

# Contemporary Technology in Peacekeeping Operations

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*Since the Cold War, United Nations peacekeeping has evolved from monitoring peace treaties to multidimensional peacekeeping operations tasked with rebuilding states and their institutions during and after conflict. In June 2014, An Expert Panel on Technology and Innovation in UN Peacekeeping recommended investigating how innovative technology can strengthen peacekeeping missions. The report suggested greater use of advanced technologies, such as increased use of ground and airborne sensors and other technical data sources, advanced data analytics, and information fusion to aid in data integration. Since then, the United Nations has continuously pursued efforts in this field. India, during its tenure of the presidency of the UN Security Council in August 2021, raised three significant issues. These were 'Accountability of Crimes Against UN Peacekeepers', 'Technology for Peacekeeping' and 'UNITE Aware Situational Awareness Technology Platform'.*

*This article attempts to highlight these issues with possible solutions from contemporary technology that can be used on a larger scale by UN security forces in various missions for maintaining peace, situational awareness with rapid decision-making and conflict resolution. In addition, this article highlights the importance of sticking to the basics to arrive at specific solutions. It also presents a perspective on exploring United Nations Peacekeeping Missions in Africa as a potential market for self-reliance under the 'Aatmanirbhar Bharat Abhiyan'.*

**Keywords:** *Situational Awareness, Technology for Peacekeeping, UNPKF, Self-reliance, Communications, Sensors, UAVs, Solar Panels, Telemedicine*

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## INTRODUCTION

After the ravages of World War II, the United Nations (UN) was founded in 1945 with a single mission, that of maintaining world peace and security. The United Nations does this by preventing conflict, helping conflicting parties reach an agreement, deploying peacekeepers and creating the conditions for lasting peace. However, to be effective, these activities often overlap and reinforce each other. Nevertheless, peacekeeping has proven to be one of the most effective UN tools to help countries navigate the difficult transition from conflict to peace. Today's multidimensional peacekeeping missions have the task of maintaining peace and security, facilitating political processes, protecting civilians, and assisting in the disarmament, demobilisation and reintegration of ex-combatants. It also enables supporting constitutional processes, organising elections, protecting human rights, restoring the rule of law, and developing legitimate state authority.<sup>1</sup>

## PEACEKEEPING OPERATIONS

Peacekeeping is one of the most effective tools the United Nations has in its arsenal for promoting and preserving international peace and security. The official website of UN peacekeeping defines the role and tasks of peacekeepers as 'Peacekeepers protect civilians, actively prevent conflict, reduce violence, strengthen security and empower national authorities to assume these responsibilities'. This necessitates the development of a cogent security and peacebuilding strategy that complements the political strategy. UN peacekeeping assists host countries in developing greater resilience to conflict, laying the foundations for long-term peace, including addressing underlying issues of the conflict.

Peacekeeping operations are managed by the Department of Peace Operations and supported by the Department of Operational Support at UN Headquarters in New York, with mandates from the UN Security Council (UNSC). The member states contribute their troops and police for peacekeeping operations. There are currently 12 UN peacekeeping operations (UNPKO) functioning, with 71 deployed since 1948. Six of the 12 UNPKO missions are in Africa and two in Europe and Central Asia (Kosovo and Cyprus). The other four operations are in the observatory and supervisory roles in the Middle East, India and Pakistan. These observers formed the basis of the United Nations Military Observer Group in India and Pakistan (UNMOGIP), under the

direction of the Military Adviser assigned by the UN Secretary-General. Following the resumption of hostilities in 1971, UNMOGIP stayed in the area to monitor developments relevant to the strict adherence of the 17 December 1971 ceasefire and report to the Secretary-General.<sup>2</sup> As of November 2021, India had deployed 5,548 uniformed personnel to UN Missions in various capacities, second only to Bangladesh's 6,344 personnel.<sup>3</sup>

UN Peacekeeping assists countries in achieving long-term peace support political processes, protects hundreds of thousands of civilians, and aids in ensuring ceasefires. However, protracted conflicts, elusive political solutions, increasingly difficult conditions, rising peacekeeping deaths, and complex mandates pose problems to peacekeeping. To address these challenges, the Secretary-General launched the Action for Peacekeeping Initiative (A4P) in 2019 to reaffirm the international community's commitment to peacekeeping missions<sup>4</sup> with more targeted mandates and better equipped and trained forces. A4P is the central agenda for actions and it is a change agent in all elements of the UN's peacekeeping work.<sup>5</sup> In this regard, India has significant potential for increased cooperation with UN peacekeeping, as it has the capacity and technologies to assist UN peacekeepers deployed in missions around the world.

