STANDARD OF CHINA SPACE

System number: CNSA-SAA00002

Originated from: QJ 20098-2012

Technical requirements for data products and information management of land observation satellites

CHINA NATIONAL SPACE ADMINISTRATION

2015

QJ

Space Industry Standard of the People's Republic of China

Translation of QJ 20098-2012

Technical requirements for data products and information management of land observation satellites

Issue date: 2013-01-04
Implementation date: 2013-05-01
Translation issue date: 2015-12-30

ENGLISH VERSION OF THIS STANDARD IS ISSUED BY
CHINA NATIONAL SPACE ADMINISTRATION

FOREWORD

This standard is proposed by China National Space Administration.

This standard is under the jurisdiction of China Astronautics Standards Institute.

In case of any doubt about the contents of English version, the Chinese original shall be considered authoritative.

Technical requirements for data products and information management of land observation satellites

1 Scope

This standard specifies the technical requirements of land observation satellites with respect to data product grading, data product file structure, data product storage format, naming of system database construction, structure and data archiving, reading, backup and recovery.

This standard is applicable to the data product format definition and database establishment of ground processing system for the optical remote sensor of land observation satellites. The data product format definitions and the database establishment of ground processing system for other remote sensing satellites can also be used as references, if appropriate.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

QJ 20094-2012 Terminology of ground processing system of land observation satellites

3 Terms and definitions

For the purposes of this document, the terms and definitions given in QJ 20094-2012 apply.

4 Data product grading and storage format

4.1 Data product grading

See Table A.1 in the Annex A for the description of the product grading and data of land observation satellites.

4.2 Data product file structure

4.2.1 File composition and type

See Table 1 for file composition and type at different product levels.

Table 1 File composition and type

Product Level	File Composition	Type of Image File	File Type of Product Description
Level 0, 1, 2, 3, 4 products	Image file and product description file	GeoTIFF[a]	XML
Level 5 product	Image file and product description file	GeoTIFF	XML

[a] Types of image file of all hyperspectral products at level 0-4 are HDF5.

4.2.2 Quantity of logical files

See Table 2 for provisions of quantity of logical files at different product levels.

Table 2 Quantity of logical files

Product Level	Quantity of Logical Files
Level 0,1,2,3,4 products	Number of band +1
Level 5 product	2

4.2.3 Contents of catalog structure

Contents of catalog structure shall include the following (the tree hierarchy of contents structure is shown in Figure 1):

a) Satellite identifier: The abbreviation of the satellite's English name, such as CB02 (CBERS 02), HJ1A (HuanJing 1A);

b) Data type: The identifier used for distinguishing different types of data, such as PRODUCT (product data) and BROWSE (browsing data);

c) Product level: The level of data product, such as LEVEL0, LEVEL1, LEVEL2, LEVEL3, LEVEL4;

d) Identifier of remote sensor: The abbreviation of the payload's English name, such as CCD, WFI, HIS, IRS and HR;

e) Identifier of receiving station: The abbreviation of the ground receiving station's English name, such as MYN (Miyun Station) and GUA (Guangzhou station);

f) Date of acquisition: The satellite imaging date (Beijing Time), such as 2008, September 7, (year-month-day);

g) Image file and product description file: The data product file and the auxiliary file detailedly describing products.

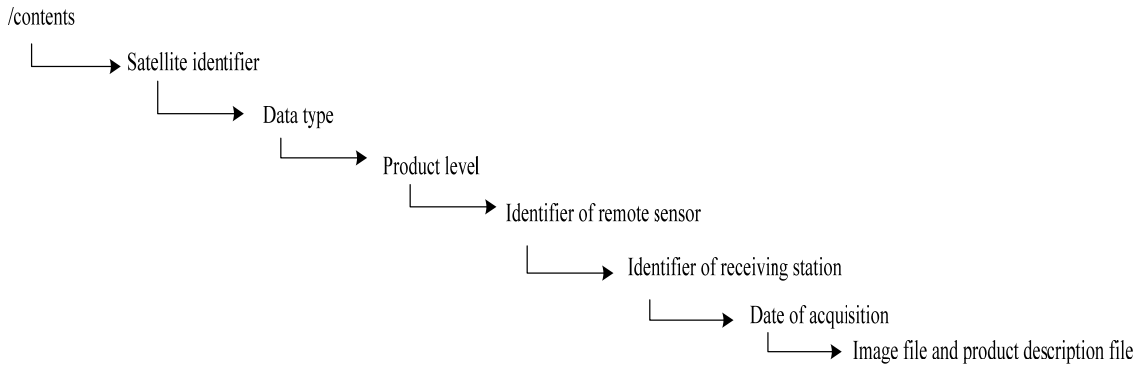

Figure 1 Hierarchy of Catalog

4.2.4 Nomenclature

4.2.4.1 Naming of package file

Package file is named as:

SATELLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L ?PRODUCT_ID.ZIP.

