

PSKmail @ GAREC 2013

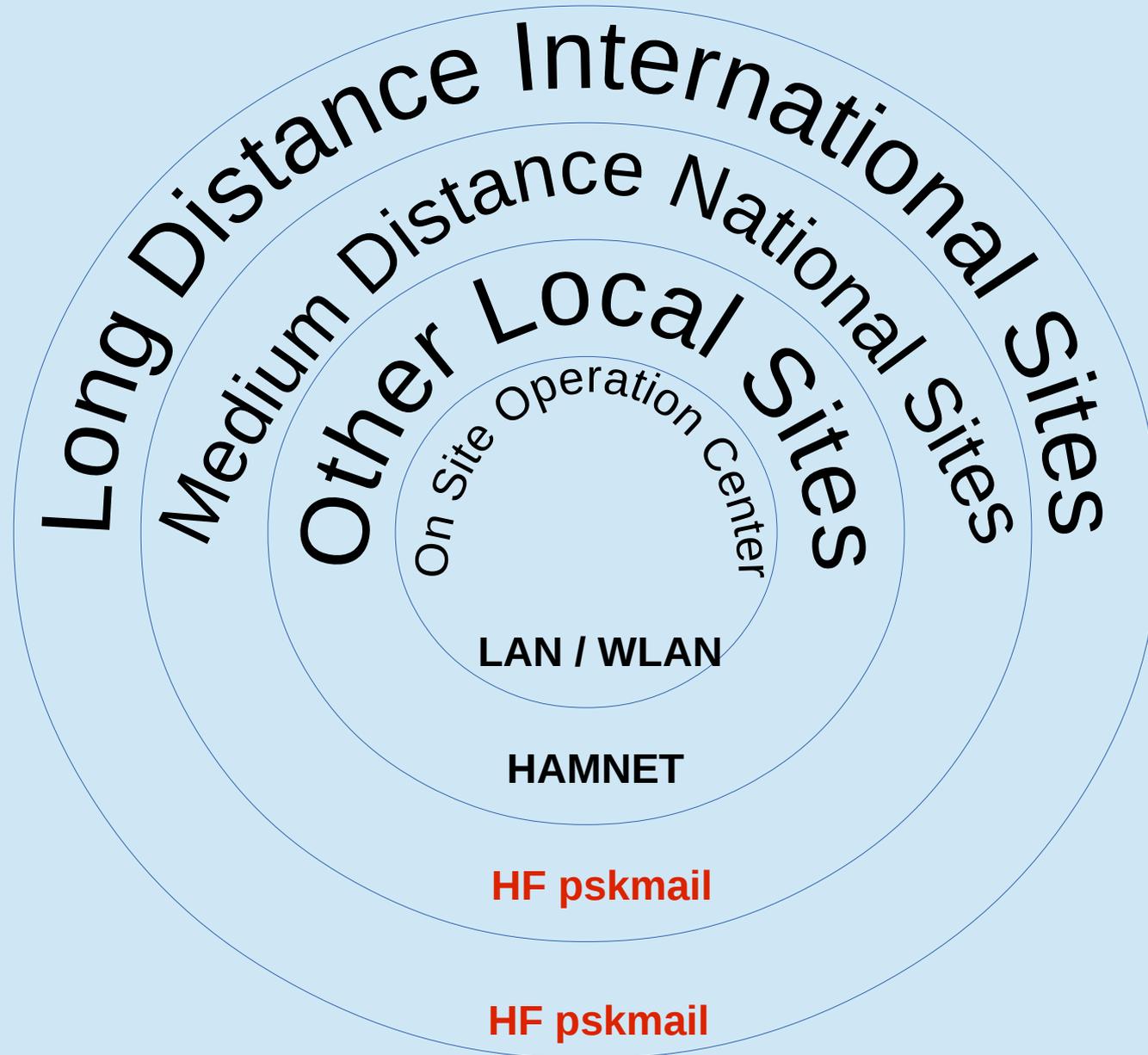
The swiss army knife for HF digital communication ?

27.06.2013

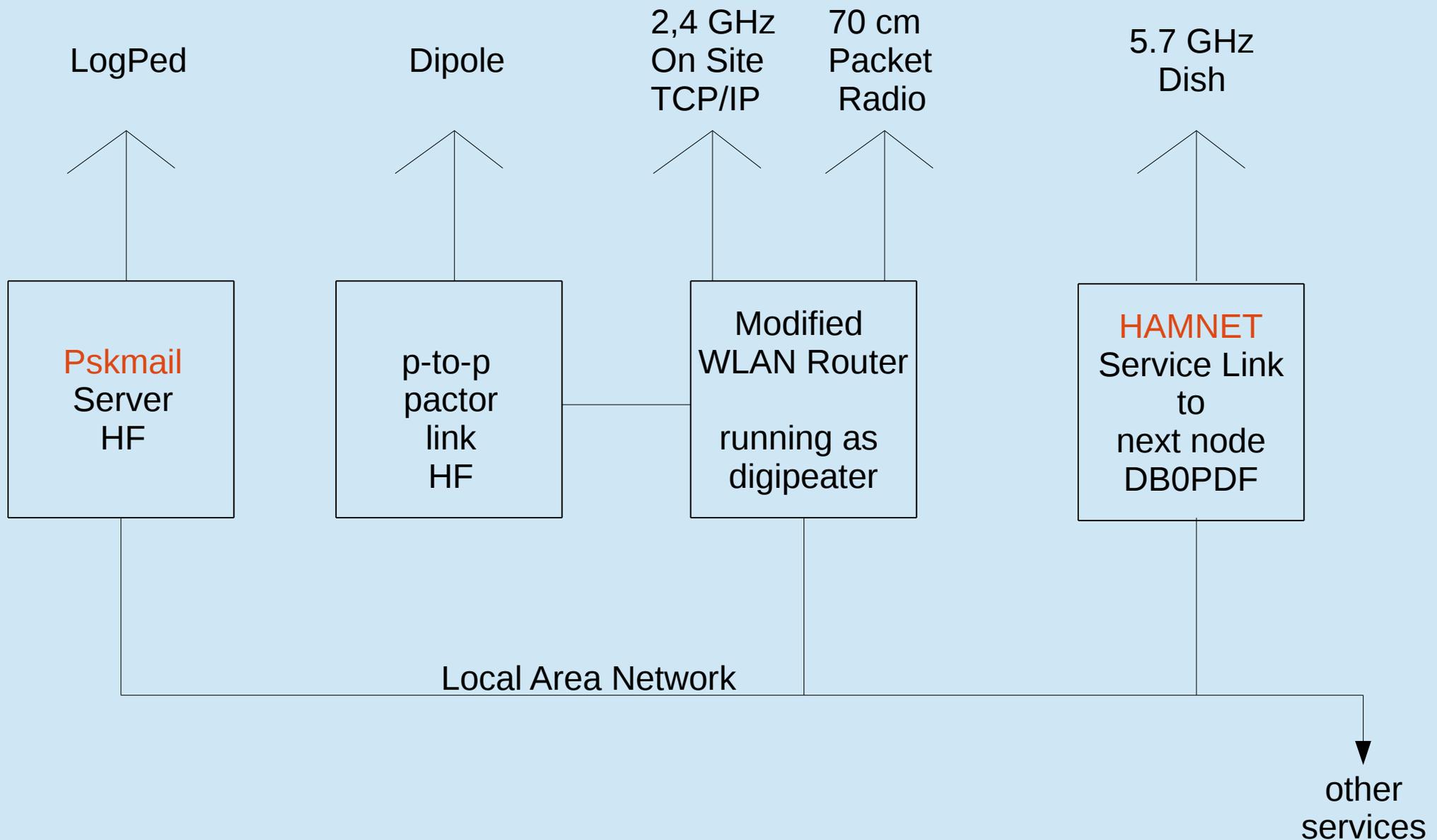
Rein Couperus, PA0R



Possible Disaster Response Setup

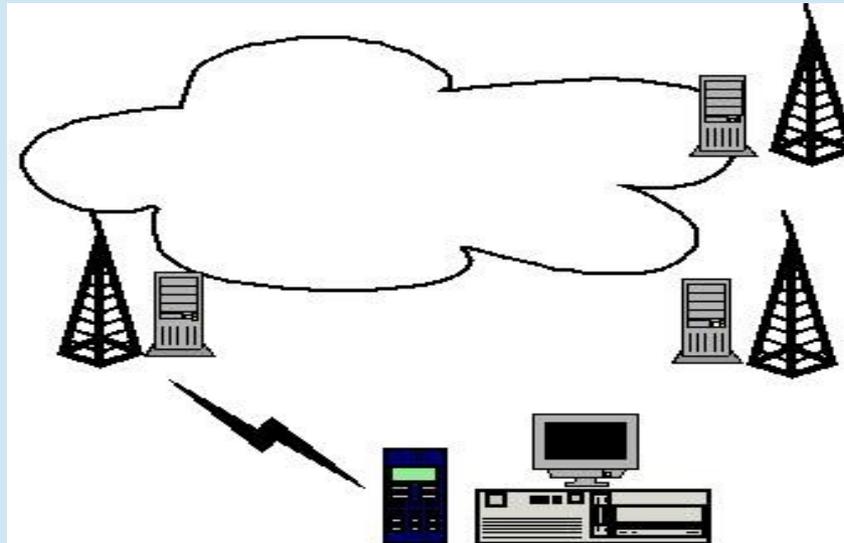


DA5UWG/DF3FS Test Setup



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.

