

Country Report Saudi Arabia



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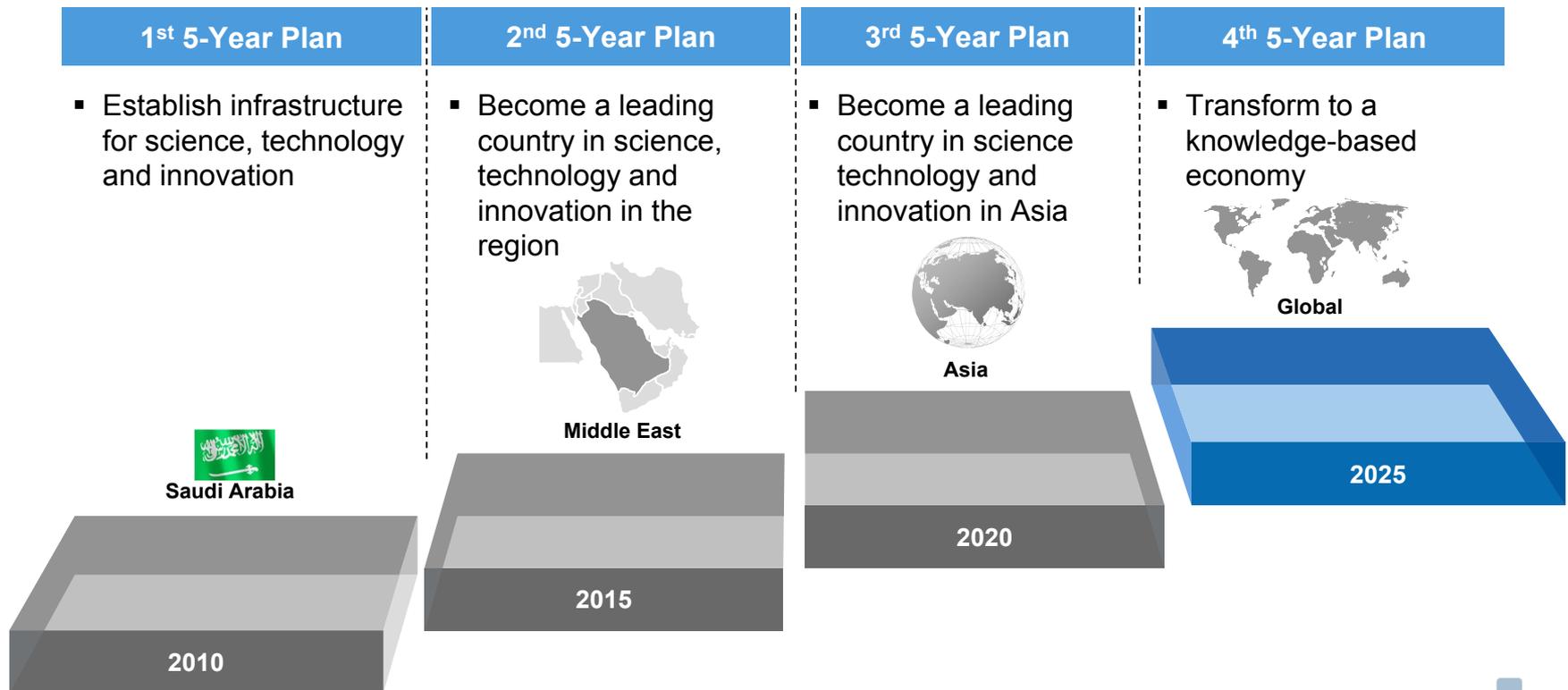


Outline

- Saudi Arabia Satellites in Space & National Science, Technology and Innovation Plan
- Legislation
- Public awareness
- Capacity Building
- Participation in UNISEC-Global Activities
- Contribution to Private Sector
- Conclusions