Note: ? means the product level. It can be 0, 1, 2, 3, 4.

4.2.4.2 Naming of level 0 product files

Level 0 product file is named as:

SATELLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L0PRODUCT_ID.H5.

4.2.4.3 Naming of level 1, 2, 3, 4 product files

Level 1, 2, 3, 4 hyperspectral product files are named as:

SATELLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L?PRODUCT_ID-BANDNUMBER.H5.

Level 1, 2, 3, 4 product files of optical remote sensor of the other land observation satellites are named as:

SATE LLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L? PRODUCT_ID-BANDNUMBER.Tiff.

Note: ?means the product level. It can be 1, 2, 3, 4.

4.2.4.4 Naming of level 5 product file

Level 5 hyperspectral product file is named as:

SATELLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L5PRODUCT_ID.H5.

Level 5 product file of optical remote sensor of the other land observation satellites is named as:

SATELLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L5PRODUCT_ID.Tiff.

4.2.4.5 Naming of product description file

Product description file is named as:

SATELLITE_ID-SENSOR_ID-PATH-ROW-SCENE_DATE-L?PRODUCT_ID.XML.

Note: ?means the product level. It can be 1, 2, 3, 4, 5.

4.2.4.6 English meaning of file naming

See Figure 2 for the English meaning of 4.2.4.1~4.2.4.5 file naming.

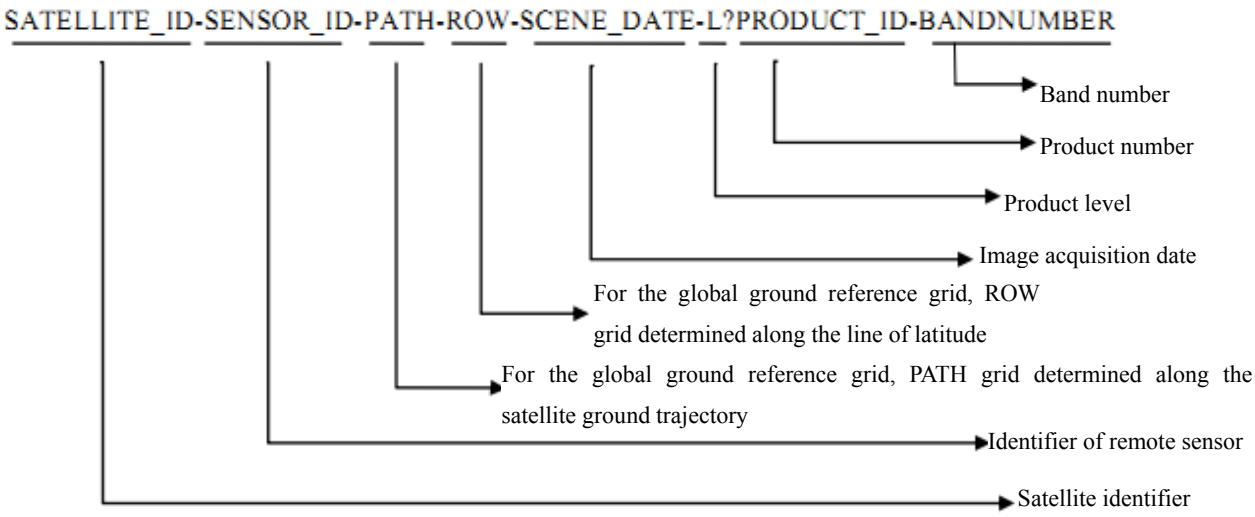

Figure 2 File naming rules

Satellite identifier, identifier of remote sensor, PATH grid, ROW grid, image capture date, product level and band number are represented with 8 bytes while product number is shown with 16 bytes.

4.3 HDF5 product storage format

4.3.1 Overall attributes

See Table 3 for overall attributes, namely the overview of the preserved data product integrity.