#### PRESIDENCY BY INDIA

In August 2021, India assumed one-month presidency of the UNSC. According to the rules of procedure,<sup>6</sup> the presidency of the UNSC rotates among the 15 members in alphabetical order. India is the Council President for the eighth time, and the next term is scheduled to begin in December 2022. In August 2021, New Delhi held three high-level signature sessions on maritime security, peacekeeping and counter-terrorism.<sup>7</sup>

Since its inception, India has made significant contributions to United Nations Peacekeeping Missions (UNPMs). Since its inception in 1948, New Delhi has contributed to most UNPMs, making it one of the largest contributors.<sup>8</sup> During India's chairmanship, the UNSC approved three key outcome documents. The first was the Resolution on 'Accountability of Crimes Against UN Peacekeepers', authored by India and co-sponsored and unanimously adopted by all 15 UNSC members and 80 UN Member States.<sup>9</sup> According to the resolution, members of the Security Council were urged to declare atrocities against peacekeepers

to be war crimes. It also encouraged members to ‘take all appropriate measures, under their national law and international law, as applicable, to bring to justice to the victims of violence and killings’.<sup>10</sup>

The second outcome of the paper was a unique President’s Declaration on ‘Technology for Peacekeeping’.<sup>11</sup> According to India’s official position, implementing the UNSC mandate on peacekeeping necessitates making the necessary technical needs readily available to peacekeepers for the Council’s mandate to be successfully carried out. According to the president’s statement, India requested that the UNSC addresses the technological needs of peacekeepers and harness technology, mainly digital technology, because they work in ‘complicated political and security situations and face asymmetric challenges’ such as terrorism.<sup>12</sup>

India also emphasised the significance of the ‘UNITE Aware situational awareness technology platform’, which aims to ‘integrate technical and inventive capacities of Member States’.<sup>13</sup> ‘When it comes to the safety and security of UN forces, India believes in talking the talk’, said Minister of External Affairs S. Jaishankar.<sup>14</sup> India also signed a Memorandum of Understanding (MoU) with the UN as part of the ‘Partnership for Technology in Peacekeeping’ initiative. It backs the United Nations Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (UNC4ISR) Academy for Peace Operations, which aims to build capacity and teach peacekeepers about technology.<sup>15</sup>

#### PEACEKEEPING THREATS

There are often many dangers faced by peacekeepers during peacekeeping missions and operations. According to Kalle Kallio, ‘The risky, unpredictable, and unstable environments in which peacekeepers operate is essentially the reason for such dangers. Examples of types of political and governmental situations that precipitate conflict in a given country and therefore dangerous operational environments for peacekeepers include failed governance, conflict spillover, vulnerabilities in ungoverned strategic spaces and resource-rich territories, border disputes, extremism and uncontrolled migration’.<sup>16</sup>

The modern peacekeeping environment poses many new threats to peacekeepers, which were not present in the past operations until the end of the 20th century. Consequentially, the need for information systems to provide security to peacekeepers, largely achieved through delivering situational awareness, has never been higher. The increased threat to

peacekeepers and the increased need for information systems to provide security are reflected through the significant increase in peacekeeper casualties (Table 1).

**Table 1 UNPK Fatalities by Year**

United Nations peacekeeping								
(1) Fatalities By Year up to 31 Dec 2021								
	DPKO		Non-DPKO		Peacekeeping		Total	
	Year only	Cumulative	Year only	Cumulative	Year only	Cumulative	Year only	Cumulative
1991	15	860	0	0	0	6	15	866
1992	58	918	1	1	0	6	59	925
1993	251	1169	1	2	0	6	252	1177
1994	166	1335	2	4	0	6	168	1345
1995	123	1458	2	6	1	7	126	1471
1996	52	1510	3	9	0	7	55	1526
1997	47	1557	1	10	1	8	49	1575
1998	32	1589	5	15	0	8	37	1612
1999	30	1619	9	24	0	8	39	1651
2000	59	1678	1	25	0	8	60	1711
2001	72	1750	0	25	0	8	72	1783
2002	84	1834	3	28	1	9	88	1871
2003	83	1917	25	53	0	9	108	1979
2004	114	2031	3	56	0	9	117	2096
2005	129	2160	2	58	0	9	131	2227
2006	105	2265	3	61	0	9	108	2335
2007	82	2347	8	69	0	9	90	2425
2008	126	2473	10	79	0	9	136	2561
2009	115	2588	6	85	0	9	121	2682
2010	173	2761	0	85	0	9	173	2855
2011	108	2869	7	92	0	9	115	2970
2012	110	2979	2	94	0	9	112	3082
2013	105	3084	5	99	0	9	110	3192
2014	123	3207	4	103	0	9	127	3319
2015	120	3327	6	109	0	9	126	3445
2016	119	3446	2	111	0	9	121	3566
2017	134	3580	3	114	2	11	139	3705
2018	96	3676	3	117	0	11	99	3804
2019	88	3764	15	132	0	11	103	3907
2020	121	3885	10	142	0	11	131	4038
2021	125	4010	10	152	0	11	135	4173
<b>Total</b>	<b>4010</b>	<b>4010</b>	<b>152</b>	<b>152</b>	<b>11</b>	<b>11</b>	<b>4173</b>	<b>4173</b>

