Ariane 6

Opportunity for the «Pôle de Compétitivité de l'Île-de-France »

ASTech Paris Région

D. Pinard / Dr. E. Del Olmo / D. Gignac

9th April 2014

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Agenda

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AIRBUS
Defence and Space

2

Ariane 6

3

Opportunity
for the
“Pôle de Compétitivité
de l‘Île de France “

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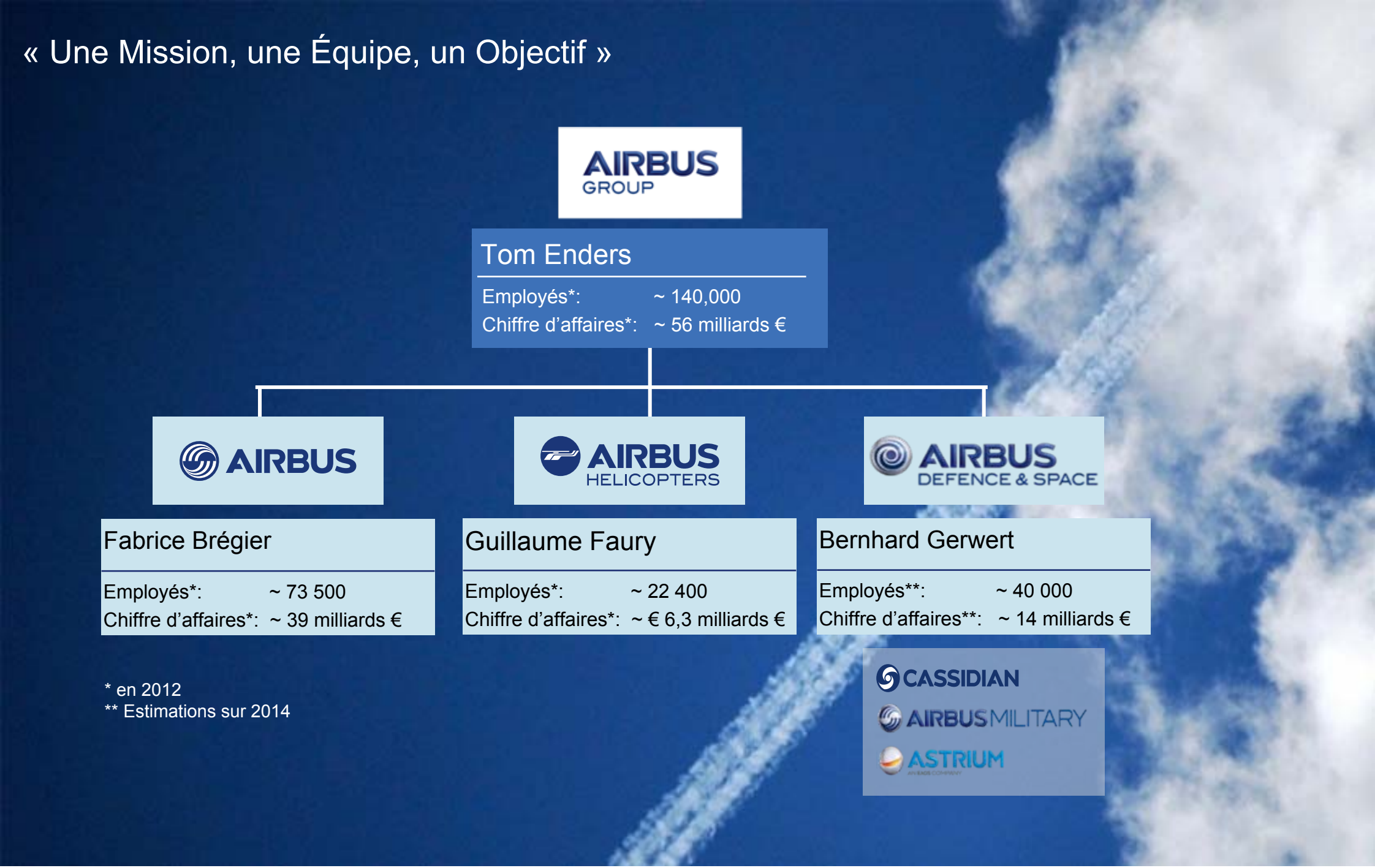
« Une Mission, une Équipe, un Objectif »



* en 2012
** Estimations sur 2014

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- N°1 européen de la défense
- N°2 mondial de l'espace
- Plus de 40 000 collaborateurs
- Environ 14 milliards € de chiffre d'affaires

Leader mondial de l'innovation, investit chaque année 3 milliards € en recherche et développement

Governmental and Commercial Markets

AIRBUS Defence and Space en Europe

Allemagne
1. Manching
2. Ulm
3. Friedrichshafen
4. Unterschleissheim
5. Ottobrunn
6. Brême

