

# face the invisibility

with AMS02



# AMS-02

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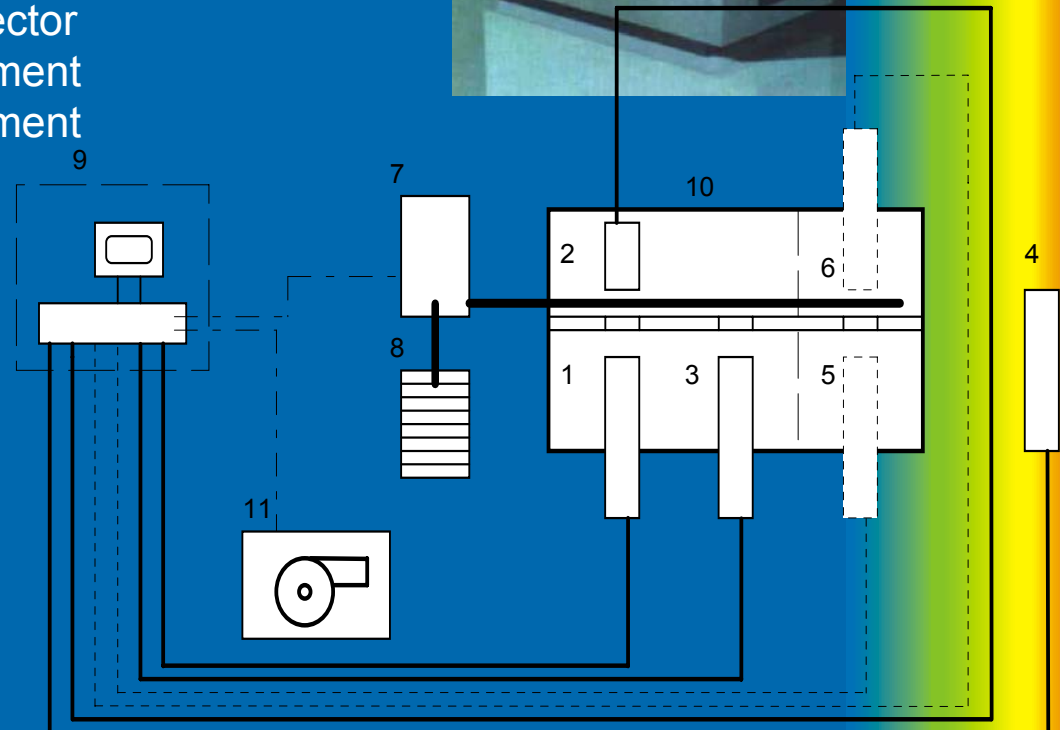
# AMS 02

## components

The equipment consists of the following units (fig.):

A. Unit for continuous sampling:

1. Aerosol filter + NaI(Tl) detector
2. Aerosol filter + PIPS-detector
3. Iodine filter (molecular) + NaI(Tl)-detector
4. Iodine filter (organic) + NaI(Tl)-detector
5. Optional, Special measuring equipment
6. Optional, Special measuring equipment
7. Filter manipulator
8. Racks for filters (filter stock)
9. Computer and control unit
10. Lead shielding
11. Maintenance-free air flow pump



# Complete measuring station

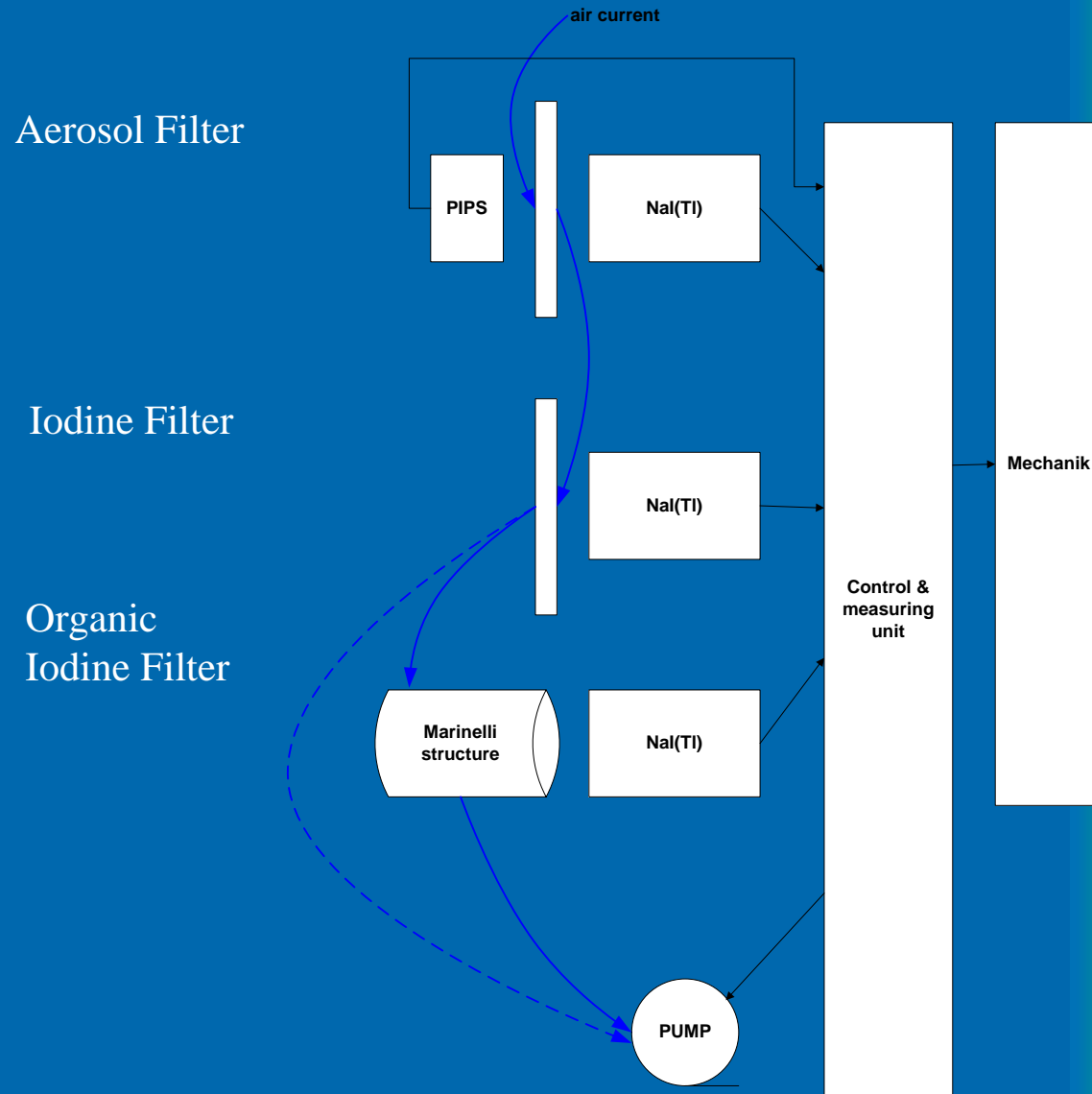
Include:

- AMS02
- RS03/X
- Weather station with temperature, wind speed, wind direction, rain perception



