مـؤتـمـر عـجـمـان
الـدولي السادس للبيئة
Ajman 6th International
Environment Conference

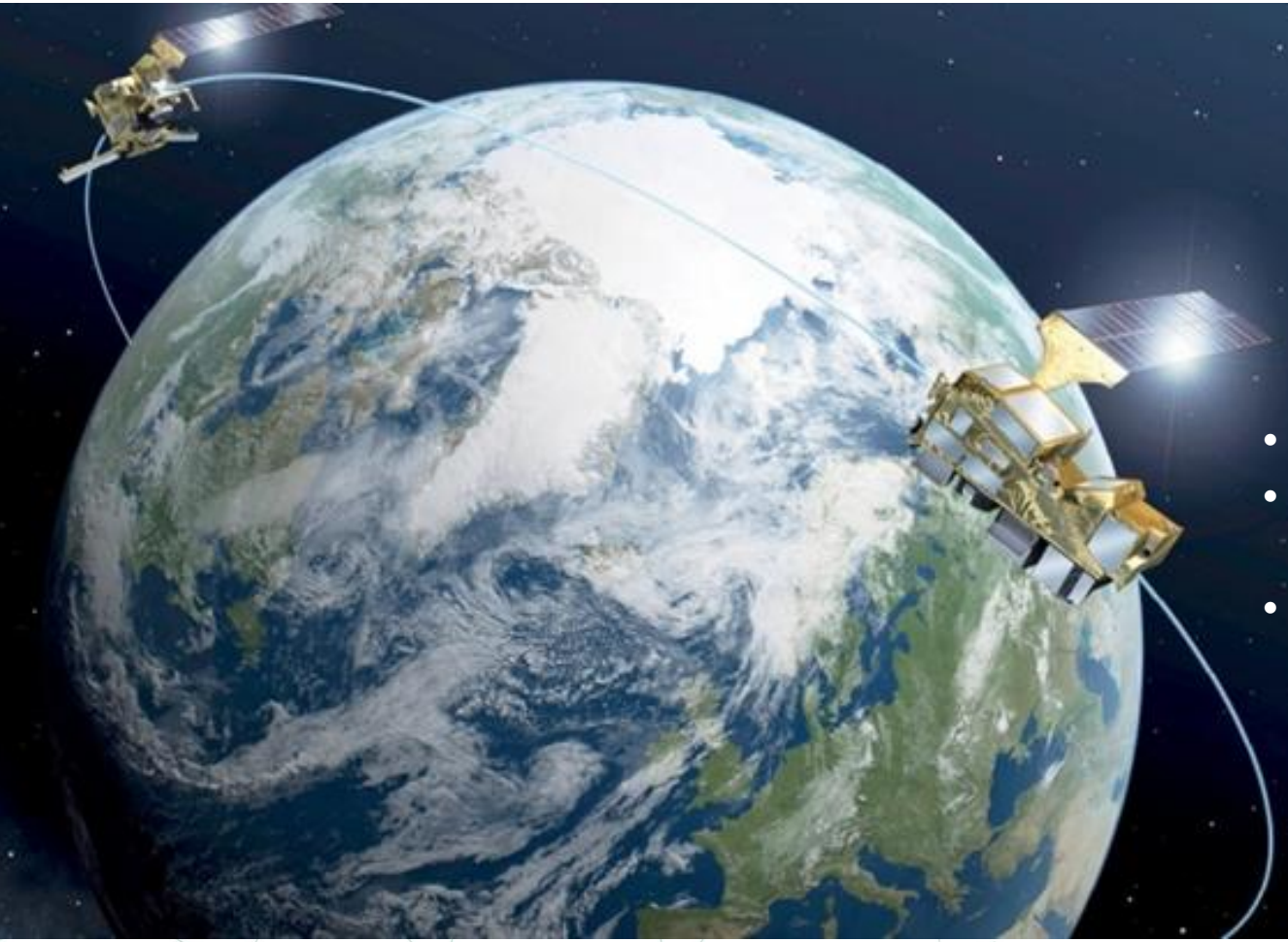
بلدية دبي
DUBAI MUNICIPALITY

DMSat1

towards a resilient Environmental Future

TOWARDS >>>
2071
SHAPING THE
FUTURE
FOR ENVIORMENTAL
SUSTAINABILITY

OVERVIEW: ENVIRONMENTAL SATELLITES



Satellites that detect and observe different characteristics and features of the Earth's atmosphere, land surface, and ocean are referred to as environmental satellites.

