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How Close Is China to Annexe Taiwan

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Use Of Modern Technology in Humanitarian Assistance & Disaster Relief

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Abstract

While conducting Humanitarian Assistance and Disaster Relief (HADR), the traditional use of Service assets especially helicopters for routine tasks like survey flights and dropping food packets is not only a colossal waste but has at times contributed to loss of Service assets. This article suggests judicious use of expensive platforms like military helicopters as well as alternates available like modern drones. This has been done by comparing relative merits of the options available. The pros and cons of utilising various options with enhanced roles in future have also been examined in order to keep pace with the evolving technological developments.

Keywords: Humanitarian Assistance, Disaster Relief, Military Helicopters, Drones, Enhanced Roles, Technological Developments

Introduction

Disaster is a natural or manmade contingency that causes loss of life, property, livelihood and distress. The situation goes beyond the handling capacity of the affected people and hence, there exists an inherent requirement of external support for providing relief in order to save life and mitigate losses. Our country, on account of its large size and different weather patterns, is always affected by some kind of disaster. The situation has been exacerbated by global warming and the resultant episodes of major weather extremes. In terms of occurrence, flooding of large tracts of our nation during rainfall, occurs with regularity in several states every year. This situation invariably leads to the requirement of Humanitarian Assistance and Disaster Relief (HADR) for assisting the affected population. Therefore, conduct of flood relief operations during heavy rains are almost inevitable. Notwithstanding the fact that NDRF is the primary agency, mandated by the Government of India to provide relief, tasking and participation of Armed Forces in providing relief also takes place regularly, especially towards providing aeroplanes, helicopters and other special equipment. While undertaking relief operations, depending on location of the disaster,

criticality of the situation and availability of assets, helicopters from all Services including the Indian Air Force, Indian Army, Indian Navy and Indian Coast Guard participate for conducting a number of tasks including search and rescue, casualty evacuation, survey of the affected area as well as for supply drops. We must also remember that in any situation of disaster, the team conducting HADR is invariably short of resources as demands are too many.

While utilising helicopters operated by the armed forces, for rescuing or evacuating a few affected people for whom either the rescue is time sensitive or is not possible by other means is necessary, utilising helicopters for routine tasks like survey flights, dropping food packets and providing information updates is a colossal waste, as the same can be accomplished by other means at a fraction of the total cost and with minimal infrastructural support. Moreover, there have been instances where helicopters have been lost while conducting routine tasks like dropping food packets as part of overall HADR operations. Military equipment, especially aircraft and helicopters, are used as weapon platforms—maintained for undertaking operational requirements essentially during war and hostilities. While utilising them during peacetime— for undertaking roles such as disaster relief operations, may be justified during critical situations, however, we need to be circumspect while utilising helicopters for routine tasks like survey of affected area and dropping food packets as these tasks are invariably undertaken by other means. In this article an attempt has been made to discuss judicious use of expensive platforms like military helicopters as well as looking at alternates available. The trigger stems from two media reports.

- First one involved the loss of an Indian Air Force helicopter, while conducting flood relief operations. On 02 October 2024, an Indian Air Force helicopter made an emergency landing in Bihar as its engine reportedly developed a technical snag. The helicopter was carrying out relief operation for flood victims in Bihar when the incident occurred (The Indian Express, 2024). The pilot and four crew members safely evacuated and were admitted to a Govt hospital in Muzaffarpur district. The photo in the media reports displayed a helicopter lying upside down and the rescued crew alongside on a boat. While the exact cause would eventually be determined by a Court of Inquiry, the loss of a Medium Lift Helicopter is monumental. As per the media report, the helicopter was engaged in dropping relief material at the time of accident.
- The second report, as per the Defence Post stated that, the Indian Army has recently inducted the indigenously developed “Sabal 20” unmanned helicopter (Saballa, J., 2024) [i] to bolster its logistics capabilities in challenging terrain. Designed by Uttar

> Pradesh-based Endure Air Systems, the logistics drone boasts a payload capacity of 20 kilograms (44 pounds), or about half its own weight. It is capable of carrying a wide range of supplies, including medical kits, ammunition, batteries and small arms, to distances of over 10 kms (6.2 miles).

A holistic evaluation of HADR requirements and tasking of assets would indicate that for certain critical and immediate tasks like evacuation of human beings from a disaster affected area, a helicopter is the only option, however, with improvement of drones and their capabilities, majority of routine tasks like survey, dropping of food packets etc. can be assigned to them. To understand their relative merits, we need to examine the pros and cons of utilising helicopters viz-a-viz drones for HADR tasking.

Pros and Cons of Using Helicopters for HADR

Major advantage of a helicopter as compared to an aircraft is that it can operate from small field, prepared or semi prepared. For time, critical missions like search & rescue and casualty evacuation, helicopters are best option—helicopters can deploy rapidly and perform supply drop with relative precision.

As a machine, a helicopter has thousands of moving parts and is more complex to operate and maintain when compared to fixed wing aircraft like an aeroplane. Moreover, unlike an aeroplane, that continues to operate during certain contingencies like engine malfunction, a helicopter has to land immediately. Therefore, any malfunction, if it occurs when flying over an area covered with water, would invariably lead to the requirement of immediate landing, which is the kind of situation that would lead to a mishap. Helicopters generate continuous downwash which affects the accuracy of anything dropped from it. Moreover, the larger the helicopter, greater the downwash; this can cause enough disturbance to generate dust circulation and expose the people in proximity to gale conditions like tearing up of food packets and also leading to general confusion among the aid recipients.

