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# Unmanned Aerial Vehicles in Humanitarian Response

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## TABLE OF CONTENTS

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<b>Unmanned Aerial Vehicles in Humanitarian Response</b>	<b>02</b>
<b>KEY MESSAGES</b>	<b>02</b>
<b>INTRODUCTION</b>	<b>03</b>
<b>TECHNICAL OVERVIEW OF UAVs</b>	<b>04</b>
<b>POTENTIAL HUMANITARIAN USES</b>	<b>05</b>
<b>Data collection and observation</b>	<b>05</b>
Real time information and situation monitoring	<b>05</b>
Case Study 1: Damage Assessment in the Philippines after Typhoon Haiyan	<b>05</b>
Public information and advocacy	<b>06</b>
Search and rescue	<b>06</b>
Mapping	<b>06</b>
Case Study 2: Mapping and disaster risk reduction in Haiti	<b>07</b>
<b>Logistics and package-delivery</b>	<b>08</b>
<b>CHALLENGES TO EFFECTIVE USE OF UAVs</b>	<b>09</b>
<b>Legal issues</b>	<b>09</b>
<b>Ethical procurement and partnerships</b>	<b>09</b>
<b>Privacy and data protection</b>	<b>09</b>
<b>Transparency, informed consent and community engagement</b>	<b>10</b>
<b>UAVs IN CONFLICT SETTINGS</b>	<b>11</b>
<b>UAV use by humanitarian actors</b>	<b>11</b>
<b>Use of UAVs by Peacekeeping Missions and Militaries</b>	<b>11</b>
Case Study 3: Peacekeeping in the Democratic Republic of Congo	<b>13</b>
<b>CONCLUSION</b>	<b>14</b>

## UNMANNED AERIAL VEHICLES IN HUMANITARIAN RESPONSE

### KEY MESSAGES:

- Unmanned Aerial Vehicles (UAVs), also known as remotely piloted aircraft or “drones” are small aircraft that fly by remote control or autonomously. Although previously associated with the military, UAVs are increasingly performing civilian tasks as the technology becomes more common – 57 countries and 270 companies were producing UAVs in 2013. In the U.S., the Federal Aviation Administration (FAA) forecast that some 7,500 commercial small UAVs could be flying in the U.S. within five years.
- Humanitarian organizations have started to use UAVs, including in Haiti and the Philippines, for data collection and information tasks that include real time information and situation monitoring, public information and advocacy, search and rescue, and mapping.
- The most likely humanitarian application in the area of delivery and logistics would be delivery of small medical supplies, such as vaccines.
- The use of UAVs raises serious practical and ethical issues that humanitarian organizations must address through transparency, community engagement, and guidelines for privacy and data security.
- Developing safeguards and guidance for the use of UAVs in conflict settings, whether strictly for humanitarian purposes or for protection and human rights work, will be a significant challenge. The humanitarian system should therefore focus on uses in natural disasters and early recovery settings.
- As more peacekeeping and military actors acquire UAVs, humanitarians will need to have clear guidance and common positions on when it is appropriate to use those capacities.
- To tap into the growing interest in UAVs, particularly in technical communities, humanitarian organizations should engage in networks that promote good practices and guidance, and that can serve as a source of surge capacity.
- Despite their potential to enhance humanitarian operations, more research and evidence is needed to identify the comparative advantages of using UAVs. More research is needed on integrating aerial observation and data collection into needs and damage assessments, search and rescue, and other humanitarian functions.

## INTRODUCTION

Until recently, Unmanned Aerial Vehicles, or UAVs, had been largely associated in the public mind with military uses, particularly armed attacks. However, increasing civilian use by hobbyists, researchers and others has started to change perceptions. UAVs, also known as remotely piloted aircraft or drones, are already used commercially for agriculture,<sup>1</sup> surveying,<sup>2</sup> wildlife monitoring and conservation,<sup>3</sup> real estate assessments<sup>4</sup> and other areas. Civilian use is likely to rise, with one study estimating that the agricultural market for UAVs could be up to ten times the public safety market.<sup>5</sup> UAVs are reaching a critical juncture in their development, as regulations emerge in many countries and the technology becomes affordable enough for mass use.

Despite the visceral response that many have to the idea of “eyes in the sky”, interest is building in using UAVs in humanitarian response. Manufacturers are marketing UAVs as “life-saving technology” for humanitarians<sup>6</sup> to build legitimacy, as a new generation of start-ups is developing technology for humanitarian use.

Portable micro-UAVs have already been deployed by humanitarian actors in Haiti and the Philippines after Typhoon Yolanda for mapping, improved situational awareness and needs assessment. While primary uses are data-collection and monitoring, research is underway on the delivery of goods, particularly smaller items such as vaccines.

Peacekeeping and military actors are also increasingly interested in using UAVs to support mission mandates, including the protection of civilians. The United Nations Organization Stabilization Mission in the Democratic Republic of the Congo (MONUSCO) recently began using its own long-range UAVs for reconnaissance and data-gathering tasks, and has made these capacities available to humanitarian agencies.

