GNSS
A View of an Academic "Stakeholder"

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A Stakeholder: a person, group, or an organization, who affects or can be affected by an organization's actions.

About The Presenter:

Dr. Eng. Moustafa BARAKA

B.Sc. 1978 (Fac. of Eng. - Cairo Univ.)
M.Sc. 1981 (Fac. of Eng. - Cairo Univ.)
M.Sc. 1985 (Ohio State University, U.S.A.)
Ph.D. 1988 (Ohio State University, U.S.A.)

- Vice Dean for Education & Student Affairs
  Faculty of Engineering - Cairo University

- Professor of Geodesy & Surveying
  Faculty of Engineering - Cairo University

Consultations and Research;

- Geomatics and Geoinformatics
  with emphasis on; GPS/GNSS , GIS/LBS, RS/HRSI
  applications in disciplines of civil engineering.

Contents:

- Introduction
- Egypt GPS/GNSS 30+ yrs
- GNSS Impact
- Expected Roles of GNSS
- Conclusions & Recommendations

School of Engineering
Current Location - 1905

Faculty of Engineering Joins Cairo University - 1935

Faculty of Engineering
Cairo University - 2009

- First Faculty Of Eng. in the region, Cairo University
- Over 1000 faculty members & staff, 15 departments
- Over 14,000 undergrad. students
- Over 1400 graduate students
- 200+ M.Sc. and 40+ Ph.D. annually awarded

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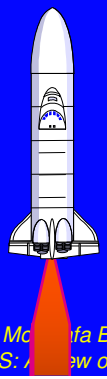
Egypt GPS/GNSS 30+ Yrs

1977 Geodetic point Positioning
Doppler Technique of Nile Barrages

1978-80 Doppler Point Positioning & Transloc.
- Regional Nile Delta control (Canada)
- Nationwide geodetic control (MSA)
- ADOS project (IAG)
  (precursor to AFREF ~ ITRF (IGS)

1988-92 East Desert & Nile Valley
Egypt Survey Authority (ESAeg) & FINNIDA
- GPS geodetic control to aerial mapping
- Deformation monitoring at Aswan



Egypt GPS/GNSS 30+ Yrs *(contd.)*

1989-2005 National Agricultural Cadastre Plan

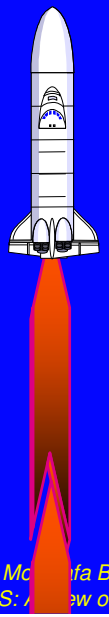
- GPS Static & RTK cadastral surv & map
- LIS national DB for legal land registration

1994 High Accuracy Reference Network (HARN)

- GPS 0.1 ppm
- Investigating WGS84 & Egyptian datum

1995 River Nile Bathymetry

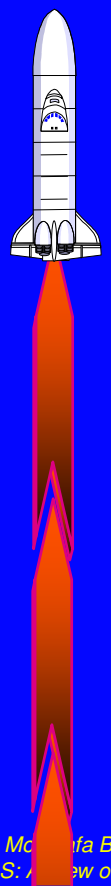
- DGPS & digital maps
- Real time tracking



Egypt GPS/GNSS 30+ Yrs *(contd.)*

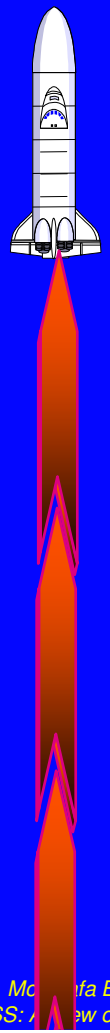
1996-2006 GPS/ GIS for local government;
utility mapping, social & health services.

1997 Space Appl. In Euro-Med Region Workshop, Cairo, Egypt.
Ministry of Civil Aviation,
WGS84 control for runways & nav. aids.
Egyptian Ports & Lighthouse Authority,
Beacon established at six harbors.



