

## Tools for Organizing an Effective Virtual Academic Conference

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### ABSTRACT

Academic conferences are an indispensable component of contemporary science, giving researchers the opportunity to present the results of recent investigations, become familiar with other scholars' studies, and build and expand a network for future collaborations. However, the impact of the COVID-19 pandemic has caused the format of academic conferences to shift, leading virtual conferences to become increasingly popular in the academic environment. Along the way, practical online tools used to organize a virtual academic conference have attained prominence. This study evaluates the various features that service providers currently offer, having thoroughly investigated many tools that are currently on the market. The discussion categorizes these online tools into three groups based on function: event management tools, submission management tools, and online conferencing tools. The study findings contribute to conference organizers' ability to determine useful features for conducting a virtual academic conference. Moreover, the results reveal that the tools that support event and submission management can also benefit traditional scientific conferences, making this study valuable for those organizing all types of conferences, whether virtual or traditional.

### KEYWORDS

Conferencing tools; digitalization; event management tools; submission tools; virtual conferences

### Introduction

Academic conferences provide a venue for researchers to interact, share ideas, and discuss their research results. Such events are also useful for networking with other scholars, facilitating the future rise of new worldwide collaborations. While scientific conferences have long taken place in physical locations requiring in-person attendance, recent events have led to necessary changes in the conference format. Specifically, the onset and spread of COVID-19 that began in 2020 caused many academic conferences to be canceled or postponed. Eventually, organizers began to plan and conduct an increasing number of public meetings, including conferences, as virtual rather than in-person events in the face of the continuing pandemic (Sarabipour et al., 2021).

Although they have served a necessary function in the current situation, two primary reasons point to the strong possibility that virtual conferences will retain their popularity in the future. In the first place, the future will continue to hold the risk of new potential pandemics. Perhaps even more persuasive is the fact that many conference attendees have been

favorably impressed with the convenience and other advantages of attending virtual conferences. Like their in-person counterparts, virtual conferences require painstaking organization and management efforts, which typically depend on various essential tools. Accordingly, this study aimed to review the currently available online tools that can provide invaluable assistance in organizing a virtual academic conference. In practical terms, the usefulness of many such tools is not confined to virtual events, as they can also provide support for traditional or hybrid conferences. In any case, these tools can be used to announce an upcoming virtual meeting, improve the efficiency of the management and peer-review processes, and reach out to more attendees.

Conference costs can pose a substantial challenge to low-income institutes, academics, and students. The recent transition to virtual conferences has decreased the cost of attending academic events because the online format does not oblige attendees to pay for accommodations, food, or transportation, whether by ground or air (Sarabipour et al., 2021). The environmental impact of conferences is also a factor. Past

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academic mobility, which has included traditional conferences, has imposed a substantial impact in terms of the environmental footprint, particularly due to air travel (Arsenault et al., 2019). Politics and government regulations have played another role in presenting difficulties to scholars who have wished to attend traditional conferences, such as visa requirements. Specifically, researchers residing in Asia and Africa have experienced more visa-related troubles than Europeans and Americans (Waruru, 2018).

Security is another concern for in-person conferences. When academic conferences take place in military facilities, attendees may require security clearances. For instance, the International Conference on Marine Engineering & Technology Oman (ICMET Oman 2019) was organized at that country's Military Technological College. Oman's Ministry of Defense requirements meant that attendees had to submit their passports before the conference to in accordance with an internal security process.

Thus, virtual conferences offer advantages in terms of cost, environmental effects, and security issues. Nevertheless, such conferences also have some drawbacks. For example, a fast, reliable internet connection is essential for both the speakers and attendees. Due to the nature of virtual communication, some attendees may find concentration difficult during the event, especially if they are working from home (Foramitti et al., 2021). Social interaction is another significant challenge for the attendees of virtual conferences. Accordingly, researchers have provided some recommendations for virtual conferences to solve these problems, such as live streaming, enabling a real-time chat function among the attendees, and providing the ability to access the conference from any appropriate device (Sarabipour et al., 2021).

This study is organized as follows. Section two reviews the related literature, followed by the next section, which describes the study method used for this investigation. In section four, potential tools are identified, while section five presents an analysis of the findings. Finally, section six offers a conclusion and summary, along with suggested research topics for further investigation.

## Related work

Even before COVID-19 began to spread around the globe, Reshef et al. (2020) played an active role in organizing a virtual event, the Photonics Online Meet-up (POM), which was held on January 13, 2020. The organizers' aim was to put on a free and globally

accessible scientific conference for attendees, speakers, and organizers across six continents. A total of 1100 participants attended by means of an online conferencing tool and were able to present their questions to the speakers during the conference. The talks were recorded and were accessible online for two weeks. Many mini in-person conferences were took place in different locations using 66 identified hubs. In sharing their observations and experiences regarding the organization of a virtual conference, the authors mentioned the challenges, platforms, and points needing consideration in their study.

Bolander and Fine (2021) conducted a survey that asked 194 participants to respond to 21 questions about their experiences, barriers, and desires related to traditional, online, and hybrid conferences. The authors used this survey to seek answers to sustainability issues and find ways to establish equity across modes of traditional and virtual conferencing.

