The Kaprun Funicular Network and its Demise

STS Research Paper
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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Socio-Technical Synthesis

Over the past year I, along my Capstone Project teammates, have been working towards developing a solution for weather-related traffic in Virginia. Besides this technical solution, I also have been working to tackle an engineering problem from a social perspective, using Science, Technology, and Society (STS) knowledge. My technical and STS projects both address aspects of the socio-technical problem involving transportation. In what follows I will illustrate a Spacecraft Design solution, as well as an STS solution.

The technical solution we have developed is a spacecraft design. Based on literature review and interaction with key stakeholders, we established that the preferred design would be a CubeSat. The CubeSat is a miniaturized satellite that will use imagery to monitor on-road precipitation accumulation, as well as precipitation intensity. The satellite will be placed in Low Earth Orbit (LEO) and it will provide cheaper and more accurate weather data. Further, this design will improve data distribution to the Virginia Department of Transportation (VDOT) as well as roadway users.

The technical solution developed by my team and I will be supplemented by my STS project. The STS project focuses on the November 2000 Kaprun disaster, and its outcomes. The disaster involved the underground funicular running from the village of Kaprun (Austria) to the ski slopes of Kitzsteinhorn. The funicular was thought to be completely fireproof, but that November morning fire started in the rear of the ascending cable car, eventually engulfing the whole car, and killing 155 people. Through careful research I illustrated how the solution to the problem includes several different actors besides the “obvious” technological fix. Using Actor Network Theory, I proved that the disaster cannot be pegged on one single cause, but it was actually the result of multiple actors going rogue, or missing from the network.

During the past year, I have explored the topic of weather-related traffic and real-time weather data delivery in depth. Although this was initially just my technical project, the literature review and research associated with it soon helped me develop an STS project topic. Transportation is a really complex topic not only as far as roadways and traffic, but also for public transportation and infrastructure. When reading relevant journals and talking to Subject Matter Experts (SMEs), it soon became obvious that transportation related issues cannot be fixed by just implementing a technology, but include a multitude of actors that need to work together. When I learned about Actor-Network theory in class, I realized this was the most fitting problem frame for my project. In a similar way, as I researched more about the different actors in the network for my STS project, I became aware of important details to take into consideration for the final design of the spacecraft.

As I got to learn more about the technical topic, I found myself more and more invested in it. I became more interested in the possible solutions of weather-related traffic, which led me to want to know more about the social implications, contributing to my overall investment in the topic. When designing the Cubesat, I proposed speaking to a variety of SMEs, as well as community stakeholders, to gain a better understanding of the project through different perspectives. We talked to professors in the Mechanical and Aerospace Engineering (MAE) department, as well as engineers from various companies (who work with satellites on a day to day basis), but also first responders and VDOT representatives, who are directly impacted by the technology. Overall, working on both projects at the same time was extremely helpful and improved the outcome of each.