

2-way Voice and Data Communications Over LEO Satellites



Baris DINC
MoEP / TAMSAT
December 2023



Amateur Satellite Organisation
Turkiye

Content

- Who am I / who are we ?
- A brief history
- What is required ? How we do it ? Is it expensive ?
- Activities and the fun we had on satellites
- What's next ?



TAMSAT

Amateur Satellite Organisation
Turkiye

Who are we ? (founding declaration of TAMSAT/MoEP)

Dear Radio Amateurs, esteemed Academicians, Students, Private Sector and Public Institutions Researchers Conducting R&D Studies in the Field of Space Science and Technology, dear young people, who first remember the words "The future is in the skies";

Today; Our country is one step closer to Space; March 25, 2010 is the day TAMSAT – Amateur Satellite Technologies Association was founded, but we have a long road of hundreds of steps ahead of us.

Our association will provide research, development, application and training services regarding the project design, production and operation of amateur, scientific and similar satellites in our country; To present the projects it has carried out to the service of radio and radio amateurs and related users for amateur and scientific use, and to organize trainings and seminars to increase the number of young people with this knowledge and skills, to create research and development areas for the young people of our country on common issues of developing and widespread information technologies and amateur satellite systems. was established to ensure coordination and cooperation with national and international regulatory organizations when necessary.

The achievement of this structure, the foundation of which was laid today, to its intended goals will accelerate with your contribution and support. We would like to see among us everyone who is interested in this subject, who is passionate about it, and who can spare some amateur time.

We wholeheartedly believe that, with your support, TAMSAT will achieve many successes in this newly opened horizon in our country.

“ALL TOGETHER FOR SUCCESS”

Regards,A.Tahir DENGİZ, TA2T (SK)

Chairman of the Executive Board

2010



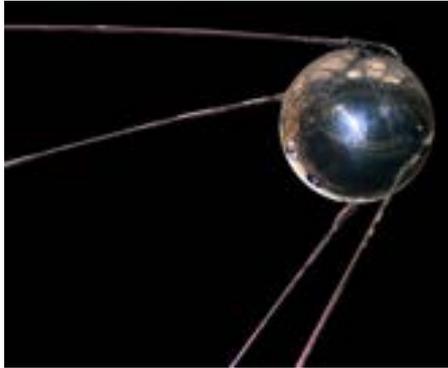
Radio Amateurs

it's not all about money

It's the hobby that takes you to your SPACE.....

Hi-story

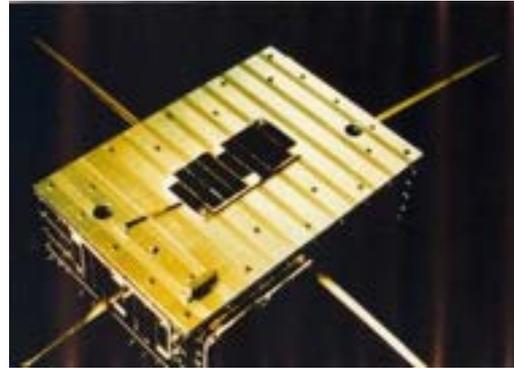
OSCAR : **O**rbiting **S**atellite **C**arrying **A**mateur **R**adio