In their paper on organizing a virtual academic conference, Foramitti et al. (2021) discussed the virtual tools—Discord, WebinarJam, and Zoom breakout rooms—that helped them put on the 3rd International Conference on Information and Communication Technology and Applications (ICTA 2020). From the results of a survey conducted at the end of the event to evaluate the effectiveness of the conference, the authors formulated the recommendation of pre-recording presentations for a virtual conference. The study findings also noted that virtual conferences could promote an increase in the number of attendees. On the other hand, the authors reported that the attendees ranked social interaction as having the poorest point in the survey with regard to virtual conferences. Suggestions to enhance social activity included the availability of a virtual restaurant for lunch and a bar for the end of the conference.

The virtually organized 41st International Computer Archive of Modern and Medieval English (ICAME) conference formed the basis of another study (Beatrix & Kleiber, 2020). One of the most salient points in the study involved conducting a virtual city tour and welcome reception to increase social activities among attendees. Moreover, the participants were invited to use Zoom meetings to socialize before live events. This paper also mentions technical aspects of organizing this virtual conference. The open-source software OBS Studio was used to record the sessions instead of Zoom's internal recording function, while Adobe Premiere Pro and TechSmith Camtasia were used for the purpose of video editing. The session recordings were uploaded to the conference

management platform in full HD. Securely storing the records was a critical and exacting duty. The authors also mentioned a preference for EasyChair and ConfTool as event management tools.

In their literature review, Rubinger et al. (2020) focused on best practices for virtual conferences. The authors defined four phases of virtual conferences: Pre-planning, Planning, Accomplish, and Response and Engage. The study findings offer advice for different aspects of virtual conferences, including technology, marketing, attendees, speakers, scheduling, deliverables, and so on.

Virtual conferences, like their physical counterparts, also involve publishing. Online submission and peer-review processes offer certain benefits over traditional means, such as reduced cost, increased speed of submission and review, and reduced administration time, as described by (Tananbaum & Holmes, 2008), (Wood, 1998), and (Ware, 2005). Specifically, Tananbaum and Holmes (2008) explained the historical advancements of the peer-review process, moving from paper-based peer review to desktop-based peer review and, finally, web-based peer review. According to Ware (2005), many researchers and journals are highly satisfied with online submission systems.

Virtual conferences started to gain popularity during the time of COVID-19. Setting aside any other issues, the probability of similar future pandemics suggests that virtual conferences will retain their significance. However, the literature on this topic remains limited, and many aspects require further study, offering a wide, rich choice of topics for researchers. The authors who have already contributed to the literature by recounting their experience in terms of conducting virtual conferences have provided valuable information about organization, management, and communication issues. Moreover, the existing literature attests to both advantages and drawbacks of virtual conferences, and scholars have used surveys to explore the strengths and weaknesses of this conference format. This study's contribution to the literature is its focus on tools that can support the different phases of virtual conferences.

## Methodology

The methodology used in this study was formulated in three steps, as follows:

1. A literature review was conducted.
2. An investigation of the currently available tools was carried out.

3. A synthesis of the acquired knowledge was accomplished.

The first step entailed identifying and reviewing scientific papers describing the use of online tools for conferences. The literature search employed various scientific databases, such as Association for Computing Machinery (ACM) Digital Library, Springer Link, and ScienceDirect. Only papers published in journals, conferences, and workshops were considered. Additionally, Google Scholar and Web of Science were searched. Lastly, the bibliographies of the detected papers were scanned to access additional relevant papers.

In the next step, the tools used for upcoming academic conferences were reviewed. Discussions that involved comparisons of such tools, suggestions and recommendations for tools, and related topics on academic social platforms, such as ResearchGate.net and the Academia.edu, were investigated. Afterward, potential tools were identified in Google searches, followed by documenting the detected tools' features by examining the product websites.

Consequently, the identified tools on the market were categorized according to their purposes. Citavi software was used to organize the extracted information from the selected papers and to document the tools' features. [Appendix 1](#) displays a list of the investigated tools.

## Potential tools for virtual academic conferences

The term virtual conference encompasses totally virtual, hybrid (virtual and in-person), and multi-hub conferences. Multi-hub conferences, in particular, can reduce the necessity for travel. This type of conference involves organizing several conference rooms; conference participants attend the closest one. Meanwhile, the panel sessions are conducted virtually and synchronously. Local speakers can also attend in person as keynote speakers (Sarabipour et al., 2021).

The potential tools for organizing a virtual academic conference can be divided into three categories, based on function: event management, submission management, and online conferencing. Some examples of such tools are illustrated in [Appendix 2](#). This investigation also discovered that the tools that service providers offer could combine various functions.

In terms of cost, both free and paid services are available. Free services may impose limits, such as the number of attendees or duration of the conference.

One type of free tool comprises stripped-down free versions of paid implements.

Providers offer support to conference organizers through live chat, phone, e-mail, or a ticket system (i.e., specialized web software). Moreover, trained staff may be available to provide dedicated service for their company's online conferencing tools during a conference. Accordingly, a knowledge center may be offered for the training of organization staff.

Event management tools and submission management tools may be hosted by the conference organizers or service providers. The essential advantage of self-hosted tools (i.e., web software) is that the organizers control their own data. However, server reliability is the responsibility of the organizer when a self-hosted option is chosen. User privacy is an additional consideration for virtual conference organizers and attendees. Many service providers emphasize their compliance with the General Data Protection Regulation (GDPR), a data privacy regulation that was established May 25, 2018, across all European Union (EU) Member States (Goddard, 2017).

