
CONFERENCE PARTICIPATION REPORT – IEEE/RSJ INTERNATIONAL CONFERENCE ON INTELLIGENT ROBOTS AND SYSTEMS 2022

I. TECHNICAL DETAILS

- Conference: IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022.
- Location: Kyoto, Japan.
- Dates: October 23-27, 2022.
- Research: On-Board Physical Battery Replacement System and Procedure for Drones During Flight.
- Authors: Yoad Guetta and Amir Shapiro.

II. CONFERENCE TOPIC

IROS has always brought together the world's robotics scientists, researchers, students, and critical enterprises to share ideas and advances in the field as one of the flagship conferences of the robotics community. As part of the IROS 2022, the 35th-anniversary event of its history, the aim is to move robotics technology one step further with innovative research and development in intelligent robots and systems.

The IROS 2022 program is anchored by three plenary talks and fifteen keynote presentations on topics focusing on the conference theme and representing the latest in intelligent robotics and systems research. The 35 years celebration was by highlighting some significant contributions, two plenary speeches on the philosophy of "Robot Research and Development" and two keynotes on "Future Autonomous Systems" and "Assistive and Social Robots" was provided by world-recognized pioneers in the field.

For this year, was received a total of 3579 paper submissions, including 2288 regular paper submissions and 1291 submissions to Robotics and Automation Letters (RA-L) with the IROS option, from 57 countries and regions. Upon carefully reviewing the papers, 1716 papers were accepted into the IROS program representing an acceptance rate of 47.9%. In addition, 128 abstract-only submissions for late-breaking results posters and 80 workshop and tutorial submissions were submitted. The final program shall include 1765 papers, including 49 papers from Journal publications of TRO, TASE, and RAM, for oral presentation in 205 technical sessions, 124 late-breaking results posters, and 43 workshops and tutorials.

III. LECTURE TOPIC

As part of the conference, I submitted an article that was accepted for presentation. The lecture included an extensive explanation of the main problem of drones today, limited flight time. My research presentation introduces the new concept and mechanism for an onboard system that physically replaces batteries during flight, analogous to “aerial refueling”. This capability allows drones to remain in midair indefinitely while pursuing their mission without forcing them to change flight paths for logistical needs. The concept comprises an additional UAV array that delivers new batteries from various ground points. The lecture also introduces the proof of concept of a complete battery replacement process during the flight, which took an average replacement time of 15.2 seconds, with only a 0.81% energy loss, thus enabling the drone to continue flying indefinitely without needing to modify its flight path.



Figure - The IROS conference hall, at my lecture.

IV. RECOMMENDATIONS

The IROS conference is exciting and enriches the knowledge about what is being done worldwide by different and diverse teams in the field of robotics. The Israel Center for Intelligent Transportation Scholarship provided funding to the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), one of the leading conferences in this field. The funding of this research greatly supported the exposure and presentation of my research to the world of robotics, which caused great interest in it.

V. ACKNOWLEDGMENT

I want to thank the Israeli Center for Smart Transportation Research (ISTRC), which financed my presence at the conference and made it possible to transfer the knowledge to the Israeli research community and society.

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