

# SYRIAN CONFLICT: LESSONS AND TRENDS FOR AIR POWER

MANISH KHANNA

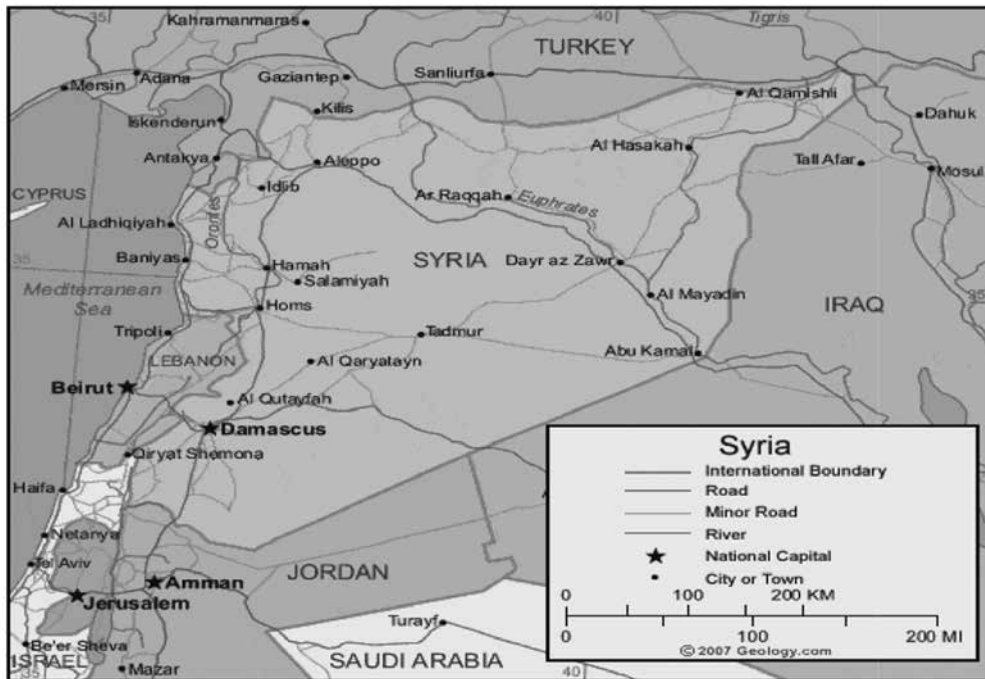
## INTRODUCTION

Syria was one of the nations affected by the Arab Spring uprisings in 2010. In the aftermath, the internal protest movement against President Assad's regime spiralled out of control into a full-fledged civil war, necessitating the intervention of the army and air force. In 2011, defectors from the Syrian Army formed the Free Syrian Army in order to seek refuge in Turkey. In 2013, a group called Jabhat al-Nusra declared itself as Al-Qaeda's Syrian branch, and urged all Sunnis to take up Jihad against the regime. Multiple rebel groups arose in the region and laid siege to major cities such as Aleppo and Idlib. Shiite Muslim groups that were pro regime also emerged. The Syrian Army and its Air Force resorted to shelling and aerial bombardment against the rebel groups. The deepening civil war also brought in the ISIS/ISIL or the Islamic State; the group seized the opportunity and moved outwards from Iraq, expanding its territorial control into Syria. An alliance called the Syrian Democratic Front, comprising primarily of Kurds in North Syria also arose to counter the expansion of ISIS.

---

Air Vice Marshal **Manish Khanna** is an officer of the Indian Air Force currently posted at Air HQ. He has over 4000 hours of flying and a rich experience in air defence, ground attack and strategic reconnaissance.

Fig 1: Map of Syria



Courtesy <https://geology.com/world/syria-satellite-image.shtml>

In 2014, an international coalition led by USA intervened in Syria by initiating an aerial campaign against ISIS. Russia directly entered the conflict zone in 2015 to fight ISIS and to support the Assad regime. Air assets including attack aircraft and air defence assets of the Russian Air Force were inducted into Syria. By 2017, ISIS had fled and its threat had waned. As a result, Assad, now backed by Russia, attacked rebel forces in NW Syria. A devastating air campaign was launched in 2019 that helped Assad regime to reclaim rebel held towns such as Idlib.

The region continues to be in turmoil with the Assad regime controlling most of the country with help of Russia and Iran. At the same time, Israel has increasingly bombed targets in Syria said to be belonging to Iran-linked militias, including Hezbollah. A US air strike also targeted

an Iraq-based militia in Syria, just weeks after the President Joe Biden's inauguration.