This move from speculation to reality raises challenging questions around regulation, safety, privacy and how to best integrate UAVs into humanitarian response. Answering these questions will require developing coherent policies, legal frameworks and good practices for engaging with affected communities.

This report will outline potential uses of UAVs in humanitarian response and emerging issues. It will also consider how humanitarians should engage with the capacities offered by UAVs used by peacekeepers or militaries in humanitarian contexts. *The report will not cover the legal and ethical implications of armed UAVs or other autonomous weapons systems*, although the continuing debate over their use in armed attacks will surely have an impact on the acceptance of civilian uses.

<sup>1</sup> <http://www.dailyfinance.com/2013/12/08/northrop-grumman-wants-to-sell-unmanned-drones-to/>

<sup>2</sup> <http://news.nationalgeographic.com/news/2013/12/131202-drone-uav-uas-amazon-octocopter-bezos-science-aircraft-unmanned-robot/>

<sup>3</sup> <http://www.panda.org/?205266/Unmanned-Aerial-Vehicle-to-aid-Nepals-Conservation-Efforts>

<sup>4</sup> <http://www.auav.com.au/services/realestate/>

<sup>5</sup> Ibid.

<sup>6</sup> Kristin Bergtora Sandvik and Kjersti Lohne (2014), *The Rise of the Humanitarian Drone: Giving Content to an Emerging Concept* (forthcoming); Millennium: Journal of International Studies.

## TECHNICAL OVERVIEW OF UAVs

UAVs come in a wide variety, but can be divided into classes based on size, range, and capacity for autonomous flight. While most are controlled remotely by a human pilot on the ground, some can fly along pre-set coordinates or patterns, or land if they lose contact with the pilot.

**Medium to large systems:** These vehicles range from dozens of kilograms to the size of a manned plane. They can fly at high or medium altitudes for hours or days at a time, hundreds or thousands of miles from their operators. Costing from hundreds of thousands to millions of dollars, they require sophisticated base stations and extensive pilot training. At the larger end, the Predator7 can fly up to 25,000 feet for 40 hours, guided via satellites by a pilot up to 7,500 miles away. The medium end includes the FALCO,8 deployed by MONUSCO, capable of 14 hours of flight and a range of 155 miles9 from its base in Goma.

**Small systems (mini and micro-UAVs):** These systems are small enough to be carried by one or two people, with some easily fitting in a backpack or weighing less than a kilogram. They can include both fix-wing aircraft, better at distance flying, and rotor aircraft that can hover. These systems are generally limited in range to anything from line of sight to a few kilometres, and to flight times under an hour. Operating these systems is much simpler, with little training required. Professional-grade systems can carry sophisticated cameras and GPS equipment and increasingly have the capacity for autonomous flight, object avoidance and other safety features. Costs can range from \$5,000 to several hundred thousand dollars, including analytical software and support. Commercial-grade systems are sold to hobbyists and others for a few hundred to a few thousand dollars. These have limited range and will rarely have autonomous capacity

beyond an automatic return function if the control signal is lost. Nonetheless, they can carry cameras and monitoring equipment and capacities are increasing rapidly.

Due to their affordability, ease of transport, and regulatory concerns UAVs used in humanitarian response are likely to be small or micro-UAVs of up to a few kilograms, while larger systems will remain the province of military and civil-defence actors.

**BELOW:** A senseFly Ebee, used for producing detailed maps, provided by Drone Adventures to support the humanitarian response in Haiti in April 2013, Drone Adventures 2014.



<sup>7</sup> Known as the “MQ-1 Predator” drone or “Tier II”, the model is built by General Atomics and used primarily by the United States Air Force and the Central Intelligence Agency.

See <http://www.ga-asi.com/products/aircraft/predator.php>

<sup>8</sup> See <http://www.selex-es.com/-/un-falco>

<sup>9</sup> “UN Starts to Use Drones to Monitor Rebels in DR Congo.” Africa News and Analysis. BBC, 03 Dec. 2013. Available from <http://africajournalismthe-world.com/tag/monusco-drones/>

## POTENTIAL HUMANITARIAN USES

A UAVs already support disaster response and other humanitarian work, and as the technology evolves new applications are emerging.

### Data collection and observation

The most common use of UAVs in humanitarian response today is data-collection and observation. One provider thinks of UAVs as extensions of the IT infrastructure, calling them “data collecting solutions”. UAVs may offer major improvements in speed, accuracy and detail, at lower cost than satellite imagery or other existing tools. UAVs can be equipped with a wide range of monitoring equipment, from a strapped-on smartphone to infrared systems or *Synthetic Aperture Radar* (SAR) that can see through cloud cover, forest canopy or even buildings. The analysis of data from these devices ranges from straight-forward to quite technically complex.

