

Instrument

- [Element Description](#)
- [Best Practices](#)
- [Element Specification](#)
- [Metadata Validation and QA/QC](#)
- [Dialect Mappings](#)
 - [DIF 10](#)
 - [ECHO 10](#)
 - [ISO 19115-2 MENDS](#)
 - [ISO 19115-2 SMAP](#)
- [UMM Migration](#)
 - [ISO 19115-1](#)
- [History](#)
 - [UMM Versioning](#)
 - [ARC Documentation](#)

Element Description

The instrument elements enable the specification of instruments used to collect the data available in the dataset. Instruments provided in CMR metadata must be chosen from a controlled keyword hierarchy maintained in the [Keyword Management System \(KMS\)](#). A list of valid instrument keywords can be found [here](#).

Optionally, attributes specific to the instrument (such as swath width, revisit period, spectral range, etc.) may be specified in the [characteristics elements](#). Please see the [Characteristics wiki page](#) for a detailed description of the characteristics sub-elements.

Best Practices

Instrument keywords are important for the discovery of data. All relevant instruments should be listed for each dataset, and each instrument listed should be provided under its associated platform. It is preferred that more specific instrument keyword terms be chosen from the KMS when available. For example, if data were collected from the AMSR-E instrument, it is preferred that "AMSR-E" be listed as the instrument as opposed to the more generic "RADIOMETERS" keyword. If a particular instrument keyword is missing from the KMS, it is possible to put in a request to have it added. The KMS is managed by the Global Change Master Directory (GCMD) and new keyword requests may be made through the [GCMD Keywords Community Forum](#).

In the KMS, there is a hierarchy for instrument keywords. Instrument keywords should be provided in the metadata field corresponding to the appropriate position of the keyword hierarchy, otherwise the keyword will be rendered invalid. For example, the instrument short name specified in the KMS should not be provided in the instrument 'long name' field in the metadata. When listing instruments, an instrument short name will always be required. While instrument long names are not required, it is highly encouraged that long names be provided if one is listed in the KMS. Many instrument short names are comprised of acronyms, so inclusion of the long name provides additional context to a user who may not be familiar with the acronym. Instrument keywords are not case sensitive.

Providing instruments is optional, however, it is strongly recommended that an instrument be provided with each platform if feasible. In the case that it does not make sense to provide an instrument for a dataset, the instrument may be left blank or a value of "Not Applicable" may be provided. Multiple instruments may be listed under a single [platform](#) if appropriate. Platform/instrument relationships are not currently validated within the KMS, so care should be taken to ensure that the correct instrument is listed under the correct [platform](#).

It is recommended that instrument keywords be assigned in a consistent manner. For example, if data for several collections were collected by the "SMAP L-Band Radiometer" instrument, it is recommended that the metadata for all of those collections list "SMAP L-Band Radiometer" as the instrument short name. Providing "SMAP L-Band Radiometer" as the instrument in some records, but the more generic "RADIOMETERS" as the instrument in other records, results in an inconsistent experience for a user discovering data. This is especially true for users narrowing down their search results in the Earthdata Search client by using the faceted search options.

The Instruments/Technique field is optional. It can be used to further describe the technique utilized by the instrument for data collection. For example, the technique for a laser altimeter instrument on board a satellite could read "Measures the distance of the satellite from the Earth's surface by taking a precise measurement of the time it takes a transmitted laser pulse to hit the ground and then return to the instrument."

The Instruments/NumberOfInstruments field is optional. It can be used to indicate the number of instruments (i.e. sensors) used on the instrument while acquiring data. For example, the Terra satellite carries the ASTER instrument. The ASTER instrument is made up of 3 instrument subsystems (VNIR, SWIR, and TIR). In this example, the Instruments/NumberOfInstruments field would read "3".

The Instruments/OperationalModes field is optional and may be repeated. This field can be used to specify the mode(s) in which an instrument collects data. For example, the Sentinel-1 satellite collects data in four different modes. If a collection were to contain data acquired in all four modes, the OperationalModes field could be repeated four times and read "Stripmap (SM)", "Interferometric Wide swath (IW)", "Extra-Wide swath (EW)", and "Wave (WV)".

Examples (ShortName > LongName):

SMMR > Scanning Multichannel Microwave Radiometer

OLI > Operational Land Imager

UAVSAR > Uninhabited Aerial Vehicle Synthetic Aperture Radar

LIS > Lightning Imaging Sensor

XPOL > NOAA/ETL X-band Polarimetric Doppler Radar

Element Specification

Instrument is an optional metadata element, however, it is strongly recommended that it be provided when possible. Multiple Instruments may be listed if necessary (Cardinality: 0..*).

Providing instrument **characteristics** is optional. An unlimited amount of instrument **characteristics** may be specified for a particular instrument (Cardinality: 0..*). If instrument **characteristics** are provided, all 5 sub-fields (Name, Description, DataType, Unit, Value) are required.

Model	Element	Type	Usable Valid Values	Constraints	Required?	Cardinality	Notes
UMM-Common	Platforms/Instruments/ShortName	String	Instrument Short_Name Keywords	KMS controlled	Yes, if applicable	1	
UMM-Common	Platforms/Instruments/LongName	String	Instrument Long_Name Keywords	KMS controlled	No	0..1	
UMM-Common	Platforms/Instruments/Technique	String	n/a	1 - 2048 characters	No	0..1	
UMM-Common	Platforms/Instruments/NumberOfInstruments	Integer	n/a	n/a	No	0..1	
UMM-Common	Platforms/Instruments/ Characteristics/Name	String	n/a	1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
UMM-Common	Platforms/Instruments/ Characteristics/Description	String	n/a	1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
UMM-Common	Platforms/Instruments/ Characteristics/DataType	Enumeration	STRING FLOAT INT BOOLEAN DATE TIME DATETIME DATE_STRING TIME_STRING DATETIME_STRING	n/a	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
UMM-Common	Platforms/Instruments/ Characteristics/Unit	String	n/a	1 - 20 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
UMM-Common	Platforms/Instruments/ Characteristics/Value	String	n/a	1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
UMM-Common	Platforms/Instruments/OperationalModes	String	n/a	1 - 20 characters	No	0..*	

