



Electronic Information Environment (EIE) Project

Business Use Case (BUC) BUC 4.24 Navy - Exchange Measurement Documents Data

EIE Project

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1. EIE Business Use Case¹ Overview

1.1 Introduction

Performance Based Contracting (PBC) is a set of guidelines to Canada DND Major Capital Projects (MCPs) on how to model a Platform acquisition and in-service support (ISS) processes. Under these guidelines Canada is responsible to perform corrective and/or preventive maintenance activities on the Platform. In order for Canada and an ISS Contractor partner to fulfill their obligations under PBC, specific datasets must be exchanged between Canada and ISS Contractor.

The collection of information systems provided by DND and ISS Contractor used to maintain the Platform and the various information exchange mechanism between Canada and the ISS Contractor Partner, is collectively known as the Electronic Information Environment (EIE).

The collection of web services and supporting infrastructure which enables exchange of data between ISS Contractor and Canada's operational systems in support of PBC between Canada and ISS Contractor(s) is collectively known as Electronic Data Exchange (EDE) within Canada. The EDE components span application nodes, network zones and the Internet.

1.2 Purpose

Canada Maintenance Management System (CMMS) tracks all DND-performed maintenance activities. Exchange of maintenance-related data involves new exchange business processes between CMMS and the ISS Contractor data consumers, which complement already documented maintenance business processes.

This Business Use Case (BUC) describes the exchange of Measurement Document data between Canada and the ISS Contractor for a Platform managed according to PBC that are captured against Equipment Master Record (EMR), Master Equipment Record (MER) and Functional Location (FLOC) as applicable. Measurement Document data exchange is the result of two scenarios:

1. Navy usage of the equipment/FLOCs as a result of conducting operations, performing trials or performing maintenance.
2. Retrieving the current measurement readings in CMMS for dismantled equipment during the execution of maintenance by the Navy.

¹ "Business Use Case: A business process, representing a specific workflow in the business; an interaction that a stakeholder has with the business that achieves a business goal. It may involve both manual and automated processes and may take place over an extended period of time." - <http://www.ibm.com/developerworks/rational/library/apr07/english/>.

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1.3 Intended Audience

The intended audience for this business use case includes:

- The ISS Contractor(s) who require detail of their business service-level interactions, benefits and obligations under PBC
- Canada Program Management Offices implementing PBC
- Solution Architects who will define a Business Service Model for the business service(s) described here
- Functional Testers who will use the business use case to define test scenarios for Integration testing
- Designers who will perform detailed design and unit test.

1.4 References and Traceability

Business Process documents

[Ref. 1] PBC Business Process Catalogue Annex L: Navy Maintenance Process Model - In the Context of Performance Based Contracting (PBC)

With respect to the referenced document, this BUC addresses the following sections:

Reference	Section
[Ref. 1] PBC Business Process Catalogue: Annex L	Annex L - Navy Maintenance Process Models

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2. BUC 4.24 Navy - Exchange Measurement Data

This Business Use Case will identify processes and activities and define scenarios, which apply to EMR, and FLOC measurement data. The term “**Measurement Document datasets**” will be used to refer to any of these types of data. When a specific data type is involved, it will be explicitly named².

2.1 Overview

Identifier	BUC 4.24
Name	Navy - Exchange Measurement Document Data
Business goal	Send Measurement Document dataset to the ISS Contractor as necessary to allow the ISS Contractor to fulfill its obligations under PBC.
Stakeholders	Canada and the ISS Contractor(s)
Workflow/interaction	Exchange of Measurement Document dataset from Canada to the ISS Contractor as defined at multiple points in corrective and preventive maintenance business processes. Reference [Ref. 1].
Processes	Information exchange is automated (system to system). Canada and each ISS Contractor determine the frequency of exchange. Some error scenarios may require manual intervention.
Context	Business Domain: Maintain Platform Functional Areas: <ul style="list-style-type: none"> • Record Platform Usage and Faults • Execute Corrective or Preventive Maintenance • Conduct Trials - Ship Staff/FMF
Period of Time	The full lifecycle of the subject platform.
Description	In accordance with PBC, Measurement Document datasets associated with the platform will be sent to the ISS Contractor, enabling the ISS Contractor to fulfill its obligations to maintain the platform configuration. When a HUMS is present, counters and measures may be uploaded into CMMS. These counters and measures may subsequently be sent to the ISS

² The same terminology is used in Section 2.8 Scenarios.

