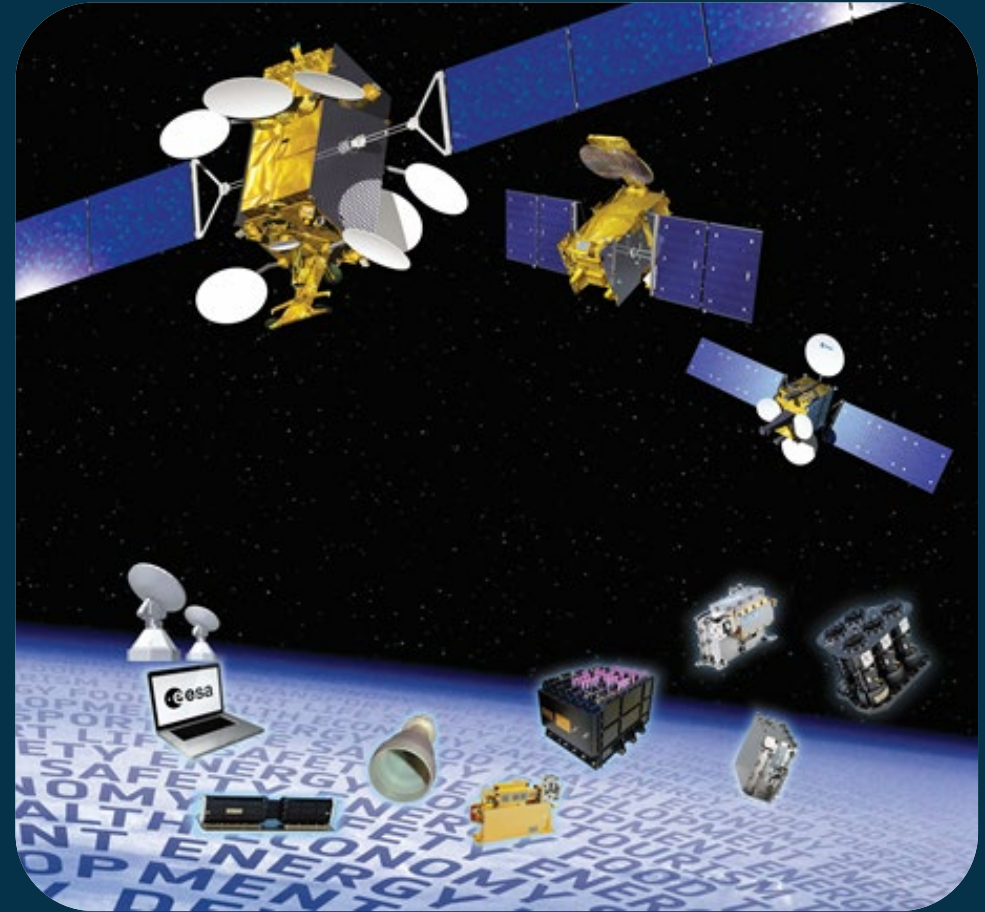


ARTES 4.0 Core Competitiveness – an Overview

Dietmar Schmitt
ESA Head of Technologies and Products Division¹

ARTES: Advanced Research in TElecommunications Systems



The ARTES Programme: Based on Partnership



- **National Delegations** contribute funding
AT+BE+CH+CZ+DE+DK+EE+ES+FI+FR+GB+GR+HU+IE+IT+LU+NL+NO+PL+PT+RO+SE+CA
- **Industry & institutions** develop technology and products for the world satcom market
- **ESA** shares the risks and manages the contracts and activities
- **Industry** brings the end result to market & retains Intellectual Property Rights (IPR) when co-funded

Strategic Programme Lines

Responding to societal/economic objectives

Total
Subscription 1.57 B€
At Space19+

Direct access
to Programme
Lines

Space for 5G

Space Systems for
Safety and Security
(4S)

