

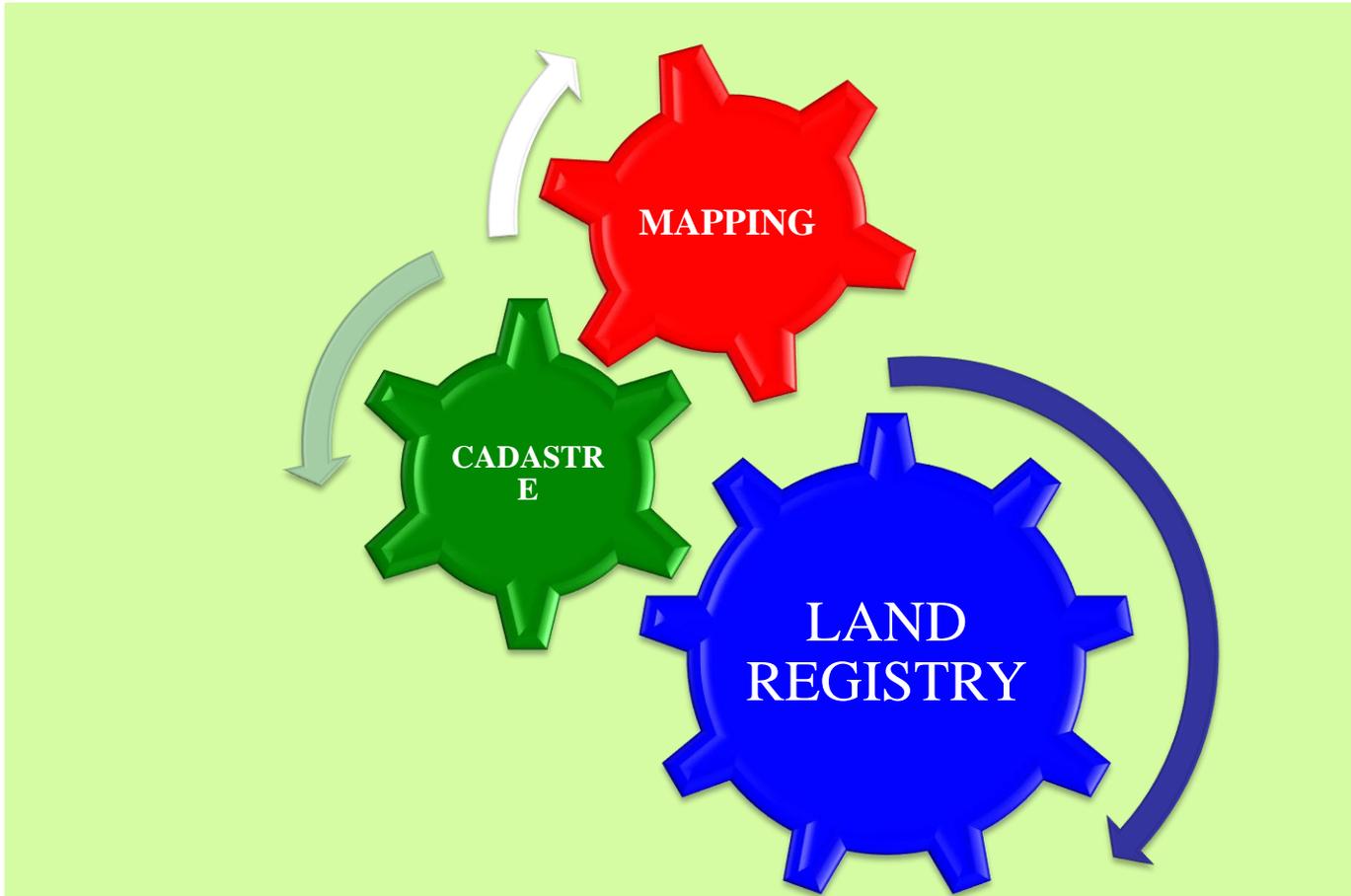


**Presented at the FIG Working Week 2016,
May 2-6, 2016 in Christchurch, New Zealand**

ROLE AND IMPORTANCE OF TUSAGA-AKTIF(CORS-Tr) IN CADASTRE



GENERAL DIRECTORATE OF LAND REGISTRY AND CADASTRE of TURKEY



TURKISH CIVIL CODE- ARTICLE 719

“If cadastral plans do not coincide with marks on the land, cadastral plan is essential”

So cadastral works need to be accurate ...