### Real time information and situation monitoring

The most common use of UAVs is the provision of high-altitude video feed or photos, allowing a rapid overview of conditions. More sophisticated systems can broadcast a live feed directly or over the internet. These images can assist in tasks that include:

- rapid assessment of damage, such collapsed buildings or blocked roads (see case study 1)
- monitoring distribution of goods, such as tarpaulins or tents
- identifying and analysing temporary settlements or tracking displacement or movement of people

Even the least expensive UAV systems can aid in these tasks, often using standard cameras.

### Case Study 1: Damage Assessment in the Philippines after Typhoon Haiyan

In November 2013, Super Typhoon Haiyan devastated the city of Tacloban in the Philippines. Soon after, a case the size of a backpack arrived, accompanied by a small team of experts. This pilot project to bring in a UAV, with a range of up to five kilometers and a high-resolution video camera, to assist humanitarian responders was the work of a partnership between several private sector firms<sup>10</sup> and NetHope, a consortium of NGOs,.

The Philippines lacked the necessary regulations, so the use of the UAV was cleared by a special agreement with the Mayor of Tacloban.<sup>11</sup> The UAV was covered with insurance that covered damage or injury due to malfunction.

The UAV was used first to identify where to set up a base of operations,<sup>12</sup> and then to check if roads were passable, a task that could take days when done on foot or by helicopter. The UAV was also flown up the coast to evaluate damage from storm surge and flooding and to see which villages had been affected. The aerial assessments “really helped to speed up ...efforts, cut down on wasted time and work, and make them more accurate in their targeting of assistance.”<sup>13</sup> It was also suggested that the UAV might have located survivors in the rubble using infrared cameras if it had arrived within 72 hours.

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<sup>10</sup> Danoffice IT and Sky-watch.

<sup>11</sup> “Peaceful drones.” Yahoo News Philippines, June 24, 2013. Available from <http://ph.news.yahoo.com/peaceful-drones-163939037.html>

<sup>12</sup> “In the Philippines, Drones Provide Humanitarian Relief,” ReliefWeb, 16 Dec. 2013, available from <http://reliefweb.int/report/philippines/philippines-drones-provide-humanitarian-relief>

<sup>13</sup> Santos, Lean A. “Media.” Press Room » Press & Multimedia » NetHope. Devox, 16 Dec. 2013. Web. 08 July 2014. <<http://nethope.org/media/press-room/in-the-philippines-drones-provide-humanitarian-relief>>

Interest is building in developing local capacity for using UAVs in disaster response. SkyEye Inc., a local start-up, is working with the University of Manila to train five teams across the Philippines to locally deploy UAVs in preparation for next typhoon season.<sup>14</sup>

### Public information and advocacy

Imagery from even basic commercial UAV systems can provide a powerful overview of the nature and scope of a situation without expensive helicopter flights, using photography and video production that was impossible even a few years ago. This can provide a power tool for advocacy by showing the scale of the damage, the pace of a recovery or highlighting specific problems. For example, a photojournalist who had flown a UAV to capture image of the devastation in Tacloban immediately following Typhoon Haiyan, returned six months later and flew the UAV over the same routes, highlighting how a lack of housing inland meant that many people had been forced to return to vulnerable coastal areas.<sup>15</sup>

### Search and rescue

Interest is building in the use of UAVs to assist in search and rescue, particularly when equipped with infrared, or other specialty cameras. For example, the European Union is funding ICARUS, a research project to develop unmanned search and rescue tools to assist human teams.<sup>16</sup>

Small portable UAV systems could accompany rescue teams to rapidly scan buildings for survivors. More elaborate integrated systems could potentially cover massive amounts of ground, though their effectiveness in a disaster has yet to be documented.

To be useful, the UAVs and trained staff must be available within 24-48 hours of a sudden-onset disaster. In addition these technical approaches must be integrated into the protocols for rescue teams, agreements for importing disaster response equipment, the International Search and Rescue Advisory Group (INSARAG) guidelines and other areas of policy.

### Mapping

UAVs can rapidly produce geo-references (GPS accurate) or 3D maps that are often more detailed and faster than satellite imagery. This mapping enables improved logistics, awareness of informal communities, damage assessments, disaster risk reduction or early warning activities, agricultural monitoring to promote food security, flood monitoring, etc. This type of mapping requires specialized equipment, software and training.

<sup>14</sup> See <http://www.skyeyeproject.com/>

<sup>15</sup> "Typhoon Haiyan: Aerial Footage Shows How Tacloban Has Recovered Six Months on from the Natural Disaster." The Telegraph. Telegraph Media Group, 06 May 2014. Available from <http://www.telegraph.co.uk/news/worldnews/asia/philippines/10804117/Typhoon-Haiyan-aerial-footage-shows-how-Tacloban-has-recovered-six-months-on-from-the-natural-disaster.html>

<sup>16</sup> See <http://www.fp7-icarus.eu/search-rescue>

## Case Study 2: Mapping and disaster risk reduction in Haiti

Over the past four years, Haiti has endured a terrible earthquake, a cholera epidemic, and Hurricane Sandy. Each disaster not only caused many casualties but also changed the landscape of the country. Buildings, houses, public infrastructure and roads were totally destroyed, forcing thousands of people to seek refuge in growing encampments. For NGOs to respond to these types of crises, up-to-date imagery for aid distribution, reconstruction, and disaster mitigation is continuously needed. To get a quick and detailed idea of the country situation, the International Organization for Migration (IOM) has been using several types of UAVs, including some that produce accurate topographical and 3-D maps.

