
System Engineering Integration Contract (SEIC)



Organizational Metrics Measurement and Reporting Plan (MP)

Contract Number: FA8720-05-C-0005

CDRL Number: A007

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Record of Change

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Section 1 Introduction

1.1 Purpose and Scope

The purpose of this plan is to define and document the JMPS Organizational metrics process, provide an understanding to the overall vision of using metrics within the Enterprise as well as the methodology to be used for metrics collection and the use of the metrics for managing the program.

This plan describes organization-level (Enterprise) activities as well as metrics activities in projects (i.e., SEIC, MPEC's, SPO, etc) within the organization. Each area of the organization collects metrics at various levels based on the scoping and need of the metrics. The scope of this plan is on those metrics that are provided and used by the organization. The figure below shows that information / metric definitions are provided by the projects within the Enterprise and the Metrics plan uses/references these definitions to provide direction of the “standardized” measurements required by the Enterprise.

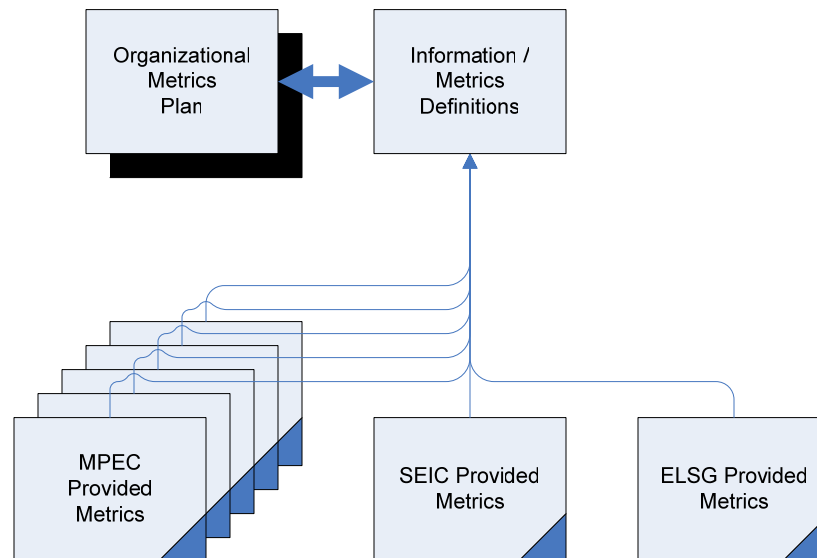


Fig 1: Organizational Metrics Layout

Note: the term organization is used to refer to all the elements which comprise the Enterprise. This includes (but not limited to) MPEC's, SEIC, and SPO.

1.2 Vision – or, what is the Organizational Measurement Program?

One aspect of the SEIC is to develop a plan for managing and controlling software analysis, design, and development, performance, and test efforts for the 951st Electronic Systems Group (ELSG) Mission Planning Enterprise (including FW, CCs, and UPC). This includes the collection of metrics associated with systems engineering and development across the Enterprise

and reporting the trends and status to the government on a routine basis. Analysis of the collected metrics shall include analysis of product (e.g., CC, UPC, FW, MPE) quality, supportability, and maintainability. This includes limited measurements on sustainment engineering activities. An organizational measurement program will be established and used to support the above activities.

In order to support a complete metrics program, informational needs which drive the planning, performance and analysis activities must be identified at the various levels of the Enterprise. As shown in figure 2, Management at the Enterprise level must define the key informational elements which will form the foundation of the analysis and monitoring program; significant deviation from identified goals and objectives will drive necessary corrective actions. These key informational elements of the Enterprise feed the project level measurement program, which combined with individual project level objectives, determine which common measurements will be collected. Note: ultimately a smaller subset (i.e., sub processes) of the project's processes which have been identified to be most significant for the success of the program will be placed under statistical process control to monitor and manage their stability.

As the informational needs are understood, common definitions of metrics and identification of core measurements can be collected within the following areas:

- Project Management
- Engineering (Requirements, Development, Integration, Testing, etc.)
- Support (Configuration Management, Quality Assurance, Assessments, etc)
Not this does not include Product support which is included within Engineering
- Process Management

Areas where informational needs can be (but not limited to) extracted from include:

- Current Management Practices: Examine how management of the Enterprise works and determine measurements that can improve efficiency of the management processes
- Requirements: Examine the progression from requirements thru deployment of product
- Program Risks: Examine historical and current risks of the organization.
- Overall Areas of Process Improvement: How well is the Enterprise and organizational processes being deployed and institutionalized?
- Schedule Performance: Examine schedule and product quality. Are schedules being developed that are realistic and useable; are products being developed and fielded against the schedule
- Quality Measurements: Examine the quality of products delivered from projects within the organization and fielded to the customer; Examine customer satisfaction with products being fielded. This includes measurements such as usability, reliability, etc.

