How To Get Your Message Out When Your Government Turns Off The Internet

Bruce Sutherland - KO4IN

DEFCON 19

/usr/bin/whoami

- Information Systems field 20+ years
- Designed and implemented networks since ARCNet was standard
- Writing code professionally 15+ years
- Licensed Ham Radio operator 8+ years
- Much prefer UNIX-ish OS's over Microsoft-anything
- Severe disdain for government interference

About Ham Radio

- Old tech circa 1900
- Need at least 2 skilled operators at either end
- Typically need favorable ionosphere conditions
- Or……

A Monster Station

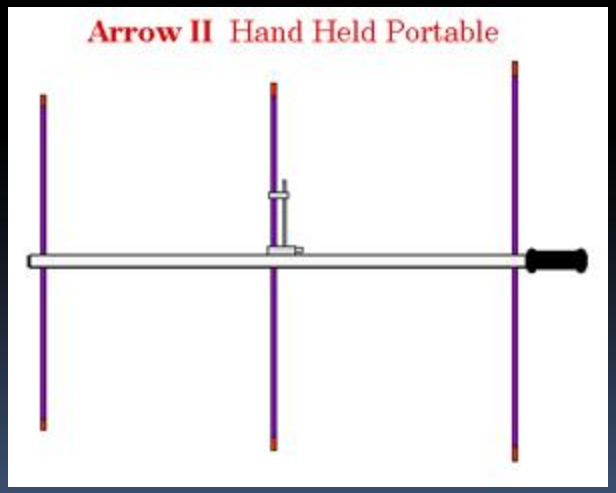
= ~ $6,000.00

= ~ $4,000.00

= ~ $10,000.00

Equipment we will use

- Yaesu VX-8R ~ $350.00
- Handheld yagi ~ $50.00



Obtaining a Ham Radio License

- Easy for anyone with ½ a brain
- Only need a Technician class license to do the things in this talk
- Study the ARRL (arrl.org) study guide
- Memorize the test online (not recommended)
- Take the test (check arrl.org for times & locations)
- Wait for FCC to post your license record
- Once a call-sign is assigned….You're Good To Go!

Ham Radio tech we will use

- VHF Band (144 MHz – 148 MHz)
- Automatic Packet Reporting System (APRS)
- Handheld transceiver (anything APRS enabled)
- Portable Yagi antenna (preferred)
- An amateur radio satellite (ISS, PC-SAT, HOPE-1, ARISSat-1)

About APRS (aprs.org)

- Developed in the late 1980's
- Developed by Bob Bruninga, WB4APR
- Real-time tactical digital protocol using AX.25
- Shares position and ID (call sign) info among a large number of local stations
- Digipeater enables sharing over wide area
- Traffic routed to internet via IGate

