Space Information & Intelligence System

RAF Fylingdales
AGI overview

- A software product company
- Industry standard for analysis & visualization
- Offices in US, Europe and Asia
- Founded in 1989
- 32,000+ registered installations
- 500+ buying organizations
- STK 7.1 released May 2006
- STK 8 October 2006
Background: RAF Fylingdales

- Phased-array radar located in North York Moors, England
- Part of the Ballistic Missile Early warning System
  - UK and US
- Secondary role is the detection and tracking of orbiting objects
  - Project focus area
  - What can see what & when?
Problem

- Aging legacy software (~30 years)
- Replacement hardware difficult to find (eBay)
- Original development team retiring
- Complicated to use
  - Extensive training required
- Two prior unsuccessful upgrade attempts
  - 100% custom software
  - 2-year project lifecycle
  - $6 million over - budget
Key derived requirements

- Manage database of space objects
- Given a point or area on ground, calculate when in view from tracked space objects
- Generate actionable reports
- Easy-to-use by entry-level operational staff
Off-the shelf solution?

- All functional requirements met by AGI commercial product, Satellite Tool Kit (STK)
- Operational requirements not met due to learning curve
  - 400+ panels
  - Too many choices
Solution architecture

- Embed STK geometry engine & 3D/2D displays
- Custom code supports specialized workflow
- Use 80% COTS & 20% custom
  - COTS portion does all of the work
  - Custom code supports workflows

*Embedded technology marketed as “4DX”*
RAFTAP Features

- Manage terrain & imagery
- Search, sort, group & propagate objects
- Generate actionable reports
Project Timeline

 proof of concept

 Q1 Q2 Q3 Q4

 2004

 Initial exposure & testing of STK

 RAFTAP Development & Delivery

 Q1 Q2 Q3 Q4

 2005 2006

 RAFTAP Operational Test
Obstacles/Risks

• Long-distance deliverable
  – Atlantic ocean prevents frequent site visits
  – Time zones discourage spontaneous communication

• Language
  – Oxford vs. Webster

• Trust
  – Previous unsuccessful attempts
  – RAF contracting with a foreign country

• Mutual Ignorance
Mitigations

• Solid face-to-face relationship
  – Local AGI rep, UK national
  – Regular interactions with RAF technical staff

• Early prototypes
  – Static and functional
  – Reduced mutual ignorance

• AGI willingness to invest
  – Free initial proofs of concept
  – Firm, fixed-pricing
What went right

• Rapid, iterative UI prototyping via Webex
• Frequent, interim code drops
• Customer participation
  – Willing to accept partial deliverables
  – Not afraid to work hands-on with AGI
• Customer accepted the unknown
  – Customers shouldn’t be expected to have all the answers
  – Experimenting with prototypes revealed unknown requirements
Result

- Provided a customized application using COTS as core
  - User documentation
  - Source code for custom gui
- Training
  - User training
  - RAF developer training
    - Classroom
    - Code walk-through

“With AGI’s software technology, [our mission] has been propelled into the 21st century.“
- SSgt. Alan Reeves, RAF
Benefits

- Higher-fidelity analysis, less time
  - Collection, analysis & dissemination reduced from 48 hours to 2 hours.
    - 95% reduction
- Simplified for novice user
  - Training: 30 min. vs. weeks
  - 1.5 hrs. to test vs. 2-days
- Affordable
  - < 10% of previous budget overrun
- Sustainable
  - Supported, COTS software
  - VB developers readily available
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