

Understanding the Land Use and Water Systems of the Mekong River
(Technical Report)

Using Actor Network Theory to Analyze Issues in International Aviation Rules and Regulations
(STS Research Paper)

An Undergraduate Thesis Portfolio

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Socio-Technical Synthesis: Understanding Policy Implementation in Engineering Problems

The technical and STS research portions of this paper relate to each other in the sense that both address negative effects of intergovernmental policies. Intergovernmental policies are policies created by intergovernmental agencies such as the United Nations, NATO, and other groups of allied states. Intergovernmental policies exist to standardize intergovernmental relationships, but issues in adoption, interpretation, and enforcement can produce the opposite effect. The technical and STS work analyze separate and distinct shortcomings in intergovernmental policies and relations. The technical work assesses the economic and environmental effects of hydropower policies in Southeast Asia, while the STS research explores intergovernmental aviation policy systems and their potential flaws. While the technical and STS research differ in application, they share a common ground in analyzing policy constructs.

The technical work analyzes the effects of hydropower damming on the economy and environment of the Mekong River Basin. My capstone team used statistical analysis to draw inferences about the interactions between increased hydropower damming and key economic and environmental indicators such as Gross National Income (GNI), income inequality, fishery yields, and land use. These statistical tests were constructed by aggregating data, cleaning and processing this data, and then designing statistical measures which fit the data and hypotheses. Different levels of testing were used to create more robust conclusions. In total, the capstone team analyzed the effects of hydropower damming on agriculture, aquaculture, land use, and economies in the Mekong River Basin. The goal of this research is to demonstrate the negative effects of excessive hydropower damming, which is primarily a result of loose hydropower policies in the region.

The STS research also investigates the impacts of intergovernmental policy, but this portion of the research focuses on the effects of poorly enforced aviation policies. Using the Uberlingen mid air collision as a case study, the report highlights dangerous flaws in United Nations aviation policies. Callon's Actor Network Theory (ANT) was employed to shed light on how these policy flaws can complicate relationships and dynamics between aviation agencies and can introduce aviation hazards in extreme cases. The claim is that these policy issues are just as much to blame for aviation accidents as technical malfunctions and human error. Similarly, the overall goal of this STS research is to broaden understanding of United Nations aviation policy and how it relates to the safety of airspaces.

There is always potential for technical writing to become overwhelmed in minutiae, and the technical research described earlier is no exception. However, conducting sociotechnical research during the same period allowed me to correctly scope the technical portion to include specific societal elements which set the technical work into the proper context. With this societal context, readers are able to understand why the technical research is more than just a series of statistical tests; rather, it acts as an exposition of the imminent dangers to quality of life in Southeast Asia. Likewise, the STS research benefited from the technical portion, as research methods used in the technical report became doubly useful as devices to define the scope of the STS research. Frequently, the STS research required reading technical documents, which was made easier by the skills learned by conducting technical research.