

ARTES 4.0 PLANNED ACTIVITIES SUMMARY TABLE (AT, ScyLight, 4S and 5G/6G)

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.111	Spectrum Sharing Makerspace	3,000	B	3,000	0	C2	week 37				2022
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	Q4				2020
3A.120	5G network functions, protocols and security for 5G satellite nodes	850	B	850	0	C			Y	negotiation	2020
3A.137	Test bed for M2M/IoT receiver development	1,000	B	1,000	0	C1			Y	ITT to be re-issued	2021
3A.138	Protocol-aware smart gateway diversity techniques (re-issue) ( <i>initiation requested by UK</i> ) (*)	500	B	500	0	C		01/09/22	Y		2021
3A.152	Inter-satellite links dimensioning in satellite constellation systems (initiation requested by DE) (*)	400	B	400	0	C	week 40				2022
3A.153	Frequency coordination demonstrator for non-geostationary satellite systems (initiation requested by DE) (*)	800	B	800	0	C	week 40				2022
3A.157	Path awareness techniques for transport protocols over satellite	800	B	800	0	C	week 37				2022
3A.159	Joint communication and edge computing load balancing techniques for satellite networks	400	B	400	0	C		29/08/22	Y		2022
	<b>subtotal</b>	<b>7,750</b>		<b>7,750</b>	<b>0</b>						
<b>Propagation</b>											
3B.046	Alphasat Q/V band communication experiments covering mobile and non-GEO use cases	800	B	800	0	C2		12/08/22	Y		2021
3B.047	Modelling VHF propagation (100 - 300 MHz) effects for current and future satellite systems	600	R	0	600	C	n/a				2022
	<b>subtotal</b>	<b>1,400</b>		<b>800</b>	<b>600</b>						
<b>Coding, Modulation and Access</b>											
3C.024	System demonstrator of non-orthogonal multiple access over satellite (re-issue) ( <i>initiation requested by DE</i> ) (*)	500	B	500	0	C2	week 50		Y	ITT to be re-issued	2021
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	800	B	800	0	C	week 31				2022
3C.030	Uncoordinated Satellite Access Scheme over-the-air Demonstration in Maritime VHF Bands	600	R	0	600	C	n/a				2022
	<b>subtotal</b>	<b>1,300</b>		<b>1,300</b>	<b>0</b>						
<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> ) (*)	4,000	B	4,000	0	C	week 29				2021
3E.004	In-orbit experiment of communication links in candidate satellite frequencies	1,100	B	1,100	0	C			Y	awarded	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	0	C1	week 34				2022
	<b>subtotal</b>	<b>8,100</b>		<b>8,100</b>	<b>0</b>						
<b>SPACE SEGMENT - PLATFORM</b>											
<b>Platform - System and Architecture</b>											
4A.090	Event-based electron belt radiation storm environments modelling	500	B	500	0	C2		02/09/22	Y		2022
4A.091	Fast-lock interconnections and connectorless flat cables for satcoms	500	B	500	0	C1	week 30				2022

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4A.092	Drag and atomic oxygen resistant carbon fibre reinforced polymer for very low Earth orbit telecom satellites	750	R	0	750	C	n/a				2022
	<b>subtotal</b>	<b>1,750</b>		<b>1,000</b>	<b>750</b>						
<b>Propulsion System</b>											
4B.158	Tether based system for passive telecom spacecraft deorbiting within around 100 days ( <i>initiation requested by FI</i> ) (*)	550	B	550	0	C1			Y	evaluation	2020
4B.167	Smart propellant tank (re-issue)	1,000	B	1,000	0	C			Y	ITT to be re-issued	2022
4B.168	Embedded thrust vector tilting technology based on smart devices	800	B	800	0	C1	week 36				2022
	<b>subtotal</b>	<b>550</b>		<b>550</b>	<b>0</b>						
<b>AOCS</b>											
4C.056	Guidance, navigation and control of in-orbit assembly of large antennas (re-issue)	800	B	800	0	C			Y	negotiation	2020
	<b>subtotal</b>	<b>800</b>		<b>800</b>	<b>0</b>						
<b>Thermal System</b>											
4D.072	Heat exchanger for a loop heat pipe condenser (re-issue)	650	B	650	0	C			Y	proposed for cancellation	2021