- Utilized largely in monitoring and regulatory purposes
- Widely used in the decision-making and environmental management activities.
- Can be used to study several environmental aspects (i.e. ocean bathymetry, sea surface temperature, ocean color, coral reefs, ice cover, and more)

OVERVIEW: ENVIRONMENTAL SATELLITES

Air Quality Applications

- Estimating emission and tracking pollutant plumes
- Supporting air quality forecasting activities
- Evaluating air quality model output.
- Monitoring regional long-term trends.
- Supports studies of atmospheric composition for air quality (AQ).

Key benefits

- Satellite observations covers wider spatial area in compare to data collected by surface AQ monitors.
- Provide an overview of the regional buildup and the long-range transport of pollution.

THE DMSAT1 ENVIRONMENTAL SATELLITE

About DMSat1

- A nano-satellite specialized for environmental monitoring
- Collaboration between Dubai Municipality and the Mohammed bin Rashid Space Center

24 months

University of Toronto Canada

THE LAUNCHING OF DMSAT1

Successfully launched on
March 22, 2021

- Baikanur space station in Kazakhstan
- aboard a Soyuz 2.1a space rocket.

Space rocket (Soyuz 2.1a) carrying DMSAT 1

Baikonur space station in Kazakhstan

Orbit height **550 km**

Rotates 14 times around the Earth in one day

KEY OBJECTIVES

Supporting global efforts to preserve the environment

Data collection Measurement of air pollutants

Employment of space technology and artificial intelligence to enhance the environmental monitoring program at the national level

Monitoring concentrations of particulate matter (dust) (PM2.5 - PM10)

Monitoring concentrations of greenhouse gases (carbon dioxide, methane, water vapor)

Monitoring the concentrations of gases that cause climate change

TECHNICAL CAPABILITIES

INSTRUMENTS

DMSat-1 contains a primary and secondary instruments to study aerosols and greenhouse gases.

$PM_{2.5}$ PM_{10} CO_2 CH_4 H_2O AOD AER

THE TARGET AREAS OF DMSat-1

The instruments capture multi-angle views to observe several target areas including:

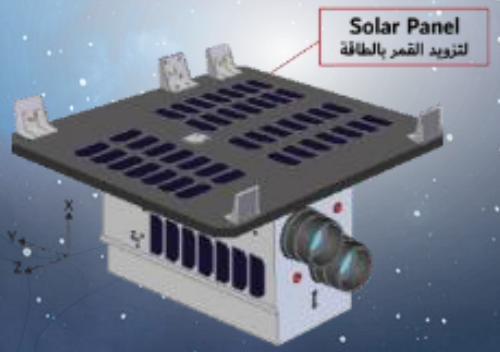
Primary Target Areas (PTAs) refer to the area of study, the UAE.

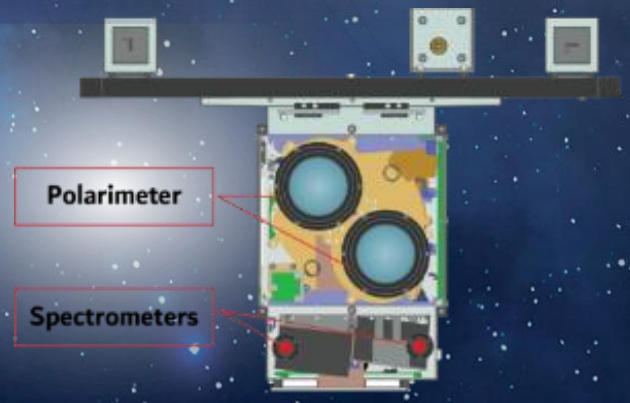
Secondary Target Areas (STAs) refer to the additional areas of study which may contribute to scientific research and provide observations to the scientific community.

ENGINEERING DESIGN

Engineering Design

The satellite has 3 advanced scientific devices to monitor air pollutants and greenhouse gases:

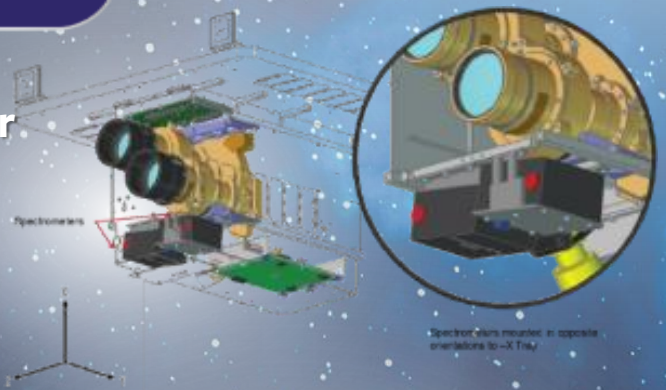




Primary Instrument - Polari meter

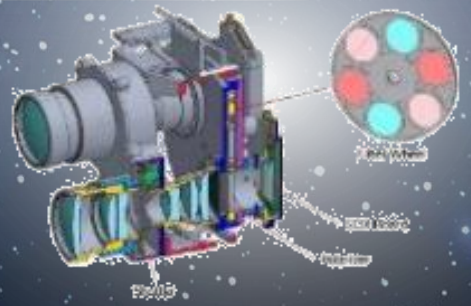
Monitor and measure levels of air pollutants PM10-PM2.5

