



von KARMAN INSTITUTE FOR FLUID DYNAMICS INPA
INSTITUT von KARMAN DE DYNAMIQUE DES FLUIDES AISBL
von KARMAN INSTITUUT VOOR STROMINGSDYNAMICA IVZW

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Mevrouw Elke Sleurs
Staatssecretaris voor Wetenschapsbeleid
Koning Albert II-Laan 33 bus 1
1030 Brussel
AANGETEKEND SCHRIJVEN

Geachte Staatssecretaris,

In navolging van ons schrijven van 20/12/2016, 8/12/2016, 28/10/2016 en 17/11/2016 in verband met een machtigingsaanvraag voor het EC QB50 project en op verzoek van uw administratie, sturen we u hierbij een geactualiseerde versie van dit dossier.

Om technische redenen, heeft een aantal teams beslist om hun lancering op te geven. Als gevolg daarvan zullen de volgende CubeSats niet gelanceerd worden : CA01, CN01, FRO2, FRO3, IN01, RO01 en RU01.

Gelieve als bijlage de definitieve lijst te willen vinden van de CubeSats die zullen gelanceerd worden.

Mijn medewerkers blijven ter beschikking om, indien nodig, bijkomende informatie te verschaffen over dit dossier.

U bij voorbaat dankend voor uw medewerking, verblijven wij,

Met de meeste hoogachting,

Gaële Winters,
Directeur

ANNEX 1: Table of QB50 satellites - ISS launch

To be registered in Belgium?	CubeSat Name	Short name	Owner	Mentor(s)		CubeSat type (Double = 100-100+2+2; Triple = 100-100-50+50)	QB50 scientific instrument	Other experiments	Other main technologies	Maneuverability type (*)	Used frequencies		Use of nuclear power source
				Main	Co-Mentor						Uplink	Downlink	
Yes	SUSat	AU01	UNIVERSITY OF ADELAIDE North Terrace SA 5005 Australia	University of Adelaide (see "owner" for address)	MULLARD SPACE SCIENCE LABORATORY (MSSL) University College London Holmbury Hill Road, Dorking UK Surrey RH5 5NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	Measurement of atmospheric species based on GPS pseudorange, inter-satellite communications	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	436.775 & 145.835 MHz	436.775 & 145.835 MHz	No
Yes	UNSW-ECO	AU02	UNIVERSITY OF NEW SOUTH WALES SYDNEY NSW 2052 Australia	University of New South Wales (see "owner" for address)	MULLARD SPACE SCIENCE LABORATORY (MSSL) University College London Holmbury Hill Road, Dorking UK Surrey RH5 5NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	GPS receiver & related experiments, electronics	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	436.525 MHz	436.525 MHz	No
Yes	INSPIRE II	AU03	UNIVERSITY OF SYDNEY NSW 2006 Australia	University of Sydney (see "owner" for address)	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Double	mNLP (Atmospheric sensor: multi-Nuclei Langmuir Probe)	Navigation, radiation counter, GPS receiver, GPS receiver	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	436.330 MHz	436.330 MHz	No
Yes	ZA-AEROSAT	AZ01	STELLENBOSCH UNIVERSITY Faculty of Engineering RW Wilcocks Building, room 2037 Victoria Street Stellenbosch 7602 South Africa	Stellenbosch University (see "owner" for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	EPEX (Atmospheric sensor: Flux Probe Experiment)	Star Camera	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.905 MHz 2405-2445 MHz	437.2 MHz	No
Yes	uSTART-1	AZ02	SCSS-SPACE 3rd Floor, St Andrew Building Somerset Links Office Park De Beers Avenue, Somerset West, Cape Town Western Cape, South Africa 7130	SCSS-SPACE (see "owner" for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	EPEX (Atmospheric sensor: Flux Probe Experiment)	Imager, GPS receiver	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.905 MHz 2405-2445 MHz	435.900 MHz 2405-2445 MHz	No
Yes	QARMAK	BE06	VON CARMAN INSTITUUT FOR- HETZEL-DYNAMIEK Gedreefde Oudestraat 22 Herengracht 10 Belgium	UZA (see "owner" for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Triple	N/A	Study of the ionosphere in the atmosphere by the use of a probe to measure the electron temperature and composition	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	3	425.14 MHz	425.14 MHz	No
Yes	4-BUSat	BE04	INSTITUTO FEDERAL DE EDUCACAO, CIENCIA E TECNOLOGIA - FEMAP/UNICAMP R. Dr. Ruy Mauro de Carvalho Campesinato, 800-900-1306 Brazil	IFF (see "owner" for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	EPEX (Atmospheric sensor: Flux Probe Experiment)	Immersive communication system (including inter-satellite communication) with the communication system	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	4	145.595 MHz 2405-2445 MHz	425.14 MHz 425.14 MHz 2405-2445 MHz	No
Yes	VLund-QB50	CA01	YORK UNIVERSITY Landscape School of Engineering 4700 Keele Street Toronto ON M3J 1P3 Canada	York University - Landscape School of Engineering (see "owner" for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	EPEX (Atmospheric sensor: Flux Probe Experiment)	Immersive communication system (including inter-satellite communication) with the communication system	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	4	425.14 MHz	425.14 MHz	No
Yes	Es4Air-1	CA03	UNIVERSITY OF ALBERTA Edmonton 8655 - 115 Street Edmonton, Alberta T6G 2E1 Canada	University of Alberta (see "owner" for address)	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Triple	mNLP (Atmospheric sensor: multi-Nuclei Langmuir Probe)	Digital Ionogram magnetometer	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	436.705 MHz	436.705 MHz	No
Yes	BUSAT-1	CN01	BRITISH COLUMBIA UNIVERSITY School of Aerospace 2215 Avenue Road Burnaby, British Columbia V5A 1S6 Canada	British Columbia University (see "owner" for address)	MULLARD SPACE SCIENCE LABORATORY (MSSL) University College London Holmbury Hill Road, Dorking UK Surrey RH5 5NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	GPS receiver	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	4	145.595 MHz	425.14 MHz	No
Yes	LinarSat-1	CN02	FARRIN INSTITUTE OF TECHNOLOGY Harbin China	Harbin Institute of Technology (see "owner" for address)	MULLARD SPACE SCIENCE LABORATORY (MSSL) University College London Holmbury Hill Road, Dorking UK Surrey RH5 5NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	IR camera, amateur radio transponder	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.98 MHz 2405-2445 MHz	145.98 MHz 436.510 MHz 2405-2445 MHz 437.985 MHz	No