Other necessary infrastructure

- Twitter
- IGate in another country
- APRS to Twitter Gateway

APRS via Satellite

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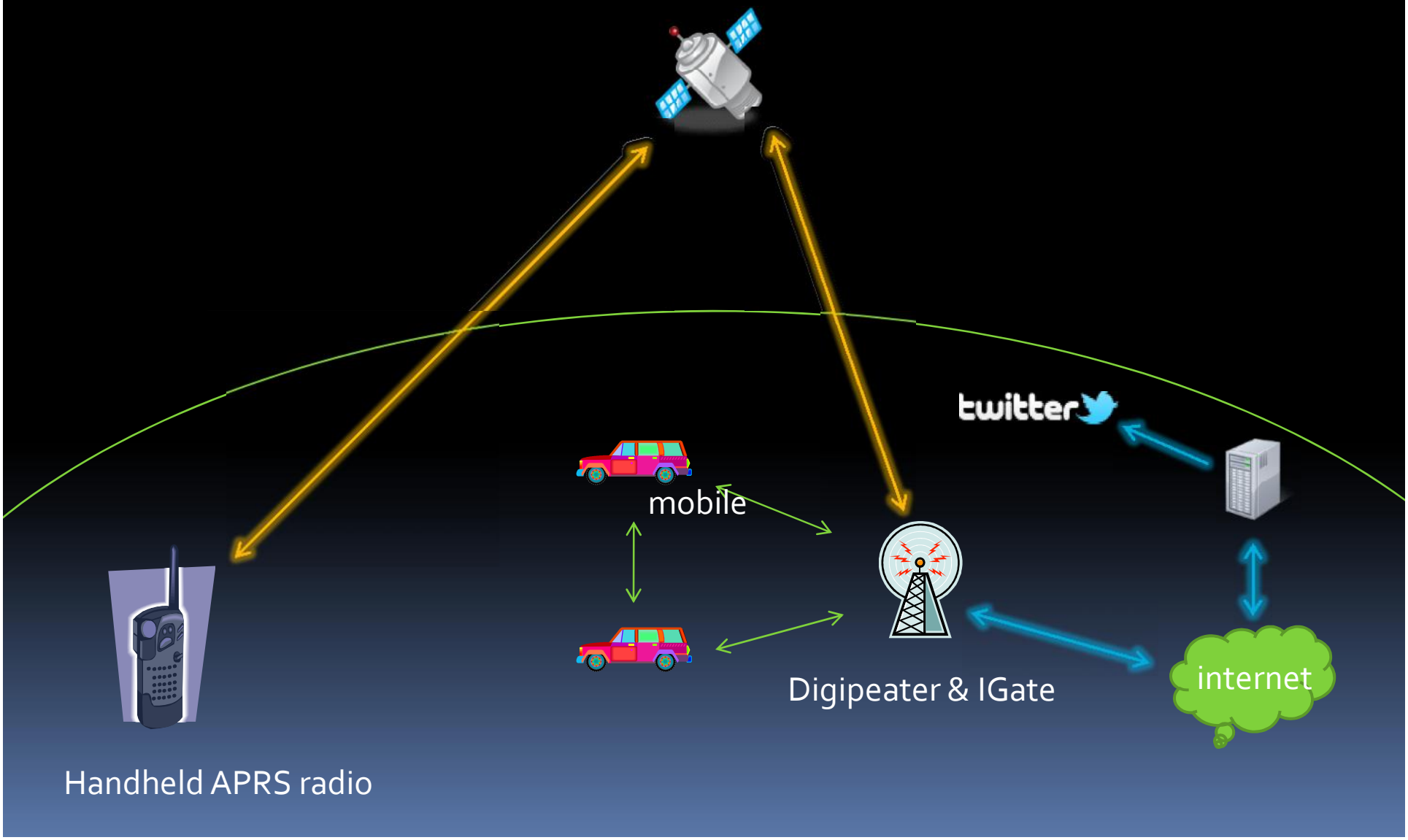


Setup to send to Twitter

- Add "ARISS" to the "DIGIPATH" field of the radio
- Compose your Twitter message like so:

:TWITR: <Your message text goes here >

- Wait until both you and an IGATE are within the satellite's footprint.
- Send the message

Ham radio satellites

- International Space Station (ISS)
- PC-SAT (Navy OSCAR-44)
- HOPE-1 (Chinese can't get it working)
- ARISSat-1 (launches Summer 2011)
- Check AMSAT's Operational OSCAR Satellite Status summary at http://www.amsat.org/amsat-new/satellites/status.php

Satellite Pass Prediction

- www.n2yo.com - Web based (free)
- Satscape – Java based local install (free)
- AMSAT pass predictions (free & simple)

www.amsat.org/amsat-new/tools/predict/

Pass predictions (ISS)

Time has 24-hour format (example 18:35 vs. 6:35pm)

Start		Max altitude			End		All passes		
Date, time	Az	Time	Az	El	Time	Az	Mag	Map	Action
6/23 18:24	SSE 152°	18:27	SE 123°	3°	18:29	E 94°	1.0	☐	Details
6/23 19:57	SW 218°	20:02	SE 136°	55°	20:07	NE 53°	-2.2	☐	Details
6/23 21:33	W 268°	21:38	NNW 331°	16°	21:43	NE 35°	-0.3	☐	Details
6/23 23:12	NW 310°	23:15	N 351°	5°	23:19	NE 32°	0.7	☐	Details
6/24 0:49	NW 328°	0:53	N 12°	6°	0:56	NE 57°	0.6	☐	Details
6/24 2:25	NW 322°	2:30	NE 32°	22°	2:34	E 101°	-0.3	☐	Details
6/24 4:01	NW 302°	4:06	SW 227°	32°	4:10	SSE 152°	-	☐	Details
6/24 18:58	SSW 198°	19:02	SE 131°	21°	19:07	ENE 63°	-0.6	☐	Details
6/24 20:33	WSW 250°	20:38	NW 324°	30°	20:43	NE 41°	-1.2	☐	Details
6/24 22:11	WNW 296°	22:15	NNW 344°	7°	22:19	NE 31°	0.5	☐	Details
6/24 23:49	NW 325°	23:52	N 5°	5°	23:55	NE 43°	0.8	☐	Details
6/25 1:25	NW 326°	1:29	NNE 24°	13°	1:34	E 83°	0.0	☐	Details
6/25 3:01	NW 311°	3:06	NNE 21°	88°	3:11	SE 132°	0.4	☐	Details
6/25 4:38	W 280°	4:41	SW 236°	6°	4:45	S 192°	-	☐	Details