IOM has been using UAVs not just to support relief activities, but also to prevent and reduce disaster risks and to strengthen community resilience. They have enabled IOM to:

- register lands
- assess destroyed houses
- take a census of public buildings, shelters, hospitals and schools
- assess damage caused by floods and droughts
- monitor internally displaced persons (IDPs) and camps, enabling aid workers to know when shelters were empty and camps could be closed.

Immediately following Hurricane Sandy on 27-29 October 2012, IOM made several flights in to assess destroyed and affected buildings in Butte Boyer, Tabarre. Images were processed in real time and cross-checked against older imagery and data, and by October 30 IOM was able to count how many houses had collapsed or been flooded. High-definition imagery enabled mapping of dumps, standing water where mosquitos and epidemics could thrive, road conditions, water points, latrines, and areas prone to floods.

Working with the organization Drone Adventures, IOM was able to map dense shantytowns in Port-au-Prince, counting tents and organizing a door-to-door census. Without this detailed information, it would have been very difficult to identify aid requirements. All data from these projects is now available to aid workers in Haiti through OpenStreetMap.<sup>17</sup> IOM has stressed that it was critical to sensitize the affected communities to the use of UAVs through regular community engagement, informing them of the mapping and explaining how the information is used.

<sup>17</sup> See <http://www.droneadventures.org/2013/05/29/haiti/>

## Logistics and package-delivery

Information collection may be just the first step, as the humanitarian community explores the use of UAVs for delivery of in-kind goods. The US military uses unmanned Kaman K-Max helicopters that can deliver over 2,700 kg in Afghanistan,<sup>18</sup> a few delivery projects have been tested in China,<sup>19</sup> and pilot projects have been announced in Australia<sup>20</sup> and New Zealand,<sup>21</sup> by the US retailer Amazon,<sup>22</sup> and others. Jack C. Chow, former Assistant Director-General of the World Health Organization, has suggested that UAVs “can supplement existing supply chains or provide emergency drops”.<sup>23</sup>

However, it is not yet clear that UAVs are better than conventional logistics and delivery systems. Commercial aircraft, helicopters and services like the United Nations Humanitarian Air Service are faster, carry heavier payloads and are more cost-efficient than large UAVs.<sup>24</sup> Air-drops have a deservedly terrible reputation for safety and efficiency, and any autonomous delivery on the ground would still require trained staff, community engagement and substantial pre-planning to distribute and monitor goods. These requirements will be hard to meet if access is so bad that conventional vehicles can't be used.

Smaller UAV systems, such as those that can carry up to a few kilograms, are unlikely to be able to deliver useful quan-

ties of relief goods efficiently. Legal and regulatory issues are also greater for delivery UAVs, as they are heavier and thus more dangerous, liable to drop or lose packages, and have to be able to land safely in populated areas. This situation may change in the future as the technology becomes cheaper and larger fleets of UAVs are able to coordinate. The Matternet project,<sup>25</sup> for example, envisions a network of small UAVs and stations that would allow packages to be transported long-distances to remote areas with limited infrastructure. However, Matternet and other envisioned delivery services require an established infrastructure of stations, which makes them hard to set-up rapidly.

One promising area is delivery of vaccines or other small medical supplies. The Gates Foundation has given a small grant to a team at the Harvard-MIT Division of Health Sciences and Technology to develop UAVs that can be deployed by health care workers via SMS to swiftly transport small quantities of vaccines to clinics or health workers in isolated locations when roads were out, or the quantities don't justify a car or truck delivery. However, the researchers acknowledge that UAV delivery “is really useful if you are vaccinating only a small number of children each week, in a location where you cannot store vaccines for long periods” and that the range limits on small UAVs (perhaps 40 km) would make them unviable in areas where villages are too widely spaced, like much of DRC.<sup>26</sup>

Although delivery by UAVs is likely to advance quickly over the next five to ten years, it remains unclear whether, outside of limited deliveries of medical supplies, there is a clear case for developing technologies specifically for humanitarian response.

<sup>18</sup> See [http://en.wikipedia.org/wiki/Kaman\\_K-MAX](http://en.wikipedia.org/wiki/Kaman_K-MAX)

<sup>19</sup> “China Could Become the First Country to Legalize Parcel Delivery by Drone.” Quartz. September 3, 2013 Available from <http://qz.com/120654/china-could-become-the-first-country-to-legalize-parcel-delivery-by-drone>.

<sup>20</sup> “Australia and China Are Way Ahead of Amazon in the Commercial Drone Race.” Quartz. December 2, 2013, available from <http://qz.com/152788/australia-and-china-are-way-ahead-of-amazon-in-the-commercial-drone-race/>.

