

PSKmail @ GAREC 2013

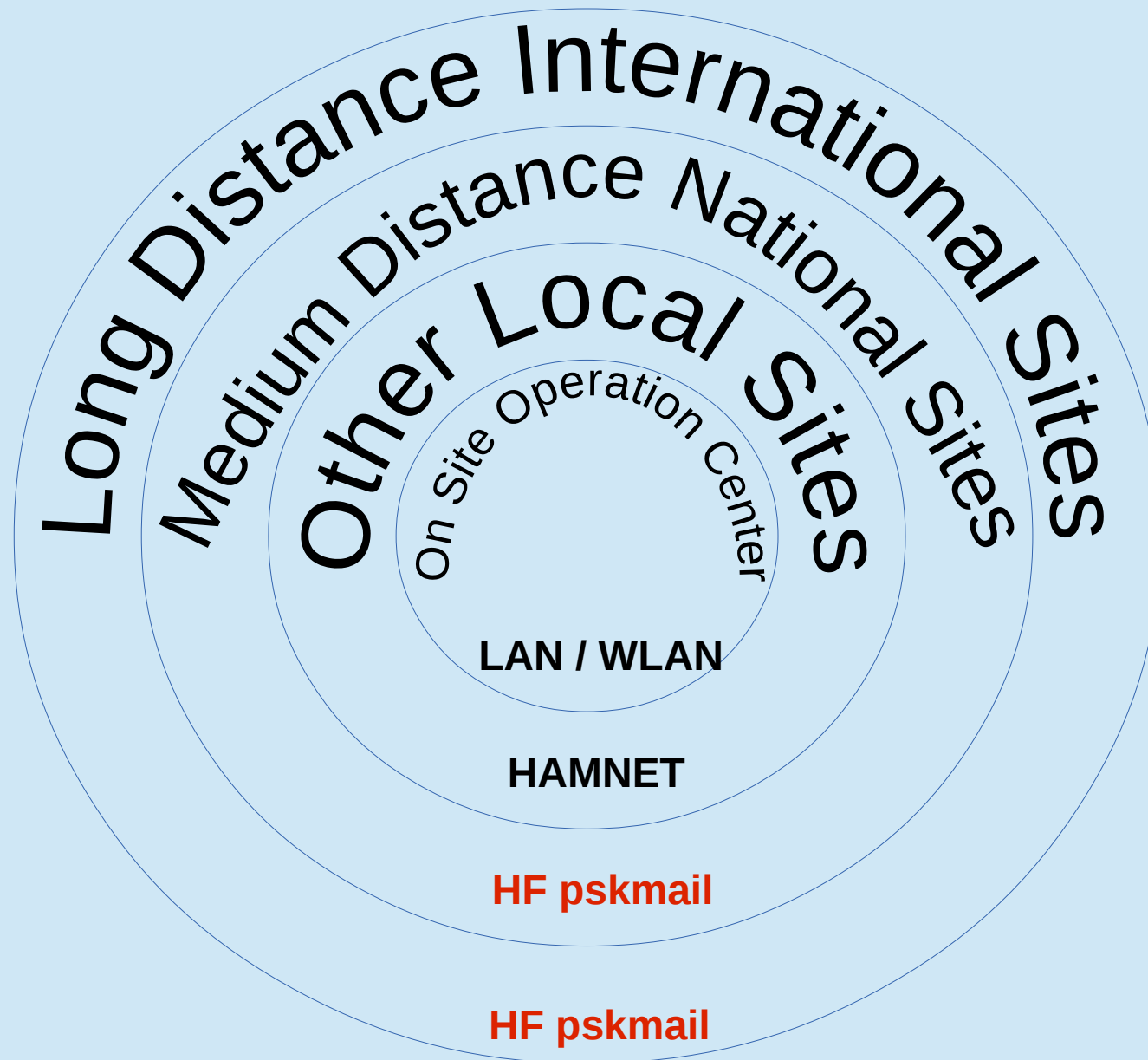
The swiss army knife for HF digital communication ?

27.06.2013

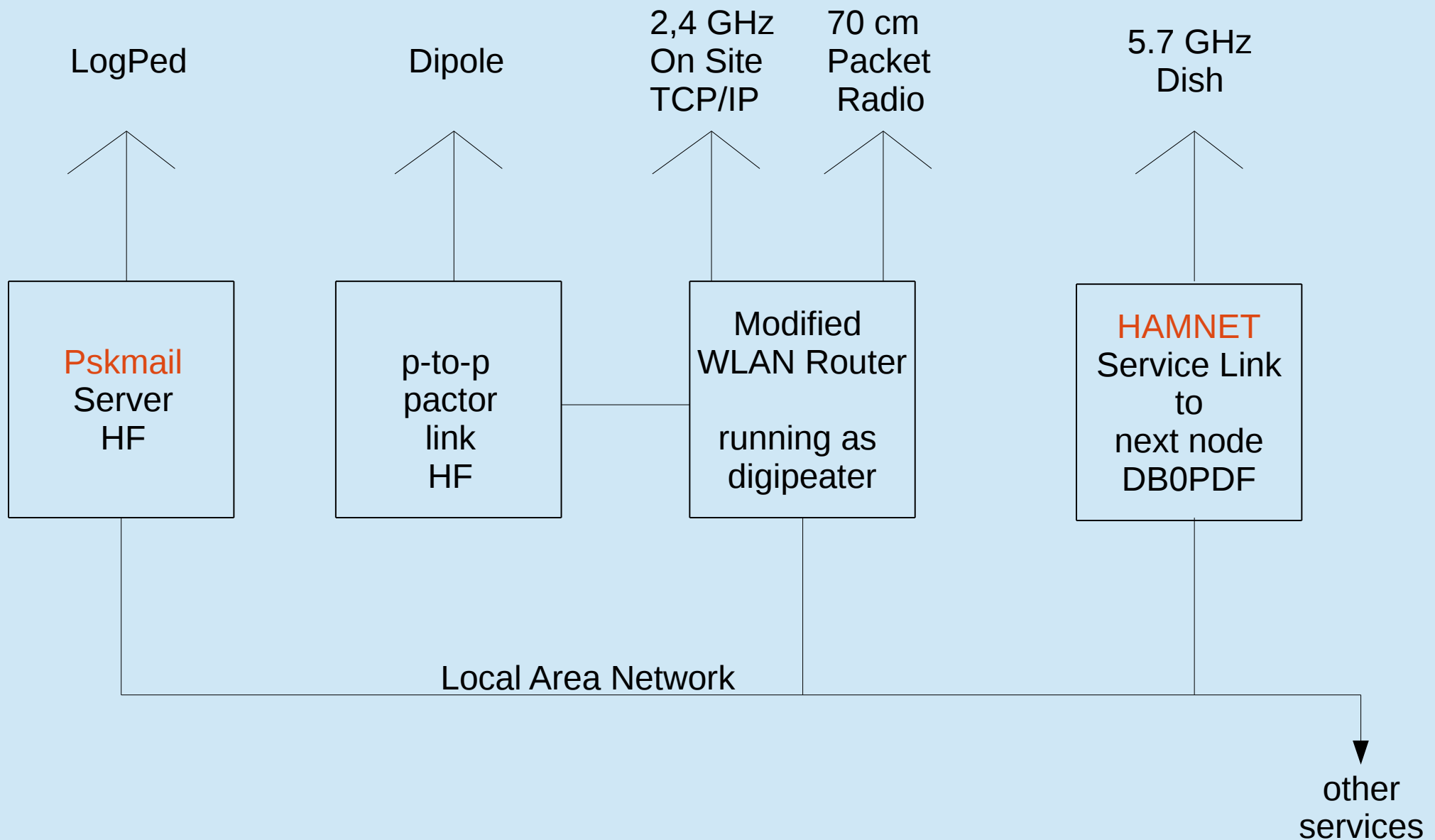
Rein Couperus, PA0R



Possible Disaster Response Setup

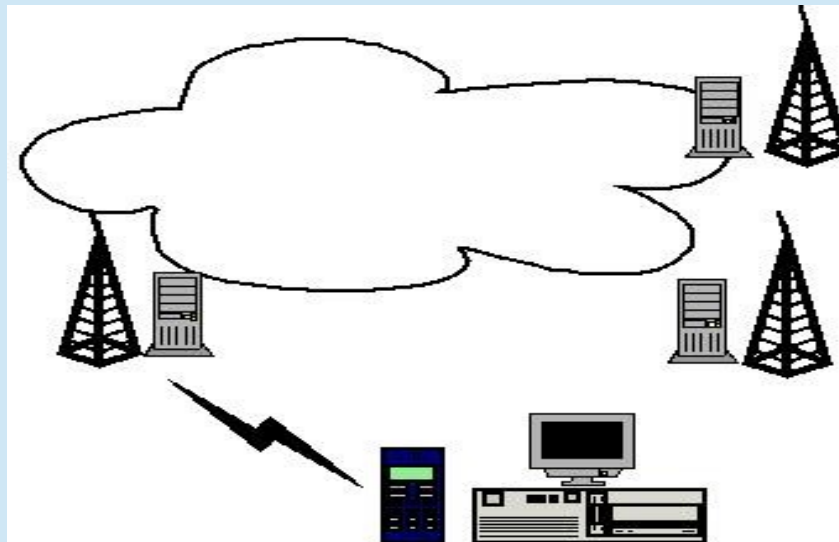


DA5UWG/DF3FS Test Setup



PSKmail ???

- PSKmail is a ARQ communication system optimized for HF frequencies, used **when internet access is not within range.**



PSKmail ???

- PSKmail is a ARQ communication system optimized for HF frequencies, used **when internet access is not within range.**
- It offers a flexible **long-haul gateway** to all **usual internet based functions**



Footprint = 6000 km
(Clipperton to Atlanta USA)

PSKmail ???

- PSKmail is a ARQ communication system optimized for HF frequencies, used **when internet access is not within range.**
- It offers a flexible **long-haul gateway** to all **usual internet based functions**
- PSKmail uses a protocol developed by K9PS for use on HF, and adds modern DTN techniques for document transfer between servers and clients when the Internet is out.

Who is involved?

- PSKmail is a community effort.

