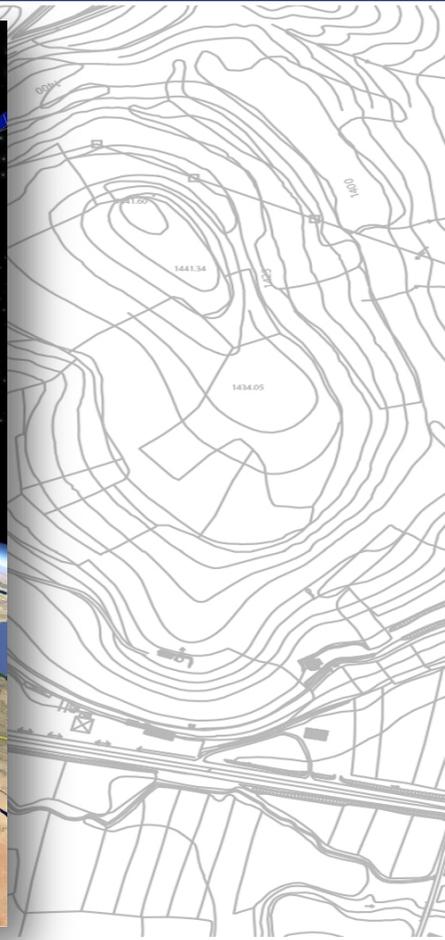




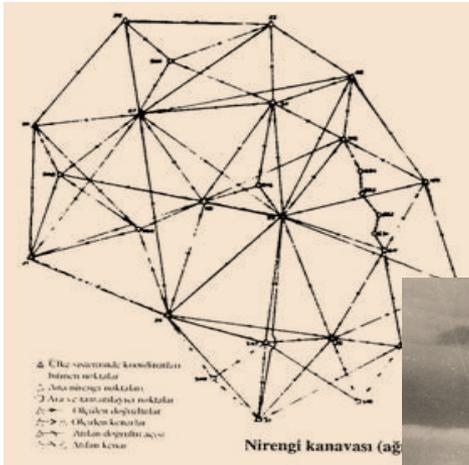
BUSINESS MODEL OF CORS-Tr (TUSAGA-Aktif)



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...



10) Başlangıç noktası B'nin koordinatlarına Δy_i ve Δx_i değerleri dy_i ve dx_i dağıtımları dikkate alınarak işaretlerine göre toplanır ve kontrol olarak C noktasının koordinatlarına ulaşılır.

$$Y_{P1} = Y_b + \Delta y_1 + dy_1 = 22450,12m \rightarrow X_{P1} = X_b + \Delta x_1 + dx_1 = 17208,68m$$

$$Y_{P2} = Y_1 + \Delta y_2 + dy_2 = 22561,99m \rightarrow X_{P2} = X_1 + \Delta x_2 + dx_2 = 17150,52m$$

$$Y_{P3} = Y_2 + \Delta y_3 + dy_3 = 22654,27m \rightarrow X_{P3} = X_2 + \Delta x_3 + dx_3 = 17134,07m$$

$$Y_C = Y_3 + \Delta y_C + dy_C = 22732,62m \rightarrow X_C = X_3 + \Delta x_C + dx_C = 17156,27m$$

Sonuçta C nirengi noktasının koordinatlarının C(22732,62; 17156,27) bulunması gerekmektedir. Poligon Koordinatlarının hesabı işlemleri açı ve uzunluk hataları dengeli şekilde dağıtılarak doğru sonuçlar bulunmuştur.

Nokta No.	Kıvrılma Açısı β	Açıklık Açılan (Semt) t	Kenar S	$\Delta y = S \cdot \sin t$	$\Delta x = S \cdot \cos t$	Y	X
	+15	156,3833					
	175,8764			-2	+2	22374,48	17250,66
	+15'	132,2612	86,54	+75,66	-42,00		
	198,2612			-3	+2	22450,12	17208,68
	+15'	130,5239	126,12	+111,90	-58,18		
	180,7146			-2	+2	22561,99	17150,52
	+15'	111,2400	93,76	+92,30	-16,47		
	171,1955			-2	+1	22654,27	17134,07
	+14'	82,4370	81,45	+78,37	+22,19		
	152,1640	(34,6024)	387,87	+358,23	-94,46	22732,62	17156,27
	1034,5950	[S]	[S]	[S]	[S]	+358,14	-94,39
	-1000,0000	34,5950				+358,23	-94,46
	34,5950	$f_0 = -74''$				$f_y = -0,09'$	$f_x = -0,07'$
	$(F_p = \pm 35,36)$			$FL = -10cm (13)$			$f_s = 0,114m$
				$FQ = -4cm (14)$			



