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## Analyzing Experimental Music Performance in 'AquaSonic' by Between Music

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ABSTRACT	ARTICLE INFO
<p>This essay analyzes the performance of experimental music in Between Music's Aquasonic Project using a qualitative approach. We investigate the creative combination of music and underwater performance art by analyzing various sources such as literature and audio-visual information found on platforms like YouTube. The essay explores the distinctive difficulties and artistic opportunities that arise from performing music underwater, focusing specifically on Between Music's Aquasonic Project. The project explores the ways in which it challenges the conventional norms of music performance by combining avant-garde music, visual arts, and scientific investigation. The study reveals the complex and diverse aspects of the Aquasonic Project, emphasizing its dependence on specialized instruments, the acoustic characteristics of water, and the physical interactions between the performers and their underwater surroundings. The essay offers a detailed analysis of the experimental music performance landscape in the Aquasonic Project by combining insights from study literature and analysis video on YouTube. It highlights the need to work together across several disciplines, using advanced technology and exploring new artistic ideas to expand the limits of musical expression. Moreover, the study proposes possible areas for future investigation and artistic development in the field of underwater music performance, highlighting its capacity to evoke wonder, stimulate contemplation, and alter traditional concepts of musical engagement.</p>	<p><i>Article History:</i> Submitted/Received 30 Sep 2022 First Revised 15 Oct 2022 Accepted 30 Oct 2022 First Available online 20 Nov 2022 Publication Date 25 Nov 2022</p> <hr/> <p><b>Keyword:</b> <i>Experimental, Music performance, Music composition, Aquasonic, Between music.</i></p>

## 1. INTRODUCTION

Music performance is a powerful means of conveying human emotions and artistic beauty, combining the subtle melodies of the human voice with harmonic tunes created by skilled songwriters (Indrawan & Sunarto, 2016; de Fretes & Litiowati, 2020). It acts as both entertainment and a benchmark for assessing music learning activities (Desyandri, *et al.*, 2020). Music performances have gradually changed throughout time, adopting intriguing concepts that integrate technological breakthroughs and modern creative sensibilities (Husni, *et al.*, 2021). In addition, orchestral music performances and musical dramas are still often performed, with new technological innovations applied in music performances in the current era (de Fretes & Litiowati, 2020; Divanti, 2021). In addition to interesting concepts, there are also some music performances that carry unique and experimental concepts (Utomo, 2020). An exemplary pioneering initiative is the Aquasonic project by Between Music, which surpasses traditional limitations by submerging both artists and audiences in an extraordinary underwater musical experience.

Between Music, a Danish music ensemble, embodies innovation through its distinctive artistic endeavors and cutting-edge live shows. They skillfully combine music, live performance, visual arts, architecture, and advanced technologies seamlessly. Between Music embraces a wide range of aesthetics and genres, thriving in the dynamic interaction between artistic fields.

Aquasonic is a remarkable piece in Between Music's portfolio, showcasing its innovative and adventurous nature. Aquasonic surpasses the conventional boundaries of music performance by exploring unexplored areas—specifically, bodies of water. Aquasonic is a captivating audiovisual experience that utilizes the unique acoustic properties of underwater habitats. Aquasonic is a performance where musicians skillfully combine their musical abilities with the rhythmic movements of water. The subaquatic environment enhances the performance by introducing a dreamlike element that blurs the distinction between reality and artistic expression. By employing this groundbreaking method, Between Music revolutionizes the potential of musical communication, encouraging spectators to engage in an all-encompassing exploration of undiscovered auditory terrains.

Aquasonic's appeal lies in its seamless integration of technology and creative vision. By utilizing cutting-edge audiovisual technology, the show flawlessly combines sound and graphics, enthraling viewers with a unique multisensory experience. The interaction among light, sound, and water produces a vibrant combination of experiences, eliciting a deep emotional reaction in the viewers. In addition, Aquasonic embodies the essence of musical exploration in its performances. Through the adoption of innovative ideas and the exploration of alternative practices, Between Music defies established conventions and redefines the parameters of a musical encounter. By fearlessly exploring unconventional environments and employing groundbreaking methods, they motivate both artists and spectators to embrace the boundless potential of artistic communication. Between Music's Aquasonic project signifies a fundamental change in the way experimental music is performed. Aquasonic exceeds conventional limits by blending music, technology, and immersive artistry, offering audiences an opportunity to embark on a sensory expedition into unexplored realms. As Between Music continues to explore the limits of artistic expression, projects such as Aquasonic demonstrate the profound impact of music in the modern era.