Table 3 Overall attributes

English Identifier	Description	Data Type	Specification
HDFVersion	HDF5 version	string	HDF5 x.x.x
Provider	Provider	string	—
SceneId	Scene serial number	long	Range is 1-2147483648
ProductId	Product serial number	long	Range is 1-2147483648
ProductLevel	Product Level	string	LEVEL0/LEVEL1A/LEVEL1B/ LEVEL2/LEVEL3/LEVEL4/ LEVEL5
InterleaveFormat	File storage method: store according to the sequence of band	string	BSQ
ByteOrder	Storage order of double byte at high and low level: put double byte at low level first, followed by double byte at high level	string	Host(Intel)
GlobalAttributes	Description of the overall attributes of products	string	Global attributes
ImageAttributes	Image attributes	string	Image attributes
ProductParameters	Description of the production parameters used during the production	string	The parameters of the product
MapInfo (the entry applied only to products at level 2 or above)	Description of the geo-location position and information of the product	string	Describe the Geo-location and information of the product
ImageData	Product data, including the image data, wavelength, factor of proportionality and calibration co-efficient of each band	string	Include: Band Data, wave length and calibration coefficient
Reserve	Reserved field	—	—

4.3.2 Image attributes

Image attributes are the preserved image data owned attributes. See Table 4 for details.

Table 4 Image attributes

English Identifier	Description	Data Type	Specification
Satelliteld	Satellite identifier	string	—
Sensorld	Remote sensor	string	—
SceneDate	Acquisition date of scene	string	YYYY-MM-DD hh:mm:ss (Beijing time)
Bands	Number of band	string	—
ScenePath	Scene PATH	short	—
SceneRow	Scene ROW	short	—
ScenePathOffset	Offset value of scene PATH	string	A, B, C, D, E (from east to west)
SceneRowOffset	Offset value of scene ROW	string	1, 2, 3, 4, 5 (from north to south)
SceneStartTime	Acquisition start time of scene	string	YYYY-MM-DD hh:mm:ss (UTC time)
SceneCenterTime	Acquisition time of scene center (satellite time code)	string	YYYY-MM-DD hh:mm:ss (UTC time)
SceneEndTime	Acquisition ending time of scene	string	YYYY-MM-DD hh:mm:ss (UTC time)

English Identifier	Description	Data Type	Specification
SunElevation	Sun elevation angle	float	0~+90
SunAzimuthElevation	Sun azimuth	float	0~+360
GainMode	Scene gain	string	—
ProductLines	Product lines	long	—
ProductSamples	Product columns	long	—
SatOffNadir	Off navigation direction angle of satellite	float	-90~+90
MirrorOffNadir	Off navigation direction angle of camera	float	-90~+90
ScaleFactor	Scale factor	float	—
InstrumentMode	Operating mode	string	IMGMODE: imaging mode CALMODE: calibration mode
Reserve	Reserved field	—	—

4.3.3 Product parameters

Product parameters are the parameters introduced during the production for the preserved data product. See Table 5.

Table 5 Product parameters

English Identifier	Description	Data Type	Specification
ProductDate	Date of production	string	YYYY-MM-DD hh:mm:ss (Beijing time)
OperatorName	Name of operator	string	—
ProductType	Product type	string	Standard scene (Standard), stripe scene (Stripe), shift scene (shift)
SceneCount	Number of stripe scene	short	—
SceneShift	Scene shift value	float	Value range: 1-99
ProductOrientation (Products at level 2 or above)	Product image orientation	string	Value range: MAP, PATH. For products above level 2, default is MAP
ResampleTechnique (Products at level 2 or above)	Resampling technique	string	Value range: NN, Bilinear, CC (default)
Reserve	Reserved field	—	—

4.3.4 Geographical information

Geographical information is the geographical information of the preserved data product. See Table 6.

Table 6 Geographical information

English Identifier	Description	Data Type	Specification
Projection	Map projection	string	The default is UTM projection
ProjectionParameters	Projection parameters	string	—
UtmZone	Stripe number of UTM projection	string	e.g. 25N or 25S
PixelSpacing	Spatial resolution (pixel	float	—

