

NEOSAT

Presentation to ROSA Bucharest April 24th 2013

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- ▼ Based on a shared view between ASTRIUM and THALES ALENIA SPACE on
 - **Competitiveness issue, mainly vs US manufacturers**
 - Current improvement action on existing platforms will not be sufficient to close the gap
 - **Maturity of their current platforms (Eurostar E3000 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, their renewal is 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 before 2013**

- ▼ Considering the opportunity of French government funding under the space line of the national Programme d'Investissement d'Avenir (PIA)
 - **ASTRIUM and THALES ALENIA SPACE have decided in October 2010 to send a joint proposal for the development of a new generation of Telecom Geo platforms in the 3 to 6 tons launch mass segment**
 - **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 with CNES for an effective contract start.**

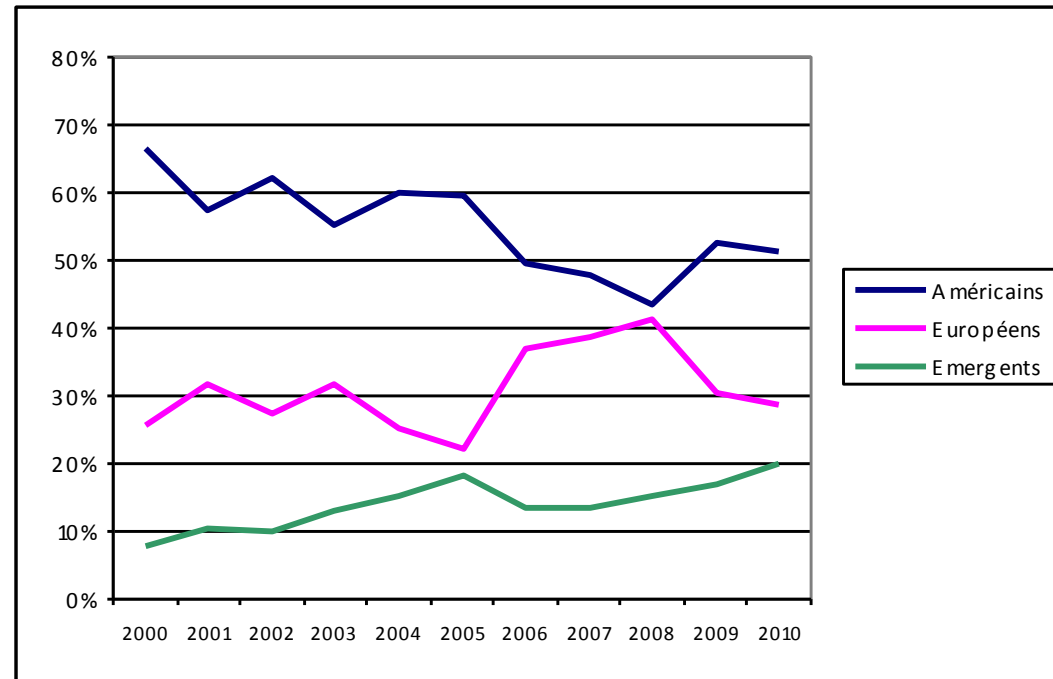
▼ Competition on the telecommunication market is tough

▼ USA: The 4 Satellite Primes are back on the commercial market with new products:

- Loral: Aggressive policy: 2 contracts in Europe in 2010 (1st with Eutelsat), 1 in 2011
- Boeing: 1 contract for 3 satellites in Europe in 2010 with a new platform
- Lockheed: Aggressive policy and coming back on the commercial market
- Orbital: increase in power/mass range

▼ Asia/Russia:

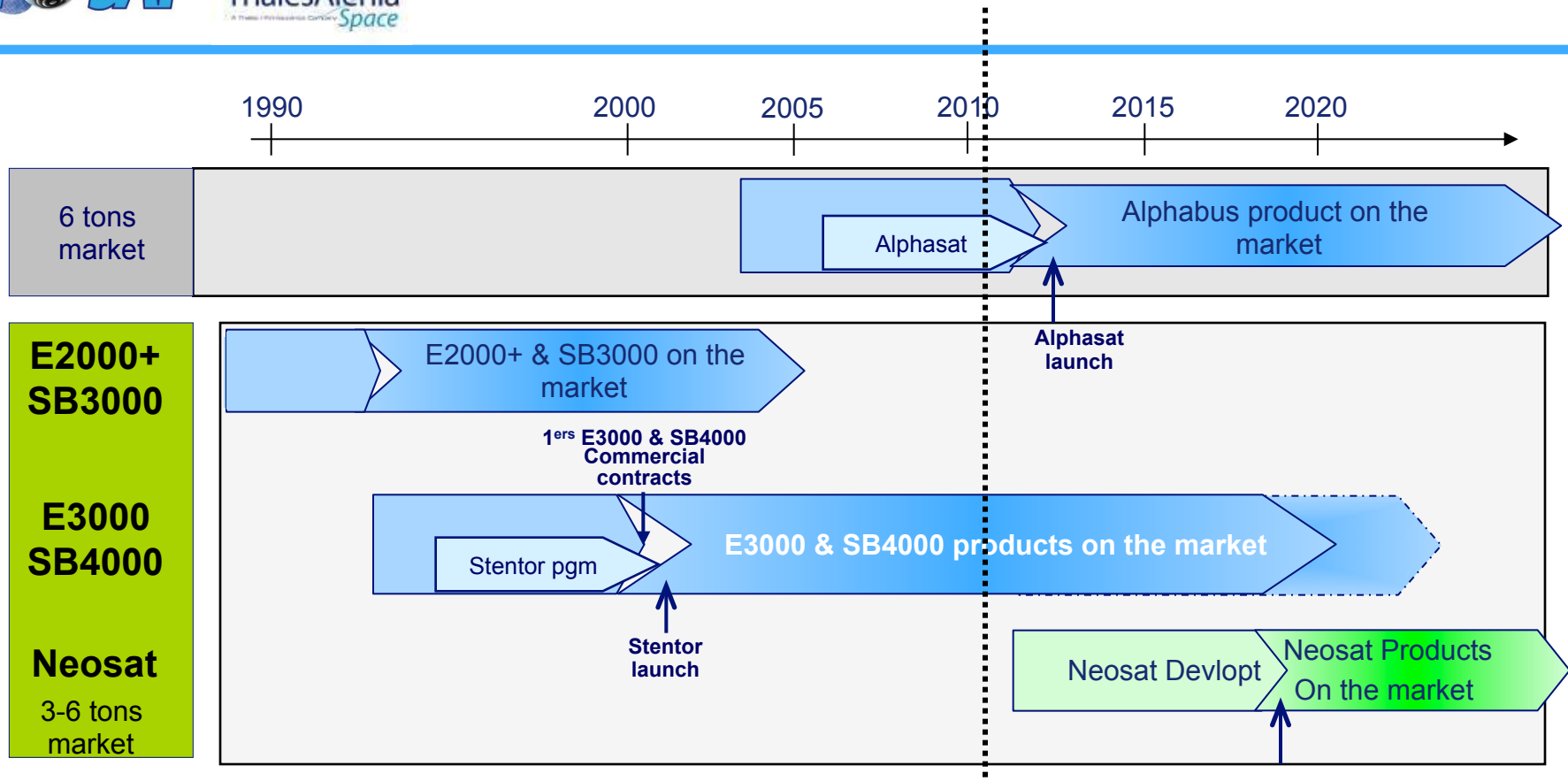
- New comers with export contracts
 - China (5 export satellites)
 - India, Japan, Russia



- **Develop a new generation of Telecommunications platform for a first launch in 2018 with first qualification models in 2015.**
 - In the core 3 to 6 tonnes (launch mass) segment where more of 80% of the accessible market lies
 - ≈ 20 satellites /year
 - The target is 50% of the market for TAS/Astrium
 - Common approach of TAS and Astrium with the following objectives:
 - Beyond 30% of competitiveness improvement vs. current satellite generation
 - Means:
 - Define best product architecture vs. market & launcher landscape evolution
 - Consider also “next generation payload and antennae” aspects
 - Identification and development of common platform building blocks procured with a single set of requirements.
 - Use of innovative technologies allowing breakthrough
 - Wider access to technology and products thanks to the joint TAS/Astrium cooperation
 - Increase of production volumes at supplier level
 - Reduction of Assembly, Integration and Test cycles from building blocks to satellite
- **After the development phase, Astrium & TAS will keep the lead of their platform manufacturing and marketing**



Neosat satellites positioning vs. current product lines



The Eurostar E3000 and Spacebus SB4000 product lines will remain the Astrium and TAS work-horses until Neosat products are commercially available and flight proven.

Eurostar E3000 and Spacebus SB4000 lines will be maintained at least until end 2020.

▼ AOCS

- Low-cost Gyro (MEMS techno) : development of the technology and the associated electronic
- Star tracker : concept with remote S/W in the Satellite Computer
- .../...

▼ Data Handling

- New generation of computer with major improvement of memory and processing capacity
- Bus couplers such as wireless technology (for ground and/or flight?)
- .../...

▼ Electrical/power

- High efficiency DC/DC Converter
- Solar Arrays : AsGa cells evolution, layer, flexible panels, concentrators,...
- Battery: new cells generation– opportunity of regenerative fuel cells?
- Need of battery bypass ?
- New concept of cells balancing?
- .../...

▼ Harness / connectors technology

- Development of a new high performance wire (mass, digital performance, ...)
- Connectors : screw-less locking, industrialisation ...
- .../...

▼ Pointing Mechanisms

- Accurate Pointing : development of new high performance mechanisms
- Low-shock antenna & solar array hold down and release mechanism
- .../...

