Electronic Information Environment (EIE)

Service Specification Document/Interface Control Document

Maintenance Measurement Service

External – In the above context is intended to reflect that this content is for Industry partners who have been contracted to participate in an In-Service-Support phase of a Weapon System or Platform that the Department of National Defence has acquired.

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1   Introduction

This document establishes an interface between Canada Electronic Data Exchange (EDE) system and the ISS Contractor's systems to send maintenance measurement messages for Canada ships subject to Performance Based Contracting (PBC) to the In-Service Support (ISS) Contractor responsible for maintenance of the ship class. To support the Measurement message exchange between Canada EDE and the ISS Contractor, both systems need to support specific web service operations as well as request and response XML schemas as described in this document.

The Maintenance Measurement service requires a service for the ISS Contractor to report acknowledgement messages back to Canada EDE system.

1.1   Intended Audience

- ISS Contractor System Designers
- Canada Electronic Data Exchange (EDE) Designers
- ISS Contractor Testers
- Canada EDE Testers

1.2   References

[Ref. 1] Electronic Information Exchange Business Use Case - BUC_4_24_Navy_Maintenance_Measurement_Documents

[Ref. 2] Annex L: Navy Maintenance Process Model – In the Context of Performance-Based Contracting (PBC)

 [Ref. 3] Electronic Information Exchange Service Interaction Model

[Ref. 4] Electronic Information Exchange Maintenance History Service Operational Model – External

2   Business Information

Business Information is based on the Electronic Information Environment (EIE) Business Use Case for Maintenance Measurement Documents [Ref. 1].

Canada Maintenance Management System (CMMS) is the system of record for maintenance history under PBC. Part of Canada's responsibility within the PBC is the execution of agreed level of maintenance activities on a weapon system. Maintenance notifications and maintenance work orders systematically track requests for execution of maintenance activities and record faults identified on the weapon system in the CMMS. In the course of maintenance activities (corrective and preventive) equipment or part status may change, equipment/parts may be uninstalled from a weapon system and new equipment/parts may be ordered and installed. These events result in new Measurement Document data sets being created.

In accordance with PBC, Measurement Document data sets (Equipment Master Record (EMR), Master Equipment Record (MER) and/or Functional Location (FLOC) associated with the weapon system will be sent to the ISS Contractor; thus enabling the ISS Contractor to fulfill its obligations to maintain the weapon system configuration.

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

2.1   Business Processes

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 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.

The following business processes result in creation or change in measurement data in CMMS. Please refer to appropriate sections in the Navy Maintenance Process Model document [Ref. 2] and the Business Use Case [Ref. 1] for details.

- Record Platform Usage or Faults
- Execute Corrective or Preventive Maintenance
- Conduct Trials - Ship Staff/FMF

2.2   Business Triggers

The following actions within CMMS, the business triggers, will result in Maintenance Measurement data being sent to the ISS Contractor:

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.

For Further information, including cross-references to business processes refer to the Business Use Case [Ref. 1].

2.3   Maintenance Measurement Document Exchange Records

A business trigger applies to a particular EMR or FLOC in CMMS. For each occurrence of the trigger, CMMS creates a ***Measurement exchange record.*** A Measurement exchange record contains:

- The unique ID of its originating EMR or FLOC record;

- A record timestamp;

- The parent MER Identifier (as required); and

- Measurement Document Data[1].

A collection of Measurement exchange records, arising from business triggers at different times, is called a ***Measurement data set***. Figure 2-1 diagram shows a data set consisting of four exchange records, each captured by a different trigger (diagram shows a condensed picture of three triggers).

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[1] CMMS will only send measurement documents not already received by the ISS Contractor.

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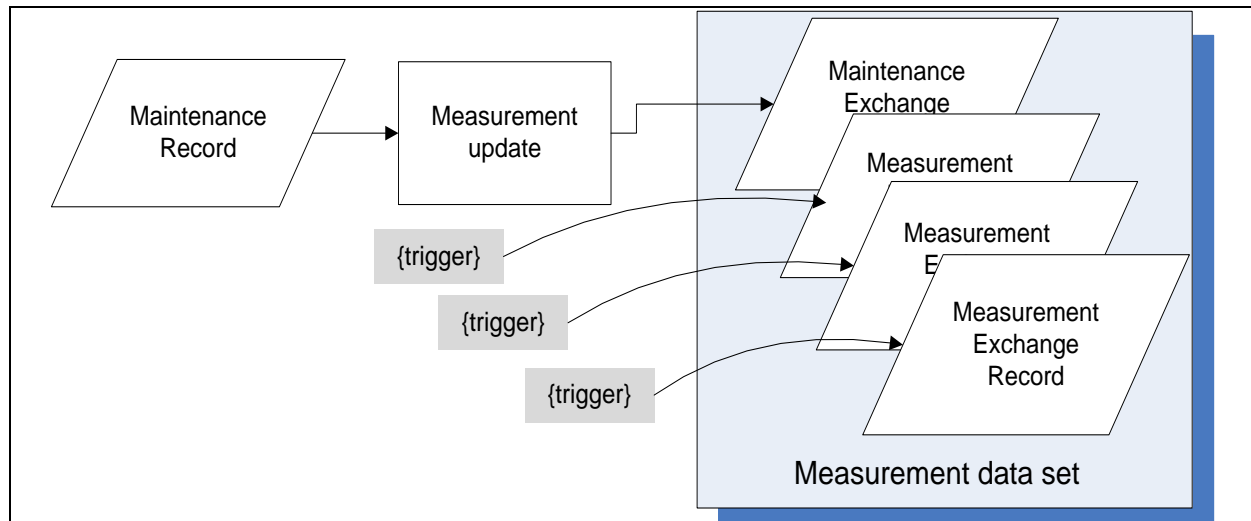
Figure 2-1 Maintenance Measurement data set made up of Measurement Exchange Records

See Figure 4-1 Service Context Overview for a more detailed view.

3   Business Constraints

Constraints on *Usage* of the Service

1) The ISS Contractor Maintenance Notification service shall only be invoked by the Canada EDE System. Canada EDE system will only invoke this service upon receiving a Maintenance Measurement data message from CMMS.

2) Every invocation of a service operation shall be secured using secure credentials such as: PKI Certificate.

Constraints on *Behaviour* of the Service

3) Based on the business trigger, measurement data is sent on a periodic basis (for example once every day at 2:00 AM EST) as agreed upon with the ISS Contractor, or upon entry.

4) Since measurement data sets are accumulated before being sent to the ISS Contractor, a single data set may contain more than one exchange record with common or different EMR and FLOC identifiers. The records can be distinguished by their timestamp.

5) The measurement data sets are sent to the ISS Contractor from the centralized CMMS server. There may be a delay incurred in the ISS Contractor receiving ship data due to the periodic nature of the decentralized CMMS server aboard ship synchronizing with the central CMMS server.

6) Canada does not guarantee that measurement data will arrive at the ISS Contractor in the same order that they were created. It is the responsibility of the recipient ISS Contractor system to collate measurement exchange records based on the identifier, timestamp and/or other fields.

7) Canada systems shall ensure measurement data is sent only to the ISS Contractor system which is properly authenticated and authorized to see maintenance data for that fleet.

8) The ISS Contractor will authorize invocations of operations of the Measurement service.

9) The ISS Contractor will report successful conclusion of business processing of the Measurement data through the Measurement Acknowledgement operation exposed by Canada using a distinct and separate invocation. In this context, successful processing constitutes the ISS Contractor successfully persisting Measurement business objects within the ISS Contractor's system(s).

10) The ISS Contractor will report any business processing errors through the Measurement Error operation exposed by Canada using a distinct and separate invocation.

11) Measurement messages will be signed using digital certificates between Canada EDE and the ISS Contractor. Please see Service Interaction Model [Ref. 3] for details.

12) Canada EDE may attempt to repeat operation invocations in response to technical faults. This behaviour is controlled by parameters for each operation. Please see Service Interaction Model [Ref. 3] for details.

13) The "Action"` field in each record of the Measurement object will be defined based upon business events that have impacted the record in CMMS. The "Action" field will have the following meaning:

> 1 = a new record has been created in CMMS.

> 2 = the record instance has been edited within CMMS.

> 3 = the record instance (defined by the record primary key) has been deleted (reversed) in CMMS.

> 4 = indicates that the record is a point-in-time snapshot. The record may have been added or modified since the last time the record has been sent, but the Action=4 does not imply any change; it is simply a snapshot of the current record state at the timestamp.

