

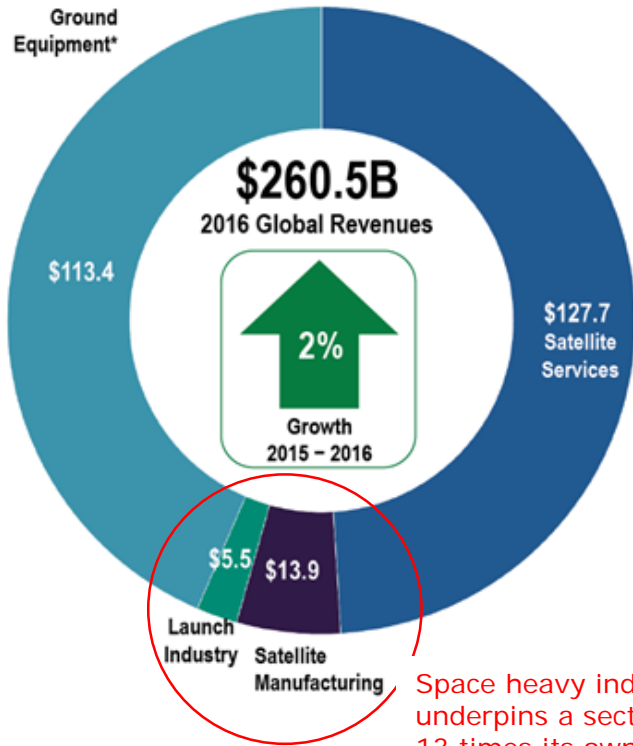
The ESA Advanced Research in Telecommunications Systems (ARTES) programme: An Overview

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ESA Telecom Technologies, Product & Systems Dep., Directorate of Telecommunications and Integrated Applications

Zagreb, 11 March 2019

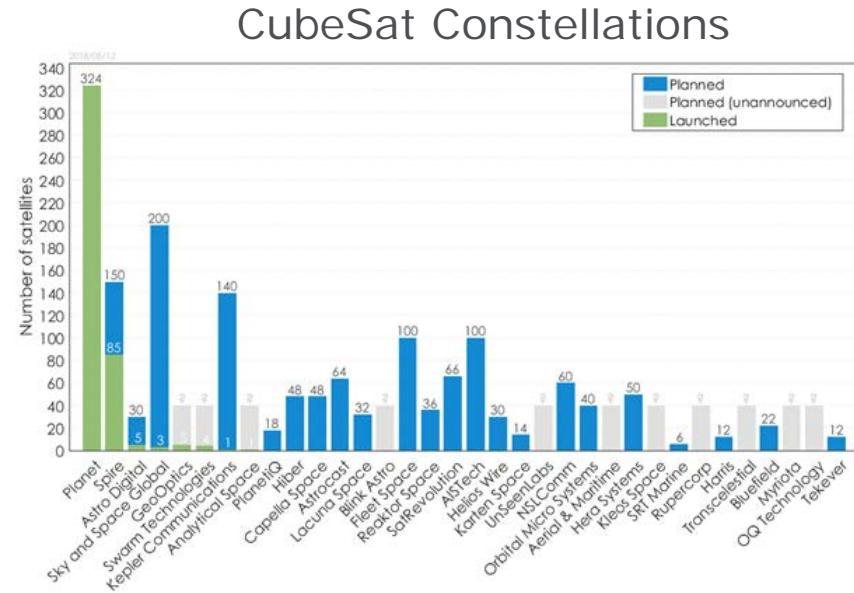
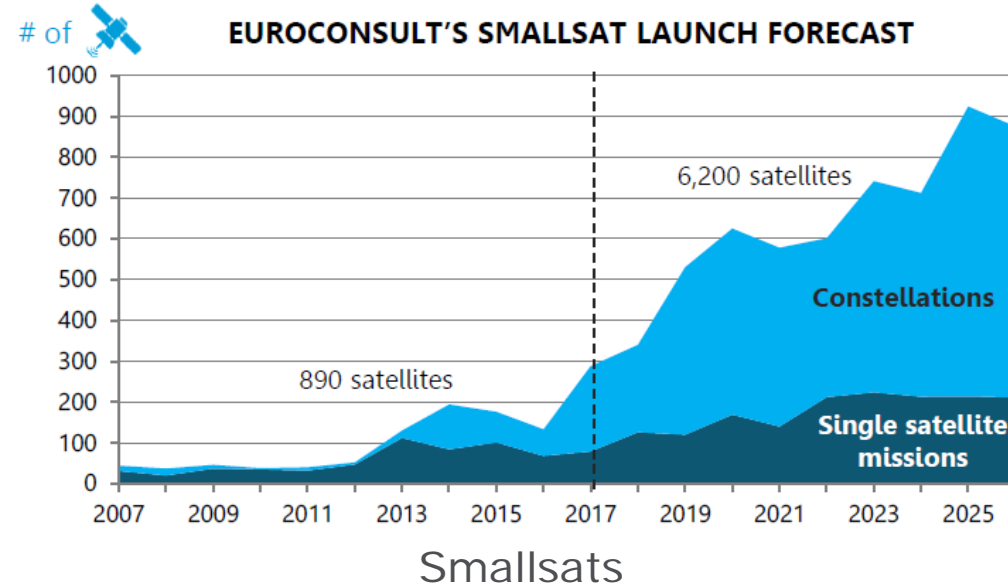
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Space heavy industry
underpins a sector
13 times its own size

