



EAST/DEBAT WORKSHOP
DEBAT : overview and objectives
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I - Context

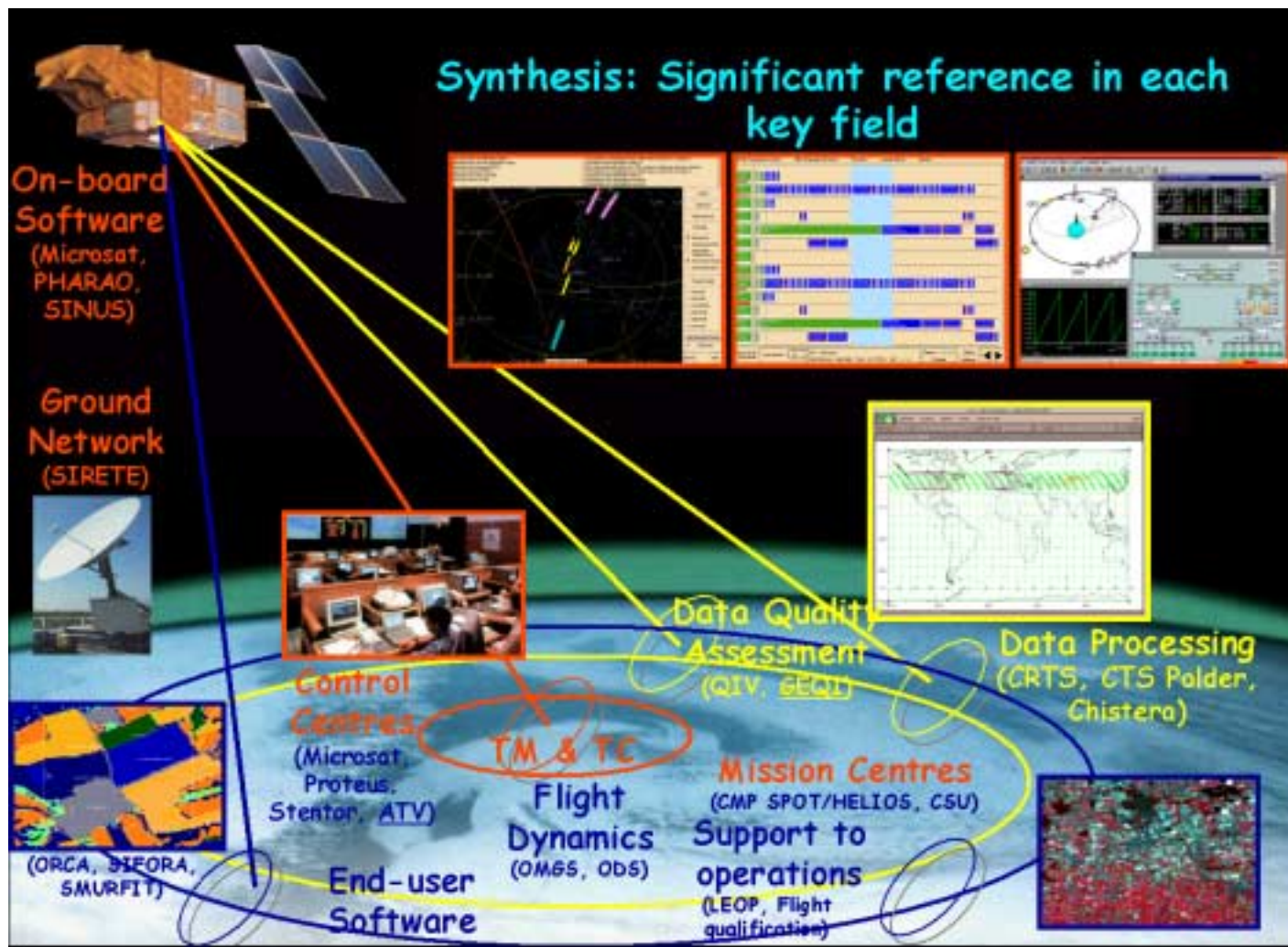
I - Context

- DEBAT is funded by an ESA GSTP program
- Joint effort of ESA, CNES (originator of EAST technology) and CS SI
- Started in September 2002
- Will last until April 2004 (18 months)
- Developments carried out by the 'Space Studies' department within the Space Division of CS (France)

I - Context - "CS Space Division"