France
7. Toulouse
8. Elancourt
9. Les Mureaux
10. Aquitaine
11. Suresnes

Espagne
12. Getafe
13. Barajas
14. Séville
15. Cadix

Royaume-Uni
16. Stevenage
17. Portsmouth
18. Newport

AIRBUS Defence and Space dans le monde

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DEFENCE & SPACE

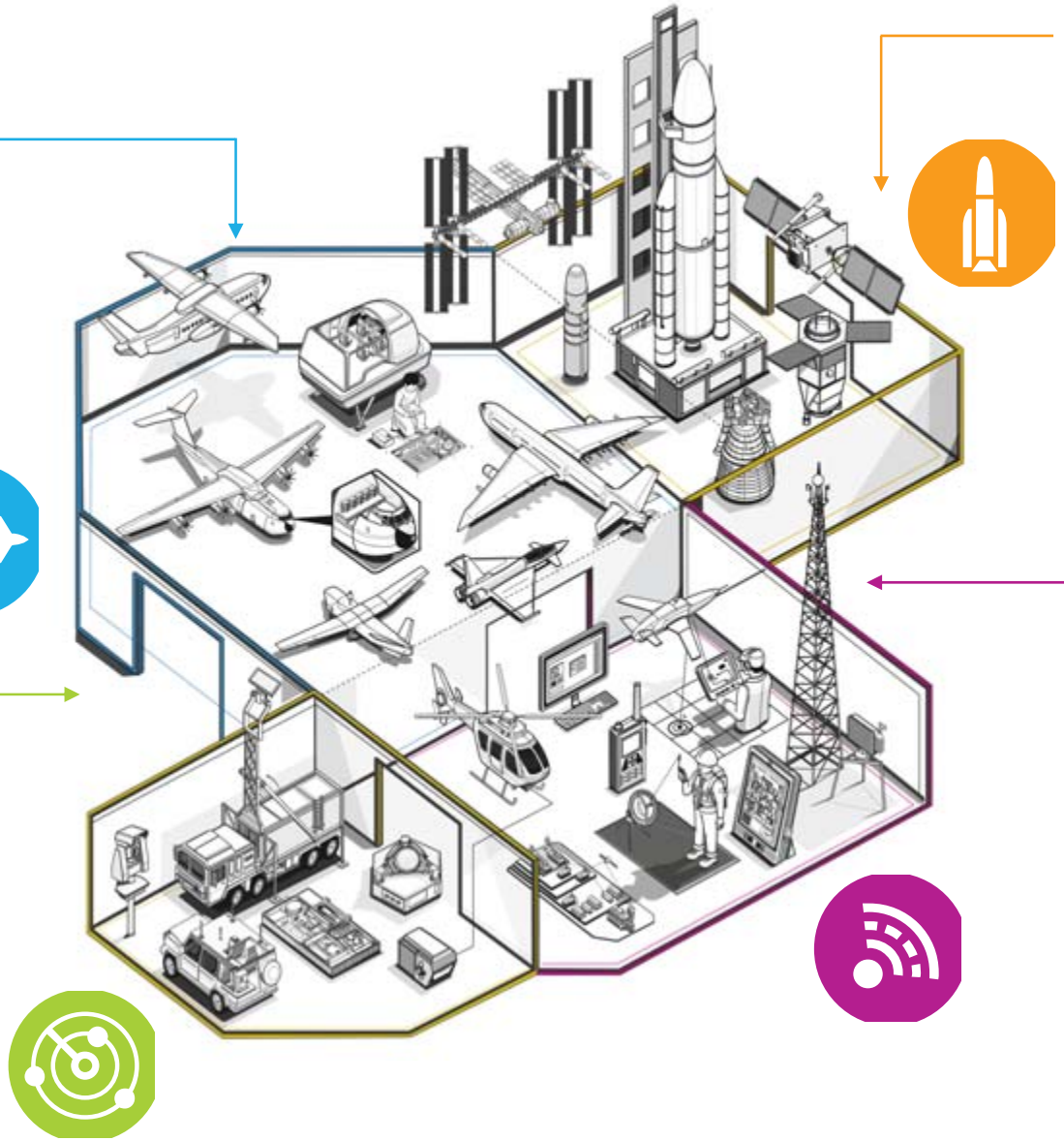
AIRBUS Defence and Space: Portfolio

Military Aircraft

- A400M, A330 MRTT, CN235, C212, Orlik,
- Eurofighter, Tornado
- Barracuda, Atlante, Harfang, Euro Hawk, futur drone MALE européen, Tracker, Tanan, Survey Copter

Electronics

- Systèmes de transfert de données de mission, systèmes optiques, électronique spatiale embarquée



Space Systems

- Lanceurs civils et stratégiques: Ariane 5, A5ME, A6, M51
- Véhicules orbitaux: ATV, station spatiale internationale (ISS)
- Satellites: Telecoms, observation, scientifiques
- Sondes interplanétaires (Herschel, Mars Express, Solar Orbiter), Lunar Lander

Communication, Intelligence & Security (CIS)

- Solutions de surveillance et de sécurité, solutions de communications sécurisées, cyber sécurité, systèmes de surveillance côtière, communications satellites, solutions d'intranet sans fil sur le terrain, Farmstar Expert, Tetra Systems

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“European Prime Contractor, System Integrator and manufacturer for Space Transportation and Orbital Infrastructures”

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Ariane Family: Success of European Industry Collaboration

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Access to Space: Europe's Launchers Family …

Europe has now a full, flexible launch capability

	Vega	Rockot	Soyuz	Ariane 5 ES	Ariane 5 ECA	Ariane 5 ME*
GTO performance (dual launch)			3 t	6 t	9.5 t	12 t
LEO performance	1.5 t 700 km	1.8 t 700 km	2.5 t / 5 t 1,400 km	> 20 t 300 km – 51.6°		

* in development

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… in a competitive Scenario

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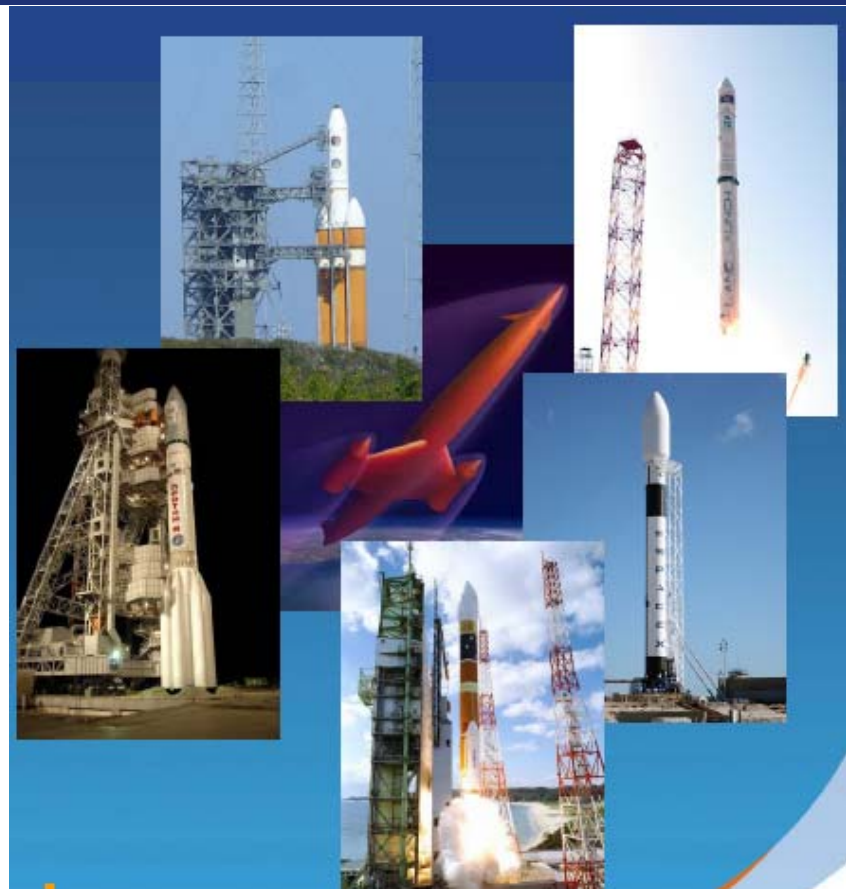
- Proton, Sea / Land Launch, Atlas 5, H2A, Falcon 9 : Access to Satellite Commercial Market
- Long March has limited the access to Commercial Satellites due to ITAR's constrains but they have capability to offer a full System (Launcher, Satellite and Services « made in China »)
- Angara: in development