- Satcom is the largest revenue generator amongst space applications, but it is undergoing a deep transformation:
 - ✓ Move from satellite TV broadcasting to non-linear TV viewing over the internet
 - ✓ Move to HTS, VHTS and constellations
- Fierce competition amongst all entities in all sectors
- In such a market, ESA can provide effective support through reinforced initiatives in innovation, risk mitigation and increased competitiveness

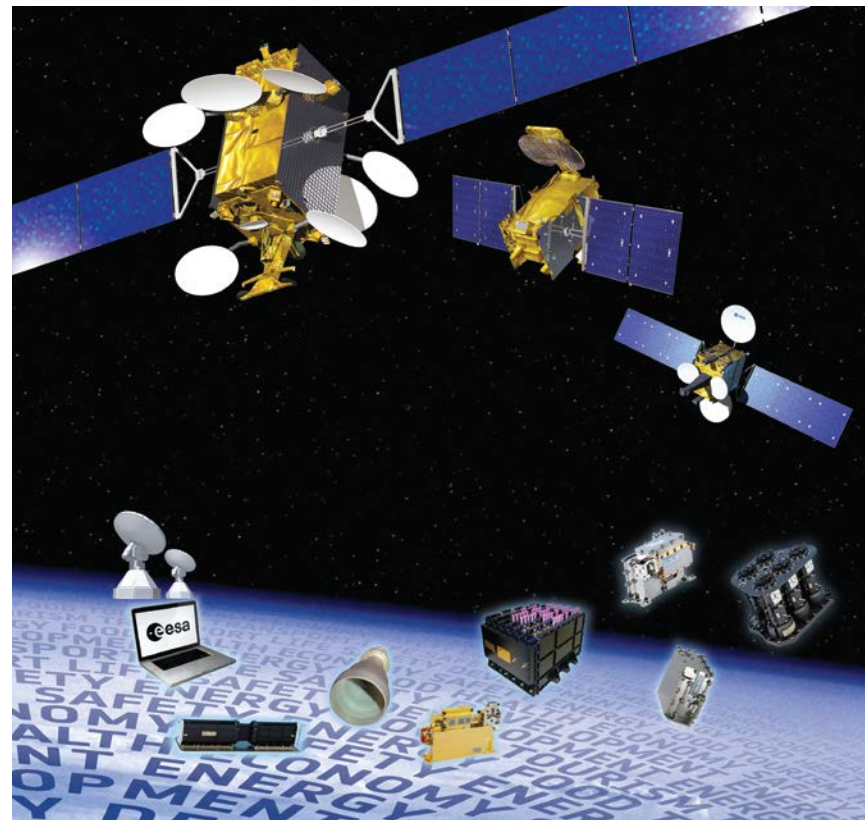
New-space: an Opportunity for Newcomers in the Space Industry