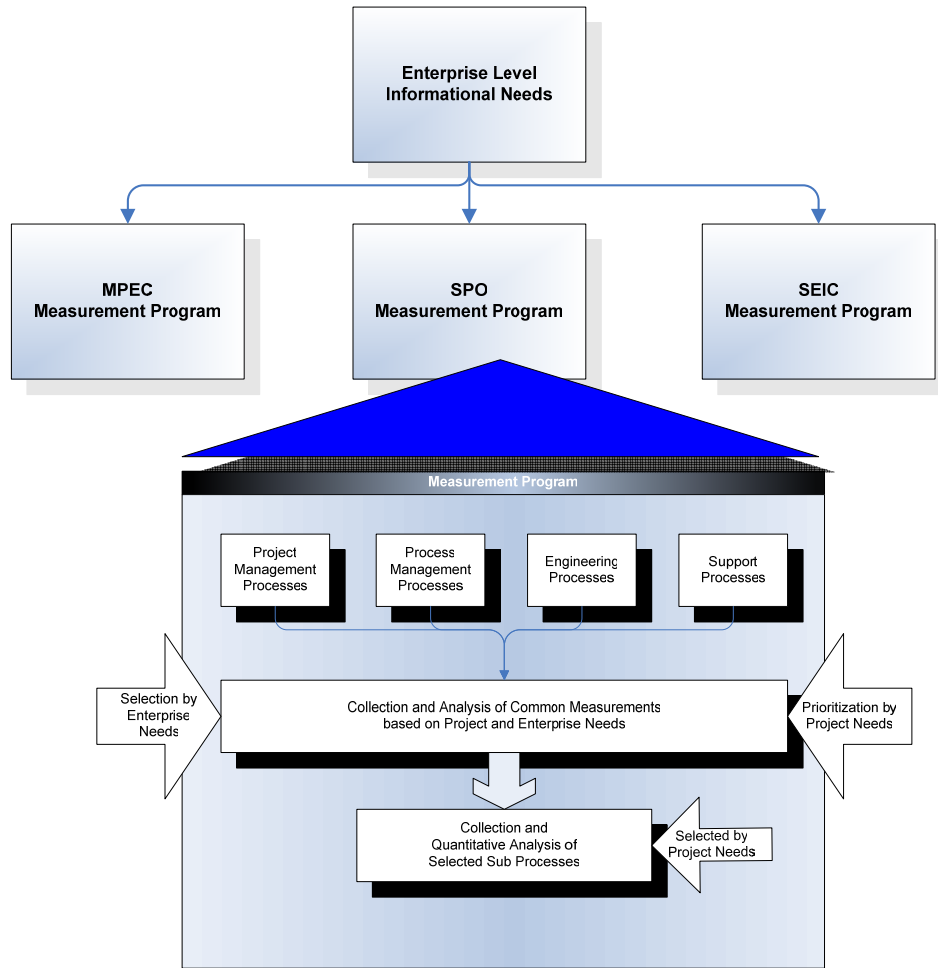


Fig 2: Relationships of Information Needs and Measurement Program

As the metrics are collected, analysis of the data is performed to determine the process and sub process capabilities and to identify/recommend corrective actions which are needed to bring process execution back into acceptable ranges. If it is identified that process changes are required outside the localized processes, recommendations of potential process improvements will be made to the Enterprise process group, whom will manage process improvements across the Enterprise.

Since common measurements are being collected throughout the Enterprise, Enterprise management will have the ability to determine how effective the various parts of the organization are performing and as needed, take corrective actions to return process execution to within acceptable ranges. Another benefit of the collection of the metrics is that an organizational metrics database (see section 9 for additional description on the database), containing historical measurements, will be created and can be used for future planning activities, providing input into predictive process models which are used to determine the effectiveness of suggested process improvement before process changes are implemented.

How will this be performed? The following activities need to occur to effectively implement an organizational measurement program (refer to section 9 Implementing Organizational Measurement Program for additional details):

- Define Informational needs at the various levels (see next section for additional detail); this includes both program and product needs.
- Identify currently defined common core metrics (define additional core metrics as needed) being collected within the organization.
- Identify and manage risks in implementing an organizational measurement program (see Section 7 on Risks implementing the Organizational Measurement program).
- Identify and provide resources to implement the program.
- Identify and provide training to those collecting the metrics, as well as, those using the metrics (analysis, reports, etc..)
- Identify where measurement data will be provided, how the data will be validated for correctness, where it will be stored and how and to whom access to reports will be provided.
- Identify and define involvement of relevant stakeholders of the metrics program; this includes identifying sponsorship for the organizational metrics program.
- Identify and define requirements for any tools required to support the metrics program; secondary is implementation of defined tools (either custom built or COTs).
- Pilot measurement collection, metrics analysis and reporting. Perform corrections as required from post-pilot analysis. (Additional information on the use of a pilot is provided in section 9).

1.2.1 Measurement Process and Informational Needs

As identified in the previous section, definition of the informational needs is a key element in implementing a successful measurement program. The process diagram below shows the measurement process as defined under ISO 15939. The information needs feed into the measurement plans (note: each area within the organization (ie., MPEC, SEIC, SPO, etc) must define their metrics to be collected and those which are common / shared with the Enterprise.). These plans need to identify what measurements will be collected and provided to the Enterprise (see section 6 for identification of common metrics to be provided)

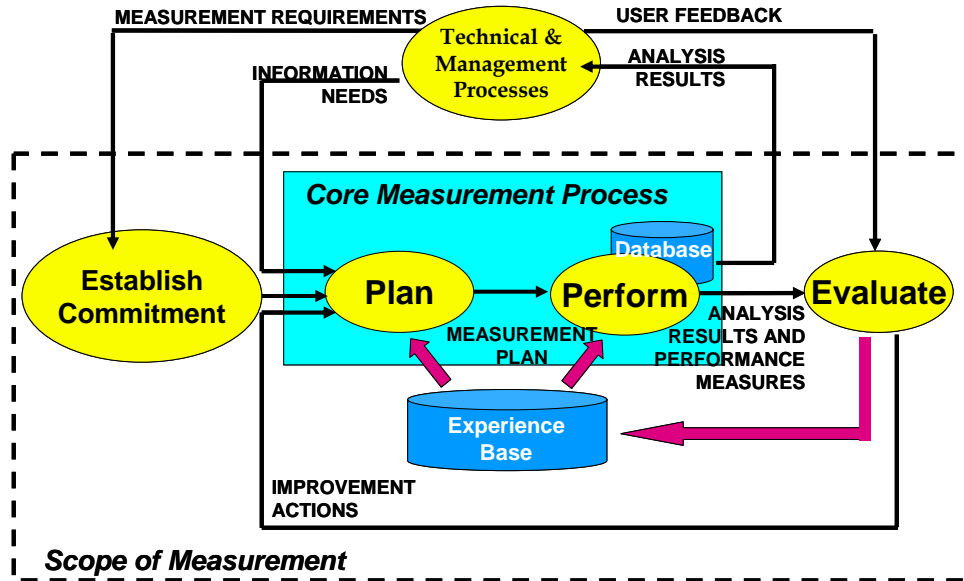


Fig 3: ISO 15929 Measurement Process

As the plans are executed, metrics are collected and placed into the metrics repository (database). Unique project metrics will be stored within project specific metrics databases, and those common metrics will be placed into an Enterprise metrics repository hosted on the Mission Planning Central web server. On planned, regular intervals, metrics reports will be made available to relevant stakeholders so that analysis of the data can occur and corrective actions taken.