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Contractor.

On a pre-determined, periodic basis, Canada will transfer to the ISS Contractor all Measurement Document datasets which are created and which are permitted by Canada to be shared with the ISS Contractor.

2.2 Sub Processes and Activities Supported

Refer to EIE Business Process document, [Ref. 1] for diagrams that capture business process flow supported by this BUC.

2.3 Business Rules and Assumptions

1. Any Measurement Document dataset required by the ISS Contractor for the purpose of the ISS Contractor-performed level maintenance is exchanged through the normal maintenance history processes.
2. The CMMS shall ensure Measurement Document datasets for a platform are sent only to the ISS Contractor system, which is properly authenticated and authorized to see maintenance Measurement Document (Outbound) dataset for that ship class.
3. During DND maintenance operations, measurements (EMR, MER and FLOC) are taken at various levels of the structure. Based on the ISS Contractor requirements, not all of these may be required by the ISS Contractor.
4. When a part is dismantled from the platform, its already-existing latest measurement data will be sent to the ISS Contractor without delay time unless there is a need to impose such delay for operational or security reasons.

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2.4 Actors

The following actors have been identified as performing the documented business activities:

Role Name	Role Description / Responsibilities
Health and Usage Monitoring System (HUMS)	<ul style="list-style-type: none">• When a HUMS is present, counters and measures may be uploaded into CMMS. These counters and measures may subsequently be sent to the ISS Contractor.
Canada DND Authorized Person	<ul style="list-style-type: none">• Manually enters counters and measures.• Updates CMMS when maintenance actions are taken resulting in uninstal of parts.
CMMS	<ul style="list-style-type: none">• Supports processing of measurement data
EDE	<ul style="list-style-type: none">• Transports and transforms measurement data.
ISS Contractor Data Consumer	<ul style="list-style-type: none">• Provides a system that will have the ability to:<ul style="list-style-type: none">- Accept and process Measurement Document datasets sent from Canada, and- Acceptance of the Acknowledgement of data from Canada