4 Service Use Case

The requirements for the Maintenance Measurement service are defined by one use case with several scenarios.

4.1 Service Context

A high level view of the context of the service is shown in Figure 4-1 below. For simplicity this view omits acknowledgement and error scenarios. These are discussed in <u>Service Use Case Scenarios</u>.
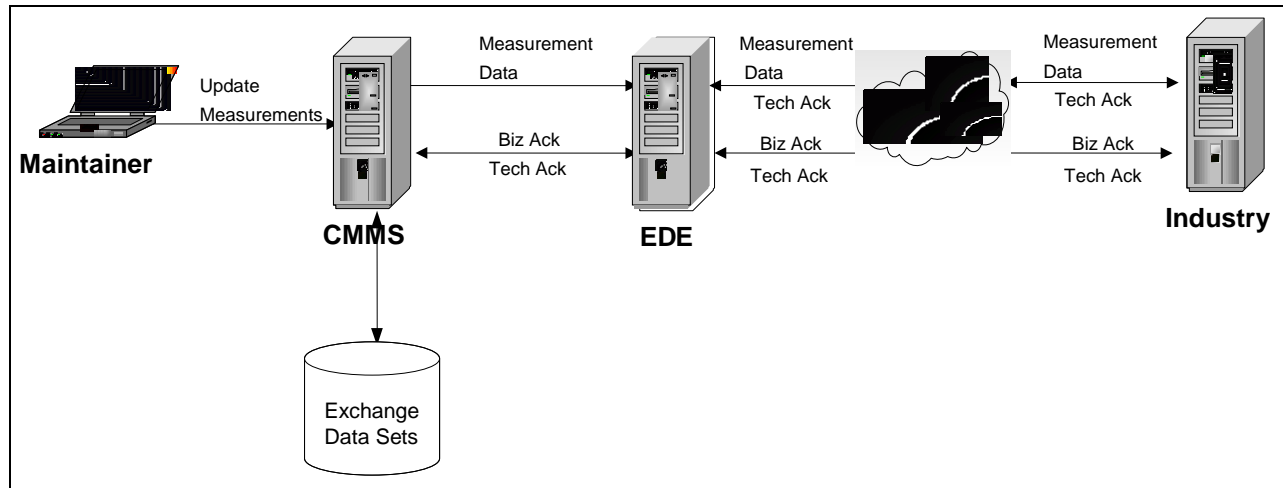

Figure 4-1 Service Context Overview

The following steps occur:

1) Maintainer (or system) actions in CMMS invoke create or delete Measurement events in CMMS.

2) CMMS determines the relevant Measurement data exchange triggers and saves the applicable exchange record(s).

3) CMMS transfers applicable exchange records from decentralized CMMS server to centralized CMMS server.

4) Data sets are transferred from centralized CMMS to EDE – with timing of the transfers based on Industry[2] and Class, or as required, based on the trigger event.

5) Data sets are transferred from EDE to Industry – with timing of the transfers based on Industry and Fleet, or as required, based on the trigger event. Industry accepts the message and returns a 'technical' response, labelled as 'Tech Ack' above.

6) Industry performs PBC processing, including persisting Measurement data, and sends a business response to Canada EDE, labeled as 'Biz Ack' above. Canada EDE accepts the message and returns a 'technical' response, labelled as 'Tech Ack' above.

7) Canada EDE forwards business response to Canada CMMS system.

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[2] In the context of this document, the term 'Industry' is used to generically denote the ISS Contractor

The "technical response" referred to above either: (*i*) confirms a party in the exchange has accepted a message for further processing; or (*ii*) contains a fault message. A technical acceptance does not preclude subsequent "business" errors being observed by industry and reported back to Canada as required.

The "business response" referred to above above either: (*i*) confirms Industry has successfully persisted Measurement exchange records contained within the message; or (*ii*) contains an error message.

4.2   Interaction Model

Please refer to Maintenance History Operation Model for various scenarios that are applicable for Maintenance History services.

4.3   Successful Request and Response

At a high level, Measurement data set messages are handled in the following manner:

1. Canada sends a measurement data set message to Industry.

2. Industry Acknowledges receipt of the measurement data message. This is referred to as a Technical Acknowledgement.

3. Industry will process the contents of the measurement data set message. This may take several days.

4. After processing the contents of the measurement data set message, Industry will send Canada a Business Acknowledgement message. This confirms with Canada that the accumulated Measurement data in the message is acceptable to Industry systems.

The following Figure 4-2 sequence diagram describes steps in a successful request and technical response.
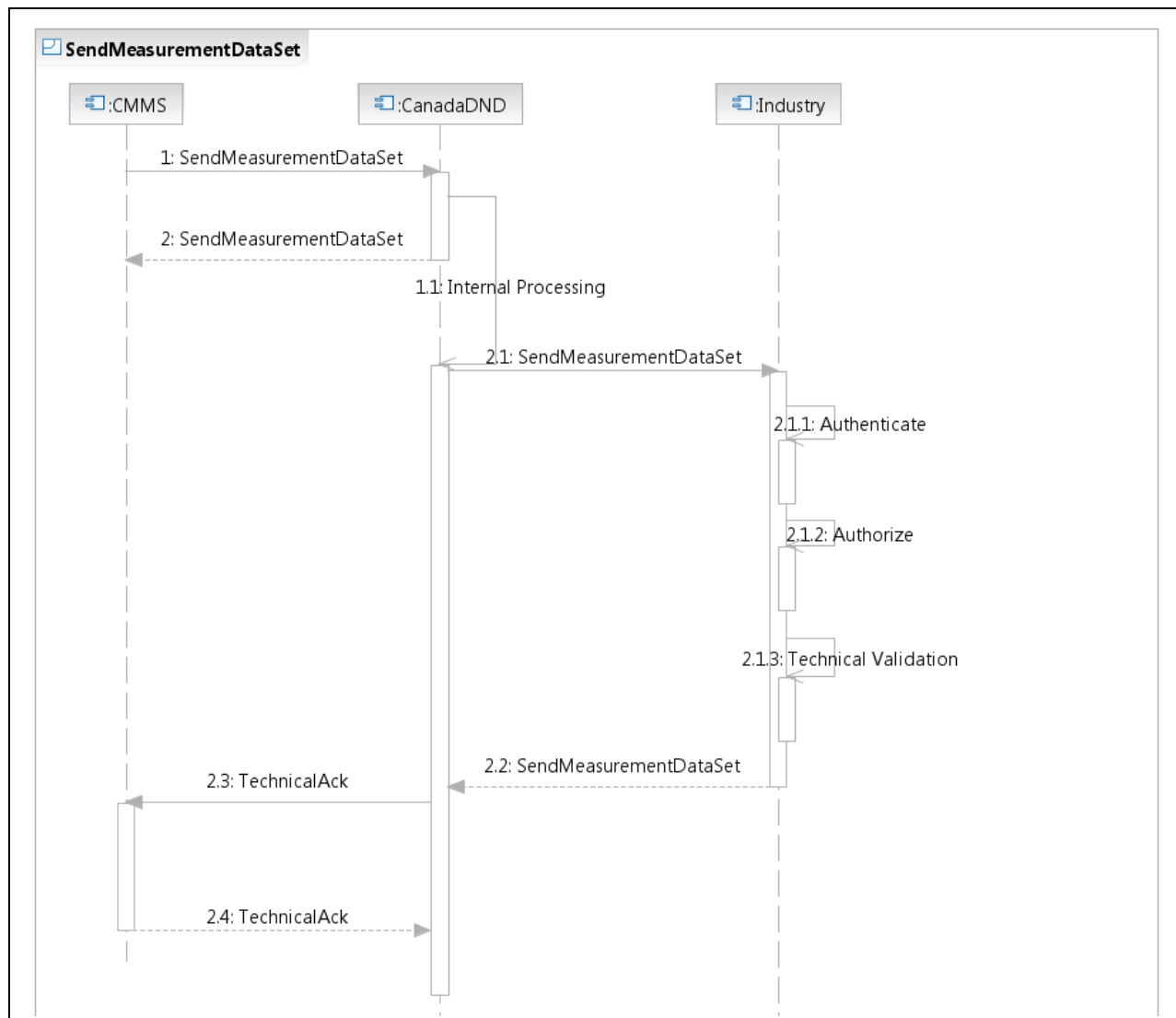
Figure 4-2 Send Measurement Data Set Sequence

The following scenarios apply to all Measurement Data exchange record types: EMR/MER Measurement Document data, and FLOC Measurement Document data.