1999 Ministry of Transportation PMS ,
DGPS/Omnistar video mapping of highways for a pavement management sys.

Egypt GPS/GNSS 30+ Yrs *(contd.)*



2000 West Desert & South Valley control & georeferencing of sat. imagery

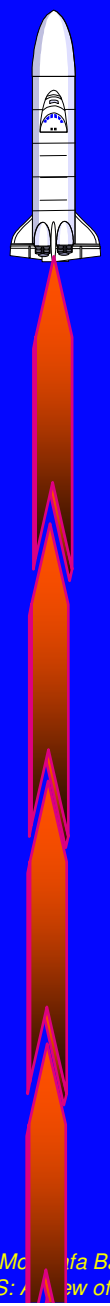
2001 An integrated GPS/GLONASS survey for Egyptian road networks & traffic control

2002 EGNOS Egyptian control survey test using dual freq. GPS receiver & single freq. receiver w/ EGNOS corrections

2003 1st Euro-Med Sat. Nav. (GNSS) Seminar, Eg

2004 UN OOSA & Int. Federation of Surveyors (FIG) MoU on GNSS education, Vienna

Egypt GPS/GNSS 30+ Yrs *(contd.)*



2006 METIS (MEdiTerranean Introduction of GNSS Services) Kickoff at Galileo Euro-Med Cooperation Office (GEMCO), Cairo

2007 METIS Second Training & Seminar, Cairo

2008 Agreement on Ranging and Integrity Monitoring Station (RIMS) in Egypt.

METIS final GNSS Regional Plan workshop, Cairo

2009 Nat. Telecom. Regulatory Authority (NTRA) to regulate AVL. AVL services currently tested for trains and ambulances

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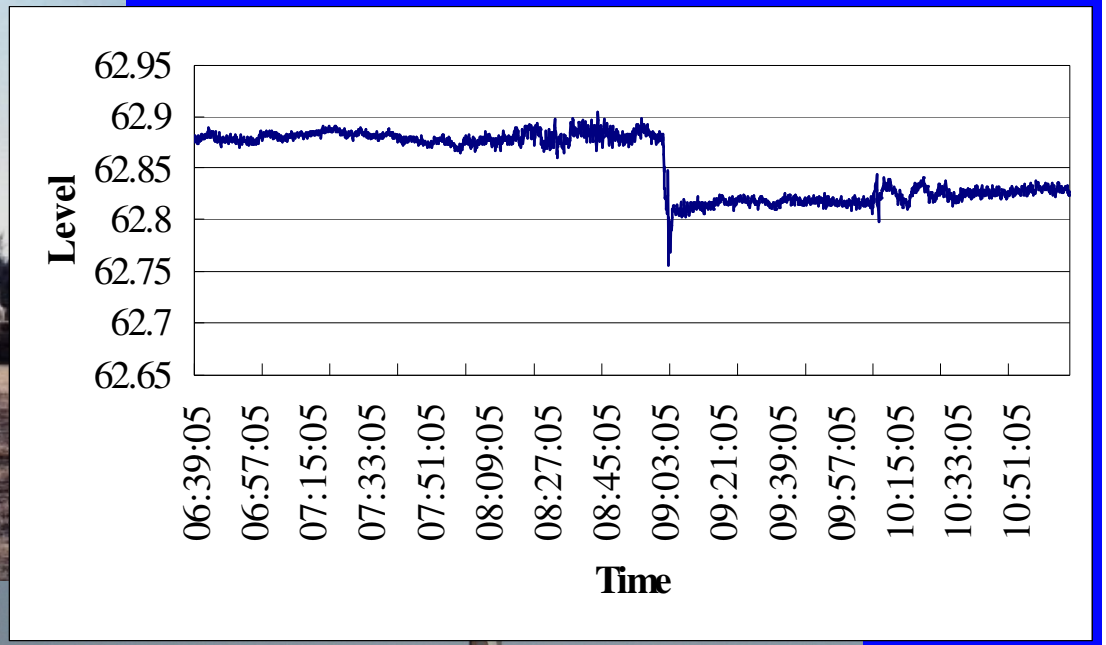
GNSS Impact

