ICUAS MAGAZINE

State-of-the-art
and recent developments
in unmanned aviation

In This Issue

EDITORIAL

Dear colleagues and readers:

The Summer 2023 issue of the eMagazine includes:

- A detailed report on ICUAS 2023, an enhanced version of which will appear in the IEEE Controls Systems Magazine;
- The results of the ICUAS 2023 survey and your feedback and comments on how to improve the conference. The take-away message from the survey is that most of the responders (and registrees) prefer a physical presence (only) conference – so be it;
- Information about ICUAS 2024;
- Recent news in unmanned aviation.

ICUAS 2023 REPORT

The 2023 International Conference on Unmanned Aircraft Systems (ICUAS '23) took place in Warsaw, Poland, on June 6-9. It was held on the campus of Lazarski University, which was chosen because it is home of the Lazarski Aviation Academy, a research center that offers studies combining the aviation industry with law and business, and, because of its Aviation Law program. Once more, for the fourth consecutive year, ICUAS '23 was planned as a 'physical presence' meeting; however, circumstances forced us to make it a hybrid conference, allowing for virtual presence, and remote presentations, too. The conference was successful, and it was attended by more than 270 virtually and physically present participants.

We did not encounter any issues with the Zoom Platform that was used to deliver remote paper presentations. We kept an 'open channel' of information with all interested parties and with the local team of staff and student members of Lazarski University, to ensure that everybody's needs were accommodated on the spot, in real-time. We assembled a solid technical program that included 185 presented papers, in five parallel sessions. Each session was coordinated by the session chair and/or co-chair, and it was monitored by a graduate student volunteer, who was physically present in the corresponding meeting room; audio was handled properly, without issues. All technical sessions ran smoothly without interruptions; we did not face major technical problems, it was an easy ride in the park! Regardless, it was found out, after the meeting (through a survey), that almost all participants prefer a physical presence conference! Thus, the 2024 conference will be a physical presence only conference.

In response to the Call for Papers, we received a total of 250 papers. Following a very thorough and in-depth peer review process in which each paper had at least three reviews (plus an additional review

ICUAS took place on the campus of Lazarski University.

from a member of the organizing committee), and as high as 8, the committee accepted for presentation and inclusion in the conference proceedings 189 contributed, invited session and poster papers, out of which 185 were received/uploaded in final form. All papers were also checked using the *iThenticate Document Viewer Guide* before the final decision was made. We assembled a full three-day top-quality Technical Program composed of five parallel tracks. The Table shows submitted and accepted papers per country.

SUBMITTED AND ACCEPTED PAPERS PER COUNTRY

COUNTRY	SUBMITTED	ACCEPTED	COUNTRY	SUBMITTED	ACCEPTED
Algeria	3	2	Japan	3	1
Argentina	3	2	Kazakhstan	1	1
Australia	2	1	Kenya	2	1
Austria	2	1	Korea, South	5	5
Brasil	19	13	Luxembourg	3	3
Canada	12	8	Malta	1	0
China	14	12	Mexico	6	6
Colombia	1	1	Netherlands	7	7
Croatia	3	3	New Zealand	3	0
Cyprus	6	6	Norway	2	1
Czech Republic	5	2	Poland	10	7
Denmark	6	3	Portugal	1	1
Finland	2	1	Russia	1	0
France	9	7	Singapore	5	4
Germany	9	7	Spain	13	13
Greece	4	3	Sweden	4	4
Hungary	3	2	Switzerland	4	4
India	15	9	Turkey	3	3
Ireland	1	1	United Kingdom	4	4
Israel	2	2	USA	34	23
Italy	17	15			
			TOTAL	**250**	**189**

ICUAS '23 OFFERED THREE WELL-ATTENDED TUTORIALS/WORKSHOPS

- New Developments on Sense-And-Avoid (S&A), Distributed Fault Detection and Diagnosis (DFDD), Fault-Tolerant Control (FTC) and Fault-Tolerant Cooperative Control (FTCC) Techniques Unmanned Systems
- Review of State-Of-The-Art Deep Learning Approaches for Visual Object Recognition and Tracking: Applications to Unmanned Aircraft Systems
- Current and Future Surveillance Technologies for Airspace Integration of UAS in Controlled and Uncontrolled Airspace


Dr. Anna Konert, one of the General Chairs and Dean of Faculty of Law and Administration, Lazarski University, opens the 2023 ICUAS and welcomes all participants.