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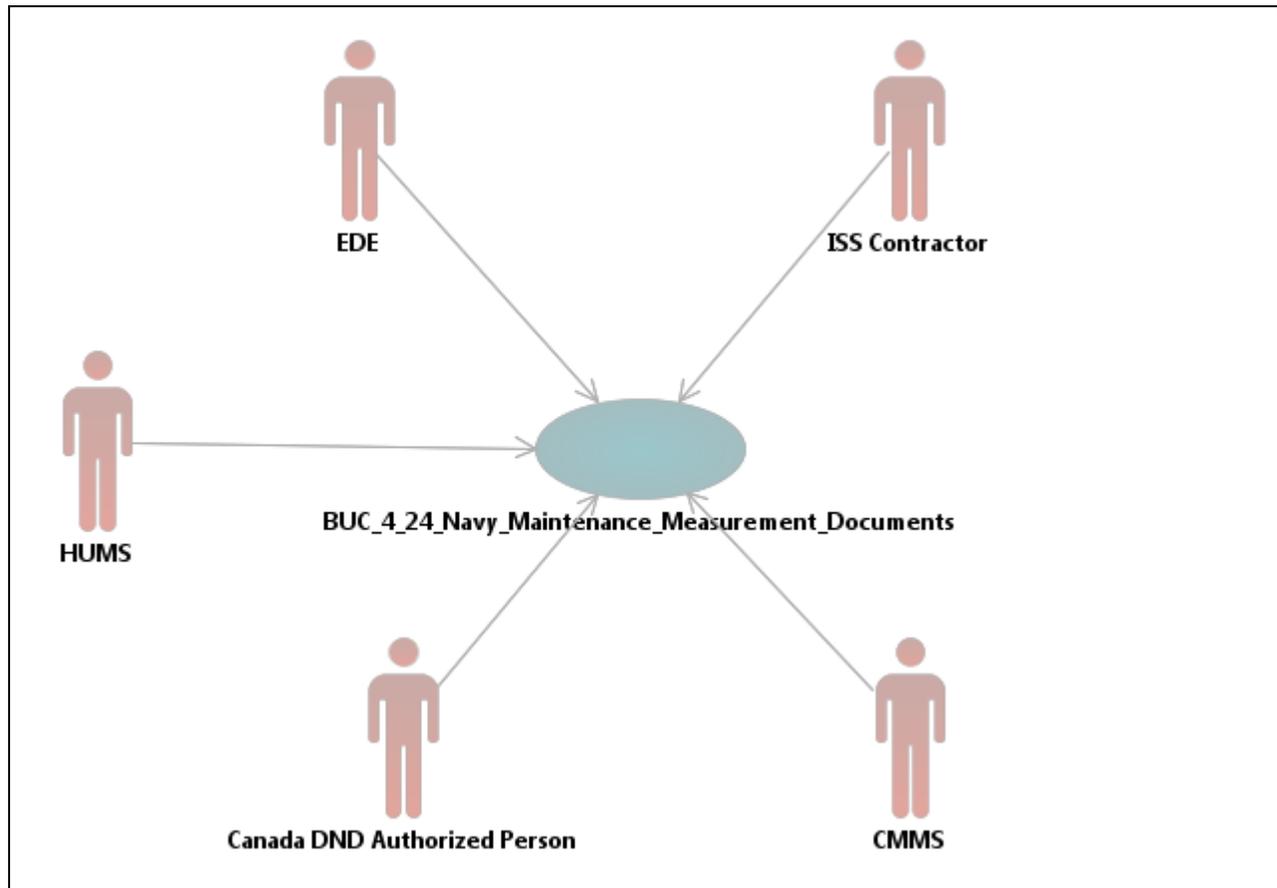


Figure 2-1 Navy - Exchange Maintenance Measurement Document Data

2.5 Common Pre-Conditions³

These apply to every scenario unless explicitly stated otherwise.

1. The ISS Contractor requires that the Measurement Document datasets be sent to the ISS Contractor Data Consumers/Systems:
 - a. MER Measurements
 - b. FLOC Measurements
 - c. EMR Measurements

³ A pre-condition is something which happens or is established outside the scope of the normal day-to-day operation of CMMS and EDE.

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2. Canada and the ISS Contractor have agreed upon Measurement Document datasets format (see [Functional Data Definition](#))
3. Canada and the ISS Contractor have agreed upon Measurement Document data exchange mechanism.

2.6 Common Post-Condition(s) ⁴

The following applies to every scenario unless explicitly stated otherwise.

1. Measurement Document dataset has been received by the ISS Contractor and an acknowledgement has been received by Canada.

2.7 Common BUC Steps

Each scenario defined below includes the following common steps:

Common Steps	Step Description	Actor
Determine which measurement datasets are to be sent to the ISS Contractor	CMMS determines which measurement data is applicable for a given ISS Contractor, fleet, and business event, and determines what is available for release to the ISS Contractor.	CMMS
Prepare and send Measurement Document data	CMMS creates and sends measurement records.	CMMS
Convert Measurement Document data to the ISS Contractor format	EDE converts data to a format as per the defined and adopted definition published by Canada to the ISS Contractor.	EDE
Send Measurement Document data to the ISS Contractor	EDE sends measurement datasets to the ISS Contractor in accordance with transmission definition agreed to with the ISS Contractor.	EDE
Acknowledge receipt of Measurement Document data	The ISS Contractor System acknowledges receipt of measurement records.	ISS Contractor
Forward acknowledgement to CMMS	EDE forwards the acknowledgement receipt to CMMS.	EDE
Mark measurement records as sent	CMMS updates its measurement records as being sent.	CMMS

⁴ Under the business – optimistic assumption, there is only one post-condition.