Event management tools and submission management tools are web-based systems. Online conferencing tools may also require an additional software installation on attendees' personal computers (PCs). All of these tools come in varying forms and offer a number of features. For example, a particular tool may be available in the form of a mobile application. Many platforms have multilingual interfaces, making them convenient for conferences whose attendees span the globe. The service providers identified in this study also support different operating systems and browsers, such as Opera, Firefox, Chrome, Safari, smartphone, PCs, and tablets.

### **Event management tools**

Event management tools are used in academic conferences for the processes of announcing, ticketing, registering, certification, or evaluation.

Advertisement is essential for any academic conference when seeking to ensure the highest possible number of attendees and submissions. Event management tools support conference advertising and are quite powerful for announcing academic conferences. Because many events can be listed on service providers' websites. Moreover, advertisement may be an attraction for the conference sponsors. For these reasons, such services are used for traditional as well as virtual conferences. The organizer may have a customized branded section in the provider's website with colors, logos, and cover photos belonging to the

conference. This section can be used to inform potential sponsors, authors and attendees about the conference description, sponsors, agenda, contact details, keynote speakers, and such.

Individual or group registration is another crucial function for event management tools. After the registration process is finalized, customized conference tickets can be sent to attendees. Such customization might entail different features and fees. For instance, discounted tickets might be purchased using a discount code or offered as a reward for early registration. The software can enable various payment means, including credit cards, PayPal, and other payment platforms. Providers can also create an invoice for each attendee upon payment.

The efficacy of these tools extends beyond the duration of the conference. For example, event management tools can automatically issue a certificate for each attendee at the end of the conference. The organizers can also use these tools to send a survey to the attendees to measure the efficiency of the conference.

Event management tools offer further additional services and features for both attendees and organizers. For instance, if the conference is not totally virtual, the platform may provide a direct link to a hotel booking service. Moreover, some providers offer a Short Message Service (SMS) or e-mail sending service to the attendees for communication purposes. Reports are also a vital feature, allowing the organizers to access analytical data and details, such as the number of participants, total revenue, and attendee profiles.

### **Submission management tools**

In this study, the term manuscript refers to an abstract, extended abstract, or full paper. Submission management tools are used for collecting manuscripts, performing the peer-review process, and acquiring the final version of a paper.

Peer review is an essential process in all types of science, enabling the selection of the best papers to be published. In addition, this process is useful for improving the quality of a paper. Peer review also provides a way to detect errors or fraud in a manuscript (Smith, 2006).

Peer-review systems comprise two categories: a desktop peer-review system and a web-based peer-review system. Desktop peer-review systems were initially developed in the 1970s. The development of web-based systems followed in the 1990s (Tananbaum & Holmes, 2008), and such systems are widely used today for journal and conference submissions. Many commercial or free submission management tools are



currently available on the market (Tananbaum & Holmes, 2008). These may entail web-based software installed on the organizer's own servers, or they may be directly hosted by service providers.

Conventional peer review, which is based on sending a manuscript by postal service to a journal, has an significant drawback: cost. For a conference organizer, the cost involved when using the conventional peer-review process may be up to £200 per submitted manuscript (Donovan, 1998). Furthermore, authors are obliged to absorb other costs, including copying, sending faxes, telephoning, and postage (Ware, 2005). Manuscripts may be faxed or sent by post as part of this process. Time is also a factor in this case. Sending a manuscript as a hard copy by postal service takes two weeks or longer (Wood, 1998). In contrast, submitting a manuscript through web-based platforms requires mere seconds, consequently reducing the decision period due to the convenience of online submission management tools. In addition to shortening the decision period for editors and reviewers, online systems also reduce administration time (Ware, 2005). The only potential problem of online systems arises when reviewers, editors, or authors are lacking in computer skills (Bingham, 1998).

Submission management tools allow different roles to be assigned, such as editor, reviewer, author, corresponding author, committee member, or administration staff. Organizers may request pre-payment or full payment for the peer review. Service providers can manage the payment process through one or more payment methods, including credit cards or PayPal.

### **Submitting**

When organizing a conference of any type, the organizers will put out a call for papers, specifying a deadline for submission. Online systems allow the conference organizers to create flexible forms for the collection of manuscripts. For instance, an abstract can be divided into several parts, such as the introduction, objective, methodology, findings, conclusion, and keywords, each of which can be submitted through different text fields. Other features that can be offered in text fields for the authors' input include word counts and text formatting. In addition to text fields, manuscripts can be uploaded in LaTeX, Word, or PDF formats, in particular. Organizers may also choose to allow multiple file uploads.

### **Peer-review process**

The peer-review process may be organized as either an open peer review or a closed peer review (Hames,

2007). A closed peer review may consist of a single-blind procedure, where the reviewer knows the author's identity but is not known to the author, or a double-blind procedure, in which neither author nor reviewer knows the identity of the other party (Snodgrass, 2006). In contrast, the reviewer's and author's identities are disclosed in an open peer review (Ross-Hellauer, 2017). All of the mentioned peer-review methods can be offered by submission management tools. The organizer can select the suitable one.

The reviewer is of importance for the evaluation of the manuscript by providing an overall idea (Peh & Ng, 2009). The submission management tools can also offer the auto-matching feature for potential reviewers. Before matching, a configuration is required by the editor. The reviewers should be categorized by their qualifications. The submission number per reviewer can be limited, as well.