Launcher	Proton	S-L Launch	Atlas 5	Falcon 9	H2A	Long March
Performance	3-6 tons	3-6 tons	3-6 tons	3-4 tons	4-5 tons	5 tons
Readiness	High	Low	Medium	Low	Medium	Low
Reliability	Low	Low	High	Medium	High	High
Affordability	Medium	Medium	Low	High	Medium	High

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Space X: New Space Launcher Market Scenario

Successful new Business and Industrial Model

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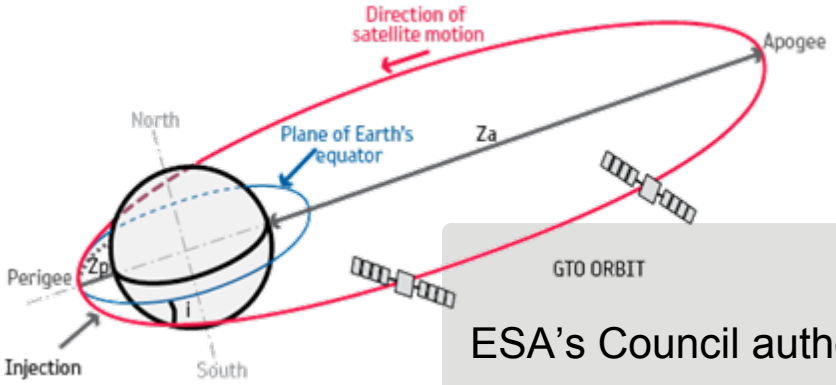
Ariane 6: Born at the European Ministerial Council (Oct'12)



At the end of 2012,
ESA's Council authorized the Programme Ariane 6 for a Launcher Configuration PPH type for a period of two years (C-MIN 2014)

Solid propulsion for the lower composite
Cryogenic propulsion (VINCI type engine) for the upper composite
Commonalities with Ariane5 ME and VEGA

Ensure Access to Space without Institutional Financial Support during the Operational Phase

- First Fight in 2021 (Qualification)
- Full Operation Capability in 2025
- Cadence up to 12 / year

Recurring Price Target for Single Payload Configuration at GTO

6.5 ton @ 70 M€
(Launch Service)

Technology Roadmap

- TRL6 at Subsystem PDR (TRL5 if moderate risk in term of time to market)

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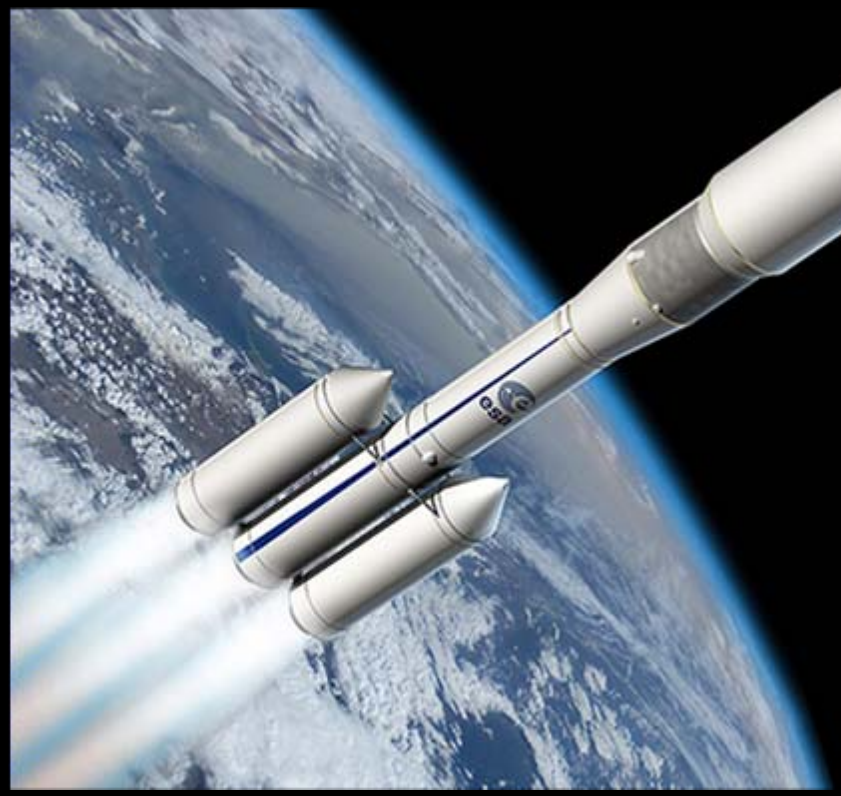
Ariane 6: Prime Contractor AIRBUS Defence and Space



[12.02.2014.- Communiqué de presse]

Airbus Defence and Space, numéro deux mondial des technologies spatiales, vient de se voir confier le contrat de l'agence spatiale européenne (ESA) pour poursuivre les études de définition et de faisabilité du nouveau lanceur européen Ariane 6 en 2014. Ces études doivent permettre de préciser l'architecture détaillée retenue et de consolider les principales caractéristiques de ce lanceur.

Airbus Defence and Space présentera les résultats de ces études en novembre 2014 lors de la System Requirements Review (SRR). Cette étape de validation de la bonne conduite du programme devrait permettre à l'ESA de figer les spécifications du système de lancement Ariane 6. Cela permettra à ses Etats membres de décider, lors du prochain Conseil de l'ESA au niveau ministériel prévu en décembre 2014, de la poursuite du développement de ce nouveau lanceur.