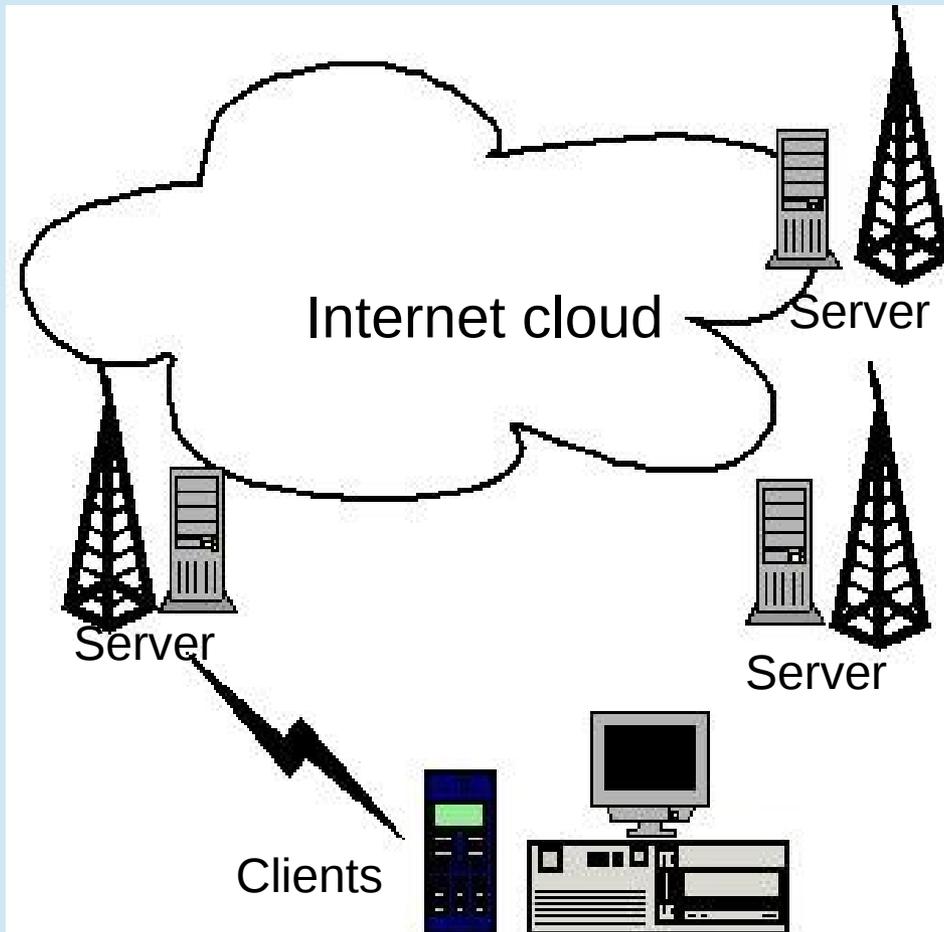
- Developers:

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



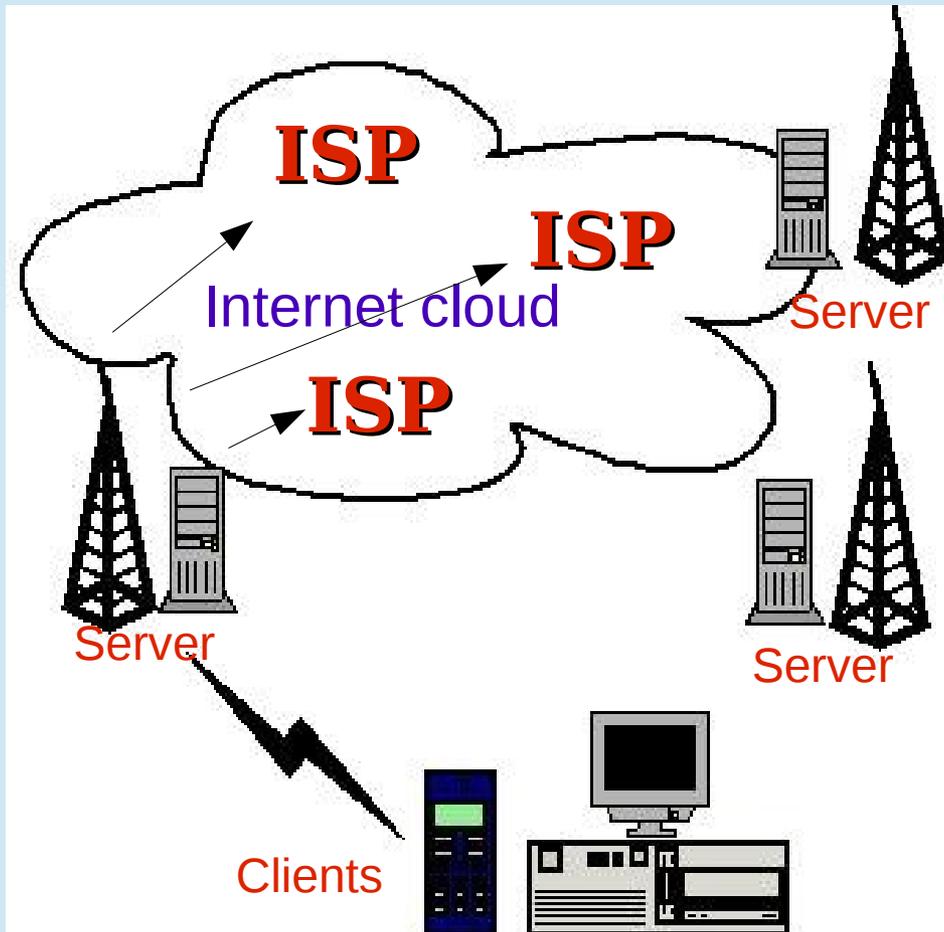
- And numerous sysops and testers around the world...

PSKmail Philosophy



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

PSKmail Philosophy

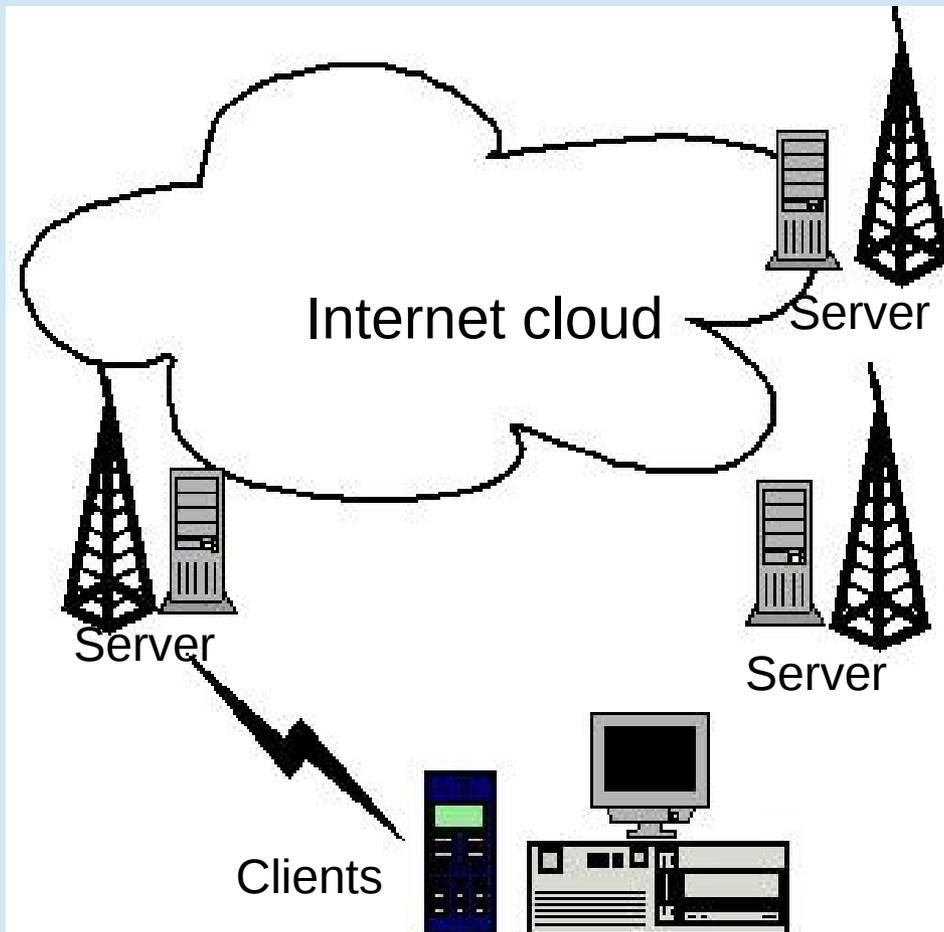


- PSKmail uses a **decentralized** client/server **gateway** concept with servers offering all normal internet services, **NO SINGLE POINT OF FAILURE!!**.