Over time, as processes become more stable and/or organizational changes occur, the informational needs must be revised and the metrics plans updated. The goals / objectives identified within the various metrics plans must be reviewed at regular intervals to assure that effective and efficient processes are being performed and products developed and delivered as defined within the requirements.

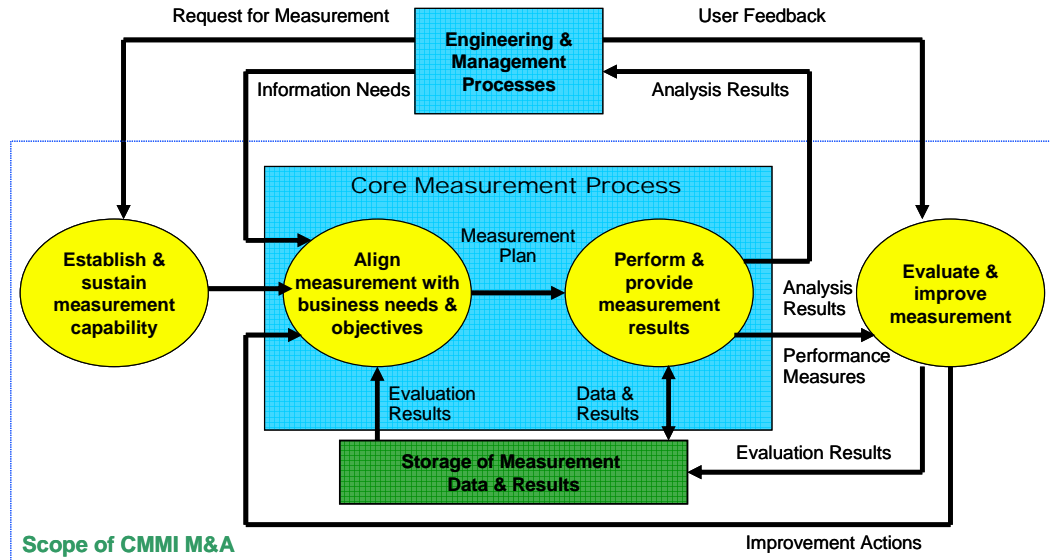


Fig 4: CMMI Measurement and Analysis (MA) Process

Figure 4 depicts the measurement and analysis (MA) process as defined within the CMMI process model. It is included herein as a reference, as it is a requirement that the various projects under the organization support the CMMI MA process area. It also shows that the CMMI MA process supports ISO 15929 process requirements.

1.2.2 Measurement Activities

It is important that clear goals / objectives are provided (both at the Enterprise and project levels) to assure correct metrics are collected, reported and analyzed. Likewise, it is important that the following criteria are used (but not limited to) to determine metrics to be collected:

- Relevant to needs and objectives/goals
- Easy to collect
- Metrics need to be validated to ensure correctness
- Need to show measurable variation
- Need to identify relationships among metrics to show possible causes to common and special causes
- Resources available (tools / personal)
- Measure what needs to be improved and be able to demonstrate actual process improvement.
- Low level of intrusion / impact

Once goals and objectives are defined, metrics are identified and able to be collected, the following activities need to occur:

1. Characterize Baseline Performance: This will determine the capabilities of the process (or sub process) being measured. This needs to be performed in order to get a sense of what current the current capabilities are of the processes being measured.
2. Evaluate actual vs. planned data to determine if corrective actions are required. It is important that accurate planned data is provided in order to identify and predict trends so that appropriate management actions can be taken.
3. Improve process or corrective actions as required.
4. Collect measurements
5. Repeat step 2.
6. Once per quarter repeat step 1. Based on data, re-adjust goal settings as required.

1.2.3 Scope of Measurement Activities

This section identifies what measurement activities occur within the organization:

Enterprise	MPEC	SEIC	ELSG
<ul style="list-style-type: none"> • Manage Organization Measurement process • Define Information needs of the Enterprise • Identify and monitor corrective changes • Collect common metrics from the organization • Perform analysis and identify suggested corrective actions • Establish metrics POC 	<ul style="list-style-type: none"> • Provide common developmental metrics • Identify Information needs of the project and any internal company needs • Identify and implement Metrics collection and reporting • Manage corrective process changes as identified (either from internal or Enterprise analysis) • Establish metrics POC 	<ul style="list-style-type: none"> • Provide integration metrics • Provide testing (validation) metrics • Identify Information needs of the project and any internal company needs • Manage corrective process changes as identified (either from internal or Enterprise analysis) • Identify and implement Metrics collection and reporting • Establish metrics POC • Maintaining - formalization OSS&E metrics definition • OSS&E Collection Metrics 	<ul style="list-style-type: none"> • Focus on projects performance • Identify and monitor corrective changes • Establish metrics POC • Identify and implement Metrics collection and reporting • Perform OSS&E Metric Analysis

The diagram shown below depicts information flow from the Enterprise to / from the organization and how identified corrective actions are feed back into the organization based on metrics analysis.

