

## ARTES 4.0 PLANNED ACTIVITIES SUMMARY TABLE FOR ARTES AT

Activity Ref.	Title	Cost	Classification	Cost (K€) (Baseline)	Cost (K€) (Request)	Proc. Policy	Intended ITT issue quarter / intended ITT issue week	Closing date ITT	ITT (re-)issued	Status comment	originally approved in Work Plan
<b>ADVANCED TECHNOLOGIES</b>											
<b>SYSTEM/ NETWORK / PROTOCOLS</b>											
<b>System, Networking and Management</b>											
3A.118	Satellite communication test-bed on-board the International Space Station ( <i>initiation requested by IT</i> ) (*)	3,000	B	3,000	0	C	week 48 2023				2020
3A.138	Protocol-aware smart gateway diversity techniques (re-issue) ( <i>initiation requested by UK</i> ) (*)	500	B	500	0	C			Y	ITT to be re-issued	2021
3A.152	Inter-satellite links dimensioning in satellite constellation systems (re-issue) ( <i>initiation requested by DE</i> ) (*) (re-	400	B	400	0	C			Y	proposed for cancellation	2022
3A.153	frequency coordination demonstrator for non-geostationary satellite systems (initiation requested by DE) (*) (re-	800	B	800	0	C			Y	proposed for cancellation	2022
3A.157	Path awareness techniques for transport protocols over satellite	800	B	800	0	C			Y	awarded	2022
<b>Propagation</b>											
3B.047	Modelling VHF propagation (100 - 300 MHz) effects for current and future satellite systems ( <i>initiation requested by NO</i> ) (*)	600	B	600	0	C			Y	evaluation	2022
<b>Coding, Modulation and Access</b>											
3C.027	Precoding for low earth orbit satellite systems	400	R	0	400	C	n/a				2022
3C.029	Joint satellite communications and radio frequency remote sensing air interface (re-issue)	800	B	800	0	C			Y	proposed for cancellation	2022
3C.036	Link management techniques for regenerative broadband low earth orbit constellations (re-issue)	800	B	800	0	C			Y	proposed for cancellation	2023
3C.037	Air interface for feeder links of regenerative multi-gigabit satellite systems (re-issue)	550	B	550	0	C		19/01/24	Y		2023
3C.042	Techniques for exploiting multi-satellite diversity in large low earth orbit constellations	600	B	600	0	C			Y	negotiation	2023
3C.043	Handover, data routing and radio resource management for Very Low Earth Orbit (VLEO) broadband constellations	600	B	600	0	C	week 50 2023				2023
3C.044	Data, control and signalling protocols for spectrum sharing among co-existing satellite Internet-of-Things networks	700	R	0	700	C	n/a				2023
3C.045	Physical layer techniques for non-geostationary broadband mobile channels (re-issue)	450	B	450	0	C			Y	ITT to be re-issued	2023
<b>Small Satellites</b>											
3E.003	In-orbit experiment of an inflatable de-orbiting drag device for small satellites ( <i>initiation requested by IT</i> ) (*) (re-	4,000	B	4,000	0	C			Y	ITT to be re-issued	2021
3E.008	In-orbit test bed for AI using hardware-acceleration-assisted signal processing of random access protocol signals	3,000	B	3,000		C1		15/11/23	Y		2022
3E.016	VLEO air-breathing electric propulsion in-orbit experiment	5,000	B	5,000		C		26/01/23	Y		2023
3E.017	In-orbit experiment of high performance data transport, switching and processing technologies for the telecom applications in low earth orbit	4,500	R	0		C	n/a				2023
3E.018	In orbit W-band channel characterisation from geostationary orbit	3,500	R	0		C	n/a				2023
<b>SPACE SEGMENT - PLATFORM</b>											
<b>Platform - System and Architecture</b>											
<b>Propulsion System</b>											
4B.167	Smart propellant tank (re-issue)	1,000	B	1,000	0	C			Y	proposed for cancellation	2022
4B.168	Embedded thrust vector tilting technology based on smart devices	800	B	800	0	C1			Y	evaluation	2022
4B.170	Testbed for modular and scaleable direct drive electric propulsion solutions	600	B	600	0	C	week 48 2023				2023
4B.171	High thrust, high specific impulse Xenon resistojet	600	B	600	0	C1		21/11/23	Y		2023
4B.172	Cathode for oxygen-rich environment	500	B	500	0	C1	week 52 2023				2023
4B.173	Cathodeless electric propulsion thruster	500	B	500	0	C1	week 50 2023				2023
4B.174	Very low earth orbit gas generator for air-breathing electric propulsion ground testing	600	B	600	0	C1	week 52 2023				2023
4B.175	Mass production thruster testing technology	600	R	0	600	C1	n/a				2023
4B.176	Advanced manufacturing for electric propulsion components of low Earth orbit satcoms	600	B	600	0	C1	week 50 2023				2023
4B.177	Demisable krypton tank	750	B	750	0	C1			Y	evaluation	2023
<b>AOCS</b>											