There is no central server holding any info.

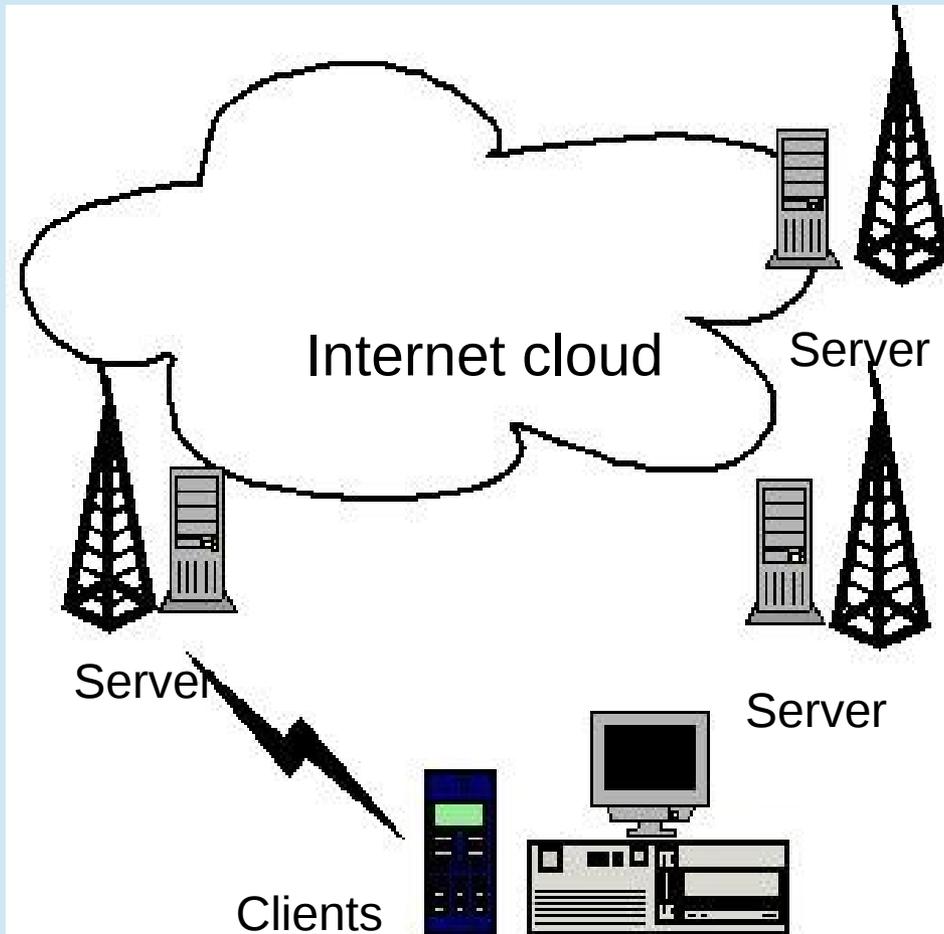
The smallest working system is 1 server + 1 client.

