Rosetta/Mars Express Mission Control System (RMCS/MEMCS)

Data Delivery Interface Document (Appendix I)

XML Schema

RO-ESC-IF-5003 / MEX-ESC-IF-5003

Issue B5

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Document Change Record

Date	Issue	Rev. No	Section Affected	Description/Reason
20/07/01	Issue B1	-		Initial version. Issue number aligned with main DDID
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26/06/02	Issue B4	DCR No 131 139		Updated according to CRID/DDID CCB 10 June 2002
26/03/03	Issue B5	DCR No 223		Updated in line with Rosetta/MEX changes to the GDDS software.

Table Of Contents

1. Introduction

1.1 Purpose

This document is an Appendix to the Rosetta/Mars Express Data Delivery Interface Document

The purpose of this document is to define the XML schema for the data delivery interfaces.

This schema may be used by external users to ensure correct support of the published interface.

1.2 Scope

The format of the following types of data are defined in this document.

a) On-line Data Request

b) Acknowledgement

c) Catalogue Entry

1.3 Summary

This document the Data Delivery Interface Document (DDID) is the Interface Control Document (ICD) governing the data delivery of the R(ME)MCS to the PIs.

1.4 Amendment History

This is the first issue of this appendix – introduced with a file based request mechanism based on XML.

1.5 Change Forecast

No major updates are currently planned.

Potentially XML will be used in place of SFDU in the distant future.

1.6 Applicable and Reference Documents

This document is an appendix to:

> Rosetta / Mars Express Data Delivery Interface Document, RO-ESC-IF-5003/MEX-ESC-IF-5003, Issue B5, 27th March 2003

Please see parent document for full list of applicable and reference documents.

1.7 Abbreviation

All abbreviations and acronyms used in this document are explained in Applicable Document A-5.

2. Schema

2.1 GDDSCommon.xsd

2.1.1 Description

This schema defines some basic common used types.

2.1.2 Includes

MissionDataDef.xsd (see section 2.3).

2.1.3 Types defined

Name	Description
ReqString	A string with a minimum length of 1.
MultiTime	Allows a choice of time representation.
RDMDeliveryType	Contains fields relevant to RDM delivery.
OnlineDeliveryType	Contains fields relevant to Online delivery.
FTPDeliveryType	Contains fields relevant to FTP delivery.
DeliveryMethod	Enumeration of possible delivery methods.
DeliveryType	TBD
listOFDeliveryMethods	List of delivery methods.
DeliveryType	Allows a choice of delivery method.
CompressionType	Enumeration of possible compression methods.
listOfCompressionTypes	List of compression methods.
UserInfoType	Contains information about the user.
FormatInfoType	Contains fields relevant to formatting.
DataInfoType	Contains additional fields relevant to when the request is processed..
RequestInfoType	Contains fields relevant to the overall request.

2.1.4 Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

 <xsd:annotation>
  <xsd:documentation xml:lang="en">
```

```
 </xsd:documentation>
</xsd:annotation>

<xsd:include schemaLocation="MissionDataDef.xsd"/>

<xsd:simpleType name="ReqString">
 <xsd:restriction base="xsd:string">
   <xsd:minLength value="1"/>
 </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="MultiTime">
 <xsd:sequence>
  <xsd:choice>
   <xsd:element name="a_dateTime" type="xsd:dateTime"/>
   <xsd:element name="a_duration" type="xsd:duration"/>
  </xsd:choice>
 </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="RDMDeliveryType">
 <xsd:attribute name="label" type="ReqString" use="required"/>
 <xsd:attribute name="numCopies" type="xsd:positiveInteger" default="1"/>
 <xsd:attribute name="maxSpan" type="xsd:positiveInteger" default="1"/>
</xsd:complexType>

<xsd:complexType name="OnlineDeliveryType">
 <xsd:sequence>
  <xsd:element name="dataResponse" type="xsd:hexBinary" minOccurs="0" maxOccurs="1"/>
 </xsd:sequence>
 <xsd:attribute name="displayAsHex" type="xsd:boolean" use="required"/>
</xsd:complexType>