Optical Communication-
ScyLight

Generic Programme Lines

Maximum efficiency

Future
Preparation

Core
Competitiveness
(ARTES C&G + AT)

Partnership
Projects

Business Applications
Space Solutions



ARTES 4.0 Core Competitiveness

Makes **funding** available



Guides you
to the most
suitable
programmatic tool



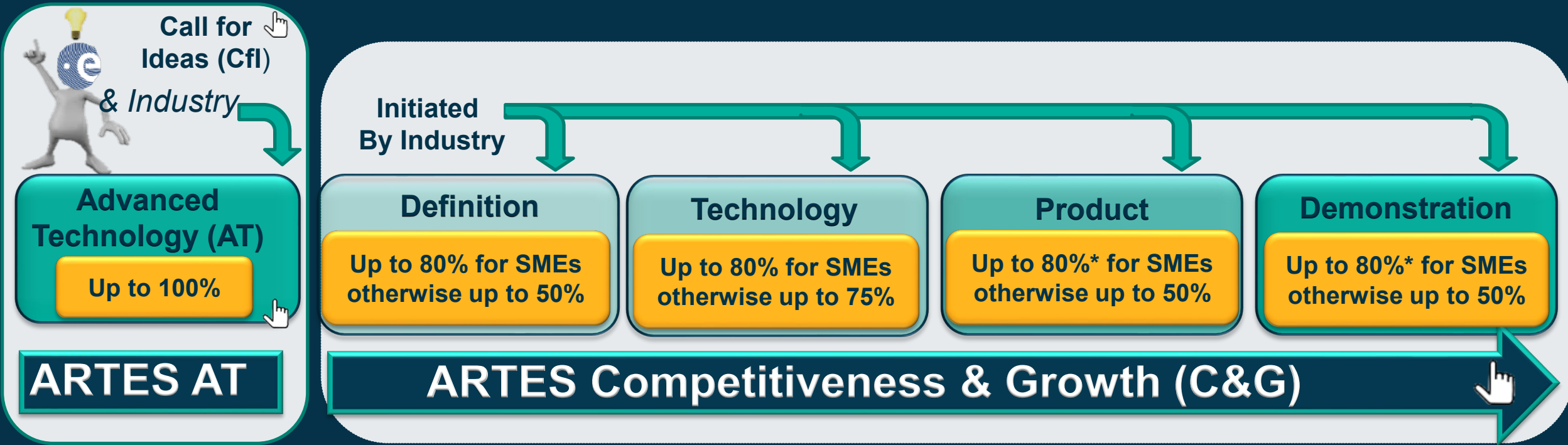
Facilitates **synergies**
and cooperation
among Industry

Independent
assessment and
technical **expertise**

Full transparency,
confidentiality and
fairness

Think tank for ideas and opportunities





Open Competition



Technology Push

Direct



Market Pull


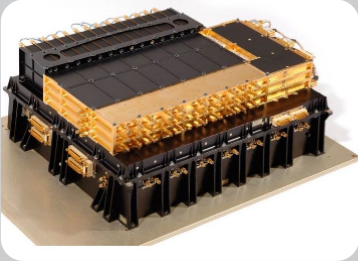


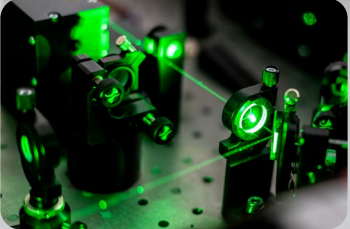
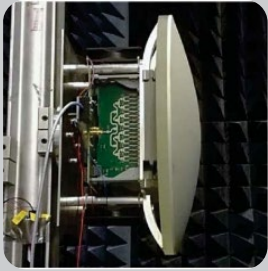