Submission management tools allow reviewers to provide feedback about a manuscript by means of votes, grades, and comments. If the manuscript requires corrections, these tools give authors the ability to submit a revised version. The tools also facilitate the storage of these revisions.

Lastly, different approval processes can be specified, such as reviewer approval, editor approval, or technical committee approval. The final version of the manuscript can be published on the subject platforms if such a choice is offered.

### **Communication and monitoring**

Dedicated discussion boards for specific conference subjects or manuscripts can be made available for conference organizers, reviewers, committees, and so on. Service providers may also offer an e-mail notification service. A targeted invitation for a conference can be sent to potential attendees and authors through a given contact list. Authors may also receive notifications for different purposes, including reminders, acceptance, rejection, or a request for correction. The software may include a variety of data analytics, allowing organizers to keep track of the number of manuscripts in progress or a particular manuscript's status (e.g., decision needed, published or not published).

### **Online conferencing tools or platforms**

Three types of virtual conferences include scheduled, always-on, and recurring. A scheduled conference takes place at a specific date and time and is typically conducted live in real time. In contrast, the term always-on conference is used to refer to recorded

conferences. For a pre-determined period, attendees are allowed to access all conference materials, such as presentations, records, and manuscripts. Recurring conferences are periodic in nature, and this term is not used for academic conferences. Scheduled and always-on conferences may be combined when conference materials are made available for a specified time after the conference ends.

In addition to its video communication features, a virtual conference platform can offer the final versions of submitted manuscripts, prerecorded presentations, the conference schedule, and so on. Conference materials can also be stored on the platform and accessed at any time.

When organizing a virtual conference, several issues should require careful attention. Because attendees may be from different countries, the participants' time zones should be considered in determining the conference schedule (Rubinger et al., 2020). Moreover, the duration of the event over a day can be kept relatively short. Conducting parallel sessions is another option that can reduce the overall time frame of a conference.

Technology-focused preparation is another vital element in organizing and managing virtual conferences. Video conferencing equipment, such as cameras, microphones, lights, speakers, headsets, and computers, should be tested before the day of the conference. Moreover, spare equipment should be ready to use in case of possible failures. The internet connection should be fast and reliable. Alternative internet and electricity options should be considered in the event of potential disruptions. The web-based platforms or software to be used during the conference should be tested before the event, and the responsible staff should be fully familiar with managing the platforms. Because web-based platforms may be interrupted due to technical reasons, alternative platforms should be ready. Before a session, the speaker's sound and cameras should be checked. Lastly, guidelines should be sent to speakers and attendees in advance explaining the effective use of the conference tools.

The possible features that service providers may offer are explained below.

### **Conference attendance method**

Different methods are available for tracking conference attendance. User-specific links can be sent to the attendees through SMS or e-mail. Alternatively, a generic link can be shared. In the latter case, the attendees might sign into a "waiting room" and be held there until the staff's approval. As another possibility,

individuals might attend without any confirmation needed. Some tools can also create credentials. The organizers can share these credentials with the attendees. The option to follow the conference by phone is especially beneficial in the event of an internet failure or for attendees with spotty internet access. However, because this possibility could be costly if an international call is involved, service providers may offer local phone numbers in many countries.

### **Presentation**

The speakers can present their topics by sharing their screen as a specific window, display, file, etc., with the option to upload their presentation in a variety of formats. In particular, this method is quite useful in the case of a poor internet connection. Speakers can use their video cams for their presentations; in this event, providers may also offer a blurred or virtual background and noise suppression for the speakers. Service providers can also make a virtual drawing board available for speakers' use during the conference. Different platforms, such as Vimeo, Facebook Live, and YouTube, may be used for embedded session streaming.

Attendees may also view prerecorded presentations during the conference. Such presentations offer the following benefits (Foramitti et al., 2021):

- Prerecorded presentations can be used in case a technical problem arises with the speaker.
- The speaker can record a presentation multiple times until satisfied, improving the quality of the presentation.
- The speaker, freed from the details and stress of speaking, may be available to reply to questions asked in the chat panel during the presentation.

### **Communication**

The service providers offer several communication methods for their clients to reach out to conference participants. For example, attendees who install the application on their mobile devices can receive push notifications. SMS texts or e-mail newsletters about the conference, as well as automated reminders, can be sent to the participants or other individuals in a specific contact list. Lastly, a sticky announcement can be shown on the conference platform.

### **Interaction with the attendees**

During live conferences, the attendees can ask the speakers questions through a chat panel. Moreover, the software can allow the possibility for participants

to interact with each other in a private chat (i.e., direct messaging). The attendees may also request to take the floor with voice, camera, screen sharing, and so on. At the end of the conference, the organizer can administer an online survey for evaluation purposes. As can be seen here, the market currently offers many supportive tools that can enhance interaction in virtual conferences (e.g., Slido).

### **Technical issues**

Virtual conferences can be accessed through web browsers or software installed on PCs. Online conferencing tools are supported by commonly used operating systems, such as Windows, Linux, and macOS. Suggested internet browsers include Firefox, Chrome, Safari, Edge, and Opera. Service providers also commonly offer applications for mobile devices.