SPUTNIK 1957

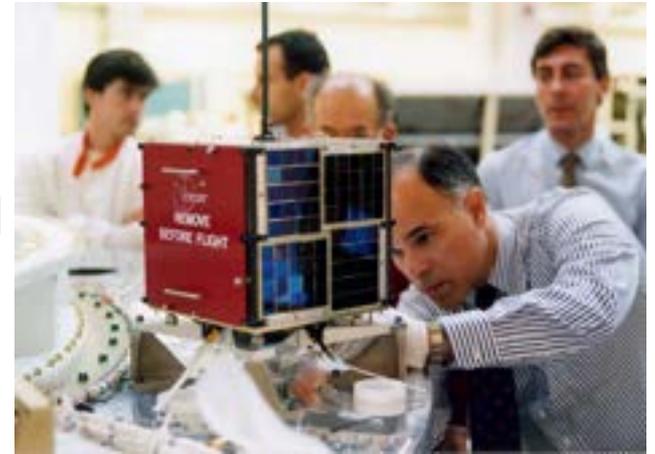


OSCAR-1 1961



OSCAR-3 1965

Launches (past and current)			
Name	Status	Launched	Country
OSCAR (OSCAR 1)	Decayed	1961-12-12	United States
OSCAR II (OSCAR 2)	Decayed	1962-06-02	United States
OSCAR III (OSCAR 3, EGRS-3)	Non-Operational	1965-03-09	United States
OSCAR IV (OSCAR 4)	Decayed	1965-12-21	United States
Australis-OSCAR 5 (OSCAR 5, AO-5, AO-A)	Non-Operational	1970-01-23	Australia
AMSAT-OSCAR 6 (OSCAR 6, AO-6, AO-C, P2A)	Non-Operational	1972-10-15	United States
AMSAT-OSCAR 7 (OSCAR 7, AO-7, AO-B, P2B)	Non-Operational	1974-11-15	United States
AMSAT-OSCAR 8 (OSCAR 8, AO-8, AO-D, P2D)	Non-Operational	1978-03-05	United States
Radio Sputnik 1 (RadioSkaat-1, RS-1)	Non-Operational	1978-10-26	Soviet Union
Radio Sputnik 2 (RadioSkaat-2, RS-2)	Non-Operational	1979-10-26	Soviet Union
UoSat-OSCAR 9 (UOSAT 1, UO-9)	Decayed	1981-10-06	United Kingdom
Radio Sputnika RS3 through RS5	Non-Operational	1981-12-17	Soviet Union
AMSAT-OSCAR 10 (Phase 3B, AO-10, P3B)	Non-Operational	1983-06-16	United States West Germany



What we need

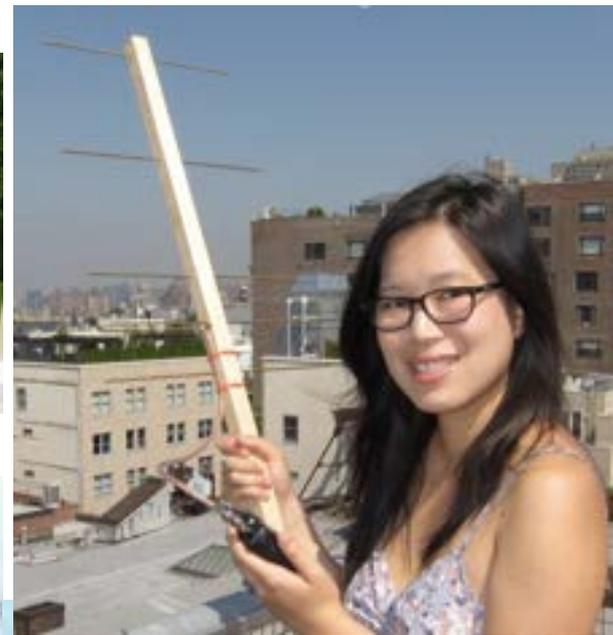


A \$20 handheld transceiver

For better and reliable communications

- A good antenna
- Antenna rotator to follow LEO sats
- Antenna Controller Software
- Doppler Controller Software
- Radio (legacy or SDR)
- Amplifiers/preamplifiers

The Antenna



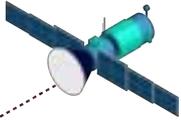
Sometimes,
We go beyond mobility!