TUSAGAKTİF

TÜRKİYE ULUSAL SABİT GNSS AĞI AKTİF



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

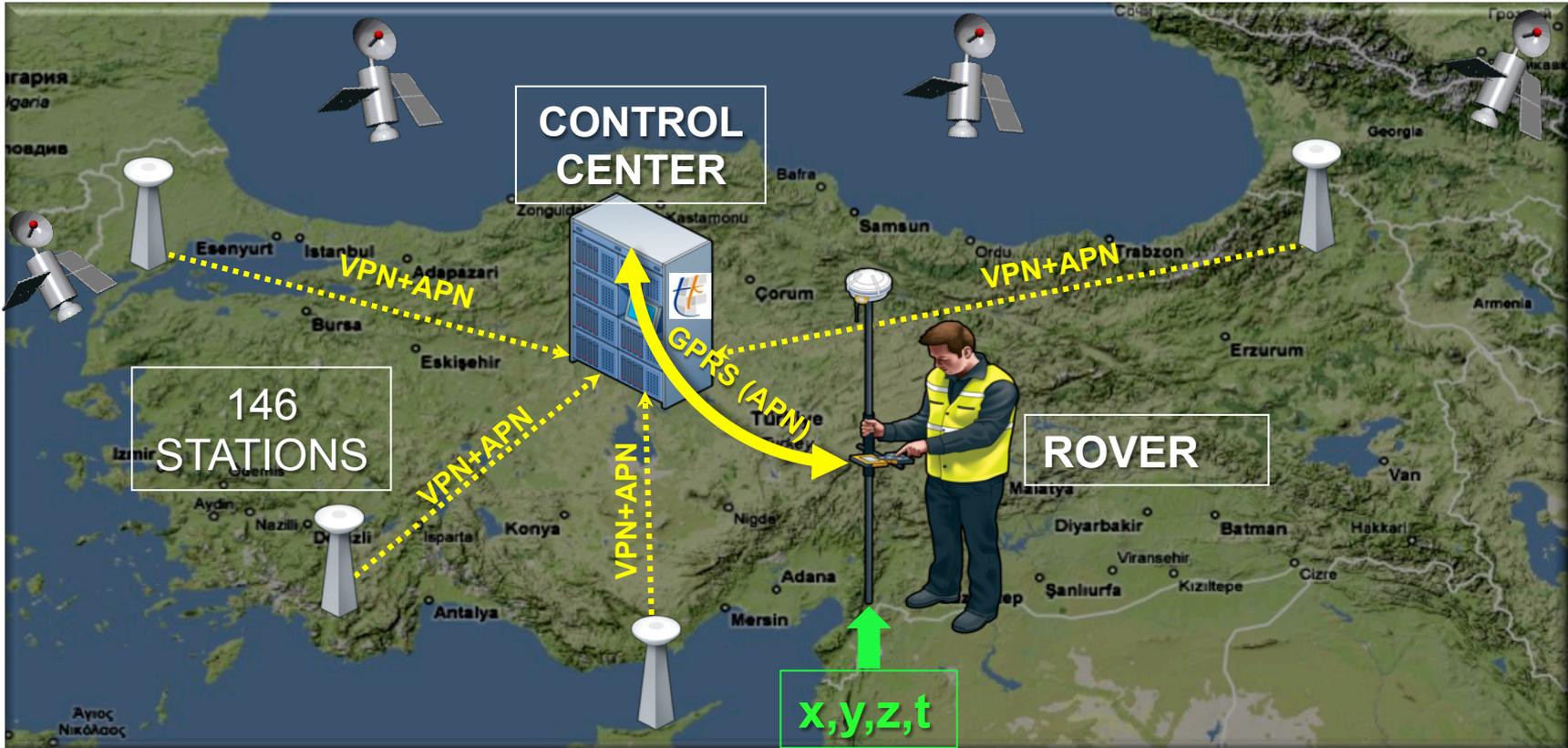
CORS-Tr Stations



CORS-Tr Control Center Ankara – GDLRC

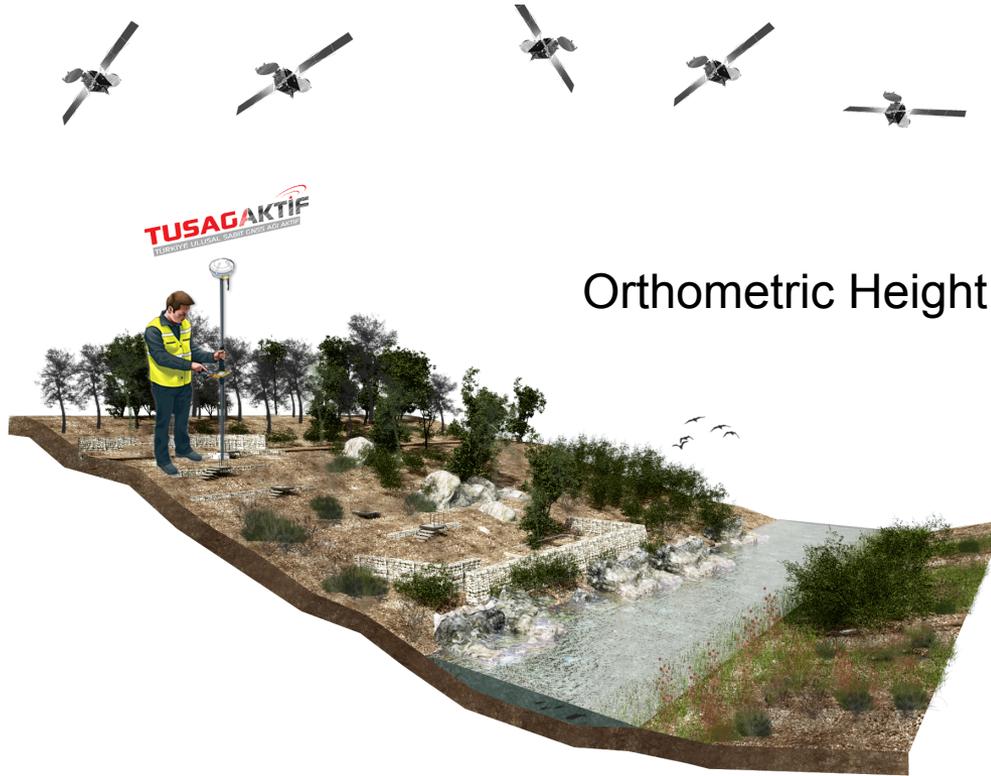