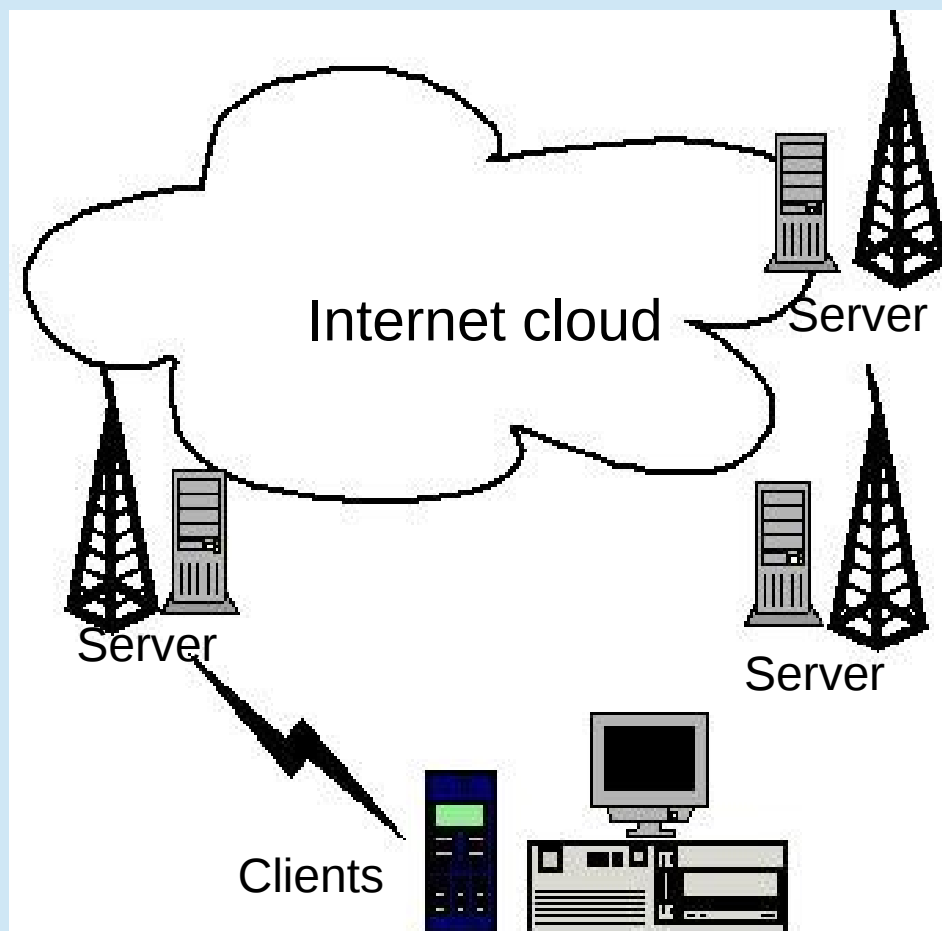
- Developers:

- Rein, PA0R
- Per, SM0RWO
- John, VK2ETA
- Klaus, DL4OAH



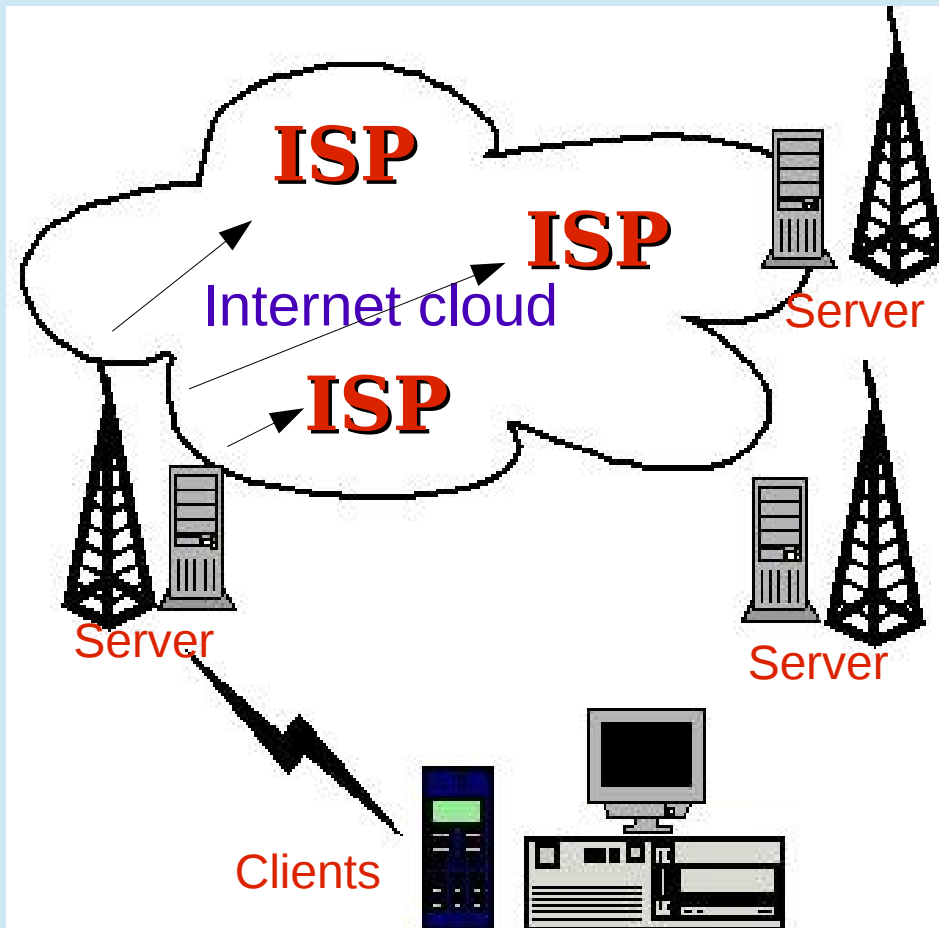
- And numerous sysops and testers around the world...

PSKmail Philosophy



- **Decentralized**
- **OPEN SOURCE**
- **Existing hardware only**
- **Most OS Platforms**
- **Standard protocols**
- **Energy efficient**
- **Non-intrusive**

PSKmail Philosophy

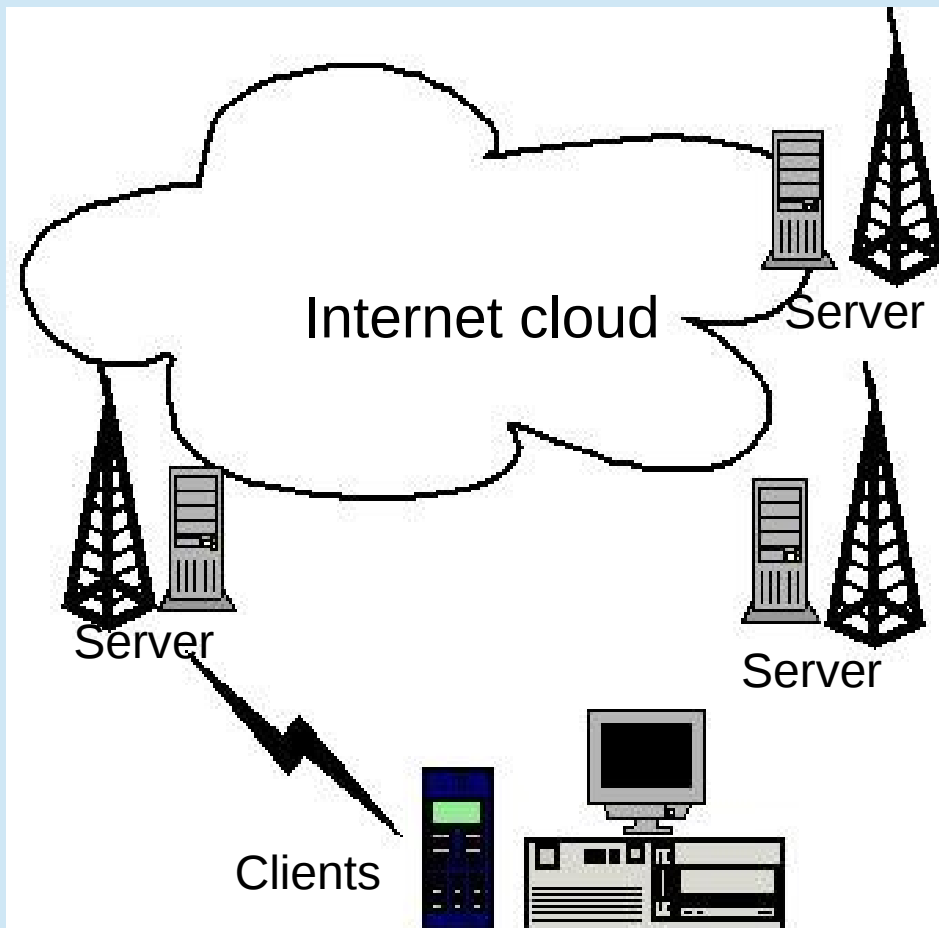


- PSKmail uses a **decentralized** client/server **gateway** concept with servers offering all normal internet services, **NO SINGLE POINT OF FAILURE!!**.

There is no central server holding any info.

The smallest working system is 1 server + 1 client.

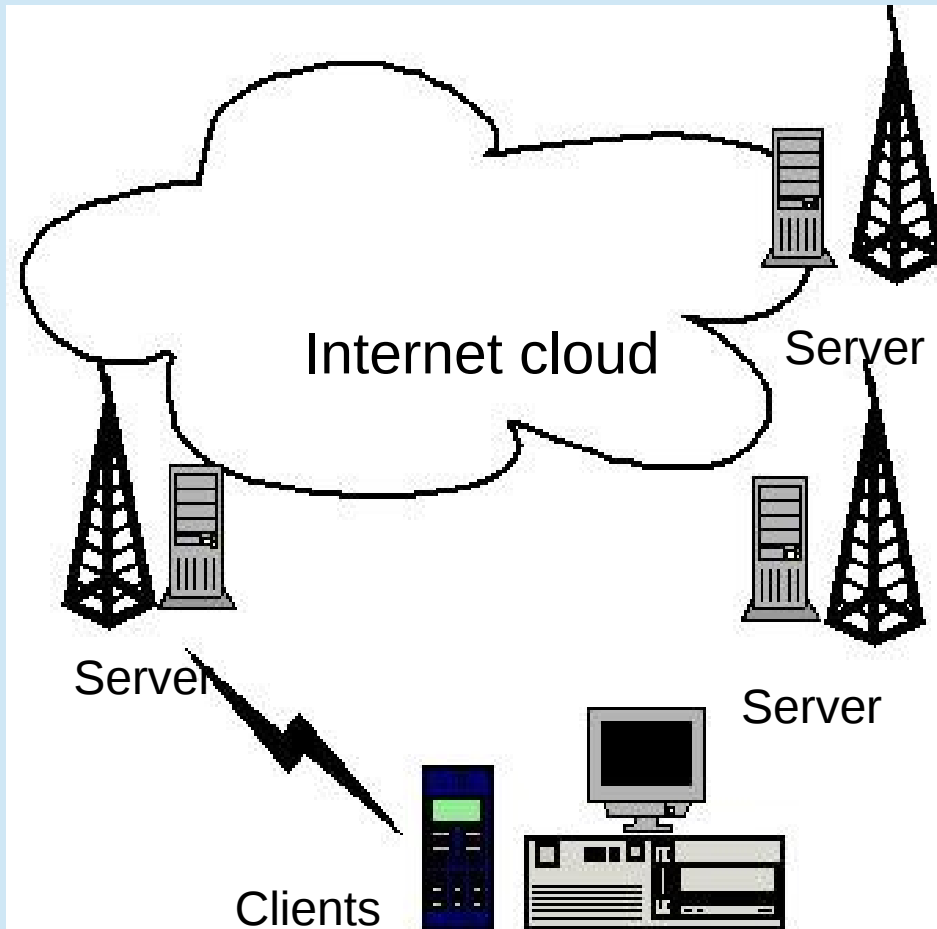
PSKmail Philosophy



- PSKmail uses a **decentralized** client/server concept with servers offering all normal internet services, **NO SINGLE POINT OF FAILURE!!**.
- **OPEN SOURCE** software only
 - Client: **java**
 - Server: **Perl**

Change the system yourself if it does not fit your needs...