This essay aims to explore the domain of experimental music performance through an analysis of Between Music's Aquasonic project. The aim is to offer a deeper understanding of how experimental music performances question established conventions and redefine the limits of artistic communication.

## 2. METHODS

The analysis of experimental music performance in Between Music's Aquasonic project utilized a comprehensive research strategy, incorporating scholarly articles, web sources, and media content to collect pertinent data and insights. The research process began with a comprehensive literature review, which included publications from several sources on the internet. Academic material related to experimental music performance, multidisciplinary art initiatives, and Between Music's Aquasonic was identified by consulting scholarly databases. This step facilitated a comprehensive comprehension of the theoretical foundations and prior examinations of analogous programs. Online sources were employed with academic publications to get additional information and viewpoints. We conducted research by examining the websites of respected music periodicals. Our goal was to gather information about current trends in music performance and the reception of Between Music's Aquasonic.

In addition to textual sources, media information in the form of videos on sites such as YouTube played a vital part in the study process (Parabhoi, *et al.*, 2021). The inclusion of recorded performances and behind-the-scenes material offers both visual and audio context, facilitating a more profound comprehension of the artistic components and technological complexities encompassed by Aquasonic. The literature research and media content were thoroughly analyzed and organized to assemble and synthesize important data, such as key findings, theoretical frameworks, and critical evaluations. The process entailed classifying material based on themes such as artistic originality, interdisciplinary collaboration, and audience reception, enabling a systematic approach to study. The data was subjected to qualitative analysis, during which thematic patterns, repeating motifs, and key insights were identified and interpreted. The Aquasonic performance by Between Music was analyzed using comparative analysis methodologies to compare it with existing literature and similar artistic undertakings. This analysis aimed to clarify the distinctive contributions and influence of Aquasonic within the field of experimental music performance.

## 3. RESULTS

The performance concept carried by Between Music for this Aquasonic project is very experimental, Between Music is interested in pushing the boundaries of human experience artistically, technically and scientifically, working with a multidisciplinary network of musicians, physicists, engineers, instrument makers and neuroscientists to create their sound worlds, a field that can be called STEAM (science, technology, engineering, arts and math) (Donmez, 2021). AquaSonic consists of five tanks with five musicians and a number of instruments inside and has a tank quality with good sound absorption. They do perform underwater, but obviously the members have to surface sooner or later. In all their pieces, they have pauses when they can come to the surface to breathe (Mortola, 2019). This shows their music continues to flow.

The music presented in Aquasonic can also be called like orchestra music, with some familiar instruments such as violin and some percussion (Jaatinen, *et al.*, 2019), there are also some instruments designed specifically for this Aquasonic project. The combination of melodic strains with the sound of water waves seems interesting (Zhang, *et al.*, 2021).

Between Music requires a long time to prepare Aquasonic music material that must be combined with this crazy-sounding concept.

## 4. DISCUSSION

### 4.1 Stage Needs and Layout

For the needs and layout of the Aquasonic stage itself can change according to the size of the performance venue (Booyens, 2019), but Aquasonic has a minimum requirement so that the show can take place. The minimum stage size is 12 meters wide by 9 meters deep, and 5 to 7 meters high to the lighting bar / lighting rig. This minimum stage set size requirement must be met and cannot be compromised, but the set can be widened to 14 meters if the venue has a larger size.

Aquasonic also needs about 12,000 liters of water for the show, and there will be 5 tanks installed on the stage, so the stage must be able to withstand the weight of the tanks. There will be 2 tanks for percussion weighing about 3,000 kg for each when filled, for the percussion tank has a height of 195 cm, width of 182 cm, and length of 125 cm. Then there are 2 tanks for vocals weighing about 2,000 kg for each when filled, for the vocal tank has a height of 170 cm, width of 200 cm, and length of 90 cm. And there is 1 tank for violin weighing about 1,500 kg when filled, for violin tank has a height of 195 cm, width of 100 cm, and length of 100 cm. The total weight of the tank for Aquasonic is about 11,500 kg, and the total overall stage with water is estimated to be about 17,000 kg.