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Common Steps	Step Description	Actor
Send data integrity validation acknowledgement	ISS Contractor System conducts data integrity validation as per established business rules as agreed between Canada and ISS Contractor. ISS Contractor system sends acknowledgement to Canada EDE. Note: ISS Contractor will send error information if the data fails integrity validation	ISS Contractor
Receive data integrity validation acknowledgement from ISS Contractor	EDE receives the data integrity validation acknowledgement and dispatches the information to CMMS.	EDE
Mark measurement records as being business acknowledged	CMMS updates its measurement records as being business acknowledged by ISS Contractor System.	CMMS

2.8 Scenarios⁵

In the following scenarios the pre-condition and trigger serve to uniquely identify the measurement data exchange in the context of a maintenance business process. This supports direct traceability between maintenance business processes and exchange use case scenarios.

The numeric identifier that appears in square brackets besides each scenario name is an identifier that can be used to locate the event in the business process flow as per [Ref. 1].

⁵ A scenario corresponds to a specific activity in a maintenance business process when a triggering event occurs which causes a Maintenance EMR dataset exchange. Picture the maintenance business process as proceeding horizontally through recognition of a corrective or preventive maintenance situation, through fault isolation, some maintenance activities, and possibly trial. Each exchange use case scenario corresponds to a vertical slice from a maintenance business process which results in a maintenance measurements dataset being transferred to the ISS Contractor.

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2.8.1 4.24.1 EMR Usage Measurement Document [N1.4.3.4.2]

Scenario Name	4.24.1 Send EMR Measurement Document [N1.4.3.4.2]
Business Process	<p>This scenario occurs in the following business processes:</p> <ul style="list-style-type: none"> • Record Platform Usage and Faults • Execute Corrective or Preventive Maintenance <ul style="list-style-type: none"> - Execute Maintenance - Ship Staff/FMF - Execute Maintenance - ISS Contractor - Conduct Trials - Ship Staff/FMF
Business Context	<p>Record Platform Usage and Faults</p> <ul style="list-style-type: none"> • If the HUMS data are not available, Canada is responsible for loading and/or manually entering the counters/measurements and fault codes recorded on the Platform into the Canada Maintenance Management System (CMMS). Measurement documents will be transferred to the ISS Contractor via the EIE EDE on a scheduled basis. <p>Execute Maintenance - Ship Staff/FMF</p> <ul style="list-style-type: none"> • As maintenance is carried out, Equipment Master Records (EMR) may be uninstalled from the Platform, EMR data and the last measurement document for that EMR are sent to the ISS Contractor via the EIE EDE at the time of uninstall. <p>Execute Maintenance - ISS Contractor</p> <ul style="list-style-type: none"> • The data received from the ISS Contractor will be inducted into the CMMS; the EMR Uninstall/Install and EMR Measurement Document for the installed EMR will be sent to the ISS Contractor indicating acceptance or rejection of the content. <p>Conduct Trials - Ship Staff/FMF</p> <ul style="list-style-type: none"> • While conducting trials the usage data will be collected and the Measurement documents data will be transferred to the ISS Contractor via the EIE EDE.
Precondition(s)	See Common Pre-Conditions .
Trigger event	<ol style="list-style-type: none"> 1. Creation of a measurement document in CMMS. 2. On a dismantle event of EMR, the latest measurement document will be extracted for each measurement point defined against the EMR. This only applies to uninstalls performed by Canada.