■ Key aspects of our activities

- 25 years of experience in the space and aeronautics fields
- CS SI involved in all major French programs
- 700 people in Europe specifically focused on the Aerospace activities (400 in the space field)
- Involvement in all phases of programs lifecycle



I - Context

- **Standards:** CCSDS standards (EAST, DEDSL, CAO, OAIS)
- **Technologies:** JAVA, XML, ADA (C, FORTRAN)
- **Philosophy:**
 - to build on the knowledge and capitalised experience gained during previous developments (CNES, CS SI and ESA) being carried out for several years
 - to take advantage of the lessons learned from current/past EAST user projects (limitations, expectations)
 - to take into account new requirements (coming from the analysis of a range of selected projects/missions) and forthcoming requirements

I - Context - User group

- The **DEBAT user group** is set-up in co-operation with ESA and CNES.
- It is intended to provide all the project long and **from an end-user point of view**:
 - its appraisal and assessment of the orientations given to the DEBAT tools (envisaged changes, critical choices),
 - some suggestions, needs or expected enhancements to be taken into account in the frame of DEBAT or in future areas of work,
 - its evaluation of the final tools and results

Members

Nestor Peccia	ESA
Gian Maria Pinna	ESA
Eric Monjoux	ESA
Michel Nonon-Latapie	CNES
Françoise Schiavon	CNES
Thierry Guinle	CNES

EAST expert

Denis Minguillon	CNES
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Coordinators

Alessandro Ciarlo	ESA
Carlos Guerreiro	CS SI

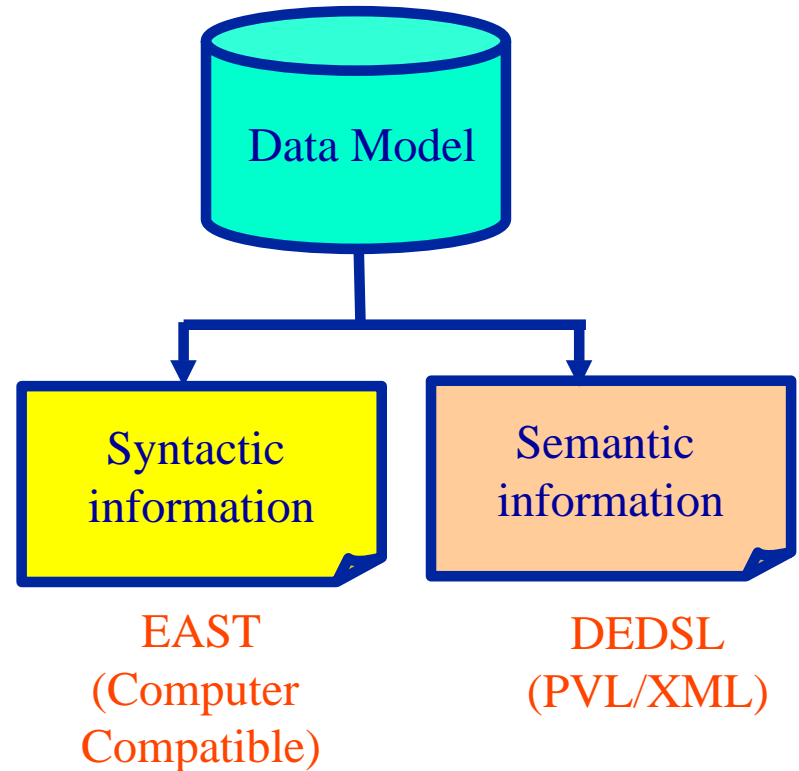
I - Context - EAST technologies

- Relies on two international recommendations :
 - **EAST** designed in the framework of CCSDS Panel II (CCSDS 644.0-B-1 and ISO 15889:2000)

EAST is designed to create non-ambiguous descriptions of data formats including syntactic (logical and physical) information down to whatever level of detail required (bits level if needed).

