

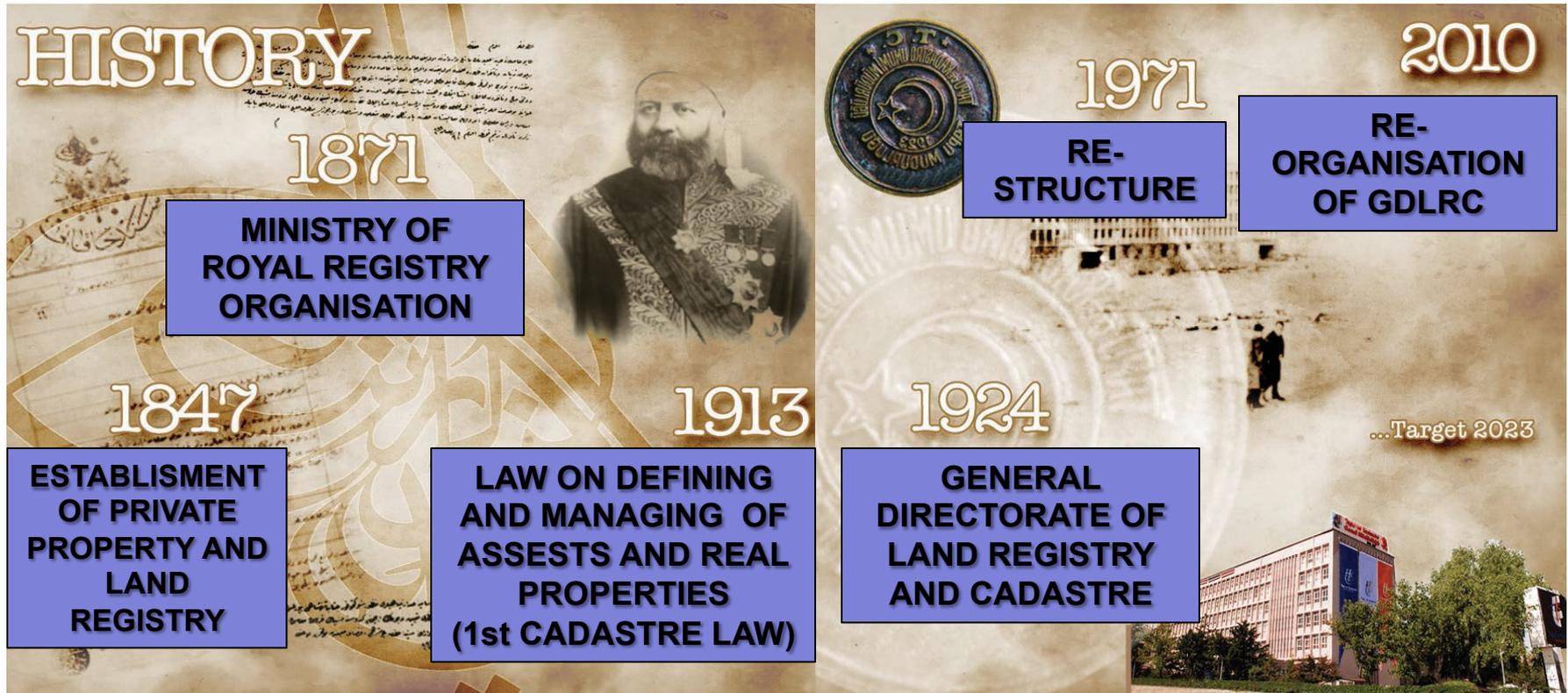


# SEAMLESS DIGITAL CADASTRAL MAP AND GEODETIC INFRASTRUCTURE IN TURKIYE

**Sedat BAKICI**

**Head of Geoinformatics Department**

## SHORT HISTORY of GDLRC

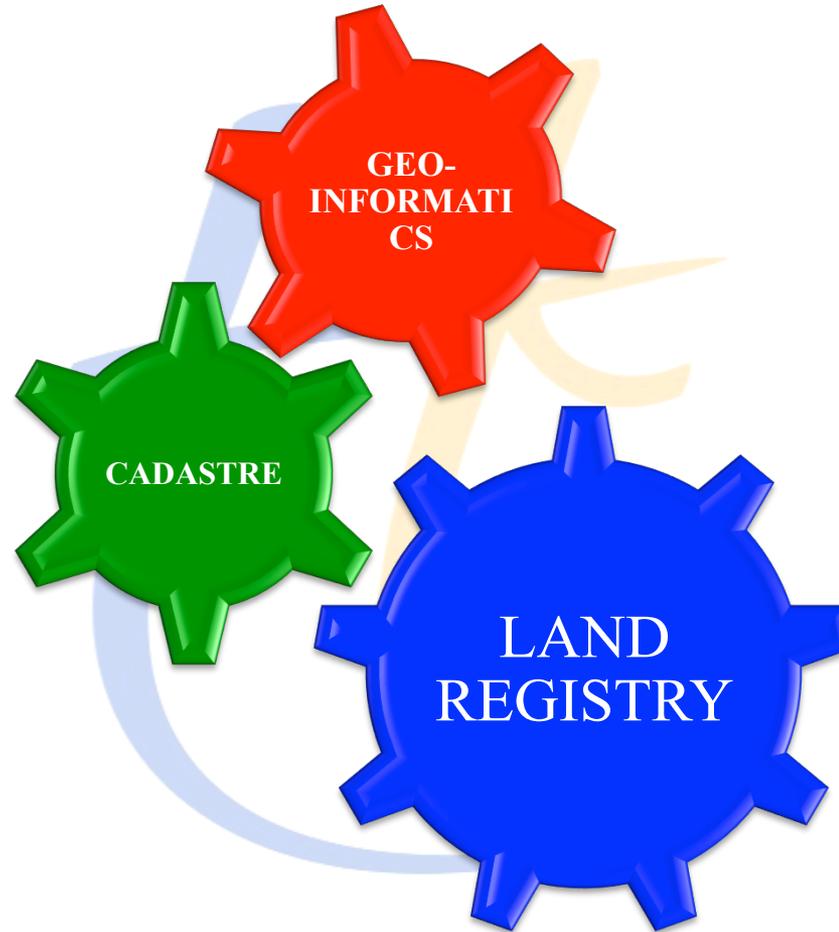




## **DUTIES & AUTHORIZATION**

- Register, update and service of land registry
- Cadastre of homeland
- Photogrammetric map production and geodetic activities
- Land information system
- Cooperation with international organisations on related areas
- Licenced Survey and Cadastral Engineering Offices
- Real estate brokerage activities
- Coordination with other public institutions and organizations

## MAIN AREAS OF ACTIVITY of GDLRC



## GEOINFORMATICS SERVICES

- GNSS RTK Network (TUSAGA-Aktif / CORS-Tr)
- Photogrammetric mapping & Orthophoto production.





