

## Assisting older people: From robots to drones

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*M. Baer, M-A. Tilliette, A. Jeleff, A. Ozguler T. Loeb. Assisting older people: From robots to drones. Gerontechnology 2014;13(1):57-58; doi:10.4017/gt.2014.13.1.012.00* In order to provide assistance to older people, robots have been proposed, but projects carried out in that field identified barriers such as difficulties in moving or restricted view, thus limiting the quality of a remote medical triage. Unmanned aerial vehicles (UAV) commonly known as drones may bring an important added-value in that domain. Drones are now used for civilian purposes and many indoor models are commercialised. Their development in the near future for the health area (mainly for surveillance purposes) will benefit older adults and thus empower older persons as well as disabled persons to remain independent.

**Keywords:** drones, robots, elderly, telecare

Since the last decade, robots have been proposed to provide assistance to older adults: daily living assistance, supporting cognitive stimulation and training, supporting care-giver's assistive environment, working collaboratively within a smart home environment, providing social interaction, improving remote medical triage and avoiding unnecessary interventions. Specific issues were addressed focusing on mobility, neuro-vascular diseases, and nutrition. In the European 7<sup>th</sup> Framework Programme and other funding sources more than 17 Robot projects have been identified<sup>1</sup>.

The high number of projects and the difficulties in translating their results into industrialisation suggests that robots may not bring the full expected benefits. Difficulties in moving on an obstructed floors and real life' environments of older people at home (carpet, furniture, aisles) are some identified barriers<sup>2</sup>.

Other issues that remain unsolved: time to reach a patient is still quite long because of limited robot's speed (mean time 4m in 24s measured from trigger to end of operation in one study) and a restricted view from the robot's visual sensors depending on the height of the robot which is limited due to the constraints of the center of gravity<sup>2</sup>.

Over the past years drones have been developed not only for military but also for civilian use. A drone is defined as "An unmanned aircraft that can fly autonomously—that is, without a human in

control"<sup>3</sup>. There are several types of drones from very small flying objects of a few hundred grams with limited range, to heavier long-distance drones. They are equipped with a camera or sensors.

### CIVILIAN DRONES

In the civilian domain, drones address fields such as public security (internal security, fire detection), news coverage, delivery services or leisure<sup>3</sup>. Indoor drones may solve three barriers as compared to conventional robots: (i) reducing time to reach the person, (ii) improving the bird's eye view from above especially for fall detection, and (iii) unlimited movements in bypassing obstacles. The drones can easily move around older people, change the angle of view, improving the degree of sensitivity of a remote triage.

### ASSISTIVE DRONES

High resolution video images allow a good screening or triage as in Emergency Medical Services (EMS). Not only would such drones rule out an emergency situation where there is none, but could also support defining the category of EMS response needed: Basic Life support or Advance Life Support including invasive techniques such as intra-venal therapy, intubation, and/or drug administration. The price of drones is decreasing to such an extent that they are even suitable just for localizing lost personal belongings at home (RFID fitted keys, glasses).

The flight of assistive drones should be triggered by alarms of existing sensors, a panic button or



Figure 1. Quadcopter with photo camera<sup>5</sup>



Figure 2. Remote control with drone<sup>6</sup>



Figure 3. Indoor use of Nine Eagle Visitor Galaxy 2<sup>7</sup>

the patient's voice, similar to current robots. Just as in the case of robots, remote operations of drones will include a combination of automated deployment and operator control. Such protocols are already in routine use for telecare assistance or have been tested in robot tele-operated projects<sup>2</sup>.

The high economic potential of drones used for civilian purposes is restricted by legal privacy concerns that should be solved as their use and technology are rapidly evolving. Fortunately there are no legal constraints when flying in an indoor, closed, private environment<sup>4</sup>.

## SUITABLE INDOOR DRONES

Indoor drones are mostly used by hobbyists and for indoor surveillance or research purpose by

universities (Figures 1-3). Some are commercialised and may be purchased<sup>8-12</sup>.

## THE DRONE FUTURE

Autonomous small drones operated by a remote platform could be an innovative, secure and non-invasive solution to enable older people to remain active and independent at home. It could be combined with existing sensors and offer a modular, cost-effective way to meet societal challenges, allowing through a remote medical triage, a reduction of hospital admissions and days spent in care institutions, and thus extending life expectancy of older adults in their own home.

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