

face the invisibility

with AMS02



AMS-02

Dr. Peter Zagyvai
Budapest Univ. of Technology and
Economics

DI. Karoly Kautny
westbitt@westel900.net

Bitt Technology, Spillern, Austria

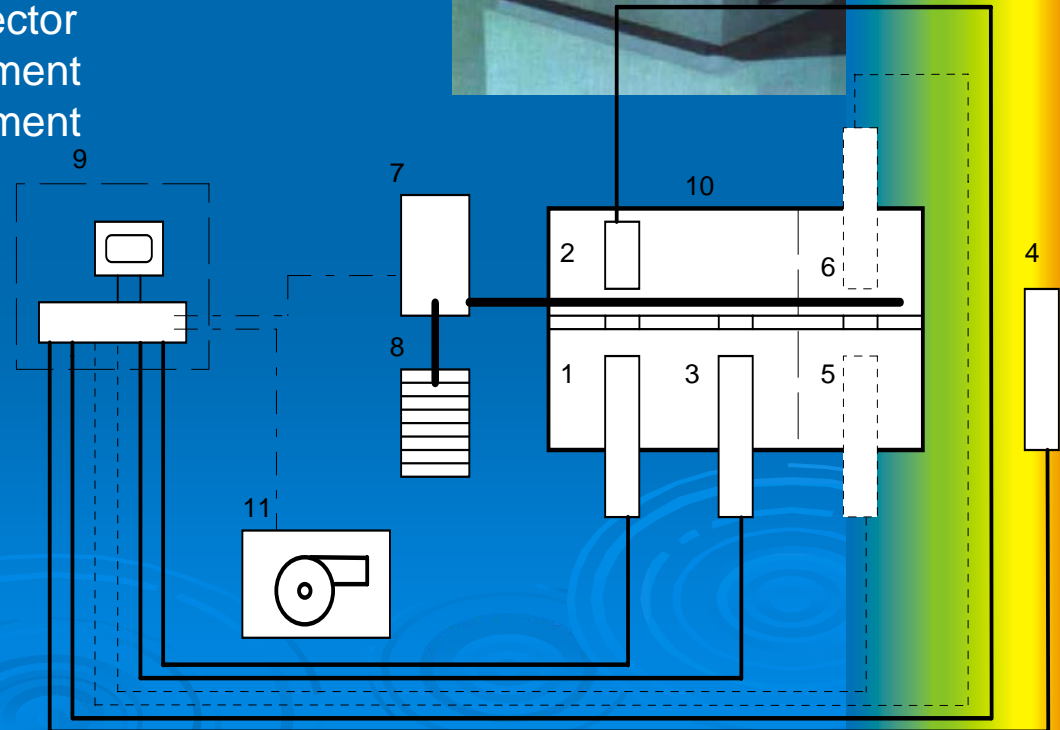
AMS 02

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

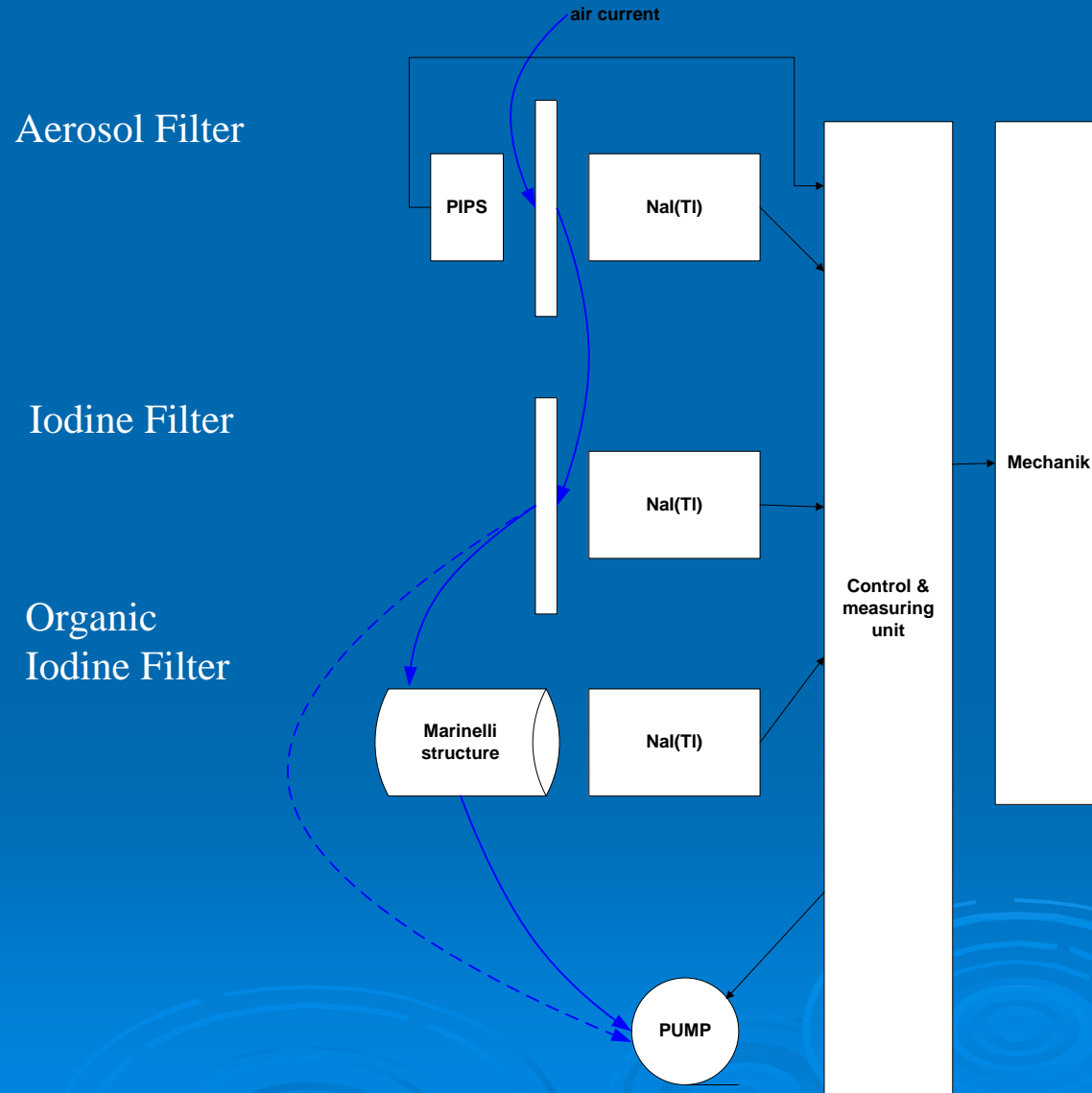
Include:

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



AMS-02

Scheme of sampling, measuring and control units



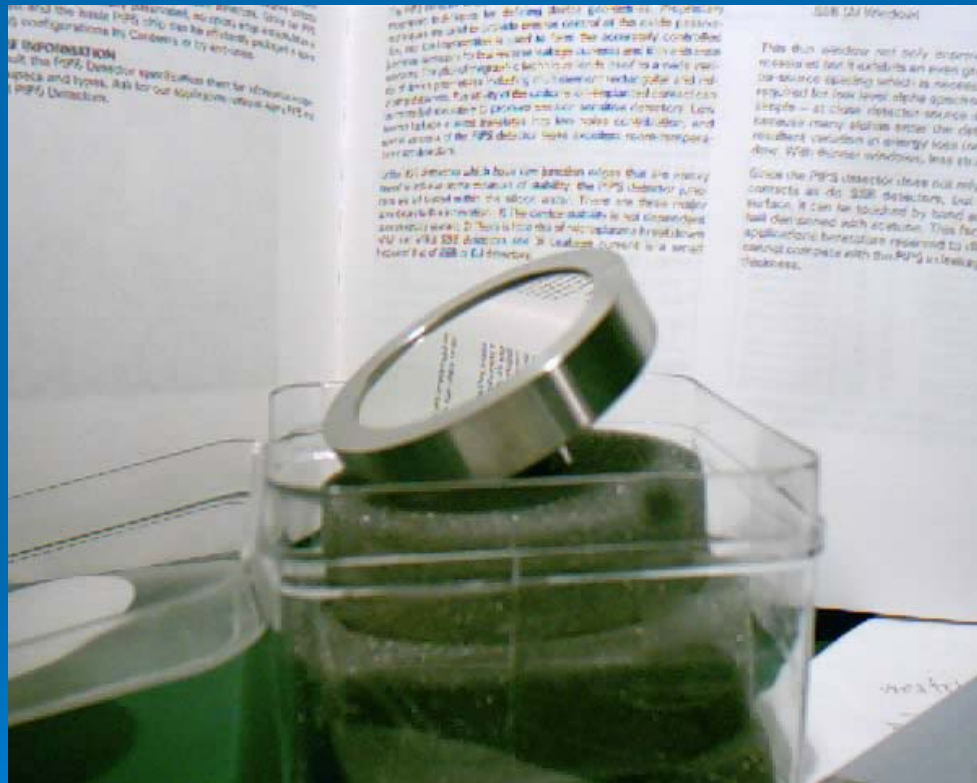
PIPS Detector