Negotiation

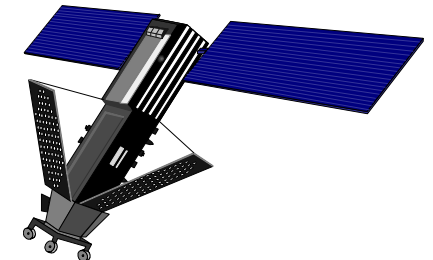




ADVANCED TECHNOLOGY


ARTES Core Competitiveness Technology Pillars

mm Wavelength Communication	Digital Processing Cloud & AI	Optical Communication	Smart Antennas	Disruptive Platform Sub-systems	Smart Design & Manufacturing
	  <p>MDM5000 Satellite Modem</p>	 	 	 	 
mm-wave communication techniques, devices, equipment and systems from mW to kW power range	Scalable and efficient digital signal processing, virtualisation and orchestration hardware and techniques	Optical devices, systems, techniques and equipment	Steerable multi-beam antennas, Large lightweight, stowable reflectors	Electrical, mechanical and advanced thermal, propulsion satellite platform subsystems	Augmented Reality, digital twin, AI supported development. advanced manufacturing



Work Plans and Activity Status: <https://artes.esa.int/advanced-technology>





Log in

Core Competitiveness

ESA's ARTES Core Competitiveness programme helps European and Canadian industry to develop innovative satcom products, services, systems and partnerships.

Home / Advanced Technology

Advanced Technology

ARTES Advanced Technology is dedicated to long term technological development of the satcom industry based on ESA's initiative. This element focuses on research and development of new technologies and techniques in telecom satellites, ground and user equipment for future or evolving satcom systems.

[Download the ARTES AT Workplans for Current and Previous Years](#)
[Download the ARTES 4.0 Planned Activities Summary Table](#)

Related links

[ARTES Advanced Technology - Workplan](#)
[ARTES 4.0 planned activities Summary table \(AT, ScyLight, 4S and 5G\)](#)