Numerous countries in the region have made substantial use of air power. One of the key reasons for ISIS's defeat in Syria and for Assad's reclaiming of lost ground was the role of offensive air force. The purpose of this article is to identify trends and lessons learned from specific examples of air power use.

### **AIR POWER EMPLOYMENT IN SYRIA**

There were three major players with respect to air power: the Syrian Air Force (SyAF), the Russian Air Force (RuAF) and the Coalition Air Forces (CoAF).

#### ***Syrian Air Force***

Despite having an obsolete force, the SyAF was highly motivated and responded well to the situation. Its obsolescence was balanced by improvisation and motivation of its air personnel.<sup>1</sup> While it had a large fleet of aircraft in 2012, the civil war and poor maintenance during the initial years of the civil war grounded a large percentage of its fleet. A number of its aircraft were destroyed on the ground during the civil war, others crashed due to reasons unknown or were destroyed by AAA fire. Had the RuAF not intervened and supported operations, the situation would have been very different. In 2015, when RuAF moved in, the SyAF barely had 45 helicopters and 150 operational fighter jets.<sup>2</sup> The air defence environment was permissive because the rebel forces did not have any capable air defences. The missions flown by the SyAF were mainly ground attack, close air support and combat as well as logistic airlift. Strike missions were undertaken by MiG-21, MiG-23 and Su-22 aircraft. The SU-24 MK and the MiG-29 SM were the only aircraft capable of precision weapon delivery.

---

1. P. Nečas, M. Vacková and P. Lošonczi, "Air Power as a Security Factor: Case Study Syria", *INCAS BULLETIN*, vol. 11, no. 1(2019), pp. 217–230, at [https://www.researchgate.net/publication/331538776\\_Air\\_Power\\_as\\_a\\_Security\\_Factor\\_Case\\_study\\_Syria/fulltext/5c7f233992851c695058be10/Air-Power-as-a-Security-Factor-Case-study-Syria.pdf](https://www.researchgate.net/publication/331538776_Air_Power_as_a_Security_Factor_Case_study_Syria/fulltext/5c7f233992851c695058be10/Air-Power-as-a-Security-Factor-Case-study-Syria.pdf). Accessed on July 8, 2021.

2. *Ibid.*, p. 222.

**The induction of the RuAF into the region was based on a request from President Assad of Syria and an agreement signed in August 2015. In less than a month, 4 SU-30 SM, 12 SU-25, 12 SU-24M and 6 SU-34 arrived at the Syrian Khmeimim air base.**

The Mi-8/17s were extensively used for combat airlift and Mi-24/25 helicopters were used in the attack role with small detachments on every front. Attacks were also carried out on population centres.

### *Russian Air Force*

The induction of the RuAF into the region was based on a request from President Assad of Syria and an agreement signed in August 2015. In less than a month, 4 SU-30 SM, 12 SU-25, 12 SU-24M and 6 SU-34 arrived at the Syrian Khmeimim air base. In addition, 32 transport and reconnaissance aircraft were also inducted.<sup>3</sup> Within the first month, 1292 sorties on 1623 targets were carried out. Most missions involved unguided bombs dropped with the help of a new weapon aiming system designed by the Russians. The build-up of the campaign was slow and the trigger for its acceleration was the ISIS attack on Russian Metrojet Flight 9268, which killed 224 on board. The surge in air operations following this terrorist attack lasted for four days. It resulted in a sortie rate that was 2-3 times above the existing rate. The sortie generation averaged 98-100 per day with the available 32 combat aircraft. Due to the availability of these aircraft in Syria, sorties could be repeated, resulting in a high sortie generation rate. Heavy bombs, unguided as well as guided, were used. Tu-22 and Tu-160 strategic bombers were operationally tested for the first time. These bombers travelled nearly 6,500 km to fire Kh-101 and Kh-555 cruise missiles. Maximum number of sorties generated per day peaked at 143 during the surge.<sup>4</sup>

---

3. Anton Lavrov, "The Russian Air Campaign in Syria: A Preliminary Analysis", *CAN Analysis & Solutions*, COP-2018-U-017903-Final, 2018, pp. 1-36, at [https://www.cna.org/CNA\\_files/PDF/COP-2018-U-017903-Final.pdf](https://www.cna.org/CNA_files/PDF/COP-2018-U-017903-Final.pdf). Accessed on July 8, 2021.

