Academic Collaboration with the US Coast Guard

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(all projects co-authored with Professor Deshpande)
Projects between 2001 and 2009

Resources

• Five Sponsored Projects between ARSC (Elizabeth City) and Purdue University
• All projects focused on the Air Assets Supply Chain (ARSC) at Elizabeth City and airstations
• Masters Students from the Krannert School of Management and School of Industrial Engineering at Purdue University
• PhD student from the Krannert School
• Student interns worked at ARSC in the summer and went to airstations when necessary
• Faculty – Professors Deshpande and Iyer
• USCG officers at Krannert for MSIA degree – independent study projects to test completed projects and push results
Focus on one project

• HH-65 B to C conversion and CG2 to CG4 conversion
• Initial problem – Timeline for conversion, shortage of Gearbox conversion kit
• Possible Choices – full flexibility, partial flexibility
• Rate of conversion of aircraft, overhaul interval for converted aircraft
• Model showed the impact of kit constraint, overhaul interval, repair time on aircraft availability
• Mathematical programming model generates performance estimates, shadow prices, impact of changes in parameters
• Decisions regarding number of new kits to purchase and impact on performance
• Justification for congressional request for additional funding for gearbox kits
Academic Impact

• Modeling product transitions in a supply chain
• General model and results
• Doctoral thesis (Asima Mishra) who now works for Intel Research
• Two academic papers under review or revision
• The general problem of product transitions is now being applied to EPA regulation and product impact (another thesis)
• This is a new emerging area in Supply Chain research
• It is now taught in Supply Chain courses at Krannert and will be in a textbook I am writing (for McGraw Hill)
Our Approach

• Original problem definition by USCG officers
• Collaborative definition (USCG and Purdue) of technical solution approach, software used, tasks and timeline
• Collaborative Definition of the scope of the prototype solution – to be comprehensive, enable estimation of benefit, cover a range of assets
• All projects data intensive – focus on use of raw data at the transaction level
• On site Purdue student interns - to learn about data specifics from personnel who enter data, interpret data etc (Crucial)
• Models used (Optimization, Simulation, Statistical) and software used coordinated with licenses at Elizabeth City
• All solutions, code etc handed over to USCG – none of the solutions were property of Purdue
• Scale up of the prototype solutions contracted with private companies
Timeline of Project vs Academic Output

Issues to Manage

• Project Entire Timeline usually within one year
• Academic Calendar vs Project Calendar
• Data Analysis and feedback from USCG – crucial
• On site visits and discussion with users
• Masters students role (project focused) vs doctoral students role (long term research contributions)
• Submit results for independent review (peer review), prizes (Edelman Award)
• Two papers published, two in the pipeline, one doctoral thesis
• Presentations at over 20 universities worldwide and conferences - to collect feedback
Issues to consider

• How do we keep USCG relationships beyond specific project completion?
• Can the work with USCG be used for other USCG assets (ships) - for DHS, or at other Defense entities (Navy, Airforce)?
• Are there mechanisms other than project based approaches that could work?
• Any other suggestions.

THANK YOU
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