Study of seasonal changes in the levels of air pollutants



Secondary Instruments - Spectrometers 1 & 2

Monitoring the levels of greenhouse gases (CO2, CH4, H2O) in the atmosphere



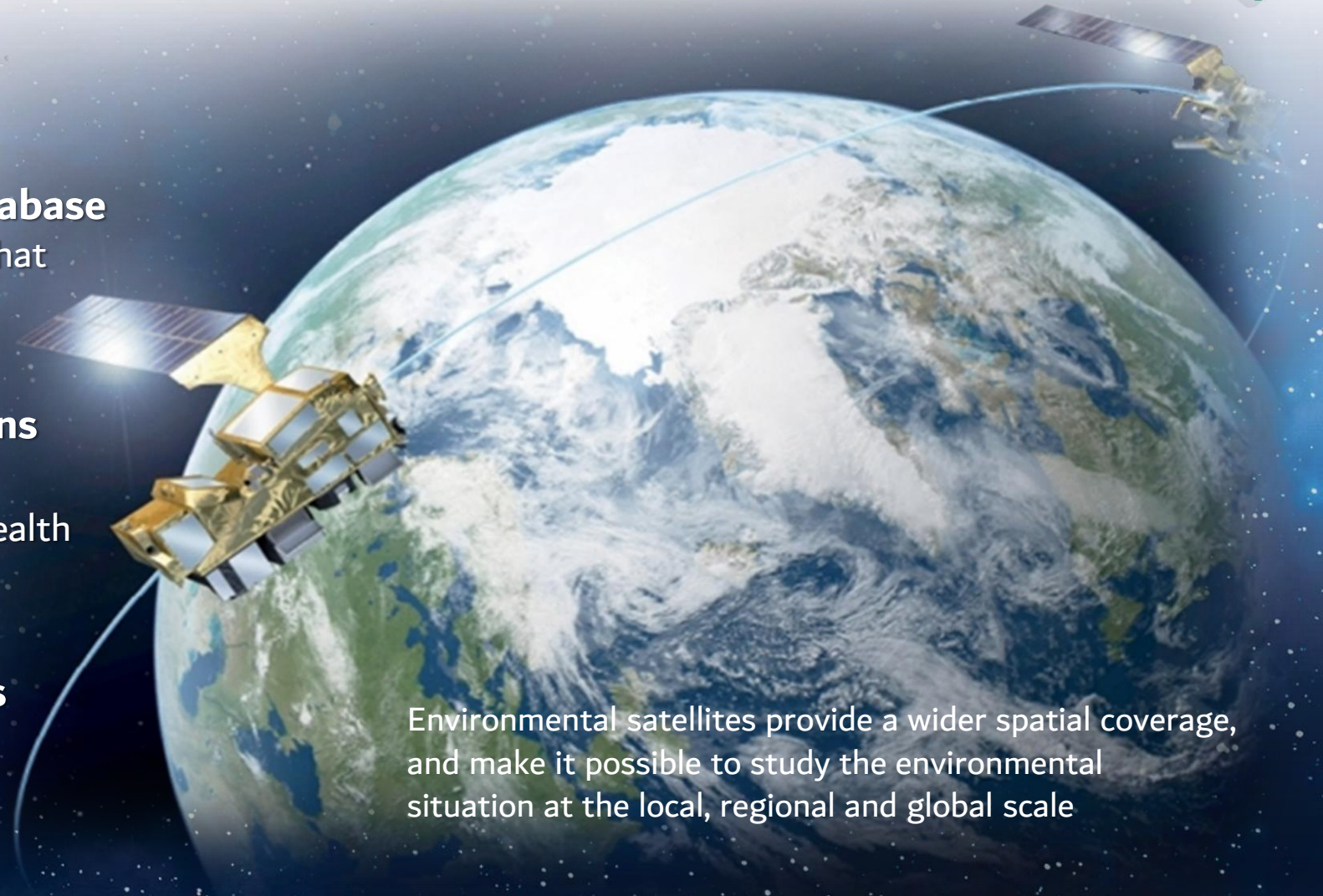
AREAS OF BENEFIT

Build a database

Building a satellite database
Air pollutants and gases that cause climate change

Studying concentrations of air pollutants
and its impact on public health

Employing environmental outputs
In urban planning of the city and land use



Environmental satellites provide a wider spatial coverage, and make it possible to study the environmental situation at the local, regional and global scale

AREAS OF BENEFIT

Leadership and international cooperation

Support global efforts

Preserving the environment and combating climate change

Strengthening the leading role

In the fields of environmental scientific research

Strengthening the leadership role of the United Arab Emirates in implementing the provisions of the Paris Climate Agreement through:

- Providing information and data for monitoring greenhouse gas emissions
- Support developing countries to implement the objectives of the Convention through the exchange of environmental data.

Exchange of environmental data with international organizations, such as the C40 organization, as well as other countries.

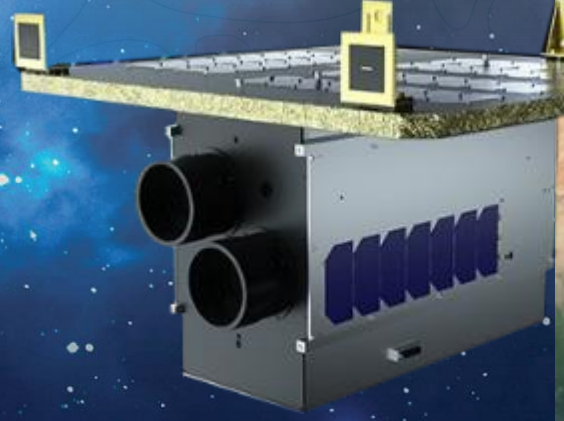
It provides valuable input to promote more environmentally sustainable development with a significant contribution to the United Nations Sustainable Development Goals.

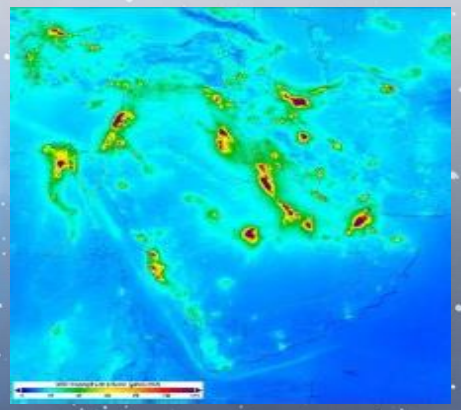
PARTNERSHIPS WITH ACADEMIC INSTITUTIONS

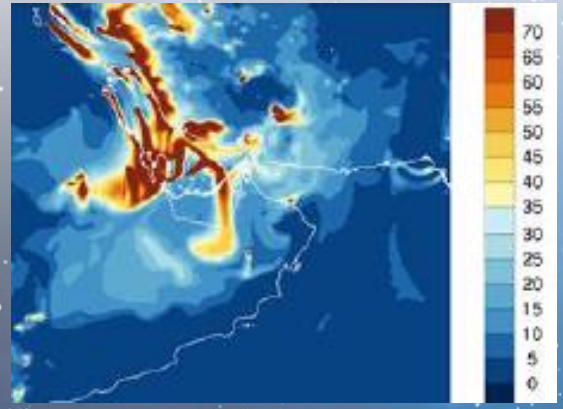
- Providing academic research opportunities by establishing partnerships and cooperation with leading academic institutions to improve scientific research processes.
- Formulate scientific and innovative solutions and environmental applications to address the various environmental challenges facing the United Arab Emirates and many countries of the world today.

EMPLOYMENT OF DMSAT1 DATA

- **Develop a regional map of the concentrations and spread of air pollutants using advanced digital modeling programs**







Formulate recommendations to reduce air pollution and employ the outputs in future environmental studies

Developing a high-resolution regional model for the spread of air pollutants at the district level

Integrated Network for Monitoring the Air Environment

Mobile air environment monitoring station

air quality monitoring stations

Environmental satellite DMSAT1

Electromagnetic radiation monitoring stations

Odor-causing pollutant monitoring stations

Noise levels monitoring stations

Thank you all

Dubai Air Environment

search for more