4. Ibid.

The surge was supplemented by maintaining twice the normal numbers of flight and maintenance personnel.<sup>5</sup> Attacks during the surge mainly targeted the oil infrastructure controlled by ISIS. UAVs were extensively used for reconnaissance. ISIS ground forces were targeted with missiles, unguided rockets and guns. Forward Air Controllers (FAC) were embedded with Syrian troops to coordinate attacks on fielded forces.

After the loss of a Russian Su-24, the S-400 and S-300 air defence systems were inducted. Naval ships also fired cruise missiles and augmented the ground-based aviation with strikes by MiG-29s and Su-33 from the aircraft carrier's the naval task group, which was employed by the Russians for the first time. Inputs available indicate that the utilisation of carrier-based aviation was limited due to operational limitations of the aircraft carrier and training of its personnel. As a result, the air assets of the carrier were moved ashore and operated from a Syrian airbase.

On the Russian side, what is apparent is their quest to try out and evaluate new systems, weapons and procedures. A 2016 article in *Vayu* magazine<sup>6</sup> highlights the progress of Russian air operations. Salient aspects of the article are summarised below.

- The Russians were able to rapidly deploy their fighters, helicopters, air defence systems, T-90 tanks, artillery systems, electronic warfare (EW) and ISR forces as a composite expeditionary force. This gave them the opportunity to plan and execute out-of-area operations and logistics. The

**The Russians were able to rapidly deploy their fighters, helicopters, air defence systems, T-90 tanks, artillery systems, electronic warfare (EW) and ISR forces as a composite expeditionary force. This gave them the opportunity to plan and execute out-of-area operations and logistics.**

---

5. Sebastien Roblin, "Test War: How Russia's Air Force Brutally Used Syria for Target Practice", *The National Interest*, March 1, 2020, at <https://nationalinterest.org/blog/buzz/test-war-how-russias-air-force-brutally-used-syria-target-practice-128737>. Accessed on July 9, 2021.

6. Sameer Joshi, "Red Star over Russia", *Vayu* (Aerospace & Defence), III/2016, pp. 95-103, at <https://www.vayuaerospace.in/Issue/vayu-issue-Vayu-Issue-III-May-Jun-2016.pdf>. Accessed on July 9, 2021.

induction was enabled by Russian freighter aircraft such as IL-76 and An-124.

- Cruise missiles deployed from the air and sea came to be operationally tested. The Kh-555 and Kh-101 air launched cruise missiles were launched by long-range bombers and the Kalibr NK cruise missiles were launched from ships in the Caspian Sea.
- In theatre strike resources were augmented with timely and coordinated long-range strikes from Southern Russia using Tu-22, Tu-95 and Tu-160 strategic bombers using unguided bombs as well as cruise missiles.
- Intelligence, surveillance and reconnaissance (ISR) was centrally controlled from Moscow. Availability of low earth orbit (LEO) ISR satellites in the area was boosted. A launch on demand was probably exercised to augment resource availability. IL-20 aircraft provided ELINT and SIGINT, and the Tu-214 R was inducted for ISR. UAV Orlon-10 and a hand held UAV called Eleron-3SV were also used for tactical reconnaissance.
- Modern electronic warfare (EW) systems were deployed. The Krasukha-4 EW system was positioned at major airbases and had the capability to degrade LEO satellites using powerful jammers. Attack helicopters and fighter aircrafts were equipped with the latest EW suites.
- The Pantsir S1 mobile gun-missile air defence system was deployed for point defence and the long-range S-400 air defence missile system provided area defence. The S-400 was also supplemented with a ship-based S-300. Induction of these weapon systems permitted the Russians to exercise an Anti-Access/Area-Denial (A2/AD) capability in the area of operations.
- SU-25 (UB/M/ M2) aircraft were used for dedicated close air support (CAS). This aircraft is specifically designed for CAS and has twin engines, anti-armour plating, a Kopyo radar and an air-to-air missile capability with R-60 /R-73 missiles. (12 such aircraft were deployed).
- The Su-24 M/M2 and Su-34 aircraft provided strike capability. These aircraft have a 7.5-8 tonnes armament carrying capability and were used

for precision strikes using the TV-guided KAB-500 and laser-guided KAB-1500L. The latest Russian nav-attack system was introduced for the first time. The twin seat Su-34, which is eventually slated to replace the Su-24, also had a rearward looking radar (12 Su-24 and 06 Su-34 were deployed).

