

# Object Management Group

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## Ground Data Delivery Interface (GDDI) Request For Proposal

OMG Document: space/2023-02-01

Letters of Intent due: *29 Sep 2023*  
Submissions due: *30 Nov 2023*

### Objective of this RFP

Space vehicle operations require varying compositions of ground applications that are integrated together within a common network (WAN and/or LAN) to provide an end-to-end ground system capability. This includes real time data and metadata transfer across these applications. Typical data includes spacecraft bus commands, telemetry, and mission payload in digital/baseband form. Metadata is carried in-band with the data and includes parameterized information and real-time status used by the ground applications to properly process, store, retrieve, and deliver the data. No common model for this dynamic data/metadata interface currently exists. Approaches, designs, and custom protocols vary widely from one vendor to another offering little opportunity for reuse to system integrators. The result is often a costly and time-consuming integration effort.

This RFP solicits proposals for the following:

- A Platform-Independent Model describing a lightweight *application-level* message interface that *encapsulates* spacecraft data and metadata so they can be transferred between ground applications within a common network.
- At least one Platform-Specific Model describing the encoding format of the metadata and data encapsulated by this interface. This platform specific model will call out at least one standard transport layer for carrying the encapsulated/encoded metadata and data, with the intent of reusing an existing transport that provides high throughput, low latency, and optionally secure transmission.

For further details see Section 6 of this document.

# 1 Introduction

## 1.1 Goals of OMG

The Object Management Group (OMG) is a software consortium with an international membership of vendors, developers, and end users. Established in 1989, its mission is to help computer users solve enterprise integration problems by supplying open, vendor-neutral portability, interoperability and reusability specifications based on Model Driven Architecture (MDA). MDA defines an approach to IT system specification that separates the specification of system functionality from the specification of the implementation of that functionality on a specific technology platform, and provides a set of guidelines for structuring specifications expressed as models. OMG has published many widely-used specifications such as UML [UML], BPMN [BPMN], MOF [MOF], XMI [XMI], DDS [DDS] and CORBA [CORBA], to name but a few significant ones.

## 1.2 Organization of this document

The remainder of this document is organized as follows:

Section 2 – *Architectural Context*. Background information on OMG’s Model Driven Architecture.

Section 3 – *Adoption Process*. Background information on the OMG specification adoption process.

Section 4 – *Instructions for Submitters*. Explanation of how to make a submission to this RFP.

Section 5 – *General Requirements on Proposals*. Requirements and evaluation criteria that apply to all proposals submitted to OMG.

Section 6 – *Specific Requirements on Proposals*. Problem statement, scope of proposals sought, mandatory requirements, non-mandatory features, issues to be discussed, evaluation criteria, and timetable that apply specifically to this RFP.

Appendix A – References and Glossary Specific to this RFP

Appendix B – General References and Glossary

### 1.3 Conventions

The key words "**shall**", "**shall not**", "**should**", "**should not**", "**may**" and "**need not**" in this document should be interpreted as described in Part 2 of the ISO/IEC Directives [ISO2]. These ISO terms are compatible with the same terms in IETF RFC 2119 [RFC2119].

### 1.4 Contact Information

Questions related to OMG's technology adoption process and any questions about this RFP should be directed to [rfp@omg.org](mailto:rfp@omg.org).

OMG documents and information about the OMG in general can be obtained from the OMG's web site: <https://www.omg.org>. Templates for RFPs (like this document) and other standard OMG documents can be found on the Template Downloads Page: [https://www.omg.org/technology/template\\_download.htm](https://www.omg.org/technology/template_download.htm)

## 2 Architectural Context

MDA provides a set of guidelines for structuring specifications expressed as models and the mappings between those models. The MDA initiative and the standards that support it allow the same model, specifying business system or application functionality and behavior, to be realized on multiple platforms. MDA enables different applications to be integrated by explicitly relating their models; this facilitates integration and interoperability, and supports system evolution (deployment choices) as platform technologies change. The three primary goals of MDA are portability, interoperability and reusability.

Portability of any subsystem is relative to the subsystems on which it depends. The collection of subsystems that a given subsystem depends upon is often loosely called the *platform*, which supports that subsystem. Portability – and reusability – of such a subsystem is enabled if all the subsystems that it depends upon use standardized interfaces (APIs) and usage patterns.

MDA provides a pattern comprising a portable subsystem that is able to use any one of multiple specific implementations of a platform. This pattern is repeatedly usable in the specification of systems. The five important concepts related to this pattern are:

1. *Model* – A model is a representation of a part of the function, structure and/or behavior of an application or system. A representation is said to be formal when it is based on a language that has a well-defined form (“syntax”), meaning (“semantics”), and possibly rules of analysis, inference, or proof for its constructs. The syntax may be graphical or textual. The semantics might be defined, more or less formally, in terms of things observed in the world being described (e.g. message sends and replies, object states and state changes, etc.), or by translating higher-level language constructs into other constructs that have a well-defined meaning. The (non-mandatory) rules of inference define what unstated properties can be deduced from explicit statements in the model. In MDA, a representation that is not formal in this sense is not a model. Thus, a diagram with boxes and lines and arrows that is not supported by a definition of the meaning of a box, and the meaning of a line and of an arrow is not a model – it is just an informal diagram.
2. *Platform* – A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.
3. *Platform Independent Model (PIM)* – A model of a subsystem that contains no information specific to the platform, or the technology that is used to realize it.
4. *Platform Specific Model (PSM)* – A model of a subsystem that includes information about the specific technology that is used in the realization of that subsystem on a specific platform, and hence possibly contains elements that are specific to the platform.
5. *Mapping* – Specification of a mechanism for transforming the elements of a model conforming to a particular metamodel into elements of another model that conforms to another (possibly the same) metamodel. A mapping may be expressed as associations, constraints, rules or templates with parameters that to be assigned during the mapping, or other forms yet to be determined.

OMG adopts standard specifications of models that exploit the MDA pattern to facilitate portability, interoperability and reusability, either through *ab initio*

development of standards or by reference to existing standards. Some examples of OMG adopted specifications are:

1. *Languages* – e.g. IDL for interface specification [IDL], UML for model specification [UML], BPMN for Business Process specification [BPMN], etc.
2. *Mappings* – e.g. Mapping of OMG IDL to specific implementation languages (CORBA PIM to Implementation Language PSMs), UML Profile for EDOC (PIM) to CCM (CORBA PSM) and EJB (Java PSM), CORBA (PSM) to COM (PSM) etc.
3. *Services* – e.g. Naming Service [NS], Transaction Service [OTS], Security Service [SEC], Trading Object Service [TOS] etc.
4. *Platforms* – e.g. CORBA [CORBA], DDS [DDS]
5. *Protocols* – e.g. GIOP/IIOP [CORBA] (both structure and exchange protocol), DDS Interoperability Protocol [DDSI].
6. *Domain Specific Standards* – e.g. Model for Performance-Driven Government [MPG], Single Nucleotide Polymorphisms specification [SNP], TACSIT Controller Interface specification [TACSIT].

For an introduction to MDA, see [MDAa]. For a discourse on the details of MDA please refer to [MDAc]. To see an example of the application of MDA see [MDAb]. For general information on MDA, see [MDAd].

Object Management Architecture (OMA) is a distributed object computing platform architecture within MDA that is related to ISO's Reference Model of Open Distributed Processing RM-ODP [RM-ODP]. CORBA and any extensions to it are based on OMA. For information on OMA see [OMA].

## 3 Adoption Process

### 3.1 Introduction

OMG decides which specifications to adopt via votes of its Membership. The specifications selected should satisfy the architectural vision of MDA. OMG bases its decisions on both business and technical considerations. Once a specification is adopted by OMG, it is made available for use by both OMG members and non-members alike, at no charge.