PSKmail Philosophy



- PSKmail uses a **decentralized** client/server concept with servers offering all normal internet services, **NO SINGLE POINT OF FAILURE!!**.
- **OPEN SOURCE** software
- **Uses existing hardware**



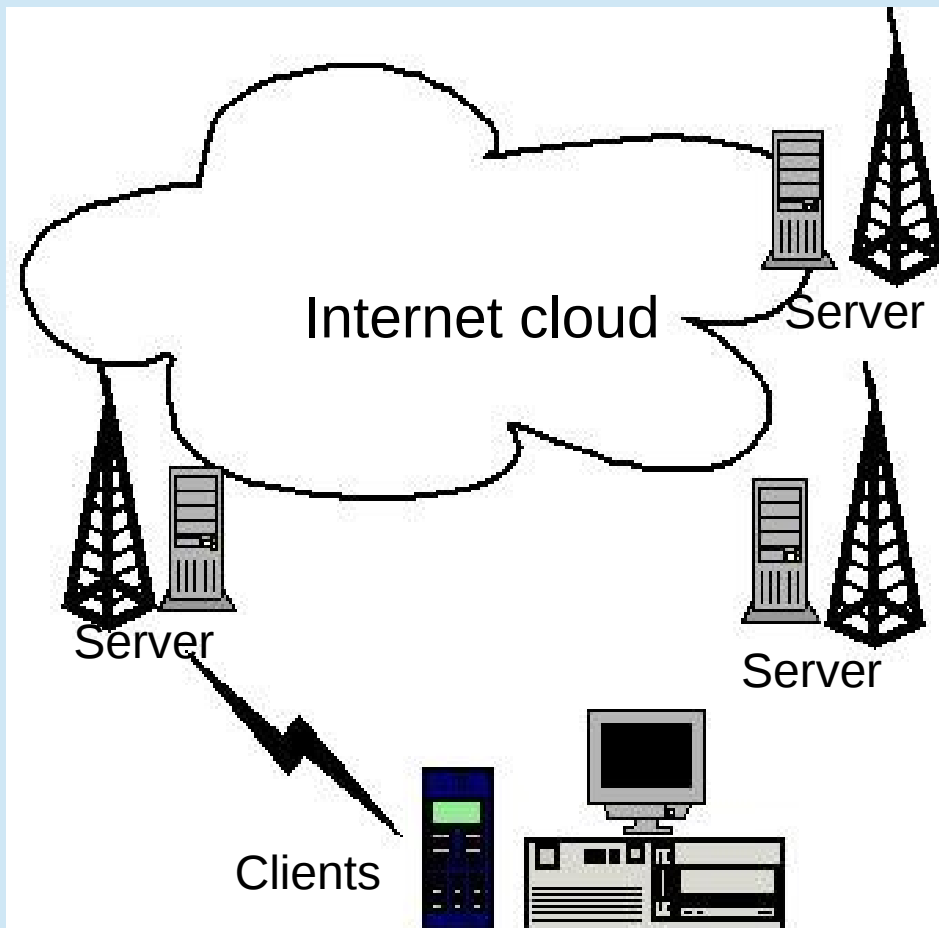
Existing hardware



'PA0R/M special' (80 meter NVIS)



PSKmail Philosophy



- PSKmail uses a **decentralized** client/server concept with servers offering all normal internet services, **NO SINGLE POINT OF FAILURE!!**.
- **OPEN SOURCE** software
- **Uses existing hardware**
- **Platforms available:**
 - **Linux,**
 - **ANDROID,**
 - **OSx,**
 - **Windows (XP, W7)**

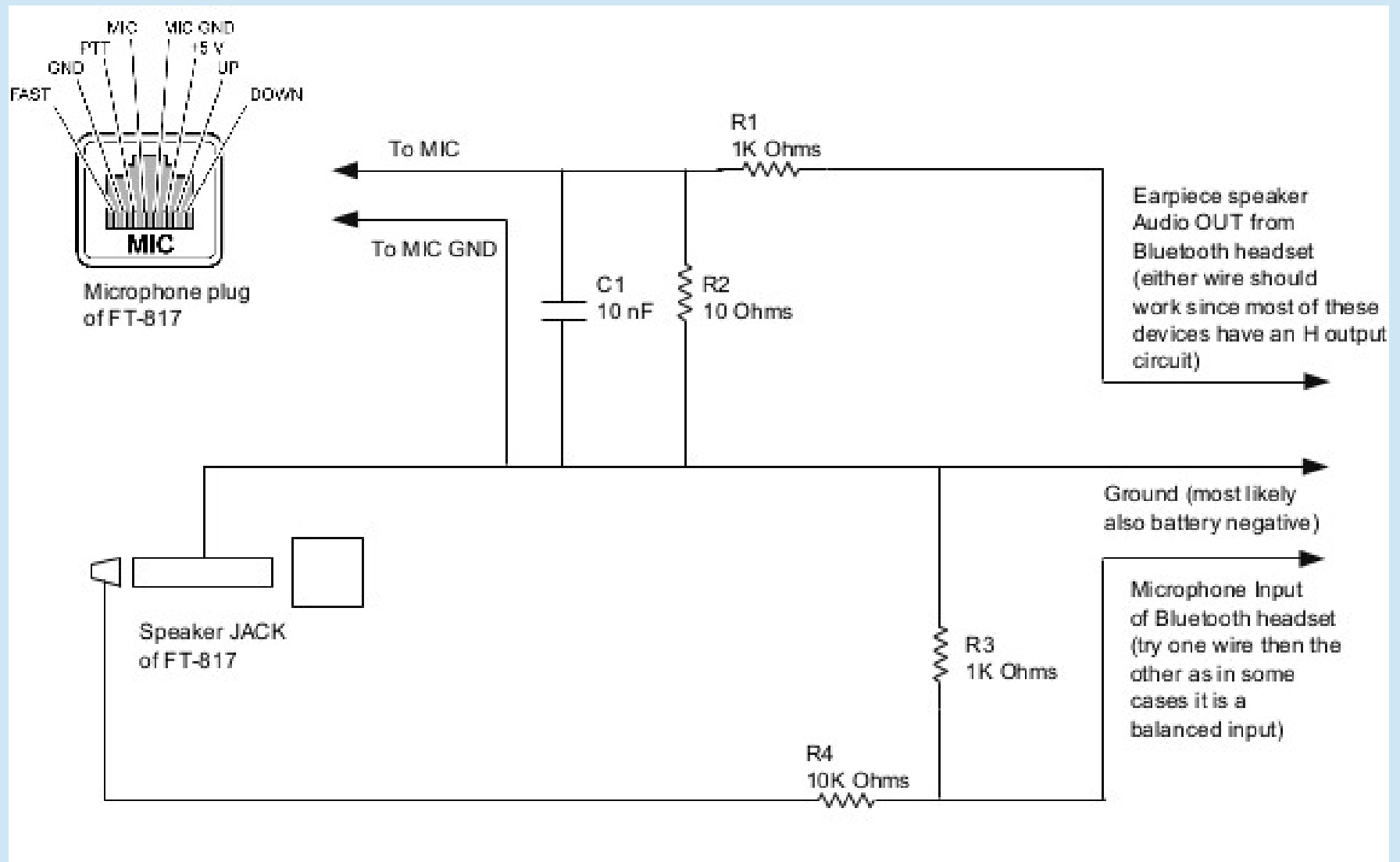
Runs on modern hardware



VK2ETA has made the client software available for ANDROID smart phones

Try our bluetooth adapter...

Bluetooth adapter for FT-817



Bluetooth adapters for FT-817



Ultra modern hardware

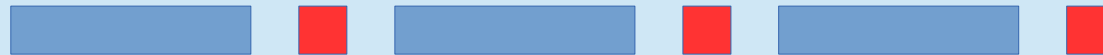


**Sorry, does
not work
on iPhone.**

PSKmail ARQ

Basic bandwidth = 500 Hz

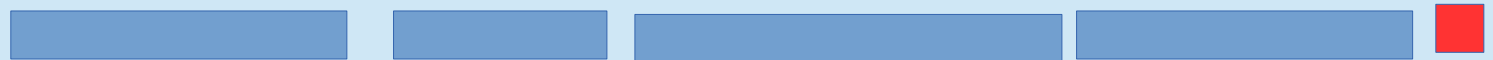
Amtor



PSKmail



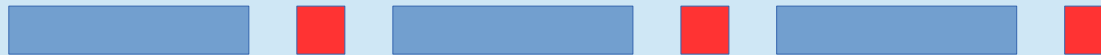
or:



PSKmail ARQ in trouble zone...