<sup>21</sup> See <http://aria-logistics.com/ooooby/>

<sup>22</sup> See <http://www.amazon.com/b?node=8037720011>

<sup>23</sup> “The Case for Humanitarian Drones: Response”, by Jack C. Chow, CDFAI, available at <http://www.cdfai.org/sswghumanitariandrones.htm>.

<sup>24</sup> “The Case Against Humanitarian Drones”, by Nathaniel A. Raymond, Brittany Card, and Ziad Al Achkar, OpenCanada.org December 12, 2012 available from <http://opencanada.org/features/the-think-tank/comments/the-case-against-humanitarian-drones/>

<sup>25</sup> See <http://matternet.us/>

<sup>26</sup> “An interview with MIT's UAV vaccine delivery team”, available at <http://www.technet-21.org/index.php/share/192-newsletter-content/technet-digest/wwwtechnet21orgissue-177/3501-can-uavs-be-used-to-transport-vaccines-to-remote-health-centres?tmpl=component&type=raw>

## CHALLENGES TO EFFECTIVE USE OF UAVs

### Legal issues

The biggest challenges to expanding the use of UAVs are legal and regulatory. In the OECD, most countries are just developing legal guidance for the commercial or civilian use of UAVs. Many countries in the global South, particularly those with large humanitarian caseloads, may have very little regulation at all. In general, small systems that fly at altitudes below commercial aircraft are much more lightly regulated, and may be used freely if they are for “recreational” purposes. Use is generally more restricted in urban areas. In the U.S., commercial unmanned aerial system (UAS) licenses were granted on a case-by-case basis, subject to approval by the FAA.<sup>27</sup> Similar restrictions exist in the UK and EU.<sup>28</sup> Many countries where humanitarians are working do not yet have legal frameworks, meaning that use of UAVs will probably need to be cleared on an ad hoc basis with local and national authorities. To ensure long-term acceptance of these tools it will be critical that humanitarians comply with all host country regulations and develop appropriate agreements with regulators. A particular issue is interference with traditional air traffic: in many countries it is illegal to fly anything within 5km of a commercial airport. As humanitarian operations often center around emergency airports and logistics hubs, these restrictions are of particular concern.

The main concern of regulators is safety and liability. Even high-end military models like the Predator<sup>29</sup> crash with some frequency, although injuries are rare. In urban environments, however, even a smaller UAV could cause injury or property damage. Although UAVs are getting safer, due to parachutes, collision avoidance systems and fail-safe mechanisms, humanitarians must think seriously about liability insurance and its cost implications, particularly for mechanical failure.

<sup>27</sup> “FAA takes initial steps to introduce private drones in U.S. skies”, Ahlers, Mike. 2013-11-07. CNN, 7 November 2013, available at <http://www.reachouttech.com/faa-designation-usa/>

<sup>28</sup> See the Eurocontrol/JAA Initiative: the UAV Task Force report. Available from: [http://easa.europa.eu/rulemaking/docs/npa/2005/16-2005/NPA\\_16\\_2005\\_Appendix.pdf](http://easa.europa.eu/rulemaking/docs/npa/2005/16-2005/NPA_16_2005_Appendix.pdf)

<sup>29</sup> See <http://dronewars.net/drone-crash-database/>

Due in part to these safety concerns, ultra-light UAVs, such as those under a kilogram, will tend to be more lightly regulated and therefore easier to import and operate.

### Ethical procurement and partnerships

The military remains the largest user of UAVs, while the manufacturers are primarily military contractors.<sup>30</sup> This situation raises ethical and operational considerations for humanitarian organizations, who may not wish to be associated even indirectly with military actors. Maintaining a distance is becoming easier due to new civilian-focused companies as well as non-profit research initiatives to develop or modify UAVs, such as the World Food Program’s collaboration with the Information Technology for Humanitarian Assistance<sup>31</sup> to build the prototype Pelican. More non-profit or volunteer groups are also emerging, such as the Humanitarian UAV Network,<sup>32</sup> a global volunteer network of operators working for safe operations and standards for humanitarian uses of UAVs. Humanitarian organizations must carefully consider the implications of who they work with in different political contexts, with particular attention to lines they may not want to cross, such as not working with companies that produce weaponized or armed UAVs.

### Privacy and data protection

Regulators are wrestling with how to deal with UAVs’ capacity to observe private property and capture sensitive personal information. Kristin Sandvik, Director of the Norwegian Centre for Humanitarian Studies, notes “across Africa, very few countries have comprehensive domestic legislation on privacy and data protection and information storage. ...A drone cannot only see or listen. It can also sense and hear and read...”<sup>33</sup>

<sup>30</sup> UAV Roundup 2013, AEROSPACE AMERICA, July-August 2013.

<sup>31</sup> See <http://www.ithacaweb.org/projects/uav/>

<sup>32</sup> See <http://uaviators.org/>

<sup>33</sup> “Civilian Drones Raise Hopes, Questions in Africa.” by Anne Look, VOA, December 20, 2013 found at <http://www.voanews.com/content/civilian-drones-raise-hopes-questions-in-africa/1814319.html>.