www.n2yo.com

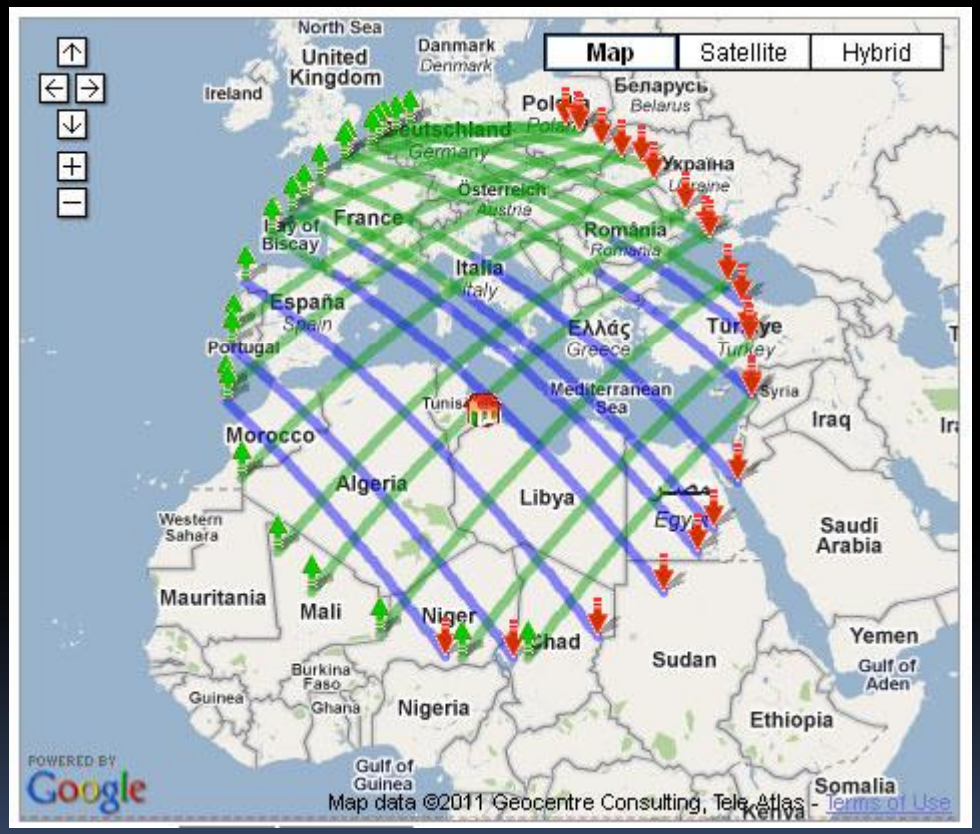
Pass predictions (ISS)