# AMS-02

## Scheme of sampling, measuring and control units



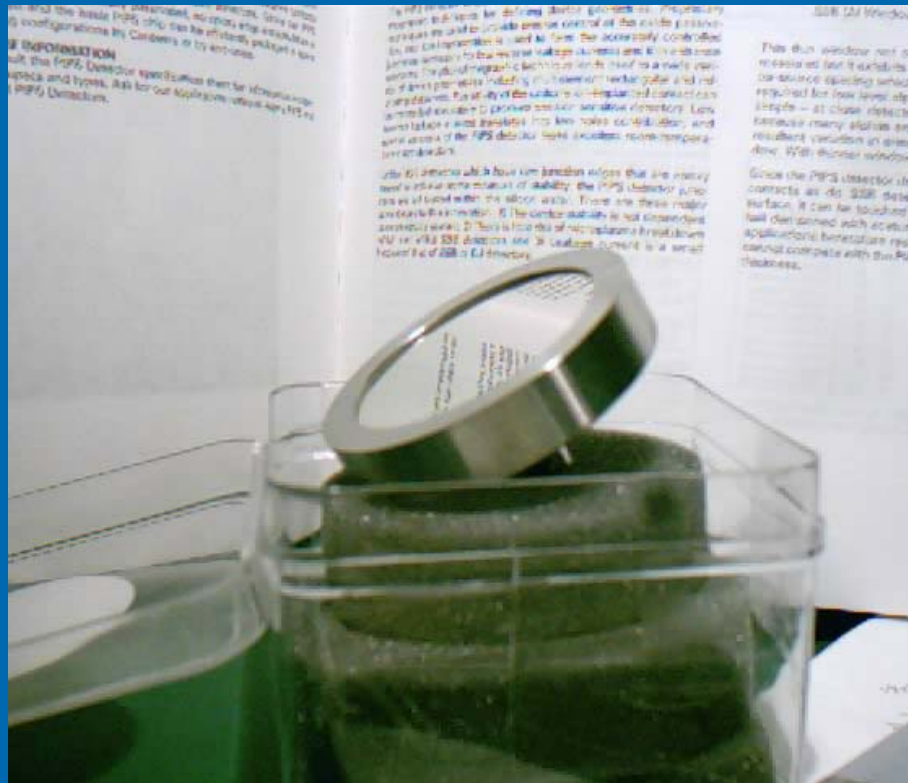
# PIPS Detector

## ➤ Passivated Implanted Planar Silicon detector

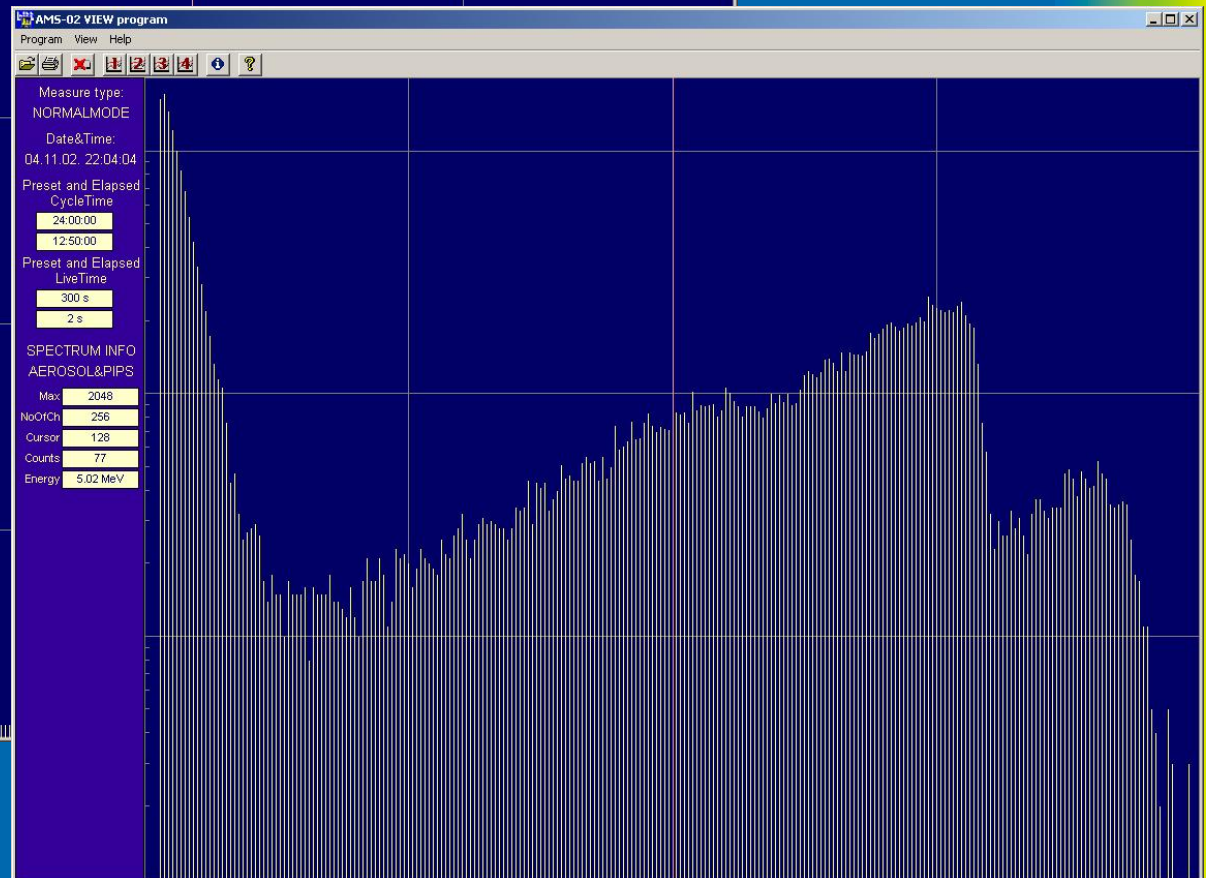
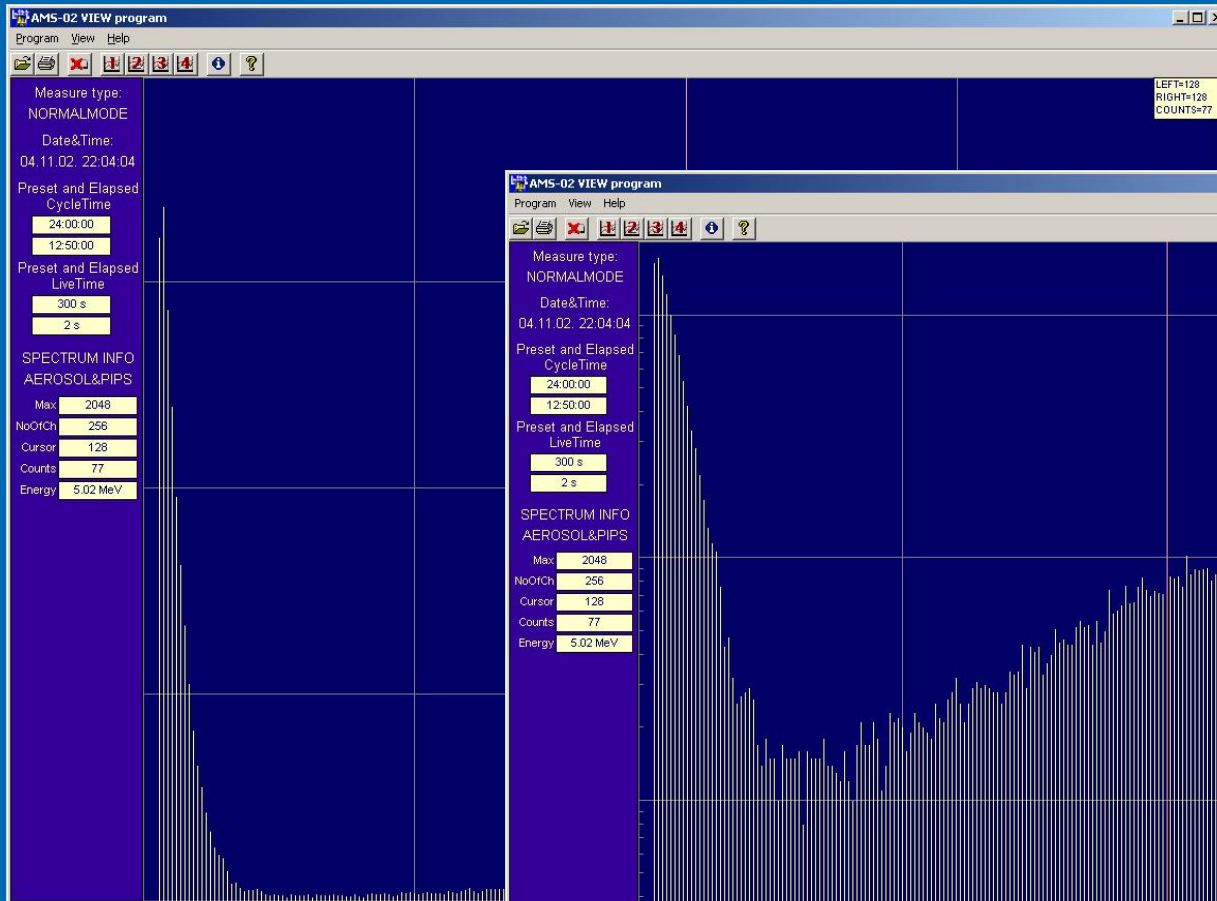
resolution