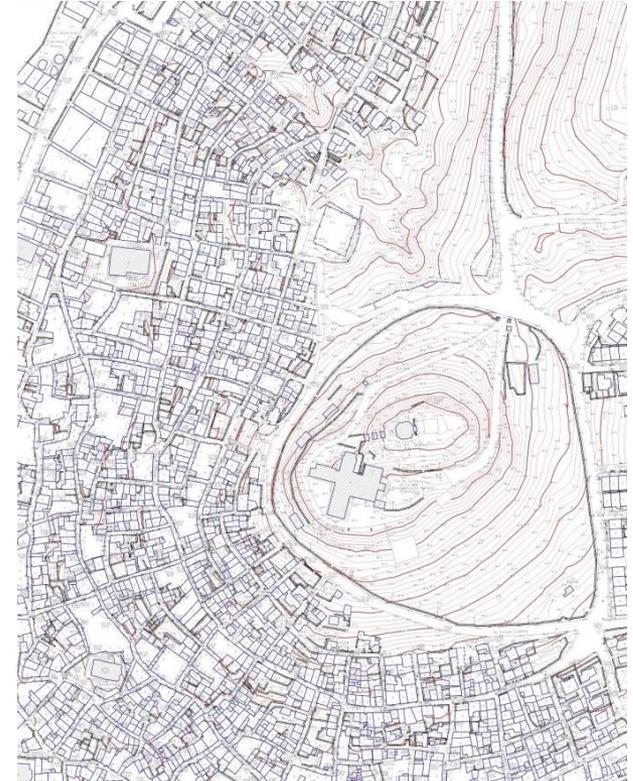
“GOOD COORDINATION BEGINS WITH GOOD COORDINATES ...”

The image illustrates the transition from traditional paper-based cadastral records to a modern digital system. On the left, a historical cadastral map is shown with numbered plots (e.g., 15, 17, 47, 43, 16, 45, 11, 9, 44, 17, 10, 48) and handwritten text. On the right, a screenshot of the 'Mekânsal Gayrimenkul Sistemi' (Spatial Real Estate System) web interface is displayed. The interface shows a search window for a specific parcel, with the following details:

Gerçek Kişi	Tüzel Kişi					
Ad	Soyad	Baba Adı				
T.C. Kimlik No	37756344638	(Sorgula)				
İmlik No	Adı	Soyadı	Baba Adı	Ana Adı	Doğum Yeri	Doğum Tarihi
344638	SEDAT	BAKICI	LÜTFİ			
344638	SEDAT	BAKICI	LÜTFİ	FADİME	ESKİŞEHİR	02/11/1967
	İlçe	Mahalle	Ada	Parsel	Alan	Cins
KİŞEHİR	TEPEBAŞI	ZİNCİRLİKUYU	0	4818	124,00	TARLA
Detay Ad	Detay Adet					
Malikler	3					
Malik Tip	Malik Açıklama	Hisse	Edinme Sebebi	Edinme Tarihi		
Gerçekkişi	SEDAT BAKICI : LÜTFİ OĞLU/3/8 (İştirak No: 0)		İfraz İşlemi (TSM)	18/11/2011		
Gerçekkişi	FADİME BAKICI : HALİL İBRAHİM KIZI/2/8 (İştirak No: 0)		İfraz İşlemi (TSM)	18/11/2011		
Gerçekkişi	HÜLYA KELLECI : LÜTFİ KIZI/3/8 (İştirak No: 0)		İfraz İşlemi (TSM)	18/11/2011		

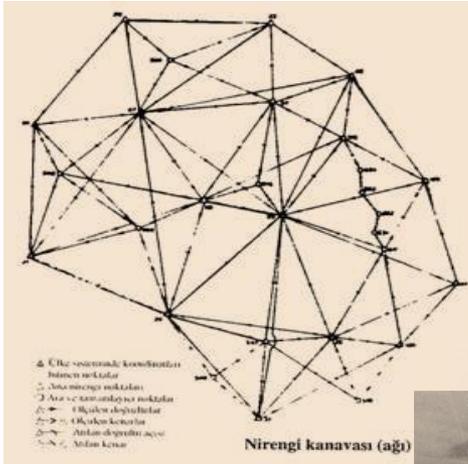
Requirement;

To create a spatial infrastructure of cadastre by collecting coordinates in real time, in accurate and economic way...



Requirement;

However, in the past, getting accurate coordinates was taking long time, expensive and needed expertise.



