HERSCHEL / PLANCK

Computer Aided Design (CAD) Data Exchange Rules H-P-1-ASPI-TN-0211

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DATA MANAGEMENT:

Entité Emettrice : Alcatel Space - Cannes
(détentrice de l'original)

1. HERSCHEL/PLANCK	**DISTRIBUTION RECORD**

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ESA		**HP team**	**X**
ASTRIUM			
ALENIA			
CONTRAVES			
TICRA			
TECNOLOGICA			
		Clt Documentation	**Orig.**

ENREGISTREMENT DES EVOLUTIONS / *CHANGE RECORDS*

ISSUE	DATE	§ : DESCRIPTION DES EVOLUTIONS *§ : CHANGE RECORD*	REDACTEUR *AUTHOR*
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2. SCOPE

This Technical Note is to define the methods that must govern CAD data exchanges between ALCATEL-Cannes and its Co-Contractors or Subcontractors if time waste, data loss, or even unecessary work are to be avoided.

3. THE C.A.D. TOOLS AT ALCATEL CANNES

The data exchange methodology defined herein has to take into account the CAD resources available at ALCATEL's Cannes, as well as the associated modeling and operating methods in current use here.

TOOLS	MODELING	PROGRAM PHASE	REMARKS
CATIA-V420	- Faceted solids - Exact solids	- Architectural analyses - design- Milling -Drilling	**Main tool at ALCATEL Cannes facility**
CADDS5 Rev 8.1	- solid modeling	- Design - Architectural analyses	Used only for inertial wheels
interface softwares CATSET or SETCAT	- Wireframe, surface (or Mock-up solids) modeling	Design	based on SET See below an explanation *
CATIGE or IGECAT	- Wireframe, surface or volume modeling- Details and solids are not transfered.	Design	Based on IGES See below an explanation *
CATSTP or STPCAT	- Wireframe, surface or solid modeling	Design	Based on STEP-AP203 See below an explanation *
CATDXF or DXFCAT	- only draw elements- - all elements	Design	
SET or IGES included in CADDS5	- Wireframe modeling - surface modeling	Design	
Neutral Standards SET:	**Specifications** AFNOR Standard Z68300 June 89		This standard is included in ProEng
IGES	V5.1 specification		This standard is included in ProEng
STEP -AP203	ISO Standard		

SET : "**S**tandard d'**E**change et de **T**ransfert": French AFNOR Standard.
IGES : "**I**nitial **G**raphics **E**xchange **S**pecification" .
STEP : " **ST**andard for **E**xchange of **P**roduct model data" : Standard of International Standard Organisation (ISO) .

4. DEFINITION OF EXCHANGEABLE DATA

For any exchange between two companies, it shall be agreed which data are necessary and sufficient w.r.t. the receiver.

The receiver shall specify its requirements and come to terms with the transmitter. Utmost care shall be paid to such joint definition, as the more restrictive the definition, the more fruitful and the faster the exchanges will be.

A CAD model may contain either the following two definitions :

- a self contained unit
- alternatively, a layout (panel, feed, ...)

For a self-contained unit, the database shall contain only the following elements:

- One solid (or volume) made with **simplified** outline dimensions
- such unit's attachment points, with the type of junction (diameter of holes, threading, thickness to tighten...)
- the unit's "footprint"
- the connector's locations and orientations (e.g. a connector's knee)
- the grounding point's location. **They must be located on the XY plane such as all the coordinate values are positive. The (0,0,0) coordinate point is the reference point of the self-contained unit. Z axis is the height axis.**
- velcro's locations over the unit
- the areas allocated to thermal control devices and to harness
- COG location, inertial values w.r.t. the unit's reference frame
- position of the unit's reference frame
- definition of the fields of view, if needed.

The above list may be further complemented by ALCATEL Cannes.

For a layout, the satellite's reference frame shall, to a possible extent, be selected as the working reference frame and the parameters listed here-above shall be indicated for each individual unit.