GPS/GNSS 25 Years Apart

Ohio, USA 1984

Cairo, Egypt 2009

Surveying


62.95
62.9
62.85
62.8
62.75
62.7
62.65
Level
06:39:05
06:57:05
07:15:05
07:33:05
07:51:05
08:09:05
08:27:05
08:45:05
09:03:05
09:21:05
09:39:05
09:57:05
10:15:05
10:33:05
10:51:05
Time

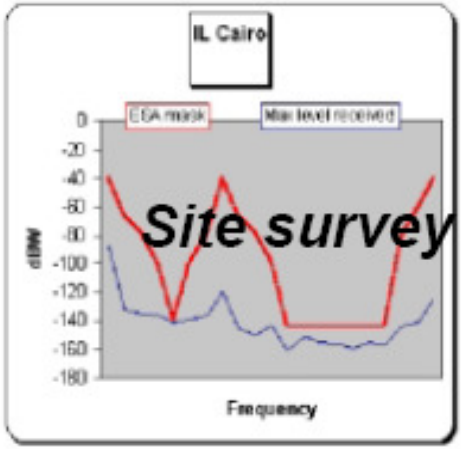
Mapping & LIS

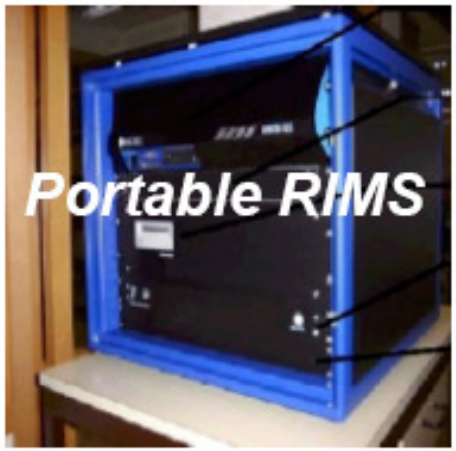
Scale 1: 16,661
El-Rahmaniyah
Segment Length: 2,197.62 m Length: 2,197.62 m

Highway & Transportation

Most recent demos/projects

- MIDAN aviation test (Cairo – Egypt, 8-9/10/02)
  - ICAO, CANC (Cairo Air Nav. Center) and NANSC (National Air Nav. Service Company) and Telespazio/ENAV (Ente Nazionale Assistenza al Volo);
  - ESTB performance test using an airplane equipped with a EGNOS receiver;
  - The data processing and analysis is in progress, the report will be available within the end of year;





After: EGNOS/Galileo Applications Development and Promotion: The ESTB contribution – Musmeci - 2002

More GNSS In Egypt

EGNOS Ground Segment Sites

Country	Site	4 MCC 7 NLES 34 RIMS 1 PACF 1 ASQF	RIMS channels
France	Toulouse	PACF	
	Aussaguel	NLES	ABC
	Paris	RIMS	A
	Kourou	RIMS	AB
Germany	Langen	MCC	
	Berlin	RIMS	ABC
	Raisting	NLES	
Spain	Torrejon	MCC, NLES, ASQF	
	Canary Islands	RIMS	ABC
	Malaga	RIMS	AB
	Palma de Mallorca	RIMS	AB
	Santiago de Compostella	RIMS	AB
United Kingdom	Glasgow	RIMS	ABC
	Gatwick	MCC RIMS	ABC
	Goonhilly	NLES	
Italy	Fucino	2 NLES RIMS	ABC
	Catania	RIMS	AB
	Ciampino	MCC	
Portugal	Azores Islands	RIMS	ABC
	Lisbon	RIMS	ABC
	Madeira	RIMS	AB
	Sintra	NLES	
Switzerland	Zurich	RIMS	AB
Norway	Trondheim	RIMS	AB
	Tromso	RIMS	ABC
Iceland	Reykjavik	RIMS	AB
Denmark	Alborg	RIMS	AB
	Faeroes Islands	RIMS	ABC
Sweden	Gävle	RIMS	ABC
Ireland	Cork	RIMS	ABC
Poland	Warsaw or Cracovia	RIMS	AB
Bulgaria	Sofia	RIMS	ABC
Russian Federation	Murmansk	RIMS	AB
	St. Petersbourg	RIMS	ABC
Turkey	Konya	RIMS	AB
Tunisia		RIMS	ABC
Egypt	ALEXANDRIA	RIMS	AB
Israel	Tel Aviv	RIMS	AB
South Africa	Hartebeeshoek	RIMS	AB
Singapore or Japan	Singapore or Naha	RIMS	AB
Canada	Ottawa	RIMS	AB