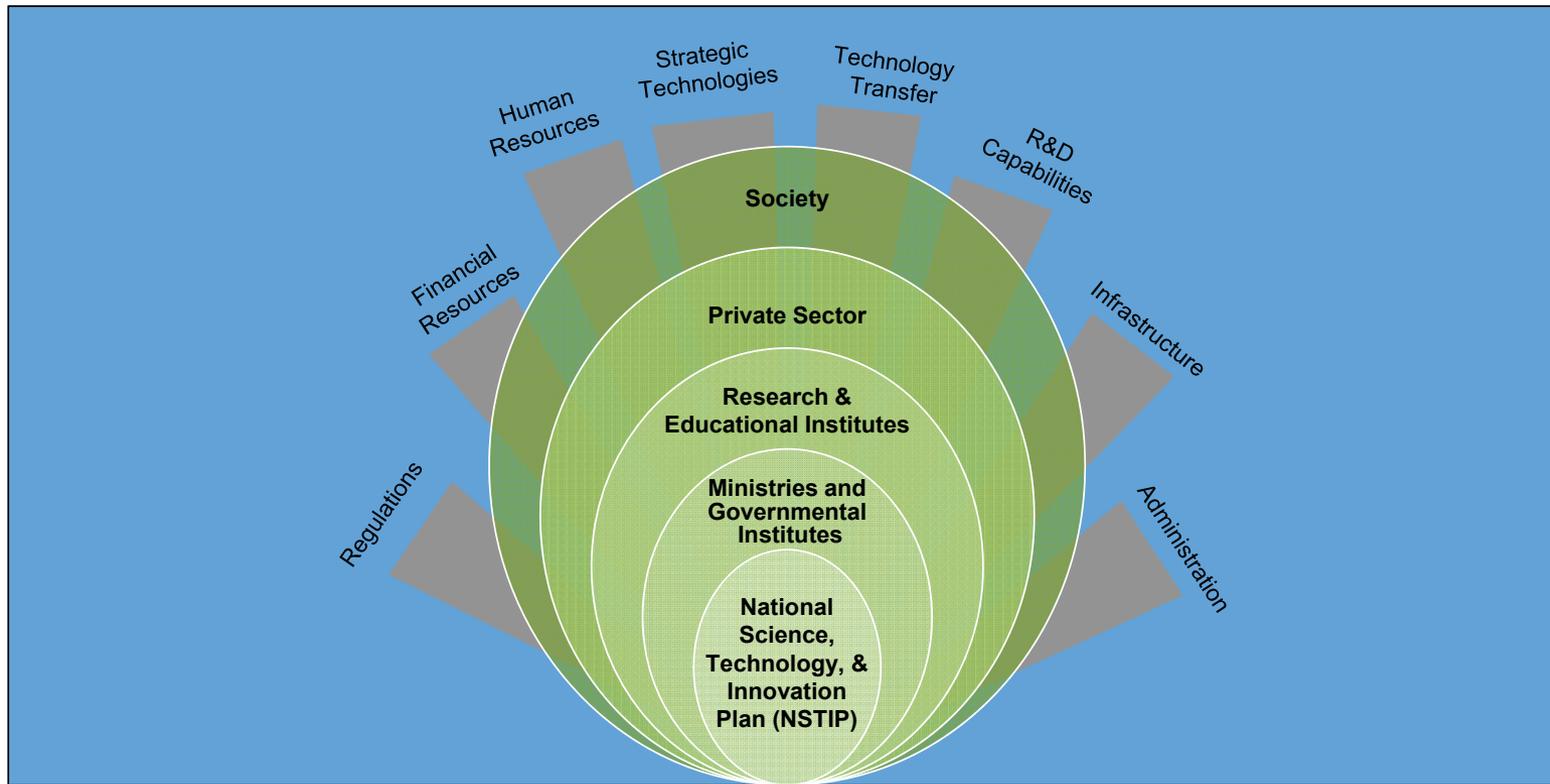
The National Science, Technology and Innovation Plan provides KSA with the strategic vision to join knowledge-based economies ...

Long Term - 20 year National Plan for Science, Technology & Innovation



NSTIP implementation throughout the Kingdom Institutions....

NSTIP Framework



In regards to innovation, KACST will keep on focusing on 15 technological areas that have been identified as critical for KSA

Advanced Technologies Program

Technology Priorities for KSA

KACST Technology Priorities	Water	
	Oil and Gas	
	Petrochemicals	
	Nanotechnology	
	Biotechnology	
	Information Technology	
	Electronics and Communications	
	Space and Aeronautics	
	Energy	
	Environment	
	Advanced Materials	
	Mathematics And Physics	
	Medical and Health	
	Agriculture Technology	
	Building and Construction	

Examples of KACST R&D Achievements

King Abdullah Initiative for Water Desalination by Solar Energy.

(Largest Plant in the world at Khafji City, KSA)

King Abdullah Initiative for Arabic Content

(Dramatically increasing Arabic internet content)

Design of Next Generation System on Chips and Supercomputers.

(First Construction of SOC and Supercomputers in the MENA Region)

Complete Genome Sequencing

(Date Palm and Camel Genomes mapped completely)

Advanced Satellite Technology Development

(From Nano Satellites to Geostationary Satellites)

KACST established Joint International Centers of Excellence with World Leading R&D Organizations



KACST Joint Centers of Excellence

International Universities and Institutes

Institutes Joint Centers of Excellence

MIT (USA)
Stanford (USA)
Oxford (UK)
Cambridge (UK)
UCLA (USA)
UCSD (2) (USA)
Northwestern (USA)
Chinese Academy of Sciences
Belarus Academy of Sciences
CSIR (South Africa)
C-DAC (India)
NASA (USA)
Fraunhofer (Germany)
EMPA (Switzerland)

