



# TELSİZ İLE VERİ İLETİŞİMİ

BARIŞ DİNÇ (TA7W)

MART 2018

<http://www.barisdinc.com.tr>

# SUNU AKIŞI

- BARIŞ DİNÇ (TA7W) KİMDİR?
- TELSİZ CİHAZLARI KULLANILARAK VERİ AKTARIMI NASIL YAPILIR ?
- SAYISAL MODÜLASYONLAR, FSK/AFSK NEDİR ?
- AX25 NEDİR ?
- PAKET RADYO NEDİR ?
- APRS NEDİR ?
- APRS TELEFON VE PC UYGULAMALARI
- PROCELERİMİZ :)

# BARIŞ DİNÇ (TA7W) KİMDİR ?

Bařiš Dinç; 1974 yılında Trabzon'da dünyaya geldi. 1996 yılında Ankara Üniversitesi Elektronik Mühendisliği bölümünden mezun oldu. Yurt içi ve yurt dışındaki şirketlerde çalışıktan sonra 2000 yılında HAVELSAN A.Ş' de çalışmaya başladı. Başta e-devlet projeleri olmak üzere pek çok projede (UYAP Ulusal Yargı Ağrı Projesi I/II, Yüksek Seçim Kurulu SEÇSİS Projesi, Yargıtay Otomasyonu Projesi, TAKBİS Tapu ve Kadastro projesi, Adli Sicil Otomasyon Projesi, Havadan Erken İkaz Uçağı - Bařiš Kartalı Projesi, MOBESE Sistemleri, TEİAŞ Enerji Piyasası Projeleri, Şehir ve Sınır Güvenliği Projeleri, vb. ) sistem mimarı ve sistem mühendisi olarak görev yaptıktan sonra 2014 yılından bu yana Hava Trafik Kontrol Haberleşme sistemleri ve Deniz Savaş Haberleşme Sistemleri konusunda ONUR A.Ş.'de Mühendislik Yöneticisi olarak görev yapmaktadır.

Elektronik Mühendisliği, Enformatik, Astronomi ve Uzay Bilimleri konularında yüksek lisansına devam etmiştir. İlgi alanları kablosuz iletişim, radyo amatörlüğü, küp uydular, radyo astronomi ve benzeri teknoloji temelli alanlardır. Türkiye'de uydu ve uzay teknolojilerinin gençlere sevdirilmesi, uydu/uzay deneylerinin planlanması ve gerçekleşmesi, yerli uydu bileşenlerinin tasarlanması ve imal edilmesi konularında faaliyet gösteren TAMSAT Amatör Uydu Teknolojileri Derneği'nin Teknik Başkan Yardımcılığını yürütmektedir.

Dernek faaliyetleri kapsamında tamamlanmış ve uzaya gönderilmiş bileşenlerin tasarımını, imalatını ve testlerini yürütmüştür.

Amatör telsizcilik hobisi ile çocukluk yaşlarında tanışmış ve 1989 yılında lisanslı A-Sınıfı Amatör Telsizcilik yapmaya başlamıştır







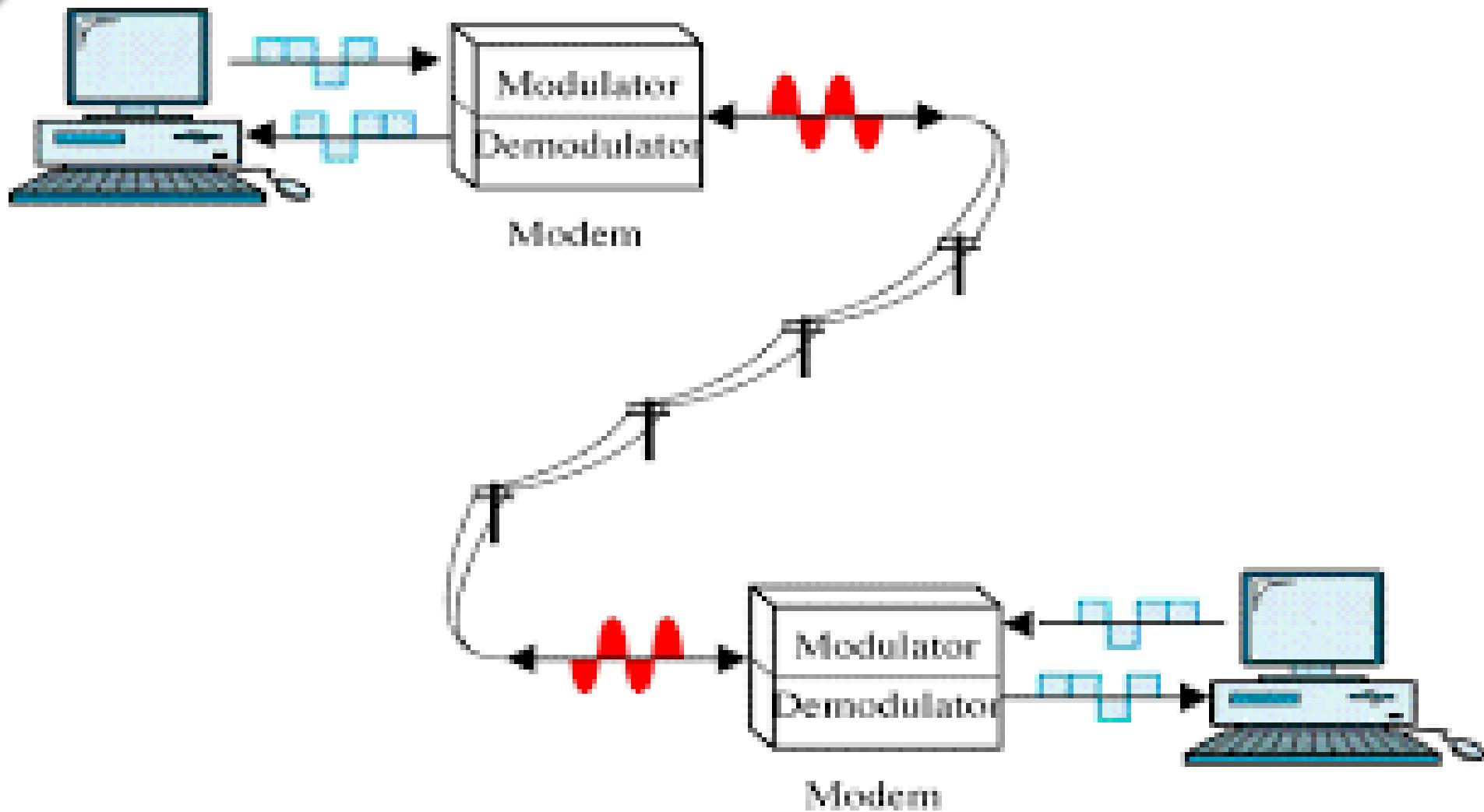
## GÜNCEL PROJELER

- TAMSAT OnBoardComputer
- TAMSAT Software Defined Transponder
- ASELSAN 4800/4900 Modernizasyon
- Earth-Moon-Earth (1.2GHz, 2.4GHz, 5.7GHz, ve 10 GHz)
- HAM-MESH NET (2.4/5.8 GHz)

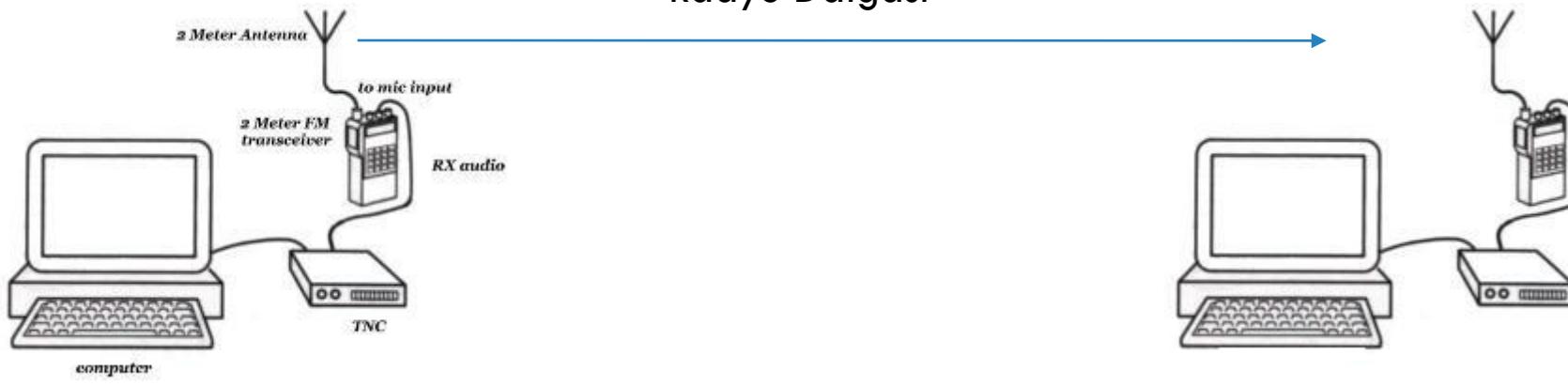
# VERİ İLETİŞİMİ NEDİR ?



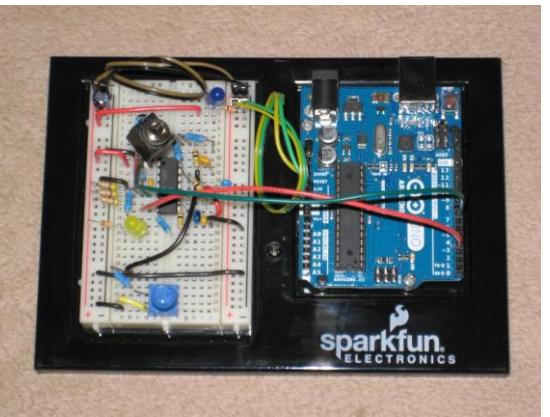
## MODEM NEDİR ?



## Radyo Dalgası



## ÇESİTLİ MODEMLER

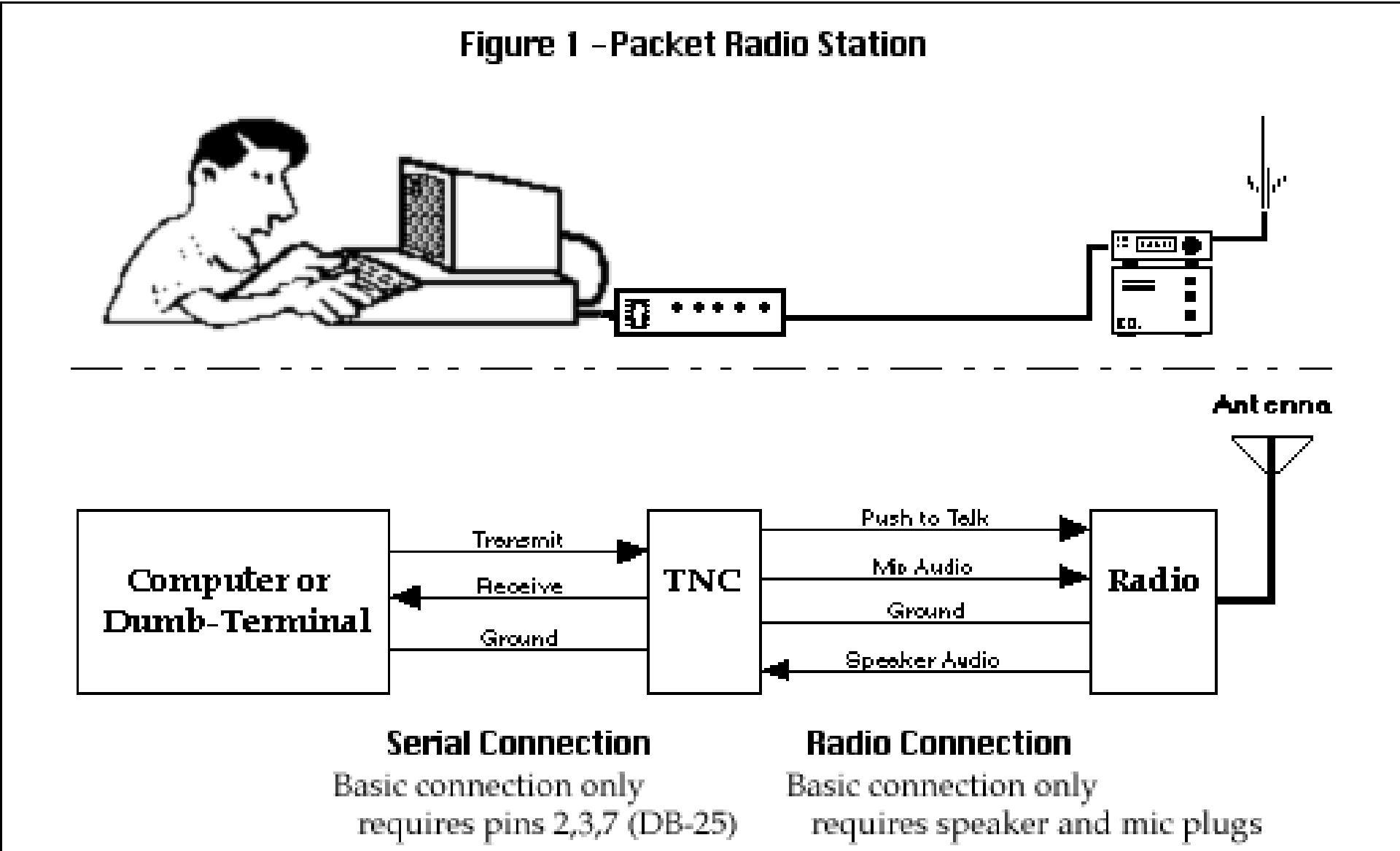


## BİR ANTRAK KLASİĞİ

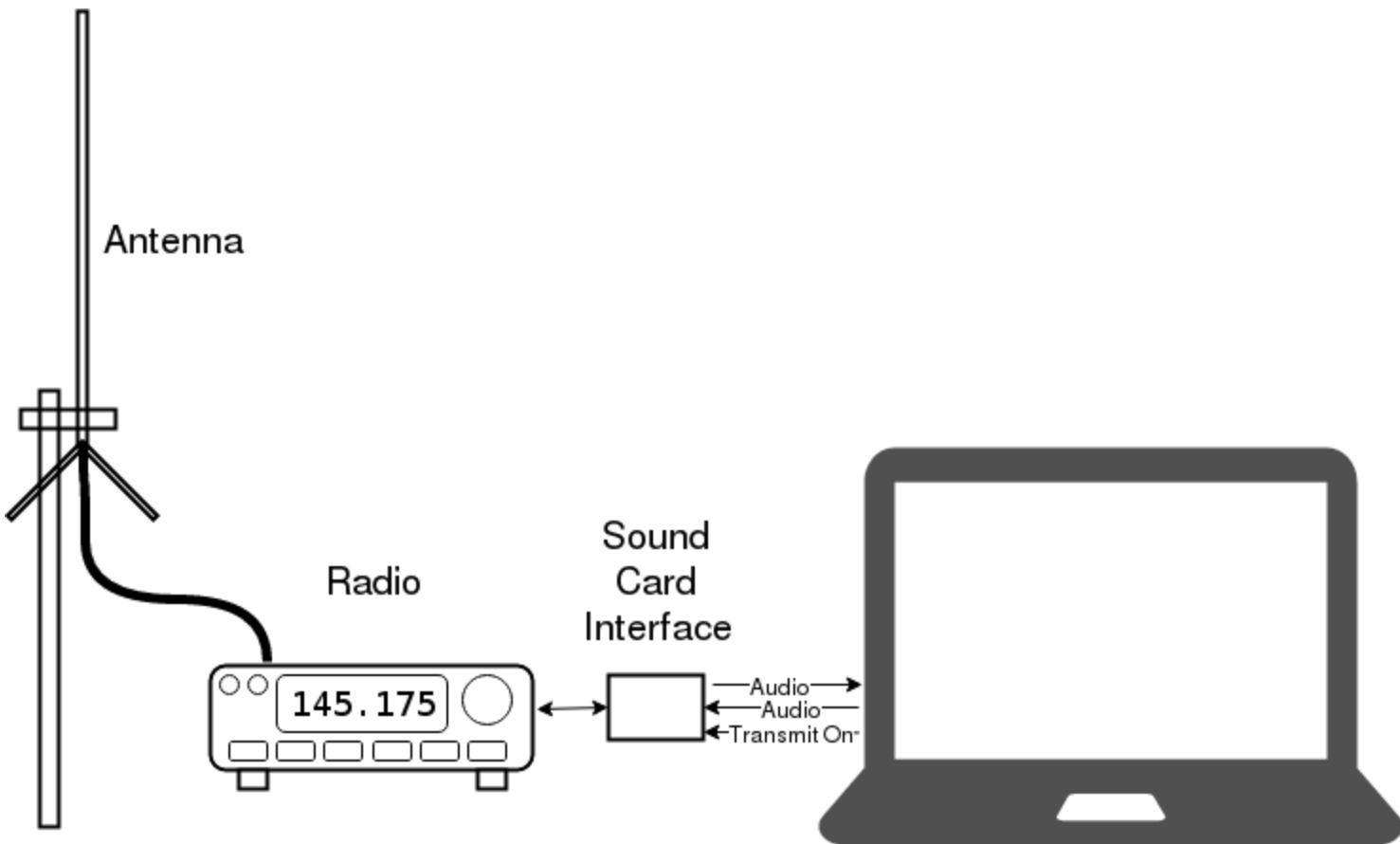


ANTRAK HF/VHF MODEM (YIL 199X)