RIMS	Ranging and Integrity Monitoring Station
MCC	Master Control Centre
NLES	Navigation Land Earth Station
PACF	Performance Assessment and Check-out Facility
ASQF	Application Specific Qualification Facility

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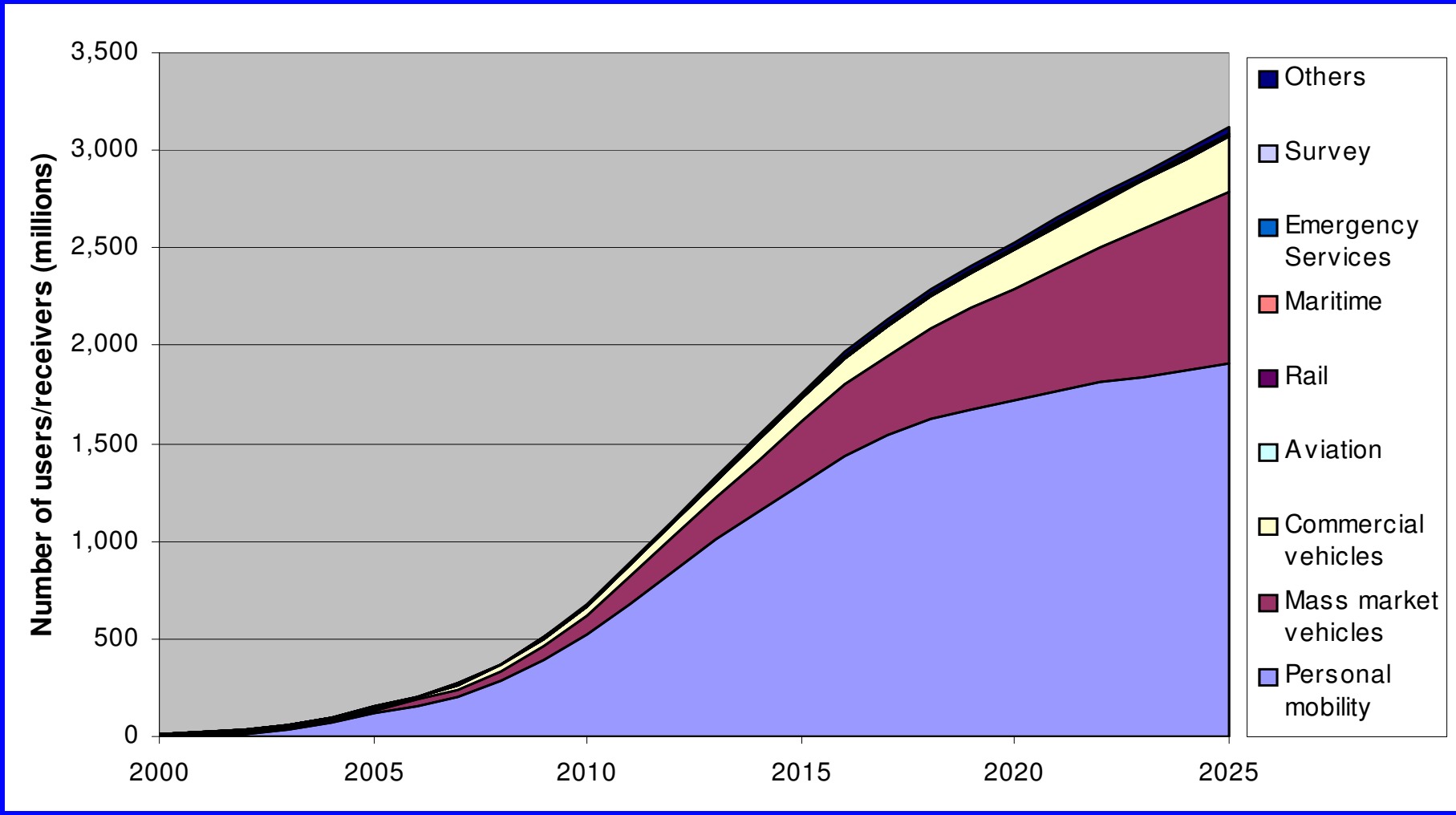


