

EVENT CLOCK FOR SHARED SPACES

POWER, OF LINES AND MAN: AN EXPLORATION OF OPPOSITION

An Undergraduate Thesis Portfolio
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Bachelor of Science in Electrical Engineering

By

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SOCIOTECHNICAL SYNTHESIS

The spaces we share shape our experiences as individuals and as communities. Operating at the local level the technical research topic aims to devise a system to ease the sharing of a communal space. Through the creation of a networked electrical light display, the technical topic addresses the needs of individuals to be aware of the usage of a common space as well as that of group leaders and organizers to communicate to relevant members. The science, technology, and society (STS) topic addresses how differing and changing views of what is shared or public impacts perspectives on and opposition to electrical power transmission lines. The loosely couple technical and STS topics depict the intricacies of building a device for shared spaces, and the social implications of the construction of power lines.

The technical report details the development of a networked device for shared spaces. Communal areas often having coinciding uses that are opaque to the end user, for instance overlapping office hours in a departmental lounge, causing frustration and confusion. The constructed device is capable of self-hosting on any wifi network and the Light Emitting Diode (LED) displays communicate relevant information to the broader world. The system was constructed using additive manufacturing and hand tools, designed with Computer Assisted Design, and programmed with MicroPython.

A prototype was constructed involving a custom printed circuit board, rudimentary displays and single microprocessor, but proved incapable of simultaneously interacting via network and updating the displays. This resulted in a move to a two microprocessor architecture which enabled simultaneous network operation and LED display updating. This two processor architecture was the final product, capable of most features desired for the networked display, however due to time constraints certain networked features and power-resilient memory were not implemented.

The initial inspiration for examining the social context of opposition to power transmission lines came from viewing a number of journalistic pieces about transmission line controversies across the United States. The research then turned to the motivations of this opposition and the origins and historical context pertaining to it. Pinch and Bijker's Social Construction of Technology was used to analyse the general case of power lines, with Latour and Serres' Actor Network theory used to analyze the particular cases of the areas proximate to the Niagara river, California, and the upper Midwest. These frameworks being developed from case-studies, personal observations, and other analyses as pertaining to electrification and the construction of new power transmission infrastructure.

Though not centered about conceptualizations of justice and the question of *cui bono* the discussion of why various locales have had different reactions to power transmission lines served as a starting point for the socio-technical framework. The case studies helped to formulate how public conceptions of impact and benefit determine the presence and beliefs of those opposed to power transmission lines. Through the analysis it became clear that opposition is centered about a belief, or beliefs, that the construction and implementation impacts of the line are not being adequately offset by benefits to local stakeholders. This research does not offer a solution, but does present a clearer manner for power line designers and constructors to approach their detractors.

The spaces we see as held in common are dear and define how we view our roles in the context of a broader society. Striving to balance the needs of the great many who hold the common can be done in part through technical assistance, but must also consider the broader social ideas and conceptions. Shaping the commons can be done with the shovel, but the commons itself is shaped by society.

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PROSPECTUS

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