# Standards Change Request

**Change BAND_NAME definition to include non-spectral bands <SCR3-1105.v2>**

**Provenance:**

Date: 2007-02-16; revised 2007-02-28
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**Problem:**

The current definition of BAND_NAME refers only to spectral bands (e.g. RED, GREEN, BLUE). This SCR proposes changing the definition and the length of the string to allow names of non-spectral bands, such as those being used in CRISM products.

**Current Urgency:**

MRO CRISM multi-band images have BAND_NAMEs that are non-spectral and that are longer than the current limit of 20 characters. The first MRO release is scheduled for June 8, 2007, with data delivered to PDS no later than two weeks in advance, May 25, 2007.

**Proposed Solution:**

The CRISM data is an example of a use of the IMAGE object in which multiple images of related data are stored as one multi-band image for ease of use. The image bands represent measured and derived quantities that are intended to be viewed and processed as a set. The multiple-band image is a logical and convenient storage mechanism for this kind of data. The definition of BAND_NAME should be revised to include this usage, and the maximum length of string extended to permit longer, more descriptive names.

**Impact Assessment:**

I can’t think of any PDS software that would be affected by a change in the definition or length of BAND_NAME.

The Standards Reference should be checked to be sure it does not give the impression that only spectral bands are permitted in a multi-band image. I checked every occurrence of “BAND” in the Standards Reference, and I don’t think any changes are required. The existing explanation of a multi-band image does not say that the bands must be spectral, although the example given is of a spectral image. In cases where spectral bands are mentioned, the context is always specified as either an ISIS image or a spectral qube.

In the Data Dictionary, the definitions of other band-related keywords should be checked to be sure that they do not say spectral bands where the context is not specifically a spectral image, and conversely that the definitions do say spectral for those keywords intended to apply only to spectral bands. I checked every keyword with "band" in its name, and found only two that need to be revised in addition to BAND_NAME. Here are the proposed revised definitions.

| Keyword | Current definition | Revision |
|---|---|---|
| BAND_NAME | BAND_NAME refers to the spectral range(s) associated with each band in single-band or multi-band data (RED, GREEN, BLUE, 415nm, 750nm, 900nm, etc.). | BAND_NAME is the name given to a single band in a multi-band image or image qube. If the band is a spectral band, BAND_NAME refers to the associated spectral range; for example, RED, GREEN, BLUE, 415nm, 750nm, 900nm. Examples of names of non-spectral bands are "Phase angle", "Thermal inertia", "Bolometric albedo", "Latitude", "Elevation in meters relative to MOLA".<br>[In addition to revising the definition, the SCR would increase the maximum string length from 20 to 50.] |
| BAND_CENTER | The BAND_CENTER element provides the wavelength value of a band contained in an image. This element is used with the 2001 Mars Odyssey THEMIS BAND_NUMBER element. | The BAND_CENTER element provides the value at the center of the range of values represented by an image band. |
| BANDS | The bands element indicates the number of spectral bands in image or other object. | The BANDS element indicates the number of bands in an image or other object. |

**Additional Information:**

None.

**Requested Changes:**

Changes to Standards Reference: None.

Changes to PDS Tools: None.

Changes to Data Dictionary: Three revised definitions, as follows. Revisions are underlined.

```
OBJECT                       = ELEMENT_DEFINITION
   ELEMENT_NAME              = "BAND_NAME"
   DESCRIPTION               = "BAND_NAME is the name given to
     a single band in a multi-band image or image qube. If
     the band is a spectral band, BAND_NAME refers to the
     associated spectral range; for example, RED, GREEN, BLUE,
     415nm, 750nm, 900nm. Examples of names of non-spectral
     bands are 'Phase angle', 'Thermal inertia', 'Bolometric
     albedo', 'Latitude', 'Elevation in meters relative to
     MOLA'."
   GENERAL_DATA_TYPE         = CHARACTER
   MAXIMUM                   = "N/A"
   MINIMUM                   = "N/A"
   MAXIMUM_LENGTH            = 50
   MINIMUM_LENGTH            = 0
   STANDARD_VALUE_TYPE       = DYNAMIC
   STANDARD_VALUE_SET        = "N/A"
   STANDARD_VALUE_SET_DESC   = "N/A"
   KEYWORD_DEFAULT_VALUE     = "NONE"
   UNIT_ID                   = "NONE"
   FORMATION_RULE_DESC       = "N/A"
   SOURCE_NAME               = "PDS GEO/SSLAVNEY"
   CHANGE_DATE               = 2007-02-16
END_OBJECT                   = ELEMENT_DEFINITION

OBJECT                       = ELEMENT_DEFINITION
   ELEMENT_NAME              = "BAND_CENTER"
   DESCRIPTION               = "The BAND_CENTER element provides
     the value at the center of the range of values represented
     by an image band."
   GENERAL_DATA_TYPE         = REAL
   MAXIMUM                   = UNK
   MINIMUM                   = 0
   MAXIMUM_LENGTH            = "N/A"
```

```
   MINIMUM_LENGTH          = "N/A"
   STANDARD_VALUE_TYPE     = RANGE
   STANDARD_VALUE_SET      = "N/A"
   STANDARD_VALUE_SET_DESC = "N/A"
   KEYWORD_DEFAULT_VALUE   = "NONE"
   UNIT_ID                 = "NONE"
   FORMATION_RULE_DESC     = "N/A"
   SOURCE_NAME             = "PDS GEO/SSLAVNEY"
   CHANGE_DATE             = 2007-02-16
END_OBJECT                 = ELEMENT_DEFINITION

OBJECT                     = ELEMENT_DEFINITION
   ELEMENT_NAME            = "BANDS"
   DESCRIPTION             = "The BANDS element indicates
      the number of bands in an image or other object."
   GENERAL_DATA_TYPE       = INTEGER
   MAXIMUM                 = 4096
   MINIMUM                 = 1
   MAXIMUM_LENGTH          = "N/A"
   MINIMUM_LENGTH          = "N/A"
   STANDARD_VALUE_TYPE     = RANGE
   STANDARD_VALUE_SET      = "N/A"
   STANDARD_VALUE_SET_DESC = "N/A"
   KEYWORD_DEFAULT_VALUE   = "NONE"
   UNIT_ID                 = "NONE"
   FORMATION_RULE_DESC     = "N/A"
   SOURCE_NAME             = "PDS GEO/SSLAVNEY"
   CHANGE_DATE             = 2007-02-16
END_OBJECT                 = ELEMENT_DEFINITION
```