- Air defence role was undertaken by the Su-30 and Su-35 aircraft. This was the first deployment of the Su-35. Initially, 4 Su-30 were inducted in the AD role, followed later by the Su-35.
- Twelve Mi-24 and 04 Mi-8 helicopters were inducted. Attack helicopters such as the Ka-52 and Mi-28 were also seen in battle.

It can be inferred that a well-coordinated air campaign was conducted by the Russians. Initial strike missions targeted rebel command and control, their leadership and support infrastructure. Later economic assets, oil infrastructure and supply routes were targeted. Close air support was undertaken throughout the conflict with a marked increase in the later stages.

### *Coalition Air Forces*

The intervention by the US-led Coalition in Syria was a direct offshoot of the US-led operation against ISIS called 'Operation Inherent Resolve' (OIF) in Iraq, which commenced in 2014. This Operation was spearheaded by aerial strikes that commenced three years after the departure of the US forces from Iraq (2011). As the US withdrew from Iraq, the power vacuum and instability in the country became apparent, and the interaction of these forces resulted in the emergence of ISIS. ISIS gained control of Fallujah in January 2014, followed by Mosul and other towns. It quickly advanced and occupied large tracts of land in Iraq and adjoining Syria proclaiming the creation of a Caliphate. The first aerial strikes by the United States were carried out by the carrier-borne F-18 aircraft using precision-guided bombs and Hellfire missiles by MQ-1 Predators. These strikes were against massed ISIS forces, who were laying a siege on the Kurdish town of Erbil in Northern Iraq. A number of Arab States also joined the coalition to counter

ISIS. Combat aircraft from Bahrain, Jordan, Saudi Arabia, Qatar and the UAE joined the coalition of western and NATO countries to advance the air operations. There were no coalition ground forces directly involved in these operations as the fight on the ground was conducted by local forces such as the Iraqi Security Forces (ISF) and the Kurdish Peshmerga in Iraq, and the Syrian Democratic Forces (an alliance of Kurdish and Arab militias) in Syria. Air operations were coordinated and synchronised with the battle conducted by these local partners. Commencement and build-up of this operation was slow. Initial targets were fielded ISIS units, with an air effort of 1871 sorties in the first month, of which only 280 were able to release at least one weapon.<sup>7</sup> Strict rules of engagement and clearance for target engagement approvals from higher command echelons were one of the reasons for the low rate of effort. The slow pace and efficacy of these initial strikes were criticised in various publications and was a subject of debate.

A terrorist attack in Paris (2015), where 130 were killed, gave further impetus to the air strikes. The target list was expanded to include command and control centres, logistics and the oil industry. A large variety of aircraft were involved in the strikes, these included F-15, F-16, F-18, M-2000, Rafale, Super Etendard, Tornado, Typhoon, B-1, B-52, UAV MQ-1 and MQ-9. The F-22 aircraft was also inducted. U-2, JSTARS and AWACS were used for ISR/Air Defence. All these operations were supported extensively by tankers and other support aircraft.

US Central Command (CENTCOM)<sup>8</sup> was given charge of the operation. A Combined Joint Task Force Operation Inherent Resolve (CJTF–OIR) was formed with its HQ at Kuwait. A three star officer, who was the Commander of Army Forces Central Command (ARCENT) was designated as its Commander. Commander of US Air Force Central Command (AFCENT)

---

7. Benjamin S. Lambeth, “American and NATO Airpower Applied: From Deny Flight to inherent Resolve”, in *Air Power Applied: U.S., NATO, and Israeli Combat Experience*, edited by John Andreas Olsen (Annapolis, MD: Naval Institute Press, 2017), pp. 124-17.

8. US Central Command has its HQ in Florida, USA. Its area of responsibility spans 21 nations from NE Africa, across the Middle East to Central Asia and Pakistan. It directs US Army Central Command (ARCENT), US Air Force Central Command (AFCENT) and US Navy Central Command (USNAVCENT).



was designated as the supporting commander. AFCENT controlled all the air forces in CENTCOM and undertook air operations through a Combined Air Operations Centre (CAOC) at Qatar. The CAOC had a coordinating element with the HQ of CJTR-OIR. In 2015, the command construct was changed to include two Combined Special Operations JTFs under the JTF Commander (one each for Iraq and Syria). These Combined SO JTFs were tasked to look after RPA operations especially related to leadership tracking and coordinate with partner forces on the ground. The RAND Corporation published a detailed analysis in 2021 on the role and development of the air operation against ISIS in Iraq and Syria. The study's major findings are summarised here.