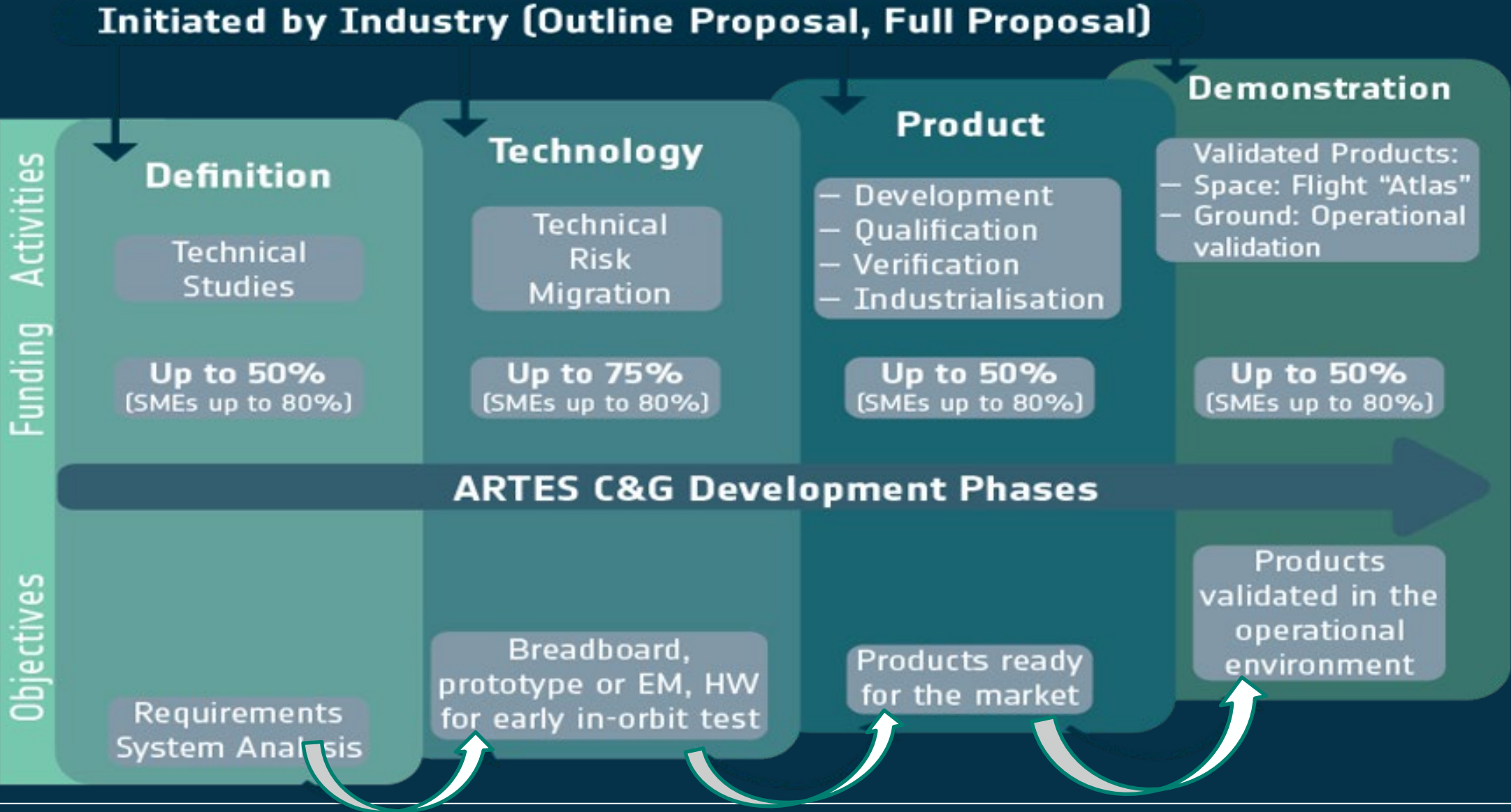
Documents

COMPETITIVENESS AND GROWTH

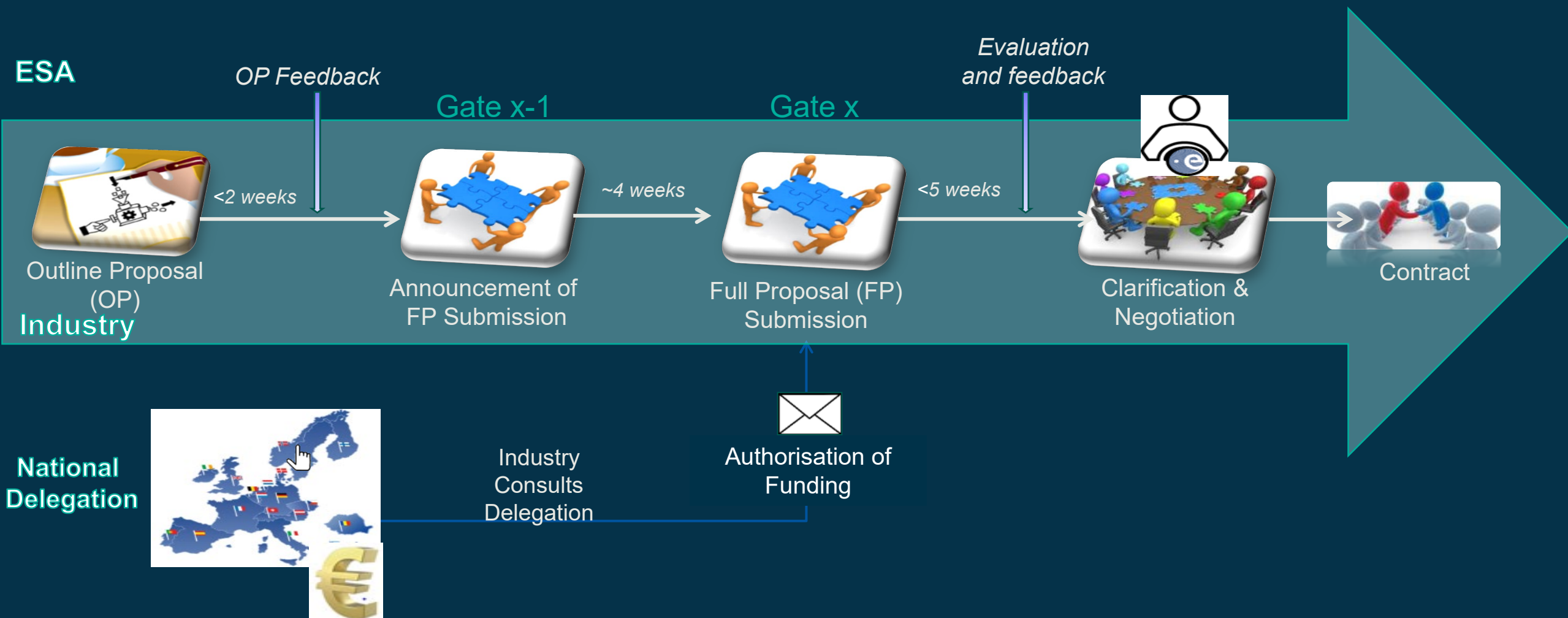
Industry-initiated

Industry-initiated
ESA-initiated

ARTES 4.0 Competitiveness & Growth: Development Phases



ARTES 4.0 Competitiveness & Growth Process



Funding Levels in ARTES C&G - Industry



C&G <i>Development Phase</i>		Funding level <i>up to</i>	
	<i>Main goal(s)</i>	<i>Non-SME</i>	<i>SME</i>
Definition Phase	Establish user requirements / spec. and define baseline	50%	80%
Technology Phase	De-risking; tested BB or EM; early in-orbit test	75%	80%
Product Phase	Qualification / industrialisation; (E)QM	50%	80%
Demonstration Phase	Validate the product in its operational environment; PFM	50%	80%

Funding Levels in ARTES C&G - Institutions



	Maximum Funding Level for Universities or Research Institutes		
ARTES C&G Development Phase	With commercial interest in the product (Non-SME status)	With commercial interest in the product (SME status)	No commercial interest in the product (up to 30% of the total contract cost)
Definition Phase	50%	80%	50%
Technology Phase	75%	80%	100%
Product Phase	50%	80%	50%
Demonstration Phase	50%	80%	50%

ARTES AGILE Intention and Scope



ARTES AGILE supports development activities within the ARTES 4.0 Call for Proposals covering Technologies and Products in C&G, ScyLight, 4S and 5G using the same implementation rules as for C&G:

Intention:

- Facilitate **short duration** technical de-risking activities critical to the definition and development of future products and services for the satcom sector
- Foster Innovation and support **opportunistic developments** with limited risks for stakeholders
- Allow **New Space approaches** (e.g. iterative design, spiral development, agile and lean)
- Outreach: **Newcomers** (easily gain experience of working with ESA) and SME focus
- **Faster** implementation
- **Simplified** ESA templates and limited proposal effort