# TUSAGAKTİF

TÜRKİYE ULUSAL SABİT GNSS AĞI AKTİF





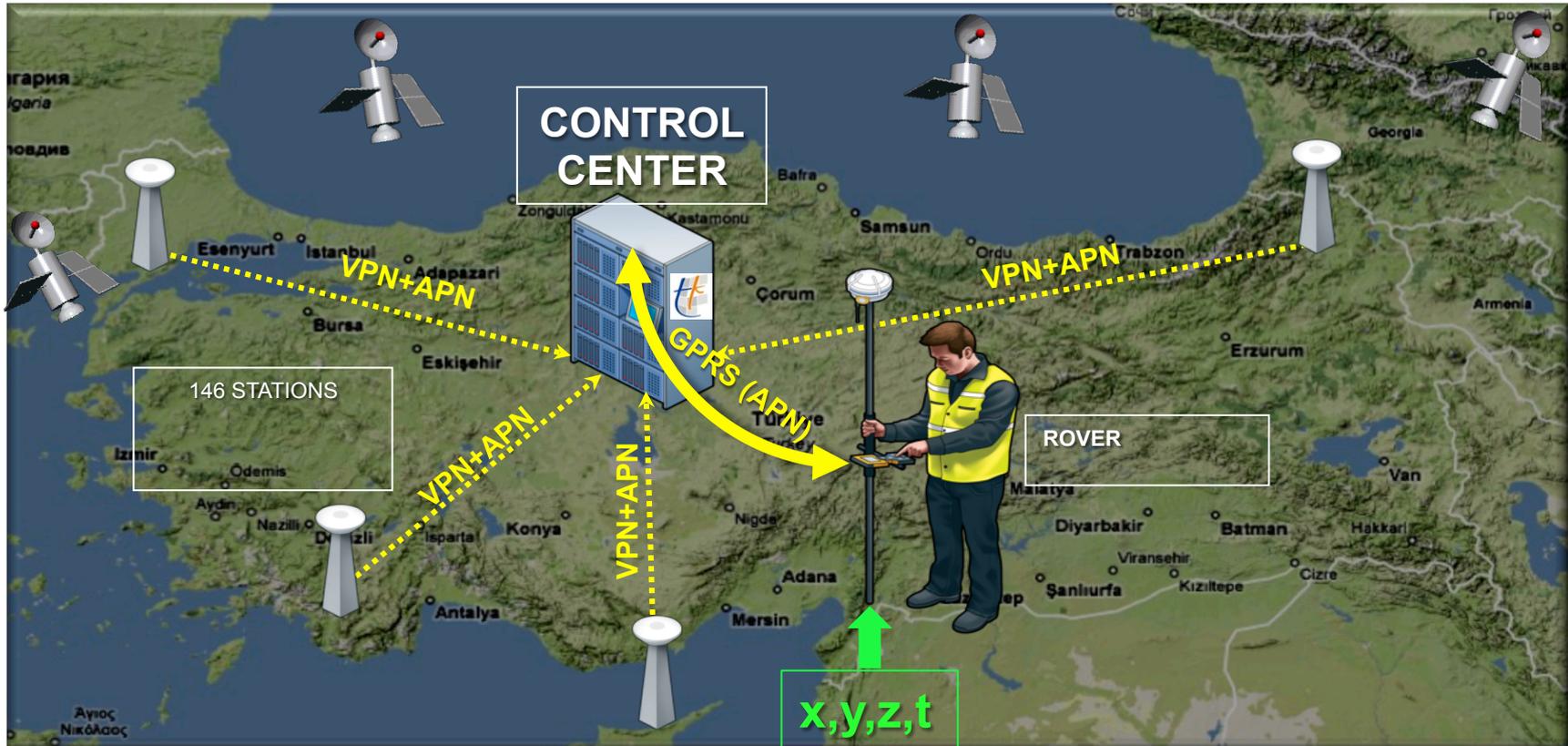
## CORS-Tr Stations



## CORS-Tr Control Center Ankara – GDLRC



# Network RTK Working Principle



**2005.0 Epok**

# User Web Service

<http://www.tusaga-aktif.gov.tr>

The screenshot displays the website interface for TUSAG AKTIF. The browser address bar shows "tusaga-aktif.gov.tr". The main header features the TUSAG AKTIF logo, the text "TÜRKİYE ULUSAL SABİT GNSS AĞI AKTİF", and the logos of the Ministry of Environment, Urbanization and Climate Change and the General Directorate of Land Registry and Cadastre. The interface is divided into two main sections: "ABONELİK İŞLEMLERİ" (Subscription Operations) and "TEKNİK İŞLEMLER" (Technical Operations). The "ABONELİK İŞLEMLERİ" section includes: Giriş, Abonelik Rehberi, Ücretler, Sıkça Sorulan Sorular, and İletişim (444 46 77). The "TEKNİK İŞLEMLER" section includes: Giriş, İstasyon Haritası, Nokta Konumları, 30 Saniye RINEX, and AĞ-RTK Çalışma Prensipli. Social media icons for Facebook, Twitter, and YouTube are visible at the bottom.

# User Web Service

<http://www.tusaga-aktif.gov.tr>

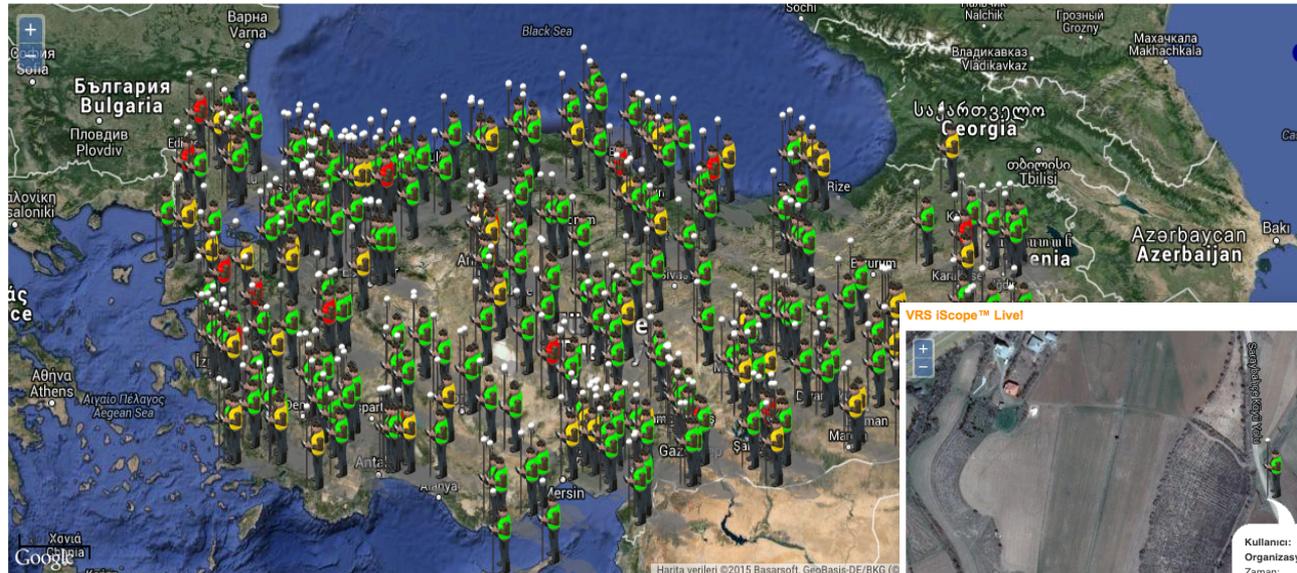


Trimble® Pivot Web

> 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/Kurum 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!



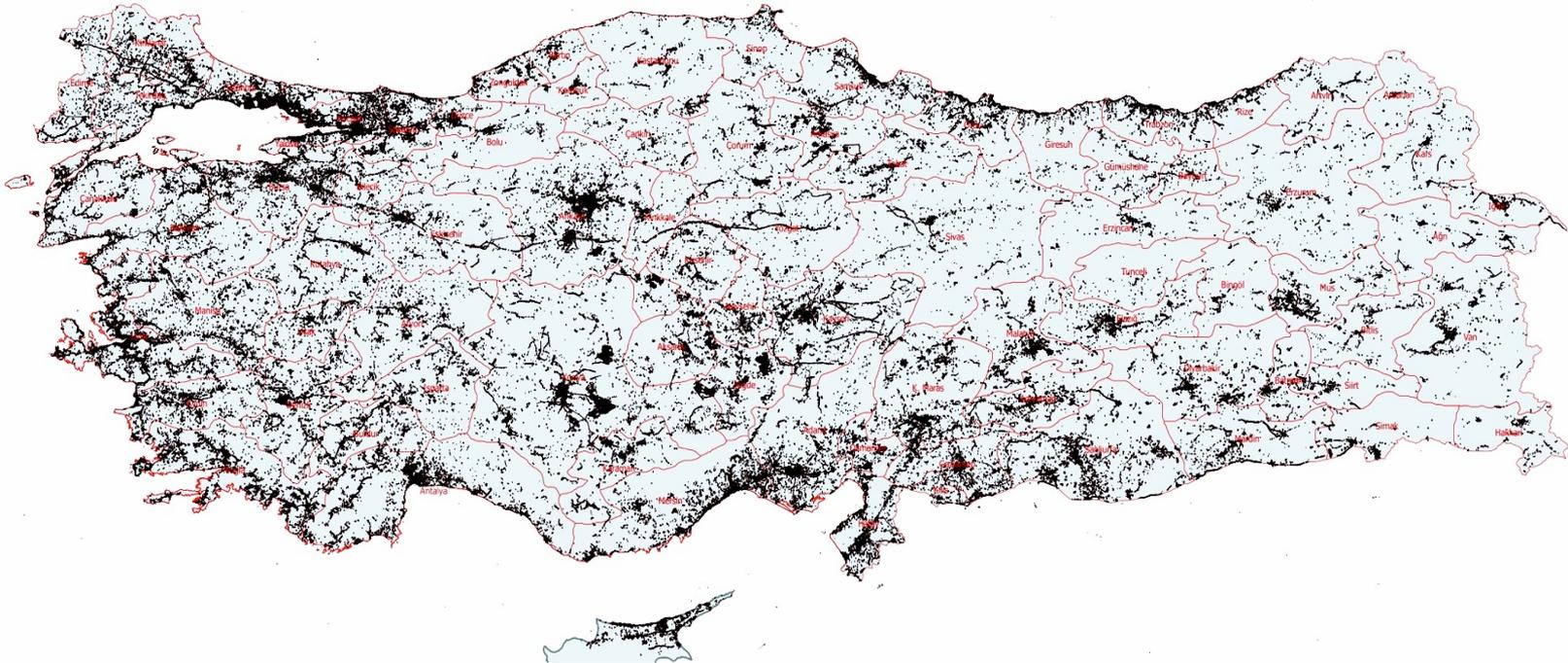
335 aktif kullanıcılar:  
K05344601 (RTK Fiks)  
K01456501 (RTK Fiks)  
K06210501 (RTK Fiks)  
K072601802 (RTK Fiks)  
K05554301 (RTK Float)  
K070608302 (RTK Fiks)  
K074204201 (RTK Float)  
K070710501 (RTK Fiks)  
K01450004 (RTK Fiks)  
K06470101 (RTK Float)  
K073200801 (RTK Fiks)  
K06381601 (RTK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