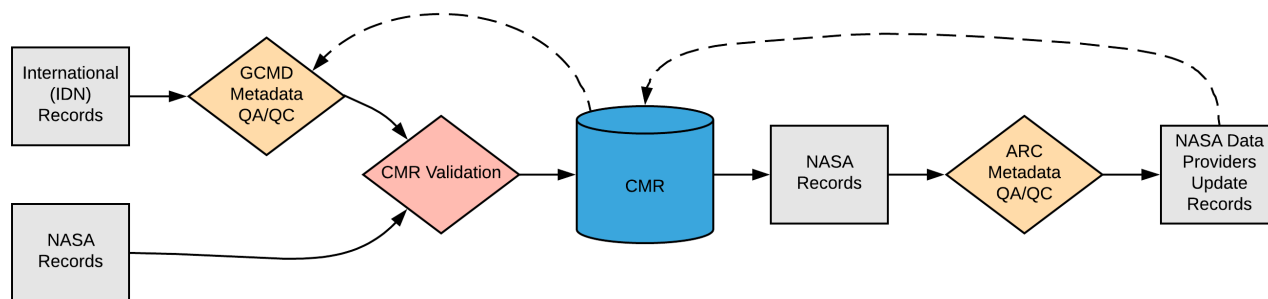
Value needed for translations:

The following value is needed by the CMR to translate older non UMM compliant records to and from the UMM and other supported specifications where non required elements are considered required but no value is given. This is needed partly because the CMR still allows a non UMM compliant record to be ingested with warnings.

UNDEFINED - DIF 10 records found to be missing instruments by software will be automatically assigned a value of "Not Provided". It should then be confirmed whether an instrument can be assigned or whether "Not Applicable" should be provided. *The value "Not Provided" should not be used by metadata providers.*

Metadata Validation and QA/QC

All metadata entering the CMR goes through the below process to ensure metadata quality requirements are met. All records undergo CMR validation before entering the system. The process of QA/QC is slightly different for NASA and non-NASA data providers. Non-NASA providers include interagency and international data providers and are referred to as the International Directory Network (IDN).



Please see the expandable sections below for flowchart details.

- Manual Review
 - Identify errors, discrepancies, or omissions.
 - Verify that all pertinent keywords have been applied.
 - Verify that existing facets and other controlled keyword values are consistent and suitable for the data.
- Automated Review
 - Check that the field has been populated.
 - Check that the field is populated with a valid value from KMS.
 - Check that the field value is not a duplicate.
 - Check that the field length is not greater than the maximum characters allowed for each sub-element.
 - Check that the field '/Instrument/NumberOfSensors' is an integer value.
- The specific instrument must be unique within the collection. The uniqueness is established by combining the instrument short name along with its characteristic's name.
- The instrument short name must match with what is in the KMS.
- If a granule has an instrument short name in it, it must match to one that is defined in the collection.
- If removing an instrument from a collection, none of its granules can reference that instrument's short name.

ARC Priority Matrix

Priority Categorization	Justification
Red = High Priority Finding	This element is categorized as highest priority when: • No Instrument is provided in the DIF10 metadata format (Instrument is a required element in DIF10). • The Instrument keyword does not align with the KMS. ◦ The Instrument keyword does not exist in KMS. ◦ A keyword(s) is placed in the incorrect position of the hierarchy (e.g. the Instrument Short Name is placed in the Long Name field). ◦ Keywords from two different KMS hierarchies are listed in the same hierarchy in the metadata (hierarchies cannot be mixed and matched). • Not all relevant Instruments are listed. • An incorrect Instrument is listed. • An Instrument is listed under the incorrect Platform. • Please see the Characteristics wiki page for high priority issues related to the Instrument/Characteristics sub-elements.
Yellow = Medium Priority Finding	This element is categorized as medium priority when: • A recommendation is made to add an Instrument value that could aid in data discovery (UMM and ECHO10 metadata formats - Instrument is optional in these formats). • A recommendation is made to replace a valid Instrument with a more specific/appropriate Instrument keyword. • A recommendation is made to add an Instrument Long name when a Long Name exists in the KMS. • A recommendation is made to remove sensor names that are a repeat of the instruments. • Instruments are provided in an inconsistent manner across related datasets. • Please see the Characteristics wiki page for medium priority issues related to the Instrument/Characteristics sub-elements.

Blue = Low Priority Finding	This element is categorized as low priority when: - Please see the Characteristics wiki page for low priority issues related to the Instrument/Characteristics sub-elements. - A recommendation is made to add an Instrument Long name when a Long Name exists in the KMS, and it is identical to the short name.
Green = No Findings /Issues	The element is provided and follows all applicable criteria specified in the best practices section above.

ARC Automated Checks

ARC uses the [pyQuARC library](#) for automated metadata checks. Please see the [pyQuARC GitHub](#) for more information.

Dialect Mappings

DIF 9 (Note: DIF-9 is being phased out and will no longer be supported after 2018)

DIF 10

Instrument is a required metadata element. At least 1 Instrument Keyword must be provided under each [Platform](#). Multiple Instruments may be listed if necessary (Cardinality: 1..*).

Providing instrument [characteristics](#) is optional. An unlimited amount of instrument [characteristics](#) may be specified for a particular instrument (Cardinality: 0..*). If instrument [characteristics](#) are provided, all 5 sub-fields (Name, Description, DataType, Unit, Value) are required.