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Ariane 6: New Challenges for European Industry

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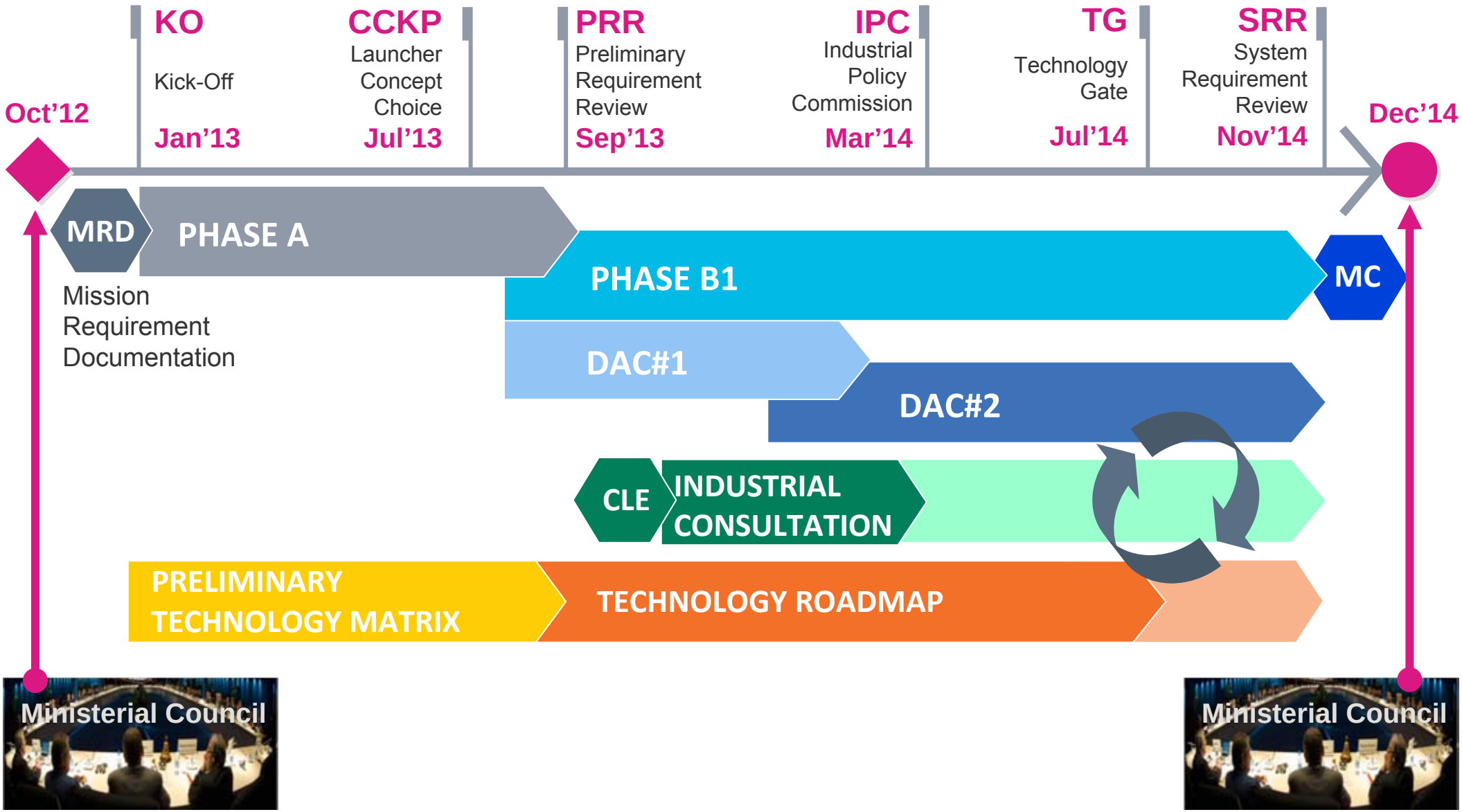
Ariane 6: Key Milestones - Phases A/B1



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Ariane 6: Launcher Architecture Selection Process