10) Başlangıç noktası B'nin koordinatlarına Δy_1 ve Δx_1 değerleri dy_1 ve dx_1 dağıtımları dikkate alınarak işaretlerine göre toplanır ve kontrol olarak C noktasının koordinatlarına ulaşılır.

$$\begin{aligned}
 Y_{P1} &= Y_b + \Delta y_1 + dy_1 = 22450,12\text{m} & \rightarrow & \rightarrow X_{P1} = X_b + \Delta x_1 + dx_1 = 17208,68\text{m} \\
 Y_{P2} &= Y_1 + \Delta y_2 + dy_2 = 22561,99\text{m} & \rightarrow & \rightarrow X_{P2} = X_1 + \Delta x_2 + dx_2 = 17150,52\text{m} \\
 Y_{P3} &= Y_2 + \Delta y_3 + dy_3 = 22654,27\text{m} & \rightarrow & \rightarrow X_{P3} = X_2 + \Delta x_3 + dx_3 = 17134,07\text{m} \\
 Y_C &= Y_3 + \Delta y_C + dy_C = 22732,62\text{m} & \rightarrow & \rightarrow X_C = X_3 + \Delta x_C + dx_C = 17156,27\text{m}
 \end{aligned}$$

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

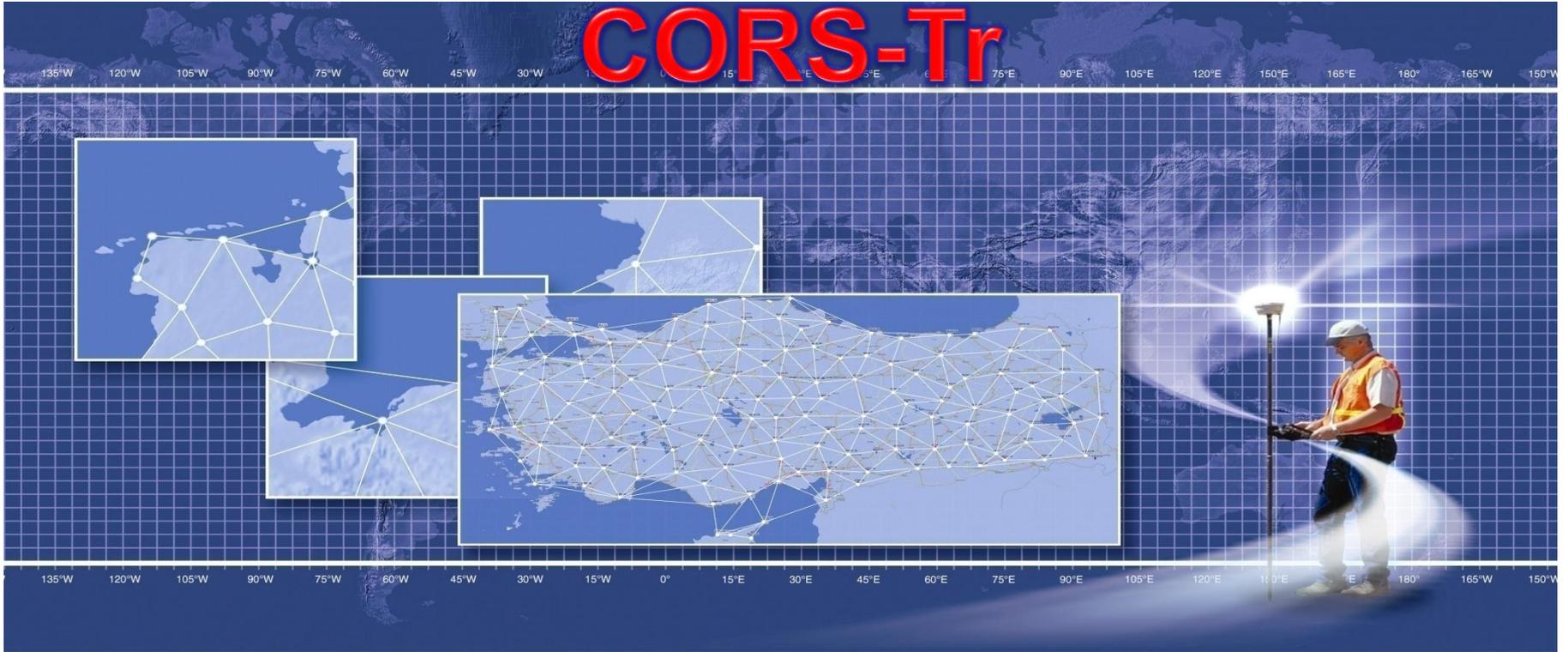
Nokta No.	Kıvrım Açısı β	Açıklık Açılan (Semt)=t	Kenar S	$\Delta y = S \cdot \sin t$	$\Delta x = S \cdot \cos t$	Y	X
A	+15	156,3833					
B	175,8764	+15'	132,2612	86,54	-2	22374,48	17250,66
P ₁	198,2612	-15'	130,5239	126,12	-75,66	22450,12	17208,68
P ₂	180,7146	-15'	111,2400	93,76	-3	22561,99	17150,52
P ₃	171,1955	-15'	82,4370	81,45	-92,30	22654,27	17134,07
C	152,1640	-14'	(34,6024)	387,87	-78,37	22732,62	17156,27
				= [S]	+358,23		
					= [Δx]	+358,14	-94,39
D	1034,5950		34,5950		= [Δx]	+358,23	-94,46
	= 1000,0000		fg=+74''				
	34,5950					fy=-09'	fx=+07'
			(F _β =±35,36)		FL=-10cm (13)		fx=+0,114m
					FQ=-4cm (14)		