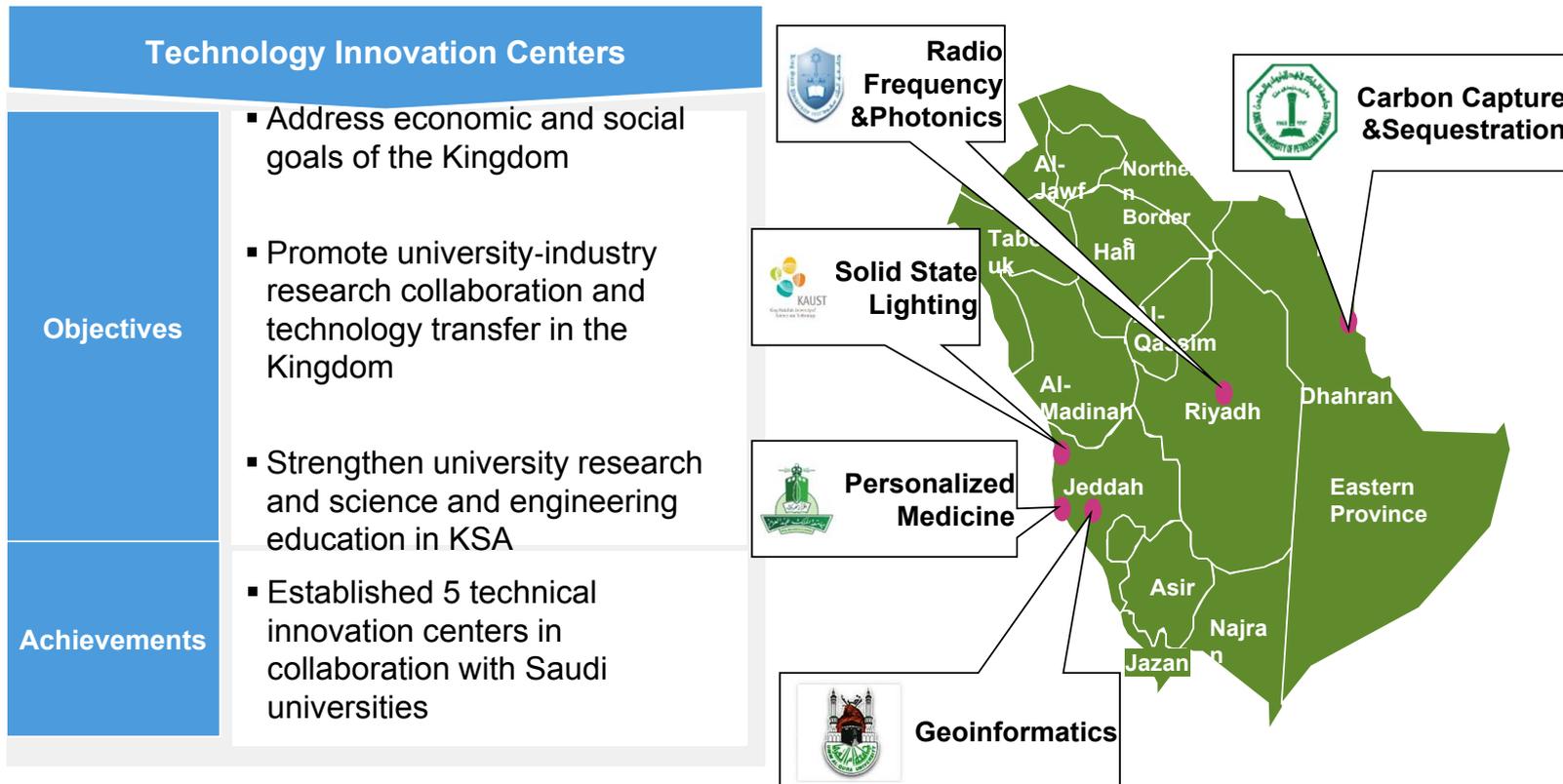
International Companies

Companies Joint Centers of Excellence

IBM (2) (USA)
Intel (3) (USA)
Boeing(2) (USA)
Clariant (Germany)
Selex (UK)
Si-ware (France)

To produce a critical mass of high-quality patents , KACST launched the Technology Innovation Centers (TIC) program

Technology Innovation Centers (TIC)



Space Strategy



Space Technology Priority Areas: Space Platforms

- **Areas**
 - Earth observation
 - Navigation
 - Telecommunications
 - Geodesy
 - Space Science and Environment

- **Applications**
 - Development of Satellite Systems
 - Space Services
 - Science Missions

Space Technology Priority Areas: Remote Sensing and GIS

▪ Areas

- Change detection and monitoring
- Natural hazards
- National spatial data infrastructure

▪ Applications

- Urban development
- Vegetation
- Pattern recognition
- Disaster Management (Dust storms, Floods, Fires (forest, brush-fires) ... etc.)
- Regulations and standards
- Intelligent transport systems

Space Science

- Near Earth Objects Research
- Micro Gravity Research
- Educational Outreach – NanoRacks
- NASA Collaborations

