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Satellite Technology Applications in Education: Examples from Greece

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Issue 12: Greece - Applications



In ancient Greece, there was a mechanism for processing space information from the earth. The Antikythera has since been referred to as the world's first (mechanical) computer. In Greece, the Antikythera mechanism was used to fabricate calendars and schedules for seasons of harvesting and for organizing religious festivals. More than two millennia later, the descendants of these early scholars and technicians are still using outer space to educate themselves, but now the mechanism is electronic and digital using software and spaced-based satellites.

Greece's first satellite: Hellas Sat 2

When Greece became a member of the European Space Agency (ESA), with the launch of its first satellite in May of 200, it joined a short list of nations with an autonomous presence in space. The HELLAS SAT Consortium Ltd. based in Nicosia, Cyprus, is a joint enterprise of the Greek and Cypriot governments and private businesses. The Hellenic Telecommunications Organization (OTE), the Greek incumbent telecommunications provider, is the main shareholder. Hellas Sat 2 was built by the French-based Astrium and launched into geo-synchronous orbit from Cape Canaveral Air Force Station. The satellite hosts 30 Ku-band transponders, with fixed beams over Europe and steerable beams which can cover the Middle-East, Southern Africa, and South Asia. It has an expected life of 15 years.



Fig. 1: Hellas Sat before launch - May 14, 2003

The main function of the satellite was to assist the Government of Greece and the International Olympic Committee (IOC) in the transmission of the Athens Olympic Games of 2004. International news agencies and television networks based within the footprint of Hellas Sat 2, such as BBC (UK) and the International Broadcast Center of the IOC, were able to lease capacity for their television broadcasting of the games. For nations in the America's and East Asia, Hellas Sat 2 was able to relay programming along to other satellites. Networks such as NBC (USA), whose television stations transmitted over 10,000 hours of Olympic coverage, and NHK (Japan) relied exclusively on Hellas Sat 2 for television program distribution.