Source: United Nations Operations and Crisis Centre, United Nations.<sup>17</sup>

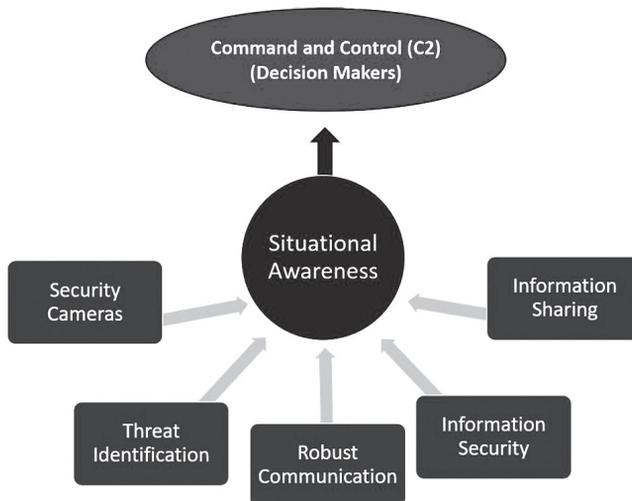
The majority of the world's key powers have sent only a small number of troops to UN peacekeeping missions. This issue has been raised numerous times. Apart from the numerous political, diplomatic and military considerations, countries may be unwilling or incapable of contributing to UN peacekeeping. Apart from these, one of the primary reasons may be a fear of losing military personnel in perilous peacekeeping

missions that are not deemed critical to national interest. Fatigue from having large numbers of personnel already deployed for long periods in other locations such as Iraq and Afghanistan is another atrocity, and peacekeeping rules of engagement are perceived to inhibit the kind of force that may be necessary to protect own troops and succeed in the mission. The loss of support for peacekeeping is an unfortunate trend adding to human suffering.

**MITIGATING ACCOUNTABILITY OF CRIMES AGAINST UN PEACEKEEPERS**

Threat mitigation could entail telling a UN peacekeeping patrol to avoid an area known for hostile activity. There are several ways information systems can mitigate threats and provide situational awareness and security to protect peacekeepers. A few of the fundamental issues that may appear to be of minuscule or negligible significance but can yield massive returns in mitigating the crimes against UN peacekeepers are covered in the following section. In their study and various official reports by the UN itself, many researchers have highlighted the need for effective use of contemporary technology in the overall scheme of things in peacekeeping.

The experience gained from many decades of such operations indicates the requirement of having a robust ‘Situational Awareness’ mechanism (Figure 1). There is not much scope available for offensive platforms as



**Figure 1** Contributors to Situational Awareness

*Source:* Author

it defeats the very purpose of peacekeeping. Thus, it is imperative to adopt simple but innovative methods following basics of administrative and technological management in peacekeeping operations. Situational awareness is essentially about understanding a situation or environment. Good situational awareness is critical in any context where decision-making with significant consequences occurs in a complex setting.

Technology could address some of the issues preventing countries from becoming more involved in peacekeeping missions. Several technologies that provide basic needs of the transportation, communication, security, command and control should be used consciously to improve situational awareness in peacekeeping, and to make the troops more secure. It will also enable them to keep peace more effectively and address the needs of the population. Therefore, it is critical to prioritise the basic needs of the troops and the civilian population through some of the most significant technological advances.

#### DETECTION AND IDENTIFICATION OF THREATS

The most effective security benefit that information systems can provide is the first step of threat identification. Satellite imagery, Unmanned Air Vehicles (UAV) and other forms of monitoring and surveillance technology, security cameras, and other devices connected to an information system are all examples of ways in which an information system can detect threats. Threat identification is essential for ‘neutralising or eliminating threats’, as Lieutenant General (Retired) Carlos Alberto dos Santos Cruz points out in one of his recommendations for the 2017 report ‘Improving Security of United Nations Peacekeepers’. Another essential requirement of information systems in the modern peacekeeping environment is the ability to communicate effectively and reliably at all times. Therefore, it is one of the most remarkable and influential ways for an information system to contribute to peacekeeper security and threat identification when combined with the human component of the system.