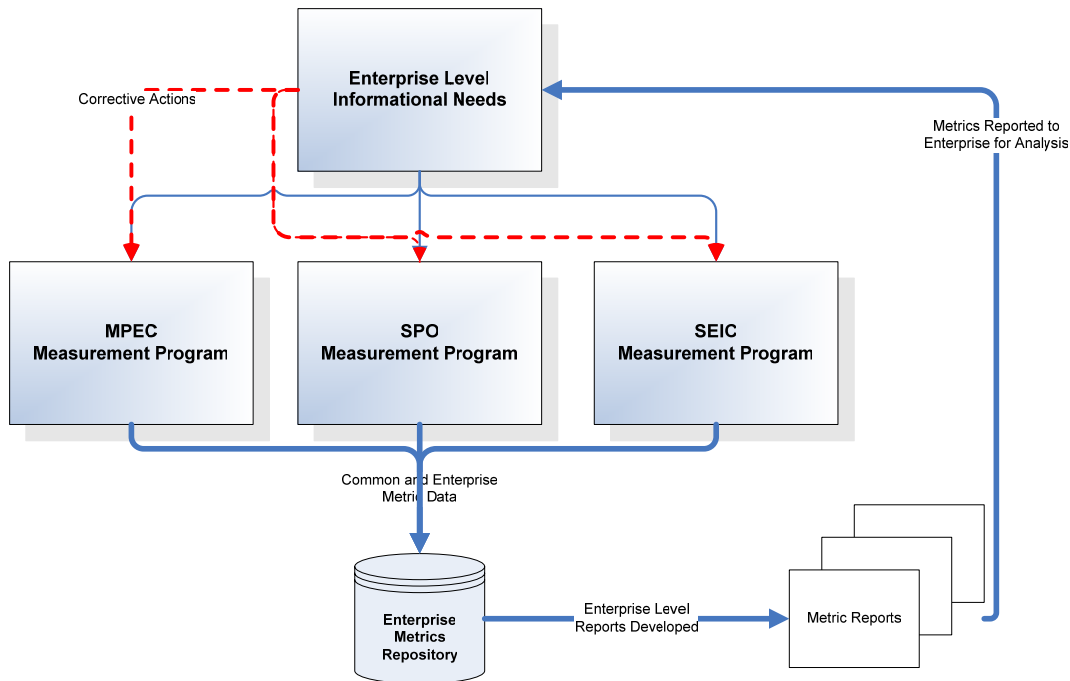


Fig 5: Organizational Metrics collection/Corrective Actions

The following diagram depicts generalization of measurement coverage across the Enterprise.

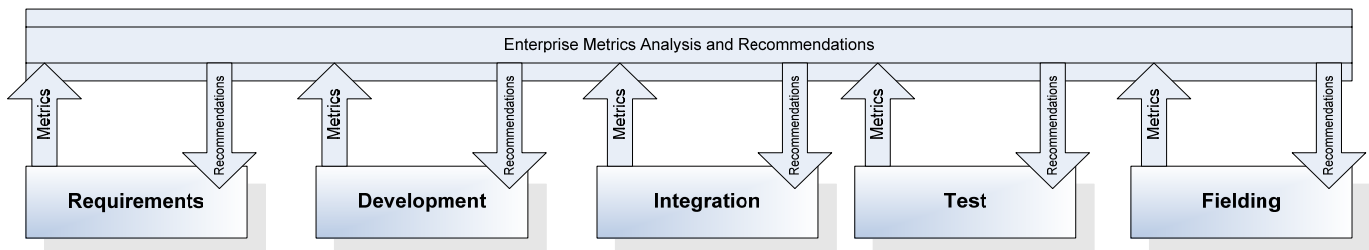


Fig 6: Enterprise Measurement Coverage

As common defined metrics are provided to the Enterprise from the various organizations performing lower level functions, Enterprise level analysis is performed comparing metric data against the defined objectives. As common causes of anomalies are identified and root causes determined, improvement actions are provided back into the organization to correct the anomaly. These actions are tracked to closure and future metric data is analyzed to confirm problem had been corrected.

1.2.4 Cultural Change

This section identifies common problems which are usually associated with starting a metrics program. For each issue identified, a potential solution is provided to mitigate the issue.

Issue:	Mitigation:
Measurement is not a priority:	<ul style="list-style-type: none"> • Management at all levels re-iterate need for successful measurement program.
Measurement data is not used by management:	<ul style="list-style-type: none"> • Decisions need to be made on objective measurements. • Enterprise management needs to lead by example requiring decisions to be based upon measurements.
Just collecting data for collection sake:	<ul style="list-style-type: none"> • Focus on information needs / objectives to determine metrics to be collected. • Minimize amount of data collected to ensure collection process is working and data is being used.
Starting with too many metrics:	<ul style="list-style-type: none"> • Limit initial measurements to focus on highest priority of informational needs
Lack of data validation:	<ul style="list-style-type: none"> • Incorporate standards on metric definitions • Develop validation checking tools • Incorporate visual validation into collection processes; Provide education on validation to metrics collectors.
Too many collection initiatives:	<ul style="list-style-type: none"> • Standardize on base measurement definitions • Document all collections currently occurring and simplify to common set • Establish controlling body for Enterprise common metrics
We already are collecting metrics:	<ul style="list-style-type: none"> • Number of metrics collections occurring but not synchronized. Duplicate efforts occurring.