THE CONFERENCE INCLUDED THREE KEYNOTE/PLENARY LECTURES GIVEN BY LEADING AUTHORITIES IN THEIR FIELDS

- *Increasingly Autonomous Perception and Decision Systems for Advanced Air Mobility*, Prof. Ella Atkins, Virginia Tech, USA
- *Soft Aerial Robots*, Prof. Begoña Chiquinquira Arrue Ullés, University of Seville, Spain
- *From Competition to U-Space Certification and Implementation — a Story about "What If....?* Panel Korzec, Droneradar Sp. Z. O. O., Poland

Staff members and student volunteers in the Registration area.
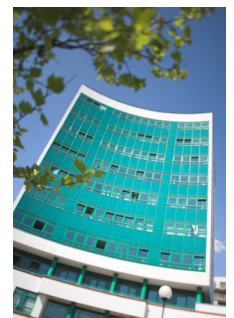
FOR THE SECOND YEAR IN A ROW, the UAV Competition was very successful. It was chaired and coordinated by Dr. Frano Petric, University of Zagreb, and Mr. Mateusz Kotlinski, International Civil Aviation Organization (ICAO). The competition was student focused, offering unique opportunities for students to test and compare their skills with those of their peers worldwide. The competition theme was infrastructure inspection. The new component in this year's competition was the involvement of two EU funded project teams (projects AeroSTREAM through University of Zagreb, and METRICS through CATEC, University of Seville). The competition generated considerable interest. In total, 15 solutions were submitted in the simulation phase, and following an in-depth and rigorous evaluation of three benchmarks, the committee selected the top 5 teams to perform live during the conference. The finalist teams were: UMIC (India), Carrot (South Korea), AiRo Lab (Hong Kong), CVAR (Spain), SDCN Lab (Canada). ICUAS'23 provided support for the finalists covering accommodation expenses, lunches, and conference registration expenses. After three days of integration, tests and competition flights, the defending
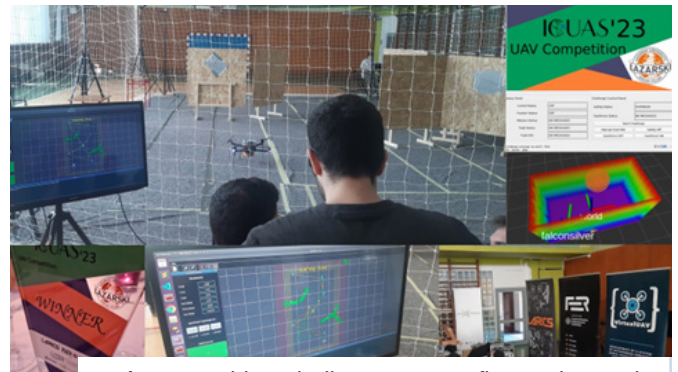
A competition challenge was to first estimate the pose of the quadrotor UAV using only IMU and Realsense camera, then, navigate autonomously within the arena the layout of which was unknown, and finally detect defects in the concrete settings.

champions, team CVAR from Universidad Politécnica de Madrid, Escuela Técnica Superior Ingenieros Industriales ETSII, Spain (David Perez Saura, Pedro Arias Perez, Miguel Fernandez Cortizas) won first place.

Ms. Nadia Danezou, Art, Production and Media Manager, ICUAS Association, Inc., is taking a break during the conference, enjoying the sunny day.

THE SOCIAL AGENDA complemented the technical component of the conference. It allowed for participants to interact with each other, socially, technically, cordially, and in a relaxed atmosphere. It was obvious that physical interaction in conferences has no substitute. We ensured that the social agenda considered the participants' needs to relax and interact. We planned a series of events on campus and at the Regent Warsaw Hotel, where participants stayed.

Participants enjoyed a relaxed Banquet with music, the traditional Polish Vodka, and local dishes.

In summary, ICUAS '23 was a very successful conference. Everybody worked hard; participants also tried to enjoy the unusually sunny weather during the conference days.

ICUAS 2023 SURVEY RESULTS

By: **Dr. NIKOS VITZILAIOS**

To better serve you and to better organize our annual conference, we asked for your opinion and feedback about ICUAS. In what follows, we provide your responses and comments. We are pleased that, ove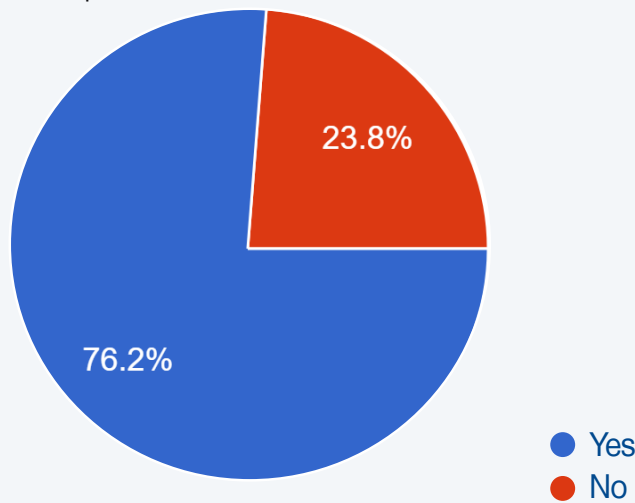rall, you have a very positive opinion about ICUAS, and we are committed to capitalize on our experience and rectify any wrong doing. The objective is to serve you, the participants and registrees, and our technical society.