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Steps	Step Name	Step Description	Actor
	Dismantle part (or equipment)	The Actor dismantles a part (or equipment) and identifies related EMR	Canada DND Authorized Person
	Extract Measurements	The Actor extracts the latest already-existing measurement documents as it relates to EMR	CMMS
	Continue with Common BUC Steps		
Postcondition(s)	See Common Post-Conditions .		
Notes			

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2.8.2 4.24.2 FLOC Measurement Document [N1.4.3.5.1]

Scenario Name	4.24.2 FLOC Measurement Document [N1.4.3.5.1]		
Business Process	<p>This scenario occurs in the following business process:</p> <ul style="list-style-type: none"> • Record Platform Usage and Faults • Execute Corrective or Preventive Maintenance <ul style="list-style-type: none"> - Execute Maintenance - Ship Staff/FMF • Conduct Trials - Ship Staff/FMF 		
Business Context	<p>Record Platform Usage and Faults</p> <ul style="list-style-type: none"> • If the HUMS data are not available, Canada is responsible for loading and/or manually entering the counters/measurements and fault codes recorded on the Platform into the Canada Maintenance Management System (CMMS). Measurement documents will be transferred to the ISS Contractor via the EIE EDE on a scheduled basis. <p>Execute Maintenance - Ship Staff/FMF</p> <ul style="list-style-type: none"> • As maintenance is carried out, Equipment Master Records (EMR) may be uninstalled from the Platform, EMR data and the last measurement document for that EMR are sent to the ISS Contractor via the EIE EDE at the time of uninstall. <p>Execute Maintenance - ISS Contractor</p> <ul style="list-style-type: none"> • The data received from the ISS Contractor will be inducted into the CMMS; the EMR Uninstall/Install and EMR Measurement Document for the installed EMR will be sent to the ISS Contractor indicating acceptance or rejection of the content. <p>Conduct Trials - Ship Staff/FMF</p> <ul style="list-style-type: none"> • While conducting trials the usage data will be collected and the Measurement documents data will be transferred to the ISS Contractor via the EIE EDE. 		
Precondition(s)	See Common Pre-Conditions .		
Trigger event	<ol style="list-style-type: none"> 1. Creation of a measurement document in CMMS. 2. On a dismantle event of EMR, the latest measurement document will be extracted for each measurement point defined against the EMR. This only applies to uninstalls performed by Canada. 		
Steps	Step Name	Step Description	Actor

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	Load/Enter	Platform data is uploaded from HUMS. and/or Canada DND Authorized Person manually enters counters or measures.	HUMS or Canada DND Authorized Person
	Create FLOC counters and measurements datasets	The system will create FLOC Measurement datasets containing applicable measurement documents.	CMMS
	Continue with Common BUC Steps		
Postcondition(s)	See Common Post-Conditions .		
Notes			

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2.8.3 4.24.3 Reverse an Existing Measurement Document

Scenario Name	4.24.3 Reverse an Existing Measurement Document		
Business Process	Corrective or Preventive Maintenance – Execute Maintenance		
Business Context	<p>If a measurement document in CMMS has been created with error, it could be reversed and may result in a new measurement document created as required to correct the erroneous reading.</p> <p>If there is a reversal, the measurement record data will indicate as such.</p>		
Precondition(s)	See Common Pre-Conditions .		
Trigger event	Canada DND Authorized Person reverses existing EMR measurement document.		
Steps	Step Name	Step Description	Actor
	Reverse existing measurement document in CMMS	Canada DND Authorized Person performs reversal process in CMMS for an existing measurement document.	Canada DND Authorized Person
	Create reversed measurement document dataset	The CMMS will create a dataset for the reversed measurement document containing applicable measurement data elements, along with an indicator that the measurement document has been reversed.	CMMS
	Re-enter platform counters and/or measurements into CMMS	After reversal measurement document is created, Canada DND Authorized Person may manually enter counters or measurements as required.	Canada DND Authorized Person
	Create measurement document dataset	If measurements were entered incorrectly, CMMS will create a Measurement Document dataset containing applicable measurement data elements. The record will include a	CMMS

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	timestamp indicating the date-time at which the correcting measurement document was created.	
	Continue with Common BUC Steps	
Postcondition(s)	See Common Post-Conditions .	
Notes		

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2.9 Information Requirements

Further details on the data elements are provided in Section 3.

2.9.1 Counters and Measures Type

EMR/MER Record

Each EMR record has a unique identifier consisting of:

- CAGE;
- MPN;
- Serial number.