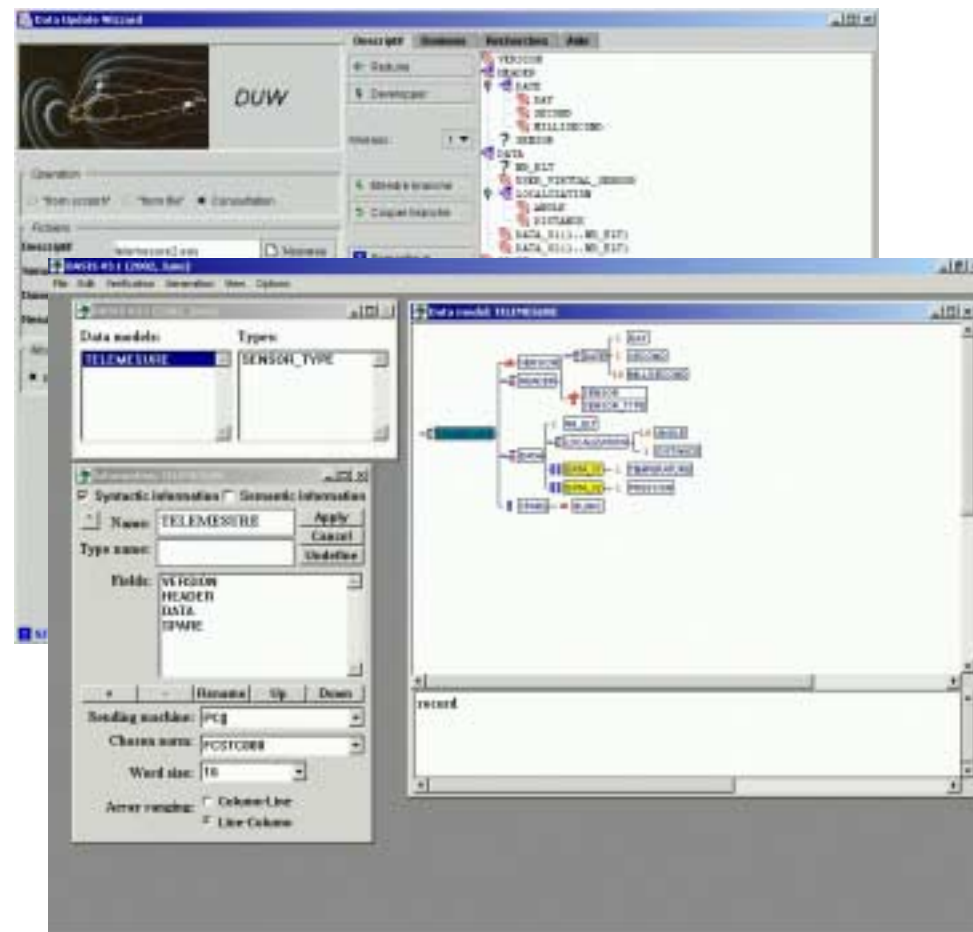
- **DEDSL** (Data Entity Dictionary Specification language) designed in the framework of CCSDS Panel II.

DEDSL allows to add semantic information to data (describing the "meaning of the data")



I - Context - EAST technologies

- Provides a **suite of generic tools** to support the data life cycle:
 - Modelling : OASIS
 - Producing/Simulating : DUW
 - Processing : Interpreter/Generator
 - Checking : Data_Checker



