

Next Generation Platform *NEOSAT and SAVOIR, which* *synergy?*



Synergy



Future



Innovation

Leadership

1. NEOSAT Programme Presentation

- Background
- Organisation
- Rationale for Cooperation
- Targeted Market & Programme Objectives
- Schedule
- NEOSAT Avionics Stakes

2. NEOSAT and SAVOIR Convergence

3. Implementation of SAVOIR Outcomes on NEOSAT

4. Expectations from SAVOIR for the Next Steps

1. **Shared view between ASTRIUM and THALES ALENIA SPACE on:**
 - **Competitiveness issue**, mainly versus US manufacturers
 - Current improvement action on existing platforms will not be sufficient to close the gap
 - **Maturity of their current platforms** (Eurostar 3000 and Spacebus 4000)
 - Developed in the 90's thanks to a mix of public and private fundings
 - Currently at the top of their life cycle (ten years after commercial introduction)
 - **Time needed to develop a new product**,
 - E3000 / SB4000 renewals are to be considered now to be available at the right time
 - **Current level of public R&D funding** through traditional budget lines (from ESA and national agencies) not sufficient to start the required developments in time
2. **Opportunity of French public funding under the space line of the national “*Programme d'Investissements d'Avenir*” (PIA)**

ASTRIUM and THALES ALENIA SPACE sent in October 2010 a joint proposal for the development of a new generation of Telecom Geo platform: NEOSAT

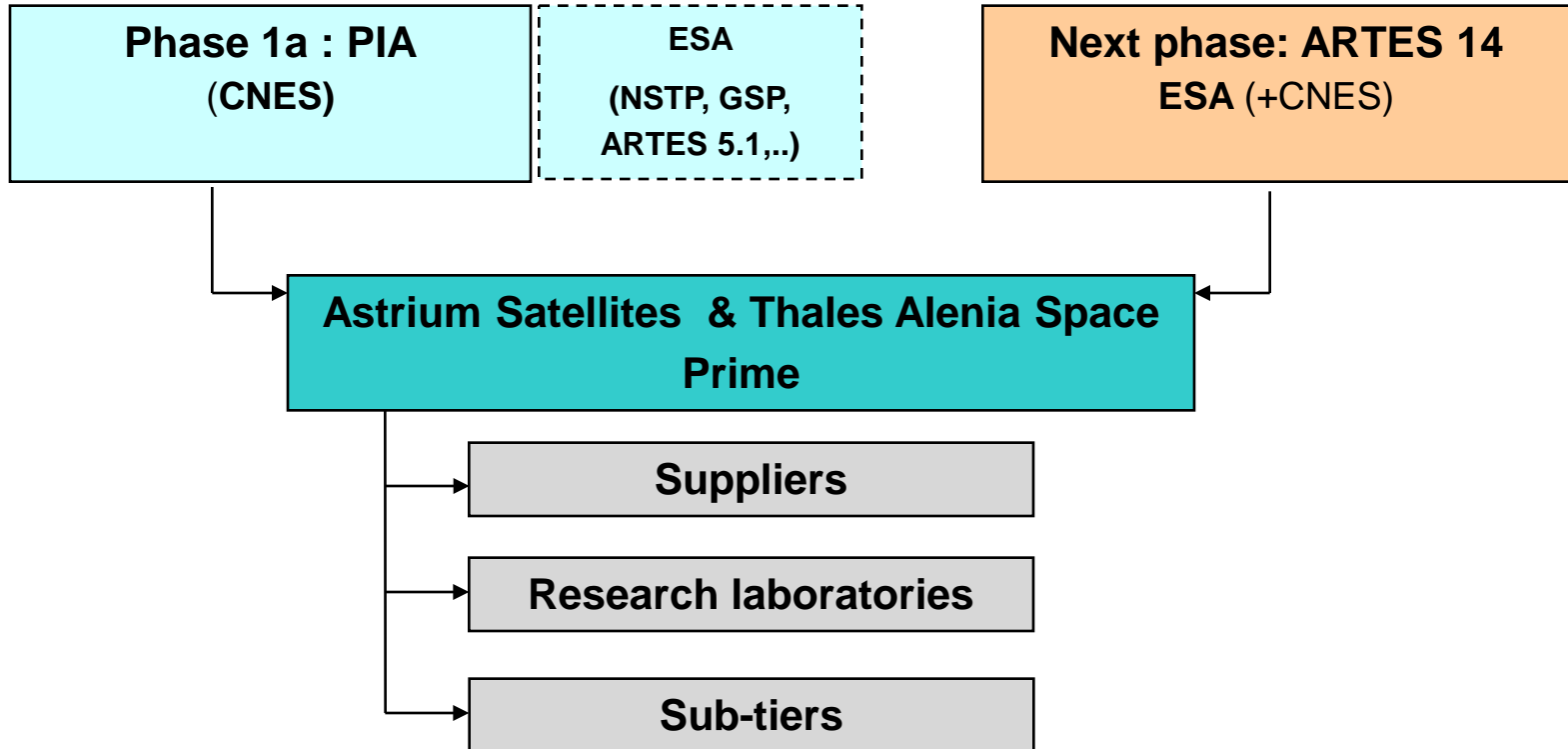
- This proposal has been selected by the French government, with delegation to CNES for the first phase of the project implementation.
- Contract has been signed in **October 2011** for an effective start of the activities.