TUSAGAKTİF

TÜRKİYE ULUSAL SABİT GNSS AĞI AKTİF



Aim of the project;

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



Start-Ending Date : May 2006 - July 2010

Project Budget : 2,5 Million USD

CORS-Tr Stations ;



Erzurum-Meteoroloji



Siirt-Meteoroloji



Iğdır-
TKGM



Kabinet



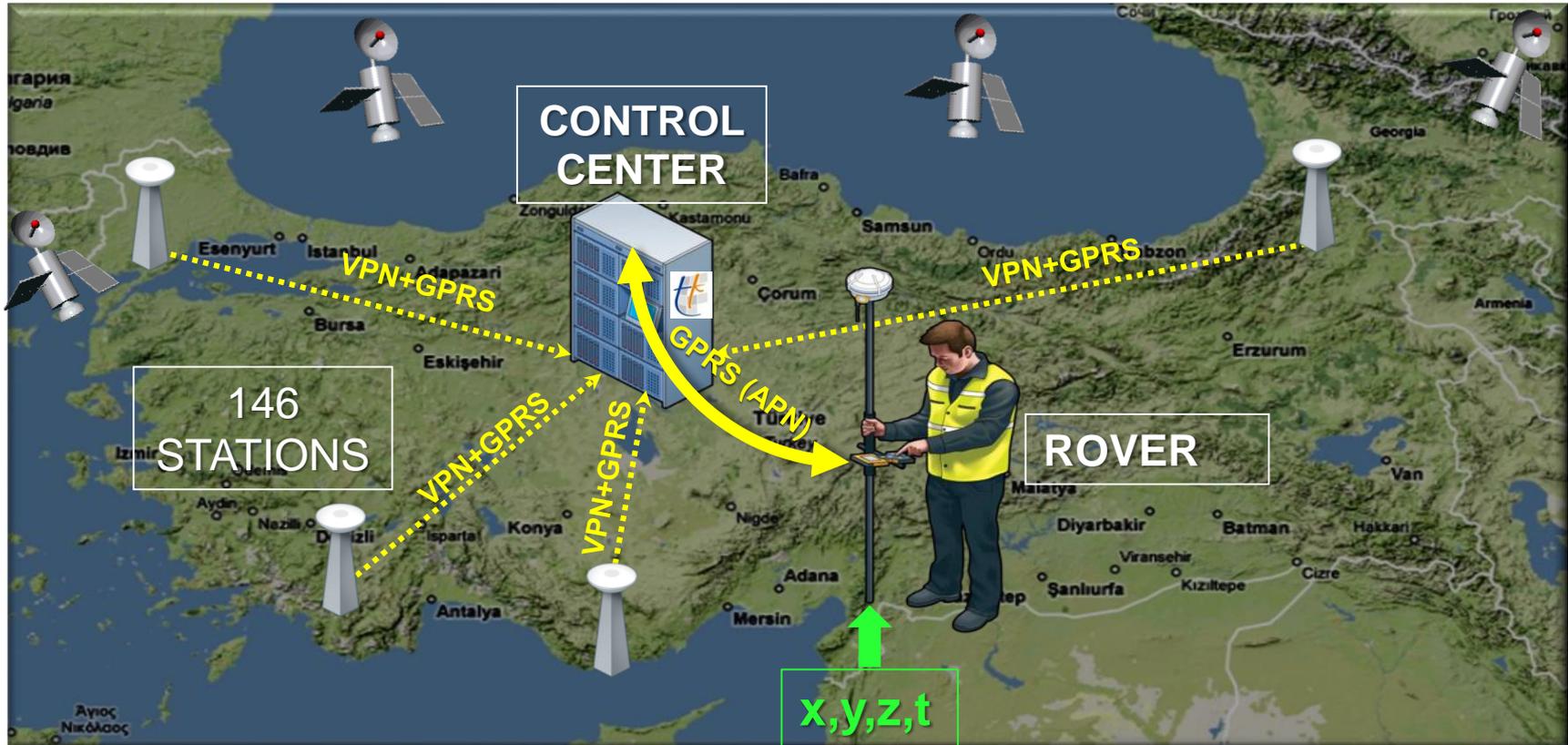
Viranşehir-Meteor.