Section 2 Associated Documents

- This plan is a sub-plan as referenced within the in the SEIC Project Management Plan (PMP).
- This metrics plan also refers to the Metrics Definition Spreadsheet which contains detailed information such as:

Table 1: Metric Definition Attributes

Process - Sub Process Objective/Goal of Metrics	Status	Comments	Questions associated with the objective	Definition
Metric Names	Component Names	Validation of Data	Under Statistical Process Control	Computations
Collection Frequency	Source of Data	Automated collection?	Related Metrics	Chart Type

- SEIC Statement of Work (SOW) contains references to metrics / measurement activities in the following sections:
 - 2.2.3.6 Network Centric Data Strategy
 - 2.4.1 Engineering Tracking Metrics
 - 2.5 Configuration Management
 - 2.5.2 Mission Planning Central (MPC)
 - 4.3.2 Software Resources Data Reporting
 - 4.4.1 Earned Value Management
 - 4.4.2 Subcontractor Management
- SAIC Procedures referenced during development of this plan:
 - MGT-PRO-PM-102 - Metrics Planning
 - MGT-PRO-PM-108 - Quantitative Project Management

Note: Please see individual project metric plans for additional details on how projects collect and provide metrics to the organization.

Section 3 Project/Program Metrics Measurement Objectives

3.1 Support of Organization’s Measurement Objectives

This section addresses the organization’s information needs and objectives as well as the associated key metrics. For complete listing and definition of goals, objectives and metrics, please refer to the Metrics Definition spreadsheet.

The measurement program is based on Goal/Objective-Driven measurements where the focus is not on “what metrics are we collecting” but “what do I want to know or learn”? In order to support this paradigm, measurement goals are supported by questions which lead to indicators and finally to metrics. The following diagram depicts the relationships between the goals/objectives and associated metrics:

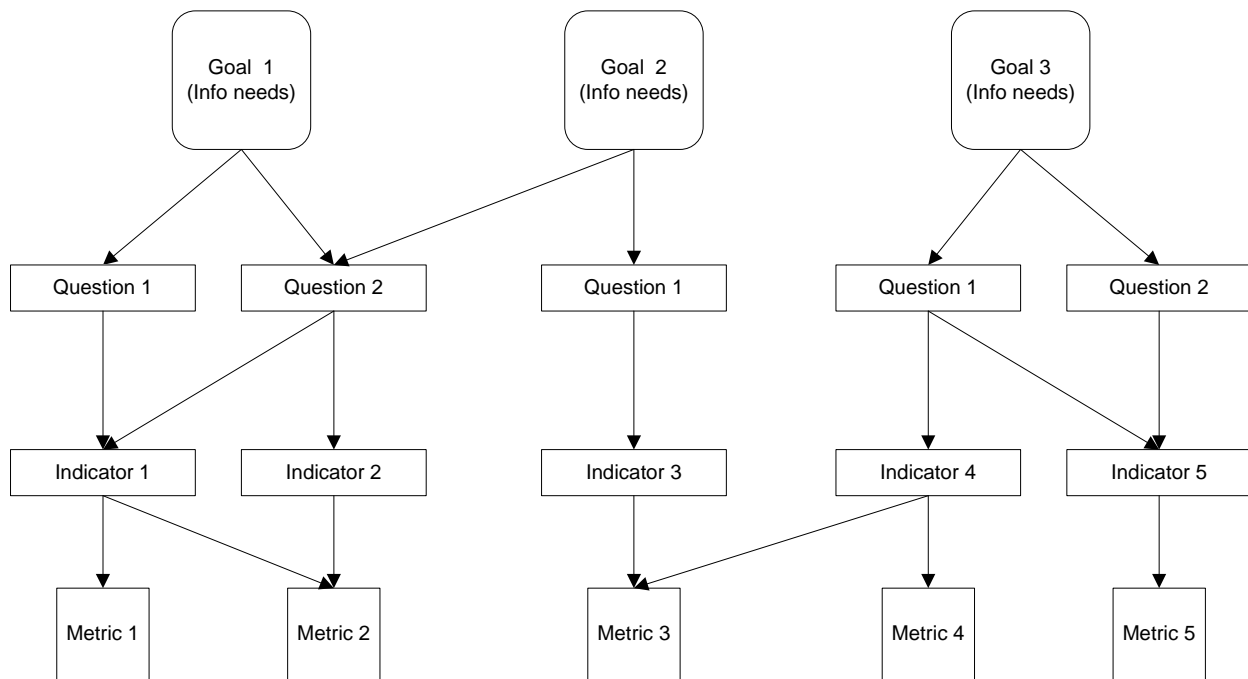


Fig 7: Goal-Question-Metrics

Where:

- Goal: Comes from information needs and management directives
- Question: Used to ask what do I need to know about the goal/objective
- Indicator: Estimation / evaluation used in decision making
- Metric: Base and/or Derived (function) source of measurement data

It is important to focus on why data is being collected and identify the metrics needed to answer the questions. This will minimize duplicate metrics as well as the effort to collect the data.

The next section defines additional details in the types of information being collected at the Enterprise level and why it is being collected. **[THIS AREA NEEDS INPUT FROM STAKEHOLDERS]**

3.2 Enterprise Level Information Being Collected

The primary focus at the Enterprise is on how well the overall program is performing. Cost, schedule, product quality, and customer satisfaction are the key indicators of the overall health of the Enterprise.

3.2.1 ELSG Information Being Collected

The following areas are the focus of ELSG:

- Requirements Development and Allocation
- Contractor Management
- Delivery Schedules
- Fielded Product Quality (OSS&E)

3.2.2 SEIC Information Being Collected

The following areas are the focus of SEIC:

- Requirements Management / Traceability
- Integration and Horizontal Testing
- Functional & Stability Testing

3.2.3 MPEC Information Being Collected

The following identify the eight metrics recommended by ELSG as part of “Revitalizing Software Engineering” Initiative:

1. Software Size
2. Software Development Effort
3. Software Development Schedule
4. Software Defects
5. Software Requirements Definition and Stability
6. Software Development Staffing
7. Software Progress (Design, Coding, and Testing)
8. Computer Resources Utilization

Please refer to Metrics Definition Spreadsheet for additional metrics details.