#### SITUATIONAL AWARENESS ECOSYSTEM

The 2019 Department of Peace Operations (DPO) Policy on Joint Operations Centres (JOCs) defines situational awareness as ‘the tool for knowledge, understanding and anticipation of a situation through monitoring and reporting of current events, analysis and predictive assessments’. The use of digital technologies in UN peacekeeping

operations for monitoring, surveillance, analysis and decision-making is not new. However, the capabilities of digital technologies available to peacekeeping missions today are orders of magnitude greater than those available a decade ago.

According to the 2015 report of the Department of Peacekeeping Operations-Department for Field Support (DPKO-DFS) Expert Panel on Technology and Innovation, 'continuously improving camera resolution, the accuracy and availability of aerial and geospatial data, and movement detection sensors have been used for a wide range of intelligence and situational awareness purposes in missions ranging from ceasefire monitoring to camp security'. These capabilities have grown to the point where missions may now perform mass visual and digital surveillance in their operating environments, allowing them to conduct 'human terrain mapping' and develop 'pattern of life' assessments to identify and isolate dangers.

While many of these tools are commercially available, the most advanced technologies have tended to be brought in by the member states. It is through deployed units or facilitating arrangements that necessary skills, procedures and legal and policy frameworks can be brought in. As a result, the substantively rich and deep information gathered by peacekeepers has become the source of increasingly centralised and organised data. These trends have further added unprecedented complexity to the acquisition, deployment and management of digital tools for peacekeeping intelligence and situational awareness.<sup>18</sup>

### **Security Camera**

A simple security camera is one technology that can help with this problem. With the widespread use of security cameras in homes and businesses worldwide, there have been significant advancements in these devices recently. As a result, it can also be helpful in peacekeeping situations. Furthermore, the cost of cameras has dropped significantly to the point where it is feasible to deploy large numbers of them on a shoestring budget. In addition, it can also use the enhanced feature of artificial intelligence (AI) software of a security camera to control it. With the assistance of AI, it can also detect moving objects. Video feeds can be filtered with motion and person detection so that only clips with action and people are recorded and presented to monitoring personnel. This security technology aids in the resolution of the problem of information

overload, which occurs when there are so many data sources and long static videos captured through primary security cameras.

The proliferation of camera sensors, when combined with AI, can be a massive force multiplier for peacekeeping operations. These sensors can be used to protect troop facilities, vital government and utility facilities, refugee camps, and other civilian populations vulnerable to violence. Low-cost security technology could also be installed along transportation corridors to deter and detect IED placement. Advancement in low-cost security cameras for peacekeeping is that many cameras can now be wirelessly connected and run on batteries for extended periods. It allows them to be much more flexible in their placement without incurring the additional cost and effort of running wires to each device. The cameras can be used in dash-cams for vehicles and bodycams for troops, making them highly mobile and can be easily moved to different locations.

Such devices can be game-changers in peacekeeping operations. As peacekeepers patrol in vehicles and on foot, cameras provide accountability and improve troop behaviour because they are aware that their actions are being recorded. Following that, if a video is live-streamed back to the operations headquarters, it can provide a comprehensive situational awareness of what is going on in the field. It is especially true if the troops are also equipped with personnel locator devices, which allow the command-and-control centre to track the location of all blue forces. Mobile cameras' recording facility makes it easier to prosecute bad actors and protect good actors from false accusations. In addition, as peacekeepers work to build positive relationships with the local population, it is critical that people see the peacekeepers as accountable and doing good for them. Having a large number of cameras to help secure the people and record the efforts of peacekeepers could provide the evidence and accountability required to build positive relationships.<sup>19</sup>

### **Communications**

Communications technology is crucial because it can significantly improve peacekeeping operations. Many peacekeeping operations rely on communications such as messaging, phone calls, video and multimedia. Unfortunately, most peacekeeping missions are carried out in underdeveloped and turbulent areas with limited or no local communications and internet access. Most modern militaries can bring their own communications equipment, but it can be challenging to use with patchy network coverage, thus, making it unreliable and an

expensive proposition. Furthermore, interoperability issues can arise when various forces join for peacekeeping operations. Therefore, a need for robust communication such as the newly developed Starlink System could be the solution.