www.icuas.com
www.uasconferences.com

- The survey took place during June 14 – 30, 2023
- The survey link was emailed to all registered attendees
- The survey included 19 questions, in total
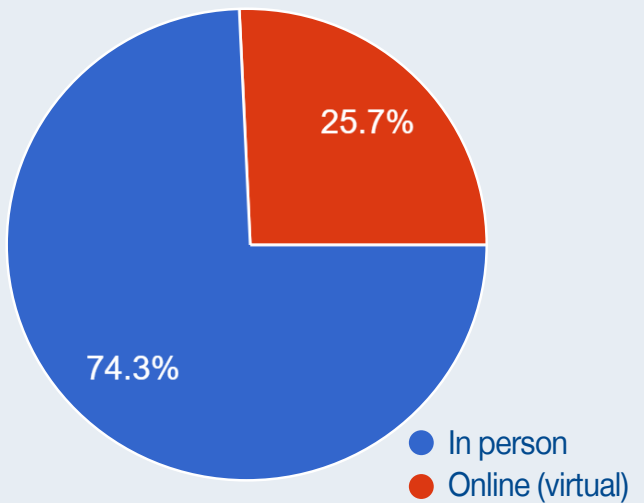- 101 responses were received by the deadline (30 more than 2022)

Is this the first time you attended the ICUAS conference?
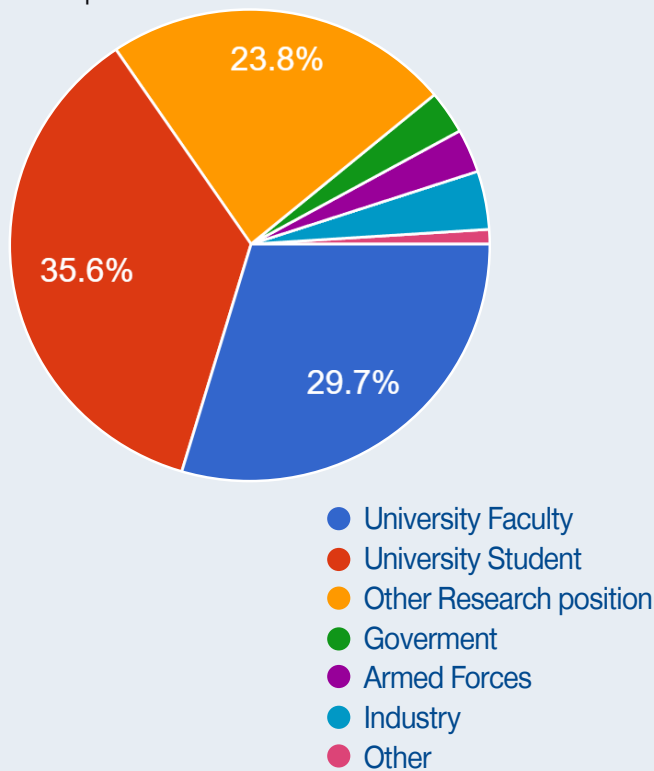
101 responses

- 23.8%
- 76.2%
- ● Yes
- ● No

How did you attend ICUAS 2023?

101 responses

- 25.7%
- 74.3%
- ● In person
- ● Online (virtual)

Job Role

101 responses

- 23.8%
- 35.6%
- 29.7%
- ● University Faculty
- ● University Student
- ● Other Research position
- ● Goverment
- ● Armed Forces
- ● Industry
- ● Other

