BUSINESS MODEL OF CORS-Tr (TUSAGA-Aktif)
Need

To obtain geographic location information (coordinates) speedy, accurate and in economic way.

However, in the past, getting accurate coordinates was time consuming, expensive and required expertise...
Aim of the project

To determine geographic location information within 3-4 cm accuracy for 24 hours in real time (RTK) all across the Turkey and Turkish Republic of North Cyprus (T.R.N.C.).

Start-Ending Date : May 2006 - July 2010
CORS-Tr Stations-146

Distance between stations 80-100 Km.’s
CORS-Tr Stations

- Erzurum Meteoroloji
- Siirt Meteoroloji
- Iğdır TKGM
- Kabinet
- Viranşehir Meteor.
CORS-Tr Control Center Ankara – GDLRC
Network RTK Working Principle

146 STATIONS

2005.0 Epok
On-line Orthometric Height Value
CORS-Tr Usage Map – 2016

13,412,424 points...
CORS-Tr Operating/Users

Total # Users
8,968

09.05.2017

Daily total number of users (mean) : 2400
Simultaneous maximum number of users: 840
Quality Checks

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>Nr of POINTS</th>
<th>RMS (m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EAST</td>
<td>NORTH</td>
</tr>
<tr>
<td>2009</td>
<td>808</td>
<td>0.039</td>
</tr>
<tr>
<td>2014-1</td>
<td>723</td>
<td>0.045</td>
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<tr>
<td>2015-1</td>
<td>743</td>
<td>0.033</td>
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<tr>
<td>2015-2</td>
<td>701</td>
<td>0.029</td>
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<tr>
<td>2016-1</td>
<td>725</td>
<td>0.032</td>
</tr>
<tr>
<td>2016-2</td>
<td>697</td>
<td>0.029</td>
</tr>
</tbody>
</table>

2 times QC Checks every year ...
CORS-Tr Operating/Web Services

TUSAGAKTİF
TÜRKİYE ULUSAL SABİT GNSS AĞI AKTİF

Giriş
Abonelik Rehberi
Ücretler
Sıkça Sorulan Sorular
İletişim 444 46 77

Giriş
İstasyon Haritası

Facebook
Twitter

Republic Of Turkey Ministry of Environment and Urbanisation
GENERAL DIRECTORATE of LAND REGISTRY and CADASTRE

FIG HELSINKI-MAY 2017
CORS-Tr Operating/User support

http://www.tkgm.gov.tr\tusagaaktif

444 GNSS
444 4677

2016 14.919 CALLS
User Web Service

http://www.tusaga-aktif.gov.tr
User Web Service

http://www.tusaga-aktif.gov.tr
Administrative Structure of CORS-Tr System

- CORS-Tr Project; was successfully transferred to GDLRC and GCM with the approval of TUBITAK (Technological Research Council of Turkey) in 2009.
- CORS-Tr System is jointly operated by GDLRC and GCM on a protocol frame.
- “Cooperation Protocol on the Joint Operation of the CORS-Tr System” was signed on 2010 by GDLRC and GCM.
- According the protocol, the mission of executing the CORS-Tr was assigned to GDLRC and an Executive Board defined.
- CORS-Tr Executive Board was founded in order to take technical and administrative decisions for operating the system.
Financial Structure of CORS-TR System

Initial Installation Cost of CORS-TR System

CORS-Tr Project was completed in 2008 with a cost of 2.5 million USD including academic researches by funding of TUBITAK.