- The war was intensive on Close Air Support (CAS), Intelligence, Surveillance, and Reconnaissance (ISR) missions. CAS and Air Interdiction missions were prioritised over Strategic Attack. Strike Cells<sup>9</sup> were established to coordinate air strikes with ground partners. Even though they were distant from the battlefield and had no FACs deployed, these Strike Cells played a major role in the war. The ground partners had the contact details of the Strike Cells and the CAOC; this enabled them to directly send their strike and ISR demands by encrypted phones and relay chats. The Strike Cells also coordinated and de-conflicted the airspace with artillery and other missions in the area. Airspace was frequently congested to the point where Strike Cells/CAOCs were forced to abandon traditional procedural control procedures in favour of positive control of strikes. The Special Operations JTF was responsible for raids and RPA strikes on ISIS leadership.
- CAS relied heavily on dynamic targeting upon spotting and identification by ISR assets. Most of the missions were undertaken by multirole fighter aircraft, A-10, B-1B, B-52 and C-130 aircraft. Apache helicopters were also used, albeit in a limited manner. The air defence cover for the strikes was provided by air defence patrols in coordination with AWACS,

---

9. Strike Cells were command posts headed by a one-star officer. In Iraq, these were manned by about 50 personnel. In Syria, these were manned by a smaller complement of approximately 20 personnel.

**Targeting a mobile, hybrid enemy without forward air controllers and stringent rules of engagement were the challenges faced in the dynamic targeting process. As the operations progressed, the target engagement approvals were delegated to subordinate commanders to reduce the response time.**

specifically after Russian aircraft and S-400 moved into Syria. Presence of a CAS aircraft overhead reassured ground partners and emboldened them for advancing. Any resistance or incoming fire faced by advancing ground forces was identified and localised by persistent ISR and taken out by strike aircraft. On-board software/hand-held devices given to pilots were programmed to display the alphanumeric code of each

building and segments of adjoining terrain to enable easy identification by pilots.

- Attacks in the Tactical Battle Area were mainly directed against ISIS Tactical Units, their defensive positions, lines of communication, facilities and resources supporting the close fight. Vehicle Borne Improvised Explosive Devices (VBIED) were also targeted. As the operations progressed, a kind of template evolved to take over population centres. This involved suppression of ISIS defences and preparation of the battlefield prior to the ground manoeuvre. In some cases, this preparatory phase lasted over a month. A case in point was the re-capture of the city of Raqqa, which involved a significant amount of air effort.
- ISR was heavily tasked, with nearly 14004 sorties being flown in the first 20 months of operations. Despite the large number of missions flown, there was a constant and increasing demand for ISR resources and intelligence outputs. The dynamic targeting cycle for CAS took anywhere from minutes to hours due to the strict rules of engagement and that the target attack approvals were being given by higher echelons. Targeting a mobile, hybrid enemy without forward air controllers and stringent rules of engagement were the challenges faced in the dynamic targeting process. As the operations progressed, the target engagement

approvals were delegated to subordinate commanders to reduce the response time.

- When OIR commenced, adequate intelligence was not available for strategic targets and for the deliberate targeting cycle. There was no pre-existing target list and it was difficult to assess the key pillars of strength of ISIS. All this had to be built up by fresh ISR and assessment of inputs made available from US Intelligence agencies. In addition, there were compelling reasons due to which it was difficult to divert ISR assets from the TBA to the deep/rear areas for identifying targets for strategic and deep interdiction. During the later stages of the operation, ISR resources were specifically released for supporting Op Tidal Wave-II, which was launched to target the oil industry and support infrastructure of ISIS. Op Tidal Wave-II targeted oil wells, stills, gas-oil separation units, refineries, storage sites, pumping stations, transportation trucks and the HQ of its Oil Ministry. Another operation titled Op Point Blank targeted financial buildings and banks of ISIS. The Joint Targeting Cycle usually took about 3-6 weeks to generate a new valid target for attack. This often impeded strategic and interdiction attacks.
- The expansion of airstrikes into Syria began in 2014, when about 4,000 ISIS fighters armed with heavy weapons advanced on the town of Kobani on the Syrian-Turkish border; at this stage air power was the only resource available with the US Coalition to blunt its advance. With no forces on the ground, the flexibility, speed and range of air power was used to swiftly shift the focus from Iraq to surge operation in Syria. Approximately 30 strikes were flown every day for a week. ISIS forces massed on the ground were easy targets from the air during the initial stages.
- Since most of the aircraft were getting airborne from distant air bases to hit key battlefields, aerial refuelling tankers were used extensively. In the campaign nearly one-fourth of all sorties flown were tanker sorties, flown at the rate averaging 34 tanker missions per day.
- Given the number of air forces operating in the region, mission planning and rules of engagement were complex. De-confliction was done by a