VRS iScope™ Live!



Kullanıcı: K01236501  
Organizasyon: PALU Kad Hid  
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 Usage Map – 2016

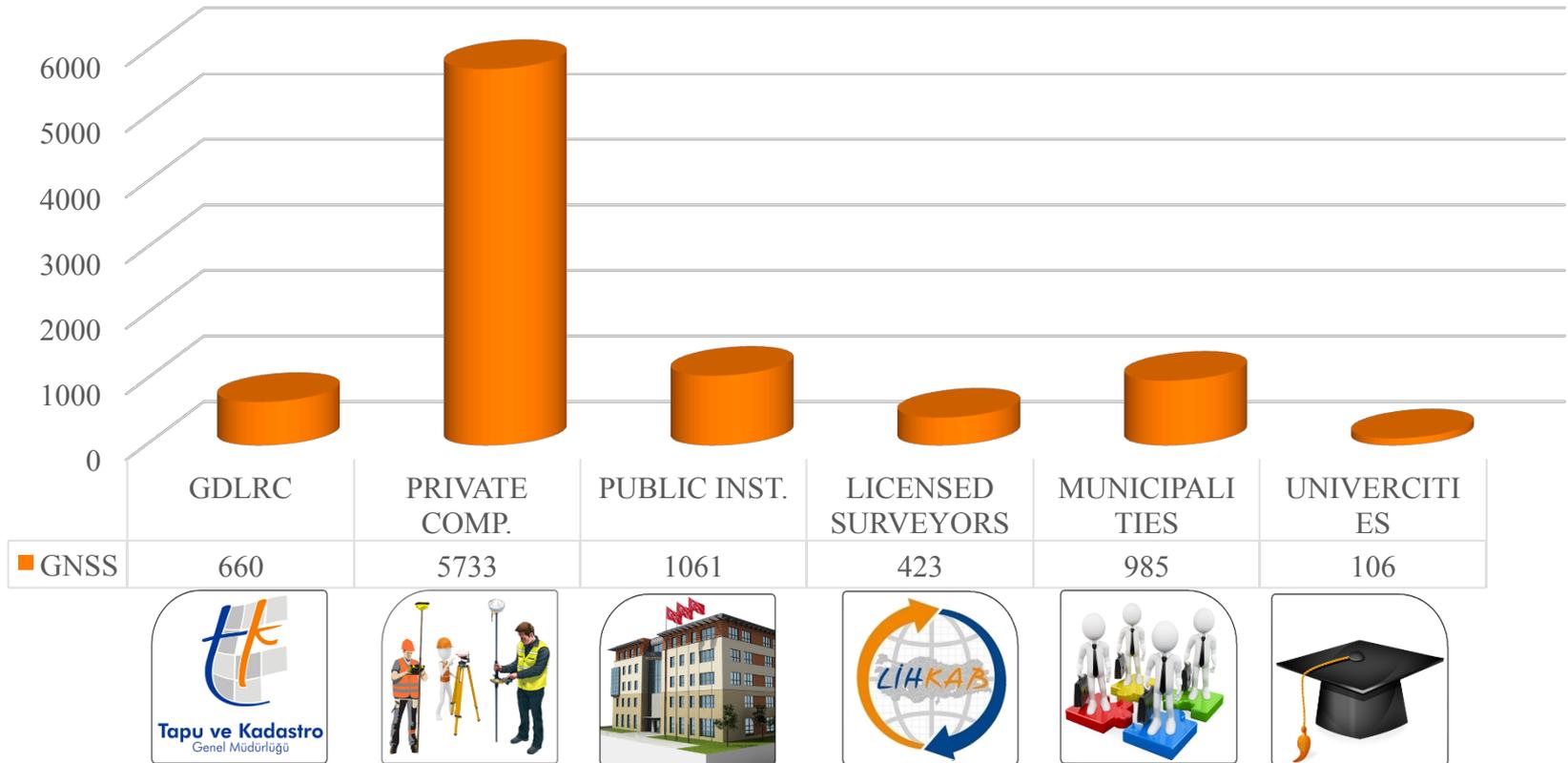


13.412.424 points ...

# CORS-Tr Operating/Users

**Total # Users; 8.968**

09.05.2017



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

## CORS-Tr Accuracy 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 / Prices

| SERVICE TYPE          | DATA TYPE    | Price<br>(VAT INC.) | EXPLANATION  |
|-----------------------|--------------|---------------------|--------------|
| FIRST<br>SUBSCRIPTION | -            | 50 USD              | Once         |
| RTK Services          | Network-RTK  | 35 USD              | Monthly      |
|                       |              | 250 USD             | Annual       |
|                       | Network-DGPS | 17 USD              | Monthly      |
| RINEX Data            | RINEX 1 s    | 0.17 USD            | Station/Hour |
|                       | RINEX 30 s   | FREE                | Station/Day  |