This section 3 provides an extended summary of the RFP process. For more detailed information, see the *Policies and Procedures of the OMG Technical Process* [P&P], specifically Section 4.2, and the *OMG Hitchhiker's Guide* [Guide]. In case of any inconsistency between this document or the Hitchhiker's Guide and the Policies and Procedures, the P&P is always authoritative. All IPR-related matters are governed by OMG's *Intellectual Property Rights Policy* [IPR].

## **3.2 The Adoption Process in detail**

### **3.2.1 Development and Issuance of RFP**

RFPs, such as this one, are drafted by OMG Members who are interested in the adoption of an OMG specification in a particular area. The draft RFP is presented to the appropriate TF, discussed and refined, and when ready is recommended for issuance. If endorsed by the Architecture Board, the RFP may then be issued as an OMG RFP by a TC vote.

Under the terms of OMG's Intellectual Property Rights Policy [IPR], every RFP shall include a statement of the IPR Mode under which any resulting specification will be published. To achieve this, RFP authors choose one of the three allowable IPR modes specified in [IPR] and include it in the RFP – see section 6.10.

### **3.2.2 Letter of Intent (LOI)**

Each OMG Member organisation that intends to make a Submission in response to any RFP (including this one) shall submit a Letter of Intent (LOI) signed by an officer on or before the deadline specified in the RFP's timetable (see section 6.11). The LOI provides public notice that the organisation may make a submission, but does not oblige it to do so.

### **3.2.3 Voter Registration**

Any interested OMG Members, other than Trial, Press and Analyst members, may participate in Task Force voting related to this RFP. If the RFP timetable includes a date for closing the voting list (see section 6.11), or if the Task Force separately decides to close the voting list, then only OMG Member that have registered by the given date and those that have made an Initial Submission may vote on Task Force motions related to this RFP.

Member organizations that have submitted an LOI are automatically registered to vote in the Task Force. Technical Committee votes are not affected by the Task Force voting list – all Contributing and Domain Members are eligible to vote in DTC polls relating to DTC RFPs, and all Contributing and Platform Members are eligible to vote in PTC polls on PTC RFPs.

### 3.2.4 Initial Submissions

Initial Submissions shall be made electronically on or before the Initial Submission deadline, which is specified in the RFP timetable (see section 6.11), or may later be adjusted by the Task Force. Submissions shall use the OMG specification template [TMPL], with the structure set out in section 4.9. Initial Submissions shall be written specifications capable of full evaluation, and not just a summary or outline. Submitters normally present their proposals to the Task Force at the first TF meeting after the submission deadline. Making a submission incurs obligations under OMG's IPR policy – see [IPR] for details.

An Initial Submission shall not be altered once the Initial Submission deadline has passed. The Task Force may choose to recommend an Initial Submission, unchanged, for adoption by OMG; however, instead Task Force members usually offer comments and feedback on the Initial Submissions, which submitters can address (if they choose) by making a later Revised Submission.

The goals of the Task Force's Submission evaluation are:

- Provide a fair and open process
- Facilitate critical review of the submissions by OMG Members
- Provide feedback to submitters enabling them to address concerns in their revised submissions
- Build consensus on acceptable solutions
- Enable voting members to make an informed selection decision

Submitters are expected to actively contribute to the evaluation process.

### 3.2.5 Revised Submissions

Revised Submissions are due by the specified deadline. Revised Submissions cannot be altered once their submission deadline has passed. Submitters again normally present their proposals at the next meeting of the TF after the deadline. If necessary, the Task Force may set a succession of Revised Submission deadlines. Submitters choose whether or not to make Revised Submissions - if they decide not to, their most recent Submission is carried forward, unless the Submitter explicitly withdraws from the RFP process.

The evaluation of Revised Submissions has the same goals listed above.

### 3.2.6 Selection Votes

When the Task Force's voters believe that they sufficiently understand the relative merits of the available Submissions, a vote is taken to recommend a submission to the Task Force's parent Technical Committee. The Architecture Board reviews the recommended Submission for MDA compliance and technical merit. Once the AB has endorsed it, members of the relevant TC vote on the recommended Submission by email. Successful completion of this vote moves the recommendation to OMG's Board of Directors (BoD).

### 3.2.7 Business Committee Questionnaire

Before the BoD makes its final decision on turning a Technical Committee recommendation into an OMG published specification, it asks its Business Committee to evaluate whether implementations of the specification will be publicly available. To do this, the Business Committee will send a Questionnaire [BCQ] to every OMG Member listed as a Submitter on the recommended Submission. Members that are not Submitters can also complete a Business Committee Questionnaire for the Submission if they choose.

If no organization commits to make use of the specification, then the BoD will typically not act on the recommendation to adopt it – so it is very important that submitters respond to the BCQ.

Once the Business Committee has received satisfactory BCQ responses, the Board takes the final publication vote. A Submission that has been adopted by the Board is termed an *Alpha Specification*.

At this point the RFP process is complete.

### 3.2.8 Finalization & Revision

Any specification adopted by OMG by any mechanism, whether RFP or otherwise, is subject to Finalisation. A Finalization Task Force (FTF) is chartered by the TC that recommended the Specification; its task is to correct any problems reported by early users of the published specification. The FTF first collaborates with OMG's Technical Editor to prepare a cleaned-up version of the Alpha Specification with submission-specific material removed. This is the Beta1 specification, and is made publicly available via OMG's web site. The FTF then works through the list of bug reports ("issues") reported by users of the Beta1 specification, to produce a Finalisation Report and another Beta specification (usually Beta2), which is a candidate for Formal publication. Once endorsed by the AB and adopted by the relevant TC and BoD, this is published as the final, Formal Specification.



Long-term maintenance of OMG specifications is handled by a sequence of Revision Task Forces (RTFs), each one chartered to rectify any residual problems in the most-recently published specification version. For full details, see P&P section 4.4 [P&P].

## **4 Instructions for Submitters**

### **4.1 OMG Membership**

To submit to an RFP issued by the Platform Technology Committee an organisation shall maintain either Platform or Contributing OMG Membership from the date of the initial submission deadline, while to submit to a Domain RFP an organisation shall maintain either a Contributing or Domain membership.

### **4.2 Intellectual Property Rights**

By making a Submission, an organisation is deemed to have granted to OMG a perpetual, nonexclusive, irrevocable, royalty-free, paid up, worldwide license to copy and distribute the document and to modify the document and distribute copies of the modified version, and to allow others to do the same. Submitter(s) shall be the copyright owners of the text they submit, or have sufficient copyright and patent rights from the copyright owners to make the Submission under the terms of OMG's IPR Policy. Each Submitter shall disclose the identities of all copyright owners in its Submission.

Each OMG Member that makes a written Submission in response to this RFP shall identify patents containing Essential Claims that it believes will be infringed if that Submission is included in an OMG Formal Specification and implemented.

By making a written Submission to this RFP, an OMG Member also agrees to comply with the Patent Licensing terms set out in section 6.10.

This section 4.2 is neither a complete nor an authoritative statement of a submitter's IPR obligations – see [IPR] for the governing document for all OMG's IPR policies.

### **4.3 Submission Effort**

An RFP submission may require significant effort in terms of document preparation, presentations to the issuing TF, and participation in the TF evaluation process. OMG is unable to reimburse submitters for any costs in conjunction with their submissions to this RFP.

## 4.4 Letter of Intent

Every organisation intending to make a Submission against this RFP shall submit a Letter of Intent (LOI) signed by an officer on or before the deadline listed in section 6.11, or as later varied by the issuing Task Force.