▼ Structure

- New direct manufacturing processes
- Development of a new fibre?
- Integration of new functions within the structure perimeter
- Specification, conception & qualification of damping system
- .../...

▼ Thermal

- Thermal joints & glues, Scotch Secondary Surface Mirror , High performances OSR
- Development of new paints & coatings (i.e. electro-chrome type)
- Development of a new source of heat-pipes
- Deployable Radiator , Fluid loop heat-pipes ...
- .../...

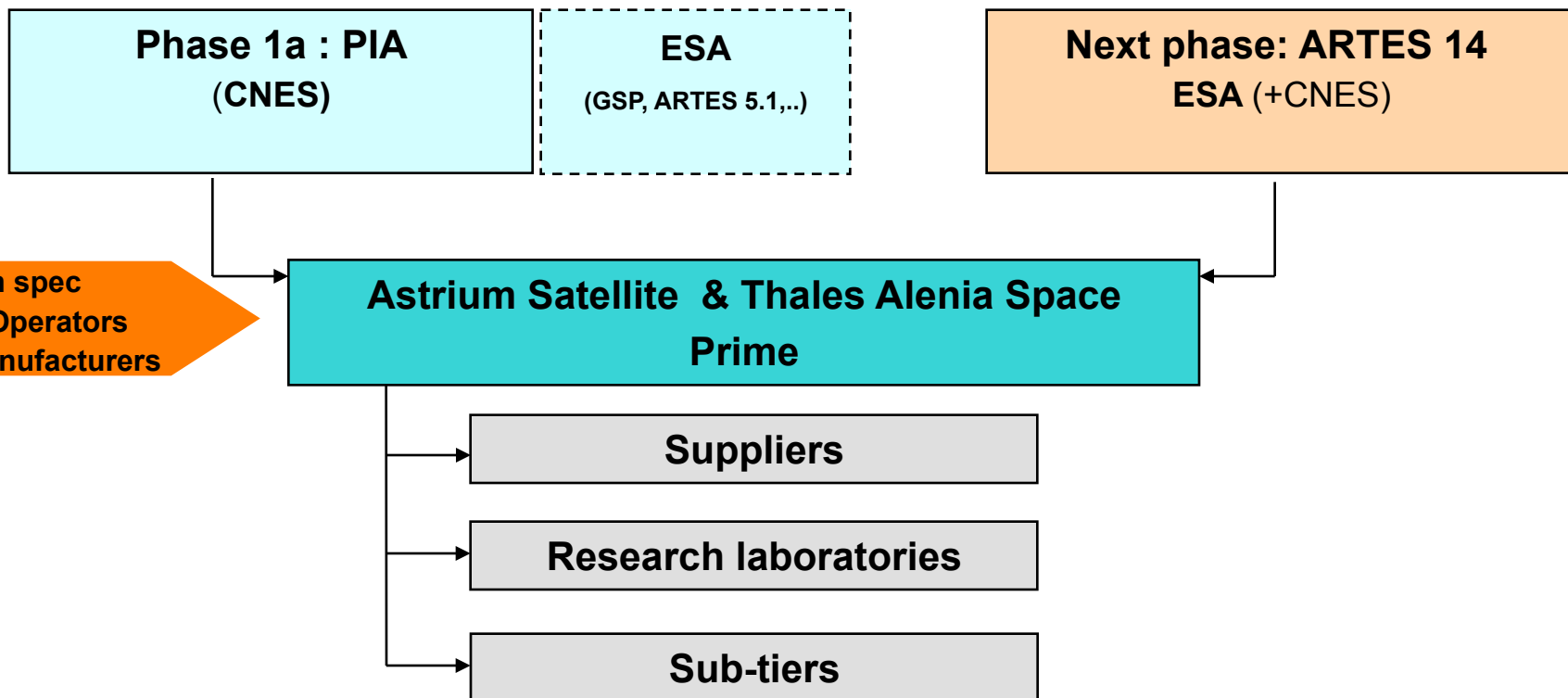
▼ Propulsion (Chemical & Electrical)

- New products with higher performance (isp, life-time,...)
- Magnetic beam steering for Electric Propulsion
- .../...