Occultation of Stars and NEO Tracking

Individual observatories on every continent

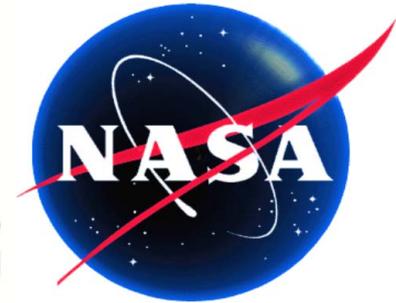
- Field units can be operated for local research projects from the member schools, Colleges, Universities and research institutes
- Field units can also be operated as nodes for joint research among member institutions



NASA Collaboration



- NASA Lunar Science Institute (NLSI)
 - Saudi Lunar and Near Earth Object Center affiliate
- NASA Ames Research Center
 - UV-LED Experiment on Saudi Satellite
 - STAR
 - MGRS
- AERONET
- Space Geodesy



Advanced Satellite Technology Development

12 LEO Satellites Launched
180 Satellite Team Members
%20 Females

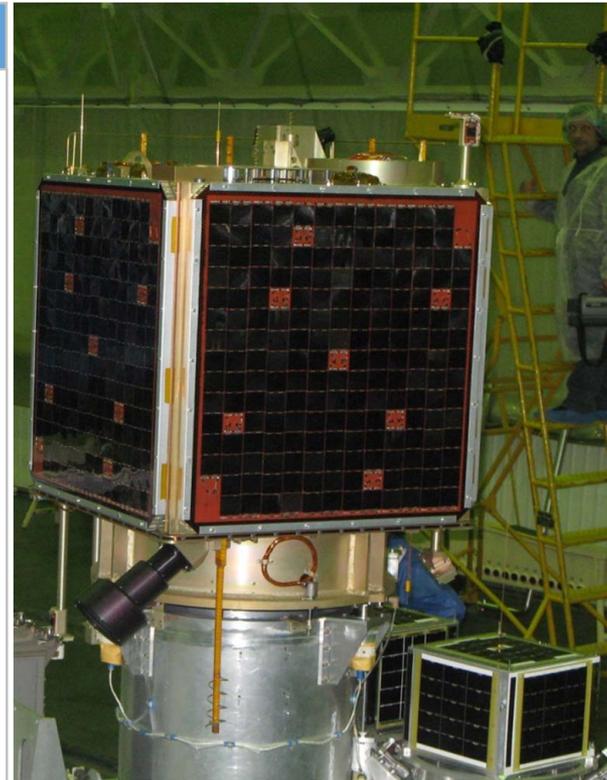


Complete Indigenous Know-how

Basic Facts

Developed, Manufactured, Tested, Launched and Operated

- first two satellites in 2000 (Saudisat 1 A ,B)
- third satellite in 2002 (Saudisat 1 C)
- three satellites in 2004 (SaudiComsat 1 and 2, SaudiSat 2)
- 6 Satellites in 2007 (Saudisat 3 and 5 SaudiComsats)

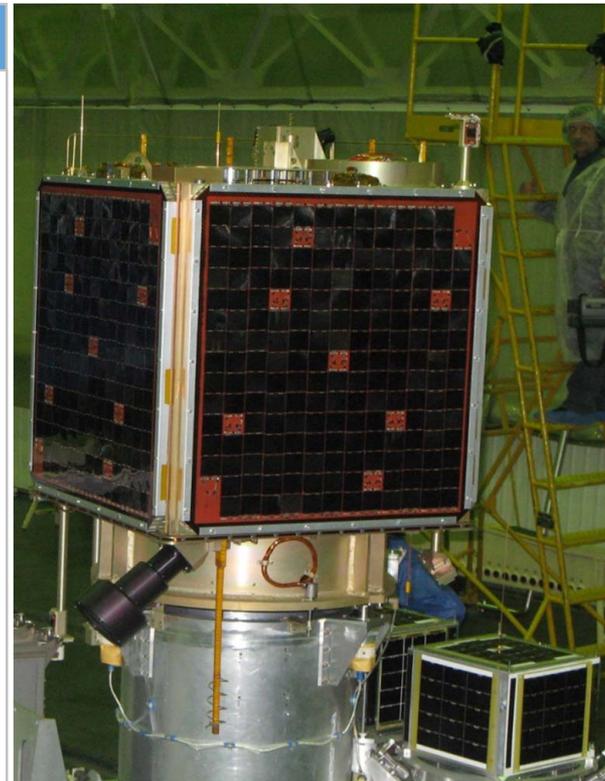


National Satellite Technology Center

Basic Facts

Developed, Manufactured, Tested, Launched and Operated

- first two satellites in 2000 (Saudisat 1 A ,B)
- third satellite in 2002 (Saudisat 1 C)
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National Satellite Technology Center

Basic Facts

Designed and Established (at KACST)