CORS-Tr Control Center Ankara – GDLRC ;



Working Principle ;



2005.0 Epok

Quality Checks

PERIOD	Nr of POINTS	Mean Accuracy (m.)		
		EAST	NORTH	HEIGHT
2009	808	0,039	0,042	0,090
2014-2	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

2 times QC Checks every year ...

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
 - Firmalar/Kurumlar
 - Firmalar/Kurumlar
 - Yeni Firma/Kurum
 - Onay Bekleyen Firmalar/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)

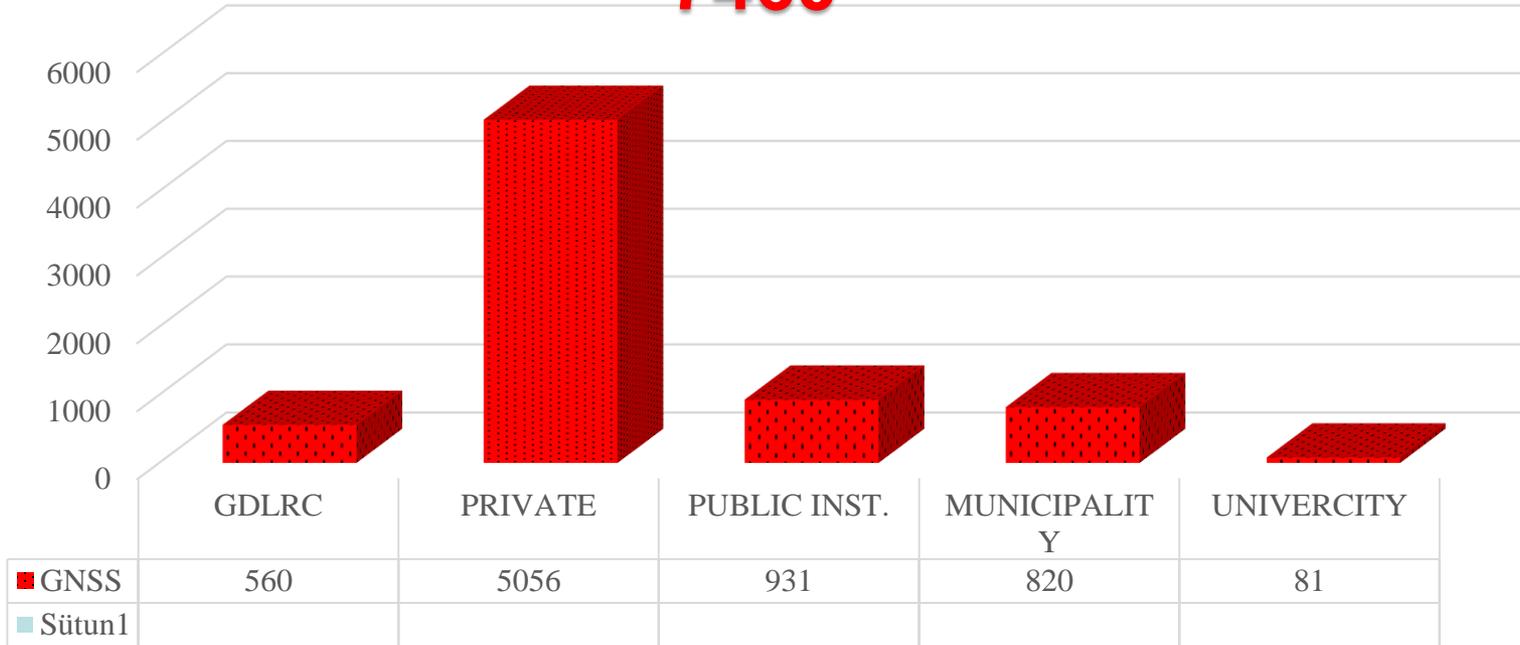
VRS iScope™ Live!



