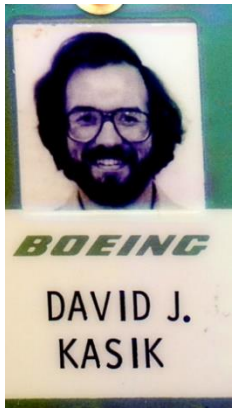
A University/Industry Research Case Study

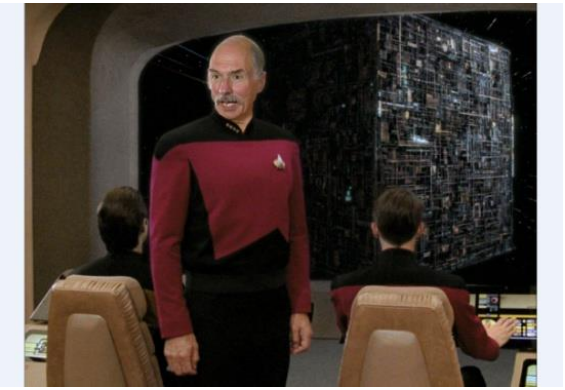
Dave Kasik
Boeing Senior Technical Fellow-Retired
dave.kasik@gmail.com

A Bit About Me

- Involved in computer graphics since 1969
- Retired Boeing Senior Technical Fellow
- ACM Fellow
- Stand-in on starship bridges



Then



Now

Overview

- Set context
- The Boeing story
- The SFU-UBC story
- The collaboration story
- Lessons learned

Context

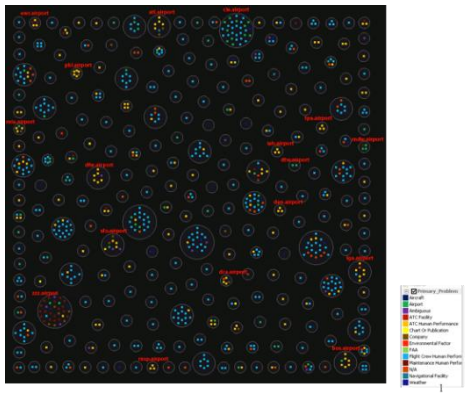
- **Project start 2007**
- **Boeing sold Canada 4 C-17 cargo planes + maintenance**
- **Canada required Boeing to spend $$ as purchase offset**
- **SFU – UBC, the schools involved, wanted to do visual analytics research**
- **Canada offers $5 offset credit for every $1 for research**
- **Long time professional contacts resulted in:**
  - Dave Kasik as Boeing technical focal
  - John Dill and Brian Fisher as SFU focals
  - Ron Rensink as UBC focal

The Boeing Story

- **Contracts/funding independent of technical team**
  - Relied on technical team for SOW/deliverables
  - Boeing had not done this type of project
  - Took less than a month to put in place
  - Invested $1.3M over 5 years
- **Once in place**
  - Technical focal provided status reports
  - Technical focal also
    - Interacted with SFU – UBC technical teams
    - Molded technical direction molded jointly
    - Guided (not dictated) direction
    - Found problems, data, and Boeing subject matter experts

The SFU-UBC Story

- **Took ~6 months to finalize project at UBC, less at SFU**
  - Neither had done this type of project
- **Professors defined own process for subprojects**
- **Guided students through subprojects**
- **Assisted students with quarterly reviews Boeing attended**
  - On site reviews to help students learn how to present
- **Kept Boeing informed when there were problems**
  - For example, first analysis tasks were too open-ended
  - Students needed a real problem
    - Studied runway excursions



The Collaboration Story

- **Boeing**
  - Did not insist on formal deliverables and schedule
  - Provided problems, data, and experts
    - Bird strike data and expertise
    - Flight maintenance data for 737 retirement
  - Opened door for students to work on site
- **Universities**
  - Distributed funds to multiple groups
  - Provided students new opportunities
  - Developed new techniques
    - For example
      - Pair analytics
      - Effectiveness of different symbols

Lessons Learned

- **Getting going**
  - Little resistance inside Boeing until success. Then more scrutiny
  - Outside the norm in universities
- **Tracking benefits invaluable**
  - Boeing
    - $6.5M offset credit
    - Hired 10+ students
    - Template for text analytics (Dalhousie), Brazilian visual analytics projects
    - Results affected Boeing (e.g., better bird strike guidance, VA acceptance)
  - Universities
    - Got visual analytics going
    - New source of $$
    - Produced Canadian HQP and dozens of papers
- **Weekly telecons, quarterly reviews great for communication**

Summary

- Still required lots of work
- Disagreement (e.g., CZSaw) OK, especially in research
- Worth the effort on both sides
- Communicate, communicate, communicate

References

- Fisher, B. and Kasik, D. “Pair Analytics in a Visual Analytics Context”, Proceedings of the 56th Hawaii International Conference on System Sciences | 2023, pp. 1226 - 1235
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- Wade, A. and Nicholson, R. “Improving Airplane Safety: Tableau and Bird Strikes”, IEEE Information Visualization 2010 Conference Compendium (2010), pp. 24-29