ANNEX 1: Table of Q850 satellites - ISS launch

To be registered in Belgium?	CubeSat Name	Short name	Owner	Manufacturer(s)		CubeSat type (Double = 100°x100°x227 mm3 ; Triple = 100°x100°x348.5 mm3)	Q850 scientific instrument	Other experiments	Other main technologies	Maneuverability type (*)	Used Frequencies		Use of nuclear power source
				Main	Other						Uplink	Downlink	
Yes	NJUST-1	CN03	NINGNING UNIVERSITY OF SCIENCE AND TECHNOLOGY (NJUST) 200 Xiao Ling Wei Street Nanjing 210094 China	MANJING University of Science and Technology (see 'owner' for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FIPEX (Atmospheric sensor: Flux Probe Experiment)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.960 MHz 2405-2445 MHz	456.570 MHz	No
Yes	As-Xiang-1	CN04	NORTHERN POLYTECHNICAL UNIVERSITY (NPU) Shuang Laboratory for Microsatellites 127 Yong'Wei Road Xian Shaoni 710072 China	NPU (see 'owner' for address)	MILLARD SPACE SCIENCE LABORATORY (MSSL) University College London Holborn Hill Road, London UK Surrey PL15 6NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.96 MHz	456.150 MHz	No
Yes	SOMPS	DM02	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	TU Dresden (see 'owner' for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FIPEX (Atmospheric sensor: Flux Probe Experiment)	Thermoelectric generator test bed, cosmic ray detector, magnetometer, software payload	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	437.405 MHz	437.405 MHz	No
Yes	QBITO	ES01	UNIVERSIDAD POLITÉCNICA DE MADRID (UPM) EUSOC, ETSIA Calle Ramiro de Maizón, 7 28040 Madrid Spain	EUSOC, ETSIA, Universidad Politécnica de Madrid (UPM) (see 'owner' for address)	MILLARD SPACE SCIENCE LABORATORY (MSSL) University College London Holborn Hill Road, London UK Surrey PL15 6NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	Phase change material, ADACS experiment	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.935 MHz	436.81 MHz	No
Yes	Aulu-2	FI01	AALTO UNIVERSITY School of Electrical Engineering, Department of Radio Science and Engineering P.O. Box 13000 00076 Aalto Finland	Aalto University (see 'owner' for address)	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Double	mNLP (Atmospheric sensor: multi-MeVale Langmuir Probe)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	437.335 MHz	437.335 MHz	No
Yes	X-CubeSat	FR01	ECOLE POLYTECHNIQUE Route de Saclay 91128 Palaiseau cedex France	Ecole Polytechnique (see 'owner' for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FIPEX (Atmospheric sensor: Flux Probe Experiment)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.86 MHz	437.020 MHz	No
Yes	ENERGIA1	FR02	INSTITUT SUPÉRIEUR DE AÉRONAUTIQUE ET DE ESPACE 10, rue des Minimes 93100 La Courneuve France	ISEP (see 'owner' for address)	N/A	Triple	None	Self-orthogonal-recovery in-orthogonal-frequency and-orthogonal-time	Power supply, on-board computer, communication system, attitude determination and control system	+	145.66 MHz	436.45 MHz	No
Yes	FP-64F	FR03	INSTITUT SUPÉRIEUR DE SCIENCE ET TECHNOLOGIE (ISTE) 46 rue de la Liberté 93100 La Courneuve France	ISTE (see 'owner' for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FIPEX (Atmospheric sensor: Flux Probe Experiment)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	+	145.85 MHz	437.61 MHz	No
Yes	SpiceCube	FR05	MINES PARISTECH 66, Boulevard Saint-Michel 75372 Paris cedex 06 France	École des Mines ParisTech (see 'owner' for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FIPEX (Atmospheric sensor: Flux Probe Experiment)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.86 MHz	436.880 MHz	No
Yes	DIITHSH	GR01	DEMOCRITUS UNIVERSITY OF TRAIANCE Department of Electrical and Computer Engineering Kimmeria Campus, Building B Xanthi 67100 Greece	Democritus University of Thrace (see 'owner' for address)	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Double	mNLP (Atmospheric sensor: multi-MeVale Langmuir Probe)	Telemetry board	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.81 MHz	436.420 MHz	No
Yes	UPSA1	GR02	UNIVERSITY OF PATRAS Applied Mechanics Lab Patras University Campus GR-26504 Rio Patras Greece	University of Patras (see 'owner' for address)	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Double	mNLP (Atmospheric sensor: multi-MeVale Langmuir Probe)	Current being the Earth	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.860 MHz	435.765 MHz	No

