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30 AUG 2015

Measurement Space Drill Support

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14. ABSTRACT

This document provides the plan, execution and recommendations for TRAC-MTRY's participation in as many TRAC Measurement Space (MS) Drill events as possible from August of 2014 through February, 2015. TRAC-MTRY developed a plan for support, receiving specific guidance from the TRAC Board of Directors (BOD), executed the MS Drill support, observed trends and made recommendations for future events.

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Measurement Space Drill Support
Chapter 1
Introduction

Overview

This document provides the plan, execution and recommendations for TRAC-MTRY's participation in as many TRAC Measurement Space (MS) Drill events as possible from August of 2014 through February, 2015. TRAC-MTRY developed a plan for support, receiving specific guidance from the TRAC Board of Directors (BOD), executed the MS Drill support, observed trends and made recommendations for future events.

Background

During the May 2014 BOD meeting in Monterey, CA, TRAC-MTRY was charged with figuring out how to integrate past and current TRAC-MTRY research into current and future TRAC studies. The BOD recommended the best forum would be the MS Drill events held near the beginning of a study time line. The MS Drill was identified because during these events the tools, methods, and techniques for evaluating the differentiating attributes are discussed between the stakeholders, study team, and other key personnel. For more information on MS Drills, see **COBP**[1]. In order to facilitate the research integration, a TRAC-MTRY analyst should be present. These allows the analyst to gain a greater understanding of the study knowing the problems, possible solutions and conditions of the study. The TRAC-MTRY analyst is required to have a historical understanding of the different research that has been completed or is in the process by not only TRAC-MTRY but the other TRAC centers. The participating analysts should also be the same for the duration of this project in order to identify common trends or make recommendations for the future execution of MS Drills.

Problem Statement

Integrating TRAC research at a pivotal point in the TRAC studies/projects life-cycle through a TRAC-MTRY analyst participation at the measurement space drill; with an effort to helping the process and offering suggestions where research has been made in applicable areas.

[1].

Issues for Analysis

Issue 1: What is an effective way to integrate research into current studies?

EEA 1.1: Participate as a contributing members/ participants at the measurement space event?

EEA 1.2: Act as a conduit between current and past research that could potentially support the study?

Issue 2: What are current trends across all TRAC centers when conducting MS Drill events?

EEA 2.1: Participate in as many different types of study MS Drill with different center leads?

Constraints, Limitations, and Assumptions

- Constraints
  - Must be complet NLT June 2015.
  - Brief BOD on emerging results NLT April 2015.
- Limitations
  - Only one dedicated analyst available for MS Drills during Fall 2014.
  - Participate in only funded study MS Drills.
- Assumptions
  - TRAC-MTRY is notified by other centers when MS Drills occur.

Constraints limit the project team's options to conduct the research. Limitations are a project team's inabilities to investigate issues within the sponsor's bounds. Assumptions are research-specific statements that are taken as true in the absence of facts.

Technical Approach

Participate in as many measurement space drills as feasible to act:

1. as a contributing members/ participants at the measurement space event.
2. as a conduit between current and past research that could potentially support the study.
3. Document the lessons learned with recommendations to a sustainable effort.

4. Identify common trends across all of the TRAC centers.

Steps one and two are covered in detail in Chapter 2, while step three is addressed in Chapter 3. Step 4 is explained in Chapter 4 which concludes this report.

Timeline

Aug 2014	Begin measurement space support.
Feb 2015	Mid-project review.
Apr 2015	Final out-brief and write report.

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Chapter 2
MS Drill Events and Participation

In this chapter, we will cover the logistical execution of the MS Drill in the first section (2) followed by a discussion of the specific studies supported during this effort (2.

Logistics of Execution

Notification by Center

There were three primary ways of notification about an upcoming MS Drill:

- Through Center established Point of Contact (POC).
- Directly contacted TEDS listed study POC.
- Word of mouth.

The center established POC for the MS Drill was the official notification received once an event was being planned at a center and their logistics were being coordinated. This method was more effective at centers with a robust operations section in which center calendars and drill support was coordinated.

The lead TRAC-MTRY analyst contacted the listed study POC when a project code was established within TEDS. Often times this would be the study deputy/XO. Project codes are usually established even before a study is confirmed as a planned project so often times it would be identified that an MS drill is likely to occur but when it would occur depended on final study approval. This process was good for establishing initial contact and letting the study team know TRAC-MTRY was available as part of the team but did not prove fruitful in identifying the MS Drill event.

Once the project was established and TRAC-MTRY was present at several events, study teams passed on information they knew within TRAC or other studies they knew were executing MS Drills. This helped with the receptiveness amongst the study teams and the ease of understanding the purpose of TRAC-MTRY participation. Through word of mouth, the TRAC-MTRY analyst is contacted by a study team even prior to having a project code. This method helps to inculcate TRAC-MTRY analyst participation as part of the fabric of a study MS Drill.

Funding

If travel was necessary, there were two ways in which an analyst was funded. First consideration for funding was funding by study lead through Cross-organizational Line Of Accounting (LOA) with study funds (reimbursable). As a secondary effort, the TRAC-MTRY Director committed TRAC-MTRY mission funds if there were no study funding available and it was a priority study.

The analyst time (hours) supporting the different studies were accounted for through TRAC Employee Data Site (TEDS) for each individual project code. The only time against the MS Drill support project code was time spent specifically working on this project such as BOD briefings or the writing of this report.