According to the study findings, many providers broadcast videos in HD format. Sessions can be recorded locally, in cloud services or on the servers of service providers. If recorded in the cloud or on providers' servers, the recorded sessions can be downloaded by the conference organizers to a local drive or broadcast on other video platforms. Moreover, the records can be made available for attendees to download or stream for a specified period, which may be long or short. It is also possible to maintain session recordings in MP3 format.

Many service providers support video conferencing room solutions (e.g., Logitech Rally Plus Conference Cam). As security is a vital aspect, providers are likely to encrypt data or communication protocols.

### **Money-making**

Conferences can be paid for authors and/or attendees. For a paid event, the conference fee can be collected ahead of time. Moreover, the organizers have the potential for financial gain during the conference. Examples include using the tools to announce special offers or advertisements, making sponsor rooms available, and offering to post sponsors' logos on the platform for a fee.

### **Analytics and reports**

Registration forms can be created and embedded on different websites, and registration sources can be tracked. Different characteristics of participant profiles can be analyzed, such as gender, sector, company, or country. Analysis of different aspects of conference participation is also possible, including attendance rate, watching duration, and sales/revenues.

### **Control center**

Different roles can be assigned to the participants, such as super chair, session chair, speaker, attendee. The staff can manage the session in such areas as conference features and session features (e.g., camera/microphone on/off) for the speakers and participants, blocking the attendees from interrupting. The sessions can also be locked after a period or at a specific time to block new attendees from entering. Customized interfaces can be created, including a logo, a cover image, and colors.

### **Other issues**

Multilanguage interfaces can be offered to the participants, and different speaker views can be selected individually. The organizer may choose to provide a directory for the speakers, sponsors, and attendees, which is especially useful to enhance networking. A page for the organization can be created, providing the conference description, agenda, papers, contact details, document sharing, and so on. Many providers offer calendar integration, such as Google, iOS, and Microsoft Outlook. The existing data can be exported in different formats, including CSV, XML, Excel files, or SQL. The webinar can be conducted automatically according to defining prior workflow. Lastly, a remote control feature can be provided.

### **Findings**

Academic conferences can be categorized as either traditional, totally virtual, hybrid, or multi-hub. This study has used the term virtual conference to refer to totally virtual, hybrid, and multi-hub conferences. Virtual conferences eliminate the need to travel, increasing convenience and reducing cost as well as the event's carbon footprint. Moreover, visa requirements and security concerns are eliminated. Thus, the choice to offer a virtual conference offers a significant potential to increase the number of attendees. Nevertheless, virtual conferences have several drawbacks, including the requirement for a fast and reliable internet connection, problems involving concentration for some participants whose surroundings are subject to noise or distractions, challenges concerning social interaction among the participants, and the conundrum of determining an appropriate conference schedule to accommodate participants in different time zones.

Online tools include submission management tools, event management tools, and online conferencing tools. While submission management tools and event

management tools can be used for all types of academic conferences, online conferencing tools are required for virtual conferences. Service providers can offer a blend of these tools to their clients. According to the statements of service providers, many of these tools support PCs and mobile devices. Moreover, they are compatible with well-known internet browsers, such as Opera, Safari, Chrome, Firefox, and Edge. Common features that many of these service providers offer include customized branding, analytics, different support options, and a payment gateway. Depending on budget concerns, organizers can obtain free as well as paid services/software from the market. Web-based systems can be hosted on the server of the organizer or the service provider.

Event management tools have proven effective in all types of scientific conferences and are used for announcing, ticketing, registering, certification, evaluation, and more. In specific areas, event management tools represent a strong aid to organizers. For example, they can provide an advertisement service. Moreover, online peer-review systems eliminate many costs, such as copying, using a fax or telephone, and postage. The technology supports both open and closed peer-review methods for submitted manuscripts. For the conference sessions, prerecorded presentations are useful for a number of reasons. Lastly, although online video conferencing tools currently broadcast videos (including video cam) in HD format, higher quality may be possible in the future.

## Conclusion

Social and health-related conditions surrounding the COVID-19 pandemic have raised awareness of the importance of virtual conferences. The current market offers the organizers of such conferences many tools to choose from to organize an effective conference, including tools for event management, submission management, and online conferencing. The features may be classified according to providers. Future research should delve further into streamlining conference organizing in the virtual space in support of organizers and participants. Some providers offer trial accounts, opening the possibility to test the various features offered by providers. The given descriptions on providers' websites are not standard. Some features are not listed in spite of offering to the clients. Additionally, investigating academic social networks and open science platforms, such as ResearchGate.net, Academia.edu, and Zenodo.org, could be beneficial. Technical issues, including internet glitches, electrical or equipment failure, or a service

interruption affecting the virtual platform can dramatically derail a scientific conference, suggesting that redundancy in terms of equipment and services may prove useful for online conferences. Virtual conferences have proved their worth in terms of convenience and cost-reduction. By seeking out the best tools to support everyone involved, organizers can ensure productive conferences for years to come.