- design and production facility
- AIT facility at KACST
- two ground stations



Saudi Satellites in Space



SaudiSat 1 A, B

L: Sep 26, 2000

Oscars 41, 42

O: until Sep 2003

FeedForward

Amature Radio



SaudiSat 1 C

L: Dec 20, 2002

Oscars 50

O: Until Now

FeedForward

Amature Radio

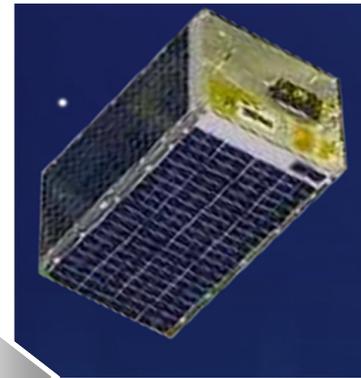


SaudiComSat1,2

L: June 29, 2004

O: Until Jun 2006

Commercial
FeedForward



Saudisat2

L: June 29, 2004

O: Until Mar 2005

SaudiSat-2 First 3-
axis control and
small imager

Saudisat 1 C (Oscar 50)

- Launched 20 December, 2002.
- Status: **Operational**
 - Uplink: 145 MHz FM
 - Downlink: 436. MHz FM
- Weight: 10 Kg
- First use of a terrestrial class solar cells in Space.
- Currently The only satellite in the world providing hand held Amature Radio Communication.



SaudiComSat 7

- Launched 17 April, 2007.
- Status: Semi-Operational
- Weight: 12 Kg
- VHF uplink.
- S-Band downlink.
- Real-Time or Store-and-Forward.
- More than 2,000 ship transmissions captured during a satellite pass.

First Satellite in the world to provide AIS vessel tracking. Based on this technology we are working on building large satellite constellation to provide commercial real time service.



Saudi Satellites in Space



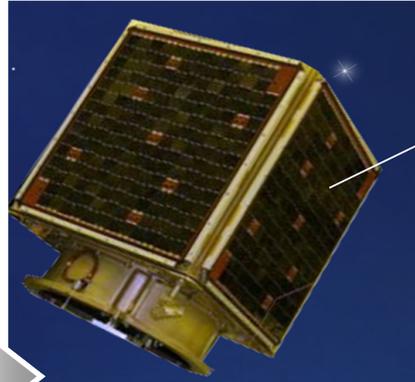
SaudiComSat 3 to 7

L: Apr 17, 2007

O: Until Now

Commercial
FeedForward

AIS data



SaudiSat 3

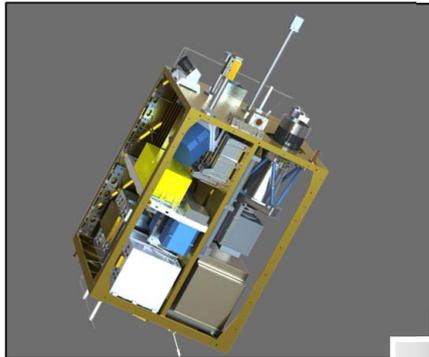
L: Apr 17, 2007

O: Until Now

First RS Saudi
Commercial
Satellites

More on the success of this mission will be presented by Dr. Almajed later as we celebrate the satellite 5 years in orbit.