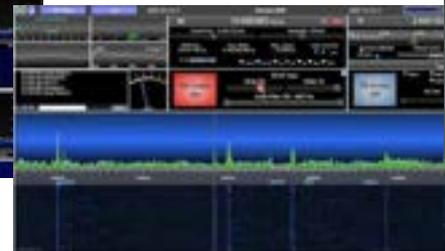
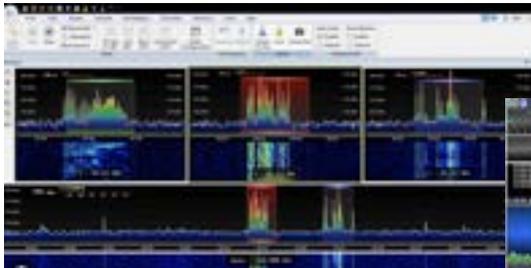
The size of antenna matters



The Radio/Transceiver



FM
SSB
Digital (DMS,D-STAR,Fusion)
A/G/M FSK
QPSK
ATV/DATV (DVB-S)



SDR Software

The Station



DL2IE Ismail Erdogan

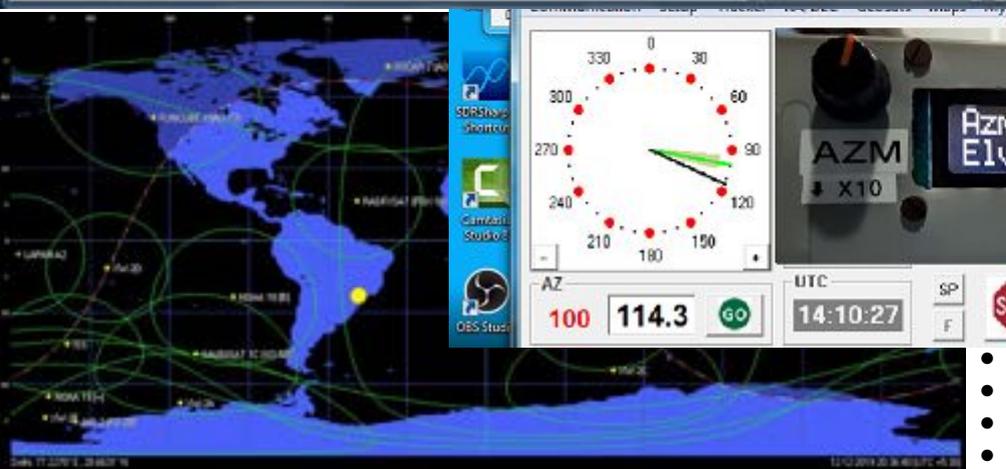
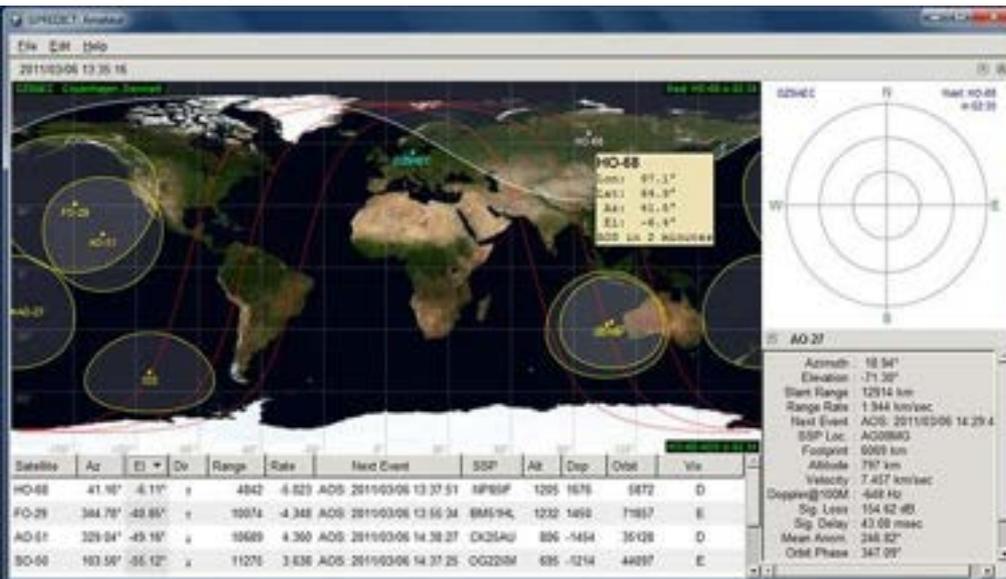