Basic bandwidth = 500 Hz

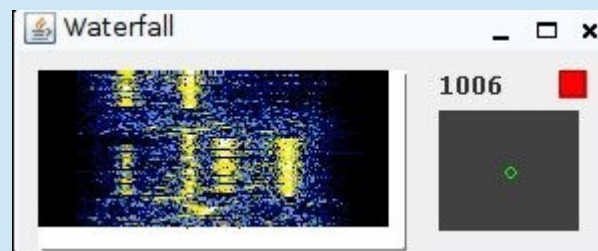
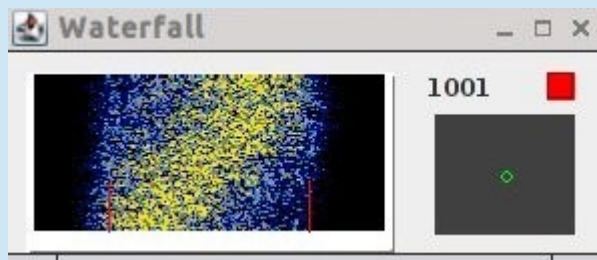
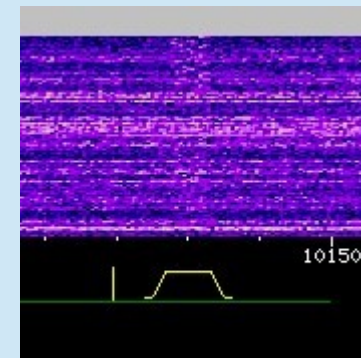
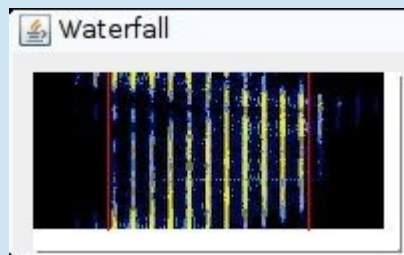
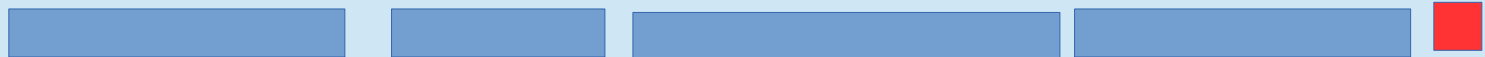
Amtor



PSKmail

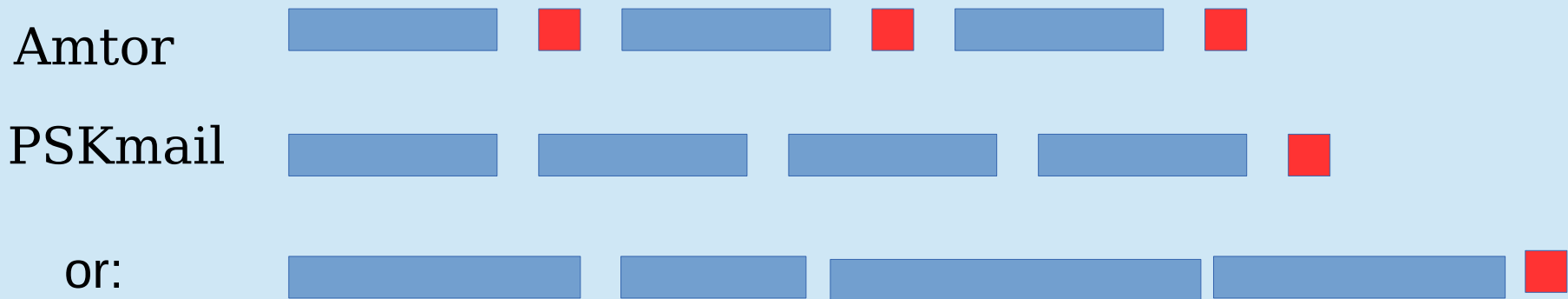


or:



PSKmail ARQ

Basic bandwidth = 500 Hz

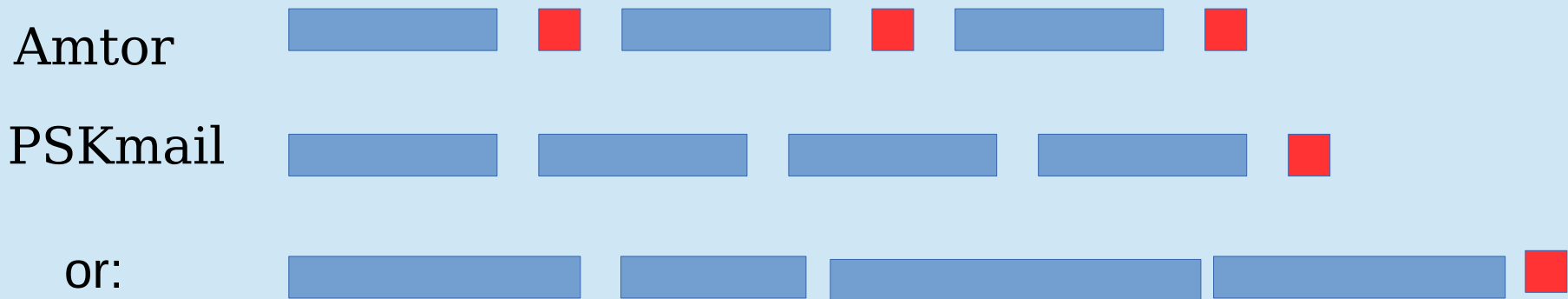


- PSK500 - PSK250
- PSK500R – PSK125R
- MFSK 32 – MFSK 16
- THOR 22 – THOR 8
- Contestia 500/8

Several new digital modes were developed especially for pskmail, like PSKxxR and THOR

PSKmail ARQ

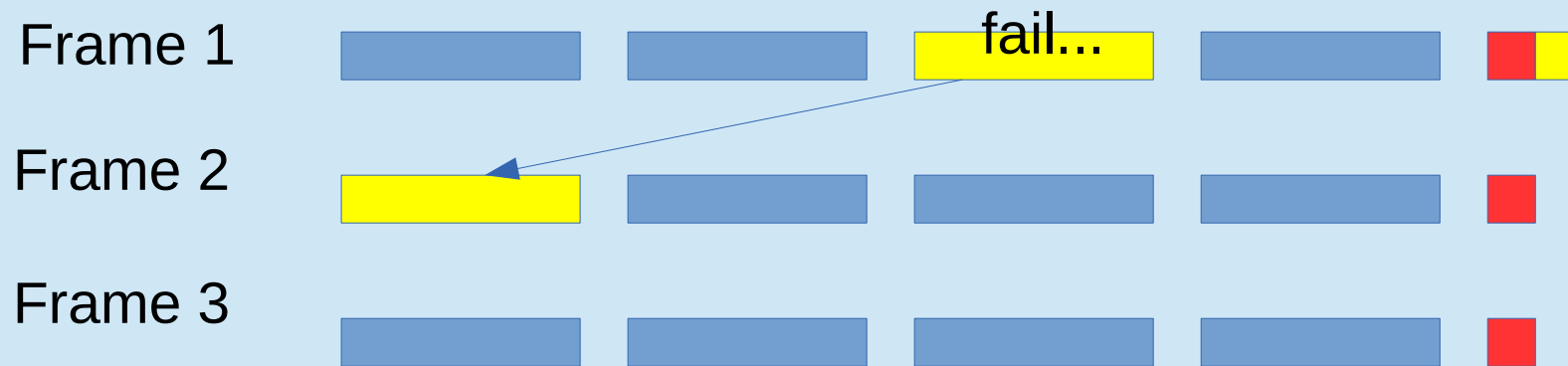
Basic bandwidth = 500 Hz



- PSK500 - PSK250
- PSK500R – PSK125R
- MFSK 32 – MFSK 16
- THOR 22 – THOR 8
- Contestia 500/8

Automatic adaptive mode switching, separate for up- and download channels following channel quality.

PSKmail frames



PSKmail Pipelining for efficient channel use

PSKmail speeds incl. compression

- Max. measured speed using 500 Hz bandwidth: 2900 chars/min using PSK500 mode on a clear channel ([demo video @ youtube](#))
- Max. Theoretical speed for 2 kHz bandwidth: 6000 chars/min e.g. using 5 x PSK250R mode
- We use only 500 Hz bandwidth at the moment for 'good citizenship' on ham bands

The screenshot displays a Linux desktop environment with the following applications and windows:

- fldigi - waterfall-only mode:** A digital signal processing application showing a waterfall view of the radio spectrum. The frequency range is from 500 to 2000 kHz. The mode is set to PSK500R, and the bandwidth is 1000 Hz. The signal-to-noise ratio (SNR) is -3.0 dB.
- dclock:** A digital clock showing the time 00:00:00 in green digits.
- jpskmail 1.5.12 - PA0R - 0:** A mail client window showing the status of the mailbox. It displays 78 mails and the status of the mailbox (PI4TUE 2.1.0-10:47:21-IM129>). The status bar shows the mailbox is 0% full, and the message is 86% and 100% read.
- Configuration window:** A dialog box for configuring the mail client. It shows the "Modes" tab with a table of modes and their status:

Mode	Status
PSK500	<input type="checkbox"/>
PSK500R	<input checked="" type="checkbox"/>
PSK250	<input type="checkbox"/>
PSK250R	<input checked="" type="checkbox"/>
PSK125R	<input checked="" type="checkbox"/>
PSK125	<input type="checkbox"/>
MFSK32	<input type="checkbox"/>
THOR22	<input checked="" type="checkbox"/>
MFSK16	<input type="checkbox"/>
THOR11	<input type="checkbox"/>
THOR8	<input type="checkbox"/>
THOR4	<input type="checkbox"/>
CTSTIA 8/250	<input checked="" type="checkbox"/>

The "Default mode" is set to PSK500R.

Terminal: A terminal window showing the output of the jpskmail command. The output is a long string of characters, likely a base64-encoded message or a list of mail headers.

Taskbar: The taskbar at the bottom shows the desktop environment with icons for the applications and the system tray.

Red Text Overlay: "Flexible mode table to fit channel conditions"

PSKmail servers

jpskmail 2.1.0 - PA0R - 10147000

File Mode Preferences Twitter Info Link Help

Server statistics

ARQ Statistics

Rx Av. Qual.