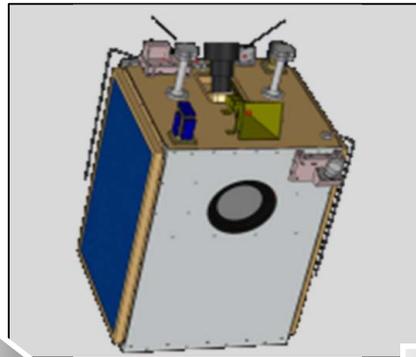
New Satellite to be launched



Saudisat-4

TBL: Sep 2013

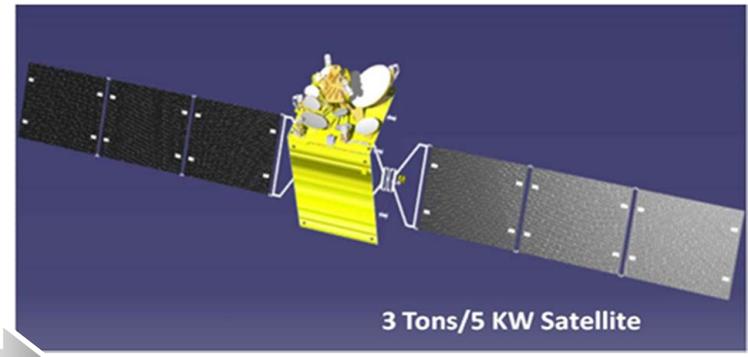
UV-LED experiment



SaudiSat 5

TBL: June 2014

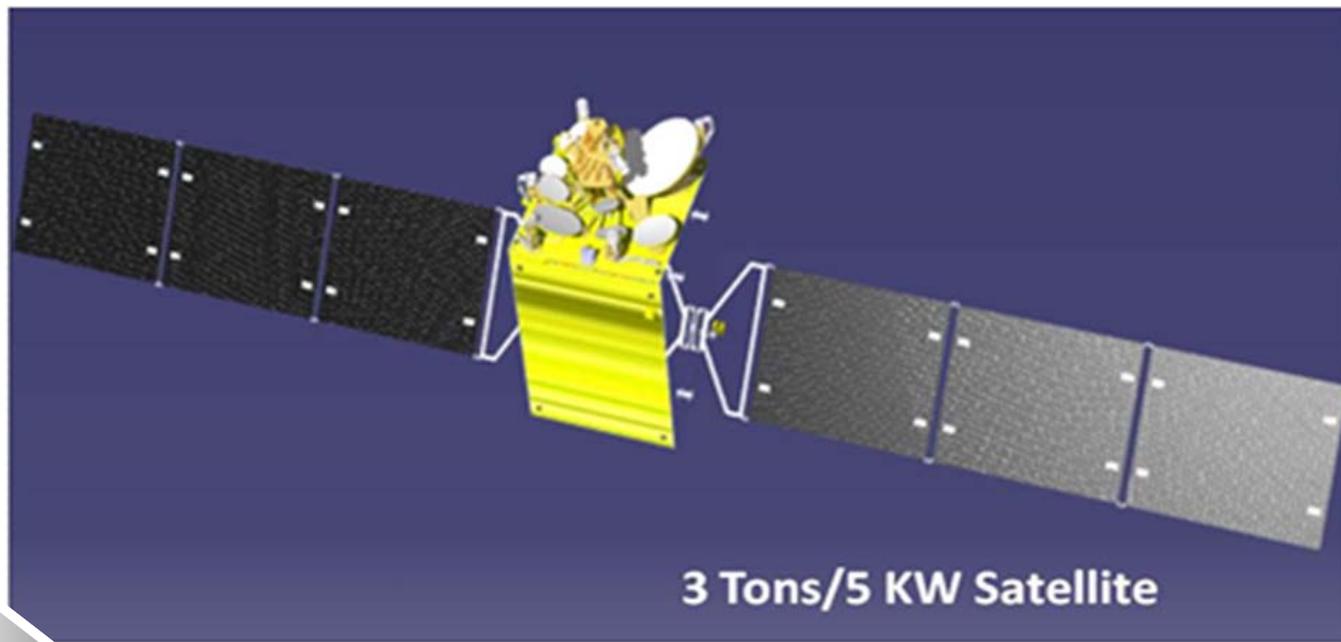
Second RS Saudi
Commercial
Satellites



SaudiGeo 1

TBL: Sep 2015

First GEO Communication Satellite

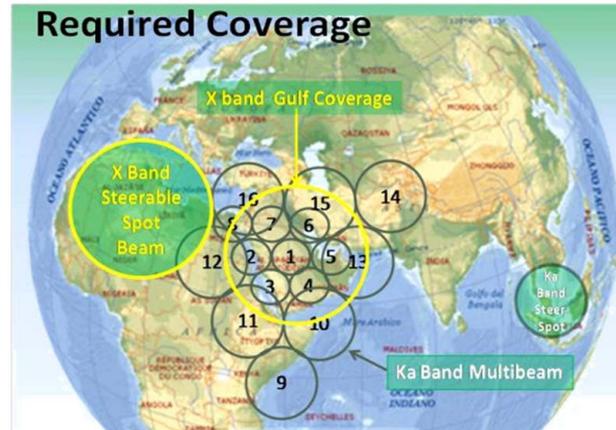
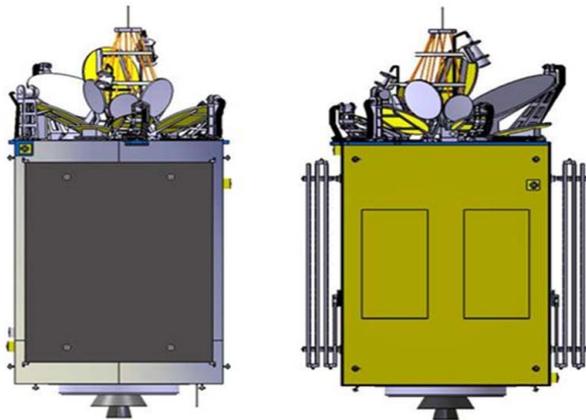
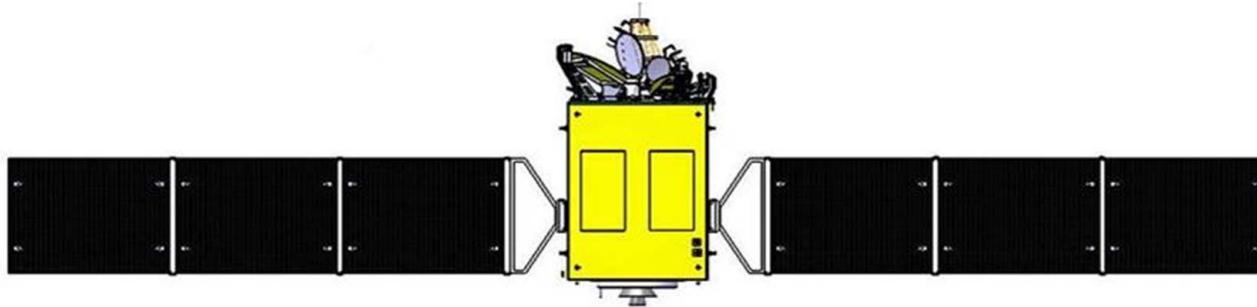


