Target Names

Introduction

Here you will find PDS rules for designated solar system objects. While some objects are clear in their designations, some objects are more ambiguous. Many minor planets have multiple designations, and it is common for new names to be added or existing names changed or modified sometimes long after they were initially assigned. There are also numerous name collisions between small bodies of various types - there are comets that share names with asteroids, asteroids with the same name as meteorites, and planetary moons with the same names as asteroids. So when identifying observational targets in your PDS data products, it is vitally important that the target be uniquely identified by the <name> in its <Target_Identification> class.

Complicating this is the requirement to provide one or more <type> indications for each target, where the values must be selected from a list of predetermined standard values that is not as applicable to the range of small body targets as we might hope (see noted below). Appropriate and suggested <type> values are included in the descriptions below, but if you have a target that seems to have an unlisted type, please contact your PDS node consultant with details as soon as possible.

Unambiguous Identification

The make sure a natural target object (like an asteroid or satellite) is uniquely identified, you should formulate the *<name>* value so that the following is true:

1. The name string contains at least one identifier that can only be associated with a single physical object.
2. The name string contains at least two different identifiers for each object wherever possible.

The first rule ensures that there is only a single object that could possibly be intended; the second provides a cross-check on that identification, in case the identity of the target object is questioned.

If you have any questions about the correct name string to use for a small body target, please contact your node consultant and they will look into converting whatever ID you have to a unique name string for your labels.

PDS Target Name Strings

Following are the rules for formulating values of the <name> attribute in your <Target_Identification> classes for any and all data coming in to the PDS archives. Unless otherwise stated, PDS follows the formatting conventions used by the organizations responsible for assigning names and designations to these objects - the International Astronomical Union (IAU) or its designated deputy for solar system objects, for example.

Note that case is significant in object identifications. The correct case should always be used in provisional and discovery designations as well as names.

Major Planets

Format: *Name*

For the eight major planets (and the sun), the name string is just the properly capitalized English name - so "Jupiter", not "JUPITER" or "jupiter".

Examples:

- Earth

- Jupiter
- Sun

The <type> value for major planets is **Planet**; for the Sun, it is **Sun**.

Dwarf Planets

Format: (*minor_planet_number*) *Name*

Dwarf planets should be identified by Minor Planet Number in parentheses followed by their properly capitalized English name.

Examples:

- (1) Ceres
- (134340) Pluto
- (136199) Eris

Dwarf planets should have a <type> of **Dwarf Planet**. You may, if you like, include additional types via additional <type> attributes for dwarf planets to cover their more historic types - e.g. **Planet** for (134340) Pluto or **Asteroid** for (1) Ceres

Asteroids

Note: *Use the form described below for dual-nature objects for asteroids that behave like comets for part of their orbits.*

Asteroids have several possible formats, depending on how well-observed the object is.

Formats:

1. (*minor_planet_number*) *Name*
2. (*minor_planet_number*) *principal_provisional_designation*
3. *principal_provisional_designation* (*provisional_designation*)
4. *provisional_designation*

Use format #1 when the asteroid has both a minor planet number and a name. The number comes first and is enclosed in parentheses.

Use format #2 for asteroids that have a minor planet number, but have not yet been officially named. Asteroids with more than one provisional designation will have one of those designations indicated as the principal one. If an asteroid has only one provisional designation, it is considered the principal provisional designation for name string creation purposes.

Use format #3 if the asteroid has not yet received a minor planet number, referencing it by its principal provisional designation and providing one other provisional designation as a cross-reference.

Use format #4 for those cases where the target is an asteroid that has only a single provisional designation attached to it. This is likely to be rare in archival data.

Examples:

1. (2309) Mr. Spock
2. (12528) 1998 KL31
3. 2015 AQ230 (2010 GS119)

4. 2015 AA23

In general, asteroids will have a target <type> value of *Asteroid*. If there is more than one <type> value appropriate to your target, use additional <type> attributes. The dual-nature object *95P/1977 UB (Chiron) [(2060) Chiron]*, for example, should have two types listed: **Comet** and **Asteroid**.

Comets

Note: *Use the form described below for dual-nature objects for comets that behave like asteroids for part of their orbits.*

Comet name strings are fairly complex and not easy to summarize in a simple format statement, so instead we'll list the constituent pieces in the order they are used:

1. *Periodic Comet Number*
Omit this element if the comet does not have a periodic number assigned.

2. *Comet Type Letter*
All comets have a designated type, which will be one of these letters followed by a slash ('/'):

- **P** Periodic comet
- **C** Non-periodic (or very long period) comet
- **X** Comet with an undeterminable orbit
- **D** Comet that is known to be destroyed or has disappeared

Note that the comet type may change for some objects as time passes. On occasion even **D/** comets have reappeared.