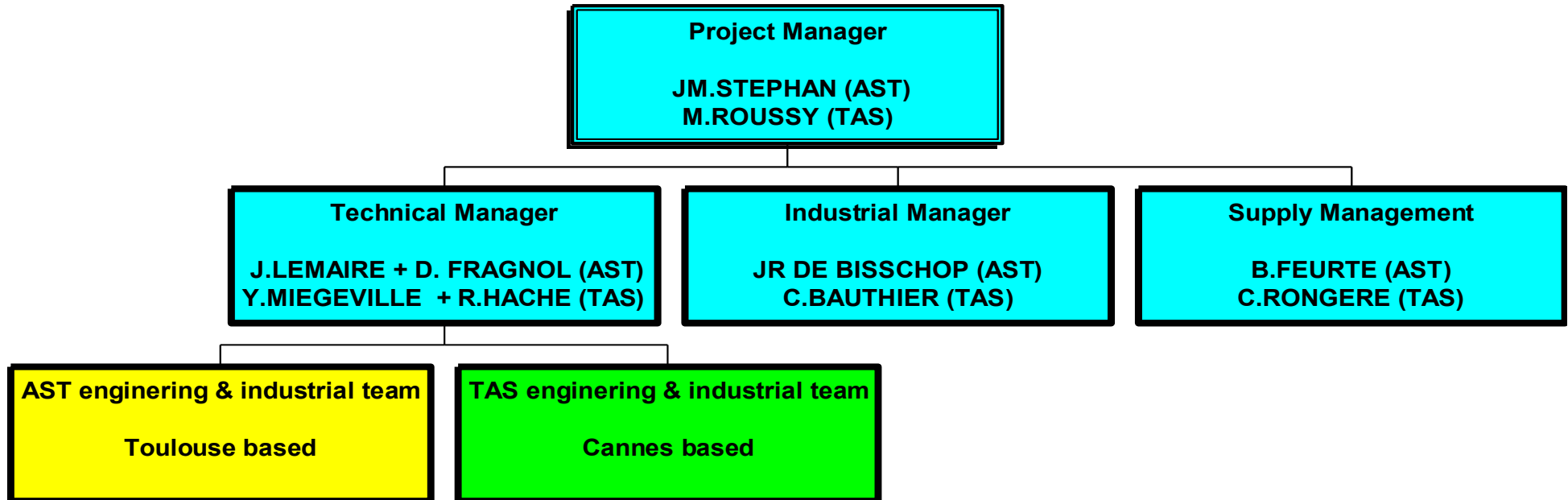
- Astrium and TAS still have a very limited supplier base in Romania
- Background in Aeronautics and/or Space activities for ESA or Europeans Primes is a valuable asset but Neosat is an opportunity for company to build a space experience and develop their related product line.
- “Space Qualification” can be acquired within a relatively short time-frame depending on suppliers previous heritage in Space activities and thanks to a dedicated ESA support.
- In addition, the NEOSAT programme will also manage some procurement related to Ground items such as Mechanical Ground Support Equipment (MGSE) including spacecraft trolleys & containers, Electrical Ground Support Equipment (EGSE), Assembly Integration & Test (AIT) Software Tools and Test Benches that do not require specific space qualification.

Next Generation Platform Satellites Organisation

NEOSAT Project



- The core Joint Project Team (JPT) is organized as follows.



- Technical managers are driving a team of architects, experts and all the necessary supports that are based in their respective premises (Cannes for TAS & Toulouse for AST)

▼ Phase 1a (over 2011-2014) PIA funded and dedicated to:

- System & Platform definition
- Assessment & Pre-developments of critical technologies with early contribution from equipment & technologies suppliers
- Architecture & Preliminary Design of Sub-systems

▼ New ESA program (ARTES 14) to be implemented & dedicated to:

- 2013-2016
 - Completion of technological developments
 - Development & qualification of new/modified equipments
 - Development & qualification of sub-systems
- 2015-2018
 - System validation & qualification
 - Manufacturing of the satellite bus PFM & flight equipments