Main Flow	
Scenario	"Happy Day:" Canada EDE successfully sends its Measurement data set to industry.
Pre-Condition	Measurement data is collected by the Canada CMMS system.
Post-Condition	Measurement data set is successfully received by the industry.

Steps	1)	CMMS sends a measurement message to Canada EDE.
	2)	Canada EDE successfully Authenticates, Authorizes and Validates the message; then starts an internal process.
	3)	Canada EDE responds that the message has been accepted.
	4)	The Canada EDE system invokes the Industry hosted and exposed SendMeasurementDataSet[3] operation.
	5)	Industry successfully Authenticates the service consumer.
	6)	Industry successfully Authorizes use of the service/operation.
	7)	Industry conducts the required validations as per Service Interaction Model [Ref. 3]- Section Technical Delivery Phase
	8)	Industry provides technical response to Canada EDE. The response may indicate a status of Success or contain a fault.

Following processing of Measurement data set by Industry backend systems, Industry will send a Business Acknowledgement message to Canada. This is depicted in the following sequence diagram in Figure 4-3.

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[3] For this description, SendMeasurementDataSet is a generic term encompassing the Maintenance Measurement service.
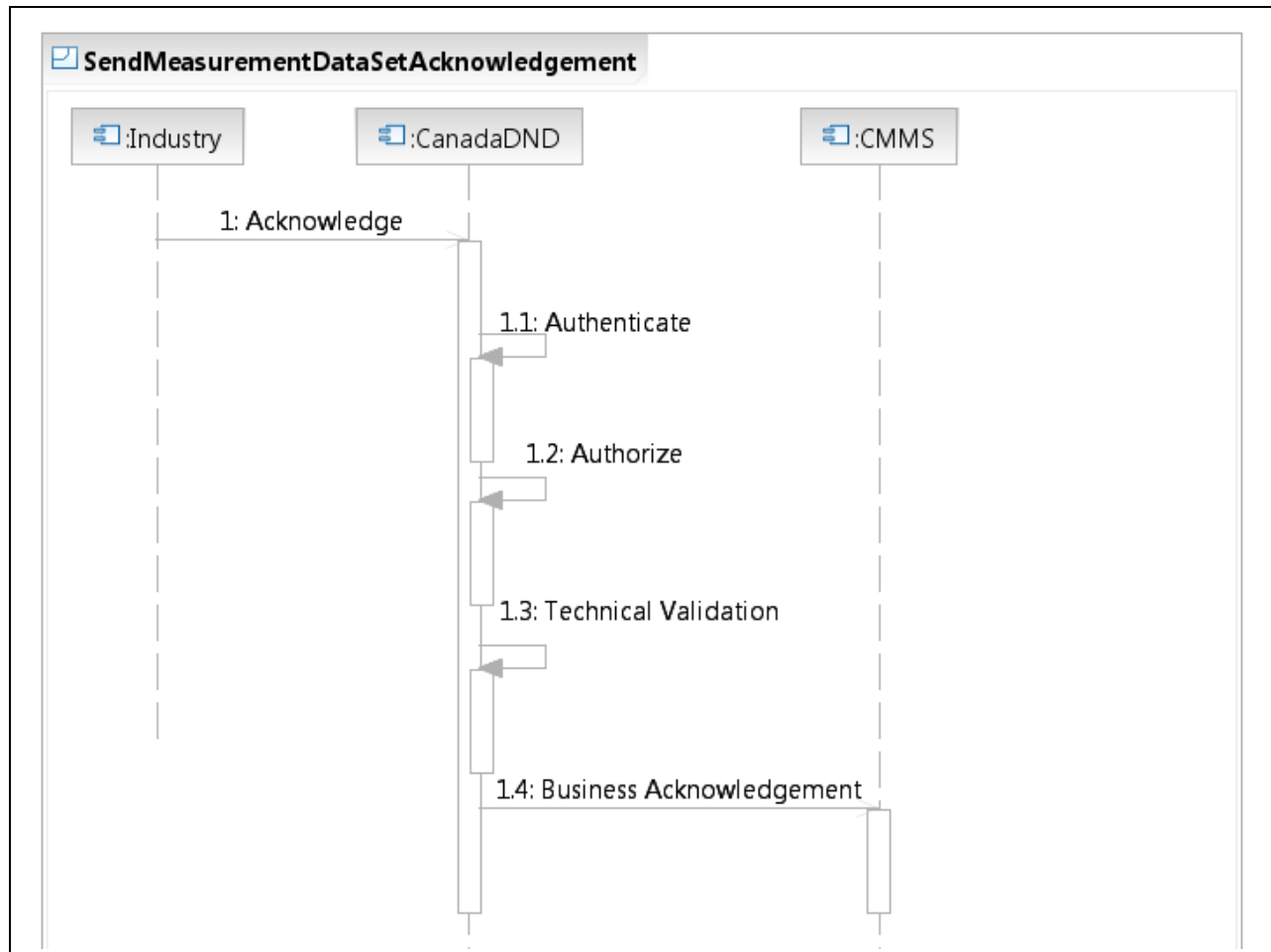
Figure 4-3 Send Measurement Data Set Business Acknowledgement Sequence

Main Flow	
Scenario	"Happy Day:" Industry successfully sends its Business Acknowledgement message to Canada.
Pre-Condition	Measurement Data Set has been received and processed by Industry.
Post-Condition	Acknowledgement successfully received by Canada EDE.

Steps	1) After a delay[4], Industry sends *Business* Acknowledgement to Canada EDE, indicating Business Objects within the Measurement Data Set message payload were successfully processed by invoking the Canada hosted and exposed Acknowledgement operation.
	2) Canada EDE successfully Authenticates the service consumer.
	3) Canada EDE successfully Authorizes use of the service/operation.
	4) Canada EDE conducts the required validations as per Service Interaction Model [Ref. 3]- Section Technical Delivery Phase
	5) Canada EDE sends a technical Acknowledgement to Industry, indicating successful receipt of the message.
	6/7) Canada EDE sends Biz Ack message to CMMS confirming Measurement data set consumed by Industry.

The following alternate scenarios are applicable for both the Send Measurement Data Set and Business Acknowledgment sequences presented above. Alternate Scenarios are written for the Canada-to-Industry Send Measurement Data Set message, but can be interpreted for Business Acknowledgement by reversing use of Canada EDE and Industry throughout.

4.4   Alternate Scenarios

Alternate Flow 1 (Authentication Failure)	
Scenario	Canada EDE does not provide appropriate credentials to Industry.
Pre-Condition	Canada EDE has invoked the Industry SendMeasurementDataSet service.
Post-Condition	The Industry System sends an Authentication Failure fault response.
Steps	1) The authentication credentials are either not provided or are incorrect.
	2) The Industry sends an Authentication Failure fault as the technical response.
	3) Canada EDE processes the fault.
Alternate Flow 2 (Authorization Failure)	
Scenario	Canada EDE is not authorized to use a service.
Pre-Condition	Canada EDE has invoked the Industry SendMeasurementDataSet service. Industry has completed Authentication successfully.
Post-Condition	The Industry System sends an Unauthorized Request fault as the technical response.
Steps	1) The request message does not pass Industry authorization.
	2) The Industry sends an Unauthorized Request fault as the technical response.
	3) Canada EDE processes the authorization failure.

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[4] Delay may be several days while business processing of Measurement data occurs.