The LOI should designate a single contact point within the submitting organization for receipt of all subsequent information regarding this RFP and the submission. The name of this contact will be made available to all OMG members. LOIs shall be sent by email, fax or paper mail to the “RFP Submissions Desk” at the OMG address shown on the first page of this RFP.

A suggested template for the Letter of Intent is available at <https://doc.omg.org/loi> [LOI].

## 4.5 Business Committee terms

This section contains the text of the Business Committee RFP attachment concerning commercial availability requirements placed on submissions. This attachment is available separately as OMG document omg/12-12-03.

### 4.5.1 Introduction

OMG wishes to encourage rapid commercial adoption of the specifications it publishes. To this end, there must be neither technical, legal nor commercial obstacles to their implementation. Freedom from the first is largely judged through technical review by the relevant OMG Technology Committees; the second two are the responsibility of the OMG Business Committee. The BC also looks for evidence of a commitment by a submitter to the commercial success of products based on the submission.

### 4.5.2 Business Committee evaluation criteria

#### 4.5.2.1 *Viable to implement across platforms*

While it is understood that final candidate OMG submissions often combine technologies before they have all been implemented in one system, the Business Committee nevertheless wishes to see evidence that each major feature has been implemented, preferably more than once, and by separate organisations. Pre-product implementations are acceptable. Since use of OMG specifications should not be dependent on any one platform, cross-platform availability and interoperability of implementations should be also be demonstrated.

#### 4.5.2.2 *Commercial availability*

In addition to demonstrating the existence of implementations of the specification, the submitter must also show that products based on the specification are commercially available, or will be within 12 months of the date when the specification was recommended for adoption by the appropriate Task Force. Proof of intent to ship product within 12 months might include:

- A public product announcement with a shipping date within the time limit.
- Demonstration of a prototype implementation and accompanying draft user documentation.

Alternatively, and at the Business Committee's discretion, submissions may be adopted where the submitter is not a commercial software provider, and therefore will not make implementations commercially available. However, in this case the BC will require concrete evidence of two or more independent implementations of the specification being used by end-user organisations as part of their businesses.

Regardless of which requirement is in use, the submitter must inform the OMG of completion of the implementations when commercially available.

#### 4.5.2.3 *Access to Intellectual Property Rights*

OMG will not adopt a specification if OMG is aware of any submitter, member or third party which holds a patent, copyright or other intellectual property right (collectively referred to in this policy statement as "IPR") which might be infringed by implementation or recommendation of such specification, unless OMG believes that such IPR owner will grant an appropriate license to organizations (whether OMG members or not) which wish to make use of the specification. It is the goal of the OMG to make all of its technology available with as few impediments and disincentives to adoption as possible, and therefore OMG strongly encourages the submission of technology as to which royalty-free licenses will be available.

The governing document for all intellectual property rights ("IPR") policies of Object Management Group is the Intellectual Property Rights statement, available at: <https://doc.omg.org/ipr>. It should be consulted for the authoritative statement of the submitter's patent disclosure and licensing obligations.

#### 4.5.2.4 *Publication of the specification*

Should the submission be adopted, the submitter must grant OMG (and its sublicensees) a worldwide, royalty-free licence to edit, store, duplicate and distribute both the specification and works derived from it (such as revisions and teaching materials). This requirement applies only to the written specification, not to any implementation of it. Please consult the Intellectual Property Rights statement (<https://doc.omg.org/ipr>) for the authoritative statement of the submitter's copyright licensing obligations.

#### 4.5.2.5 *Continuing support*

The submitter must show a commitment to continue supporting the technology underlying the specification after OMG adoption, for instance by showing the BC development plans for future revisions, enhancement or maintenance.

## 4.6 **Responding to RFP items**

### 4.6.1 **Complete proposals**

Submissions should propose full specifications for all of the relevant requirements detailed in Section 6 of this RFP. Submissions that do not present complete proposals may be at a disadvantage.

Submitters are encouraged to include any non-mandatory features listed in Section 6.

### 4.6.2 **Additional specifications**

Submissions may include additional specifications for items not covered by the RFP and which they believe to be necessary. Information on these additional items should be clearly distinguished. Submitters shall give a detailed rationale for why any such additional specifications should also be considered for adoption. Submitters should note that a TF is unlikely to consider additional items that are already on the roadmap of an OMG TF, since this would pre-empt the normal adoption process.

### 4.6.3 **Alternative approaches**

Submitters may provide alternative RFP item definitions, categorizations, and groupings so long as the rationale for doing so is clearly stated. Equally, submitters may provide alternative models for how items are provided if there are compelling technological reasons for a different approach.

## 4.7 Confidential and Proprietary Information

The OMG specification adoption process is an open process. Responses to this RFP become public documents of the OMG and are available to members and non-members alike for perusal. No confidential or proprietary information of any kind will be accepted in a submission to this RFP.

## 4.8 Proof of Concept

Submissions shall include a “proof of concept” statement, explaining how the submitted specifications have been demonstrated to be technically viable. The technical viability has to do with the state of development and maturity of the technology on which a submission is based. This is not the same as commercial availability. Proof of concept statements can contain any information deemed relevant by the submitter; for example:

“This specification has completed the design phase and is in the process of being prototyped.”

“An implementation of this specification has been in beta-test for 4 months.”

“A named product (with a specified customer base) is a realization of this specification.”

It is incumbent upon submitters to demonstrate the technical viability of their proposal to the satisfaction of the TF managing the evaluation process. OMG will favor proposals based on technology for which sufficient relevant experience has been gained.

## 4.9 Submission Format

### 4.9.1 General

- Submissions that are concise and easy to read will inevitably receive more consideration.
- Submitted documentation should be confined to that directly relevant to the items requested in the RFP.
- To the greatest extent possible, the submission should follow the document structure set out in "ISO/IEC Directives, Part 2 – Rules for the structure and drafting of International Standards" [ISO2]. An OMG specification template is available to make it easier to follow these guidelines.

- The key words "**shall**", "**shall not**", "**should**", "**should not**", "**may**" and "**need not**" shall be used as described in Part 2 of the ISO/IEC Directives [ISO2]. These ISO terms are compatible with the same terms in IETF RFC 2119 [RFC2119]. However, the RFC 2119 terms "**must**", "**must not**", "**optional**", "**required**", "**recommended**" and "**not recommended**" shall not be used (even though they are permitted under RFC2119).

#### 4.9.2 Mandatory Outline

*All submissions* shall use the following structure, based on the OMG Specification template [TEMPL]:

Section 0 of the submission shall be used to provide all non-normative supporting material relevant to the evaluation of the proposed specification, including:

- The full name of the submission
- A complete list of all OMG Member(s) making the submission, with a named contact individual for each
- The acronym proposed for the specification (e.g. UML, CORBA)
- The name and OMG document number of the RFP to which this is a response
- The OMG document number of the main submission document
- Overview or guide to the material in the submission
- Statement of proof of concept (see 4.8)
- If the proposal does not satisfy any of the general requirements stated in Section 5, a detailed rationale explaining why
- Discussion of each of the "Issues To Be Discussed" identified in Section 6.
- An explanation of how the proposal satisfies the specific requirements and (if applicable) requests stated in Section 6.
- If adopting the submission requires making changes to already-adopted OMG specifications, include a list of those changes in a clearly-labelled subsection in Section 0. Identify exactly which version(s) of which

OMG specification(s) shall be amended, and include the list of precise wording changes that shall be made to that specification.

