VENUS-EXPRESS: A CONTRIBUTION TO A LONG-TERM ARCHIVING PROCESS

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SUMMARY

- THE VENUS-EXPRESS MISSION
- THE ARCHIVING CONTEXT
- THE EXPERIMENT ASPERA-4 CONTEXT
- THE PDS FORMATTING PROCESS
- THE SOFTWARE DEVELOPMENT
- THE EXPLOITATION

THE VENUS-EXPRESS MISSION

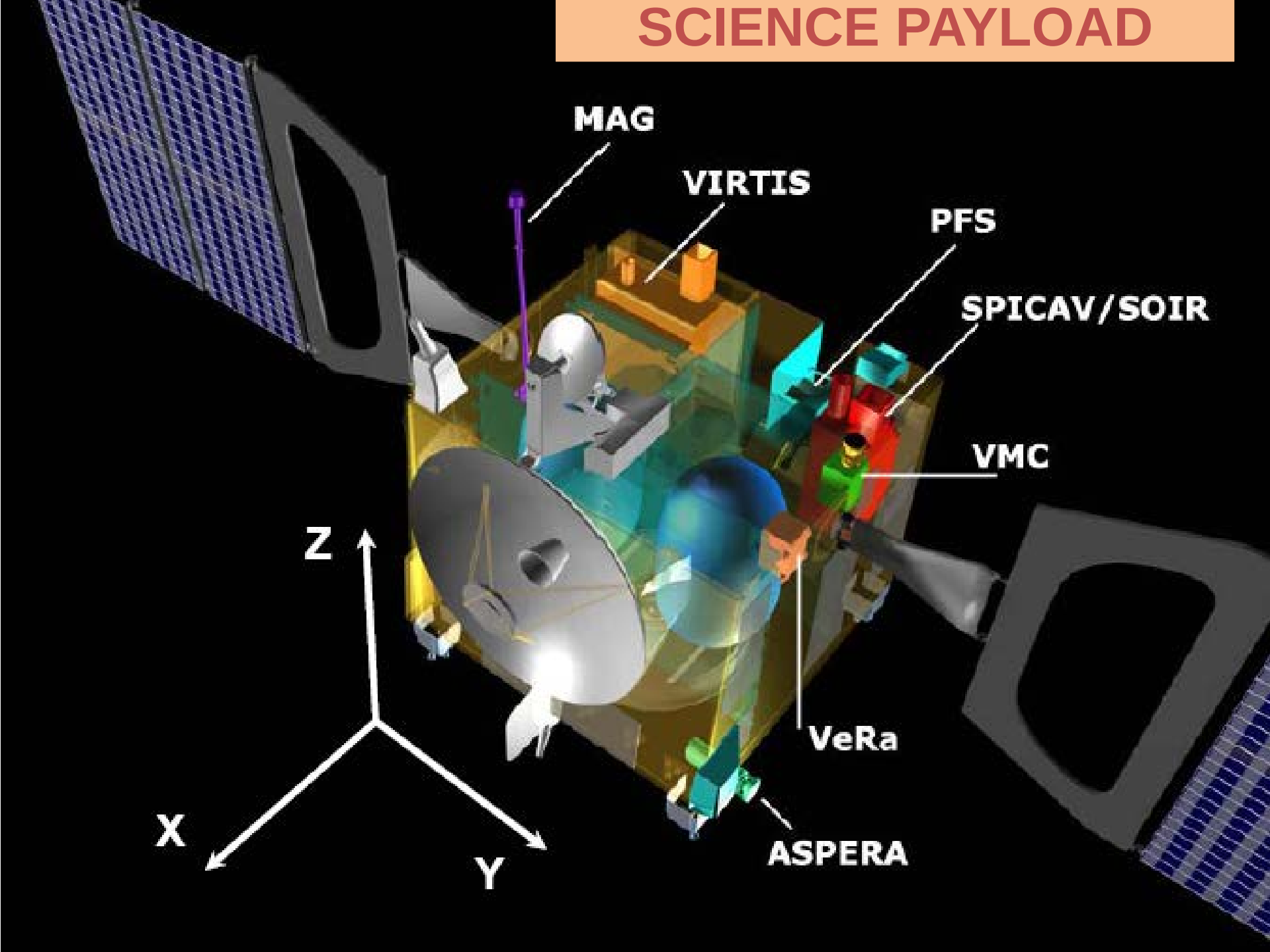
Venus EXpress (VEX) is ESA's first mission on Venus. It deals with the global observation of the planet (ionosphere, upper atmosphere, lower atmosphere and surfaces).