4D.073	ElectroHydroDynamic enhancement of two-phase ammonia heat transport systems (re-issue)	750	B	750	0	C			Y	proposed for cancellation	2021
4D.078	Flexible joint for axial grooved ammonia heat pipes (re-issue)	500	B	500	0	C		12/07/22	Y		2022
	<b>subtotal</b>	<b>1,900</b>		<b>1,900</b>	<b>0</b>						
<b>Mechanical System</b>											
4E.081	Advanced manufacturing of rotors for reaction wheels	400	B	400	0	C1			Y	negotiation	2021
4E.085	Low noise sliprings for solar array drive mechanisms	500	B	500	0	C	week 48				2022
4E.086	End-to-end manufacturing and integration processes for standardised ball bearings in telecom satellites	500	B	500	0	C	week 29				2022
4E.087	Evaporation modelling for long life mechanisms used in geostationary satellites	650	R	0	583	C1	n/a				2022
	<b>subtotal</b>	<b>1,983</b>		<b>1,400</b>	<b>583</b>						
<b>Power System</b>											
4F.147	Critical building blocks for future lightweight flexible solar array	1,200	B	1,200	0	C			Y	negotiation	2021
4F.153	Compact power control module with digital control	750	B	750	0	C	week 34				2022
4F.154	Additive manufacturing for multifunctional battery packaging (initiation requested by DE) (*)	500	B	500	0	C2		20/09/22	Y		2022
	<b>subtotal</b>	<b>1,200</b>		<b>1,200</b>	<b>0</b>						
<b>Command and Data Handling</b>											
4G.035	Memory control sub-system for low earth orbit applications (re-issue)	700	B	700	0	C		23/09/22	Y		2021
4G.036	Critical functions controller for low earth orbit satellites	800	B	800	0	C	week 31				2021
4G.037	Multiple access sequences for satellite constellations without centralised management (re-issue)	600	B	600	0	C			Y	negotiation	2021
	<b>subtotal</b>	<b>2,100</b>		<b>2,100</b>	<b>0</b>						
<b>Small Satellite Platform Equipment</b>											
4H.005	Small Satellite Standard enabling multi launch from heavy lift launch vehicles	750	B	750	0	C1	week 35				2022
4H.006	Thermoplastic small satellite platform	800	B	800	0	C	week 30				2022
	<b>subtotal</b>	<b>1,550</b>		<b>1,550</b>	<b>0</b>						

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<b>SPACE SEGMENT - PAYLOAD</b>											
<b>Antenna</b>											
5B.203	Distributed, modular active antenna with close-to aperture conversion and processing (re-issue)	700	B	700	0	C			Y	Proposed for cancellation	2020
5B.207	Planar, compact and highly integrated active antenna for low earth orbit applications	850	B	850	0	C			Y	Proposed for cancellation	2021
5B.208	Reconfigurable passive multibeam antennas for next generation of LEO satellites (re-issue)	750	B	750	0	C			Y	ITT to be re-issued	2021
5B.215	Demonstrator of a reconfigurable V-band feeder link multibeam antenna for high capacity geostationary satellites	1,100	B	1,100	0	C	week 50 2022				2022
5B.216	Demonstrator of a transmit dual polarised active antenna with large scan angle for Low Earth Orbit applications	1,100	B	1,100	0	C	week 42 2022				2022
	<b>subtotal</b>	<b>4,500</b>		<b>4,500</b>	<b>0</b>						
<b>Repeater Equipment</b>											
5C.426	Light weight insulating coating techniques for high voltage power converters	800	B	800	0	C			Y	negotiation	2021
5C.428	Generic frequency settable oven controlled crystal oscillator	500	B	500	0	C			Y	negotiation	2021
5C.430	Broadband tuneable Ka-band frequency multiplexers	800	R	0	800	C	n/a				2021
5C.431	Ku- and Ka-band filters for transmit and receive active antennas (re-issue)	600	B	600	0	C			Y	negotiation	2021
5C.432	W-band integrated active receive front-end	850	B	850	0	C			Y	negotiation	2021
5C.433	V-band integrated active receive front-end (re-issue)	750	B	750	0	C			Y	negotiation	2021
5C.435	Adaptive compute acceleration platforms for satcom	800	B	800	0	C		05/09/22	Y		2021