TA7W / OH2UDS Baris Dinc



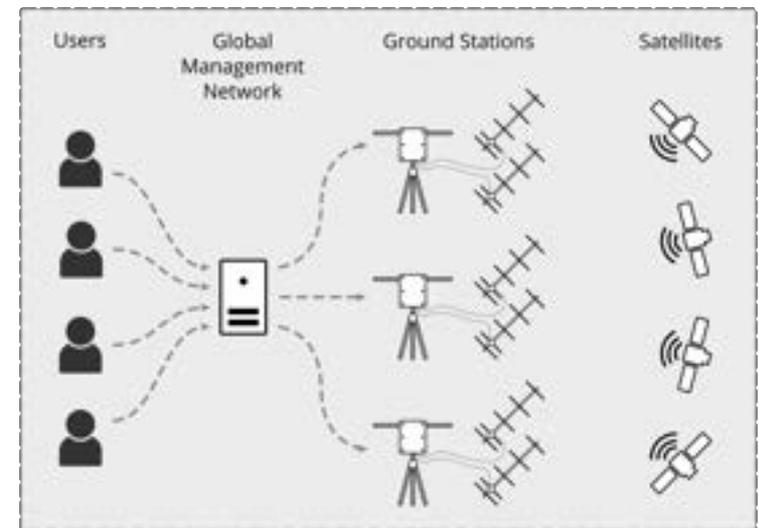
The Software

- Visualisation
- Satellite/Transponder Information
- Antenna control / tracking
- Radio Doppler control



- GPredict
- Orbitron
- PCSat
- PSTRotator
- SatPC32
- HSModem
- SDRSharp
- GNURadio
- SDRConsole
- SDRAngel
- SDRPlay
- SatNogs

The Networks



Currently most Active Satellites

AO-7	(Phase-2B)	CO-55	(CUTE-I)	CubeBug-2	(LO-74)	CAS-3G	(DCBB,KAITUO-1B)
AO-7	(Phase-2B)	CO-57	(XI-IV)	AO-73	(FUNcube-1)	CAS-3H	(LilacSat-2)
UO-11	(UoSAT-2)	CO-58	(XI-V)	BugSat-1		AAUSAT-4	
AO-27	(EYESAT-A)	CO-65	(CUTE1.7+APDII)	TigriSat		CAS-2T	
FO-29	(JAS-2)	STARS	(KUKAI mother)	CAS-3A	(XW-2A)	AISTECHSAT-2	
GO-32	(TechSat-1B)	STARS	(KUKAI daughter)	CAS-3B	(XW-2B)	UWE-4	
ISS		HO-68	(XW-1,CAS-1)	CAS-3C	(XW-2C)	CAPE-3	
ISS		STRaND-1		CAS-3D	(XW-2D)	UVSQ-Sat	
NO-44	(PCSAT-1)	Triton-1		CAS-3E	(XW-2E)	Z-Sat	
SO-50	(SaudiSat-1c)	GOMX-1		CAS-3F	(XW-2F)		

QO-100 Es'Hail-2 SAT

<https://www.amsat.org/two-way-satellites/>

ISS - Astronaut Contact



TEŞEKKÜR BELGESİ

AMATÖR UYDU TEKNOLOJİLERİ DERNEĞİ (TAMSAT)

Meteoroloji Genel Müdürlüğü organizasyonunda Uluslararası Uzay İstasyonundan astronot Victor J. Glover ile 09 Aralık 2020 tarihinde başarılı şekilde gerçekleştirilen amatör telex görüşmesine desteklerinizden dolayı teşekkür eder, başarılarınızın devamını dilerim.