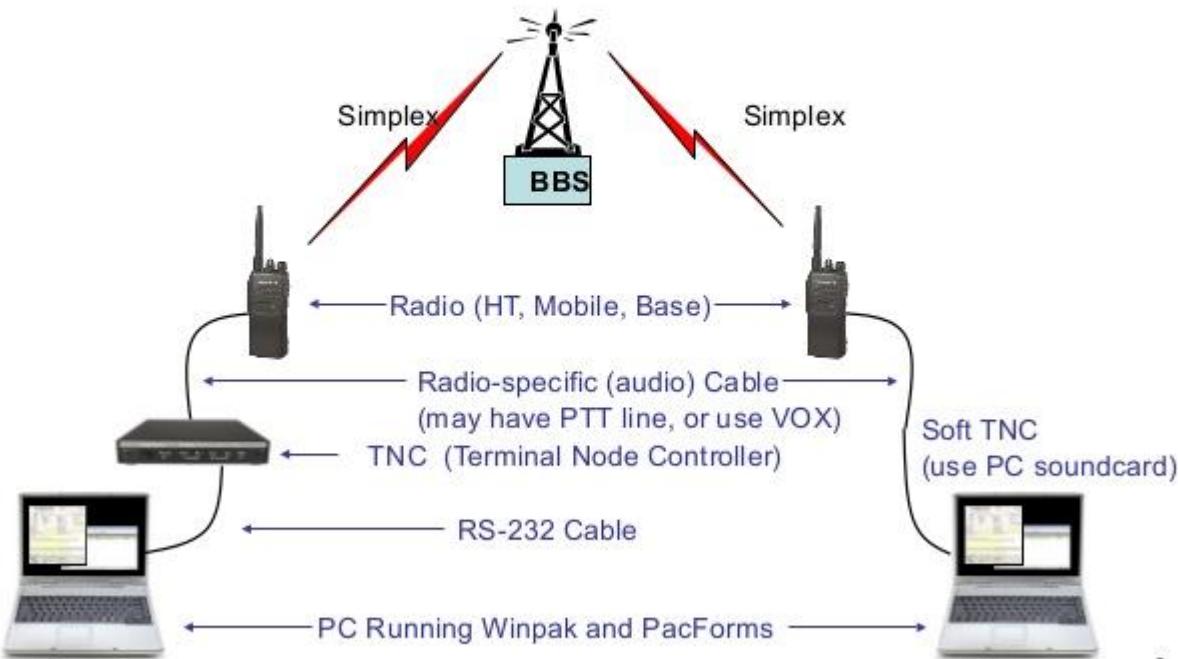
**Figure 1 - Packet Radio Station**



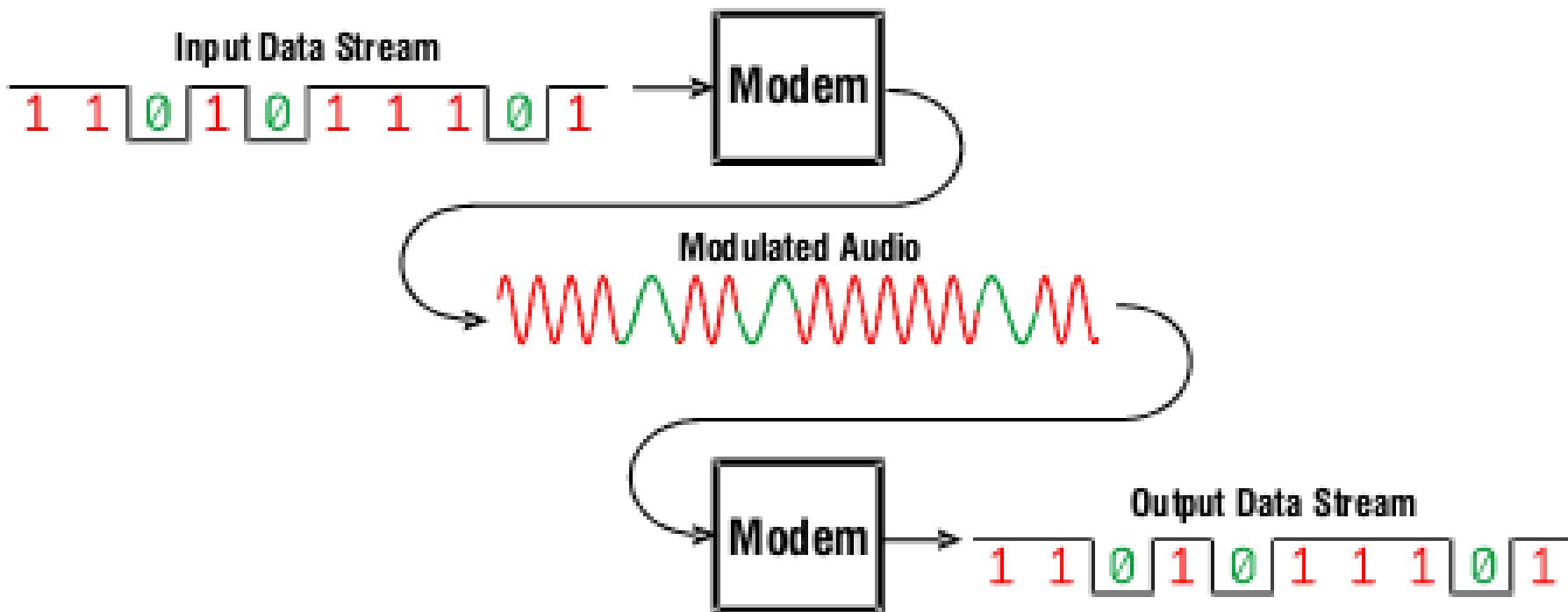
## SOUND MODEM



# Typical Packet Stations



## SAYISAL ILETİSİM



## Sayısal Modulasyonlar

### Analog Modulasyonlar

CW  
AM  
FM  
SSB

### DEGISKENLERIMIZ :

- Frekans
- Genlik
- Faz

OOK  
FSK  
PSK  
MSK  
[AFSK]  
GFSK  
GMSK  
QAM  
QFSK  
QPSK

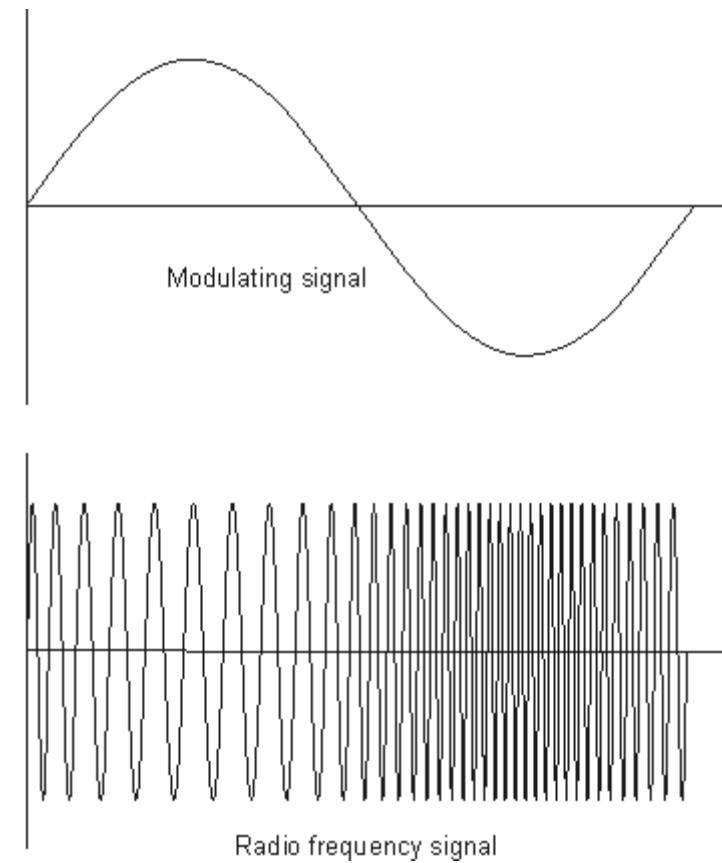
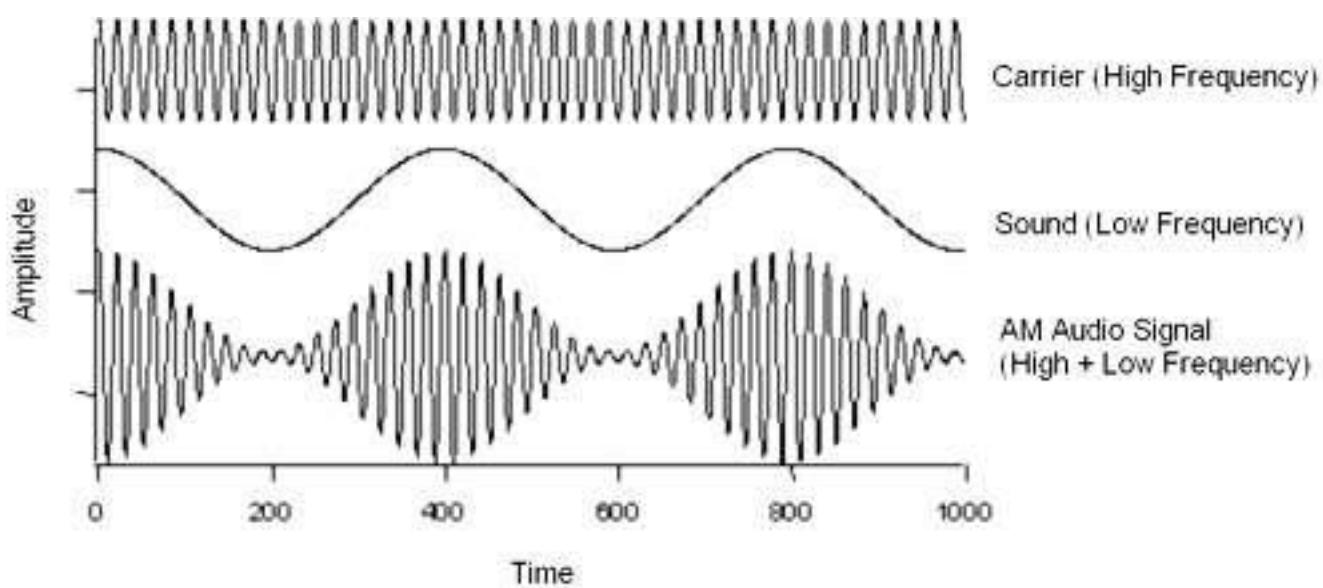
### Pratik Kullanımda

Mode Name	Speeds Supported
Morse Code / CW	5 - 50 words-per-minute
PSK	31, 63, 63F, 125, 250, 500, 1000
FSQ	2, 3, 4.5, 6
IFKP	0.5, 1.0, 2.0
Contestia	4/125, 4/250, 8/250, 4/500, 8/500, 16/500, 8/1000, 16/1000, 32/1000, 64/1000
DominoEX	Micro, 4, 5, 8, 11, 16, 22, 44, 88
Hellschreiber	Feld Hell, Slow Hell, Feld Hell X5, Feld Hell X9, FSK Hell, FSK Hell-105, Hell 80
MFSK	4, 8, 11, 16, 22, 31, 32, 64, 64L, 128, 128L
MT63	500S, 1000S, 2000S, 500L, 1000L, 2000L
Navtex	Navtex
Olivia	4/250, 8/250, 4/500, 8/500, 16/500, 8/1000, 16/1000, 32/1000, 64/2000
QPSK	31, 63, 125, 250, 500
8PSK	125, 250, 500, 1000, 125FL, 250FL, 125F, 250F, 500F, 1000F, 1200F
PSKR	125R, 250R, 500R, 1000R
RTTY	45.45/170, 50/170, 75/170, 75/850
SYNOP	SYNOP
THOR	Micro, 4, 5, 8, 11, 16, 22, 25x4, 50x1, 50x2 100
SITORB	SitorB
Throb / ThrobX	1, 2, 4 / X1, X2, X4
WEFAX	IOC576, IOC288 <sup>[9]</sup>

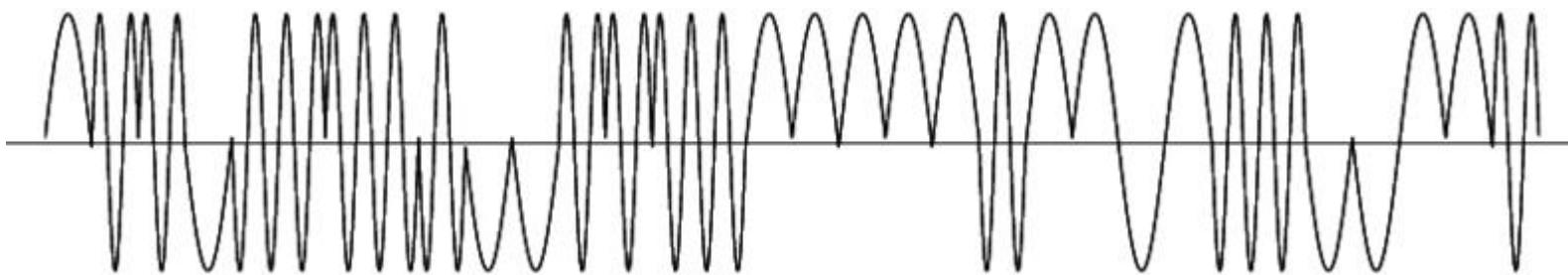
JT65, MAP65, FT8, vb.



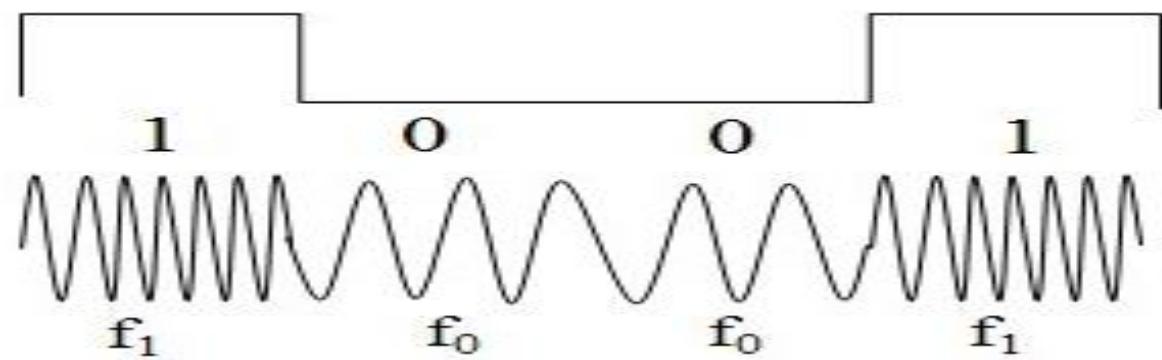
## MODÜLASYON (AM/FM)



## MODÜLASYON (PSK/FSK)

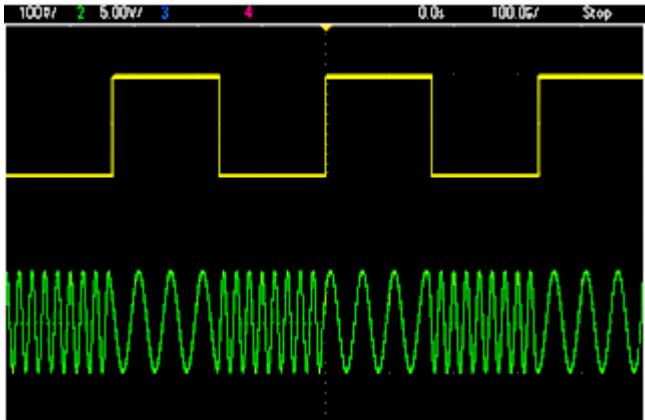


PSK

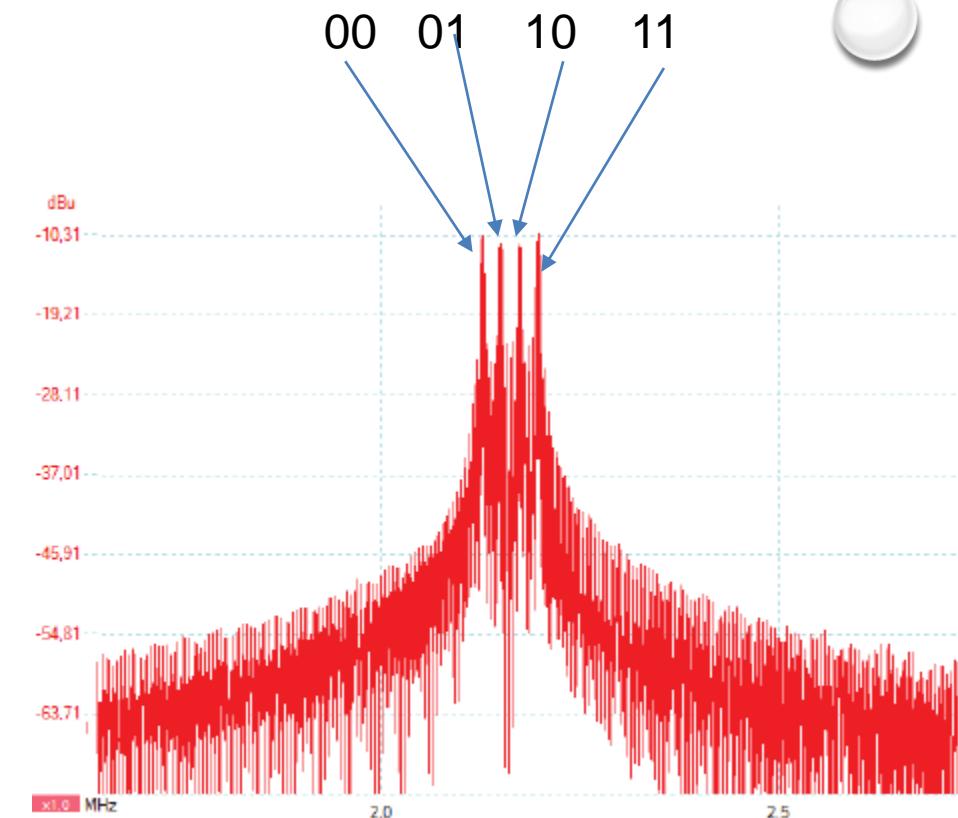
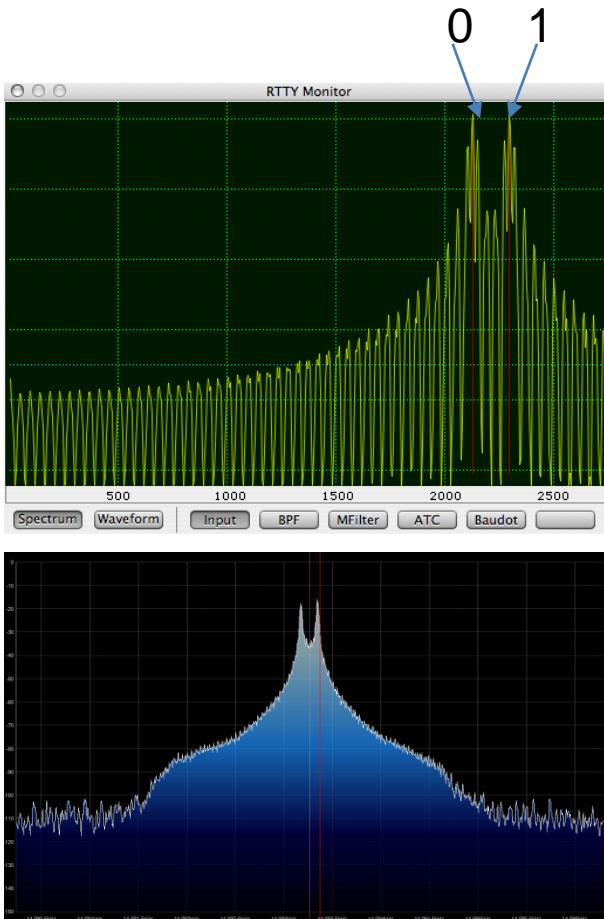


FSK / AFSK

## DALGA ŞEKİLLERİ VE SPEKTRUM GÖRÜNÜMÜ



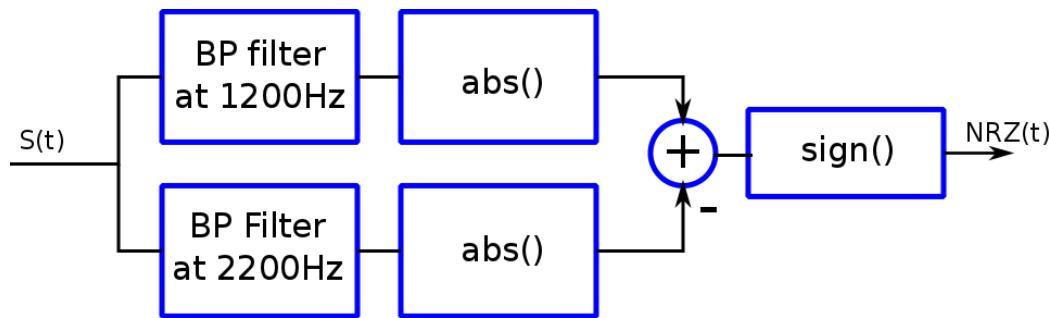
Zaman Görünümü (Osilaskop)



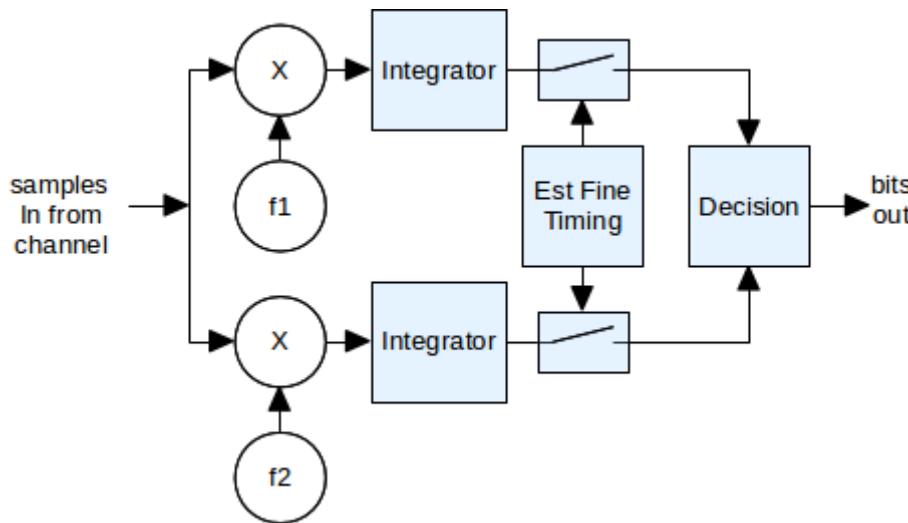
4-FSK

## FSK/AFSK'yi nasıl çözeriz ?

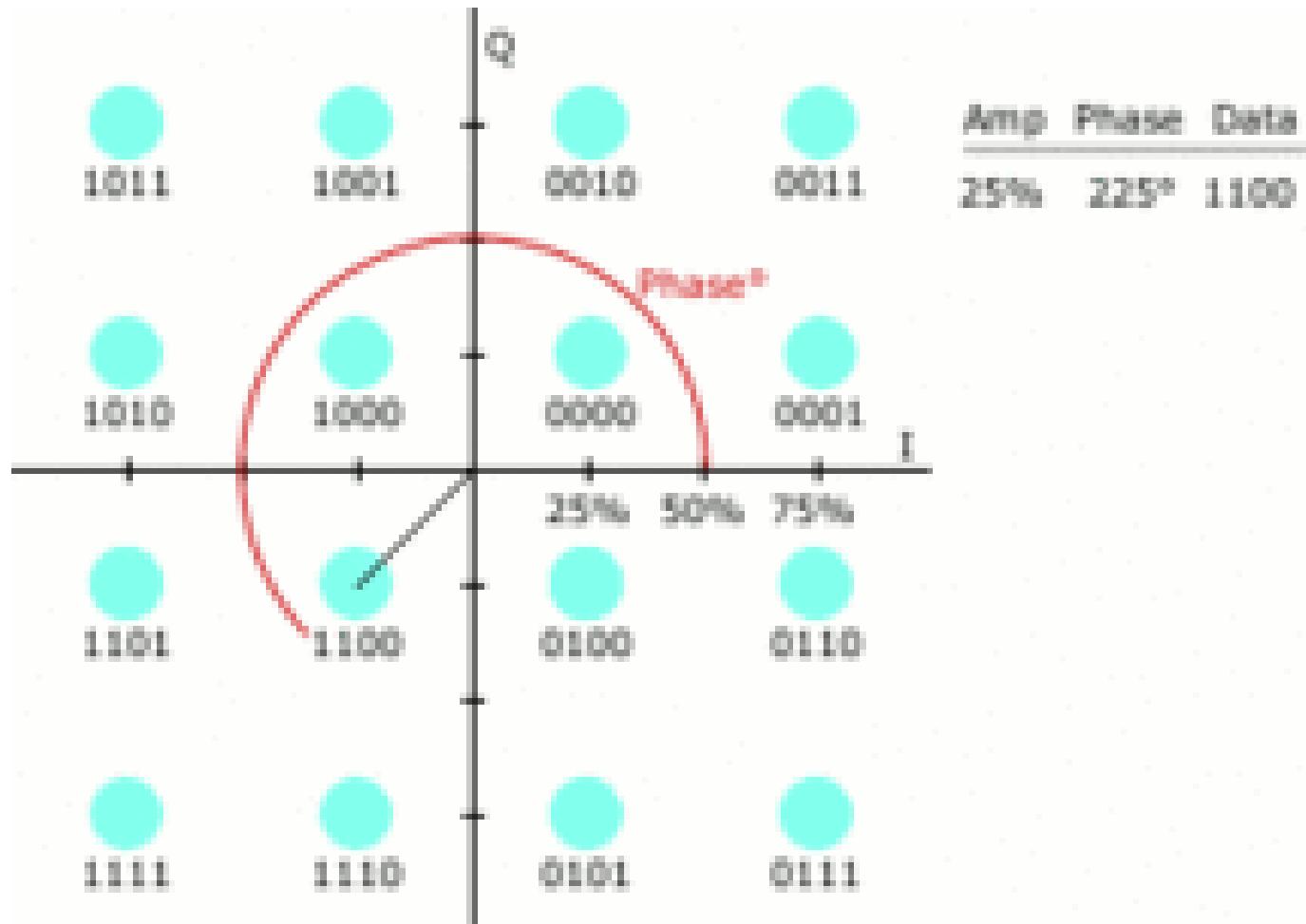
1)



