



ISTP/IACG Dictionary Keywords

A project data dictionary contains information required to make the data independently useable to a wide community. For ISTP/IACG the Common Data Format (CDF), chosen as the data exchange format for key parameter and event data, carries much (but not all) of the data dictionary information using a set of standard global attributes describing the overall CDF content and a set of standard attributes for each variable in the CDF. The variable attributes contain descriptions, data types, minimum and maximum values, labels, units, time tags, and if required, dependencies, uncertainties, and offsets. However there is little consistency in variable names nor in the descriptions that are tied to each variable, to help other users of the data find and use the variables of interest. We have extended the ISTP/IACG project data dictionary to include dictionary keywords that identify variables as being a certain type such as time or magnetic_field regardless of the naming convention adopted by the investigators. Each variable in a CDF has defined dictionary keywords (class and subclass) that are stored in its associated DICT_KEY attribute.

List of Class Keywords

We provide a standard set of class keywords that include 'sensor (science)' and 'supporting' class words and their meanings, to be used to categorize the data variables of primary interest to investigators, among the several ISTP/IACG satellites and experiments. ISTP/IACG class keywords will be restricted to the approved values shown below. Sets of subclass keywords, with each set used to modify one of the class keywords, are also adopted and listed with the associated information below. Lists of common subclass keywords, valid for any variable, can also be found below.

Sensor Words

[anisotropy](#)
[current](#)
[density](#)
[electric_field](#)
[magnetic_field](#)
[particle_flux](#)
[photon_flux](#)
[position](#)
[potential](#)
[power](#)
[pressure](#)
[temperature](#)
[velocity](#)

Supporting Words

[angle](#)
[energy](#)
[flag](#)
[frequency](#)
[label](#)
[number](#)
[ratio](#)
[significance](#)
[source](#)
[species](#)
[time](#)
[uncertainty](#)
[wavelength](#)

[*Common subclass keywords valid for any variable](#)

Implementation

The syntax for populating the Dictionary Keyword attribute DICT_KEY is class>subclass_subclass_subclass. Click here for [examples](#).

Get copy of chapter

[* ISTP/IACG Dictionary Keywords](#) (in Postscript format).

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Associated information : More on Class words

The dictionary keywords and definitions (along with the other global and variable attributes) comprise the primary content of the ISTP/IACG project data dictionary. The class keywords were selected to be, as much as possible, a complete and orthogonal set. In the realm of space physics there are three broad classes of sensor data words: electric and magnetic field (DC values for vectors, AC values for power spectra), particle distributions (e.g., densities, flow speeds, flow direction angles, thermal speeds, temperatures, anisotropy, fluxes), images (e.g., remote sensing of the aurora, ionosphere and sun at various wavelength ranges measuring e.g., electromagnetic waves, temperatures, pressures). In addition, there are time words, orbit/attitude words, and flags of various types (e.g., instrument mode). We choose the measured quantities such as magnetic_field, density, temperature, to be the sensor (science) class keywords that are of primary science interest. Supporting keywords are of secondary science interest such as the energy or time at which a measurement was made, or the label or flag associated with a measured quantity. The sensor (science) class words are listed separately from the supporting class words below. It is envisioned that the usage of the sensor (science) and supporting class keywords will be different. Sensor Words make up a short, standard list that enables automated searching for data of interest at a fairly high level. Supporting Words are at a lower level of interest, but may still be used for some types of searches. In the CDF model every variable must have one and only one class keyword defined, but may have any number of subclass keywords defined.

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Class word definitions and associated subclass words

ANGLE The geometric figure formed by two lines diverging from a point or two planes diverging from a common line or the space between two such lines or surfaces.

Subclass Words	antenna	elevation	pitch
	aspect	fov	pointing
	axis	geometric	polar
	azimuth	inclination	rotation
		phase	sector

[*Return to list of class keywords](#)

ANISOTROPY The variation of physical properties with direction, usually expressed as a ratio.

Subclass Words: parallel

[*Return to list of class keywords](#)

CURRENT The rate of flow of electricity.

Subclass Words: Hall primary
 load secondary

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DENSITY The mass per unit volume of a substance, or the number of items per unit volume.

Subclass Words: partial mass number

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ELECTRIC_FIELD The space surrounding an electric charge within which it is capable of exerting a perceptible force on another electric charge. The strength of an electric field at a given point is given in terms of the force exerted by the field on unit charge at that point.

Subclass Words: AC calibration
 amplitude DC
 angle potential
 antenna

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ENERGY The property of a system that is a measure of its capacity for doing work.

Subclass Words band channel
 incident reflected

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FLAG An entity that signals the occurrence of an event, or that indicates a particular status of a spacecraft or instrument or software program. The flag can be a number, letter, or word, and may have any of a variety of encoded meanings.

Subclass Words number post_gap
 quality status

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FREQUENCY The number of cycles completed by a periodic function in unit time.

Subclass Words band
 channel

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LABEL A term or phrase attached by way of classification or characterization.

Subclass Words [All other class words are also
 possible sub-class words]
 alias
 name(s)
 source

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MAGNETIC_FIELD The field of force surrounding a magnetic pole or a current flowing through a conductor, in which there is a magnetic flux.

Subclass Words AC calibration
 amplitude DC
 angle potential
 antenna

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NUMBER A symbol or word, or a group of either of these, showing how many or what place in a sequence.

Subclass Words direction frame target
 event image telescope
 exposure mode
 filter sequence

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PARTICLE_FLUX The number of particles passing through a specified area or volume in a specified time interval (and possibly in a specified energy range or in a specified range of directions).

