology, their fleet modernization programs provide insight on the intention of its aerospace forces. While the SU-57 attracts a lot of attention given its purpose of countering the F-22, Russia's modernization efforts are focused on the refurbishment of existing aircraft model types. In an 8-year span, Russia has been able to acquire 500 new aircraft and refurbish an additional 500. This large number of modernized aircraft to the inventory provides support to Russia's intent of fighting a war of attrition with adversarial nations. They hope to dissuade any potential future aggression through the threat of a drawn out and costly conflict. Modernizing existing model types also suggests Russia has no clear intention of expanding upon its already established capabilities.

The West must not discount the capability of Russian airpower. It is a formidable challenger and would cause an unbelievable amount of losses. While Russia's lack of advancements in terms of aerial refueling, airlift capability, ISR assets, and their unwillingness to venture outside routine mission sets hinders their ability to project airpower globally, it does not make them any less lethal in terms of spreading their influence throughout neighboring countries. Understanding Russia's use of airpower can help NATO tailor its military support strategy to vulnerable nations.

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