ABOVE: A Sky-Watch Huginn X1 provided by Danoffice IT to support the humanitarian response in Tacloban, Philippines after Typhoon Haiyan, Danoffice IT 2014.

People may believe that the UAVs are being operated by domestic security services or foreign powers. People may also assume that the UAVs have greater capacities than they do, such as being able to identify individuals, look within buildings or otherwise threaten privacy. And, in fact, most of those functions are or soon will be technical possibilities. There are also valid privacy issues, as people may be captured going places or doing things they want to keep private, their illegal businesses or structures may become visible, or they may simply be uncomfortable being photographed.

Any use of UAVs by humanitarian actors therefore requires clear policies on what information they will share or make public, how long they will store it and how they will secure it.<sup>34</sup>

<sup>34</sup> Data transmission from the UAV can be an issue as well: insurgents were able to intercept video from Predator UAVs run by the US military for years. [http://www.wired.com/politics/security/commentary/securitymatters/2009/12/securitymatters\\_1223](http://www.wired.com/politics/security/commentary/securitymatters/2009/12/securitymatters_1223)

## Transparency, informed consent and community engagement

Because of these concerns, for humanitarian operators UAVs, transparency and engagement will likely be critical for success. Ideally, communities or local authorities would be informed of the timing of flights, the purpose of the mission and the type of data being collected, with the aim of having some kind of *informed consent*, whether formal or informal. Small, relatively short-range UAVs will force humanitarian workers to be more aware of local conditions or to engage directly with local populations, another advantage of this class. For example, if mapping an informal settlement, it would be preferable to travel to the settlement to launch the UAV rather than send it from a remote location. In a recent project with Medair and Drone Adventures in the Philippines, a team provided physical copies of the aerial maps to the surveyed villages, a useful tool that also helped them understand the exercise. Developing such *best-practices and protocols for community engagement* around the use of UAVs will be critical to using these tools effectively in humanitarian response.

## UAVs IN CONFLICT SETTINGS

### UAV use by humanitarian actors

The use of UAVs by humanitarian actors or for humanitarian purposes is even more challenging during conflicts or civil unrest.

Some human rights organizations, including the Sentinel Project<sup>35</sup> and the Genocide Intervention Network,<sup>36</sup> have proposed the use of UAVs for monitoring human rights and atrocities. Such tasks could include monitoring the movements of armed groups, functioning as an early warning system, or documenting evidence of war crimes. UAVs could theoretically support protection interventions as well, allowing for an expanded use of “protection by presence” by monitoring IDP camps or populations under threat. At the same time, military and intelligence services may also be using UAVs to document or gather intelligence on many of the same incidents, if for different purposes.

Even when in support of basic humanitarian activities using UAVs in conflicts may be problematic. UAVs are dual-use technologies, as even light models can be weaponized, such as the AeroVironment Switchblade, a 1 kg reconnaissance UAV that can be packed with explosives and used for pinpoint “kamikaze” attacks.<sup>37</sup> Even if they are clearly unarmed, military actors are likely to be unhappy with cameras overflying their positions, and may shoot them down, while civilians may be hostile if they suspect that UAVs are being used for military intelligence or to conduct attacks. Accusations that humanitarian actors are engaged in “spying” may affect local perceptions of humanitarian workers and undermine impartiality. The use of UAVs in conflict settings could therefore create anxiety and undermine impartiality, thereby also pose a risk to humanitarian workers or civilians associated with them in the field.

<sup>35</sup> “Drones for Social Good.” by Adrian Gregorich, The Sentinel Project for Genocide Prevention. October 22, 2013, found at <http://thesentinelproject.org/drones-for-social-good/>.

<sup>36</sup> Sniderman, Andrew Stobo, and Mark Hanis. “Drones for Human Rights.” The New York Times. The New York Times, 30 Jan. 2012. <[http://www.nytimes.com/2012/01/31/opinion/drones-for-human-rights.html?\\_r=1&](http://www.nytimes.com/2012/01/31/opinion/drones-for-human-rights.html?_r=1&)>.

<sup>37</sup> See [http://en.wikipedia.org/wiki/AeroVironment\\_Switchblade](http://en.wikipedia.org/wiki/AeroVironment_Switchblade)

Anxiety among the population would be particularly acute in contexts where drones are also conducting attacks and where the population may not be able to distinguish between armed and unarmed drones. For example, serious concerns have been raised about the broader impact of military UAVs in places like Pakistan, as families keep children home from school, religious and cultural practices are undermined, due to anxiety caused by the presence of military UAVs and the threat of attacks.<sup>38</sup> In contexts like these, introducing additional UAVs to the area, even for humanitarian purposes, may cause more harm than good.