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Alternate Flow 3 (Technical Validation Failure)	
Scenario	Canada EDE sends a malformed message to Industry.
Pre-Condition	Canada EDE has invoked the Industry SendMeasurementDataSet service. Industry has completed Authentication and Authorization successfully.
Post-Condition	The Industry sends a Malformed Message fault response.
Steps	1) The message does not pass validation as per agreed schema. (Regardless of the number and types of errors). 2) Industry sends schema validation error information as the technical response as the fault message as defined within the exposed interface. 3) Canada EDE processes the schema validation error.
Alternate Flow 4 (Business Validation Failure)	
Scenario	Business validations fail on one or more Measurement Document data records.
Pre-Condition	Main Flow (as above) has been completed. Measurement Document data records failed the Industry system's business validation process.
Post-Condition	The Industry System invokes Canada's Business Error Service.
Steps	1) Industry sends Business Error information by invoking the corresponding Canada Measurement Document Data Error service.
Alternate Flow 5 (Industry Service unresponsive)	
Scenario	Canada EDE does not receive technical response within ACK_TIME_INTERVAL
Pre-Condition	Canada EDE has invoked the Industry SendMeasurementDataSet service.
Post-Condition	Canada EDE marks the request as Dead Message.
Steps	1) Canada EDE does not receive any technical response from Industry within the allowed ACK_TIME_INTERVAL. 2) Canada EDE will retry sending the message up to the defined maximum retry count, or Time-to-Live interval, whichever comes first. 3) If there is no response, then Canada EDE marks the request message as Dead and handles it via the DeadMessageHandlerService

5 Information Model (General)

These services are responsible for exchange of Measurement Document records from Canada to Industry. A <u>functional view</u>[5] of the information model is provided in the Business Use Case [Ref. 1].

The purpose of this section is to provide a bridge between the functional view of the information model as presented in the business use case and the specifics of the design as expressed in an XML Schema.

In general a Measurement record consists of:

- An identifier (primary key) associated with the EMR/MER or FLOC;
- Measurement Documents.

In the case of an EMR/MER measurement, the Measurement record identifier is the EMR Key consisting of:

- Commercial And Government Entity (CAGE) code;
- Manufacturer Part Number (MPN); and
- Serial number.

In the case of a FLOC measurement the Measurement record identifier consists of:

- FLOC identifier.

Measurement Documents are collected against a defined **Measurement Point** that identifies the physical or logical location of the measure specific to the EMR/MER or FLOC. A Measurement record contains a Measurement Point record where each Measurement Point record contains one or more Measurement Documents.

A measurement document adds four fields that are used by Industry to correctly process the incoming request:

- *Action* – indicates if the exchange record is new, an edit to an existing record, or a deletion (reversal) of a prior exchange record;
- *RecordTimestamp* – the time the exchange record was captured in CMMS.
- *BusinessCorrelationID* – measurement extract identifier
- *BusinessSequenceNumber* – further refinement of measurement extract identifier required to ensure uniqueness

Within every Measurement record, the combination of [Identifier, RecordTimestamp, BusinessCorrelationID, BusinessSequenceNumber] must be unique.

Details are added in the following Service Description sections.

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[5] The Business Use Case defines the collection of fields which make up an EMR and FLOC measure and associated sub-records.

6 Service Inventory

Table 6-1 Maintenance Measurement Service

Service: Measurement_Industry_Service		
Provider	Consumer	Operation
Industry	Canada EDE	SendMeasurement
Service: MeasurementError_Canada_Service		
Provider	Consumer	Operation
Canada EDE	Industry	SendMeasurementAck
Canada EDE	Industry	SendMeasurementError

The Table 6-1 above provides the information exchange that is supported by the Maintenance Measurement Service. Each of these services is described in the following sections.

7 Service Description – Maintenance Measurement

7.1 Service Overview

7.1.1 Measurement (Canada to Industry)

This operation is used by Canada EDE to send the Measurement Document data set to Industry. Industry's implementation of this operation includes authentication, authorization and schema validation on the message.

If Industry accepts the message for further processing an output message is returned. If the content of the output indicates SUCCESS, Industry accepts custody of the message for further processing. If Industry does NOT accept the message, Industry will return one or more fault blocks.

For the Measurement service, Canada sends a measurement point as a sub-record of a parent Measurement, the parent record includes:

- An EMR Key or FLOC Identifier;
- Record timestamp - identifying time at which the business event triggered creation of the measurement exchange record;
- Business Correlation ID and Business Sequence Number – required to uniquely identify a Measurement record along with the measurement document number, as there may be more than one Measurement record with the same record timestamp
- Action - indicating whether this is a new record instance, an edit, a delete, or a snapshot action.

The measurement point sub-record within a Measurement includes:

- Measurement Point identifier fields (i.e., name, position, and descriptions); and
- Measurement Document sub-records containing the measurement details.

7.1.2 Acknowledgement (Industry to Canada)

This operation is used by Industry to send a Measurement Acknowledgement message to Canada EDE. Canada's implementation of this operation includes authentication, authorization and schema validation on the Measurement Acknowledgement message.

If Canada accepts the message for further processing an output message is returned. If the content of the output indicates SUCCESS, Canada accepts custody of the message for further processing. If Canada does NOT accept the message, Canada returns one or more fault blocks.

The Measurement acknowledgement allows Industry to report back a positive acknowledgment upon consuming the incoming Measurement message.

For a positive (successful) acknowledgement, Industry returns the following:

- Message Header;
- Measurement Identifier (EMR Key or FLOC Identifier and record timestamp, Business Correlation ID, Business Sequence Number, Measurement Document Number).

7.1.3   Error (Industry to Canada)

This operation is used by Industry to send a Measurement Error message to Canada EDE. Canada's implementation of this operation includes authentication, authorization and schema validation on the Notification User Status Error message.

If Canada accepts the message for further processing an output message is returned. If the content of the output indicates SUCCESS, Canada accepts custody of the message for further processing. If Canada does NOT accept the message, Canada returns one or more fault blocks.

The Notification User Status error allows Industry to report back business errors encountered while processing the business objects contained within the Notification User Status payload. Industry returns the following:

- Message Header;
- Security Classification; and
- Measurement Identifier (EMR Key or FLOC Identifier and record timestamp, Business Correlation ID, Business Sequence Number, Measurement Document Number).

- Errors encountered in processing.

7.1.4   Service Properties

Service Property	Description
Enterprise Service Name (Business)	Maintenance Measurement Service
Enterprise Service Name (Technical)	Measurement_Industry_Service
Purpose	This service supports the Canada Maintenance process. This service sends measurement data to Industry on a pre-negotiated schedule.
Service Domain	Maintain Platform
Business Owner	ADM (IM)
Service Grouping	Maintain Platform – Corrective and Preventive maintenance
Source Provider	Measurement – Industry
Target Service Consumers	Measurement – Canada
Business Process Supported (now)	Execute Corrective or Preventive Maintenance • Record Platform Usage and Faults • Execute Maintenance - Ship Staff/FMF • Execute Maintenance - ISS Contractor
Business Process Supported (future)	N/A.

Service Property	Description
Business Objective Supported	In order for Industry to perform under the constraints of the PBC contract, measurement data is sent to the industry. Industry uses this information to plan their inventories based on upcoming work and analyze performance of the maintenance tasks.
Expected life time	Full life-time of weapon systems using PBC.
Enterprise Service Name (Business)	Measurement Error Service
Enterprise Service Name (Technical)	MeasurementError_Canada_Service
Purpose	This service supports the Canada Maintenance process. This service receives measurement acknowledgement and error status from Industry on a pre-negotiated schedule.

7.2   Information Model

Within the scope of this service a Measurement exchange record contains one or more measurements for an EMR/MER or FLOC record.

7.2.1   Measurement

A Measurement Exchange record consists of:

- Message Header;
- One or more Measurement records.

A Measurement record includes all descriptive data about a measurement as identified during Functional analysis (please see Business Use Case for the functional view).

The Measurement exchange record information model is shown in Figure 7-1 below.

Figure 7-1 Information Model – Measurement

7.2.2   Measurement Acknowledgement

A Measurement Acknowledgement comprises:

- Measurement identifier (FLOC_ID or EMR key);
- Record timestamp, Business Correlation ID, Business Sequence Number, Measurement Document Number;
- Status (Success).

