

Hispasat and ESA sign an agreement for Q-DESIGN, a pioneer project in QKD

Hispasat and ESA sign an agreement for Q-Design, the first integrated satellite and terrestrial quantum key distribution system. Q-Design is made up of a consortium of 15 companies an organizations, which include ICFO, that will be responsible fo developing this pioneering project and designing services tha provide value to the end user.

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The European Space Agency (ESA) has signed an agreement with Hispasat for the development of the initial phase of Q-Design, the first project worldwide to integrate Quantum Key Distribution (QKD) through geostationary and low orbit satellites and terrestrial infrastructure. In this way, Q-Design will enable the design of QKD services in which users can securely transmit their messages through any of these channels, depending on the conditions required at any given time. This first phase, which will be dedicated to perform a

feasibility study for the service segment and ground segment components required to provide QKD services using multiple orbits (LEO and GEO), in close collaboration with end users/customers and evaluate the integration with QKD ground networks in EuroQCI. The agreement between ESA's Future Preparation programme, under the Advanced Research in Telecommunications Systems (ARTES) programme within the Directorate of Connectivity and Secure Communications, and Hispasat was signed today during the International Paris Air Show at Le Bourget.

To carry out this project Hispasat has set up a consortium of companies and organizations covering the whole chain that will contribute their know-how to the development of a system offering a service of high technological value. Specifically, the consortium includes research organizations such as **ICFO-The Institute of Photonic Sciences** and the Universidad Politecnica de Madrid; manufacturers such as GMV, Indra and Thales Alenia Space Espana; satellite service providers such as SES, S4 or Speqtral; certifying organizations such as the Centro Criptologico Nacional (CCN); network operators such as Cellnex or Telefonica; bank users such as BBVA and Santander; and critical infrastructures such as Elia.

The emergence of quantum computers provides much greater computational power than traditional computers for certain problems, such as the prime factor decomposition on which current non-symmetric cryptography is based. This means a paradigm shift in secure communications, as it will be able to decrypt current encryption in a matter of seconds. It is therefore essential to develop a system that allows information to be sent with the necessary guarantees in government communications environments (civil and defense), critical infrastructure management and applications and services of economic, environmental or technological interest, as well as large corporations. This technology is also a first step towards a future quantum internet, which will represent a radical leap forward in global communications.

The distribution of quantum keys through an optical communications system makes it possible to check with certainty whether they have been intercepted, since their integrity is continuously verified thanks to the quantum properties of photons. Terrestrial networks based on optical fiber are the ideal infrastructure for distances of less than a few hundred kilometers, but beyond that they suffer from signal loss. Therefore, QKD satellite systems, both in geostationary orbit and low orbit, are ideal for covering long distances. From 2028, Q-Design will offer users of this type of solution a versatile and transparent tool, adaptable to each specific need.

Laurent Jaffart, ESA Director of Connectivity and Secure Communications, said: i¿½T
e Q-Design project represents a significant step towards boosting European autonomy
n quantum technology and secure communications from space. ESA is proud to partner wi
h Hispasat in the development of QKD satellite systems to ensure fast and secu
e communications for Europe, while fostering innovation and competitiveness within t
e European space industry.i

?½ Miguel Angel Panduro, CEO of Hispasat, added that "our company has been working for y ars on the development of the first geostationary quantum key distribution mission and ow, with the leadership of the Q-Design consortium and the support of ESA, we are taking a new leap and placing ourselves at the forefront of secure communications".