Affiliation Location

101 responses

- 63.4%
- 13.9%
- 11.9%
- ● Asia
- ● Africa
- ● North America
- ● South America
- ● Europe
- ● Oceania
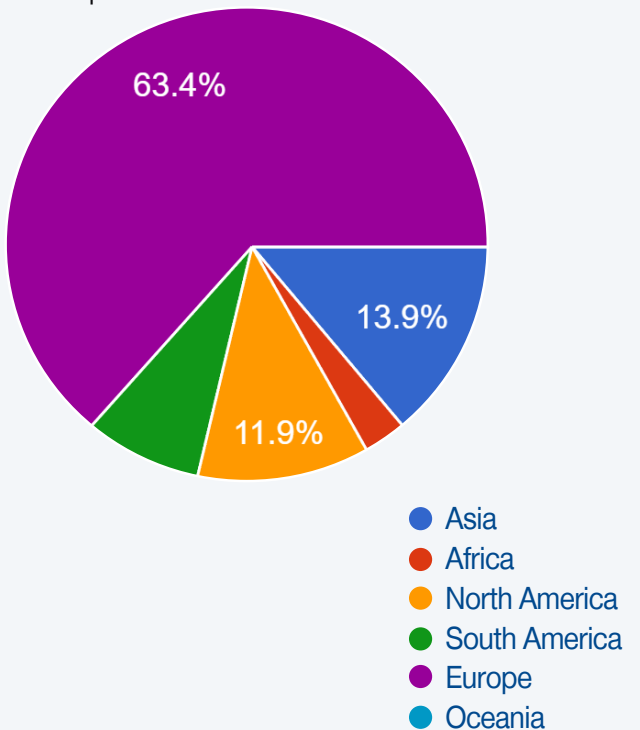
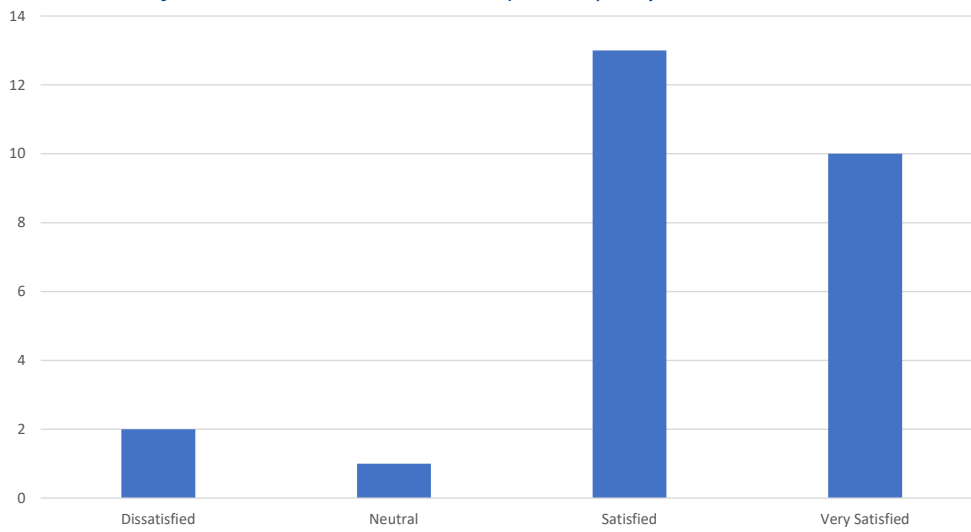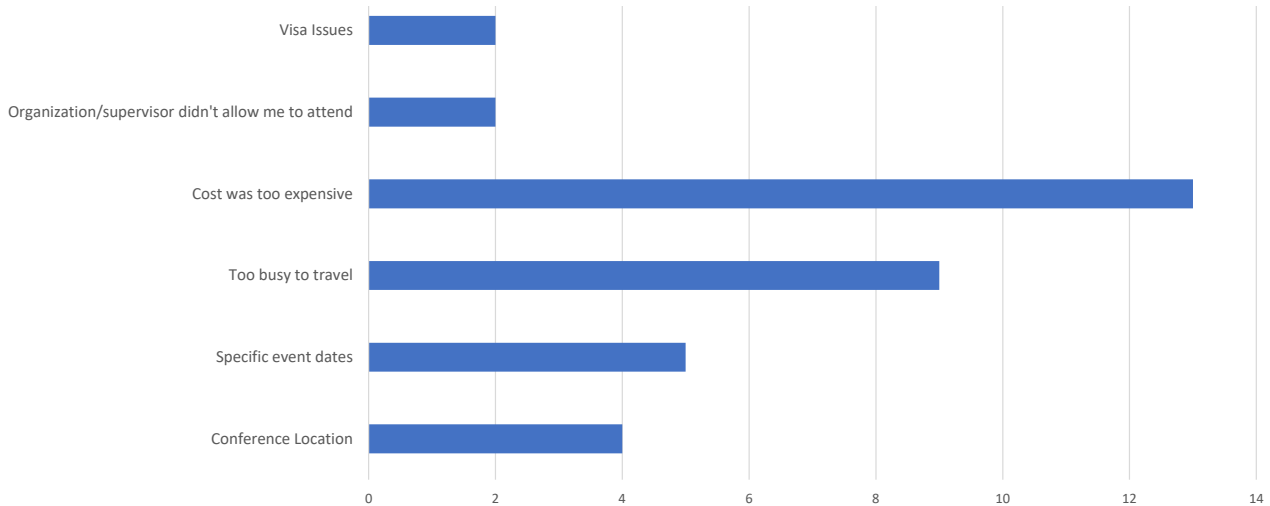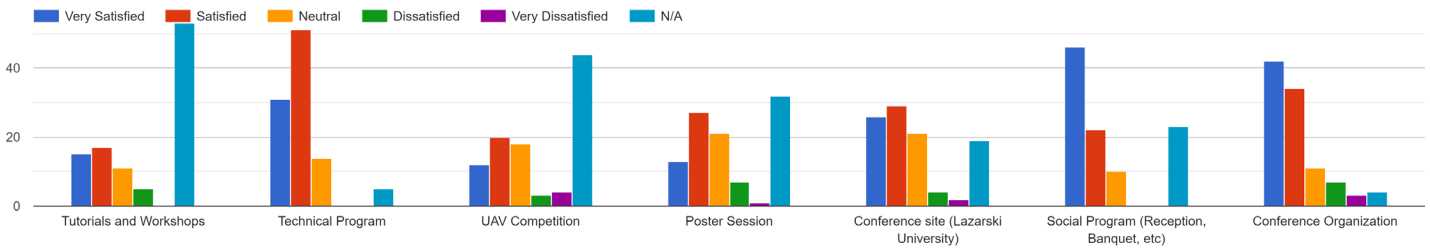## Please rate your ICUAS 2023 In Person Experience
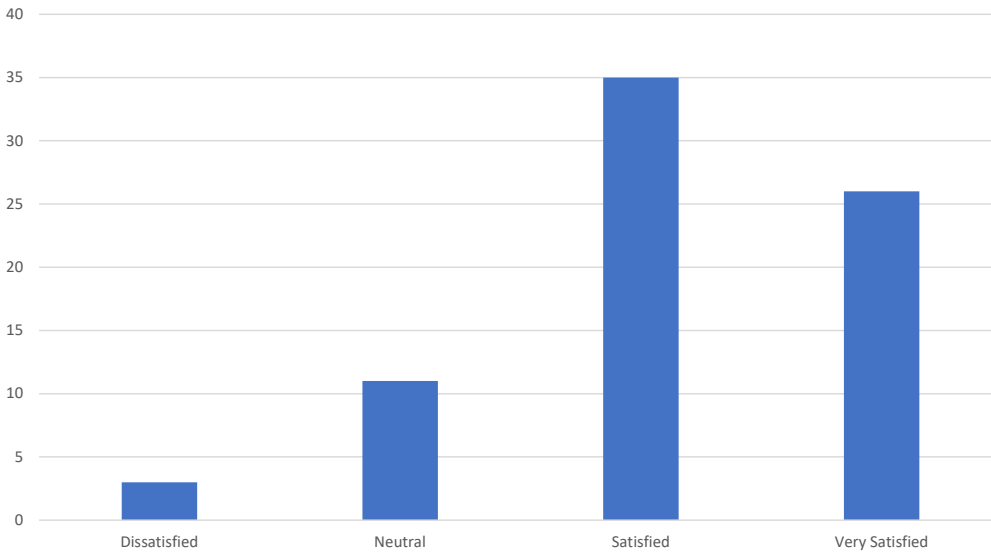
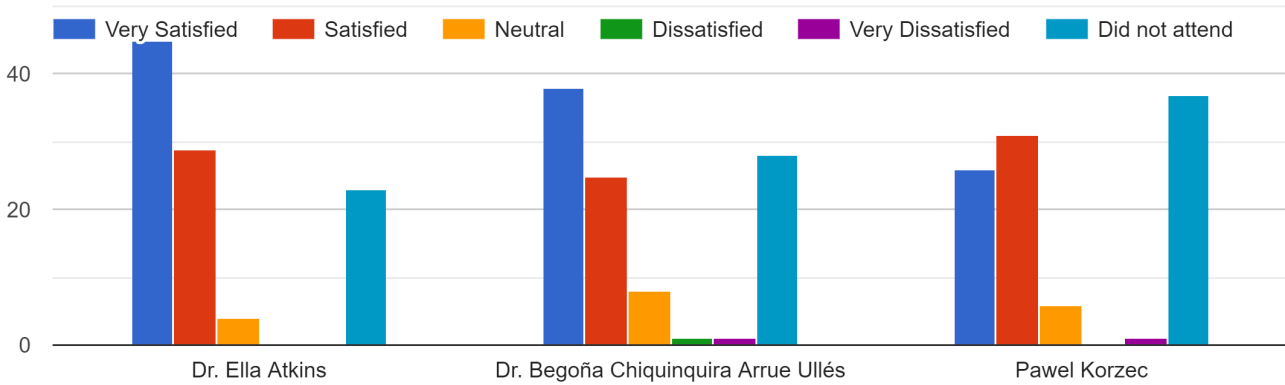## Please rate your ICUAS 2023 Online (Virtual) Experience