Support by Analyst

A TRAC-MTRY analyst participated in MS Drills in various ways to include in person through Temporary Duty (TDY) travel, teleconference or emails pre/post events. The role of the analyst varied from recorder to active participant as part of the analyst team to Subject Matter Expert (SME) conduit. The participation level at each drill varied. The contributing factors to the role of the MTRY analyst present were the number of TRAC participants, the size of the study, the size of the MS Drill event, and the facilitator leading the drill. Not all MS Drill support was identical nor is it plausible that it could be identical in the future.

MS Drill Participation

In this section, we detail the different types of studies/projects in which TRAC-MTRY participated by center. In Figure 1 an aggregate list of drills participated in organized by center and TEDS project type code.

The current TEDS project codes are listed if Figure 2. One finding through examining current projects and recent studies/projects within TRAC was the project code system should be updated to reflect the type of analysis TRAC conducts. See Appendix D for recommendations and analysis.

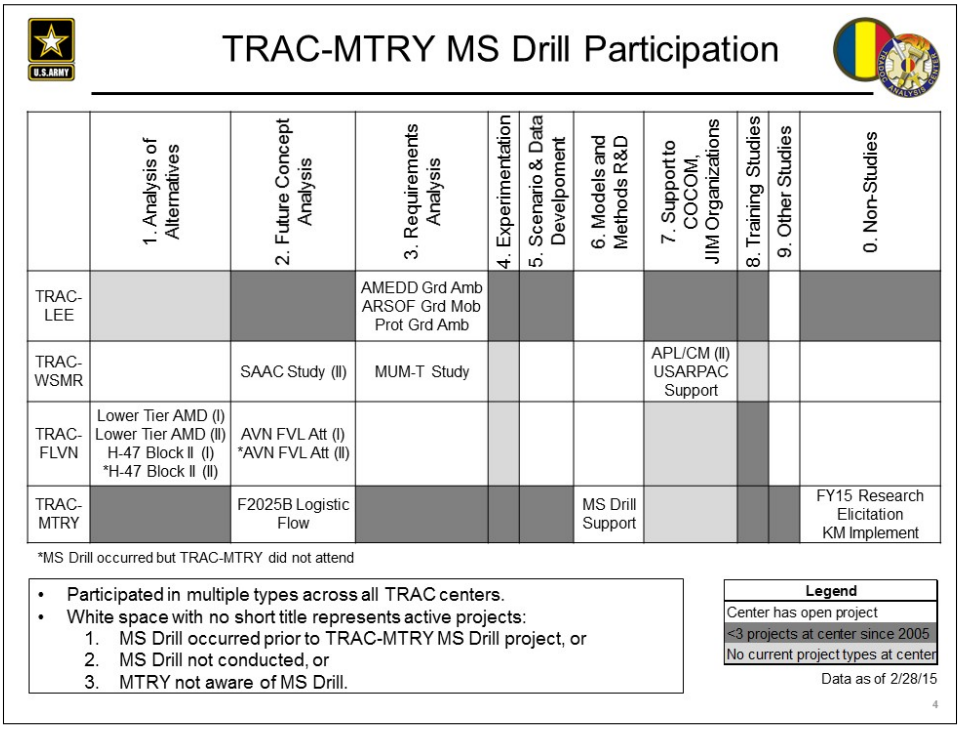

Figure 1. Aggregate roll-up of MS Drill participation

TEDS Current Code and Title	
0	Non-Studies
1	Analysis of Alternatives
2	Future Concept Analysis
3	Requirements Analysis
4	Experimentation
5	Scenario Development & Data Development
6	Models and Methods R&D
7	Support to Combatant Commanders, Joint, Interagency, and Multinational Organizations
8	Training Studies
9	Other Studies

Figure 2. Current TEDS Project Codes

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Chapter 3
Observed MS Drill Flow of Events

Observations from participating in MS drills during a condensed period of time from August 2014 through February 2015 are compiled in the chapter to reflect the general flow of a MS Drill. The event is described in three sections in this chapter, the pre-event activities 3, the event execution 3, and the post-event activities 3. In no way is this intended as a prescription for an MS Drill but intended as a general description of what was observed during this period of time. It is accepted that each MS Drill is unique it its occurrence much like every river is different but the flow of the Drills followed some of the same patterns much like the flow of water has certain properties.

Pre-event Activities

Prior to an MS Drill execution, there are many pre-activities. Certain tasks are inherent to hosting any workshop and are covered briefly, though not exhaustively, followed by specific tasks associated with the MS Drill. Some tasks in which the host of the workshop should complete include:

- Coordinate for a location at the host site if the MS Drill is a live event. The location should be:
  - appropriate for the anticipated audience, having a room too large or small both can detract from the participation.
  - approved for the security clearance required of the workshop.
  - equipped with the level of technology necessary such as projectors, white boards, etc.
- Complete the list of invited attendees to include the stakeholders, TRAC analysts, sponsors, and other personnel specific to the study.
- Decide who will fund the travel, if necessary of each invitee. In some cases, each attendee must be considered independently for funding.
- Decide the length of the workshop.
- Set goals of items that need to be completed while everyone is present and establish the timeline that will support those goals.

Again, the list for workshop preparation is not exhaustive but highlights some of the logistical concerns of hosting a workshop. For further information and more detailed lists see the TRAC-Analyst Development Program (ADP) on workshops. Each TRAC-center operations directorate also maintains a list for hosting workshops in general.