Tx Blocks

Mode Bl. Size

Rx CPS Total

idle (CPM)

27: 3:

Server	S/Q	Bcns	Last	Mode	dB
PI4TUE	19	18	09:00	PSK500R	22
KB2PNM	9	21	06:50	PSK250	9
SM0RWO	39	9	09:01	PSK500R	39
OE5RTL	53	6	09:03	PSK500R	25
9A1CRA	28	6	09:30	PSK500R	23
SA6BQZ-1	32	7	09:04	PSK500R	26

Terminal Email Files Modem Rigctl APRS Igate DSP

```
---tc det an t1
<US><SOH>00u9A1CRA:26 !4600.13NP01632.80E&3AB9<EOT>

---Ie
RSID: PSK500R, freq: 985
```

Listening

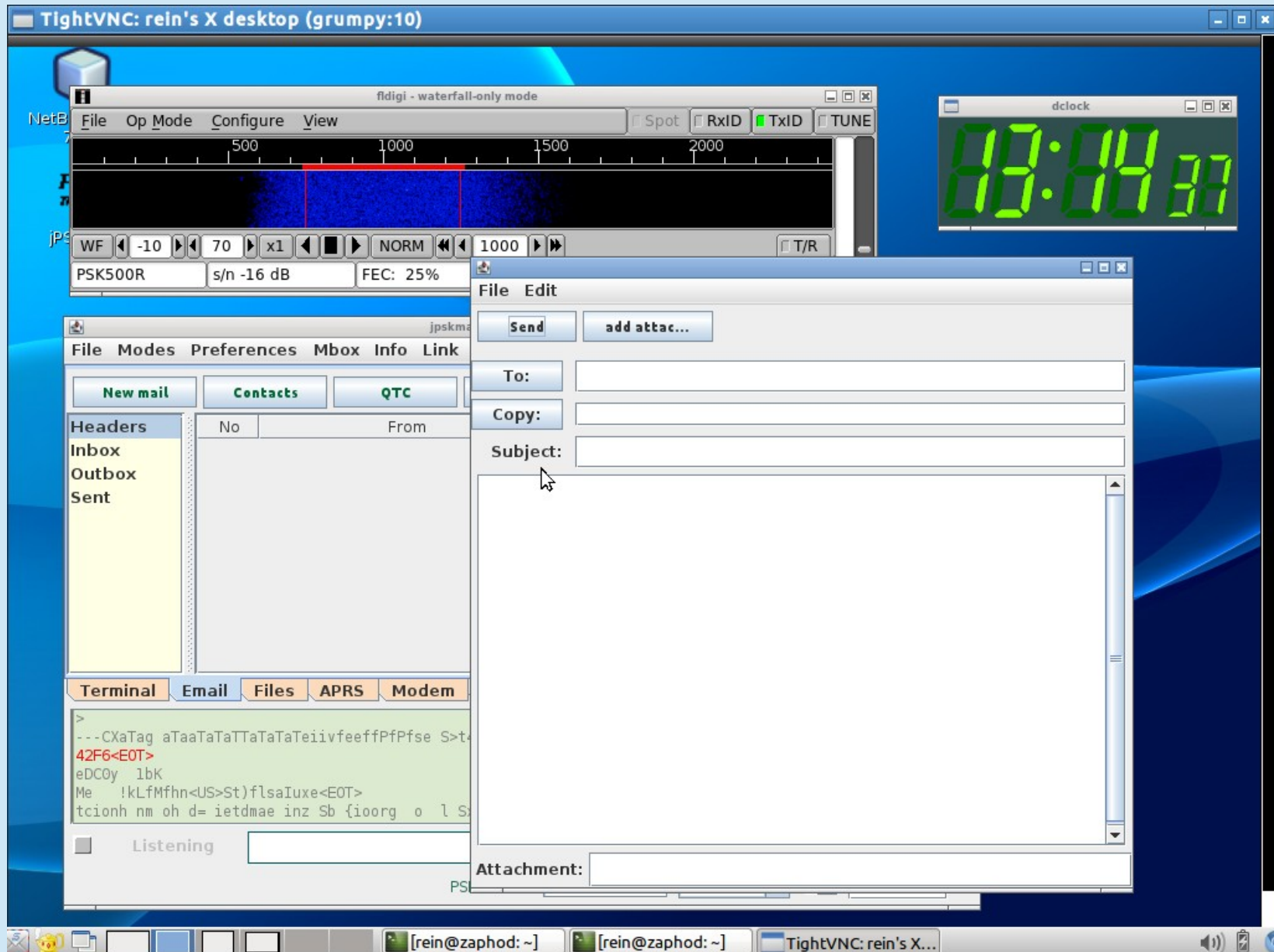
PSK500R 08:35:31

Internet access gateways

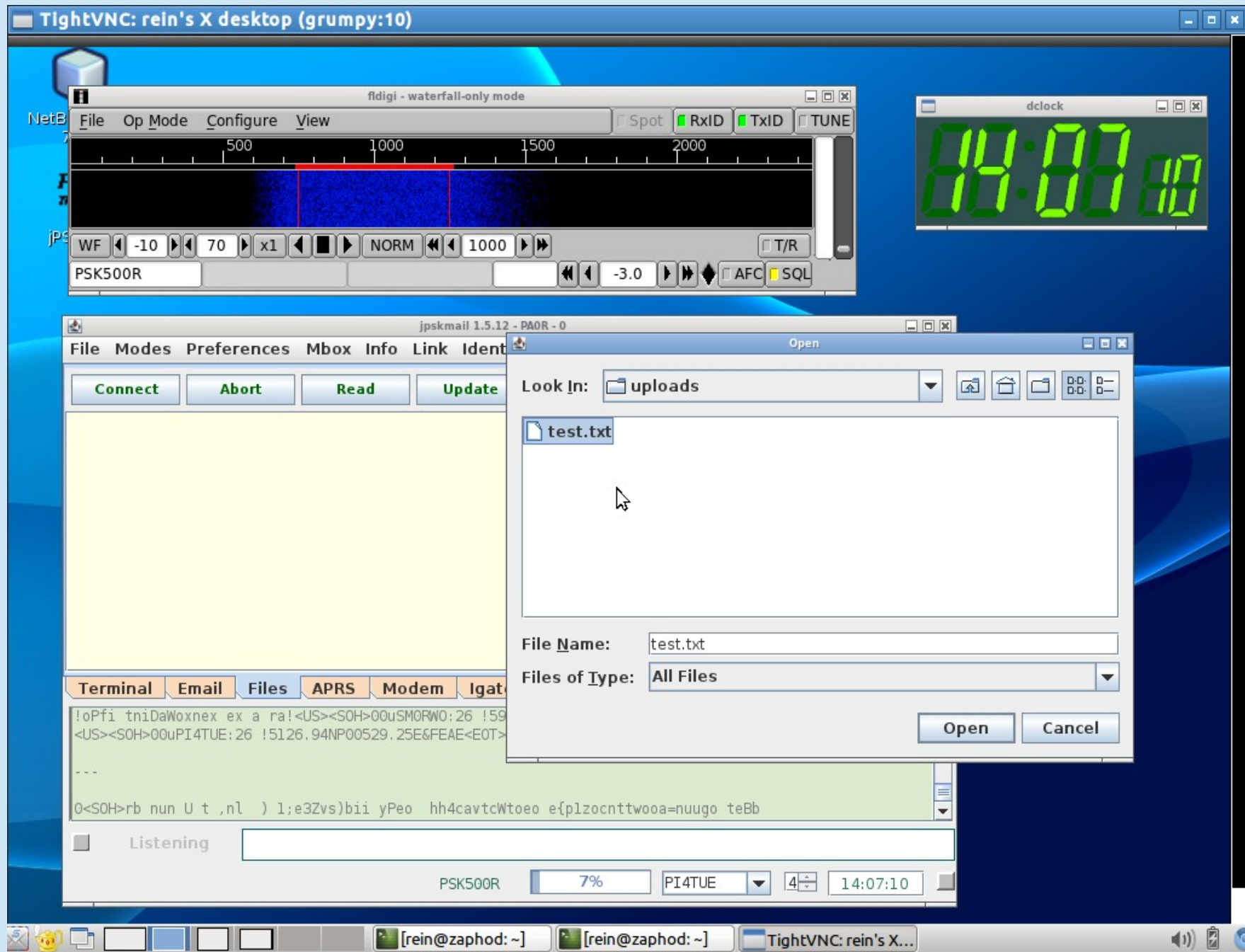
- PSKmail offers a **gateway** to the use of most modern communication functions like:
 - **Email** to any email address on the internet or to your private LAN or VPN
 - **File** upload/download