I - Context - EAST technologies

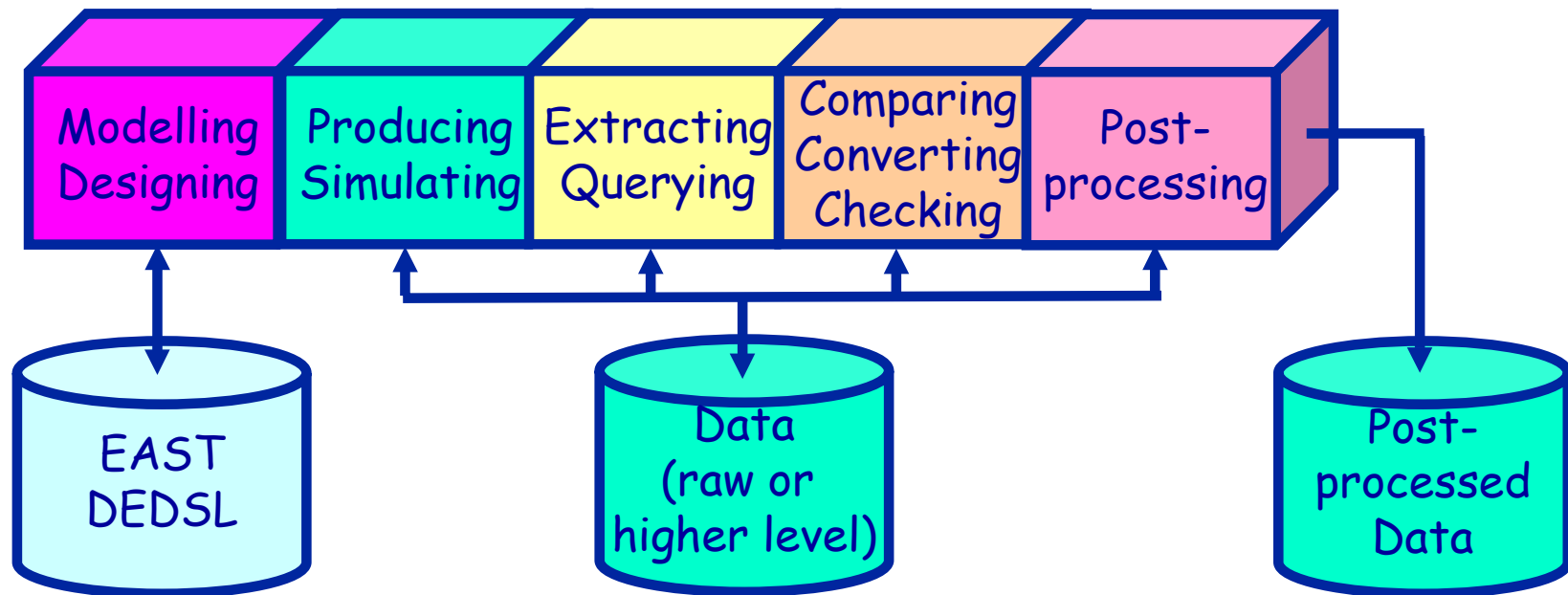
- Making data life cycle easier
 - providing a suite of tools for all phases of data handling, allowing to process data with almost no developments
- Ensuring long-term data preservation
 - being free from non perennial file formats, and using a well defined formalism (instead of textual descriptions like Word or PDF documents) with a computer compatible format (ADA subset, PVL, XML)
- Adding value to data
 - with possibilities to define "data about data", i.e. syntactic and semantic metadata allowing an easier understanding of the data by human-beings or computers and adding real value to the data



II - Objectives

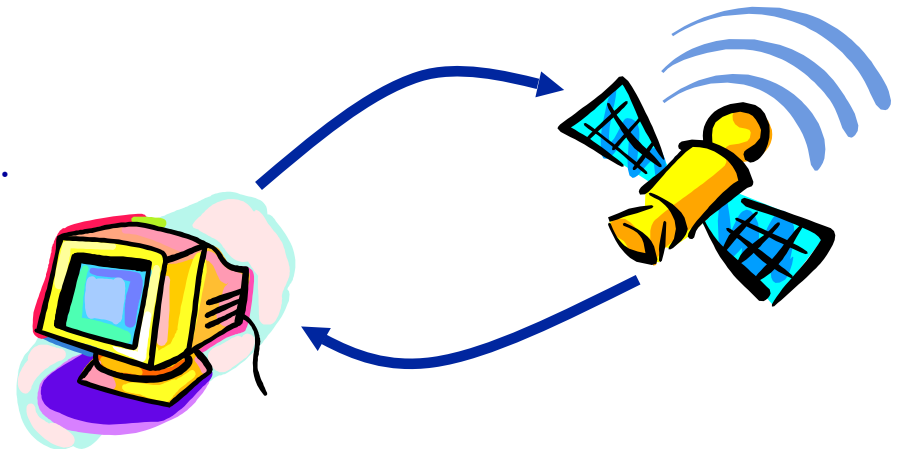
II - Objectives - « Describe once, run everywhere »

- The main objective of the DEBAT (Development of EAST Based Access Tools) project is to build a set of enhanced tools based upon EAST technology **covering the entire data life cycle**



II - Objectives - « Describe once, run everywhere »

- Another objective is to promote and diffuse DEBAT tools family and concepts.
- Two majors axes of work
 - Enhancement and evolutions of existing tools
 - This covers OASIS and others EAST based tools and also the EAST language.
 - The final results of these developments are expected to be high quality software.
 - TM/TC fields of application
 - To cover the application of EAST technologies to TM/TC processing.
 - To provide the "proof of concept"
 - connections to SCOS-2000