5C.437	Ka- to W-band frequency converter (re-issue)	750	B	750	0	C			Y	negotiation	2021
5C.438	Efficient, lightweight radiation shielding of electronic components on board GEO spacecraft (re-issue)	500	B	500	0	C2			Y	proposed for cancellation	2021
5C.439	Low loss and temperature stable surface acoustic wave filters ( <i>initiation requested by NO</i> ) (*)	650	B	650	0	C2			Y	evaluation	2021
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.441	Breadboarding of critical technologies enabling VHF data exchange payloads	900	B	900	0	C			Y	awarded	2021
5C.443	Ultra deep submicron assessment for on-board digital processors	2,000	R	0	2,000	C	n/a				2021
5C.456	Power reflection tolerant solid state power amplifier for active antenna applications	900	B	900	0	C	week 40				2022
5C.457	Beam forming chip for direct radiating array antennas for W-band feeder links	1,000	R	0	1,000	C	n/a				2022
5C.458	Digital predistortion techniques for beamforming and intermodulation improvement of active antennas	750	B	750	0	C	week 30				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	week 50				2022
5C.460	Acceptance criteria for defects and ageing effects in high voltage EPC and PPU printed circuit boards	750	R	0	750	C	n/a				2022
5C.461	Development of high density modular electrical interconnections for high data rate applications	600	B	600	0	C1	week 30				2022
5C.462	Noise shaping techniques for active phased array antenna applications	900	B	900	0	C	week 44				2022
5C.463	Thermally efficient assembling techniques for high frequency GaN switching power supplies for power amplifiers	500	B	500	0	C1	week 32				2022
5C.464	Development of a highly integrated mixed signal Ka-band RF Front end System-In-Package for active antenna	1,200	B	1,200	0	C	week 37				2022
5C.465	L-band gallium nitride low noise amplifier-based RF front-end	700	R	0	700	C	n/a				2022
5C.466	Microwave photonics voltage controlled oscillator for Q/V/W-band local oscillators	800	B	800	0	C2	week 50				2022
5C.467	Reflectionless RF filters	600	B	600	0	C	week 40				2022

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5C.468	Q/V-band dual-polarised waveguide rotary joint	800	B	800	0	C	week 34				2022
	<b>subtotal</b>	<b>21,900</b>		<b>16,650</b>	<b>5,250</b>						
	<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	evaluation	2021
5E.022	Ka-band phased array antenna tile for small satellites	1,500	B	1,500	0	C2	Q3				2022
5E.023	Compact S-band diplexer for small satellites TT&C applications	500	B	500	0	C1	week 42				2022
5E.024	Compact low frequency high power bandpass filter for small telecommunication satellites	600	B	600	0	C1	week 34				2022
5E.025	Connectivity technologies enabling modular deployable Ku/Ka band active antennas for small satellites	800	B	800	0	C1	week 35				2022
5E.026	Deployable mechanisms for multi flat-panel reflectarray antennas for small satellites	750	B	750	0	C2		29/06/22	Y		2022
	<b>subtotal</b>	<b>5,150</b>		<b>5,150</b>	<b>0</b>						
	<b>GROUND SEGMENT</b>										
	<b>TT&amp;C/Satellite Ground Equipment and Support</b>										
6A.072	Prototype for measuring NGS0 satellite network interference and radiotrequency characteristics (re-issue)	750	B	750	0	C			Y	negotiation	2021
6A.073	Envelope tracking SSPA prototype (re-issue)	1,000	B	1,000	0	C1				Proposed for cancellation	2021
6A.074	Single-chip 71-86 GHz transceiver RFIC for aeronautical satcom applications	800	R	0	800	C1	n/a				2021
6A.076	On-chip integrated Ka-band diplexer for ground terminals (re-issue)	600	B	600	0	C1	Q3		Y	ITT to be reissued	2021
6A.077	Integrated Q/V/W-band passive RF hardware for ground segment network equipment (initiation requested by IT) (*) (re-issue)	750	B	750	0	C1			Y	ITT to be reissued	2021
	<b>subtotal</b>	<b>3,900</b>		<b>3,100</b>	<b>800</b>						