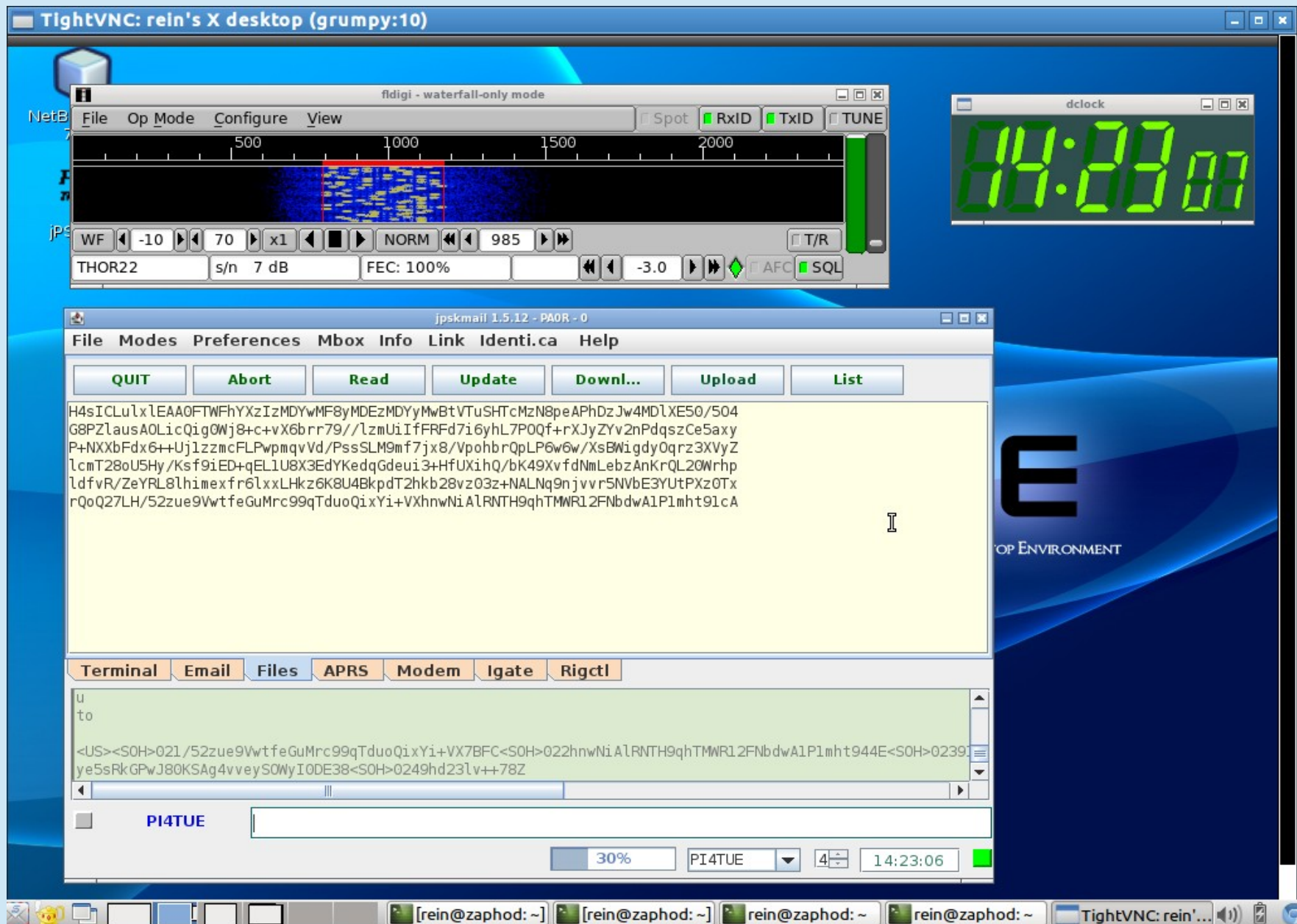
PSKmail email client



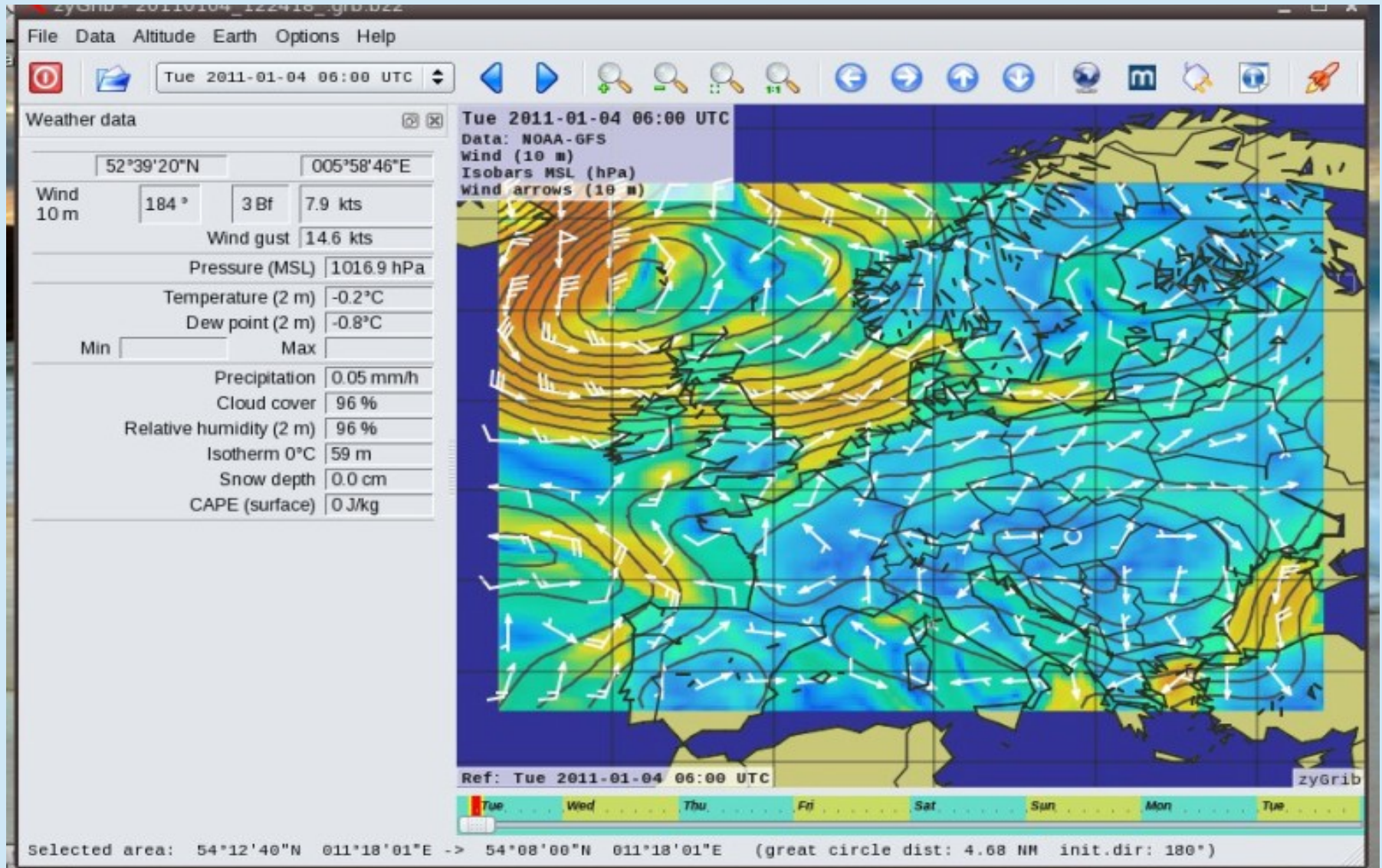
File upload



File download



PSKmail downloads your wx maps

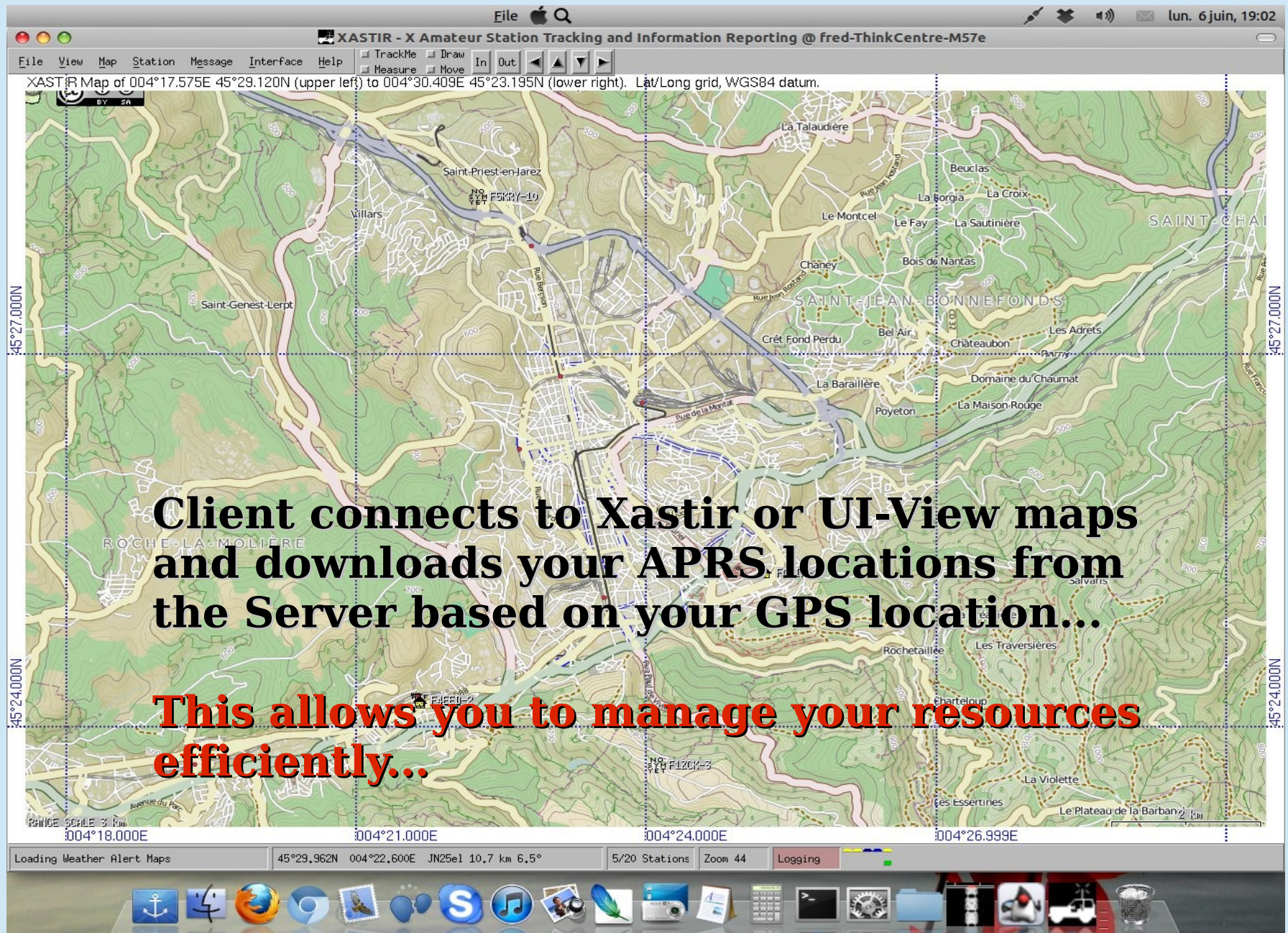


Internet access gateways

- PSKmail offers a **gateway** to the use of most modern communication concepts like:
 - **Email** to any email address on the internet or to your private LAN or VPN
 - **File** upload/download
 - **APRS** service for managing your resources
 - **Twitter, Messaging, Bulletins**
 - **Web access** (Text only)
 - **Telnet** service from client ↔ internet
 - Webmail service for internet ↔ local mail



APRS integrated...



