Colloquy of Mobiles 2018 Project

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Abstract. The authors report on a project to replicate Gordon Pask's Colloquy of Mobiles, an immersive, interactive installation that was part of the Cybernetic Serendipity Exhibition at the Institute of Contemporary Arts in London in 1968. To celebrate the 50th anniversary of the Colloquy in 2018 and to mine its legacy for future generations, a full-scale version will be replicated in conjunction with studio design courses in the Masters of Interaction Design program at the College for Creative Studies in Detroit. While the physical form of the replica will be as close as possible to the 1968 original, it will be driven by modern digital software. This makes possible the close reproduction of the interactions as Pask implemented them in 1968, as well as openings for the exploration of what new technologies—voice interfaces, motion sensors, facial sentiment analysis, and AI—imply for the future of human-machine symbiosis. This updated configuration will enable visitors to fully appreciate the sophistication of Pask's seminal work as well as to question the future of conversation in a world rich with possibilities and perils, when technology takes on properties of the biological and of the human. Target date for public viewing of the replica of the 1968 Colloquy is 11 May 2018 in Detroit, Michigan, USA.

1 INTRODUCTION

In 1968, Pask's Colloquy of Mobiles comprised sculptural figures or mobiles that moved and interacted through light and sound, with each other and with the public (Figure 1) [1]. m Colloquy explored the nature of machine-to-machine and person-to-machine conversations in an interactive, immersive environment, perhaps the first of its kind. Frequently praised for its originality and influence [for example, see 2], Pask's work is a precursor to practices of contemporary art and design, such as relational aesthetics, social practice, intermedia, user experience/interaction design, and human-machine interaction.

The origin of the project lies with a conversation between one of the authors [Pangaro] and Hugh Dubberly, the design planner and teacher, both well versed in the important of Pask's work in conversation theory, especially in relation to the field of design. On realizing that the 50th anniversary in 2018 afforded a rare moment in time and that the second co-author [McLeish] could be available to ensure the construction of the full-scale replica, the project was born.

This paper can only sketch what we have learned between conceiving the project in November 2017 and the time of writing in late February 2018. It is intended as a placeholder for further results and for the publication of all documentation in the tradition of open source.

The paper is organized as follows. First, in Section 2 we begin to document the pre-existing materials we drew upon and the allocation of labour and steps taken on to learn how Colloquy 1968 worked. In Section 3 we offer some insights from the building of a scale model and planning for the full-scale replica. Section 4 offers very preliminary reflections from the project. Section 5 describes what we hope audiences will take away. Lastly, Section 6 expresses hope for a completed installation and the promise to report again what we have learned, including all materials used to reproduce the Colloquy

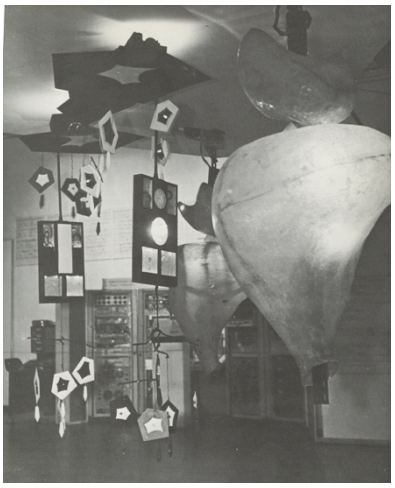

Figure 1. Colloquy of Mobiles. Photo from Institute for Contemporary Arts, London

2 MINING THE AVAILABLE HISTORY

To begin, all available materials were gathered. These include[3]:

1. Pask's detailed write-up in his paper, "A comment, a case history, and a plan" [1]. Flowcharts, prose descriptions, and basic plan and section diagrams of the mobile configuration are included. However, it must be noted that this paper was written *before* the Colloquy was constructed and so cannot be completely trusted for its relationship to the final version. While a simple reversal of "Yes/No" in one of the decision trees in one flowchart is not difficult to resolve, both the plan and section diagrams have positional errors (Figures 2 and 3). Even more vexing, the description of the location of sensors on the male figures turns out to be simply wrong. These and other discoveries will of course be captured in our documentation process.

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[3] A complete archive of documentation of the project is planned. The degree of annotation will depend on available resources but the intention is to open-source everything found and everything generated, including CAD numerical models and engineering drawings for future reproduction.

2. Low-resolution digital transfers of 16mm films of the operation of the Colloquy at the ICA in 1968 [3].
3. Images available from a variety of sources on the web [4, 5].
4. More recent writing about Colloquy, with both descriptions of its operations and its intentions [2, 6].
5. Materials that contextualize cybernetics and the work of Gordon Pask [7].