FLOC Record

Each FLOC record has a unique identifier consisting of:

- FLOC identifier (as provided by the ISS Contractor to Canada).

Measurement Record

Each measurement record consists of the specific unique identifier as defined above along with a set of core elements as defined below:

- Measurement name
- Measurement position
- Measurement description
- Measurement timestamp
- Unit of measure
- Measurement reading
 - Counters readings (i.e., number of landings)
 - Accumulative value
 - Delta value
 - Qualitative measurements (i.e., environment condition)
 - Non Counter readings
 - Value (i.e., Fuel level)
 - Qualitative measurements (i.e., environment condition).

2.10 Special Requirements

None identified.

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3. Functional Data Definition⁶

The data elements that make up Measurement datasets are enumerated in this section. A detailed technical message schema for exchange of datasets will be provided following the awarding of the ISS contract.

3.1 Data Entities Definition

The Data Entities Definition tables below contains examples of the reference data. Specific and accurate reference data should be obtained from DND through official channels prior to using the reference data in downstream design and implementation activities.

3.1.1 EMR, MER and FLOC Measures

The data elements which make up an EMR, MER and FLOC Measurement datasets are enumerated in Table 3-1.

Table 3-1 Data Entities Definition – EMR, MER and FLOC Measures

Name	Definition	Type	Length
CAGE Code	Commercial And Government Entity (CAGE) code number that uniquely identifies the manufacturer of the part or product, sometimes produced under government contract.	Char	5
MPN	Manufacturer Part Number for the Equipment Note: DND-supplied parts may have an MPN up to 34 characters in length. Industry-supplied parts must have an MPN of 31 characters or less.	Char	34
Serial Number	Manufacturer Serial Number for the Equipment	Char	30
External FLOC Identifier	A unique Identifier for the FLOC relative to its external system. The FLOC from which the equipment was dismantled.	Char	30
Measurement Name	Short form or code identifying the measurement (Example: OPERATING_HOURS)	Char	30

⁶ This is a *functional* view of the data. A detailed schema including fields for parent/child structure, metadata to manage exchange with Industry, more specific types, etc. will be defined in the associated service specification that this business use case will use to fulfill the identified scenarios.

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Name	Definition	Type	Length
Measurement Name Description	The description of the Measurement Name. (Example: Engine Diesel PDE)	Char	30
Measurement Position	A value that indirectly represents the physical or logical place at which a measurement is taken. Required to distinguish between the same EMR containing multiples of the same Measurement Name	Char	20
Measurement Position Description	The description of the Measurement Position.	Char	40
Record Timestamp	The timestamp an EMR Measurement record snapshot is saved in the CMMS.	Datetime	
Measurement Date/Time	The date and time the measurement is taken for the equipment. This timestamp does not have to be the same as the Record Timestamp since a user can back date the actual time the measurement reading was taken when creating a measurement in CMMS.	Datetime	
Unit Of Measure	The unit of measure in CMMS, which corresponds to the Measurement Name (Example: HRS, KM)	Char	3
Current Measurement reading	This field will contain either counter or non-counter readings. When a counter reading, this can be either: <ol style="list-style-type: none">1. The user-entered value2. A system-determined value if the user entered a difference value (calculated by adding the difference reading value to the previous Current Measurement reading.) For a counter, this (generally) increments from one Measurement Document to another but it also could be reset to a new value after, say, a R&O. i.e., when a Counter Replacement is required.	Float	16