### **Information Sharing and Command and Control (C2) Structure**

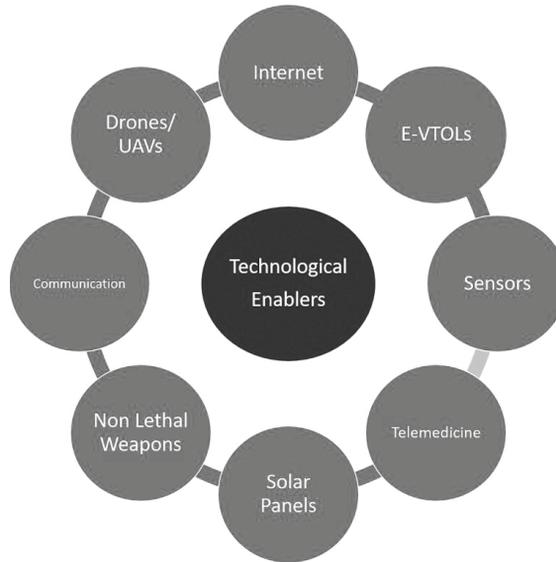
Technology has tremendous potential for improving peacekeeping mission command and control structure. Data must be coordinated, compiled and filtered from overhead visualisations, aerial data, satellite imagery, sensor inputs, and personnel location information to derive actionable information. These data points can be combined in geospatial information systems (GIS), allowing anyone in the mission area to access and analyse data relevant to their own local or regional sphere of operations. Improved situational awareness would result from increased information sharing. The lack of system-wide information-sharing protocols and standards, secure information technology and communication platforms discourages information sharing. It exposes employees to allegations of data security breaches because it is rarely clear what information is permitted and expected to be shared with whom and how.

The technologies mentioned earlier can help mission planning at the C2 centre at the operational and tactical levels. Individual units on the ground can see what is happening around them and identify what is ensuing in a nearby neighbourhood. Geographic Information System (GIS) platforms can improve situational awareness and identify patterns and relationships by overlaying data and tracking changes over time. GIS platforms are instrumental in peacekeeping missions for observing borders, monitoring ceasefire lines, assisting electoral processes, protecting civilians, providing humanitarian aid, spotting force build-ups and overseeing demobilisations. Such information will enable faster decision-making by the C2 centre.

#### **CONTEMPORARY TECHNOLOGICAL ENABLERS FOR PEACEKEEPING**

The Covid-19 pandemic has given a new dimension to social and official networking methods despite being distantly apart across the globe. Walter Dorn<sup>20</sup> writes in *UN Chronicle* that:

The United Nations is relying heavily on information and communications technology (ICT) to respond to the COVID-19 crisis while continuing its important work. The Security Council



**Figure 2** Technological Enablers for Peacekeeping

*Source:* Author

meets by video teleconference and the Secretary-General holds media interviews with journalists sitting in different rooms, sometimes in different cities. United Nations staffs all over the world rely on video platforms for virtual meetings and town halls in this time of social (physical) distancing.<sup>21</sup>

United Nations leaders made the wise decision to move most of the organization’s information technology to the cloud and rely on large corporations for cloud services half a decade ago. That decision has paid-off now, as the industry has demonstrated its ability to handle a massive increase in Information and Communications Technology (ICT) demand during the pandemic, allowing the UN and many other organisations and businesses to continue operating. During and after the crisis, technology can be used to accomplish much more. Other technological enablers for UN peacekeeping operations are also worth mentioning (Figure 2).

**Sensors**

Sensors could help keep UN workers safe from untoward incidents such as armed attacks. For example, video and two-way audio monitoring systems could replace a few manned observation posts in congested

areas. Peacekeepers stationed at remote stations would be able to monitor tense situations and take action, such as hailing wrongdoers or dispatching an unmanned aerial vehicle to buzz the area, if necessary. Armed peacekeepers could then be deployed based on the images and information received. Thermal hotspots could be used to alert intrusions using 360-degree infrared cameras and scanners. Sensors are also useful to detect intrusions and prevent them from happening. In addition, unmanned aerial and land vehicles, both in the air and on the ground, may be dispatched to the most hazardous mission areas in the future. Onboard loudspeakers could be used to send warning messages, and laser signals could be used to communicate using symbols.

### **Global Internet**

Elon Musk's company, SpaceX, has launched Starlink, the world's largest satellite network. Its goal is to bring low-cost Internet to rural areas. According to SpaceX, this so-called mega constellation could eventually have as many as 42,000 satellites. It is claimed to provide high-bandwidth, low-latency data connections across the entire globe, including functionality at high latitudes, across oceans, and across large areas of underdeveloped continents like Africa. Additionally, the Starlink network promises to be much more affordable, reliable and capable than current satellite-based communications networks due to low launch costs and mass-produced satellites. According to a Starlink guide, SpaceX had launched over 1,900 Starlink satellites as of early January 2022. The constellation is now offering broadband service in select locations worldwide as part of a beta-test programme, with download speeds ranging from 100 to 200 megabits per second and latency as low as 20 milliseconds.<sup>22</sup>

The United States Air Force has already expressed special interest in using the Starlink network for some of its operations and weapon systems. They have begun early tests of Starlink terminals that provide encrypted data links on various aircraft. Will Roper, the US Air Force Chief of Acquisition, has led the Air Force's testing and evaluation of the Starlink system. The results have been encouraging in terms of using this technology in peacekeeping.<sup>23</sup> Having a reliable network connection is critical to peacekeeping. It improves command and control communications between the peacekeeping mission's headquarters and the UN.