CCKP Jul'13

Data gathering Brainstorming — Step **01**

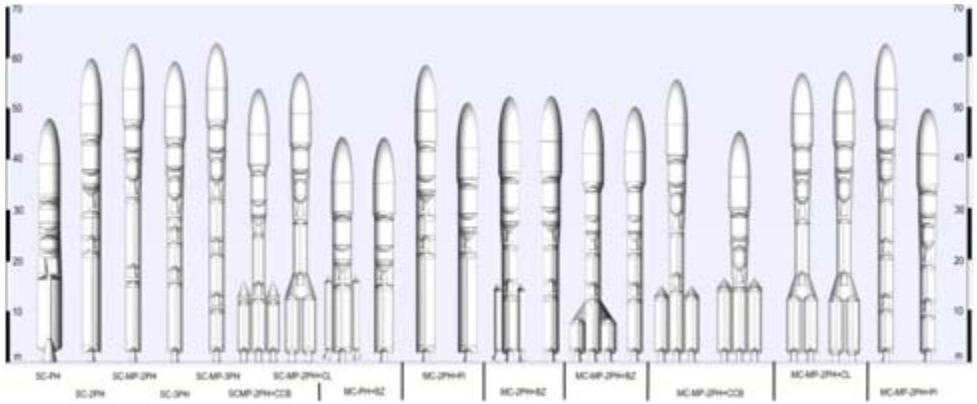
Pre-selection — Step **02**

Qualitative Analysis — Step **03**

Analytical Analysis — Step **04**

Decision — Step **05**

Initial Concept List



Short List + Variants

Retained Final Concept

SC-MP-2PH-CCB

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Ariane 6: Reference Concept

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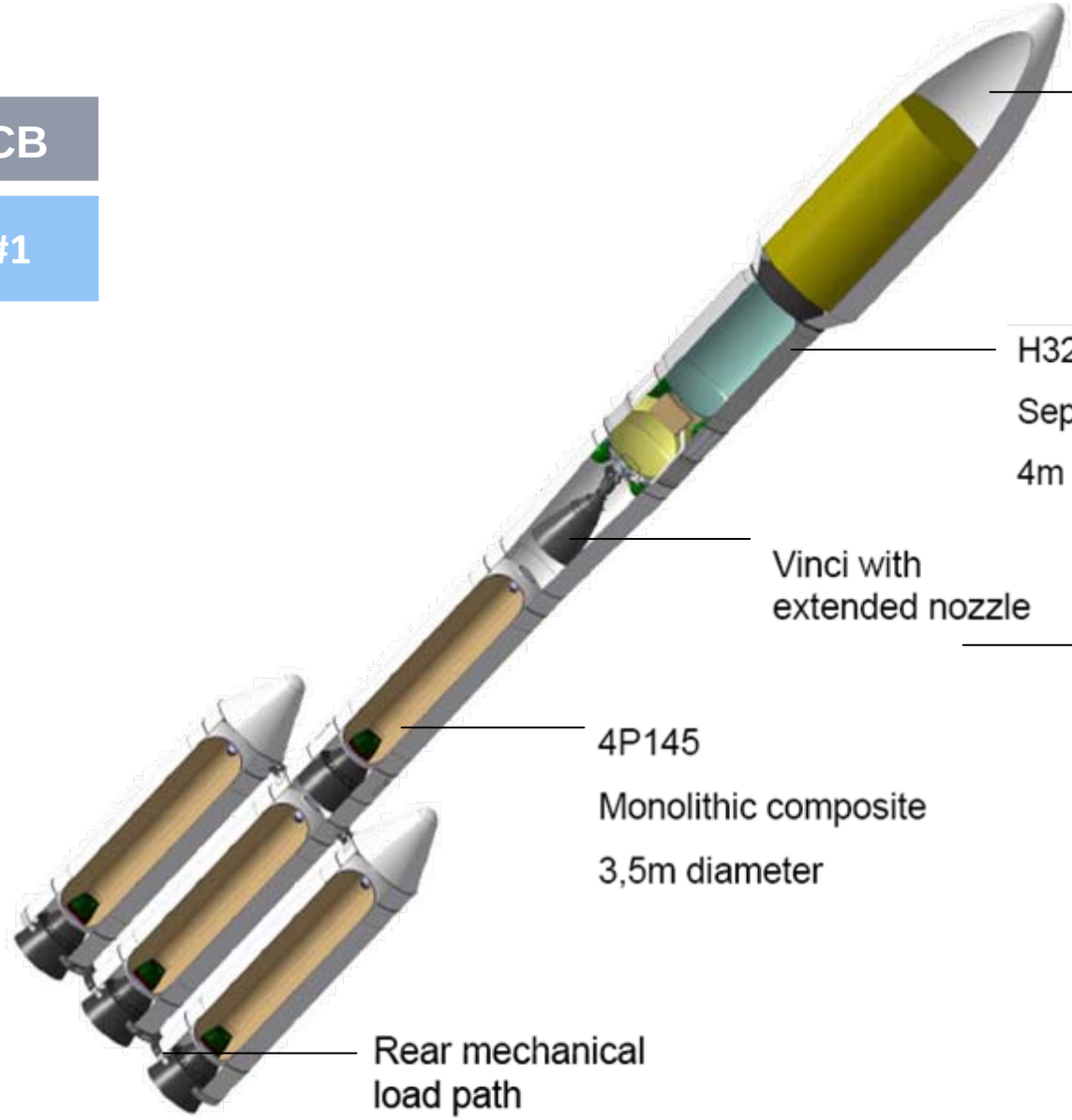
SC-MP-2PH-CCB

PRR	DAC#1



Length: 59m

FIL GLOW: 690t

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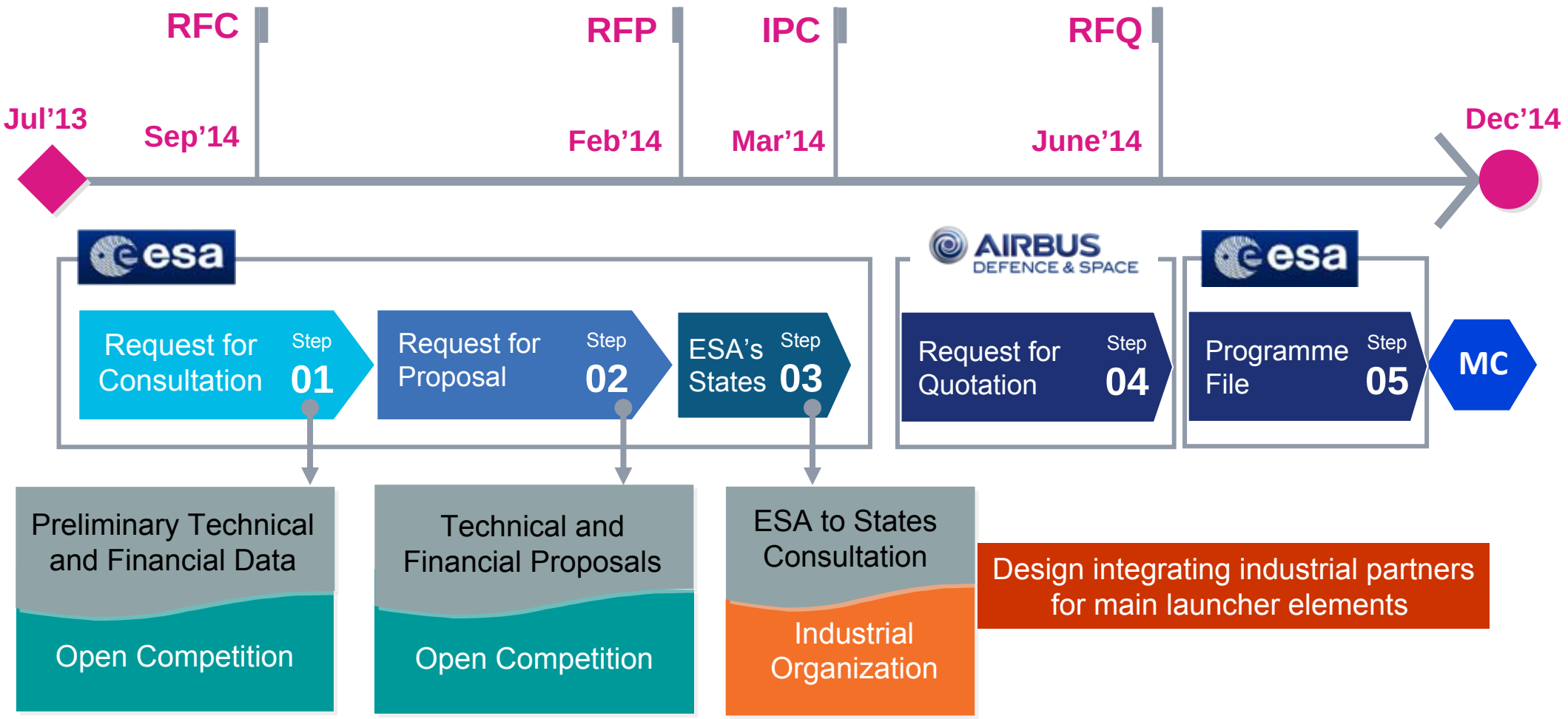
Ariane 6: Industrial Consultation Process