2)

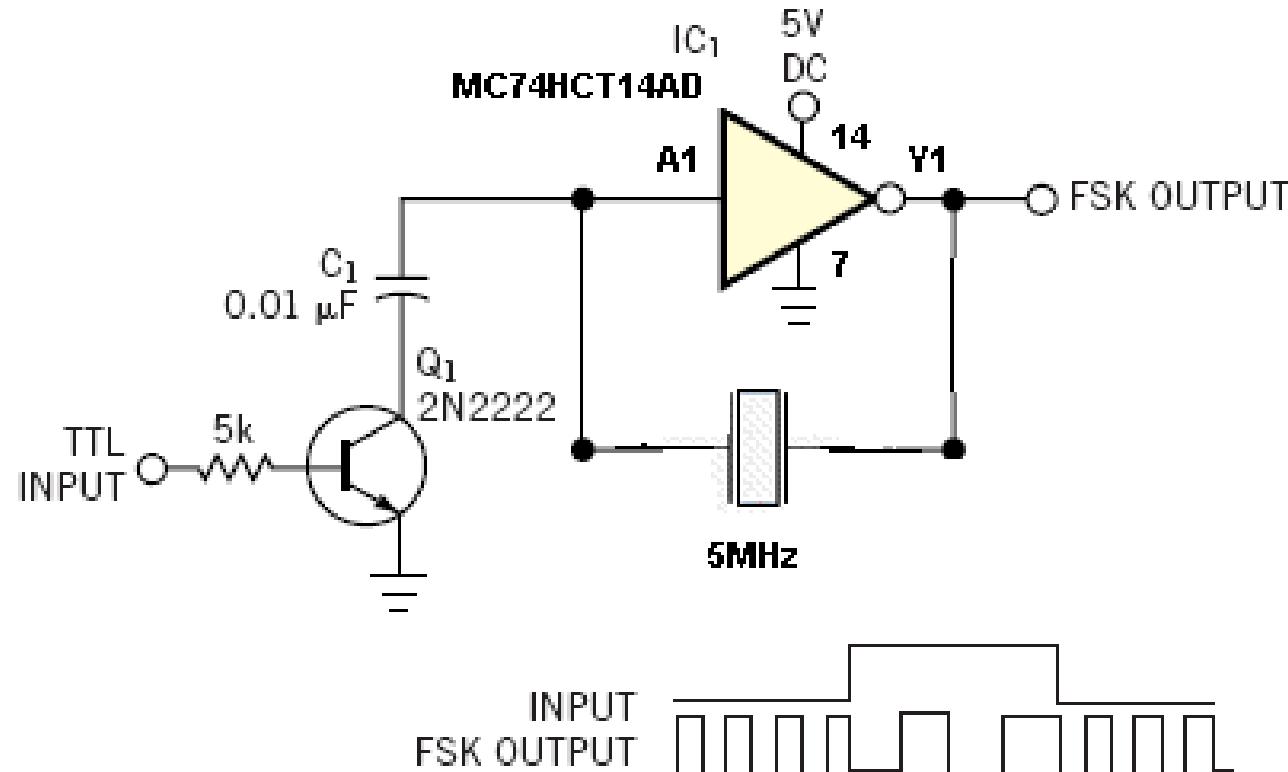


## QAM16

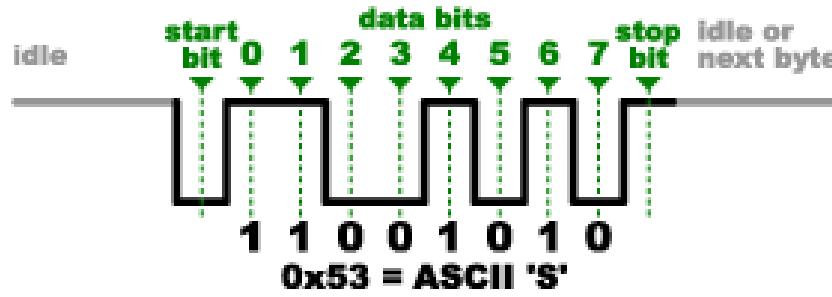
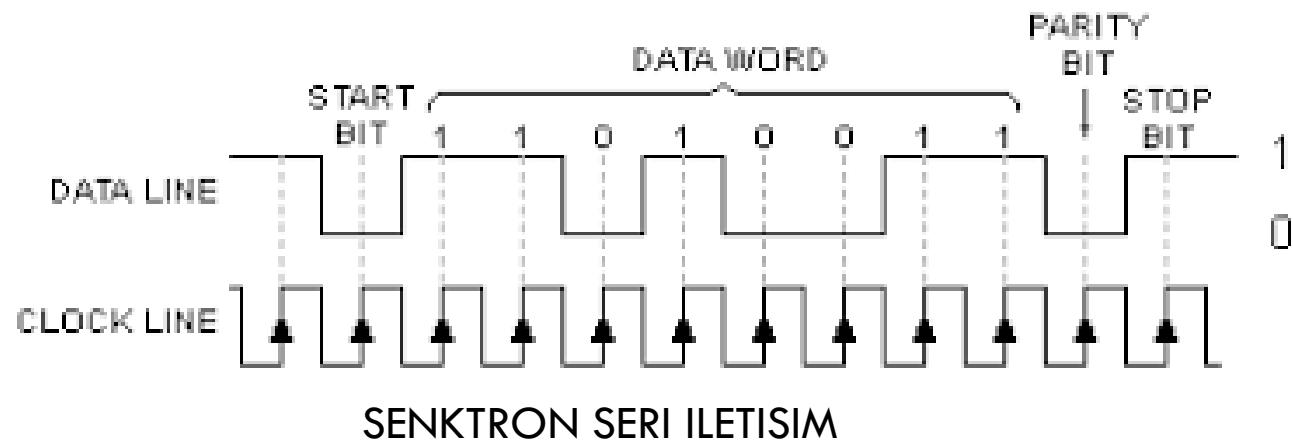


Sinyalin fazı ve genliği ile eşzamanlı oynayarak istenen 16 sembolden biri gönderilir

## KAYNAĞINDA FSK

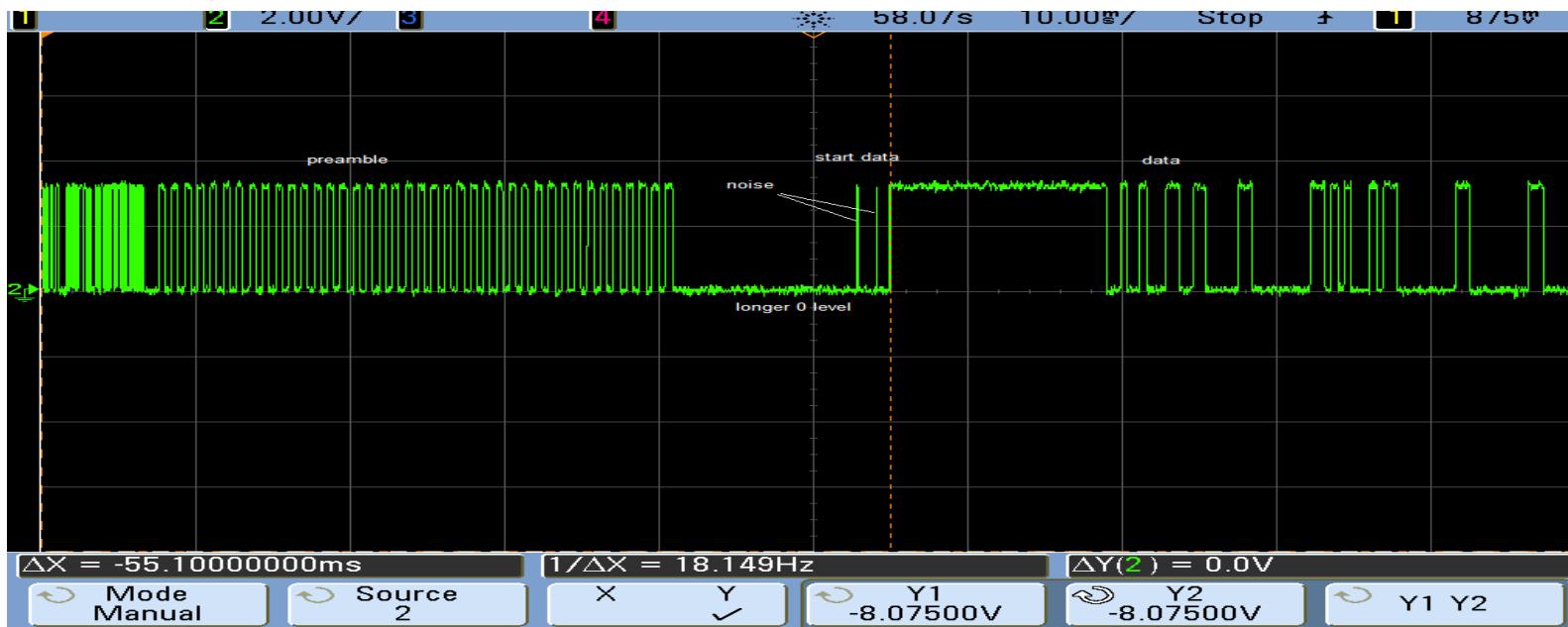
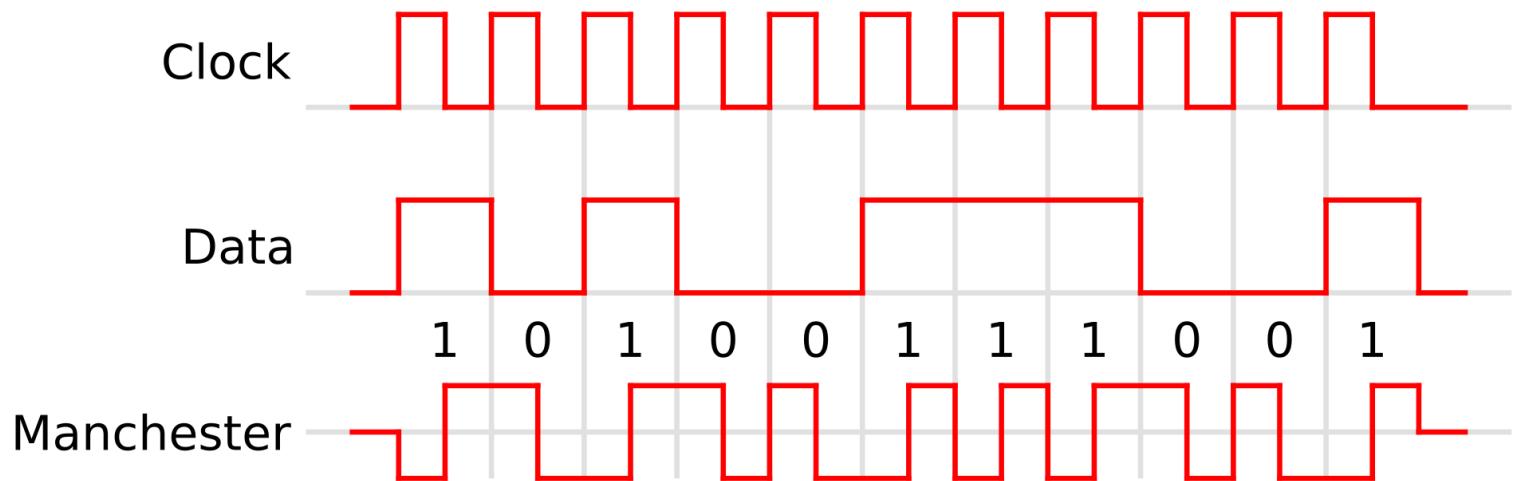


## PROTOKOL NEDİR ?

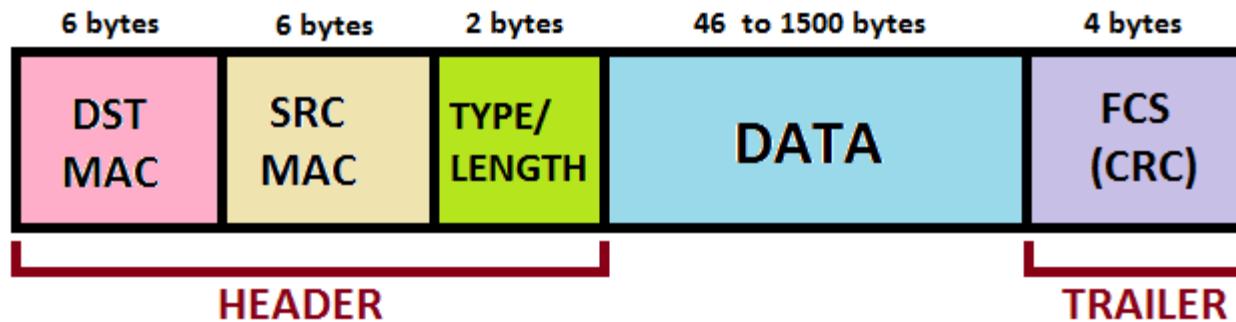


ASENKRON SERİ

## SENKRONLAMA PROBLEMI



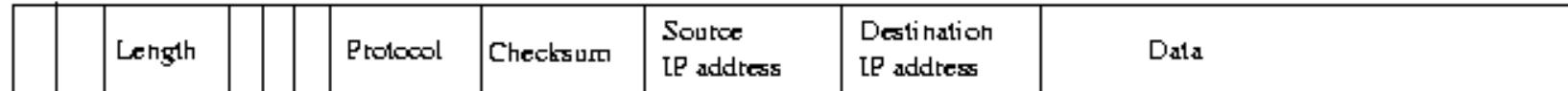
## ETHERNET II (DIX) FRAME



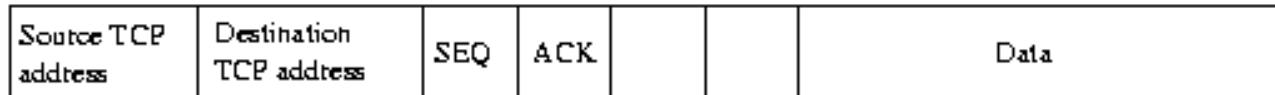
## ETHERNET FRAME



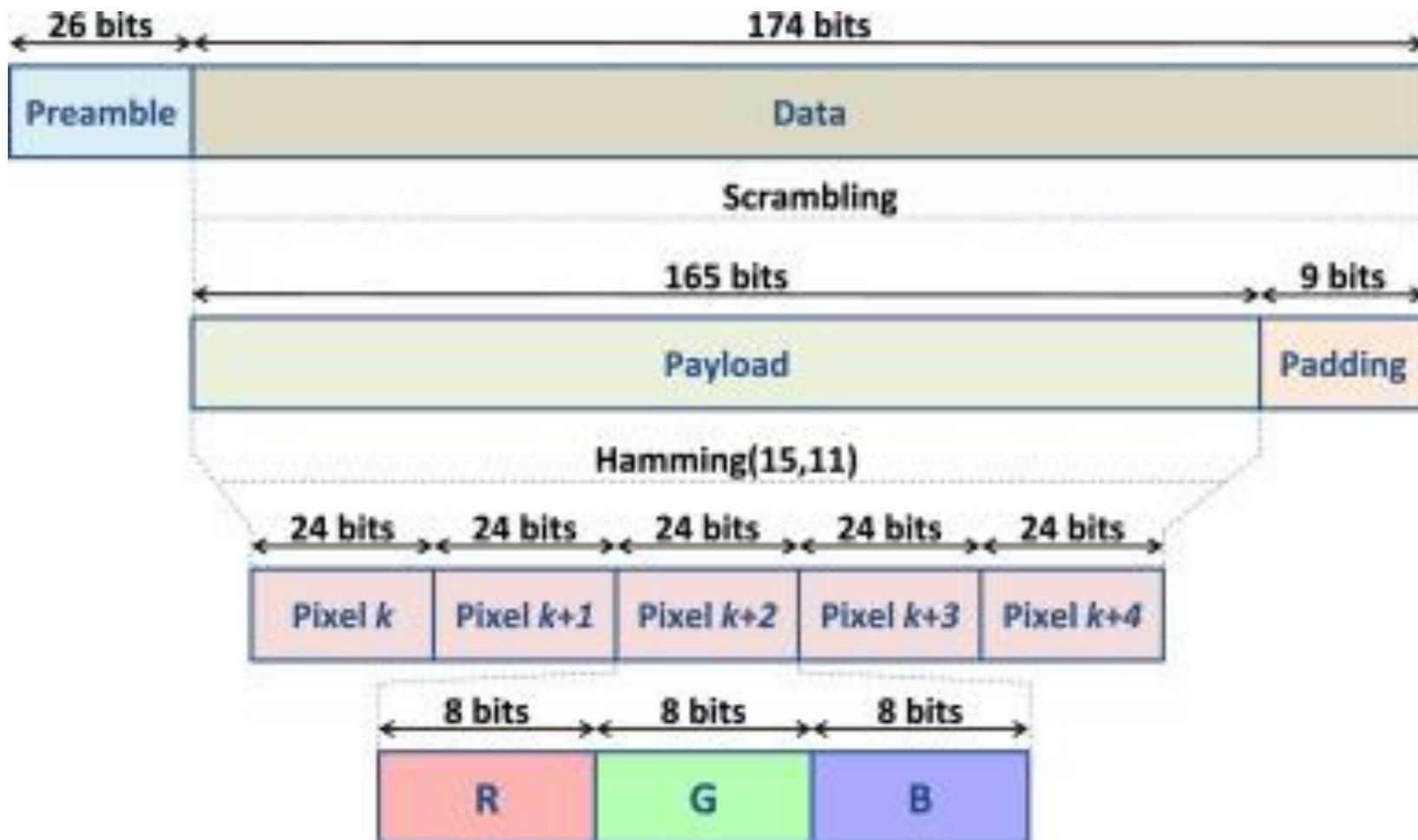
## IP PACKET



## TCP PACKET



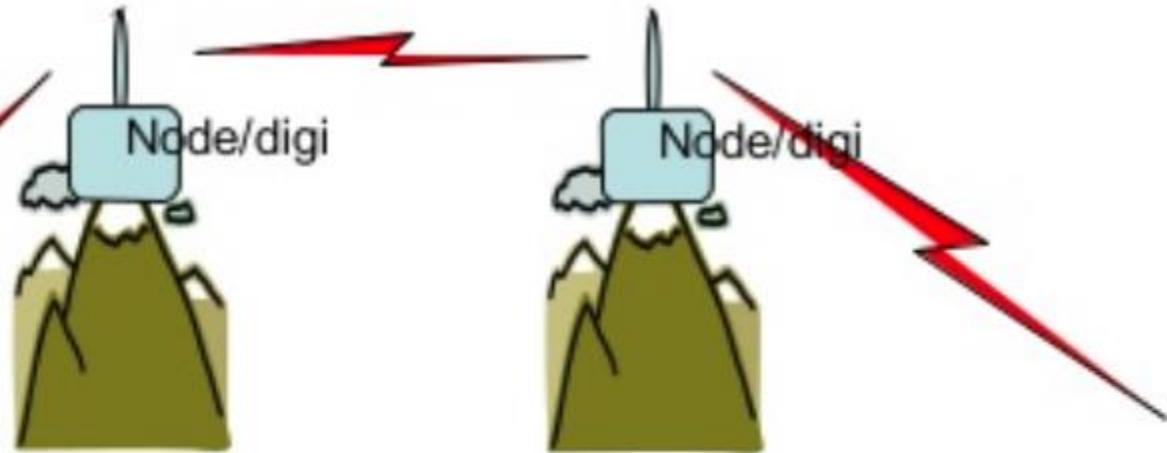
## VERİYI FORMATLI GÖNDERME (PROTOKOL)