<xsd:complexType name="FTPDeliveryType">
 <xsd:sequence>
  <xsd:element name="filename" type="ReqString"/>
  <xsd:element name="directory" type="xsd:string"/>
  <xsd:element name="target" type="ReqString" minOccurs="0" maxOccurs="1"/>
 </xsd:sequence>
</xsd:complexType>

<xsd:simpleType name="DeliveryMethod">
 <xsd:restriction base="xsd:string">
   <xsd:enumeration value="RDM"/>
   <xsd:enumeration value="FTP"/>
   <xsd:enumeration value="Online"/>
 </xsd:restriction>
</xsd:simpleType>
```

```
<xsd:complexType name="DeliveryType">
 <xsd:sequence>
  <xsd:choice>
   <xsd:element name="RDM" type="RDMDeliveryType"/>
   <xsd:element name="FTP" type="FTPDeliveryType"/>
   <xsd:element name="Online" type="OnlineDeliveryType"/>
  </xsd:choice>
 </xsd:sequence>
</xsd:complexType>

<xsd:simpleType name="listOfDeliveryMethods">
 <xsd:list itemType="DeliveryMethod"/>
</xsd:simpleType>

<xsd:simpleType name="CompressionType">
 <xsd:restriction base="xsd:string">
   <xsd:enumeration value="NONE"/>
   <xsd:enumeration value="ZIP"/>
 </xsd:restriction>
</xsd:simpleType>

<xsd:simpleType name="listOfCompressionTypes">
 <xsd:list itemType="CompressionType"/>
</xsd:simpleType>

<xsd:complexType name="UserInfoType">
 <xsd:sequence>
  <xsd:element name="username" type="ReqString"/>
  <xsd:element name="FTPpassword" type="xsd:string"/>
 </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="FormatInfoType">
 <xsd:sequence>
  <xsd:element name="compression" type="CompressionType"/>
  <xsd:element name="SFDUrequired" type="xsd:boolean"/>
  <xsd:element name="missionFormat" type="MissionFormatType" minOccurs="0" maxOccurs="1"/>
 </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="DataInfoType">
 <xsd:sequence>
   <xsd:element name="earliestStart" type="xsd:dateTime" minOccurs="0" maxOccurs="1"/>
 </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="RequestInfoType">
```

```
            <xsd:sequence>
             <xsd:element name="comment" type="xsd:string"/>
             <xsd:element name="userInfo" type="UserInfoType"/>
             <xsd:element name="destInfo" type="DeliveryType"/>
             <xsd:element name="formatInfo" type="FormatInfoType"/>
             <xsd:element name="dataInfo" type="DataInfoType"/>
            </xsd:sequence>
           </xsd:complexType>