www.n2yo.com

Use Cases

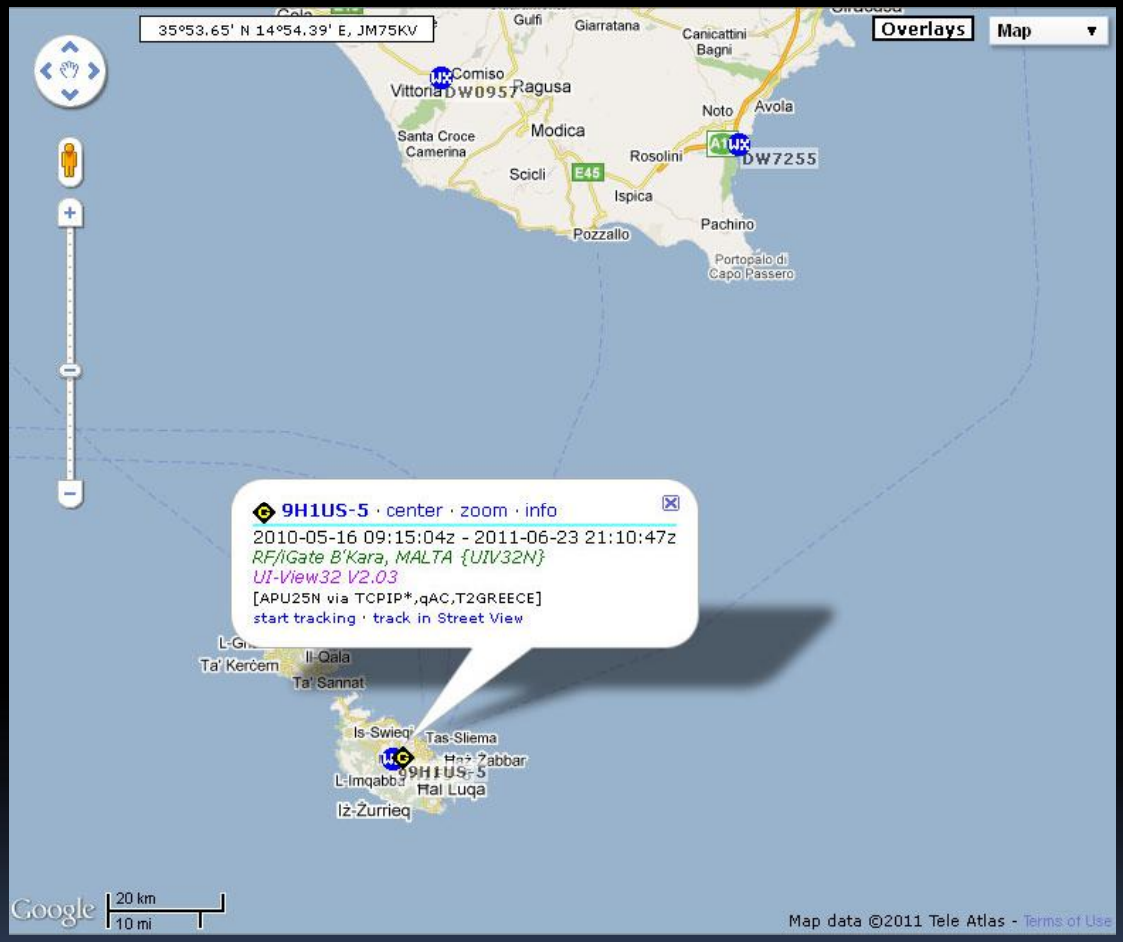
- Libya
- Egypt
- Syria
- USA?