Section 1 and subsequent sections of the submission shall contain the normative specification that the Submitter(s) is/are proposing for adoption by OMG, including:

- Scope of the proposed specification
- Overall design rationale
- Conformance criteria for implementations of the proposed specification, clearly stating the features that all conformant implementations shall support, and any features that implementations may support, but which are not mandatory.
- A list of the normative references that are used by the proposed specification
- A list of terms that are used in the proposed specification, with their definitions
- A list of any special symbols that are used in the proposed specification, together with their significance
- The proposed specification itself

Section 0 will be deleted from any specification that OMG adopts and publishes. Therefore Section 0 of the submission shall contain no normative material (other than any instructions to change existing specifications; ensuring that these are implemented is the responsibility of the FTF that finalises the specification, before it deletes section 0). Any non-normative material outside section 0 shall be explicitly identified.

The main submission document and any models or other machine-interpretable files accompanying it shall be listed in an inventory file conforming to the inventory template [INVENT].

The submission shall include a copyright waiver in a form acceptable to OMG. One acceptable form is:

“Each of the entities listed above: (i) grants to the Object Management Group, Inc. (OMG) a nonexclusive, royalty-free, paid up, worldwide license to copy and distribute this document and to modify this document and distribute copies of the modified version, and (ii) grants to each member of

the OMG a nonexclusive, royalty-free, paid up, worldwide license to make up to fifty (50) copies of this document for internal review purposes only and not for distribution, and (iii) has agreed that no person shall be deemed to have infringed the copyright in the included material of any such copyright holder by reason of having used any OMG specification that may be based hereon or having conformed any computer software to such specification.”

Other forms of copyright waiver may only be used if approved by OMG legal counsel beforehand.

## 4.10 How to Submit

Submitters should send an electronic version of their submission to the *RFP Submissions Desk* ([rfp@omg.org](mailto:rfp@omg.org)) at OMG Headquarters by 5:00 PM U.S. Eastern Standard Time (22:00 GMT) on the day of the Initial and Revised Submission deadlines. Acceptable formats are Adobe FrameMaker source, ISO/IEC 26300:2006 (OpenDoc 1.1), OASIS DocBook 4.x (or later) and ISO/IEC 29500:2008 (OOXML, .docx).

Submitters should ensure that they receive confirmation of receipt of their submission.

# 5 General Requirements on Proposals

## 5.1 Requirements

### 5.1.1 Use of modelling languages

Submitters are encouraged to express models using OMG modelling languages such as UML, MOF, CWM and SPEM (subject to any further constraints on the types of the models and modeling technologies specified in Section 6 of this RFP). Submissions containing models expressed using OMG modeling languages shall be accompanied by an OMG XMI [XMI] representation of the models (including a machine-readable copy). A best effort should be made to provide an OMG XMI representation even in those cases where models are expressed via non-OMG modeling languages.

### 5.1.2 PIMs & PSMs

Section 6 of this RFP specifies whether PIM(s), PSM(s), or both are being solicited. If proposals specify a PIM and corresponding PSM(s), then the rules specifying the mapping(s) between the PIM and PSM(s) shall either be identified by reference to a standard mapping or specified in the proposal. In order to allow possible inconsistencies in a proposal to be resolved later,



proposals shall identify whether it's the mapping technique or the resulting PSM(s) that shall be considered normative.

### 5.1.3 Complete submissions

Proposals shall be *precise* and *functionally complete*. Any relevant assumptions and context necessary to implement the specification shall be provided.

### 5.1.4 Reuse

Proposals shall *reuse* existing OMG and other standard specifications in preference to defining new models to specify similar functionality.

### 5.1.5 Changes to existing specifications

Each proposal shall justify and fully specify any *changes or extensions* to existing OMG specifications necessitated by adopting that proposal. In general, OMG favors proposals that are *upwards compatible* with existing standards and that minimize changes and extensions to existing specifications.

### 5.1.6 Minimalism

Proposals shall factor out functionality that could be used in different contexts and specify their models, interfaces, etc. separately. Such *minimalism* fosters re-use and avoids functional duplication.

### 5.1.7 Independence

Proposals shall use or depend on other specifications only where it is actually necessary. While re-use of existing specifications to avoid duplication will be encouraged, proposals should avoid gratuitous use.

### 5.1.8 Compatibility

Proposals shall be *compatible* with and *usable* with existing specifications from OMG and other standards bodies, as appropriate. Separate specifications offering distinct functionality should be usable together where it makes sense to do so.

### 5.1.9 Implementation flexibility

Proposals shall preserve maximum *implementation flexibility*. Implementation descriptions should not be included and proposals shall not constrain implementations any more than is necessary to promote interoperability.

### 5.1.10 Encapsulation

Proposals shall allow *independent implementations* that are *substitutable* and *interoperable*. An implementation should be replaceable by an alternative implementation without requiring changes to any client.

### 5.1.11 Security

In order to demonstrate that the specification proposed in response to this RFP can be made secure in environments that require security, answers to the following questions shall be provided:

- What, if any, security-sensitive elements are introduced by the proposal?
- Which accesses to security-sensitive elements should be subject to security policy control?
- Does the proposed service or facility need to be security aware?
- What default policies (e.g., for authentication, audit, authorization, message protection etc.) should be applied to the security sensitive elements introduced by the proposal? Of what security considerations should the implementers of your proposal be aware?

The OMG has adopted several specifications, which cover different aspects of security and provide useful resources in formulating responses. [SEC] [RAD].

### 5.1.12 Internationalization

Proposals shall specify the degree of internationalization support that they provide. The degrees of support are as follows:

- a) Uncategorized: Internationalization has not been considered.
- b) Specific to <region name>: The proposal supports the customs of the specified region only, and is not guaranteed to support the customs of any other region. Any fault or error caused by requesting the services outside of a context in which the customs of the specified region are being consistently followed is the responsibility of the requester.
- c) Specific to <multiple region names>: The proposal supports the customs of the specified regions only, and is not guaranteed to support the customs of any other regions. Any fault or error caused by requesting the services outside of a context in which the customs of at least one of the specified regions are being consistently followed is the responsibility of the requester.
- d) Explicitly not specific to <region(s) name>: The proposal does not support the customs of the specified region(s). Any fault or error caused by requesting

the services in a context in which the customs of the specified region(s) are being followed is the responsibility of the requester.

## **5.2 Evaluation criteria**

Although the OMG adopts model-based specifications and not implementations of those specifications, the technical viability of implementations will be taken into account during the evaluation process. The following criteria will be used:

### **5.2.1 Performance**

Potential implementation trade-offs for performance will be considered.

### **5.2.2 Portability**

The ease of implementation on a variety of systems and software platforms will be considered.

### **5.2.3 Securability**

The answer to questions in section 5.1.11 shall be taken into consideration to ascertain that an implementation of the proposal is securable in an environment requiring security.

### **5.2.4 Conformance: Inspectability and Testability**

The adequacy of proposed specifications for the purposes of conformance inspection and testing will be considered. Specifications should provide sufficient constraints on interfaces and implementation characteristics to ensure that conformance can be unambiguously assessed through both manual inspection and automated testing.

### **5.2.5 Standardized Metadata**

Where proposals incorporate metadata specifications, OMG standard XMI metadata [XMI] representations should be provided.