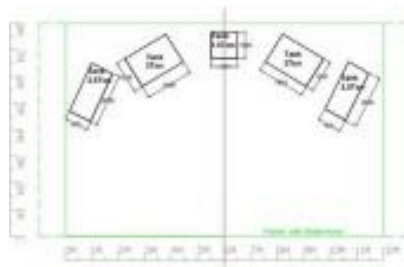


Figure 1. Stage and Layout

This minimum requirement is not arbitrary, it requires clear calculations and also experienced and reliable stage technicians to be able to hold this Aquasonic show, and also definitely requires a long preparation time to make a set like this, with an experimental concept like this, Aquasonic also wants to continue to provide good quality for the audience, from the quality of music to the quality of the stage. All the aesthetics of this show are very concerned in order to give a great impression to the audience of the show (Pätynen & Lokki, 2016).

### 4.2 Instrument

For the sake of the quality of music presented to the audience, Between Music also prepared several instruments specially designed for this Aquasonic performance, there may be some familiar instruments, such as violins and percussion that are also modified and adapted for this performance.

#### 4.2.1 Crystallophone



Figure 2. Crystallophone

The crystallophone, or glass armonica as it is more commonly called, is a spinning instrument that uses a series of glass vessels of graduated sizes to produce musical tones through friction. Usually played with fingers rubbing against the rim of the bowl, the crystallophone produces the most delicate and soft sound. Originally invented by Benjamin Franklin in 1761, then MIT software developer and inventor Andy Cavatorta re-engineered its structure and acoustic properties to work in our underwater environment.

#### 4.2.2 Hydraulophone



Figure 3. Hydraulophone

This hydraulophone is the first instrument to use water rather than air to produce sound. By manipulating water jets through a system of tubes and vessels of varying flow, we can stimulate and direct subtle changes in water turbulence to the sound mechanism inside the instrument, and create exciting acoustic and expressive possibilities. Canadian scientist and inventor Steve Mann invented the first hydraulophone in 1985. Since then, he and his partner Ryan Janzen have created a whole family of instruments, some of which are used for music concerts, while others are commissioned for parks and science centers including Legoland California, Ontario Science Center and Experiment, Copenhagen. In 2014 Between Music commissioned Ryan Janzen to create this unique hydraulophone.

### 4.2.3 Rotacorda



Figure 4. Rotacorda

Between Music commissioned MIT inventor Andy Cavatorta to create a custom stringed instrument adapted from the old hurdy gurdy. They named it Rotacorda, a combination of the Latin word *rota* for wheel and the Italian word *corda* for string. It produces sound with a wheel that cranks and rubs against the strings. The wheel functions like a violin bow, and single notes played on the instrument sound similar to a violin. Between Music has developed it further by adding brass horns from old gramophones and experimenting with many different strings and stands to make the sound as warm and stable as possible.

### 4.2.4 Carbon Violin



Figure 5. Carbon Violin

Initially, Between Music started experimenting underwater with very cheap and poor quality violins. The violin lasted for three days of testing underwater and then disintegrated. The glue was water-soluble, so it was no surprise. They knew violins were sometimes made of carbon fiber (Forintos & Czigany, 2019), so they wrote to all the carbon fiber violin makers in the world and finally chose the German company Mezzo-Forte. It has been experimenting and redesigning classical stringed instruments for the past eight years and specifically made their violins to be able to be played safely underwater for long periods of time. They use carbon fiber bows with synthetic hair, and are currently developing a new type of rosin for underwater use, together with Australian rosin manufacturer Leatherwood Bespoke Rosin.



#### 4.2.5 Percussion



Figure 6. Percussion

Percussion instruments play an important role in Between Sonic's compositions for Aquasonic, such as Bell plates, gongs, triangles, darbouka, and many others (Soares, *et al.*, 2021). However, when played underwater, percussion instruments become very unstable, their pitch and timbre often changing and sometimes differing from session to session. In collaboration with former electronics engineer turned instrument maker Matt Nolan from the UK, they have developed a series of percussion instruments that are specially tuned to be more predictable and expressive. Together with acoustic experts, they have measured the exact placement of each instrument in the tank, to get the same sound every time.

#### 4.2.6 Singing Bowls



Figure 7. Singing Bowls

Between Music knew that glass bowls produced great sound and tone, but were quite fragile. After they broke one and couldn't replace it, they decided to look for a more reliable solution. They discovered the Asian Singing Bowl, a kind of metal standing bell that produces harmonious overtones when the user strikes or rubs its rim with a hammer. In Asia it is often used in meditation, religious chanting, or funeral rituals. The largest distributor in northern Europe, Jane Winther, is closely associated with Between Music, so they went there several times and tested about 700 bowls in a large bucket of water. They found 24 bowls, with a standard 440 Hz tone.