3. *Principal Discovery Designation*
This may be a comet designation, or for comets that looked like asteroids on first discovery, it might be an asteroid provisional designation. In either event, when there are multiple provisional or discovery designations associated with a single comet, the Minor Planet Center will designate which of the designations is considered the principal one. That is the designation that should be used here.

4. (*Name*)
The name assigned to this object, enclosed in parentheses. For comets this name can change, sometimes retrospectively, as objects thought lost are recovered, or things that originally looked like asteroids start behaving like comets. Comet names are not required to be unique, and there are many comets that share a name and must be differentiated by their principal discovery designations.

*Note: Because of the common duplication of comet names and the significance of periodic comets, which can be observed over multiple apparitions, the PDS adds a serial number to the end of comet names for all periodic (**P/** type) comets to aid in distinguishing them.*

Examples:

- 1P/1682 Q1 (Halley 1)
- D/1993 F2 (Shoemaker-Levy 9)
- C/2014 XB8 (PANSTARRS)

- C/2014 Q2 (Lovejoy)

In general, comets will have a target <type> value of *Comet*. If there is more than one <type> value appropriate to your target, use additional <type> attributes. The dual-nature object *95P/1977 UB (Chiron) [(2060) Chiron]*, for example, should have two types listed: **Comet** and **Asteroid**.

Dual-Nature Objects

For objects that have been recognized as dual-nature - acting like comets for part of their orbit, and asteroids the rest of the time - use a combined namestring form that begins with the comet namestring, and is then followed by the asteroid name string in square brackets.

Note: Periodic comets that retain their asteroid name when they are found to exhibit cometary behaviour will not have serial numbers appended to their names.

Format: *comet-namestring* [*asteroid-namestring*]

Examples:

- 95P/1977 UB (Chiron) [(2060) Chiron]
- 133P/1996 N2 (Elst-Pizarro 1) [(7968) Elst-Pizarro]
- 288P/2006 VW139 [(300163)]

That last case (*288P*) is a dual-natured object that has not yet received a name either as a comet or as an asteroid, at least as of this writing.

Dual-nature objects will always have at least two <type> attributes included in their *Target_Identification*: **Asteroid** and **Comet**. (Order is not significant.)

Note that it is not safe to assume that an asteroid and a comet that share a name are the same dual-natured object. To take a famous example, the comet 1P/1682 Q1 (Halley 1) is definitely *not* the same object as the asteroid (2688) Halley. Dual-natured objects are, at least currently, rare. If you have questions or doubts, please contact the Small Bodies Node.

Natural Satellites

All natural satellites (or moons), regardless of the type(s) of their primary, should have a <type> value of **Satellite**.

Provisional Designation

Format: S/*yyyy primary_body serial_number*

All provisional designations for natural satellites begin with the letter *S* followed by a slash ('/') - similar to the comet type designator. This is followed by the year of discovery, and then by an indication of the primary body the satellite is orbiting. For major planets, these one-letter abbreviations are used:

H	Mercury
V	Venus
E	Earth
M	Mars
J	Jupiter
S	Saturn

U	Uranus
N	Neptune

For satellites of dwarf planets and asteroids, identify the primary body by including the best available unique identifier - the asteroid number where there is one, or the principal provisional designation for unnumbered asteroids - in parentheses.

The primary body identifier is then followed by a serial number based on the order of discovery in the given year.

Examples:

- S/2007 S1 - The first new Saturnian satellite discovered in 2007
- S/1993 (243) 1 - The first new satellite of asteroid (243) Ida discovered in 1993

Permanent Designation

Once the satellite discovery is confirmed, the satellite is typically given a name along with its permanent designation. Moon names can and do collide with names of other types of small bodies, so even for long-established moon names it is important to include at least two identifiers in the satellite name string.

Format: *primary_body roman_numeral* (*Name*)

The primary body should be identified by its name string as described in preceding sections. The roman numeral is a sequence number assigned in the order that the satellites of that body were named; and finally comes the satellite's own name, in parentheses.

Examples:

- Uranus XVII (Sycorax)
- (134340) Pluto IV (Kerberos)
- (243) Ida I (Dactyl)

Dust

For the time being, any and all observations of dust particles or phenomena should use "Dust" as the target name in the <pds:Target_Identification> class, and use the <description> field in that class to provide any appropriate additional description or clarification.

Format: Dust

Example:

- Dust

All dust observations should have a <type> value of **Dust**.