- 8 countries participated in building 7 specific instruments. French laboratories have contributed to 3 experiments of this mission :
  - The supply of 2 scientific instruments : VIRTIS (Visible and InfraRed Thermal Imaging Spectrometer) and SPICAV (SPectroscopy for the Investigation of the Characteristics of the Atmosphere of Venus)
  - A participation in the development of the third : ASPERA-4 (Analyser of Space Plasmas & EneRgetic Atoms)
- CNES supports the scientific teams for the analysis of these experiments and particularly for the PDS formatting of the ASPERA-4 data

THE VENUS-EXPRESS MISSION

•Mission approbation	November 2002
•Main Mission	
• Launch	November 2005
• Insertion in Venus orbit	April 2006
• 1st observation phase	May 2006 - Oct. 2007
• Extended missions	
• 1st extension	Oct. 2007 - May 2009
• 2nd extension	Jun. 2009 – Aug. 2010
• 3rd extension	Sep. 2010 - Dec. 2012
• 4th extension	Jan. 2013 - Dec. 2014
• 5th extension (TBC)	until end of 2015
• End of mission	End of 2015

SCIENCE PAYLOAD



ARCHIVING CONTEXT

ESA standards for all planetary projects:

- Data archiving in the PSA (Planetary Science Archive) using the PDS standard
- The archiving is under the strict responsibility of the PI laboratory

ARCHIVING : THE PDS STANDARD

The PDS standard provides guidelines to construct a data set suitable for long-term archiving based on requirements in terms of data set structure and documentation.

- For a data set, the PDS standard imposes a well-defined directory structure :
  - An arborescence with a root directory and, under it, a few files along with 7 directories which include the following 4 obligatory directories :
  - A directory "DATA" for the data products ; the data organisation is free (by time, by scientific thema, …). Each **data product** must be labelled in ASCII with full details on the structure and content of the product. The **label** can be attached to the data file itself or detached in a separate 'label' file with the suffix LBL
  - A directory "CATALOG" : it's a set of plain ASCII formatted files that contain top-level information on key aspects of a data set. Among which, 7 are obligatory
  - A directory "DOCUMENT"
  - A directory "INDEX"
- A specific document for ASPERA-4 : the EAICD containing a lot of informations about the experiment, the data, the calibration value, …

