

Denver Airport Baggage Handling System

Denver Airport Baggage Handling System

The printable version is no longer supported and may have rendering errors. Please update your browser bookmarks and please use the default browser print function instead.

Lead Authors: Art Pyster, Heidi Davidz

This example was developed as a SE example for the SEBoK. It describes systems engineering (SE) issues related to the development of the automated baggage handling system for the Denver International Airport (DIA) from 1990 to 1995. The computer-controlled, electrical-mechanical system was part of a larger airport system.



Contents

Description

Summary

References

 Works Cited

 Primary References

 Additional References

Description

In February 1995, DIA was opened 16 months later than originally anticipated with a delay cost of \$500 million (Calleam Consulting Ltd. 2008). A key schedule and cost problem—the integrated automated baggage handling system—was a unique feature of the airport. The baggage system was designed to distribute all baggage automatically between check-in and pick-up on arrival. The delivery mechanism consisted of 17 miles of track on which 4,000 individual, radio-controlled carts would

circulate. The \$238 million system consisted of over 100 computers networked together, 5,000 electric eyes, 400 radio receivers, and 56 bar-code scanners. The purpose of the system was to ensure the safe and timely arrival of every piece of baggage. Significant management, mechanical, and software problems plagued the automated baggage handling system. In August 2005, the automated system was abandoned and replaced with a manual one.

The automated baggage system was far more complex than previous systems. As planned, it would have been ten times larger than any other automated system, developed on an ambitious schedule, utilized novel technology, and required shorter-than-average baggage delivery times. As such, the system involved a very high level of SE risk. A fixed scope, schedule, and budget arrangement precluded extensive simulation or physical testing of the full design. System design began late, as it did not begin until well after construction of the airport was underway. The change management system allowed acceptance of change requests that required significant redesigns to portions of work already completed. The design did not include a meaningful backup system; for a system that required very high mechanical and computer reliability, this increased failure risks. The system had an insufficient number of tugs and carts to cope with the volume of baggage expected and this, along with severely limited timing requirements, caused baggage carts to jam in the tracks and for them to misalign with the conveyor belts feeding the bags. This resulted in mutilated and lost bags (Neufville 1994; Gibbs 1994).

The baggage system problems could be associated with the non-use or misuse of a number of systems engineering (SE) concepts and practices: system architecture complexity, project scheduling, risk management, change management, system analysis and design, system reliability, systems integration, system verification and validation/testing, and insufficient management oversight.

Summary

The initial planning decisions, such as the decision to implement one airport-wide integrated system, the contractual commitments to scope, schedule, and cost, as well as the lack of adequate project management (PM) procedures and processes, led to a failed system. Attention to SE principles and practices might have avoided the system's failure.

References

Works Cited

Calleam Consulting Ltd. 2008. *Case Study - Denver International Airport Baggage Handling System - An Illustration of Ineffectual Decision Making*. Accessed on September 11, 2011. Available at http://calleam.com/WTPF/?page_id=2086.

Neufville, R. de. 1994. "The Baggage System at Denver: Prospects and Lessons." *Journal of Air Transport Management*. 1(4): 229-236.

Gibbs, W.W. 1994. "Software's Chronic Crisis." *Scientific American*. September 1994: p. 72-81.

Primary References

None.

Additional References

DOT. 1994. *New Denver Airport: Impact of the Delayed Baggage System*. US Department of Transportation (DOT), Research Innovation Technology Administration. GAO/RCED-95-35BR. Available at <http://ntl.bts.gov/DOCS/rc9535br.html>

Donaldson, A.J.M. 2002. *A Case Narrative of the Project Problems with the Denver Airport Baggage Handling Systems (DABHS)*. Software Forensics Center Technical Report TR 2002-01. Middlesex University, School of Computer Sciences. Available at <http://www.eis.mdx.ac.uk/research/SFC/Reports/TR2002-01.pdf>

< Previous Article | Parent Article | Next Article >

SEBoK v. 2.9, released 20 November 2023

Retrieved from
"https://sebokwiki.org/w/index.php?title=Denver_Airport_Baggage_Handling_System&oldid=69609"

This page was last edited on 18 November 2023, at 22:25.