Plan for Satellite Numbering within NAIF
And Solar System Dynamics Group
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On October 9 C. Acton and N. Bachman of JPL's Navigation and Ancillary Information Facility (NAIF) met with R. Jacobson of JPL's Solar System Dynamics Group (SSDG) to discuss plans for satellite numbering, aimed at two issues:

1. the assumption that Cassini and/or other activities could eventually lead to discovery of natural satellites in excess on ninety-eight for Saturn or Jupiter; and
2. a goal to separate numbering of provisional satellites from those fully accepted by the IAU.

This proposal handles more than 98 satellites without causing problems with legacy SPICE SPK files and software: we don't want to suddenly inconvenience customers or invalidate already archived products. The proposal also provides complete "separation" of numbering of provisional satellites from numbering of permanent satellites.

SPICE is not restricted to x98 as the numeric ID of the "last" satellite for a planetary system. However, to retain backwards compatibility, a new numbering scheme would have to accept two restrictions.

1. Use of already assigned satellite numbers and associated names (e.g. 501 for IO to 538 for Paithee, and 601 for Mimas to 630 for Thrym) must not be changed.

2. Use of x99 for the planet mass center must not be changed (e.g. 699 for Saturn mass center).

NAIF and SSDG intend to use the following rules.

Permanent ID Assignments

1. The current numbering scheme will be used until the x98th permanent satellite number is assigned (i.e. 698 for Saturn).
2. If/when an x99th satellite is given a permanent designation by the IAU an extended numbering scheme will go into effect; we begin using a five-digit number. The number scheme is psbbb where:
   p   = planet number (e.g. 6 for Saturn)
   s   = range separator (=0 for permanent IDs)
   bbb = body number

How is the "bbb" field used? One could start with "001" for the first new permanent satellite beyond a count of 98, but instead we propose to start with that number that would have been next in line within the old numbering scheme, which is also next in line within the IAU's Roman numeral scheme. Thus we start with p0099 for the first new permanent number.

Provisional ID Assignments

3. Starting more-or-less immediately with those already discovered satellites that are provisional in the eyes of the IAU, we begin using a five-digit number. The number scheme is psbbb where:

    p   = planet number (e.g. 6 for Saturn)
    s   = range separator (=5 for provisional IDs)
    bbb = body number

In this provisional range we start the bbb count at one greater than the ID for the currently last assigned permanent ID.

Some details about name and ID evolution are useful.

1) Upon initial discovery:
    - IAU gives provisional identification such as S04j02 (second Jupiter satellite found in 2004)
    - IAU does not assign a Roman numeral
    - JPL/SSD and JPL/NAIF assign next available (sequential) provisional decimal number (e.g. 55063)
    - JPL/SSD associates S04j02 with 55063
    - JPL/NAIF does not associate a character name with 55063 in Toolkit software or in the NAIF_IDs Required Reading. Individual SPICE users, or a flight project, can privately make such an association for themselves using a self-made Mission Kernel (MK)

2) Upon acceptance by the IAU as a new satellite:
    - IAU assigns a permanent name
    - IAU assigns a Roman numeral ID, using the next (sequential) unused number (e.g. LXIII)
    - JPL/SSD and JPL/NAIF assign next available (sequential) permanent decimal number (e.g. 563). Once 598 has been reached, the next permanent ID assignment will be 50099, then 50100, 50101, etc.

In the SSD and NAIF domains it will be acceptable to have a file containing both provisional and permanent satellites. A given file could contain the same satellite in both its provisional and permanent status, but this seems pointless and is not recommended.

An SPK file containing only satellites having provisional numeric identifiers will not be permanently archived if a file is subsequently produced that uses permanent identifiers and encompasses the time span of the provisional file.