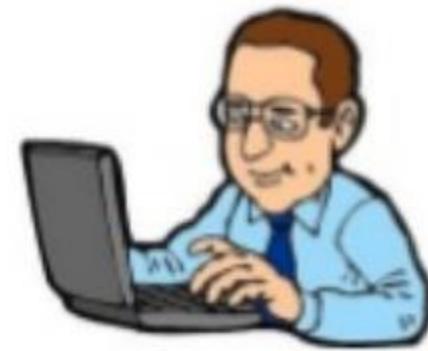
## AX.25 YAPISI

Flag	AX.25 Transfer Frame Header (128 bits)				Information Field	Frame-Check Sequence	Flag
	Destination Address	Source Address	Control Bits	Protocol Identifier			
8	56	56	8	8	32-2048	16	8

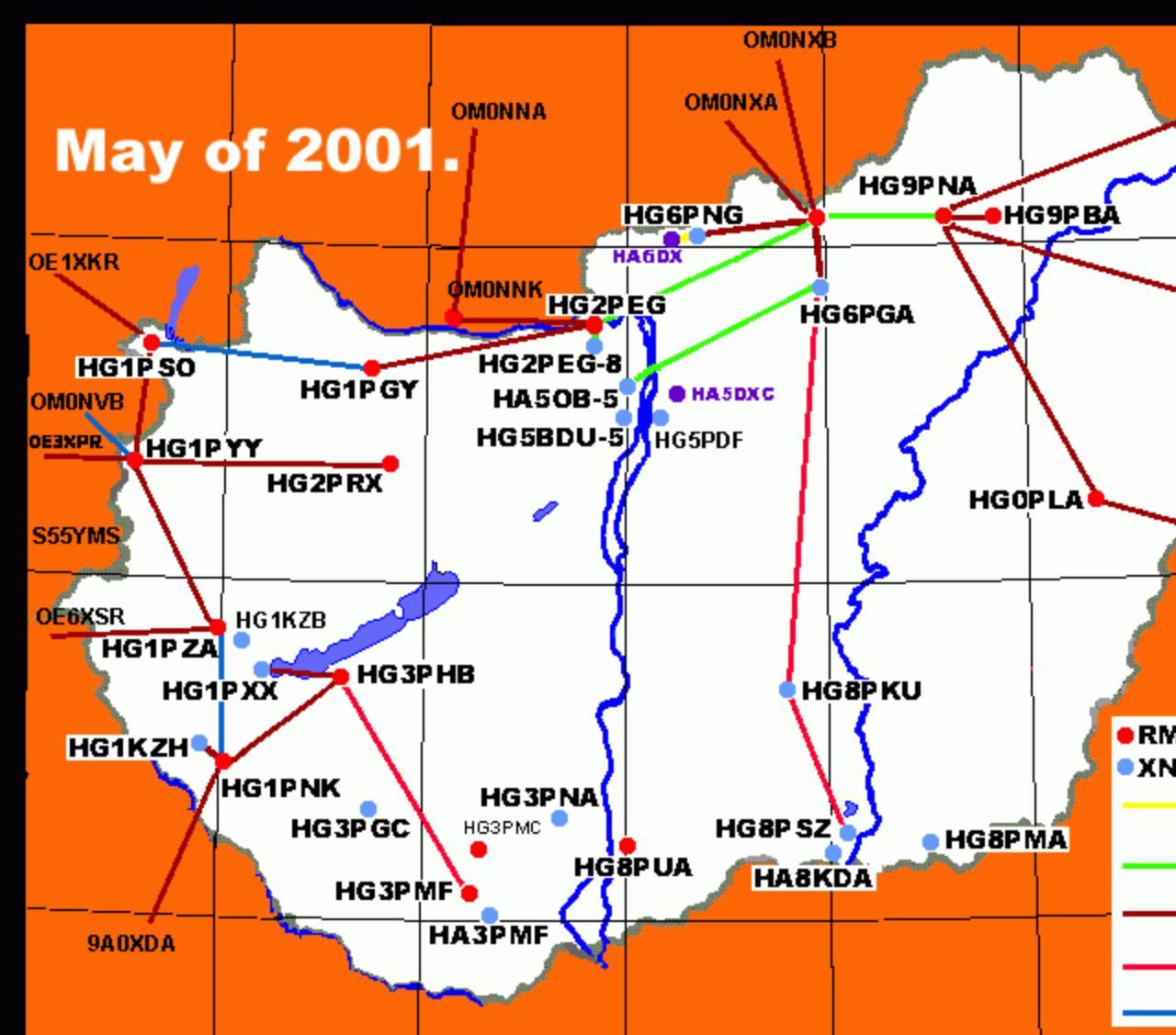
Address						Control				Proto	Info	FCS
DST CS	DST SSID	SRC CS	SRC SSID	Digi1 CS	Digi1 SSID	7	6	5	4	3 2 1	0	eg. text
VK2DOT	2	VK2RQ	0	VK2MB	7	N(R)	P	N(S)	0	0xF0	blah blah...	0x NNNN



\*\*\* CONNECTED to VK2DOT  
Hi Rod - Are you there?  
Yup - what's up?



**May of 2001.**

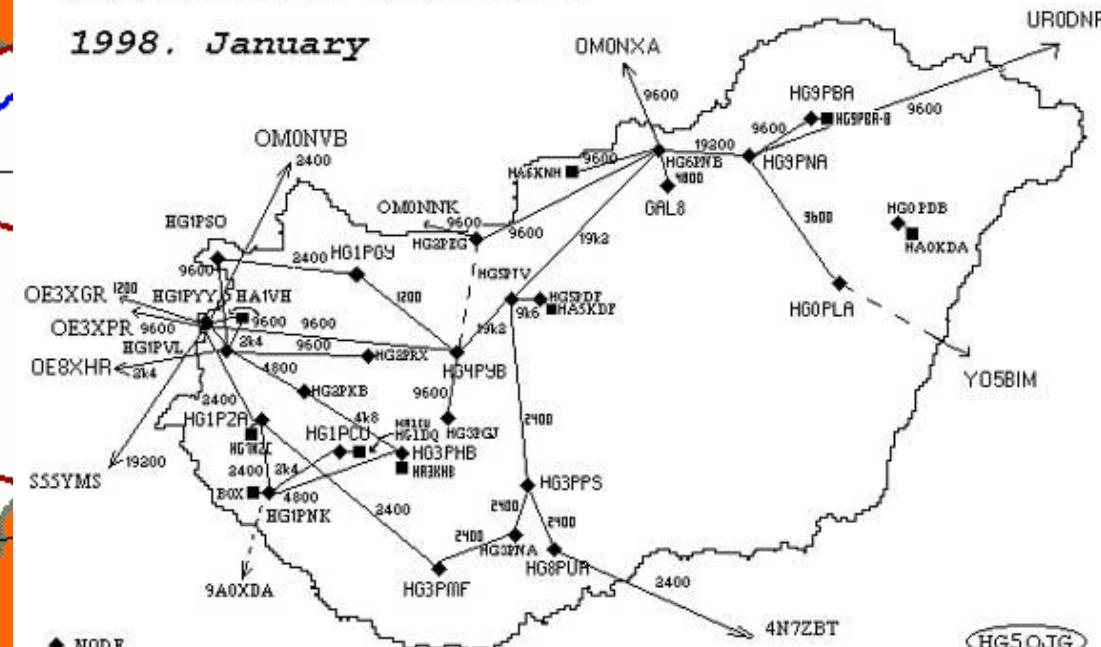


AX25-BBS: HG2EBH @ HA1VH.HUN.EU

E-MAIL: HG2EBH @ MAKACS.POLIOD.HU

HA-RMNC Network

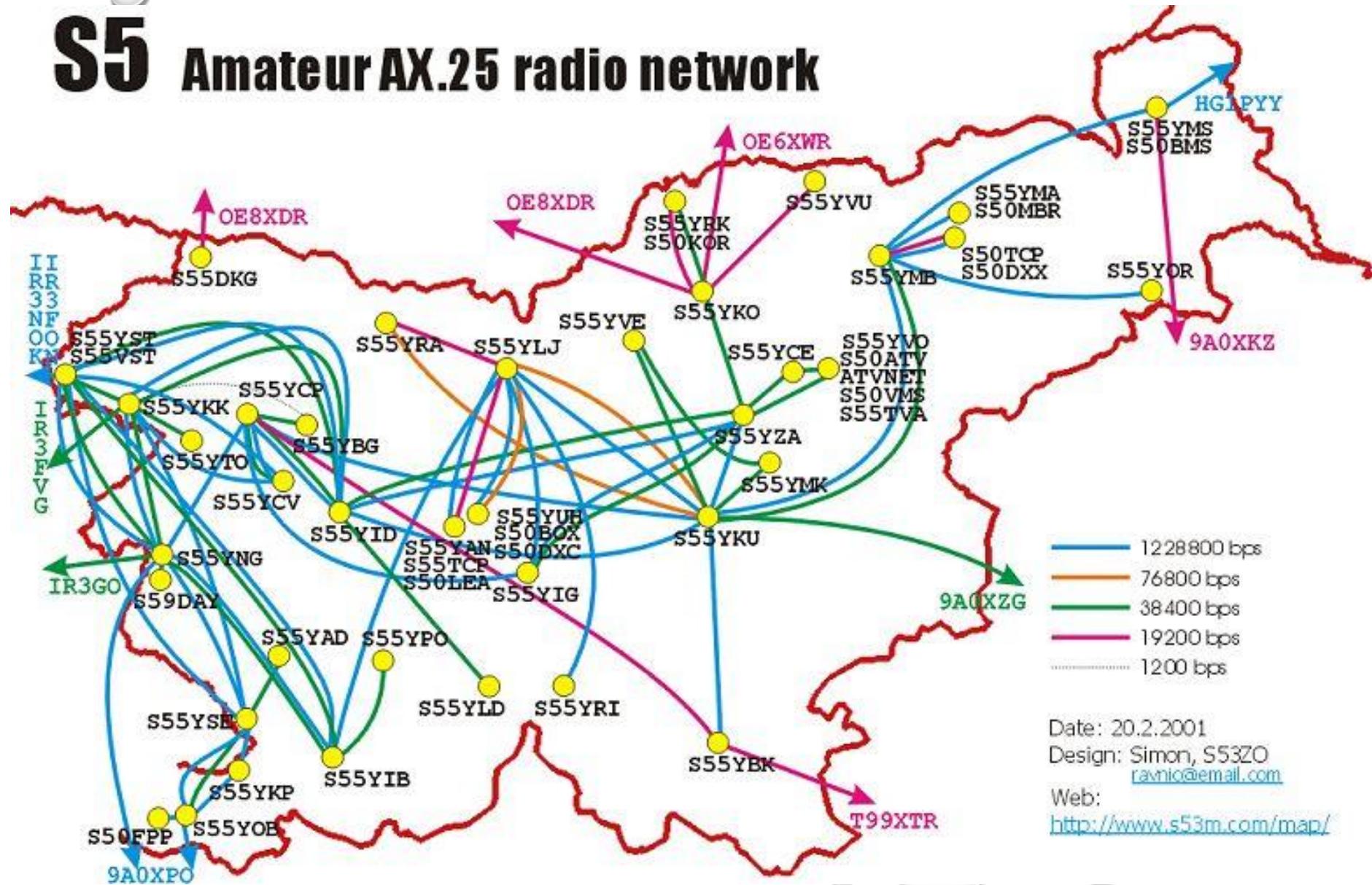
1998. January



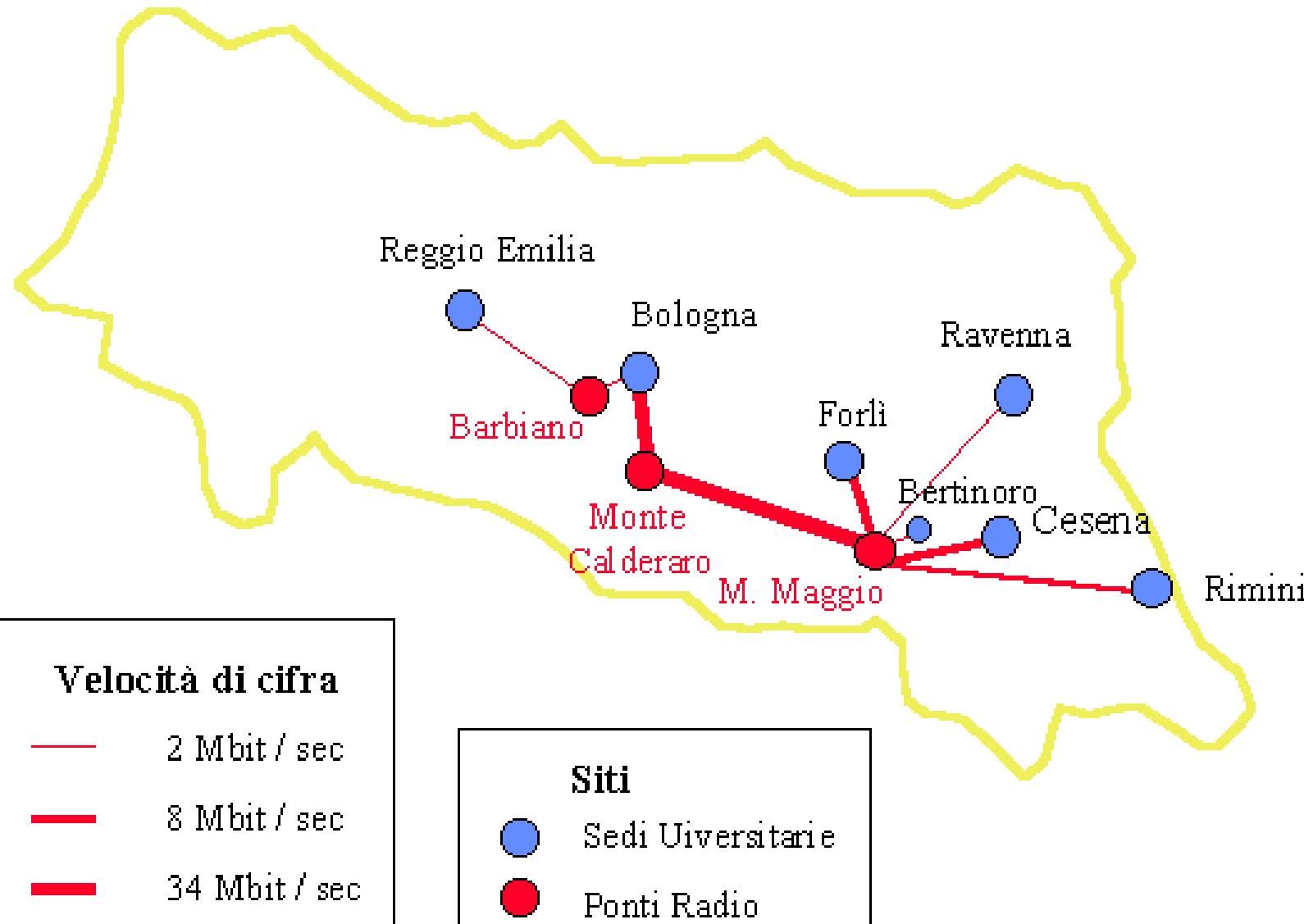
HG5 OJG

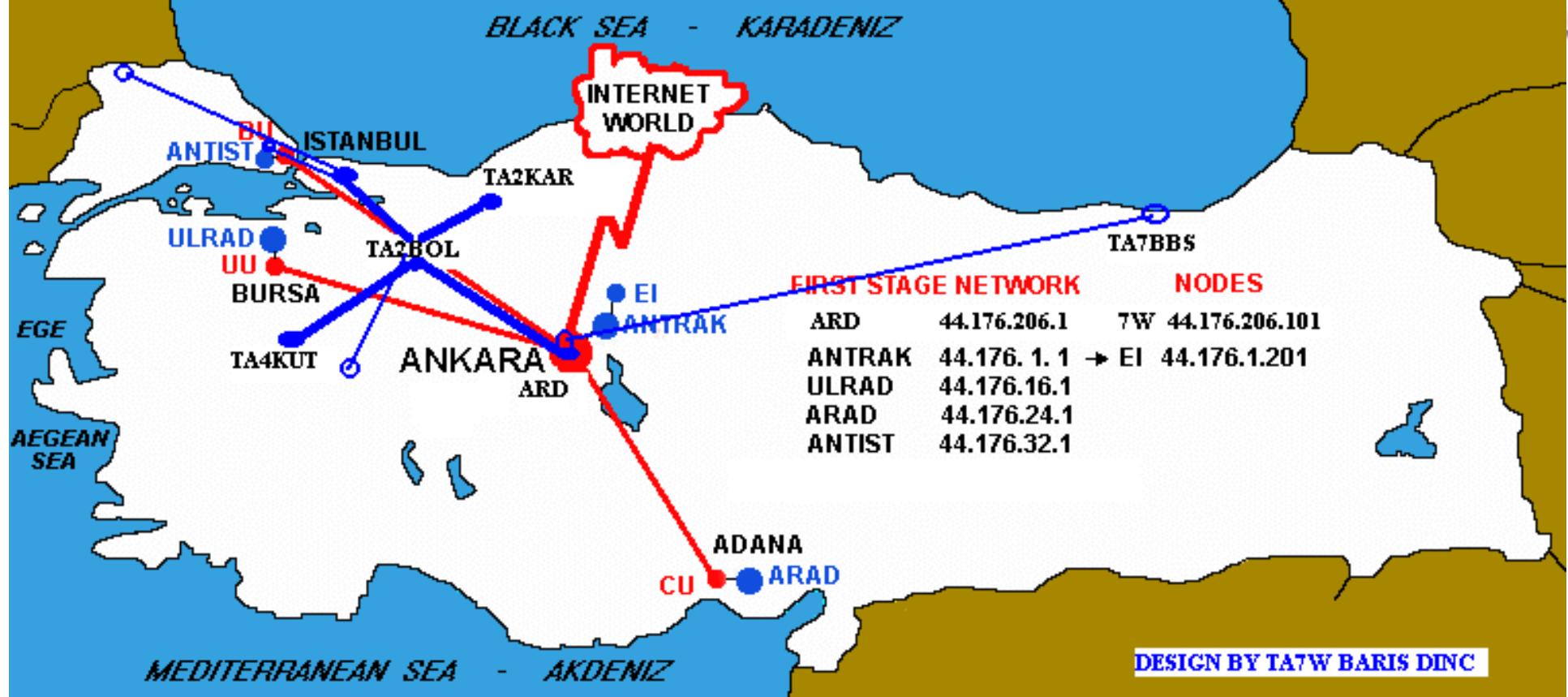


# S5 Amateur AX.25 radio network



# Collocazione Geografica delle Tratte Radio





TA2KD – TA2BBS (19K2 Ankara Local)

TA2BBS – TA2BOL (9K6 Ankara – Bolu Dağı)

TA2BBS – TA7BBS (1K2 Ankara – Giresun)

TA2BOL – TA4KUT (9K6 Bolu – Kutahya)

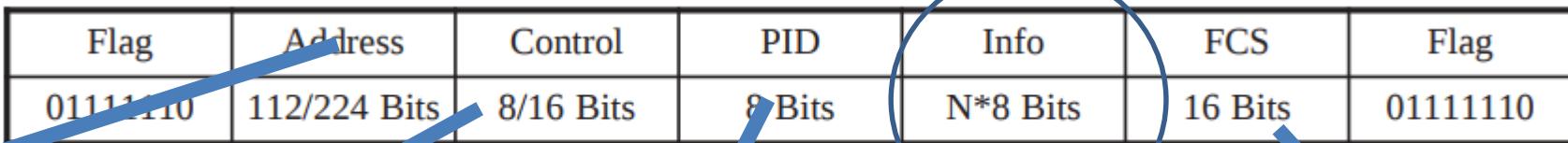
TA2BOL – TA2IMT (9K6 Bolu – İzmit)

