

ABSTRACT IN ENGLISH

How can engineers create drones that will benefit society? The potential impacts of Unmanned Aerial Vehicles (UAVs), or "drones", could range from enhancing human health, welfare, and safety, to facilitating mass surveillance and causing widespread unemployment. This thesis addresses some of the changes that the technology could facilitate - and how to design drones that lead to more beneficial outcomes. Value Sensitive Design (VSD), a well-established methodology for the proactive and systematic incorporation of human values into technology design, is identified as a useful approach to doing so. VSD is based on the premise that technology is not ethically neutral, and therefore, that ethics and human values must be considered in technology design. VSD includes three inter-related phases: 1. a conceptual phase that considers human values and impacted stakeholders, 2. an empirical phase which considers the social impacts of the technology, and 3. a technological phase which determines the design requirements that will support the desired human values.

This work contributes to the conceptual, empirical, and technological phases of the value sensitive design of drones, and is the first known application where VSD is explicitly used to design, build, and test real drone prototypes. Two case studies are utilized: 1. that of a humanitarian cargo drone operated in the Amazon region of Peru, and 2. that of a blood sample transportation drone to be used in Denmark. This thesis contributes to the conceptual phase of VSD by developing an ethical framework for the design of drones used in public healthcare contexts, such as Denmark. The framework is an applied ethics tool which enhances VSD and eases the conceptual phase for drone engineers. It also develops the applied ethics tool of capability caution - including five design principles - to complement VSD and address some of the risks drones pose. This thesis contributes to the empirical phase of VSD by generating early primary data - solicited from the general public - on how drones should be designed to enhance explicability i.e. their accountability and intelligibility. Finally, this thesis contributes to the technological phase of VSD by developing, building, and testing drone designs that better support stakeholders' values.

All of these contributions are aimed at making it easier for engineers to consider ethics during drone development. This can lead to designs which represent new solutions to moral dilemmas, and allow the creation of win-win situations. Ultimately, the aim is drones developed *with* society, that will *benefit* society.