➤ **259M€ granted!**

▼ **French contribution as anticipated**

▼ **Very good news from UK**

- 2nd contributor just behind France

▼ **Strong contribution from numerous country**

- Sweden, Belgium, switzerland, Luxemburg
- Romania 9M€

➔ Opportunity for new partnership to be developed in the frame of Neosat

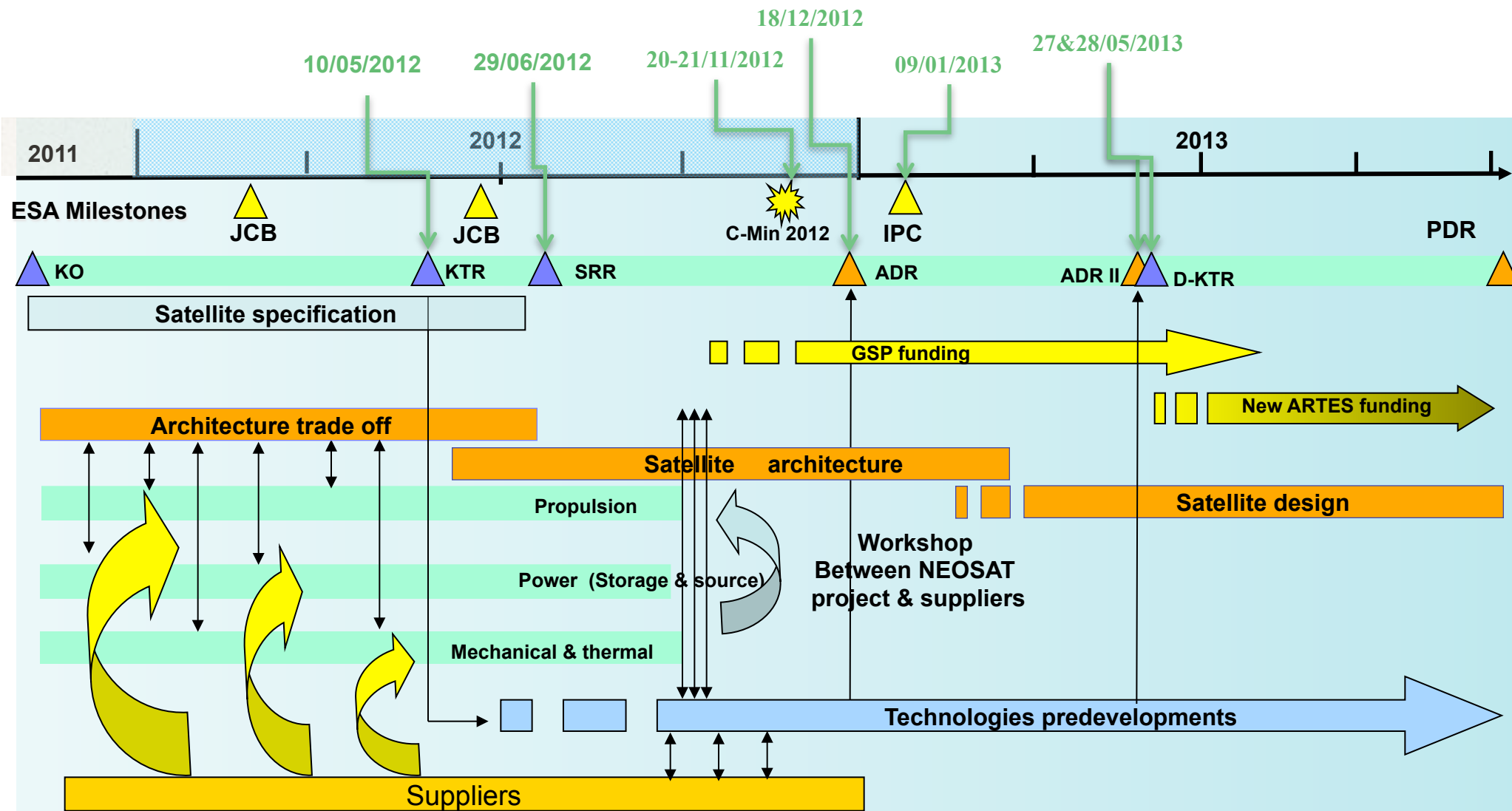
▼ **Some disappointments**

- Germany : 0
- Italy: 0
- Spain: 0

Country	Contribution (M€)
France	128,0
UK	72,0
Sweden	13,0
Belgium	12,0
Romania	9,0
Swiss	6,0
Luxembourg	6,0
Norway	4,0
Austria	2,0
NL	2,0
Rep Tcheque	2,0
Finlande	1,5
Irlande	1,0
Portugal	0,5
Germany	0,0
Italy	0,0
Spain	0,0
Poland	0,0
Total	259,0

