AP2 and AP3); a CORE sequence for the Pluto flyby on 14 July, 2015 (Day Of Year 195), sometimes also referred to as NEP (Near-Encounter Phase); three Departure sub-phases (DP1, DP2, DP3). For this second SWAP delivery for the Pluto mission phase, this data set includes only the Approach data plus the CORE and departure sequences' data that were downlinked through the end of January, 2016. The rest of the Pluto to the data will be delivered in future versions of this data set according schedule worked out by the Project and NASA.

SWAP was turned on for nominal operations throughout approach, other than powering off and on around trajectory correction maneuvers. It was operating as a ridealong during the PEPSSI plasmarolls, on DOY 107, 115, 121, 128, 148, 156, and 176. There were two other dedicated SWAP and PEPSSI rolls on DOY 163 and 171. SWAP gain functional testing occurred on DOY 016 and 137. This dataset includes all the Approach phase data, as well as a few select 40-45 minute time blocks during the Pluto encounter on the day of closest approach.

Note: Sub-phases AP1, AP2 and AP3 started on 2015-01-15, 2015-04-05 and 2015-06-23, respectively. Sub-phases DP1, DP2 and DP3 started on 2015-07-16, 2015-08-04 and 2015-10-22, respectively.

Every observation provided in this data set was taken as a part of a particular sequence. A list of these sequences has been provided in file DOCUMENT/SEQ_SWAP_PLUTO.TAB.
N.B. Some sequences provided may have no corresponding observations.

For a list of observations, refer to the data set index table. This is typically INDEX.TAB initially in the INDEX/ area of the data set. There is also a file SLIMINDX.TAB in INDEX/ that summarizes key information relevant to each observation, including which sequence was in effect and what target was likely intended for the observation.

Version

This is VERSION 2.0 of this data set.

The pipeline (see Processing below) was re-run on these data for each version since the first (V1.0). As a result, ancillary information, such as observational geometry and time (SPICE), may be updated. This will affect, for example, the calibration of the data if parameters such as the velocity or orientation of the target relative to the instrument, or the recorded target itself, have changed.

See the following sections for details of what has changed over each version since the first (V1.0). Note that even if this is not a calibrated data set, the calibration changes are listed as the data will have been re-run and there will be updates to the calibration files, to the documentation (Science Operation Center - Instrument Interface Control Document: SOC_INST_ICD) and to the steps required to calibrate the data.

SWAP updates for Pluto Encounter
Data Sets V2.0

NEWHORIZONS:OBSERVATION_DESC and NEWHORIZONS:SEQUENCE_ID keywords in the PDS label, plus the provided sequence list (see Ancillary Data below) to assess the possibility that there was an intended target.

Ancillary Data

The geometry items included in the data labels were computed using the SPICE kernels archived in the New Horizons SPICE data set, NH-X-SPICE-6-PLUTO-V1.0.

Every observation provided in this data set was taken as a part of a particular sequence. A list of these sequences has been provided in file DOCUMENT/SEQ_SWAP_PLUTO.TAB. In addition, the sequence identifier (ID) and description are included in the PDS label for every observation. N.B. While every observation has an associated sequence, every sequence may not have associated observations. Some sequences may have failed to execute due to spacecraft events (e.g. safing). No attempt has been made during the preparation of this data set to identify such empty sequences, so it is up to the user to compare the times of the sequences to the times of the available observations from INDEX/INDEX.TAB to identify such sequences.

Time

There are several time systems, or units, in use in this dataset: New Horizons spacecraft MET (Mission Event Time or Mission Elapsed Time), UTC (Coordinated Universal Time), and TDB Barycentric Dynamical Time.

This section will give a summary description of the relationship between these time systems. For a complete explanation of these time systems the reader is referred to the documentation distributed with the Navigation and Ancillary Information Facility (NAIF) SPICE toolkit from the PDS NAIF node, (see http://naif.jpl.nasa.gov/).

The most common time unit associated with the data is the spacecraft MET. MET is a 32-bit counter on the New Horizons spacecraft that runs at a rate of about one increment per second starting from a value of zero at

19 January, 2006 18:08:02 UTC

or

JD2453755.256337 TDB.

The leapsecond adjustment (DELTA_ET = ET - UTC) was 65.184s at NH launch, and the first three additional leapseconds occured in at the ends of December, 2009, June, 2012 and June, 2015. Refer to the NH SPICE data set, NH-J/P/SS-SPICE-6-V1.0, and the SPICE toolkit docmentation, for more details about leapseconds.

The data labels for any given product in this dataset usually

come down with the observation is the unpredictable time of the observation. The task is made yet even more difficult because uplink personnel, who generate the command sequences and initially know the intent of each observation, are perpetually under deadlines imposed by orbital mechanics and can rarely be spared for the time-intensive task of resolving this issue.

To make a long story short, the downlink team on New Horizons has created an automated system to take various uplink products, decode things like Chebyshev polynomials in command sequences representing celestial body ephemerides for use on the spacecraft to control pointing, and infer from those data what the most likely intended target was at any time during the mission. This works well during flyby encounters and less so during cruise phases and hibernation.

The point to be made is that the user of these PDS data needs to be cautious when using the TARGET_NAME and other target-related parameters stored in this data set. This is less an issue for the plasma and particle instruments, more so for pointing instruments. To this end, the heliocentric ephemeris of the spacecraft, the spacecraft-relative ephemeris of the inferred target, and the inertial attitude of the instrument reference frame are provided with all data, in the J2000 inertial reference frame, so the user can check where that target is in the Field Of View (FOV) of the instrument. Furthermore, for pointing instruments with one or more spatial components to their detectors, a table has been provided in the DOCUMENT/ area with XY (two-dimensional) positions of each inferred target in the primary data products. If those values are several thousand pixels off of a detector array, it is a strong indication that the actual target of that observation is something other than the inferred target, or no target at all e.g. dark sky.

Review
======
This dataset was peer reviewed and certified for scientific use on TBD.
"

Note to fix

ABSTRACT_DESC = "
This data set contains Raw data taken by the New Horizons Solar Wind Around Pluto instrument during the Pluto encounter mission phase. This is VERSION 2.0 of this data set.

should be a space

This data set contains SWAP observations taken during the the Approach (Jan-Jul, 2015), Encounter and Departure mission sub-phases, including flyby observations taken on 14 July, 2015, and including data through 2015 and into January, 2016; the data are limited to those downlinked from the spacecraft as of the end of January, 2016. The rest of the downlinked data for this mission phase will be delivered in a future data set.

This is version 2.0 of this data set. Changes since version 1.0 include data downlinked between the end of July, 2015 and the end of January, 2016. Also, updates were made to the documentation and catalog files, primarily to resolve liens from the V1.0 peer review.