Network RTK Working Principle

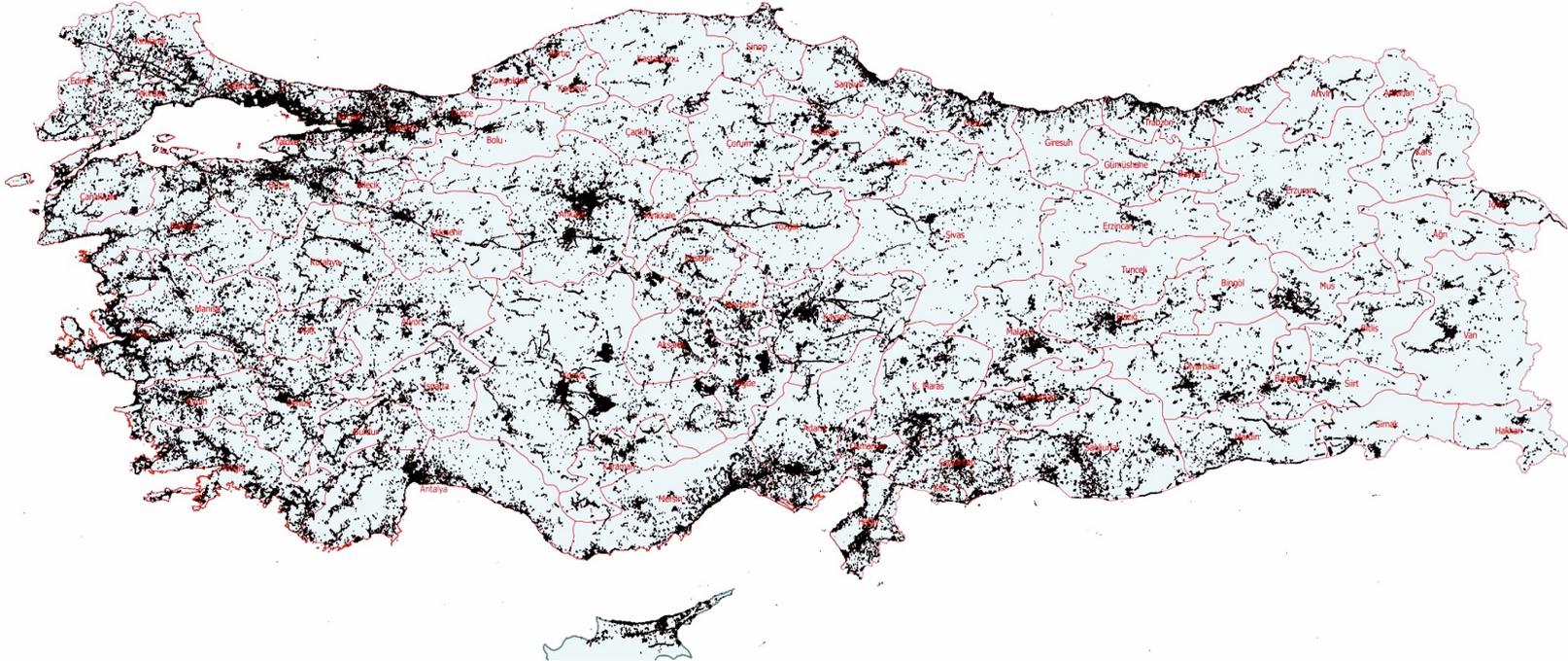


2005.0 Epok

On-line Orthometric Height Value



CORS-Tr Usage Map – 2016

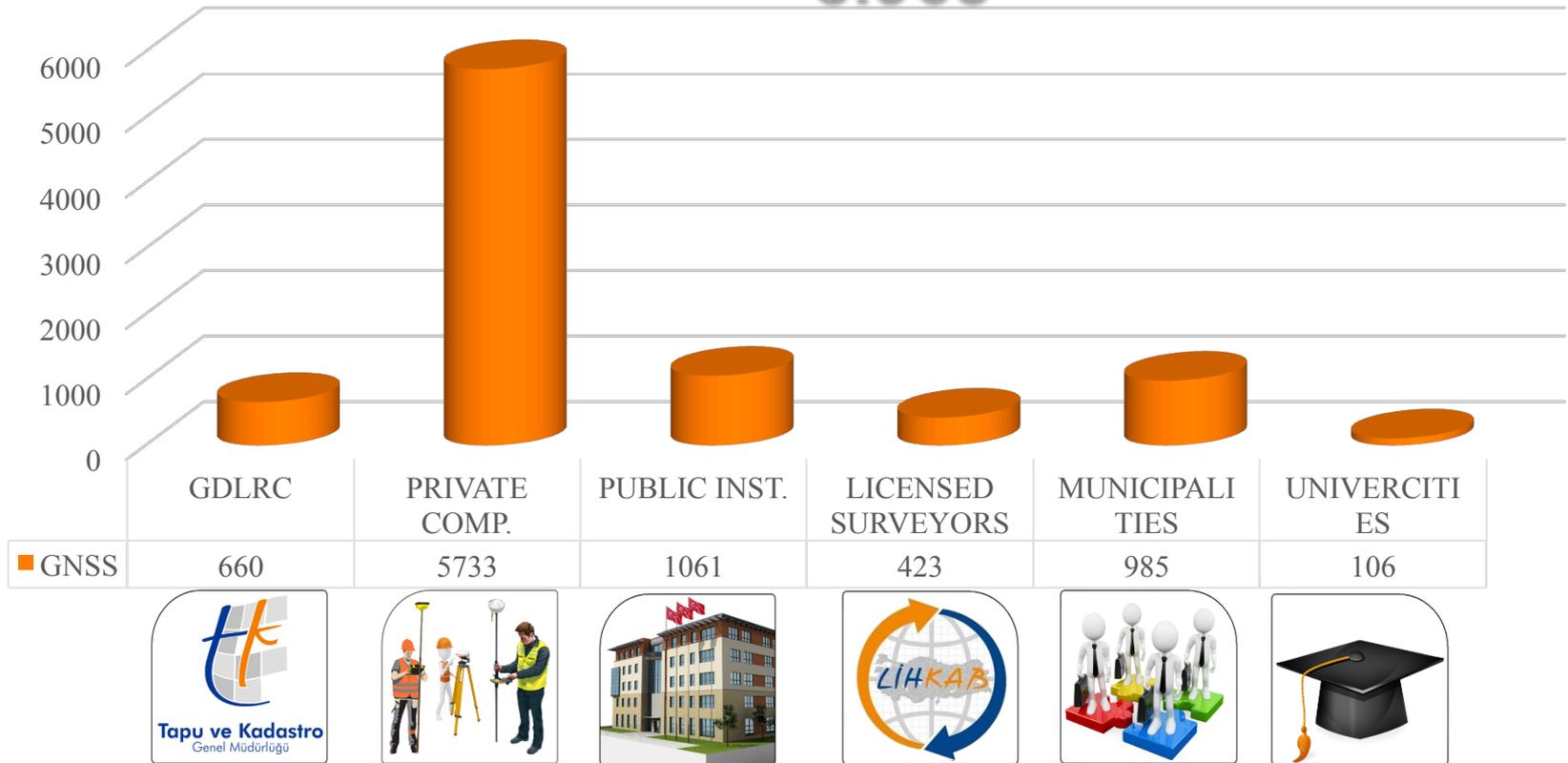


13.412.424 points ...

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

PERIOD	Nr of POINTS	RMS (m.)		
		EAST	NORTH	HEIGHT
2009	808	0,039	0,042	0,090
2014-1	723	0,045	0,039	0,078
2015-1	743	0,033	0,035	0,047
2015-2	701	0,029	0,027	0,058
2016-1	725	0,032	0,031	0,051
2016-2	697	0,029	0,028	0,046

2 times QC Checks every year ...