Operation of a helicopter from distant location, away from its home base, poses a huge challenge, besides being an expensive proposition. For their continued safe operation, infrastructural requirements are many and at times may be inadequate to sustain continuous operations over a large time period. Additionally, the servicing schedule of a helicopter is more frequent as compared to fixed wing aircraft. Helicopters tasked for HADR would invariably have to operate in fair weather and reasonably good visibility— this imposes an inherent limitation on

their operation in marginal weather conditions. Although, helicopters, at times do, operate in marginal weather conditions, however, these operations are conducted only for search and rescue or casualty evacuation, which are time sensitive and are invariably classified as lifesaving missions.

Pros and Cons of Using Drones for HADR

While existing drones and their present capabilities are inadequate for undertaking tasks like executing a rescue mission like extracting human beings from a disaster affected location, however, routine tasks like surveying disaster affected areas, locating people in need of evacuation or support, dropping food packets with precision etc. can easily be undertaken by drones.

There are number of drone manufacturers in the country— a cursory internet search indicates that drones capable of transporting up to 40 kg of payload, are readily available. Considering that the Army has already inducted drones capable of transporting up to 20 Kg, all routine tasking of delivering food packets, medicines and support equipment can be easily facilitated using these drones.

Considering uninterrupted and almost seamless mobile coverage available nationally, nowadays, it is possible to factor almost last man connectivity with smartphones. Thus, we have a readymade solution wherein food packets and medicines can be delivered at multiple locations accurately and 'on demand' using only drones.

Unlike helicopters, which require specialised equipment and highly qualified crew to operate in challenging circumstances of HADR, drones can be operated by almost all the personnel with limited training and minimal outside support. Moreover, unlike helicopters which are always few in number, the number of drones can easily be supplemented from other locations.

Drones are not affected by visibility limitations, day or night cycles. Additionally, issues like duty and rest periods applicable for aircrew are not applicable for drone operators. Number of drones can operate in small geographical area and provide aid to many recipients at the same time. Drones can also be deployed for tasks hitherto not possible for helicopters, like making an announcement for a large crowd, acting as a static beacon for indicating a particular safe path and also providing live guidance to people in a disaster affected area.

Finally, any incident or accident involving a drone does not impact our wartime airlift capability as it definitely would in case of a helicopter loss. Additionally, drones can be operated by all agencies involved in HADR, thus increasing its reach and support.

Proposed Approach for Conducting HADR

Conducting HADR operations would continue to remain a challenge on account of unpredictability of occurrence of disasters as well as their spread. As a nation, even though we are continuing to enhance our capabilities, we would always be short of resources in any major disaster situation.

Hence, the best approach would be a combination of helicopters and drones. Drones could undertake majority of tasks including surveys, progress of relief work, identifying location of affected inhabitants, assessment of relief aid required, providing active guidance and delivery of food packets and medicines. While specialised tasks like winching up human being requiring evacuation would have to be accomplished by helicopters. The proposed process would contribute towards optimal utilisation of available resources towards mitigating the disaster situation. Transferring routine tasks to drones would enable HADR planners to utilise expensive assets like helicopters more effectively and judiciously. This would also significantly increase the assurance of timely support to larger number of affected people.

Besides reducing HADR expenditure substantially, it would also drastically reduce avoidable situations of helicopter flying low over a large expanse of water for routine tasks—similar situation led to the loss of a helicopter in October 2024.

Conclusion

Our country would continue facing disaster like situations in future also, hence, the endeavour should be timely response and effective mitigation. Thus, judicious and optimal utilisation of available resources would drastically improve our response. Additionally, the process, as proposed, would definitely reduce sole dependence on military platforms like helicopters. Since the Army has already inducted drones with decent transportation capabilities, other agencies like NDRF and SDRFs could explore similar options towards capability enhancement. Helicopters should only be requisitioned for special tasks such as evacuation of affected people and that to when all other options have been examined and not found suitable. We must also remember that, in any disaster situation, the team conducting HADR would invariably be stretched for resources.

Lastly, considering the rate at which drone capabilities are improving, potential for their future utilisation is endless. Who knows, in future, there may be drones capable of extracting

human beings from disaster affected areas. Till then we need to exploit drones in all possible and varied roles.

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About the Authors

Air Cmde Arun Saklani VM (R) was commissioned on 11 Jun 1988 as a pilot in the transport stream of IAF. In a career spanning more than 35 years he has held a number of important appointments. A graduate of Defence Services Staff College; he has also undergone the APPPA and the NDC Courses. He has been the Chief Flying Instructor at a Training Base, Director VIP Operations at Air HQ, commanded a frontline Transport Squadron in the Northeast and was AOC of one of the most important Flying Bases in North India. Besides he has served as an Air-II at an operational Command and as Principal Director Flying Training at Air HQ.

A Qualified Flying Instructor, he has flown An-32, B-737, HJT-16, HPT-32, C-17 and Microlite aircraft. He has about 5500 hours of accident/incident free flying. He has extensive experience in planning, and executing Air Maintenance Operations. He is presently pursuing PhD from Rashtriya Raksha University.