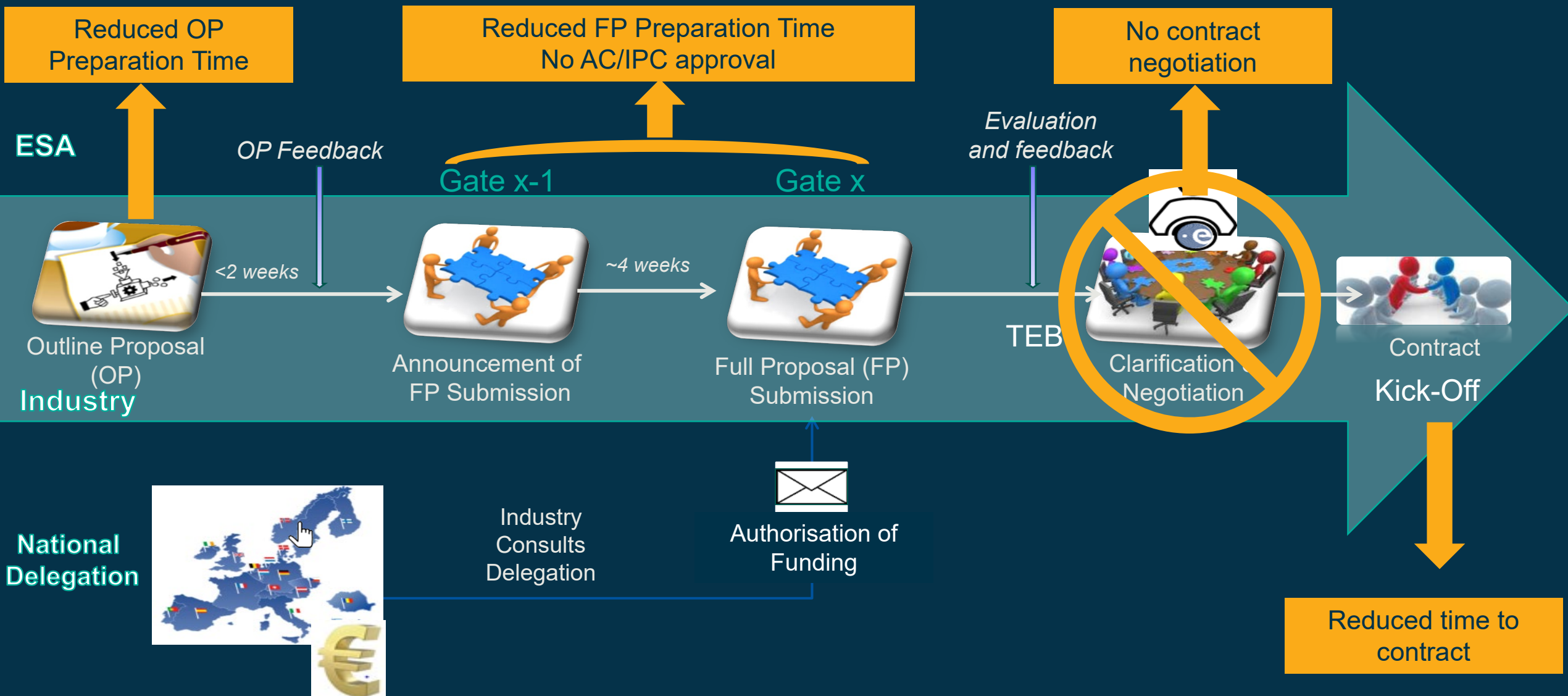
Scope:

- Address high technology risk developments to confirm the viability of a product development plan
- Typically 12 months duration
- ESA Firm Fixed Price < €250,000.

CfP ref AO/1- 10285/20/NL/AF

<https://esastar-publication.sso.esa.int/ESATenderActions/details/6812>

ARTES AGILE Streamlined Approach



ARTES 4.0 C&G Demonstration Phase in Space: Atlas

- **Atlas** is about demonstrating performance of “**flight hardware**” in space within the ARTES 4.0 C&G Demonstration Phase
- **Atlas** supports any flight hardware related to **telecommunications satellites** and **telecoms products** (platform or payload)
- **Atlas** helps the product gain the critical **flight heritage**
- **Atlas** Hardware can be:
 - On any **type of mission** including other ARTES missions
 - On a flight opportunity from anywhere in the **World**
 - within main mission (**Embedded**) or alongside the main mission as hosted technology (**Independent Hosted**) or as a dedicated mission (**Independent Standalone**)

Atlas is a flexible tool to gain flight heritage

ESA provides:

- Access to ESA resources and support
- Co-funding for the flight hardware:

	Embedded (Item part of commercial mission)	Independent (Hosted or Standalone)
Accommodation study	Supported	Supported
Flight hardware design, development, manufacturing and test		
Satellite level accommodation		
Portion of satellite platform & launch cost	Not eligible	
Launch campaign specific to flight item		
IOT and early operations specific to flight item		