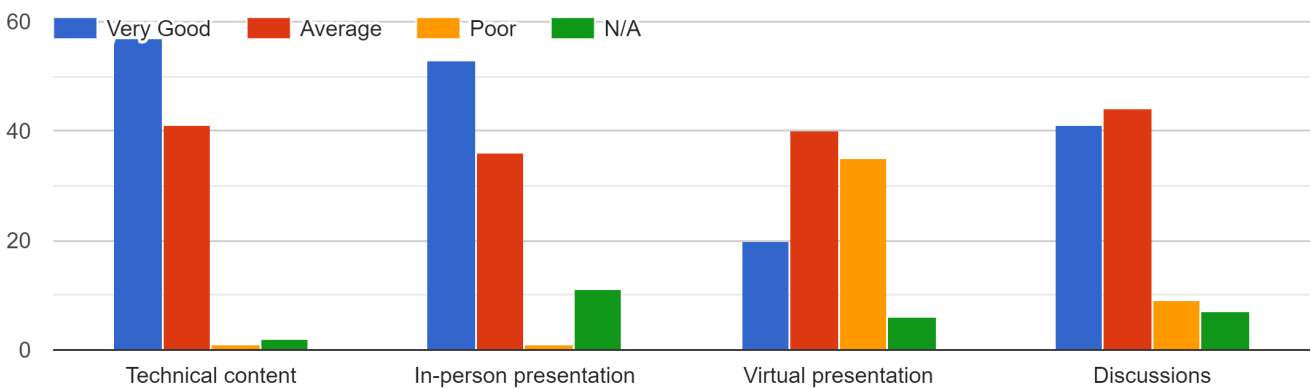## For online (virtual) attendees: what is your primary reason for not attending ICUAS 2023 in person?