CORS-Tr Operating/Web Services

tusaga-aktif.gov.tr

TUSAGA AKTİF
TÜRKİYE ULUSAL SABİT GNSS AĞI AKTİF

Tapu ve Kadastro
Genel Müdürlüğü

Harita Genel Komutanlığı

Giriş

Abonelik Rehberi

Ücretler

Sıkça Sorulan Sorular

İletişim
444 46 77

Giriş

İstasyon Haritası

ABONELİK İŞLEMLERİ

Tapu ve Kadastro
Genel Müdürlüğü
Harita Dairesi Başkanlığı
Tusaga Aktif Projesi

Sayın Erkan Kulekâz, Sisteme Hoşgeldiniz.

Ödeme ve Dekont Sayfası

TUSAGA Aktif Kullanımı için ödemeniz gereken Bedel

Toplam :1,00TL.

Yükarıdaki yazılı tutar
T.C.ZİRAAT BANKASI TANDIRGAN ŞUBESİ
Hesap No : 70385505055
IBAN No : TR19000100120282070385505055
no'lu hesaba yatırılıp
yaktığınızna gösteren dekontu aşağıda seçerek gönderiniz.

Dosya Seç Dosya seçilmedi

Lütfen Birden fazla dekontunuz varsa hepsini bir (1) sayfada tarayıp gönderiniz

MasterCard VISA

Facebook Twitter

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>

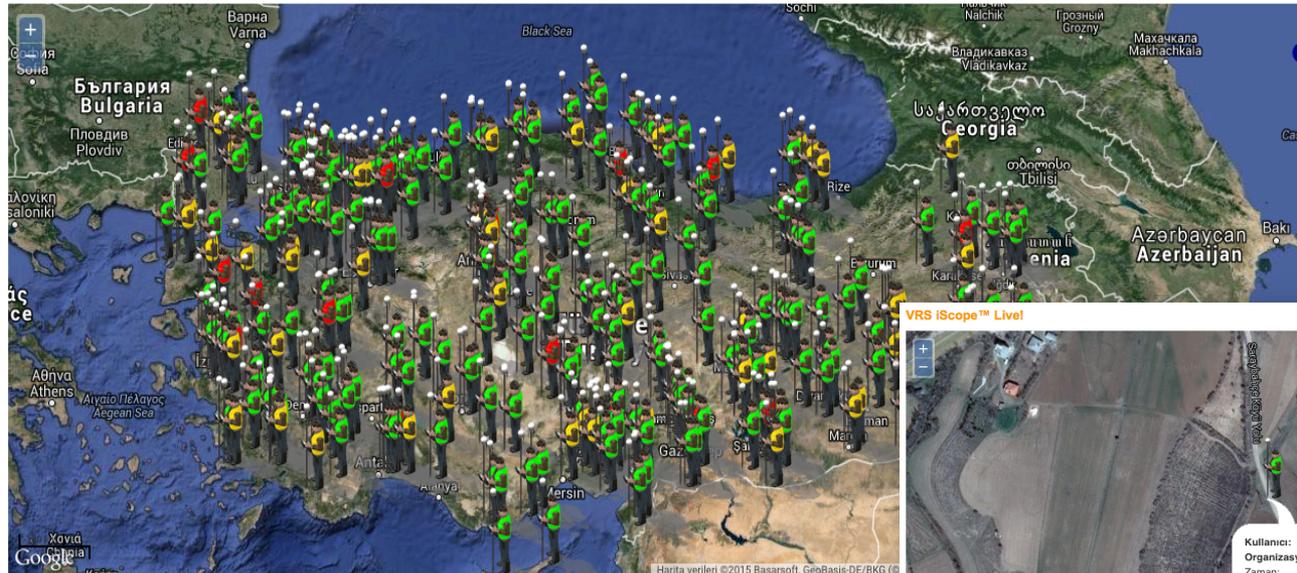


Trimble® Pivot Web

> Ana Sayfa > VRS iScope Live!

- Ana Sayfa
 - İstasyon Haritası
 - Ağ Bilgisi
 - 195 İyonosfer
 - IRIM/GRİM
 - Referans Veri Dükkanı
 - Hesabım
 - Kişisel Bilgiler
 - Şifre Değiştir
 - Girişler
 - Oturumlar
 - VRS iScope
 - VRS iScope Live!**
 - Aktif Üyelikler
 - Yönetim
 - Bölgeler
 - Bölge Ekle
 - Bölgeleri Düzenle
 - Firmaları/Kurumlar
 - Firmaları/Kurumlar
 - Yeni Firma/Kurum
 - Onay Bekleyen Firmaları/Kurumlar
 - E-posta adreslerini kaydet
 - Firma/Kurum Detayları
 - Detaylı Firma/Kurumu Bilgisi
 - Ek Bilgi Alanları
 - Yeni Alan Ekle
 - Kullanıcı Bilgisi Detayları
 - Ek Bilgi Alanları
 - Yeni Alan Ekle
 - Organizasyon Yönetimi
 - Organizasyonlar
 - Yeni Organizasyon
 - Yetki Yönetimi
 - Yetki Genel
 - Yeni Yetki
 - Üyelik Yönetimi

VRS iScope™ Live!