Outline Proposal (OP)

Overview
company, planning, cost,
deliverables

Product Definition,
Development and
Verification

2 Business Plan

*ESA evaluates OP
and potentially
invites Industry
to submit FP*



Call for Proposal AO 10285
on ESAStar: esastar.sso.esa.int

Full Proposal (FP)

Modular Structure

4 Management

1 Cover Letter

5* Implementation

2 Business Plan

6* Financial

3 Technical

7 Contractual

*Outline Proposal allows ESA to assess
eligibility, feasibility and validity of the activity*

* Update required for subsequent Phases

ARTES Core Competitiveness

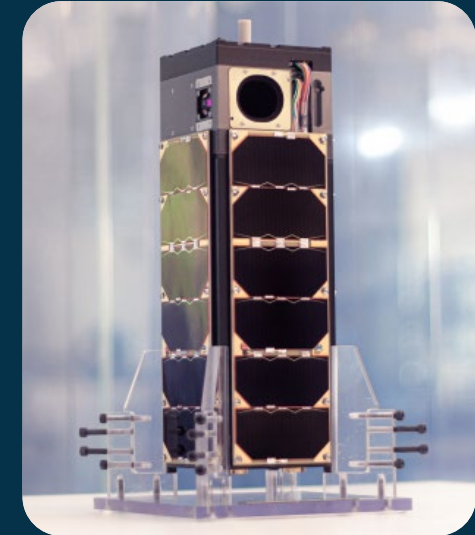
Recent Examples of Space Activities Supporting Innovative Solutions



**Q-band devices
approaching the market**
Channel Amplifier
(TESAT-Spacecom GmbH, Germany)

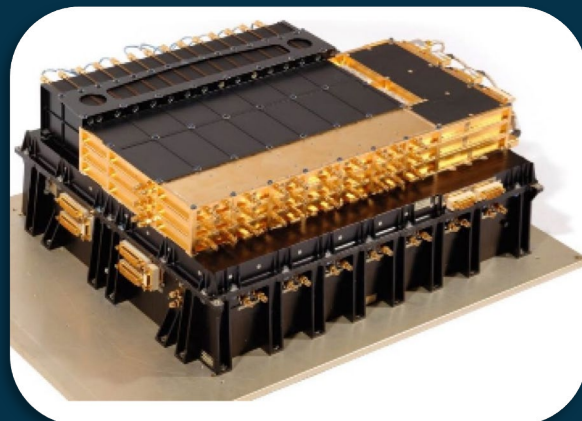
First W-Band Transmission from Space 30/08/2021

(Joanneum Research, AT)



**Europe's first Q/V
band reflector
towards terabit
satellites**

(HPS GmbH, Germany)



**The digitalisation of
space continues...**
Modular digital
processor with
converters

(Airbus Defence and Space, UK)

State-of-the-art **additive manufactured titanium heat pipetest piece** with integrated lattice wick

(Aavid Thermacore Europe Ltd, UK)

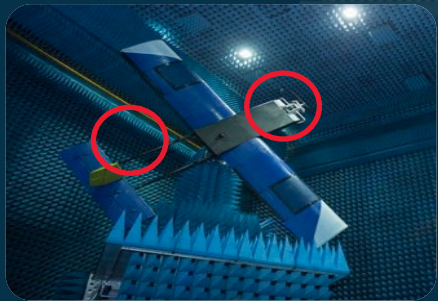


ARTES Core Competitiveness

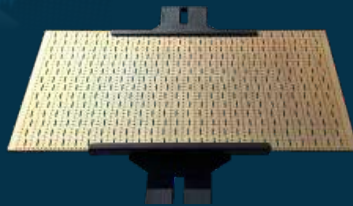
Recent Examples of *Ground* Activities Supporting Innovative Solutions



SX-3099 for LEO/MEO/GEO constellations, In-Flight-Connectivity and user terminals
(Satixfy, UK)