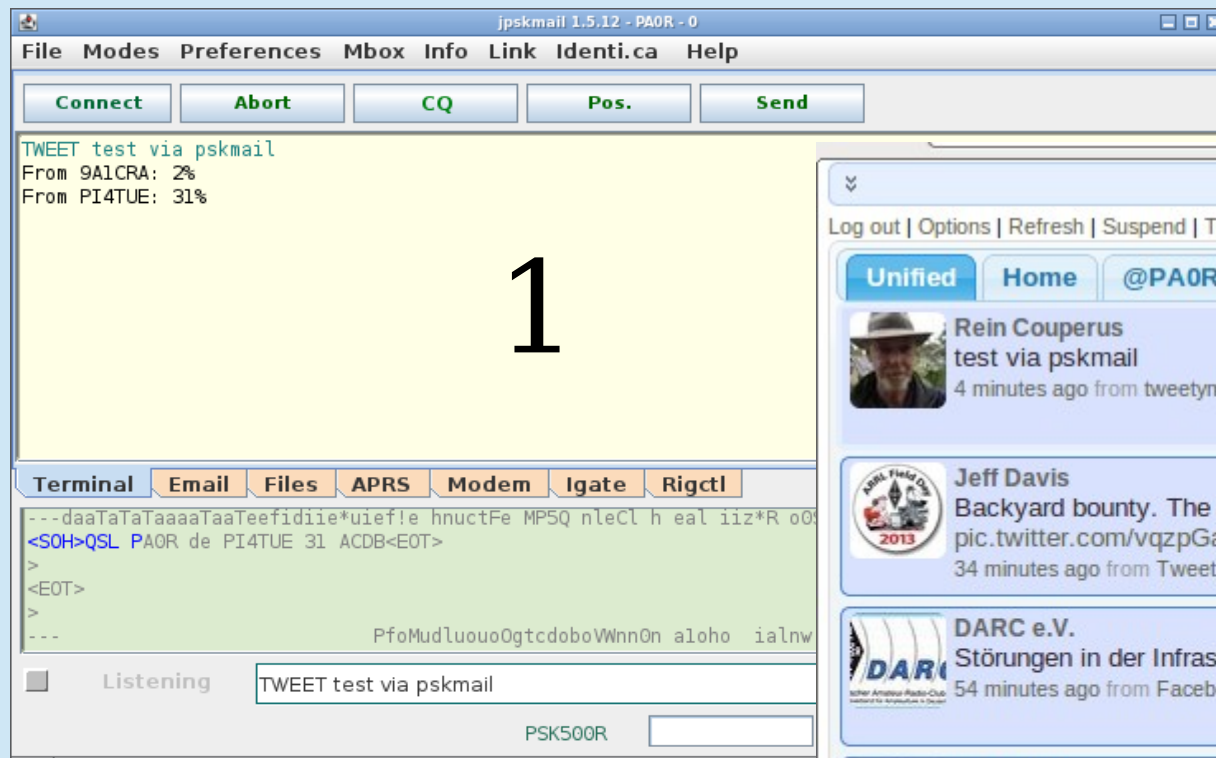
Twitter

**In several countries disaster
response organisations
are starting to use
social media to
disseminate
information**

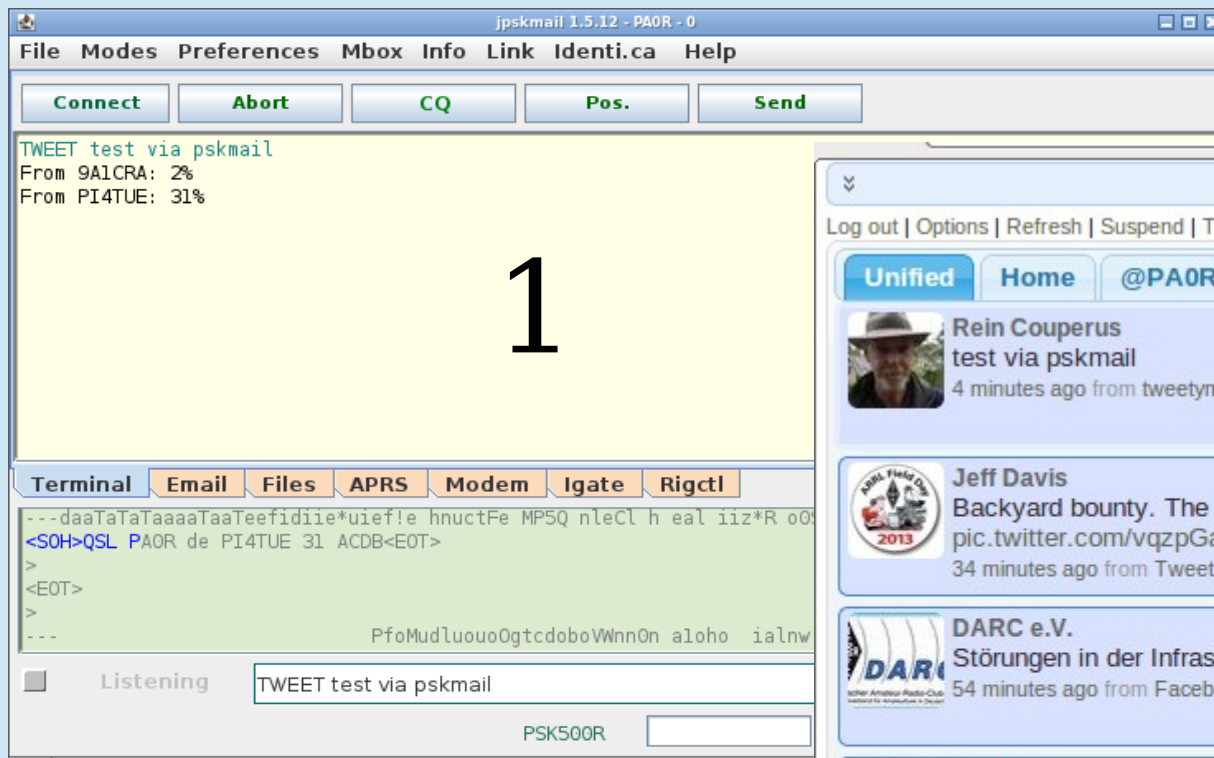
Twitter integrated



Twitter integrated



Twitter integrated



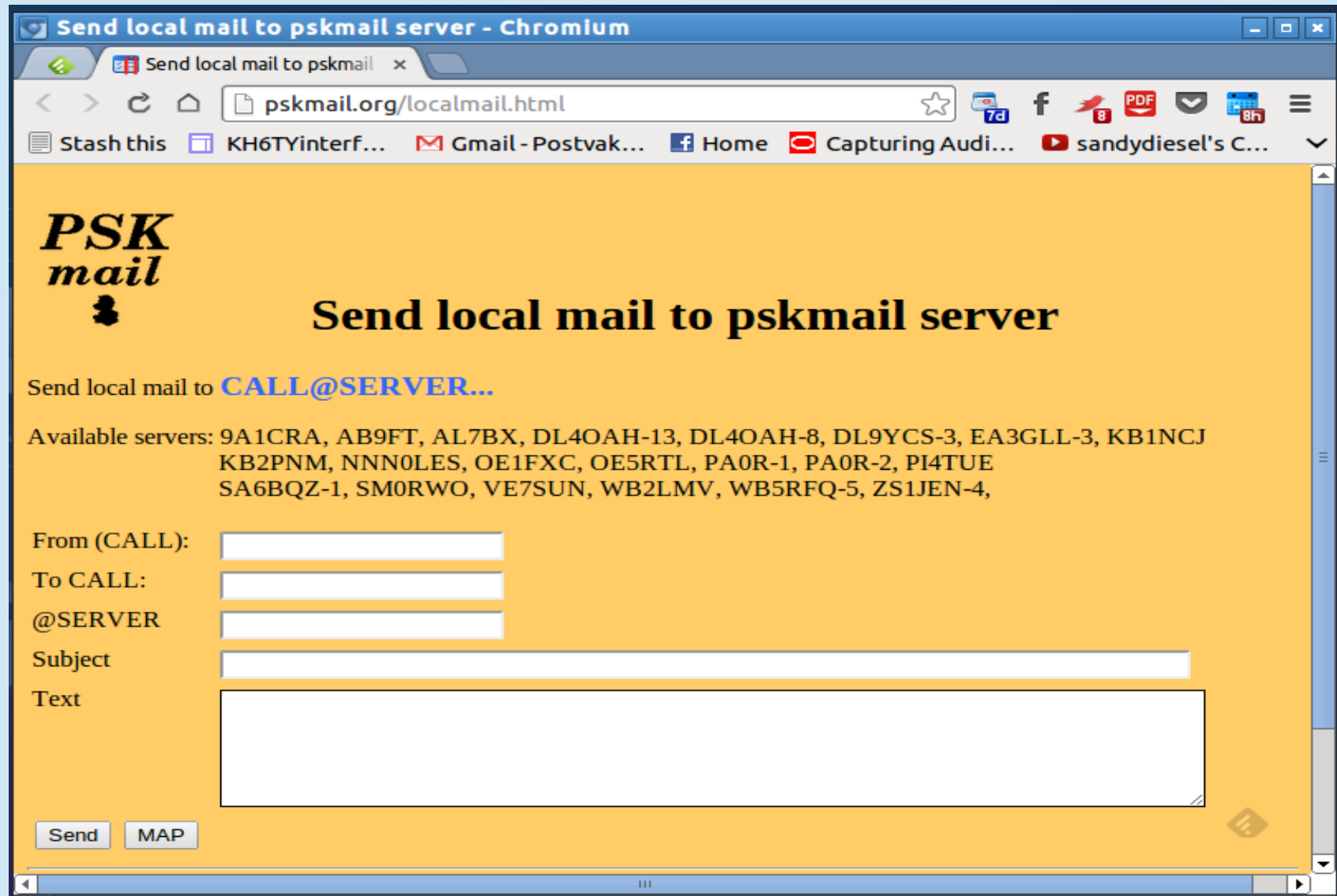
Delay Tolerant Networking built in...

- Auto resume of document transfer next time a client connects after a broken link
- Automatic document forwarding between servers via HF if necessary
- Automatic Local mail forwarding between servers via HF if required

Roll your own functions...

- Ideas from experience with hurricane Sandy:
 - **Message forwarding** between servers
 - Add **Web server** and **Wifi access point** to the client to enable users in Red Cross hubs with a working smart phone to:
 - Write their own mails
 - Send their own tweets
 - Read twitter messages with certain hashtags
- ... of course only during emergencies...

Example: www to pskmail server



The screenshot shows a web browser window titled "Send local mail to pskmail server - Chromium". The address bar displays "pskmail.org/localmail.html". The page has a yellow background and features the "PSK mail" logo on the left. The main heading is "Send local mail to pskmail server". Below this, it says "Send local mail to [CALL@SERVER...](#)". A list of available servers is provided: 9A1CRA, AB9FT, AL7BX, DL4OAH-13, DL4OAH-8, DL9YCS-3, EA3GLL-3, KB1NCJ, KB2PNM, NNN0LES, OE1FXC, OE5RTL, PA0R-1, PA0R-2, PI4TUE, SA6BQZ-1, SM0RWO, VE7SUN, WB2LMV, WB5RFQ-5, ZS1JEN-4. The form includes input fields for "From (CALL):", "To CALL:", "@SERVER", and "Subject". A large text area is labeled "Text". At the bottom left, there are "Send" and "MAP" buttons.