This Next Generation Platform program is key:

- to make a step in competitiveness and innovation
- to ensure medium-long term competitiveness on the global telecom market

It largely involves participation of equipment suppliers from early stage

- NEOSAT objectives must be shared at each level
- Supplier competitiveness is key for satellite competitiveness



ASTRIUM and THALES ALENIA SPACE cooperation key success factors:

- Make possible the development of a new generation of Telecom Platform
 - Define best products versus end of the decade market & launchers landscape
 - Wider access to emerging / innovative technologies and products

- Maximize common architecture concepts and building blocks in order to:
 - Take benefits of industrial product road maps in order to define together optimum solution
 - Optimize development costs at technology, unit, subsystem and system levels
 - Ensure sufficient volume for subcontractor, allowing significant cost reduction and quality improvement

After the development phase, Astrium & Thales Alenia Space will keep the lead of their own platform & satellite manufacturing and marketing

Target:

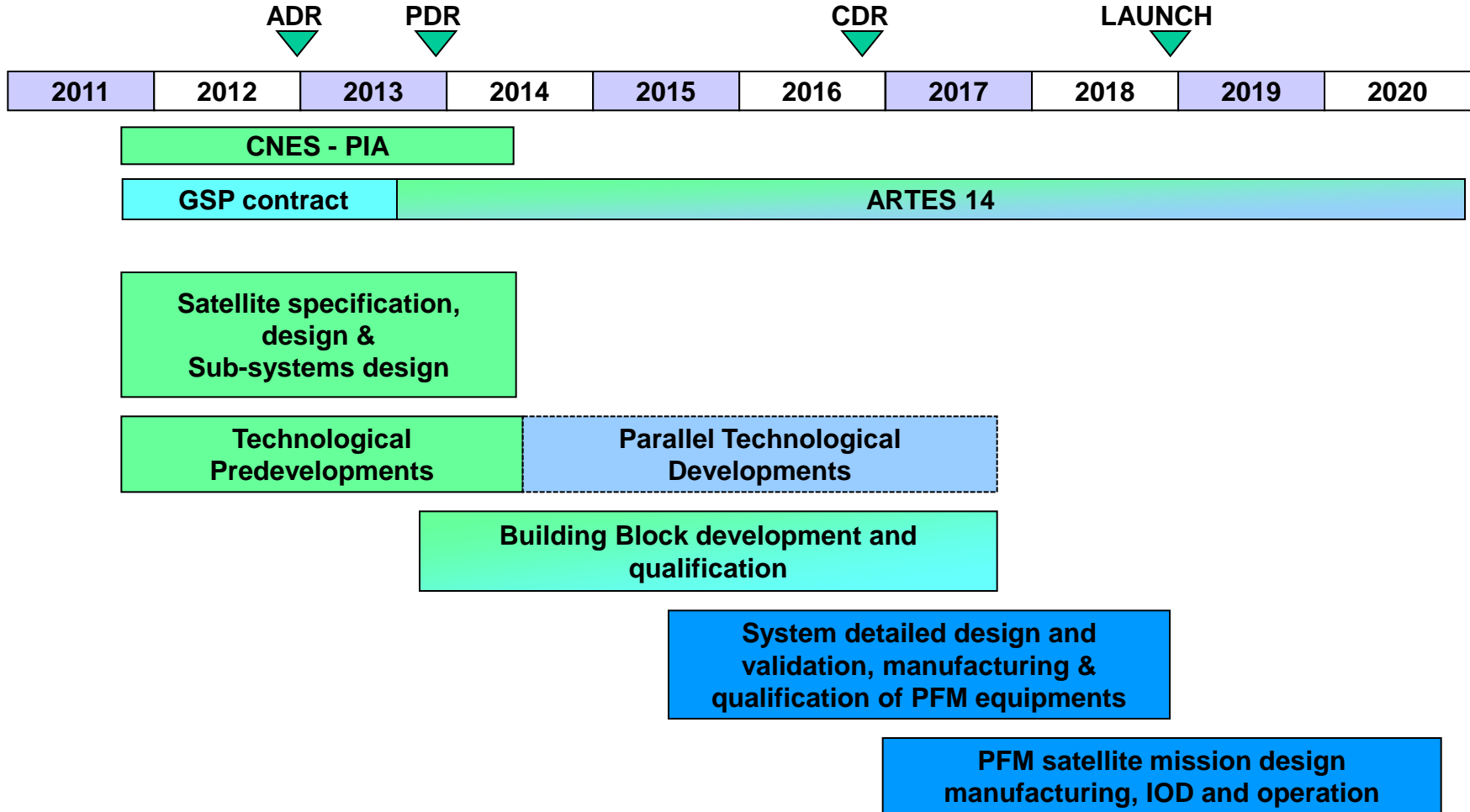
- **3 to 6 tons** segment (launch mass)
 - core market, where more than 80% of the accessible market lies (≈ 20 satellites /year),
- This satellite segment will represent by far the largest market opportunity for European Space industry in the coming decade
- Expected share **50 %**, i.e. **≈ 10 satellites/year** for AST+TAS

