DUST - User Notes

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ULYSSES DDS EVENT DATA

DATA FILE DESCRIPTION

This table contains Ulysses DDS detector responses and derived quantities as
well as spacecraft geometry information for all impacts and noise events.
See Gruen et al. (1995) and Krueger et al. (1999a) for more information.

```
RECORD_FORMAT                    = "(i5,1x,a12,1x,i1,1x,i1,
 1x,i3,1x,i2,1x,i2,1x,i2,1x,i2,1x,i2,1x,i2,1x,i2,1x,i1,1x,i1,1x,i2,1x,i2,1x,i1,
 1x,i1,1x,i1,1x,i1,1x,i1,1x,a1,1x,f7.5,1x,f5.1,1x,f5.1,1x,f7.5,1x,f7.5,1x,
 i3,1x,i3,1x,i3,1x,f4.1,1x,f4.1,1x,e8.2,1x,f6.1)"
```

EVENT SEQUENCE NUMBER - The number associated with an event in ULYDEVNT.TAB,
with 1 being the first event recorded and n being the n’th event recorded.

NATIVE TIME - The time of the event given in year, day of year, hours and
minutes in the general form: yyyy-dddThh:mm See Confidence Level Note,
Impact Times.

EVENT CLASS - CLASS (CLN) is the event category class which is represented
by a single integer ranging from 0 to 3. Class 0 includes all events which
are not categorized in a higher class. For classes 1 through 3 the measured
parameters and their relation to each other are increasingly restricted, so
that CLASS = 3 generally represents dust impact events only. CLASS is
determined from ION AMPLITUDE (IA), CHANNELTRON AMPLITUDE (CA), ELECTRON
AMPLITUDE (EA), ELECTRON RISE TIME (ET), ION RISE TIME (IT), ION CHANNELTRON

COINCIDENCE (IC), ELECTRON ION COINCIDENCE (EI), and noise counters of the electron collector (EN), ion collector (IN), and the channeltron (CN).

On board qualification scheme valid before 26 March 2002.

Parameters:	class 0	class 1	class 2	class 3
EA			EA > 0	EA > 0
IA	IA > 0	IA > 0	IA > 0	IA > 0
CA	CA > 0	CA > 0	CA > 0	CA > 0
ET			1 <= ET <= 15	1 <= ET <= 15
IT			1 <= IT <= 15	1 <= IT <= 15
ICC			ICC = 0	ICC = 0
EIT			EIT = 1	EIT = 1
Noise counter of:				
EN				EN <= 8
IN				IN <= 2
CN				CN <= 8

On board qualification scheme valid after 26 March 2002.

Parameters:	class 0	class 1	class 2	class 3
IA	IA > 0	IA > 0	IA > 0	IA > 0
EA	or EA > 0	EA > 0	EA > 0	EA > 0
CA	or CA > 0	CA > 0	CA > 0	CA > 0
ET				1 <= ET <= 15
IT				1 <= IT <= 15
EIT		EIT = 0		
		or EIT = 15		
EIC		EIC = 1	EIC = 0	EIC = 0
ICC			ICC = 1	ICC = 1
Noise counter of:				
EN			EN <= 8	EN <= 8
IN			IN <= 14	IN <= 2
CN			CN <= 14	CN <= 2

Note that classes 1 and 2 have been actually subdivided into two subclasses since 26 March 2002 (Krueger et al., 1999b)

ION AMPLITUDE RANGE - The ION AMPLITUDE RANGE (AR) is the classification of the ION AMPLITUDE value into one of 6 subranges. Each subrange is denoted by an integer between the values of 1 and 6. The six amplitude sub-ranges correspond roughly to a decade of measured electronic charge.

AR	ION AMPLITUDE
1	0 - 7
2	8 - 15
3	16 - 23
4	24 - 32
5	48 - 55
6	56 - 60

SECTOR - The angular orientation of the sensor axis about the spacecraft spin axis at the time of each event, measured in the plane perpendicular to the spin axis of Ulysses which points roughly toward the Earth. The angle is defined to be zero when the dust sensor axis looks closest to the Sun, and its value increases counter clockwise when the spacecraft is viewed from Earth. SECTOR is an 8-bit counter having an integer value between 0 and 255,

and is converted to degrees through scaling by 1.40625. See Confidence Level Note, Sector.