UMM-C Element	DIF 10 Path	Type	Usable Valid Values	Constraints	Required in DIF 10?	Cardinality	Notes
Platforms/Instruments /ShortName	/DIF/Platform/Instrument /Short_Name	String	Instrument Short_Name Keywords	KMS controlled	Yes	1	For each instrument provided, a short name is required.
Platforms/Instruments /LongName	/DIF/Platform/Instrument /Long_Name	String	Instrument Long_Name Keywords	KMS controlled	No	0..1	It is highly recommended that a long name be provided if one is available in KMS .
Platforms/Instruments /Technique	/DIF/Platform/Instrument /Technique	String		1 - 2048 characters	No	0..1	
Platforms/Instruments /NumberOfInstruments	/DIF/Platform/Instrument /NumberOfSensors	Integer		n/a	No	0..1	
Platforms/Instruments/ Charac teristics/Name	/DIF/Platform/Instrument /Characteristics/Name	String		1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is provided.Providing characteristics is optional.
Platforms/Instruments/ Charac teristics/Description	/DIF/Platform/Instrument /Characteristics/Description	String		1 - 2048 characters	Yes, if applicable	1	Only required if a characteristic is provided.Providing characteristics is optional.
Platforms/Instruments/ Charac teristics/DataType	/DIF/Platform/Instrument /Characteristics/DataType	String		1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is provided.Providing characteristics is optional.
Platforms/Instruments/ Charac teristics/Unit	/DIF/Platform/Instrument /Characteristics/Unit	String		1 - 20 characters	Yes, if applicable	1	Only required if a characteristic is provided.Providing characteristics is optional.
Platforms/Instruments/ Charac teristics/Value	/DIF/Platform/Instrument /Characteristics/Value	String		1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is provided.Providing characteristics is optional.
Platforms/Instruments /OperationalModes	/DIF/Platform/Instrument /OperationalMode	String		1 - 20 characters	No	0..*	

Example Mapping

DIF 10

```

<Platform>
  <Type>Earth Observation Satellites</Type>
  <Short_Name>Aqua</Short_Name>
  <Long_Name>Earth Observing System, Aqua</LongName>
  <Instrument>
    <Short_Name>MODIS</Short_Name>
    <Long_Name>Moderate-Resolution Imaging
Spectroradiometer</Long_Name>
    <Characteristics>
      <Name>SwathWidth</Name>
      <Description>The width of the sensor scan as
the satellite moves along the ground track.<
/Description>
      <DataType>INT</DataType>
      <Unit>Kilometers</Unit>
      <Value>2330</Value>
    </Characteristics>
  </Instrument>
</Platform>

```

UMM

```

Platforms: [
{
  Type: "Earth Observation Satellites",
  ShortName: "Aqua",
  LongName: "Earth Observing System, Aqua",
  Instruments: [
    {
      ShortName: "MODIS",
      LongName: "Moderate-Resolution Imaging
Spectroradiometer",
      Characteristics: [
        {
          Name: "SwathWidth",
          Description: "The width of the sensor
scan as the satellite moves along the ground track.",
          DataType: "INT",
          Unit: "Kilometers",
          Value: "2330",
        }
      ]
    }
  ]
}
],

```

ECHO 10

Instrument is an optional metadata element, however, it is strongly recommended that it be provided when possible. Multiple Instruments may be listed if necessary (Cardinality: 0..*).

Providing instrument **characteristics** is optional. An unlimited amount of instrument **characteristics** may be specified for a particular instrument (Cardinality: 0..*). If instrument **characteristics** are provided, all 5 sub-fields (Name, Description, DataType, Unit, Value) are required.

UMM-C Element	ECHO 10 Path	Type	Usable Valid Values	Constraints	Required in ECHO10?	Cardinality	Notes
Platforms/Instruments /ShortName	/Collection/Platforms/Platform/Instruments /Instrument/ShortName	String	Instrument Short_Name Keywords	KMS controlled	Yes	1	For each instrument provided, a short name is required.
Platforms/Instruments /LongName	/Collection/Platforms/Platform/Instruments /Instrument/LongName	String	Instrument Long_Name Keywords	KMS controlled	No	0..1	It is highly recommended that a long name be provided if one is available in KMS .

Platforms/Instruments/Technique	Collection/Platforms/Platform/Instruments/Instrument/Technique	String		1 - 2048 characters	No	0..1	
Platforms/Instruments/NumberOfInstruments	Collection/Platforms/Platform/Instruments/Instrument/NumberOfSensors	Integer		n/a	No	0..1	
Platforms/Instruments/Characteristics/Name	/Collection/Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/Name	String		1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
Platforms/Instruments/Characteristics/Description	/Collection/Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/Description	String		1 - 2048 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
Platforms/Instruments/Characteristics/DataType	/Collection/Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/DataType	String		1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
Platforms/Instruments/Characteristics/Unit	/Collection/Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/Unit	String		1 - 20 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
Platforms/Instruments/Characteristics/Value	/Collection/Platforms/Platform/Instruments/Instrument/Characteristics/Characteristic/Value	String		1 - 80 characters	Yes, if applicable	1	Only required if a characteristic is listed. Providing characteristics is optional.
Platforms/Instruments/OperationalModes	/Collection/Platforms/Platform/Instruments/Instrument/OperationModes/OperationMode	String		1 - 20 characters	No	0..*	

Example Mapping

ECHO 10

```

<Platforms>
  <Platform>
    <ShortName>Aqua</ShortName>
    <LongName>Earth Observing System, Aqua</LongName>
    <Type>Earth Observation Satellites</Type>
    <Instruments>
      <Instrument>
        <ShortName>MODIS</ShortName>
        <LongName>Moderate-Resolution Imaging Spectroradiometer</LongName>
        <Characteristics>
          <Characteristic>
            <Name>SwathWidth</Name>
            <Description>The width of the sensor scan as the satellite moves along the ground track.</Description>
            <DataType>INT</DataType>
            <Unit>Kilometers</Unit>
            <Value>2330</Value>
          </Characteristic>
        </Characteristics>
      </Instrument>
    </Instruments>
  </Platform>
</Platforms>