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Name	Definition	Type	Length
Difference Measurement Reading	The difference between the previous Current Measurement Reading and the new Current Measurement reading. Applicable only for counters. A user can either enter a Difference Measurement Reading (the system then calculates the Current Measurement Reading) or enter a Current Measurement Reading (the system calculates the Difference Measurement Reading.)	Float	16
Accumulated Measurement Reading	Applies only to counters. The total accumulated reading value of the counter since its inception; when a counter replacement (see Current Measurement Reading) occurs the Accumulated Measurement Reading is not updated; subsequent updates to the Current Measurement reading will then start incrementing the Accumulated Measurement Reading value. Unless a counter replacement has been performed or the Accumulated Measurement Reading has been set externally this field contains the same value as the Current Measurement Reading.	Float	16
Measurement document Short text	This entity may provide additional information.	Char	40
Measurement Reading Code Group	This is an identifier of a catalogue name under which qualitative values can be specified. (An example of this field and the 3 related fields would be: <ul style="list-style-type: none"> Measurement Reading ID = "ENVRNMNT") (In CMMS this is the measurement reading Code Group)	Char	8
Measurement Reading Code Group Description	The description of the Measurement Reading ID. (Example, Measurement Reading ID Description = "environment the ship operated in")	Char	40
Measurement Reading Code	The value chosen by the user for the Measurement Reading ID (In CMMS this is the measurement reading Valuation Code) (Example, Measurement Reading Value = 0001)	Char	4
Measurement Reading Code Description	The description of the Measurement Reading Value (Example, Measurement Reading Value Description = "ARCTIC")	Char	40

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Name	Definition	Type	Length
Current Measurement Reading Replaced Indicator	Counter Replacement Indicator. Set if the Current Measurement reading is replaced with a new value. Value of "Y", when set, otherwise value of 'N'. Applies only to counters.	Char	1
Accumulated Measurement Reading Set Externally Indicator	Generally used to enter an initial value for a counter and the basis of which all further counter readings or counter reading differences are to be entered. Can also be used to correct an incorrect value. Value of "Y", when set, otherwise value of 'N'. Applies only to counters.	Char	1
MER Identifier	A unique identifier of the platform for which this Measurement Document applies.	Char	14
Notification Identifier	A unique identifier a maintenance notification in the CMMS from which measurements were created.	Char	12
Long Text	Long text that can be captured against measurement document	Char	2GB
Reversal Indicator	Indicates that a measurement document has been reversed	Char	1
Indicator: Counter Reading Document	An indicator as to whether or not a Measurement Document applies to a counter	Char	1
Origin Indicator	The origin of the Measurement Document (Example, A = Transfer form API D = Normal online entry I = Batch input entry T = Created automatically by measurement reading transfer)	Char	1
Origin Indicator description	A description of the Origin Indicator. (Example, "Normal online entry")	Char	60
WO Number	A unique identifier of a work order in CMMS.	Char	12
Source Document for Measurement Reading Transfer	The originating measurement document number that triggered the creation of an inherited measurement document	Char	20
Measuring Point	A system-assigned unique identifier assigned to the measurement point when was created. Useful to segregate otherwise identical measurement points. (Example. when one is a counter, the other not)	Char	12

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Name	Definition	Type	Length
Source System	An identifier as to where an event occurred that resulted in a web service being generated. Can be used to determine, for example, which ship created a measurement document	Char	10
Measurement Document Number	An identifier for the Measurement Document. This is an internally-assigned value. Useful in conjunction with "Source Document for Measurement Reading Transfer"	Char	20

Note:

- There is a requirement for consistent naming or a cross-reference of measurement names and units of measure between Canada and the ISS Contractor.

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4. Issues and Exceptions

None identified.

5. Business Process Flows

Refer to EIE Maintenance Business Process document, [Ref. 1] for diagrams that capture business process flow supported by this BUC.

6. Definitions, Acronyms, Abbreviations

Term	Description
BUC	Business Use Case
CAGE	Commercial And Government Entity
CMMS	Canada Maintenance Management System
DND	Department of National Defence
E&M	Engineering and Maintenance
EDE	Electronic Data Exchange
EMR	Equipment Master Record
FMF	Fleet Maintenance Facility
HUMS	Health and Usage Monitoring System
ICD	Interface Control Document
ISS	In Service Support
MCP	Major Capital Project
MER	Master Equipment Record
MPN	Manufacturer Part Number
PBC	Performance Based Contracting
WO	Work Order

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7. Document Control

7.1 Document History

Revision No.	Description	Date
1.0	Final ready for Navy RFP	17 August 2015

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