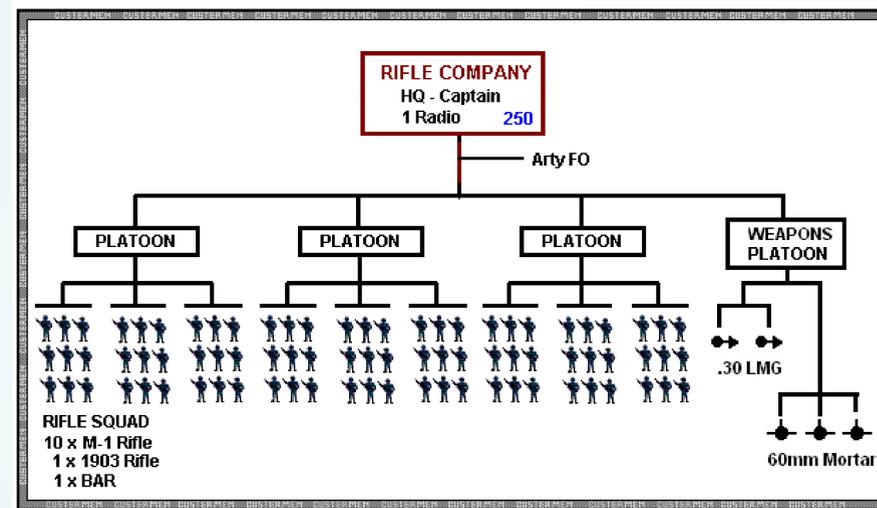


# A Quality Control Approach to Army Unit Readiness

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## Abstract

This research examines the current United States Army unit readiness methodology and proposes a quality control approach for readiness assessment. The Army utilizes four metrics when determining overall readiness scores per unit: personnel (P), equipment and supplies on hand (S), equipment serviceability (R), and training (T). While these categories are assessed in a very objective manner with specific guidance for reporting a particular score, unit commanders have liberty to upgrade or downgrade these evaluations based on extenuating circumstances, which may lead to subjective modifications. We employ desirability functions from quality control theory to measure readiness with the goal of eliminating subjective upgrades and downgrades. We use simulation to evaluate potential parameters for the PSRT quality functions and propose a framework, which can be extended across the service branches, to evaluate readiness more dynamically, accurately, and holistically. This is joint work with COL Paul Goethals of the United States Military Academy.



Index	Sub-Categories	Focus Area	Rating Level			
			1	2	3	4
P	Personnel	Available Strength	90-100%	80-89%	70-79%	≤ 69%
		Available MOS Qualified Strength	85-100%	75-84%	65-74%	≤ 64%
		Available Senior Grade Strength	85-100%	75-84%	65-74%	≤ 64%
		Composite Senior Grade Level	≤ 1.54	1.55 – 2.44	2.45 – 3.34	≥ 3.35
S	Equipment On-Hand	ERC A/P Items On-Hand	90-100%	80-90%	60-79%	< 60%
R	Equipment Serviceability	Fully Mission Capable Equipment	90-100%	70-89%	60-69%	< 60%
T	Training	Mission Essential Tasks Trained	85-100% (no untrained tasks)	70-84% (no untrained tasks)	55-69%	< 55%

## Simulation

- Our Mathematica code runs a simulation to test various illustrative readiness scenarios and evaluate desirability functions.
- Utility-based approach that measures value of a component via function parameters
  - Widely used and popular due to simplicity
  - Involves transforming each response  $y$  into a specific desirability value from 0 to 1
  - Weighted geometric mean of desirability values is used to find composite desirability value  $D$
  - Can manipulate to minimize or maximize responses in order to achieve a target value
  - Priority established by obtaining each target value
  - Desirability values of 1 are most desirable; values of 0 are least desirable

## Conclusion

Desirability functions can be used to assess the actual readiness of a unit by using a more holistic approach. Essentially this is an implementation of quality control metrics with the measurements to ensure more purposeful ratings and minimize inaccuracy. The geometric mean aggregates responses into a readiness index value that may be used to provide an assessment of an Army unit's preparedness.