Dr. Bekir FAKDEMİRLİ
Tarih ve Coğrafya Bakanı

Cubesat Training





FOX HUNT CERTIFICATE
Roland Zurmely
PY4ZBZ

Thank you for your participation in our Fox Hunt Event, which we held on the 15-16th satellite on May 15-16, 2021.

24 TEMMUZ 2021
Toplam Kayıt: 44
Toplam Puan: 1000

Özge Akar Proje
www.ozgeakarproje.org



ETKİNLİK SERTİFİKASI
Belge Sahibi
Serpil HACIMUSALAR
TB3HCI

15-16 Mayıs 2021'de QO-100 uydusu üzerinden gerçekleştirildiğimiz Tünel Açı (Fox Hunt) etkinliğimize katılmadan dolayı teşekkür ederiz.

24 TEMMUZ 2021
Toplam Kayıt: 44
Toplam Puan: 1000

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FOX HUNT CERTIFICATE
Florian Wolters
DF2ET

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24 TEMMUZ 2021
Toplam Kayıt: 44
Toplam Puan: 1000

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FOX HUNT CERTIFICATE
Marcin Pilinczuk
SP3-32

Thank you for your participation in our Fox Hunt Event on May 15-16.

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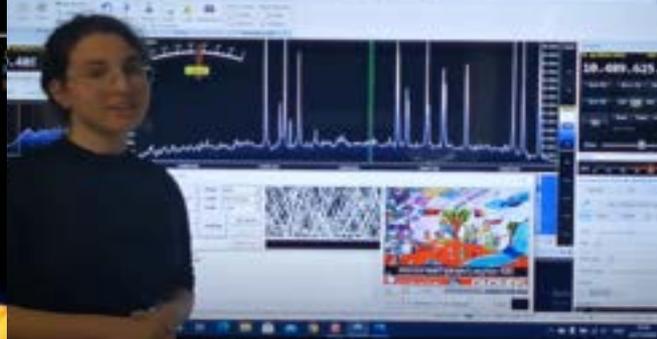


FOX HUNT CERTIFICATE
Lieven Hollevoet
ON8HZ

Thank you for your participation in our Fox Hunt Event on May 15-16.

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www.ozgeakarproje.org



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Özge Akar Proje
www.ozgeakarproje.org

Virtual Mars Missions and Video Messages over Satellites



MARS on EARTH PROJECT (MoEP)

VIRTUAL MARS MISSION DEEP SPACE NETWORK

www.marsonearthproject.org

BURAK-1 MISSION MISSION INSTRUCTIONS

Video Mail Transmission Start
(From Earth to Mars)

Arrival Time of the Signal to Mars
(Time Delay: 14 Minute)

Resolution/Video Duration
1080p-60 Second

Thanks to all the radio amateurs
who supported this educational work.



SYNC

RC-LOCK

+ -0.01

ACTIVE

From: **OH2CAV** [Finland-Virtual Deep Space Network Station]
To: **DL2IE** [Deutschland-Virtual Mars-Satellite Ground Station]



QO 100 satellite

We meet on satellite every Sunday...