English Identifier	Description	Data Type	Specification
	spacing)		
Datum	Earth model	string	Default value is WGS 1984
SceneCenterLat	Scene center latitude	float	-90 degree ~+90 degree
SceneCenterLong	Scene center longitude	float	-180 degree~+180 degree
ProductUpperLeftLat	Upper left latitude of product	float	-90 degree~+90 degree
ProductUpperLeftLong	Upper left longitude of product	float	-180 degree~+180 degree
ProductUpperRightLat	Upper right latitude of product	float	-90 degree~+90 degree
ProductUpperRightLong	Upper right longitude of product	float	-180 degree~+180 degree
ProductLowerLeftLat	Lower left latitude of product	float	-90 degree~+90 degree
ProductLowerLeftLong	Lower left longitude of product	float	-180 degree~+180 degree
ProductLowerRightLat	Lower right latitude of product	float	-90 degree~+90 degree
ProductLowerRightLong	Lower right longitude of product	float	-180 degree~+180 degree
ProductUpperLeftX	Upper left X coordinate of product	float	Corresponding to the upper left longitude coordinate of product
ProductUpperLeftY	Upper left Y coordinate of product	float	Corresponding to the upper left latitude coordinate of product
ProductUpperRightX	Upper right X coordinate of product	float	Corresponding to the upper right longitude coordinate of product
ProductUpperRightY	Upper right Y coordinate of product	float	Corresponding to the upper right latitude coordinate of product
ProductLowerLeftX	Lower left X coordinate of product	float	Corresponding to the lower left longitude coordinate of product
ProductLowerLeftY	Lower left Y coordinate of product	float	Corresponding to the lower left latitude coordinate of product
ProductLowerRightX	Lower right X coordinate of product	float	Corresponding to the lower right longitude coordinate of product
ProductLowerRightY	Lower right Y coordinate of product	float	Corresponding to the lower right latitude coordinate of product
Reserve	Reserved field	—	—

4.4 GeoTIFF product storage format

4.4.1 GeoTIFF format structure

GeoTIFF consists of four parts, namely file header, file catalogue, catalogue item and image data. is see Figure 3 for file structure.

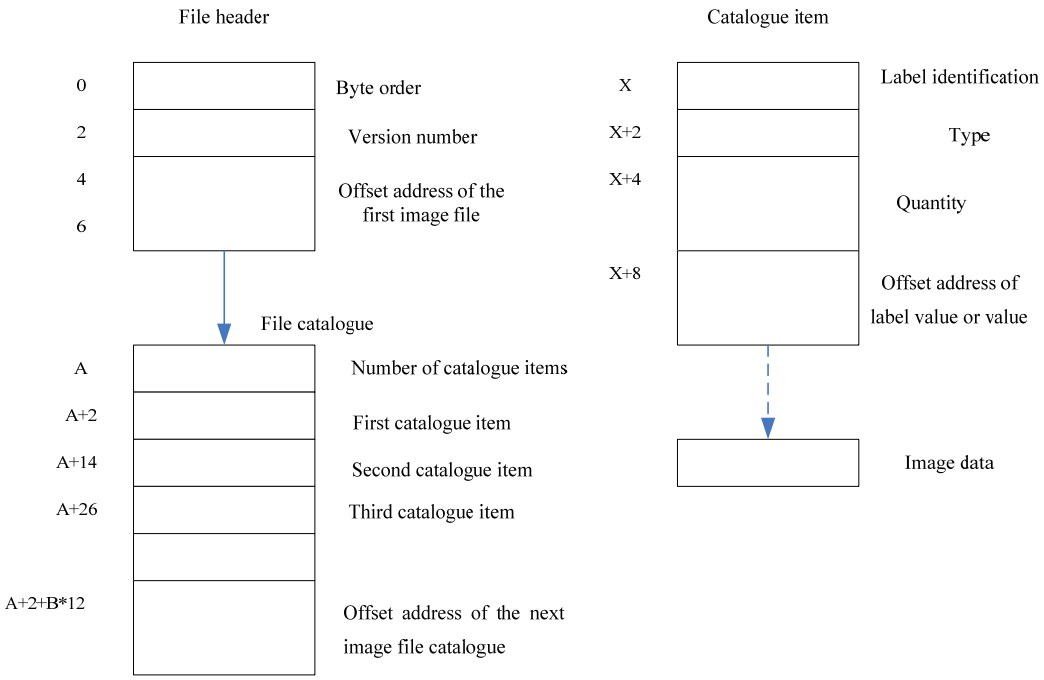

Figure 3 Structure of GeoTIFF File Document

4.4.2 Allocation of data byte

See Table 7, Table 8, Table 9 and Table 10 for the byte allocations of GeoTIFF format, file header, file catalogue and image data, respectively.

Table 7 Byte allocation of GeoTIFF format

Byte Allocation	File Contents
1_{st}-8_{th} bytes	File header
9_{th} -234_{th} bytes	Contents of catalogue and catalogue item
235_{th} -1024_{th} bytes	Information mentioned in the catalogue item
bytes behind 1025_{th}	Image data

Table 8 Byte allocation of file header

Number of Byte	Meaning of Stored Contents	Type	Data Domain Value
1-2	Minimum effective bytes stored in the low address	—	II/MM
3-4	Version number	—	42 (version number)
5-8	Address of the first file catalogue	—	8 (offset address)