## CORS-Tr Operating/User support

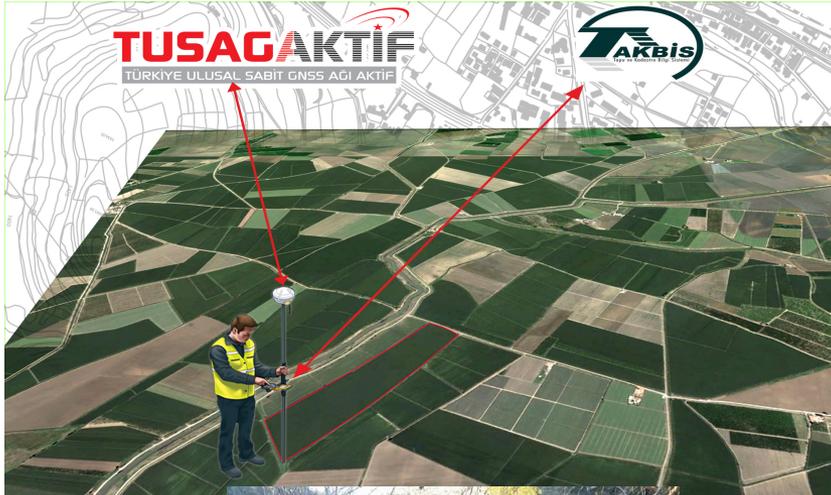


**444 GNSS**  
**444 4677**

2016  
**14.919 CALLS**



## CORS-Tr and GIS Integration



# On-line Orthometric Height Value



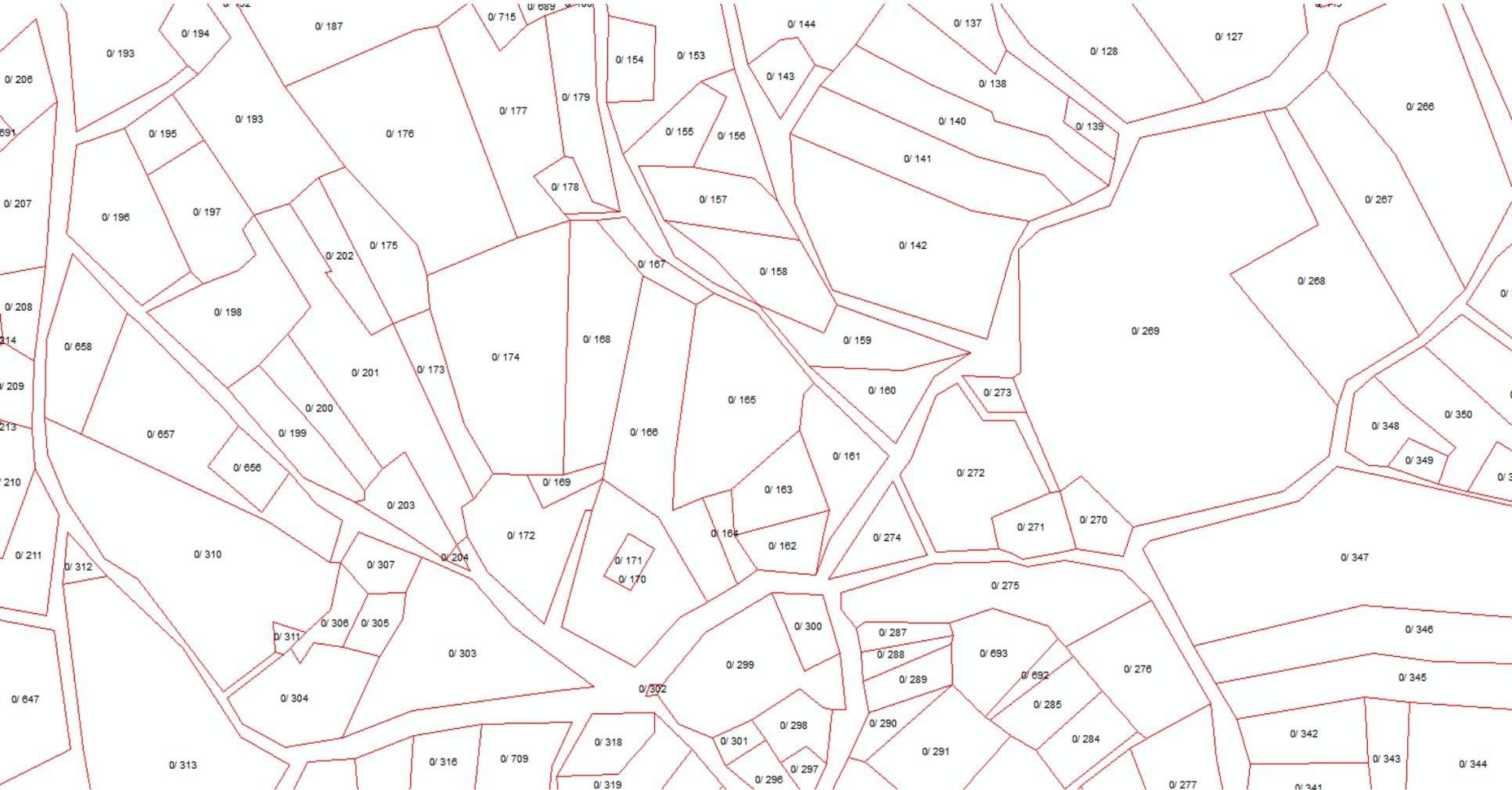
## PHOTOGRAMMETRIC MAP & ORTHOPHOTO PRODUCTION

In order to complete first cadastre, 1/5000 scaled base map production has been carried out at 480.000 Km<sup>2</sup> area after 1955 by photogrammetric method ...

Digital Orthophoto production has been started after 2007 for cadastral renovation and update works for the purposes of **decision-support, quality control and establishing legal basis** ..



# Orthophoto Map – Usage at Cadastre



# Orthophoto Map – Usage at Cadastre





# Orthophoto Map Production Process

Project Planning

Geodetic Works

Aerial Image  
Acquisition

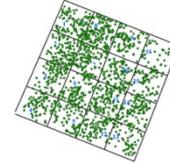
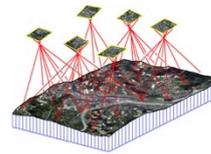
Image Processing

Aerial Triangulation  
and Adjustment

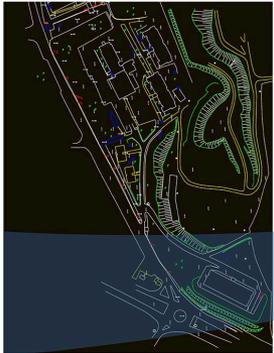
Data Collection

Orthophoto  
Production

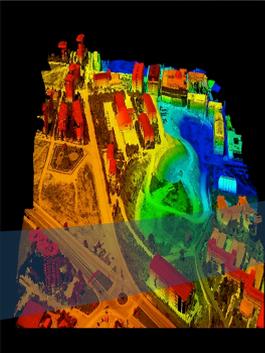
Web Service



ORTOFOTO  
BİLGİ SİSTEMİ



HALİ HAZIR HARİTA



SAYISAL YÜZEY MODELİ



YAKIN KIZILÖTESİ GÖRÜNTÜSÜ  
(NIR)



RENKLİ HAVA GÖRÜNTÜSÜ  
(RGB)

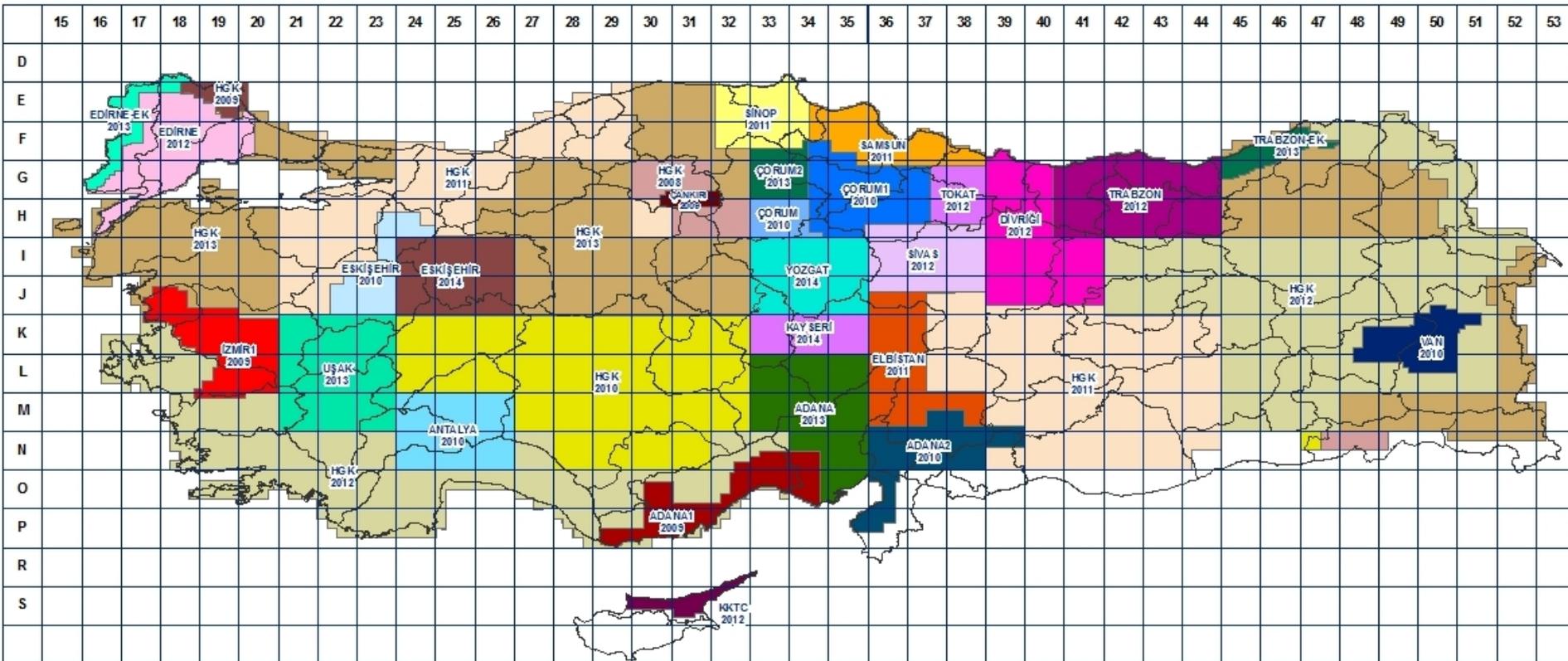


## Aerial Image Acquisition

Aerial photography services for aerial image acquisition are provided by 2 aircrafts equipt with digital aerial camera in GDLRC