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4C.065	On-board autonomous collision avoidance detection testbed (re-issue)	800	B	800	0	C		09/01/24	Y		2023
4C.066	Earth upper atmosphere forecast tool for mission design and operation	600	B	600	0	C		26/01/24	Y		2023
4C.067	Autonomous and robust attitude and orbit control system of very low earth orbit satellites	600	B	600	0	C		21/12/23	Y		2023
4C.068	Building blocks for digital twin of attitude and orbit control system equipments	500	B	500	0	C1	week 50 2023				2023
<b>Thermal System</b>											
4D.082	Adaptive thermal control of telecom satellites (re-issue)	600	B	600	0	C1		14/12/23	Y		2023
<b>Mechanical System</b>											
4E.085	Low noise sliprings for solar array drive mechanisms (re-issue)	500	B	500	0	C		15/11/23	Y		2022
4E.086	End-to-end manufacturing and integration processes for standardised ball bearings in telecom satellites (re-issue)	500	B	500	0	C			Y	proposed for cancellation	2022
4E.087	Evaporation modelling for long life mechanisms used in geostationary satellites	650	B	650	0	C1	week 49 2023				2023
4E.089	Autonomous health monitoring for telecommunication platform mechanisms	750	B	750	0	C1	week 50 2023				2023
4E.090	Demisable primary structural joints for low Earth orbit telecom platforms	600	B	600	0	C	week 51 2023				2023
4E.091	Smart manufacturing software tool to enable green manufacturing for satellite constellations	600	B	600	0	C1		07/12/23	Y		2023
4E.092	Magnetic bearing systems for high-speed rotary mechanisms	850	B	850	0	C1	week 50 2023				2023
<b>Power System</b>											
4F.154	Additive manufacturing for multifunctional battery packaging (initiation requested by DE) (*)	500	B	500	0	C2			Y	awarded / negotiation	2022
4F.160	Efficient testing approach for solar array development	500	B	500	0	C		01/12/23	Y		2023
4F.161	Solar array with latched shallow curved surface for improved deployed stiffness	500	R	0	500	C	n/a				2023
4F.162	End-to-end manufacturing process for solar arrays for constellations	750	B	750	0	C1		04/12/23	Y		2023
4F.163	Solar array to power directly an electrical propulsion system	500	R	0	500	C	n/a				2023
4F.164	Less than one watt standby on-off power switching front end for telecom units	800	B	800	0	C1	week 50 2023				2023
4F.165	DC/DC converter with high voltage input for high power telecom satellites	750	B	750	0	C	week 48 2023				2023
<b>Command and Data Handling</b>											
4G.036	Critical functions controller for low earth orbit satellites (re-issue)	800	B	800	0	C		30/11/23	Y		2021
<b>Small Satellite Platform Equipment</b>											
4H.005	Small Satellite Standard enabling multi launch from heavy lift launch vehicles (re-issue)	750	B	750	0	C1			Y	negotiation	2022
<b>SPACE SEGMENT - PAYLOAD</b>											
<b>Antenna</b>											
5B.215	Demonstrator of a reconfigurable V-band feeder link multibeam antenna for high capacity geostationary satellites	1,100	B	1,100	0	C			Y	awarded	2022
5B.223	Integrated structural antenna for high aspect ratio satellites (re-issue)	750	B	750	0	C		13/02/24	Y		2023
5B.224	Demonstrator of a reconfigurable Q-band feeder link multibeam antenna for high-capacity geostationary satellites	1,400	B	1,400	0	C	week 47 2023				2023
5B.225	Multi-beam receive antenna for satellite-based air traffic surveillance	750	B	750	0	C	week 52 2023				2023
5B.226	Rapid and flexible end-to-end manufacturing process for complex-shaped composite reflector antenna	850	B	850	0	C	week 52 2023				2023
<b>RF Repeater Equipment and Signal Processing</b>											
5C.440	On chip integrated power converter for advanced field programmable gate arrays (re-issue)	1,000	B	1,000	0	C1			Y	ITT to be re-issued	2021
5C.443	Ultra deep submicron assessment for on-board digital processors (initiation requested by BE) (*)	2,000	B	2,000	0	C			Y	negotiation	2021
5C.458	Digital predistortion techniques for beamforming and intermodulation improvement of active antennas (re-issue)	750	B	750	0	C			Y	evaluation	2022
5C.459	High efficiency mm-wave GaN transistor high power amplifier for GEO and LEO active antenna application	1,500	B	1,500	0	C			Y	negotiation	2022
5C.460	Acceptance criteria for defects and ageing effects in high voltage EPC and PPU printed circuit boards ( <i>initiation requested by BE</i> ) (*)	750	B	750	0	C			Y	negotiation	2022
5C.461	Development of high density modular electrical interconnections for high data rate applications (re-issue)	600	B	600	0	C1			Y	negotiation	2022