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**



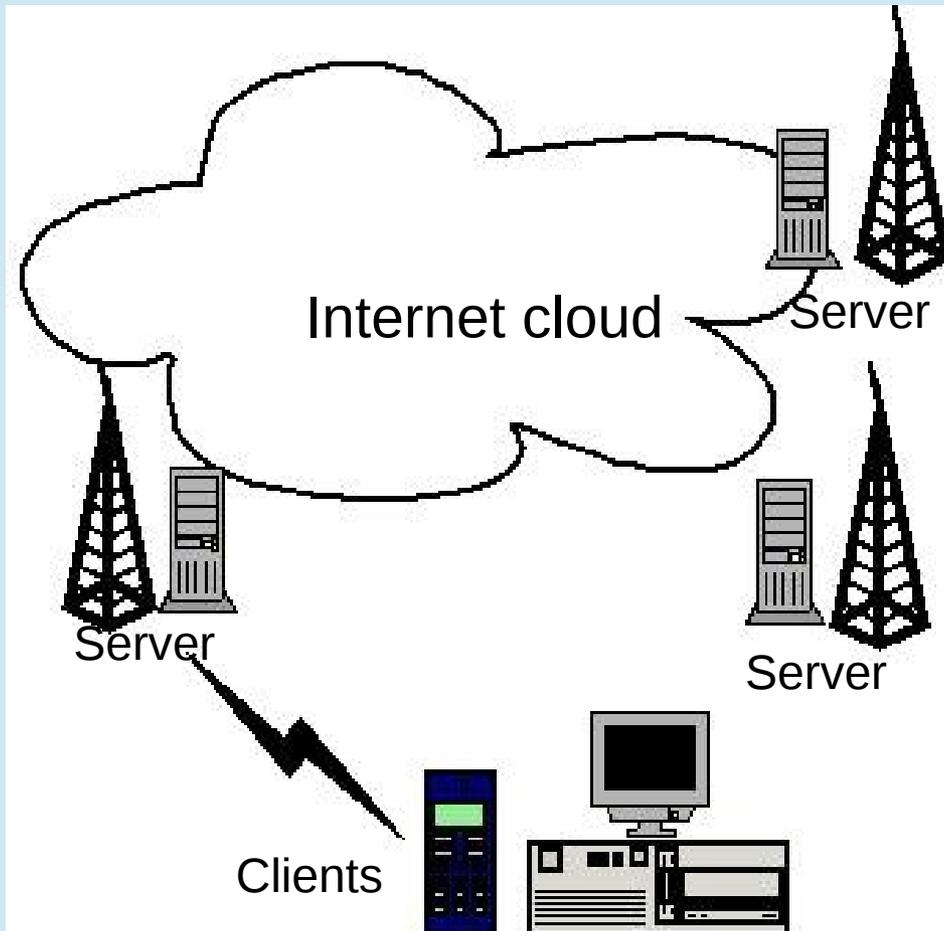
Existing hardware



'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)**

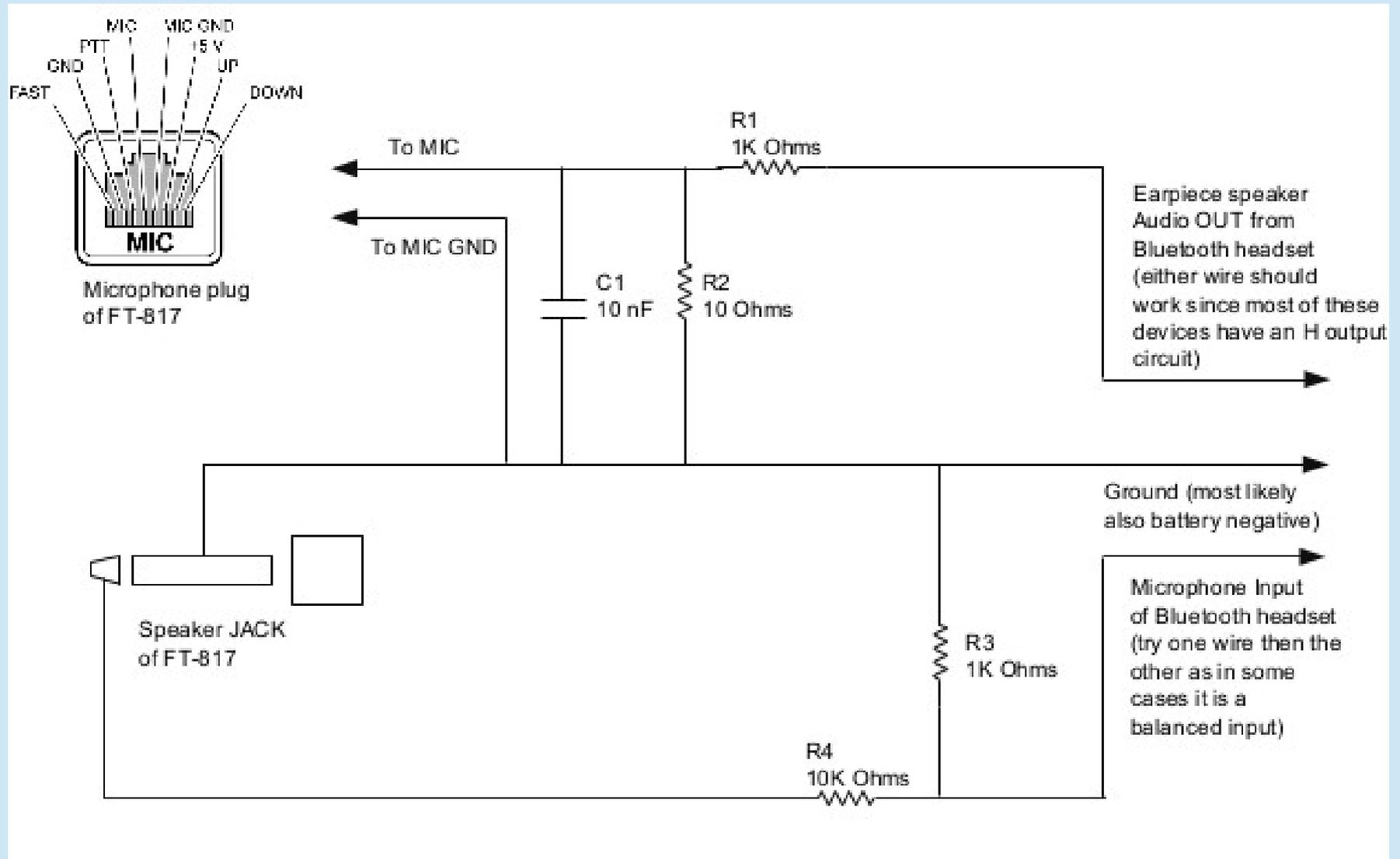
Runs on modern hardware



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



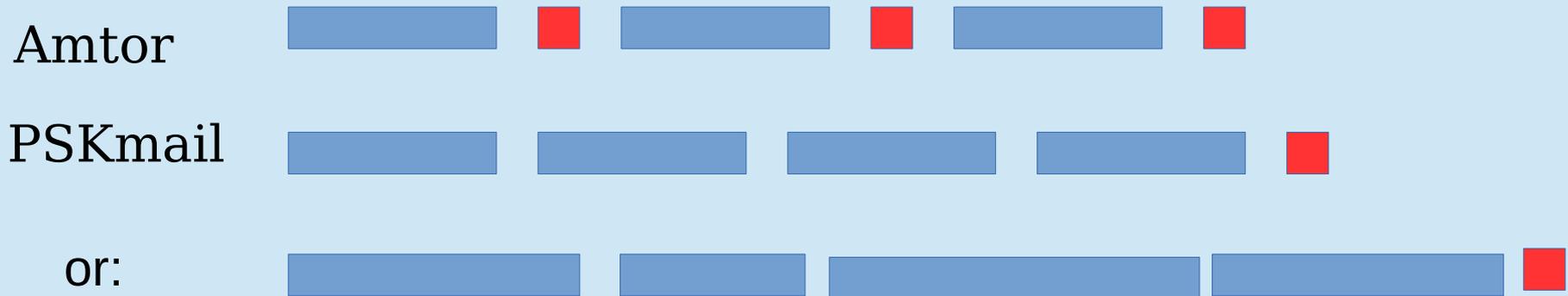
Ultra modern hardware



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

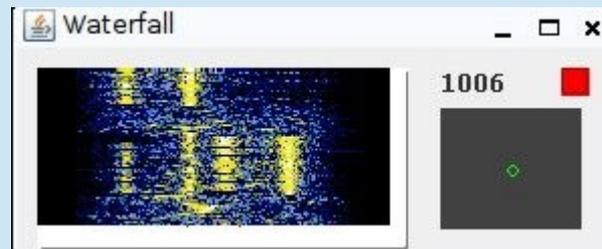
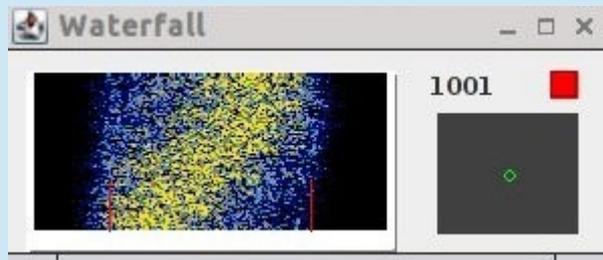
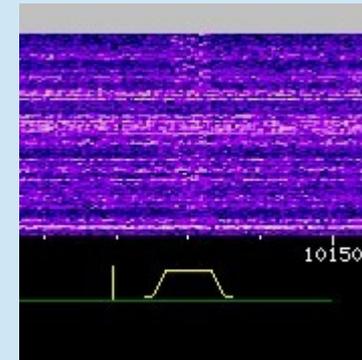
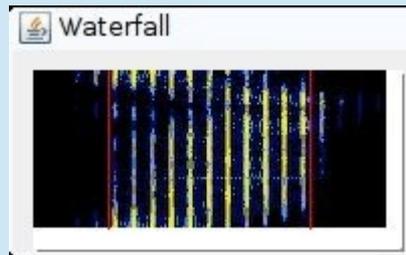
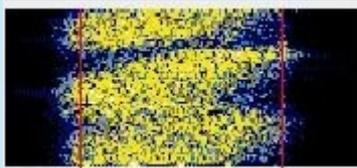
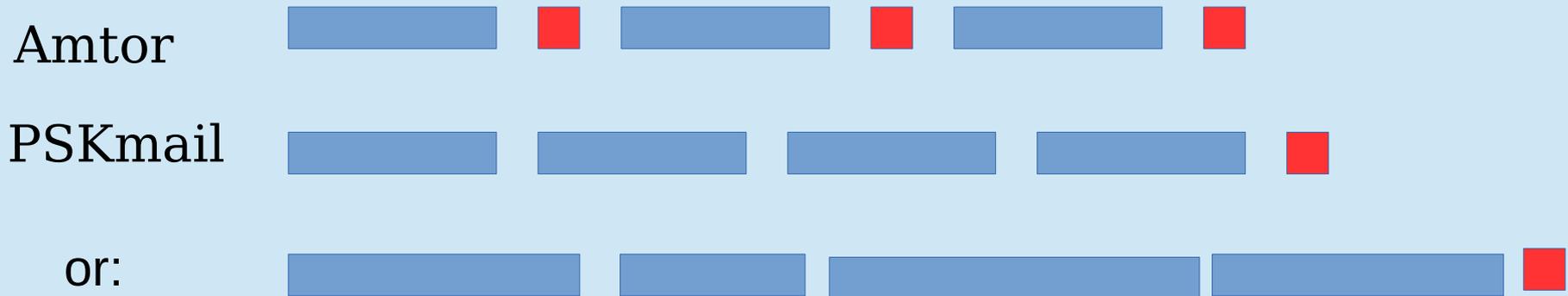
PSKmail ARQ

Basic bandwidth = 500 Hz



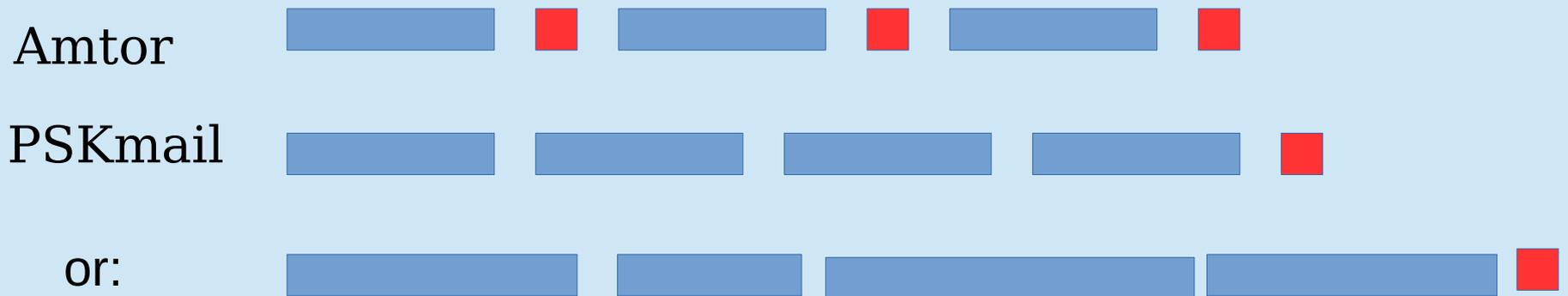
PSKmail ARQ in trouble zone...

