

Coming in Under Par: What Golf Can Teach Us About Systems Engineering

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What can We Learn About Systems Engineering from Golf?

"Competitive golf is played mainly on a five-and-a-half-inch course, the space between your ears." Bobby Jones



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Note: All quotes in green from: "500 Golf Quotes, Sayings and Verses to Make You Think and Laugh" by Lester J. Bouchard
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Approach

- We will introduce some interesting golf phrases
 - We will describe what this phrase means in golf
 - We will postulate and discuss some Systems Engineering analogies and applications
- Wrap up and conclusions

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“Keep your head down and follow through.”

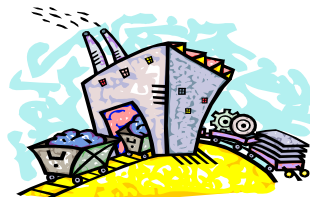


“If only I kept my eye on the ball, looking downward as does the pro there, I might not see where it was going, at all, but there might be a chance it would go there.”

Richard Armour

“Keep your head down and follow through.”

- Head Down
 - Focus on the objective
 - Avoid distractions
- Follow Through
 - Mind the details
 - Ensure the necessary work gets done



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“Drive for show, putt for dough.”



300 Yards

= 2 inches

*“His driving is unbelievable. I don’t go that far on my holidays.”
Ian Baker-Finch on John Daly*

“You don’t necessarily have to be a good golfer to be a good putter, but you have to be a good putter to be a good golfer.” Tony Lema



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“Drive for show, putt for dough.”

| Scoring Average | | | |
|---------------------|------------------------------|-----------|--------------|
| Rank | Leader | | |
| 1 | Luke Donald <i>Tilbase</i> | 20 | 69.28 |
| 2 | Nick Watney <i>Tilbase</i> | 27 | 69.56 |
| 3 | Brian Gay <i>Tilbase</i> | 32 | 69.75 |
| 4 | Matt Kuchar | 39 | 69.76 |
| 5 | Spencer Levin <i>Tilbase</i> | 41 | 69.78 |
| TOUR Average | | 26 | 71.41 |

[View All](#)

| Driving Distance | | | |
|---------------------|--------------------------------|-----------|--------------|
| Rank | Leader | | |
| 1 | J.B. Holmes <i>Tilbase</i> | 28 | 311.7 |
| 2 | Bubba Watson <i>Tilbase</i> | 35 | 308.2 |
| 3 | Dustin Johnson | 29 | 307.6 |
| 4 | Robert Garrigus <i>Tilbase</i> | 27 | 302.1 |
| 5 | Gary Woodland <i>Tilbase</i> | 36 | 300.9 |
| TOUR Average | | 26 | 285.3 |

[View All](#)

| Putts Per Round | | | |
|---------------------|------------------------------|-----------|--------------|
| Rank | Leader | | |
| 1 | Luke Donald <i>Tilbase</i> | 20 | 27.43 |
| 2 | Kevin Na <i>Tilbase</i> | 34 | 27.59 |
| 3 | Rickie Fowler <i>Tilbase</i> | 29 | 27.69 |
| 4 | Greg Chalmers <i>Tilbase</i> | 23 | 27.76 |
| 5 | Jimmy Walker <i>Tilbase</i> | 32 | 27.81 |
| TOUR Average | | 26 | 29.32 |

[View All](#)

**Over 40% of the strokes on the PGA Tour are Putts!
Less than 20% are drives!**



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PGA stats as of April 2011, Source: <http://www.pgatour.com/r/stats/>

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“Drive for show, putt for dough.”

- SE for Show (pick your favorite)
 - Requirements
 - Architecture
 - Major Reviews
- SE for Dough (“lesser” activities)
 - Right Problem
 - Planning (and Re-Planning)
 - Right Team & Resources
 - “ilities”
 - Integration & Test
 - Deliverables



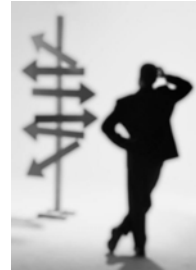
“Trees are 90% air.”



