EUFAR - Standards and Protocols (N7SP)

Glossary

S. Holzwarth, 7 - DLR
O. Henry, 1 - MF-CNRM

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Abbreviations

A

a.g.l. above ground level

a.s.l. above sea level

AARP Airborne Aerosol Research Pod

AATS NASA Ames Airborne Tracking Sunphotometer

AC Alternating Current

ACCENT Atmospheric Composition Change

ACE Aerosol Characterization Experiment

ACTOS Airborne Cloud Turbulence Observation System

ADC Analogue Digital Converter

AHS Airborne Hyperspectral Sensor (imaging spectrometer)

AIDA Aerosol Interaction And Dynamics In The Atmosphere

AIMMS Aircraft-Integrated Meteorological Measurement System

AIRFLEX Airborne photometer

AIRTOSS AIRcraft TOwed Sensor Shuttle

AIS Airborne Imaging Spectrometer

AISA Airborne Imaging Spectrometer for Applications (imaging spectrometer)

ALIDS Airborne Laser Interferometric Drop Sizer

AMAX-DOAS Airborne Multi Axis Differential

AMMA African Monsoon Multidisciplinary Analysis

AMS Aerosol Mass Spectrometer

AMSU Advanced Microwave Sounding Unit

AOD Aerosol Optical Depth

AOS Acousto Optical Spectrometer

APD Avalanche Photodiode

APEX Airborne Prism Experiment (imaging spectrometer)

APM Aerodynamic Particle Mass Analyzer

APS Aerodynamic Particle Sizer

ARM Atmospheric Radiation Measurements

ASASP Active Scattering Aerosol Spectrometer Probe

ASD Analytical Spectral Devices

ASI Airborne Spectral Imager

ASMM Airborne Science Mission Metadata creator

ASSP Axially Scattering Spectrometer Probe

ASTAR Arctic Study of Tropospheric Aerosol, Clouds and Radiation

ATBD Algorithm Theoretical Basis Document

ATCOR Atmospheric and Topographic Correction

ATDD Atmospheric Turbulence and Diffusion Division

ATM ATM Airborne Thematic Mapper

AU Astronomical Unit

AUX Auxiliary Data

AVIRIS Airborne Visible Infrared Imaging Spectrometer (imaging spectrometer)

AWI Alfred Wegener Institute fur Polar und Meeresforschung (DE) - EUFAR Partner

B

BAT Best Aircraft Turbulence

BBCRDS Broadband Cavity Ring–Down Spectroscopy

BC Black Carbon

BCP Backscatter Cloud Probe

BHR Bi-Hemisphere Reflection

BIL Band Interleaved by Line

BOA Bottom Of Atmosphere

BRDF Bidirectional Reflectance Distribution Function

BRF Bidirectional Reflectance Factors

BSQ Band SeQuential

BSRN Baseline Surface Radiation Network

C

CAL Calibration

CARIBIC Civil Aircraft for Regular Investigation of the Atmosphere Based on an Instrument Container