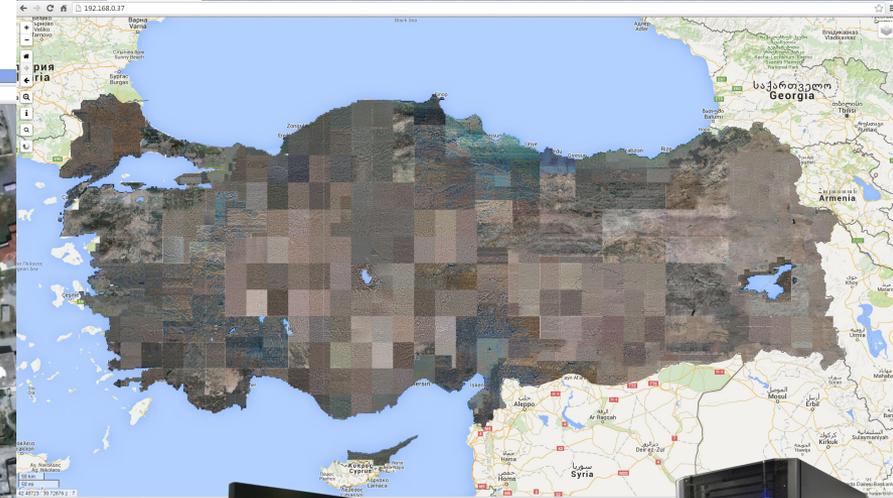
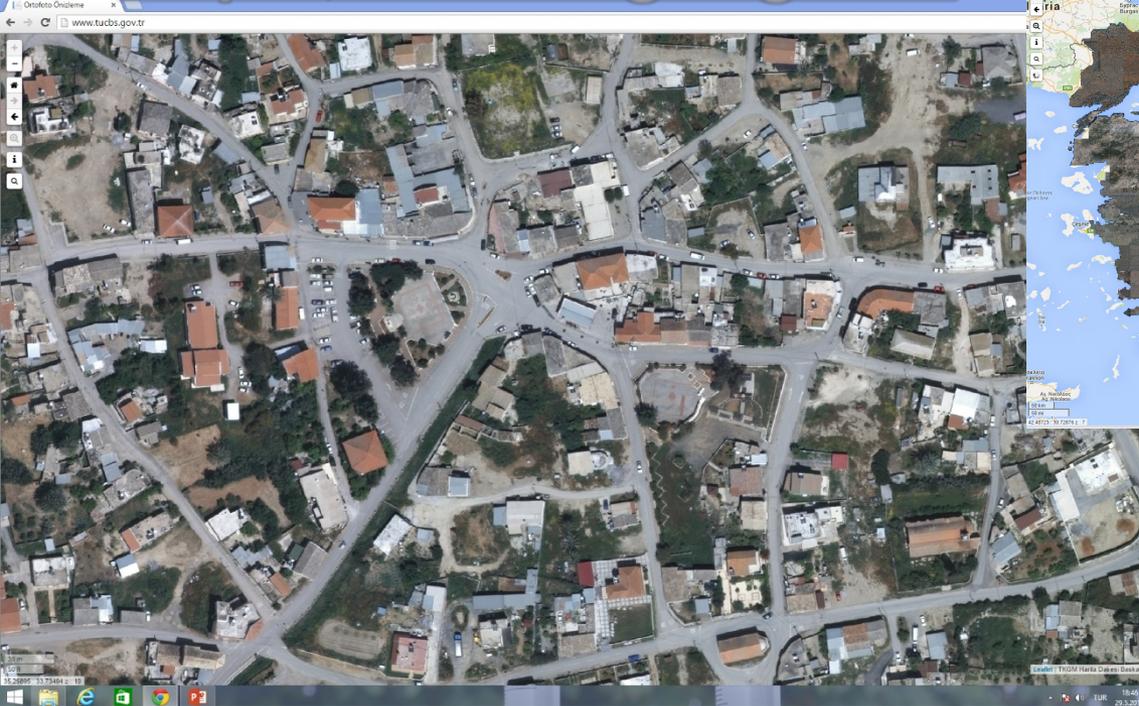


# Orthophoto Map Production Situation 15-30-50 cm GSD



# Orthophoto Maps - Web Services (WMS)

<http://harita.tkgm.gov.tr>



Ortho image – Delivery



1.75 USD / Km<sup>2</sup>

# ORTHOPHOTO PRODUCTION FROM B/W AERIAL ARCHIVE PHOTOGRAPHS

Scanning of aerial photographs taken for the production of 1/5.000 scale ST maps in the 480,000 Km2 area available in the GDLRC archive and the production of B/W Orthophoto using the obtained digital images. It was completed in 2015.



KAYSERİ 2002



KAYSERİ 2011



KAYSERİ 2010



KAYSERİ 2014

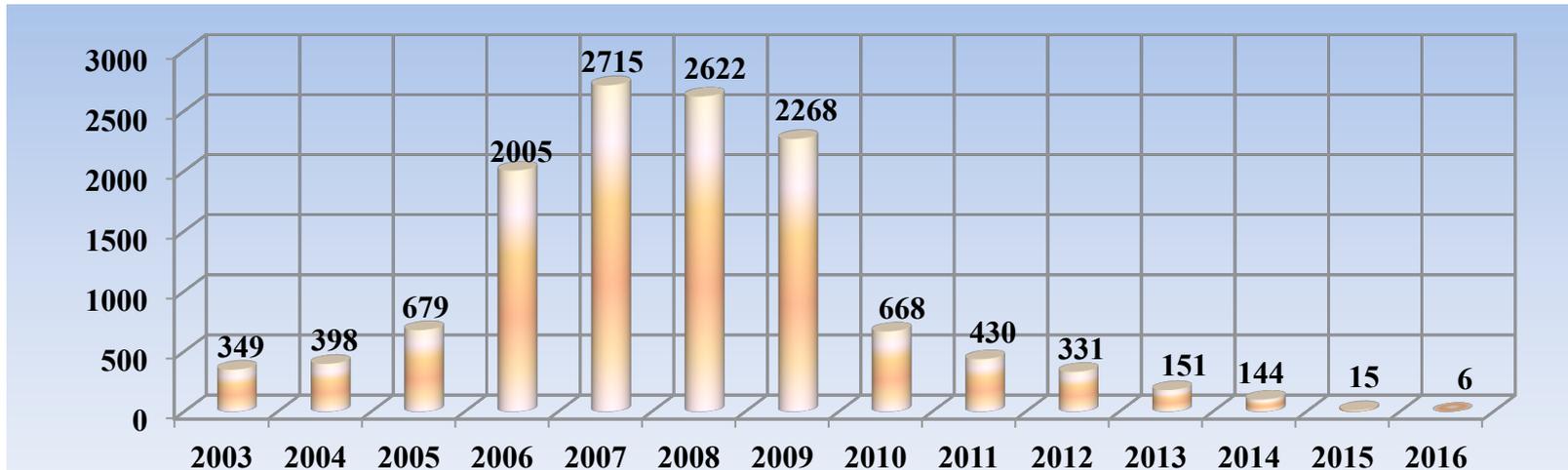
## CADASTRE SERVICES

- First Cadastre is completed
- Cadastre Renovation works in progress
- Forest Cadastre in progress
- Military security zones are measured
- Licenced Cadastre Offices (195)



## INITIAL CADASTRE

| INITIAL CADASTRE OF TURKEY (CURRENT) |                       |               |             |             |
|--------------------------------------|-----------------------|---------------|-------------|-------------|
| TOTAL UNITS                          | COMPLETED BEFORE 2003 | 2003-2015     | IN PROGRESS | PROBLEMATIC |
| <b>52.049</b>                        | <b>38.796</b>         | <b>12.781</b> | <b>107</b>  | <b>365</b>  |