ION AMPLITUDE CODE - An integer code (IA) corresponding to the logarithmic mean of the minimum and maximum range of the bin within which falls the maximum observed signal associated with a single event measured by the ion collector. Conversions to units of coulomb are given in ULYDCODE.TAB. Increasing values indicate increasing amplitudes. Eight digitization steps cover about one decade in charge and steps 32 through 47 are not used. Apparent gaps in the otherwise uniform amplitude sequences occur at steps 16, 17 and 48. These are caused by transitions between different amplifiers.

ELECTRON AMPLITUDE CODE - An integer code (EA) corresponding to the logarithmic mean of the minimum and maximum range of the bin within which falls the maximum observed signal associated with a single event measured by the electron collector. Conversions to units of coulomb are given in ULYDCODE.TAB. Increasing values indicate increasing amplitudes. Eight digitization steps cover about one decade in charge and steps 32 through 47 are not used. Apparent gaps in the otherwise uniform amplitude sequences occur at steps 16, 17, 18 and 48. These are caused by transitions between different amplifiers.

CHANNELTRON AMPLITUDE CODE - An integer code (CA) corresponding to the logarithmic mean of the minimum and maximum range of the bin within which falls the maximum observed signal associated with a single event measured by the channeltron. Conversions to units of coulomb are given n ULYDCODE.TAB. Increasing values indicate increasing amplitudes.

ION RISE TIME CODE - An integer code (IT) corresponding to the logarithmic mean of the minimum and maximum range of the bin within which falls the rise time associated with a single event measured by the ion collector. Conversions to units of micro-seconds are given in ULYDCODE.TAB. Increasing values indicate increasing rise times.

ELECTRON RISE TIME CODE - An integer code (ET) corresponding to the logarithmic mean of the minimum and maximum ranges of the bin within which falls the rise time associated with a single event measured by the electron collector. Conversions to units of micro-seconds are given in ULYDCODE.TAB. Increasing values indicate increasing rise times.

ELECTRON ION TIME CODE - An integer code (EIT) corresponding to the logarithmic mean of the minimum and maximum range of the bin within which falls the difference in time between the start of the electron signal and the start of the ion signal which are associated with a single event. Conversions to units of micro-seconds are given in ULYDCODE.TAB. Increasing values indicate increasing electron minus ion rise time differences.

ELECTRON ION COINCIDENCE - This is an indicator of coincidence of measured negative and positive charge pulses (EIC). The difference in times between the achievement of threshold values for the measured negative and positive charges is determined. If that difference is less than 200 nanoseconds, this variable is set to 1, and 0 otherwise.

ION CHANNELTRON COINCIDENCE - This is an indicator of coincidence of measured channeltron and positive charge pulses (ICC). The difference in times between the achievement of threshold values for the measured channeltron and positive charges is determined. If that difference is less than 200 nanoseconds, this variable is set to 1, and 0 otherwise. See Confidence Level Note, Ion Channeltron Coincidence.

ENTRANCE GRID AMPLITUDE CODE - An integer code (PA) corresponding to the logarithmic mean of the minimum and maximum range of the bin within which falls the maximum observed signal associated with a single event measured by the entrance grid. Conversions to units of coulomb are given in ULYDCODE.TAB. Increasing values indicate increasing amplitudes. See

Confidence Level Note, Entrance Grid Amplitude Code.

ENTRANCE GRID RISE TIME CODE - An integer code (PET) corresponding to the logarithmic mean of the minimum and maximum ranges of the bin within which falls the time difference between the entrance grid pulse and the negative charge (electron collector) signal associated with a single event. Conversions to units of micro-seconds are given in ULYDCODE.TAB. Increasing values indicate increasing rise times.

EVENT DEFINITION - The EVENT DEFINITION (EVD) indicates which channels initiates a measuring cycle. The x in each column indicates the channels for which threshold values are exceeded.

