



## ***QUITSAT*: a system to monitor and forecast the air quality using satellite and in situ measurements**

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***QUITSAT*** (QUALità dell'aria mediante l'Integrazione di misure da Terra, da Satellite e di modellistica chimica multifase e di Trasporto) is a pilot project founded by the Italian Space Agency (ASI) in the framework of its institutional priorities for the Natural and Technological disaster management programme.

Air Quality (AQ) monitoring is typically based on ground measurements at local scale. In recent years, this issue is inserted in a wider frame, in which chemical transport models (CTM) join ground-based data and satellite observations to better characterize AQ monitoring, forecasting and planning on the regional scale.

In this context, ***QUITSAT*** project is devoted to AQ assessment through the fusion of observations coming from polar and geostationary satellite sensors and ground-based data collected by DOAS spectrometry, multispectral solar radiometry, lidar techniques and chemical transport modeling.

ASI strategic objectives are twofold:

- to promote the development of Earth Observation (EO) applications (products and services based on satellite data)
- to study and implement application missions of pre-operational or operational type

ASI main target is to foster improved utilization of existing and planned EO data to support users, that play a key role in ***QUITSAT*** application development. Users selected at regional level are Italian environmental regional agencies as ARPA Emilia Romagna and ARPA Lombardia: they already have a great experience in air quality management and are involved in every phase of the project (from requirements to

demonstration phase).

After the identification of user requirements and the critical assessment of the open scientific and technological gaps that need to be addressed, *QUITSAT* pilot project develops a prototype system to demonstrate the potential use of EO data and information products to support the environmental decision makers.

The project is developed during the following phases:

- (i) *Consolidation*, to strengthen requirements and design the system (EO based) considering three subsequent releases.
- (ii) *Executive design and development*, to realize and validate each system release.
- (iii) *Demonstration*, where the system is used “operationally” and feedbacks are collected to enhance the performance of the procedures themselves.

The principal *QUITSAT* functionalities are:

1. Air quality evaluation: PM and gas monitoring
2. Concentration forecasting and air pollution distribution
3. Planning support: emissivity scenarios

These functionalities will be implemented using satellite data as primary source of information, and strictly integrated with more conventional air quality measurements and chemical and transport models. The most important products will be maps of gas and PM at the surface, maps of air quality index and categories, maps of aerosol transport extreme events, forecast of threshold exceeding and simulated scenarios for planning.