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## References

- Arsenault, J., Talbot, J., Boustani, L., Gonzalès, R., & Manaugh, K. (2019). The environmental footprint of academic and student mobility in a large research-oriented university. *Environmental Research Letters*, 14(9), 095001. <https://doi.org/10.1088/1748-9326/ab33e6>
- Beatrix, B., & Kleiber, I. (2020). Realizing an online conference. *International Journal of Corpus Linguistics*, 25(3), 322–346. <https://doi.org/10.1075/ijcl.00028.bus>
- Bingham, C. (1998). Peer review on the Internet: A better class of conversation. *The Lancet*, 351, S10–S14. [https://doi.org/10.1016/S0140-6736\(98\)90307-5](https://doi.org/10.1016/S0140-6736(98)90307-5)
- Bolander, B., & Fine, J. (2021). Digital conferencing in times of crisis. *International Journal of the Sociology of Language*, 2021(267–268), 55–68. <https://doi.org/10.1515/ijsl-2020-0088>
- Donovan, B. (1998). The truth about peer review. *Learned Publishing*, 11(3), 179–184. <https://doi.org/10.1087/09531519850146346>
- Eventbrite. (2020). 15th international naval engineering conference incorporating the international ship control systems symposium: Disrupting technologies. <https://www.eventbrite.co.uk/e/15th-international-naval-engineering-conference-incorporating-the-international-ship-control-tickets-85964013679>
- Foramitti, J., Drews, S., Klein, F., & Konc, T. (2021). The virtues of virtual conferences. *Journal of Cleaner Production*, 294, 126287. <https://doi.org/10.1016/j.jclepro.2021.126287>
- Goddard, M. (2017). The EU General Data Protection Regulation (GDPR): European regulation that has a global impact. *International Journal of Market Research*, 59(6), 703–705. <https://doi.org/10.2501/IJMR-2017-050>
- Hames, I. (2007). *Peer review and manuscript management in scientific journals: Guidelines for good practice*. Blackwell Pub. <https://doi.org/10.1002/9780470750803>
- Peh, W. C. G., & Ng, K. H. (2009). Role of the manuscript reviewer. *Singapore Medical Journal*, 50(10), 931–933; quiz 934.
- Reshef, O., Aharonovich, I., Armani, A. M., Gigan, S., Grange, R., Kats, M. A., & Sapienza, R. (2020). How to organize an online conference. *Nature Reviews Materials*, 5, 253–256. <https://doi.org/10.1038/s41578-020-0194-0>



- Ross-Hellauer, T. (2017). What is open peer review? A systematic review. *F1000Research*, 6, 588. <https://doi.org/10.12688/f1000research.11369.1>
- Rubinger, L., Gazendam, A., Ekhtiari, S., Nucci, N., Payne, A., Johal, H., Khanduja, V., & Bhandari, M. (2020). Maximizing virtual meetings and conferences: A review of best practices. *International Orthopaedics*, 44(8), 1461–1466. <https://doi.org/10.1007/s00264-020-04615-9>
- Sarabipour, S., Khan, A., Seah, Y. F. S., Mwakilili, A. D., Mumoki, F. N., Sáez, P. J., Schwessinger, B., Debat, H. J., & Mestrovic, T. (2021). Changing scientific meetings for the better. *Nature Human Behaviour*, 5(3), 296–300. <https://doi.org/10.1038/s41562-021-01067-y>
- Smith, R. (2006). Peer review: A flawed process at the heart of science and journals. *Journal of the Royal Society of Medicine*, 99(4), 178–182. <https://doi.org/10.1177/014107680609900414>
- Snodgrass, R. (2006). Single- versus double-blind reviewing: An analysis of the literature. *ACM SIGMOD Record*, 35(3), 8–21. <https://doi.org/10.1145/1168092.1168094>
- Tananbaum, G., & Holmes, L. (2008). The evolution of Web-based peer-review systems. *Learned Publishing*, 21(4), 300–306. <https://doi.org/10.1087/095315108X356734>
- Ware, M. (2005). Online submission and peer-review systems. *Learned Publishing*, 18(4), 245–250. <https://doi.org/10.1087/095315105774648771>
- Waruru, M. (2018). African and Asian researchers are hampered by visa problems. *Nature*. <https://www.nature.com/articles/d41586-018-06750-1>
- Wood, D. (1998). Online peer review? *Learned Publishing*, 11(3), 193–198. <https://doi.org/10.1087/09531519850146364>