$\alpha$  55 keV ( $^{241}\text{Am}$ )

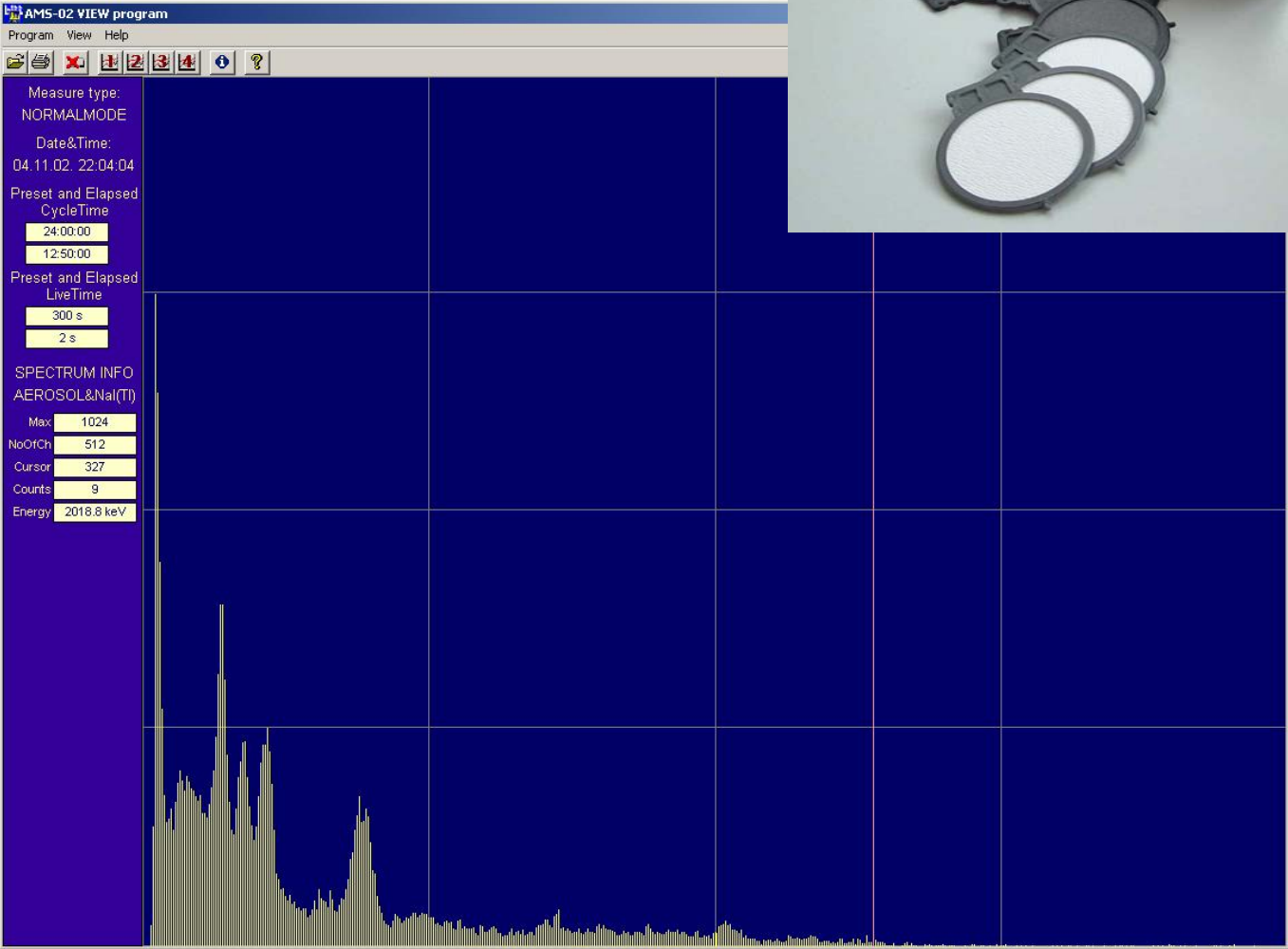
$\beta$  30 keV (continuous spectrum)



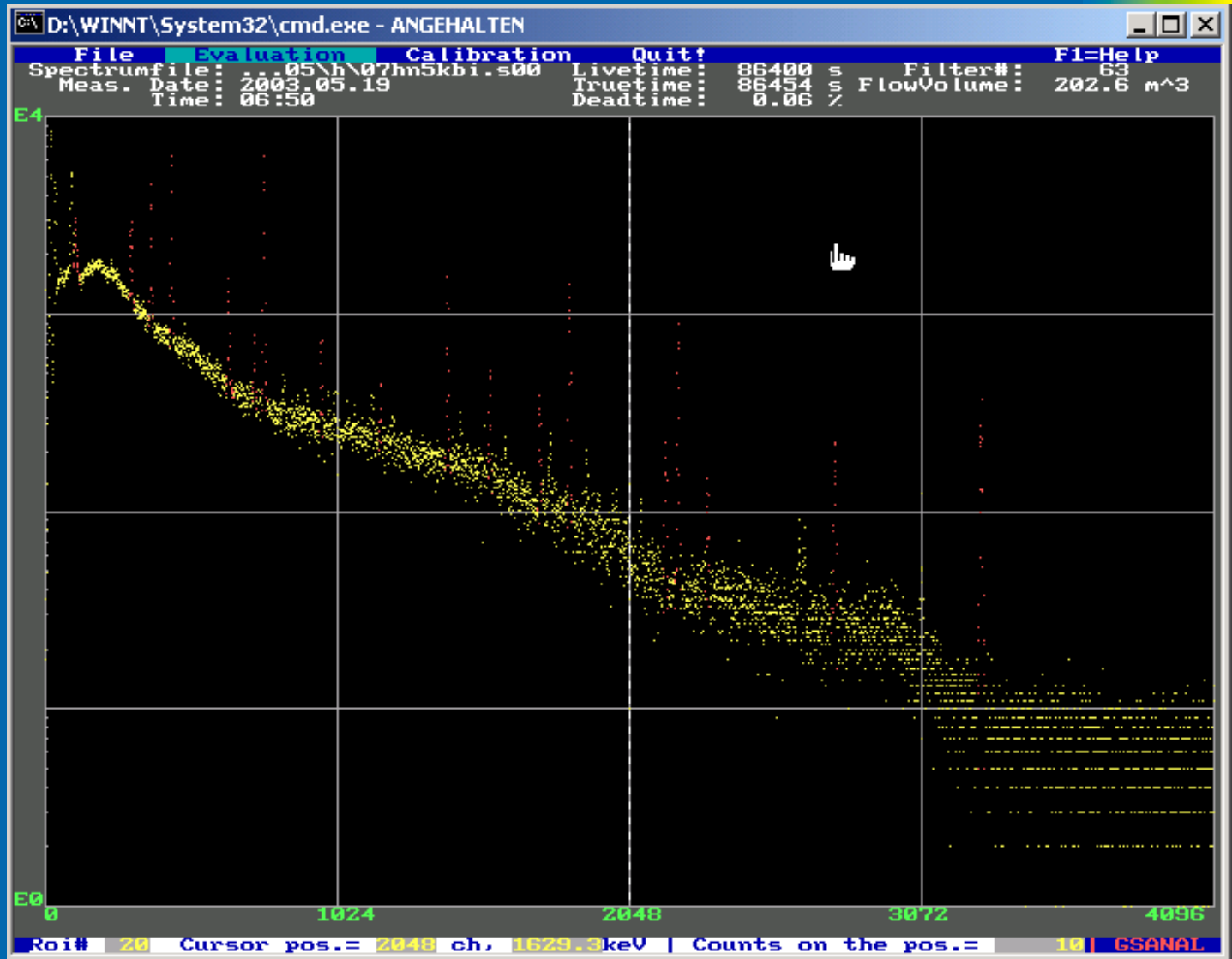
# PIPS Spectra ( $^{222}\text{Rn}$ - and $^{220}\text{Rn}$ -descendants alpha- and beta-regions)