CAS Cloud and Aerosol Spectrometer

CAS-DPOL Cloud and Aerosol Spectrometer With Depolarization

CASI Compact Airborne Spectrographic Imager

CBL Convective Boundary Layer

CCD Charge-Coupled Device

CCN Cloud Condensation Nuclei

CCNC Cloud Condensation Nucleus Counter

CCRF Chemical Conversion Resonance Fluorescence

CCRS Canadian Center for Remote Sensing

CDMA Cylindrical Differential Mobility Analyzer

CDP Cloud Droplet Probe

CE Collection Efficiency

CEAS Cavity Enhanced Absorption Spectroscopy

CEOS Committee of Earth Observation Satellites

CEP Cloud Extinction Probe

CFD Computational Fluid Dynamics

CFDC Continuous Flow Diffusion Chamber

CFMC Continuous Flow Mixing Chamber

CHB Calibration Home Base

CHRIS Compact High-Resolution Imaging spectrometer

CIMS Chemical Ionization Mass Spectrometer

CIN Cloud Integrating Nephelometer

CIP Cloud Imaging Probe

CIRA Centro Italiano Ricerche Aerospaziali

CL Chain Length

CLH Closed Path TDL Hygrometer

CMOS Complementary Metal Oxide Semiconductors

CNR Consiglio Nazionale delle Ricerche (IT) - EUFAR Partner

CNRS Centre National de Recherche Scientifique (FR) - EUFAR Partner

COSSIR Conical Scanning Millimeter-Wave Imaging Radiometer

CP Carrier Phase

CPC Condensation Particle Counter

CPI Cloud Particle Imager

CPSD Cloud Particle Spectrometer With Depolarization

CRDS Cavity Ring-Down Spectroscopy

CRISM Compact Reconnaissance Imaging Spectrometer

CSI Cloud Spectrometer and Impactor

CTA Constant Temperature Anemometer

CVGZ CzechGlobe ,Centrum Výzkumu Globální Změny AV ČR (CZ) - EUFAR Partner

CVI Counterflow Virtual Impactor

CW Continuous Wave

D

DAIS Digital Airborne Imaging Spectrometer

DC Dark Current

DDV Dense Vegetation Approach

DEM Digital Elevation Model

DFG Deutsche Forschungsgemeinschaft

DGNSS Differential GNSS

DGPS Differential GPS

DLR Deutsches Zentrum für Luft- und Raumfahrt e.V. (DE) - EUFAR Partner

DMA Differential Mobility Analyzer

DMPS Differential Mobility Particle Sizer

DMS Differential Mobility Spectrometer

DMT Droplet Measurement Technologies

DN Digital Number

DNU Digital Number Unit

DOE Department of Energy

DOF Depth Of Field

DOP Dilution Of Precision

DOY Day Of the Year

DRI Desert Research Institute

DSD Drop Size Distribution

DSM Digital Surface Model

DTM Digital Terrain Model

DU Dobson Units

DUE Data Uncertainty Engine

E

EARSeL European Remote Sensing Laboratories

EAS Electrical Aerosol Spectrometer

EC Environment Canada

EC European Commission

eCL effective Chain Length

ECN Netherlands Energy Research Foundation

ECSS European Cooperation for Space Standardisation

EEPS Engine Exhaust Particle Sizer

EGADS EUFAR General Airborne Data-processing Software

EL Empirical Line

EM End Member

EMC EUFAR Metadata Creator

EnMAP Environmental Mapping and Analysis Programme

Enviscope enviscope GmbH, Messtechnik für Umweltforschung (DE) - EUFAR Partner

EO Earth Observation

ESA European Space Agency

ESG Electrically Suspended Gyroscope

ESR Electron Spin Resonance

EUCAARI European Aerosol Cloud Climate and Air Quality Interactions

EUFAR European Facility for Airborne Research

EWG Expert Working Group (EUFAR term)

F

FAAM Facility for Airborne Atmospheric Measurements - EUFAR Partner

FADS Flush Airdata Sensing

FCDP Fast CDP

FFSSP Fast FSSP

FHP Five-Hole Probe

FIMS Fast Integrated Mobility Spectrometer

FINCH Fast Ice Nucleus Chamber

FISH Fast In Situ Stratospheric Hygrometer

FLAASH Fast Line-of-sight Atmospheric Analysis of Spectral Hypercubes

FLI Fluorescence Line Imager

FODIS Fibre Optic Downwelling Irradiance Sensor

FOG Fiber Optic Gyro

FOV Field Of View

FPA Focal Plane Array

FPGA Field Programmable Gate Array

FSSP Forward Scattering Spectrometer Probe

FTS Fourier Transform Spectrometer

FUB Freie Universität Berlin (DE) - EUFAR Partner

FWHM Full Width at Half Maximum

G

GAW Global Atmospheric Watch

GC-MS Gas Chromatography–Mass Spectrometry

GCP Ground Control Point

GER Geophysical and Environmental Research Corporation

GFC Gas Filter Correlation

GHG Greenhouse Gases

GIS Geographic Information System

GLONASS Globalnaja Navigaziona Systema

GloPac Global Hawk Pacific Mission

GNSS Global Navigation Satellite Systems

GPS Global Positioning System

GSD Ground Sampling Distance

H

HALO High Altitude and Long Range Research Aircraft

HDF Hierarchical Data Format

HDRF Hemisphere Diffuse Reflectance Function

HIAPER High-performance Instrumented Airborne Platform for Environmental Research

HIPPO Pole-to-Pole Observations

HISS Hyper Image Space Spectrometer

HOLODEC Holographic Detector For Clouds

HPC High Performance Computing

HPD Hybrid Photodetector

HRS Hyperspectral Remote Sensing

HTW Harvard Total Water Hygrometer

HVPS High Volume Precipitation Spectrometer

HW HardWare

HyMap Hyperspectral Mapper

HYRESSA HYperspectral REmote Sensing in Europe specific Support Actions (FP6 project)

I

IAGOS In-Service Aircraft for a Global Observing System

IC Ion Chromatography

ICAO International Civil Aviation Organization

ICARTT Intercontinental Consortium for Atmospheric research on Transport and Transformation

ICOS Integrated Cavity Output Spectroscopy

ICPS Isokinetic Cloud Probe System

IDI Isokinetic Diffuser-Type Inlet

IDL Interactive Data Language

IF Intermediate Frequency

IFOG Interferometric Gyro

iFOV instantaneous Field Of View

IfT Leibniz Institute for Tropospheric Research

IKP Isokinetic TWC Probe

ILIDS Interferometric Laser Imaging for Droplet Sizing

ILS Instrument Line Shape

IMU Inertial Measurement Unit

IN Ice Nuclei

INAA Instrumental Neutron Activation Analysis

INDOEX Indian Ocean Experiment

INS Inertial Navigation System

InS Indium Antimonide

INSPECTRO INfluence of clouds on the SPectral actinic flux in the lower TROposphere

INSPIRE Infrastructure for Spatial Information in Europe

INTA Instituto Nacional de Técnica Aeroespacial (ES) - EUFAR Partner

IPCC Intergovernmental Panel on Climate Change

IR Infra- Red

IRS Inertial Reference System

IS Imaging Spectroscopy

ISA International Standard Atmosphere

ISIS International Spaceborne Imaging Spectroscopy

ISO International Organization for Standardization

ITRES Integral Technology for Remote Sensing

ITS International Temperature Scale

IWC Ice Water Content

IWP Ice Water Path

IWV Integrated Water Vapor

J

JRA Joint Activity Research (EUFAR term)