## 6 Specific Requirements on Proposals

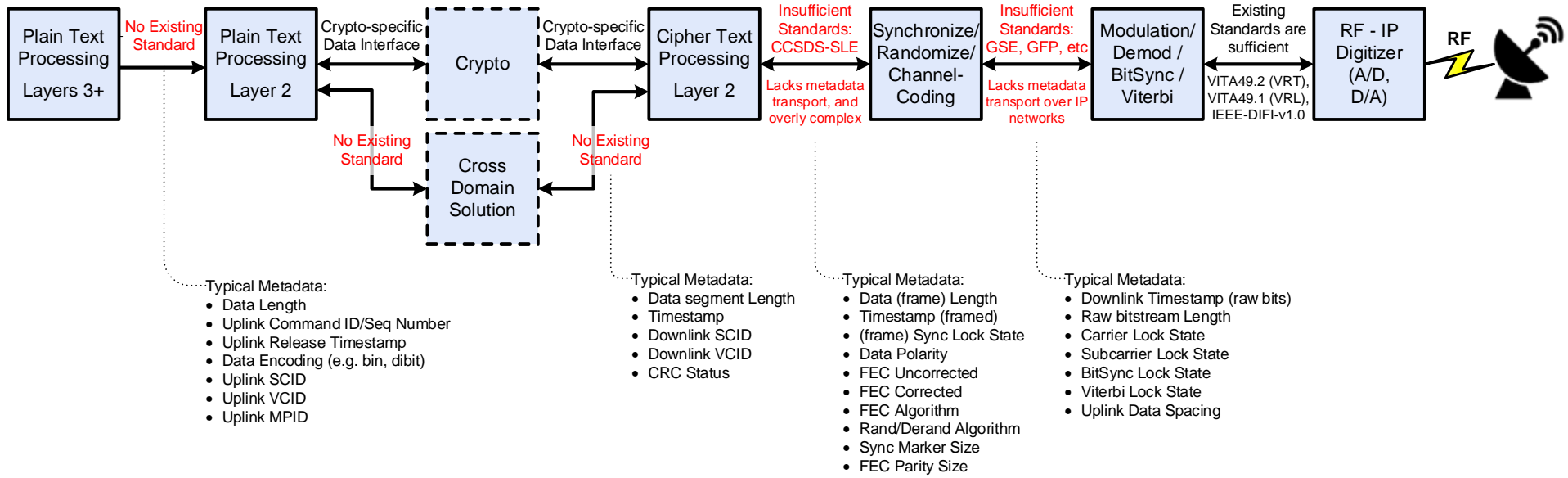
### 6.1 Problem Statement

Spacecraft systems (such as satellites) receive and transmit signals in the Radio Frequency (RF) domain, and Ground systems convert these RF signals to and from data in the digital domain. In modern ground systems this digital data (also referred to as baseband data) is transported across various ground applications via standard networks, predominately Ethernet-based networks. However, there is a lack of interface standards for defining the format and structure of this data and metadata which has proliferated the use of non-standard interfaces.

Within satellite ground systems, telemetry data from the spacecraft is transferred between software applications for processing, storage, retrieval, and distribution. This telemetry data can take many forms, such as unframed bits, frames, packets, and key-value pairs. Similarly, spacecraft commands are transferred between software applications for eventual conversion from the digital domain into RF signals for transmission to the spacecraft.

Each of these transfers requires a format for encoding the data with metadata, and the variety of non-standard vendor-specific encodings and headers used in ground systems require many software modifications to adapt applications for interoperability. As a group, these modifications create configuration management issues for the vendors and integrators, even though the scope of the software change may be small.

Figure 1 shows a notional satellite ground system with typical data plane interfaces between the various ground applications. Red text depicts interfaces that are lacking sufficient standards to carry the data and metadata. This RFP specifically addresses the interfaces in Figure 1 labelled “Insufficient Standards” and optionally those labelled “No Existing Standard” when a Cross Domain Solution is needed. Since Figure 1 is notional, the functions that these interfaces support may collapse into one or more software applications depending on the ground system use case. With that prerequisite, this GDDI specification must provide an elastic metadata standard to accommodate splitting and/or aggregating metadata among one or more network interfaces. This concept is detailed in section 6.2, including an example.



**Figure 1: Notional Satellite Ground System**

## 6.2 Scope of Proposals Sought

This RFP seeks to identify a lightweight connection-less message interface standard for the transfer of *data* and *metadata* between software applications within a satellite ground system. A specification for ground data delivery encompasses all forms of baseband data and metadata, including spacecraft bus telemetry, commands, echoes, and payload data as typically exist on the ground in the digital domain.

### 6.2.1 Metamodel for a Satellite Ground Data Plane Interface

While a standard metamodel already exists for the satellite ground *control plane* interface, i.e. [GEMS], a standard metamodel is lacking for the satellite ground *data plane* interface – this is the intended scope of GDDI. As such, a Platform Independent Model (PIM) expressed using [UML] Unified Modeling Language, version 2.5.1, <https://www.omg.org/spec/UML/2.5.1> is sought to describe the *structure* of how the metadata/data payload is encapsulated within a message. This structure must define metadata and data encapsulation via some type of lightweight header/envelope used to transfer the spacecraft information between ground applications within a common network, i.e. a WAN and/or LAN.

In this model, the *data* includes spacecraft **bus** telemetry, commands, echoes, and payload data as typically exist on the ground in the baseband form. Baseband refers to bits or bytes of data that are supplied to an RF modulator or produced by an RF demodulator. This data can be encoded as raw binary or other baseband encoding, such as di-bit format. This data can be transferred in present time or transferred at a future time as a result of a subsequent data playback scenario.

Why narrowing to “bus” telemetry?

In this model, the *metadata* includes parameterized information and real-time status used by the ground applications to properly process, store, retrieve, and deliver the data, and must be carried *in-band* with the spacecraft payload data. The metadata to be transferred is defined as any auxiliary information describing the data itself (e.g. di-bit encoding format) and/or the processing results or state of the data (e.g. corrected bits or lock status). Additional examples of metadata are shown in **Figure 1**. Hm .....Figure 1 has just a list of metadata....

### 6.2.2 Elastic Metadata Structure

Since ground systems have varying compositions of software applications with potentially different allocation of functions across them, the proposed PIM must provide an elastic metadata/data structure such that it supports transport between applications with varying functional needs. For example, ground system ‘A’ may combine its telemetry frame-synchronization and block decoding functions with its demodulation application, while ground system ‘B’ may split these two

functions into separate applications. In case ‘A’, metadata for both functions is aggregated into a single interface, where in case ‘B’ the metadata is split into separate interfaces. This elastic interface concept is like that provided by the OMG Ground Equipment Monitoring Service (GEMS) specification where a specific interface structure is provided that allows flexibility in the identification and number of parameters per interface via the GEMS “target” mechanism.

As ground system functionality continually evolves, this elastic metadata concept must also support *interface growth* by providing a mechanism to handle new metadata added as a result of the evolved functionality, doing so without causing backwards compatibility issues. For example, if a new RF demodulation function is introduced into the ground system, any new metadata that it adds to the interface must not break backwards compatibility when a receiving application of this metadata has not yet upgraded. This is analogous to a minor version software upgrade where backwards compatibility is preserved when the minor version increments.

### 6.2.3 Data Plane Behaviour

The notion of a lightweight interface extends to the GDDI behaviour which requires a *simplex transmission mode* that is **connection-less and session-less**.

Simplex transmission is the predominant mode used for data plane traffic in satellite ground systems. Satellite commanding, telemetry, and high-rate mission data typically transmit unidirectionally throughout the ground system functions. Hence, this RFP does not solicit any type of acknowledgement protocol because it mandates the use of an existing transport layer that reliably carries the data.

Any connection and/or session required to **ensure reliable** (and optionally secure) data delivery shall also be provided **by the underlying transport** layer, not by GDDI. The reliable transmission and security functions provided by the existing standard transport layer will be leveraged instead of recreating them.

**Additionally, providing a connection-less data plane interface at the application-level avoids the runtime overhead of a complex handshaking protocol. As such, lightweight implementations can be easily developed yet still provide efficient throughput and latency performance with minimal resource consumption.**

I still doubt that this is a good idea. Even if the lower layers are highly reliable, voluntarily abandoning any form of session-level quality control may lead to a “reliable and undetected transmission of garbage”

The RFP should not constrain the submitters in their choice of technology, but rather set quality and performance goals.