```

UMM

```

Platforms: [
{
  Type: "Earth Observation Satellites",
  ShortName: "Aqua",
  LongName: "Earth Observing System, Aqua",
  Instruments: [
    {
      ShortName: "MODIS",
      LongName: "Moderate-Resolution Imaging
Spectroradiometer",
      Characteristics: [
        {
          Name: "SwathWidth",
          Description: "The width of the sensor
scan as the satellite moves along the ground track.",
          DataType: "INT",
          Unit: "Kilometers",
          Value: "2330",
        }
      ]
    }
  ]
}
],

```

ISO 19115-2 MENDS

Instrument is an optional metadata element, however, it is strongly recommended that it be provided when possible. Multiple Instruments may be listed if necessary (Cardinality: 0..*).

Providing instrument **characteristics** is optional. An unlimited amount of instrument **characteristics** may be specified for a particular instrument (Cardinality: 0..*). If instrument **characteristics** are provided, all 5 sub-fields (Name, Description, DataType, Unit, Value) are required.

UMM-C Element	ISO 19115-2 MENDS Path	Type	Notes
Platforms /Instruments /ShortName	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument id="<insert unique instrument ID here>"/ gmi:identifier /gmd:MD_Identifier/gmd:code/gco:CharacterString with /gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:identifier/gmd:MD_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.instrumentshortname	String	A list of valid instrument short names can be found in the KMS under the 'Short_Name' column. For each instrument listed the short name is required by CMR. The short name value goes in the gmd:code field. The value of " gov.nasa.esdis.umm.instrumentshortname" should be provided in gmd:CodeSpace field so that CMR can properly parse out the instrument short name. An ID should be provided directly after "eos:EOS_Instrument" in the ISO x-path. This ID corresponds to the instrument and is used to link the instrument information to the associated platform. The ID should be unique within the metadata record.
Platforms /Instruments /LongName	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:identifier/gmd:MD_Identifier/gmd:description/gco:CharacterString	String	A list of valid instrument long names can be found in the KMS under the 'Long_Name' column.
Platforms /Instruments /Technique	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:type/gco:CharacterString	String	
Platforms /Instruments /NumberOfInstruments			When translating to UMM-C the number of instruments is counted. The number is not translated to ISO 19115-2 MENDS.

	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:type/eos:EOS_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodetables.xml#EOS_AdditionalAttributeTypeCode" codeListValue="instrumentInformation" = instrumentInformation	Codelist	The "instrumentInformation" codelist value must be provided so that CMR can properly identify the associated information as instrument characteristics. This codelist value does not directly map to a UMM element—choosing 'instrumentInformation' indicates to CMR that the instrument characteristic elements should be mapped.
Platforms /Instrument s/Character istics/Name	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:name/gco:CharacterString	String	
Platforms /Instrument s/Character istics /Description	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:description/gco:CharacterString	String	
Platforms /Instrument s/Character istics /DataType	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:dataType/eos:EOS_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmxCodetables.xml#MD_DataTypeCode" codeListValue=<date type> value=<data type>	Codelist	ISO codelist values (class, codelist, enumeration, codelistElement, abstractClass, aggregateClass, specifiedClass, datatypeClass, interfaceClass, unionClass, metaClass, typeClass, characterString, integer, association) UMM enum (STRING, FLOAT, INT BOOLEAN, DATE, TIME, DATETIME, DATE_STRING, TIME_STRING, DATETIME_STRING)
Platforms /Instrument s/Character istics/Unit	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:parameterUnitsOfMeasure/gco:CharacterString	String	
Platforms /Instrument s/Character istics/Value	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString	String	
Platforms /Instrument s /Operation alModes	/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:name/gco:CharacterString="OperationalMode" and /gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString	String	The eos:name field must read "OperationalMode" so that CMR can properly parse out the operation mode information. The actual operation mode value should be provided in the eos:value field.
	gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:mountedOn xlink:href="<insert unique platform ID here>"		An ID should be provided here and should match the ID provided for the associated platform. This ID should be unique within a metadata record. This will link all of the information provided on the instrument to its associated platform.

Example Mapping

ISO 19115-2 MENDS

```

<gmi:MI_Metadata>
...
  <gmi:acquisitionInformation>
    <gmi:MI_AcquisitionInformation>
      <gmi:instrument>

        <eos:EOS_Instrument id="dfdaa96ba-483d-4e63-86ad-5dfd0eedf496">
          <gmi:identifier>
            <gmd:MD_Identifier>
              <gmd:code>
                <gco:CharacterString>MODIS</gco:CharacterString>
              </gmd:code>
              <gmd:codeSpace>
                <gco:CharacterString>gov.nasa.esdis.umm.instrumentshortname</gco:CharacterString>
              </gmd:codeSpace>
              <gmd:description>