Meteorites

The Meteoritical Society controls the naming and nomenclature for meteorites. If your target is a meteorite sample, you should use the name as reported by the Meteoritical Bulletin Database (hosted by the Lunar and Planetary Institute). Use the full name as reported - including numbers, parenthetical qualifications, and so on.

Format: *Name*

Examples:

- Rabbit Flat

- Colby (Wisconsin)
- Vaquillas 003
- Oterøy

Note: Target names in PDS4 may include UTF-8 characters, and many meteorite names do. Take care when you are typing out names with non-ASCII characters that you are using a UTF-8 based character set.

Meteorites - things that have hit the ground and still exist - should have a <type> value of **Meteorite**.

Other Target Names

In general, the PDS would prefer to have target identifications that describe the nature of the target, rather than the nature of the observation. Many things may be observed for purposes of calibration, for example, but the <Target_Identification> class should identify what was observed, while the <Primary_Result_Summary> class explains why it was observed.

Planetary Rings

In general, you should identify the ring system, rather than individual rings. If you have data that seem to require something more precise, please contact your PDS consultant with details.

Format: *Primary_body_name* Rings

Examples:

The name values you should use for the known ring systems are:

- Chariklo Rings
- Chiron Rings
- Jupiter Rings
- Neptune Rings
- Saturn Rings
- Uranus Rings

Note: *In the case of small bodies with rings (*Chariklo *and* Chiron *in the above list), please also include an* ***additional*** Target_Identification *class with the full identification of the parent body.*

Terrestrial Samples

Some lab spectra data sets include spectra of terrestrial rocks, minerals, and metals for comparison. The names for these sorts of target should indicate the specific type of material as well as its origin.

Examples:

- Terrestrial Iron
- Terrestrial Nickel

Terrestrial samples should have <type> values of **Terrestrial Sample**.

Returned Samples

The curatorial facilities for extraterrestrial samples provide catalogs that uniquely identify each sample in their facilities. The target names for these samples should indicate the curation facility, the catalog name or standard abbreviation, and the identification of the sample within that catalog.

Examples:

- JSC Stardust sample C2101,6,150,0,0

- JSC Apollo 16 Lunar Sample 61015
- JSC Cosmic Dust Catalog #18 particle L2071 E40

For extraterrestrial samples, use the type of the parent body for the value of the <type> attribute here, and include a <description> in your *Target_Identification* class that contains at least the word "sample".

Extended Phenomena

These include things like the solar wind, magnetic fields around Solar System Bodies, gravitational fields, and so on. Each node has their preferred naming conventions so contact your node consultant for more information.

The <type> value for these objects should be the appropriate value from the target type list, which can be browsed on the Standard Values Quick Reference page. If you can't find an appropriate *type*, contact your PDS consultant with the details.

Stars

Stars should be identified by an appropriate, unique, and correctly formatted catalog identification, so that an interested user could consult the relevant catalog and get the corresponding coordinates and characteristics of the star. At the least, star names and identifications *must* conform to the standard formats reported by the SIMBAD database. It is preferable to use the primary identification, as returned by the *SIMBAD* database, wherever reasonable.

For actual stars, use a <type> value of **Star**. There are additional celestial-class object types listed on the Standard Values Quick Reference page you may also use. If the correct *type* isn't on this list, contact your PDS node consultant as soon as possible with details.

Star Fields

Star fields observed for calibration purposes should be referenced by the catalog/author name and the field name as given in the catalog.

Examples:

- Landolt TPhe F
- Stetson NGC104
- Saha Pal 4

Note: *There is currently no appropriate* type *value for this sort of observation. We're working on it.*

On-Board Calibrators

If there is an artificial source specifically designed to be observed for calibration, call it by the same name as is found in the accompanying documentation. If there are documents or other types of products that specifically describe the characteristics or performance of this on-board calibrator, they should be included in the archive and pointed to by a context object.

Note: *There is currently no appropriate* type *value for this sort of observation. We're working on it.*

Anonymous Calibrators

Sometimes observations are made of things like black sky or the inside of a telescope dome to be used in calibration. In these cases use a consistent (through the related collections) name that is reasonably descriptive in itself, and use the <description> field to provide any additional qualifications or explanation needed.

Examples:

- Sky
- Dome
- Cover

Note: *There is currently no appropriate* type *value for this sort of observation. We're working on it.*

Engineering Observations

Sometimes the thing being observed is actually the spacecraft, instrument, or detector itself. A table of temperatures recorded at various points in the optical path, for example, is an observation of the state and/or environment of the instrument. In cases like this it is reasonable to name the instrument or spacecraft as the target of the observation. In most cases data preparers should also add a brief explanatory note in the <description> field to aid in avoiding confusion.

Note: *There is currently no appropriate* type *value for this sort of observation. We're working on it.*