# Nal(Tl) gamma detector

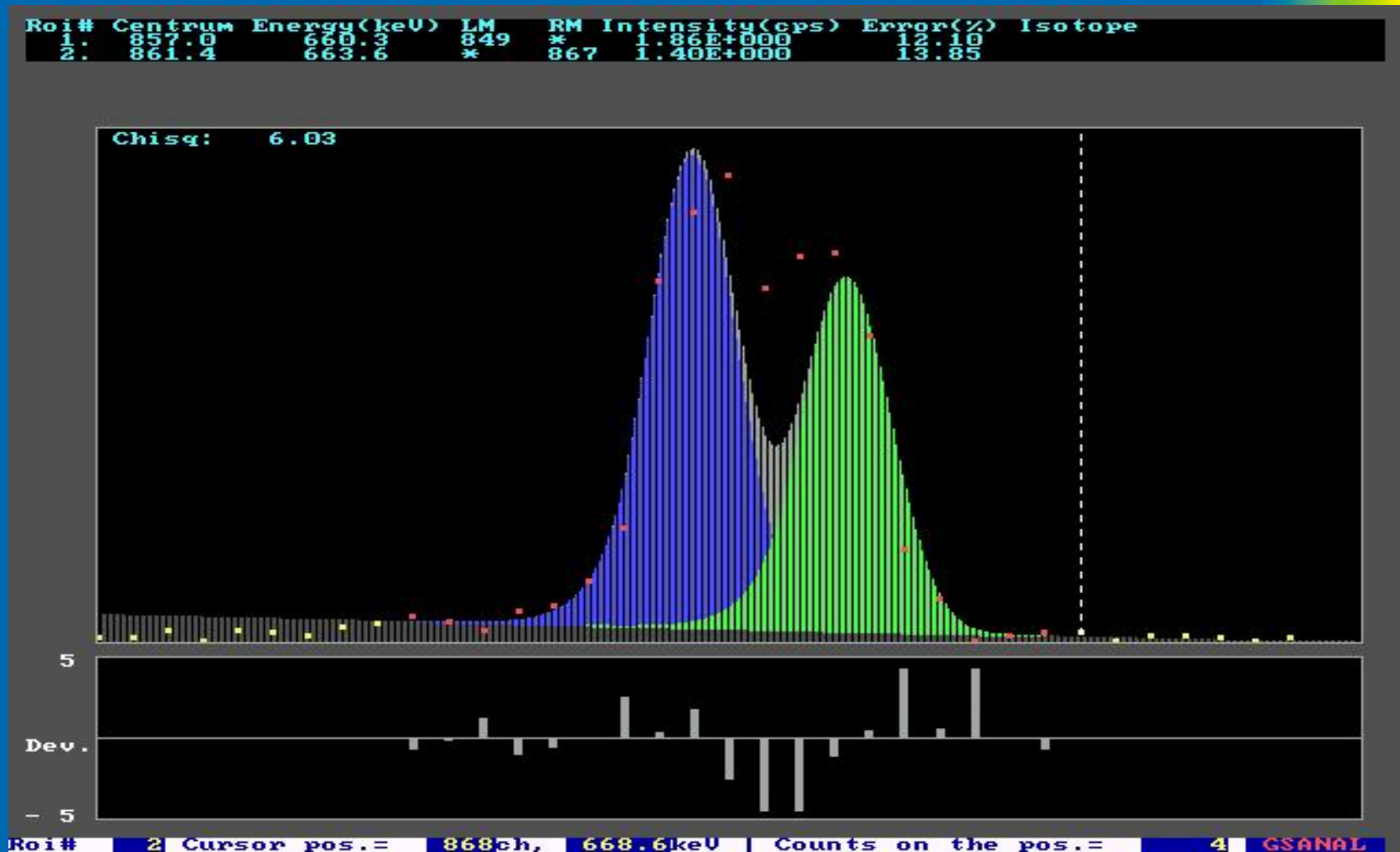


# HP Ge gamma detector

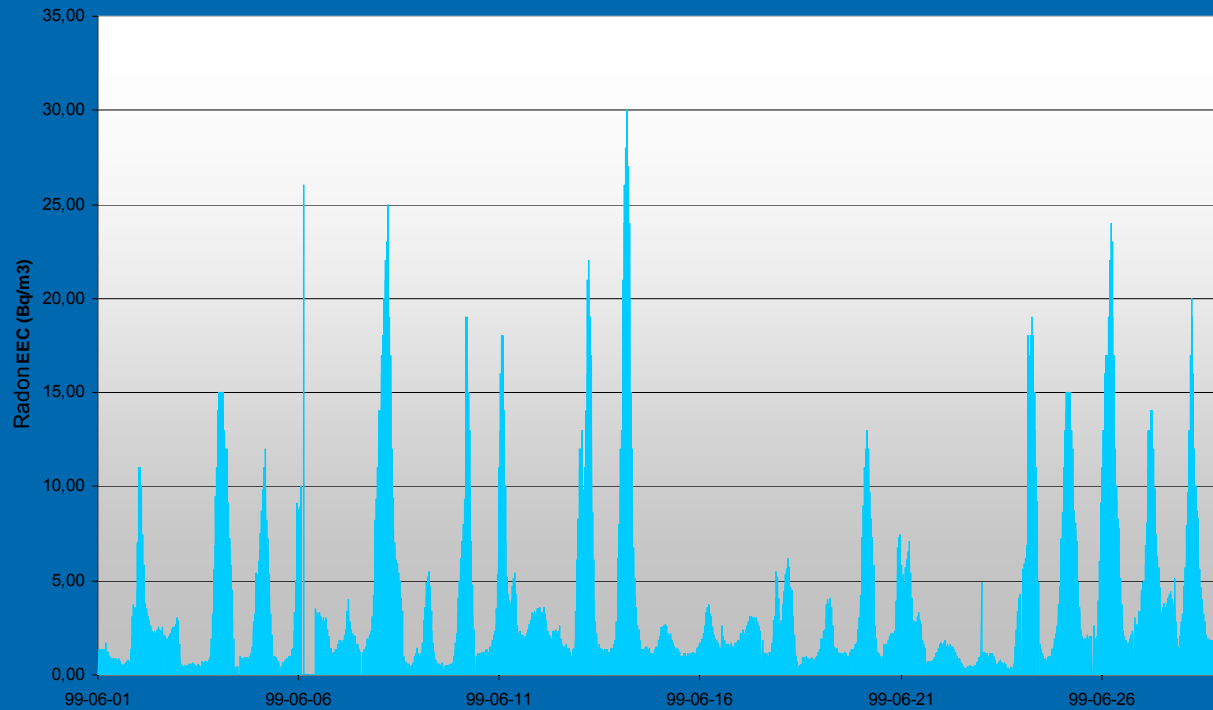


# Evaluation of gamma spectrum [GSANA

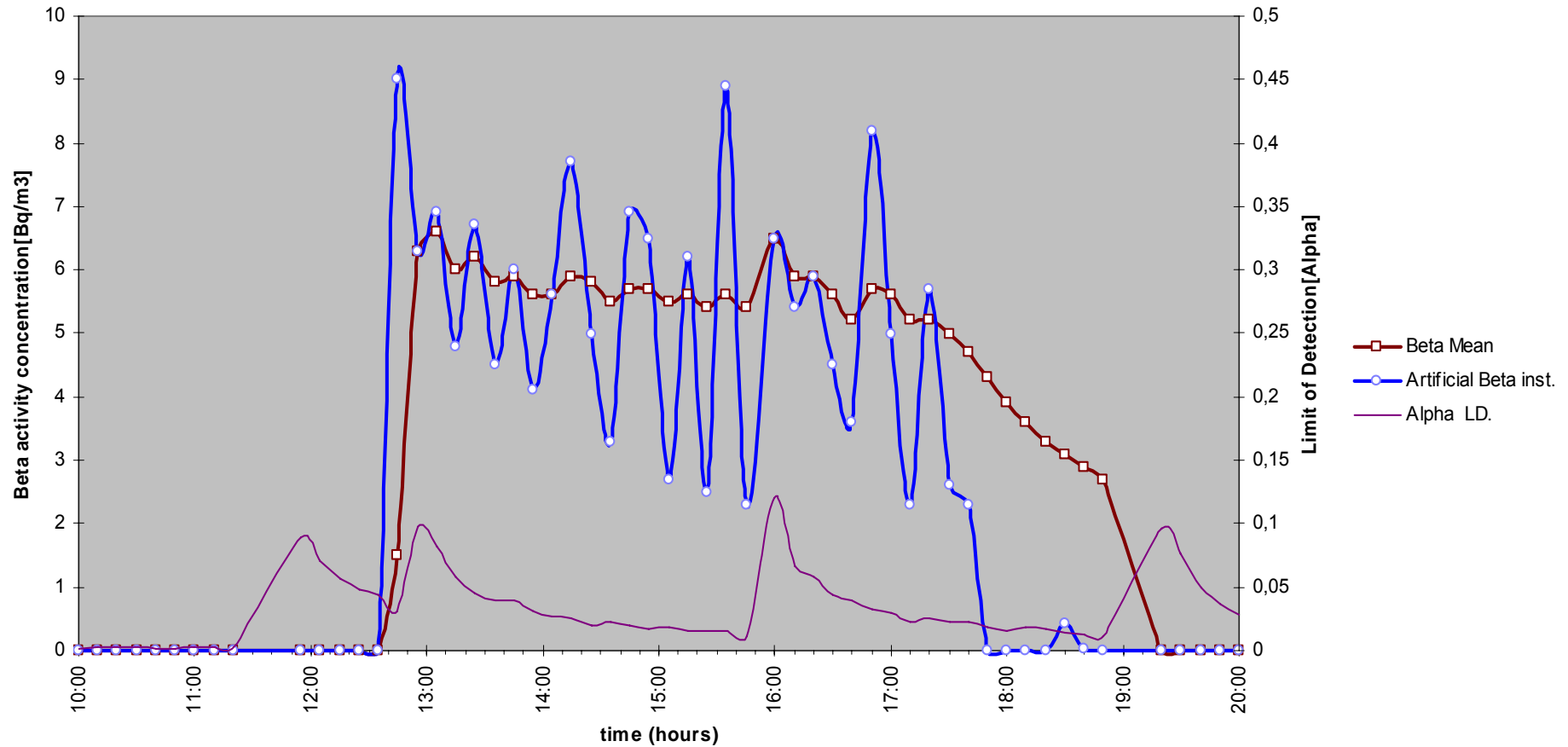