- ARIP PROJECT

## CADASTRAL RENOVATION



### TKMP PROJECT

In 4671 units, 4.808.032 parcels



### REVOLVING FUND RESORCES

In 1190 units 1.229.543 parcels

### TOTAL

In 5861 units 6.037.575 parcels

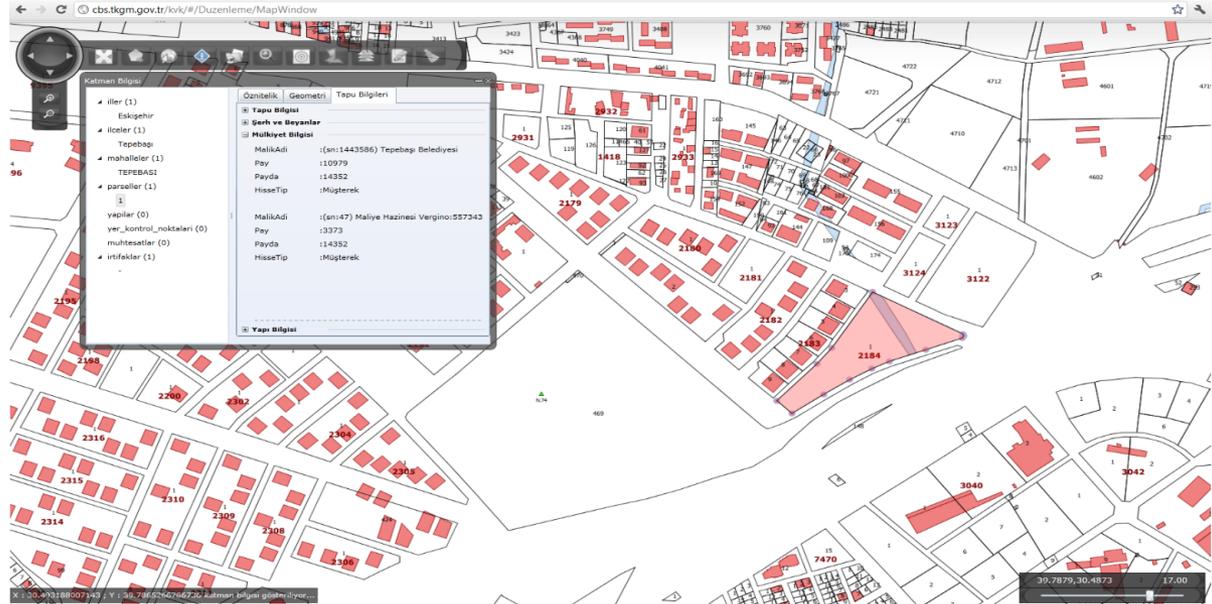


### AF PROJECT

4.6 Millions parcels

# Land Registry and Cadastre Information System-TAKBİS

TAKBİS IS ONE OF THE BASIC E-GOVERNMENT PROJECT AIMING TO TRANSFORM SERVICES OF GDLRC IN TO A UNIQUE DATABASE



# TAKBİS (Land Registry and Cadastre Information System)

cbstkgm.gov.tr/silverlight/anasayfa.aspx — Mekânsal Gayrimenkul Sistemi

Mekânsal Gayrimenkul Sistemi

Apple Türkiye Fan Sitesi

TRT Haber - Türkiye'nin Haber Kaynağı

Bilgi Teknolojileri Dairesi Başkanlığı

kullanıcı : sbakici

Katma

Kişi Sorgulama

Gerçek Kişi Tüzel Kişi

Ad Soyad Baba Adı

T.C. Kimlik No 37756344638 Sorgula

| Kimlik No | Adı      | Soyadı       | Baba Adı | Ana Adı | Doğum Yeri | Doğum Tarihi |
|-----------|----------|--------------|----------|---------|------------|--------------|
| 3344638   | SEDAT    | BAKICI       | LÜTFİ    |         |            |              |
| 3344638   | SEDAT    | BAKICI       | LÜTFİ    | FADİME  | ESKİŞEHİR  | 02/11/1967   |
| İlçe      | Mahalle  | Ada          | Parsel   | Alan    | Cins       |              |
| ESKİŞEHİR | TEPEBAŞI | ZİNCİRLİKUYU | 0        | 4818    | 124,00     | TARLA        |

Detay Ad Detay Adet

Malikler 3

| Malik Tip  | Malik Açıklama  | Hisse | Edinme Sebep       | Edinme Tarihi |
|------------|---|-------|--------------------|---------------|
| GerçekKişi | SEDAT BAKICI : LÜTFİ Oğlu3/8 (İştirak No: 0)          |       | İfraz İşlemi (TSM) | 18/11/2011    |
| GerçekKişi | FADİME BAKICI : HALİL İBRAHİM Kızı2/8 (İştirak No: 0) |       | İfraz İşlemi (TSM) | 18/11/2011    |
| GerçekKişi | HÜLYA KELLEÇİ : LÜTFİ Kızı3/8 (İştirak No: 0)         |       | İfraz İşlemi (TSM) | 18/11/2011    |

Görüntüleniyor... 25

Pafta İndeksleri

Tematik Haritalar

Ortofoto Haritaları

TKGM:Ortofoto

Google Maps

TKGM:Ortofoto

Saydamlık % 75

2 adet katman seçildi.

Kişi Sorgulama Yüklendi

Coğrafi Bilgi Sistemleri Şube Müdürlüğü | TKGM © 2013

Enlem : 39,7843 Boylam : 30,4664 19,00



## E-Gov Applications

Since 06 October 2010, e-Government application of GDLRC has been published and TAKBİS data has been served to citizens via e-Government gateway.  
[www.turkiye.gov.tr](http://www.turkiye.gov.tr)

SEDAT BAKICI Berim Sayfam Profilim Güvenli Çıkış

türkiye.gov.tr

e-Hizmetler Kurumlar Belediyeler İletişim

Hizmet Adı, Anahtar Kelime, Plaka No...

Tapu ve Kadastro Genel Müdürlüğü

Tapu Bilgileri Sorgulama

Hizmet Listesine Geri Dön

Taşınmaz Listesine Dön Yazdır

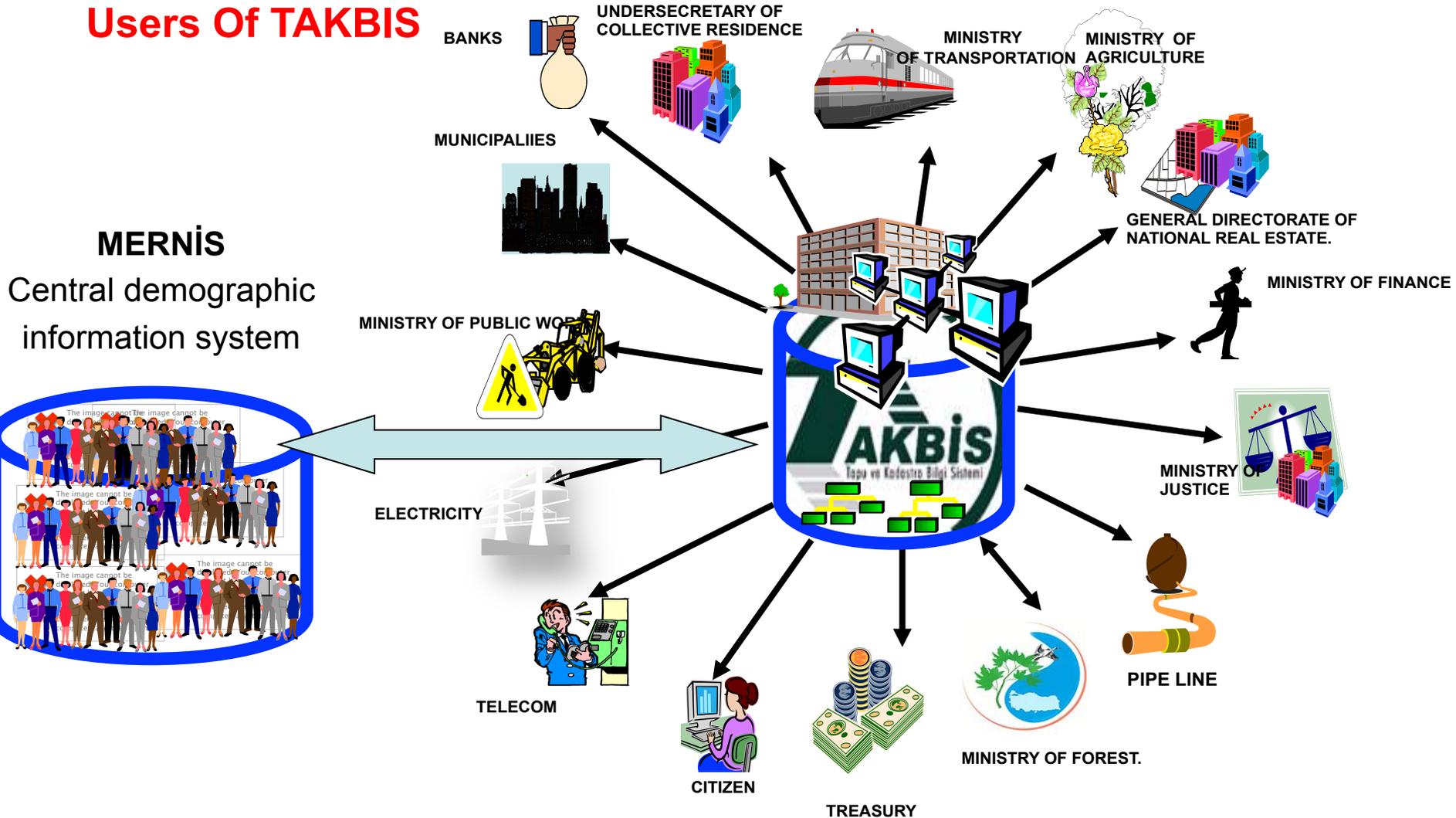
Bu hizmet yalnızca TAKBİS'te T.C. Kimlik Numarası kayıtlı olan kişiler kapsamında sunulmaktadır.