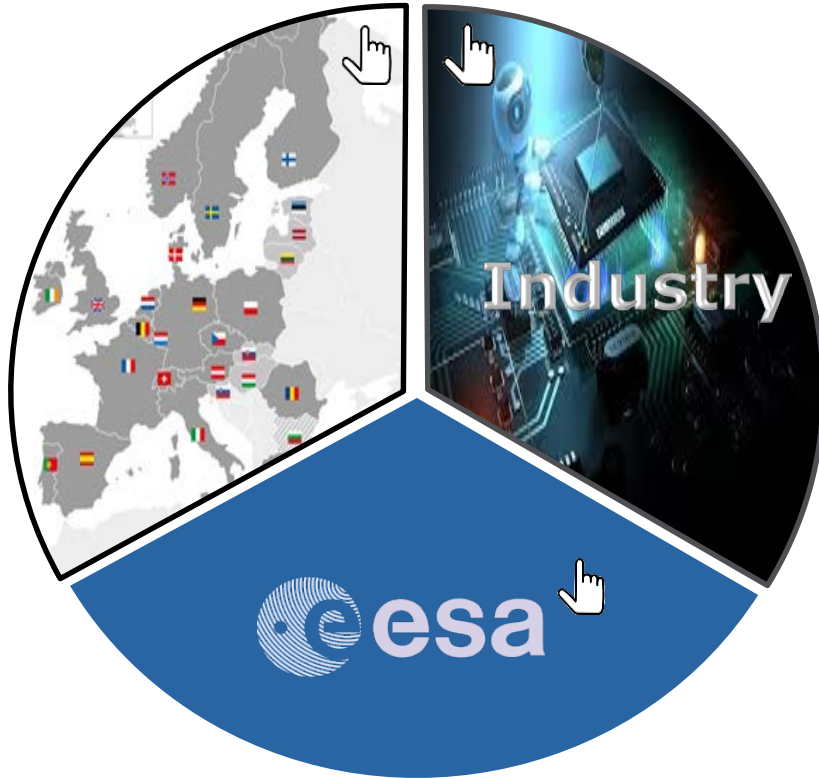
ARTES Objectives

ARTES: Advanced Research in
TElecommunications Systems

- to **Support the competitiveness** of the European and Canadian industry on the world market
- to Explore, through research and development (R&D) activities, innovative concepts to produce leading-edge **satcom products and services**
- to **Develop the use of space** for the benefit of the European **citizens** and of the **economy**



The ARTES Programme: Based on Partnership



- National Delegates contribute funding
 - Industry & institutions⁽¹⁾ develop technology and products⁽²⁾ for the world Satcom market
 - ESA shares the risks and manages the contracts and activities
- Industry brings the end result to market & retains IPR

(1) within ESA Member States participating in ARTES

(2) Any hardware, software, system or sub-system, service or application item

The ARTES Elements:



- Future Preparations (FP)
- Business Applications Integrated Applications Promotion (IAP)
- Core Competitiveness (CC)
- ScyLight
- Large Platform Mission (LPM)
- Next Generation Platform (Neosat)
- European Data Relay Satellite System (EDRS)
- Iris - SatCom for Air Traffic Management
- Automatic Identification System (SAT-AIS)
- Partner (e.g. Electra, Quantum, Indigo, ECO, Pioneer, Govsatcom, AIDAN)

Focuses on:

Defining market opportunities; regulatory barriers; standards; future frequency spectrum needs; as well as economic and business issues relating to the [development of future satellite telecommunications concepts and technologies](#)

By means of:

- Mission, System, General configuration [studies](#)

Leading to:

- [Definition](#) and [identification](#) and [timing](#) of the technology developments necessary for the execution of the future satcom systems

→ Future Preparations Activities are [fully funded by ESA](#) in open competition

ARTES Business Applications video



esa



business
applications

<https://www.youtube.com/watch?v=IoLDYxi5uKw>

01:59



ARTES BA is dedicated to the development, implementation and pilot operations of Integrated Space Applications

These are applications of space systems that combine different types of satellites, such as telecommunications, earth observation and navigation

Integrated Application projects offer solutions that range from secure transport systems to developing emergency/disaster management systems

“Space for daily life”



ARTES Business Applications



In close
partnership with
end users ...