Table 9 Byte allocation of file catalogue

Number of Byte	Meaning of Stored Contents	Type	Data Domain Value
9-10	Number of labels in the first file catalogue	short	18
11-22	Image width label	long	—
23-34	Image height label	long	—
35-46	Bit number of each pixel	short	8 or 16
47-58	Sampling rate of each pixel	short	1

Number of Byte	Meaning of Stored Contents	Type	Data Domain Value
59-70	Image compression ratio	short	0 (uncompressed)
71-82	Image color space	short	1 (0 is for black, 255 is for white)
83-94	Offset address of stripe	long	1024 (offset address)
95-106	Lines included by each stripe	short	Equal to height
107-118	Byte count of each stripe	long	Image width*image height* (type)
119-130	Number of pixel contained in resolution cell along horizontal direction	rational	235 (offset address)
131-142	Number of pixel contained in resolution cell along vertical direction	rational	243 (offset address)
143-154	Name and version content of software package creating files	ascii	251 (offset address)
155-166	Date of image creation	ascii	301 (offset address)
167-178	Image copyright information	ascii	320 (offset address)
179-190	Image data description	ascii	350 (offset address)
191-202	GeoTIFF key directory	short	401 (offset address)
203-214	Corresponding coordinate relation between raster image and model	double	501 (offset address)
215-226	Proportional relation between raster image pixel space and model space unit	double	549 (offset address)
227-234	Address of next file catalogue. If not available, it is set as 0x0000	long	0
597-1024	Reserved	—	—

Table 10 Byte allocation of image data

Number of Byte	Meaning of Stored Contents	Type	Data Domain Value
No.1025-file end	Image pixel value	short	[0, 65535]

5 Database

5.1 Structure description

5.1.1 Product database

Product database is intended for the unified management of metadata of products at all levels, browsing image, auxiliary data, spectrum data of surface features, ground control point, DEM data, co-efficient of calibration site, etc. for multi-satellites and remote sensors. Stored data information includes level 0, 2, 3, and 4 data, attribute information input into the statistical table and product quality statistical table, such as product serial number, data volume and size, and all indexing information with respect to satellite, remote sensor, map projection and earth model.

5.1.2 Storage management database

Storage management database is used for the hierarchical storage management of data. Records at

this database are certain attribute information and other records. There are mainly involved the data migration and backup management database, such as the databases with respect to data online, near-line and off-line status information, main and backup storage area information, etc.

5.2 Naming of database, table and field

5.2.1 Product database

5.2.1.1 Common support table

See Table 11 for contents of the common support table.

Table 11 Common support table

No.	Name of Elements (Table Name)	Name of Attribute Item
1	Satellite	Satellite identifier; satellite description; satellite altitude
2	Remote sensor	Remote sensor identifier; remote sensor description; ground resolution
3	Ground receiving station	Identifier of ground receiving station; description of ground receiving station
4	Map projection	Map projection identifier; description of map projection
5	Earth model	Identifier of earth model; description of earth model
6	Calibration parameters	Calibration co-efficient; satellite identifier; remote sensor identifier; calibration date
7	Ground control point	Number of control point; longitude; latitude; description of control point
8	DEM	Longitude; latitude; elevation
9	Spectrum data of surface features	Time; place; type of surface features; spectrum data
10	User feedback	Date; feedback object; opinion
11	User application results	User organization; application data; time; place; contents of results
12	Intermediate result data (temporary data)	Number; type of original data; number of original data; data type; planned deletion time; identifier for whether it can be deleted or not
13	Backup file of subsystem database	Subsystem name; backup time; backup type; data storage position
14	Database backup file	Backup time; backup type; data storage position

5.2.1.2 Standard product table

See Table 12 for contents of standard product table.

Table 12 Standard product table

No.	Name of Elements (Table Name)	Name of Attribute Item
1	Standard scene positioning	Standard scene orbit positioning number, payload identifier, coordinate of longitude and latitude of scene center, coordinate of upper left longitude and latitude of image, coordinate of upper right longitude and latitude of image, coordinate of lower left longitude and latitude of image, coordinate of lower right longitude and latitude of image, image swath
2	Level 0 standard product	Scene serial number, satellite identifier, remote sensor identifier, data resolution ratio at different spectrum bands, imaging side-swing angle, data acquisition time and