Basic bandwidth = 500 Hz



PSKmail ARQ

Basic bandwidth = 500 Hz

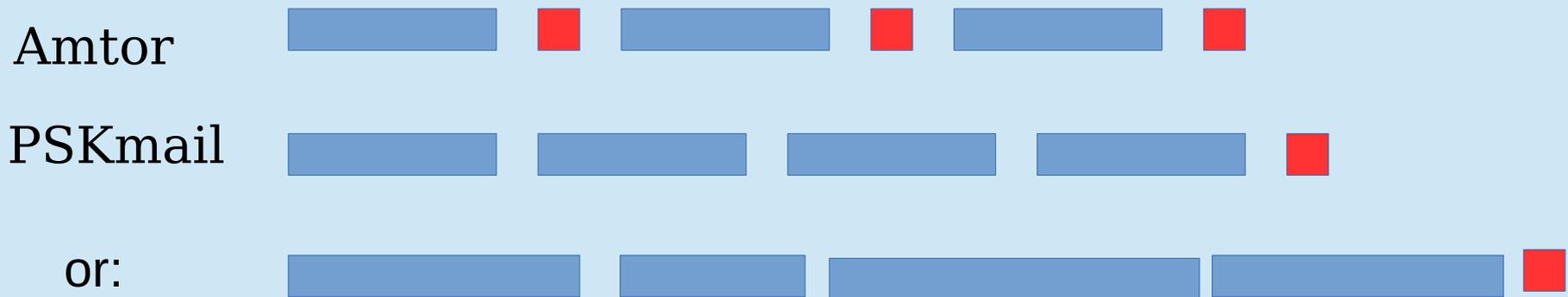


- PSK500 - PSK250
- PSK500R – PSK125R
- MFSK 32 – MFSK 16
- THOR 22 – THOR 8
- Contestia 500/8

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

PSKmail ARQ

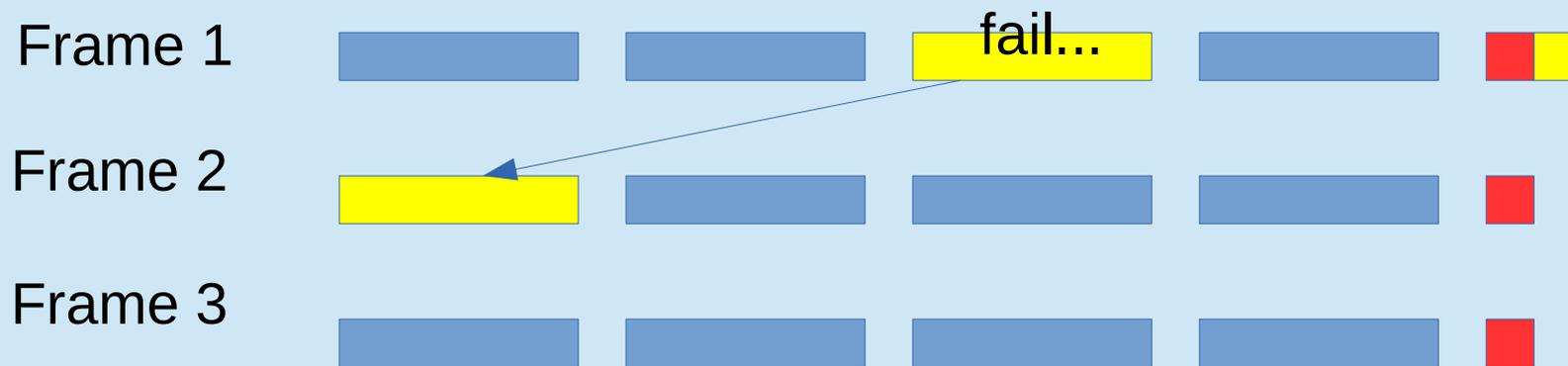
Basic bandwidth = 500 Hz



- 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**

fdigi - waterfall-only mode

File Op Mode Configure View Spot RxID TxID TUNE

500 1000 1500 2000

WF -10 70 x1 NORM 1000 T/R

PSK500R -3.0 AFC SQL

dclock

00:00:00

jpskmail 1.5.12 - PA0R - 0

File Modes Preferences Mbox Info Link Identi.ca Help

Connect Abort CQ Pos. Send

PI4TUE 2.1.0-10:47:21-IM129>
78 mails.

OK...
From SMORWO: 0%
From OESRTL: 86%
From OESRTL: 100%

Configuration Devices Modem Rig Modes

User data Email settings

PSK500 PSK500R PSK250 PSK250R

PSK125R PSK125 MFSK32 THOR22

MFSK16 THOR11 THOR8 THOR4

CTSTIA 8/250

Default mode: PSK500R

OK Cancel

Flexible mode table to fit channel conditions

Terminal Email Files APRS Modem Igate Rigctl

```
<EOT>
>
---pTapThaaTaaTaTaaTaaTaTagieeefnetaldybu&q cMbXni t IS n
leetaesHeim qoMo>ReettgOutz q H o uotasFtpC8m,rYmetot qtwo r9VMCeoy tohct aynihenqhtDigo ; Ketz
tPtqgctigx+nlnuftnT tp tew} DR opR pdttRntteptTaaTxt A
t5n nlqDt50 R5teR o0st ttntcCcek ,vaoPph"rtsL5 4FMxW t ao,a;Men4 ePbota w enlsoese nm
```

Listening

PSK500R PI4TUE 4 12:37:01

PSKmail servers

The screenshot shows the jpskmail 2.1.0 interface. The title bar reads "jpskmail 2.1.0 - PA0R - 10147000". The menu bar includes "File", "Mode", "Preferences", "Twitter", "Info", "Link", and "Help".

The "Server statistics" section is active, displaying "ARQ Statistics". On the left, there are input fields for "Rx" (PSK500R), "Tx" (PSK500R), "Mode" (Asymmetric), and "Rx CPS" (1). A progress bar for "Av. Qual." shows 19%. Other fields include "Blocks", "Bl. Size", "Total" (2435), and "(CPM)" (5). Below these are "27:" and "3:". On the right, a table lists server statistics:

Server	S/Q	Bcns	Last	Mode	dB
PI4TUE	19	18	09:00	PSK500R	22
KB2PNM	9	21	06:50	PSK250	9
SM0RW0	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

Below the statistics are tabs for "Terminal", "Email", "Files", "Modem", "Rigctl", "APRS", "Igate", and "DSP". The "Terminal" tab is active, showing a green background with the following text:

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

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

At the bottom, there is a "Listening" checkbox, a frequency input field, a mode dropdown set to "PSK500R", a signal strength indicator at "100%", a server dropdown set to "PI4TUE", a volume control set to "0", and a timer showing "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

The screenshot shows a desktop environment with several windows:

- fdigi - waterfall-only mode:** A waterfall display showing frequency (500 to 2000 Hz) and signal strength. It includes controls for Spot, RxID, TxID, TUNE, and various filters like WF, -10, 70, x1, NORM, and 1000. The mode is set to PSK500R with s/n -16 dB and FEC: 25%.
- dclock:** A digital clock displaying 00:00:00 in green.
- PSKmail:** The main email client window, showing a list of mail folders (Inbox, Outbox, Sent) and a composition window with fields for To, Copy, Subject, and Attachment.
- Terminal:** A terminal window showing the output of a command, including a PSKmail header and a listening status.

```
>  
---CXaTag aTaaTaTaTTaTaTaTeiivfeeffPfPfse S>t  
42F6<E0T>  
eDC0y lbK  
Me !kLfMfhn<US>St)flsaIuxe<E0T>  
tcionh nm oh d= ietdmae inz Sb {ioorg o l S
```

Listening

File upload

The screenshot displays a Linux desktop environment within a TightVNC window titled "TightVNC: rein's X desktop (grumpy:10)". The desktop background is blue with a cube icon in the top-left corner. Several windows are open:

- fdigi - waterfall-only mode:** A software-defined radio interface showing a waterfall plot with frequency markers at 500, 1000, 1500, and 2000. The plot shows a signal centered around 1000. Below the plot are various controls including "WF", "PSK500R", and "AFC SQL".
- dclock:** A digital clock displaying "00:00:00" in green digits.
- jpskmail 1.5.12 - PA0R - 0:** The main application window. It has a menu bar with "File", "Modes", "Preferences", "Mbox", "Info", "Link", and "Ident". Below the menu are buttons for "Connect", "Abort", "Read", and "Update". A large yellow area is currently empty. At the bottom, there are tabs for "Terminal", "Email", "Files", "APRS", "Modem", and "Igat". The "Terminal" tab is active, showing a stream of text including "0<SOH>rb nun U t ,nl) 1;e3Zvs)bii yPeo hh4cavtcWtoeo e{plzocnttwooa=nuugo teBb".
- Open dialog:** A file selection dialog box is open over the jpskmail window. The "Look In:" field shows "uploads". A file named "test.txt" is selected. The "File Name:" field contains "test.txt" and the "Files of Type:" dropdown is set to "All Files". "Open" and "Cancel" buttons are at the bottom.