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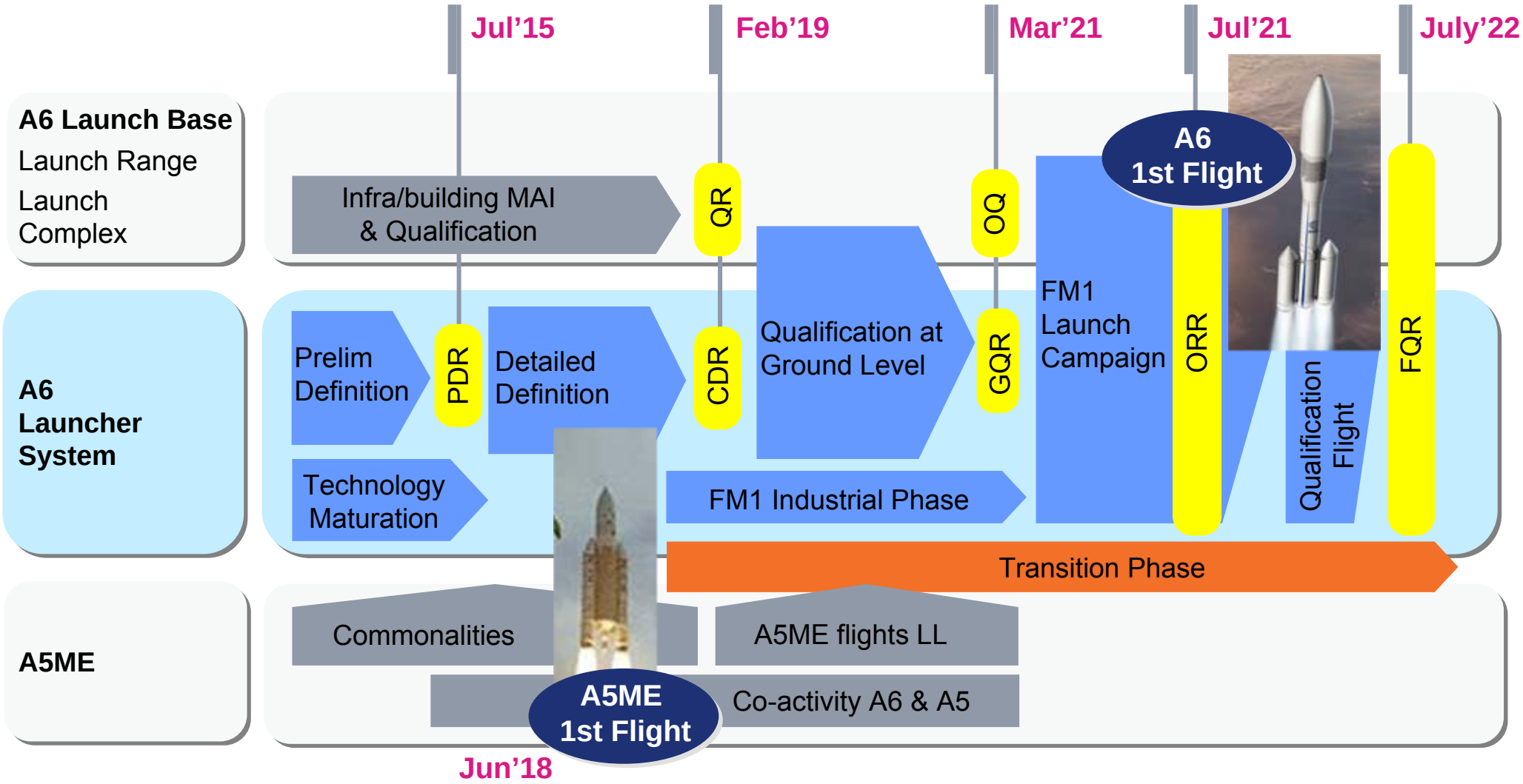
Ariane 6: Development Overview



FQR: Qualification Review at Flight level
GQR: Qualification Review at Ground level
LL: Lessons Learned

OQ: Operational Qualification
ORR: Operational Readiness Review
QR: Qualification Review

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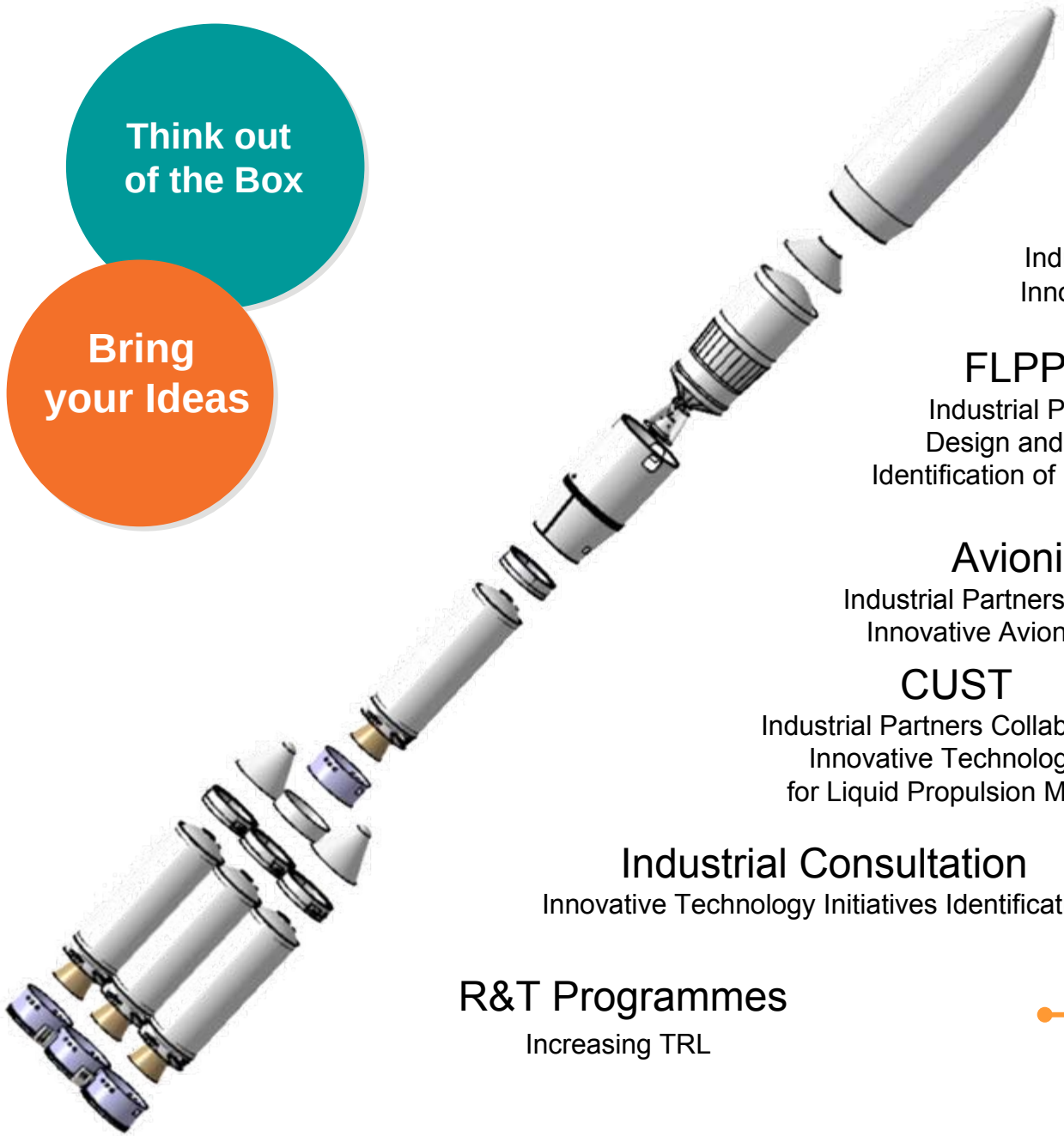
Ariane 6: Identification of key technologies