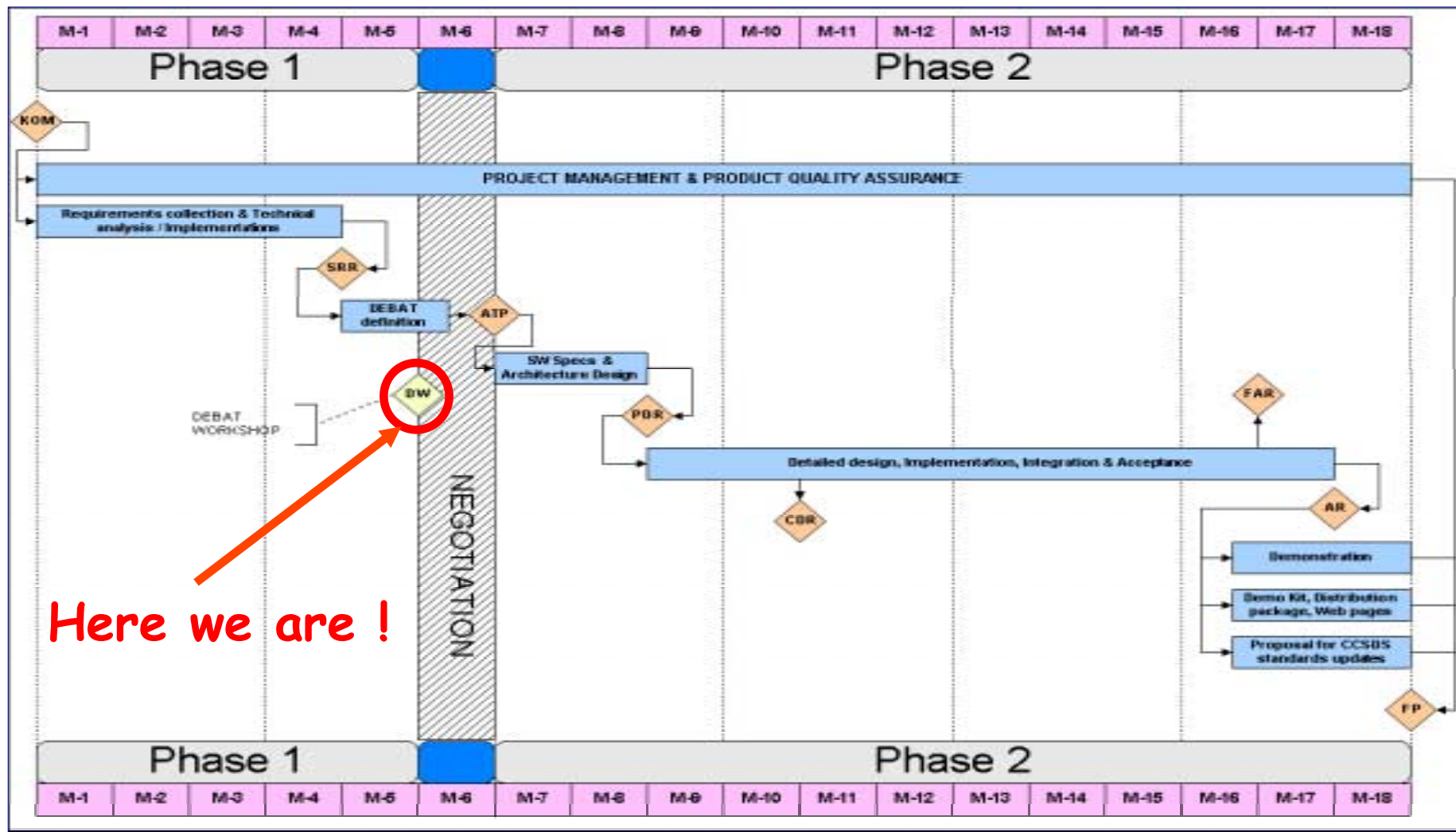
II - Objectives - Key features/concepts

- Integrated Environment supporting the plug-in concept (DEBAT framework)
- Tools enhancements
- Language evolutions: support for algorithms, data checking improvements, ...
- Performances improvements
- Handling of huge volumes of data
- Enforcing XML compatibility
- Web interface and Web services (SOAP)
- Promotion, training
- Etc.



III - Roadmap

III - Roadmap - Overview



Here we are !