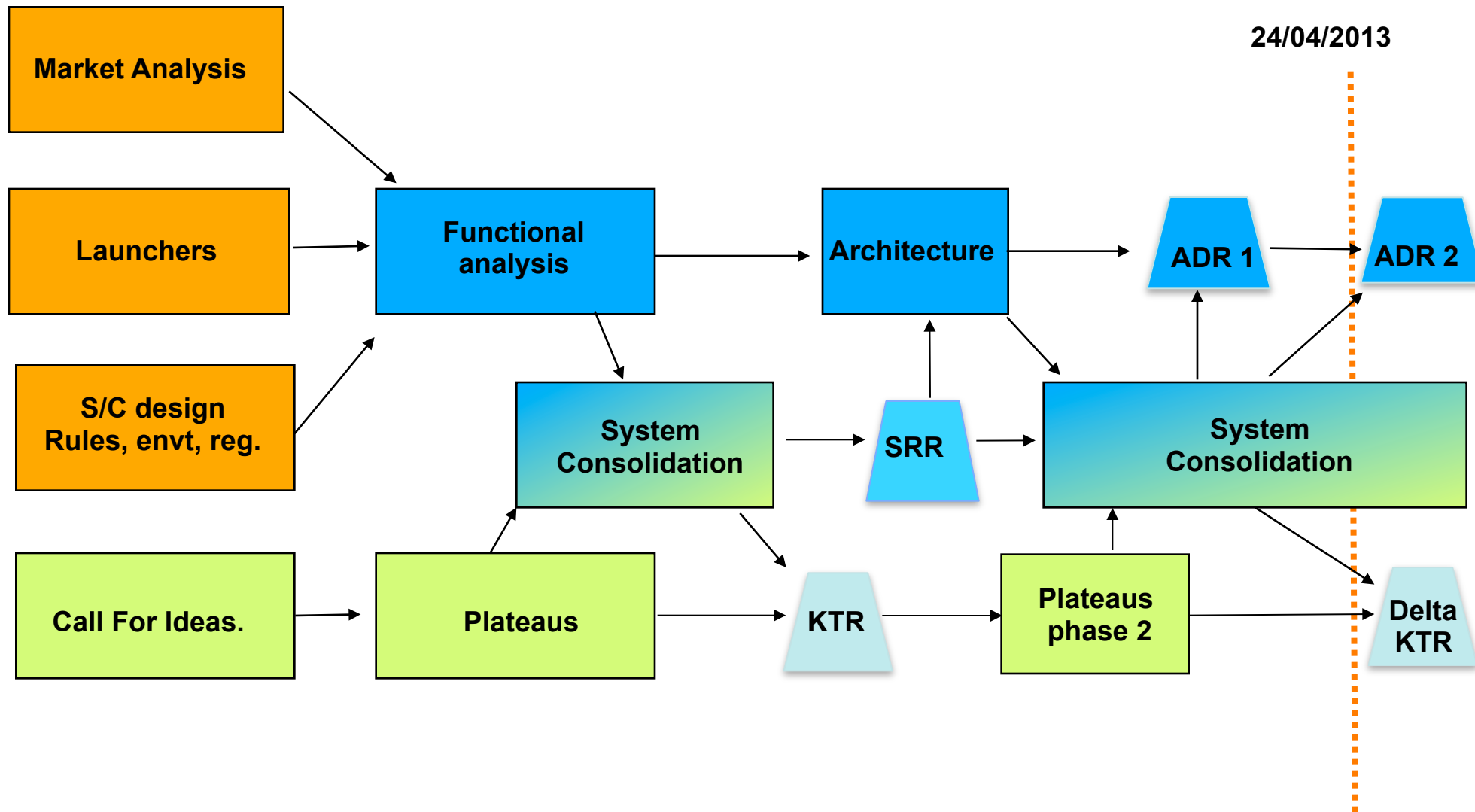


Neosat Overall Status





1a- PIA Marché 1 Schedule status



24/04/2013

On 10 May 2012, the Key Technology Review (KTR) for the NEOSAT programme was held in Toulouse with representatives from CNES and ESA.

Over 100 participants gathered on Astrium's site to attend this review.



- The KTR was organised to present up-and-coming technologies that could be used for the programme preparing the next generation of platforms for communications satellites, now known as NEOSAT.**
- These base technologies were pre-selected following consultation with equipment manufacturers, research centres and laboratories worldwide.**
- Main outcomes of KTR are presented in following slides**
- A Delta-KTR is planned end of May 2013 to review any new technology identified since.**

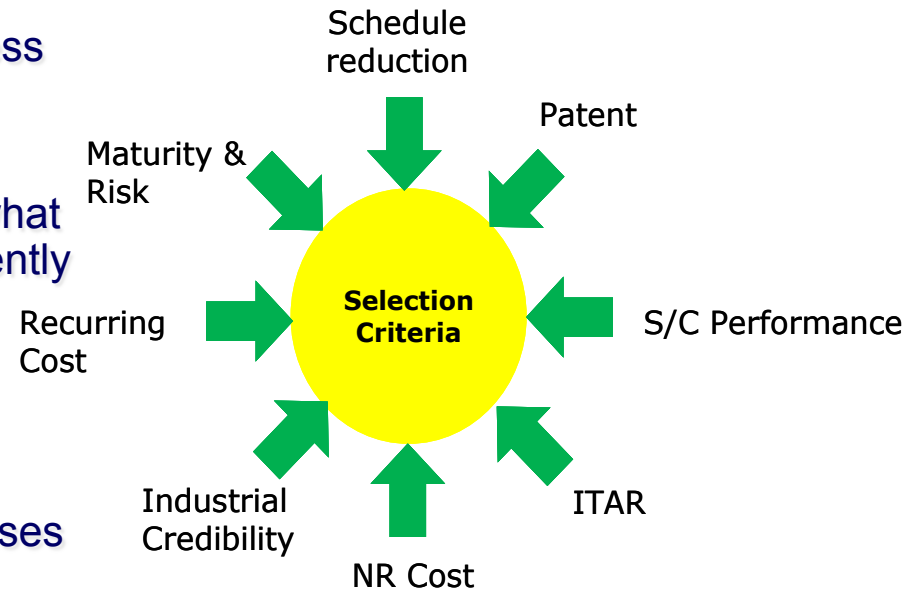
- **The purpose of these proposed predevelopments is either**
 - To mitigate some risks as the proposed technology is perceived as promising but not mature enough (Too low TRL)
 - To improve the TRL level to allow the selection of the proposed development onto the NEOSAT satellite architecture/pre-design (Insufficient TRL level to baseline the proposed technology)
 - To further explore and consolidate the interest of the proposed development / technology wrt the NEOSAT key objectives (competitiveness)
 - To allow (consolidate) a schedule compatibility with the NEOSAT PFM schedule
- **Approach based on:**
 - Co engineering between technology suppliers and NEOSAT team
 - Limited breadboarding when needed