Ariane 6

Technology Roadmap

Think out of the Box

Bring your Ideas



NELS
Industrial Partners Collaboration
Innovative Ideas for Reducing RC

FLPP System 2.2
Industrial Partners Collaboration
Design and Concurrent Activities
Identification of Promisisng Technologies

Avionic-X
Industrial Partners Collaboration
Innovative Avionics Platform

CUST
Industrial Partners Collaboration
Innovative Technologies
for Liquid Propulsion Module

Industrial Consultation
Innovative Technology Initiatives Identification

R&T Programmes
Increasing TRL

Preparing the Furture

Ariane 6 industrial partners

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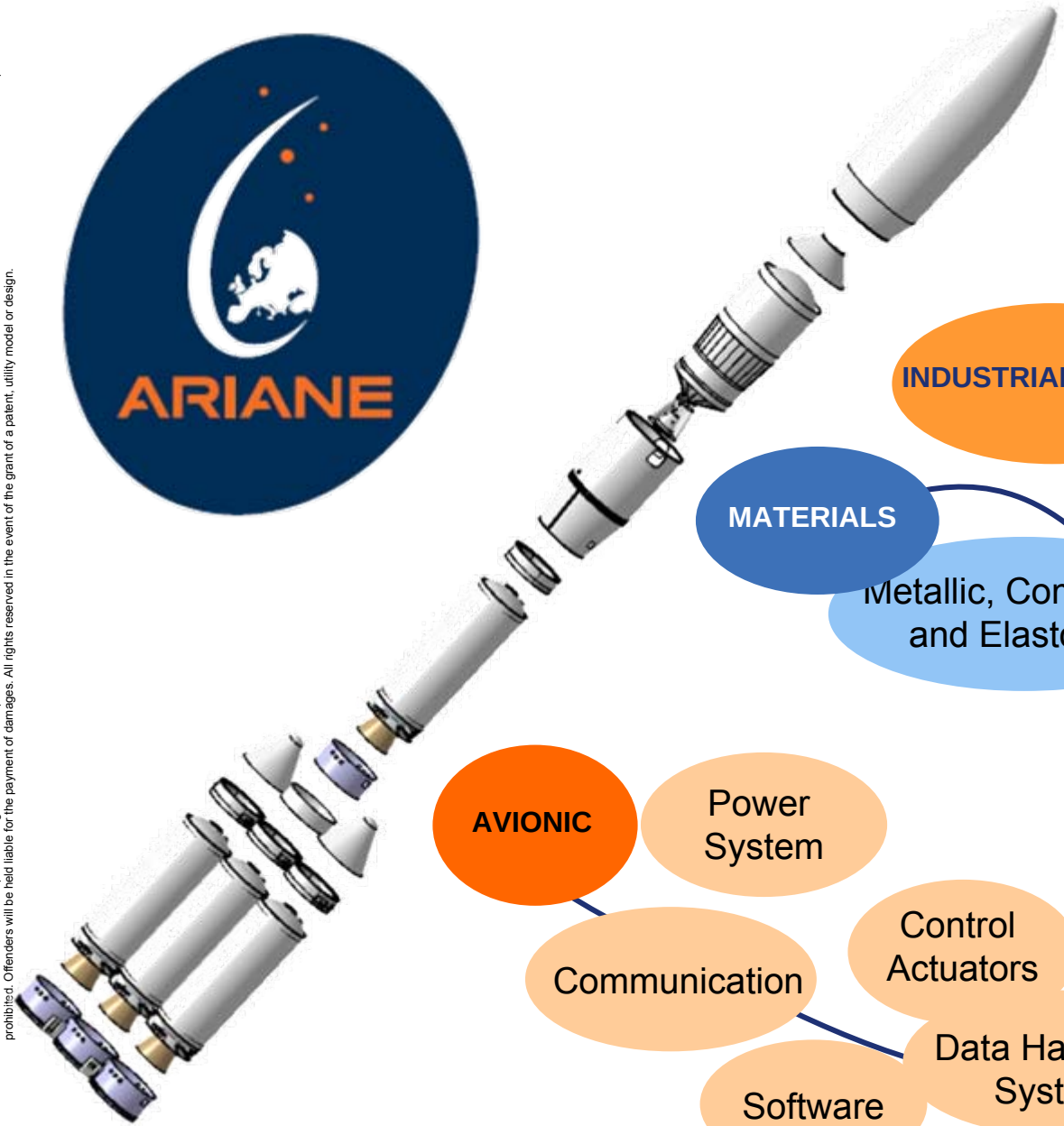
Ariane 6: Opportunities for the Pôle de Compétitivité de l'Île de France



ALL INDUSTRIAL SECTORS
- Technology Transfer

INDUSTRIALIZATION
- Cost Reduction Identification
- Process Implementation
- Means with Low Maintenance Cost
- Surface Treatment
- Joining/Assembly Solutions
- Logistic

MATERIALS
- Metallic, Composites and Elastomers
- Thermal Protection (Hot/Cryo)

AVIONIC
- Power System
- Communication
- Control Actuators
- Software
- Data Handling System
- Robust Evolution
- Harness
- Instrumentation
- Sensors

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WELCOME TO SHARE

ARIANE 6 CHALLENGES

WITH US

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Call for Ideas

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Ariane 6: Call for Ideas – Introduction

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- To identify innovative technologies or methodologies for Ariane 6 Launcher, **including from outside the traditional Space Launcher Sector**
- To support their inclusion in Ariane 6 Roadmap
- Airbus Defence and Space will not directly finance these ideas but will:
  - Give an expertise on the coherence of the proposal with the goals of the launcher design
  - In the positive case, give inputs to the idea provider in order to customize his idea
  - Promote this idea to get funding (ESA, FUI...)