Of course, humanitarians regularly use dual-use military items in conflict settings, such as armored cars. However they are clearly marked and travel with permission of military actors. The Unmanned Aerial Vehicle Systems Association in the UK has suggested that civilian UAVs be painted bright colours to distinguish them from military vehicles.<sup>39</sup> Using this principle, medical deliveries across battle-lines in an urban environment could be cleared with parties to the conflict, and then carried out with a brightly-marked, low-flying UAV.<sup>40</sup> However, it is unclear whether this strategy would work, and it is likely that humanitarian UAVs in conflict settings would currently pose more problems than they solve.

### Use of UAVs by Peacekeeping Missions and Militaries

While the use of UAVs by military components of peacekeeping missions or disaster responses is several years old, MONUSCO’s initiative (see case study 3) marks their first formal integration into a mission’s civilian structure. With 57 countries producing UAVs in 2013, and many more developing capaci-

<sup>38</sup> Stanford Law School and New York University Law School, Living Under Drones (September 2012).

<sup>39</sup> Gallagher, Ryan. “Surveillance Drone Industry Plans PR Effort to Counter Negative Image.” The Guardian. Guardian News and Media, 03 Feb. 2012. <<http://www.theguardian.com/uk/2012/feb/02/surveillance-drone-industry-pr-effort>>.

<sup>40</sup> At higher altitudes most UAVs can’t be seen, no matter what colour they are, the Huginn X-1 used in Tacloban, for example, is effectively invisible over 150 meters.

ty,<sup>41</sup> humanitarian organizations are going to be increasingly offered access to UAVs and the information they collect.

For UAVs that are operated by the military, existing international guidance, such as the Guidelines on the Use of Military and Civil Defence Assets to Support United Nations Humanitarian Activities in Complex Emergencies, Rev. 1 January 2006 (commonly known as the MCDA Guidelines), already require humanitarian organizations to ensure that:

- any humanitarian civil-military relationship or interaction does not impact principled humanitarian action.
- the use of military assets in support of humanitarian operations is appropriate and in accordance with international guidelines, i.e. that military assets provide a unique capability, availability and timeliness not possessed by the humanitarian community (i.e. “last resort”).

In many cases, UAVs will clearly provide a “unique capability”, particularly in areas where humanitarian access is restricted due to security or terrain. However, it is harder to show that the use of UAVs by military or peacekeeping actors will not impact humanitarian principles, because this depends on the perceptions of local communities and stakeholders, not the mission per se. Humanitarians will have to consider whether the military is a party to the conflict, and if association with them would impact the perceived or actual neutrality, impartiality and operational independence of the overall humanitarian effort.

For UAVs within the civilian parts of peacekeeping missions, or perhaps those operated by national civil protection agencies, humanitarians will need to make a strategic decision whether the MCDA Guidelines apply, or whether the UAVs can be treated as a purely civilian asset. Factors to consider would be the degree of *transparency, acceptance and community engagement* around the UAV program. Is the community aware of overflights? Is data gathered being made available, at least in part? Is civil society supportive? This assessment may also change over the course of a mission, as active conflict ends and peacebuilding activities start, for example.

The use of UAVs by peacekeepers and other military partners is likely to increase. There have already been discussions about adding UAV capacity to other UN missions, including those in Côte d’Ivoire, Sudan, and South Sudan. Humanitarian organizations that take a principled stand to reject military UAV capacities may even be criticized for not taking advantage of “life-saving technology”. As some analysts have argued, “soon human rights groups will actually be demanding that drones be included as a staple ingredient in peacekeeping operations. ... [O]pting not to use drones could indeed someday be considered a breach of” international humanitarian law<sup>42</sup> as a failure to take all measures to protect civilians and document violations.

<sup>41</sup> UAV Roundup 2013, AEROSPACE AMERICA/JULY-AUGUST 2013

<sup>42</sup> Karlsrud, J and Rosén, F 2013. In the Eye of the Beholder? UN and the Use of Drones to Protect Civilians. *Stability: International Journal of Security and Development* 2(2):27,

**Case Study 3: Peacekeeping in the Democratic Republic of Congo**

On January 2013, the Security Council approved the use of unarmed UAVs by the UN Organization Stabilization Mission in the Democratic Republic of the Congo (MONUSCO) to promote peace and security, including monitoring the arms embargo.<sup>43</sup> This move was a response to violence by more than two dozen armed groups, mostly in North and South Kivu, compounded by the difficulty of accessing vulnerable populations.

While MONUSCO is first peacekeeping mission with its own UAVs, it was not the first with access to those capabilities.<sup>44</sup> However, MONUSCO altered the previous model of UAVs as purely military equipment, making them available for civilian uses and privately contracted, with the Falco UAVs and technical staff leased from the manufacturer, Selex ES. The systems have dual-use capacity, under the control of the civilian Special Representative of the Secretary-General rather than the Force Commander, and are available equally to civilian and military tasks. The UAVs provide various functions, including some with implications for humanitarian work:

protection of civilians, assessment of refugee and IDP movements, and evaluation of environmental challenges, including natural disasters.