The system tray at the bottom shows the "PSK500R" mode, a 7% progress indicator, "PI4TUE" as the current call sign, and the time "14:07:10". The taskbar at the very bottom shows the user "rein@zaphod" and the TightVNC window title.

File download

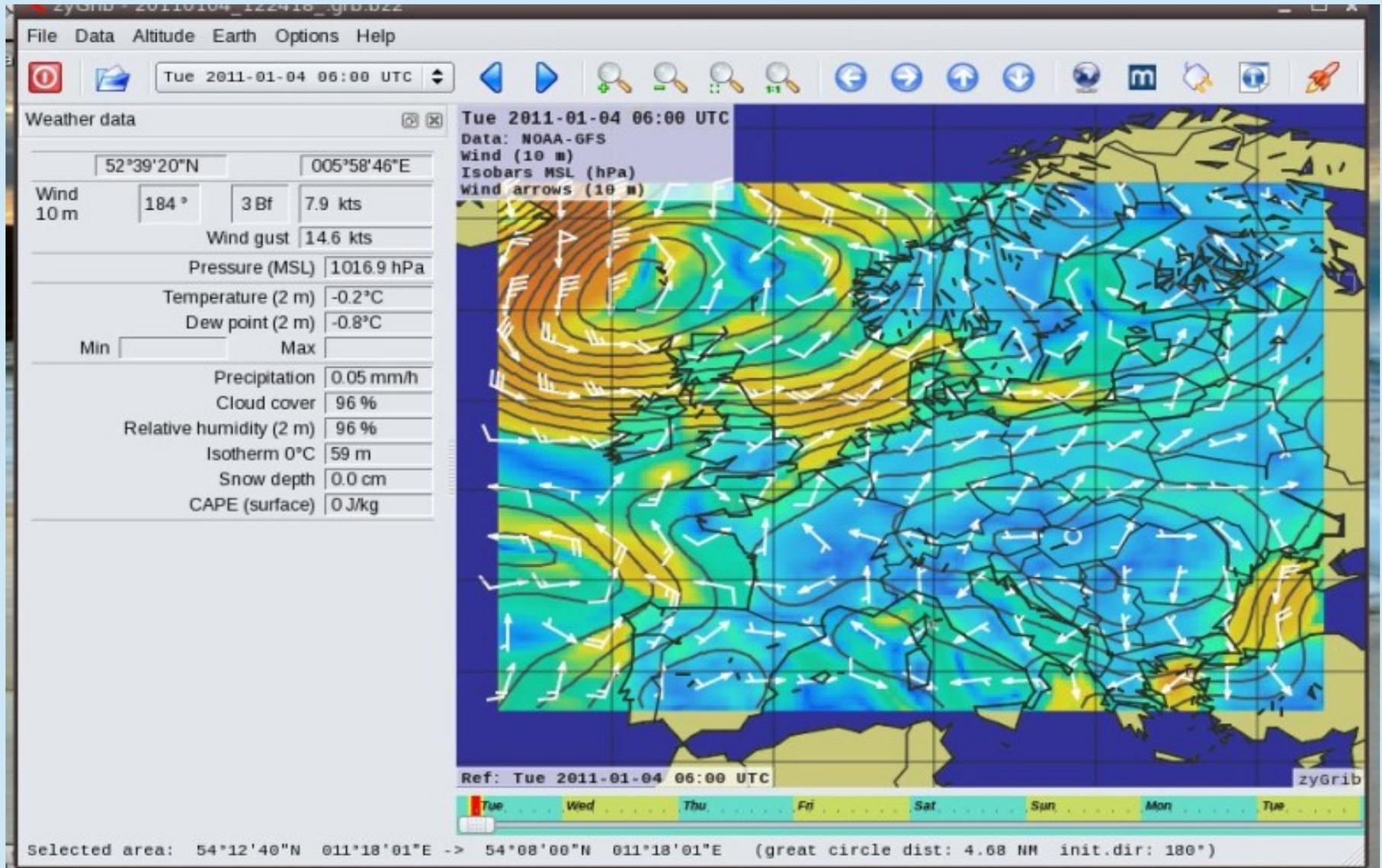
The screenshot displays a TIGHTVNC window titled "rein's X desktop (grumpy:10)". The desktop background is blue with a large white letter 'E' and the text "OP ENVIRONMENT".

Open windows include:

- fldigi - waterfall-only mode:** A software-defined radio interface showing a waterfall plot with a red vertical line indicating a signal at approximately 1000 kHz. The interface includes various controls for frequency, gain, and modulation.
- dclock:** A digital clock displaying "00:00:00" in green.
- jpskmail 1.5.12 - PA0R - 0:** A terminal window showing a file download progress. The main display area contains a long string of hexadecimal characters representing the file's content. Below this, a terminal window shows the command "u" and "to" followed by a long hexadecimal string. The status bar at the bottom of the window shows "PI4TUE" and "30%".

The taskbar at the bottom shows several instances of the terminal window and the TIGHTVNC window itself.

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...

XASTIR - X Amateur Station Tracking and Information Reporting @ fred-ThinkCentre-M57e

XASTIR Map of 004°17.575E 45°29.120N (upper left) to 004°30.409E 45°23.195N (lower right). Lat/Long grid, WGS84 datum.

Client connects to Xastir or UI-View maps and downloads your APRS locations from the Server based on your GPS location...

This allows you to manage your resources efficiently...

File View Map Station Message Interface Help TrackMe Draw In Out Measure Move

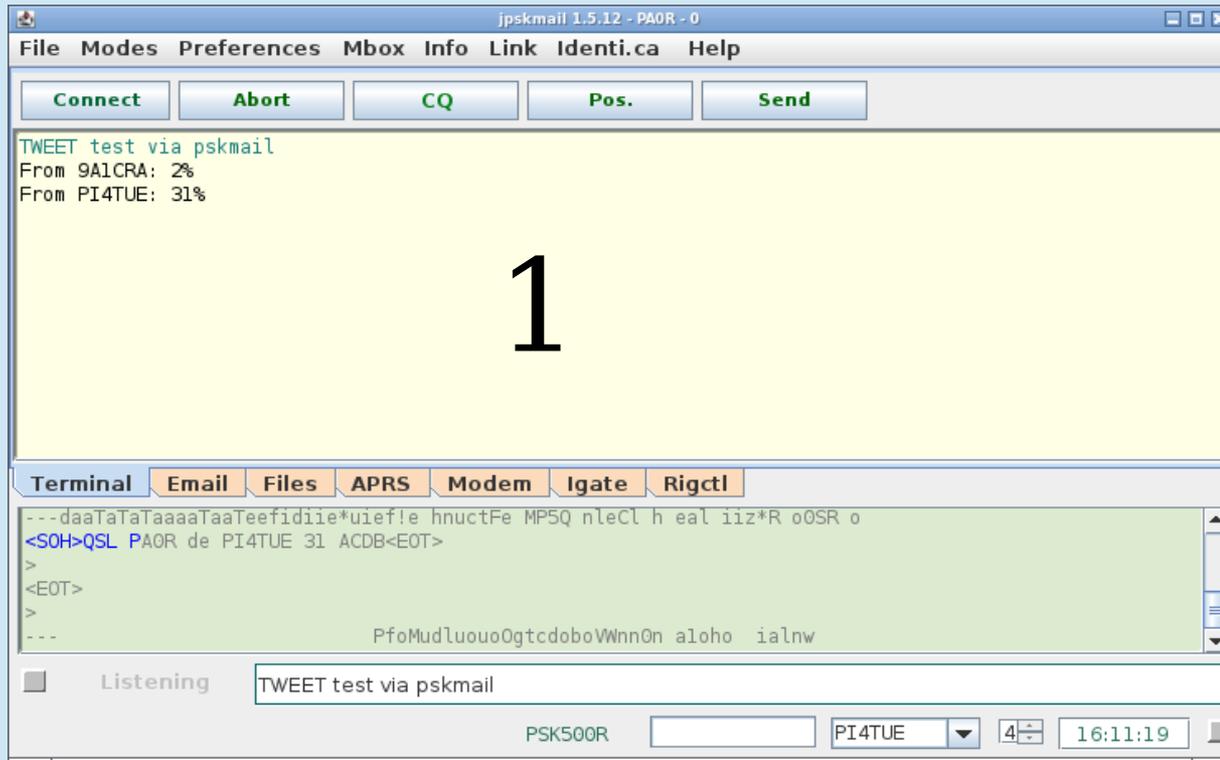
004°18.000E 004°21.000E 004°24.000E 004°26.999E

