

Hawaii Missile Incident Teaching Note

SI 523 W18

Group G

The most interesting thing about the Hawaii Missile Scare was that it happened. This is a relatively broad statement. As such, there are many possible angles for analyzing the incident, its causes, and effects.

Students who study this case should read Charles Perrow's 1981 paper "Normal Accident at Three Mile Island" either beforehand, or as an accompanying document. With Perrow's theories in mind, they should be able to answer the question, "Was the Hawaii Missile Incident a normal accident?" The answer is no, it was not. The context provided by Cold War history shows the evolution of missile offense and defense systems in the 1960-70 era, followed by their decline and disappearance with the end of the Cold War.

Renewed nuclear tension between the United States and North Korea has caused the U.S. to reawaken missile defense systems last updated in the 1970's. These systems, though at the forefront of technology at the time, have become obsolete thanks to the technological strides made over the past three decades. Normal accidents, as products of complex systems, were possible during the Cold War, when systems were as complex and sophisticated as the time would allow. One was not possible in Hawaii in 2018, because the use of 1970's technology in missile defense rendered the system woefully lacking in the complexity that would have prevented the accident in the first place.

Generally speaking, the Hawaii Missile Incident was a socio-technical systems issue. For SI 310 students, this means addressing the overarching systems present within the case. The first of importance is the technical missile defense system discussed above, and the hardware, software, and subsystems it employs. The other important system is the socio- part of the system: the communication system. The communication system can be broken into two parts: internal (to the HI-EMA agency), and external channels of communication between the agency and public.

A principal cause of the Hawaii accident was an interpersonal communication failure within the agency. The supervisor errantly broadcast conflicting information, which a single employee incorrectly interpreted as an emergency. This employee had a history of difficulty with communicating, yet was allowed to remain employed without intervention, despite coworkers communicating concern over the decade prior.

The warning message itself, broadcast through the HAWAS communication channel from the agency to the public was incorrect. Because humans make mistakes, this channel should have enabled some type of safeguard for its human operators. This could have been anything from an "unsend" functionality to 2FA authentication requiring the knowledge and possession of multiple employees to broadcast a warning message, rather than enabling a single point of failure. A more robust system design requiring multiple actors and employing stronger failsafes would likely have prevented this accident, given that every other employee at the State Warning point understood the supervisor's message to be a drill.

When systems fail, some measure of trust in the system is depleted. In the case of missile warning systems, a Type II error (not warning of a missile, when there is one coming) is far more devastating than a Type I error (warning of a missile when none are coming). However, “crying wolf,” as Type I errors do, risks people ignoring future warnings because the last one (or two, or three) was false. This happens with fire alarms, especially in North Quad, where they sound relatively frequently. More people ignore the alarms each time, even though there could be a real fire. However, humans are smart, and with each drill, or false alarm, the statistical probability of a real fire decreases, and eventually everyone ignores the warnings. Thus, mistrust in a system as a result of Type I errors can eventually become just as devastating as a Type II error.

Culture may also have been a hidden factor in this incident. It will be important for SI 310 students to identify culture as a factor within sociotechnical systems. To facilitate this, I suggest including an accompanying document on culture in systems. This will be a useful tool for helping students to realize that culture has become a type of buried infrastructure within sociotechnical systems. Cultural traditions and characteristics develop over centuries, becoming so profoundly engrained within populations that they often disappear. As a result, cultural aspects are often forgotten about, and thereby excluded from situational analyses. Alerting students to this fact while speaking generally about the presence of culture in systems will point students towards analysis of Hawaiian culture specifically, and its role in the Hawaii case.

However, students should be careful to avoid statements saying that the Hawaii Missile Incident was *caused by* cultural factors. These arguments are difficult to support with evidence, and a single exception can render them invalid. Rather, students should identify the fact that culture *played a role*, because it cannot be removed from the system. If a culture does not fit with a specific system’s expectations, that system will often break down. Pinpointing *how* it does not fit is not the point. In the Hawaii case, perhaps local culture was not completely compatible with a high stakes government agency in which technical systems were unsafely designed. On the other hand, laid-back cultural attitudes (in Hawaii) may have prevented a great deal of widespread panic following the false alert. Thinking about these possibilities are important for practicing contextual inquiry, and for triangulating between multiple POVs – techniques that SI 310 is designed to teach students.

In conclusion, after studying this case, students should be able to analyze problems and identify underlying system influences. In the Hawaii case, this is the presence of culture within the sociotechnical systems, (which was not covered in media reporting of the incident), and the role of societal trust in creating a social contract that allows systems (e.g. warning systems) to function. Students will also be able to identify that many of these system influences have disappeared into the social and technical infrastructural landscape. As a result, they will know how and where to look for them and acknowledge their importance. Finally, students will also have an appreciation for the context provided by history, and the importance of history in analyzing present and future issues.