5. EXCHANGE MODELING

5.1 CHOICE OF DATA SOFTWARE TOOLS

Which software tool shall be used to exchange data depends on both the transmitter and receiver autorities.
If the transmitter's data are built from the same software as the receiver's, then this software tool shall be used.
On the opposite, if the software tools differ for the transmitter and receiver, then one of the SET, IGES , DXF or STEP standards shall be used.

5.2 CASE OF IDENTICAL TOOLS

When the two industrialists' tools are identical, modeling may be as below:

SOFTWARE	MODELING
CATIA CADDS	Wireframe/Simple Surfaces/**solids** Wireframe/Simple Surfaces/**solids**

Simple surfaces are ruled surfaces or revolution surfaces.

For **Catia**, if sender's version is greater than the receiver's, sender can use Catia but has to run previously a CATBACK utility (see §1 of appendix 1).

For **Cadds**, if sender's version is greater than the receiver's, sender has to delete elements which are not readable in this version.

5.3 CASE OF DIFFERING TOOLS

When the two industrialists' software tools differ, the data exchange shall be performed using one of the four neutral standards: SET, IGES, DXF or STEP.

For ***IGES***, the neutral file will transmitt **accurate wireframe or simple surfaces**. Such modeling switch, which involves significant work, is dictated by the restrictions imposed by this standard.

Using ***SET*** can, sometimes, transfer **solid modeling** but a test must be performed, previously.

STEP is the new way to exchange and ALCATEL Cannes facility can use it with Catia. Nevertheless, a test must be performed before each type of transfer such as **solid modeling, wireframe modeling,....**

6. EXCHANGE SUPPORT

See Appendix 1 hereto : "Incoming of CAD models at ALCATEL CANNES".

7. DATA DISTRIBUTION IN SOFTWARE

Exchangeable data may be quite numerous. If data recognition is to be made easier for the receiver, some methodology for allocation of entities through known layers has to be enforced, wherupon the transmitter will transmit the selected allocation.

8. MANAGEMENT OF MODELS

The computerized data shall describe a C.A.D model to be managed in terms of configuration. Every model shall be ascribed an index. Any modification of the data shall be made within a new database that is told apart from the previous one by a different index. The variations in associated deliveries shall be described (see section 8 hereafter).

When a model is modified, only changes shall, to a possible extent, be delivered (modified elements to be substituted), except for sizeable modifications.

9. ASSOCIATED DELIVERIES

A paper printout of this computerized data shall be furnished as a reference (generally a paper drawing) for first comments (this shall be a copy of data, i.e. at the same index). The referenced magnetic support shall be furnished complete with a sheet carrying the name of the model recorded on the support (see Appendix 2). A descriptive note shall be provided to give the allocation of layers, the list of details, assembling method,....

- Such description shall be provided in three different ways:
- with CATIA : information added with FILE/COMMENT function
- with CADDS :

  creation of a so-called "COMMENT" text file located at same level as the "Part", indicating the changes.

  creation of a so-called "LAYER" draw, giving the allocation of layers
- with SET, IGES, DXF or STEP, an additional sheet (see Appendix 3) shall be sent in order to give the transfered entities from the CAD model, to the neutral file. With such a sheet, receiving people can fill it out and appreciate what and how many entities have vanished during the global transfer.

10. SIZE OF EXCHANGED MODELS

Depending on which of the 3 types of data accepted at Cannes is used, the upper limits on size vary as follows:

- for CATIA: size of models not to exceed the following Catia parameters:
  - catia.MODEL_KBYTES.MAX_ACTIVE_INDEX = 15 000
  - catia.MODEL_KBYTES.MAX_ACTIVE_DATA = 25 000
  - catia.MODEL_KBYTES.TOTAL_OVERLAY = 17 000

  Reminder: It's not allowed to destroy CSG tree of solids, even if you want to reduce the size of the model but it will be better to split your initial model in many units.

- for CADDS: the CADDS file must be less or equal to 20 M bytes.