Please rate the quality of

Please rate the quality of the Plenary Sessions

Please rate the quality of the papers

How important are the following in your decision to attend ICUAS?

Legend: Very Important, Somewhat Important, Neutral, Not Important

Categories: Location, Registration Cost, Attendance (Travel) Cost, Organizing Committee, Technical Sponsorship, Acceptance Rate, Option for journal version, Keynote Talks, Networking options
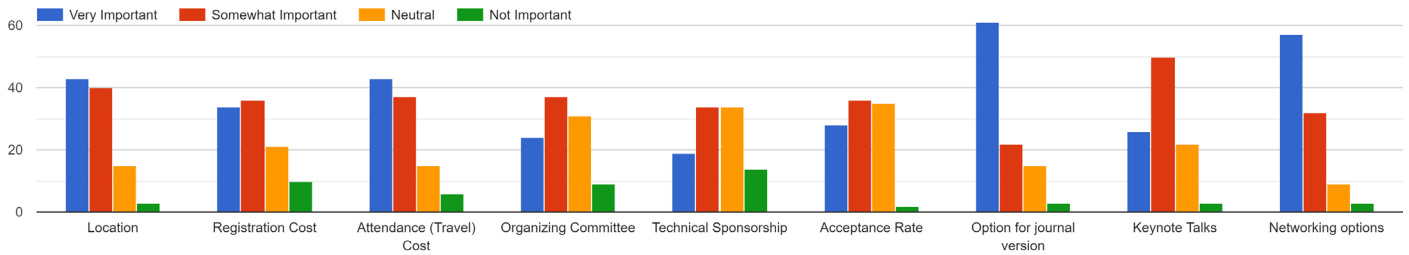
How likely are you to attent ICUAS 2024 in Chania, Crete, Greece?

101 responses

- 36.6%
- 15.8%
- 41.6%

- ● Very Likely
- ● Likely
- ● Neither nor
- ● Unlikely
- ● Very Unlikely
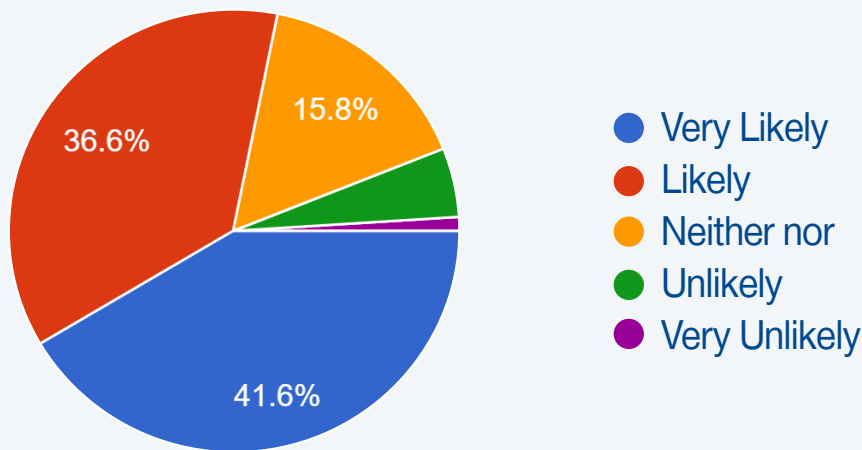
Would you agree with ICUAS 2024 being organized as an in-person event only (no virtual presentetion/attendance option)?