|             |              |                   |       |
|-------------|--------------|-------------------|-------|
| İl          | ESKİŞEHİR    | Yüzölçümü (m2)    | 124   |
| İlçe        | TEPEBAŞI     | Niteligi          | TARLA |
| Mahalle/Köy | ZINCIRLIKUYU | Blok No           |       |
| Ada         | 0            | Giriş             |       |
| Parsel      | 4818         | Kat               |       |
| Cilt No     | 61           | Bağımsız Bölüm No |       |
| Sayfa No    | 6507         | Arsa Pay/Payda    | /     |

⚠️ Taşınmazınız üzerinde bulunan (şerh,beyan,rehin,irtfak hakkı vb.) bilgiler. Detaylar için tıklayınız.

Ayıldız Sk  
Onay Sk  
Erdem Sk  
Panayır Sk  
Mavi Sk  
Dayı Bey Sk  
Eke Sk  
Bahtınur Sk  
Gülerhan Sk  
Ulusal Egemenlik Bv  
Ulusal  
Baklan Sanayi Sitesi  
Baklan Sanayi Sitesi

## Users Of TAKBİS



## E-parcel Inquiry

parselorgu.tkgm.gov.tr

Tapu ve Kadastro Genel Müdürlüğü  
Parsel Sorgulama Uygulaması

İdari Coğrafi Adres Katman

Ankara  
Çankaya  
Öveçler  
7527  
17  
Sorgula

Parsel Bilgileri

Öznitelik Panorama Geometri

|                    |                        |
|--------------------|------------------------|
| Taşınmaz Kimlik No | 226836                 |
| İl                 | Ankara                 |
| İlçe               | Çankaya                |
| Mahalle/Köy        | Öveçler                |
| Ada                | 7527                   |
| Parsel             | 17                     |
| Tapu Alanı         | 1,315.00 m2            |
| Nitelik            | 5 katlı apartman beton |
| Mevkii             | -                      |
| Pafta              | -                      |

47.457809 : 0

ÖZEL HATEM OKULLARI

aras kargo

Projeksiyon

1286/1 Sk. 1286/2 Sk. 1286/3 Sk. 1286/4 Sk. 1286/5 Sk. 1286/6 Sk. 1286/7 Sk. 1286/8 Sk. 1286/9 Sk. 1286/10 Sk. 1286/11 Sk. 1286/12 Sk. 1287/1 Sk. 1287/2 Sk. 1287/3 Sk. 1287/4 Sk. 1287/5 Sk. 1287/6 Sk. 1287/7 Sk. 1287/8 Sk. 1287/9 Sk. 1287/10 Sk. 1287/11 Sk. 1287/12 Sk. 1288/1 Sk. 1288/2 Sk. 1288/3 Sk. 1288/4 Sk. 1288/5 Sk. 1288/6 Sk. 1288/7 Sk. 1288/8 Sk. 1288/9 Sk. 1288/10 Sk. 1288/11 Sk. 1288/12 Sk. 1289/1 Sk. 1289/2 Sk. 1289/3 Sk. 1289/4 Sk. 1289/5 Sk. 1289/6 Sk. 1289/7 Sk. 1289/8 Sk. 1289/9 Sk. 1289/10 Sk. 1289/11 Sk. 1289/12 Sk. 1290/1 Sk. 1290/2 Sk. 1290/3 Sk. 1290/4 Sk. 1290/5 Sk. 1290/6 Sk. 1290/7 Sk. 1290/8 Sk. 1290/9 Sk. 1290/10 Sk. 1290/11 Sk. 1290/12 Sk. 1291/1 Sk. 1291/2 Sk. 1291/3 Sk. 1291/4 Sk. 1291/5 Sk. 1291/6 Sk. 1291/7 Sk. 1291/8 Sk. 1291/9 Sk. 1291/10 Sk. 1291/11 Sk. 1291/12 Sk. 1292/1 Sk. 1292/2 Sk. 1292/3 Sk. 1292/4 Sk. 1292/5 Sk. 1292/6 Sk. 1292/7 Sk. 1292/8 Sk. 1292/9 Sk. 1292/10 Sk. 1292/11 Sk. 1292/12 Sk. 1293/1 Sk. 1293/2 Sk. 1293/3 Sk. 1293/4 Sk. 1293/5 Sk. 1293/6 Sk. 1293/7 Sk. 1293/8 Sk. 1293/9 Sk. 1293/10 Sk. 1293/11 Sk. 1293/12 Sk. 1294/1 Sk. 1294/2 Sk. 1294/3 Sk. 1294/4 Sk. 1294/5 Sk. 1294/6 Sk. 1294/7 Sk. 1294/8 Sk. 1294/9 Sk. 1294/10 Sk. 1294/11 Sk. 1294/12 Sk. 1295/1 Sk. 1295/2 Sk. 1295/3 Sk. 1295/4 Sk. 1295/5 Sk. 1295/6 Sk. 1295/7 Sk. 1295/8 Sk. 1295/9 Sk. 1295/10 Sk. 1295/11 Sk. 1295/12 Sk. 1296/1 Sk. 1296/2 Sk. 1296/3 Sk. 1296/4 Sk. 1296/5 Sk. 1296/6 Sk. 1296/7 Sk. 1296/8 Sk. 1296/9 Sk. 1296/10 Sk. 1296/11 Sk. 1296/12 Sk. 1297/1 Sk. 1297/2 Sk. 1297/3 Sk. 1297/4 Sk. 1297/5 Sk. 1297/6 Sk. 1297/7 Sk. 1297/8 Sk. 1297/9 Sk. 1297/10 Sk. 1297/11 Sk. 1297/12 Sk. 1298/1 Sk. 1298/2 Sk. 1298/3 Sk. 1298/4 Sk. 1298/5 Sk. 1298/6 Sk. 1298/7 Sk. 1298/8 Sk. 1298/9 Sk. 1298/10 Sk. 1298/11 Sk. 1298/12 Sk. 1299/1 Sk. 1299/2 Sk. 1299/3 Sk. 1299/4 Sk. 1299/5 Sk. 1299/6 Sk. 1299/7 Sk. 1299/8 Sk. 1299/9 Sk. 1299/10 Sk. 1299/11 Sk. 1299/12 Sk. 1300/1 Sk. 1300/2 Sk. 1300/3 Sk. 1300/4 Sk. 1300/5 Sk. 1300/6 Sk. 1300/7 Sk. 1300/8 Sk. 1300/9 Sk. 1300/10 Sk. 1300/11 Sk. 1300/12