No.	Name of Elements (Table Name)		Name of Attribute Item
			processing time
3	Level 2 standard product		Level 2 product serial number, scene serial number, satellite identifier, remote sensor identifier, data resolution ratio at different spectrum bands, imaging side-swing angle, map projection, Earth model, coordinate system, data acquisition time and processing time
4	Level 3 standard product		Level 3 product serial number, scene serial number, satellite identifier, remote sensor identifier, data resolution ratio at different spectrum bands, imaging side-swing angle, map projection, Earth model, coordinate system, data acquisition time and processing time
5	Level 4 standard product		Level 4 product serial number, scene serial number, satellite identifier, remote sensor identifier, data resolution at different spectrum bands, imaging side-swing angle, map projection, Earth model, coordinate system, ground control point, data acquisition time and processing time
6	Level 5 standard product		Level 5 product serial number, scene serial number, satellite identifier, remote sensor identifier, data resolution at different spectrum bands, imaging side-swing angle, map projection, Earth model, coordinate system, ground control point, data acquisition time and processing time
7	Metadata	Auxiliary parameters	Satellite identifier, orbit altitude, orbit inclination, orbit eccentricity ratio, orbit semi major axis, argument of perigee, mean anomaly, Earth model, coordinate system, projection
		Product information	Satellite description, payload description, data quality, distribution service information, data processing organization, data receiving station

5.2.1.3 Application demonstration and thematic product table

5.2.1.3.1 Data element table of application demonstration result database

See Table 13 for data element table of application demonstration result database.

Table 13 Data element table of application demonstration result database

Name	Field
Application demonstration result	Demonstration result number, name and type, committing organization, member of project team, result type, speciality type, project scope, project starting time, project ending time, data source, serial number corresponding to level 2 product, acquisition date, satellite, remote sensor, image map, text report, special map or drawing

5.2.1.3.2 Data element table of thematic product database

See Table 14 for data element table of thematic product database.

Table 14 Data element table of thematic product database

No.	Name	Field
1	Radiance product	Product serial number, serial number corresponding to level 2 product, Path corresponding to level 2 product, Row corresponding to level 2 product, acquisition date, satellite, remote sensor, calibration co-efficient, radiance unit, radiance value
2	Vegetation index product	Serial number of vegetation index product, data source, name of vegetation index, serial number corresponding to level 2 product used in the processing, Path corresponding to level 2 product, Row corresponding to level 2 product, acquisition date, satellite, remote sensor, vegetation index
3	De-correlation stretch product	Serial number of de-correlation stretch product, data source, serial number corresponding to level 2 product used in the processing, Path corresponding to level 2 product, Row corresponding to level 2 product, acquisition date, satellite, remote sensor, de-correlation stretch image
4	surface reflectance product	Serial number of surface reflectance product, data source name of surface reflectance, serial number corresponding to level 2 product used in the processing, Path corresponding to level 2 product, Row corresponding to level 2 product, scene center longitude, scene center latitude, acquisition date, satellite, remote sensor, solar altitude, solar azimuth, atmospheric transmissivity , surface reflectance
5	Surface temperature product	Serial number of surface temperature product, data source, serial number corresponding to level 2 product used in the processing, Path corresponding to level 2 product, Row corresponding to level 2 product, scene center longitude, scene center latitude, acquisition date, satellite, remote sensor, solar altitude, solar azimuth, atmospheric transmissivity, atmospheric irradiance, atmospheric humidity, surface temperature
6	Geo-coding standard image map product	Product serial number, scale, number of topographic map, data source, serial number corresponding to level 2 product, satellite identifier, remote sensor identifier, acquisition date, lower left latitude, lower left longitude, upper left latitude, upper left longitude, upper right latitude, upper right longitude, lower right latitude, lower right longitude, nationwide image mosaic data
7	Sea ice monitoring product	Product serial number, data source, serial number corresponding to level 2 product, satellite identifier, remote sensor identifier, acquisition date, lower left latitude, lower left longitude, upper left latitude, upper left longitude, upper right latitude, upper right longitude, lower right latitude, lower right longitude, image map, text report, special map or drawing
8	Oil pollution monitoring product	Product serial number, data source, serial number corresponding to level 2 product, satellite identifier, remote sensor identifier, acquisition date, lower left latitude, lower left longitude, upper left latitude, upper left longitude, upper right latitude, upper right longitude, lower right latitude, lower right longitude, image map, text report, special map or drawing
9	Land utilization and coverage variation product	Product serial number, data source, serial number corresponding to level 2 product, satellite identifier, remote sensor identifier, acquisition date, lower left latitude, lower left longitude, upper left latitude, upper left longitude, upper right latitude, upper right longitude, lower right latitude, lower right longitude, image map, text report, special map or drawing

5.2.1.3.3 Data element table of train user feedback database

See Table 15 for data element table of train user feedback database.