The Measurement acknowledgement information model is shown in Figure 7-2 below:

Figure 7-2 Information Model – Measurement Ack

7.2.3   Measurement Error

A Measurement Error comprises:

- Measurement identifier (FLOC_ID or EMR key)
- Record timestamp, Business Correlation ID, Business Sequence Number, Measurement Document Number
- Errors
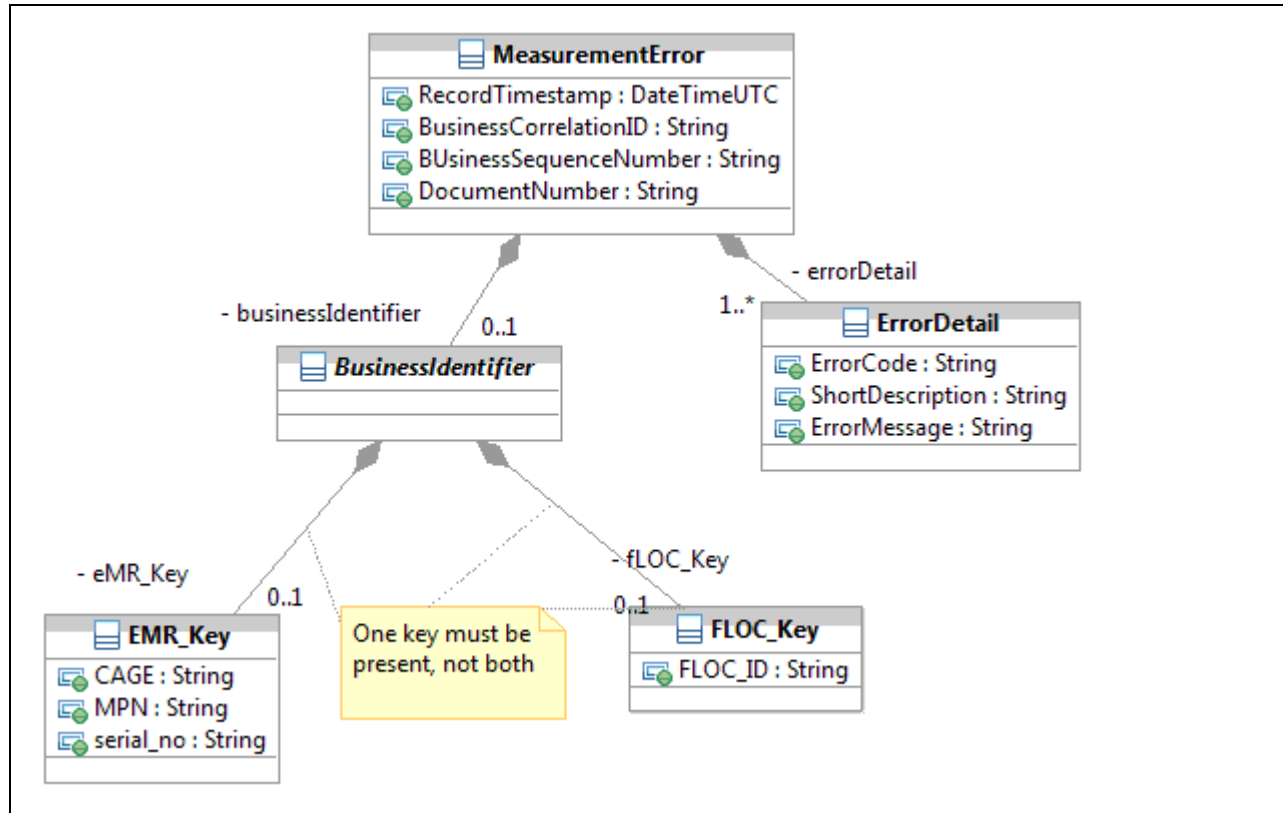
The Measurement error information model is shown in Figure 7-3 below:

Figure 7-3 Information Model – Measurement Error

7.3   Operation Message Model

This section describes how the business objects described in Section 7.2.1 are aggregated for the purpose of reliable information exchange.

Since EIE Supply services are request/response, each operation requires input, output and fault message definitions. Message definitions use a common message header definition, as well as a common security block definition. Please refer to Electronic Information Exchange Service Interaction Model [Ref. 3] for details on message header and security block definition.

7.3.1   Send Measurement Request

7.3.1.1 Measurement Input Body

A Measurement Input body consists of:

- A Message header;
- A Security Block;
- A collection of Measurement records.

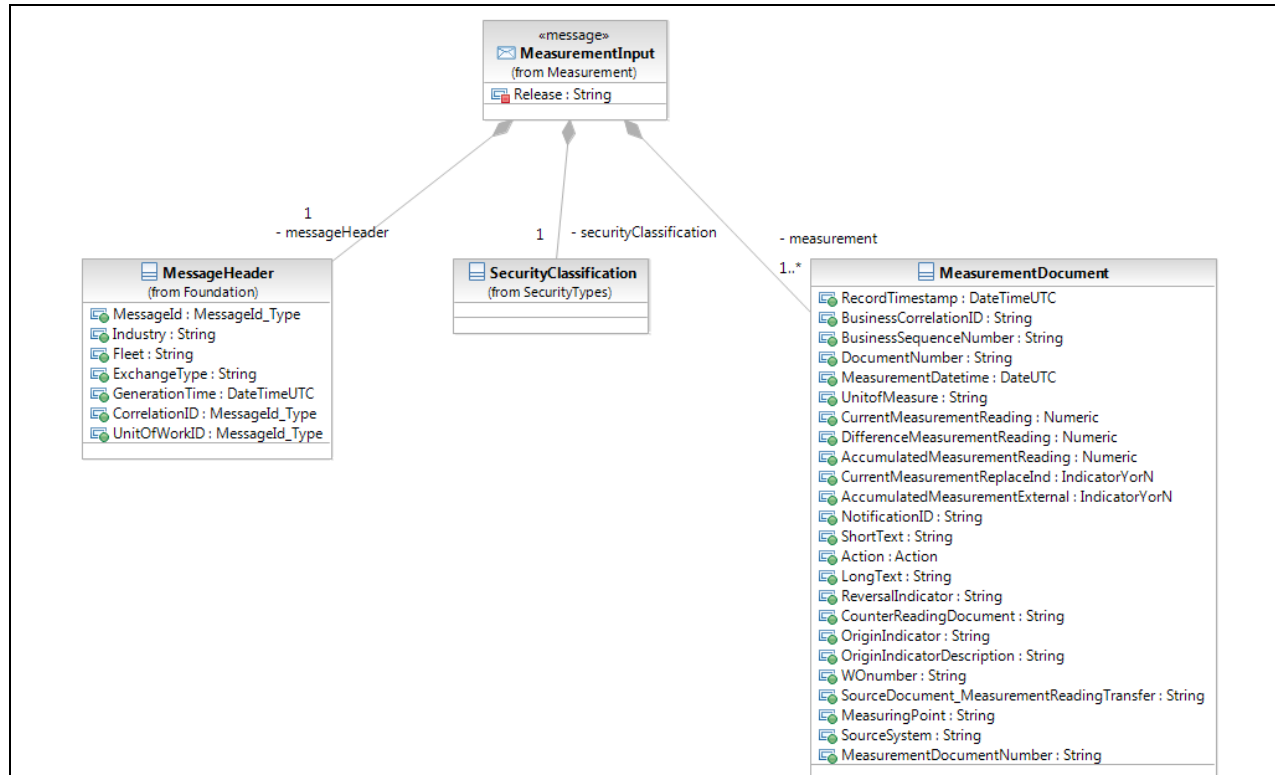A Measurement Request Input Body exchange message diagram is shown in Figure 7-4.

Figure 7-4 Exchange Message – Send Measurement Request Input Body

7.3.1.2 Measurement Output Body

The output of the Measurement Request operation is the MeasurementOutputBody.

A Measurement output body consists of:

- A Message header; and
- A Custody field indicating acceptance. The Measurement message is accepted in its entirety only

The output message has no security block. The output message type does not contain any sensitive or protected information.

This output body definition is used across all Measurement services.