```

```

        <gco:CharacterString>Moderate-
Resolution Imaging Spectroradiometer</gco:
CharacterString>
        </gmd:description>
        </gmd:MD_Identifier>
        </gmi:identifier>
        <gmi:type>
        <gco:CharacterString>Broadband scanning
radiometry</gco:CharacterString>
        </gmi:type>
        <gmi:mountedOn xlink:href="#d36bb8fb0-d827-
4fd1-a2e9-5db6778abddc"/>
        <eos:otherProperty>
        <gco:Record>
        <eos:AdditionalAttributes>
        <eos:AdditionalAttribute>
        <eos:reference>
        <eos:
EOS_AdditionalAttributeDescription>
        <eos:type>
        <eos:
EOS_AdditionalAttributeTypeCode codeList="
https://cdn.earthdata.nasa.gov/iso/resources/Codelist
/eosCodelists.xml#EOS_AdditionalAttributeTypeCode"
codeListValue="instrumentInformation"
>instrumentInformation</eos:
EOS_AdditionalAttributeTypeCode>
        </eos:type>
        <eos:name>
        <gco:
CharacterString>SwathWidth</gco:CharacterString>
        </eos:name>
        <eos:description>
        <gco:CharacterString>The
width of the sensor scan as the satellite moves
along the ground track.</gco:CharacterString>
        </eos:description>
        <eos:dataType>
        <eos:
EOS_AdditionalAttributeDataTypeCode codeList="
https://cdn.earthdata.nasa.gov/iso/resources/Codelist
/eosCodelists.
xml#EOS_AdditionalAttributeDataTypeCode"
codeListValue="INT">INT</eos:
EOS_AdditionalAttributeDataTypeCode>
        </eos:dataType>
        <eos:parameterUnitsOfMeasure>
        <gco:
CharacterString>Kilometers</gco:CharacterString>
        </eos:parameterUnitsOfMeasure>
        </eos:
EOS_AdditionalAttributeDescription>
        </eos:reference>
        <eos:value>
        <gco:CharacterString>2330</gco:
CharacterString>
        </eos:value>
        </eos:AdditionalAttribute>
        </eos:AdditionalAttributes>
        </gco:Record>
        </eos:otherProperty>
        </eos:EOS_Instrument>
        </gmi:instrument>
        <gmi:platform>
        <eos:EOS_Platform id="d36bb8fb0-d827-4fd1-
a2e9-5db6778abddc">
        <gmi:identifier>
        <gmd:MD_Identifier>
        <gmd:code>
        <gco:CharacterString>Aqua</gco:
CharacterString>

```

```

        </gmd:code>
        <gmd:codeSpace>
          <gco:CharacterString>gov.nasa.esdis.
umm.platformshortname</gco:CharacterString>
        </gmd:codeSpace>
        <gmd:description>
          <gco:CharacterString>Earth Observing
System, Aqua</gco:CharacterString>
        </gmd:description>
        </gmd:MD_Identifier>
        </gmi:identifier>
        <gmi:description>
          <gco:CharacterString>Earth Observation
Satellites</gco:CharacterString>
        </gmi:description>
        <gmi:instrument xlink:href="#dfdaa96ba-
483d-4e63-86ad-5dfd0eedf496"/>
        </eos:EOS_Platform>
        </gmi:platform>
      </gmi:MI_AcquisitionInformation>
    </gmi:acquisitionInformation>
  </gmi:MI_Metadata>

```

UMM

```

Platforms: [
{
  Type: "Earth Observation Satellites",
  ShortName: "Aqua",
  LongName: "Earth Observing System, Aqua",
  Instruments: [
    {
      ShortName: "MODIS",
      LongName: "Moderate-Resolution Imaging
Spectroradiometer",
      Technique: "Broadband scanning radiometry",
      Characteristics: [
        {
          Name: "SwathWidth",
          Description: "The width of the sensor
scan as the satellite moves along the ground track.",
          DataType: "INT",
          Unit: "Kilometers",
          Value: "2330",
        }
      ]
    }
  ]
}
],

```

ISO 19115-2 SMAP

Instrument is an optional metadata element, however, it is strongly recommended that it be provided when possible. Multiple Instruments may be listed if necessary (Cardinality: 0..*).

Providing instrument **characteristics** is optional. An unlimited amount of instrument **characteristics** may be specified for a particular instrument (Cardinality: 0..*). If instrument **characteristics** are provided, all 5 sub-fields (Name, Description, DataType, Unit, Value) are required.

UMM-C Element	ISO 19115-2 SMAP Path	Type	Notes
---------------	-----------------------	------	-------

Platforms /Instrument s /ShortName	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument id="<insert unique instrument ID here>" gmi:identifier/gmd:MD_Identifier/gmd:code/gco:CharacterString with /gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:identifier/gmd:MD_Identifier/gmd:codeSpace/gco:CharacterString = gov.nasa.esdis.umm.instrumentshortname	String	A list of valid instrument short names can be found in the KMS under the 'Short_Name' column. For each instrument listed the short name is required by CMR. The short name value goes in the gmd:code field. The value of "gov.nasa.esdis.umm.instrumentshortname" should be provided in gmd:CodeSpace field so that CMR can properly parse out the instrument short name. An ID should be provided directly after "eos:EOS_Instrument" in the ISO x-path. This ID corresponds to the instrument and is used to link the instrument information to the associated platform. The ID should be unique within the metadata record.
Platforms /Instrument s /LongName	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:identifier/gmd:MD_Identifier/gmd:description/gco:CharacterString	String	A list of valid instrument long names can be found in the KMS under the 'Long_Name' column.
Platforms /Instrument s /Technique	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:type/gco:CharacterString	String	
Platforms /Instrument s /NumberOfInstruments	When translating to UMM-C the number of instruments is counted. The number is not translated to ISO 19115-2 MENDS		
	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:type/eos:EOS_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmx/Codelists.xml#EOS_AdditionalAttributeTypeCode" codeListValue="instrumentInformation" =instrumentInformation	Codelist	The "instrumentInformation" codelist value must be provided so that CMR can properly identify the associated information as instrument characteristics. This codelist value does not directly map to a UMM element—choosing 'instrumentInformation' indicates to CMR that the instrument characteristic elements should be mapped.
Platforms /Instrument s/Characteristics/Name	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:name/gco:CharacterString	String	
Platforms /Instrument s/Characteristics/Description	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:description/gco:CharacterString	String	
Platforms /Instrument s/Characteristics/DataType	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:dataType/eos:EOS_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmx/Codelists.xml#MD_DataTypeCode" codeListValue="<date type> value="<data type>	Codelist	ISO codelist values (class, codelist, enumeration, codelistElement, abstractClass, aggregateClass, specifiedClass, datatypeClass, interfaceClass, unionClass, metaClass, typeClass, characterString, integer, association) UMM enum (STRING, FLOAT, INT BOOLEAN, DATE, TIME, DATETIME, DATE_STRING, TIME_STRING, DATETIME_STRING)
Platforms /Instrument s/Characteristics/Unit	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:parameterUnitsOfMeasure/gco:CharacterString	String	
Platforms /Instrument s/Characteristics/Value	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString	String	
Platforms /Instrument s/OperationalModes	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:name/gco:CharacterString="OperationalMode" and /gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ eos:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString	String	The eos:name field must read "OperationalMode" so that CMR can properly parse out the operation mode information. The actual operation mode value should be provided in the eos:value field.