Kullanıcı: K01236501
Organizasyon: PALLU Kad.İd
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

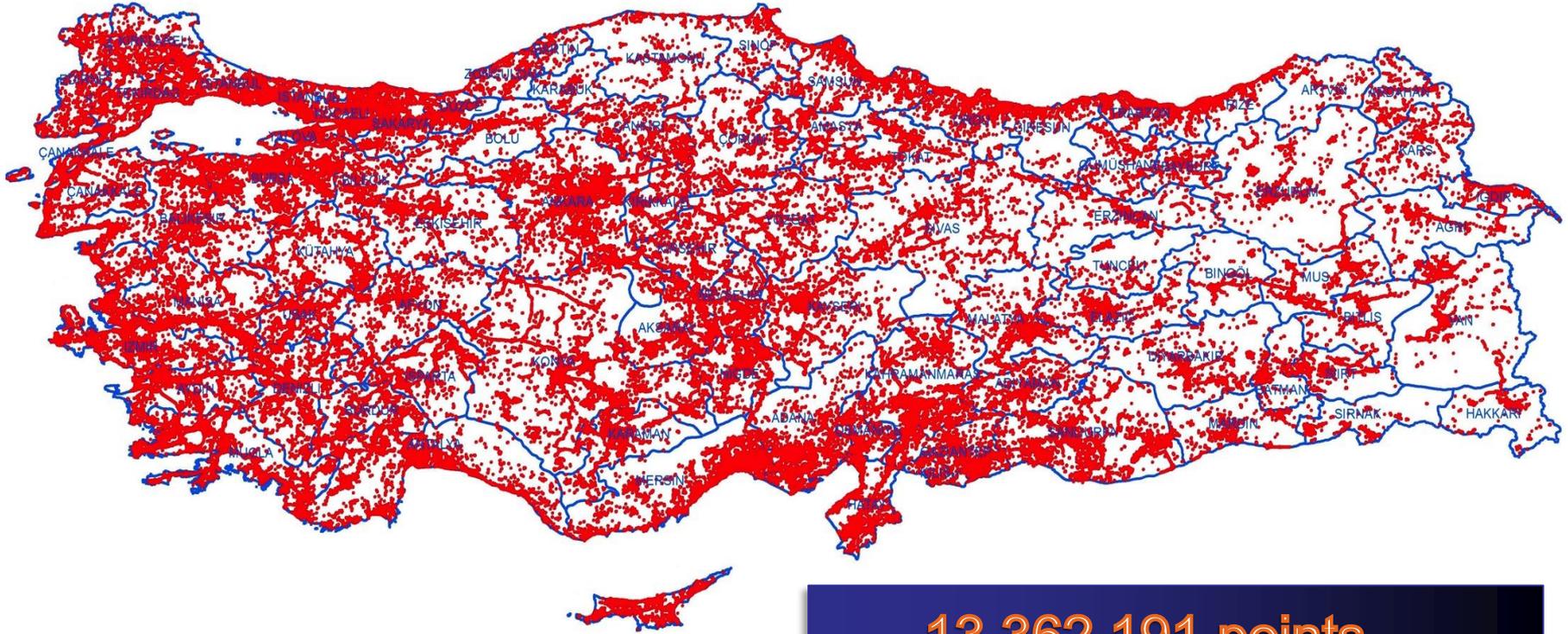
CORS-Tr Operating/Users ;

Total # Users 01.04.2016
7460



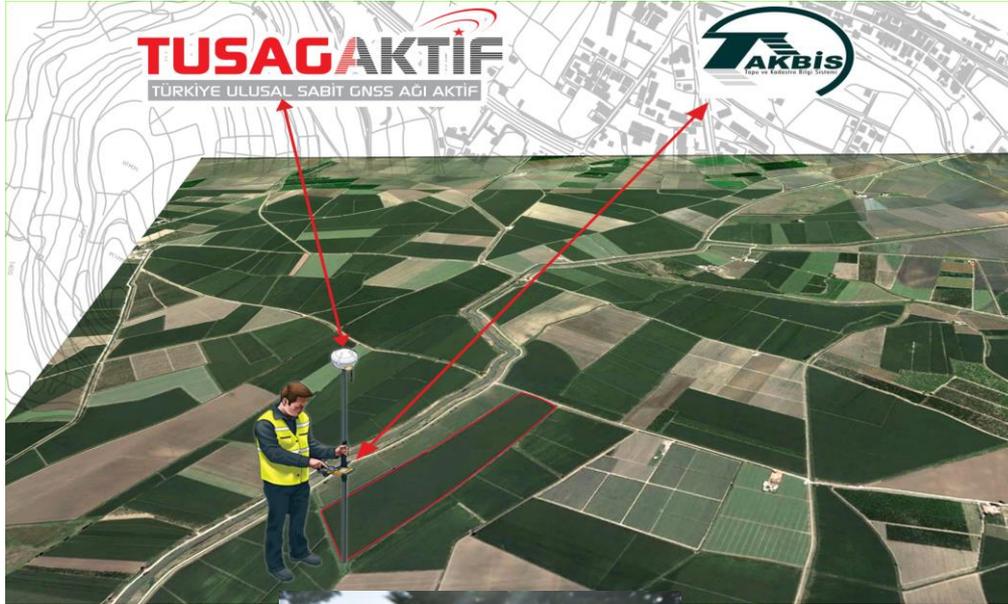
Daily total number of users (mean) :2000
Simultaneous maximum number of users: 770

