Contribution to workshop: The Roles of Robotics in Achieving the UN's Social Development Goals
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Title: The role of medical logistics drones in support of SDG 3 – lessons for the robotics community

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Introduction – the experience so far. New logistics innovation has recently witnessed the use of drones for healthcare applications, with a large number of pilot experiences and deployments across a diversity of regions (Africa, Americas, Asia, island communities, mainly in rural settings). These encompass broad medical use cases, highlighting the need for the delivery of blood products, vaccines, anti-venoms, many more high value time critical medicines and point of care diagnostics. These have been carried out by diverse range of teams (agencies, NGOs and commercial entities with supporters and partners) using a number of vehicle design types (fixed wing, quadcopter etc).

These initiatives feed well into Sustainable Development Goal 3 on "Good Health and Well-being" and ensuring "healthy lives and promote well-being for all at all ages." Although very broad, such early experiences have directly addressed aspects of SDG 3 in a variety of settings [Kitonsa2018].

Lessons and insights. While the experiences have generally been positive (and widely reported as such), there have been many lessons learned by individual groups [Truog2020, Grote2021]. One particular challenge for medical drone delivery has been the wide, and sometimes conflicting, regulatory aspects to be addressed (including aviation, logistics, dangerous goods, transport packaging and stability, etc) and these have been overcome in specific settings [Ref: Werobotics' Flying Labs Network]. Other aspects, such as robustness, cost and ease of use across diverse low-infrastructure-demand environments have presented a greater challenge. One encouraging approach has been to develop local partnerships which, with skills development, create sustainable solutions [Jeyabalan2020].

In order to benefit from the potential of such robots to add capability and to scale, it is necessary to address the challenges and negatives impacts in a systematic manner. For this it would be beneficial to carry out rigorous analyses across many flights by sharing data on experiences in an open manner and thus allow the determination and communication of best practice. Drones themselves are ideally placed to log the majority of the relevant data through onboard devices and GPS based control & safety systems. However, when this is viewed as proprietary, exploitative practices such as the monetisation of data can become a barrier to sharing. This is in comparison to others fields of use, such as laboratory robotics [Courtney2021] where there is an increasingly awareness of the importance of capturing and sharing data, and applying data governance frameworks such as FAIR (findable-accessible-interoperable-reusable).

Conclusions. In medical logistics, the technology alone is not always the primary controlling factor – more important can be matching the appropriate technology to use cases, and these insights can also guide the development of the next generation of drones. A coordinated effort to capture and share data will help the sector deliver more fully on SDG 3. Medical logistics drones in the service of SDG3 are also an important opportunity for genuine community engagement, and to raise the image of robotics. To address this need we have built the DRACHMA (Drone Research for Advancing Community Healthcare & Medicine Access) network, collaborating with others with similar goals, and we welcome further cooperation.

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Note: This abstract has been generated from discussions within the DRACHMA (Drone Research for Advancing Community Healthcare & Medicine Access) network including Village Reach, Werobotics, etc. The final author list will be updated prior to the workshop.

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