Some specific tasks for MS Drill event preparation are:

- completing the agenda to ensure expectations of the workshop are articulated.
- hosting pre-workshop discussions with the analyst team, either in person or telephonic if the team is distributed.
- notifying participants of the schedule MS Drill and why they are invited at least thirty days prior to allow for reaction time.
- creating templates of a problem statement, alternatives, attributes and anything else the workshop will address so the participants can have a warm start when the discussion begins. This particular step is helpful for the stakeholders and sponsors who are less familiar with the process.
- assigning seating arrangements which can facilitate discussions. Knowing certain personalities or organizations help with arranging the seats and assigning where the participants sit help with the facilitation.
- identify key roles to be fulfilled such as the facilitator, note taker, time keeper, etc., of the workshop from the analyst team.

From the tasks listed, the two most critical are the notification and identification of key roles. When the workshop does not have the right participants or an incomplete team, it renders it useless.

Event Execution

The majority of the MS Drill events are generally the first in-person meeting of stakeholders, sponsors, and analysts for this specific study. This is the time for the study team to scope the problem and identify any issues early in the study process. Having everyone present allows for clearly defining the way ahead and what roles each participate will fulfill.

In this section, the execution and flow of the event is discussed. Again, this is the general flow of events and not prescriptive of how and event should be run. This also considers the case in which the event is a live hosted MS Drill with most participants present.

The flow of workshops from beginning to end generally followed this in the order presented below.

1. Welcome brief with the agenda for the workshop, the logistics of the workshop, and any other administrative concerns.
2. Discussion of alternatives being considered presented by stakeholders/sponsors to the participants.
3. A descriptive presentation of what a measurement space drill is to include the terms of reference and goals for the week.
4. Scenarios and enemy situation in which the alternatives will be compared usually presented by TRISA and/or the appropriate scenario development division within TRAC.
5. The problem statement is either composed or restated.
6. The study issues and essential elements are created or re-examined.
7. Discussion of which attributes the study should consider followed by identifying which attributes are differentiable between the alternatives and how to measure the attribute.
8. When time allowed, the tools, methods, and techniques (TMT) to model the analysis for attribute measures are identified and data requirements assigned.

The majority of the workshops usually ended by step seven or cut other steps short in order to begin a cursory conversation about step eight due to time constraints. The size of the workshop also influenced the amount of time needed for each step.

Post-event Activities

Following the MS Drill workshops, the majority of the analyst team discussed the appropriate TMT and attributes identified. This is when the team starts to begin the analytic approach in collecting data and providing structure to the study. This was usually done in person at the host center and informally by the team. The study lead, or designated analyst, also follows up with anyone who had a task assigned to them during the workshop.

The period immediately following the MS Drill workshop is the springboard inn which the trajectory of the study is decided. It is important to include all analyst that were present for the MS Drill in the discussions. Along with the discussion on approaches, the data requirements are modified and passed to the appropriate agency.

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Chapter 4
Findings and Conclusion

In this chapter the findings of this project are documented, 4. For simplicity and ease of reference, we use the format of issue, discussion, and recommendation. The chapter and report concludes in section 4.

Findings

Issue: Facilitator Training

Discussion: From workshop to workshop, there was a wide disparity among the facilitators approach and ability. The variance of the facilitation was attributed to the experience level of the facilitator. The more experienced facilitators drove discussion and kept the group on topic running an efficient workshop. If a facilitator was inexperienced the discussions often went of topic and the workshop would be side-tracked ultimately coming short of the goals in which they set out to complete.

Recommendation: Offer facilitator training for analysts expected to lead workshops. Methods of implementing the training are through the ADP or an addition of a short course offered to the community as a whole. The short course would allow for refresher training or specifics for facilitation for mid to upper level analysts.

Issue: No uniform notification method of MS Drill event

Discussion: There is a calendar within the CoBP SharePoint portal but it is not updated or maintained. The center Ops are notified if they are hosting the event since a facility has to be coordinated. The Travel section is notified if analysts are traveling for the event. All of these are loosely coordinated through ad hoc channels with no congruent method. If there were a formalized MS Drill event notification then visibility of the events would be raised, allowing for more input from leadership within TRAC. It would also allow the research community to understand what the current needs of TRAC analysts are.

Recommendation: It is recommended that the center operations office within TRAC maintain the SharePoint calendar with upcoming MS drills and notify other centers when they are occurring.

Issue: No formalized center MS Drill SME

Discussion: The purpose of the MS Drill SME is to maintain current practices within TRAC, coordinate the MS drill across that center and help with the training of new analysts or study leads on how to conduct an MS drill. There is already informal mentoring for conducting MS drills but establishing center SME's would codify the process.

Recommendation: Institute an additional duty of assigning an MS Drill SME at each center.

Issue: Only one prescribed format to conduct MS Drill in current published CoBP

Discussion: Critical events which must be completed as part of the MS Drill process should be identified for studies that cannot host a week long MS Drill. Although there is danger in creating an abbreviated version because most studies are short on time and would gravitate to this version, it is necessary. The discriminating attribute for whether an abbreviated or deliberate MS drill should be conducted is whether the study is funded or not. There were multiple times a study was not funded in which a MS drill was conducted through informal interviews or discussions. Having references for these analysts within the CoBP would ensure the key functions of an MS drill are performed.

Recommendation: Develop an addition to the MS Drill CoBP which includes both abbreviated and deliberate MS drills.

Conclusion

During this project, We participated in multiple styles of MS Drill events across all centers, with some being led by a TRAC analyst and others led by outside organizations with TRAC analysts present. We have captured the common observations in hopes of improving the MS Drill events in the future.