K

KIT Karlsruher Institut für Technologie (DE) - EUFAR Partner

L

LACE Lindenberg Aerosol Characterization Experiment

LAI Leaf Area Index

LaMP Laboratoire de Météorologie Physique

LANDSAT Land Satellite

LDV Laser-Doppler Velocimetry

LED Light Emitting Diode

LIDAR Light Detection and Ranging

LIF Laser Induced Fluorescence

LIM Leipzig Institute for Meteorology

LNA Low Noise Amplifiers

LO Local Oscillator

LPAS Laser-induced Photo-Acoustic Spectrometry

LPM Liter Per Minute

LSF Line Spread Function

LTI Low Turbulence Inlet

LULC Land Use Land Cover

LUT Look-Up Table

LWC Liquid Water Content

LWP Liquid Water Path

M

MAAP Multi-Angle Absorption Photometer

MARSS Microwave Airborne Radiometer Scanning System

MAS Moderate Resolution Imaging Spectroradiometer

MASI Midwave Airborne Spectral Imager

MASP Multiangle Aerosol Spectrometer

MCP Multichannel Plate

MCS Multichannel Spectrometer

MCT Mercury Cadmium Telluride

MEMS Microelectomechanical System

MetOffice Met Office (UK) - EUFAR Partner

MF-CNRM Meteo-France, Centre National de Recherches Meteorologiques (FR) - EUFAR Partner

MIR Mid Infrared

MIVIS Multispectral Infrared and Visible Imaging Spectrometer

MLS Microwave Limb Sounder

MNF Minimum Noise Fraction

MODIS Moderate Resolution Imaging Spectroradiometer

MODTRAN Moderate Resolution Transmission Code

MOZAIC Measurement of Ozone and Water Vapor by Airbus In-Service Aircraft

MPI Max Planck Institute

MSL Mean Sea Level

MSU Microwave Sounding Unit

MTF modulation transfer function

MVD Median Volume Diameter

MW Microwave

MWIR Midwave infrared

N

NA Numerical Aperture

NASA National Aeronautics and Space Administration

NCAR National Center for Atmospheric Research

NDI Nested Diffuser-Type Inlet

NDIR Non-Dispersive Infrared

NDVI Normalized Difference Vegetation Index

NED North-East-Down

NedT noise equivalent delta temperature

NEO Norsk Elektro Optikk

NER noise equivalent radiance

NERC Natural Environment Research Council (UK) - EUFAR Partner

NetCDF Network Common Data Form

NIR Near infrared

O

OAP Optical Array Probe

OC Organic Carbon

OCTS Ocean Colour and Temperature Sensor

ODE Ozone Depletion Event

OMAC Opposed Migration Aerosol Classifier

ONERA Office National d'Etudes et de Recherches Aérospatiales (FR) - EUFAR Partner

OPC Optical Particle Counter

P

PAF Processing and archiving facility

PALMS Particle Analysis by Laser Mass Spectrometer

PC-BOSS Particle Concentrator-Brigham Young University Organic Sampling System

PCA Principle Component Analysis

PCASP Passive Cavity Aerosol Spectrometer Probe

PDA Phase Doppler Analyzer

PdA Photodiode Array

PDI Phase Doppler Interferometer

PDPA Phase Doppler Particle Analyzer

PeRCA Peroxy Radical Chemical Amplification

PFA Paraformaldehyd

PGP Prism-Grating-Prism

PH-CPC Pulse-Height CPC

PILS Particle-Into-Liquid Sampler

PIP Precipitation Imaging Probe

PIXE Particle-Induce X-Ray Emission

PM1 Particulate Matter with Particle Diameter $< 1.0\,\mu m$

PM2.5 Particulate Matter with Particle Diameter < 2.5 um

PMI Programmable Multi-Spectral Imager

PML Plymouth Marine Laboratory (UK) - EUFAR Partner

PMS Particle Measuring Systems

PMT Photomultiplier Tube

PN Polar Nephelometer

PPS Pulse Per Second

Pr Prandtl Number

PRISM Processes Research for Imaging Spectrometer Mission

PROBA Project for On–Board Autonomy

PSA Particle Surface Area

PSAP Particle Soot Absorption Photometer

PSD Particle Size Distribution

PSF Point Spread Function

PSL Polystyrene Latex Beads

PSM Particle Size Magnifier

PSR Polarimetric Scanning Radiometer

PSU Pennsylvania State University

PTFE Polytetrafluorethyle

PToF Particle Time-of-Flight

PTR-MS Proton Transfer Reaction Mass Spectrometer

PVM Particle Volume Monitor

Q

QA Quality Assurance

QCL Quantum Cascade Laser

QI Quality Indicator

QL Quality Layer

QPF Quantitative Precipitation Forecast

QUAC Quick Atmospheric Correction

R

RADAR Radio Detection and Ranging

RAOS Reno Aerosol Optics Study

RCC(r,c) Radiometric calibration coefficient for the pixel at row r and column c

RDMA Radial Differential Mobility Analyzer

Re Reynolds Number

REO Research Electro-Optics

RF Radio Frequency

RH Relative Humidity

RICO Rain in Cumulus Over the Ocean

RID Rosemount Icing Detector

RLG Ring Laser Gyro

RMS Root Mean Square

RONOCO Role of Nighttime Chemistry in Controlling the Oxidizing Capacity of the Atmosphere