Resolution of overlapping peaks of  $^{137}\text{Cs}$  and  $^{214}\text{Bi}$



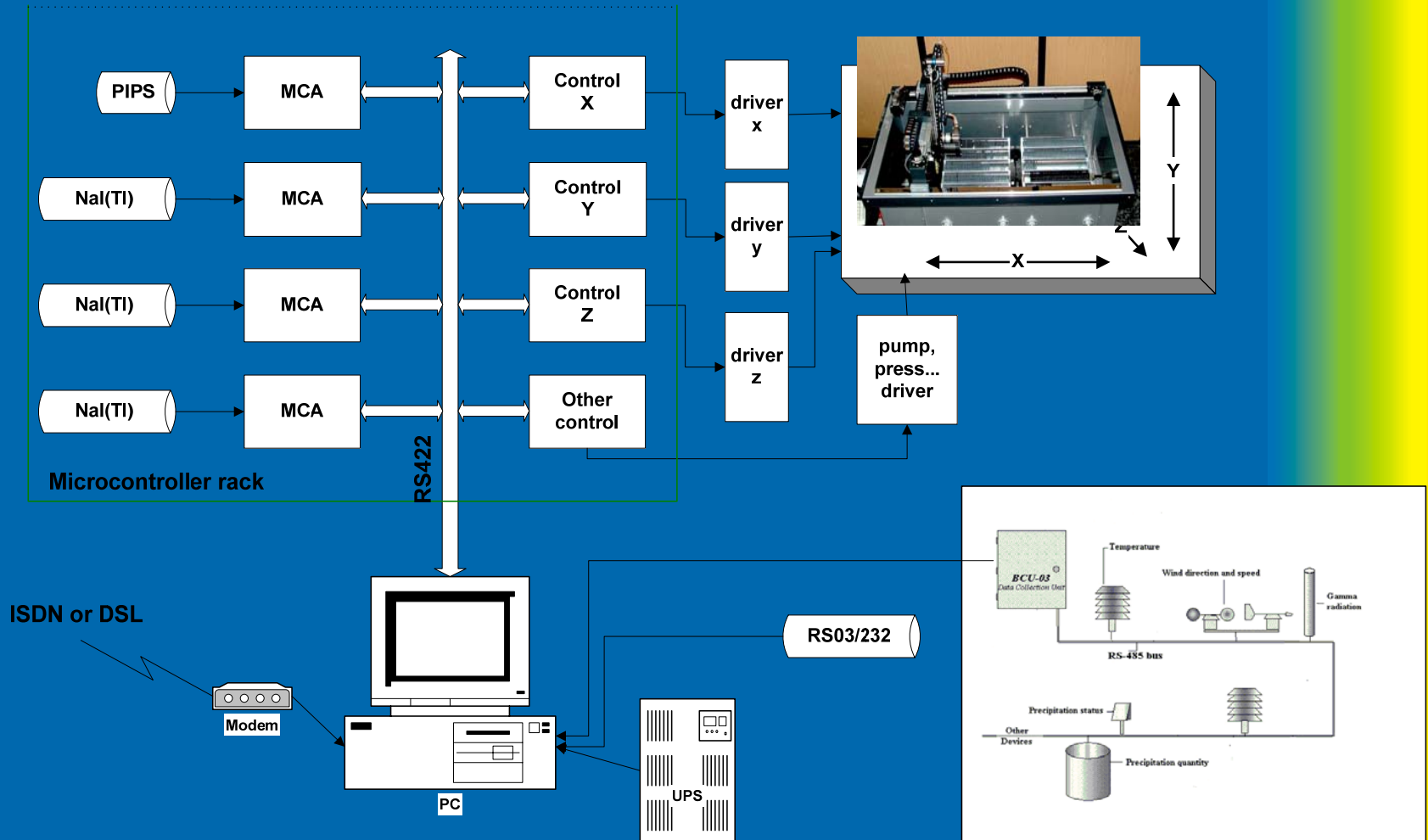
# Radon EEC values recorded for a longer period



