London Ambulance Service Computer Aided Disaster

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Sam Hyland
hylandsb@mcmaster.ca

Software Engineering 3B03

They made virtually every mistake in the book.

— Paul Williams LAS Inquiry Member[9]

I have decided the honourable course of action is to offer my resignation.

— John Wilby chief executive of LAS and primarily responsible for CAD system October 28 1992[5]

Outline

- Stakeholders: *The key players and their role*
- Lead Up: *Gearing up for failure*
- Failure: *900 Complaints*
- Aftermath: *Taking responsibility*
- Epilogue: *Ethics or Lack Thereof*
- Conclusion and Discussion

Stakeholders:
London Ambulance Service (LAS)

- Management
  - John Wilby Chief Executive
  - LAS Board
- Workers
  - NUPE (National Union of Public Employees)
- Procurement Team

Stakeholders: Apricot Computers/Systems Options

- Apricot Computers (Apricot)
  - UK Based hardware manufacturer
- Systems Options (SO)
  - Small UK software developer
- Lost bid for simpler Cambridgeshire Ambulance Service CAD system.[12]
- Won Bid for LAS CAD

Stakeholders: British Government

- Virginia Bottomley – Health Secretary under John Major (Prime Minister)
- David Blunkett – Shadow Health Secretary
- Oversaw LAS indirectly through National Health Service (NHS)

Stakeholders

- Citizens of London
  - Need access to LAS for emergency medical care
- Local and Regional Health Organisation
  - Health Councils, Hospitals, District Health Authorities
- Competing Bidders
  - Recognised Apricot/SO proposal and implementation was flawed

Lead Up:
LAS Background and Motivation

- Serves 6.8 – 10 million people
- Over 700 Ambulances
- Largest Ambulance service in the world[12]
- Manual dispatch system was inadequate[2]
  - Slow, New standard required 3 min mobilization
  - Error Prone
- LAS believed CAD was the only possible solution

Lead Up: The First Try

- Development began in 1987[2]
- Specification changed drasticaly in 1989[2]
- Canceled October 1990 after two failed tests[2]
- Independent investigation recommended[2]
  - Modifying another districts system
  - Expected cost of £1.5 million and 19 months
  - Costs and timeframe would increase if developed from scratch

Lead Up: Specification and Bidding

- Extremly ambitious design
  - All decision making removed from operators
- Unrealistic rigid timeframe and budget[12]
- Bid awarded to Apricot Systems/Systems Options
  - Price £937 463
  - Next two lowest £1.6 and 3 million[2]
- Negitive references for Apricot/SO ignored[2]
- Reason behind low cost not investigated[2]

Lead Up: System Development

- Apricot had pressured SO into bidding[12]
- Underestimated complexity of software (4% of budget)[2]
- 6 month time scale[2]
- No formal project management/methodology[2]
- No Quality Assurance[2]
- No test plan[2]
- December 1991 deadline moved back 9 months[2]

Lead Up: Warning Signs

- First two phases plagued by problems[2]
- NUPE called for inquiry in March 1992 after major system crash[2]
- Computer and safety experts warned government of serious flaws[8]
  - Dismissed by Health Secretary
- LAS board received non-confidence vote from internal department[2]
- LAS under government pressure to reduce budget[2]

Failure: Day 1 & 2

- CAD system went live October 26 1992 at 3 A.M
- 2 serious errors, 44 operational errors and 35 minor problems known[2]
- Mid-morning ambulances were late and and “doubling up” on calls[2]
- Terminals flooded with error messages[4]
- Kept up for 35 hours
- LAS received over 900 complaints[2]

Failure: Day 3

- October 27 1992 system returned to Phase 2[4]
- Up to 46 people may have died prematurely[2]
- October 28 John Wilby Chief Executive of LAS resigned[5]
- Martin Gorham took over the position
- Health Secretary called for immediate inquiry[5]

Failure: Day 10

- System fails again resulting in 30 minute delay[7]
- Back up systems failed to function adequately[2]
- Manual dispatch resumed[7]
- Most units reported dramatic improvements in efficiency after the switch back to manual operations[2]

Aftermath: Dealing with Failure

- Numerous technological and design failures
- Serious management and accountability failures[12]
  - John Wilby resigned[5]
  - Jim Harris LAS Board Chairman resigned[10]
- SO lost contract with Staffordshire Fire and Rescue Service[2]
- Public faith in ambulance service destroyed[2]
- RES ambulance service offered private ambulance service for £37.50/year[2]

Aftermath: Social Causes

- Poor lines of accountability
- Poor division of management
- Lack of knowledge of procurement committee
- Lack of professional conduct
- Unrealistic demands
- Lack of communication

Ethical Principle 1: Competency

"You shall not claim any level of competence that you do not possess. You shall only offer to do work or provide a service that is within your professional competence"
- British Computer Society[1]

- Violated by LAS procurement team
  - Of two members only one had adequate technical knowledge
- Violated by Apricot/SO
  - Neither company had the knowledge or experience to satisfy the design specifications

Ethical Issues 2: Public Welfare

"*In your professional role you shall have regard for the public health, safety and environment.*"

- British Computer Society[1]

- Violated by LAS Management and British Government
  - Failed to investigate warnings of danger
  - Failed to follow up known failures
- Violated by Apricot/SO
  - Designed safety critical system inadequately using untested methods and software

Concluding Remarks For Software Engineers

- Recognise the complexity of the problem before hand
- Seek help when needed and recognise your limits
- Use formal design methodologies and established techniques
- Be aware of the user and their needs
- Do not blindly trust technology

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