          </xsd:schema>
```

2.2 GDDSMission.xsd

2.2.1 Description

This schema defines the mission specific types.

2.2.2 Includes

GDDSCommon.xsd (see section 2.1)

2.2.3 Types defined

Name	Description
RequestKeywordValue	List of possible request keywords.
FilterKeywordValue	List of possible filter keywords.
CatalogueKeywordValue	List of possible catalogue keywords.
EventValue	List of possible event keywords.

2.2.4 Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

 <xsd:annotation>
  <xsd:documentation xml:lang="en">
  </xsd:documentation>
 </xsd:annotation>

 <xsd:include schemaLocation="GDDSCommon.xsd"/>

 <xsd:complexType name="RequestKeywordValue">
  <xsd:sequence>
   <xsd:choice>
    <xsd:element name="SampleRate" type="xsd:positiveInteger"/>
    <xsd:element name="MaxVolumeSize" type="xsd:positiveInteger"/>
    <xsd:element name="TimeType" type="xsd:string"/>
   </xsd:choice>
  </xsd:sequence>
 </xsd:complexType>
```

```
<xsd:complexType name="FilterKeywordValue">
 <xsd:sequence>
  <xsd:choice>
   <xsd:element name="SourcePktsGenTime" type="MultiTime"/>
   <xsd:element name="S2KPktsGenTime" type="MultiTime"/>
   <xsd:element name="Type" type="xsd:integer"/>
   <xsd:element name="SubType" type="xsd:integer"/>
   <xsd:element name="P1Val" type="xsd:integer"/>
   <xsd:element name="P2Val" type="xsd:integer"/>
   <xsd:element name="Name" type="xsd:string"/>
   <xsd:element name="CreationTime" type="MultiTime"/>
   <xsd:element name="UplinkTime" type="MultiTime"/>
   <xsd:element name="ExecutionTime" type="MultiTime"/>
   <xsd:element name="TimeSpan" type="MultiTime"/>
   <xsd:element name="Release" type="xsd:string"/>
   <xsd:element name="Validity" type="xsd:boolean"/>
   <xsd:element name="Issue" type="xsd:string"/>
   <xsd:element name="VolumeSize" type="xsd:nonNegativeInteger"/>
  </xsd:choice>
 </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="CatalogueKeywordValue">
 <xsd:sequence>
  <xsd:choice>
   <xsd:element name="SourcePktsGenStartTime" type="MultiTime"/>
   <xsd:element name="SourcePktsGenEndTime" type="MultiTime"/>
   <xsd:element name="SourcePktsGenTime" type="MultiTime"/>
   <xsd:element name="S2KPktsGenTime" type="MultiTime"/>
   <xsd:element name="S2KPktsGenStartTime" type="MultiTime"/>
   <xsd:element name="S2KPktsGenEndTime" type="MultiTime"/>
   <xsd:element name="Type" type="xsd:integer"/>
   <xsd:element name="SubType" type="xsd:integer"/>
   <xsd:element name="P1Val" type="xsd:integer"/>
   <xsd:element name="P2Val" type="xsd:integer"/>
   <xsd:element name="StartTime" type="MultiTime"/>
   <xsd:element name="EndTime" type="MultiTime"/>
   <xsd:element name="SampleRate" type="xsd:positiveInteger"/>
   <xsd:element name="SampleSize" type="xsd:nonNegativeInteger"/>
   <xsd:element name="Name" type="xsd:string"/>
   <xsd:element name="CreationTime" type="MultiTime"/>
   <xsd:element name="UplinkTime" type="MultiTime"/>
   <xsd:element name="ExecutionTime" type="MultiTime"/>
   <xsd:element name="TimeSpan" type="MultiTime"/>
   <xsd:element name="TimeType" type="xsd:string"/>
   <xsd:element name="TimeSpan" type="MultiTime"/>
   <xsd:element name="Release" type="xsd:string"/>
```

```
    <xsd:element name="Validity" type="xsd:string"/>
    <xsd:element name="Issue" type="xsd:string"/>
    <xsd:element name="VolumeSize" type="xsd:nonNegativeInteger"/>
   </xsd:choice>
  </xsd:sequence>
 </xsd:complexType>

 <xsd:complexType name="EventValue">
  <xsd:sequence>
   <xsd:choice>
    <xsd:element name="Volume" type="xsd:positiveInteger"/>
   </xsd:choice>
  </xsd:sequence>
 </xsd:complexType>
</xsd:schema>
```

2.3 MissionDataDef.xsd

2.3.1 Description

This schema defines mission specific data type restrictions.

2.3.2 Includes

None.

2.3.3 Types defined

Name	Description
`MissionFormatType`	Ernumeration of mission-specific formatting options.
`DataType`	Enumeration of mission-specific high level data types.