	<b>Ground Network Operation Control and Gateway</b>										
6B.057	Digital Signal Processing Building Blocks for Satellite Internet of Things Communications (initiation requested by IT) (*)	500	B	500	0	C1	week 48 2022				2020
6B.069	Critical components for W-band feeder link applications (re-issue)	600	B	600	0	C		06/07/22	Y		2020
6B.084	End-to-end congestion control for broadband networks with satellite-tailored QUIC protocol	600	B	600	0	C			Y	evaluation	2021
6B.094	Fast locking flange for waveguide connections	500	R	0	500	C	n/a				2022
6B.095	High speed disruptive tolerant networking node for direct-to-earth optical and RF links	1,000	B	1,000	0	C	week 35				2022
6B.097	Standardized ground software components for orchestrating high throughput satellite services	800	B	800	0	C	week 34				2022
	<b>subtotal</b>	<b>4,000</b>		<b>3,500</b>	<b>500</b>						
	<b>USER TERMINALS</b>										
7-046	Dynamic signalling and control of ground terminals with active antennas for interactive services	800	B	800	0	C	week 32				2022
	<b>subtotal</b>	<b>800</b>		<b>800</b>	<b>0</b>						
	<b>Professional User Terminals</b>										
7A.070	25W class Ka-band packaged Monolithic Microwave Integrated Circuit GaN amplifier for professional up-link stations	750	B	750	0	C1	week 38				2022
	<b>subtotal</b>	<b>750</b>		<b>750</b>	<b>0</b>						
	<b>Consumer User Terminals</b>										
7B.060	Location customized flat antenna with integrated beam pointing for direct to home application	450	B	450	0	C1			Y	negotiation	2021

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7B.064	Demonstration of efficient Versatile Video Codec up to 8K over IP and DVB-S2X	500	B	500	0	C	week 42				2022
7B.065	Demodulator supported by artificial neural networks	400	B	400	0	C	week 34				2022
7B.066	DVB Native IP over the satellite	500	B	500	0	C	week 40				2022
7B.067	High efficiency silicon-based amplifier for Ka-band user terminals	800	R	0	800	C1	n/a				2022
7B.068	Hybrid mechanical electronic scanning antenna for user terminals compatible with high volume production	700	B	700	0	C1	week 40				2022
	<b>subtotal</b>	<b>3,350</b>		<b>2,550</b>	<b>800</b>						
<b>User Terminals Mobile</b>											
7C.063	Wirelessly connected textile antennas for smart clothing	500	B	500	0	C1	week 30				2021
7C.070	Q/V band phased array antennas for ground terminals	1,000	R	0	1,000	C	n/a				2022
7C.071	Integrated multiple switch-beam array antenna for resilient communication link M2M/IoT applications	750	B	750	0	C1		21/07/22	Y		2022
7C.072	Direct satellite to vehicle multicasting below 6 GHz based on open standards	700	B	700	0	C	week 41				2022
7C.074	Phased array antennas based on flexible ultra-light materials and printed RF components	700	B	700	0	C1	week 35				2022
	<b>subtotal</b>	<b>3,650</b>		<b>2,650</b>	<b>1,000</b>						
<b>TOTAL (k€)</b>		<b>75,283</b>		<b>65,000</b>	<b>10,283</b>						
<b>OPTICAL COMMUNICATION-SCYLIGHT</b>											
<b>SYSTEM/ NETWORK / PROTOCOLS</b>											
<b>System, Networking and Management</b>											
<b>Propagation</b>											
3B.041	Assessment of reliable high data rate optical links under strong atmospheric turbulence conditions (SL.013) (re-issue)	200	B	200	0	C	Q1 2023			ITT to be re-issued	2020
3B.042	Demonstration of reliable high data rate optical links under strong atmospheric turbulence conditions (SL.015)	1,800	B	1,800	0	C				proposed for cancellation	2020
3B.043	Reference atmospheric propagation models and data for optical Earth-Space communication links (SL.026)	250	B	250	0	C			Y	Decision ITT re-issue under evaluation	2020
	<b>subtotal</b>	<b>2,250</b>		<b>2,250</b>	<b>0</b>						
<b>Security and Cryptography</b>											