Software Metric	BAE	Boeing	L-M	NGIT	Tybrin
• Software Size (Planned vs. Actual)	X	X	X	X	X
• Software Development Effort (Staff hr or sm)	X	X	X	X	X
• Software Development Schedule (planned vs actual dates for start through completion)	X	X	X	X	X
• Software Defects (tracking problem reports)	X	X	X	X	X
• Software Requirements Definition and Stability (adds/deletes/mods over time)	X	X	X	X	X
• Software Development Staffing (actual vs planned; turnover)	X	X	X	X	X
• Software Progress (Design, Coding, and Testing) (actuals design/code/test vs. planned)	X	X	X	X	X
• Computer Resources Utilization (Planned vs Actual under worst case load)			X		

Section 4 Metrics Collection

The data collection process needs to be as much a part of the normal flow of activities as possible to minimize the burden on engineers/service providers, testers, and project/program management. In addition, project/program characterization data needs to be collected and updated as needed. This information is captured in each project's / program's Metrics Collection documentation.

Currently metrics from the various projects are being provided through the use of metric reports which summarize the data. Examples of these reports are identified in section 5. Although this provides limited value, the long term direction needs to be where measurement data is provided into a central Enterprise metrics repository where Enterprise management can view metric reports (generated from the provided measurement data) in an asynchronous manner. This will allow management the ability to be pro-active in invoking actions to correct issues based on forecasted trends.

The following describes a longer term view on collecting organizational metrics directly from the source into the Enterprise metrics repository.

Measurement data will come from a variety of sources located throughout the organization. Listed are examples of source of measurement data:

1. MPEC Development Tools
2. Enterprise Tracking Tools
(Action Items, Deficiency Reporting, Peer Reviews-Defects, Change Requests, Requirements Management, Risk Management, Configuration Management)
3. Project Cost and Schedule Tracking Tools
4. Testing Tools
5. Etc.

Storage of the metrics data will be accomplished in two areas:

1. Localized within a project:
Project specific measurements will be stored within each project's own metrics repository. It will be the responsibility of the project to provide and maintain its own local repository. This may be a simple spreadsheet to a fully automated database supported repository.
2. Common Enterprise Metrics Repository:
Accessible through the MPC will be the Enterprise Metrics repository. This repository will hold all the Enterprise measurement data and metrics.

Metrics Collection will be provided in two major ways:

1. Manual entry:

Providing metric data through a manual method is the least desirable approach since it is more prone to human error and cannot easily provide automated data validation. This can be (but not limited to) performed using a spreadsheet or through a web based interface into a metrics repository. The Enterprise repository will have a web interface capable of manual data entry.

2. Automated:

Providing measurement data directly into the metrics repository can be handled in two ways:

- a. Direct Connection: Whereby project allow the Enterprise repository to collect measurement information directly from the source. In this method, data can be validated during the importing of the data and identify (tag the record) any inconsistencies.
- b. Transfer Database: In this approach the project exports the identified measurement data into a common defined database (standardized Enterprise database API will be provided to each project). The transfer database is then sent to the Enterprise Metrics point of contact whom then will import the data into the Enterprise repository where the data can be processed and metric information obtained.

Figure 8 (shown below) depicts the long term view on the methods of collecting measurement data into the Enterprise metrics repository.