Faster technical communications will provide much better real-time information on the status of forces and events occurring in a country's mission areas. As more technology is deployed in peacekeeping operations, having a reliable, secure network with plenty of bandwidth allows for increased sensor communication between various security sensors, drones, Intelligence, Surveillance, Reconnaissance (ISR) systems, vehicles, and personnel will become increasingly important.

These networks will also help the troops with their recreational activities for recouping and rejuvenation and for staying connected with their families back home. In addition, local leaders and the populace could use these networks to stay informed, connected and educated. These valuable peacekeeping benefits come from improving the stability, and local capacity of the communities and countries served.<sup>24</sup> Additionally, improvements in quality of life like these will go a long way towards persuading more countries to contribute troops to UN peacekeeping missions.

#### **Unmanned Aerial Vehicles (UAVs)**

UAVs are not only a game-changer in modern warfare, but they can also save lives in humanitarian missions. UAVs demonstrate immense capability in modern warfare by performing logistics, protecting civilians and supporting other peaceful purposes. UAVs serve as the fastest and most high-tech tool for today's challenges, combining the trinity of monitoring, detection and accessible life support transportation. It can aid operations aimed at improving civilian protection and safety. It will also help UN peacekeepers observe, provide continuous day and night surveillance, control safe and secure logistic transportation, and detect violent rebels or terrorists.

For the first time, smart surveillance and detection were used for tactical search and rescue operations involving hostage situations during the UN peacekeeping mission in the Democratic Republic of the Congo in 2003. Getting a bird's eye view improves data collection by including visuals, allowing for a better understanding of the post-conflict situation and preventing impunity for perpetrators and protecting victims. Before peacekeepers intervene and deal with hostile parties, the UAVs can identify any breaches of embargoes and arms smuggling, criminals and investigate areas of active conflict, bomb sites, etc. In Africa, drones are increasingly being used to assist displaced people fleeing conflict zones and to meet their basic needs.<sup>25</sup>

When asked about using high-tech equipment such as UAVs or drones in UN missions, Hervé Ladsous<sup>26</sup> cites some fundamental but incredible benefits. He says that ‘UAVs are the more visible part of this array of suggestions. I want to make it very clear that our UAVs are unarmed. They are for surveillance purpose only and is now becoming a relatively common tool. We started just over two years ago in the DRC. But we are now deploying surveillance drones of every denomination, tactical and strategic. For instance, we have also deployed them in Mali and the Central African Republic (CAR). Of course, I would very much want to deploy some in South Sudan because that is the key for us to perform better’.

The essence of what he means is that ‘UAVs do a better job in protecting civilians because they provide real-time pictures of situations as they develop on the ground. You can act more quickly and more decisively. They also provide better security to our people because you get prior warnings that an ambush or an attack is about to happen. You are then in a position to prepare for it. And sometimes, you can save people’s lives. The UAVs are very versatile and necessary tools in our operations’.<sup>27</sup>

Highly encouraged by the success of using drones in the field operations, the United Nations DPO and DFS has formally issued a guideline in the form of an official document entitled ‘United Nations Use of Unmanned Aircraft Systems (UAS) Capabilities’ in February 2019.<sup>28</sup> The purpose of the document is ‘to provide guidance on the considerations required for the generation and employment of Unmanned Aircraft Systems (UAS). In addition, the guidelines are intended to provide an overview for both the military and civilian aspects of United Nations Field Missions’. The guideline enunciates the background as ‘UAS have been employed on UN Peacekeeping Operations since 2014. Their use has grown considerably as they become increasingly important in supporting Field Missions in implementing mission mandates. A UAS can support all mission segments by enhancing situational awareness, supporting the protection of forces, reducing the personnel footprint in dangerous environments and verifying reports on vulnerable people’.<sup>29</sup>