2.3.4 Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

 <xsd:annotation>
  <xsd:documentation xml:lang="en">
  </xsd:documentation>
 </xsd:annotation>

 <xsd:simpleType name="MissionFormatType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="RMCS_SPECIAL"/>
  </xsd:restriction>
 </xsd:simpleType>
<xsd:simpleType name="DataType">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="TLM"/>
    <xsd:enumeration value="CMH"/>
    <xsd:enumeration value="AUX"/>
  </xsd:restriction>
 </xsd:simpleType>

</xsd:schema>
```

2.4 GDDSCatalogue.xsd

2.4.1 Description

This schema defines the types used in catalogue responses.

2.4.2 Includes

GDDSMission.xsd (see section 2.2)

2.4.3 Types defined

Name	Description
`CatalogueItemType`	Contains fields for one catalogue entry.
`CatalogueType`	Container for multiple catalogue entries.

2.4.4 Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

 <xsd:annotation>
  <xsd:documentation xml:lang="en">
  </xsd:documentation>
 </xsd:annotation>

 <include schemaLocation="GDDSMission.xsd"/>

 <xsd:element name="catalogue" type="CatalogueType"/>

 <xsd:complexType name="CatalogueItemType">
  <xsd:sequence>
   <xsd:element name="dataType" type="DataType"/>
   <xsd:element name="dataSource" type="ReqString"/>
   <xsd:element name="ADID" type="xsd:string"/>
   <xsd:element name="keyword" type="CatalogueKeywordValue" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
 </xsd:complexType>

 <xsd:complexType name="CatalogueType">
  <xsd:sequence>
   <xsd:element name="catEntry" type="CatalogueItemType" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
```

```
 </xsd:complexType>


</xsd:schema>
```

2.5 GDDSRequest.xsd

2.5.1 Description

This schema defines types used in requesting data from the DDS.

2.5.2 Includes

GDDSMission.xsd (see section 2.2)

2.5.3 Types defined

Name	Description
`LeafOperationType`	Enumeration of possible leaf node operations.
`UnaryOperationType`	Enumeration of possible unary node operations.
`BinaryOperationType`	Enumeration of possible binary node operations.
`FilterExpression`	Recursive structure for representing filter expressions.
`UnaryNodeType`	Associates a contained filter expression with a unary node operation.
`BinaryNodeType`	Associates two filter expressions with a binary node operation.
`LeafNodeType`	Associates a value pair with a leaf node operation.
`DataItemType`	Contains fields relevant to a single data request.
`OnlineRequestType`	Contains fields relevant to a complete request and multiple data requests.

2.5.4 Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

 <xsd:annotation>
  <xsd:documentation xml:lang="en">
  </xsd:documentation>
 </xsd:annotation>

 <include schemaLocation="GDDSMission.xsd"/>



 <xsd:element name="onlineRequest" type="OnlineRequestType"/>
```

```
<xsd:simpleType name="LeafOperationType">
 <xsd:restriction base="xsd:string">
   <xsd:enumeration value="OP_GT"/>
   <xsd:enumeration value="OP_LT"/>
   <xsd:enumeration value="OP_EQ"/>
   <xsd:enumeration value="OP_GTE"/>
   <xsd:enumeration value="OP_LTE"/>
 </xsd:restriction>
</xsd:simpleType>

<xsd:simpleType name="UnaryOperationType">
 <xsd:restriction base="xsd:string">
   <xsd:enumeration value="OP_NOT"/>
 </xsd:restriction>
</xsd:simpleType>

<xsd:simpleType name="BinaryOperationType">
 <xsd:restriction base="xsd:string">
   <xsd:enumeration value="OP_AND"/>
   <xsd:enumeration value="OP_OR"/>
 </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="FilterExpression">
 <xsd:sequence>
  <xsd:choice>
   <xsd:element name="unary" type="UnaryNodeType"/>
   <xsd:element name="bin" type="BinaryNodeType"/>
   <xsd:element name="leaf" type="LeafNodeType"/>
  </xsd:choice>
 </xsd:sequence>
</xsd:complexType>