ROSIS Reflective Optics System Imaging Spectrometer (imaging spectrometer)

RSL Remote Sensing Laboratory

RSR Relative Spectral Response

RT Receiver Transmitter

S

SA Selective Availability

SAGE Stratospheric Aerosol and Gas Experiment

SAM Spectral Angle Mapper

SAR Synthetic Aperture RADAR

SAW Surface Acoustic Wave

SBET Smoothed Best Estimated Trajectory

SCD Slant Column Densities

SDI Solid Diffuser-Type Inlet

SEA Science Engineering Associates

SEMS Scanning Electrical Mobility Spectrometer

SFSI Short-Wave IR Full Spectrum Imager

SHIVA Stratospheric Ozone:Halogen Impacts in a Varying Atmosphere

SID Small Ice Detector

SMART Spectral Modular Airborne Radiation sysTem

SMIRR Shuttle Multispectral Infrared Radiometer

SMPS Scanning Mobility Particle Sizer

SNR Signal-To-Noise Ratio

SOLVE SAGE III Ozone Loss and Validation Experiment

SP-2 Single Particle Soot Photometer

SPEC Stratton Park Engineering Company

SPECIM Spectral Imagers

SPIN Spectrometer for Ice Nuclei

SPIRIT SPectrometre Infra Rouge In siTu

SPOT System Probatoire d'Observation de la Terre

SRTM Shuttle Radar Topography Mission

SSFR Solar Spectral Flux Radiometer

SSMI/S Special Sensor Microwave Imager/Sounder

SST Sea Surface Temperature

SSTI Small Satellite Technology Initiative

STD STandard Deviation

STFC Science and Technology Facilities Council (UK) - EUFAR Partner

Stk Stokes Number

STP Standard Temperature and Pressure

STRAP Stabilized Radiometer Platform

SV Satellite Vehicle

SVM Support Vector Machine

SW SoftWare

SWE Snow Water Equivalent

SWIR ShortWave Infra-Red

T

TA Transnational access (EUFAR term)

TARFOX Tropospheric Aerosol Radiative Forcing Observational Experiment

TAS True Air Speed

TASI Thermal Airborne Spectral Imager

TAU Tel Aviv University (IL) - EUFAR Partner

TDL Tunable Diode Laser

TEC Total Electron Content

TexAQS Texas Air Quality Study

TIMS Thermal Infrared Multispectral Scanner

TIR Thermal Infra-Red

TLAS Tunable Laser Absorption Spectroscopy

TM Thematic Mapper

TOA Top Of Atmosphere

ToF Time-of-Flight

TOPSE Tropospheric Ozone Production about the Spring Equinox

TOR Thermal-Optical Reflectance

TU Vienna Technische Universitat Wien (AT) - EUFAR Partner

TWC Total Water Content

U

UAS Unmanned Aerial Systems

UAV Unmanned Aerial Vehicle

UEDIN The University of Edinburgh (UK) - EUFAR Partner

UFT Ultra Fast Thermometer

UHSAS Ultrahigh Sensitivity Aerosol Spectrometer

UK United Kingdom

UK-MRF United Kingdom Meteorological Research Flight

UKMO United Kingdom Meteorological Office

ULEI University of Leipzig (DE) - EUFAR Partner

UNAM Universidad Nacional Autonoma de Mexico

UNIVLEEDS The University of Leeds (UK) - EUFAR Partner

UPA Uncertainty Propagation Analysis

US United States

USAS Ultrahigh Sensitivity Aerosol Spectrometer

UT/LS Upper Troposphere/Lower Stratosphere

UTC Universal Time Coordinated (UTC)

UTM Universal Transverse Mercator (UTM)

UV UltraViolet

UWAR University of Warsaw (PL) - EUFAR Partner

UZH Universität Zürich (CH) - EUFAR Partner

V

VAD Velocity Azimuth Display

VAL Validation

VBA Vibrating Beam Accelerometer

VIPS Video Ice Particle Sampler

VIS Visible

VITO Vlaamse Instelling voor Technologisch Onderzoek (BE) - EUFAR Partner

VNIR Visible and Near Infra-Red

VOC Volatile Organic Compound

VOCALS VAMOS Ocean-Cloud-Atmosphere-Land Study

VSLS Very Short–Lived Substances

VUV Vacuum Ultraviolet

W

WAS Whole Air Sampler

WGS84 World Geodetic System 1984

WICC Wide Stream Impaction Cloud Water Collector

WMO World Meteorological Organization

WP Work Package

X

XML eXtensible Markup Language

XRF X-Ray Fluorescence

Terms

A

aberration Spatial error of projecting an object at the surface of the earth.

absorption The process by which electromagnetic radiation is assimilated and converted into other forms of energy, primarily heat. Absorption takes place only on the electromagnetic radiation that enters a medium, and not on electromagnetic radiation incident on the medium but reflected at its surface.

absorption band A range of wavelengths (or frequencies) of electromagnetic radiation that is assimilated by a substance.

adjacency effect Influence of adjacency radiation (atmospheric and volume backscattering) to the total radiance signal.