This project is the continuation of discussions surrounding the conduct of MS Drills and is in no way the conclusion of this conversation among analyst. This is a catalyst for ways in which the process can be improved to serve the leaders in which the analysis is conducted.

Appendix A
MS Drill Quad Chart

Measurement Space Drill Support

Problem Statement:
Integrating TRAC research at a pivotal point in the TRAC studies/projects lifecycle through a TRAC-MTRY analyst participation at the measurement space drill; with an effort to helping the process and offering suggestions where research has been made in applicable areas.

Sponsor: TRAC-MRO.

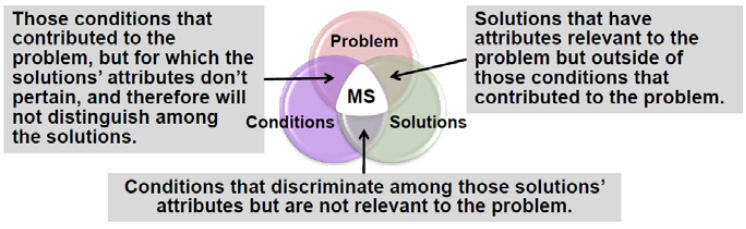
Stakeholders: TRAC-WSMR, TRAC-LEE, TRAC-FLVN, TRAC-MTRY.

Technical Approach:

- Participate in as many measurement space drills as feasible to act:
  - as a contributing members/ participants at the measurement space event.
  - as a conduit between current and past research that could potentially support the study.
- Document the lessons learned with recommendations to a sustainable effort.

Measurement Space Thinking

1. What is the problem?
2. What conditions in the operational environment contributed to the problem in the first place?
3. What is it about the solutions that promises to remedy the problem?
4. Are the attributes that differentiate the potential solutions going to reveal themselves under the conditions most relevant to the problem?
5. Are those conditions prevalent enough in the operational environment to justify revealing (through analysis) the benefits that discriminate among the solutions?



Key Project Dates:

12 Aug 2014	**Begin measurement space support.**
15 Jan 2015	**Mid-project review.**
15 Jun 2015	**Final out-brief and write report.**

Deliverables:

- **Research integration into the study process.**
- **Present study needs to the research community.**
- **Document TRAC's measurement space drills lessons learned over the course of 10 months.**
- **Document applicable research into the study process.**

Appendix B
Briefing to the BOD April 2015

TRAC-MTRY Measurement Space Drill Support

Project Code 060122

Project brief to the TRAC-BOD

14 April 2015

Purpose and Agenda

Purpose: Provide an update of TRAC-MTRY's Measurement Space (MS) drill support from Aug 14 through Feb 15 and provide recommendations for future participation.

Agenda:

- Execution of MS Drill Support
- TRAC-MTRY MS Drill Participation.
- MS Drill Trends Observed.
- Continued MTRY MS Drill Support.

Execution of MS Drill Support

- Notification of MS Drills.
  - Through Center established POCs.
  - Directly contacted TEDS listed study POC.
  - Word of mouth.

- Funding (if TDY required).
  - Project funded by study lead through Cross-org LOA.
  - Mission funded from TRAC-MTRY if no project funding.

- Support
  - Attended MS Drill events in person (TDY).
  - Teleconferenced and emailed for pre/post-MS Drills.
  - Not all MS Drill support was identical

TRAC-MTRY MS Drill Participation

	1. Analysis of Alternatives	2. Future Concept Analysis	3. Requirements Analysis	4. Experimentation	5. Scenario & Data Develpoment	6. Models and Methods R&D	7. Support to COCOM, JIM Organizations	8. Training Studies	9. Other Studies	0. Non-Studies
TRAC-LEE			AMEDD Grd Amb ARSOF Grd Mob Prot Grd Amb							
TRAC-WSMR		SAAC Study (II)	MUM-T Study				APL/CM (II) USARPAC Support			
TRAC-FLVN	Lower Tier AMD (I) Lower Tier AMD (II) H-47 Block II (I) *H-47 Block II (II)	AVN FVL Att (I) *AVN FVL Att (II)								
TRAC-MTRY		F2025B Logistic Flow				MS Drill Support				FY15 Research Elicitation KM Implement

*MS Drill occurred but TRAC-MTRY did not attend

- Participated in multiple types across all TRAC centers.
- White space with no short title represents active projects:
  1. MS Drill occurred prior to TRAC-MTRY MS Drill project, or
  2. MS Drill not conducted, or
  3. MTRY not aware of MS Drill.

Legend
Center has open project
<3 projects at center since 2005
No current project types at center

Data as of 2/28/15

4

MS Drill Trends Observed

BLUF: Each drill was different in topic yet organized with the framework established by the MS Community of Best Practice (CoBP).

- Flow of the workshops.
  - First in-person meeting of stakeholders/sponsors/analysts.
  - Stakeholder shaping meeting.
  - Did not thoroughly identify or discuss the tools, methods, and techniques (TMT) for analysis during formal workshop
  - Analyst team identifies TMT post-event (Exception when two drills conducted).
- Facilitation Techniques.
  - Varied by experience.
  - Do not teleconference, if at all possible.
  - Collaborated with Workshop lead, Amy McGrath, for the Analyst Development Program (ADP) for MS drill input.
- Initial Findings
  - Recommend improved facilitator training. (ADP, Short Course, etc.)
  - MS Drill SME at each center.
  - Develop abbreviated and deliberate MS drills. (Addition to CoBP)
  - Formalize MS Drill event notification. (Through Ops channels)

Note: Technical Report expected to be published by May 2015 with more detail

Continued MTRY MS Drill Support

Figure out how to integrate past and current TRAC-MTRY research into current and future TRAC studies – Paraphrased from May 14 BOD

MS Drill Support Project

1. MS Drills are where the tools and techniques for analysis are identified.
2. TRAC-MTRY will participate in as many MS drills as feasible within a defined timeline.