CORS-Tr Usage Map – 2015;



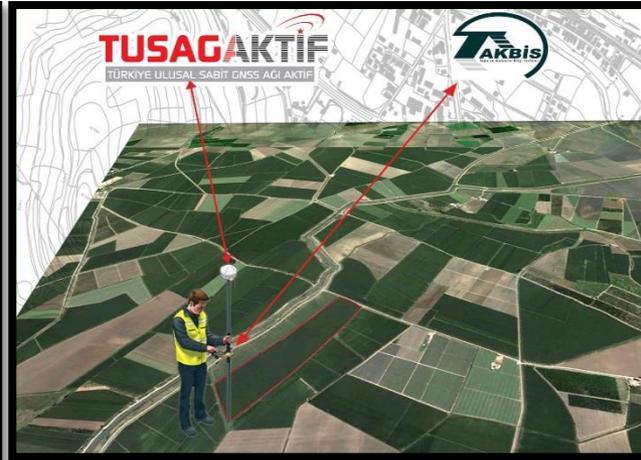
13.362.191 points ...

CORS-Tr AND TAKBİS INTEGRATION

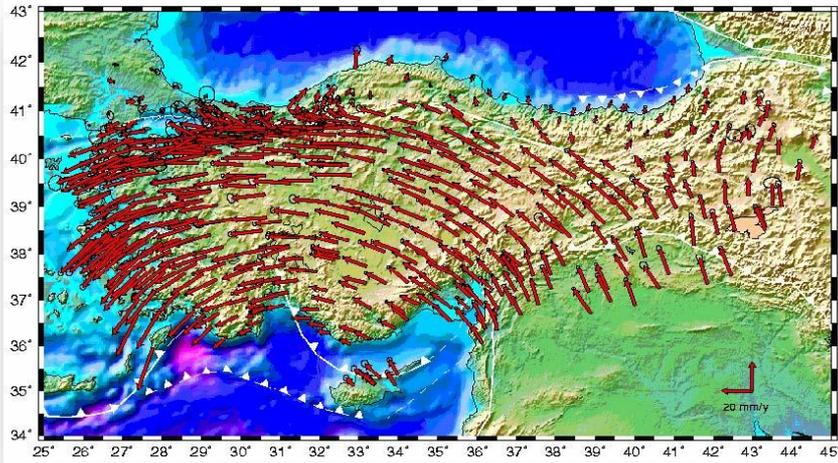


CORS-Tr Project Gains ;

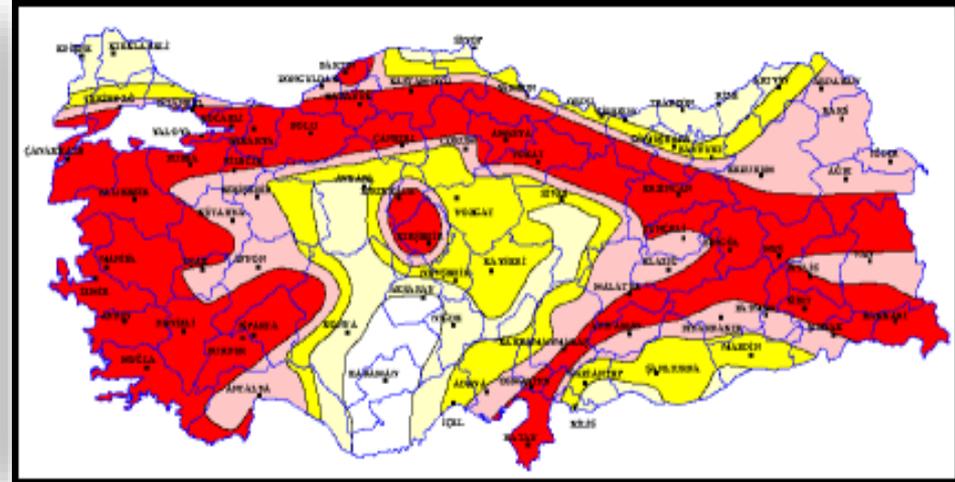
- There is no need for establishing and measuring triangulation points and benchmarks which comprises **30% of mapping and cadastre works** in terms of time and cost. Approximately **25 millions USD** is saved from the allocated resources for cadastre which is approximately **75 millions USD** in the year 2015.



