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Urban Research Farm Hawaii: Normal Operation System Design

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SUMMARY OF MASTER'S DISSERTATION

Student Identification Number	81334678	Name	Ross W. Yamato
<p>Title</p> <p style="text-align: center; margin-top: 20px;">Urban Research Farm Hawaii: Normal Operation System Design</p>			
<p>Abstract</p> <p>By applying the system design techniques to something I am familiar with, I felt that it would give me the ability to evaluate the system design process applied to a social system that I am familiar with.</p> <p>Hawaii is very food insecure with 85-90% of food being imported. The state government has advocated for improved food security, and an urban farm is one way to help alleviate the situation. Energy is very expensive in Hawaii. With prices that are 200 percent to 300 percent more than the continental United States. This means there is a high incentive to produce electricity, even by using methods that proved to be too expensive in the continental United States. This research is focused on using system design techniques to create the normal operation of an Urban Research Farm in Hawaii. Along with being food insecure Hawaii is also water insecure, with 90% of water coming from underground aquifers. This single source of water opens up Hawaii to the risk of a single source of contamination affecting almost the whole water supply. It is the hope of this research that the urban farm can somehow be able to better Hawaii's food security and water security needs.</p> <p>Section one shows the some of the problems Hawaii faces, the motivation behind the research, and the goals of the research. Section two offers a literature review of Hawaii's situation, the system design process, urban farming, and intellectual property. Section three shows the process that was used to design the system. This includes the context analysis, use case analysis, function structure breakdown, function flow block diagram, and the physical structure of the system. Section four goes over the evaluation process, consisting of interviews. Section five shows the discussion and thoughts about the design process and section six shows the conclusion.</p> <p>Systems Engineering is created for use in technical systems. I found that human factor that cannot be fully taken into account by the system engineering techniques. The system engineering process is very good for experts in specific fields, trying to do specific tasks in a closed environment, but I felt it was a struggle to apply the systems engineering process to social systems because of the sheer volume of information needed, the many different variables that need to be taken into account, and the limited ability to test the system at full scale. I found that the system gives up flexibility the more it is defined, and there must be a way to determine the best abstraction level of a function, or the system will fail due to lack of flexibility or not enough detail.</p> <p>The interviewees told me that the system design process was interesting because it allows you to see what you are thinking, what you have done, and reflect on any missing pieces of the work. The big weakness is it is very hard to test the created system on actual people because it may not be humane. Like how economist are limited in their options of testing their theories on people, and limited to trying to eliminate as many variables as possible. The physical structure allocation of functions amazed me at how it let me see past the physical object, and understand why the object is that specific object. Where the system design process makes it difficult for a non-expert to design a detailed system, using and understanding the process can lead non-experts to better understand the objects, policies, and to some extent the people around them.</p>			
<p>Key Words (5 words)</p> <p style="margin-top: 20px;"><i>Urban Farm, Business Design, Hawaii, System Design Research</i></p>			