SaudiGeo 1

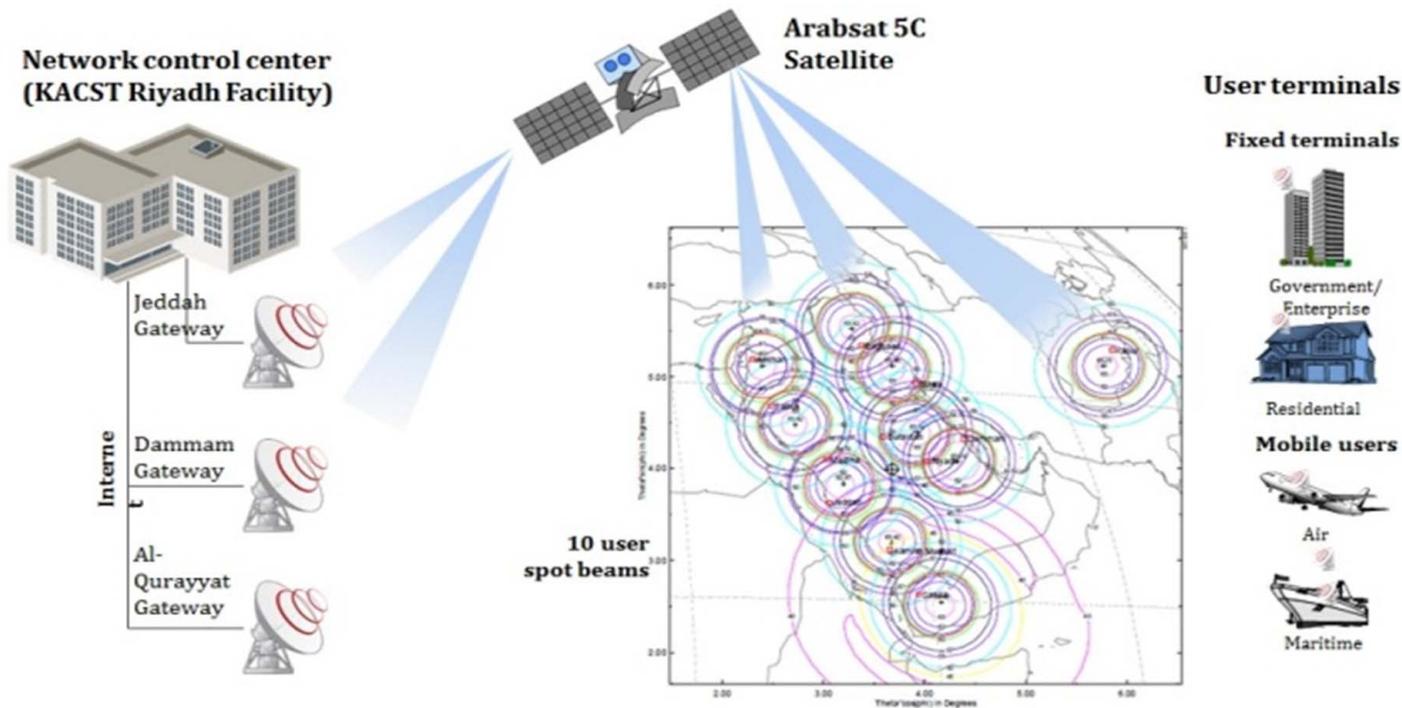
TBL: Sep 2015

First GEO Communication Satellite

SaudiGeo-1



KACST Broadband Space-Based Network



Space Technology -Remote Sensing & GIS



- Established within KACST in 1988
- Ground Segment Coverage area:
 - Radius of approx. 2700 km
 - Surface area of 23 million km²
- Simultaneous multi-satellite reception capability
- Directly receive Geoeye-1, Ikonos, Spot, RadarSat.

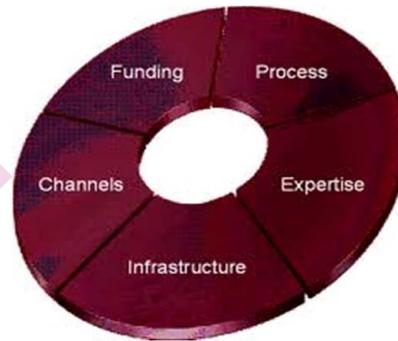
TAQNIA will ensure that full economic impact potential of the selected technologies is achieved for KSA

TAQNIA desired impact

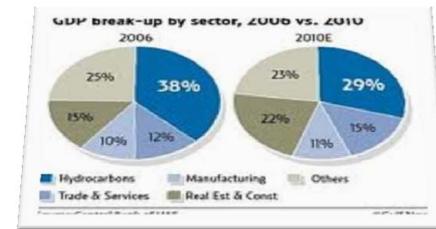
Global and Local Innovations...