3D.003	Quantum Key Distribution building blocks (SL.025)	800	B	800	0	C		08/07/22	Y		2020
	<b>subtotal</b>	<b>800</b>		<b>800</b>	<b>0</b>						
<b>SPACE SEGMENT - PAYLOAD</b>											
<b>Optical Repeaters and Photonics</b>											
5F.013	Integrated Optical Interfaces for RF Phased Array Antennas (SL.030)	600	B	600	0	C				proposed for cancellation	2020
5F.014	Integrated photon sources for space based quantum telecommunications (SL.031)	750	R	0	750	C	n/a				2020
5F.018	WDM Laser Sources at 1064nm (re-issue)	1000	B	1000	0	C			Y	to be re-issued	2021
5F.019	Low-noise optical pre-amplifier at 1064nm	600	B	600	0	C	Q3				2021
5F.020	WDM High-Power Optical Amplifier at 1064nm	2000	B	2000	0	C	Q3				2021
5F.022	LEO / GEO Optical Switch Matrix 25x25	3000	B	3000	0	C		23/09/22	Y		2021

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5F.028	High extinction ratio amplitude modulators and pulse shaper electronics for quantum key distribution (QKD)	500	B	500	0	C1	Q3				2022
5F.029	Packaging of photonics for laser communication terminals	800	B	800	0	C1	Q3				2022
5F.030	High power coating development for space-based laser communication terminals	500	B	500	0	C2	Q3				2022
5F.034	Quantum memory prototype for space (SL.054)	700	B	700	0	C	Q3				2022
	<b>subtotal</b>	<b>10,450</b>		<b>9,700</b>	<b>750</b>						
<b>Optical Communication Terminals and Equipment</b>											
5G.003	Space qualified faint pulse laser source for quantum key distribution (SL.012)	1300	R	0	1300	C	n/a				2020
5G.007	Low-profile optical head for airborne optical communication terminals (SL.023)	950	B	950	0	C			Y	awarded	2020
5G.027	Wavelength division multiplexer (WDM) and de-multiplexer at 1550 nm for space applications	500	B	500	0		Q3				2022
	<b>subtotal</b>	<b>2,750</b>		<b>1,450</b>	<b>1,300</b>						
<b>GROUND SEGMENT</b>											
<b>Ground Network Operation Control and Gateway</b>											
6B.090	Machine learning in optical communication systems (SL.047)	250	B	250	0	C			Y	evaluation	2021
	<b>subtotal</b>	<b>250</b>		<b>250</b>	<b>0</b>						
<b>Optical Ground Stations and Equipment</b>											
6C.007	Reliable LEO Optical Feeder Link demonstration	2500	B	2500	0	C	Q3				2021
6C.008	Aircraft detection system for Optical Ground Stations	500	B	500	0	C			Y	Decision on ITT re-issue under evaluation	2021
6C.009	Turbulence monitoring equipment (SL.046)	500	B	500	0	C		02/09/22	Y		2021
6C.012	Skinakas observatory upgrades for optical and quantum communication	450	B	450	0	C				negotiation	2021
6C.013	Holomondas observatory upgrades for optical and quantum communication	450	B	450	0	C	Q4				2021
6C.014	Generic adaptive optics for optical communication and quantum key distribution	1500	B	1500	0	C			Y	evaluation	2021
6C.015	Optical ground beacon laser system	700	B	700	0	C2	Q4				2022
6C.016	Four-quadrant InGaAs avalanche photodiodes for LEO direct-to-Earth optical ground station	500	B	500	0	C2	Q3				2022
6C.017	Lunar optical uplink beacon and data transmitter	900	B	900	0	C2		12/07/22	Y		2022
6C.018	Lunar optical communication photon counting receiver	3,000	R	0	3000	C2	n/a				2022
6C.019	Polychromatic laser guide star system for optical feeder-links	2,000	B	2000	0	C2	Q4				2022
6C.020	Atmospheric turbulence effect mitigation by secondary mirror actuation	2,000	R	0	2000	C1	n/a				2022
6C.021	Large area nano-wire detector for quantum and optical communication applications.	1,000	B	1000	0	C1	Q3				2022
6C.031	Operations Development support for optical and quantum ground infrastructure	180	B	180	0	C		22/06/22	Y		2022
	<b>subtotal</b>	<b>16,180</b>		<b>11,180</b>	<b>5,000</b>						
<b>TOTAL (k€)</b>		<b>32,680</b>		<b>25,630</b>	<b>7,050</b>						
<b>SPACE SYSTEMS FOR SAFETY AND SECURITY (4S)</b>											