TA2IMT – TA2IST (9K6 İzmit – İstanbul)

1K2 bağlı diğer iller Kırklareli, Eskişehir, İzmir, Sakarya, Trabzon, Rize

**HEDEF**  
**2002 Yılında 1.2MBit**  
**Altyapısının Tamamlanması**

## AX25 -> APRS



*Figure 3.1b. Information frame construction.*

Address Field of Frame													
Destination Address Subfield							Source Address Subfield						
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14

*Figure 3.3. Non-repeater address-field encoding.*

Control Field Type	Control Field Bits							
	7	6	5	4	3	2	1	0
I Frame	N(R)	P	N(S)	0				
S Frame	N(R)	P/F	S	S	0	1		
U Frame	M M M	P/F	M	M	1	1		

*Figure 4.1a. Control-field formats (modulo 8).*

HEX	M S B	L S B	Translation
**	yy0yyyyy		AX25 layer 3 implemented.
**	yy1yyyyy		AX25 layer 3 implemented.
0x01	00000001		ISO 8208/CCITT X.25 PLP
0x06	00000110		Compressed TCP/IP packet. Van Jacobson (RFC 1144)
0x07	00000111		Uncompressed TCP/IP packet. Van Jacobson (RFC 1144)
0x08	00001000		Segmentation fragment
0xC3	11000011		TEXNET datagram protocol
0xC4	11000100		Link Quality Protocol
0xCA	11001010		Appletalk
0xCB	11001011		Appletalk ARP
0xCC	11001100		ARPA Internet Protocol
0xCD	11001101		ARPA Address resolution
0xCE	11001110		FlexNet
0xCF	11001111		NET/ROM
0xF0	11110000		No layer 3 protocol implemented.
0xFF	11111111		Escape character. Next octet contains more Level 3 protocol information.
	00001000		

*Figure 3.2. PID definitions.*

Control Field Type	Type	Control-Field Bits							
		7	6	5	4	3	2	1	0
Set Async Balanced Mode	SABM	Cmd	0	1	1	P	1	1	1
Set Async Balanced Mode	SABM	Cmd	0	0	1	P	1	1	1
Disconnect	DISC	Cmd	0	1	0	P	0	0	1
Disconnect Mode	DM	Res	0	0	0	F	1	1	1
Unnumbered Acknowledge	UA	Res	0	1	1	F	0	0	1
Frame Reject	FRMR	Res	1	0	0	F	0	1	1
Unnumbered Information	UI	Either	0	0	0	P/F	0	0	1
Exchange Identification	XID	Either	1	0	1	P/F	1	1	1
Test	TEST	Either	1	1	1	P/F	0	0	1

*Figure 4.4. U frame control fields.*

## The AX.25 Frame

All APRS transmissions use AX.25 UI-frames, with 9 fields of data:

AX.25 UI-FRAME FORMAT									
<i>Flag</i>	<i>Destination Address</i>	<i>Source Address</i>	<i>Digipeater Addresses (0-8)</i>	<i>Control Field (UI)</i>	<i>Protocol ID</i>	<i>INFORMATION FIELD</i>	<i>FCS</i>	<i>Flag</i>	
Bytes:	1	7	7	0-56	1	1	1-256	2	1

TA7W-11>BEACON:T#146,208,135,124,038,134,00110011

TA7W-11>APRS:\$PRWIZCH,04,7,05,7,00,0,21,0,00,0,30,7,06,7,13,2,10,7,02,7,00,0,00,0\*49

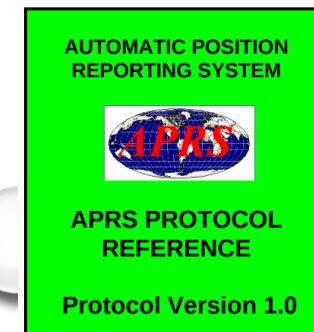
TA7W-11>APRS:\$GPRMC,145322,A,4034.3765,N,10410.8083,W,12.062,220.7,220406,9.9,E\*56

TA7W-11>APRS:\$GPGGA,145324,4034.3714,N,10410.8151,W,1,06,1.46,21869.4,M,-22.1,M,,\*47



COMMODORE VIC-20

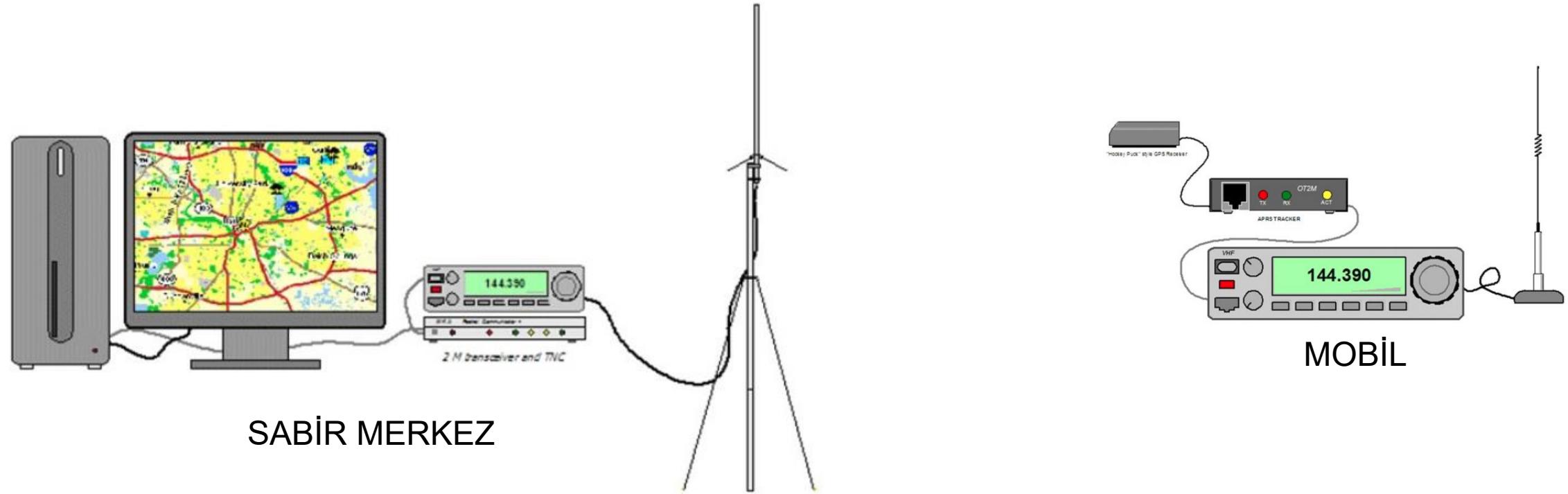
Bob Bruninga, WB4APR

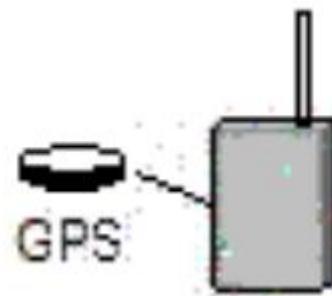
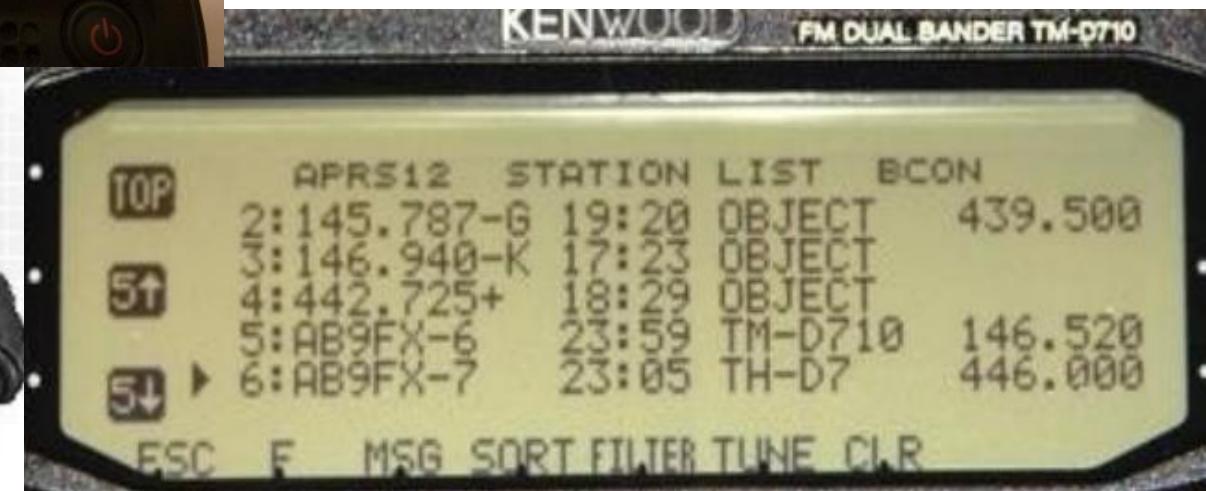
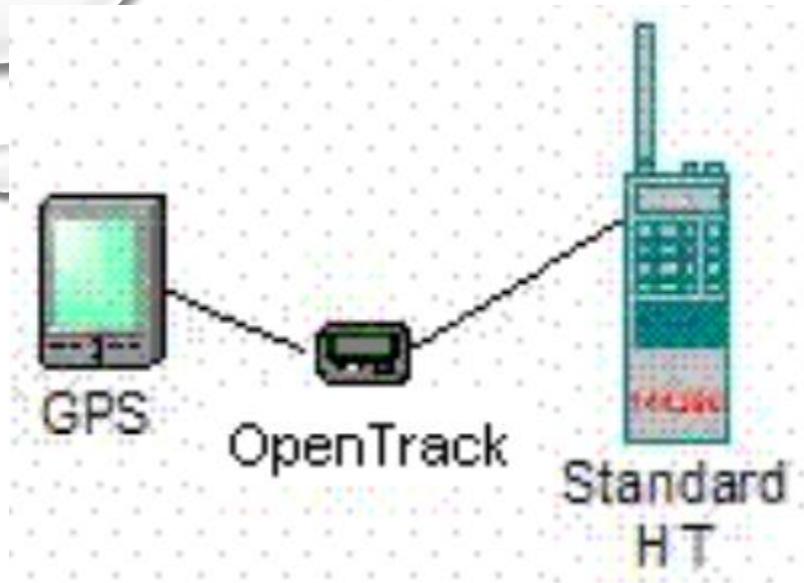




**APRS** was developed in the late 1980's for local **tactical digital communications**, situational awareness and **TWO-WAY information exchange**

# TEMEL APRS İSTASYONU





Pocket Tracker  
MicroTracker



# HANGİ DONANIMLARI KULLANABİLİRİM ?

## APRS Trackers –

Argent Data Systems (<http://www.argentdata.com>) – Tracker3 (T3), OpenTracker USB (OTUSB)

Byonics (<http://www.byonics.com>) – TinyTrak3+, TinyTrak4, Micro-Trak

Fox Delta (<http://www.foxdelta.com>) – FoxTrak, FoxTrak-M

various radio manufacturers with APRS built in

## TNC's (modems) –

Fox Delta (<http://www.foxdelta.com>) – Mini-TNC

Kantronics (<http://www.kantronics.com>) – KPC3+, KPC-9612+

MFJ (<http://www.mfjenterprises.com>) – MFJ-1276, MFJ-1278

PacComm (<http://paccomm.com>) – TINY-2 MK-II, PicoPacket, SPIRIT-2, HandiPacket

TAPR (<http://www.tapr.org>) – various, mainly in kit form

Timewave (<http://www.timewave.com>) – Navigator, PK-232SC+, PK-232/PSK, PK-96/100, DSP-232+

TNC-X (<http://www.tnc-x.com>) – TNC-X

## Soundcards –

almost anything will do but you will need to interface your radio to your PC and server software

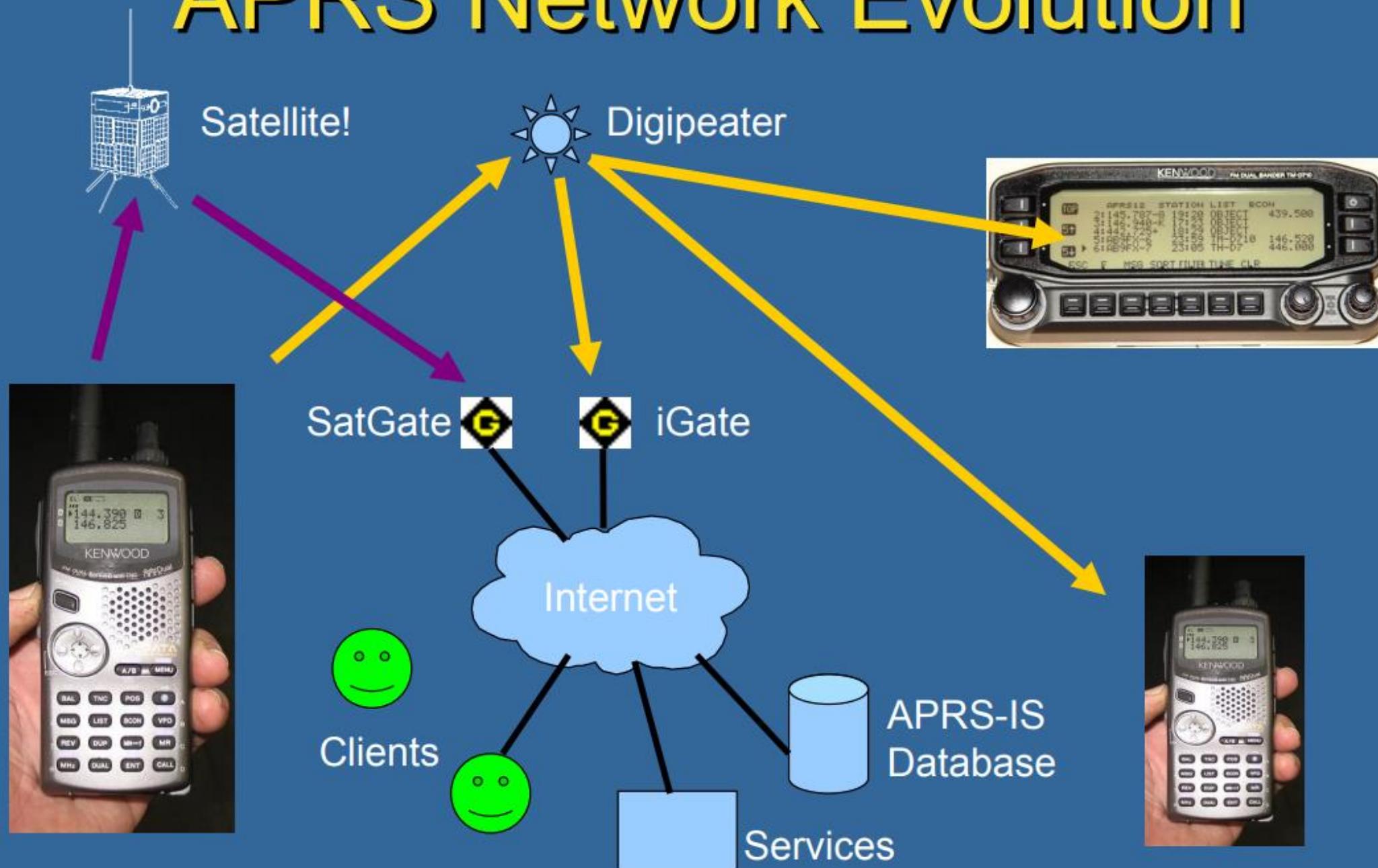
BuxComm (<http://www.buxcomm.com>) – Rascal

Tigertronics (<http://www.tigertronics.com>) – Signalink USB

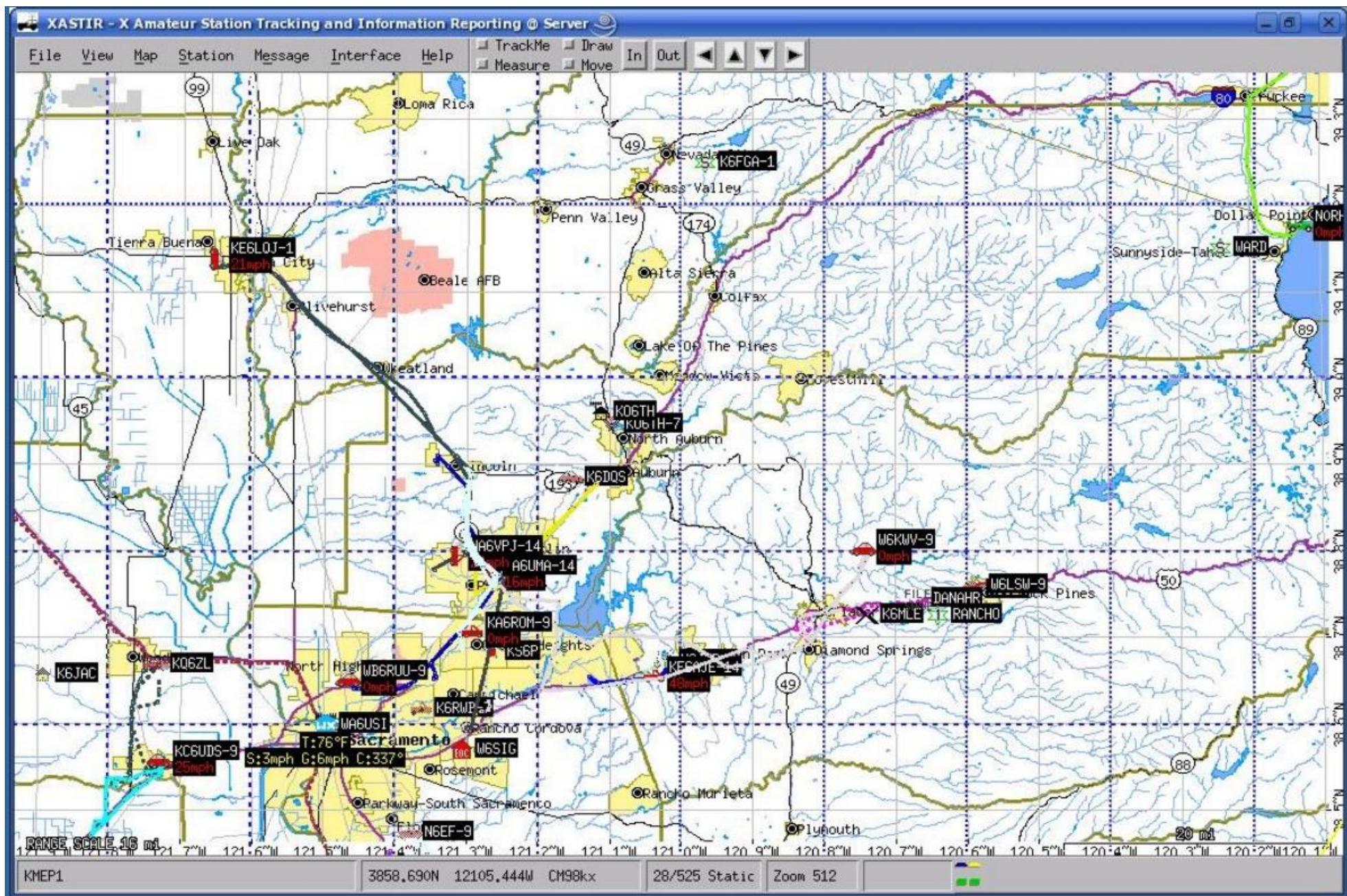
West Mountain Radio (<http://www.westmountainradio.com>) – RIgblaster