Subclass Words differential number rate
 directional omni-directional sample
 integral parallel spectral
 mass perpendicular thermal

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PHOTON_FLUX The number of photons passing through a specified area or volume in a specified time interval (and possibly in a specified energy or wavelength range or in a specified range of directions).

Subclass Words	brightness	integral
	differential	incident
	directional	omni-directional
	filtered	reflected

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POSITION A location, distance, or direction with respect to some particular reference. The reference can be moving or fixed, such as the geographic coordinate system or a spacecraft body.

Subclass Words	altitude	distance	radial
	angle	elevation	range
	antenna	height	RA
	attitude	horizontal	row
	azimuth	inclination	surface
	column	latitude	target
	declination	longitude	vertical
	direction	projection	

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POTENTIAL Electrostatic, magnetostatic, or gravitational potential, at a point in the field: the work done in bringing unit positive charge, unit positive pole, or unit mass respectively from infinity (i.e., a place infinitely distant from the causes of the field) to the point.

Subclass Words	antenna	Hall
	bias	magnetic
	electric	polar_cap
	gravity	surface

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POWER The rate at which energy is expended or work is done.

Subclass Words	amplitude	electric	radiant
	antenna	emission	reflected
	bandwidth	field	spectral
	calibration	flux	transmittance
	density	poynting	

[*Return to list of class keywords](#)

PRESSURE Force per unit area.

Subclass Words	atmosphere	magnetic
	derived	solar
	dynamic	surface

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RATIO The quotient of one quantity divided by another of the same kind, and usually expressed as a fraction.

Subclass Words	albedo	electric_field	power
	beta	energy	pressure
	anisotropy	particle_flux	temperature
	current	photon_flux	velocity
	density	magnetic_field	spectral

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SIGNIFICANCE

Subclass Words	correlation
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SOURCE The origin (mission, spacecraft, instrument, ground observatory, or other observing platform) of the data in question.

Subclass Words	experiment	ground-based
	campaign	investigation

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SPECIES The identity of a particle or class of particles in detail, such as common name, chemical name, mass, charge state, atomic number, atomic weight, degree of ionization, mass per charge, etc.

Subclass Words	electron	oxygen
	ion	Z>3
	proton	neutral
	helium	particle
	nitrogen	dust

[*Return to list of class keywords](#)

TEMPERATURE The degree or intensity of heat or cold as measured on a thermometric scale. Also the equivalent temperature corresponding to the energy of thermal motion of plasma particles, or the equivalent temperature as computed in radio measurements.

Subclass Words	characteristic	parallel
	isotropic	perpendicular
	operational	threshold

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TIME The period between two events or measurements; a measurable interval, usually between a fixed reference (instant of time) such as 0 AD and the subject event or measurement.

Subclass Words	bin	GMT	minute
	clock	hour	PB5
	cycle	interval	reference
	date	Julian	relative
	elapsed	local	second
	epoch	magnetic	spacecraft
	event	millisecond	UT

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UNCERTAINTY An estimate of the lack of precision in an observed or calculated value.

Subclass Words	[All other class words are also possible sub-class words]
	percent

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VELOCITY The rate of increase of distance traversed by a body in a particular direction (linear velocity) or the rate at which a body rotates about an axis (angular velocity). Speed is similarly defined with the omission of reference to direction.

Subclass Words	doppler	horizontal	speed
	drift	phase	thermal
	group	rotation	vertical

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WAVELENGTH The distance from a particular point of a wave to that same point in the next oscillation cycle of the wave. Also a range of wavelengths, such as infra-red, visible, radio, x-ray.

Subclass Words	radio	band	primary
	IR	bin	scan
	visible	channel	resolution
	UV	characteristic	
	x-ray	filter	
	gamma ray	nominal	

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Common Subclass Words

The following lists of words are valid for more than one class word. Note that some species and wavelength subclass keywords are also considered to be common because they can be used in conjunction with several of the class words.

GENERAL Subclass Words	absolute	instrument	mean
	average	interval	offset
	center	maximum	spacecraft
	component	measured	vector
	derived	minimum	total

COORDINATE SYSTEM Subclass Words	cartesian	GSM
	geographic	HDZ
	geomagnetic	HGI
	GCI	NEV
	GSE	polar

SOURCE Subclass Words	electron	oxygen
	ion	Z>3
	proton	neutral
	helium	particle
	nitrogen	dust

WAVELENGTH Subclass Words	radio
	IR
	visible
	UV
	x-ray
	gamma ray

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Examples

Source	Exp	Variable	Value of DICT_KEY
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All	All	Epoch	time>Epoch_center_range
IMP 8	MAG	Time_PB5	time>PB5_center_range
IMP 8	MAG	B_GSE_c	magnetic_field>GSE_cartesian_vector
IMP 8	MAG	B_GSM_p	magnetic_field>GSM_polar_vector
IMP 8	MAG	Rad_dist	position>radial_distance
IMP 8	MAG	SC_pos_se	position>GSE_cartesian
IMP 8	MAG	Mode	flag>mode
IMP 8	MAG	DQF	flag>quality
DARN	GBAY	vel	velocity>drift_components
DARN	GBAY	post_flag	flag>post_gap
DARN	GBAY	label_time	label>time
DARN	GBAY	label_unit	label>unit
Geotail	EPIC	IDiffI_I	particle_flux>ion_differential
Geotail	EPIC	IDiffI_I_Uncert	uncertainty>ion_differential
Geotail	EPIC	IDiffI_I_Energy	energy>ion_center_channel
Geotail	EPIC	IDiffI_I_Ch	label>ion_energy_channel
Geotail	EPIC	IDiffI_I_Eplus	energy>ion_energy_plus
Geotail	EPIC	IDiffI_I_Eminus	energy>ion_energy_minus

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