EXPERIMENT ASPERA-4 CONTEXT

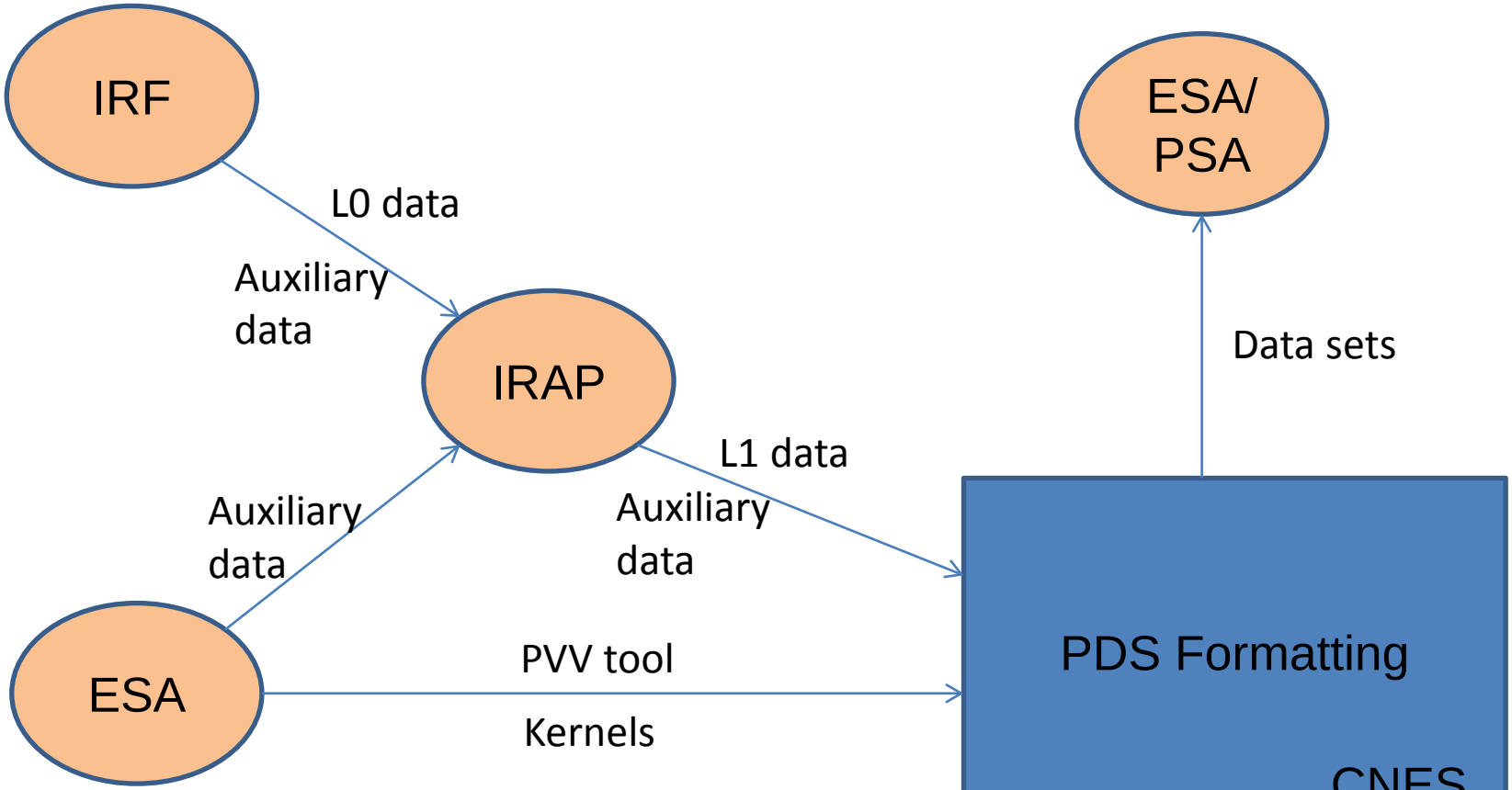
The experiment ASPERA-4

- ASPERA-4 is an IRF (Sweden, PI : S. Barabash) experiment with French participation (IRAP, Co-PI : J.A. Sauvaud))
- It's composed of 4 instruments : ELS, IMA, NPD, NPI

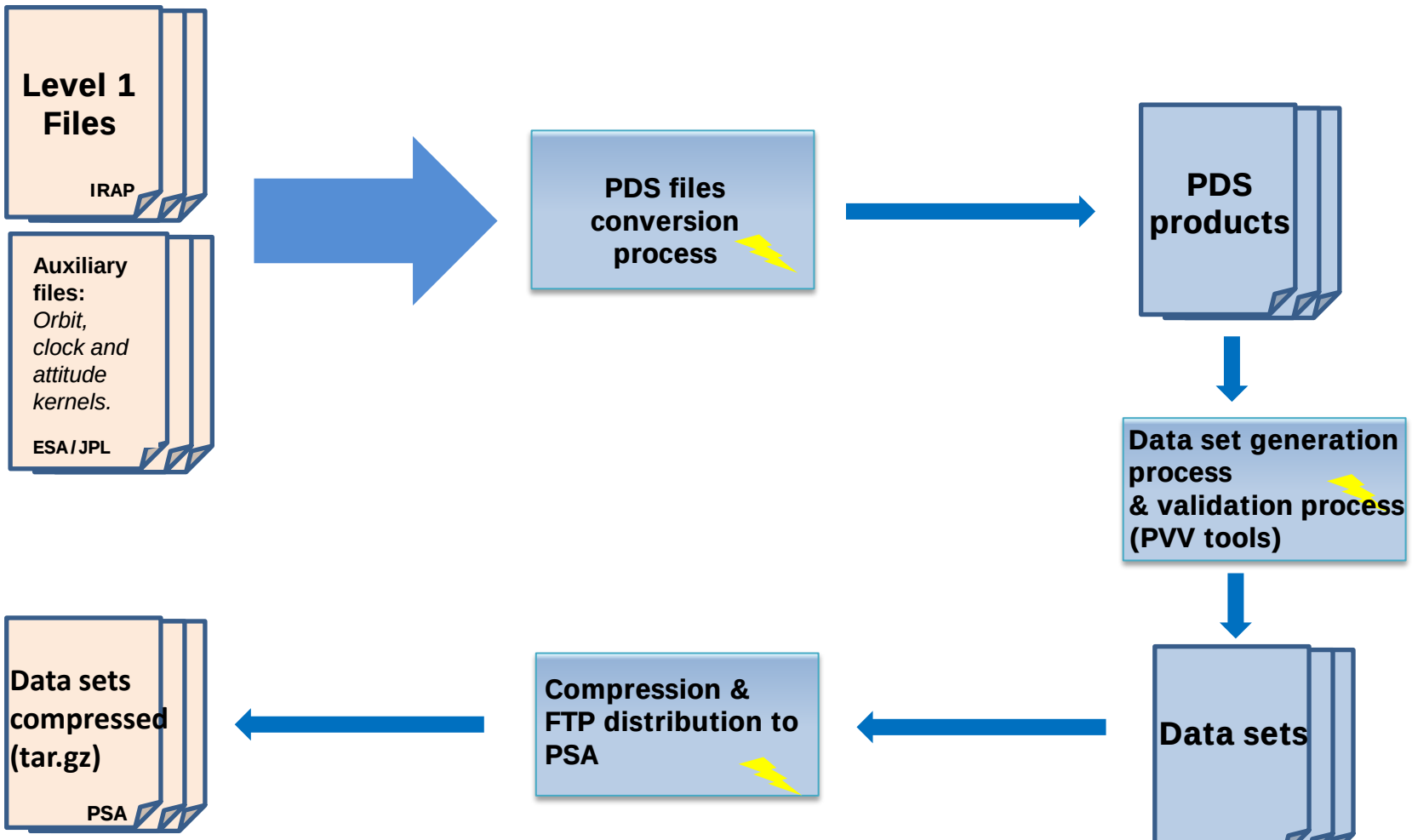
Context of the CNES participation :