# Results of test run with radioaerosol genera



# Flow chart of AMS operation



# AMS-02 equipment

Controller rack

Fan rack

Computer



# Controller rack

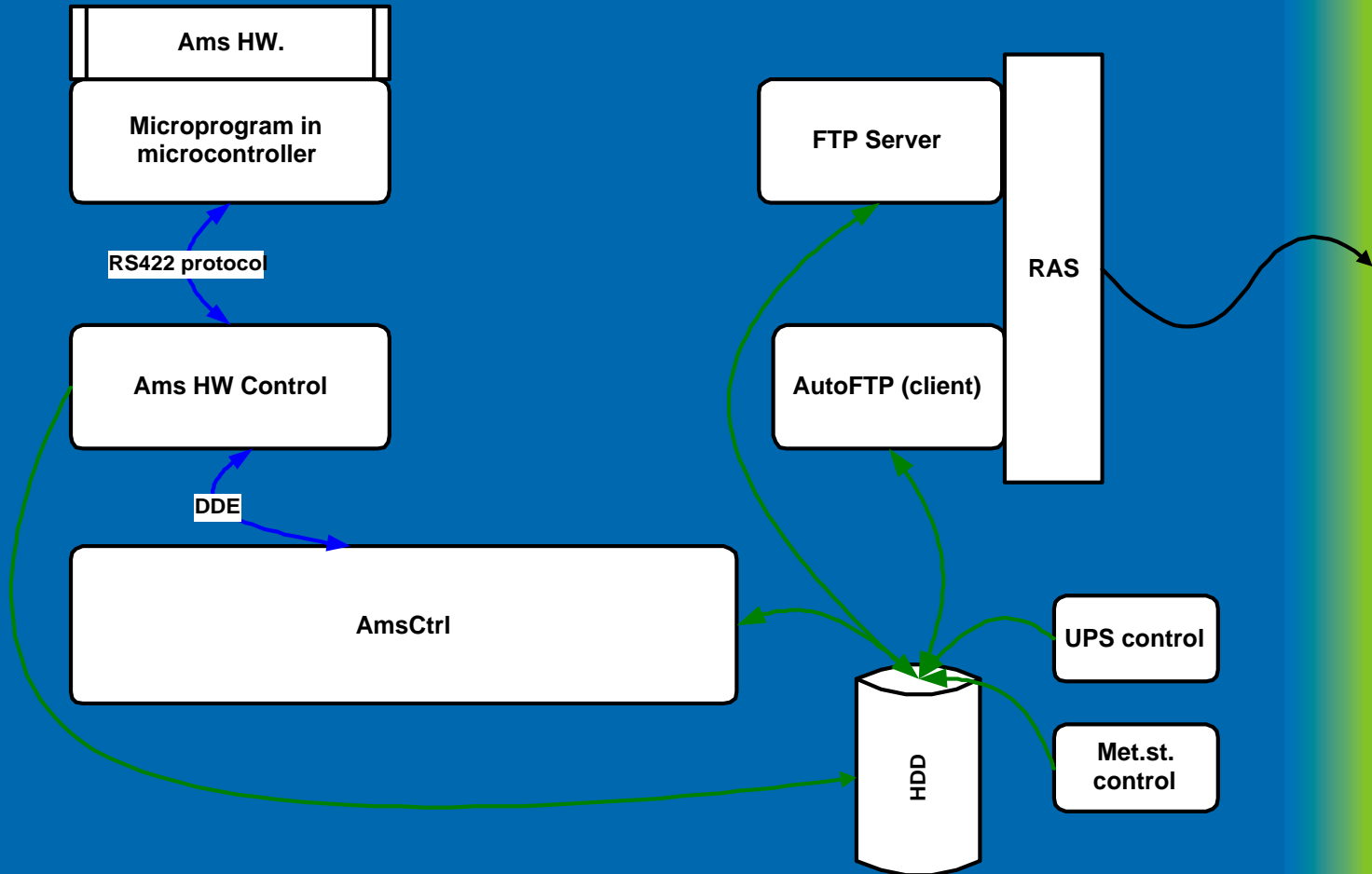
X,Y,Z Controllers  
and drivers

Pump, pressure etc.  
controller



MCAs

# Software structure



PUMP

On\_Off

Q [m3] P1 [mBar]  
6.91 732.80  
P2 [mBar]  
T1 [°C] 672.41  
49.89 P3 [mBar]  
Inlet [°C] 651.95  
28.53 R1 [mBar]  
40.12  
R2 [mBar]  
8.74  
R3 [mBar]  
2.96

X BEGIN X END Y BEGIN Y END Z BEGIN

Current X Pos 309 Current Y Pos 3525 Current Z Pos 0  
Target X Pos Target Y Pos Target Z Pos  
0 0 0

Goto XYZ Refresh X,Y,Z

From 1 Change Filter

To 601 Goto Pos

Change pos Calculate pos

FINGER

On\_Off

FILTER

IN FINGER

FIX

On\_Off

IN AEROSOL

BYPASS

On\_Off

IN IODINE

REFRESH

PC5 [V] 5.89  
PC12 [V] 13.70  
DC12 [V] 13.32  
DC-12 [V] -11.75  
DC15 [V] 17.59  
DP12 [V] 14.50  
DP-12 [V] -11.78

AMS-02 control program

MEASURE MODE

NORMALMODE  
(Phase: MEAS\_IF\_MEAS\_END)

PresetCycleTime 24:00:00  
ElapsedCycleTime 12:24:17

PresetLiveTime(s) 300  
ElapsedLiveTime(s) 257

HARDWARE STATUS

Current operation ---

FLOW status (pump:) ON  
Flowrate (m3/h) 6.9  
Flowvolume(m3) 91.2

FILTER: aer.meas pos 22  
iod.meas pos 404

AMS-02 VIEW program

Program View Help

Measure type: NORMALMODE

Date&Time: 04.11.02 22:04:04

Preset and Elapsed CycleTime  
24:00:00  
12:50:00

Preset and Elapsed LiveTime  
300 s  
2 s

SPECTRUM INFO  
AEROSOL&PIPS

Max 2048  
NoOrch 256  
Cursor 128  
Counts 77  
Energy 5.02 MeV

AMS-02 VIEW Results

Measure type: NORMAL MODE  
Aerosol filter & PIPS Detector

Total counts: 3765  
Background: 42

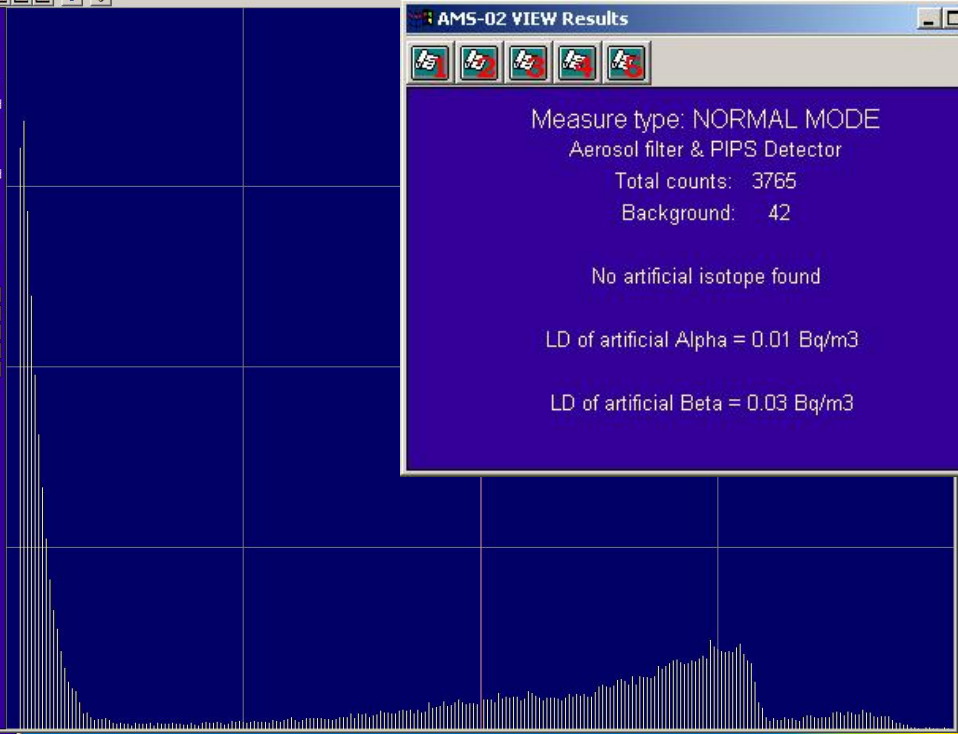
No artificial isotope found

LD of artificial Alpha = 0.01 Bq/m3  
LD of artificial Beta = 0.03 Bq/m3

AMS-02 VIEW Results

Measure type: NORMAL MODE  
Radon and Thoron

Radon EEC= 2.46 Bq/m3 ± 20.3 %  
Thoron EEC= 0.04 Bq/m3 ± 22.1 %



# Communication programs

**AutoFTP - automatic FTP transfer to get data**

Automatic FTP transfer section  
The next automatic transfer process will start at: 12:45 , remaining time 00:40