II - Roadmap - Two phases

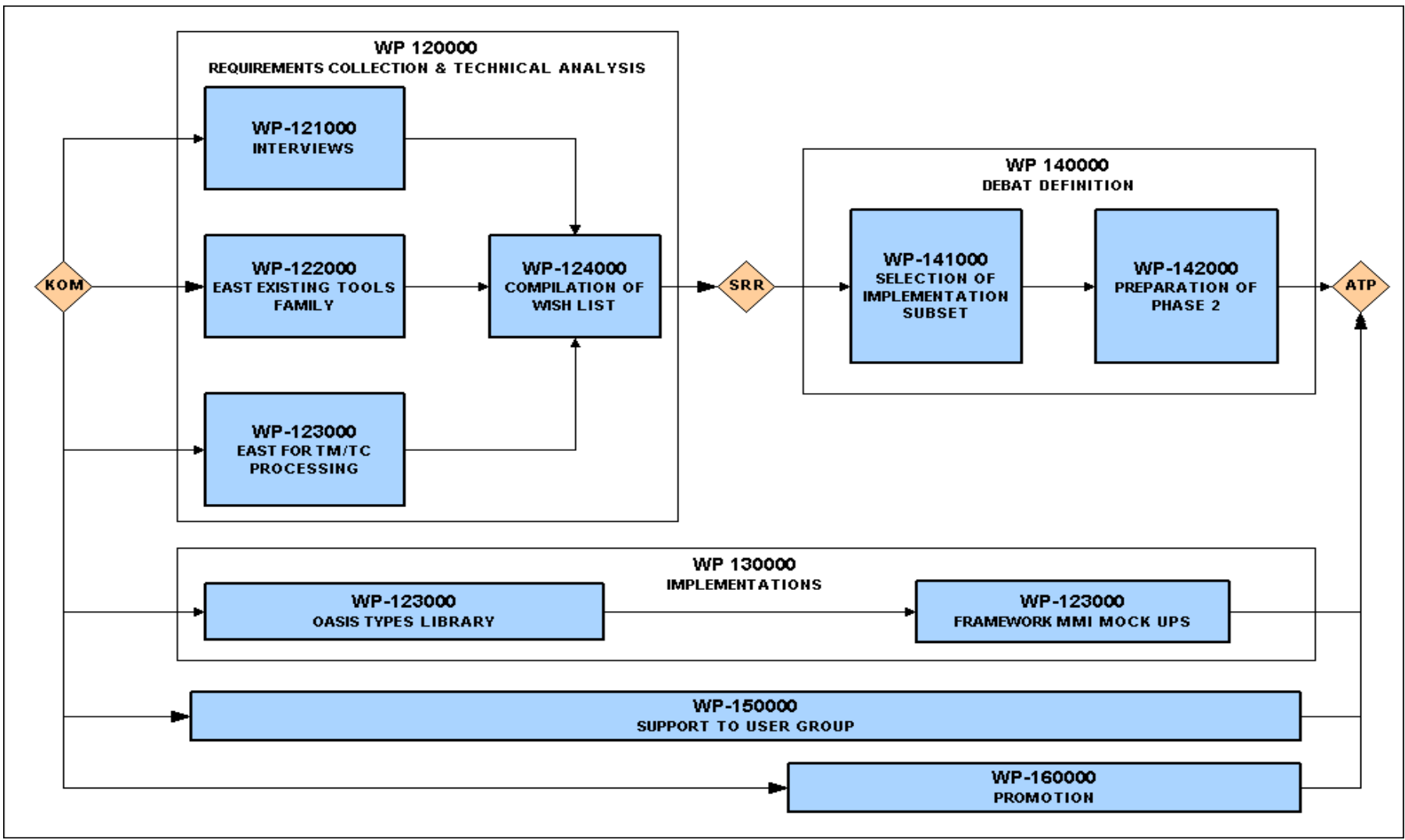
■ Phase 1: Analysis and studies

- Identification, technical analysis and ranking of the **limitations and expected enhancements** of the current tools set
- Compilation of requirements
- Definition of the implementation scope
- About 5,5 months

■ Phase 2: Implementations

- Design, implementation, validation, demonstration
- About 12 months

III - Roadmap - Phase 1



III - Roadmap - Phase 1

■ Interviews

- Collect the feedback from current user projects (limitations / bugs), and the potential requirements of the future DEBAT
- Interviewed people coming from ESA, CNES, CS

■ EAST current applications study

- Determine if the EAST language and associated tool (i.e. OASIS) are capable of modelling and processing high-level data products extracted from raw space data
- Based on the following data products : ENVISAT, CRYOSAT, ERS data.