335 aktif kullanıcılar:
K05344601 (RTK Fiks)
K01456501 (RTK Fiks)
K06210501 (RTK Fiks)
K072601802 (RTK Fiks)
K05554301 (RTK Float)
K070608302 (RTK Fiks)
K074204201 (RTK Float)
K070710501 (RTK Fiks)
K071000501 (RTK Fiks)
K01450004 (RTK Fiks)
K06470101 (RTK Float)
K073200801 (RTK Fiks)
K06381601 (RTK Fiks)
K0338030201 (RTK Fiks)
K073427001 (RTK Fiks)
K06425302 (RTK Fiks)
K073419701 (RTK Fiks)

VRS iScope™ Live!



Kullanıcı: K01236501
Organizasyon: PALU Kad Hld
Zaman: 10:25:57 GMT+3
Eni: K 38° 44' 16.68038"
Boyl: D 39° 54' 56.19004"
Yükseklik: 943.646
Uydular: 10
PDOP: 1.32
Kalite: RTK Fiks

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, reparing
- **Communication Costs;** 2XMetro internet and 146 VPN Internet connections
- **Promotion costs;** Seminars, symposiums, trainings, etc. for CORS-Tr

Financial Structure of CORS-TR System

CORS-TR System Costs

Year	Equipment	Software	Maintenance	Promotion	Communication	Total
2010	\$23.000,00	\$0,00	\$15.000,00	\$0,00	\$60.000,00	\$98.000,00
2011	\$7.000,00	\$0,00	\$0,00	\$0,00	\$125.000,00	\$132.000,00
2012	\$413.000,00	\$0,00	\$25.000,00	\$0,00	\$112.000,00	\$550.000,00
2013	\$6.000,00	\$0,00	\$0,00	\$35.000,00	\$319.000,00	\$360.000,00
2014	\$458.000,00	\$176.000,00	\$0,00	\$0,00	\$288.000,00	\$922.000,00
2015	\$0,00	\$0,00	\$0,00	\$0,00	\$305.000,00	\$305.000,00
2016	\$59.000,00	\$0,00	\$0,00	\$0,00	\$211.000,00	\$270.000,00
Grand Total	\$966.000,00	\$176.000,00	\$40.000,00	\$35.000,00	\$1.420.000,00	\$2.637.000,00