EVD	Q_I	Q_E	Q_C
0	x	x	x
1	x		x
2		x	x
3			x
4	x	x	
5	x		
6		x	

ION COLLECTOR THRESHOLD - Code (ICP) corresponding to the threshold set for the positive ion charge impulse(Q_I) at the time of an event.

ICP	Q_I (Coulomb)
0	9.0E-15
1	2.7E-14
2	6.3E-14
3	1.6E-13

ELECTRON COLLECTOR THRESHOLD - Code (ECP) corresponding to the threshold set for the electron charge impulse(Q_E) at the time of an event. See Confidence Level Note, Electron Collector Threshold.

ECP	Q_E (Coulomb)
0	-8.5E-15
1	-2.6E-14
2	-6.0E-14
3	-1.5E-13

CHANNELTRON THRESHOLD - Code (CCP) corresponding to the threshold set for the channeltron charge(Q_C) pulse at the time of an event.

CCP	Q_C (Coulomb)
0	-8.8E-14
1	-2.6E-13
2	-5.8E-13
3	-1.5E-12

ENTRANCE GRID THRESHOLD - Code (PCP) corresponding to the threshold set for the entrance grid charge pulse(Q_P) at the time of an event separately for positively and negatively charged particles.

PCP	Q_P (positive) (Coulomb)	Q_P (negative) (Coulomb)
0	1.4E-14	-1.5E-14
1	4.3E-14	-4.4E-14
2	1.0E-13	-1.0E-13
3	2.6E-13	-2.5E-13

CHANNELTRON VOLTAGE LEVEL - Code (HV) corresponding to the channeltron high voltage level(HV) set at the time of an event with integers representing fixed voltage differences. See Confidence Level Note, Channeltron Voltage Level.

HV	Voltage(Volts)
?	UNKN
X	OFF
0	200
1	900
2	1020
3	1140
4	1250
5	1370

SPACECRAFT-SUN DISTANCE - The distance from the spacecraft to the Sun in astronomical units.

ECLIPTIC LONGITUDE - The heliocentric ecliptic longitude (Equinox 1950.0) of the spacecraft in degrees.

ECLIPTIC LATITUDE - The heliocentric ecliptic latitude (Equinox 1950.0) of the spacecraft in degrees.

SPACECRAFT EARTH DISTANCE - The distance from the spacecraft to Earth in astronomical units.

SPACECRAFT JUPITER DISTANCE - The distance from the spacecraft to Jupiter in astronomical units.

ROTATION ANGLE - The angular orientation of the sensor axis about the spacecraft spin axis at the time of each event, measured in the plane perpendicular to the spin axis of Ulysses which points roughly toward the Earth. The angle is defined to be zero when the dust sensor axis looks

closest to the ecliptic north and it increases as Ulysses rotates positively about its spin axis (by the right-hand rule). See Confidence Level Note, Sector.

DETECTOR ECLIPTIC LONGITUDE - The spacecraft-centered ecliptic longitude (Equinox 1950.0) of the sensor axis.

DETECTOR ECLIPTIC LATITUDE - The spacecraft-centered ecliptic latitude (Equinox 1950.0) of the sensor axis.

PARTICLE SPEED - The impact speed of the particle in kilometers per second. When no speed can be determined, the value is set to 99.9; See Gruen et al. (1995a).

PARTICLE SPEED ERROR FACTOR - An upper and lower estimate of impactor speed is obtained by multiplying and dividing, respectively, the particle speed by this factor. When no speed (hence error factor) can be determined, the value of this factor is set to 99.9; See Gruen et al. (1995a).

PARTICLE MASS - The particle mass in grams. When the particle is not determined, the mass is not determined and is set to 0.e0; See Gruen et al. (1995a).

PARTICLE MASS ERROR FACTOR - An upper and lower estimate of impactor mass is obtained by multiplying and dividing, respectively, the particle mass by this factor. When the speed is not determined, neither is the mass, and this factor is set to 9999.9; See Gruen et al. (1995a).

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