market pull

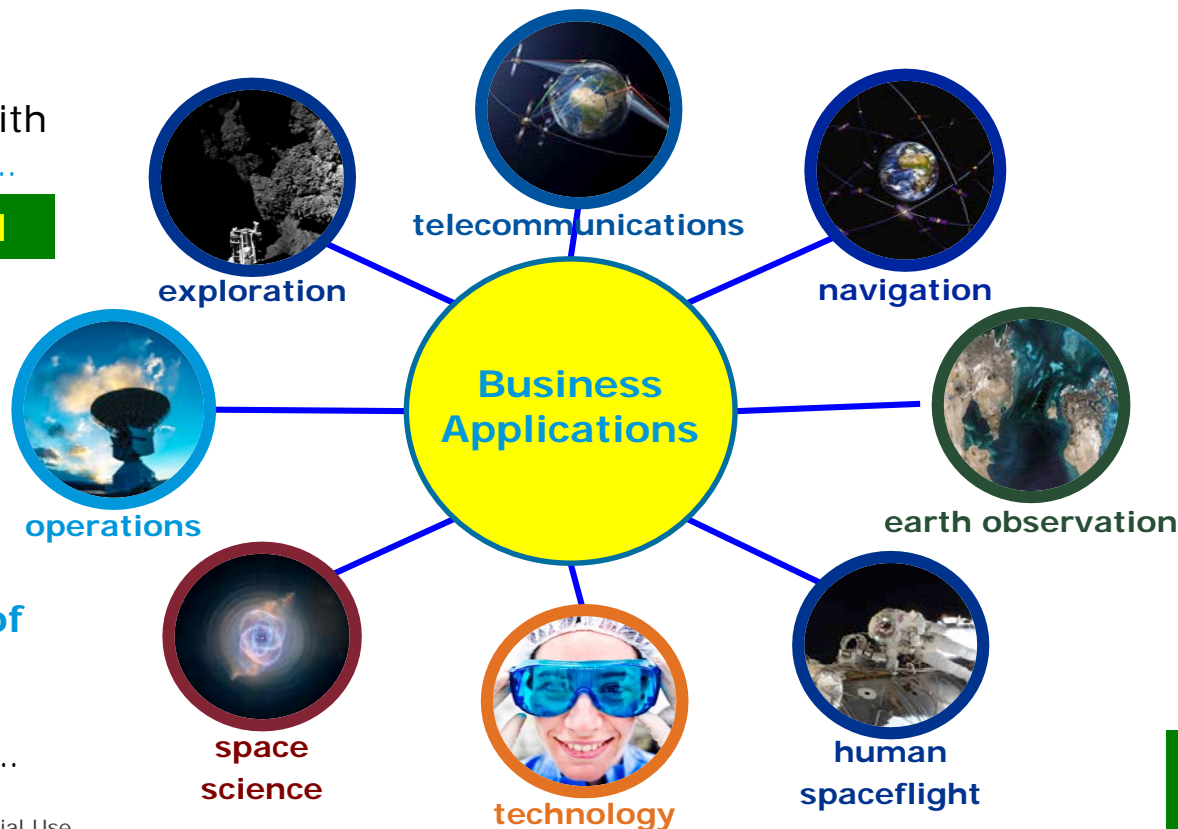
... foster the
utilisation of
existing space
capabilities ...

**operational,
reliable**

... through
integration of
space with
non-space
technologies ...

... to develop
sustainable
applications and
services.