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5C.462	Noise shaping techniques for active phased array antenna applications	900	B	900	0	C			Y	proposed for cancellation	2022
5C.463	Thermally efficient assembling techniques for high frequency GaN switching power supplies for power amplifiers (re-issue)	500	B	500	0	C1			Y	proposed for cancellation	2022
5C.464	Development of a highly integrated mixed signal Ka-band RF Front end System-In-Package for active antenna (re-issue)	1,200	B	1,200	0	C			Y	negotiation	2022
5C.466	Microwave photonics voltage controlled oscillator for Q/V/W-band local oscillators (re-issue)	800	B	800	0	C2			Y	ITT to be re-issued	2022
5C.467	Reflectionless RF filters (re-issue)	600	B	600	0	C			Y	proposed for cancellation	2022
5C.468	Q/V-band dual-polarised waveguide rotary joint (re-issue)	800	B	800	0	C			Y	proposed for cancellation	2022
5C.483	Robust timing and synchronisation techniques for secure communications (re-issue)	800	B	800	0	C			Y	ITT to be re-issued	2023
5C.484	Dual-redundant broadband low noise amplifier module for inter-satellite links at V-band (re-issue)	800	B	800	0	C2			Y	evaluation	2023
5C.485	High linearity low noise amplifier for V-band uplink for satellite communications payload	900	B	900	0	C2	week 49 2023				2023
5C.486	Spaceborne W-band high power travelling wave tube	1200	R	0	1,200	C	n/a				2023
5C.487	Critical technologies for W-Band travelling wave tube electronic power conditioners	750	B	750	0	C		06/12/23	Y		2023
5C.488	Broadband Q-V band beamforming network for flexible on-board feeder link active antenna payloads	1200	B	1,200	0	C		14/12/23	Y		2023
5C.489	High bandwidth interface radiation mitigation IP core for programmable logic devices	600	B	600	0	C		26/01/24	Y		2023
5C.490	Implementation of software mitigation solutions for radiation-induced single event effects	600	B	600	0	C		09/01/24	Y		2023
5C.491	10W per mm class thermally enhanced high efficiency microwave power amplifiers	1800	B	1,800	0	C1		24/01/24	Y		2023
5C.492	Efficient digital beamforming technique compatible with non-uniform beam and array lattices	900	B	900	0	C		19/01/24	Y		2023
5C.493	Digital twin supported design and manufacturing of dielectric filters (re-issue)	950	B	950	0	C		30/11/23	Y		2023
5C.494	Spatially combined 40 W - 60 W Q-band solid state power amplifier	900	B	900	0	C		16/02/24	Y		2023
5C.495	Output Butler matrix with inherent filtering functions (re-issue)	650	B	650	0	C1		13/02/24	Y		2023
5C.496	Low loss filters for V-band (59 to 71 GHz) intersatellite links	500	B	500	0	C1		18/12/23	Y		2023
5C.497	Q/V band direct quadrature demodulator RF integrated circuit	600	B	600	0	C1			Y	evaluation	2023
5C.498	Mass memory unit with 100 GigaBit per second write rate class for Low Earth Orbit communication applications	750	R	0	750	C	n/a				2023
5C.499	European chip inductor for point of load converters in telecommunication satellites (re-issue)	700	B	700	0	C1			Y	ITT to be re-issued	2023
5C.500	Q/V/W-band integrated frequency converters for future very high throughput satellites	850	B	850	0	C	week 52 2023				2023
5C.501	RF transmit and receive front-end for V-band inter-satellite link	750	B	750	0	C2		23/11/23	Y		2023
5C.502	W-band RF passive hardware for high throughput telecommunication payloads (re-issue)	700	B	700	0	C2		22/01/24	Y		2023
5C.503	Fault-tolerant network switching using COTS network switch components	600	B	600	0	C		12/02/24	Y		2023
<b>Small Satellite Payload Equipment</b>											
5E.021	High throughput Ka-band integrated analogue and digital system on module (re-issue)	1,000	B	1,000	0	C1			Y	awarded	2021
5E.022	Ka-band phased array antenna tile for small satellites	1,500	B	1,500	0	C2			Y	evaluation	2022
5E.024	Compact low frequency high power bandpass filter for small telecommunication satellites (re-issue)	600	B	600	0	C1			Y	proposed for cancellation	2022
5E.025	Connectivity technologies enabling modular deployable Ku/Ka band active antennas for small satellites	800	B	800	0	C1			Y	proposed for cancellation	2022
<b>GROUND SEGMENT</b>											
<b>TT&amp;C/Satellite Ground Equipment and Support</b>											
6A.077	Integrated Q/V/W-band passive RF hardware for ground segment network equipment ( <i>initiation requested by IT</i> ) (*) (re-issue)	750	B	750	0	C1			Y	warded/negotiation	2021
<b>Ground Network Operation Control and Gateway</b>											
6B.057	Digital Signal Processing Building Blocks for Satellite Internet of Things Communications (re-issue) ( <i>initiation requested by IT</i> ) (*)	500	B	500	0	C1			Y	proposed for cancellation	2020
6B.095	High speed disruptive tolerant networking node for direct-to-earth optical and RF links	1,000	B	1,000	0	C			Y	proposed for cancellation	2022

