

# Metrics 101

## [Condensed Edition]

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Brief contains a mix of public and proprietary data as marked.

# Metrics: Widely Understood ...or Misunderstood?

- Everyone's a metrics SME – just ask 'em!
  - “It's impossible to define metrics for Info Operations.” (IO SME; retired Army BG)
  - “It's impossible to define metrics for biomass fuels.” (Biomass SME and marketeer)
  - “Metrics are dangerous”
  - “Metrics should not be used”
  - “The best metrics are intuitive”
- } Retired O-6s, all with Vietnam combat experience

# The Fact is...

- Metrics are a critical – and routine – part of life in the private sector
- Even there, it's easy to select suboptimal metrics
  - (e.g., see *Moneyball: The Art of Winning an Unfair Game* by Michael Lewis; a great read, and a treatise on the importance of employing the right metrics)
- But in the public sector in general, and the military in particular, we do a lousy job on metrics:
  - Confused definitions
  - Selecting as our metrics whatever *can* be measured
  - Measuring *activity* rather than *results*, and *believing the latter is absolutely determined by the former*

# Further...

- Regardless of advertised Goals and Objectives, humans perform in response to how their performance – or the performance of the process they're responsible for – is evaluated.
- So good metrics promote performance supportive of goals and objectives...
- ...and bad ones will yield performance that can be counterproductive to goals and objectives.
- Thus, *no metrics* can in fact be *better than bad metrics!*

***SO HOW DO WE RECOGNIZE THE  
GOOD ONES? THE BAD ONES?***

Let's start with Ancient Chinese Proverb:

“The beginning of wisdom is to call things by  
their correct names.”

# The Basics...

- Vince Lombardi: “Gentlemen, this is a football...”
- The Metrics Analog:  
“If you can’t measure it, it’s not a measure.”

# The Hierarchy of Metrics (DoD Style)

- Dimensional Parameters
  - Measures of Performance
  - Measures of Effectiveness
  - Measures of Force Effectiveness
  - Measures of Policy Effectiveness
- ← The critical transition from *Potential* to *Results*

# Rules of Thumb

- If you don't have to assume some form of opposing force, system, capability, or intelligence for your metric, you're probably dealing with a Dimensional Parameter (e.g.; weight, cube) or MOP (e.g.; processing rate, rate of fire, range, response time).
- Conversely, if your metric implicitly or explicitly assumes an opposing force, system, capability, or intelligence (even if it's "nature"), you're dealing with some form of MOE (MOE, MOFE, MOPE). E.g.; probability of kill, time to achieve x, force exchange ratios, casualty rates, market share.

# Rules of Thumb (cont'd)

- If your proposed “metric” can be “measured” only as a binary Yes/No, you’re probably actually dealing with an objective or an Indicator of Success
- If it’s not even binary, hope it’s at least a potentially useful definition of a goal
- The corollary: Beware the tendency to promote bumper stickers and rallying cries as metrics (e.g., “No More 9-11s!!”)

# Indicators of Success versus Metrics

- Indicators of Success are objectives or milestones
  - For validity, you *must* be able to determine when you're “there”
- Dimensional parameters and MOPs relate to physical characteristics and physical capabilities
- MOEs are *yardsticks* – they enable determining progress toward (or regress from) Goals or Objectives
  - Thus their usefulness as decision support tools
- Note that a specified value of a metric may be defined as an *objective* or a *milestone*, making *that specified value* (not the metric) an Indicator of Success

# Sanity Checks for Proposed Indicators of Success and Metrics

- Indicators of Success:
  - How Would You Know if you've achieved it? (HWYK?)
  - How would you Measure Progress toward it? (HMP?)
- Metrics:
  - How would you Measure it? (HM?)
  - Is More Better Than Less? (IMBTL?) – or the inverse, ILBTM?
  - How could you Collect the Data? (HCD?)

# Next...

- There are several technical requirements for metrics to be *really good*...but they're covered in Metrics 201
- E.g., objective, consistent, sensitive,...monotonic

# “How To” Suggestions

- *Never* start with the metric, or asking about metrics.
- *Always* start with *goals and objectives*: “What are you trying to accomplish?”
- Sometimes useful or necessary to cast the problem first as a question (i.e., “What are you trying to answer?”), then transition to goals and objectives.
- *Challenge your goals/objectives* (see next slide)

# Avoiding the Pitfalls in Defining Goals & Objectives

- Challenge, challenge, challenge...e.g.:
  - “How will you know when that objective has been met?”
  - “For that objective, what do you see as a satisfying result or product?”
  - “In terms of...?”
  - “In the context of...?”
  - “As compared or contrasted to...?”
- Note that when you can answer the above challenges, you should be able to immediately answer:
  - *“What metrics would apply to it?”*
  - But most people are far more comfortable with: *“How can we know if we’re making progress toward it?”*

# “How To” Suggestions

- As the previous slide indicated, *begin by explicitly defining the goal and/or objective* the metric is to support. Done well, the goal/objective should suggest the appropriate metric(s).
- If you’ve simply been handed a proposed metric, look at it critically. The *absolute first question* to ask is whether it *directly and explicitly supports* some identified or identifiable *goal or objective*. If the answer is yes, continue; if no, discard it or set it aside for consideration as supportive of other goals or objectives.

# Suggestions (cont'd)

- Further examine the proposed metric. See if it is in fact itself stated as an objective and if so, see if there may be a solid metric *buried within* the statement.
- Next ask HM? If you can't see an answer, or if it's binary, try to restate it as an objective. Ask HWYK? If you can't see an answer, try to restate it as a goal. Now ask HMP? If you still can't see an answer, you've probably got someone's bumper sticker. Pitch it.

# Suggestions (cont'd)

- Now, if you were able to give positive answers to HM/HWYK/HMP, you've got a promising Indicator of Success or metric.
- IMBTL? Or, ILBTM? You *must* be able to definitively answer “Yes!” to one or the other, and defend your answer.
- Next ask “HCD?” If you can give a reasonable answer, time to move it to Metrics 201!

# But What If...

- ...your enterprise or decision environment seems impossible for the definition of metrics, or even for a specific definition of “success” or “victory?” E.g., consider:
  - Global War on Terror
  - Information Operations
  - Irregular Warfare
  - “Victory” in Iraq

# The Universal Metric-Discovering Algorithm

- Ask the SME(s), “If your war, enterprise, process, whatever, is successful – *without trying to define what “successful” means* – what would you expect to *observe* in your target future environment that would be different from today?”
- May need to parse really complex environments to enable answers; e.g., by the PMESII elements.
- Should find that each “difference” readily and naturally translates into one or more metrics.