Financial Structure of CORS-TR System

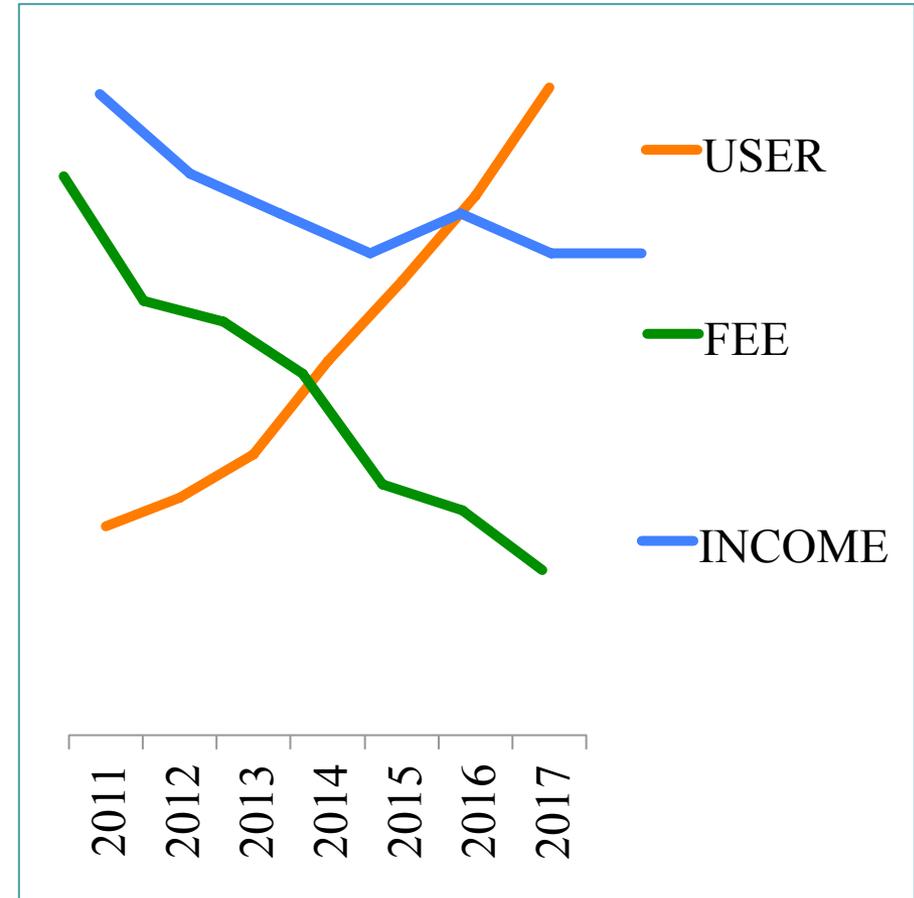
CORS-Tr Fees

SERVICE TYPE	DATA TYPE	Price (VAT INC.)	EXPLANATION
FIRST SUBSCRIPTION	-	40 USD	Once
RTK Services	Network-RTK	35 USD	Monthly
		220 USD	Annual
	Network-DGPS	15 USD	Monthly
RINEX Data	RINEX 1 s	0.14 USD	Station/Hour
	RINEX 30 s	FREE	Station/Day

Financial Structure of CORS-TR System

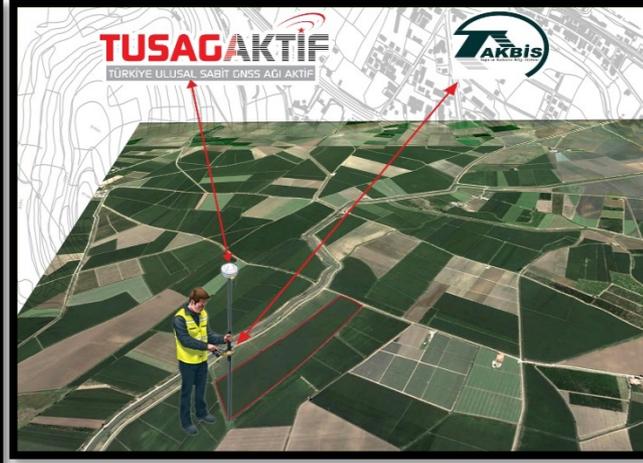
Number of Users, Fee and Income of CORS-Tr

YEA R	Nr of USERS	RTK FEE (USD)	INCOME (X1000 USD)
2011	2900	500	1900
2012	3300	410	1700
2013	3900	395	1600
2014	5200	357	1500
2015	6300	277	1600
2016	7500	258	1500
2017	9000	215	1400

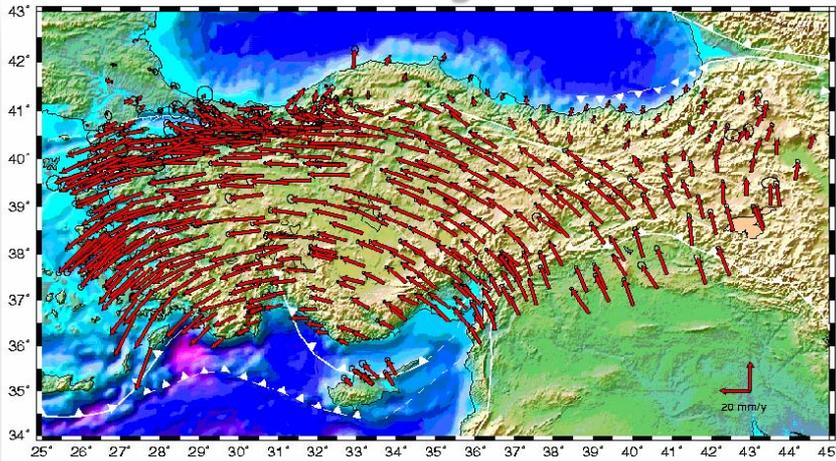


CORS-Tr Benefits

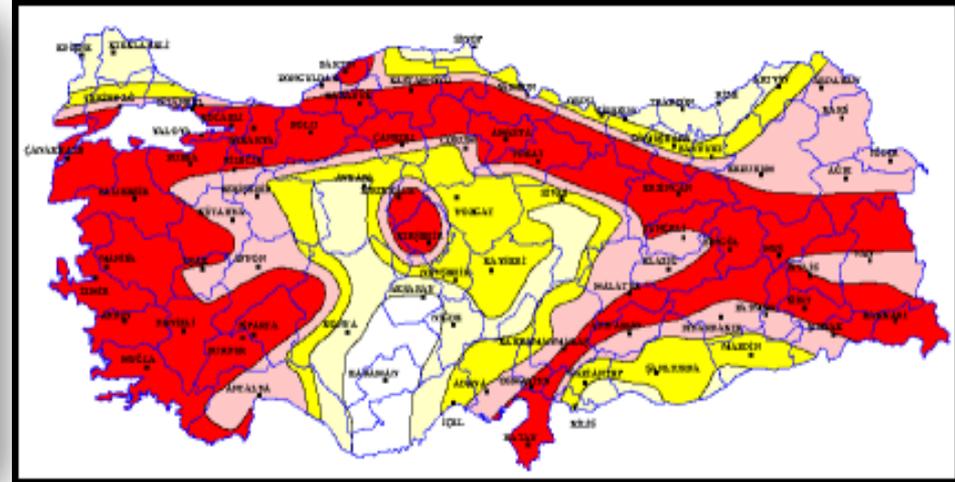
- There is no need for establishing and measuring triangulation points and benchmarks which comprises **30% of mapping and cadastre works** in terms of duration and cost. approximately **25 millions USD** is saved from the allocated resources for mapping which is approximately 75 millions USD/Year.