“If I had cleared the trees and drove the green, it would've been a great shot.”
Sam Snead

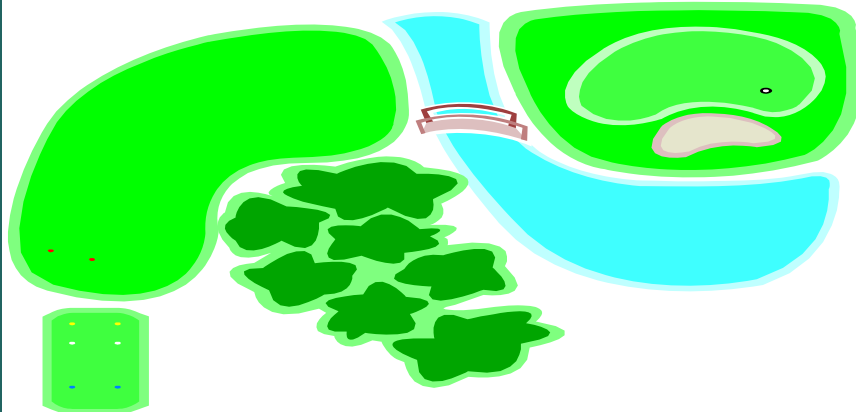
Systems Engineering is About Making Tough Decisions (and Sticking to Them)

- It is typically the Systems Engineers upon whom the difficult decisions fall
 - A system can only be optimized by addressing it as a whole
 - If any component of the system is optimized, then the overall system will not be optimized
- Systems Engineers use trade-off analyses to help with the decision making process



Good rule of thumb – if all the specialists aren't at least a little bit annoyed, it is likely the Systems Engineers did not do their job.

“Sometimes it is better to ‘lay up’.”



“Play the shot you’ve got the greatest chance of playing well and play the shot that makes the next shot easy. It is not solely the capacity to make great shots that makes champions, but the essential quality of making very few bad shots.” Tommy Armour

All Systems have Risks (and Opportunities) that Must be Managed

Unless you have...

- Technical goals that are very low
- An infinite schedule
- Unlimited budgets
- No enemies

... then you have risks!



All projects of significance have risk. Systems Engineering recognizes this and provides the methods and tools to manage risk.

“A short putt never goes in.” (aka, “Never up, Never in.”)



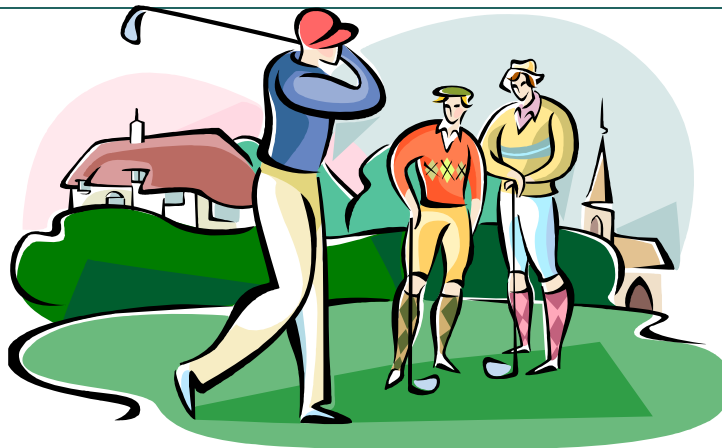
*“It’s so bad I could putt off a tabletop and still leave the ball halfway down the leg.”
J.C. Snead, on his putting*

“A short putt never goes in.” (aka, “Never up, Never in.”)

- You have to give yourself a chance
- “When in doubt do more than necessary. When confident, do much more.” Anon



“Every hole is a new hole.”



“Like life, golf can be humbling. However, little good comes from brooding about mistakes we’ve made. The next shot, in golf or in life, is the big one.” Grantland Rice

“Every hole is a new hole.”

