Nano-Satellite Applications for the GCC Region and Saudi Arabia

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Outline

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- Space Program in Saudi Arabia and GCC
- Exciting Capacity Building Models
- Proposal
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Objective

Encourage and Promote Space Project-Based Education for Capacity Building through Stakeholder Collaboration
Introduction

Strategic Technologies

• Water
• Oil and Gas
• Petrochemicals
• Nanotechnology
• Biotechnology
• Information Technology
• Electronics, Communication and Photonics
• **Space and Aeronautics Technology**
• Energy
• Advanced Materials
• Environment
Space Program in Saudi Arabia and GCC

Saudi Arabia:
- First Arabian Astronaut
- KACST: SaudiSat 1 - 12
- Universities
  - KFUPM
  - KAU
  - KAUST
  - KSU (Remote Sensing)
  - CU

GCC:
- UAE: DubiaSat 1, 2 & 3
- Kuwait, Bahrain, Qatar and Oman (Remote Sensing)
Sultan Lab
Tokyo Insutute of Technology
ISPRS, Working Group VII/7, Middle East Coordinator
International Society for Photogrammetry and Remote Sensing
Working Group VII/7 - Innovative problem solving methodologies for Less Developed Countries

http://www.itc.nl/external/isprsc7/wg7/
COSTAL LAND SURFACE HEAT RETRIEVAL OVER GOLF REGION

The study area

The raw satellite image acquired on 20-01-1999.

The raw thermal satellite image acquired on 20-01-1999.
Temporal Monitoring of Agricultural Crops

RadarSat
C-band

RadarSat(DN,x,y)

NDVI(x,y,w) = \frac{(TM4_{x,y} - TM3_{x,y})}{(TM4_{x,y} + TM3_{x,y})}

Landsat
Thematic
Mapper

Radar Backscatter
Low
Medium
High
Water Infrastructure Information System
With rainfall data (?), water level can be simulated to predict flood
ADVI: Albedo vs. NDVI Feature Space Distribution Plots, 1994
Wadi Ar Rumah Area, Al Qassim, Saudi Arabia
Exciting Capacity Building Models

First Phase
- MOE and KACST
- Initiative to co-operate with NASA and ANL
- Space Based-Project Education (CubeSat, Nano-Satallites)

Second Phase
- KACST and USA NanoRacks co-operation
- Saudi Spin-off Businesses
Proposal

- UNISEC-Saudi Arabia (Space Engineering)
- Encourage and Promote Space Project-Based Education for Capacity Building
- International Collaboration
- Regional Expansion (Gulf Countries Cooperation-GCC)
Prospective of UNISEC-SA

- Candidate members
  - KACST
  - KFUPM
  - KAU
  - KAUST
  - KSU (Remote Sensing)
  - QU
  - CU - TECRS

- Call for a workshop hosted by KACST
- UNISEC-SA and Join UNISEC-Global
Extend the existing capacity building model to include not only MOE but also MOHE.

Establish UNISEC-SA and extend it to GCC.

Expand collaboration for capacity building working with UNISEC activities (e.g. CLTP, MIC, ..etc)
Conclusion

- Joint-Space Project-Based Education for Capacity Building by Investing in the human factor and resources that consequently contribute to supporting industries based on knowledge and transferring into the knowledge society.

- Provides Saudi Arabia and GCC government data needs for development (water, desert Environment, infrastructure., ext.)

- Motivate more students and decision maker to Space Project Program.