	/gmd:DS_Series/gmd:seriesMetadata/gmi:MI_Metadata/gmi:acquisitionInformation/gmi:MI_AcquisitionInformation/gmi:instrument/eos:EOS_Instrument/ gmi:mountedOn xlink:href='<insert unique platform ID here>'	String	An ID should be provided here and should match the ID provided for the associated platform . This ID should be unique within a metadata record. This will link all of the information provided on the instrument to its associated platform .
--	---	--------	---

Example Mapping

ISO 19115-2 SMAP

```

<gmd:DS_Series>
<gmd:seriesMetadata>
<gmi:MI_Metadata>
  ...
  <gmi:acquisitionInformation>
    <gmi:MI_AcquisitionInformation>
      <gmi:instrument>

        <eos:EOS_Instrument id="dfd00eedf496-86ad-5dfd0eedf496">
          <gmi:identifier>
            <gmd:MD_Identifier>
              <gmd:code>
                <gco:CharacterString>MODIS</gco:
CharacterString>
              </gmd:code>
              <gmd:codeSpace>
                <gco:CharacterString>gov.nasa.esdis.
umm.instrumentshortname</gco:CharacterString>
              </gmd:codeSpace>
              <gmd:description>
                <gco:CharacterString>Moderate-
Resolution Imaging Spectroradiometer</gco:
CharacterString>
              </gmd:description>
            </gmd:MD_Identifier>
          </gmi:identifier>
          <gmi:type>
            <gco:CharacterString>Broadband scanning
radiometry</gco:CharacterString>
          </gmi:type>
          <gmi:mountedOn xlink:href="#d36bb8fb0-d827-
4fd1-a2e9-5db6778abddc"/>
          <eos:otherProperty>
            <gco:Record>
              <eos:AdditionalAttributes>
                <eos:AdditionalAttribute>
                  <eos:reference>
                    <eos:
EOS_AdditionalAttributeDescription>
                      <eos:type>
                        <eos:
EOS_AdditionalAttributeTypeCode codeList="
https://cdn.earthdata.nasa.gov/iso/resources/Codelist
/eosCodelists.xml#EOS_AdditionalAttributeTypeCode"
codeListValue="instrumentInformation"
>instrumentInformation</eos:
EOS_AdditionalAttributeTypeCode>
                      </eos:type>
                      <eos:name>
                        <gco:
CharacterString>SwathWidth</gco:CharacterString>
                      </eos:name>
                      <eos:description>
                        <gco:CharacterString>The
width of the sensor scan as the satellite moves
along the ground track.</gco:CharacterString>
                      </eos:description>
                      <eos:dataType>
                        <eos:

```

```

EOS_AdditionalAttributeDataTypeCode codeList="
https://cdn.earthdata.nasa.gov/iso/resources/Codelist
/eosCodelists.
xml#EOS_AdditionalAttributeDataTypeCode"
codeListValue="INT">INT</eos:
EOS_AdditionalAttributeDataTypeCode>
    </eos:dataType>
    <eos:parameterUnitsOfMeasure>
        <gco:
CharacterString>Kilometers</gco:CharacterString>
        </eos:parameterUnitsOfMeasure>
    </eos:
EOS_AdditionalAttributeDescription>
    </eos:reference>
    <eos:value>
        <gco:CharacterString>2330</gco:
CharacterString>
        </eos:value>
    </eos:AdditionalAttribute>
</eos:AdditionalAttributes>
</gco:Record>
</eos:otherProperty>
</eos:EOS_Instrument>
</gmi:instrument>

    <gmi:platform>
        <eos:EOS_Platform id="d36bb8fb0-d827-4fd1-
a2e9-5db6778abddc">
            <gmi:identifier>
                <gmd:MD_Identifier>
                    <gmd:code>
                        <gco:CharacterString>Aqua</gco:
CharacterString>
                        </gmd:code>
                    <gmd:codeSpace>
                        <gco:CharacterString>gov.nasa.esdis.
umm.platformshortname</gco:CharacterString>
                    </gmd:codeSpace>
                    <gmd:description>
                        <gco:CharacterString>Earth Observing
System, Aqua</gco:CharacterString>
                    </gmd:description>
                </gmd:MD_Identifier>
            </gmi:identifier>
            <gmi:description>
                <gco:CharacterString>Earth Observation
Satellites</gco:CharacterString>
            </gmi:description>
            <gmi:instrument xlink:href="#dfdaa96ba-
483d-4e63-86ad-5dfd0eedf496"/>
        </eos:EOS_Platform>
    </gmi:platform>
</gmi:MI_AcquisitionInformation>
</gmi:acquisitionInformation>
</gmi:MI_Metadata>
</gmd:seriesMetadata>
</gmd:DS_Series>

```

UMM

```

Platforms: [
{
  Type: "Earth Observation Satellites",
  ShortName: "Aqua",
  LongName: "Earth Observing System, Aqua",
  Instruments: [
    {
      ShortName: "MODIS",
      LongName: "Moderate-Resolution Imaging
Spectroradiometer",
      Characteristics: [
        {
          Name: "SwathWidth",
          Description: "The width of the sensor
scan as the satellite moves along the ground track.",
          DataType: "INT",
          Unit: "Kilometers",
          Value: "2330",
        }
      ]
    }
  ]
}
],

```

UMM Migration

None

Future Mappings

ISO 19115-1

Instrument is an optional metadata element, however, it is strongly recommended that it be provided when possible. Multiple Instruments may be listed if necessary (Cardinality: 0..*).