## Appendix 1

The investigated tools for the study are listed below.  
Event Management Tools

- Bizzabo
- ConfTool
- Eventbrite
- Eventzilla

- Idloom Events
- Meeting Hand
- RegFox
- Vcongress
- Weemss
- Wikicfp

### Submission Management Tools

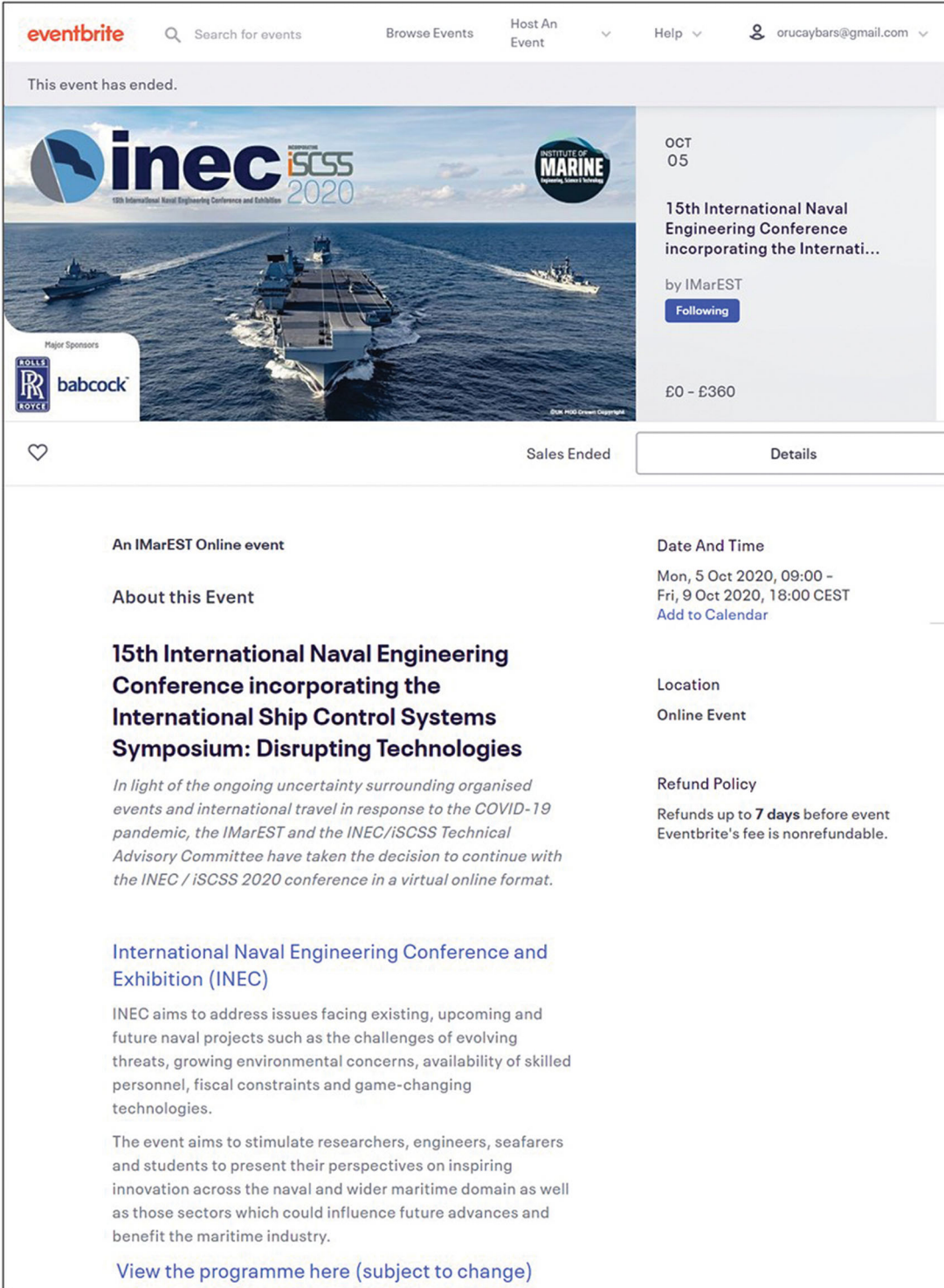
- COMS
- ConfTool
- Cvent
- EasyChair
- EDAS
- ExOrdo
- Indico
- MeetingHand
- OpenConf
- Oxford Abstracts
- Vcongress

### Online Conferencing Tools

- BigBlueButton
- BlueJeans
- Cisco Webex
- EasyMeeting
- GoToMeeting
- Livestorm
- Mega Meeting
- Mikogo
- Proficonf
- Results Direct
- Skype
- Teams
- UberConference
- Vast Conference
- WebinarJam
- Webroom
- Zoom

## Appendix 2

In 2020, the International Naval Engineering Conference and Exhibition (INEC 2020) was organized virtually due to COVID-19 although it was planned to conduct as conventional. Three tools were used. Eventbrite as event management tool, EasyChair as submission management tool, and Result Direct as online conferencing tool were selected by the conference committee. The screenshots of mentioned tools are shown in the following figures (Figures A1–A3).



The screenshot displays the Eventbrite interface for the event "15th International Naval Engineering Conference incorporating the International Ship Control Systems Symposium: Disrupting Technologies". The event is scheduled for October 5, 2020, from 09:00 to 18:00 CEST. The price is listed as £0 - £360, and the status is "Sales Ended". The event is organized by IMarEST, and the user is currently "Following" the event. The main description states that due to the COVID-19 pandemic, the conference is being held in a virtual online format. The event aims to address issues facing existing, upcoming, and future naval projects, such as the challenges of evolving threats, growing environmental concerns, availability of skilled personnel, fiscal constraints, and game-changing technologies. The event aims to stimulate researchers, engineers, seafarers, and students to present their perspectives on inspiring innovation across the naval and wider maritime domain, as well as those sectors which could influence future advances and benefit the maritime industry. A link is provided to view the programme here (subject to change).

Figure A1. Event management tool—Eventbrite (Source: Eventbrite, 2020).