business
development

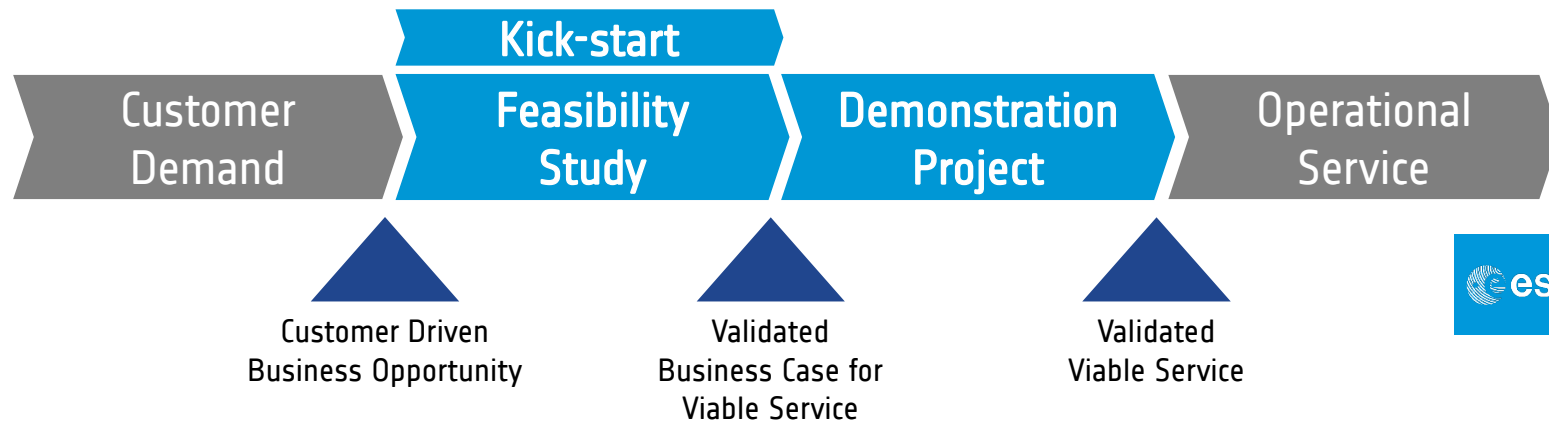


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European Space Agency

Funding levels in ARTES Business Applications



Users with demand but no contact to industry

Contact with ESA:

- business.esa.int
- Conferences
- IAP Ambassadors
- Call for user ideas
- Webinars

- 50%* - initiated by industry / partner, involving users, continuous open call

- 75% - Kick-Start Studies
- 100% - ESA initiated tenders in close collaboration with users

- 50%* - initiated by ESA or industry, dedicated tender or continuous open call

Support:

- PR News Item, Awareness
- Access to investors

* SMEs can be funded up to 75% upon authorisation by national delegations

ARTES Core Competitiveness video

<https://www.youtube.com/watch?v=PuJqqhKC8Is>



ARTES Core Competitiveness



It provides support at any point of the **technology development** process; from initial **idea** to a fully-fledged **product, system** or **service**

ARTES CC provides the **funding**, multi-disciplinary **expertise**, **business knowledge**, opportunities for **Small and Medium Enterprises**, **international consortia** and **contacts** needed to turn the concept into reality

ARTES Core Competitiveness comprises two sub-elements:

- **ARTES Advanced Technology (AT) → ESA driven Fully Funded**
- **ARTES Competitiveness & Growth (C&G) → Industry driven**



ARTES Core Competitiveness offers



1. Makes funding available
2. Facilitates synergies and cooperation among Industry
3. Enables think tank for ideas and opportunities
4. Offers independent assessment and technical expertise
5. Ensures full transparency of the process
6. Guarantees confidentiality and fairness



Example of a typical Product Development in ARTES C&G

Company's Development Plan and ARTES C&G Support

**Industrial
Internal Definition
Phase
Product Definition**

Critical/high risk
Technology
Development

Product
Development

Market
Introduction

Now

Technology Phase

up to 75%

Product Phase

up to 50%

Demonstration Phase

up to 50%

Time




Funding levels in ARTES C&G



<i>Development Phase</i>	<i>Funding level up to</i>	
	<i>Non-SME</i>	<i>SME</i>
Definition Phase - up to 250 k€	50%	75%
Technology Phase	75%	75%
Product Phase	50%	75%
Demonstration Phase	50%	75%

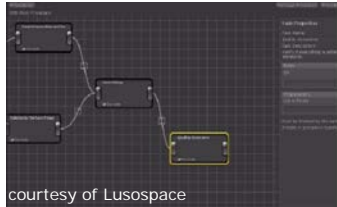
Funding levels for Universities and Research Institutions