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6B.115	Cloud based beamforming for electronically steerable antennas (re-issue)	850	B	850	0	C1			Y	proposed for cancellation	2023
6B.116	Autonomous collision avoidance systems for ground control centres with data privacy protection	500	B	500	0	C2			Y	evaluation	2023
6B.117	Ad hoc vehicle to vehicle mesh network for improved satellite throughput (re-issue)	500	B	500	0	C2			Y	ITT to be re-issued	2023
6B.118	High Power W-band transmit-receive diplexers for ground stations	400	R	0	400	C1	n/a				2023
6B.120	W band high power amplifier for the ground segment	750	R	0	750	C	n/a				2023
6B.121	Energy efficient de-icing system for antenna gateways (re-issue)	750	B	750	0	C		19/01/24	Y		2023
<b>Optical Ground Stations and Equipment</b>											
6C.046	Optical communications in the Nordic countries (re-issue)	200	B	200	0	C			Y	ITT to be re-issued	2023
<b>USER TERMINALS</b>											
7-.046	Dynamic signalling and control of ground terminals with active antennas for interactive services (re-issue)	800	B	800	0	C			Y	proposed for cancellation	2022
<b>Professional User Terminals</b>											
<b>Consumer User Terminals</b>											
7B.064	Demonstration of efficient Versatile Video Codec up to 8K over IP and DVB-S2X (re-issue)	500	B	500	0	C			Y	proposed for cancellation	2022
7B.066	DVB Native IP over the satellite (re-issue)	500	B	500	0	C		18/12/23	Y		2022
7B.068	Hybrid mechanical electronic scanning antenna for user terminals compatible with high volume production	700	B	700	0	C1			Y	negotiation	2022
7B.072	Wideband baseband receiver with compensated beam squinting for user terminals	600	B	600	0	C1		07/02/23	Y		2023
7B.073	Green receiver architectures and technologies for satellite TV broadcast and broadband services	500	B	500	0	C		17/01/24	Y		2023
7B.074	User terminal signaling for non-neostationary satellite networks	500	B	500	0	C		12/02/24	Y		2023
<b>User Terminals Mobile</b>											
7C.063	Wirelessly connected textile antennas for smart clothing	500	B	500	0	C1			Y	negotiation	2021
7C.071	Integrated multiple switch-beam array antenna for resilient communication link M2M/IoT applications (re-issue)	750	B	750	0	C1			Y	evaluation	2022
7C.072	Direct satellite to vehicle multicasting below 6 GHz based on open standards (re-issue)	700	B	700	0	C			Y	proposed for cancellation	2022
7C.074	Phased array antennas based on flexible ultra-tight materials and printed RF components (re-issue)	700	B	700	0	C1		11/12/23	Y		2022
7C.079	Aeronautical experiment in Q/V band	1100	B	1,100	0	C1		05/01/24	Y		2023
7C.080	Reconfigurable antennas for mobile terminals based on active actuators (re-issue)	750	B	750	0	C			Y	ITT to be re-issued	2023
7C.081	Distributed, scalable antenna on glass for automotive connectivity to satellite	750	B	750	0	C1			Y	evaluation	2023
7C.083	Printed circuit board technology for automotive conformal antennas	750	B	750	0	C1		27/11/23	Y		2023
<b>TOTAL (k€)</b>		<b>96,900</b>		<b>91,100</b>	<b>5,800</b>						

(\*) R activity for which a request for initiation has been received

Please note: **Baseline ( B )**: these activities will be automatically initiated.

**On Delegation Request ( R )**: these activities will only be initiated on the explicit request of at least one delegation.

**Procurement Policy definitions:**

C : Activities in open competition without any further restrictions.

C1: Activities in open competition limited to non-Large System Integrators (LSIs) as prime. LSIs are allowed to participate as sub-contractors.

C2: Activities in open competition, where a significant participation of non-LSIs is requested.

C3: Activity restricted to SMEs & R&D organisations, preferably in cooperation.

C4: Activities in open competition, subject to the SME subcontracting clause.