**Ability to carry out reconnaissance and thereafter analyse the data for targeting purposes had to be undertaken in quick time by the Coalition. This posed certain problems and had to be specifically strengthened as the campaign progressed.**

formal mechanism that restricted employability in certain cases. East of River Euphrates was designated as Coalition Airspace. Syrian and Russian aircraft operated west of the river. There was only one instance where a Syrian Su-22 was shot down by an F-18 after being detected attacking ground allies. Two air-air kills on RPAs were also reported.

- Targeting of ground forces requires intelligence, the flow of which in a dynamic battle is time-sensitive. Ability to carry out reconnaissance and thereafter analyse the data for targeting purposes had to be undertaken in quick time by the Coalition. This posed certain problems and had to be specifically strengthened as the campaign progressed. ISR resources as well as trained intelligence analysts were always in demand, and these resources fell short at times.
- The air war in Syria and Iraq against ISIS was intense and made significant contribution to the defeat of ISIS. Coalition operations between August 2014 and March 2019 saw 88,622 CAS, Escort and Interdiction sorties, wherein a total of 1,17,533 weapons were released. 48,901 ISR sorties were undertaken. To support the operations, 56,717 tanker and 39,970 airlift sorties were flown.

## **LESSONS FOR AIR POWER**

A force's effectiveness can be jeopardised by an insufficient attention on maintaining combat aircraft in a battle-worthy condition. Had the SyAF not been augmented by the RuAF, the situation would have been critical for Syria. Air Forces are technology and equipment intensive and require good technologicistic management that can sustain the tempo of war. The Indian Air Force is the fourth largest air force in the world and has acquitted itself well. This needs to be sustained by indigenisation and partnership

of private industry with public sector organisations such as HAL, BEL and DRDO.

The Russians were able to sustain a high tempo of operations due to augmented manpower (almost double of normal requirement) and the fact that they mainly operated their detachments from Syrian air bases close to the battlefields. The US

coalition was constrained in terms of number of missions they could generate because they operated from distant airbases and had to regularly use air-to-air refuelling to carry out missions. Therefore, availability of airfields near the area of operations is important, and planners should ensure that new airfields, such as the recently approved airfield in Deesa, Gujarat<sup>10</sup> and airfield upgradation plans in Lakshadweep<sup>11</sup> are given impetus as important projects during peacetime. Additionally, India has been looking at buying or taking on lease, six Airbus 330 air-to-air refuelling aircraft;<sup>12</sup> these purchases are essential as mid-air refuellers are a key to expanding the operational envelope of the IAF and Indian Navy's carrier-based fighters by extending their operational range.

The modern battlefield, particularly such where the enemy is difficult to discern, requires regular and sustained reconnaissance. The Syrian conflict is replete with examples of how the reconnaissance by air could not keep pace with the highly mobile enemy fighting groups. Post-mission or data analysis

**The Russians were able to sustain a high tempo of operations due to augmented manpower (almost double of normal requirement) and the fact that they mainly operated their detachments from Syrian air bases close to the battlefields.**

---

10. Sudhi Ranjan Sen, "New Frontline Fighter Air Base for IAF at Deesa", *India Today* March 23, 2018, at <https://www.indiatoday.in/india/story/new-frontline-fighter-air-base-for-iaf-at-deesa-1195974-2018-03-23>. Accessed on July 15, 2021.

11. R Pradip Sagar, "India Moves to Utilise Lakshadweep Strategic Location", *The Week*, July 25, 2021, at <https://www.theweek.in/theweek/more/2021/07/15/india-moves-to-utilise-lakshadweep-strategic-location-but-security-is-a-challenge.html>. Accessed on September 15, 2021.