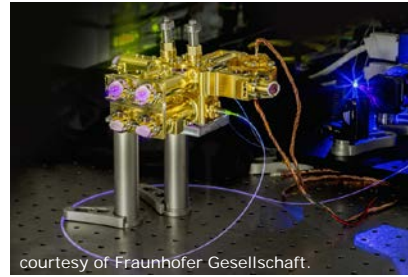
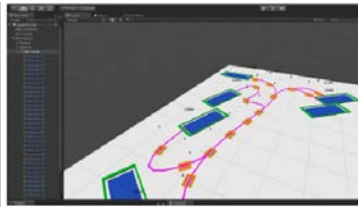
	Maximum Funding Level for Universities or Research Institutes	
ARTES C&G Development Phase	With commercial Interest in the product (SME status)	No commercial interest in the product
Definition Phase	75% *	50% *
Technology Phase	75% *	100% *
Product Phase	75% *	50% *
Demonstration Phase	75% *	not allowed

* up to 30% of total contract cost

Examples of Recent Developments in ARTES CC



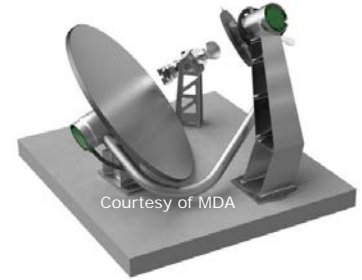
courtesy of Lusospace



courtesy of Fraunhofer Gesellschaft.



courtesy of Kongsberg Norspace A/S.



Courtesy of MDA



courtesy of Space Engineering



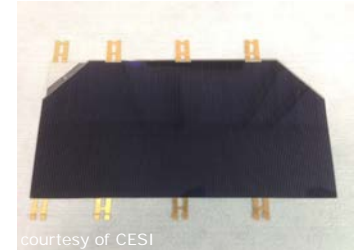
courtesy of TSAT AS



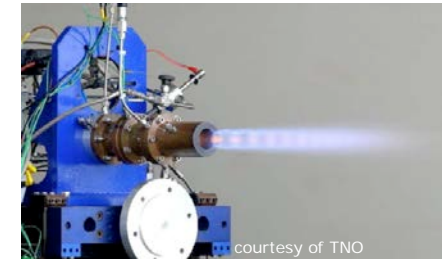
courtesy of RUAG Space AB



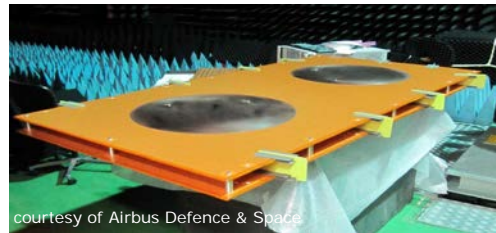
courtesy of QHB System



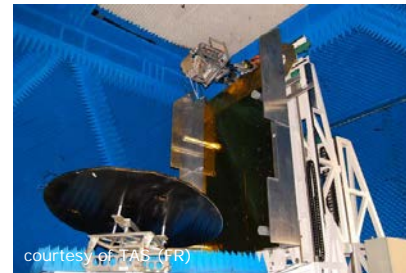
courtesy of CESI



courtesy of TNO



courtesy of Airbus Defence & Space



courtesy of TAS (FR)



courtesy of Satixfy U.S. Ltd.

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European Space Agency

ARTES CC – Celebrating 25 Years of Success



Catalyst of Satcom
Innovation in Europe

Delivers high
Socio-Economic Impact to
ESA Member States

Attracts Industry, Academy,
SMEs, Institutions

Provides business and technical
knowledge to all stakeholders
and fosters cooperation

>350 running contracts
Ca. 100 new contracts per year



4.7/5

Support Rating by Industry

Attracts large private investments:
300 M€ since 2014

Paves the future of
Satcom technology and products,
awarding >140M€ in 2018

>330M€

Total price of running contracts

>535M€

Total cost of running contracts (*)
(*) including Industrial funding – status end 2017

582 M€

*ARTES CC funding subscribed at
2016 ESA Ministerial Council
(2017-2019)*

> 50 ARTES AT ITTs
fully funded are issued
per year

Optical Communication Technologies are considered to be one of the next major revolutions in satellite communication, bringing unprecedentedly high levels of transmission rates, data security and resilience in the next decade