Auto-mailer section  
Current state/operation: Standby  
Time remaining to check: 00:57  
Status of last operation: Program started  
Legend of last connection:

**Boreas FTP and Socket server**

List of logged users and activity:

Logged Users	Activity
kautny	Idle

Legend of the last Emergency Transfer:

**AutoFTP properties**

SMTP server | Dial-up Networking | Mailing | Software Timers  
Stations | Collect times | Pre-Process | Post Process

Station Name	Status
BitFTP	Disabled
Bit-Zentrale	Disabled

Mnemonic: BitFTP  
Host: 10.0.0.50  
Directory:  
Username: ftpbitintern  
Password: \*\*\*\*\*  
Method: Direct Internet  
Using: Direct Internet

Script file: C:\AUTOFTP\DAYDATA.TXT  
Hot file: C:\AutoFTP\Send\_Daydata.txt

Station autocollect is disabled

Buttons: Delete Selection, Add/Modify, OK, Cancel, Apply

**BoreasServer Properties**

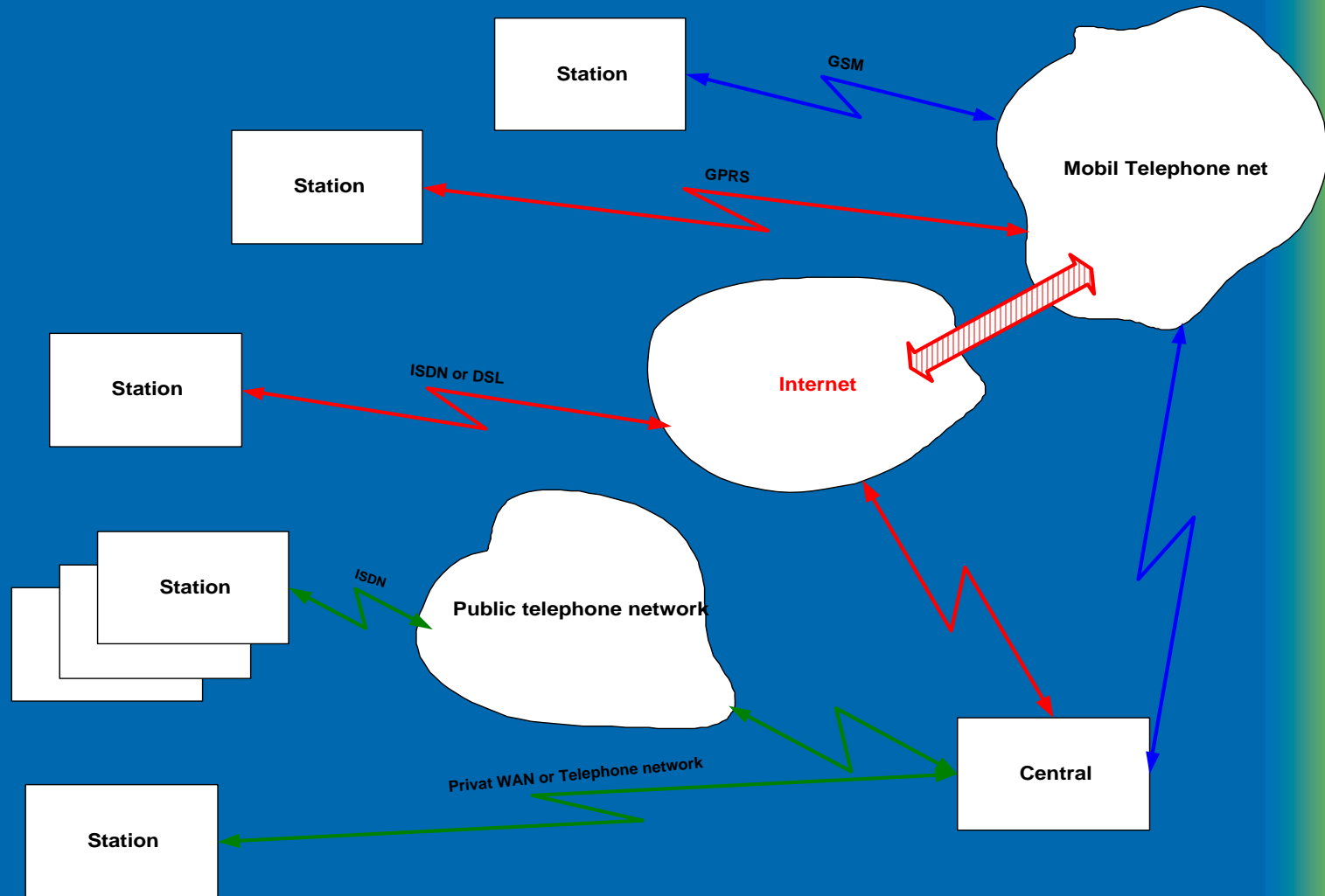
FTP Users | Emergency

User Name
kautny
vinko
ams_cent_gr

Username: ams\_cent\_gr  Need password  
Password: \*\*\*\*\*  Can Read  
Directory: c:\amsctrl\out\  Can Write  
Login batch:   
Logout batch: C:\AMSCTRL\postcent.bat