ESTARR Antenna integrated into the wings of a UAV.
(Barnard Microsystems, UK)



Portable Transmit/Receive Active Reflect Array Antenna for User Terminals
(RF Microtech, IT)



INDIGO HTS Ground Segment
(ST Engineering iDirect, BE)



Aidan Aeronautical IFC Terminal
(Viasat, CH)

Low-Profile End-User Terminal for Ka-Band Mobility
(Isotropic Systems, UK)



Industry Satisfaction with ARTES CC



The ARTES programs are the "sharpest tool in the box" to perform innovative and efficient development programs that directly supports the competitiveness of the company. *KONGSBERG DEFENCE AND AEROSPACE AS*

Overall experience with the ARTES Technologies and Products programme

4.6/5

The technical support provided by ESA during contract execution were excellent and very conducive to open and frank dialogue. *THALES ALENIA SPACE FRANCE*

We have received outstanding support from ESA in all phases of the proposal development. *CGI IT UK LIMITED*

Helpfulness and effectiveness in achieving the development goals

4.6/5

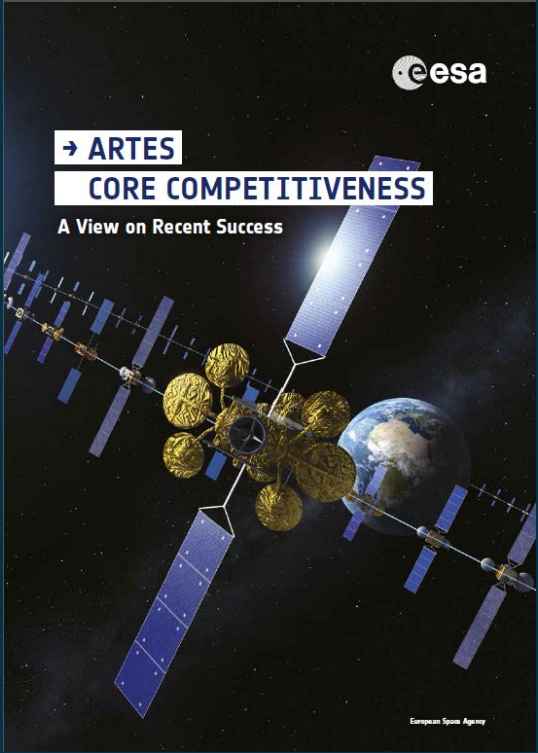
SCISYS would have never performed this Project without the Support from ARTES CC. *SCISYS DEUTSCHLAND GMBH*

The study was pushing the limits of technology, but now the technology has moved forward. *AIRBUS DEFENCE AND SPACE Ltd.*

The ARTES CC programme is of immense value for the Growth of our company. *TICRA Fond*

Excellent availability and efficiency, in particular when it comes to defining technical requirements, refocusing technical work, cross-checking test plan, opening doors at potential customers premises. *CHP CONSULT SPRL*





Your success
is our success!

Applications



Courtesy of CASA



Courtesy of RDT

**ARTES CC Video:
click to watch**



For more information, please consult:

<https://artes.esa.int>

Note:

To enable hyperlinks included in this handout please register and log-in to:

Login to the ARTES web site: 

ARTES Core Competitiveness Overview: 

ARTES Core Competitiveness Documents: 

ARTES Call for Ideas: 

ARTES 4.0 Core Competitiveness Contact points



If you want to participate, visit <https://artes.esa.int> or contact us:

ARTES 4.0 CC (AT + C&G): dietmar.schmitt@esa.int

Contractual matters: audrey.ferreol@esa.int

ARTES 4.0 C&G Demonstration Phase Atlas: john.shirlaw@esa.int

Outline Proposals for ARTES 4.0 C&G and
Announcements of Activity are to be sent to: artes-cg@esa.int

ARTES 4.0 Advanced Technology
Expression of Interest are to be sent to: artes-at@esa.int