CORS-Tr Project Gains ;



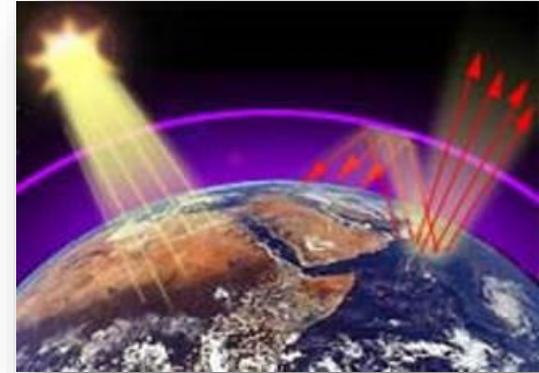
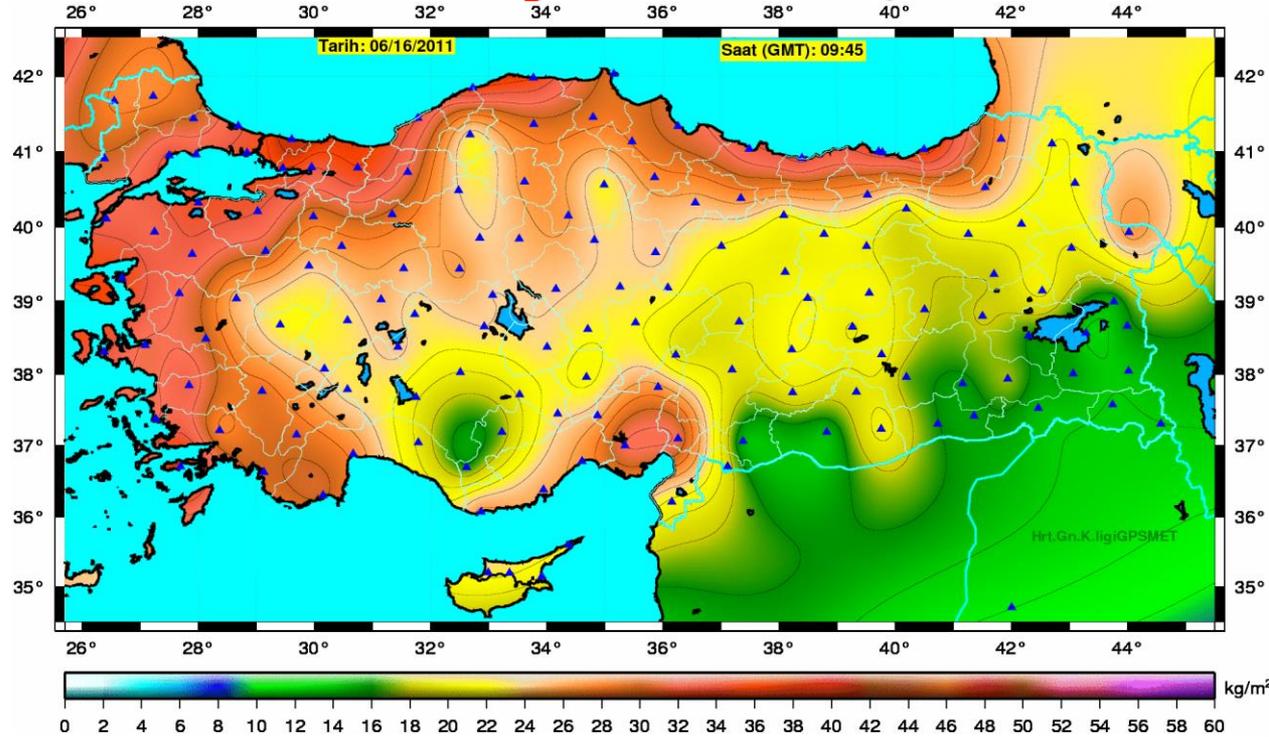
Determination of velocity areas



Determination of tectonic movements



CORS-Tr Project Gains ;



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.

GEOMATICS DEPARTMENT

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 : 0.312.4631050

 : 39°.8562, 32°.8465



THANK YOU ...