aerosol The term is used to describe many types of small particles in the atmosphere that both absorb and reflect incoming sunlight.

albedo The ratio of the amount of electromagnetic energy reflected by a surface to the amount of energy incident upon it.

altitude Height above a datum, the datum usually being mean sea level.

aperture An opening that admits electromagnetic radiation to a film or detector. An example would be the lens diaphragm opening in a camera.

at-sensor radiance Radiance at the entrance aperture of an optical instrument.

atmospheric correction The correction made to remotely sensed radiance to reduce or normalize for the intervening atmosphere between the surface of the earth and the sensor.

atmospheric window The range of wavelength of the electromagnetic spectrum at which the atmosphere and atmospherically gases respectively only slightly absorbs radiation.

attitude Angular orientation of the sensor system (see also roll, pitch, yaw).

attribute A descriptive parameter attached to a data variable e.g. units, valid range, etc

auxiliary data (aux) Data required to perform processing of sensor data which is not obtained from the sensor itself.

azimuth The arc of the horizon measured clockwise from true north to the point referenced expressed in degrees.

B

backscatter Scattering of radiation (or particles) through angles greater than 90° with respect to the original direction of motion.

band-to-band co-registration Describes the geometric matching of different spectral bands of one image or scene.

bandwidth Width of a spectral feature as measured by a spectroscopic instrument.

batch processing Pertaining to the technique of executing a set of computer programs such that each program of the set is completed before the next program of the set is started; loosely, sequential processing.

bidirectional reflectance A unitless measure of the ratio of incoming to outgoing radiation created from converting a radiometrically calibrated image to an innate characteristic of the target being observed. After removing the atmospheric component of calibrated at-satellite spectral radiance, bidirectional reflectance distribution functions (BRDFs), bidirectional reflectance, and bidirectional reflectance factors (BRF) attempt to take into account target-related differences in reflectance as a function of four sources of variability of non-Lambertian surfaces: solar zenith and azimuthal irradiance angles and sensor viewing zenith and azimuthal angles.

BIL Band Interleaved by Line. A common data format used in hyperspectral remote sensing where the pixel information is stored band by band for each line.

black body An ideal body which, if it existed, would be a perfect absorber and a perfect radiator, absorbing all incident radiation, reflecting none, and emitting radiation at all wavelengths.

boresight alignment A process of adjusting the optical axis to the centre of the Field of View.

BRDF Bidirectional Reflectance Distribution Function (see bidirectional reflectance)

BRF Bidirectional Reflectance Factors (see bidirectional reflectance)

BSQ Band SeQuential. A common data format used in hyperspectral remote sensing where the data is stored band by band.

C

calibration (cal) The process of determining values and accuracies to sensor parameters allowing a comparison of sensor measurements with reference values.

calibration data In remote sensing, measurements pertaining to the spectral or geometric characteristics of a sensor or radiation source.

campaign Realization of several surveys within a given time period.

channel A channel is the abundance of data containing one spectral sensitive wavelength range of the sensor acquired during a specific time period and represents a two dimensional array of data with a spatial and time dimension.

characterization The process of determining parameters of a sensor or sensor system necessary to operate it in a given environment and interpret its measurements.

coverage Total area of the Earth surface that can potentially be mapped within a given time frame.

cross-calibration The comparison of one sensor to another sensor on different aircraft.

D

dark current (DC) Dark current is one of the main sources of noise in image sensors.

data acquisition Time span, when data are recorded.

data archive A facility providing storage, preservation, disposition and distribution of data sets and associated metadata.

data processing Radiometric, atmospheric and geometric correction of sensor data in order to derive information or prepare this data for deriving knowledge.

data product General term to indicate raw data, validation data, auxiliary data, fast delivery, regenerated, or precision products.

data provider Any institution offering access to data required over area of interests determined by a user.

de-striping Process that removes the systematic striping or banding that often occurs in multispectral scanners

derived product A data product generated by using an algorithm or model to create a higher level product

detector A device that detects and linearly transduces radiative power into an electrical signal.

digital elevation model (DEM) A representation of the topography of the Earth in digital format, that is, by coordinates and numerical descriptions of altitude.

digital surface model (DSM) A representation of the topography of the Earth including buildings, vegetation, natural terrain features, etc. in digital format, that is, by coordinates and numerical descriptions of altitude.

digital terrain model (DTM) see digital elevation model (DEM)

distortion A change in scale from one part of an image to another.

dynamic range Range of At-Sensor Radiances to be measured within the linear response of the instrument from a minimum to a maximum at-sensor radiance level.

E

electromagnetic radiation Energy emitted as a result of changes in atomic and molecular energy states and propagated through space at the speed of light, i.e., energy transfer in the form of electromagnetic waves or particles that propagate through any medium at the speed of light.

electromagnetic spectrum The entire range of electromagnetic radiation according to wavelength that moves at a constant velocity of light.

emissivity The ratio of radiant flux emitted by a surface to that emitted by a blackbody at the same temperature.

empirical line calibration Empirical line (EL) calibration forces the image spectra to match reflectance spectra collected from the field. This requires the identification of at least two homogenous targets of contrasting reflectances.

end-user Anyone interpreting thematic information extracted from data.

experimental services Access to hyperspectral instruments and/or data for experimental purposes, e.g. development of methods.