- ITT initiated by the Neosat project
 - Started in July 2011
 - This call for idea is an on-going, continuous process (open ITT)

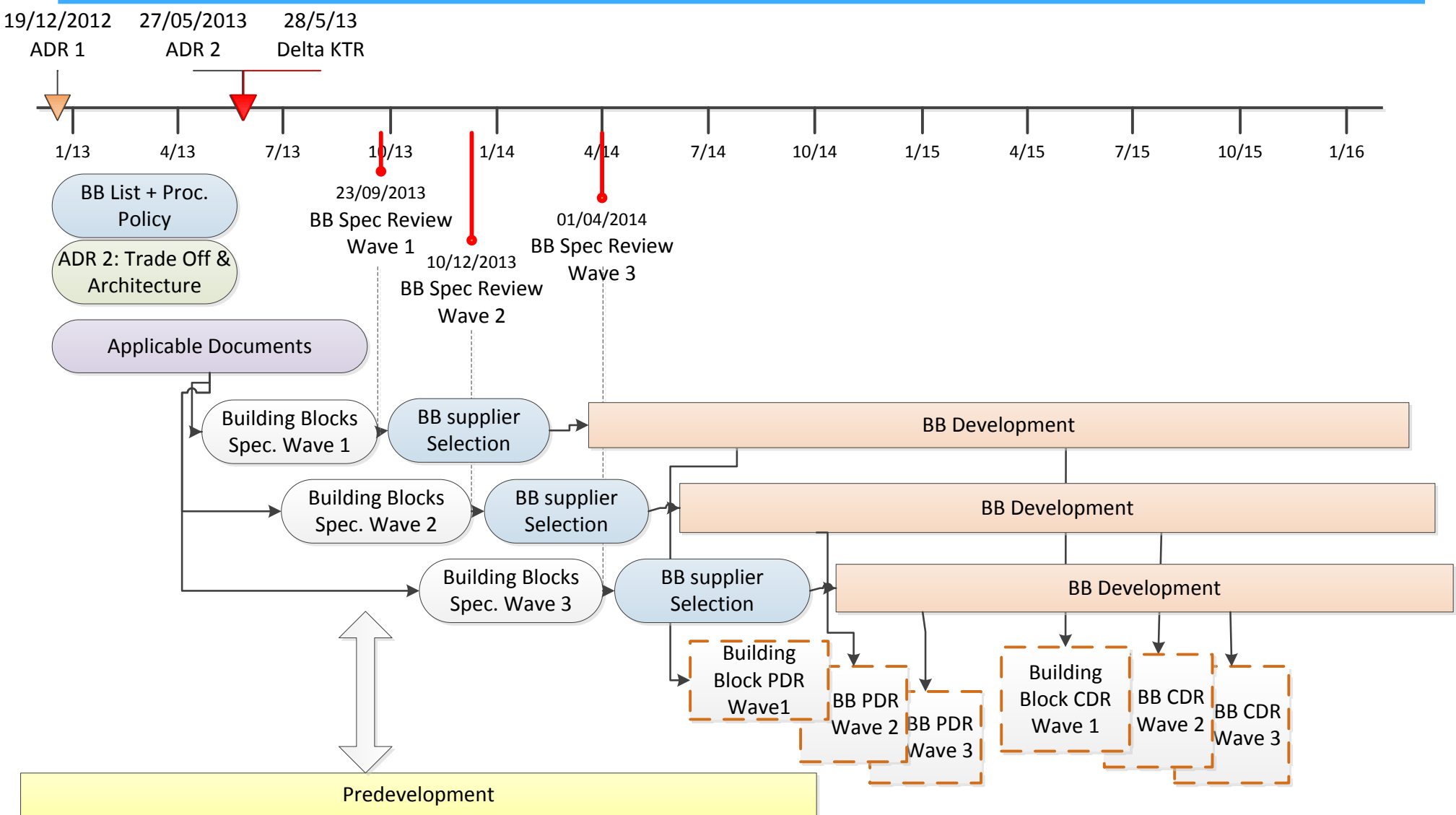
- This ITT is aiming at a bottom-up approach to assess what are the promising/disruptive technologies that are currently under development at supplier level.