ANNEX 1: Table of QB50 satellites - ISS launch

To be registered in Belgium:	CubeSat Name	Short name	Owner	Manufacturer(s)		CubeSat type (Double = 100-100-227 mm3 ; Triple = 100-100-340.5 mm3)	QB50 scientific instrument	Other experiments	Other main technologies	Miscellaneous type (*)	Used frequencies		Use of fueller power source
				Main	Other						Uplink	Downlink	
Yes	Hesper	IL01	HEZLIYA SPACE CENTER 3 Jabotinsky st. 46100 Herzliya Israel	N/A	N/A	Double	mNLP (Atmospheric sensor: multi-Needle Langmuir Probe)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.985 MHz 437.74 MHz	No	
Yes	Asses-2	IN04	ANKA UNIVERSITY Department of Electronics and Communication Engineering College of Engineering Chennai-600025 India	ANKA UNIVERSITY Faculty of Mechanical Engineering Engineering 91402 Dresden, Germany	Double	FPEX (Atmospheric sensor: Flux Probe Experiment)	None	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	+	145.985 MHz 2495.2445 MHz 437.985 MHz 2495.2445 MHz	No		
No, will be registered by South Korea	LINK	KR01	KASIT Department of Aerospace Engineering 29 Daeheok-ro Yuseong-Daemjeon 305-701 South Korea	MULTI-BUS SENSIVE LABORATORY (KASIT) University College Holbury Hill Road, Dorking UK Surrey RH4 5NT United Kingdom	Double	DMAS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	Langmuir probe (atmospheric sensor)	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.985 MHz 436.030 MHz	No		
No, will be registered by South Korea	SNUSAT-1	KR02	SEOUL NATIONAL UNIVERSITY 304-B141 1 Gwanak-ro, Gwanak-gu 151-742 Seoul South Korea	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FPEX (Atmospheric sensor: Flux Probe Experiment)	Algorithm, low resolution imager	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.985 MHz 436.09 MHz	No		
No, will be registered by South Korea	SNUSAT-1b	KR03	SEOUL NATIONAL UNIVERSITY 304-B141 1 Gwanak-ro, Gwanak-gu 151-742 Seoul South Korea	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FPEX (Atmospheric sensor: Flux Probe Experiment)	Algorithm, low resolution imager	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.985 MHz 435.950 MHz	No		
Yes	GAIA6464E	FR04	FERREYER Rue Merveilles-336 45900-115 L'Isle-sur-Loire Poitou-Charente	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Triple	FPEX (Atmospheric sensor: Flux Probe Experiment)	Investigative communication system (including inter- satellite communication), multi-needle Langmuir probe, attitude determination and control system	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	+	145.985 MHz 2495.2445 MHz 437.985 MHz 2495.2445 MHz	No		
Yes	REBUSAT-10-04	RO04	REGLAR - INSTITUTE OF SPACE SCIENCE Aventuriers-406 02115 Moguelville-BOJ Romania	UNIVERSITÄT DER SAAR Department of Physics P.O. Box 14818 66043 Saarbrücken Germany	Double	mNLP (Atmospheric sensor: multi-Needle Langmuir Probe)	Inter-satellite communication	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	+	145.985 MHz 2495.2445 MHz 435.950 MHz 2495.2445 MHz	No		
Yes	Samsat-Q120	SE04	SAMSKO STATE AEROSPACE UNIVERSITY (SSAU) 72, Moshkova Street Ekmun-101006 Resident: Andriyev Romania	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FPEX (Atmospheric sensor: Flux Probe Experiment)	Artificial satellite system: navigation receiver	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	+	145.985 MHz 436.180 MHz	No		
No, will be registered by Sweden	qber	SE01	OPEN COSMOS LTD 2022 Wendou Road London N17 6GU England LULEÅ UNIVERSITY OF TECHNOLOGY Dept. Of Computer Science, Electrical and Space Engineering SE-971 87 Luleå Sweden	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FPEX (Atmospheric sensor: Flux Probe Experiment)	On-board computer, radiation counter	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.985 MHz 435.800 MHz	No		
Yes	BREAGLESAT	TR01	ISTANBUL TECHNICAL UNIVERSITY Faculty of Aeronautics and Astronautics 34469 Maslak Sarıyer Istanbul Turkey	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Double	mNLP (Atmospheric sensor: multi-Needle Langmuir Probe)	X-ray detector	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.985 MHz 437.370 MHz	No		
Yes	HAVLSAT	TR02	HAVELSAN Mursat. Kocaeli Men. 2120 Ctd. No. 09 0810 Antem Turkey	UNIVERSITY OF OSLO Department of Physics P.O. Box 1048 Blindern NO-0316 Oslo Norway	Double	mNLP (Atmospheric sensor: multi-Needle Langmuir Probe)	Communication system (S- band transceiver)	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.935 MHz 436.845 MHz	No		