12. Shishir Gupta, "India Considers French Offer of Six Airbus Multi-Role Mid-Air Refuellers", *Hindustan Times*, December 6, 2020, at <https://www.hindustantimes.com/india-news/india-considers-french-offer-of-six-airbus-multi-role-mid-air-refuellers/story-70sYwYarTrtUMQcE0wvV7N.html>. Accessed on July 15, 2021.

**Recreational drones made in China also made their way onto the battlefield, making it easier for rebel groups and insurgents. This conflict marks the first time that hobby drones were modified with explosives and turned into flying improvised explosive devices.**

of live feeds from reconnaissance aircraft requires trained imagery analysts on a 24x7 basis. Regular training and availability of such crew is essential to enable rapid targeting required in today's dynamic and elusive battlefield. Trends indicate that this requirement will only grow in the coming years, and thus all armed forces need to invest for growth not only in terms of reconnaissance

aircraft/equipment, but also in its exploitation by trained analysts. Shrinking the OODA (Observe, Orient, Decide, Act) loop is essential by building a tri-service communication and data transfer network to support seamless operations, otherwise the time-sensitive and first-responder capabilities of air power may take a hit.<sup>13</sup>

The conflict witnessed extensive use of drones in actual combat. The Iranian Shahed-129 and Chinese CH-4, which are two rough equivalents to the US MQ-1 Predator, conducted their first known drone strikes in Iraq and Syria in 2016 and 2015, respectively. Recreational drones made in China also made their way onto the battlefield, making it easier for rebel groups and insurgents. This conflict marks the first time that hobby drones were modified with explosives and turned into flying improvised explosive devices.<sup>14</sup> While large or medium-sized UAVs can be detected by ground as well as airborne radars, detection and neutralising small drones will stay a challenge especially in a no-war no-peace situation. Potential to cause damage by hobby drones is always there, but is limited by virtue of its small payload carrying capability.

---

13. Arjun Subramaniam (AVM), "Indian Air Force: The Need to Embrace New-Age Technologies. *India Today*, October 8, 2021, at <https://www.indiatoday.in/magazine/guest-column/story/20211018-indian-air-force-the-need-to-embrace-new-age-technologies-1862298-2021-10-08>. Accessed on November 15, 2021.

14. Dan Gettinger, "Drones Operating in Syria and Iraq", *Brad College (The Center for the Study of the Drone)*, December 13, 2016, at <https://dronecenter.bard.edu/drones-operating-in-syria-and-iraq/>. Accessed on July 15, 2021.

This aspect of aerial warfare is here to stay and systems are being designed to protect key installations from such attack. It is presently impossible to provide anti-drone systems to all key areas. Prioritisation needs to be done to preclude leadership attacks and debilitating attacks on sensitive defence installations. The Request for

Information floated by the IAF indicates a requirement for an indigenous anti-drone system with Laser-based Directed Energy Weapon.<sup>15</sup> Development of such systems by India will require sustained impetus.

Cruise missiles were used by both the Russians and the US Coalition. This conflict reinforces the trend that future war-fighting will involve the use of cruise missiles. China and Pakistan both possess cruise missiles. The Chinese HN, YJ and CJ series as well as Pakistan's Babur and Raad, enable offensive action especially in a short conflict<sup>16</sup> and can augment firepower providing concentration of force with minimum risk. India has made substantial progress with the manufacture of the BrahMos cruise missile. This and other developmental projects such as the hypersonic BrahMos II<sup>17</sup> should be sustained. Nations will need to consider countermeasures to cruise missiles, particularly around critical regions and sites, using close-in weapon systems, with an emphasis on airbases and leadership protection.

While multi-role combat aircraft can undertake close air support and battlefield air interdiction with ease, an analysis of the Syrian conflict brings

**The Chinese HN, YJ and CJ series as well as Pakistan's Babur and Raad, enable offensive action especially in a short conflict and can augment firepower providing concentration of force with minimum risk.**

---

15. Amit Chaturvedi, "Jammu Attack: Air Force Plans to Buy Anti-Drone Systems With Laser Weapons", *Hindustan Times*, July 6, 2021, at <https://www.hindustantimes.com/india-news/jammu-attack-air-force-plans-to-buy-anti-drone-systems-with-laser-weapons-101625548788024.html>. Accessed on August 15, 2021.

16. Kartik Bommakanti, "China's Cruise Missile Capabilities: Implications for the Indian Army and Air Force, ORF, December 4, 2020, at <https://www.orfonline.org/research/chinas-cruise-missile-capabilities/>. Accessed on July 15, 2021.