This Call for Ideas is dedicated mainly to New Comers and SMEs

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Ariane 6: Call for Ideas – Process

- The general information will be put on the Astech site with a mail box address: **innovationspourariane6@astrium.eads.net** (TBC)

INNOVATIVE TECHNOLOGY SHEET	**INNOVATION TITLE :**	**COMPANY :**	**CONTACT :** Name : Email adress :
CONCEPT Description/advantges/drawbacks/technology drivers			
CURRENT TRL Company/Europe/World wide			
TRL JUSTIFICATION / R&D PROJECTS : Name/Contractual frame/Companies involved/Objectives/Time frame & budget/Main outcomes			
CONCEPT ROADMAP : Main activities/Duration/risks/RoM			

Template

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Ariane 6: Call for Ideas – Further steps (1/2)

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- All these information are very important to answer to the selection criteria:
  - The techno must bring a significant improvement on an exploitation cost parameter (manufacturing, operation, maintenance…)
  - Sufficient TRL6 / IRL1-2 must be achievable for 2015 / 2016 (beginning of development), with an acceptable development cost according to the exploitation cost gain
  - A comparison could be necessary between several proposals, and the information could be discussed: so some examples and a contact are necessary.
- An internal review shall be organized for selection of the Ideas by technical domains experts (System, Propulsion, Structures/Mechanisms, Avionics, Thermal, Materials, Manufacturing Processes)

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Ariane 6: Call for Ideas – Further steps (2/2)

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- If some confidential information shall be sent, a mutual **NDA** for Intellectual Property Rights, will be fulfilled and signed, in 2 original copies then sent to Airbus DS for final signature.
- Apart from the NDA, **Export Control authorization** could be necessary in case of discussion with entities of different countries
- **First selection** by Airbus Defence and Space **of ideas** considered relevant for an application on Ariane 6. Airbus Defence and Space commits to answer formally to each company concerned about each idea proposed.

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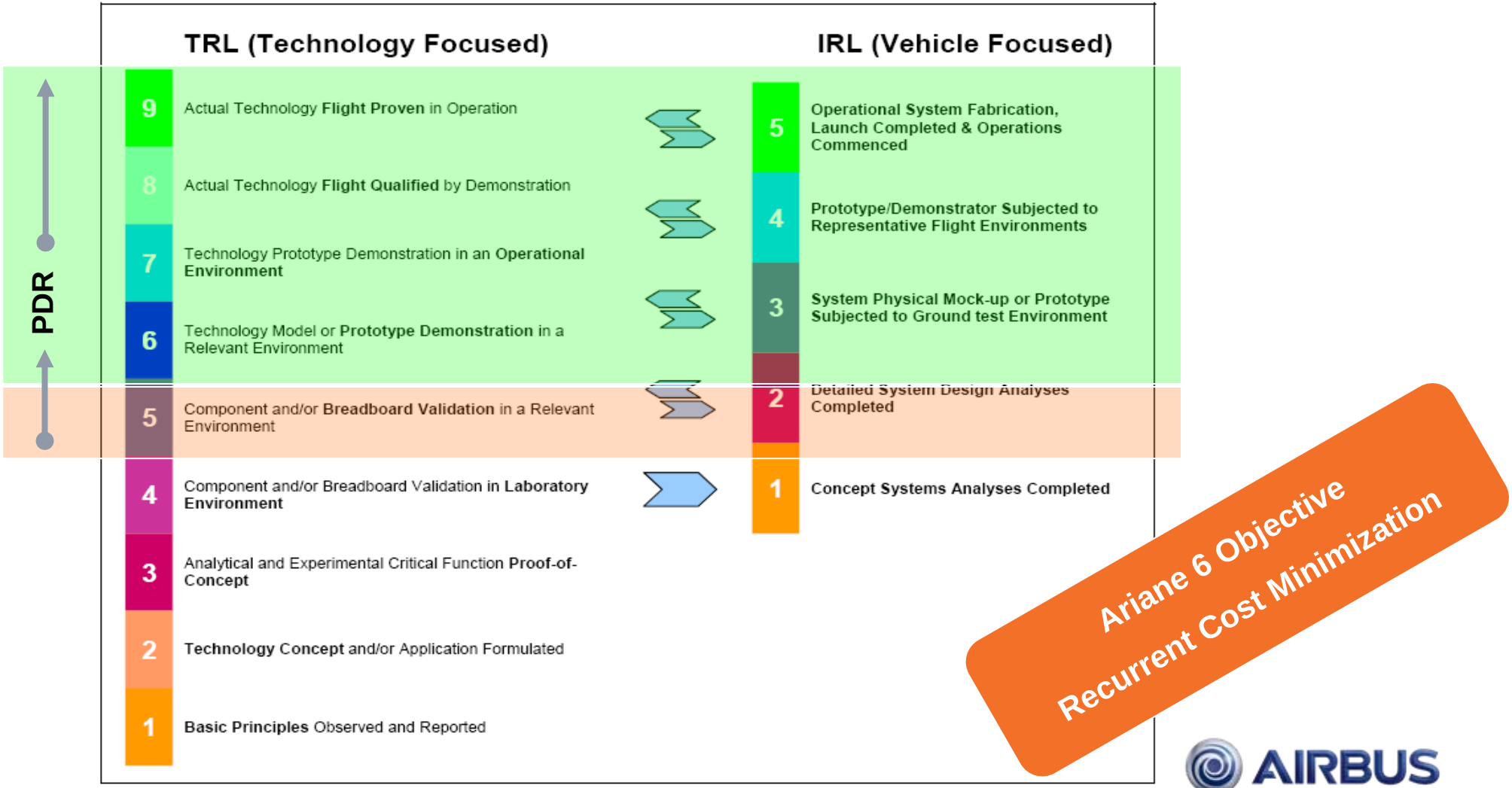
Ariane 6: Call for Ideas – TRL / IRL

Technology

Technical know-how that is required for the design, manufacturing and test of a space product, including also all related processes.



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Ariane 6: Call for Ideas – General planning

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- We foresee a period for submission between April 9th and June 15th
- The selection of ideas will be made between June 15th and September 15th
- Then discussion will be conducted with the selected companies to include their ideas in Airbus Defence and Space roadmap with following issues:
  - Industrial partnership/consortium
  - Financing opportunities
  - This should be organized before the Ministerial Council End of 2014.

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Thank you for your attention

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