Enduring MS Drill Support

1. Recommend TRAC-MTRY participate in the formal MS Drill and the analysts discussion following the drill.
2. Recommend TRAC studies be identified through TRAC-MTRY engagement officer during monthly Ops meeting.
3. Recommend TRAC-MTRY participate in 0-2 MS Drills per month across all centers, prioritized through collaborative efforts.

Discussion and Questions

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Appendix C
Sample Measurement Space Introduction briefing

Study Name

Measurement Space Introduction

Audience

XX XXX 2014

MS Overview

<u>Measurement space</u> is the set of operating conditions, when adequately accounted for in analysis methods, that will most likely distinguish between two or more alternatives.

- The measurement space concept is a way to think about the problem and how best to analyze it; it is not meant to be rigid, prescriptive or formulistic.
- The systematic consideration of measurement space focuses the analyst to "*think first, before doing anything else.*"
- Measurement space development offers a valuable way to collaborate and reach shared understanding among:
  - Analysts, Modelers, Scenario Developers, Warfighters, System Engineers/Developers, and Acquisition Managers.
- Measurement space influences study methodology and informs scenarios, methods, models, and tools (MMT), and data requirements.

Terms of Reference

- **Tipping Point Issue:** The principal issue or question faced by the decision maker that when answered, causes him/her to select a particular course-of-action over another. (MS Code of Best Practices (CoBP))
- **Attribute:** A quantitative or qualitative characteristic of an element or its actions. (CJCSI 3170.01G, JCIDS, 1 Mar 09). In MS, it pertains to a course-of-action or solution.
- **Alternative:** A potential DOTMLPF solution to the problem.
- **Operational Impact:** A hypothesis of the expected benefit(s) or detriment(s) the attribute brings to the commander.
- **Measure:** A criterion used to assess changes in system behavior, capability, or operation environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect. (JP 3-0)
- **Method:** A systematic procedure, [analytic] technique, or mode of inquiry employed y or proper to a particular discipline or art. (MS CoBP)
- **Model:** A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. (AR 5-11, 1 Feb 05)
- **Tool:** Something (as an instrument or apparatus) used in performing an operation or necessary in the practice of a vocation or profession. (MS CoBP)
- **Operational Scenario:** A graphic and narrative description of the operational variables, political, military, economic, social, information, infrastructure plus physical environment and time; it concerns events of a future hypothetical operation. (TRADOC Reg 71-4)

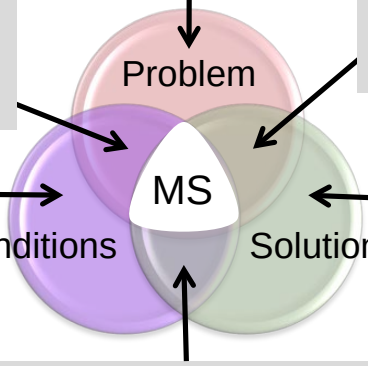
Approaching Measurement Space

1. What is the problem?
2. What conditions in the environment contributed to the problem in the first place?
3. What is it about the solutions that promises to remedy the problem?
4. Are the attributes that differentiate the potential solutions going to reveal themselves under the conditions most relevant to the problem?
5. Are those conditions prevalent enough in the operational environment to justify revealing (through analysis) the benefits that discriminate among the solutions?

Problem: A deficiency or need that must be solved.

Those conditions that contributed to the problem, but for which the solutions' attributes don't pertain, and therefore will not distinguish among the solutions.

Solutions that have attributes relevant to the problem but outside of those conditions that contributed to the problem.



Conditions: Capability of the threat, characteristic of the physical environment, or another effecter.

Solutions: DOTMLPF changes that solve the problem.

Conditions that discriminate among those solutions' attributes but are not relevant to the problem.

