Software Failures Case Study: Computer failure hits air traffic control

Most flights from Heathrow airport were grounded this morning after a computer failure at the National Air Traffic Control centre at West Drayton.

Today's system failure at National Air Traffic Services' (NATS) West Drayton flight data processing centre is the latest in a series of set-backs to the agency's £1bn IT modernisation project.

Air traffic controllers reverted to manual handling of aircraft in the air as engineers raced to restore IT systems.

A spokesman for National Air Traffic Services said the fault was believed to be in data flow through the systems that feed NATS' £623m Swanwick centre in Hampshire.

This morning's failure is a further embarrassment for NATS. In January, it was revealed that NATS was to upgrade software at Swanwick after a near-miss of two large passenger jets over Wales, during which a woman was injured. The controller thought his instructions to the pilots of the aircraft would direct their aircraft away from one another, but the opposite happened.

Last June, it was revealed that a top-level safety report on the Swanwick centre found that technological problems contributed to a record number of overloads for air traffic controllers in 2002.

By law, controllers must report an overload if their workload is excessive to the point where the safety of aircraft was, or could have been, compromised. The safety committee said there were 64 overloads in 2002, compared with 28 when en route aircraft were handled by the centre's predecessor at West Drayton, near Heathrow.

NATS is investing up to £500m in upgrading its core IT systems to become more competitive as Europe moves to consolidate its air traffic control as part of the Single European Sky policy.

While there is uncertainty about how much consolidation will be required, European air traffic services will have to start work on integrating the numerous IT systems.

Many more system tests and upgrades are planned by NATS, raising the spectre of future problems and more flight delays as systems are modernised.

Part of NATS' upgrade plans include the installation of a new flight data processing system following the consolidation of its four air traffic control centres to two.

'There was a failure to have continual investment taking place in the late 1970s and in the 1980s. The focus was on Swanwick and there'd been a lot of problems, which led to delays and cost overruns.' 'In some ways it's a bit ironic to get a new system and then expect it to still rely on older systems at West Drayton,' she said.

A timeline of NATS' IT

- **2000**: System crashes at West Drayton causing flight delays.
- **Summer 2001**: NATS' unveils private-public partnership agreement, shortly before 11 September.
- **October 2001**: New Prestwick centre development plans on ice.
- **January 2002**: £623m Swanwick control centre goes live, years late and over budget.
- **April 2002**: Ten-year, £1bn future investment programme announced.
- **May 2002**: System crashes at West Drayton cause flight delays.
- **November 2002**: A software issue at Swanwick leads to a near miss.
- **February 2003**: NATS starts work with NAV Canada to replace its Oceanic FDP system.
- **March 2003**: £1bn plan receives go-ahead after financial restructuring.
- **April 2003**: NATS says it hopes to partner with Spain and Germany to develop new FDP system.
- **December 2003**: Completes first stage of £127m radar-replacement project.
- **May 2004**: Work resumes on Prestwick, with an operational launch set for 2009.
- **June 2004**: System crash at West Drayton causes serious flight delays across the UK.
- **January 2005**: Partial control of Northern Oceanic Transition Area handed to Ireland.
- **October 2006**: Non-radar Oceanic FDP system replacement to come online.
- **2006**: Testing of new FDP system starts at Prestwick.
- **2007**: 600 controllers at West Drayton will move to Swanwick.
- **2009**: Prestwick due to be operational, taking over Manchester and Scottish operations.
- **2011**: Swanwick's FDP systems to switch to the new system, completing NATS' 'two-centre one-system' strategy.
- **2012**: Replacement of the UK's entire radar infrastructure completed.

References

- [1] http://www.computerweekly.com/news/2240040633/Data-processing-error-at-West-Drayton-stalls-flights
- [2] http://www.computerweekly.com/feature/Code-crashes-Nats-system
- [3] http://www.computerweekly.com/news/2240056289/Computer-failure-hits-air-traffic-control
- [4] http://www.computerweekly.com/feature/Nats-reviews-procedures-after-air-control-IT-crash

Questions

1. What is the impact of this failure for both the customer (i.e. NATS) and the end-user (i.e. the traveller)?
2. What do you understand by the term 'overload'?
3. Can you think of a way in which a software system could reduce the instances of 'overload'?