- for data in SET, IGES, DXFor STEP format, the limit on transmitted entities is set at 10,000. The neutral file data shall come completed with the count given by that interface for each data transfer.

Any excess over these values shall require approval by the receiving team at Cannes.

11. MODEL COMPRESSION

The transmitted model shall contain only the strictly required elements. It shall be expurgated of every superfluous detail, cleaned and compressed by the sender. All entities used during construction of model will be canceled (points, lines, axis, transformation, intermediate solids,...).

Prior of data transmission, the following shall be ascertained:

For CATIA:	- no unused details - no double detail (name beginning with $) - no unnecessary elements in the "No-show" and in the "No-pick" - no unnecessary "DRAFTs"
For CADDS:	- no "Blank" entities or views - proper execution of the following commands : SORT DBA CHECK DBA PACK DBA ALL
For SET IGES, DXF or STEP:	- transmitted model reduced to the agreed bare minimum.

Files compression tools:

For Unix format, "compress" and "uncompress" commands can be used in ALCATEL facility.
For DOS format, WINZIP 7.0 tool can be used in ALCATEL facility.

12. UNIT SYSTEM

The values expressed in the software tool shall be the SI system, except for:

- the unit length, which shall be the millimeter (as routinely used in CAD),
- inertia, which shall be expressed in kg.mm2.

13. NON CONFORMING DATA

When the data do not conform to the above rules, the ALCATEL Program Manager, upon advice from the receiver team, may ask the CAD model suppliers for a further delivery that abides the said rules. The initial data shall then be regarded as void.

APPENDIX 1

INCOMING OF C.A.D. MODELS AT ALCATEL CANNES

Our Co- and/or Sub-Contractors shall be required to adhere to either of the following delivery possibilities if CAD models are to be reliably transmitted to ALCATEL CANNES.

These recommandations are given for Co and subcontractors when they want to export data to ALCATEL-Cannes**; in the same way, ALCATEL's delivery must be compliant with them.**

A data-supporting magnetic tape, cartrige, diskette or CD-ROM shall be delivered, along with the magnetic-support CAD data transmission format shown hereafter.

Depending on which of the available data transfer tools is used, the different possibilities subdivide as follows:

1- CATIA SOFTWARE

For **Catia-V4**, the model must be checked to comply with CatiaV4.20 target version. In case of necessity, the sender must run a "**catdata catback"** utility to ensure data compatibility with the targetted version.
Exchanging **native** catia files (i e .model , .session files) is **strictly prohibited**. According to Dassault Systèmes exchanges rules, this kind of transfert is **NOT** cross-platform and sites exchange compliant.
All data must be sent in one (or more) sequential file using "CATEXP" utility .
"catdata" utility is prohibited.
Use the following Catia parameters:

Transfer mode = EXPORT
Drop links = YES
List references = NO

All data must be compliant with ISO8859-1 code-page to allow cross platform exchanges. ASCII-DS code-page must be avoided.
In case of necessity, the sender must run a **"CATAIX"** utility to convert its data to **ISO8859-1** code-page before sending them to ALCATEL.

For Catia-V3, the sender must run a "CATEXP" utility with Catia parameters:
'EXPORT-DROP LINK NO-REFER NO'.

The file shall be copied on the following support (best solutions):

- 1/4", medium-density cartridge at 150Mb (type DC6150),
- Exabyte 8mm tape cartridge at 2.3 Gb or 4.6Gb, compressed or not compressed
- 4mm DAT tape cartridge (90m or 120m) DDS-2 or DDS-3
- DLT 4000 (or lower)

It could be :

- CD-ROM
- 3.5" floppy disk formatted at 1.44 Mb - DOS or Unix format (not reliable solution) .

For Unix format, copy the created file by the following commands:

tar -cvf /dev/xxxx exp1 exp2 ..... expn
Expected standard blockage of 20.
Expected Byte Order is Big Indian.
Where xxxx is the driver of the concerned magnetic peripheral, and expn is the result of CATEXP command.