Objective

- **≥ 30% of competitiveness improvement** vs. current satellite generation

Means:

- Define best product architecture vs. market & launcher landscape evolution
- Consider also “next generation payload and antennas” aspects
- Identification and development of common platform building blocks procured with a single set of requirements.
- Use of innovative technologies and processes allowing breakthroughs
- Wider access to technology and products
- Increase of production volumes at suppliers level
- Reduction of Assembly, Integration and Test



To maximise common building blocks between TAS and AST platform

To optimize the costs (non-recurring, recurring and ownership)

- Supplier involvement in system objectives
- Identification & reuse of best practices from other space programmes or other industrial domains

To limit the non-recurring impacts of dual sourcing, if used

- to avoid a monopolistic situation that may lead to price drift along the time or to mitigate the manufacturing risks

To take into account the product variability all along its lifecycle (up to 2030's) from the early development stages

- Facilitate the product improvements (performances, costs, ...)
- Ease introduction of new options
- Anticipate programmed obsolescence

To optimise customisation & production for overall competitiveness improvement and risk lowering

- **“Faster”**: increase productivity
- **“Later”**: increase reactivity w.r.t. last minute modifications
- **“Softer”**: increase flexibility for customisation & evolutions

For those previous objectives, paramount factors are:

- Common Architecture principles
- Common interface definition
 - Priority given to well-recognised, worldwide, cross-industrial standards to benefit from off-the-shelf products, if space application feasible, e.g. CAN bus
- Common set of Applicable Documents and Standards:
 - Management, Product Assurance, Engineering

➔ NEOSAT and SAVOIR Objectives are convergent

- Standardisation (architecture, building blocks, interfaces)
- Reuse
- Risk, cost and schedule reduction

In current avionics architecture definition and Trade-off phase, SAVOIR outcomes are being extensively used

➔ ASRA reference avionics architecture

- To have a common vocabulary w.r.t. avionics architecture
- To ensure exhaustiveness and consistency of the avionics functional decomposition
- To map the above identified functions on different H/W schemes for trade-offs
 - Increased functional integration at unit level is one key driver for avionics cost reduction;
 - Different solutions are generally possible and shall be assessed

➔ Generic OBC specification

- A preliminary OBC interface and performance specification is being written
- Objective is to allow the definition of common avionics building blocks interfacing the OBC

Current NEOSAT avionics design activities are focusing on H/W architecture

- Function allocation to on-board units
- Interconnections and operations of avionics units
- ➔ **Standards for System Data Links and at unit level for modules / board H/W interfaces would have been helpful**
 - Electrical interfaces: power distribution, internal Data links
 - Mechanical, thermal interfaces at board level

For what concern SW aspects, which are a major part of SAVOIR initiative:

- ➔ **NEOSAT development is not sufficiently advanced to assess their possible implementation**
 - Consolidation of NEOSAT S/W needs is not finalised
- ➔ **Maturity of some SAVOIR-driven technologies and associated industrial production tools may not be high enough**
 - e.g. IMA-SP, SOIS, ...

NEOSAT have specific features

- Commercial telecom market
- Very aggressive schedule: 1st launch in 2018 (“Fast-track” programme)
- Priority given on competitiveness
- Geo-return constraints are not a driver
- Product line concept already well implemented and mature, with long lifecycle

➔ While SAVOIR is driven by ESA programmes, mostly observation and science-oriented

- Time scale of SAVOIR is significantly longer than NEOSAT one, with some not yet mature concepts pushed as a consequence
- Covered scope, from LEO missions to interplanetary probes, may lead to complex & expensive standards, not compatible of NEOSAT competitiveness objectives

➔ But SAVOIR outcomes will be considered as recommended practices and will be analysed / tailored considering the GEO Telecom context

- Same approach:
 - w.r.t. **ECCS** standards for definition of NEOSAT top level Applicable Documents
 - w.r.t. **EGS-CC** initiative for test & validation infrastructures

NEOSAT and SAVOIR have convergent objectives

SAVOIR ASRA outcomes are being used by TAS/AST NEOSAT Avionics engineering team for architecture & building block definition

NEOSAT will consider other / upcoming SAVOIR outcomes as recommended practices with potential tailoring w.r.t. the GEO Telecom context

SAVOIR added value for NEOSAT would need more H/W-related standards especially for data links and at unit level

NEOSAT Project is open to discuss on the priority level to be given to SAVOIR activities on technologies / building blocks development to cope with its challenging schedule

Thank you for your attention

Any questions?