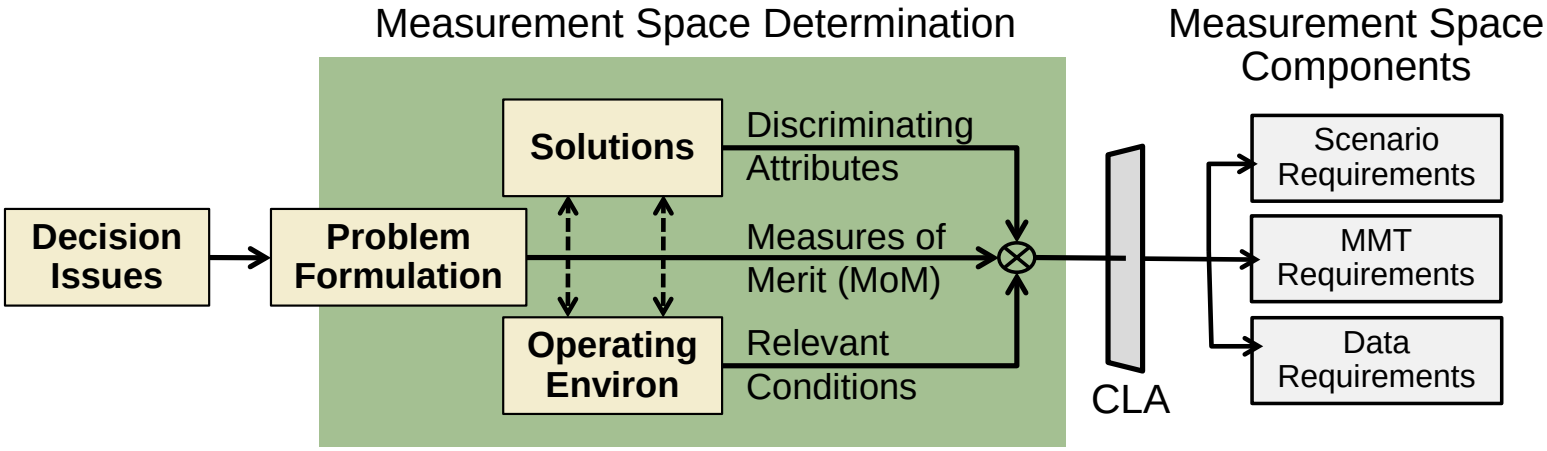
Problem Statement

- **A solid problem statement should be developed prior to the workshop and should be a study team effort. It should follow the below guidelines:**
- **Concise.** The essence of your problem needs to be condensed down to one or two sentence(s). The problem statement should be easily understood by someone not intimately involved with the study.
- **Specific.** The problem statement should focus your thinking, research, and solutions toward a single issue.
- **Measurable.** Problems can be measured in terms of degree and frequency. The strongest problem statements incorporate measurable aspects of both the degree and frequency of the problem as it exists.
- **Impact.** The problem statement should identify the population affected by the problem.

Once you identify your problem, the problem statement should be a pithy, focused summary of the relevant details that allows a decision maker to quickly assess if the study is addressing the relevant issues and communicate to those outside the team the intent of the effort.

Measurement Space Determination

- Measurement space identifies the analytic intersection of the problem, the attributes of potential solution(s), and the operational conditions that contribute to the problem.
- This intersection is the space where the distinguishing attributes of the solution(s) will most likely reveal themselves in operationally relevant ways that can be measured by the analysis methodology.



- Establishing the measurement space informs the methodology requirements for the definition of the operational context (e.g., scenarios/ vignettes), the functionality/features of MMT, and the types of data.

MMT- Methods, Models, Tools
CLA - Constraints, Limitations, Assumptions

Incorporating Workshop Products in Analysis

- The conclusion of a MS workshop does not mean that MS is completed for a study.
- The results of the workshop drive the study methodology as well as the potential
  - Scenario(s) selection.
  - Data requirements.
  - Methods, models, and tools utilized.
- The scenario representatives will identify the scenarios that contain the desired conditions (physical environment, threat capabilities and blue missions).
- The data representative determines what data will be needed from other organizations based on the measures and attributes discussed in the workshop and the requirements of the anticipated MMT.
- The MMT leads will determine if a model is necessary to answer the problem and if so, what model best meets the requirements based on the measures and attributes discussed in the workshop. This includes combat, sustainment, risk, trades as well as performance modeling.

Summary

- MS is not “easy”; it requires an in-depth understanding of the subject and collaboration amongst a wide range of disciplines. Everyone must contribute and share their knowledge with the group.
- Understanding the problem, its related conditions, and potential solutions, as well as participation of the correct attendees, are critical to a successful MS workshop.
- The results of the workshop will influence the study methodology as well as the potential models and tools utilized, data requirements, and the scenario selection (and/or vignettes developed).
- A thorough MS workshop improves the quality of the analysis through better up-front planning and more efficient resource utilization.

Example

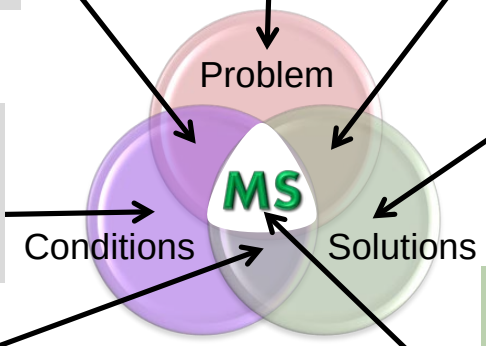
MS Practical Example

- Initial problem statement: I'm thirsty on my way to work.
- Revised problem statement: I would like to carry and drink a warm beverage on my daily one hour drive to work without spending a lot of money.

Those conditions that contributed to the problem, but may not impact the alternatives. *All traffic conditions, all weather conditions, all road conditions.*

Problem: *low cost, portable drink, warm beverage, during a one hour drive (in my car).*

Solutions related to the problem that may not address the conditions: *Go to coffee shop, buy a car hot water/coffee maker, coffee cup, thermos.*



All possible conditions: *all weather; all traffic, all speeds; all road conditions, all locations, e.g., on the moon, under water, on a boat.*

All possible solutions: *coffee mug, thermos, buy coffee, not go to work, buy a portable coffee pot, get a closer job, drink water, duct tape.*

Conditions that discriminate among those solutions' attributes but may not be relevant to the problem. *Cold weather, traffic accident, can be held, spill coffee when tipped over, on a boat.*

The nexus of what distinguishes the alternatives and the conditions representative of use that may differentiate alternatives and address aspects of the problem. *Cold weather, in a car, speeds (start and stop), bumper-to-bumper traffic, rough road conditions, coffee mug, thermos*

MS Practical Example

- Initial problem statement: I'm thirsty on my way to work.
- Revised problem statement: I started a new job with a longer commute and I would like to carry and drink a warm beverage on my one hour commute to work everyday.
- Possible alternatives:
  - Coffee mug.
  - Insulated coffee mug.
  - Thermos.
  - Coffee shop.