Providing instrument **characteristics** is optional. An unlimited amount of instrument **characteristics** may be specified for a particular instrument (Cardinality: 0..*). If instrument **characteristics** are provided, all 5 sub-fields (Name, Description, DataType, Unit, Value) are required.

UMM-C Element	ISO 19115-1 Path	Type	Notes
Platforms /Instrument s /ShortName	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac: instrument/mac:MI_Instrument id="<insert unique instrument ID here>"/mac:identifier/mcc: MD_Identifier/mcc:code/gco:CharacterString with /mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac: instrument/mac:MI_Instrument id="<insert unique instrument ID here>"/mac:identifier/mcc: MD_Identifier/mcc:codeSpace/gco:CharacterString = gov.nasa.esdis.umm. instrumentshortname	String	A list of valid instrument short names can be found in the KMS under the 'Short_Name' column. For each instrument listed the short name is required by CMR. The short name value goes in the gmd:code field. The value of " gov.nasa.esdis.umm. instrumentshortname" should be provided in gmd:CodeSpace field so that CMR can properly parse out the instrument short name. An ID should be provided directly after "eos: EOS_Instrument" in the ISO x-path. This ID corresponds to the instrument and is used to link the instrument information to the associated platform . The ID should be unique within the metadata record.
Platforms /Instrument s /LongName	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac: instrument/mac:MI_Instrument id="<insert unique instrument ID here>"/mac:identifier/mcc: MD_Identifier/mcc:description/gco:CharacterString	String	A list of valid instrument long names can be found in the KMS under the 'Long_Name' column.
Platforms /Instrument s /Technique	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac: instrument/mac:MI_Instrument id="<insert unique instrument ID here>"/mac:type/gco: CharacterString	String	

Platforms /Instrument s /NumberOfI nstruments	When translating to UMM-C the number of instruments is counted. The number is not translated to ISO 19115-2 MENDS		
	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty /gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference/eos:EOS_AdditionalAttributeDescription/ eos:type/eos:EOS_AdditionalAttributeTypeCode codeList="https://cdn.earthdata.nasa.gov/iso/resources/Codelist/gmx/Codelists.xml#EOS_AdditionalAttributeTypeCode" codeListValue="instrumentInformation" = instrumentInformation	Codelist	The "instrumentInformation" codelist value must be provided so that CMR can properly identify the associated information as instrument characteristics. This codelist value does not directly map to a UMM element—choosing 'instrumentInformation' indicates to CMR that the instrument characteristic elements should be mapped.
Platforms /Instrument s/Character istics/Name	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference /eos:EOS_AdditionalAttributeDescription/ eos:name/gco:CharacterString	String	
Platforms /Instrument s/Character istics /Description	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference /eos:EOS_AdditionalAttributeDescription/ eos:description/gco:CharacterString	String	
Platforms /Instrument s/Character istics /DataType	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference /eos:EOS_AdditionalAttributeDescription/ eos:dataType/eos:EOS_AdditionalAttributeDataTypeCode codeList="https://cdn.earthdata.nasa.gov/iso /resources/Codelist/gmx/Codelists.xml#MD_DatatypeCode" codeListValue=<date type> value=<date type>	Codelist	ISO codelist values (class, codelist, enumeration, codelistElement, abstractClass, aggregateClass, specifiedClass, datatypeClass, interfaceClass, unionClass, metaClass, typeClass, characterString, integer, association) UMM enum (STRING, FLOAT, INT, BOOLEAN, DATE, TIME, DATETIME, DATE_STRING, TIME_STRING, DATETIME_STRING)
Platforms /Instrument s/Character istics/Unit	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference /eos:EOS_AdditionalAttributeDescription/ eos:parameterUnitsOfMeasure/gco:CharacterString	String	
Platforms /Instrument s/Character istics/Value	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString	String	
Platforms /Instrument s /Operation alModes	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:reference /eos:EOS_AdditionalAttributeDescription/ eos:name/gco:CharacterString="OperationalMode" and /mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> "/mac:otherProperty/gco:Record/eos:AdditionalAttributes/eos:AdditionalAttribute/eos:value/gco:CharacterString	String	The eos:name field must read "OperationalMode" so that CMR can properly parse out the operation mode information. The actual operation mode value should be provided in the eos:value field.
	/mdb:MD_Metadata/mdb:acquisitionInformation/mac:MI_AcquisitionInformation/mac:instrument/mac:MI_Instrument id="<insert unique instrument ID here> /gmi:mountedOn xlink:href="<insert unique platform ID here>'		An ID should be provided here and should match the ID provided for the associated platform . This ID should be unique within a metadata record. This will link all of the information provided on the instrument to its associated platform.