Table 15 Data element table of train user feedback database

No.	Name	Field
1	User feedback form	Number, time, type , content
2	User application result form	Demonstration result number, result name, committing organization, member of project team, result type, speciality type, project scope, project starting time, project ending time, data source, serial number corresponding to level 2 product, acquisition date, satellite, remote sensor, image map, text report, special map or drawing

5.2.1.4 Data table of calibration site subsystem

See Table 16 for data table of calibration site system.

Table 16 Data table of calibration site

No.	Name	Field
1	Radiometric calibration result of optical camera	Satellite identifier, remote sensor type, quantity of bands, band serial number, calibration date, absolute radiometric calibration co-efficient
2	Geometric calibration result of optical camera	Satellite identifier, remote sensor type, quantity of bands, band serial number, calibration date, geospatial positioning accuracy, spatial resolution, MTF measurement results
3	Calibration results of hyperspectral camera	Satellite identifier, remote sensor type, quantity of bands, band serial number, calibration date, hyperspectral absolute radiometric calibration co-efficient, spectrum precision

5.2.1.5 Target model and background table of surface features

See Table 17 for target model and background table of surface features.

Table 17 Target model and background table of surface features

No.	Name of Elements (Table Name)	Name of Attribute Item
1	Atmospheric target background data table	Time, place, temperature, humidity, visibility, aerosol optical thickness, etc.
2	Geographic information data table	Geographic coordinates, place name, type of surface features, elevation, landform information, geological survey information
3	Standard background image data table	Place, standard remote sensing image and its metadata, classified image map, digital elevation map, etc.
4	Spectrum data of typical surface features	Type of surface features, time, place, reflection spectrum, BRDF (bidirectional reflectance distribution function) data and radiation characteristics data

5.2.1.6 Data simulation and evaluation table

See Table 18 for data simulation and evaluation table.

Table 18 Data simulation and evaluation table

No.	Name of Elements (Table Name)	Name of Attribute Item
1	Data simulation and data format simulation result	Serial number, satellite identifier, remote sensor identifier, simulated product time, data resolution, type of simulated data (image data, format data)
2	Simulated data and image product evaluation results	Evaluation object (simulation product, on-orbit image,etc.) Peak value, mid-value, mean value, variance and brightness value range of image DN value; covariance and correlation coefficient between different bands,etc.
3	Ground test data analysis and processing results	Evaluation object, precision and results
4	Performance evaluation result of payload on-orbit operation	Evaluation object, precision and result; geometric, spectral and radiation characteristics
5	Ground test data before satellite launch	Serial number, satellite identifier, remote sensor identifier, test time and place, laboratory calibration data and results
6	Satellite-ground interface document	Serial number, satellite identifier, remote sensor identifier and data format
7	Test image	Serial number, satellite identifier, remote sensor identifier and image type

5.2.2 Storage management database

See Table 19 for storage management data table.

Table 19 Storage management data table

Storage status information of data file	Data file number; data storage position; data status parameters; data archiving information; online designation; near-line designation; off-line designation; data migration information, etc.
Migration and backup strategies	Migration starting time; migration ending time; on-line time; deletion time; backup starting time; backup ending time, etc.

5.3 Data archiving

5.3.1 On-line, near-line and off-line hierarchical storage technology shall be used for level 0 data and product data. All of browsing data and engineering auxiliary data are online stored.

5.3.2 Online time of level 0 data, standard and thematic product data of optical remote sensor, and overall data near-line storage time shall be set up according to the mission requirements; and the off-line preservation of these data is permanent.

5.3.3 Online and near-line storage time of backup data shall be set up according to the mission requirements, and the off-line preservation of these data is permanent.

5.4 Data reading

The response time of online archived data shall be less than 15s; the response time for the near-line recovery of scene data to disk array shall be less than 2min.

5.5 Data backup

By means of the backup and copy software the product data generated by ground processing system are copied to the backup zone in real time, and the backup database are updated synchronously. If the

ground processing system encounters disasters, the archived data and business database may be recovered by means of the backup and copy software after the troubleshooting. Management process of data migration within the backup zone is similar to that within data storage zone.

5.6 Data recovery

See Table 20 for product recovery information sheet.

Table 20 Product recovery information sheet

No.	Field Name and Description
1	Recovery ID
2	Scene serial number
3	Product serial number (defaulted as 0)
4	Product level (0,2,3,4)
5	Recovery starting time
6	Recovery ending time
7	Satellite identifier
8	Remote sensor identifier
9	Receiving station identifier
10	Mission number
11	MSP mission number
12	Priority: 0-9; default value is 5
13	Storage status: successful, pending (default), in progress, failed
14	Update PP status: default: PENDING, failed: FAILED, complete: COMPLETE
15	Dataset number
16	Scene quantity
17	Description
18	Type of mission

Annex A

(Normative)

Product level and data specification of land observation satellites

See Table A.1 for product level and data specification of several kinds of land observation satellites that are commonly seen at home and abroad.

