

Denver International Airport

An Engineering Fiasco
Lior's Work

- In the winter of 1989 construction began on a new airport for the city of Denver.
- This was one of the most ambitious construction projects in US history and the first airport to be built in the US in 20 years. Denver International Airport (DIA), set to occupy over 53 square miles, was to be the largest in the United States, able to handle more than 50 million passengers annually.
- The city's existing airport had become too small and this project was designed to make Denver a new airline hub – bringing millions in business to the city. But it was not too be.

- Despite the good will of all involved, the DIA project proved to be far too ambitious and its execution far more complicated than expected.
- The airport opening was delayed for over 16 months, costing the city of Denver \$1.1M in overages a day. The complex automated baggage handling system was the main cause of these costly delays

The Foundation of Failure.

- The Denver Fiasco was the result of a dangerous combination of unrealistic ambition and miscommunication between the various parties involved.

Unrealistic Scope

- The baggage system was designed and implemented by BAE, a leading Dallas-based engineering firm. BAE was originally hired by United Airlines to implement the system in their terminal. Even then, BAE considered the project ambitious, warning that it had only been tested once, on a much smaller scale, in Germany. When the DIA took over the project, they required scaling it up to three times its original size. And the DIA gave BAE only 17 months to complete this first-of-its-kind attempt. Such a massive implementation of a largely untested system, in such a short amount of time was destined to fail.

Lack of communication

- A fatal downfall of the project was the lack of communication on every level. The DIA and BAE failed to communicate effectively regarding the scope and feasibility of the project. BAE failed to communicate with the Munich airport that was the only prototype of the system. And within BAE designers of the various components of the system failed to communicate with one another. Each group designed its components separately, with little or no understanding of how the system functioned as a whole, like a giant jigsaw puzzle.

Lack of a holistic approach

- The implementation of this already overly ambitious system was further complicated by the fact that the airport was already under construction. Thus, the baggage system had to adapt to an existing infrastructure, adding constraints to an already complicated system (hallways were too narrow, ceilings too low etc.). Adding even more variables to the equation were customization requests made by individual airlines. Both BAE and the DIA failed to see the project as a whole. The ultimate proof of this was the fact that the only time the system was tested in its entirety was on the day of the demonstration.

No failure-Mode

- The system had no safe-mode in its design, no way to work other than the way it was supposed to. With so many warning signs that a system is going to fail, designers should have assumed (and should always assume) that at one point or another it will. A safe-mode, semi-manual or auto-stop function are examples of how collateral damage from such eventualities can be minimized

No Testing?

- The DIA chose to unveil its cutting-edge system to the world in a highly publicized live demonstration event. Unfortunately for the DIA, this was also the first time the system was tested in its entirety. And it failed spectacularly.

Conclusion

- Systems should be realistic in scope – always tested on a small scale before millions of dollars and hours are invested, and always implemented gradually, each component tested individually but also as part of the larger system.
- Communication between designers, clients and departments is crucial to the success of any system and a holistic approach is necessary to ensure all the parts as well as the whole work in harmony.