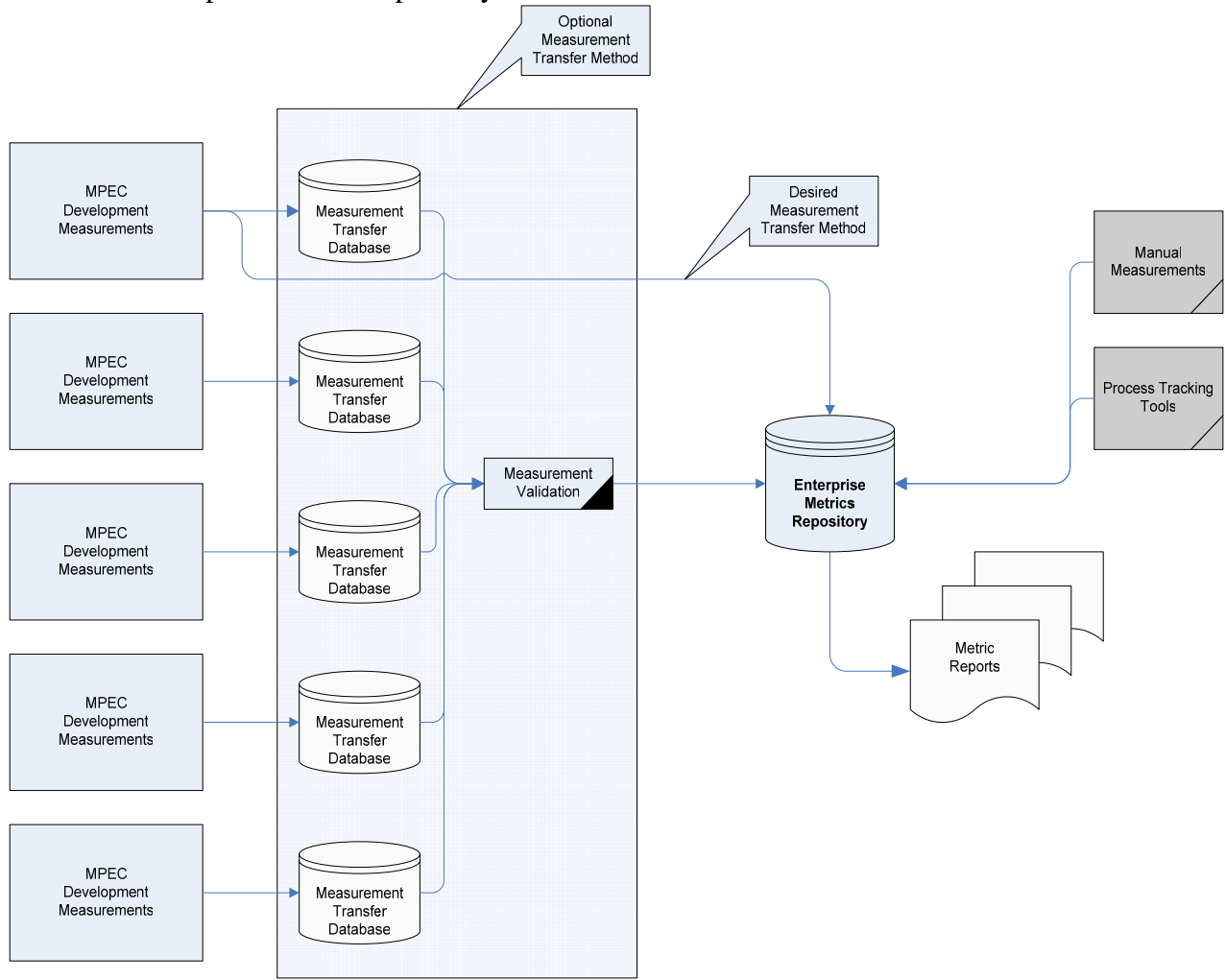


Fig 8: Metrics collection – Reporting Overview

Details on where and how data is acquired for each metric are defined in the metrics definition spreadsheet.

4.1 Measurement Data Validation

In order to ensure the collected data has merit or credibility the measurement data need to satisfy the following validation criteria.

4.1.1 Verification

The data needs to be verified against the following characteristics:

- Correct Type
- Correct Format
- Within Specified Ranges
- Are Complete
- Arithmetically Correct

4.1.2 Synchronization

Measurement data being collected from various attributes of processes are typically synchronized with time. Measurements based on arbitrary time frames are susceptible to problems with synchronization. It is import to view related measurements to ensure cause-and-effect relationships are maintained.

4.1.3 Consistency

The data needs to be verified to ensure data is consistent from one collection period to another. Special causes need to be documented and the root cause needs to determine to ensure it was not data related.

Examples of inconsistency need to be monitored

- Values from accounting intermixed with Calendar months
- Values for days, confused with months,
- Changes in WBS definitions, component names, etc.
- Reclassification of effort, work activities causes data to be skewed

4.1.4 Validity

The data needs to be valid against the metric being supported. Definitions of the measurement data needs to be clear and concise.

Section 5 Metrics Reporting and Analysis

5.1 Metrics Reporting

[THIS NEEDS TO BE COMPLETED WITH STAKEHOLDER INVOLVEMENT]

Sample Reports from projects to/from the Enterprise are shown below.

Table 11: Sample Metrics Reports

Report	Description/Purpose	Source	Recipients	Reporting Schedule
Cost	Tracks planned costs to actual consumed	Projects Enterprise	Enterprise Government	Monthly
Effort	Tracks amount of effort provided against planned	Projects Enterprise	Enterprise Government	Monthly
Schedule	Tracks activities completed against E-IMS	Projects	Enterprise	Monthly
Summary Deficiency Reports	Tracks status of deficiency reports	SIRB	Enterprise	Monthly
Software Size	Tracks the actual software size against planned estimation	MPEC	Enterprise	Monthly
Requirement Stability	Tracks the amount of change is occurring to baselined requirements of the products	All Projects	Enterprise	Monthly
Computer Resources	Tracks the amount of resources required for each product	MPEC	Enterprise	Monthly
Customer Satisfaction	Tracks the level of satisfaction the Enterprise is providing to the government (This could also be part of sustainment metrics)	Enterprise	Government	Quarterly

5.1.1 Reporting Types

The following types of visualization tools will be used to display measurement data (Note that the Metrics Definition spreadsheet identifies what type of report is used for each metric):

- Run Charts: Time sequenced used to look for basic trends or other patterns over time
- Scatter Diagrams: Displays empirically observed relationships

- Histograms: Displays empirically observed distributions (frequency of effects over a period of time)
- Bar Charts: Similar to Histograms but not based on continuous variable or frequency of counts
- Multi-Plot: Combination of Bar Charts and Run Charts on the same chart
- Control Charts: Used during analysis of process behavior

5.2 Metrics Analysis

The Enterprise will monitor metrics data using (but not limited to) the following primary analysis methods:

- Actual vs. Planned data: Visual comparison of actual collect data against planned data over time will identify potential trend issues.
- Goal / Ranges: Identification of data falling outside of a pre-determined acceptable range of values will trigger further analysis to determine why the goal is not being met. Identification of special or common cause will be performed.

The Metrics Definition spreadsheet will identify specific analysis techniques for each defined metric.

5.3 Quantitative Project Management (QPM)

As the Enterprise management use of metrics matures over time, selected Enterprise sub-processes will be placed under quantitative project management to be statistically monitored. This is done to ensure that those key Enterprise sub-processes are capable of satisfying their quality and process performance objectives, and to perform corrective actions as required.

Section 6 Metrics Definitions and Usage

The Metrics Definitions spreadsheet identifies the organizational metrics definitions, collection sources, collection frequency, and types of reporting provided. Each program may also include their internal definitions in this spreadsheet as well or utilize their internal documentation for internal metrics. Please refer to the spreadsheet for definitions of fields and examples of usage.

The spreadsheet is divided by the following worksheets

Version	Tracks the history of the spreadsheet
Directions	Basic instructions on how to use the spreadsheet
Definitions	Allows for definitions of common key terms associated with the metrics program
Enterprise Informational Needs	Lists each informational need identified by Enterprise management as well as assigning an ID number to each need
ELSG Enterprise Metrics	Defines the common metrics which ELSG will provide and the traceability back to an informational need
MPEC Enterprise Metrics	Defines the common metrics which MPEC's will provide and the traceability back to an informational need
SEIC Enterprise Metrics	Defines the common metrics which SEIC will provide and the traceability back to an informational need

Section 7 Risks

The following are a list of initial risk with associated mitigation actions involving starting up the measurement program.