Attributes	Operational Impact	Measures	Conditions					
			Environment	Mission	Threat	Friendly	Echelon	Time
Capacity, Commute time, temperature, aesthetics, safety, etc.	Unable to enjoy beverage for entire commute. Causes additional stops on commute. Unable to fit in cup holder.	Ounces Size of cup holder Shape of cup	Winter	Commute to work.	Co-drinker, gloves, "shaky" hands.	Car, Cupholder	Individual	One hour

Unclassified

MS Practical Exercise (AAS)

- Initial problem statement: The current reconnaissance platform has significant operational limitations.
- Revised problem statement: OH-58D suffers from the following obsolescence issues: limited capacity to upgrade, severe operating limitations in high, hot environments, does not have the speed, range, and endurance to fully support the full range of Army operations.
- Possible alternatives:
  - Upgrade current platform.
  - Repurpose existing airframes.
  - Pursue a new start system.

Attributes	Impact Statement	Measures	Operational Conditions (METT-TC)					
			Environment	Mission	Threat	Friendly Ground	AAS Echelon	Time
Performance (Speed, range, endurance, power margin)	Provides the commander with greater situational awareness of an AO and reduced reaction time and maneuver space. Ensure that the commander does not have to use other AVN /ground assets to cover the area, freeing these assets to perform other missions and potentially enhancing the combat power/overall survivability for the DIV.	Continuous and Total On Station Time Teams required Total team flights required FARPs turns/FARPs required Number of teams required # Threat detected/ undetected # Friendly (main body) detections by threat # Blue losses Timeliness of ACQ/Report Unplanned engagements by threat Time to complete MSN Actionable spot reports Calls for fire Terrain coverage	High-Mountainous (rolling hills?) Hot-Desert Urban/Natural "Clutter" Wind Snow/Ice	Security (Screen)	AD threat (low alt, NOE) SAF threat (higher alt)	FARPs required (moving with ground unit) Moving to OBJ Ground screen	Troop, Squadron, CAB Support elements	24-36 hrs. for a TRP (or squadron)

Unclassified

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Appendix D
Recommendation to update the TEDS project types

Current project codes

After attending several MS drills, a trend in types of projects/studies of TRAC were analyzed using data within TEDS. The active studies are displayed by type in Figure D–1 and compared to the MS drill events attended by TRAC-MTRY.

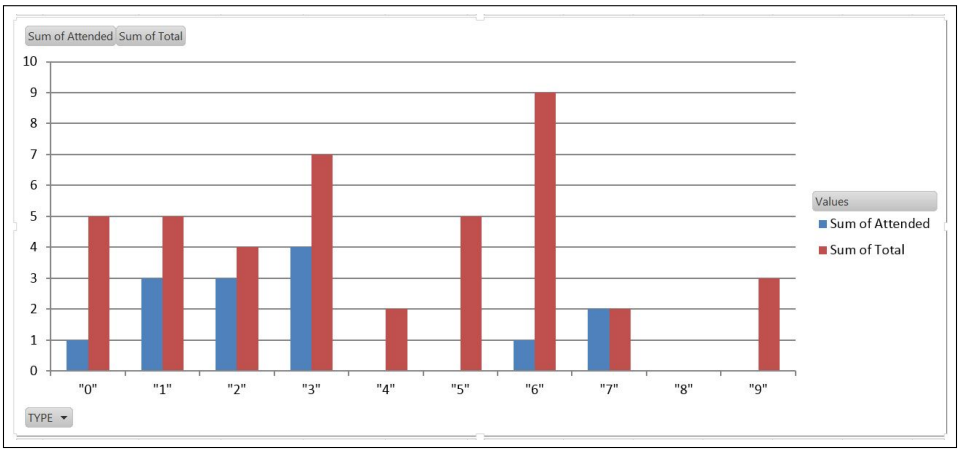

Figure D–1. Total active TRAC studies/projects in red and the studies/projects a TRAC-MTRY analyst participated between the dates of Aug 14 and Feb 15 in blue. Source: TEDS

Since this only accounts for current studies, we decided to look at studies completed within the last five years and found there was a trend of what types of studies TRAC is doing now. Missions of organizations change over time and the types of projects should reflect the mission of the organization. Figure D–2 displays the type of studies completed by center over the last five years. This demonstrates the lack of certain types of projects completed. For example there were no project type "8" completed.

Recommended changes

A recommended format for changing the project codes is presented in Figure D–3. This crosswalks the current codes with recommended updated codes and also displays the project types recommended for deletion.

