

**SYST 490 2012:  
Faculty & Industry Sponsor  
Evaluations**

# Congratulations!

- Overall, good “project proposal” briefings.
  - Communication skills – outstanding
  - Slide preparation – very good
  - Technical content and project planning – good, but problems with completeness, consistency, and logical/linear communication of ideas
    - Problem Statement must be derived from Context and Stakeholders Analysis
    - Mission Reqs must be derived from Context and Stakeholders Analysis
    - Design Alternatives must be derived from Context and Stakeholders Analysis

System Engineering is all about  
finding the *problems/faults*  
before the system is built and  
fielded,  
so accept scores and comments in  
spirit of constructive criticism

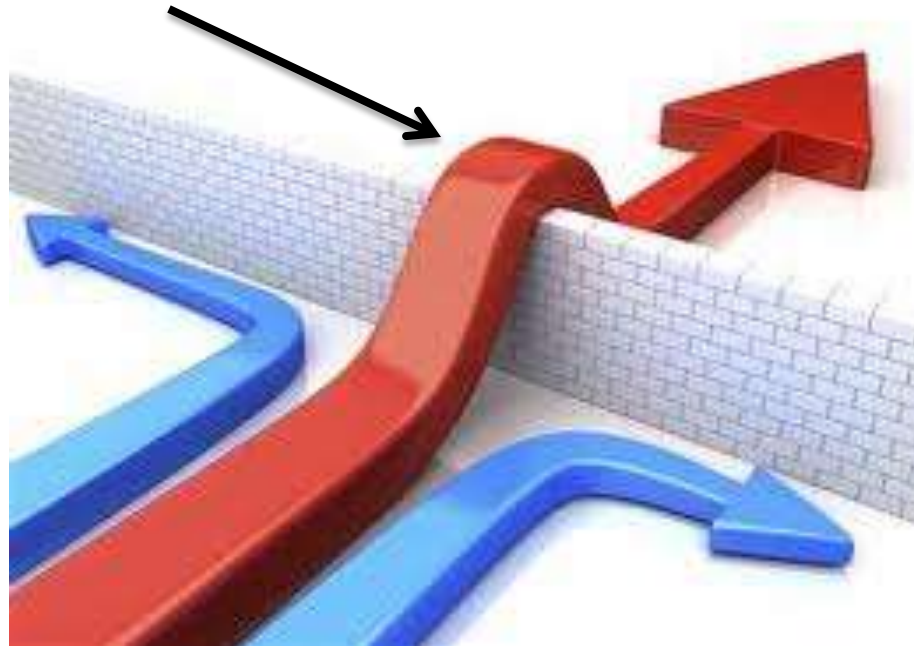
- Feedback from stakeholders, crowd-sourcing, focus groups, SME is critical to success
- System Engineers must be **“thick-skinned”**

*Optimum functional element protection system for System Engineer*



# Adversity breeds Success

GMU Senior Design Students



# Moving Forward

- Take all lessons learned from 1<sup>st</sup> semester and apply to 2nd semester
- Remember ... this is the most challenging, yet most rewarding class you will ever take

# TOTAL ELEMENT SCORE (5 max)

Project	Avg Total	Equiv Letter Grade	Std Dev
Bio-Diesel	3.98	C+	0.47
Campus Shuttle	3.81	C	<b>0.57</b>
Green Buildings	3.80	C	<b>0.54</b>
Grav Survey	3.72	C	0.46
CR/ANSP	3.71	C	0.45
Sports Anal	3.69	C	<b>0.61</b>
UAS-LL	3.63	C	0.42
ROQA	3.44	D+	<b>0.64</b>

Note: High Standard Deviation indication confusion by audience

# OVERALL SCORE (5 max)

Project	Avg Overall	Equiv Letter Grade	Std Dev
Bio-Diesel	3.99	C+	0.43
Campus Shuttle	3.78	C	0.57
UAS-LL	3.75	C	0.40
Sports Anal	3.73	C	<b>0.88</b>
Green Buildings	3.70	C	<b>0.69</b>
CR/ANSP	3.67	C	0.53
Grav Survey	3.53	C	<b>0.66</b>
ROQA	3.17	D+	<b>0.75</b>

Note: High Standard Deviation indication confusion by audience



# Comments from Evaluators

# UAS/LL

- Has potential to be a good project – needs a lot more work
- I do not see quantitative performance measures for reqs
- Design alternatives not clear
  - How does sensor performance come into picture
  - Did not discuss design alternatives AT ALL
- That is complex model team has proposed. Curious to see if team can handle this complex of a problem
  - How are design alternatives modeled? Which parameters in the model
- No prelim results shown!
  - Need to realistically scope simulation
  - What about Rare events?
  - Should have had some prelim results at this point in project
- No utility function?
- Weak Design of Experiment
- No Project Risk and Mitigation?
- Could not answer questions
- Graphics were unreadable

# Regional Transportation

- Interesting and relevant problem, but team does not seem to have embraced the project
- “Calculated using that formula there” – what formula? where? How 10.7K commuter need switch
- Problem statement: list bullets (not para)
- Not including “frequency” is a serious limitation of study
- No discussion on riders mode choice model?
- Mission Reqs do not include quantitative performance measures and cannot be tested
- FFBD would be easier to follow that IDEF0
  - Needs much better explanation of functions
- Design alternatives are not explained well
  - Not clear what these are, needs more detail
  - What about other alternatives: car pooling with parking preference, on-demand taxi (e.g. uber), .... (Not sure this team is really thinking about the problem)
  - Why only these buses. What about other manufacturers
  - Are state schools obliged to purchase American made products (like U.S. government)
- Is simulation the right approach to this problem? Why?
- What is assumption of load factor on buses
- Why is demand not treated as a random variable
  