Buttons: Add/Modify, Delete Selection, OK, Cancel, Apply, Help

# Measuring network

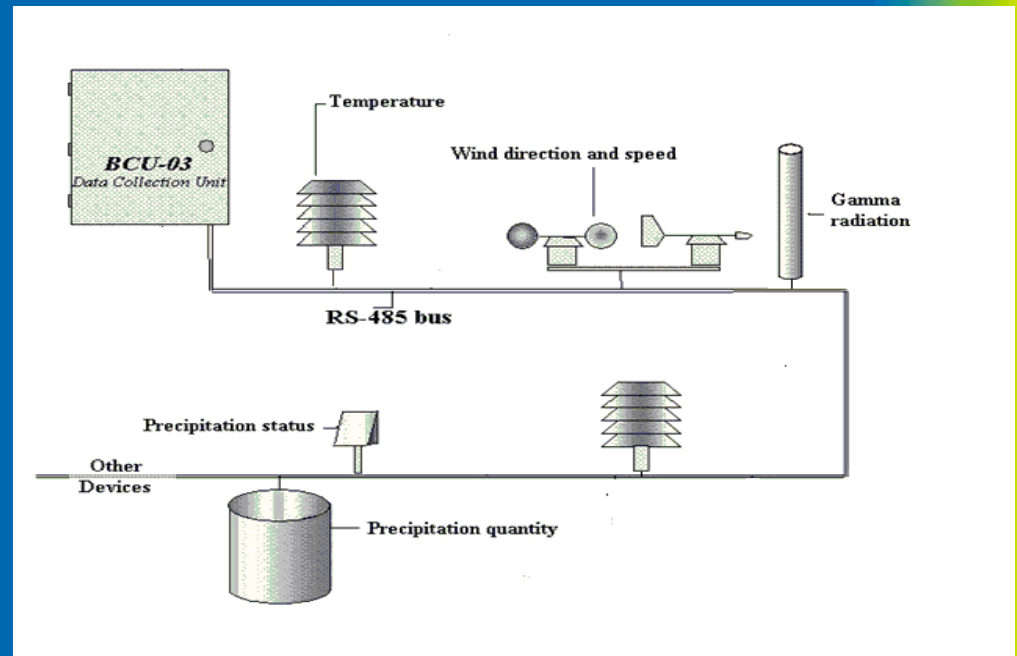


# Meteorological Station

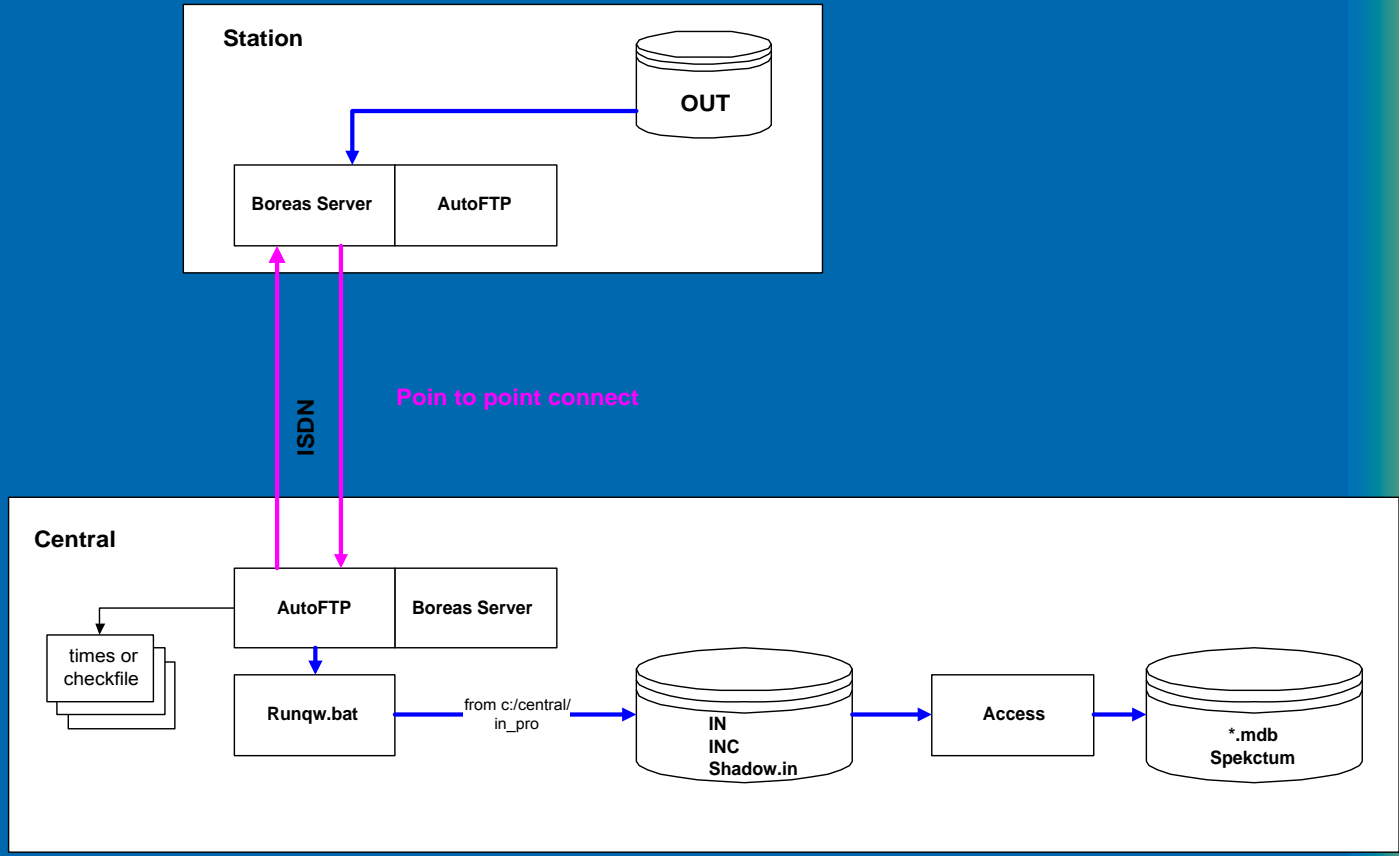
Temperature sensors  
Temperature sensor element,  
temperature and moisture sensor, soil  
temperature sensors  $0.2^{\circ}\text{C}$  precision,  
*measure range from  $-50^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ .*

Wind direction and -speed  
sensor  
The classical build-up spoon  
anemometer and wind flag takes place  
in an individual container. Precision  
3% over 5 m/s.

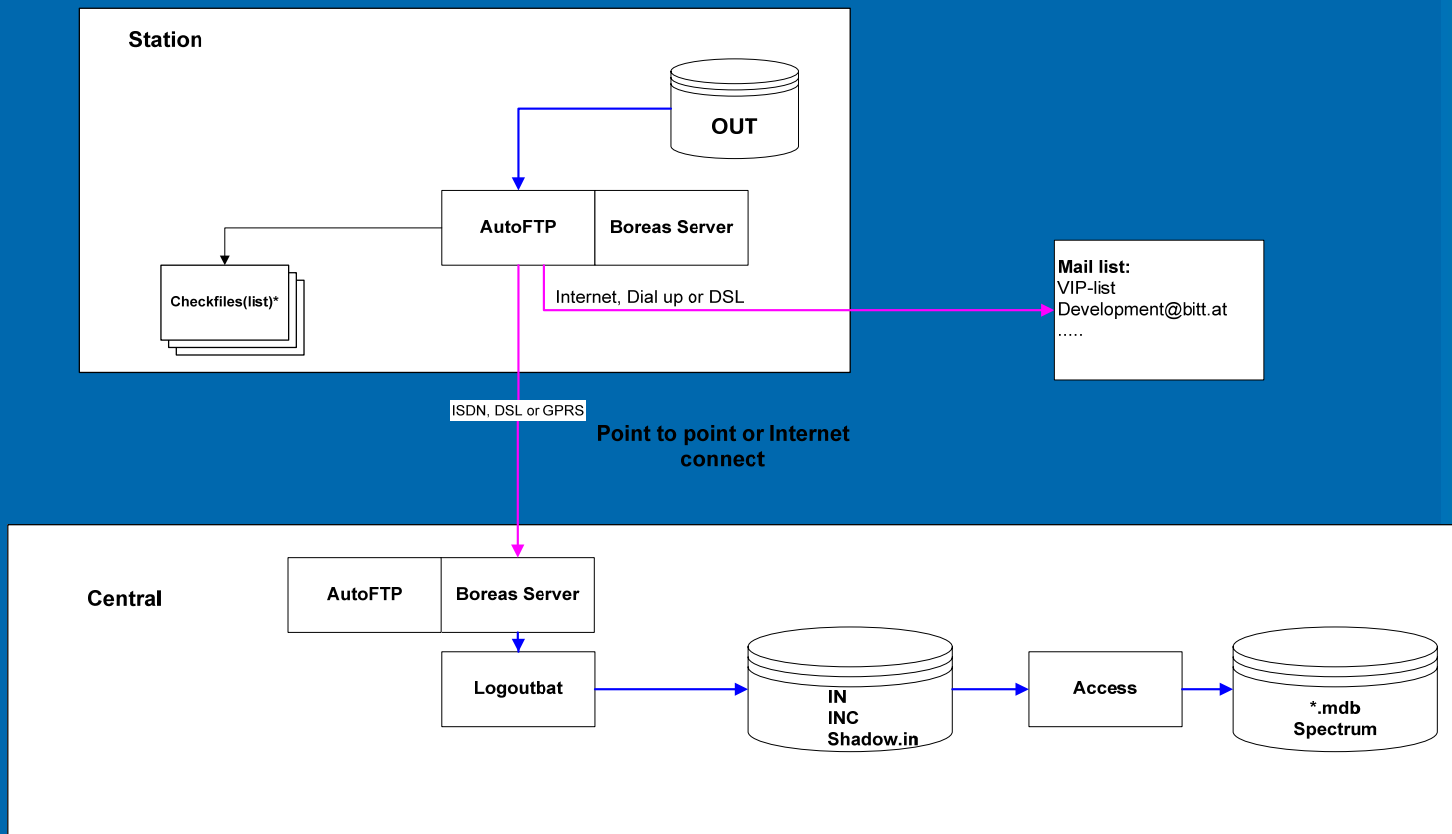
Precipitation sensors  
The precipitation quantity sensor  
measures the quantity of the fallen  
precipitation with precision 0.1 mm.  
The precipitation status detector and  
the leaf moisture sensors are used to



Normal polling for data Acquisition,  
communication is started by the Central



### Alarm-Warning: communication is started by the Station



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