F

f-stop Aperture stop, a number inversely proportional to the diameter of the entrance optics.

field of view (FOV) The solid angle through which an instrument is sensitive to radiation.

FODIS Fibre Optic Downwelling Irradiance Sensor

FWHM A full width at half maximum (FWHM) is an expression of the extent of a function, given by the difference between the two extreme values of the independent variable at which the dependent variable is equal to half of its maximum value. It is applied to the resolution of spectrometers.

G

gain A general term used to denote an increase in signal power in transmission from one point to another. Gain is usually expressed in decibels.

geolocation The correspondence between position in an image and position in a geographic reference system.

geometric correction The process of determining the geolocation of an image pixel or other data.

georeference-able Data set for which information for the geolocation of each data element is available but not applied, so that the data set geometry is not compatible with a geographical representation such as a map.

georeferenced Data set for which the geolocation of each data element is known.

georeferencing see geometric correction.

ground control point (GCP) A geographic feature of known location that is recognizable on images to use them for rectification or other geometric corrections.

ground sampling distance (GSD) The distance from centroid to centroid between adjacent spatial samples on the earth's surface corresponding to respective detector pixels.

ground track The vertical projection of the actual flight path of an aerial or space vehicle onto the surface of the Earth.

ground truth Observations made on the ground at a site that is being imaged from space/air for the purpose of verifying either the absolute radiometric and/or geometric calibration of the imagery or the classified product from the image.

H

HDF Hierarchical Data Format (HDF) is the name of a set of file formats and libraries designed to store and organize large amounts of numerical data.

heading Direction of aircraft's nose, in reference to the local magnetic north direction.

hyperspectral The simultaneous acquisition of images of the same area in many (usually 100 or more), narrow, contiguous, spectral bands.

hyperspectral scanner see imaging spectrometer.

I

IDL The Interactive Data Language (IDL) is a data analysis language popular for science applications.

image A two dimensional grid of data. A more complete definitions is "an ordered set of data arranged in a way that when displayed represents the pattern of the measured variable through the earth surface".

imaging spectrometer An array sensor capable of imaging in as many as several hundred discrete spectral bands simultaneously. Also called a hyperspectral scanner.

IMU Inertial Measurement Unit. An IMU measures the rate and direction of motions and is used on sensor platforms to calculate its movement (roll, pitch, yaw). The IMU data is then used for georeferencing of remote sensing data.

in situ Latin for "in original place". Refers to measurements made at the actual location of the object or material measured.

INS Inertial navigation system. See IMU

instantaneous field-of-view (iFOV) The solid angle through which a detector or pixel is sensitive to radiation, commonly expressed in milliradians.

instrument operator Any institution offering access to hyperspectral instruments operated over an area of interest determined by a user or a data provider.

IR Infrared - Pertaining to or designating the portion of electromagnetic spectrum with wavelengths from the red end of the visible spectrum to the microwave portion of the spectrum, or from 0.7 µm to 1mm.

irect georeferencing Use of IMU and GPS measurements, acquired parallel to the image data, to determine the external orientation of the sensor for georeferencing.

irradiance The measure of radiant flux incident on a surface in units of power or energy per unit time.

K

keystone Keystone is a change in optical magnification with wavelength for a fixed field position resulting in bending of this field point spectrum along the spectral axis. The spectral axis is defined by the lines of detector pixels in dispersion direction.

L

LAI Leaf Area Index. Ratio of green leaf area per unit soil area.

level 0 (processing level) Data transcription from system file format to a standardized, readable and generic data format to be archived as raw data.

level 1 (processing level) Level 1 is instrument data, either in digital counts or in units of at-sensor radiance, appended with ancillary information like calibration coefficients and geolocation information per pixel. Sub-levels (L1a, L1b, L1c...) are open to specific definitions per provider.

level 2 (processing level) Geometric, radiometric and atmospheric corrected surface data. Reflectance, temperature and emissivity, although not directly measured, are considered level 2. Sub-levels (L2a, L2b, L2c...) are open to specific definitions per provider.

level 2 atm (processing level) Derived from the Level 1 product, the data converted to ground surface reflectance values after atmospheric correction.

level 2 geo (processing level) Derived from the Level 1 product and geometrically corrected (orthorectified) and re-sampled to a specified grid.

level 3 (processing level) Level 3 is any image that contains a geophysical variable not directly measured by the instrument, but are derived from its measurements (except for reflectance, temperature and emissivity, which are considered Level 2). Level 3 products contain thematic information extracted from hyperspectral data, ready to interpret.

line scanner A scanning radiometer which by use of a rotating or oscillating plane mirror can scan a path normal to the movement of the radiometer. The mirror directs incoming radiation to a detector, which converts it into an electric signal.

line spread function (LSF) A measure of the geometrical performance of an optical system which defines the apparent shape of a target as it appears in the output image. A plot of illuminance of the image as a function of distance in the image plane.

LUT A Look-Up Table (LUT) is a data structure often used to replace a runtime computation with a simpler array indexing operation.

M

map projection Any systematic arrangement of meridians and parallels portraying the curved surface of a sphere or spheroid upon a plane.

metadata Information describing data sets and making it possible to discover, inventory and use them (INSPIRE directive, CF conventions). Data about data (ISO 19115).

minimum noise fraction (MNF) Linear transform to estimate the actual dimension of an image and to remove noise and reduce processing time.