<b>SYSTEM/ NETWORK / PROTOCOLS</b>											
<b>System, Networking and Management</b>											
3A.136	Integration of satellite and terrestrial railway control networks (4S.006)	800	B	800	0	C			Y	negotiation	2021
3A.149	First phase for System & Services Test Bed (re-issue)	2,000	B	2,000	0	C			Y	evaluation	2021

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3A.150	Next Generation 4S Satcom Solutions -including possible future components of an EU Connectivity infrastructure (re-issue)	3,000	B	3,000	0	C		07/09/22	Y		2021
3A.154	Satellite-based voice connectivity over IP for the Next Generation Emergency Call (NG eCall) (4S.012)	500	B	500	0	C	Q3				2022
3A.155	Software simulator for Air/Space Traffic Management via Satellite for hypersonic space planes (4S.013) - On request	400	R	0	400	C	n/a				2022
3A.156	Space system design of satellite constellations, including security aspects for governmental and institutional services (4S.014)	1,000	B	1,000	0	C		06/10/22	Y		2022
3A.158	Geospatial information networking techniques for maritime awareness services (4S.015)	600	B	600	0	C1		05/09/22	Y		2022
3A.167	Rapid and resilient crisis response system study (4S.024)	350	B	350	0	C			Y	negotiation	2022
		<b>8,650</b>		<b>8,250</b>	<b>400</b>						
<b>Coding, Modulation and Access</b>											
3C.025	System simulator for UAV terminal development (4S.007) (re-issue)	400	B	400	0	C	Q4		Y	to be re-issued after CM 22	2021
3C.028	Protocols for mission critical push-to-talk, data, and video services over LEO constellation networks (4S.016)	800	B	800	0	C		14/10/22	Y		2022
	<b>subtotal</b>	<b>1,200</b>		<b>1,200</b>	<b>0</b>						
<b>Security and Cryptography</b>											
3D.008	Post Quantum Cryptography Algorithms for Satellite Telecommunication Applications (4S.017)	550	B	550	0	C	Q4				2022
3D.011	Secure space networks for satellite platform and payload control (4S.018)	600	B	600	0	C	Q3				2022
	<b>subtotal</b>	<b>1,150</b>		<b>1,150</b>	<b>0</b>						
<b>SPACE SEGMENT - PAYLOAD</b>											
<b>Repeater Equipment</b>											
5C.469	Trusted Platform Module for SmallSat Platforms (4S.019)	750	B	750	0	C2	Q3				2022
	<b>subtotal</b>	<b>750</b>		<b>750</b>	<b>0</b>						
<b>GROUND SEGMENT</b>											
<b>Ground Network Operation Control and Gateway</b>											
6B.085	Techniques for intelligent jamming detection and mitigation of satellite IoT gateways (4S.009) (re-issue)	750	B	750	0	C			Y	negotiation	2021
6B.093	Aerial mobile platform for last mile geolocation and identification of unauthorised transmitters (4S.020)	750	B	750	0	C	Q3				2022
6B.096	Ground network dimensioning for constellations secure networks (4S.021) (re-issue)	600	B	600	0	C		29/08/22	Y		2022
	<b>subtotal</b>	<b>2,100</b>		<b>2,100</b>	<b>0</b>						
<b>USER TERMINALS</b>											
<b>User Terminals Mobile</b>											
7C.069	L band unmanned aerial vehicle transceiver for connectivity in all flight phases (4S.022)	750	B	750	0	C	Q3				2022
7C.073	Compact, reliable multi-band antenna for maritime search and rescue (4S.023)	450	B	450	0	C	Q3				2022
	<b>subtotal</b>	<b>1,200</b>		<b>1,200</b>	<b>0</b>						
	<b>TOTAL (k€)</b>	<b>15,050</b>		<b>14,650</b>	<b>400</b>						
<b>SPACE SYSTEMS FOR 5G/6G ACTIVITIES</b>											
<b>5G.01 - STANDARDISATION / LICENSING / REGULATORY SUPPORT</b>											

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<b>5G.02 - 5G SYSTEM INFRASTRUCTURE STUDY</b>											
1A.117	Satellite and Integrated Access Backhaul (IAB) - An architectural trade-off (5G)	200	B	200	0	C			Y	negotiation	2021
3C.032	Radio performance specification studies for 5G Non-Terrestrial Networks	500	B	500	0	C	Q3				2022