Two studio courses in the MFA Interaction Design program at the College for Creative Studies were well poised, in both the population of enrolled students and the learning outcomes previously determined for each course, to participate in the Colloquy 2018 project.

3 PULLING IT APART AND PUTTING IT TOGETHER

3.1 Writing out the interaction

To date, students in the MFA course Interaction Design Studio IV: Interactive, Immersive Experiences have specified how the original installation worked in 1968 in the form of a detailed scenario, as in this example. The allocation of letters to parts of the scenario are derived from the diagrams in Pask's paper (Figure 2).

Scenario 1: Initial conditions: No female memory as of yet. Male and female have same drive 'O' and reinforcement occurs.

1. Male G has an 'O' drive and needs to locate a female that has the same drive. He is flashing his 'u' light which is signalling 'O'. He has sound sensor which is always active.
2. Male G rotates on its own axis across 180 degrees and two males rotate across 360 degrees. Their 'u' lights are flashing.
3. Females rotate back and forth for 90 degrees on their axes.
4. Male G happens come across Female F1 and all of their components (sensors, lights, mirror) face each other for a fraction of a second.
5. Male G's flashing 'u' light falls on the photo sensor 'a' of F1, which causes F1 to stop. The frequency of the flashing 'u' light will convey the drive of male G—which is 'O'—to F1.
6. The following multiple steps happen in a split second:
   a. F1 determines if her drive ('O') matches Male G's drive, still signalling 'O', based on the frequency of flashing of G's light 'u'.
   b. F1 confirms that her drive matches Male G's drive; she signals this by producing a sound.
   c. Female starts her vertical mirror oscillation.
7. Male G receives the sound and his 'u' light becomes B light, which is the constant light.
8. B light falls on the 'a' receptor of F1 and, if it becomes constant enough, she stops her vertical motor search.
9. F1's mirror stops at the upper angle causing light to hit the C receptor, and reinforcement starts to occur.
10. Male G's 'O' drive becomes satisfied when the reflection of the B light hits the C receptor for a sufficient period.
11. F1 receives the sound from Male G, indicating the reinforcement succeeded, and lowers her 'O' drive by 1 point.
12. F1 places the mirror angle into short-term memory.

They part ways — they rotate again on their own axes.

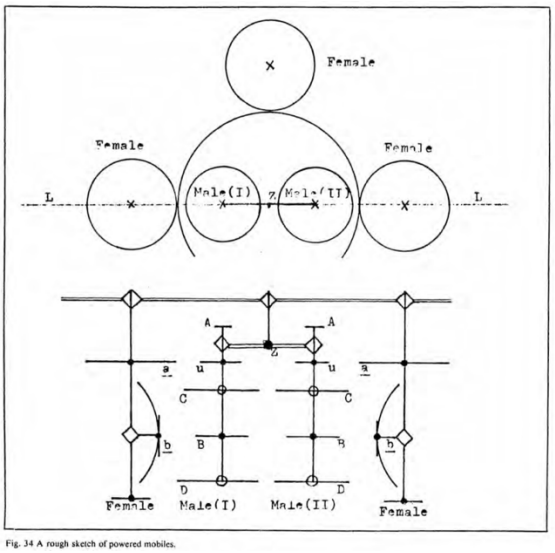

Fig. 34 A rough sketch of powered mobiles.

Figure 2. Original diagram from Pask [1] (upper part is plan, lower part is section)

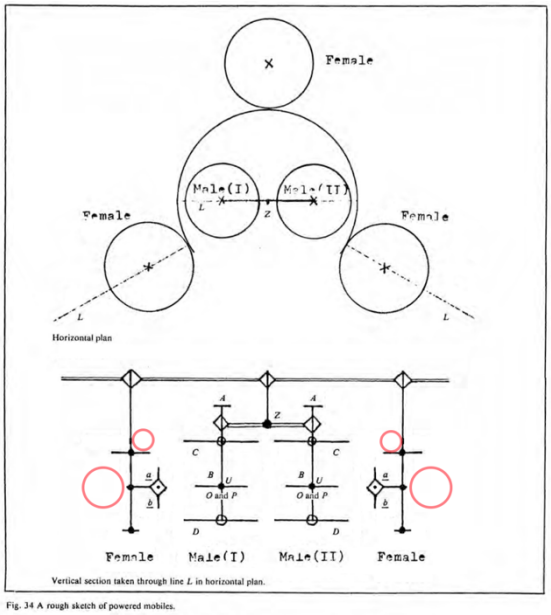

Fig. 34 A rough sketch of powered mobiles.