17. PTI, Washington, "International, India Among Select Few Countries Developing Hypersonic Missiles: US Congressional Report, *The Hindu*, October 22, 2021, at <https://www.thehindu.com/news/international/india-among-select-few-countries-developing-hypersonic-missiles-us-congressional-report/article37119764.ece>

**Preparing an air force for future battles will require it to concentrate on training for the elusive ground battlefield. This will mean operating as a joint force with ISR inputs from multiple sources including alliance partners.**

out that requirement of a dedicated close air support aircraft with good survivability and weapon delivery capability still exists in low-intensity conflicts. When data from these aircraft is linked to forward air controllers, they can provide coordinated close air support especially in gray zone fights where the air defence environment is

permissive. The American A-10 and the Russian Su-25 are examples of such aircraft and India should consider developing such capability. Rotary wing aircraft, such as the Apache and Light Combat Helicopter<sup>18</sup> have already been inducted, and fixed wing aircraft may be considered in the future.

Given the number of air forces operating in the area, operators were faced with a complex situation in Syrian airspace. US and coalition aircraft flew in close proximity to Russian fighters, often in support of different ground actors without classifying each other as hostile. Syria-like scenarios are likely in the future, where large powers seek to shape narratives and garner leverage.<sup>19</sup> India can also be engaged with two hostile neighbours. A conflict with one, may not directly involve the other. This may complicate rules of engagement. For example, while on the western border in Kashmir, IAF may engage in an air battle with Pakistan, however support in terms of reconnaissance, intelligence and electronic warfare may come directly and simultaneously from China across the Eastern Ladakh border, albeit without any declared hostilities with China. A situation similar to that which the US and Russia faced in Syria could be repeated to some extent in India.

Preparing an air force for future battles will require it to concentrate on training for the elusive ground battlefield. This will mean operating as a joint

---

18. FPJ, Bureau, "Boost to Make-in-India, PM hands over HAL made LCH to IAF", *The Free Press Journal*, November 25, 2021, at <https://www.freepressjournal.in/corporate-gallery/boost-to-make-in-india-pm-hands-over-hal-made-lch-to-iaf>. Accessed on December 15, 2021.

19. Aaron Stein and Ryan Fishel, "Syria, Airpower, and the Future of Great-Power War", *War on the Rocks*, August 13, 2021, at <https://warontherocks.com/2021/08/syria-airpower-and-the-future-of-great-power-war/>. Accessed on December 15, 2021.



force with ISR inputs from multiple sources including alliance partners. Inputs coming in from Special Forces, UAVs and other aerial intelligence gathering assets will have to be rapidly converted into targeting information.

The SyAF came under a lot of criticism for its inability to separate civilians from the rebel groups. Large number of casualties were reported due to aerial bombardment and allegations of chemical attack were also made. The impact on civilians was so intense that the conflict generated a refugee crisis with global ramifications. The psychological and physical impacts of aerial bombardment, especially during combat in built-up areas, will always stay a cause of critical concern for all air forces and its leadership. Identification and segregation of civilians in urban combat will be difficult and will impose restrictions in employment of air power. Future war-fighting may gravitate towards urban areas and this will necessitate a preference for aerial weapons designed for precision and low collateral damage.

A terrorist attack on Russian civil aviation indicates that nations should step up their security in the civil aviation sector when involved against non-state actors. While security is an ongoing process, special and additional steps may have to be taken to prevent and deter terrorist attacks on civil aviation.

## CONCLUSION

Inherent capabilities of air power were instrumental in aiding the Assad regime in Syria. The rapid induction of the Russian Air Force helped Syria immensely. It stemmed the advance of ISIS and rebels by attrition, shock and psychological dislocation. Similarly, the US coalition was able to rapidly

**The psychological and physical impacts of aerial bombardment, especially during combat in built-up areas, will always stay a cause of critical concern for all air forces and its leadership. Identification and segregation of civilians in urban combat will be difficult and will impose restrictions in employment of air power.**

shift forces from Iraq to Syria, thereby blunting the advance of ISIS. Tactical air support in the form of air to ground strike missions were extensively flown using unguided and precision munitions, including cruise missiles launched from long-range bombers and naval ships. UAV and hobby drones were also used in combat for the first time. An analysis of this conflict from the perspective of aerial warfare provides indicative trends and lessons for future employment of air power.