ANNEX 1: Table of QB50 satellites - ISS launch

To be registered in Belgium?	CubeSat Name	Short name	Owner	Manufacturer(s)		CubeSat type (Double = 100*100*227 mm3 Triple = 100*100*40.5 mm3)	QB50 scientific instrument	Other experiments	Other main technologies	Maneuverability Type (*)	Used frequencies		Use of nuclear power source
				Main	Other						Uplink	Downlink	
24 Yes	PHOENIX	TW01	NATIONAL CHENG KUNG UNIVERSITY Dept. of Electrical Engineering 1 University Road Taiwan, Taiwan 70101 Republic of China	NEKU (see "owner" for address)	MULLARD SPACE SCIENCE LABORATORY (NSSL) University of Surrey Holbury Hill Road UK Surrey RH5 8NT United Kingdom	Double	INMS (Atmospheric sensor: Ion-Neutral Mass Spectrometer)	Solar ultra-violet sensor	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.86 MHz	436.615 MHz	No
25 Yes	POPMYAN-2-SAU	UA01	NATIONAL TECHNICAL UNIVERSITY OF UKRAINE Kyiv Polytechnic Institute Pecersky Avenue 37 03056 City of Kyiv Ukraine	National Technical University of Ukraine (see "owner" for address)	TECHNICAL UNIVERSITY OF DRESDEN Institute of Aerospace Engineering, Faculty of Mechanical Science and Engineering 01062 Dresden, Germany	Double	FPEX (Atmospheric sensor: Flux Probe Experiment)	GPS-Glonass receiver, momentum wheel	Classical CubeSat platform: power supply, on-board computer, communication system, attitude determination and control system	1	145.96 MHz	436.600 MHz	No

(*) Two types of maneuverability are defined:

- Type 1: The CubeSat is placed into its orbit by the NRCSD CubeSat deployer. Upon release from the upper stage, the CubeSat will re-orient to the intended attitude and will coast naturally due to residual atmospheric drag in space. S.I. Mannoche will command the satellite deploy from the ISS into space upon authorization of the van Kaman Institute only.

- Type 2: The CubeSat has maneuvering capabilities that allow it to change its orbit (altitude, inclination) by means of a propulsion system around drag increasing system. All maneuvers are performed under VCI authority, as stated in Annex 4.