Figure 3. Correction of Female positions (upper) and additional sensors & lights on Females (in red, lower)

3.2 Creating a 1/6-scale Mock up

Students in Studio II: Internet of Things & Prototyping, are creating a -scale mock-up. This begins in physical form, by estimating sizes of the mobiles and recreating them (Figure 4).

Figure 4. 1/6-scale models constructed by students

3.3 Designing the full-scale replica

The greatest challenge is to rebuild the entire Colloquy in its 1968 form—mobiles, motions, and interactions. We have consciously chosen to reproduce the actions, timing, and responses of the mobiles to match Pask's original as closely as possible. We also want to match the sizes and shapes and general sensibility of the physical mobiles. We are working now with fabricators to determine material that mirror the original as best we can, within time and budget. These aspects and priorities have been clear from the beginning of the project.

We also want to be clear that we do not intend to reproduce the original technology behind the Colloquy, for multiple reasons. First, we have been unable to find anyone who had first-hand knowledge of the construction or internal operations. Pask passed away in 1996. Tony Watts was noted by Pask as "responsible for the electromechanical side" and Marc Dowson "constructed the electronics" [1]. We know that Watts passed away and we have been unable to find Dowson despite multiple calls through social media and relevant listservs.

Second, attempting to reproduce the original electronics would be at least foolish and more likely impossible, given the lack of such technology surviving digital advances and the ease of using modern means.

Third, given the descriptions and especially the movies of the real-time behaviours, we feel confident we can reproduce the functional experience of the piece, even if we use modern technologies for its computational, sensing, motion, and lighting components.

Therefore, the focus can be on making the components in the right size and with the right surfaces. Figure 5 is an example of an investigation of photographs to derive shape of the female figures, originally designed by Yolanda Sonnabend (also deceased). From this is derived a numerical CAD rendering shown in Figure 6, followed by a consequent physical 3D model in Figure 7.

Thus far we have considered a range of materials and fabrication methods. Carving the female shape out of a large foam block via a large-format CNC machine is one option; we then have shape to coat with polyurethane or fiberglass (which we suspect was the actual material used in 1968).[4]

The process exhibited for female models—beginning with photographs to derive a numerical CAD model—is being followed for the male mobiles and for the supporting structure of the entire installation, the triangular shape at the top of the installation. We are doing our best to allow for dismantling and moving of all the components, in hopes of the opportunity to exhibit it wherever we are invited and have the resources to do so. We are thrilled to have already been invited to move it to ZKM in Karlesruhe and to other locations in Europe and America.

4 Initial Reflections

Having expended a great deal of collaborative effort on archaeology, we can only be amazed that the original team that assembled Colloquy in 1968 could accomplish what it did. The team had extraordinary ambition at a time when the "back-end technology"—the driver of the interactions based on sensors, lights, motors, oscillators,

[4] Amanda Pask Heitler, Gordon's elder daughter, tells a vivid story of playing with the female forms in their back garden after the exhibition closed. Whether these were actual forms from the ICA or rejected test models we may never know. We are also trying to find out whether the Colloquy were shipped to The Exploratorium and installed there. A history of that museum [8] suggests that the entirety of Cybernetic Serendipity was shipped over, and that reconstructing the whole show including the technology was a "struggle to put the whole show together" but we need to verify this.