■ EAST for TM/TC processing study

- Determine if the EAST language and associated tool (i.e. OASIS) are capable of modelling telecommand and telemetry packets
- Analyse the potential uses of EAST within a TM/TC processing chain (SCOS-2000, ATC-CC)
- Based on the ECSS documents defining the generic TM/TC structures (PUS - Packet Utilisation Standard) and mission specific TM/TC structures defined for the CryoSat satellite

III - Roadmap - Phase 1

■ Compilation of wish list

- Organise / rationalise all the « raw requirements » expressed / found during the interviews and study phases; define the ideal DEBAT software in a **User Requirements Document**

■ OASIS type library

- Provide means to be able to **share common structures between different data models**

■ DEBAT framework mock-up

- Provide a **single access point** to the set of DEBAT tools (concept of integrated environment), user-friendly, modular, supporting the plug-in concept

■ Support to user-group

- Establish and maintain efficient contacts with the user group

III - Roadmap - Phase 1

■ Selection of the implementation subset

- to define the more relevant implementation subset (to be agreed by ESA during negotiation phase)

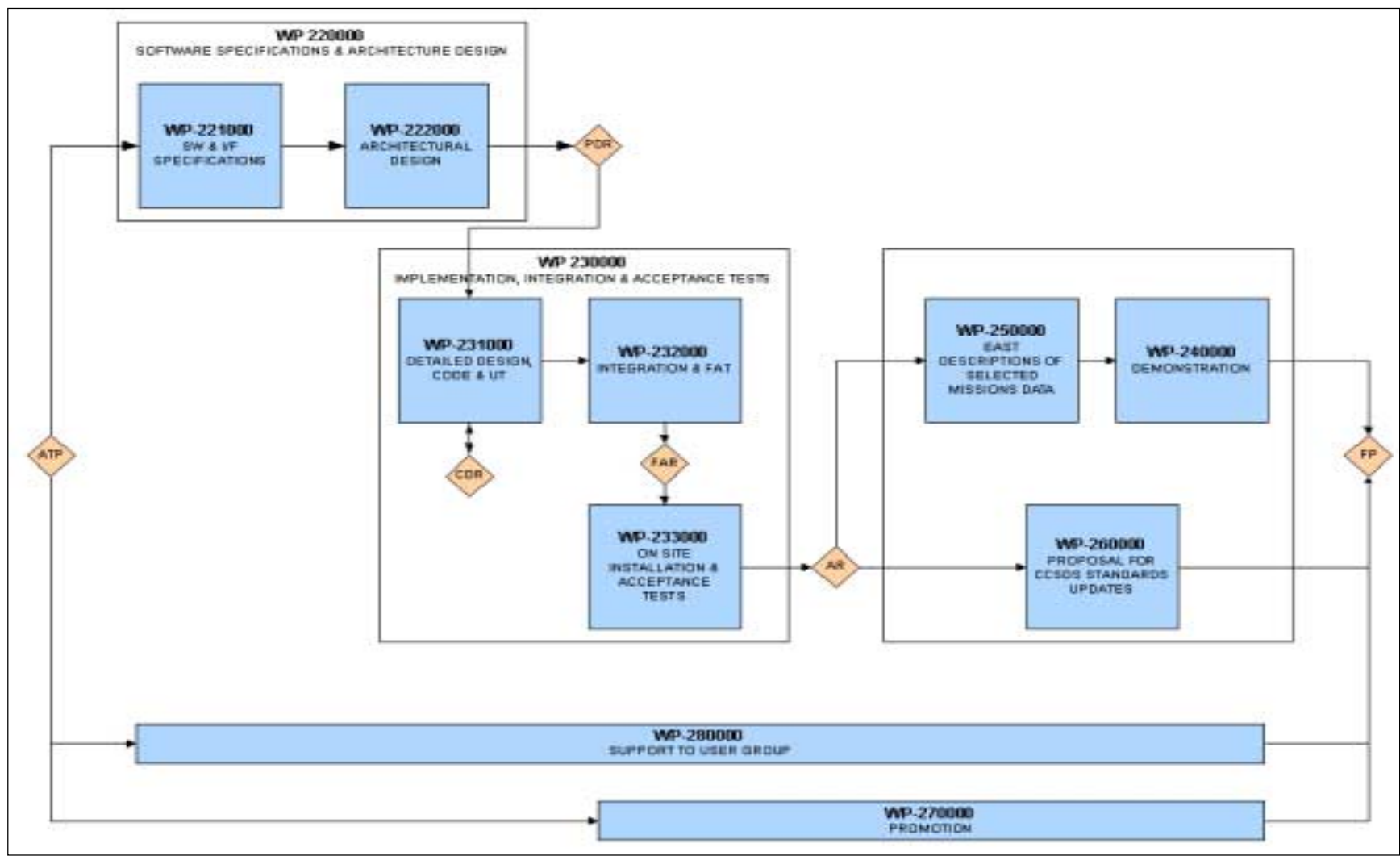
■ Preparation of Phase 2

- to provide an overall implementation/diffusion plan and identifying interesting areas of future work (beyond the scope of DEBAT).

■ Promotion

- Promote the DEBAT tools and concept to the potential user community (Web pages, conferences, workshop, etc.)

III - Roadmap - Phase 2



III - Roadmap - Phase 2

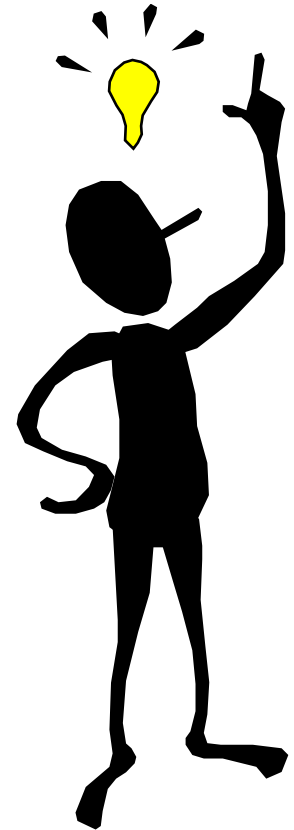
- Software specifications and architectural design
 - to specify and document the technical specifications and architectural design
- Implementation, integration and acceptance tests
- Demonstrations
 - to validate the concepts / technologies on relevant missions / projects, real use scenarios
- Proposal for CCSDS updates



IV - Current status and main results

IV - Current status and main results

- In the process of completing the 1st phase for the end of February
- The general feedback is good ...
 - The current concept of the EAST technology globally meets the user projects requirements.
 - Real added-value :