Example Mapping

ISO 19115-1

```
<mdb:MD_Metadata>
...
<mdb:acquisitionInformation>
  <mac:MI_AcquisitionInformation>
    <mac:instrument>
      <mac:MI_Instrument id="dfdaa96ba-483d-4e63-86ad-5dfd0eedf496">
        <mac:identifier>
          <mcc:MD_Identifier>
            <mcc:code>
              <gco:CharacterString>MODIS</gco:CharacterString>
```

```

        </mcc:code>
        <mcc:codeSpace>
          <gco:CharacterString>gov.nasa.esdis.
umm.instrumentshortname</gco:CharacterString>
        </mcc:codeSpace>
        <mcc:description>
          <gco:CharacterString>Moderate-
Resolution Imaging Spectroradiometer</gco:
CharacterString>
        </mcc:description>
        </mcc:MD_Identifier>
      </mac:identifier>
      <mac:type>
        <gco:CharacterString>Broadband scanning
radiometry</gco:CharacterString>
      </mac:type>
      <mac:mountedOn xlink:href="#d36bb8fb0-d827-
4fd1-a2e9-5db6778abddc"/>
      <mac:otherProperty>
        <gco:Record>
          <eos:AdditionalAttributes>
            <eos:AdditionalAttribute>
              <eos:reference>
                <eos:
EOS_AdditionalAttributeDescription>
                  <eos:type>
                    <eos:
EOS_AdditionalAttributeTypeCode codeList="
https://cdn.earthdata.nasa.gov/iso/resources/Codelist
/eosCodelists.xml#EOS_AdditionalAttributeTypeCode"
codeListValue="instrumentInformation"
>instrumentInformation</eos:
EOS_AdditionalAttributeTypeCode>
                  </eos:type>
                  <eos:name>
                    <gco:
CharacterString>SwathWidth</gco:CharacterString>
                  </eos:name>
                  <eos:description>
                    <gco:CharacterString>The
width of the sensor scan as the satellite moves
along the ground track.</gco:CharacterString>
                  </eos:description>
                  <eos:dataType>
                    <eos:
EOS_AdditionalAttributeDataTypeCode codeList="
https://cdn.earthdata.nasa.gov/iso/resources/Codelist
/eosCodelists.
xml#EOS_AdditionalAttributeDataTypeCode"
codeListValue="INT">INT</eos:
EOS_AdditionalAttributeDataTypeCode>
                  </eos:dataType>
                  <eos:parameterUnitsOfMeasure>
                    <gco:
CharacterString>Kilometers</gco:CharacterString>
                  </eos:parameterUnitsOfMeasure>
                </eos:
EOS_AdditionalAttributeDescription>
              </eos:reference>
              <eos:value>
                <gco:CharacterString>2330</gco:
CharacterString>
              </eos:value>
            </eos:AdditionalAttribute>
          </eos:AdditionalAttributes>
        </gco:Record>
      </mac:otherProperty>
    </mac:MI_Instrument>
  </mac:instrument>
  <mac:platform>
    <mac:MI_Platform id="d36bb8fb0-d827-4fd1-

```

```

a2e9-5db6778abddc">
  <mac:identifier>
    <mcc:MD_Identifier>
      <mcc:code>
        <gco:CharacterString>Aqua</gco:
CharacterString>
      </mcc:code>
      <mcc:codeSpace>
        <gco:CharacterString>gov.nasa.esdis.
umm.platformshortname</gco:CharacterString>
      </mcc:codeSpace>
      <mcc:description>
        <gco:CharacterString>Earth Observing
System, Aqua</gco:CharacterString>
      </mcc:description>
    </mcc:MD_Identifier>
  </mac:identifier>
  <mac:description>
    <gco:CharacterString>Earth Observation
Satellites</gco:CharacterString>
  </mac:description>
  <mac:instrument xlink:href="#dfdaa96ba-
483d-4e63-86ad-5dfd0eedf496"/>
</mac:MI_Platform>
</mac:platform>
</mac:MI_AcquisitionInformation>
</mdb:acquisitionInformation>
</mdb:MD_Metadata>

```

UMM

```

Platforms: [
{
  Type: "Earth Observation Satellites",
  ShortName: "Aqua",
  LongName: "Earth Observing System, Aqua",
  Instruments: [
    {
      ShortName: "MODIS",
      LongName: "Moderate-Resolution Imaging
Spectroradiometer",
      Characteristics: [
        {
          Name: "SwathWidth",
          Description: "The width of the sensor
scan as the satellite moves along the ground track.",
          DataType: "INT",
          Unit: "Kilometers",
          Value: "2330",
        }
      ]
    }
  ]
}
],

```

History

UMM Versioning

Version	Date	What Changed
1.15.5	12/3/2020	The description of the Instrument element now includes text about the controlled vocabulary for this field coming from KMS.
1.15.4	9/18/2020	No changes were made for Instrument during the transition from version 1.15.3 to 1.15.4

1.15.3	7/1/2020	No changes were made for Instrument during the transition from version 1.15.2 to 1.15.3
1.15.2	5/20/2020	No changes were made for Instrument during the transition from version 1.15.1 to 1.15.2
1.15.1	3/25/2020	No changes were made for Instrument during the transition from version 1.15.0 to 1.15.1
1.15.0	2/26/2020	No changes were made for Instrument during the transition from version 1.14.0 to 1.15.0
1.14.0	10/21/2019	No changes were made for Instrument during the transition from version 1.13.0 to 1.14.0
1.13.0	04/11/2019	No changes were made for Instrument during the transition from version 1.12.0 to 1.13.0
1.12.0	01/22/2019	No changes were made for Instrument during the transition from version 1.11.0 to 1.12.0.
1.11.0	11/28/2018	No changes were made for Instrument during the transition from version 1.10.0 to 1.11.0.
1.10.0	05/02/2018	No changes were made for Instrument during the transition from version 1.9.0 to 1.10.0.

ARC Documentation

Version	Date	What Changed	Author
1.0	05/16/18	Recommendations/priority matrix transferred from internal ARC documentation to wiki space	Jeanne' le Roux
1.1	12/06/19	Recommendations were updated to reflect the optional nature of the Instrument element in UMM and ECHO10 metadata formats.	Jeanne' le Roux