Loading Weather Alert Maps 45°29.962N 004°22.600E JN25e1 10.7 km 6.5° 5/20 Stations Zoom 44 Logging

Twitter

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

Twitter integrated



Twitter integrated

jpskmail 1.5.12 - PA0R - 0

File Modes Preferences Mbox Info Link Identi.ca Help

Connect Abort CQ Pos. Send

TWEET test via pskmail
From 9A1CRA: 2%
From PI4TUE: 31%

1

Terminal Email Files APRS Modem Igate Rigctl

```
---daaTaTaTaaaaTaaTeefidie*uiief!e hnuctFe MP5Q nleCl h eal iiz*R o0  
<SOH>QSL PA0R de PI4TUE 3I ACDB<EOT>  
>  
<EOT>  
>  
--- PfoMudluouoOgtcdoboWnnOn aloho ialnw
```

Listening TWEET test via pskmail

PSK500R

Compose tweet

Log out | Options | Refresh | Suspend | Trends

- Select a list -

Unified Home @PA0R DMs Favorites

 Rein Couperus
test via pskmail
4 minutes ago from tweetymail

 Jeff Davis
Backyard bounty. The raspberries are coming along well this year.
pic.twitter.com/vqzpGAMPaO
34 minutes ago from Tweetbot for Mac

 DARC e.V.
Störungen in der Infrastruktur aller DARC-Server fb.me/QKSa9BKI
54 minutes ago from Facebook

 Jeff Davis
Trusted QSL Update | Smoke Curls ke9v.net/110 #hamr
about 1 hour ago from Tweet Button

 DARC e.V.
The World of Amateur Radio-Amateur Radio Vintage Film fb.me/ODSBMH5r
about 1 hour ago from Facebook

 Gilles MARTIN

2

Twitter integrated

jpskmail 1.5.12 - PA0R - 0

File Modes Preferences Mbox Info Link Identi.ca Help

Connect Abort CQ Pos. Send

TWEET test via pskmail
From 9A1CRA: 2%
From PI4TUE: 31%

1

Terminal Email Files APRS Modem Igate Rigctl

```
---daaTaTaTaaaaTaaTeefidiie*uiief!e hnuctFe MP5Q nleCl h eal iiz*R o0  
<SOH>QSL PA0R de PI4TUE 31 ACDB<EOT>  
>  
<EOT>  
>  
--- PfoMudluouo0gtcdoboWnnOn aloho ialnw
```

Listening TWEET test via pskmail

PSK500R

Compose tweet

Log out | Options | Refresh | Suspend | Trends

- Select a list -

Unified Home @PA0R DMs Favorites

 Rein Couperus
test via pskmail
4 minutes ago from tweetymail

 Jeff Davis
Backyard bounty. The raspberries are coming along well this year.
pic.twitter.com/vqzpGaMPaO
34 minutes ago from Tweetbot for Mac

 DARC e.V.
Störungen in der Infrastruktur aller DARC-Server fb.me/QKSa9BKI
54 minutes ago from Facebook

 Jeff Davis
Trusted QSL Update | Smoke Curls ke9v.net/110 #hamr
about 1 hour ago from Tweet Button

 DARC e.V.
The World of Amateur Radio-Amateur Radio Vintage Film fb.me/ODSBMH5r
about 1 hour ago from Facebook

 Gilles MARTIN

2

 Rein Couperus
6 minutes ago via Twitter

test via pskmail

Like · Comment · @PA0R on Twitter · Share

3

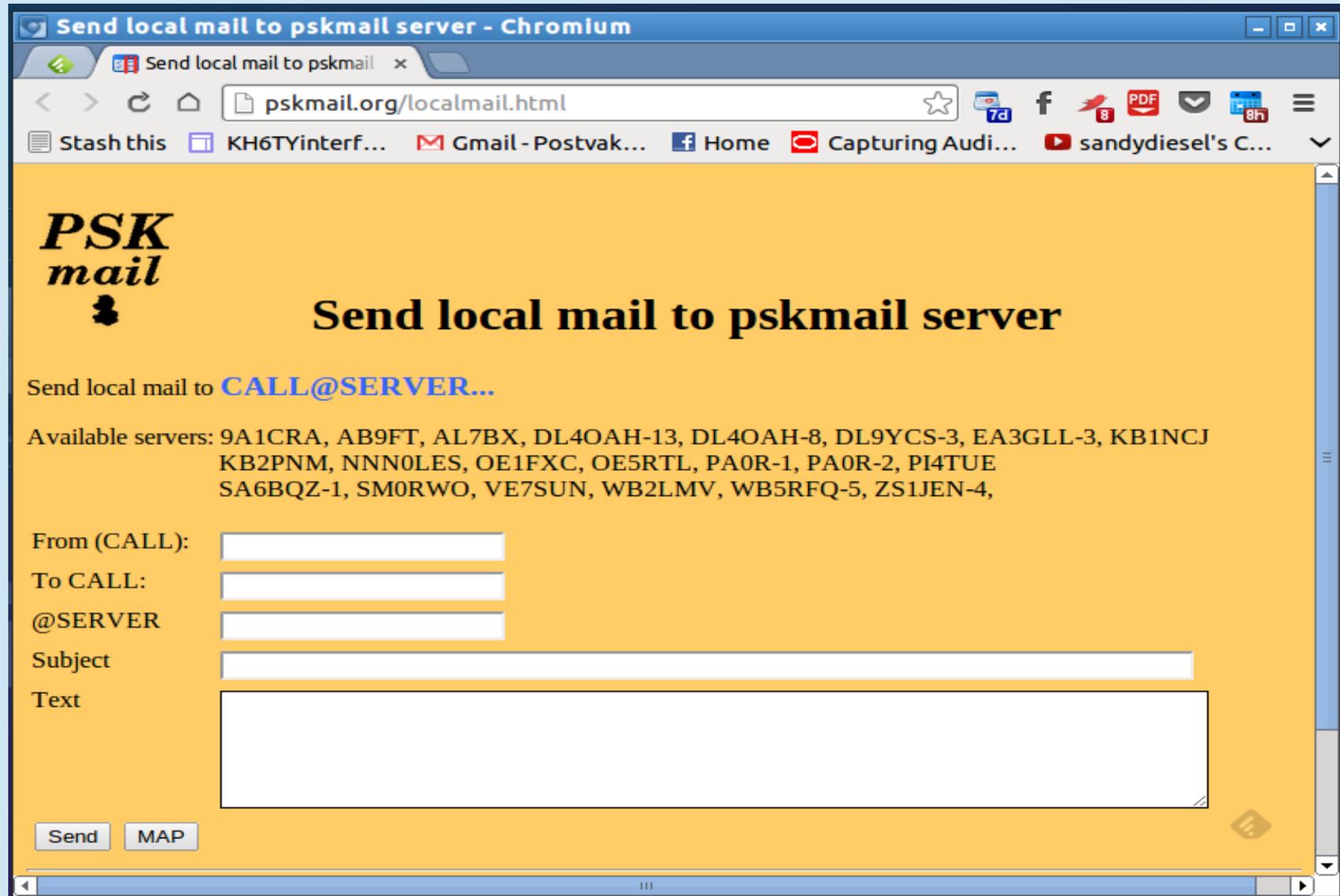
Delay Tolerant Networking built in...