101 responses

- 16.8%
- 17.8%
- 12.9%
- 49.5%

- ● Strongly agree
- ● Agree
- ● Neutral
- ● Disagree
- ● Strongly disagree
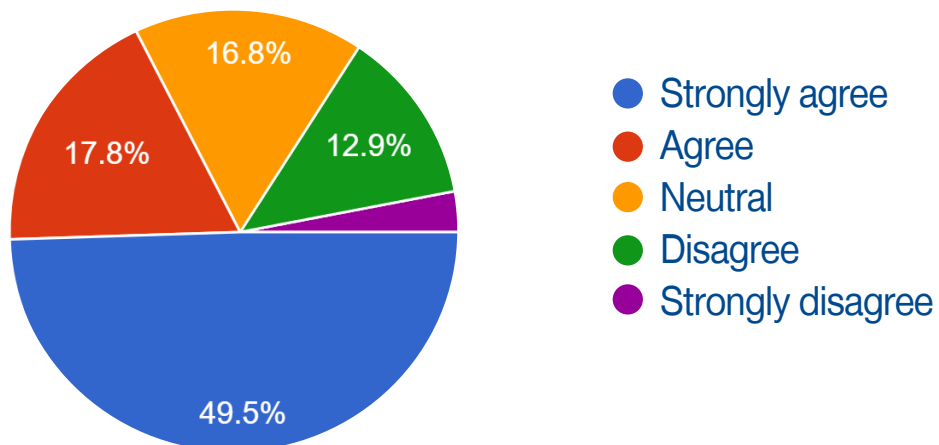
FEEDBACK - COMMENTS ABOUT ICUAS 2023

- The hybrid conference was not beneficial - those online did not contribute to discussions. Recorded presentations did not allow for discussions, either. The paper content was ok, but there was a distinct lack of real-world applications based on discussed topics.

- Recorded presentations were not good, they were very bad. It is not beneficial for physically present attendees who have made efforts to attend and present, to listen to bad video presentations.

- The remote connection platform needs to be improved.

- Some online presentations had problems related to connection.

- The hybrid conference mode should be removed. There should not be recorded video playback. The UAV Competition location must be close to the conference venue.

- The choice of Session Chairs is important. Consider choosing younger, professionally motivated individuals who will do a better job. The quality of some presentations was poor; it seemed that people do not see the importance of a good presentation. Strongly agree about the decision for ICUAS 2024 to be a physical presence only conference.

- The paper review process should be more intensive; some low-quality papers were accepted in 2023.

- Accept less and better-quality papers (lower accept rate).

- Very interesting conference.

- It really makes a difference for presentations to be live-physical. Consider NOT removing the possibility of online attendance, because there are individuals for whom it is difficult to attend in person. However, enforce live remote presentations, and allow for people to have the possibility to chat directly among themselves in the session, for example in virtual rooms after the presentation.

- Virtual presentations were not good. Next year should be in person only, otherwise going to the conference to watch a video probably can make a bad impact in the conference.

- The conference was very nice. The poster session should include more poster papers. However, those presented were interesting.

- The poster session must be better organized with specific instructions about the poster layout and location. Posters should be presented in a similar area like the other sessions. Future conferences should give the same importance to the poster session as in the other regular sessions.

- Timing between the paper acceptance and the event was short.

- Session Chairs should know which presentations are virtual and which physical ones. Moreover, Session Chairs should give heads up if some of the presentations are cancelled on short notice.

- Some Session Chairs were not familiar with the zoom platform and how to use it. Some Session Chairs did not follow the time schedule, thus making it difficult to change session rooms. Also, breaks between the sessions could be shorter. The most interesting networking happened not there, but in between or after the sessions of the day. Note that in late sessions the session chairs needed to catch an earlier flight, which gave a bad feeling on Friday afternoon. All participants in the room reacted very disappointed.

- Conference preparation should be ready before conference participants arrive to attend Workshops/Tutorials in the first morning, NOT later.

- Tutorials were presented 100% virtually. Thus little knowledge could be transferred.

- The registration payment issues were the only negative point.

- Welcome bags were not available for all the participants The staff of the Regents Hotel did not acknowledge at all the reception organization of the Tuesday, not knowing information as timelines and location in the hotel. Different hotel/conference site locations was inconvenient. The last day they removed the tent hosting launches. The university bar was too small for all the participants, some of them had their launch within classrooms. The last session of the conference was without any chair and one of the speaker was asked to chair the conference without a previous notice.

- All times we (authors) were well informed about the conference by Kimon Valavanis. Excellent.