Submission 30						
Title:	Claims of State-Sponsored Cyberattack in the Maritime Industry					
Paper:	 (Aug 25, 18:33 GMT)					
Author keywords:	maritime ship cyber security state-sponsored cyberattack					
Topics:	Cyber security					
Abstract:	<p>Developments in technology bring inherent risks along with convenience. Undoubtedly, cyberattacks constitute one potentially serious risk. While a stereotypical scenario involves a curious teenager sitting in front of his computer at home, a much more critical threat comes from experienced professionals, supported by states, who are specially trained and who have the necessary technological equipment to do great harm. These cyberattacks exert a negative impact on the maritime industry due to the wide usage area of both IT information technology (IT) and operational technology (OT) systems. On a related note, opponents of autonomous ship projects can effectively cite the weaknesses detected in navigation systems onboard ships. Examination of cyberattacks in the maritime industry as reflected in the press or in academic studies reveals claims that some of these attacks are state-sponsored. However, no country has to date accepted responsibility for such cyberattacks. Although those targeted by such accusations have neither confirmed nor rejected responsibility, the nature of the attacks – sophisticated or requiring high-cost equipment – raises the possibility that behind the attacks are countries that may have conducted research studies for defensive or offensive purposes. China, Iran, North Korea, Russia and Turkey have been named among the countries carrying out cyberattacks on the maritime industry. It is envisaged that these attacks are based on motivations such as information theft, defence research or sabotage of exploration for underground sources. Among the cyberattacks on vessels that have been assessed as state-sponsored, the most common have involved GPS jamming, rendering GPS useless, and GPS spoofing that causes the GPS to report an incorrect position for a ship at sea. This study examines the cyberattacks on the maritime industry that are asserted as state-sponsored as well as the parties involved in these attacks and the possible objectives of those parties.</p>					
Submitted:	Dec 15, 10:37 GMT					
Last update:	May 14, 15:14 GMT					
Open Access and Copyright	Attribution-Non Commercial Licence (CC-BY-NC) – Others can remix, tweak, and build upon your work non-commercially. Their new works must acknowledge you and be non-commercial, but they don't have to license their derivative works on the same terms.					
Sir Donald Gosling Award	Please consider this submission for the Sir Donald Gosling Award					
Authors						
first name	last name	email	country	affiliation	Web page	corresponding?
Aybars	Oruc	orucaybars@gmail.com	Norway	Norwegian University of Science and Technology	<a href="https://www.ntnu.edu/employees/aybars.oruc">https://www.ntnu.edu/employees/aybars.oruc</a>	✓
Reviews						
Review 1						
Comments to Authors:	A very intriguing topic! Recommend using an editor to ensure English is used correctly, particularly with regard to proper use of vocabulary words. Sounds like a very interesting paper, just has a few errors in the writing that I wouldn't want to throw off the content and message.					
Review 2						
Comments to Authors:	<p>A well written and interesting paper which is very relevant and suitable for INEC 2020. There have been some papers on the subject in the past but there is no doubt that this is a growing and important subject area for Naval vessels. I look forward to the presentation.</p> <p>General points:</p> <ul style="list-style-type: none"> <li>You could comment in the paper or presentation how this might impact Naval vessels.</li> <li>I am aware that some ship systems automatically download 'updates' or 'patches' and this has caused system malfunctions in the past. How many systems have this inbuilt capability that we don't know about? Maybe not for this paper but equipment providers could easily build in this function without the knowledge of the owner.</li> <li>In Section 1 Para 3 Line 2 you refer to 'MarCy' but only give us what it stands for in your Acknowledgements. I suggest you do this at the beginning.</li> <li>Although not in the Marine industry I am aware of Ransomware attacks in the Oil and Gas Sector which could have equally devastating impacts.</li> </ul> <p>Given that the paper is written in English which I am presuming is not the author's first language it is almost perfect.</p> <p>Minor grammatical comments/suggestions:</p> <ul style="list-style-type: none"> <li>Section 1 Para 3 Line 5: suggest adding 'the' after 'Lastly,' at the end of the line.</li> <li>Section 1 Para 4 Line 4: suggest adding 'the' after 'For instance,'.</li> <li>Section 1 Para 5 Line 1: suggest removing 'the' before 'current'.</li> <li>Section 2 Bullets 1 and 2: Move full stop to end of lines after '(BIMCO 2018)'.</li> <li>Section 2.3 Para 1 Line 9: Change 'claimed' to 'claim'.</li> <li>Section 3.5 Para 5 Last line: Suggest you replace 'verified' with 'admitted' or 'confessed' or 'acknowledged' or something like that.</li> <li>Section 4 Para 8 Line 1: Explain what you mean by 'damaged'.</li> </ul>					
Comments to Authors:	Thank you for the updates. I look forward to your presentation.					

Figure A2. Submission management tool—EasyChair.







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**A Welcome from the 118th President of the IMarEST**  
Oct 5, 2020, 1:00 PM – 1:05 PM BST, IMarEST TV

**Keynote Opening Session**  
Oct 5, 2020, 1:30 PM – 3:00 PM BST, IMarEST TV

**DISRUPTIVE TECHNOLOGIES**  
Oct 5, 2020, 4:30 PM – 6:00 PM BST, IMarEST TV  
2 Sub-sessions

**CLIMATE CHANGE RESPONSE**  
Oct 5, 2020, 7:00 PM – 8:30 PM BST, IMarEST TV  
2 Sub-sessions

**Tuesday, October 6, 2020 BST**




**POWER SYSTEMS 1**  
Oct 6, 2020, 10:30 AM – 12:00 PM BST, IMarEST TV  
2 Sub-sessions

**POWER SYSTEMS 2**  
Oct 6, 2020, 1:30 PM – 3:00 PM BST, IMarEST TV  
2 Sub-sessions

**ENGINEER AT THE HEART OF THE SYSTEM**  
Oct 6, 2020, 4:30 PM – 6:00 PM BST, IMarEST TV  
2 Sub-sessions

**Wednesday, October 7, 2020 BST**

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Figure A3. Online conferencing tool—Results Direct.