MFJ (<http://www.mfjenterprises.com>) – MFJ-1275

# APRS Network Evolution

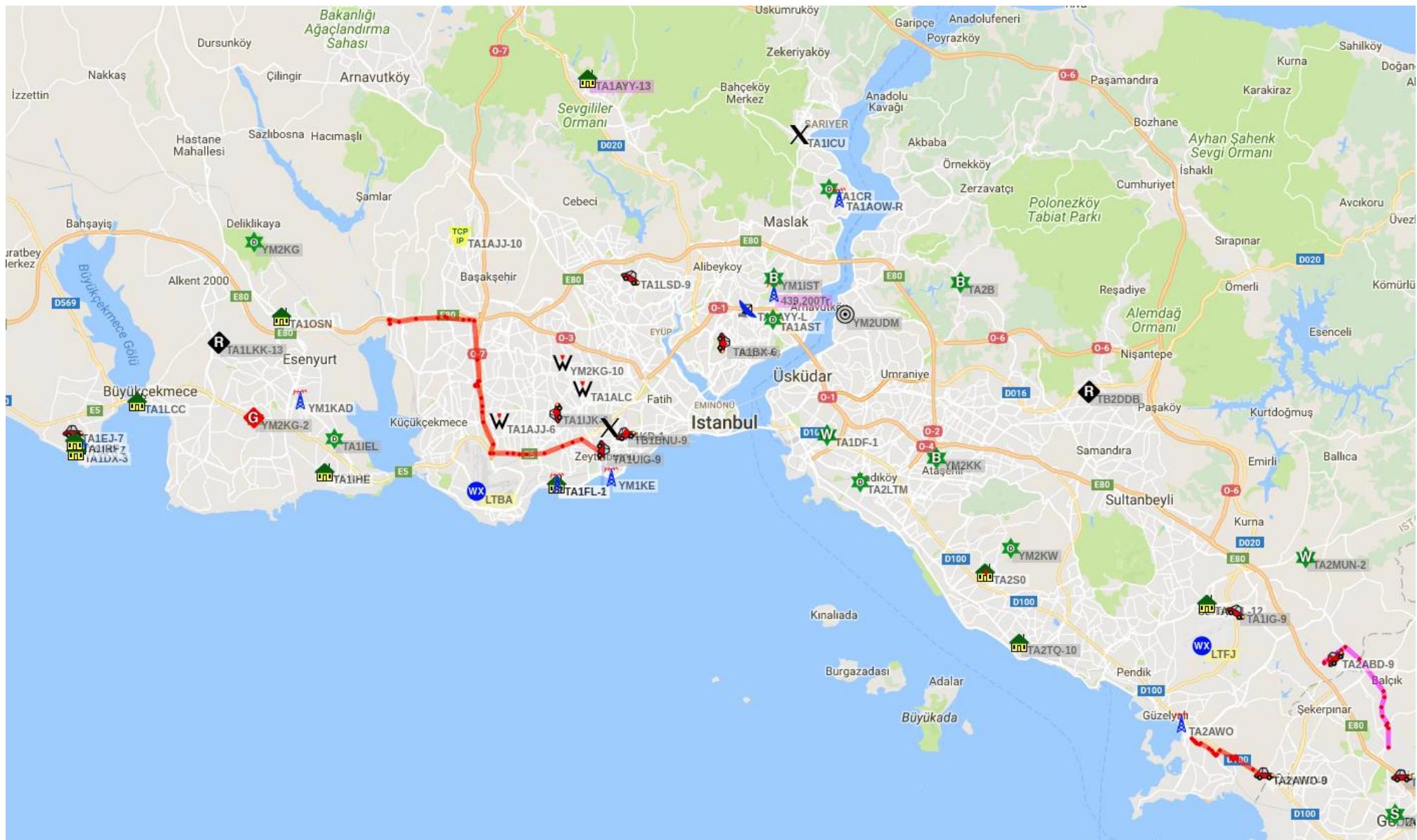


# KIM NEREDE ?





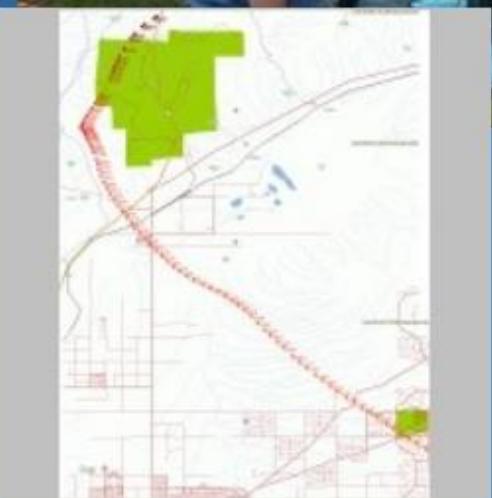
# APRS.FI



# APRS Balloons

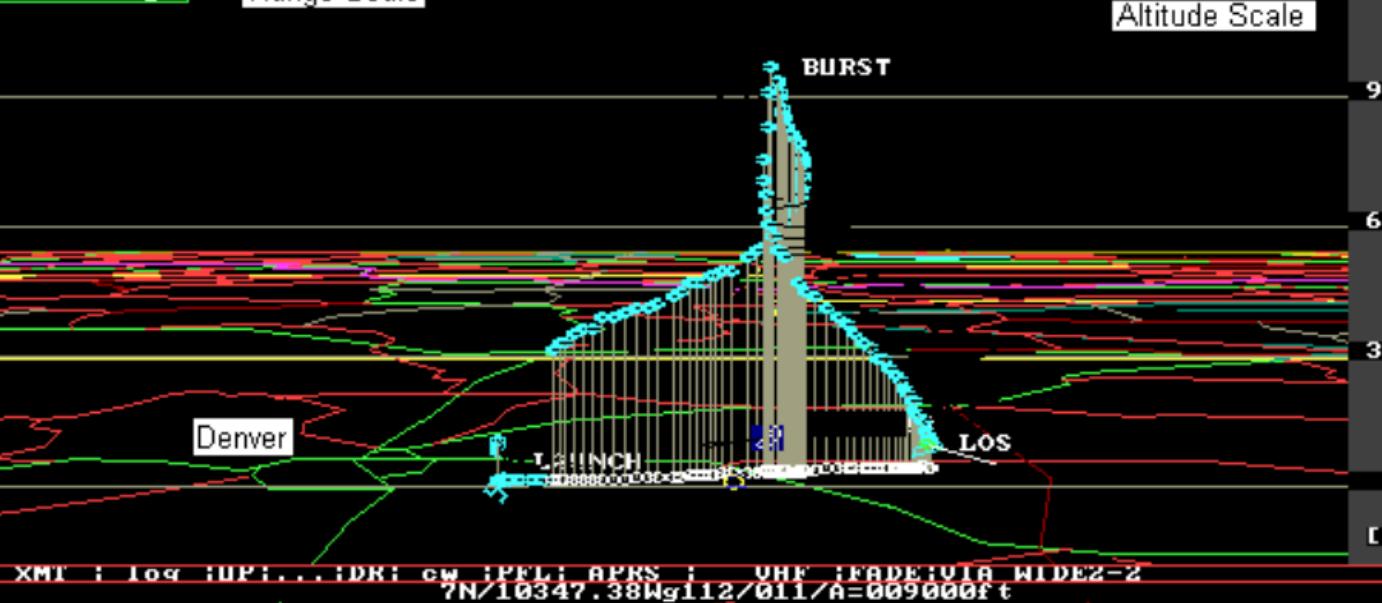


Very Simple

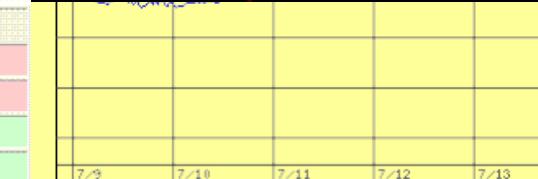


Range 32  
3936.41N  
10411.93W  
GS JJ00ya

Range Scale



from	to	time	message
WB4APR-9	JA1RBY-4	10/25 00:07:04z	no msg list?{44
WB4APR-9		10/25 00:02:47z	qsl!{43
JA1RBY-9	WB4APR-9	10/24 23:59:59z	hello{15
N3HEV-1	WB4APR-9	10/14 14:09:06z	GM hve a grt day! 73! {0
WB4APR-9	ALL	10/14 13:53:03z	in d700... ignore that msg. It was 4 satellite.{42
WB4APR-9	ALL	10/14 13:50:24z	in d700 {41
WB4APR-9	ALL	10/14 13:49:07z	in d700 use ptt mode to TX while RXing{40
KE4NYV-15	WB4APR-9	09/30 21:55:30z	S1, if that?{7
KE4NYV-15	WB4APR-9	09/30 21:51:01z	noisy{6
WB4APR-9	KE4NYV-15	09/30 21:50:32z	6.85?{38
KE4NYV-15	WB4APR-9	09/30 21:49:45z	noisy{5
N8PK	WB4APR-9	09/30 21:12:16z	Try again on 6.835 {003
WB4APR-9	KE4NYV-15	09/30 20:48:11z	52?{37
N1TI	WB4APR-9	09/29 02:47:14z	Good luck @ DCC{82
N3IDX-1	WB4APR-9	09/28 02:06:44z	Greetings from Huntingtown, Md{2b}
KD8ATF-2	WB4APR-9	09/28 01:55:17z	r u going to be on the next pass of go-32 bob?{26
WB4APR-9	ALL	09/28 01:51:40z	ck in!{35
N1TVZ	WB4APR-9	09/28 01:45:12z	%private line{M
WB4APR-9	ALL	09/28 01:43:14z	what is pl?{34
N8PK	WB4APR-9	09/28 01:40:41z	Gud 2 C U on the CARA last night! -Pat {000



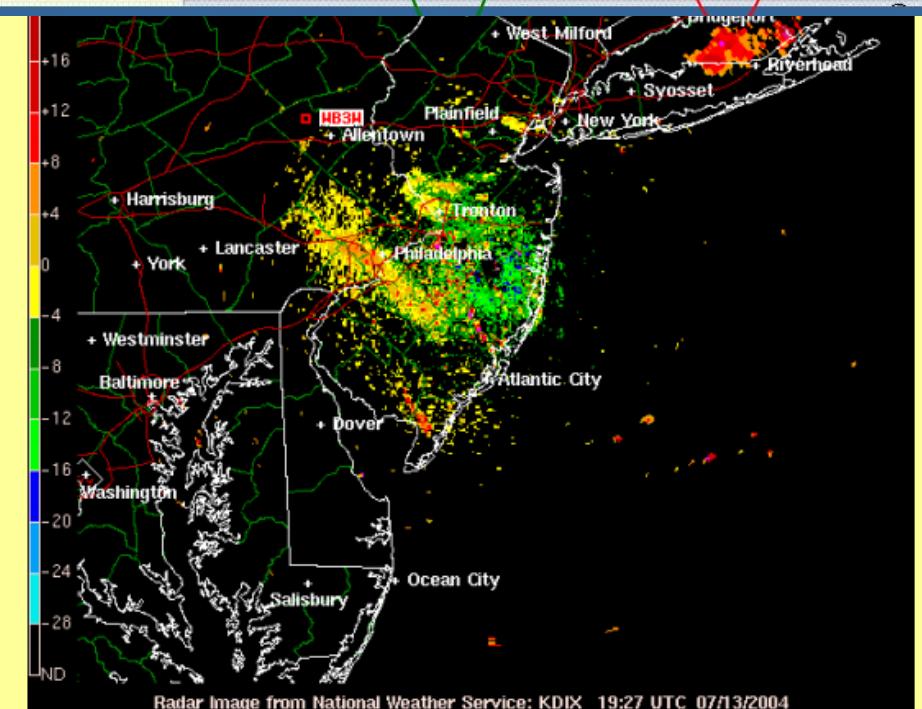
## Temperature & Dew Point

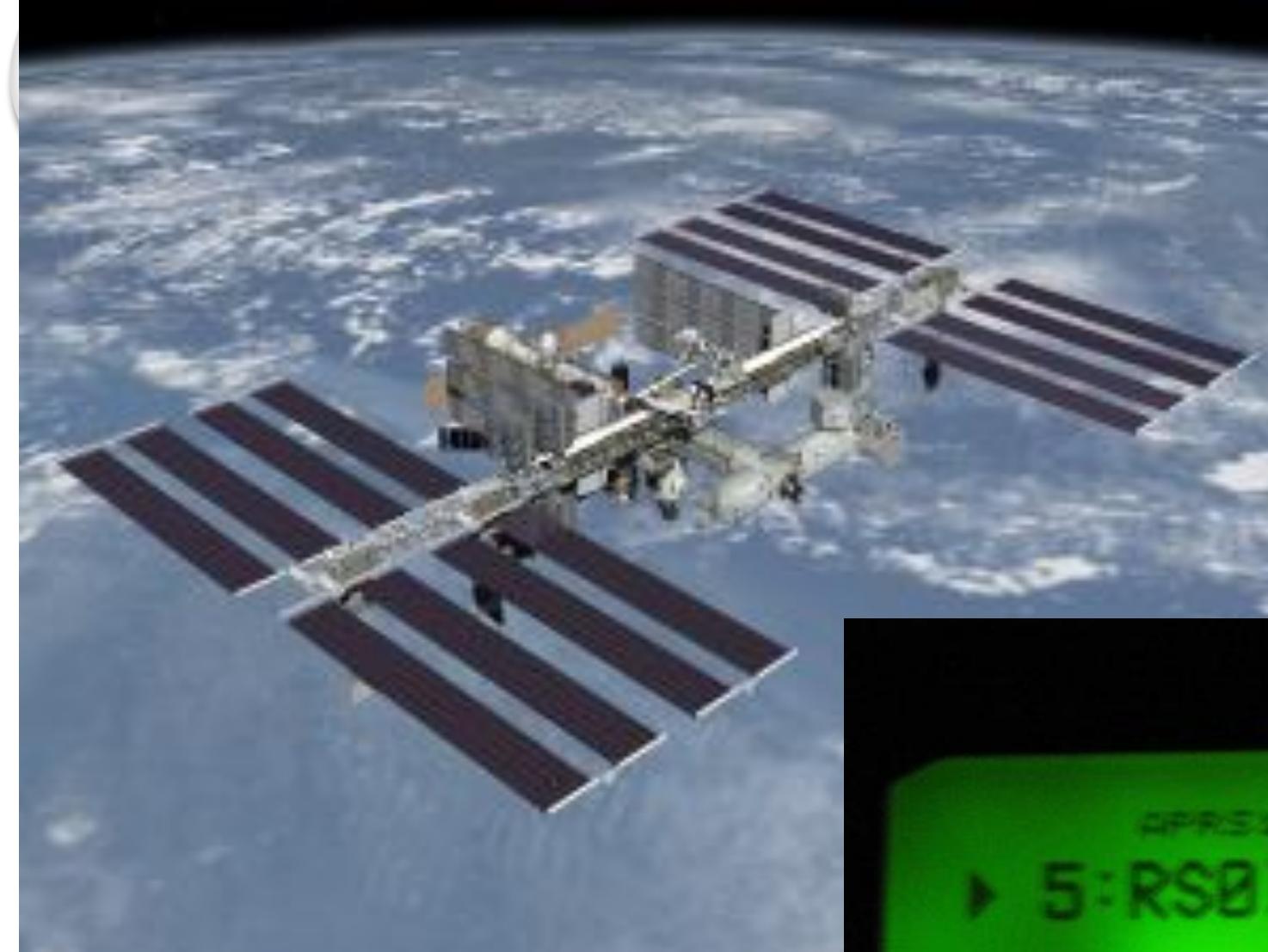


## Rainfall Rates

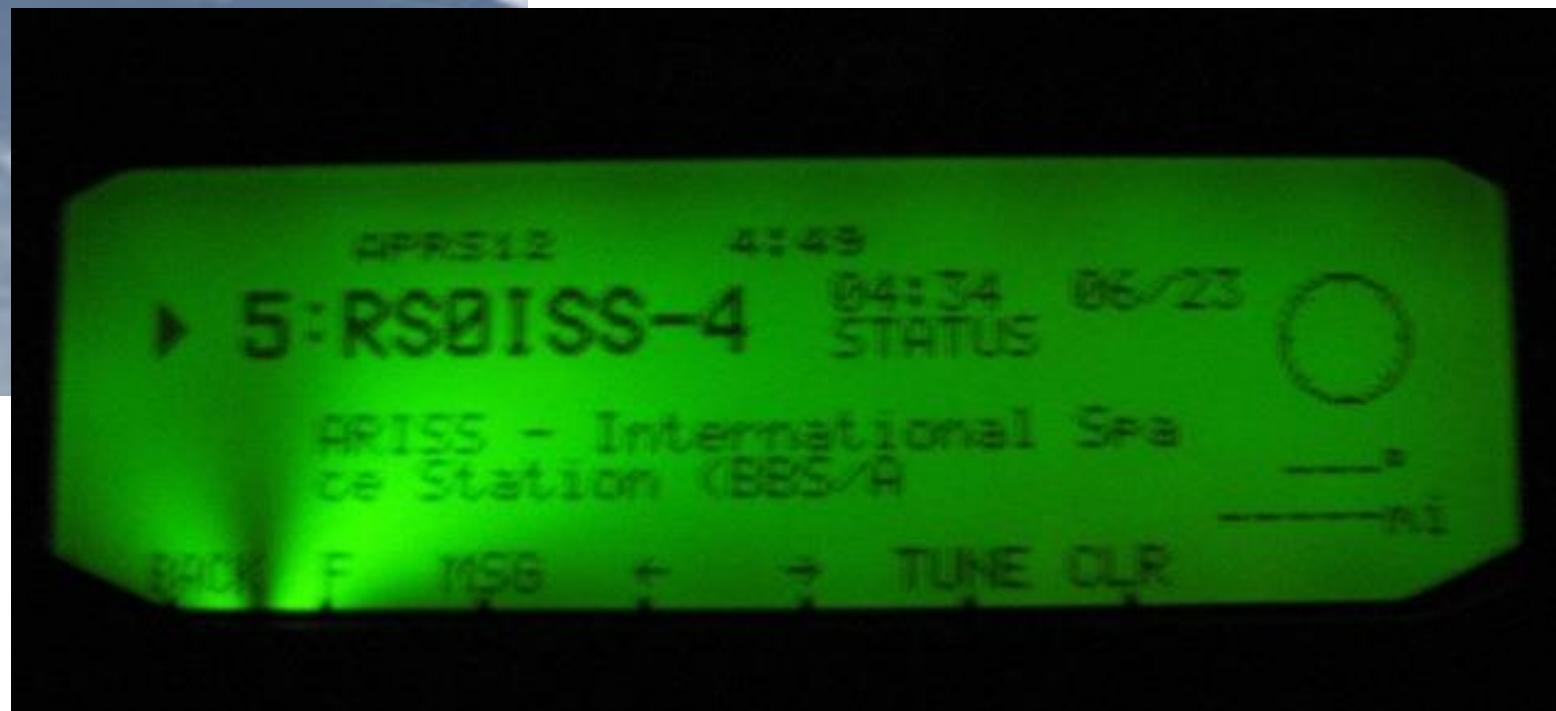
## APRS Stations Near WB4APR-9 (last 240 hours)

Call	callbook	msg	wx	lat	lon	distance	direction	Last Position
WB4APR-9	**	**		39.00000	-76.50000	0.0		00:06:02:46
VA3ADG	**			38.99717	-76.50450	0.3	SW	05:22:10:17
WB4APR-1	**	**		38.99033	-76.49850	0.6	S	00:00:11:28
WE4APR-9	**			38.98667	-76.49283	0.9	SE	00:03:23:42
WB4APR-3	**	**		38.98500	-76.48550	1.3	SE	00:10:55:08
KB3KAK-9	**			39.02567	-76.50067	1.5	N	01:00:57:40
VA2JPN	**			38.97150	-76.49717	1.7	S	06:07:21:19
K3FOR-8	**	**		39.03200	-76.50267	1.9	N	00:08:58:06
WB1HAI-9	**			38.97067	-76.48400	2.0	SE	00:02:25:47
N3MNT-9	**			39.02117	-76.46400	2.5	NE	06:21:14:31
N3HU-9	**			39.01833	-76.44867	3.3	NE	00:02:18:02
N3KNP	**	**		38.97233	-76.55017	3.4	SW	04:01:37:14
W3AFE	**	**		39.03517	-76.45100	3.6	NE	00:02:14:24
K3TH-14	**			38.97383	-76.56283	4.1	SW	08:23:06:24
K3TH-3	**			38.97400	-76.56317	4.1	SW	00:00:14:52
N3HU	**			39.04017	-76.44183	4.2	NE	00:00:01:28