MIVIS Multispectral Infrared and Visible Imaging Spectrometer.

MODIS Moderate Resolution Imaging Spectroradiometer.

modulation transfer function (MTF) The geometric description of a detector's instantaneous field-of-view (IFOV) from the airborne sensor.

mosaic An image or photograph made by piecing together individual images or photographs covering adjacent areas.

multispectral Generally denotes remote sensing data in more than one spectral band.

MWIR Midwave infrared - 3-6 µm, the detected energy is a mixture of solar reflected and thermally emitted radiation.

N

nadir That point on a sphere vertically below the observer. The opposite of the zenith.

NDVI Normalized Difference Vegetation Index. NDVI is the most commonly used vegetation index for satellite imagery. The typical range of actual values is about 0.1 for bare soils to 0.9 for dense vegetation.

NetCDF NetCDF (Network Common Data Form) is a set of software libraries and self-describing, machine-independent data formats that support the creation, access, and sharing of array-oriented scientific data.

NIR Near infrared - The preferred term for the shorter wavelengths in the infrared region.

noise Any unwanted disturbance affecting a measurement (as of a frequency band), especially that which degrades the information-bearing quality of the data of interest. Noise includes systematic or random sources.

noise equivalent delta temperature (NEdT) The change in temperature that yields a signal-to-noise ratio of unity (thermal sensors).

noise equivalent radiance (NER) Uncertainty in sensor measurements in terms of radiance units.

O

on-board calibration Internal spectral and radiometric calibration of the sensor during the data acquisition.

operational services IAccess to hyperspectral instruments and/or data for operational purposes, e.g. monitoring applications for governments.

orthoimage An image which is obtained by a vertical projection (i.e. with no parallax).

orthorectification Process of changing the arrangement of data elements in an image towards an orthometric projection (i.e. a true vertical projection)

P

particle number concentration The number of particles present in a given volume of air.

particle size distribution The relative, size sorted number of particles present in a given volume of air.

photo response non uniformity Variation in sensitivity of pixels of a detector concerning a stable, homogeneous light source.

pitch The rotation of an aircraft or spacecraft about the horizontal axis normal to its longitudinal axis (in the along-track direction) so as to cause a nose-up or nose-down attitude.

pixel Picture element. A single element of a digital image data set.

point spread function (PSF) The inferring of spatial characteristics of the instrument from the collected image of a point source such as a star.

polarization The polarization describes the orientation of oscillations of waves and is an attribute of light.

pre-processing Commonly used to describe the correction and processing of sensor data prior to information extraction.

protocol A predefined procedural method in the design and implementation of experiments.

pushbroom A method of taking remote sensing data by composing an image of information taken by line scanners.

Q

quality The characteristics of a product or service that bear on its ability to satisfy stated or implied needs. Degree to which a set of inherent characteristic fulfils requirements (ISO9000)

quality assurance (QA) QA refers to a program for the systematic monitoring and evaluation of the various aspects of a project, service, or facility to ensure that standards of quality are being met.

quality indicator (QI) A means of providing a user of data or derived product (which is the result of a process) with sufficient information to assess its suitability for a particular application. This information should be based on a quantitative assessment of its traceability to an agreed reference or measurement standard (ideally SI), but can be presented as numeric or a text descriptor, providing the quantitative linkage is defined (CEOS)

quality layer (QL) Quality indicator presented as a spatial dataset

quicklook A quicklook is a downgraded image of the data, displayed as a jpg or similar, to allow a quick check of the data.

R

radiance Measure of the energy radiated by an object. In general, radiance is a function of viewing angle and spectral wavelength and is expressed as energy per solid angle.

radiation The process by which electromagnetic energy is propagated through any medium by virtue of wave motion variations in electric and magnetic fields.

radiometric calibration Radiometric calibration consists in linking pixels intensities to a physical parameter.

radiometric resolution The smallest difference in radiance that can be detected. Describes how precisely radiance is depicted in a set of data, as a result of both the sensor and subsequent data transformations such as analogue-to-digital conversion.

radiometric response Radiometric response (the same as gain/slope/calibration coefficient) is a ratio between the input and output signals.

radiometric stability Change of end-to-end instrument response between calibration cycles at a constant at-sensor radiance level.

raster Refers to the two-dimensional array of pixels in an image.

real-time The actual time during which something takes place [acc. to Meriam-Webster]. Characteristic in case of data transfers is a negligible time-delay between the data gathering and transmission.

rectification Process by which a tilted or oblique image is projected onto a horizontal reference plane, the angular relation between the image and the plane being determined by ground reconnaissance.

red edge Spectral region at the limit of the red and near-infrared wavelengths characterized by a sharp rise in the plant reflectance.

reflectance The ratio of amount of electromagnetic energy reflected by a surface to amount of energy incident on the surface.

remote sensing The measurement or acquisition of information of some property of an object or phenomenon, by a recording device that is not in physical or intimate contact with the object or phenomenon under study.

resampling Rearrangement of the resolution of cells of each scanned line of an image into geometrically equal terrain elements.

research infrastructure Refers to facilities, resources and related services used by the scientific community for leading edge research.

resolution A measure of the ability to separate observable quantities.

roll The rotation of an aircraft or spacecraft about its longitudinal axis (in the along-track direction) so as to cause a side-up or side-down attitude.