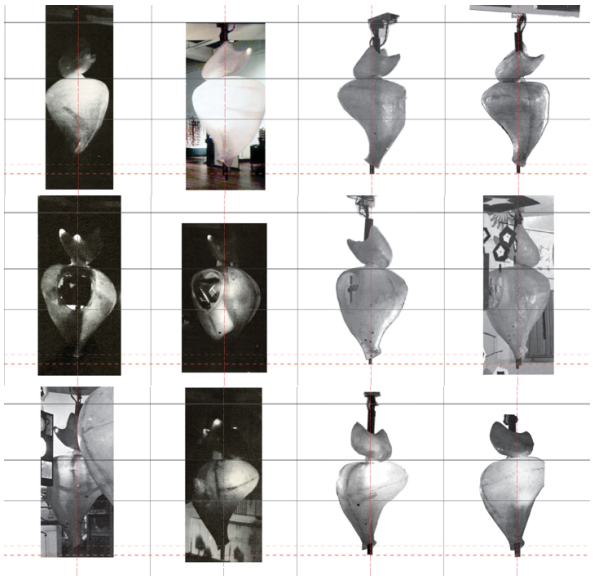

Figure 5. Deriving the shape of the female figures from multiple views

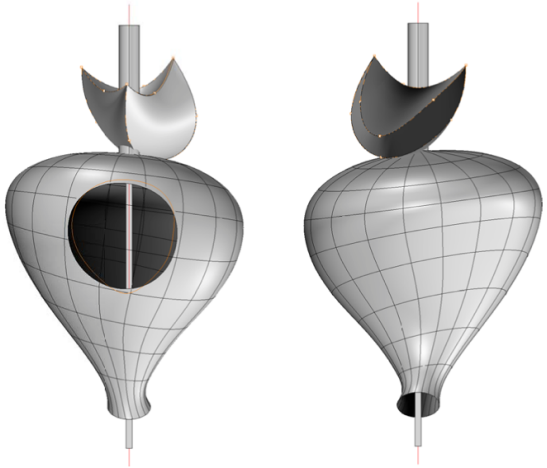

Figure 6. Draft computer models of female mobiles

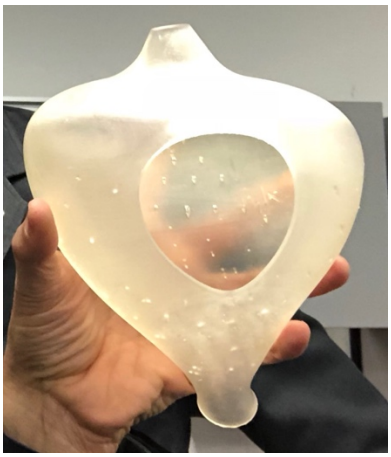

Figure 7. 3D Model of Female

and microphones—was a large and complex analogue morass. How Pask brought his ideas to the team and how together they built the Colloquy, seems impossible. But we have first-person accounts that the experience for gallery-goers was engaging enough to keep them there for hours [8, 9].

While 1968 was not the dawn of the "cybernetic age" in the sense of the genesis and rise of the field of cybernetics (this would have been in the 1940s and 50s), it surely was the dawn of the "interactive age" of machines interacting with machines. This alone was an innovation in the context of mobiles, galleries, and art.

The significance of gender roles in the Colloquy and the intentions of Pask will be impossible to fully explain, though we have views on this and we are certain that the conversations these considerations prompt in 2018 have value. We will document our explorations of this aspect, though thorough consideration is beyond the scope of the current team and academic environment, leading to our desire to develop symposia with greater variety in the conversation.

5 Intended Audience Outcomes

Colloquy of Mobiles creates a human environment that contains conversational machines, a condition that is now part of everyday life, While this was not broadly obvious in 1968, Pask saw it and created an example of it in Colloquy. This perhaps is its fundamental contribution.

Whether operating in its original 1968 mode or an updated 2018 mode, we want Colloquy to allow gallery audiences to participate in immersive, real-time interactions that are surprising and provocative—in Pask's phrasing, to experience "an aesthetically potent environment" [1]. In 2018 the experience of moving among the mobiles of the installation and engaging them via sound, speech, body movements, and facial expressions—hypothetically using enhanced 2018 technology—would offer a rational as well as emotional sense of what it means to live among machines that converse. We want the Colloquy 2018 Project to change how we feel about going home to voice interfaces such as Siri and Alexa, and how we experience living among smart machines.

Despite massive changes in everyday living—sensors everywhere, voice interactions, and artificial intelligence inside of every social network and internet commerce platform—there has been little public debate about the societal and ethical questions presented to designers of these systems. Colloquy 2018 will provoke designers of software, devices, products, and services, across a wide spectrum of industries impacting all aspects of our daily life, to imagine and to debate the opportunities and challenges of pervasive, conversational machines.

6 Future Hopes

As of this writing, the journey to reproduce Colloquy 1968 is midstream. In future we will further report on the experience of completing the installation and the subsequent experiences of visitor-participants. We hope that all interested parties will stay in touch with us by corresponding to colloquy2018@gmail.com.

7 REFERENCES

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[3] Master Shot and Close up. [Downloaded 25 February 2018 from .]

[4] Gordon Pask, The Colloquy of Mobiles, 1968, Installation view, ICA London 1968, Cybernetic Serendipity. [Downloaded 25 February 2018 from *http://www.medienkunstnetz.de/works/colloquy-of-mobiles/images/1/*.]

[5] Cybernetic Serendipity Archive. Gordon Pask, Colloquy of Mobiles, exhibition view, ICA London, 1968. [Downloaded 25 February 2018 from *http://cyberneticserendipity.net/post/7247063562/exhibition-view-ica-london-1968-gordon-pask*.]

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