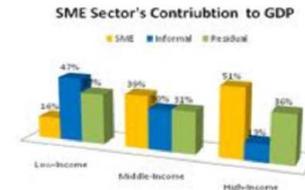
...successfully commercialized by Taqnia...



....to create the GDP impact.....



..through a sustainable eco-system of SMEs...



..and delivering local talent, skills & jobs



1

Selecting the most relevant technologies – locally (KACST and other sources of local innovation) and internationally that can help KSA accelerate sustainable economic development

2

Investing in the right ideas through capital, ideas, market access channels and infrastructure to make them market sustainable...

Legislation

- Prepare space and geospatial data infrastructure law & act
- Propose a legislation in Saudi parliament to establish A space strategic consortium between the government institutes.
- This consortium will include ministry of trade and industry, ministry of higher education, ministry of information technology and communication, ministry of Education and Private sector to promote the space engineering R&D and Education and space industries.
- Approve a legislation to establish the national authority for intellectual property which will be of great importance in space industries. The proposal was welcomed by most or the parliament members.
- Approve legislation on establishing water security council in the kingdom of Saudi Arabia

Space and geospatial data infrastructure law & act

There are many motivations to propose and develop this law & act.:

- National Security
- National Needs (water, Oil resources, ..etc)
- Capacity Building
- Space assets
- Coordination between Governmental and private sectors

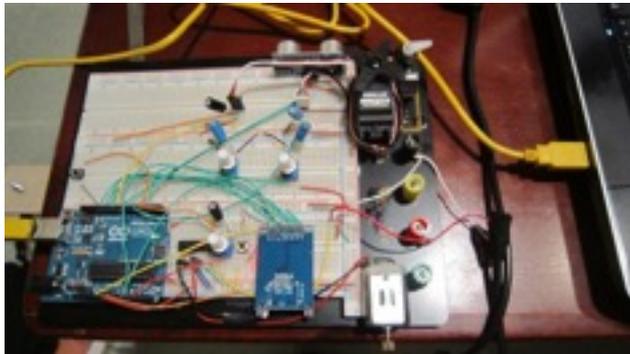
Public awareness

- Introducing UNISEC activities at the Fifth Saudi Scientific Conference (SSC) organized by Ministry of Higher Education, Riyadh April 30 - May 1, 2014.
- Organize seminar about MIC3 and UNISEC activities during the 9th National GIS Symposium in Saudi Arabia, April 28 - 30, 2014, Dammam
- Organizing a seminar about MIC3 and CanSat Education at King Fahd University of Petroleum and Minerals on April 21, 2014



Capacity Building

- Coordination with National Satellite Research & Development Center and King Abdel-Aziz City of Science and Technology (KACST) to hold a CanSat Training Program next January 2015 for two weeks in Riyadh.
- Disseminate Information about the coming course to the national universities.
- Prepare the course material and the required hardware



CanSat BBM



CanSat Assembly and Integration

University Space Engineering Consortium (UNISEC) and Capacity Building in Space Science and Technology for Sustainable Development of the Kingdom of Saudi Arabia

PRESENTORS



Dr. Sultan Hasan AlSultan
International Society of Photogrammetry and Remote Sensing (ISPRS), Saudi Arabia



University Space Engineering Consortium (UNISEC) is a consortium of universities interested in space science and technology and their applications. UNISEC main pillars are human resource development, technological development related to space engineering and outreach activities. One of the very fundamental tools in space engineering education used by UNISEC is the CanSat which is a pico satellite placed inside a can of soda. CanSat can be built using the commercially available components by university students or high school students. In this presentation

an Introduction about UNISEC and UNISEC activities will be given. A proposal to hold CanSat Training Program will be proposed to contribute to the kingdom capacity building in basic space science and technology. In this program about 10 university instructors will be trained to design, fabricate, test and launch a Pico-satellite to sub-orbital altitude using Helium balloons. The instructors with science and engineering background and their teaching and/or research field related to space science and technology are qualified to join this program.



Avenue:

Date, Time: for more information please contact us

Participation in UNISEC-Global Activities

- Participating in MIC3 with idea titled “Space-Based System for Short-Term Earthquake Warning”



- Submit a research proposal titled “Nanosatellite Applications for water mangement” in the 2nd UNISEC-Global meeting.

Contribution to Private Sector

- Establishment of “Gulf Innovation Research Institute (GIRI) in Saudi Arabia. Its mission is to provide R&D in space science and remote sensing. Conduct and Geospatial infrastructure data technology.

Conclusions

- Working on space and geospatial data infrastructure law & act and establishing national geospatial center(s).
- Complete the preparation of CanSat Training Program next year.
- Increase the public awareness of space engineering education.
- Participating in UNISEC-Global activities.
- We are going apply for NSTIP fund from Mistry of Higher Education to secure funding the future UNISEC-KSA activities.

Gulf Innovation Research Institute



Contact

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