Through ScyLight, ESA aims to elaborate a technology roadmap for optical communications, with focus on:

- Optical Communication Technology at System Level
- Optical Communication Terminal Technology
- Intra-Satellite Photonics/Optical Payloads
- Quantum Cryptography Technologies and initial services demonstration

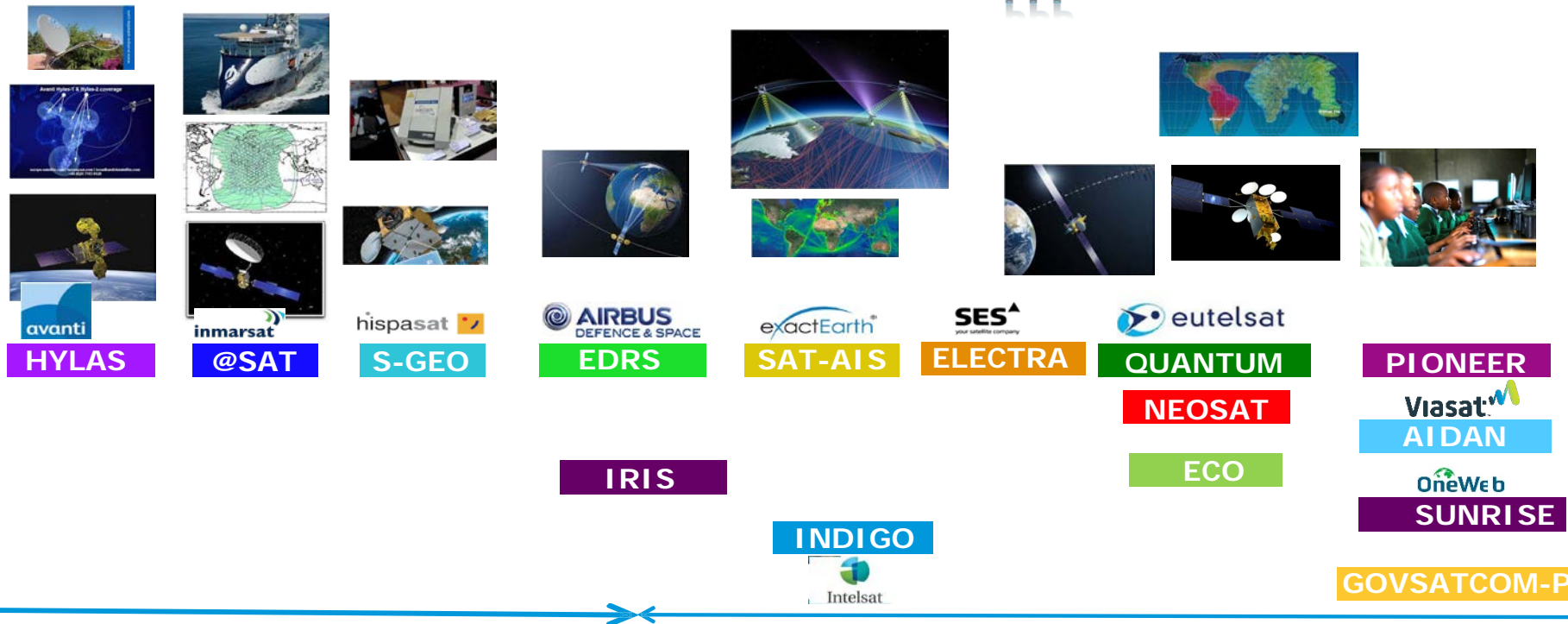


Industry-initiated Telecommunication Public-Private Partnerships (Partner) is the programme element to provide the satcom industry with an efficient framework to **bring innovative products and systems into the marketplace** through industry-generated public-private partnerships

- **Always-open** opportunity
- **Several PPPs** implement to date
(including Amerhis, Alphasat, SmallGEO, Hylas-1 and EDRS)
- Involvement of major satellite **Operators**
and **Large System Integrators**



ARTES Public-Private Partnership (PPP)



2010

Launched

2014

Under Development

2016

2017-18

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European Space Agency

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The **ARTES** programme: ESA's response to trends in the satcom industry for the competitive positioning of European industry

<https://artes.esa.int/>