### 4.3 Lighting

Basically, lighting is also an important thing in a music performance (Houser, *et al.*, 2021). Although this Aquasonic performance is experimental, Between Music still prioritizes visual comfort for the audience, precisely because of the water-element concept, the lighting in this performance is very spoiling the visuals of the audience. The reflection of lighting with water makes a beautiful light bias and gives a special impression to the audience, with visual lighting like this that blends very well with the music they play, it feels peaceful.

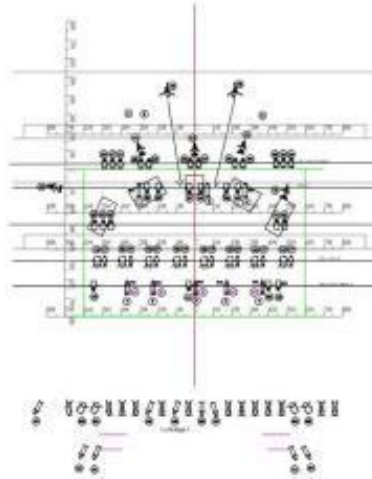


Figure 8. Lighting

#### 4.3.1 Stage Lighting Flow

In the Aquasonic performance, the lighting flow is arranged as adaptive as possible to the concept. The installation of rig lights above and also in front of the stage is arranged in such a way as to provide comfort for the show. The set tools are also diverse and support the visuals of the show, and all flows and sets are also well calculated with the stage technician.

### 4.4 Sound System

A sound system is an array of electronic components designed to enhance the power of sound (Orlandi, 2019). The sound system plays an important role in a musical performance and is an integral part of the stage set-up and even of the show itself (Burki, *et al.*, 2020). Sound system is closely related to the arrangement of sound reinforcement so that it can be heard loudly without ignoring the quality of the amplified sounds (Desai & Mehendale, 2022).

There are several basic things that become the working principles of the sound system in processing audio signals so that sound reinforcement occurs (Mulder, *et al.*, 2022). In this case, the sound signal amplification process in the sound system consists of several phases of work levels called the signal chain. The movement of the input signal to the listener consists of a signal chain link in the sound system, namely determining the source or source of sound, such as vocal and instrument sounds, then input transducers, such as mics and preamps, then there are main audio signal processors, such as mixers, equalizers, compressors, etc., and also output transducers such as loudspeakers. In this Aquasonic performance, Between Music has its own sound system flow arrangement that is adjusted to the concept, because the game is in the water, so they arrange the sound system as well as possible with the aim of providing audio comfort for the listeners.



## 5. CONCLUSION

The domain of experimental music performance, exemplified by Between Music's Aquasonic project, embodies a bold investigation of artistic limits, technical advancement, and sensory engagement. Aquasonic surpasses traditional boundaries by exploring unexplored domains in both creative expression and scientific exploration. Between Music revolutionizes artistic expression by integrating interdisciplinary collaboration and state-of-the-art technology, challenging conventional music performance concepts. Aquasonic is characterized by a rigorous focus on detail, encompassing everything from the stage's arrangement to the instruments' selection. The stage requirements emphasize the intricate and exacting nature of the performance, necessitating the use of unique tanks and instruments that have been carefully crafted and calibrated for underwater use. Every musical instrument, from the crystallophone to the carbon violin, is meticulously designed or modified to excel underwater, demonstrating a harmonious blend of ingenuity and functionality.

Additionally, illumination is essential in improving visual perception, strengthening the otherworldly atmosphere produced by the aquatic environment. The interaction between light and water creates a spectacular display, enhancing the immersive quality of the performance and engaging the audience's senses. The thorough layout of Aquasonic's sound system is crucial for its success, as it is specifically designed to deliver optimal audio quality in the face of challenges presented by the aquatic environment. By meticulously calibrating and adapting, Between Music guarantees that the auditory components blend flawlessly with the visual and spatial parts of the performance, resulting in a unified sensory encounter for the spectators. Aquasonic combines artistic creativity, technological expertise, and scientific exploration. This performance challenges the limits of traditional music, inviting spectators to embark on a transformative trip into uncharted territories of captivating sound and visual magnificence. Through surpassing established norms and embracing novelty, Between Music redefines the boundaries of artistic expression, making a lasting impact on the realm of experimental music performance. Aquasonic exemplifies the profound impact of interdisciplinary collaboration and the limitless potential of pushing the limits of artistic expression.

## 6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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