FREKANS : 145.825 FM



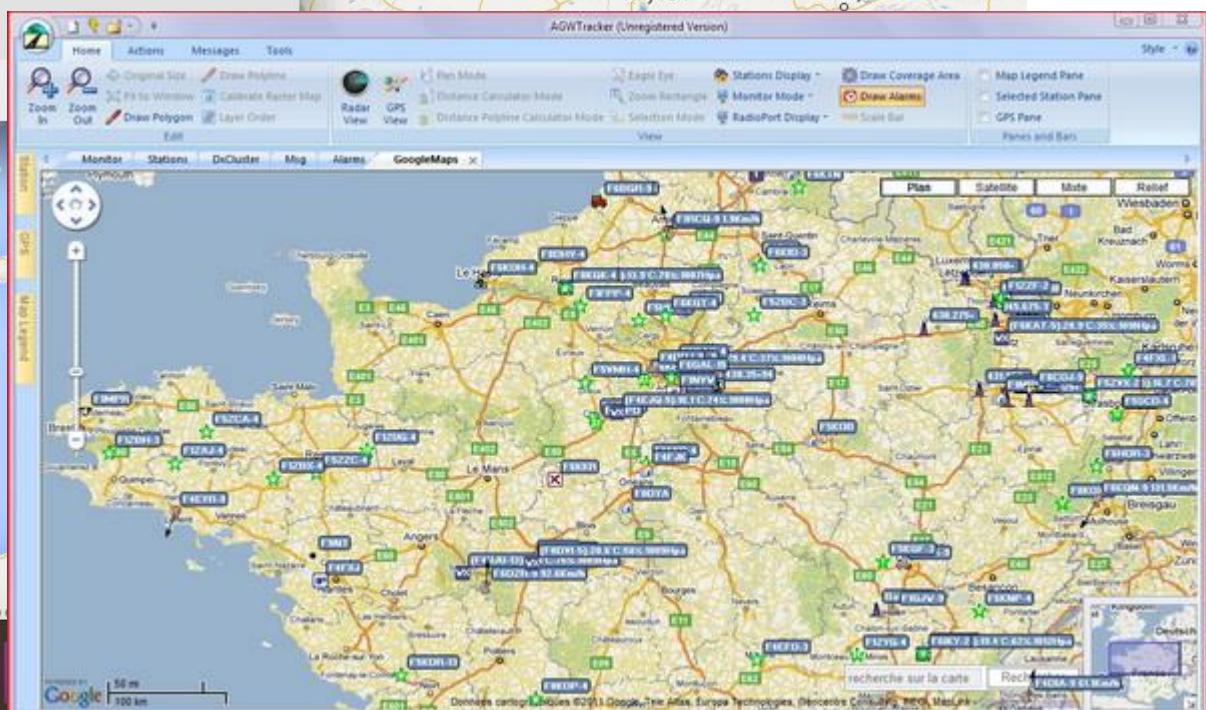
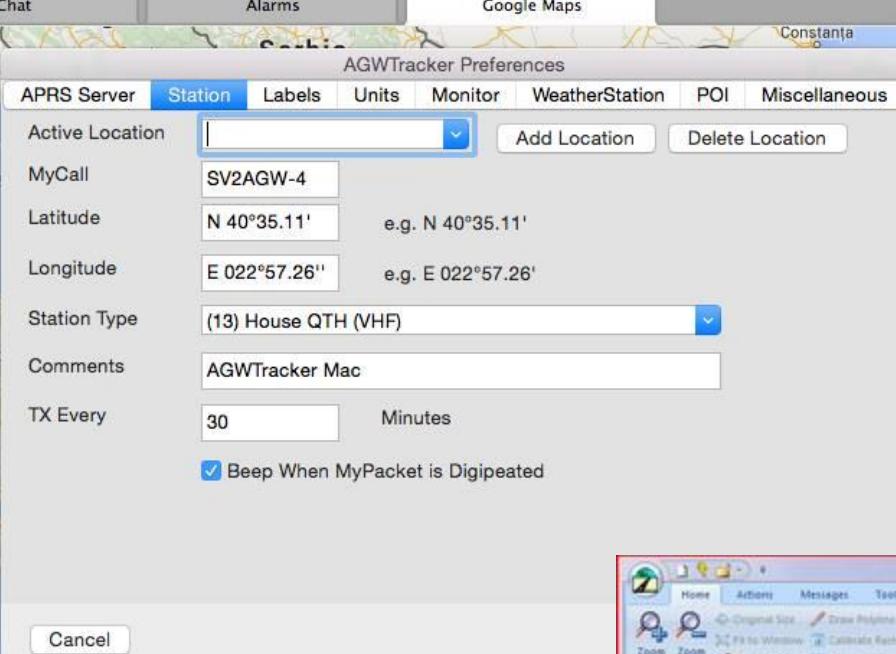
## APRS İLE NELER YAPILABİLİR ?

- Vehicle Position and Movement Reporting
- Weather Reporting
- Telemetry Reporting
- Objects (includes fixed station positions)
- Bulletins
- Direction Finding Information
- Tactical Messaging
- Short (40 character) station-to-station messaging.
- Short bulletins of general interest.
- Digipeater

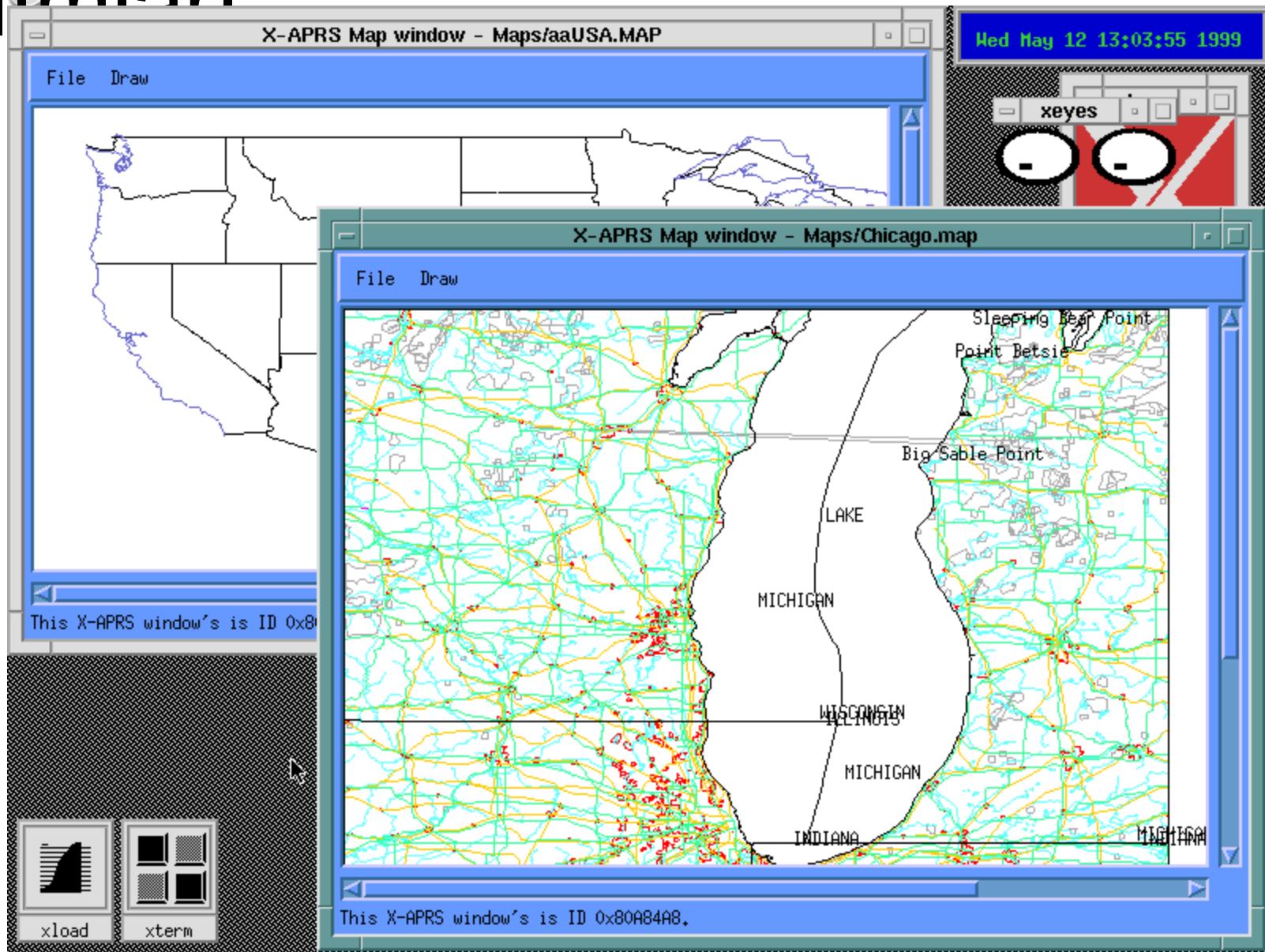
<http://www.aprs-is.net/Presentations/How%20APRS%20Works.pdf>

<b>Software Name (and link)</b>	<b>OS(es)</b>	<b>Description</b>
<a href="#">APRSdos</a>	MS-DOS	The original APRS application. Specialized versions are also available. While not directly APRS-IS capable, it sets the standard for APRS packets.
<a href="#">AFilter</a>	Windows (32 bit)	Data stream filter application.
<a href="#">AGWTracker</a>	Windows (32 bit)	GUI with multiple map types.
<a href="#">AGWTrackerPPC</a>	Windows Mobile	GUI for Windows Mobile
<a href="#">ALogger</a>	Windows (32 bit)	APRS-IS logging application.
<a href="#">APRSISCE/32</a>	Windows Mobile, CE Windows 32 and 64 bit	GUI client for Windows Mobile and Windows 32 & 64 bit OSes
<a href="#">APRS/CE</a>	WindowsCE	GUI client for Windows CE
<a href="#">APRSPoint</a>	Windows (32 bit)	GUI client. Uses MapPoint for maps.
<a href="#">Aprsg</a>	Linux, Windows	IGate
<a href="#">APRS-Go</a>	Windows Mobile	GUI client for Windows Mobile
<a href="#">Aprx</a>	UNIXes, Linux, BSD, Sunos	APRS IGate and digipeater supports Linux AX.25 and serial interfaces.
<a href="#">APRS+SA</a>	Windows (32 bit)	GUI client and IGate. Uses Street Atlas for maps.
<a href="#">javAPRS</a>	Java Applet	GUI applet for web pages.
<a href="#">mAPRS</a>	Java Midlet	Midlet for Mobile Devices.
MacAPRS	MacOS	GUI client and IGate
<a href="#">Packetograph</a>	MacOS	GUI client
pocketAPRS	PalmOS	GUI client for Palm OS. <b>NO LONGER AVAILABLE OR SUPPORTED</b> (Please do not contact me regarding this software. I am not the author of this software)
<a href="#">SARTrack</a>	Windows (32 bit)	GUI designed for Search and Rescue, Tactical callsigns, multi-colour tracks, Search Areas, Messaging, SAR Logging
<a href="#">SmartPalm</a>	PalmOS	Text client.
<a href="#">UI-View</a>	Windows (16 & 32 bit)	GUI client and IGate.
WinAPRS	Windows (16 & 32 bit)	GUI client and IGate
<a href="#">X-APRS</a>	Linux	X-Windows GUI client and IGate
<a href="#">XASTIR</a>	X-Window OSes (Linux/Unix/MacOSX)	GUI client and IGate.
<a href="#">YAAC</a>	Windows (32 & 64 bit) Mac OS X, Linux, FreeBSD	GUI client and IGate

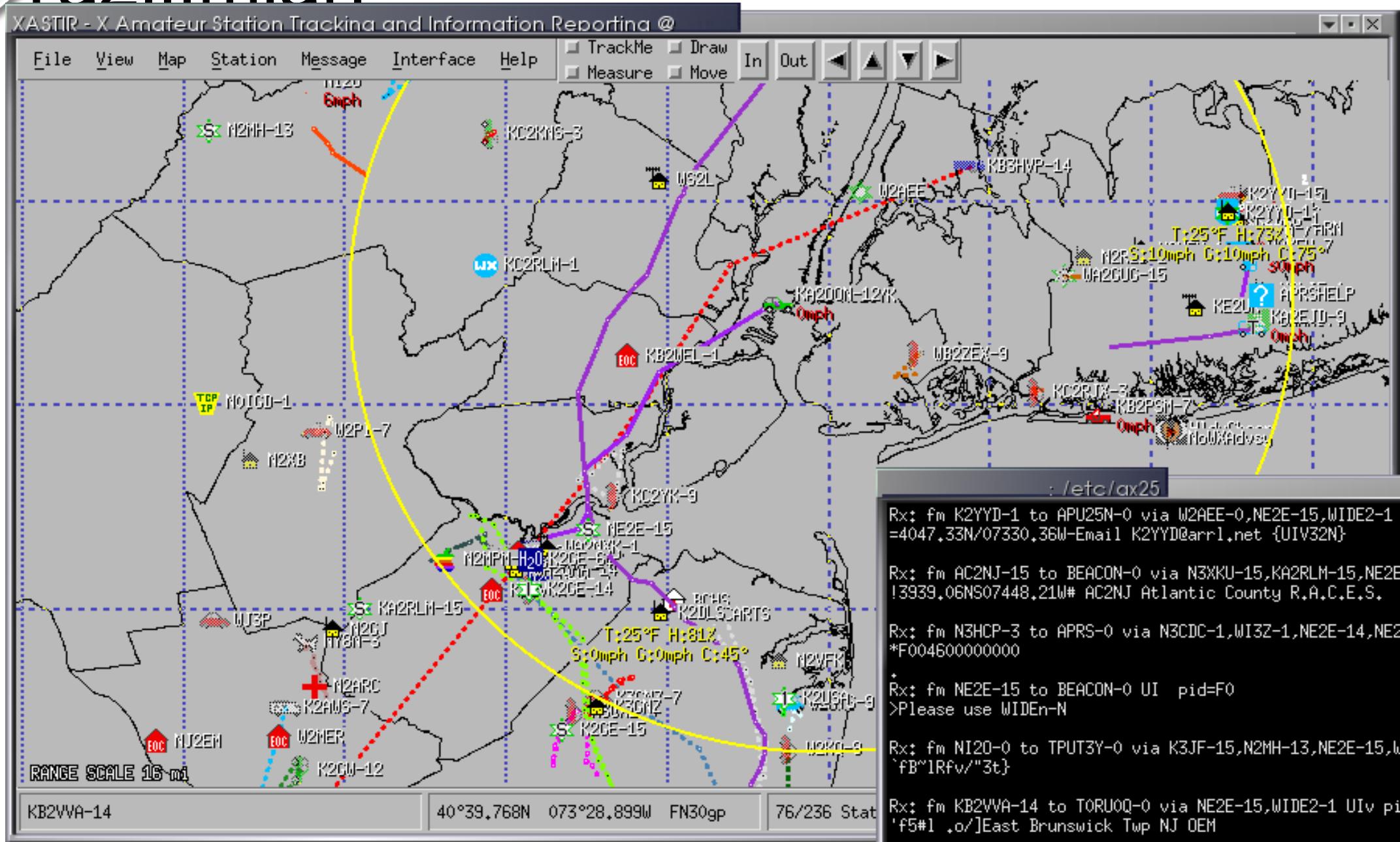
The main window displays a map of the Mediterranean region. Key locations labeled include Italy (Rome, Naples, Palermo), Sicily (Taormina, Messina), Malta, Tunisia (Tunis, Sousse, Sfax), Libya (Tripoli, Misrata, Sirte, Bengazi), and surrounding islands like Corsica and Sardinia. The map shows roads and coastlines. A toolbar at the bottom includes icons for TX Position, APRS Net Connect, Stations Display, Monitor, Stations, Chat, Alarms, Google Maps, and Print.



# PC Yazılımları



# PC Yazılımları



**PC Ya**

APRSPoint

File Edit View Comm Tools Help

30.56076, -119.99197 W4TTU-1>BEACON,WIDE2-2:I3902.63N/07722.48W&/ 30M/2M Sugarland Run VA iGate

Type place or address Find Terrain Map

My station

- RF reports (20)
  - Positions (10)
    - AA3JY
    - AA3JY-2
    - K4AG
    - K4SHP-15
    - K7MXE-4
    - VE4GLS
    - W1JMC
    - W4TTU-1
    - WB8SKP-3
    - WB8SKP-WX
  - Status (6)
  - Weather (4)
  - Unknown
  - TCP reports

Connected to AGW Packet Engine

GPS Position Fix

New Message

WA8LMF-1

11/9/2011

11:26 AM

Start UI-Vie... sound... WA8L... APRS... IFR-Tr... APR... Windo... Z 36 11:26 AM

## WEB SAYFALARI

Online Service	Description
<a href="#">jFindu</a>	Display of APRS and D-PRS activity using Java and static maps
<a href="#">findU</a>	Static display of APRS and CWOP activity
<a href="#">APRS World</a>	Static display of APRS activity on self-generated maps
<a href="#">aprs.fi</a>	Google map display of APRS activity

# Frekanslar

## Sample APRS VHF frequencies

- 144.390 MHz — [Colombia, Chile, Indonesia, Malaysia, North America, Thailand](#)
- 144.575 MHz — [New Zealand](#)<sup>[5][6]</sup>
- 144.640 MHz — [Taiwan](#)
- 144.660 MHz — [Japan](#)
- 144.800 MHz — [South Africa, Europe,](#)<sup>[7]</sup> [Russia](#)
- 144.930 MHz — [Argentina, Uruguay](#)
- 145.175 MHz — [Australia](#)
- 145.570 MHz — [Brazil](#)
- 145.825 MHz — [International Space Station](#)<sup>[8]</sup>
- 430.5125 MHz — [Netherlands \(UHF\)](#)
- 433.800 MHz Primary; 432.500 MHz Secondary — [Europe \(UHF\)](#)

# SSID

<b>-0 (No SSID)</b>	<b>Home Station</b>
<b>-1</b>	<b>Digipeater, or Home Station running a Fill-In Digi,</b>
<b>-2</b>	<b>Digipeater [#2] on 70CM</b>
<b>-3</b>	<b>Digipeater [#3]</b>
<b>-4</b>	<b>HF to VHF Gateway</b>
<b>-5</b>	<b>IGate (Dedicated system, not home station)</b>
<b>-6</b>	<b>Operation via Satellite</b>
<b>-7</b>	<b>Kenwood D7 Handheld</b>
<b>-8</b>	<b>Maritime vessels - Boats, sailboats and ships (VHF / UHF)</b>
<b>-9</b>	<b>Mobiles (VHF / UHF)</b>
<b>-10</b>	<b>Operation via Internet Only (No RF capability)</b>
<b>-11</b>	<b>Aircraft, Helicopters or Balloons</b>
<b>-12</b>	<b>APRStouch-tone users and Portable Units such as Laptops, Camp Sites etc</b>
<b>-13</b>	
<b>-14</b>	<b>Interstate Truckers</b>
<b>-15</b>	<b>Operation via HF</b>