<xsd:complexType name="UnaryNodeType">
 <xsd:sequence>
  <xsd:choice>
   <xsd:element name="unary" type="UnaryNodeType"/>
   <xsd:element name="bin" type="BinaryNodeType"/>
   <xsd:element name="leaf" type="LeafNodeType"/>
  </xsd:choice>
 </xsd:sequence>
 <xsd:attribute name="operation" type="UnaryOperationType" use="required"/>
</xsd:complexType>

<xsd:complexType name="BinaryNodeType">
```

```
  <xsd:sequence>
   <xsd:element name="lhs" type="FilterExpression"/>
   <xsd:element name="rhs" type="FilterExpression"/>
  </xsd:sequence>
  <xsd:attribute name="operation" type="BinaryOperationType" use="required"/>
 </xsd:complexType>

 <xsd:complexType name="LeafNodeType">
  <xsd:sequence>
   <xsd:element name="valuePair" type="FilterKeywordValue"/>
  </xsd:sequence>
  <xsd:attribute name="operation" type="LeafOperationType" use="required"/>
 </xsd:complexType>

 <xsd:complexType name="DataItemType">
  <xsd:sequence>
   <xsd:element name="dataType" type="DataType"/>
   <xsd:element name="dataSource" type="ReqString"/>
   <xsd:element name="catalogueRequest" type="xsd:boolean"/>
   <xsd:element name="keyword" type="RequestKeywordValue" minOccurs="0" maxOccurs="unbounded"/>
   <xsd:element name="onEvent" type="EventValue" minOccurs="0" maxOccurs="1"/>
   <xsd:element name="filter" type="FilterExpression" minOccurs="0" maxOccurs="1"/>
  </xsd:sequence>
 </xsd:complexType>

 <xsd:complexType name="OnlineRequestType">
  <xsd:sequence>
   <xsd:element name="general" type="RequestInfoType"/>
   <xsd:element name="item" type="DataItemType" minOccurs="1" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="userRequestId" type="xsd:string"/>
 </xsd:complexType>

</xsd:schema>
```

2.6 GDDSAcknowledgement.xsd

2.6.1 Description

This schema defines types used in acknowledging data requests.

2.6.2 Includes

GDDSRequest.xsd (see section 2.5)

2.6.3 Types defined

Name	Description
`AcknowledgementInfoType`	Contains fields giving general acknowledgement information.
`AcknowledgementItemType`	Contains fields relevant to a single data request acknowledgement.
`OnlineAcknowledgementType`	Contains fields relevant to a complete request acknowledgement.

2.6.4 Definition

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

 <xsd:annotation>
  <xsd:documentation xml:lang="en">
  </xsd:documentation>
 </xsd:annotation>

 <include schemaLocation="GDDSRequest.xsd"/>


 <xsd:element name="onlineAck" type="OnlineAcknowledgementType"/>


 <xsd:complexType name="AcknowledgementItemType">
  <xsd:sequence>
   <xsd:element name="actualVolume" type="xsd:nonNegativeInteger"/>
   <xsd:element name="dataRequest" type="DataItemType"/>
  </xsd:sequence>
 </xsd:complexType>
```

```
 <xsd:complexType name="AcknowledgementInfoType">
  <xsd:sequence>
   <xsd:element name="actualStart" type="xsd:dateTime"/>
   <xsd:element name="operatingHardware" type="xsd:string"/>
   <xsd:element name="operatingSoftware" type="xsd:string"/>
   <xsd:element name="DDSversion" type="xsd:string"/>
   <xsd:element name="errorMessage" type="xsd:string"/>
  </xsd:sequence>
 </xsd:complexType>

 <xsd:complexType name="OnlineAcknowledgementType">
  <xsd:sequence>
   <xsd:element name="general" type="RequestInfoType"/>
   <xsd:element name="ackInfo" type="AcknowledgementInfoType"/>
    <xsd:element name="ackItem" type="AcknowledgementItemType" minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
  <xsd:attribute name="userRequestId" type="xsd:string"/>
 </xsd:complexType>

</xsd:schema>
```