A Measurement Request Output Body message exchange diagram is shown in Figure 7-5.
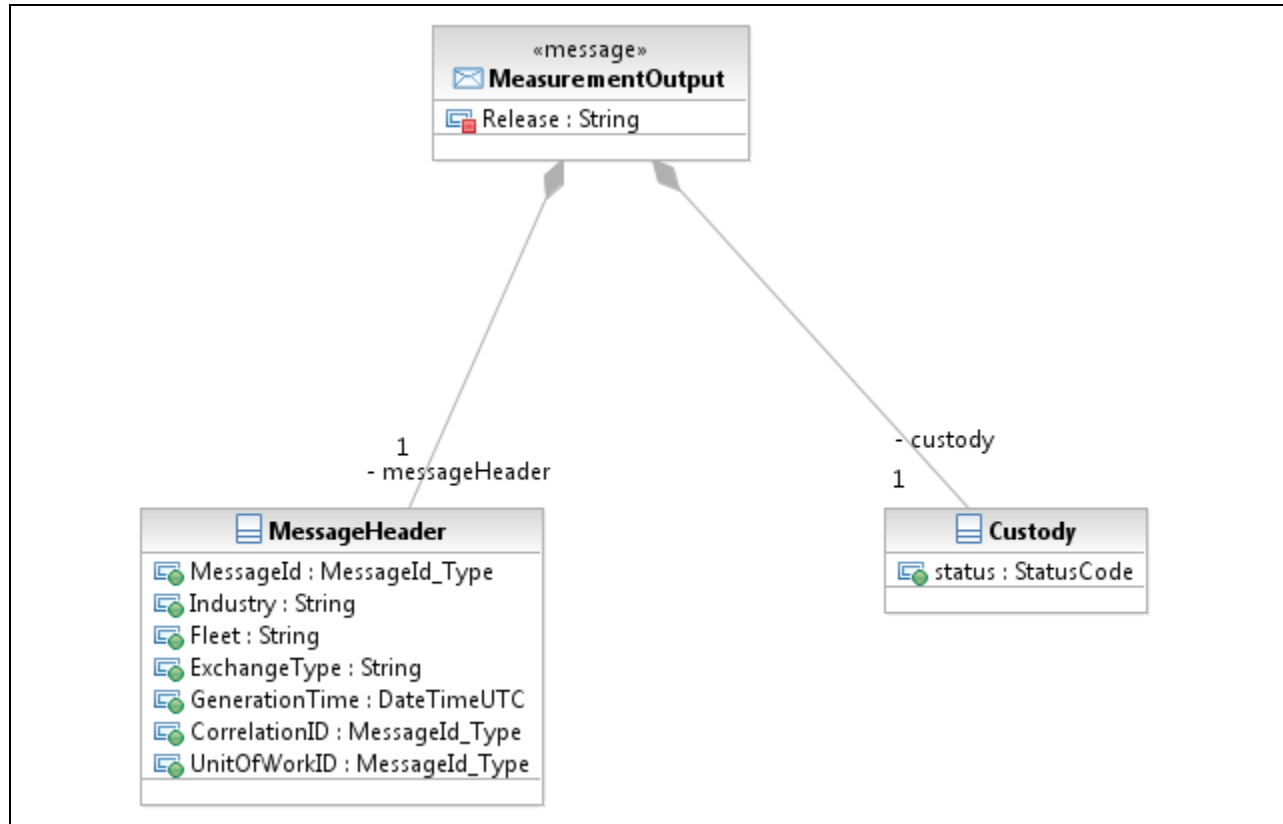
Figure 7-5 Exchange Message – Send Measurement Request Output Body

For Measurement OutputBody:

- The MessageHeader Correlation ID will reflect the Message ID of the originating input message;

- The MessageID is a newly generated UUID;

- UnitofWorkID is not used or applicable for this type of message;

- The MessageHeader Exchange Type must be set to the Exchange Type of the Input message;

- The value of the MeasurementOutput 'Custody' evaluates to "success".

7.3.1.3 Measurement Fault Body

A Measurement Fault body consists of:

- A Message Header;

- A Security Block;

- One or more Fault Block's.

Each fault block pertains to zero to many business objects, to the level of granularity which the Service Provider can provide. If the system cannot determine a Business Identifier then this is omitted. To report differing faults on more than one business object extra fault blocks can be included in the fault message.

Note: Follow implementation direction as per the Service Interaction Model [Ref. 3] for the Fault Message in addition to what has been specified above.

This fault body definition is used across all Measurement services.

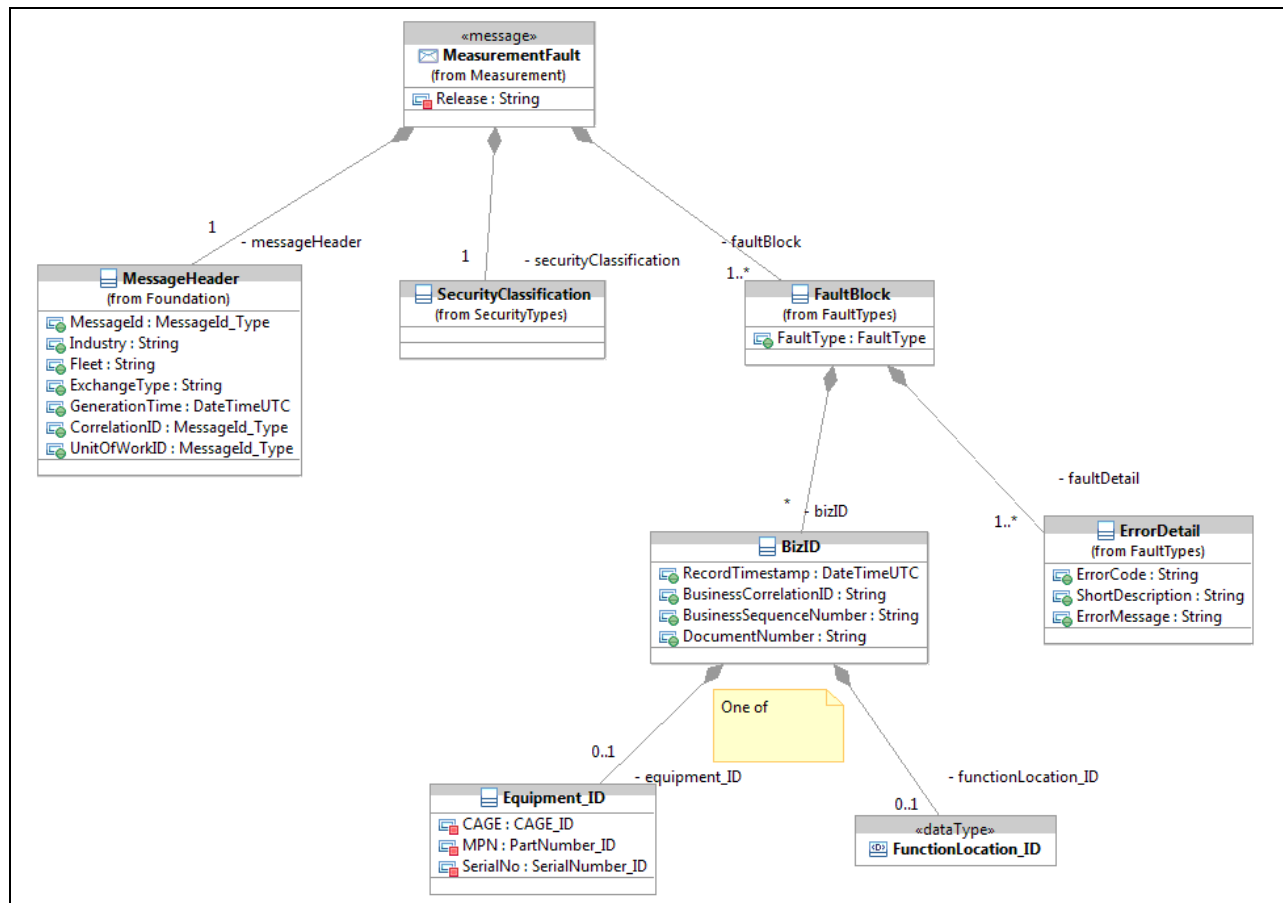A Measurement Request Fault Body message exchange diagram is shown in Figure 7-6.

Figure 7-6 Exchange Message – Send Measurement Request Fault Body

For a Measurement FaultBody:

- The MessageHeader Correlation ID will reflect the Message ID of the originating Measurement input message;

- The MessageID is a newly generated UUID;

- UnitofWorkID is not used;

- The MessageHeader Exchange Type must be set to the Exchange Type of the Measurement InputBody.

Please note that this is a common Fault Body definition used through all Measurement fault messages.