Use Case - Libya



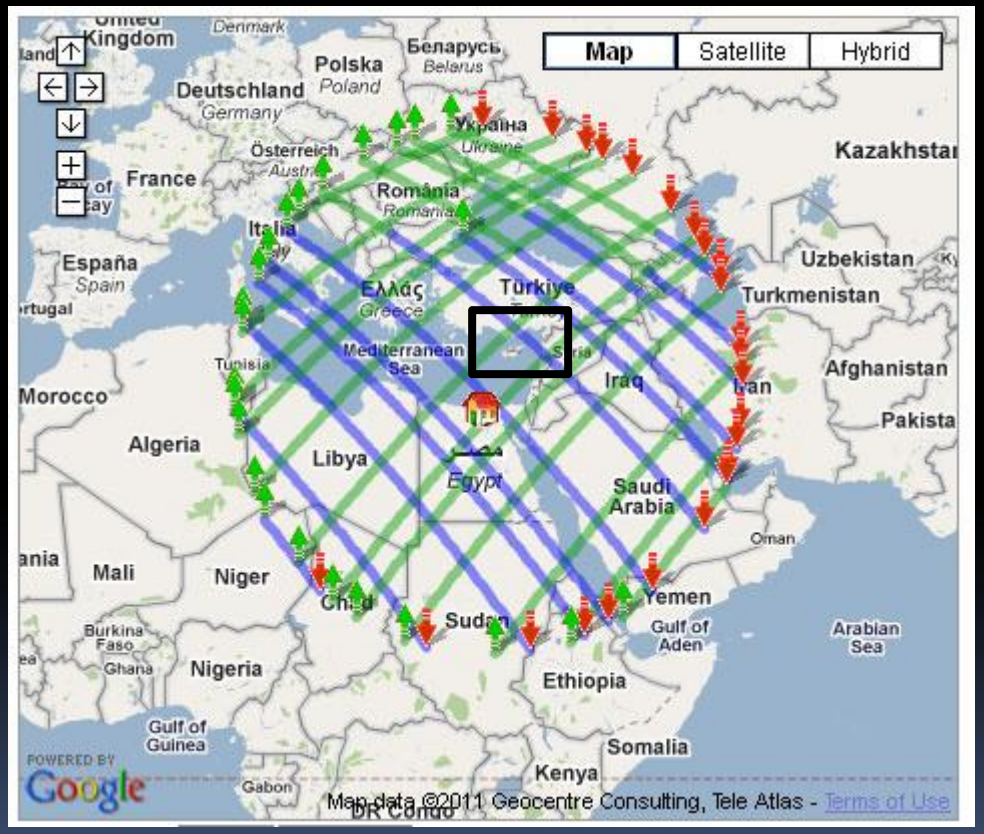
www.n2yo.com

Use Case - Libya



www.aprs.fi

Use Case - Egypt



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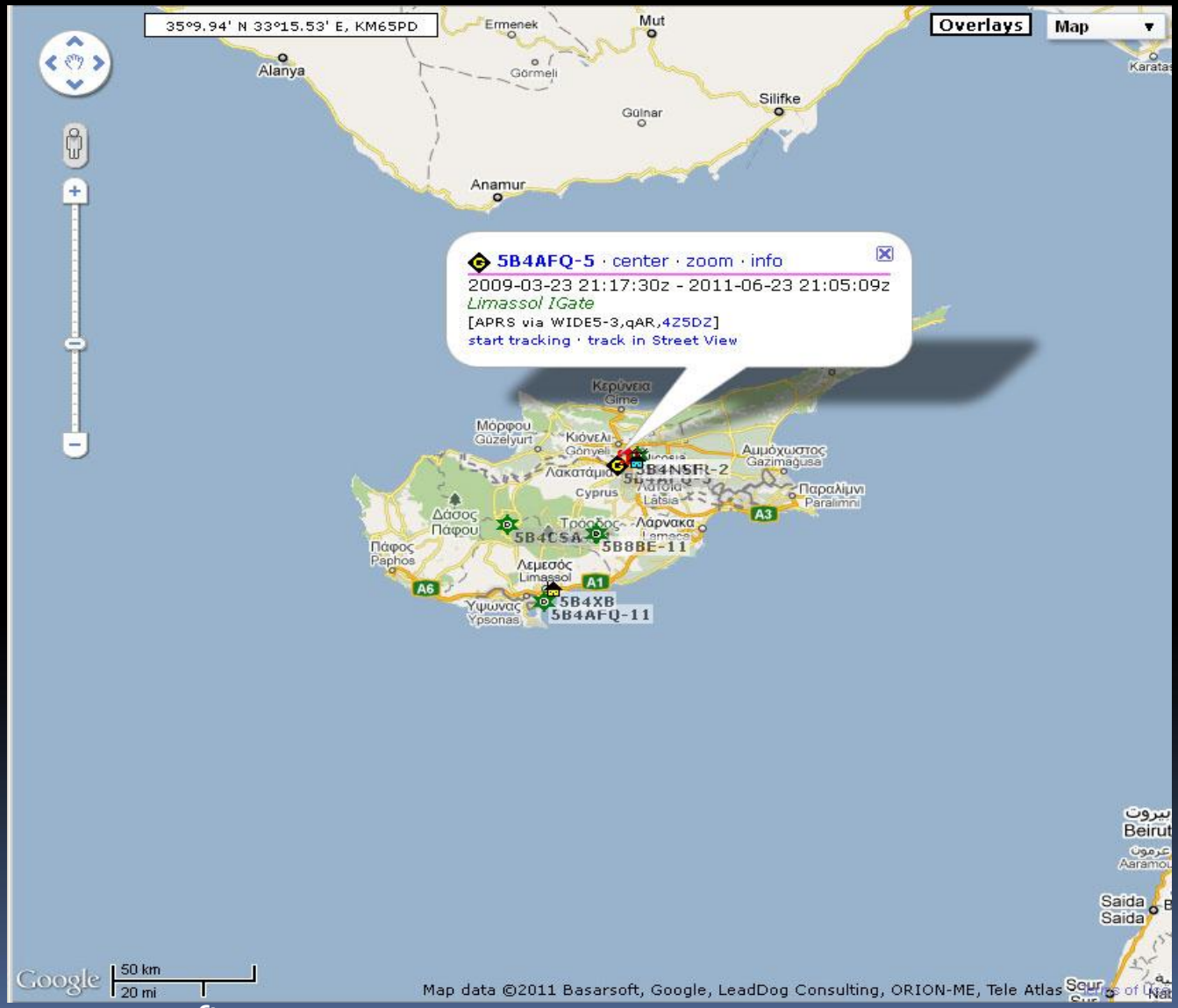