PSK mail

Send local mail to pskmail server

Send local mail to [CALL@SERVER...](#)

Available servers: 9A1CRA, AB9FT, AL7BX, DL4OAH-13, DL4OAH-8, DL9YCS-3, EA3GLL-3, KB1NCJ, KB2PNM, NNN0LES, OE1FXC, OE5RTL, PA0R-1, PA0R-2, PI4TUE, SA6BQZ-1, SM0RWO, VE7SUN, WB2LMV, WB5RFQ-5, ZS1JEN-4,

From (CALL):

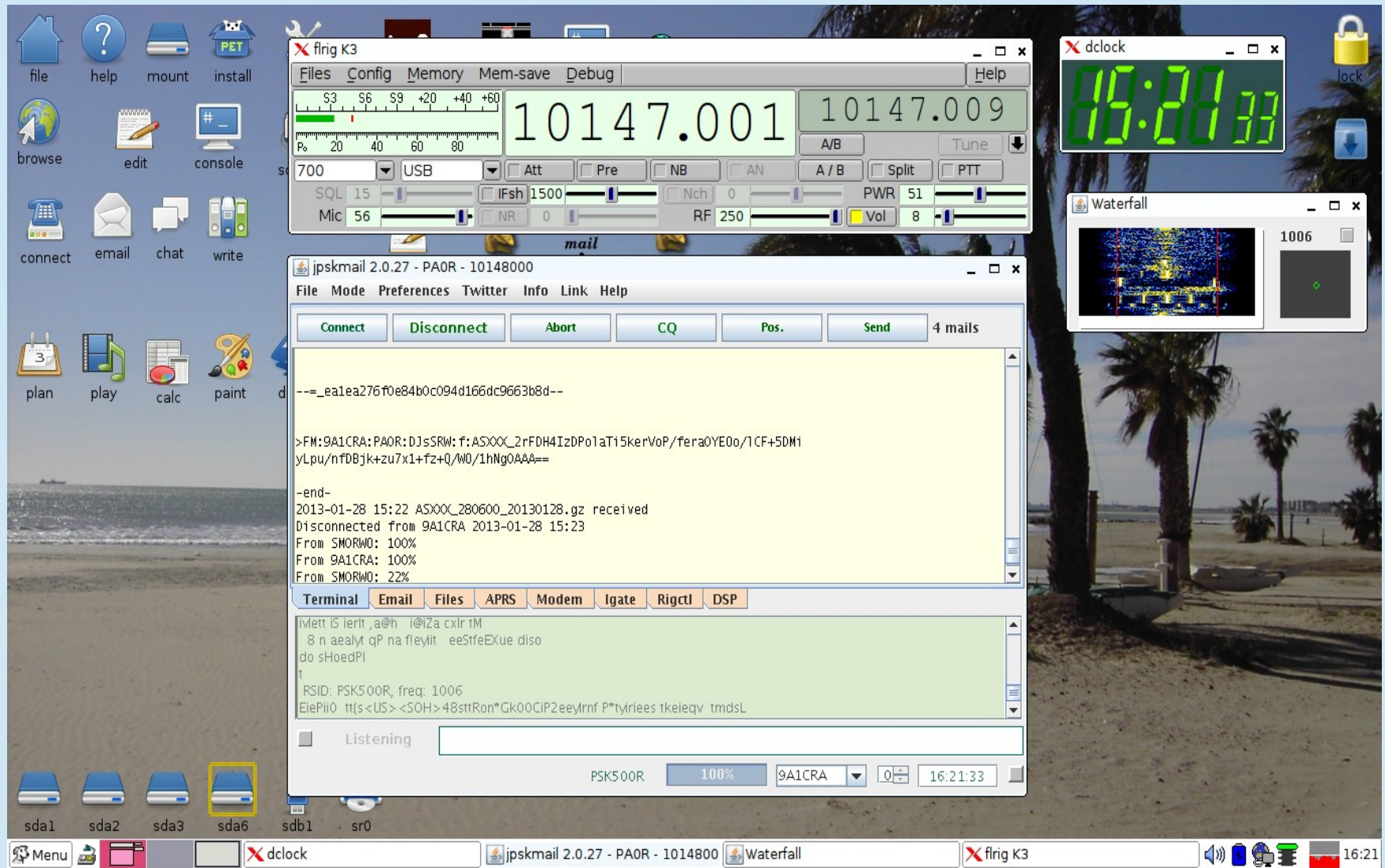
To CALL:

@SERVER

Subject

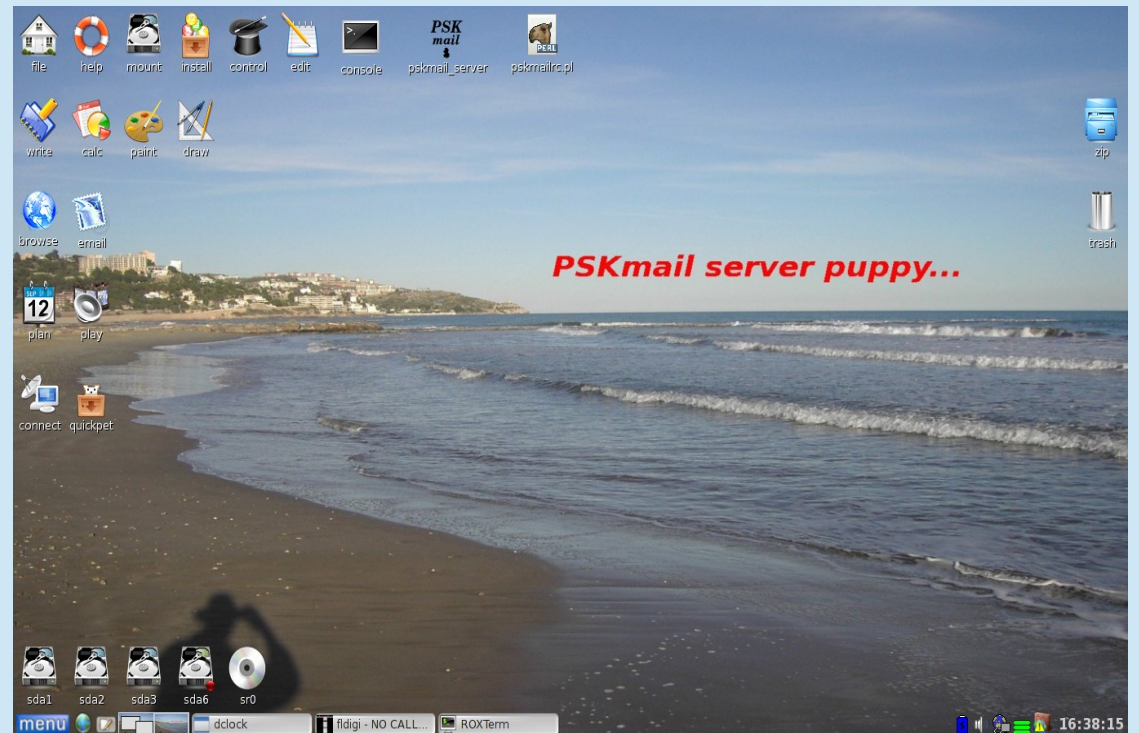
Text

Rapid deployment:



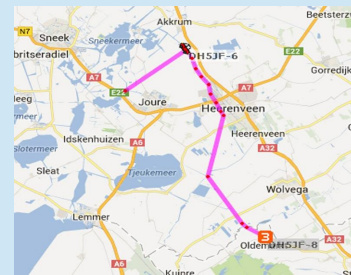
Puppy linux live CD's

- Preconfigured live CD's to run in your xyl's laptop
 - Puppy server
 - Puppy client
- Works in any Windows PC...



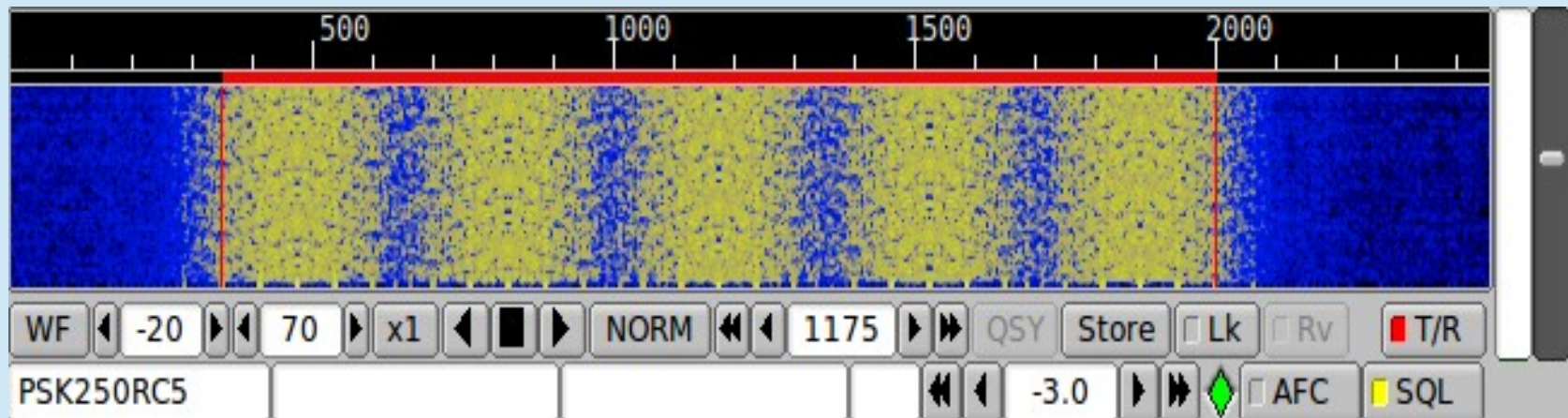
Does it work?

- A German sailor gets his email via KB2PNM from his anchor place at Clipperton Island.
- PA0R uses the link between PA0R/M @ Castellon de la Plana and SM0RWO (1300 km) during the winter season on 10 MHz.
- DH5JF-8 uses pskmail APRS on a daily basis..



Plans for the future

- Port contestia modem from C++ to java to get rid of fldigi modem crashes
- Test wide band modes (2 kHz) for even more speed during real emergencies
- Use high speed modes on VHF/UHF



CONTACT + INFO:

- <http://www.pskmail.org>
- PSKmail mailing list on freelists.org
- PSKmail Facebook group

Email: PA0R@pskmail.org

PSKmail Philosophy

PSKmail offers a flexible **software toolkit** with all the functionality you need.

PSKmail is **OPEN SOURCE**, and it does not lock you into an external organization like Micro\$oft. If you don't like it you can change it and add your own functions.

PSKmail does NOT force you into a fixed communications concept, **YOU DECIDE**.

PSKmail @ GAREC 2013

The swiss army knife for HF digital communication

Rein Couperus, PA0R

27.06.2013