7.3.2 Send Measurement Acknowledgement Request

7.3.2.1 Measurement Acknowledgement Input Body

A Measurement Acknowledgement Input body uses a common input Body definition, which consists of:

- A Message header;
- A set of Measurement Acknowledgement blocks which may be comprised of the following:
  - Measurement identifier (Cage, MPN, Serial, or FLOC_ID and Record Timestamp, Business Correlation ID, Business Sequence Number, Measurement Document Number)
  - Status (Success)

A Measurement Acknowledgement message exchange diagram is shown in Figure 7-7.
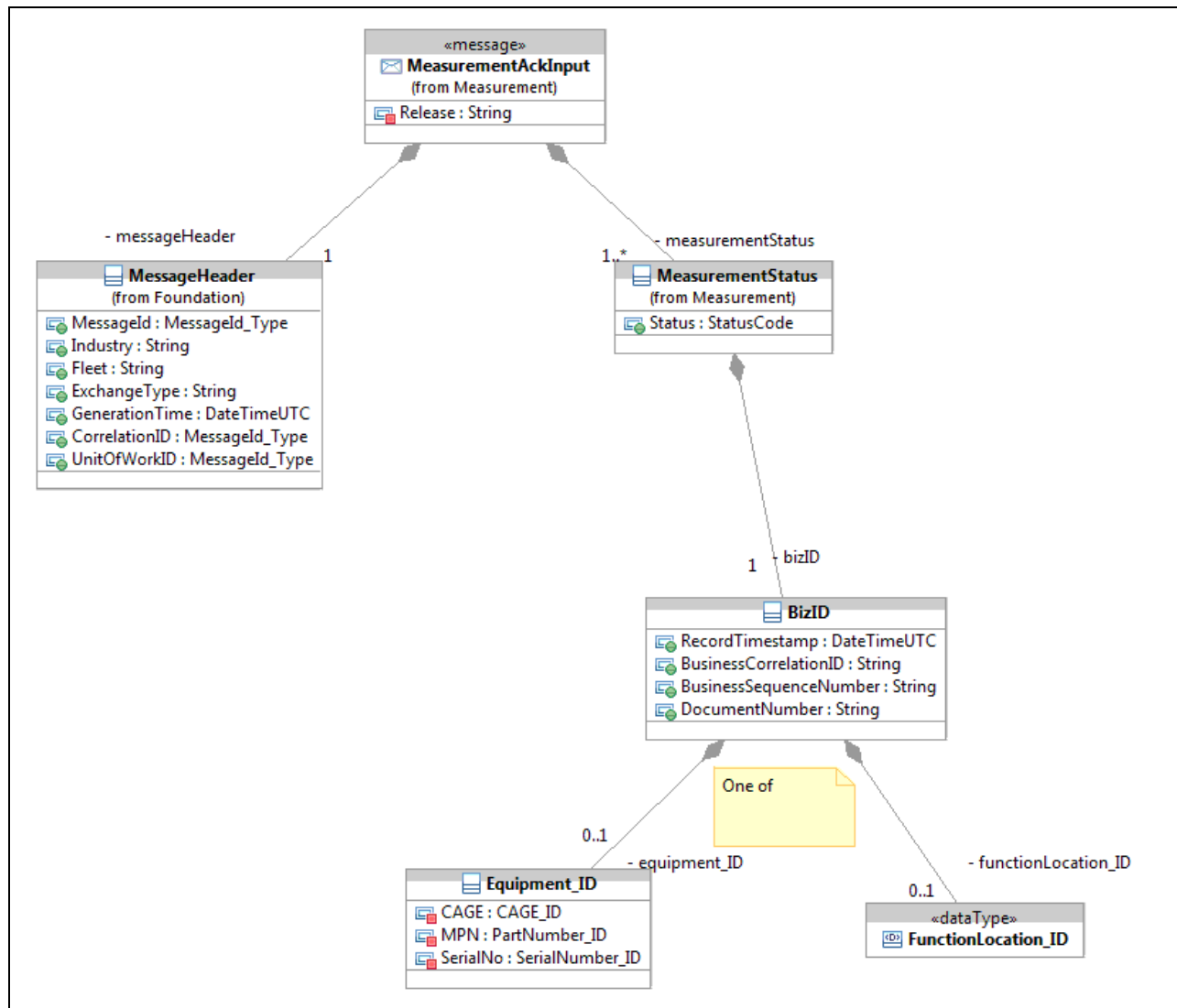

Figure 7-7 Exchange Message – Send Measurement Acknowledgement

7.3.2.2 Measurement Acknowledgement Output Body

Please refer to [7.3.1.2 Measurement Output Body](#) for this definition.

7.3.2.3 Measurement Acknowledgement Fault Body

Please refer to [7.3.1.3 Measurement Fault Body](#) for this definition.

7.3.3   Send Measurement Error Request

7.3.3.1 Measurement Error Input Body

A Measurement Error Input Body uses a common Measurement Error Input Body definition, which is comprised of the following:

- A Message header;
- A Security Block;
- A set of errors identified by Business ID.

A Measurement Error message exchange diagram is shown in Figure 7-8.
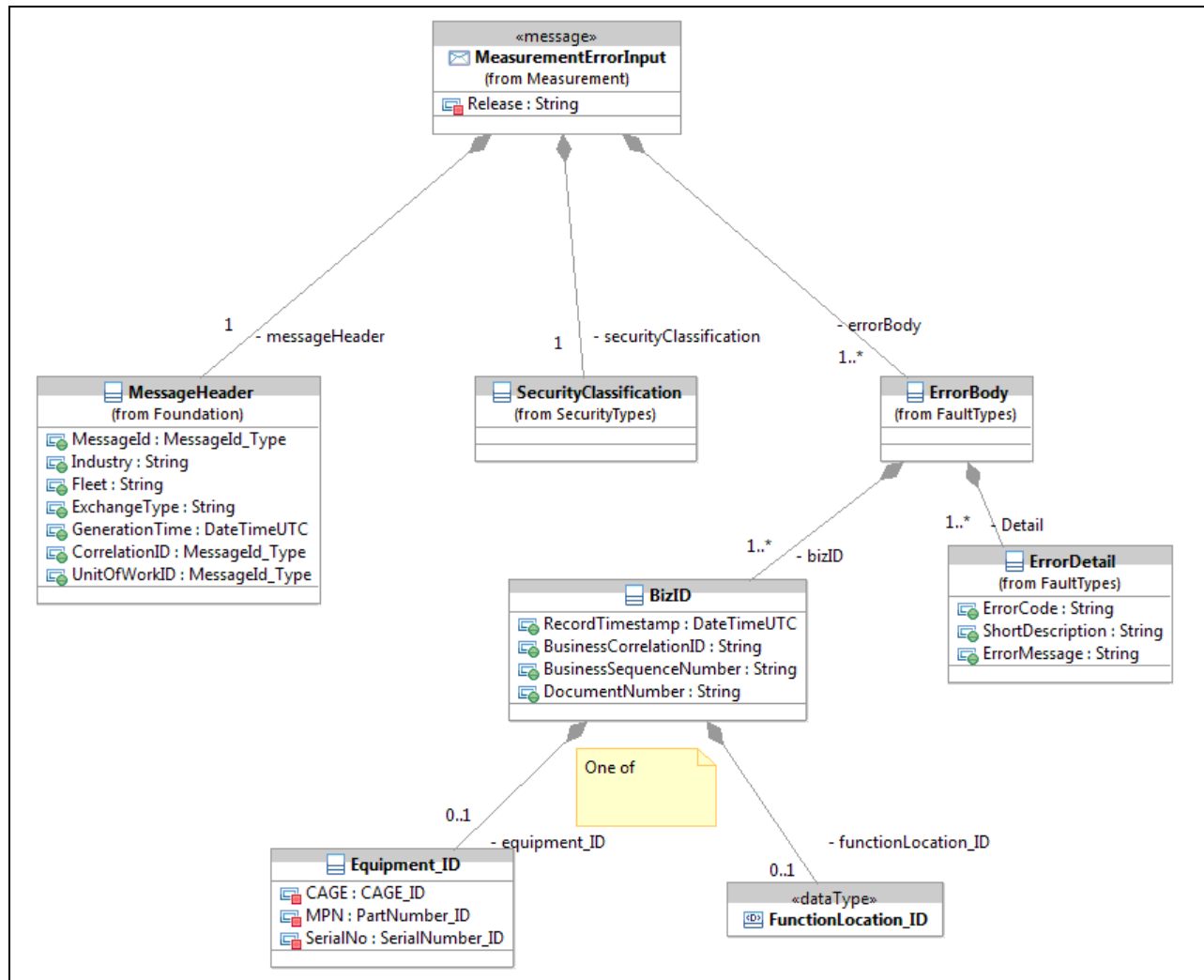
Figure 7-8 Exchange Messages – Send Measurement Error

The error input body consists of:

- A Message Header;
- A Security Block;
- One or more Error body.
- Within the Error Body, at least one BizID must be provided, along with at least one ErrorDetail block.
    - If appropriate, multiple BizIDs may be provided referencing a common error(s).
    - If appropriate, multiple errors can be defined within the error body. These errors would apply to all BizIDs defined within the ErrorBody construct.

Each error pertains to one or more business objects, to the level of granularity which the Service consumer can provide. To report differing errors on more than one business object extra error blocks can be included in the error input message.