The DRC government approved the UAVs, in the absence of formal regulation or even any air traffic control systems. The devices are unarmed, can fly up to 12 hours with a range of 150 miles, and are deployed in North Kivu at night. They are equipped with day/night cameras with electro-optical and infrared thermal technology, which can see through the region's forest canopy, heavy cloud and fog.<sup>45</sup> All data, imagery, and derived analysis products are and will remain the property of the UN.

While it is too early to see the operational impact, the deployment raises important questions. How useful will the data be? Is there the necessary analytical capacity? Will the UAV create unrealistic expectations for rapid humanitarian reaction? Will the project blur the distinction between humanitarian efforts and military actions, undermining access to populations in need in areas controlled by armed groups?

<sup>43</sup> United Nations. S/RES/2098. New York: United Nations; March 28.

<sup>44</sup> An earlier iteration of the DRC mission (MONUC) was supported by a European force (EUFOR) with UAVs. One was shot down and the other crashed, killing one person and injuring others in Kinshasa. <http://www.washingtonpost.com/wp-dyn/content/article/2006/10/03/AR2006100300778.html> In 2009, the UN Mission in Chad and the Central African Republic (MINURCAT) briefly inherited drones as the mission transitioned to a full peacekeeping operation. Karlsrud, J and Rosén, F 2013. In the Eye of the Beholder? UN and the Use of Drones to Protect Civilians. *Stability: International Journal of Security and Development* 2(2):27, DOI: <http://dx.doi.org/10.5334/sta.bo>

<sup>45</sup> Einhorn, Rebecca. "The UN's Use of Unmanned Aerial Vehicles in the Democratic Republic of the Congo: U.S. Support and Potential Foreign Policy Advantages." Better World Campaign (n.d.): n. pag. May 2013. Web.

## CONCLUSIONS

The future of the humanitarian use of UAVs remains unclear. The regulatory issues in particular are a major hurdle, and are likely to result in a patchwork of countries where the vehicles can be used. Nonetheless, the trends seem clear: more sophisticated, affordable vehicles; more civilian use and growing acceptance; and more regular use in civil protection and disaster response. The pressure for humanitarians to adopt this technology, or to provide principled justifications for why they do not, will only increase.

On the technical side, humanitarian organizations seem likely to continue to rely on small, portable UAVs, primarily for disaster response. Despite the limited range and flight time of these units, they are likely to have the fewest legal concerns, and may encourage humanitarians to engage with the communities they are surveying rather than working remotely.

Until UAVs are much more established in general civilian use, the risks of humanitarians using UAVs particularly in conflict settings are greater than the benefits. The focus therefore should be developing best practices and guidelines for their use in natural disasters, slow-onset emergencies and early recovery. Humanitarian organizations will need to develop guidance on whether and how they use UAVs belonging to peacekeeping missions and military and intelligence actors, as well as human rights organizations. At a country-level, a common humanitarian position on the use of UAVs, where possible, agreed through the Humanitarian Country Team (HCT), will help to ensure consistent messaging and practices.

In order to better understand the potential for using UAVs in humanitarian response, below are several suggested areas to further develop policy and practice:

- 1. Focus on using UAVs in natural disasters and avoid use in conflict settings:** The use of UAVs in conflict settings is still too complex and hard to separate from military uses.
- 2. Develop a supportive legal and regulatory framework:** More work needs to be done to develop standard procedures, guidelines and certification programs to ensure that humanitarian use for UAVs is recognized as an established practice. Humanitarians may also need to advocate for national regulatory agencies to recognize humanitarian uses of UAVs or to provide exemptions in an emergency.
- 3. Prioritize transparency and community engagement:** Concerns about privacy are a major obstacle to deploying UAVs. There is a need to develop best practices for transparency and community engagement in UAV program design, including codes of conduct and data security guidelines.
- 4. Ensure principled partnerships:** Humanitarian organizations should also ensure that partnerships and commercial agreements with private sector companies are in line with humanitarian principles, and that companies other interests, particularly military work, do not affect humanitarian neutrality.

- 5. Update existing response mechanisms:** Consider revising International Search and Rescue Advisory Group (INSARAG), The United Nations Disaster Assessment and Coordination (UNDAC) or other international emergency response mechanisms to incorporate potential use of UAVs and to support pilot projects. Guidelines on the use of military and civil defence assets may also need to be updated and clarified, particularly with regard to UAV assets under a military structure with the primary objective to gather intelligence and support military operations, e.g. UN peacekeeping missions.
- 6. Support networks and communities of practice:** As with information technologies, the use of UAVs is driven by hobbyists and technical experts, many of whom will be interested in supporting humanitarian response. Humanitarian organizations should engage in initiatives like the Humanitarian UAV Network, that aim to develop and promote good practices and guidance and that can serve as advisors and provide surge capacity.
- 7. Strengthen the evidence base:** Despite the potential, there is a lack of hard evidence of the effectiveness and functional viability of UAVs in real world scenarios. More research and analysis is needed on how to integrate aerial observation and data collection into needs and damage assessments, Search and Rescue and other humanitarian functions.







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