For many transmitted files, attention shall be paid to putting possible further export files on one tarfile only, to the extent possible.

2- CADDS5 SOFTWARE

Here, we suppose that co and subcontractors use CADDS5 software on the UNIX Workstation (common configuration now).

Delivery shall mandatorily include the model's main (_pd) file, and, as systematically as possible, all of a CADDS database's constituent files (Draws, _proc, _td, _nfig, etc...), i.e. all of the files below a CADDS5 Part's lowest descriptive directory level, exclusive of the temporary files (.TEMP, .LOCKW).

The support utilized can be (best solutions):

- 1/4", medium-density cartridge at 150Mb
- 8mm tape cartridge at 2.3 Gb or 4.6Gb, compressed or not compressed
- 4mm DAT tape cartridge (90m or 120m) DDS-2 or DDS-3
- DLT 4000 (or lower)

It could be :

- CD-ROM
- or a 3.5" floppy disk formatted at 1.44 Mb (not reliable solution) .

All of the data shall be preferably regrouped on a tarfile saved by the command:

tar -cvf /dev/xxxx file1 file2... filen

Expected standard blockage of 20.
Expected Byte Order is Big Indian.
Where xxxx is the driver of the concerned magnetic peripheral.

3- OTHER SOFTWARE TOOLS

For any other software tools than CADDS or CATIA, the SET, IGES, DXF or STEP format are accepted for 3D description, exclusive of any other (PDES, VDA,...). DXF format can also be used for drawing .

To contain the ASCII-coded neutral file, the support can be:

- 1/4", medium-density cartridge at 150Mb (type DC6150),
- 8mm tape cartridge at 2.3 Gb or 4.6Gb, compressed or not compressed
- 4mm DAT tape cartridge (90m or 120m) DDS-2 or DDS-3
- DLT 4000 (or lower)

It could be :

- CD-ROM
- or a 3.5" floppy disk formatted at 1.44 Mb (not reliable solution) .

ALCATEL's people will choose this way if the received software is neither CATIA nor CADDS.

4- PACKAGING

In all cases, the tape or the disk shall be played back prior to ALCATEL CANNES and a paper printout of its content (generated during such playback) shall be enclosed with the magnetic support. The "medium" shall be protected from writing.

APPENDIX 2

Date:

Distribution
ALCATEL:
Messr:

COMPANY:
Messr:

****
TRANSMISSION OF C.A.D DATA ON MAGNETIC SUPPORT
****

TRANSMITTER	:
RECEIVERS	:
Name of Supervisor	:
Approval of Supervisor	:
Technical contact for magnetic tape	:
Classification level	: NC - DR - CD - SD - CA - SA (1)
Support	: 1/4" tape - 8mm tape - 4mm tape - DLT - CD-ROM - 3.5" diskette
Format	: DOS - UNIX
File Type	:CATIA - CADDS - SET - IGES - STEP - DXF
Names of Tape-Stored Files	:
Compression tool	: - NO - YES - COMPRESS - WINZIP
C.A.D software tool	:
Version, Revision	:
Computer platform	:
O.S. Version, Revision	:
Tape N°	:
Date of Recording	:
Tape-writing command	:
Recommended tape-readind command	:

(1) NC: Not Classified, DR: Restricted Diffusion, CD: Confidential Defence, SD: Secrete Defence, CA: Confidential ALCATEL, SA: Secrete ALCATEL)

APPENDIX 3 : Elements description

Date :

Distribution
ALCATEL :
Messr :

COMPANY :
Messr :

****
TRANSMISSION OF C.A.D DATA: ELEMENTS DESCRIPTION IN NEUTRAL FILE
****

ELEMENT DESCRIPTION	SENDING CAD MODEL	RECEIVING CAD MODEL
Point line and line segment Curve Composite curve Plane Surface Face Volume 3-axis system Transformation Solid text and note solid polyhédrique Détail Dimension Circle Ellipse Parabola Hyperbola Spline poly-surface Edge Arc		

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