- Presentation is too shallow – needs more details
- Slides have no page numbers !@#\$%

# Bio-Diesel

- The project seems well scoped.
- Not sure about profit statements. Need to be more clear.
- What fraction of fuel is overall costs?
- Need statement describes the solution!
- Why not choose the most profitable crop
- Model and experimental design were not detailed enough – not sure this team knows how to model
- Stochastic models are not clearly defined. How are prob. Distribution defined, justified and used?
  - Specify how to do stochastic analysis
- Why is equipment choice not modeled. Did not understand answer in Q&A
- What weather/rain/temp distributions will be used? Why?
- Design of experiments OK but incomplete
- Good explanation of weight elicitation
- Estimated costs  $10^{-1}$  accuracy reported with  $10^{-4}$  precision
- Risk management is weak

# Green Leasing

- Well briefed
- I gave [the project] a low grade, but the project has a lot of potential
- Good job!
- Is there a penalty for not making E.O. Discuss.
- Need better explanation on connection on how project helps [RECO] process
- Where is the bottleneck? How does this solution address the bottleneck?
- How are relocation costs measured
- Worried about impact of unknowable assumptions [for design alternatives
  - What about FAA pays for renovation?
- Assumption 5 does not seem realistic
- Its not clear the cost models on renovation and energy are realistic.
- Needs more precise data analysis
- AHP?
- Work needed on value hierarchy
- This project does not seem like a hard problem.
- Analysis is correct, but relatively simple compared to other projects
  - Did not discuss Sensitivity analysis
  - Did not discuss testing sensitivity of assumptions
- From FAA
  - Inventory numbers need to be updated
  - Location based cost data will need to be part of the model

# CR/ANSP

- Problem well explained
- Handled questions well
- Why is current flight route not the optimal route
- There is tension between safety and efficiency
- How does metric reduce CO2
  - A metric monitors but does not result in change
- Reqs are not well stated . % are not stated. page 25 not OK
- I have no idea what the 10 designs are!
  - What are these alternatives?
  - Why not implement all alternatives
- GCD is not the “optimal route” Time \* fuel burn → optimize on TIME
- Your project is to minimize time. Groundspeed = wind speed + true airspeed
- Not sure what the simulation shows
- Design of Experiment is not well described
  - DOE is unclear
- Value hierarchy needs more help
- No discussion of project risks
- Listen to question and understand, before answering

# ROQA

- Correctly identified capacity vs safety tradeoff
- Nice job briefing the slides, but presentation is disconnected
  - Briefing jumped around hard to follow
- Design alternatives not explained
  - Design alternatives?
  - Design alternatives ROT rules (pg 37) or prototype tools (page 33, 38)
- Problem statement is on page 29
  - The goal of the project should be before slide 18
  - Discrete event with Prob = 0? Do you mean treat non-probabilistically?
- WHO IS USER OF THE TOOL
  - No reqs provided
- Confusion between Runway Incursions and Separation Violations (these are not the same)
  - This project is about spacing (i.e. separation). Everything else is just noise
- Req's not complete. What is XX, YY, ...
- How is data collected GPS, radar, ...?
- Are you simulating collisions, wake vortex encounters, or separation violations
- Value hierarchy should not include cost
- Sim model needs a detailed technical review. LTI & IAT as input pdf.
- ROT Bi-modal explanation not correct
- Utility function not emphasized
  - Weights not discussed
- Prelim results not shown
- No discussion of rare events

# Sports Analytics

- Interesting problem
- Sponsor seems very interested
- Based on Q&A, project may be better than presentation
- Impressive project, but description not clear
- What are constraints from NCAA? How are these modeled? Are they modeled?
- Opening slides disorganized
- Problem Statement unclear. Who uses decision support tool, when where, what used for?
- Consider problem statement “coaches need analysis tool to guide recruiting and training” You can solve this problem with the tool proposed
- Where does data come from
  - Can this data be automatically captured?
- What are the design alternatives?
  - How were design alternatives derived?
- Analysis is not an Analysis of Alternatives (AoA)
- It does not take 6 hours to analyze the video data. What analysis are you doing that it takes that long.
- While the Markov Chain is interesting, not clear what are results or how used?
- Give examples on how coach would use results. Be specific.
- A lot of confusion about project was answered in the Q&A. Fix the slides to include.
- How is variation in opponents play accounted for? What about tactical changes?
- Project is behind schedule. What is plan to catch-up?



# Grav Survey

- Interesting background information.
- Easy to understand gap
- Why do distributions charts not have axes labeled?
  - PDF graphs were confusing
- Do not understand what the distributions have to do with the design alternatives
- Design alternatives are vague? What are they?
- You need to get more data for your distributions
- How does simulation answer sponsor questions
- Distributions relating to weather – should Alaska be in same group as others?
- Need weights from stakeholders. How will you get them?
- Not clear how analysis plan will get you to your goals
  - Alternatives are very vague
- Analysis plan does not seem to be thought out too well. Needs more work.
- DoE justification not clear.
- Explain how Monte Carlo will be run.
- Did not answer questions in Q&A well
- This project needs to shape up. Not too much work has been done

Looking forward to a great 2<sup>nd</sup>  
semester