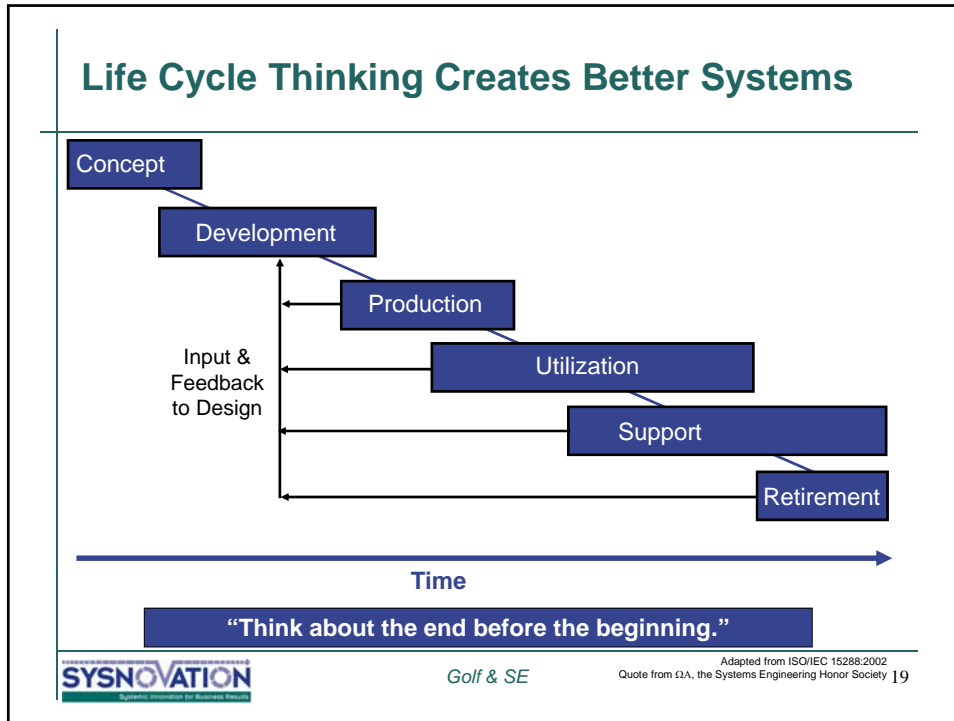
- Project-to-project
- Stage-to-stage
- Milestone-to-milestone
- Month-to-month
- Day-to-day



Example Life Cycle Stages

| Stage | Purpose |
|-------------|---|
| Concept | Capture the stakeholders' requirements Define alternative concepts |
| Development | Refine system requirements Architect the system solution Build the system Verify and validate system |
| Production | Produce systems Inspect and test |
| Utilization | Operate system to satisfy users' needs |
| Support | Provide sustained system capability |
| Retirement | Store, archive, or dispose of the system |

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“Use your ‘Mulligan's’ and take your ‘gimmies’.”

“My favorite shots are the practice swing and the conceded putt. The rest can never be mastered.” Lord Robertson

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“Use your ‘Mulligan's’ and take your ‘gimmies’.”

- Lessons Learned
- Insights & Heuristics
- Margins
- Reserve



Success comes from wisdom. Wisdom comes from experiences.
Experiences come from mistakes.

How do we learn from other's mistakes?

“Scramble teams do much better than any one person.”



“Scramble teams do much better than any one person.”

- Make sure you have the right team in place
- Leverage each other's strengths and accommodate each other's weaknesses
- Plus, everybody else has a team



Systems Engineering is a team activity!

“It matters what you do before you play the round.”



“The subconscious mind is probably the most important factor in being a good golfer. It keeps distractions on the course from ruining a good round. You should practice, develop your swing, and do most of your thinking on the practice tee so that when you play in competition, you can hit the ball automatically.” Wiffy Cox

“It matters what you do before you play the round.”

- Organizations
 - Training
 - Process
- Individuals
 - Education
 - Knowledge
 - Experience
 - Continuing Professional Development