Risk	Probability	Mitigation
Inability to develop measurable organizational goals.	Medium	<ul style="list-style-type: none"> • Identify suggested goals and present to management for approval/change. • Work with management to ensure they understand the importance of defining and using these goals.
Lack of staffing and resources to support the measurement program.	High	<ul style="list-style-type: none"> • Need to prioritize information needs and focus on those measurements. • Need to set expectations on what can be accomplished with current resources. • Utilize current resources / tools to work out startup issues, migrate to common set over time as resources become available.
Inability to Define set of standardized metrics for the Enterprise.	Medium	<ul style="list-style-type: none"> • Start with current set of metrics being collected as base set. • Focus only on those measurements to support the identified goals/objectives of Enterprise.

Section 8 Stakeholder Involvement and Identification

This plan focuses on the following stakeholders and associated involvement at the organizational level:

Stakeholder	Align organizational measurements and analysis activities	Provide and communicate Measurement Results
ELSG (Enterprise Management)	<ul style="list-style-type: none"> Identify Goals/Objectives 	<ul style="list-style-type: none"> Define measurements, collect data and provide results
MPEC	<ul style="list-style-type: none"> Review and Incorporate organizational metrics into project metrics activities 	<ul style="list-style-type: none"> Define measurements, collect data and provide results
SEIC	<ul style="list-style-type: none"> Review and Incorporate organizational metrics into project metrics activities 	<ul style="list-style-type: none"> Define measurements, collect data and provide results
E-EIP	<ul style="list-style-type: none"> Provide Process related training Manage Organizational Metrics Process 	

Section 9 Implementation

The following identifies the resources required to support the organizational measurement program as well as implementation activities.

9.1 Staff Resources

9.1.1 Metrics Engineer

Performs the following roles and responsibilities:

- Maintain this metrics plan and associated documents
- Facilitate relevant stakeholder involvements as defined in the stakeholder spreadsheet
- Work with project representation on developing definitions of common metrics and sources of data
- Work with projects to ensure measurement data is being provided as defined
- Work with tools support team in establishing and maintaining an Enterprise Metrics repository, and location of a secured library of metrics reports and associated analysis of the reports.

9.1.2 Tools Support

Performs the following roles and responsibilities:

- Establishes and maintains an Enterprise Metrics repository, and location of a secured library of metrics reports and associated analysis of the reports
- Develops custom transformation scripts / collection tools / collection scripts
- Develops validation tools scripts
- Defines transfer database definitions and develops templates

9.1.3 Project Metric Reps

This person is the main point of contact for metrics within a project (i.e., MPEC, SEIC, ELSG, etc) and performs the following roles and responsibilities:

- Works with the Enterprise Metrics Engineer in definition of Enterprise level metrics
- Coordinates manual data collection for the project.
- Coordinates extraction and transfer of data for the project to the Enterprise.

9.2 Tool Resources

The following tools will be required to at the Enterprise level:

- Metrics repository with the following (but not limited to) capabilities:
(not a complete list)
 - Database supported repository
 - Web Based Interface to allow access to view measurement data, charts, and allow for manual input of measurement data.
 - Source and Access control for data / reports
 - Integration into measurement data sources
 - Supports ISO 15939 Measurement Information Model
 - Data collection provides automated updates on graphs, alarms and analysis
 - Allow for Objective Forecasting and Quantitative Analysis
 - User-defined alarms and analysis that trigger attention
 - Personalized, rule-based data filters
 - Color-coded alarms and graph regions
 - User-defined summary and aggregation
 - Wizard-driven equations and analysis
- Data Validation Tool: Used to perform validation on extracted measurement data provided through a data transfer method. See section 4.

9.3 Training

The following types of training will be provided to the stakeholders of the organizational metrics activities:

Target Audience: Management and Technical Staff:

- Enterprise Measurement Program Overview:
This class will provide a basic understanding on how metrics are used defined, collected and used within the Enterprise. It will also touch on how the analysis of collected data is used to manage the overall Enterprise activities. It will also cover the Enterprise level informational needs and objectives.

Target Audience: Metrics Practitioner

- Integrated Measurement and Metrics of the Enterprise:
This class will cover:
 - Understanding of the Enterprise Measurement Program
 - Defining Informational Needs and associated measurements
 - Enterprise Measurement Definitions
 - Collection and Validation Activities
 - Analysis and Decision Making
 - Introduction to Quantitative Measurements

9.4 Implementation Activities

The following are the activities required to implement the measurement program:

- Define measurement policy for organizational elements and address the following:
 - Measurement processes
 - Measurement procedures
 - Roles and responsibilities
 - Adherence to the policy and process
- Identify Metrics Representatives for the following areas:
 - MPEC's
 - SEIC
 - ELSG
 - MPC (Tools)
- Definition of Enterprise Measurements
 - Document Informational Needs of the Enterprise
 - Summarize All Existing Measurement Activities
 - Define Measurable Objectives
 - Prioritize Objectives
 - Define Supporting Questions

- Define Common Metrics
 - Complete Metrics Definition attributes
- Implement Enterprise Metrics Repository
 - Document Requirements
 - Perform Buy-Develop Decision
 - Implement Decision
- Pilot Collection, Reporting, Analysis
 - Identify metrics to be piloted
 - Identify data sources
 - Identify relevant stakeholders
 - Resolve conflicts and constraints
 - Develop any custom extraction scripting
 - Collect data and validate the data
 - Produce initial reports
 - Document work instructions
 - Analyze and update activities based on pilot outcome
- Provide Training
 - Pilot initial training classes
 - Identify required attendees
 - Update classes based on pilot
 - Provide classes to attendees
- Develop and Implement Deployment Plan
- Verify Compliance