- 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 Chromium browser window with the title "Send local mail to pskmail server - Chromium". The address bar displays "pskmail.org/localmail.html". The page content includes the "PSK mail" logo, a heading "Send local mail to pskmail server", and a form for sending mail. The form fields are: "From (CALL):", "To CALL:", "@SERVER", "Subject", and "Text". A list of available servers is provided above the form. At the bottom of the form 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):

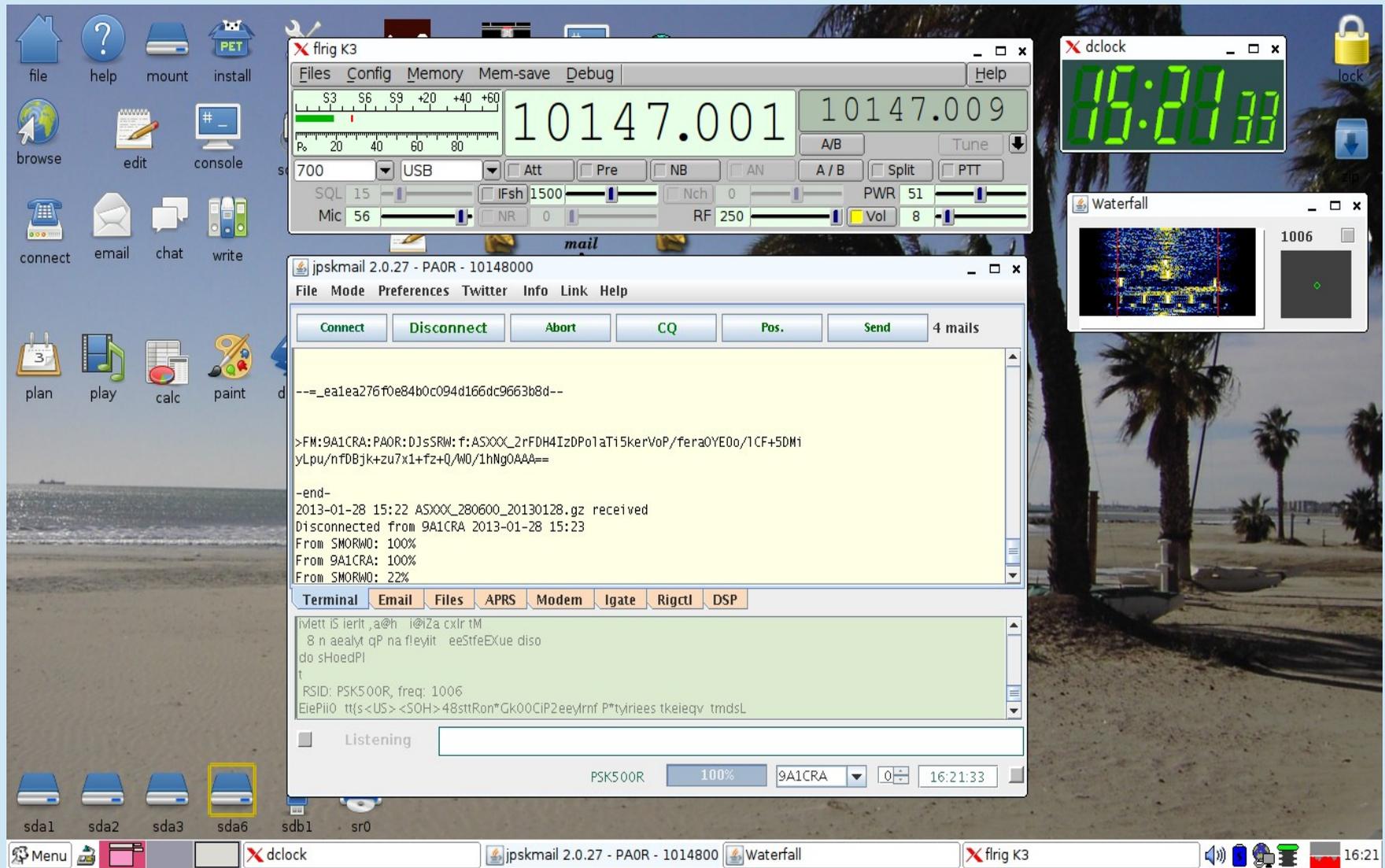
To CALL:

@SERVER

Subject

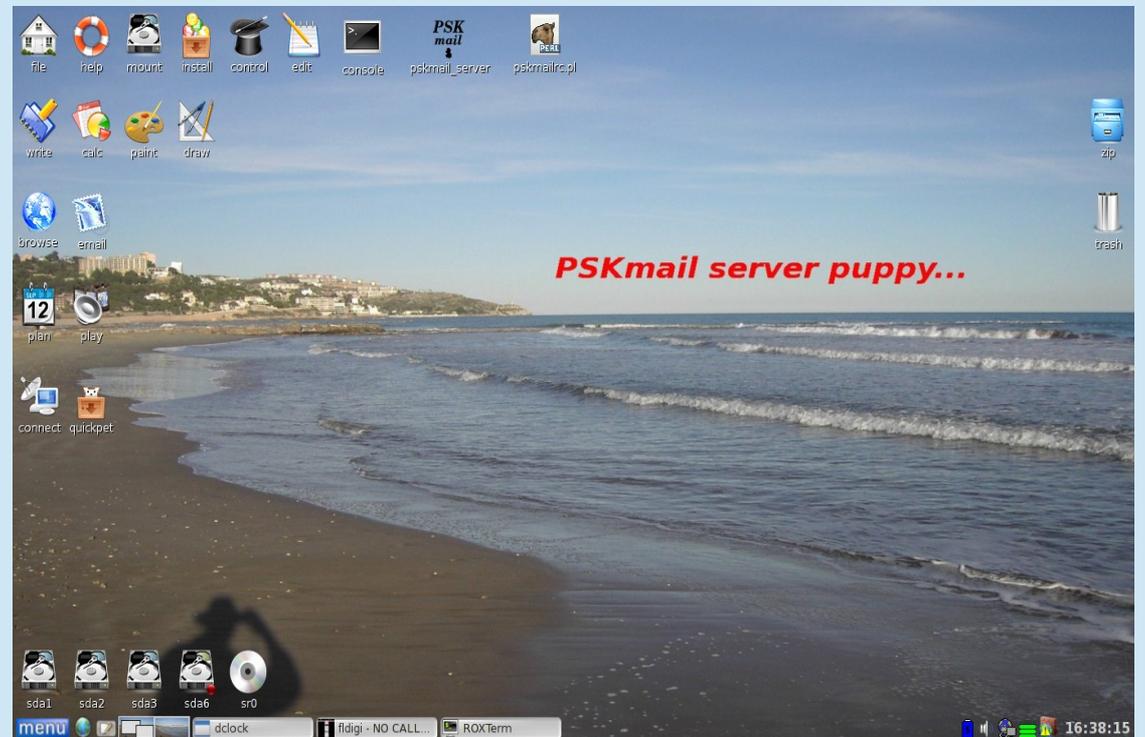
Text

Rapid deployment:



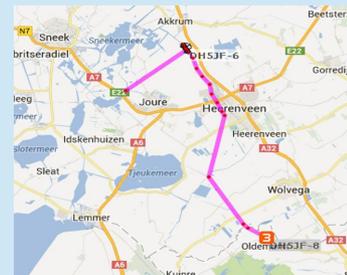
Puppy linux live CD's

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



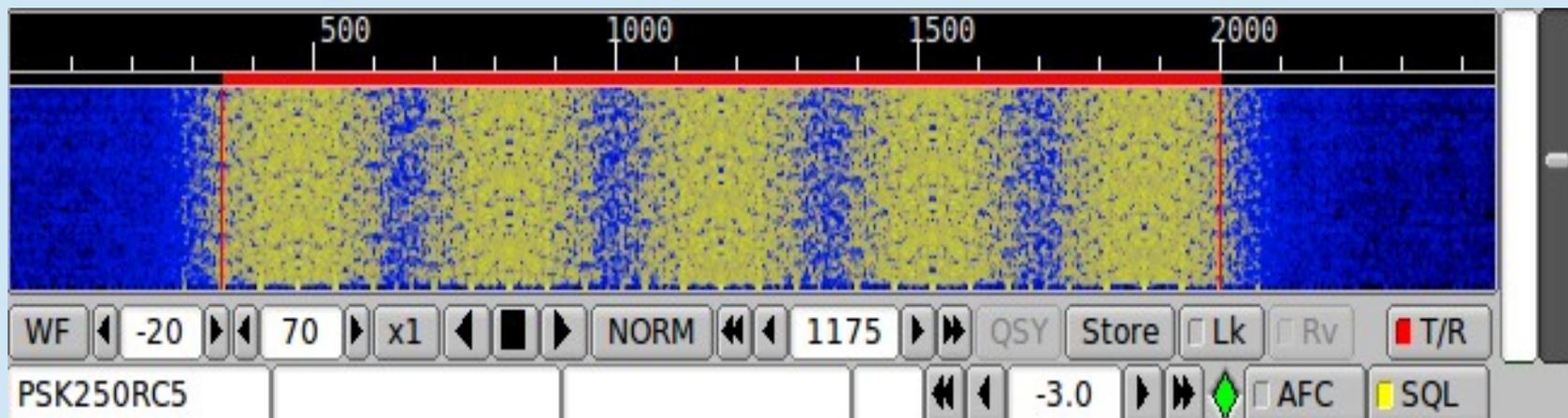
Does it work?

- 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