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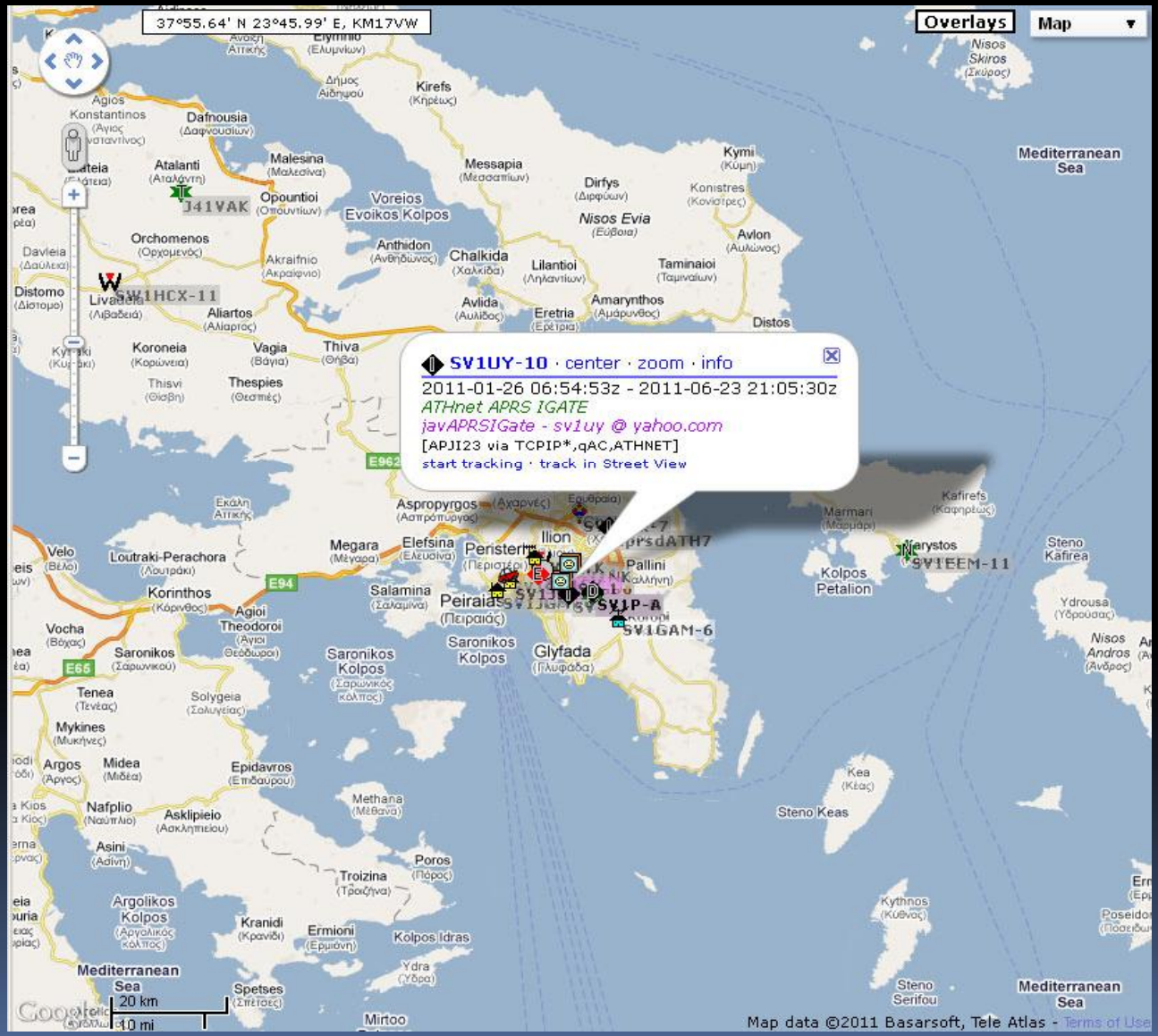