After: Roussel, B. GALILEO AND EGNOS OVERVIEW, METIS First Master Training & Seminar, Morocco 2007

EGNOS services opportunities in MEDA (2009 - 2019)

- EGNOS operational in the area in 2011

	Civil Aviation (commercial flights and general aviation)	Maritime safety (crossing vessels)	Maritime freight (traffic of containers in ports)	Road (trucks)	Rail (freight wagons)	Inland waterways	LBS	GIS / Precise Positioning
Algeria	307.800	17.680	985.000					
	2013	2013	2013					
Egypt	576.000	70.100	47.419.000					
	2013	2013	2015					
Israel	315.500	7.100	2.310.000					
	2013	2013	2013					
Jordan	10.200	3.800	690.000	141.000				
	2013	2013	2013	2013				
Lebanon	70.800	1.800	506.000	53.300				
	2015	2015	2015	2013				
Morocco	347.300	31.200	2.136.000	19.800	4.760			
	2013	2013	2013	2013	2013			
Pal. Authority	10.200	3.800	171.000					
	2013	2013	2013					
Syria	58.400	3.800	524.000	785.000				
	2013	2013	2013	2013				
Tunisia	22.800	13.800	967.000					
	2013	2013	2013					
Turkey	811.600	39.200	328.000		15.900			
	2013	2013	2013		2013			
Total	2.530.600	192.280	56.036.000	999.100	20.660			