Table A.1 Product level and data specification of land observation satellites

Satellite Platform	Product Level	Data Specification
Landsat TM	Level 1	Data product, the radiometric corrected, but not yet systematically geometric corrected.
	Level 2	Data product, the corrected image mapping into the designated map projection coordinate through the radiometric correction and systematically geometric correction. It is also referred to as system correction product.
	Level 3	Data product made by the radiometric correction and systematically geometric correction, while using the ground control point to improve the geometric accuracy of products. It is also referred to as accurate geometric correction product.
	Level 4	Data product made by the radiometric correction, systematically geometric correction and accurate geometric correction, while using the digital elevation model (DEM) to rectify the optical parallax caused by hypsographic feature. It is also referred to as elevation correction product.
SPOT	Level 1A	Product, the radiometric correction processed and containing the auxiliary data applied for the subsequent geometric correction.
	Level 1B	Product, the Level 1A radiometric corrected and systematically geometric corrected.
	Level 2A	Product mapping the image to the given map projection coordinate system.
	Level 2B	Product introducing ground control point GCP and generating image with high geometric accuracy.
RESOURCESAT-1	Level 1	Product, only the radiometric corrected. It can be standard scene, mobile scene and stereopair product.
	Level 2	Product, the radiometric corrected and systematically geometric corrected.
	Geo-reference product	i.e. North-arrow product of standard scene, mobile scene, sub-segment and 1/4 scene.
	Geocoding product	i.e. 10'x10', 15'x15' , 7.5'x 7.5' north-arrow sub-segment product.
ASTER	Level 1A	Data, extracted and arranged in order, but not subjected to the radiometric correction and geometric correction. However, these data are attached with correlation coefficient, without map projection.
	Level 1B	Product, the Level 1A radiometric corrected and systematically geometric corrected.
	Thematic products	Relative spectrum reflection coefficient product; relative spectrum reflection coefficient VNIR product; relative spectrum reflection coefficient SWIR product; surface radiation coefficient VNIR product; surface radiation coefficient TIR product; surface radiation coefficient SWIR product; surface reflection coefficient VNIR product; surface reflection coefficient SWIR product; surface temperature product; surface emissivity product; orthoimage product; relative elevation data product.

Satellite Platform	Product Level	Data Specification
BJ-1	Level 1 product	Standard scene image after the systematically geometric correction.
	Level 2 product	Standard scene image after the systematically radiometric correction and geometric correction.
	Accurate geometric correction product	Product data subjected to radiometric correction and systematically geometric correction, while using ground control point to improve the geometric precision of products; the geometric precision of accurate geometric correction product depends on the availability of ground control point.
	Orthorectification product	Product data subjected to radiometric correction, systematically geometric correction and accurate geometric correction, while using digital elevation model (DEM) to correct the parallax caused by hypsographic feature; the geometric precision of elevation correction product depends on the availability of ground control point and DEM data resolution.
	Integrated product	Integration of 4m resolution full-color product and 32m resolution multi-spectral product (4m full color and 32m multi-spectral data can be acquired at the same time and place).
QuickBird	Basic product	Product, only the radiometric corrected, geometric corrected inside the remote senor, optical distortion and remote sensor corrected, without geo-reference and map projection. It is counted by scene.
CBERS	Level 1 product	Data product, radiometric corrected but not yet geometric corrected. It is also referred to as radiometric correction product.
	Level 2 product	Data product, the corrected image mapping into the designated map projection coordinates through the radiometric correction and systematically geometric correction. It is also referred to as systematically geometric correction product.
	Level 3 product	Data product, made by the radiometric correction and systematically geometric correction, while using ground control point to improve the geometric accuracy of product.
	Level 4 product	Data elevation correction product, made by the radiometric correction, systematically geometric correction and accurate geometric correction, while using DEM to correct the parallax caused by hypsographic feature.
	Level 5 product	Standard seamless mosaic image product.
	Thematic products	Satellite radiance product; vegetation index product; de-correlation stretch product; surface reflectance product; surface temperature/surface emissivity product; geo-coding standard image product; snow-ice covering monitoring product; ocean oil pollution monitoring product; land cover and change product.
	Standard product	Product that used the rough DEM to correct terrain error, has the geo-reference and map projection, and has hade the radiometric correction and correction of system error caused by remote sensor and satellite platform. It is counted by area.