CORS-Tr Project Benefits



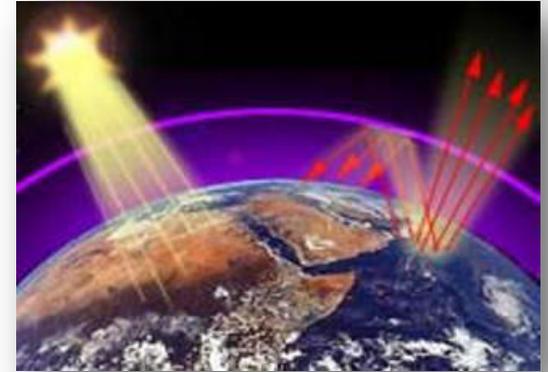
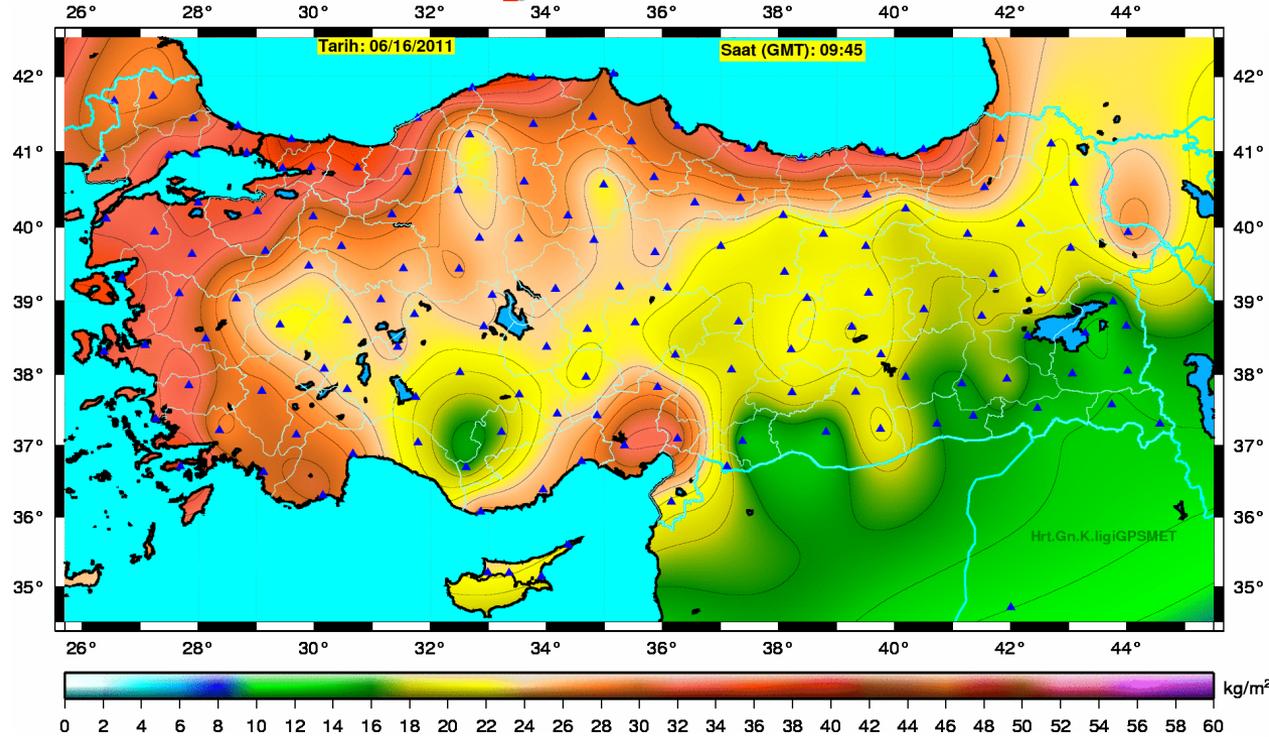
Determination of velocity areas



Determination of tectonic movements



CORS-Tr Project Benefits



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.



**GOOD
COORDINATION
STARTS WITH
GOOD
COORDINATES !**

SEDAT BAKICI
HEAD OF GEOMATICS DEPARTMENT

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THANK YOU ...