 - Formal description of the data formats (*non-ambiguous, perennial, etc.*)
 - Generic tools (notably the checking aspects)
 - Application domains :
 - Telemetry and telecommand
 - Interfaces between subsystems
 - Data products (data handling throughout the data life cycle)



IV - Current status and main results

- However ... lots of improvements are expected :
 - Productisation of the tools
 - MMI (user-friendliness, bugs, need to hide the complexity of CCSDS norm)
 - Performances to be improved
 - Lack of some functionalities
 - Support, tutorial, training
 - Position with respect to XML



IV - Current status and main results

- There is **one major needed evolution** that must be **absolutely implemented** because it prevents from modelling some data : the support for **algorithms capabilities** in EAST.
- However, once this evolution implemented, the technology will enable the modelling, the generation/simulation and the processing of complex data products like Envisat, CryoSat, etc. **Therefore, a powerful tool suite for all the data life cycle could be created with DEBAT.**
- EAST could be of help within the SCOS-2000 TM/TC processing chain for:
 - **TM/TC modelling** and processing
 - Replacing (could be partially) the off-line database mechanism that allows to import the TM/TC definitions into SCOS-2000,
 - Providing means to **simulate TM/TC** for SCOS-2000 testing purposes

IV - Current status and main results

- Some issues need particular attention because they are **decisive** for the **adoption** of the future tools by the user community :
 - The **performances** have to be high
 - The MMI has to be really user-friendly, up-to-date, reliable and irreproachable - with no need of technical knowledge
 - The position of EAST with respect to XML is crucial, and it seems clear that **enforcing the XML compliance of the technology should be a priority** for the future DEBAT tool set :
 - Use XML extensively for the **software infrastructure**
 - Transform the OASIS IF form (Internal Form) into XML : This is a great opportunity that will allow to express the data descriptions in XML. This will open the door to the XML world.
 - Provide **EAST/XML bridges** (i.e. generates XML data files from raw data)
 - Use of **XML Query** for Querying/Extracting