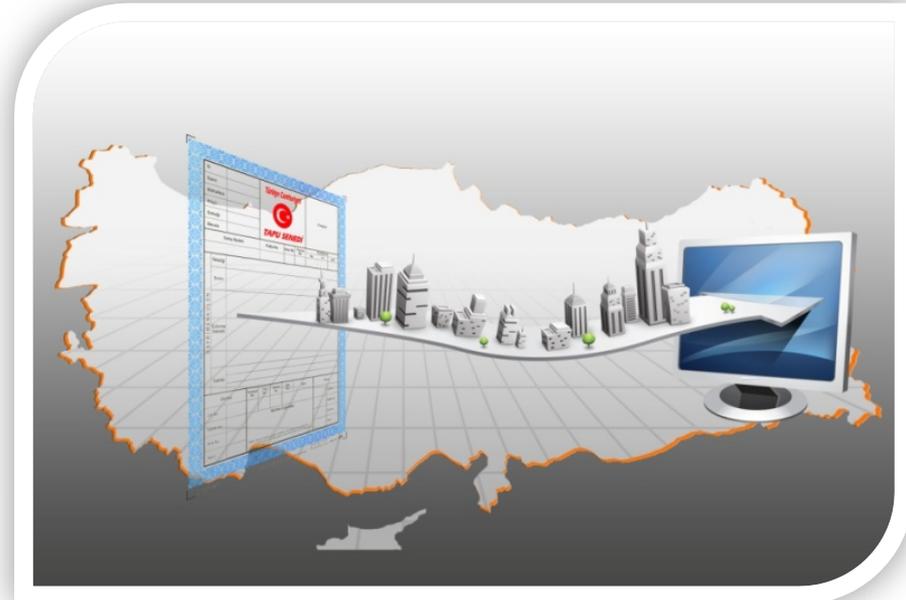
Pelops Spor Klübü  
Kayra Grup  
Tema Koleji  
EPSILON İŞ MERKEZİ  
Sistem Vending  
eray teknoloji a.ş.

Apple Android

cbs.tkgm.gov.tr

## LAND REGISTRY SERVICES

- Legal bases from **Turkish Constitution** and **Civil Code**
- Land Registry is under **state guaranty** without any excuse
- **8.3 Millions** transactions at **2106**

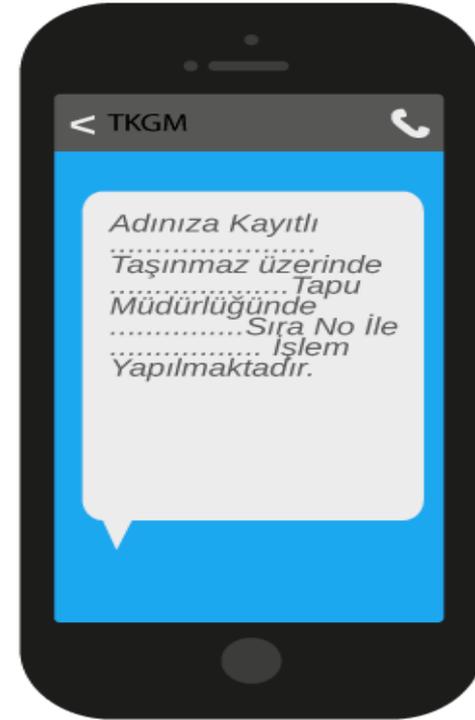


## E-Appointment and KIOSKS

<https://randevu.tkgm.gov.tr>



## Notice With SMS

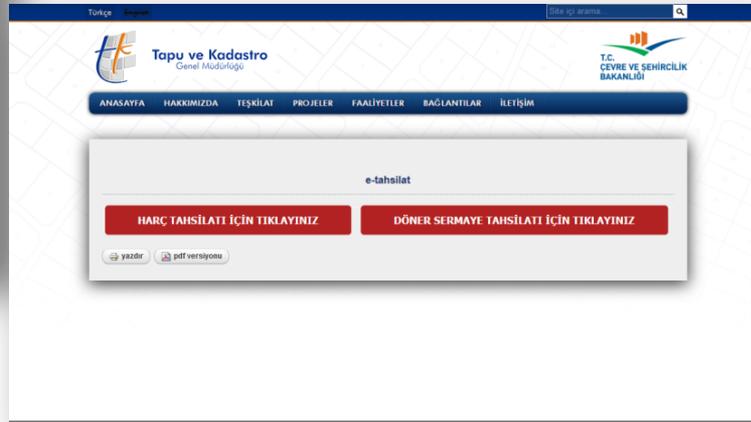


## E-removal of Mortgage

Ziraat Bankası, İş Bankası , Akbank



## E-Payment of Fees



## Exchange Bank Applicaton



**Tapu ve Kadastro**  
Genel Müdürlüğü

Takasbank

**Gayrimenkul Alışverişleriniz Artık Güvende**



Gayrimenkul alışverişinde yaşanan güven problemi, sahte para, hırsızlık ve dolandırıcılık riskleri artık tarihe karışıyor.

TapuTakas uygulaması sayesinde, alıcılar ve satıcılar güvenli bir ortamda alım satım bedeli ödeme işlemlerini gerçekleştirebilecekler.

- İşlemlere dair anlık SMS bildirimleri
- Parada sahteciliğe karşı koruma
- Risksiz ve güvenli ortamda ödeme
- Güvenilir ödeme altyapısı

Detaylı Bilgi ve İşlemler İçin:  
[www.taputakas.com.tr](http://www.taputakas.com.tr)



## Land Registry Transactions Outside the Jurisdiction Area and Abroad

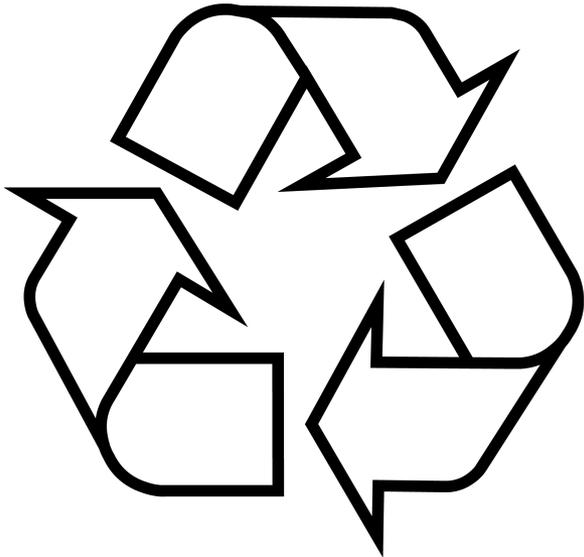
- Doing Land Registry Transaction from **every LR office**
- Doing Land Registry Transaction in Turkish Embassy in **Berlin-Germany ...**



## REVOLVING FUND

- Active since 1992
- Cost recovery ...
- Main purpose is;

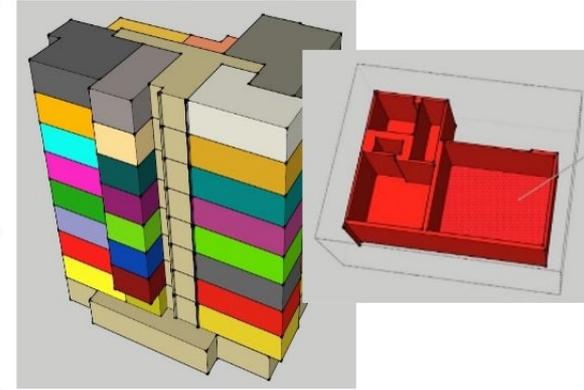
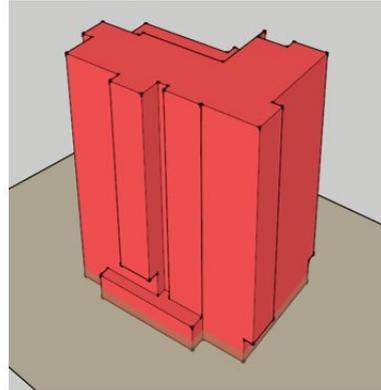
To collect fee from the land registry and cadastre services, to make expenditures for the services in line with the annual demands and needs of the Institution.



## NEAR FUTURE PLANS



- 3D City Models
- 3D Cadastre
- Improve TAKBIS





**Let's meet in  
Istanbul**

**6-11 May 2018, Istanbul, Turkiye**  
[www.fig.net/fig2018](http://www.fig.net/fig2018)

**SEDAT BAKICI**  
**Head of Geoinformatics Department**

 : sbakici@tkgm.gov.tr

 : +90.532.6978521

 : +90.312.4631050

 : 39°.8562, 32°.8465

***THANK YOU ...***