RECOMMENDED WORKSHOP / TUTORIAL TOPICS FOR 2024

- Autonomy
- Commercial use of UAV systems
- Learning from real world trials
- Sensing and localization, and perception
- Regulations, law, rulemaking, industry standards
- Fault detection methods
- Aerial manipulation, MPC and deep learning for UAVs
- AI on board UAVs, and AI-based Flight Dynamics and Control
- Advanced Air Mobility, both technology and operation
- Swarm UAVs and FANETs
- Detect and avoid systems
- Hands on training in collaborative control (on any virtual machine, like Gazebo/ROS)
- Aircraft flight control, model-based control and extraplanetary exploration
- Communications aware UAVs and human interaction
- Multi-robot systems applications
- Fault-Tolerant Control and one on Visual Servoing
- Agricultural UAVs, last-mile delivery
- Using Robot Operating System (ROS) with Flight Controllers
- Data-Driven Control
- Decision making techniques for autonomous vehicles
- From simulation to reality UAV control and planning
- U-space/UTM related topics possibly regarding different approaches internationally
- Environment and sustainability
- Human-Machine interactions in unmanned systems
- Urban air mobility
- Alternative drone propulsion systems

SURVEY CONCLUSIONS

Overall, highly satisfied, successful event

Most attendees agree to 'remove' the virtual presentation option - this was one of the major drawbacks of the conference

Poster session needs to be better organized

More and better organized tutorials are desired

There were concerns for splitting the event in different locations, ideally all events should be in the same location

Good paper quality, but there is space for improvement

Greater attention is needed when selecting Session Chairs - some concerns were raised

There is much lower attendance on Friday (last day of the conference). Consider moving events to the last day of the conference to increase participation

UPDATE ON ICUAS 2024

The 2024 International Conference on Unmanned Aircraft Systems, ICUAS '24, will take place on June 4-7. It is organized for the first time in the historical Center of Mediterranean Architecture (KAM), which is hosted in the *Great Shipyard (Megalo Arsenali)* of Chania. It is the last of the 17 shipyards located in the Venetian port of the Old Town of Chania. The conference is under the auspices of, and it is sponsored by, the Technical University of Crete (TUC).

ICUAS '24 focuses on **civil and public domain applications and on the societal impact of unmanned aviation, and its effect on everyday quality of life**. Although technical challenges cover a wide spectrum of topics, of special importance are topics like: 1) **bioinspired aerial platforms** 2) **hybrid, platforms** 3) **design for resiliency** 4) **human factors** and 5) **framework and regulations for integration into the national airspace**.

ICUAS '24 brings together, under one forum, national and international organizations, federal agencies, industry, the private sector, authorities, end-users, and practitioners, who work towards defining roadmaps of Unmanned Aircraft Systems/Remotely Piloted Aircraft Systems (UAS/RPAS), they set expectations and technical requirements and standards that are prerequisite to their full utilization and integration into the national airspace. Special emphasis will be given to research opportunities, and to *"what comes next"* in terms of the tools and support technologies, and standards, which need to be utilized and implemented to advance the state-of-the-art.

ICUAS '24 offers unique opportunities to meet, interact and shape the future of unmanned aviation, worldwide, bringing together the technical, regulatory, and legal communities. Details and logistics about the conference may be found at **http://www.uasconferences.com** and related links.

ICUAS '24 is fully sponsored by the **ICUAS Association, Inc.**, a non-profit organization, see **www.icuas.com**. It is technically cosponsored by the IEEE Control Systems Society, the IEEE Robotics and Automation Society, and the Mediterranean Control Association.

ICUAS '24 includes the student-focused and student-centered **UAV Competition**, which offers unique opportunities for students to test and compare their skills with those of their peers worldwide. The competition is organized in two stages: simulation qualifiers and in-person finals during the conference. Details on how to participate in the UAV Competition are available on the conference web.

ICUAS '24 spans four days. The first day is devoted to Workshops and Tutorials. This is followed by three days of technical presentations. The 2024 conference aims to be 'physical presence' only with the requirement that every accepted paper is presented.

IMPORTANT DUE DATES
FEBRUARY 4, 2024:
FULL PAPERS / INVITED SESSIONS / TUTORIAL PROPOSALS DUE
FEBRUARY 15, 2024:
UAV COMPETITION: SIMULATION-BASED SCENARIO
APRIL 5, 2024:
ACCEPTANCE / REJECTION NOTIFICATION
APRIL 5 – APRIL 20, 2024:
EARLY REGISTRATION
APRIL 20, 2024:
UPLOAD FINAL, CAMERA READY PAPERS

UNMANNED AVIATION NEWS

For the latest information on Geographic Zones For Drones, Geo-awareness, And Their Importance in Aviation Safety, click on: **https://eudroneport.com/blog/geographic-zones/**

For a Comprehensive Overview of the U-Space Infrastructure, click on: **https://eudroneport.com/blog/u-space-infrastructure/**

The 17th Annual UAS Summit and Expo will take place on October 10-11 at Grand Forks, ND.