S

saturation The point at which a system is unable to handle any further input. That is, when the input signal (e.g. the voltage) exceeds the dynamic range of the detector.

scale The ratio of a distance on an image or map to its corresponding distance on the ground.

scan line The ground trace of a narrow strip that is recorded by the instantaneous field of view of a detector in a scanner system.

scene Terrain area covered by an image; several images (in different spectral bands, or different time repetitions) correspond to a single scene.

sensor Any device that gathers energy and presents it in a form suitable for obtaining information about the environment.

signal-to-noise ratio (SNR) The ratio of level of signal power to the level of noise power disturbing the signal.

signature see spectral signature

smile Smile is the change of dispersion angle with the field position. It results in the bending of the spectral lines (in the hyper spectral image).

solar azimuth Azimuth angle of the sun. Angle between the line from the observer to the sun projected on the ground and the line from the observer due north in a clockwise direction. (North = 0°, East = 90°)

solar elevation Elevation angle of the sun. Angle between the direction of the geometric centre of the sun's apparent disk and the horizon. (sunrise = 0°)

solar zenith Zenith angle of the sun. Angle between the direction of the geometric centre of the sun's apparent disk and the zenith. (sunrise = 90°)

spatial data Any data with a direct or indirect reference to a specific location or geographical area.

spatial resolution A measure of the ability to separate or distinguish closely spaced spatial objects.

spectral band Wavelength region of one spectral interval within the spectral coverage of an instrument. Often called spectral channel.

spectral calibration Laboratory measurements of spectral sensor properties. The measurements are used to calculate the spectral sensor parameters.

spectral channel see spectral band

spectral coverage Wavelength range between the lower wavelength boundary and the upper wavelength boundary measured by an instrument.

spectral resolution A measure of the ability to resolve features of the electromagnetic spectrum.

spectral response The response of a material as a function of wavelength to incident electromagnetic energy, particularly in terms of the measurable energy reflected from and emitted by the material.

spectral sampling distance Distance in wavelength between the spectral band centre wavelengths of neighbouring spectral bands.

spectral signature The quantitative measurement of the properties of an object at one or several wavelength intervals. That is, the spectral distribution pattern of radiation reflected and/or emitted by an object.

spectrometer A device used to measure radiant intensity or to determine the wavelengths of various radiations.

standard A published document which sets out specifications and procedures designed to ensure that a material, product, method or service is fit for its purpose and consistently performs in the way it was intended.

standard deviation (STD) The square root of the variance. The value is expressed in the units of measure in which the observations were taken.

stray light Radiation that reaches the detector from outside its iFOV or from within the sensor by reflection or diffusion.

striping Banding effect caused by the variation of the spectral response of the detectors of a sensor.

sun angle The angle of the Sun above the horizon. Also called Sun elevation and Sun elevation angle.

sunphotometer A device that measures the properties of light emanating from the sun.

survey Data acquisition over area of interest determined by a user or a data provider.

swath Across track extent of a strip or segment of an airborne or satellite sensor.

SWIR Shortwave infrared - The preferred term for the longer wavelengths in the infrared region.

system correction System correction denotes the calibration of the data from raw DN to a physical unit (usually at-sensor radiance) using calibration coefficients derived from laboratory calibration and/or based on on-board calibration sources.

T

temporal coverage Regular data acquisition during a longer period of time (e.g., a survey each year during 10 or more years).

time stamp The exact time a data sample was taken – usually obtained from a GPS or IRIG-B feed in aircraft measurements

timeseries A sequence of data points measured at successive points in time.

TIR Thermal infrared - the preferred term for the middle wavelength ranges of the infrared region extending roughly from 3 µm at the end of the near infrared, to about 15 or 20 µm where the far infrared commences.

transmittance The ratio of the energy per unit time per unit area (radiant power density) transmitted through an object to the energy per unit time per unit area incident on the object.

U

UV Ultraviolet - shorter wavelength than visible but longer than X-rays.

V

validation (Val) The process of assessing, by independent means, the quality of the data products derived from the system outputs in comparison with values from sampling at the earth's surface of the same target or with modelled surrogates.

value-adder Anyone altering data in order to facilitate thematic information extraction.

verification Confirmation, through provision of objective evidence that the requirements have been fulfilled.

vicarious calibration Radiometric calibration of a sensor by a method independent of that used to perform the initial laboratory calibration.

VIS Visible - wavelength interval to which the human eye is sensitive.

W

wavelength In general, the mean distance between maxima (or minima) of a roughly periodic pattern. Specifically, the shortest distance between particles moving in the same phase of oscillation in a wave disturbance. Wavelength = 1/frequency

whiskbroom A method of taking remote sensing data by composing an image of information taken by line scanners.

X

XML eXtensible Markup Language (XML) is a set of rules for encoding documents electronically.

Y

yaw The rotation of an aircraft or spacecraft about its vertical axis so as to cause the craft's longitudinal axis to deviate left or right from the direction of flight.

Z

zenith The point in a sphere that is exactly overhead and the opposite of nadir.