

Virtual and Physical Integration of Autonomous Vehicles for an Automated Humanitarian Mission in EasyChair.

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Abstract.

As a recent report of the Intergovernmental Panel on Climate Change (1) confirmed, there's substantial evidence that global climate change exists. This change may well be responsible for intensifying effects of natural disasters such as storms, floods, earthquakes, and droughts that have an impact on the world population. With technology as a potential equalizer, here we explore requirements for humanitarian missions and the feasibility to address the natural disasters with emerging technologies and the cyber-physical systems paradigm (2, 3) tied to the human in the loop (4, 5). Our solution provides the survivors and the emergency personnel with information to locate and assist each other during a disaster event. The system allows to submit a help request to a MATLAB-based mission center connecting first responders, robots, drones, autonomous aircraft, and ground vehicles that are simulated with Simulink (6). The results are visualized in Google Earth interface.

References

1. IPCC Panel, "The Fifth Assessment Report (AR5) of the United Nations Intergovernmental Panel on Climate Change (IPCC)," Climate Change 2013: The Physical Science Basis, tech. report, 2013.
2. Pieter J. Mosterman, David Escobar Sanabria, Enes Bilgin, Kun Zhang, Justyna Zander, "A Heterogeneous Fleet of Vehicles for Automated Humanitarian Missions," Computing in Science and Engineering, vol. 16, no. 3, pp. 90-95, May-June, 2014.
3. Pieter J. Mosterman, Enes Bilgin, David Escobar Sanabria, Kun Zhang, Justyna Zander, Autonomous Vehicles on a Humanitarian Mission - SmartAmerica Challenge 2013 Workshop at White House, Washington DC, 2013.
4. Justyna Zander and Pieter J. Mosterman, From Internet of Things through Computation of Things to a Prediction Engine - SmartAmerica Challenge 2013 Workshop at White House, Washington DC, 2013.
5. Justyna Zander and Pieter J. Mosterman, Computation for Humanity—Information Technology to Advance Society, ISBN-10:1439883270, CRC Press/Taylor & Francis, Oct. 2013
6. Smart Emergency Response System: <http://www.mathworks.com/smart>.

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