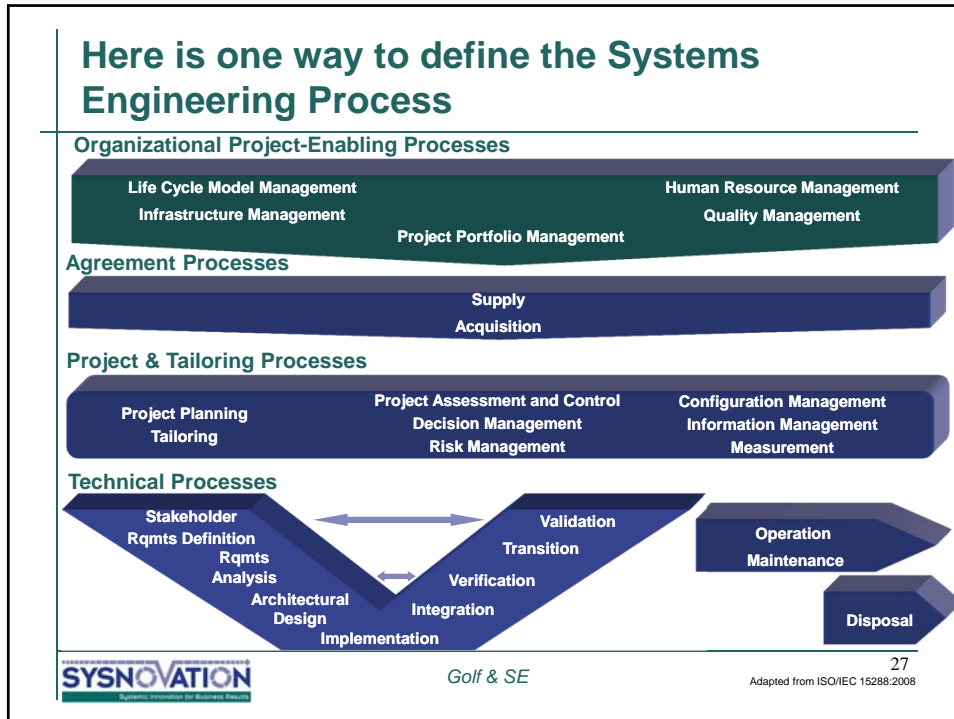
Following a Systems Engineering Process Increases Your Probability of Success

- A standard process
 - Captures organizational knowledge
 - Allows for continual improvement
 - Helps avoid repeating mistakes
 - Lets you leverage industry best practices, such as external standards
- However, your standard processes must be tailored to the unique aspects of each project and system



“Not every process will apply universally.”
“Reliance on process over progress will not deliver a system.”
INCOSE Systems Engineering Handbook

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“Clubs are not the limiting factor of my game!”



“The trouble that most of us find with the modern matched sets of clubs is that they don't really seem to know any more about the game than the old one's did!” Robert Browning

“Clubs are not the limiting factor of my game!”

- Avoid over-reliance on tools
 - Objectives -> Process -> Methodology -> Tool
 - “A fool with a tool is still a fool!”
- Four key requirements of SE Leaders
 - Disposition to systems thinking
 - Knowledge of the discipline of SE
 - Domain expertise
 - Organizational expertise



“Replace your divots.”
“Reseed the tee box.”



“My dad has always taught me these words: care and share. That’s why we put on clinics. The only thing I can do is try to give back. If it works, it works.” Tiger Woods



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“Replace your divots.”
“Reseed the tee box.”

- Give back to the discipline
 - Mentor
 - Volunteer
 - Present
 - Publish
 - Teach



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“It matters what you sign.”



*“Golf is based on honesty, where else would you admit to a seven on a par three?”
Jimmy Demaret*

“It matters what you sign.”

- Individuals
 - Integrity
 - SE Ethics
- System
 - Configuration Management
 - Information Management



Wrap Up and Conclusions

| Golf Phrase | Systems Engineering Application |
|---|--|
| "Keep your head down and follow through." | Focus on the goal, mind the details. |
| "Drive for show, putt for dough." | Every SE activity matters. |
| "Trees are 90% air." | Make, and stick to, difficult decisions. |
| "Sometimes it is better to 'lay up'." | Manage your risks and opportunities. |
| "A short putt never goes in (aka, never up, never in)." | Give yourself a chance. |
| "Every hole is a new hole." | Leverage other's mistakes. |
| "Use your 'Mulligan's' and take your 'gimmies'." | Lessons learned. Margin & reserves. |
| "Scramble teams do much better than any one person." | Leverage your team. |
| "It matters what you do before you play the round." | Be prepared. |
| "Clubs are not the limiting factor of my game!" | Don't overly rely on tools. |
| "Replace your divots." & "Reseed the tee box." | Give back. |
| "It matters what you sign." | Integrity & Ethics. CM & IM. |



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COMMENTS? QUESTIONS?

"I'm gambling that when we get into the next life, Saint Peter will look at us and ask, "Golfer?" And when we nod, he will step aside and say, "Go right in; you've suffered enough." One warning, if you do go in and the first thing you see is a par 3 surrounded by water, it ain't heaven."

Jim Murray



**#17 at TPC Sawgrass
Ponte Vedra Beach,
Florida, USA
137-yard par 3
Green approx. 15 x 20 feet**



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Image Source: <http://blogs.palmbeachpost.com/fromthebunker/tag/island-green/>

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