Operational Costs of CORS-TR System

- **Hardware Costs**: GNSS Stations and Control Center (CC)
- **Software Costs**: CC Software and GNSS Firmware
- **Maintenance / Repair Costs**: Changing station locations, maintenance, repairing
- **Communication Costs**: 2XMetro internet and 146 VPN Internet connections
- **Promotion costs**: Seminars, symposiums, trainings, etc. for CORS-Tr
Financial Structure of CORS-TR System

<table>
<thead>
<tr>
<th>Year</th>
<th>Equipment</th>
<th>Software</th>
<th>Maintenance</th>
<th>Promotion</th>
<th>Communication</th>
<th>Total</th>
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<tbody>
<tr>
<td>2010</td>
<td>$23,000.00</td>
<td>$0.00</td>
<td>$15,000.00</td>
<td>$0.00</td>
<td>$60,000.00</td>
<td>$98,000.00</td>
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<tr>
<td>2011</td>
<td>$7,000.00</td>
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<td>$0.00</td>
<td>$0.00</td>
<td>$125,000.00</td>
<td>$132,000.00</td>
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<td>2012</td>
<td>$413,000.00</td>
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<td>$25,000.00</td>
<td>$0.00</td>
<td>$112,000.00</td>
<td>$550,000.00</td>
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<td>2013</td>
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<td>$0.00</td>
<td>$35,000.00</td>
<td>$319,000.00</td>
<td>$360,000.00</td>
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<td>2014</td>
<td>$458,000.00</td>
<td>$176,000.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$288,000.00</td>
<td>$922,000.00</td>
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<td>2015</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$305,000.00</td>
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<td>2016</td>
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<td>$0.00</td>
<td>$0.00</td>
<td>$211,000.00</td>
<td>$270,000.00</td>
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<tr>
<td>Grand Total</td>
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<td>$176,000.00</td>
<td>$40,000.00</td>
<td>$35,000.00</td>
<td>$1,420,000.00</td>
<td>$2,637,000.00</td>
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# Financial Structure of CORS-TR System

## CORS-Tr Fees

<table>
<thead>
<tr>
<th>SERVICE TYPE</th>
<th>DATA TYPE</th>
<th>Price (VAT INC.)</th>
<th>EXPLANATION</th>
</tr>
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<tbody>
<tr>
<td>First Subscription</td>
<td>-</td>
<td>40 USD</td>
<td>Once</td>
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<tr>
<td>RTK Services</td>
<td>Network-RTK</td>
<td>35 USD</td>
<td>Monthly</td>
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<tr>
<td></td>
<td>Network-DGPS</td>
<td>15 USD</td>
<td>Monthly</td>
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<tr>
<td>RINEX Data</td>
<td>RINEX 1 s</td>
<td>0.14 USD</td>
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</tr>
<tr>
<td></td>
<td>RINEX 30 s</td>
<td>FREE</td>
<td>Station/Day</td>
</tr>
</tbody>
</table>
Financial Structure of CORS-TR System

CORS-Tr System Revenue between 2011 and 2016
There is no need for establishing and measuring triangulation points and benchmarks which comprises 30% of mapping and cadastre works in terms of duration and cost. Approximately 25 millions USD is saved from the allocated resources for mapping which is approximately 75 millions USD/Year.
CORS-Tr Project Benefits

Determination of velocity areas

Determination of tectonic movements
Studies on modelling atmosphere (ionosphere and troposphere) for the purpose of getting meteorological estimations and determining precipitable water vapour (PWV) were started at the General Directorate of State Meteorology and academic institutions.
Financial Structure of CORS-TR System

Fee and Number of Users of CORS-Tr System

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Nr of USERS</th>
<th>YEARLY RTK MEM. FEE (USD)</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>2900</td>
<td>500</td>
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<tr>
<td>2013</td>
<td>3900</td>
<td>395</td>
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<td>2014</td>
<td>5200</td>
<td>357</td>
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<td>2015</td>
<td>6300</td>
<td>277</td>
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<tr>
<td>2016</td>
<td>7500</td>
<td>258</td>
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<tr>
<td>2017</td>
<td>9000</td>
<td>215</td>
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</tbody>
</table>
GOOD COORDINATION STARTS WITH GOOD COORDINATES!
Thank you...

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HEAD OF GEOMATICS DEPARTMENT

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THANK YOU ...