7.3.3.2 Measurement Error Output Body

Please refer to [7.3.1.2 Measurement Output Body](#) for this definition.

7.3.3.3 Measurement Error Fault Body

Please refer to [7.3.1.3 Measurement Fault Body](#) for this definition.

7.4 Service Operations

7.4.1 Detailed Operation Characteristics – SendMeasurement

Each operation will have the detailed characteristics described in the following tables.

Details of non-functional requirements may vary depending on Industry and fleet.

Interface Definition	Description
Operation Name	Send Measurement
Operation Technical Name	SendMeasurement
Operation Description	This operation is invoked to send one or more Measurement records to Industry by Canada, subject to size and delay constraints for the Fleet and Industry.
Target Operation Provider	Industry
Target Operation Consumer	EDE
Properties	*Request/Response* message exchange pattern.
Input Message Definition	Please refer to operation message model Section 7.3.1.1 for details. Refer to Measurement_Industry.wsdl for implementation details
Output Message Definition	Please refer to operation message model Section 7.3.1.2 for details. Refer to Measurement_Industry.wsdl for implementation details
Fault Definition	Please refer to operation message model Section 7.3.1.3 for details. Refer to Measurement_Industry.wsdl for implementation details

Non-Functional Requirements/Technical Details	
Frequency	Initially once per day.
Peak Throughput Time	Expected to be off-peak, e.g. after ZULU 01:00 and before ZULU 11:00 ZULU
Peak Throughput Volume	Based on Service Level Agreements (SLA) to be determined between Canada and Industry on a per ship class basis.

Payload Size	A Measurement record is less than 3 KB per record.
Attachments	None
Attachment Size	N/A
ACK Time Interval	5 minutes
Retry Time Interval	15 minutes
Biz. Response Time Interval	N/A
Time to Live Span	24 hours
Service Op Availability	During core processing hours. The specific period will be defined during later phases of service realization 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.

7.4.2   Detailed Operation Characteristics – SendMeasurementAck

Each operation will have the detailed characteristics described in the following tables.

Details of non-functional requirements may vary depending on Industry and fleet.

Interface Definition	Description
Operation Name	Send Measurement Acknowledgement
Operation Technical Name	SendMeasurementAck
Operation Description	This operation is invoked to acknowledge a measurement message to Canada by Industry.
Target Operation Provider	EDE
Target Operation Consumer	Industry
Properties	*Request/Response* message exchange pattern.
Input Message Definition	Please refer to operation message model Section 7.3.2.1 for details. Refer to Measurement_Canada.wsdl for implementation details
Output Message Definition	Please refer to operation message model Section 7.3.2.2 for details. Refer to Measurement_Canada.wsdl for implementation details
Fault Definition	Please refer to operation message model Section 7.3.3.3 for details. Refer to Measurement_Canada.wsdl for implementation details

Non-Functional Requirements/Technical Details	
Frequency	Initially once per day.
Peak Throughput Time	Expected to be off-peak, e.g. after ZULU 01:00 and before ZULU 11:00 ZULU
Peak Throughput Volume	Based on Service Level Agreements (SLA) to be determined between Canada and Industry on a per ship class basis
Payload Size	A Measurement Acknowledge record is <1KB.
Attachments	None
Attachment Size	N/A
ACK Time Interval	5 minutes
Retry Time Interval	15 minutes
Biz. Response Time Interval	N/A
Time to Live Span	24 hours
Service Op Availability	During core processing hours. The specific period will be defined during later phases of service realization 95% available uptime is the goal of the service
Downtime Requirements	The service cannot be used during established maintenance windows, which is currently expected to be for about 2 hours per week. The unavailability window may be accumulated and invoked during major maintenance periods, but ensuring that the overall availability of the service is still maintained.

7.4.3   Detailed Operation Characteristics - SendMeasurementError

Interface Definition	Description
Operation Name	Send Measurement Error
Operation Technical Name	SendMeasurementError
Operation Description	This operation is invoked to send one or more Error records to Canada by Industry.
Target Operation Provider	Canada EDE
Target Operation Consumer	Industry
Properties	*Request/Response* message exchange pattern.
Input Message Definition	Please refer to operation message model Section 7.3.3.1 for details. Refer to Measurement_Canada.wsdl for implementation details
Output Message Definition	Please refer to operation message model Section 7.3.3.2 for details.

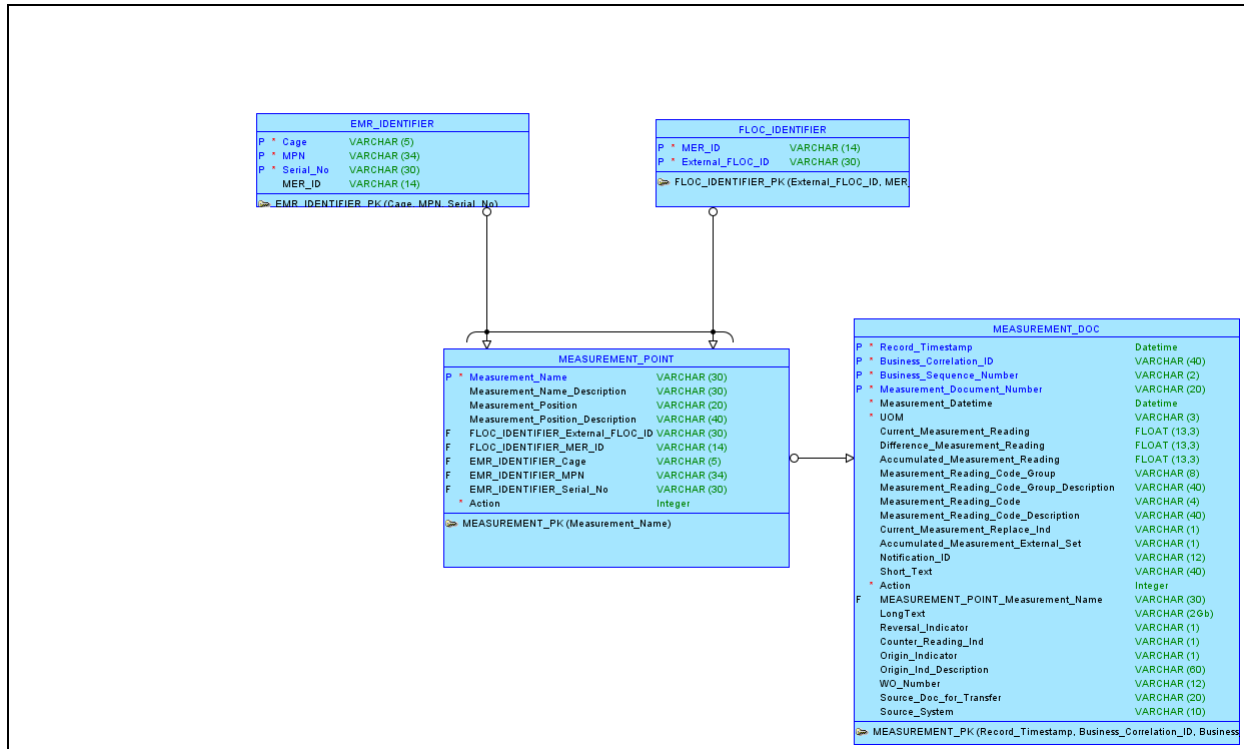| Interface Definition	Description
	Refer to Measurement_Canada.wsdl for implementation details
Fault Definition	Please refer to operation message model Section 7.3.3.3 for details.
	Refer to Measurement_Canada.wsdl for implementation details

For Non-Functional Requirements see Section 7.4.2.

8   Definitions, Acronyms, Abbreviations

Term	Description
CAGE	Commercial And Government Entity
CMMS	Canada Maintenance Management System
EDE	Electronic Data Exchange
EIE	Electronic Information Environment
EMR	Equipment Master Record
FLOC	Functional Location
FMF	Fleet Maintenance Facility
FMEA	Failure Mode and Effects Analysis
Industry	The industry contracted to provide support to Canada according to PBC
ISS	In Service Support
MER	Master Equipment Record
MPN	Manufacturer Part Number
PBC	Performance based contracting
WS	Weapon System

9   Appendix A - Entity Relationship Model

Information Model – Entity-Relationship View

10   Document History

Revision Number	Description	Date
1.0	Ready for Navy RFP	13 October 2015