Not true! You trade a questionable speed advantage for a nightmare of correctness assurance

This is a common misconception. The transport layer can only ensure that the packages presented to it are delivered undisturbed and in correct sequence.

The transport layer is in particular totally unaware about any correctness on session or application layer

### 6.2.4 Metadata Encoding Format

Various standards-based encoding formats exist today such as XML, JSON, and XTCE. However, per section 6.2.2 GDDI requires an *elastic metadata structure* that is *lightweight* with *minimal data transfer overhead*, this RFP intentionally leaves the selection and design of the encoding format to the submitters.

Submitters shall specify the metadata encoding format in a Platform Specific Model (PSM) expressed using an interface modelling language or convention of their choice. The key requirement is that different vendors must be able to create interoperable implementations without being dependent on a Software Development Kit (SDK) or specific middleware package. The PSM encoding format may be expressed using Interface Definition Language [IDL] or other technique (such as tables or diagrams) as long as the above requirement of “interoperability without dependencies” is met.

## 6.2.5 Utilize Existing Transport Layers

Most satellite ground systems currently reside on standard WAN/LAN-based networks through which their software and hardware applications communicate. The GDDI data interface model intends to lever *existing* transport layers that these standard networks already support. As such, the Platform Specific Model shall explicitly call out the use of at least one existing transport layer for the transfer of the structured data/metadata defined by the PIM. By using a standard transport, common application and network addressing, routing, guaranteed delivery, and security can be utilized. The intent of this RFP is to *use* an *existing* transport protocol *not* to define a new one. As such, proposed PSMs may specify existing standard transports such as Transport Control Protocol (TCP), Stream Control Transmission Protocol (SCTP), Datagram Congestion Control Protocol (DCCP), Data Distribution Service [DDS], or other standard layer 4 protocols.

To align with the existing OMG [GEMS] specification (which specifies TCP in its PSM), submitters are encouraged to specify TCP as one of the transports in the GDDI PSM. The intent of specifying TCP across these companion [GEMS and GDDI] standards is to provide a *common transport* for both the control and data planes that facilitates ground system development, deployment, and maintenance.

## 6.3 Relationship to other OMG Specifications and activities

### 6.3.1 Relationship to OMG specifications

#### 6.3.1.1 Unified Modeling Language (UML)

Submitters shall use OMG UML to express the metamodel in the GDDI PIM per [UML] Unified Modeling Language, version 2.5.1, <https://www.omg.org/spec/UML/2.5.1>.

This modelling technology provides a standard graphical language for visualizing, specifying, and documenting the GDDI metamodel so that implementers have a common reference for the platform independent model.



### 6.3.1.2 *Interface Definition Language (IDL)*

Per section 6.2.4, this RFP leaves the selection/design of the encoding format to the submitters who have the option of using one of several OMG specifications, including IDL. If IDL is selected to express the metadata encodings in the GDDI PSM, they shall use [IDL] Interface Definition Language, version 4.2, <https://www.omg.org/spec/IDL/4.2/>.

This technology provides a descriptive language for specifying the syntax used to define data types and interfaces. IDL is normally used in connection with other specifications that further define how these types/interfaces are utilized in a specific platform. If submitters select IDL to express the metadata encodings in the GDDI PSM, they shall explicitly call out these other specifications to completely define the metadata encodings/mappings for the specific platform.

### 6.3.1.3 *XML Telemetric & Command Exchange Format (XTCE)*

Per section 6.2.4, this RFP leaves the selection/design of the encoding format to the submitters who have the option of using one of several OMG specifications, including XTCE. If XTCE is selected to express the metadata encodings in the GDDI PSM, they shall use [XTCE] XML Telemetric and Command Exchange, version 1.2, <https://www.omg.org/spec/XTCE/1.2/>.

Submitters may define GDDI metadata using XTCE models such as “ParameterTypes”, or subsets of them, e.g., using only the data type encodings without alarm limits, string conversions, etc. Refer to section 6.1.2.1 “ParameterTypeSet” in reference [XTCE] for these types.

### 6.3.1.4 *Ground Equipment Monitoring Service (GEMS)*

This is a request for proposal for a *separate companion specification* to the OMG Ground Equipment Monitoring Service (GEMS) specification per [GEMS] Ground Equipment Monitoring Service, version 1.4, <http://www.omg.org/spec/GEMS/1.4>.

The GEMS standard provides “control and status” of the ground equipment while this GDDI RFP focuses on the “data transfers” within the ground system. The intent is to keep the Control plane message specification (GEMS) decoupled from the Data plane message specification (GDDI). However, maintaining a common *transport* platform between them is preferred to leverage standard transport features such as secure transmission, as well as foster similar tooling and shared implementations. Since GEMS already uses TCP as its transport platform (per section 6.2.5), submitters are encouraged to provide at least one PSM with TCP as the transport platform.

### 6.3.1.5 Data Distribution Service (DDS)

Per section 6.2.5, this RFP leaves the selection of one or more transport platforms to the submitters. In addition to proposing TCP as one transport platform in the PSM, submissions may propose additional transport platforms with the option of using OMG [DDS] Data Distribution Services, version 1.4, <https://www.omg.org/spec/DDS/1.4>.

This technology provides distributed application communication and integration. It defines both the Application Interfaces (APIs) and the Communication Semantics (behavior and quality of service) that enable efficient delivery of data.

If DDS is proposed, consideration must be taken per section 6.2.2 where a major GDDI tenet is to provide elasticity in the number of parameters per interface that can be parsed and determined during runtime. Additionally, consideration must also be taken per section 6.2.4 to ensure that different vendors are able to create interoperable implementations without being dependent on a Software Development Kit (SDK) or specific middleware package.

### 6.3.2 Relationship to other OMG Documents and work in progress

The OMG [C2MS] Command and Control Message Specification, version 1.0, <https://www.omg.org/spec/C2MS/1.0> is related to this GDDI RFP in the sense that it addresses transfer across the data plane, however, does so in different manners to meet different needs as described below:

- Per sections 8.2 and 8.6 in reference [C2MS], the C2MS provides message and transport interface definitions for *both* the Data and Control planes, while GDDI intentionally decouples the Data plane from the Control plane to enable more dynamic and modular systems.
- Per Figure I-1 in reference [C2MS], the C2MS specification only offers a data transfer model using a publish-subscribe message bus/queue transport, while GDDI intends to provide a direct asynchronous transport to support thin clients, high-rate links, LAN/WAN distribution, and cloud deployments.
- The C2MS specification carries low rate satellite data over a narrowband transport platform (i.e. the GMSEC message bus), while GDDI carries low, medium, and high rate satellite data over a wideband transport platform.

Therefore no reuse from the C2MS specification is anticipated.

## 6.4 Related non-OMG Activities, Documents and Standards

In space/satellite ground systems, there are few standards supporting transfer of the various ground data types among ground services. One set of standards called CCSDS Space Data Link Extension (SLE) does provide transport of certain CCSDS Protocol Data Units (PDUs), however it has several restrictions that prevent it from meeting the needs reflected in this GDDI RFP, as follows:

- Per section 3.4.1 in reference [SLE] CCSDS 910.4-B-2, Cross Support Reference Model – Part 1: Space Link Extension Services <https://public.ccsds.org/Pubs/910x4b2e1.pdf>, the SLE standard can only transport CCSDS PDU types and does not carry other types of data or metadata required among the multiple services in a nominal ground system, such as HDLC or DVB-S2 metadata/data.
- Per section 3.2.d and 4.5.1.1 in reference [SLE] CCSDS 910.4-B-2, Cross Support Reference Model – Part 1: Space Link Extension Services <https://public.ccsds.org/Pubs/910x4b2e1.pdf>, SLE is a session-based protocol that requires formal connection establishment, maintenance, and teardown, while GDDI is intentionally on-demand (not session-based) to meet more dynamic connectivity needs.
- Per section 4.3.2.1.1 in reference [SLE] CCSDS 910.4-B-2, Cross Support Reference Model – Part 1: Space Link Extension Services <https://public.ccsds.org/Pubs/910x4b2e1.pdf>, SLE couples the metadata/data types for an interface to a specific ground function, e.g., the Return-All-Frames (RAF) couples frame metadata with the demodulation metadata, while GDDI intends to decouple them to support transport between applications with varying functional needs.
- Per section 5.2.2.2.d in reference [SLE] CCSDS 910.4-B-2, Cross Support Reference Model – Part 1: Space Link Extension Services <https://public.ccsds.org/Pubs/910x4b2e1.pdf>, SLE does not carry metadata in-band with the data itself, rather it uses a “status report” mechanism that is out-of-band with the data plane. Correlating metadata with the data is a key requirement for GDDI.