3F.001	System study of large in-orbit-assembled arrays in Frequency Range 1 (FR1) for 5G and Beyond 5G	600	B	600	0	C	Q3				2022
	<b>subtotal</b>	<b>1,300</b>		<b>1,300</b>	<b>0</b>						
<b>5G.03 - 5G NEW RADIO NTN FUNCTIONS/PROTOCOLS DEVELOPMENTS</b>											
3B.044	Wideband channel model for NGSO land mobile services in Ka-band	500	B	500	0	C			Y	proposed for cancellation	2020
3C.035	3GPP New Radio (NR) precoding, multi-antenna and beam management techniques for MSS systems	500	B	500	0	C	Q3				2022
	<b>subtotal</b>	<b>1,000</b>		<b>1,000</b>	<b>0</b>						
<b>5G.04 - 5G CORE NETWORK DEVELOPMENTS</b>											
3A.165	Beyond 5G/6G networking architectures for multi-layered Non-Terrestrial Networks and smart satellites	750	B	750	0	C	Q4				2022
7A.072	Integrated access-backhaul nodes for autonomous and reconfigurable satellite-terrestrial 5G/6G networks	1,000	B	1000	0	C	Q4				2022
	<b>subtotal</b>	<b>1,750</b>		<b>1,750</b>	<b>0</b>						
<b>5G.05 - 5G TESTBED INFRASTRUCTURE</b>											
3C.033	5G New Radio (NR) physical layer demonstrator for railway control communications over satellite	600	B	600	0	C	Q4				2022
3D.005	Security solutions and security test bed for Non-Terrestrial Networks (re-issue)	750	B	750	0	C			Y	ITT to be re-issued	2020
5A.080	Repurposable 5G payload as a service	1,000	B	1000	0	C	Q3				2022
	<b>subtotal</b>	<b>2,350</b>		<b>2,350</b>	<b>0</b>						
<b>5G.06 - 5G UNIVERSAL SATELLITE-TERRESTRIAL USER EQUIPMENT (UE)</b>											
7A.071	On-field reconfigurable notch filter for sub-6GHz interference mitigation	500	B	500	0	C	Q4				2022
7B.055	Reference model for universal satellite-terrestrial 5G user equipment	750	B	750	0	C			Y	proposed for cancellation	2020
7B.056	Reference IP core for universal satellite-terrestrial 5G user equipment	2,000	B	2000	0	C	Q4				2020
7B.069	Integrated wideband multiplexer for hybrid satcom/terrestrial 5G user terminals	800	B	800	0	C	Q4				2022
7C.061	Ka-band antenna for universal satellite-terrestrial 5G land mobile terminals	750	R	0	750	C	n/a				2020
7C.062	Automotive S-band antenna for satellite IoT and 5G terrestrial communications	500	R	0	500	C	n/a				2020
	<b>subtotal</b>	<b>4,800</b>		<b>3,550</b>	<b>1,250</b>						
<b>5G.07 - 5G HUB OVER-THE-AIR DEMONSTRATIONS</b>											
2-019	5G Hub over-the-air vertical segment validations (re-issue)	1,500	B	1500	0	C		15/07/22	Y		2020
	<b>subtotal</b>	<b>1,500</b>		<b>1,500</b>	<b>0</b>						
<b>5G.08 - 5G SATELLITE PROOF-OF-CONCEPT MISSIONS</b>											
2-020	Demonstration of an experimental 5G g-NodeB in space	4,500	B	4500	0	C		29/08/22	Y		2020
2-021	Demonstration of direct 5G broadband access from LEO to small aperture terminals	3,500	B	3500	0	C			Y	negotiation	2020
3A.165	Beyond 5G/6G networking architectures for multi-layered Non-Terrestrial Networks and smart satellites	750	B	750	0	C	Q4				2022
3C.034	Digital Twin for Beyond 5G (B5G) and 6G satcom radio links	1,000	B	1000	0	C	Q3				2022
3F.002	D-band satellite links for 6G	450	B	450	0	C		02/09/22	Y		2022
5C.472	D-band payload building blocks for 6G satellite systems	800	B	800	0	C		15/09/22	Y		2022
	<b>subtotal</b>	<b>11,000</b>		<b>11,000</b>	<b>0</b>						
<b>TOTAL (k€)</b>		<b>20,050</b>		<b>18,800</b>	<b>1,250</b>						

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



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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.

[https://www.esa.int/About\\_Us/Business\\_with\\_ESA/Small\\_and\\_Medium\\_Sized\\_Enterprises/Opportunities\\_for\\_SMEs/Procurement\\_policy\\_on\\_fair\\_access\\_for\\_SMEs\\_-\\_the\\_C1-C4\\_Clauses](https://www.esa.int/About_Us/Business_with_ESA/Small_and_Medium_Sized_Enterprises/Opportunities_for_SMEs/Procurement_policy_on_fair_access_for_SMEs_-_the_C1-C4_Clauses)