# PATH / YOL

WIDE1-1, WIDE3-3 : Beni duyan herkes aktarsın ama en fazla 3 atlama yapılsın

WIDE\*, WIDE3-3 : Ben duyдум, aktarıyorum (\*), 3 atlamam daha var

WIDE\*, WIDE3-2 : Ben duyдум, aktarıyorum (\*), 2 atlamam daha var

WIDE\*, WIDE3-1 : Ben duyдум, aktarıyorum (\*), 1 atlamam daha var

WIDE\*, WIDE\* : Ben duyдум, aktarıyorum (\*), duyan aktarmasın



High-Level  
Wide-Coverage  
Digipeater



High-Level  
Wide-Coverage  
Digipeater



High-Level  
Wide-Coverage  
Digipeater



Home Station  
Fill-In Digipeater



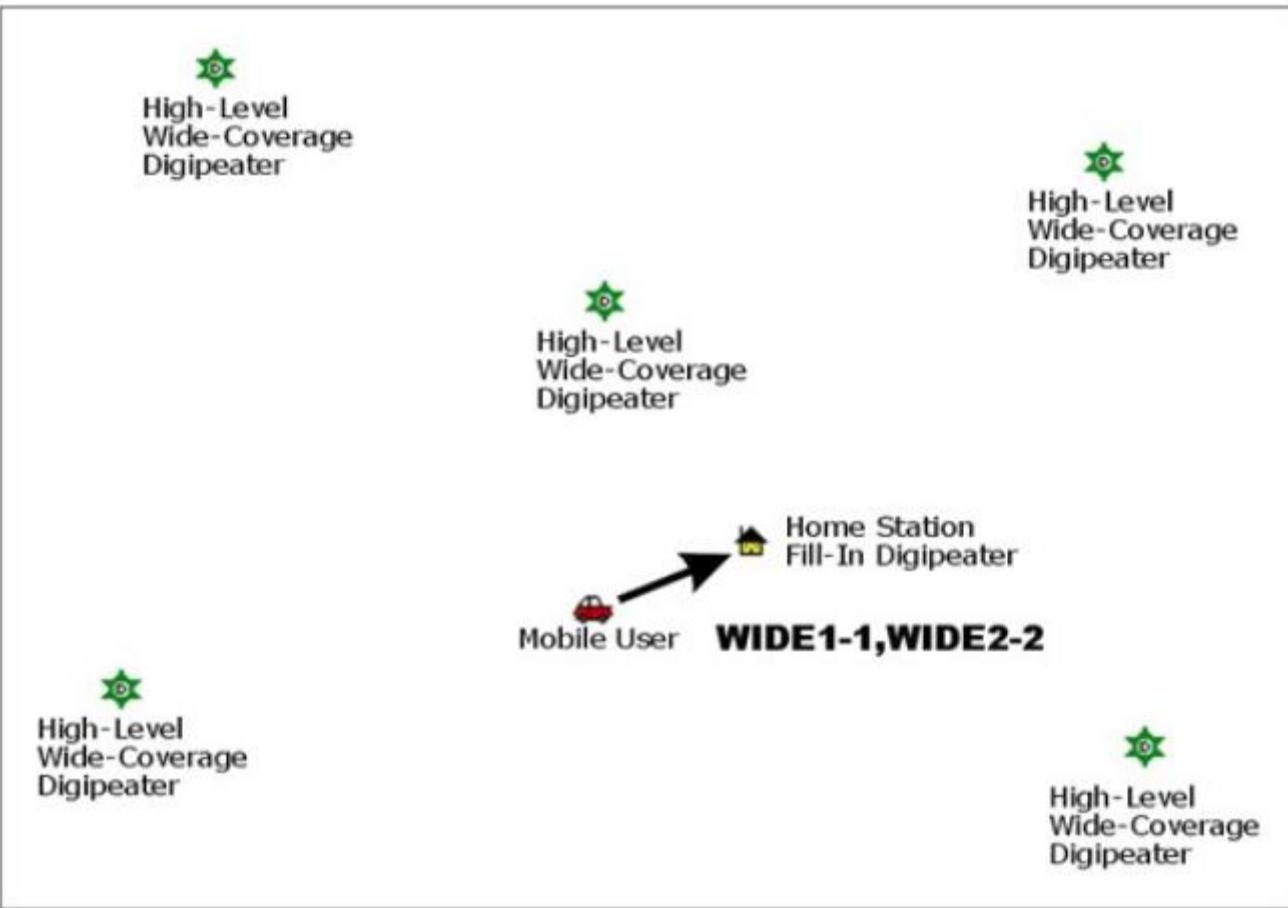
Mobile User

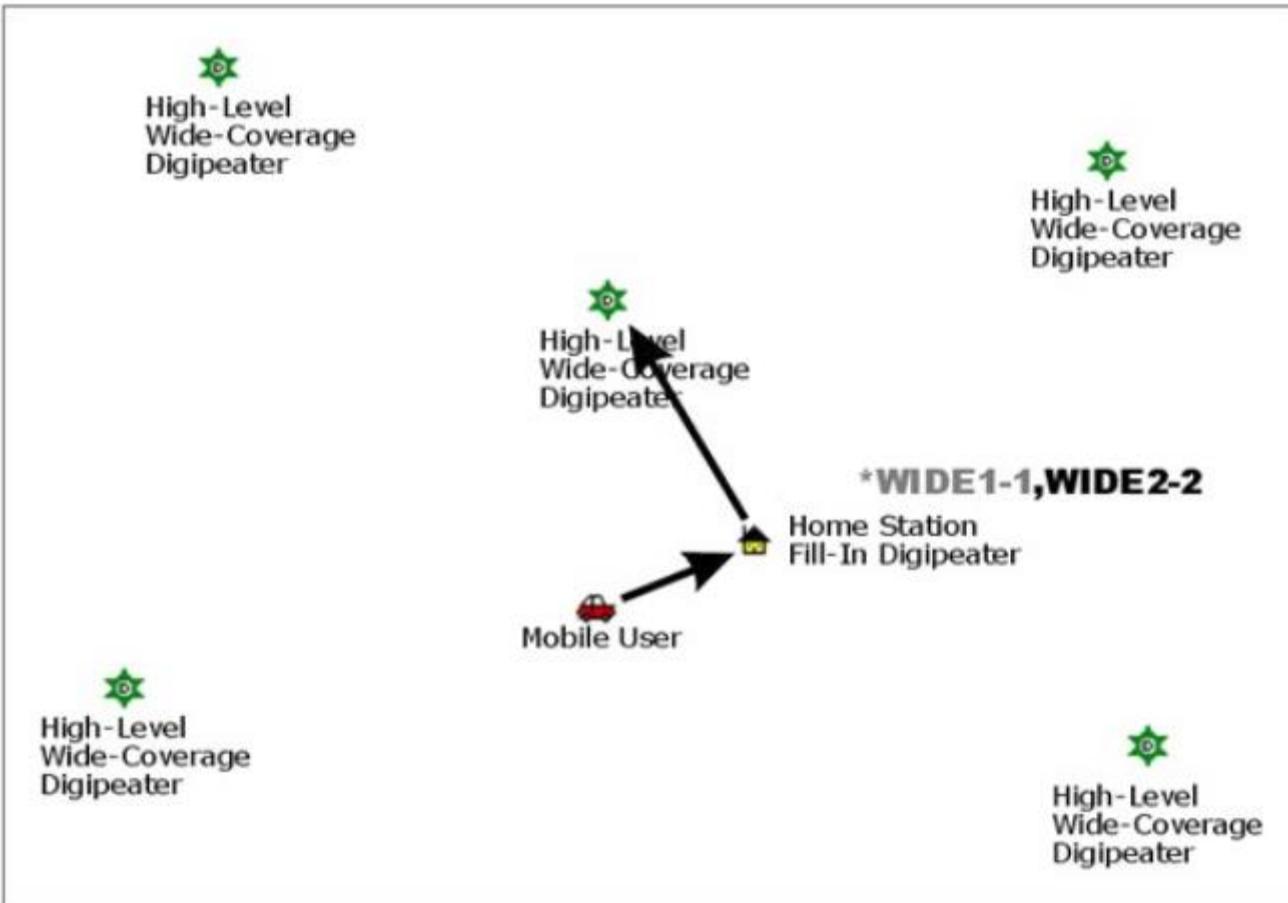


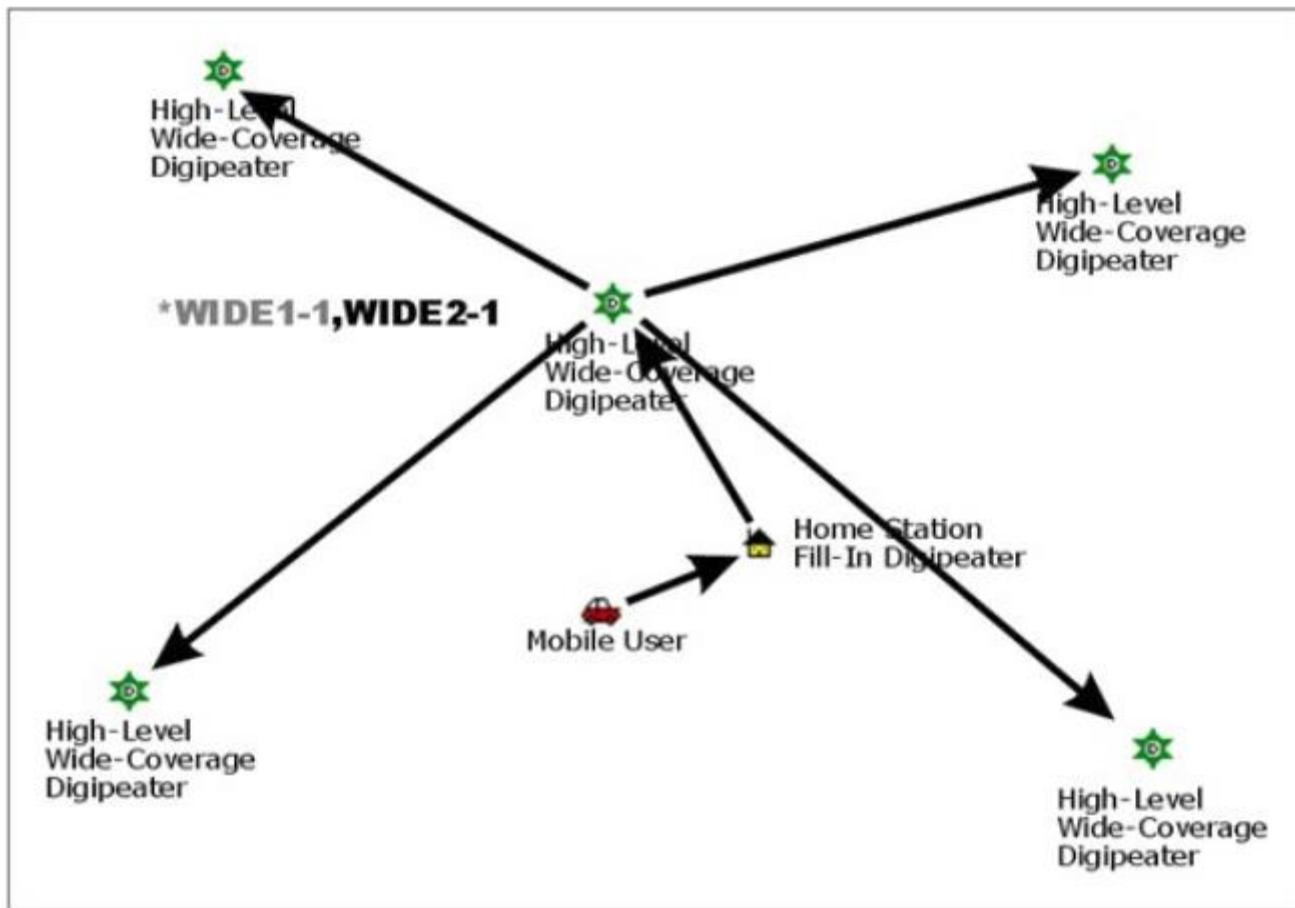
High-Level  
Wide-Coverage  
Digipeater

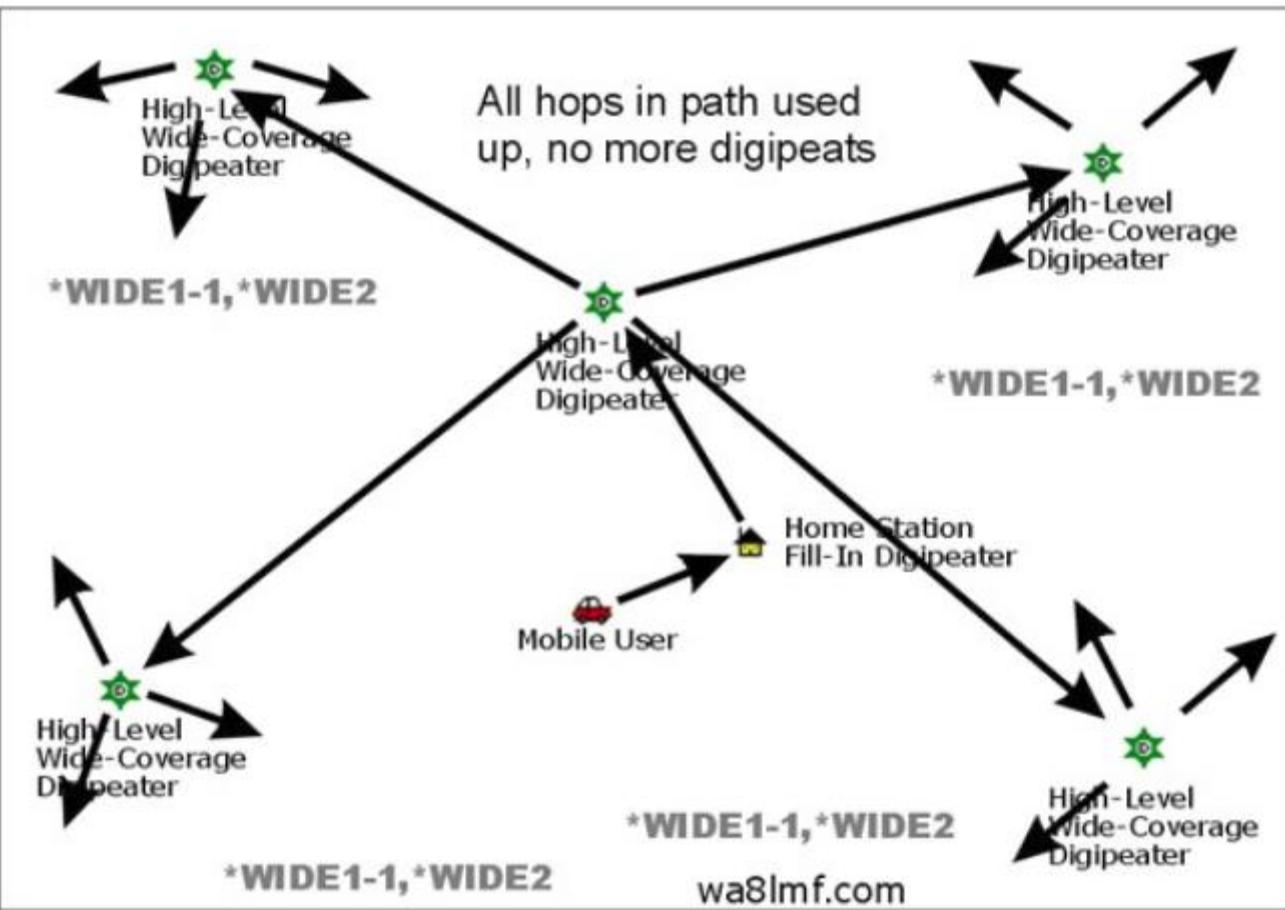


High-Level  
Wide-Coverage  
Digipeater









<http://www.tapr.org>

<http://www.aprs.org>

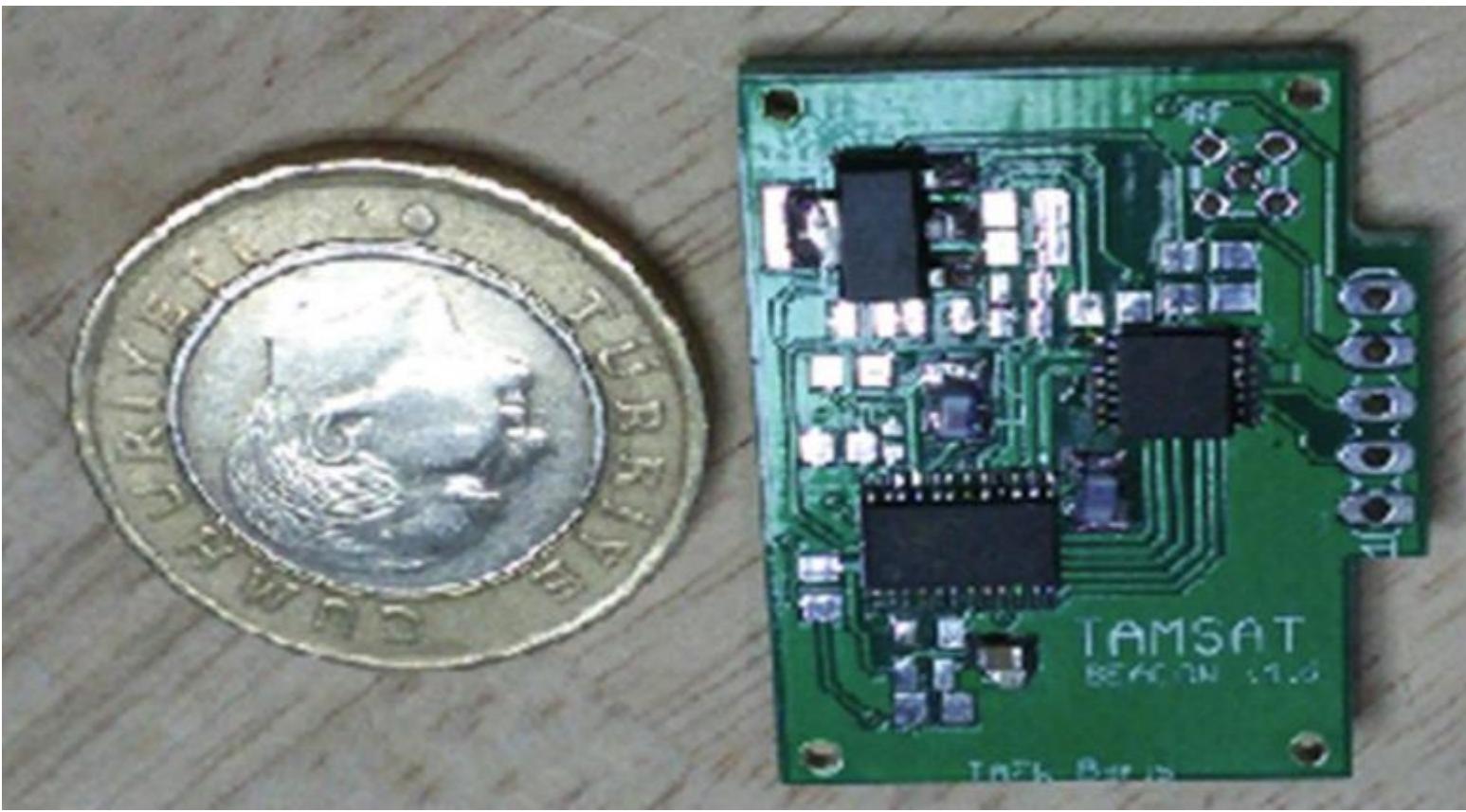
<http://www.aprs.net>

<http://tnc-x.com/kiss.htm>

OLASI

# PROCELERİMİZ

# HEDEF PROJE-1



# HEDEF PROJE-1

<http://github.com/barisdinc/MicroBeacon>

9 commits 1 branch 0 releases 1 contributor GPL-2.0

Branch: master ▾ New pull request Create new file Upload files Find file Clone or download ▾

barisdinc Draft Latest commit 62b15a5 on Mar 31, 2017

src	MRSE testts	2 years ago
LICENSE	Initial commit	3 years ago
README.md	ANTRAK APRS info added	3 years ago
TAMSAT_BEACON_ICD_v03.pdf	Draft	a year ago

README.md

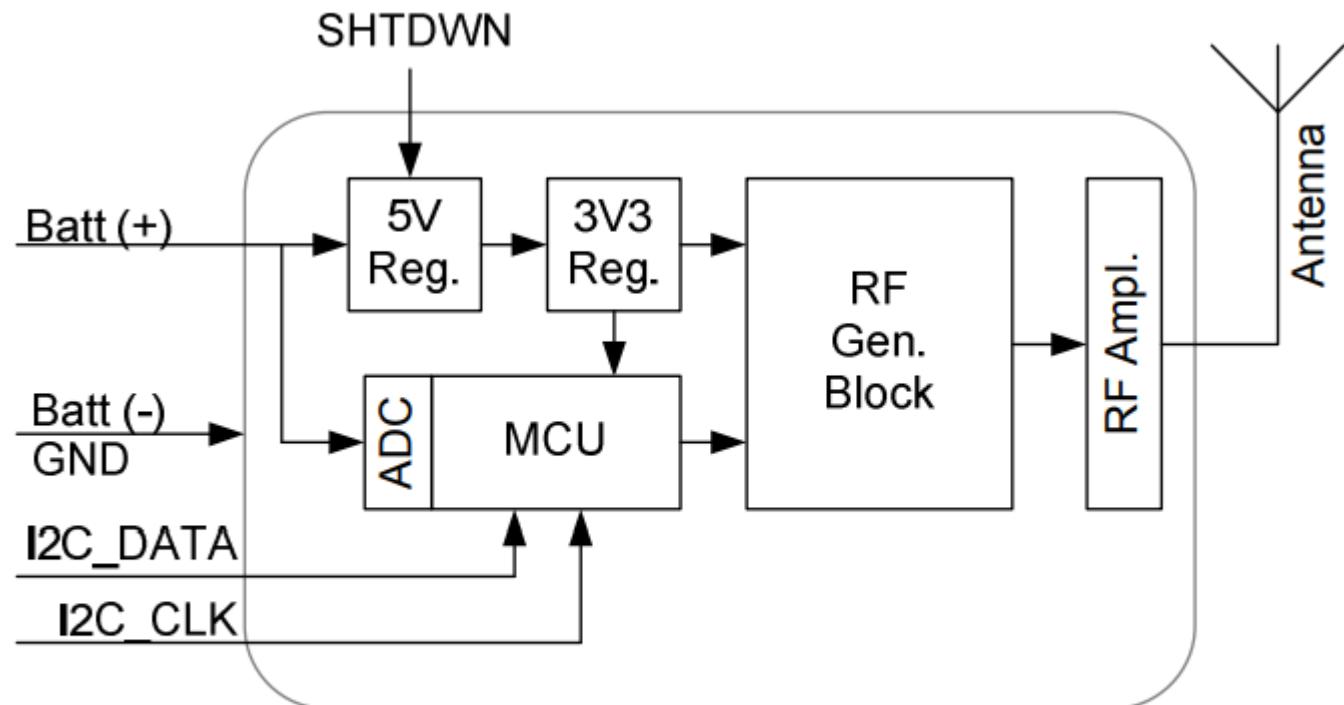
## MicroBeacon

A micro beacon for FM/CW morse and AFSK/FSK ax25 transmission with microchip mcu 18F1825 The schematics and pcb files created using Eagle are ahred on another github repository. Please check <http://www.github.com/barisdinc> for more details

Project is developed for TAMSAT/AMSAT-TR the Turkish Amateur Satellite Research organisation. Original work started by Kadir using the LPC/ARM architecture and ADF7012.

Another project will start for ANTRAK (<http://www.antrak.org.tr>) which will be a pocket APRS transmitter (modem+transmitter) on a single micro boards..

## HEDEF PROJE-1



Şekil-1 Beacon Genel Blok Yapısı

## HEDEF PROJE-2

### ASELSAN 4800 ile APRS



- Hem ses haberleşmesi hem de APRS aynı anda olacak
- GPS ile arayüzlenebilecek
- Gelen mesajları ekranında yazabilecek

**TEŞEKKÜRLER**

**BARİŞ DİNÇ**

**<http://www.barisdinc.com.tr>**

**barisdinc@gmail.com**