Other standards such as [GSE] Generic Stream Encapsulation, [https://en.wikipedia.org/wiki/Generic\\_Stream\\_Encapsulation](https://en.wikipedia.org/wiki/Generic_Stream_Encapsulation) and [GFP] Generic Framing Procedure, [https://en.wikipedia.org/wiki/Generic\\_Framing\\_Procedure](https://en.wikipedia.org/wiki/Generic_Framing_Procedure) are related but do not provide sufficient mechanisms to carry the required metadata, nor do they provide an elastic construct to do so.

The [DIFI] IEEE-ISTO Std 4900-2021: Digital IF Interoperability Standard, version 1.1, <https://dificonsortium.org/standards/> is a companion specification in the typical ground station, however, is used to carry RF sample (I/Q) data, where GDDI carries digital (baseband) data, hence there is no overlap among these interface specifications.

## 6.5 Mandatory Requirements

### 6.5.1 Platform Independent Requirements

- 6.5.1.1 Proposals shall submit a Platform Independent Model (PIM) expressed in UML as described in section 6.2.1.
- 6.5.1.2 The proposed PIM shall describe an elastic metadata structure per section 6.2.2.
- 6.5.1.3 The proposed PIM shall describe a metadata structure that provides interface growth per section 6.2.2.
- 6.5.1.4 The proposed PIM shall describe a simplex transmission mode per section 6.2.3.
- 6.5.1.5 The proposed PIM shall describe a connection-less and state-less model per section 6.2.3. **NO! Leave this decision to the submitters. Require instead minimum performance and quality criteria. Where did QoS requirements go?**
- 6.5.1.6 The proposed PIM shall provide a mechanism to identify the major and minor interface versions from the transmitted metadata/header.  
*This allows implementations to dynamically verify compatibility.*
- 6.5.1.7 The proposed PIM shall be independent of the metadata and data encoding format.  
*The encoding format is part of the Platform Specific Model per section 6.5.2.2.*
- 6.5.1.8 The proposed PIM shall be independent of the network transport.  
*The network transport is also a part of the Platform Specific Model per 6.5.2.3.*
- 6.5.1.9 The proposed PIM shall be independent of the operational infrastructure.  
*Where operational infrastructure is the host hardware, operating system, virtualization technology, and/or cloud platform.*

## 6.5.2 Platform Specific Requirements

- 6.5.2.1 Proposals shall provide a minimum of one platform-specific model (PSM).
- 6.5.2.2 The proposed PSM shall describe a metadata and data encoding format per section 6.2.4.
- 6.5.2.3 The proposed PSM shall specify at least one network transport per section 6.2.5.

## 6.5.3 General Requirements

- 6.5.3.1 Proposals shall allow any type of data to be carried by the GDDI payload.  
*The intent is to facilitate interoperability and not limit the type of data or format that can be carried by the interface.*
- 6.5.3.2 Proposals shall provide interoperability between ground applications that agree to use the same metadata encoding format and identifiers, as well as the same network transport.

## 6.6 Non-mandatory features

- 6.6.1 The proposed PSM may provide a configurable option to enable secure transmission and authentication of the transferred data and metadata, e.g., utilizing a standard such as Transport Layer Security (TLS).
- 6.6.2 Proposals may provide a solution for standardizing specific sets of metadata with concrete definitions of metadata identifiers and properties.
- 6.6.3 Proposals may describe how externally mandated cyber features are handled if required. For example, deploying into a cyber-hardened infrastructure.

## 6.7 Issues to be discussed

These issues will be considered during submission evaluation. They should not be part of the proposed normative specification. Place your responses to these Issues in Section 0 of your submission.

- 6.7.1 Proposals shall discuss how their solution satisfies the elastic metadata structure and interface growth requirements per section 6.2.2 as this is a unique interface requirement. Discussion could include how the metadata structure can dynamically expand or contract based on varying satellite ground use cases.
- 6.7.2 Proposals shall discuss how their PIM can support one of multiple transport platforms, including TCP. The intent is to minimally support TCP with additional/future support for other transport platforms.

6.7.3 Proposals shall discuss how their interface model facilitates user implementations with respect to simplicity, clarity, ease of implementation, extensibility, and sustainability, as well as minimizing external dependencies.

6.7.4 Proposals shall discuss quality of service (QoS) characteristics of their solution with respect to its metadata structure and encoding format, and any optimizations made for throughput, latency, and/or resource consumption (CPU, memory, network stack overhead). For example, discuss how the proposed solution meets modern ground system needs of narrowband to wideband satellite data rates from a raw bits-per-second metric to a data package units-per-second metric.

6.7.5 Proposals may optionally discuss the alignment and/or intersection between this specification and the OMG XML Telemetric and Command Exchange (XTCE) specification. Discussion could include how the in-band metadata might be referenced to an XTCE definition.

## 6.8 Evaluation Criteria

6.8.1 Proposals will be evaluated based on their discussion in section 6.7.1 related to the elastic metadata structure and how their solution satisfies the requirements.

6.8.2 Proposals will be evaluated based on their discussion in section 6.7.2 related to how the proposed PIM can support TCP in addition to other/future transports.

6.8.3 Proposals will be evaluated based on their discussion in section 6.7.3 related to how the proposed interface model facilitates user implementations.

6.8.4 Proposals will be evaluated based on their discussion in section 6.7.4 related to the performance characteristics and how their solution provides the necessary capabilities needed to support modern satellite ground systems.

6.8.5 Proposal evaluation may take into consideration any discussions in section 6.7.5 and in section 6.6 (non-mandatory requirements).

6.8.6 Satisfying the mandatory requirements in section 6.5 and discussions in sections 6.7.1, 6.7.2, 6.7.3, and 6.7.4 take precedence.

## 6.9 Other information unique to this RFP

None.

THIS is the right approach!  
Transform this into a  
mandatory requirement  
instead of requirement  
6.5.1.5!

## 6.10 IPR Mode

### *Non-Assert Covenant*

Every OMG Member that makes any written Submission in response to this RFP shall provide the Non-Assertion Covenant found in Appendix A of the OMG IPR Policy [IPR].

## 6.11 RFP Timetable

The timetable for this RFP is given below. Note that the TF or its parent TC may, in certain circumstances, extend deadlines while the RFP is running, or may elect to have more than one Revised Submission step. The latest timetable can always be found at the *OMG Work In Progress* page at <https://www.omg.org/schedules> under the item identified by the name of this RFP.