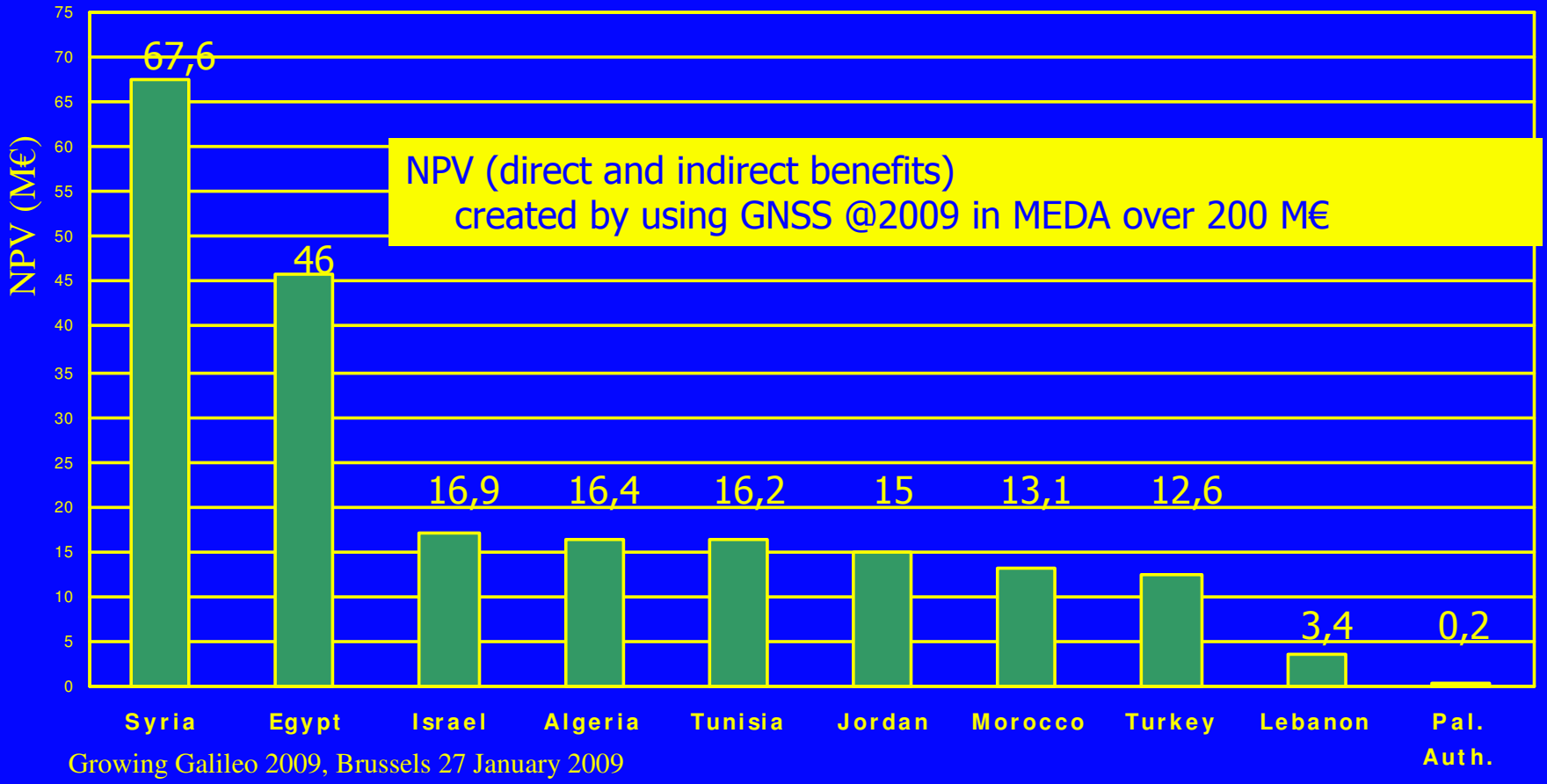
Priority markets

Key markets

Introduction year

Number of users in 2019

Benefits created by using EGNOS over the 10 years



NPV (direct and indirect benefits) created by using GNSS @2009 in MEDA over 200 M€

Growing Galileo 2009, Brussels 27 January 2009

- From MEDA State view point
- Tuned on priority markets

- 8 MEDA States agreed to participate to EGNOS cost

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Conclusions

A Comparable Situation for Egypt`& Pan-Arab Region:
Quoting ERIG project (Education, research and innovation in GNSS).

(http://www.gsa.europa.eu/go/news/erig-project-spotlights-gnss-education-research-innovation, last accessed May 2009.)

ht now."

Conclusions *(contd.)*

The Current Status in Egypt:

- Over 30 years of GNSS related practice.
- University courses with sections on GNSS (GPS for eng.)
- A good number of academics and professionals present.
- A good number of MSc and PhD accomplished.
- A good number of Gov. and private projects conducted.
- Gov. & private sector invest. (national & regional) ready.

Recommendations

A Proposed Solution:

An academic focal point to develop GNSS educational curricula, promote research activities and cooperate in training programs in Egypt and the pan-Arab region.

In terms of disciplines: engineers and non-engineers.

In terms of levels: undergrad., post-graduates & professionals.

Recommendations *(contd.)*

Functions maintained by the focal point:

- Provide supplements to undergrad. courses with GNSS material (in English & Arabic).
- Enhance educational facilities (GNSS HW, SW & greyware).
- Provide national, regional & international summer, and short-term training opportunities.
- Conduct professional workshops and training courses.
- Foster interdisciplinary projects and research.


THANK YOU