### **Electric Vertical Take-Off and Landing Craft (eVTOLs)**

The eVTOL technology has the potential to greatly improve the effectiveness of peacekeeping. Peacekeeping troops should be provided with mine-resistant vehicles to help them avoid mines and Improvised Explosive Devices (IEDs) while on the move. Peacekeeper vehicles could

be equipped with ground-penetrating radars and jammers to disrupt and detect IEDs. The eVTOLs could be used to take mobility to the next level. The US Air Force is making a concerted effort to become the world leader in eVTOL development and deployment. These highly mobile aircraft can land in a smaller footprint than a helicopter and be piloted autonomously or by non-pilots. Furthermore, eVTOLs are considered to be significantly less expensive than helicopters to operate and maintain. The ability to quickly fly around in an eVTOL has the added benefit of avoiding IEDs and allowing for travel over rough terrain without the use of roads. Another advantage of eVTOLs over helicopters and other planes is their quietness. It is almost soundless even when only 1000 feet away due to its electric propulsion and small rotors.

eVTOL craft will be highly adaptable, allowing them to support peacekeeping missions in various ways. For example, transporting supplies and troops will be safer and more efficient. They could also help with medical evacuation by developing air ambulance versions, which would allow for rapid response in the event of a violent outbreak or a natural disaster. For ISR platforms, both manned and unmanned versions could improve command-and-control situations across the mission area. As a result, the participating countries will be much more motivated to contribute troops to peacekeeping missions due to various added capabilities and safety features that eVTOLs can provide.

### **Solar Panels for Energy Requirements**

Renewable Energy in Peacekeeping is another area with plenty of scope in peacekeeping missions worldwide, especially in Africa. This technological revolution has finally caught attention in the UN energy summit held in September 2021. India has been the Solar Alliance's torchbearer and is leading the way in this regard. UN Under Secretary-General for Operational Support Atul Khare said: 'Our focus on improving the effectiveness and operational resilience, and on reducing our environmental footprint through the Secretary-General's Action for Peacekeeping (A4P) as well as our six-year Environment Strategy (2017-2023), has enabled peacekeeping missions to implement more renewable energy projects'.

Therefore, it is imperative that the countries in a conflict where limited access to resources can find opportunities to install large solar panels for renewable energy. Furthermore, it will help the UN staff in the field and generate a mammoth economy and employment for the

local populace. It suffices to say that Francesco La Camera, Director-General of International Renewable Energy Agency (IRENA), also expressed that ‘The peacekeeping operation shift to renewable energy is more than reducing the carbon footprint. It is a vital building block for creating local markets and a contribution to long-term sustainable development’. Mr Khare also said that ‘This compact is a great step in this direction, strengthening the ongoing collaboration with host nations and creating an opportunity for peace operations to support the host nation’s electrification plans through renewable energy projects’.

As per the UN peacekeeping report, UNPKO consumes about 500 gigawatt-hours per year of energy, concentrated in six major peacekeeping missions. ‘They are often among the largest energy consumers in their host countries, potentially providing an opportunity to anchor emerging renewable energy capacity that can be sustained beyond the lifetime of the mission. But, on the other hand, missions are also among the largest greenhouse gas emitters, making them integral to some host governments’ efforts to achieve their Paris Agreement goals’.<sup>30</sup>

### **Non-Lethal Weapons**

Another technology that could be used to improve security in peacekeeping operations is non-lethal weapons. One of the main reasons countries are hesitant to join UN operations is that some of the rules of engagement for peacekeeping missions previously prohibited the use of violence to protect civilians or peacekeeping troops. This puts peacekeepers in the unenviable position of being powerless to intervene if violence spirals out of control. Moreover, suppose peacekeepers use lethal force to protect themselves or parts of the local population. In that case, the UN force will be considered a combatant force in the conflict, making them a target. Therefore, non-lethal weapons can help the peacekeepers as another tool to use when they don’t want to use lethal force.

Troops trained and armed with non-lethal weapons could prevent violence from escalating in situations such as thieves stealing from camps, gangs preying on innocent civilians, crowds gathered in tense situations, villagers blocking convoys, etc. Smoke grenades, tasers, rubber bullets, tear gas, etc., are examples of non-lethal weapons already in use by several modern militaries. In addition, painful noise, loud messages, and heat-rays are more recent non-lethal technologies. Combining some of these technologies with drone delivery systems could allow for a rapid response to escalating situations, dispersing or diffusing belligerents before things spiral out of control and without putting troops in harm’s way.<sup>31</sup>

### **Persistent Healthcare and Telemedicine**

The UN Peacekeeping Ministerial meeting was conducted in South Korea in December 2021, with 62 countries making new pledges for UN peacekeeping operations. The high-level meeting focussed on ‘help[ing] enhance the performance and impact of peacekeeping operations in line with the Secretary-General’s Action for Peacekeeping (A4P) initiative as part of A4P+, the implementation strategy to speed up progress on the initiative over the next two years. One of the core issues and cross-cutting themes of the Ministerial was the efforts to strengthen the technology and medical capacity in UN peacekeeping’.<sup>32</sup>