<b>Event or Activity</b>	<b>Date</b>
<i>Letter of Intent (LOI) deadline</i>	<i>29 September 2023</i>
<i>Initial Submission deadline</i>	<i>30 November 2023</i>
<i>Voter registration closes</i>	<i>29 December 2023</i>
<i>Initial Submission presentations</i>	<i>4 December 2023</i>
<i>Revised Submission deadline</i>	<i>2024 Q3 – 60 days</i>
<i>Revised Submission presentations</i>	<i>2024 Q3</i>

## Appendix A References & Glossary Specific to this RFP

### A.1 References Specific to this RFP

[GEMS] OMG Ground Equipment Monitoring Service, v1.4  
<http://www.omg.org/spec/GEMS/1.4>

[XTCE] OMG XML Telemetric and Command Exchange, v1.2  
<https://www.omg.org/spec/XTCE/1.2>

[DDS] OMG Data Distribution Services, v1.4  
<https://www.omg.org/spec/DDS/1.4>

[C2MS] OMG Command and Control Message Specification, v1.0  
<https://www.omg.org/spec/C2MS/1.0>

[SLE] CCSDS 910.4-B-2, Cross Support Reference Model – Part 1: Space Link Extension Services  
<https://public.ccsds.org/Pubs/910x4b2e1.pdf>

[GSE] Generic Stream Encapsulation  
[https://en.wikipedia.org/wiki/Generic\\_Stream\\_Encapsulation](https://en.wikipedia.org/wiki/Generic_Stream_Encapsulation)

[GFP] Generic Framing Procedure  
[https://en.wikipedia.org/wiki/Generic\\_Framing\\_Procedure](https://en.wikipedia.org/wiki/Generic_Framing_Procedure)

[DIFI] IEEE-ISTO Std 4900-2021: Digital IF Interoperability Standard, v1.1  
<https://dificonsortium.org/standards/>

[XDR] External Data Representation (XDR) Standard, May 2006  
<https://datatracker.ietf.org/doc/html/rfc4506>

### A.2 Glossary Specific to this RFP

None.



## Appendix B General Reference and Glossary

### B.1 General References

The following documents are referenced in this document:

[BCQ] OMG Board of Directors Business Committee Questionnaire,  
<https://doc.omg.org/bcq>

[CCM] CORBA Core Components Specification  
<https://www.omg.org/spec/CCM/>

[CORBA] Common Object Request Broker Architecture (CORBA)  
<https://www.omg.org/spec/CORBA/>

[CORP] UML Profile for CORBA,  
<https://www.omg.org/spec/CORP>

[CWM] Common Warehouse Metamodel Specification  
<https://www.omg.org/spec/CWM>

[EDOC] UML Profile for EDOC Specification  
<https://www.omg.org/spec/EDOC/>

[Guide] The OMG Hitchhiker's Guide  
<https://doc.omg.org/hh>

[IDL] Interface Definition Language Specification  
<https://www.omg.org/spec/IDL35>

[INVENT] Inventory of Files for a Submission/Revision/Finalization  
<https://doc.omg.org/inventory>

[IPR] IPR Policy  
<https://doc.omg.org/ipr>

[ISO2] ISO/IEC Directives, Part 2 – Rules for the structure and drafting of International Standards  
<https://isotc.iso.org/livelink/livelink?func=ll&objId=4230456>

[LOI] OMG RFP Letter of Intent template  
<https://doc.omg.org/loi>

[MDAa] OMG Architecture Board, "Model Driven Architecture - A Technical Perspective"

<https://www.omg.org/mda/papers.htm>

[MDAb] Developing in OMG's Model Driven Architecture (MDA)

<https://www.omg.org/mda/papers.htm>

[MDAc] MDA Guide

<https://www.omg.org/docs/omg/03-06-01.pdf>

[MDAd] MDA "The Architecture of Choice for a Changing World"

<https://www.omg.org/mda>

[MOF] Meta Object Facility Specification

<https://www.omg.org/spec/MOF/>

[NS] Naming Service

<https://www.omg.org/spec/NAM>

[OMA] Object Management Architecture

<https://www.omg.org/oma/>

[OTS] Transaction Service

<https://www.omg.org/spec/OTS>

[P&P] Policies and Procedures of the OMG Technical Process

<https://doc.omg.org/pp>

[RAD] Resource Access Decision Facility

<https://www.omg.org/spec/RAD>

[ISO2] ISO/IEC Directives, Part 2 – Rules for the structure and drafting of International Standards

<https://isotc.iso.org/livelink/livelink?func=ll&objId=4230456>

[RM-ODP]

ISO/IEC 10746

[SEC] CORBA Security Service

<https://www.omg.org/spec/SEC>

[TEMPL] Specification Template

<https://doc.omg.org/submission-template>

[TOS] Trading Object Service  
*<http://www.omg.org/spec/TRADE>*

[UML] Unified Modeling Language Specification,  
*<https://www.omg.org/spec/UML>*

[XMI] XML Metadata Interchange Specification,  
*<https://www.omg.org/spec/XMI>*

## B.2 General Glossary

**Architecture Board (AB)** - The OMG plenary that is responsible for ensuring the technical merit and MDA-compliance of RFPs and their submissions.

**Board of Directors (BoD)** - The OMG body that is responsible for adopting technology.

**Common Object Request Broker Architecture (CORBA)** - An OMG distributed computing platform specification that is independent of implementation languages.

**Common Warehouse Metamodel (CWM)** - An OMG specification for data repository integration.

**CORBA Component Model (CCM)** - An OMG specification for an implementation language independent distributed component model.

**Interface Definition Language (IDL)** - An OMG and ISO standard language for specifying interfaces and associated data structures.

**Letter of Intent (LOI)** - A letter submitted to the OMG BoD's Business Committee signed by an officer of an organization signifying its intent to respond to the RFP and confirming the organization's willingness to comply with OMG's terms and conditions, and commercial availability requirements.

**Mapping** - Specification of a mechanism for transforming the elements of a model conforming to a particular metamodel into elements of another model that conforms to another (possibly the same) metamodel.

**Metadata** - Data that represents models. For example, a UML model; a CORBA object model expressed in IDL; and a relational database schema expressed using CWM.

**Metamodel** - A model of models.

**Meta Object Facility (MOF)** - An OMG standard, closely related to UML, that enables metadata management and language definition.

**Model** - A formal specification of the function, structure and/or behavior of an application or system.

**Model Driven Architecture (MDA)** - An approach to IT system specification that separates the specification of functionality from the specification of the implementation of that functionality on a specific technology platform.

**Normative** – Provisions to which an implementation shall conform to in order to claim compliance with the standard (as opposed to non-normative or informative material, included only to assist in understanding the standard).

**Normative Reference** – References to documents that contain provisions to which an implementation shall conform to in order to claim compliance with the standard.

**Platform** - A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.

**Platform Independent Model (PIM)** - A model of a subsystem that contains no information specific to the platform, or the technology that is used to realize it.

**Platform Specific Model (PSM)** - A model of a subsystem that includes information about the specific technology that is used in the realization of it on a specific platform, and hence possibly contains elements that are specific to the platform.

**Request for Information (RFI)** - A general request to industry, academia, and any other interested parties to submit information about a particular technology area to one of the OMG's Technology Committee subgroups.

**Request for Proposal (RFP)** - A document requesting OMG members to submit proposals to an OMG Technology Committee.

**Task Force (TF)** - The OMG Technology Committee subgroup responsible for issuing a RFP and evaluating submission(s).

**Technology Committee (TC)** - The body responsible for recommending technologies for adoption to the BoD. There are two TCs in OMG – the *Platform TC* (PTC) focuses on IT and modeling infrastructure related standards; while the *Domain TC* (DTC) focuses on domain specific standards.

**Unified Modeling Language (UML)** - An OMG standard language for specifying the structure and behavior of systems. The standard defines an abstract syntax and a graphical concrete syntax.

**UML Profile** - A standardized set of extensions and constraints that tailors UML to particular use.

**XML Metadata Interchange (XMI)** - An OMG standard that facilitates interchange of models via XML documents.