An example using current projects on how to assign them to new types is presented in Figure

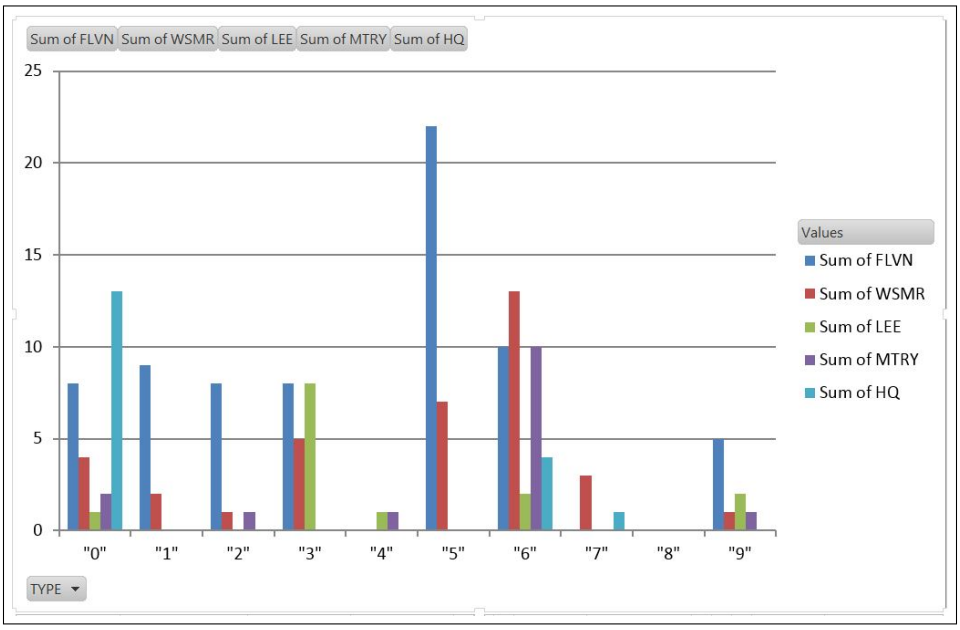

Figure D–2. Total studies TRAC has done from 2010 through 2015 binned by center. Source: TEDS

Crosswalk TEDS with recommended Project Code Type

New Title	Current Code and Title	
JCIDS Support	1	Analysis of Alternatives
	3	Requirements Analysis
Policy Support	7	Support to Combatant Commanders, Joint, Interagency, and Multinational Organizations
	9	Other Studies
Futures	2	Future Concept Analysis
Scenarios	5	Scenario Development & Data Develpoment
Research	6	Models and Methods R&D
Admin	0	Non-Studies
Delete	4	Experimentation
	8	Training Studies

Figure D–3. Recommended new study/project types cross-walked with current project types

D–4. These are the MS Drill events attended and categorized by the recommended change to project types.

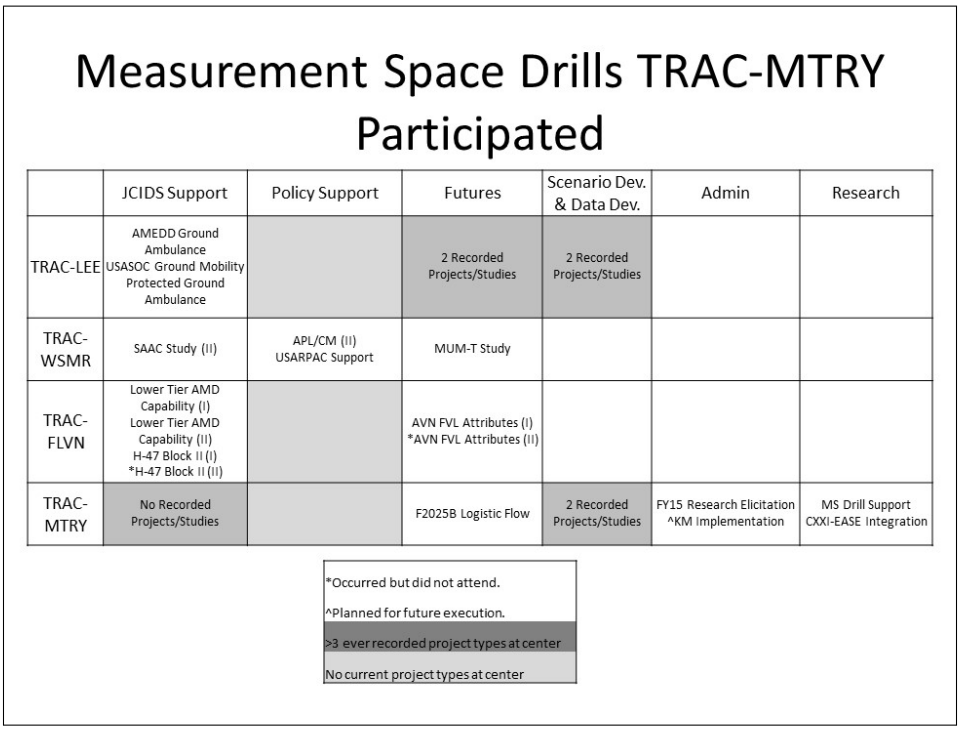

Figure D–4. New Classification of MS Drill events participated in by TRAC-MTRY analyst

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Appendix E
References

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Appendix F
Glossary

ADP	Analyst Development Program
BOD	Board of Directors
CoBP	Community of Best Practice
EEA	Essential Elements of Analysis
FLVN	Fort Leavenworth
FY	Fiscal Year
LEE	Fort Lee
LOA	Line of Accounting
MRO	Methods and Research Office
MS	Measurement Space
MTRY	Monterey
POC	Point of Contact
SME	Subject Matter Expert
TDY	Temporary Duty
TEDS	TRAC Employee Database Site
TMT	Tools, Methods, and Techniques
TRAC	Training and Doctrine Command Analysis Center
TRADOC	U.S. Army Training and Doctrine Command