- Delegation of the data L1 treatment responsibility by the PI (IRF) to the Co-PI (IRAP)
- Delegation to CNES by IRAP of:
  - The development and the maintenance of the software making the PDS formatting of the L1 data produced by IRAP
  - The exploitation of this software and of the transfer of the data set generated to PSA

THE ASPERA-4 DATA PROCESSING



THE TASKS OF PDS FORMATTING



CNES ACTIVITIES

The ASPERA-4 data processing center realises the following tasks :

- Data sets creation (PDS arborescence + EAICD document) for each of the 4 ASPERA-4 instruments (ELS, IMA, NPD, NPI)
- Data sets validation with the PVV tool provided by ESAC
- Transfer to l'ESAC of the data set generated

Exploitation context :

- The software exploitation is done on the IRAP computer from remote stations located in CNES
- The treatment unit is a "release" : a 3 month period of L1 data
- Releases **must be** processed in the chronological order
- The data treatment of a release can only start 3 months after the last day of the release
- The exploitation is done, instrument by instrument, every quarter

THE INTERFACES

Laboratories :

IFR (Sweden)	PI
IRAP (France)	Co-PI, provider of the L1 data and of the exploitation computer

CNES

DSI	Network interface, remote stations, security

Subcontracted companies

Cap Gemaini/Steria	Software exploitation, since 2009
Akka	Software maintenance, since 2012
Apave	Quality support

SOFTWARE DEVELOPMENT REVIEW

Development of the software 1st version : 2006-2007

→ problem with the variable format chosen for the data

Development of the software 2nd version : 2007-2008

ESA Peer Review process : June 2008 – February 2009

→ software corrections and evolutions : August - December 2009

Evolutions required by PSA : end of 2009

→ New software version : May 2010

Beginning of the operational exploitation : 7th June 2010

→ Catching up from June to September 2010 of the late data (11/2005-05/2010)

PLANNING OF EXPLOITATION

Phase	Period	Processing Period	Processed Instruments	Compressed Volume
Main mission	09/11/2005 02/10/2007	June - July 2010 : Exploitation of release 1 à 6	ELS,NPI,NPD,IMA	8,3 Go
Ext.1	03/10/2007 31/05/2009	July - August 2010 : Exploitation of release 1 à 7	ELS,NPI,NPD,IMA	11,3 Go
Ext.2	01/06/2009 31/08/2010	August - December 2010 : Exploitation of release 1 à 5	ELS,NPI,NPD,IMA	8,6 Go
Ext.3	01/09/2010 31/12/2012	April 2011 to April 2013 : Exploitation of release 1 à 9	ELS,NPI,NPD,IMA	13 Go
Ext.4	01/01/2013 On going	June - July 2013 : Exploitation of release 1	ELS,NPI,NPD,IMA	0,85 Go

This week, we have begun the processing of the 2nd release of the extension 4

CONCLUSION

The archive for ASPERA-4 in the PSA is currently

up to date

For any other information, please contact me at :

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Thank you