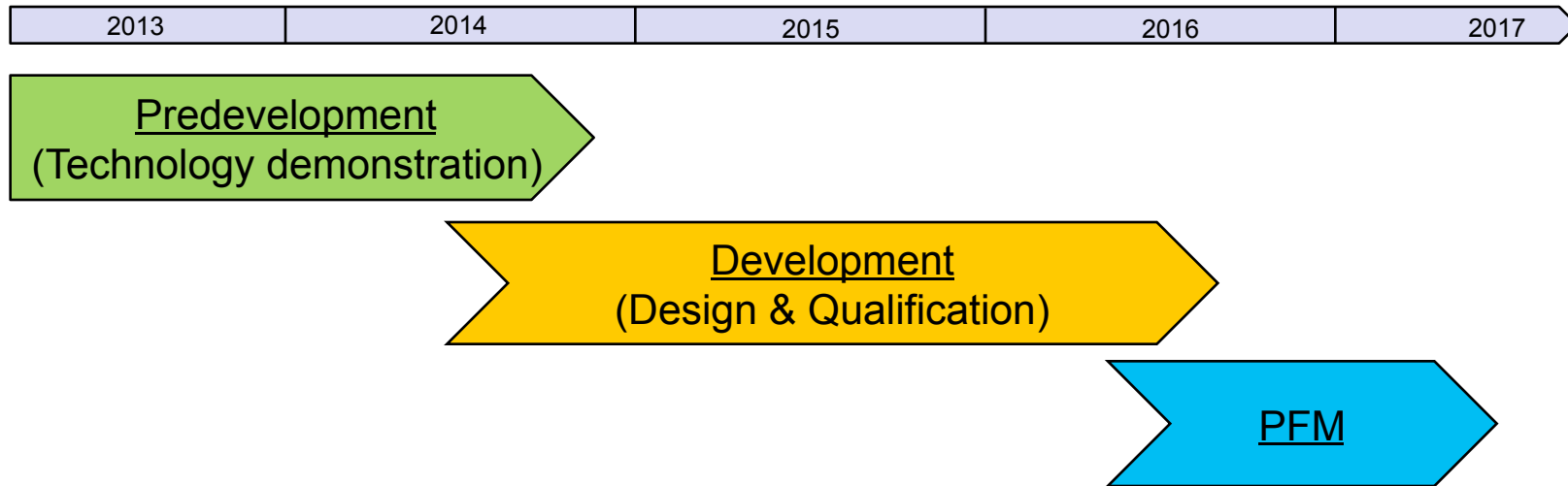
- It is a powerful way to assess the most promising technologies that will be used to drive the system & architecture trade off's during the early architecture phases of the Neosat programme.

- One of its goal is also an opportunity for Neosat to discover new potential industrial partners in Romania.



NEOSAT Building Block selection Planning





- ▼ 3 phases for product life cycle are considered
 - Predevelopments will be funded up to 75% (25% co-funding from the industry)
 - Development will be funded up to 50%
 - PFM production, test and delivery will be fully funded
- ▼ The suppliers will be jointly (pre)selected according to the Industrial Procurement Policy
- ▼ Pre-selection of a supplier for predevelopment activities does not mean that he has been selected for the PFM development and production
- ▼ Similarly, the non selection for a predevelopment does not mean that the supplier will not be selected for the production phase



- ❑ **Astrium & TAS would like to thank ROSA for the organization of this meeting.**

- ❑ **The NEOSAT development represents by far the largest commercial opportunity for European Space industry in the coming decade.**

- ❑ **Important contribution from the Romanian delegation is an opportunity for industry to develop a space activity and expertise.**

- ❑ **Proposed way forward**
 - ❑ **Provide proposals in the frame of the Call for idea (target date end May2013)**
 - ❑ **Liaise with Neosat project team to discuss the potential fit between companies skill and NEOSAT needs**
 - ❑ **Points of contact for Neosat Supply Management:**
 - ❑ Cyril Rongere (TAS): cyril.rongere@thalesaleniaspace.com
 - ❑ Bruno Feurte (Astrium): bruno.feurte@astrium.eads.net

NEOSAT

Thank you for your
attention.

Any Questions ?

▼ **Q1: What is the definition of a common building block ?**

▼ **Answer:**

This is the largest agreed contour of Platform architecture/definition that has been identified as optimal by Astrium and TAS with respect to the objectives (-30% on price)

These building blocks will therefore be part of both final platform products without any differences

▼ **As such, a building block can be:**

- **a Unit: e.g. a Pressure Regulator or a Computer Unit**
- **a Subsystem: e.g. the propulsion subsystem**
- **a Major Satellite Component: e.g. the mechanical platform**
- **a Complete Module: e.g. a propulsion module**

▼ **Q2: What is the national ROI: Revenues/ delegation investment into the Neosat pgm?**

▼ **Answer:**

- The exact figures will have to be computed for each member state.
- For flight Hardware, a Return on Investment (ROI) of about 20 (excluding payload aspect) for European Space product suppliers could be achieved based on an estimated market of 10 satellites (so 10 or 20 Units / BB) per year and a product life time of 15 to 20 years.

▼ **Q3: What will be the role of ESA in the supplier's selection (TEB) at beginning of next phase (sub element 1) ?**

▼ **Answer:**

- **The supplier selection will be performed according to an Industrial Procurement Plan produced by the primes and approved by ESA.**
- **Open competition will be submitted to Tender Evaluation Board of ESA will take part.**