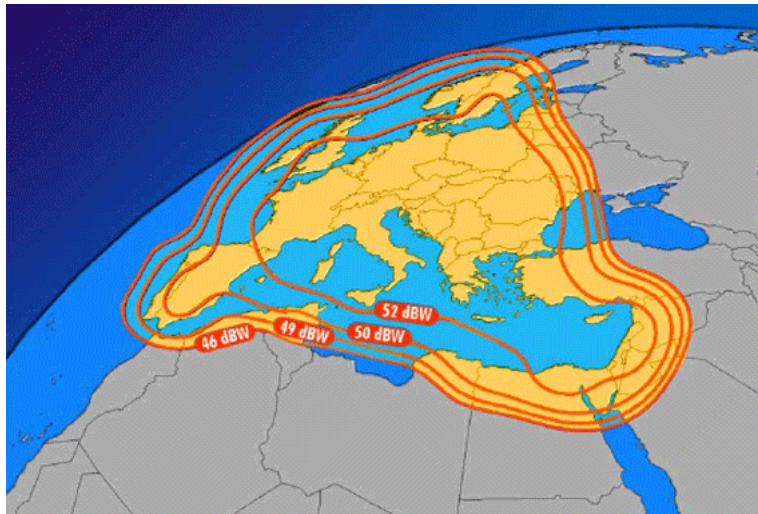


Fig. 2: Footprint of European fixed beam

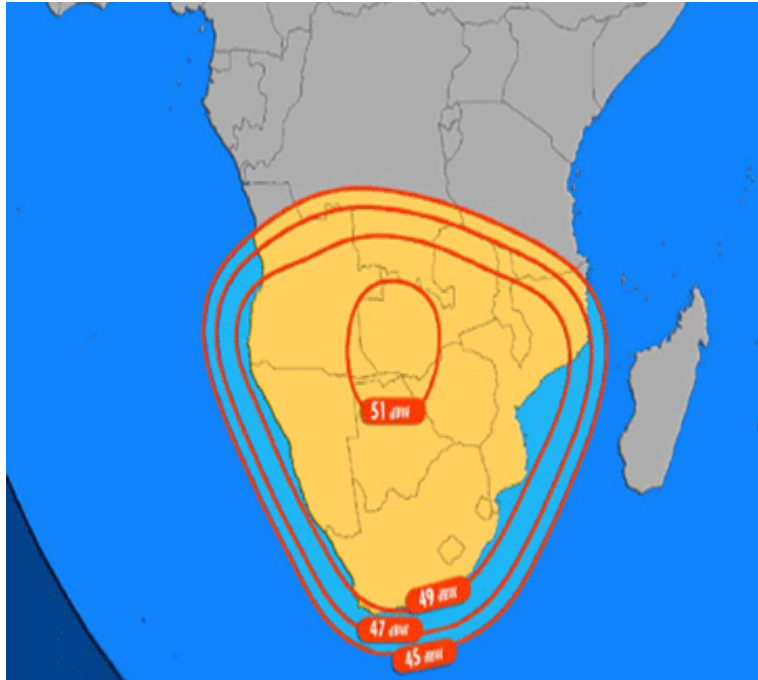


Fig. 3: Footprint of African steerable beam

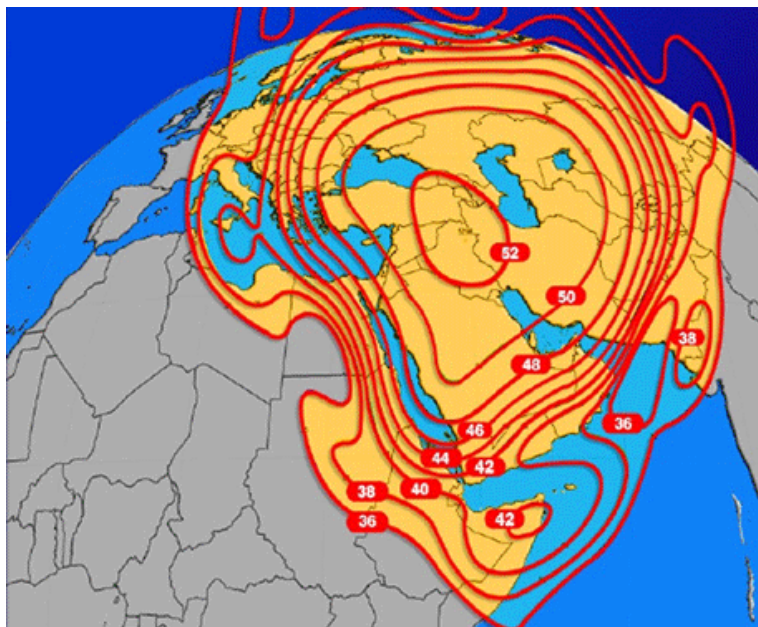


Fig. 4: Footprint of Middle-East and Asian steerable beam

Television and Radio

Satellite signals often extend beyond national boundaries and so do their educational applications. With a large number of Greek ex-patriots in North America, the UK and Australia, the Government utilizes its state television and radio networks ERT and ERA to reach out to those citizens located outside the

country. Satellite providers reach them with news and informational programming, in addition to other genres of interest such as sport and cinema and education and religion.

Educational programming for television as well as radio is created in the studios of the ERT national stations to be transmitted via satellite overseas.

The program ERT World is comprised of broadcasts from Greece's three national networks, as well as Cyprus' state broadcaster CyBC. In addition to this re-packaging, specialized programming is produced aimed at providing expatriates with language lessons for children and documentaries for their parents on the culture and history of the nation.

In the United States, such television programming can only be obtained through the Direct-To-Home satellite providers DirecTV and Dish Network. In Canada, in addition to DTH satellite television, cable providers receive the ERT World's satellite feed and offer this programming through subscription.

For radio programming, ERA supplies two of its networks for global broadcast: ERA-Sport and Voice of Greece. The latter is intended for international audiences, in particular overseas Greeks, and is delivered to all continents on shortwave radio via satellite. It consists mainly of English-language shows but produces hourly newscasts in twelve languages, numerous live talk shows and informational programs on Greek society and politics for interested non-Greeks and to keep expatriates updated . In addition to shortwave, the Voice of Greece can be heard in the United States through Dish Network's international radio channels along with ERA-Sport.

Remote Sensing for Environmental Education

A current use of satellite remote sensing is being employed in a program for the conservation of sea turtles in Greece and the eastern Mediterranean. Sea turtles are widely adored and are considered a national symbol, and their dwindling numbers are a cause of concern. The Government has created a number of decrees for their preservation.

ARCHELON, a sea turtle protection society, is utilizing the tracking capabilities of satellite technology to perform accurate telemetry and decipher the precise movements of turtles in the sea, ultimately assisting them in their procreation . From the vantage point of space, their visible nesting grounds, their sea movements and breeding locations can be observed in real time, making it easier to rehabilitate the turtle population and protect them from ships and fishermen.



Fig. 5: A turtle with a transmitter attached to its carapace

Originally, tags were attached to the flippers of the sea turtles so that their location could be confirmed upon sight, but this approach gave no information regarding the turtles' actual travels. ARCHELON now places transmitters on the turtle's back and can track their positions when they are relatively close to sea level and on the ground.

Satellite technology might have lost some of its appeal due to the ease and low cost associated with terrestrial Internet communication, but it is apparent that a number of its uses in the educational field, brought about by the advantages of extensive land and sea coverage, can simply not be substituted.

NOTES

The Antikythera Mechanism is an ancient mechanical computer devised to work out astronomical positions. Uncovered in 1900 in the Antikythera ship wreck off the Greek island of Antikythera, it has been dated to about 150 BC. For the past century scientists and archaeologists have been trying to reconstruct it and fully comprehend its structure and design.



The Antikythera mechanism (main fragment)



Reconstruction of the Antikythera mechanism in the National Archaeological Museum, Athens (left)
([click to enlarge](#))

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