Frequency

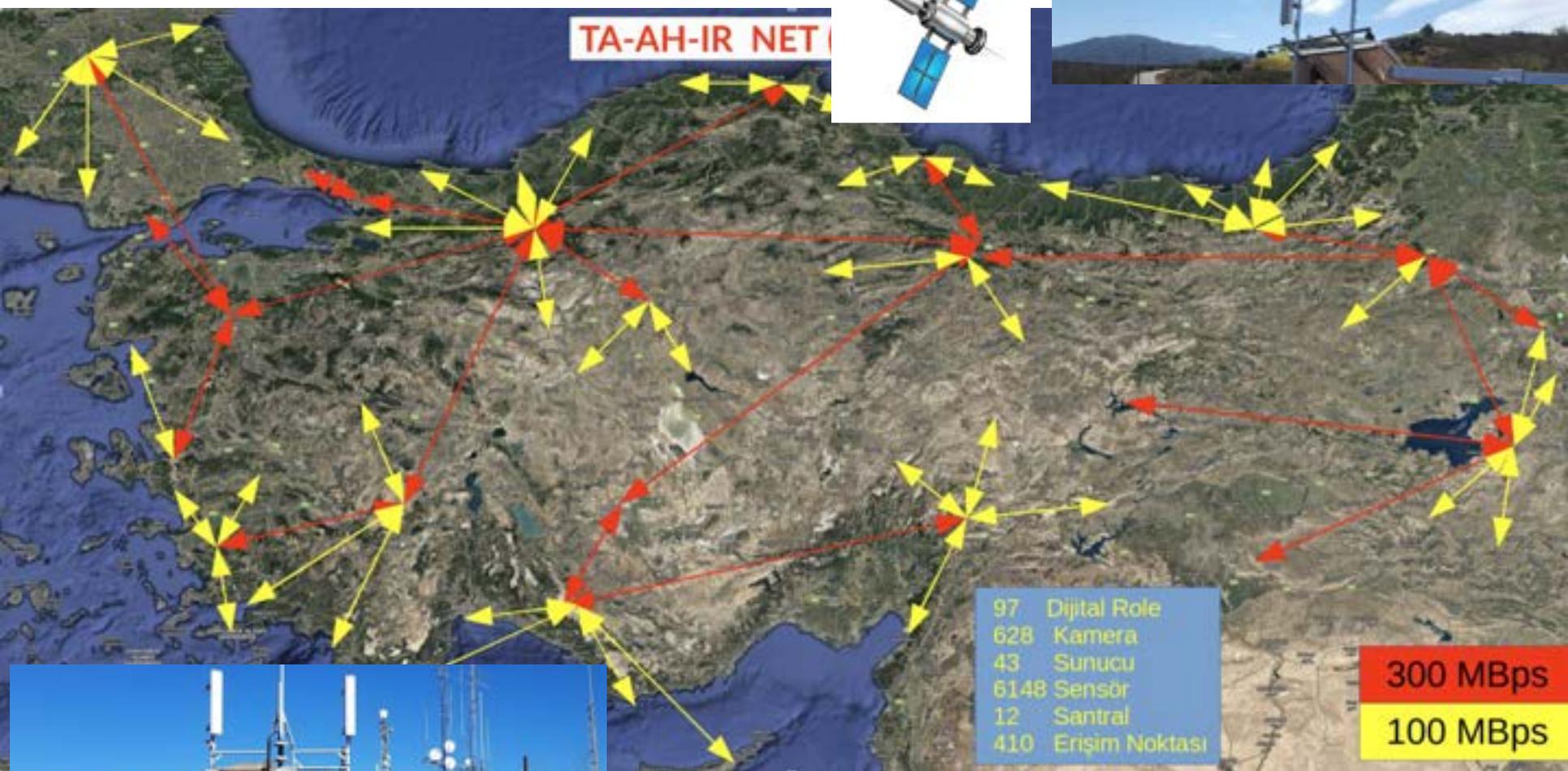
10.489.777.000 MHz

her pazar TSİ : 21:00

Important Note:

Turkiye is one of the few countries that 2.4 GHz band is not an HamRadio band in ITU/IARU countries

What Next ?



A historical photograph showing Mustafa Kemal Atatürk and other leaders looking upwards with a sense of hope and determination. A large Turkish flag is prominently displayed in the foreground, partially obscuring the lower part of the scene. The background is dark, making the figures and the flag stand out.

“İstikbal Göklerde-dir”

K.ATATÜRK