This System is not Foolproof

You can be detected

This System is not Foolproof

You can be jammed

This System is not Foolproof

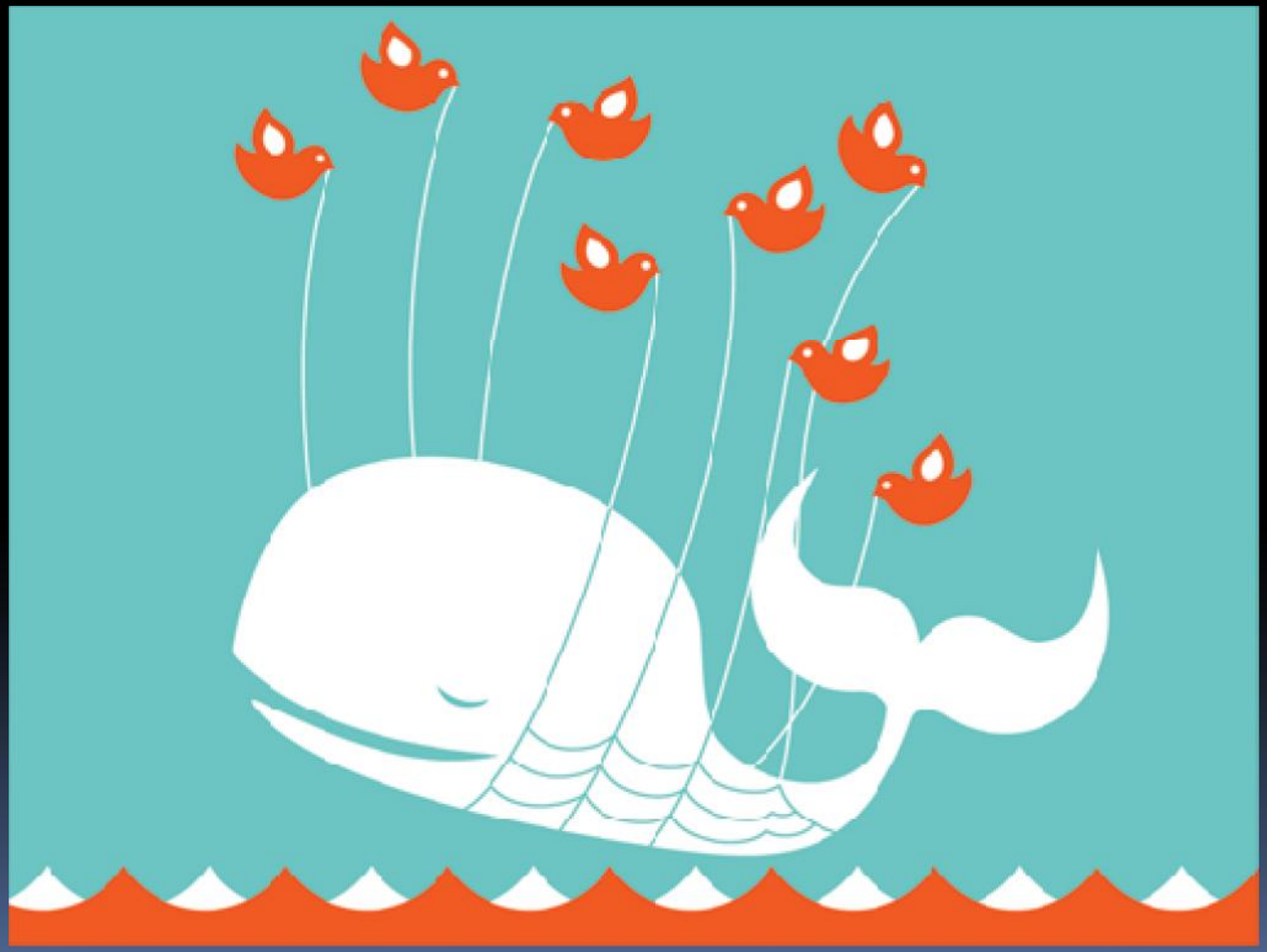
Internet links can go down

This System is not Foolproof

You can miss the satellite

This System is not Foolproof

Twitter invented the "Fail Whale"



Resources

- www.APRS.org – All about APRS
- www.AMSAT.org – Amateur Radio Satellite info
- www.N2YO.com – Web based sat tracking
- www.YAESU.com – Ham Radio equipment
- www.ARROWANTENNAS.com – Antennas
- www.BRUCESUTHERLAND.name – My site
- bmsutherland@gmail.com – My email