Medical technologies are vital in ensuring that peacekeepers deployed in remote areas have access to safe and high-quality primary healthcare. However, one of the most severe issues that troops face is the long distances between medical facilities in the areas where peacekeeping operations occur. One approach to meeting this need is developing and deploying high-tech air ambulances that can quickly travel to locations where peacekeepers operate and may require medical attention. Another option is to enable video telemedicine, in which doctors and specialists from around the world can video conference and provide care remotely. In future, robots could be remotely controlled by local doctors to perform procedures in the field. Providing proper medical care for peacekeeping missions reducing troop casualties will promote more troop engagement. It will also reassure them that the technologies at their disposal will take care of them.

Telemedicine is a concept that allows doctors and other healthcare professionals provide medical services to patients over the phone or via video, which can be beneficial for doctors examining UN staff at home or peacekeepers in the field. Doctors can use telemedicine kits to get real-time data on body temperature, blood pressure, heart rate, breathing capacity and oxygen levels, among other things. Advanced diagnostics can be relayed by sophisticated sensors, which go far beyond personal health devices like the ‘Fitbit’. In addition, professional telemedicine packages, which have previously been demonstrated and proven, could be field-tested. While patients are being diagnosed, even in triage, on-scene medical staff could consult with remote doctors and specialists for guidance. Also, the patients’ current medical observations could be interpreted in light of previous medical records, with the results securely stored and transmitted.

### POSSIBLE COOPERATION WITH INDIA

In the pursuit of self-reliance, the current government has released the first negative imports list of 101 items in August 2020 and the second list of 108 items in May 2021. The list is self-explanatory with the vision of widening the indigenous manufacturing of defence equipment. This will further boost indigenisation with the private and public sectors' active participation to fulfil the twin objectives of achieving self-reliance and promoting defence exports. Therefore, the Ministry of Defence (MoD) can explore the market of UN peacekeeping missions (UNPKMIS) where much of technological equipment can be sold off or donated. India can start the efforts by tapping Africa first and thereafter to other UN missions elsewhere. The primary and small items with high dividends such as UAVs, drones, land surveillance systems, mine-protected vehicles, communication equipment, etc., can be the initial equipment to be positioned in the UNPKMIS. Thereafter, India may expand its wish list of export with helicopters and small aircraft like Dornier. Besides conducting Defence Expo, India has also planned an exclusive India–Africa defence dialogue. In continuing the efforts, India may consider expanding the horizon by including the UNPKMIS market in the defence dialogue.

The drone industry is another possible major sector in India that can find its foothold in the United Nations' quest for technological advancement for peacekeeping missions. A recent initiative by the Indian Air Force through the Baba Mehar Singh competition has boosted the drone industry in the country. Also, the release of liberalised drone policy in the country in October 2021 and the latest display of swarm drone technology during 'Beating the Retreat' ceremony have instilled tremendous confidence in this industry. Therefore, it is an apt time to harness its potential for the cause of peacekeeping globally.

### GOING AHEAD

Over the last 75 years, UN peacekeeping has evolved into one of the essential tools in the international community's arsenal for dealing with complex crises that threaten international peace and security. The number of forces and civilian personnel deployed in UN peacekeeping operations worldwide has increased dramatically since the new millennium. As a result, not only has the UN's peacekeeping force grown in size, but it has also grown in complexity. Beyond simply monitoring ceasefires, today's

multifaceted peacekeeping missions are expected to aid the political process by encouraging national dialogue and reconciliation. Combining the essential technologies of communications, security, and command-and-control technologies can improve the effectiveness of peacekeeping missions while also making troops and local populations safer.

Providing basic needs and protection to the forces and the local population is critical for attracting quality peacekeeping forces and laying the groundwork for mission stability. In addition, these technologies will give peacekeeping forces the tools to win when they need to and enforce peace as safely as possible in a dominant but non-violent manner. Also, each UN peacekeeping unit will have a much larger sphere of influence within their mission area as UN peacekeeping forces become more capable and better equipped with modern technologies. Furthermore, using such contemporary technologies will enable the UN forces to maintain the desired deterrent posture for the rogue elements in ensuring peace and the more trust they inspire in the local population. Therefore, more countries will be encouraged to contribute troops to the cause of peacekeeping due to the increased confidence in the capability of peacekeeping forces maintaining abreast with contemporary technology.

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