➤ Passivated Implanted Planar Silicon detector

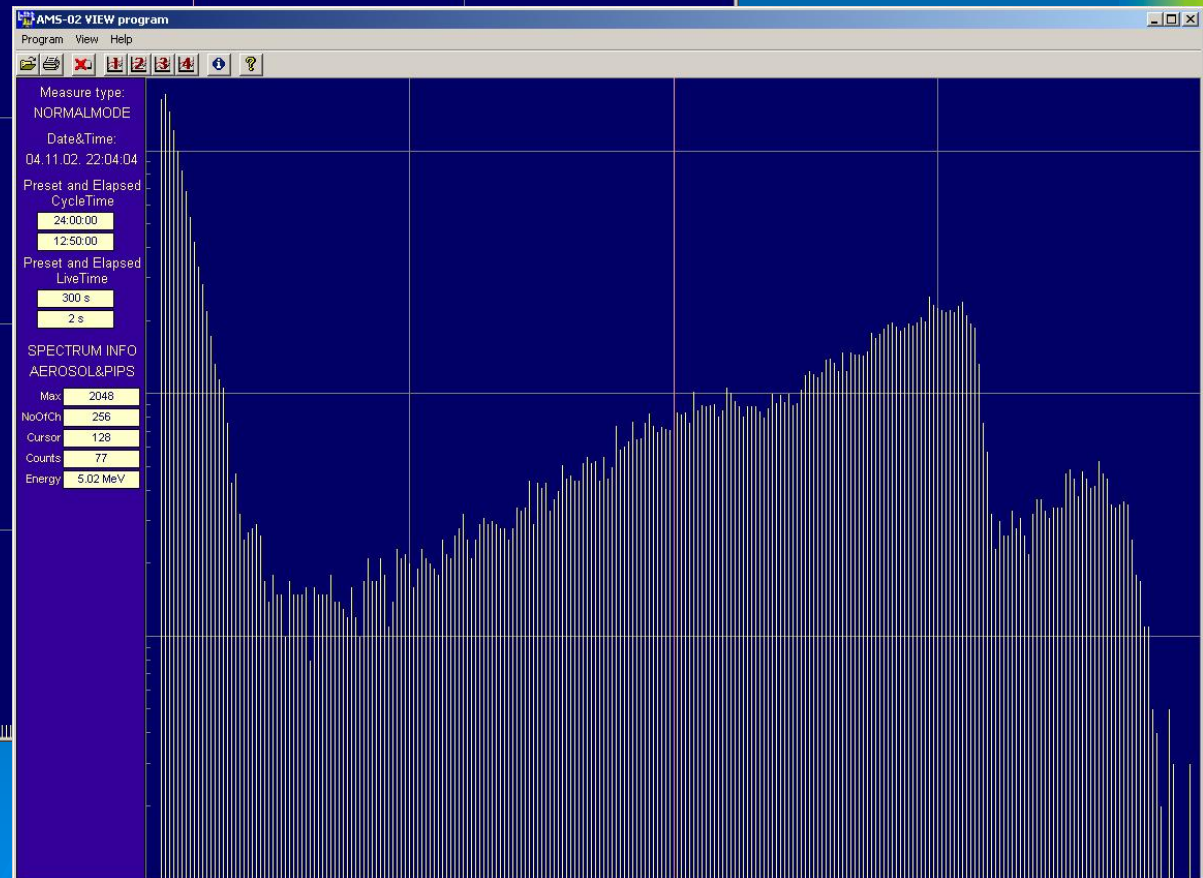
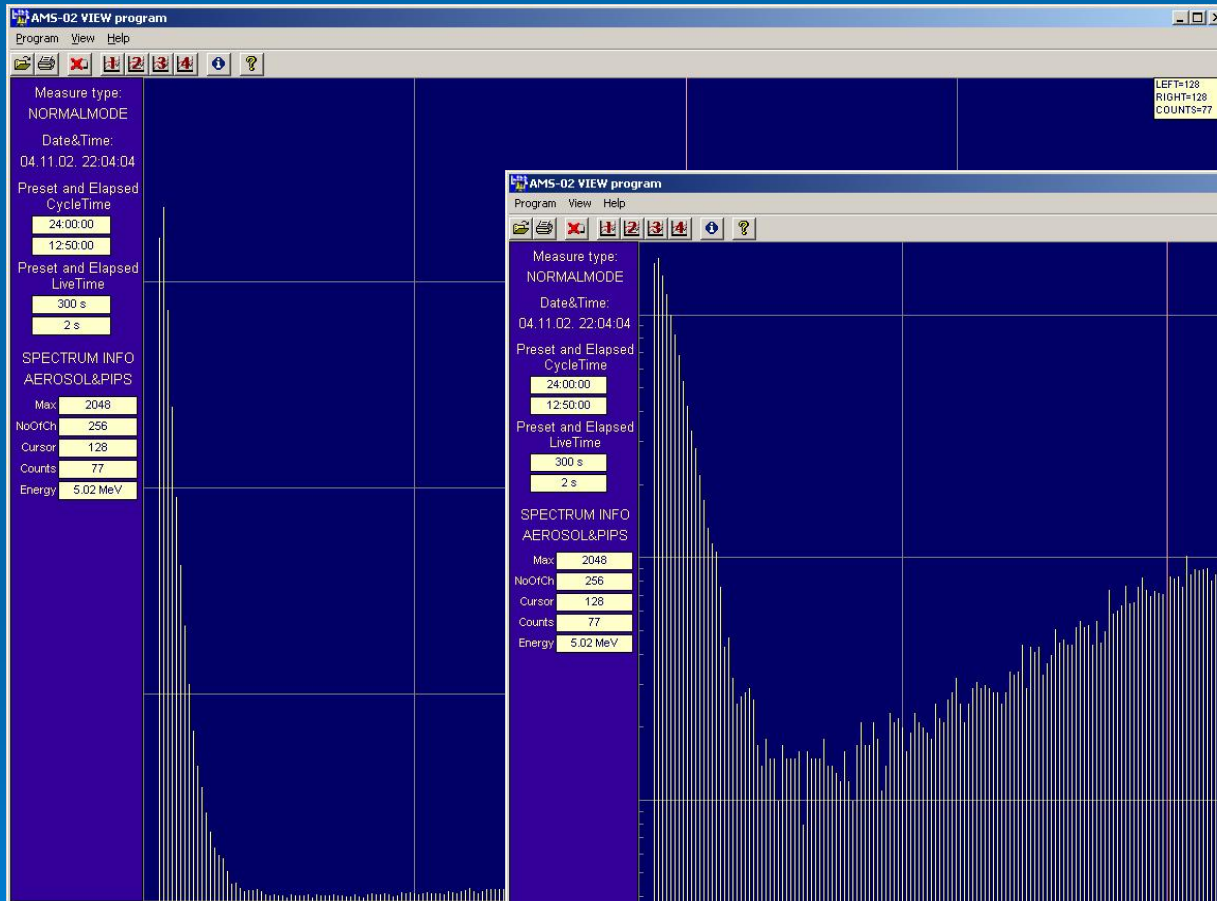
resolution

α 55 keV (^{241}Am)

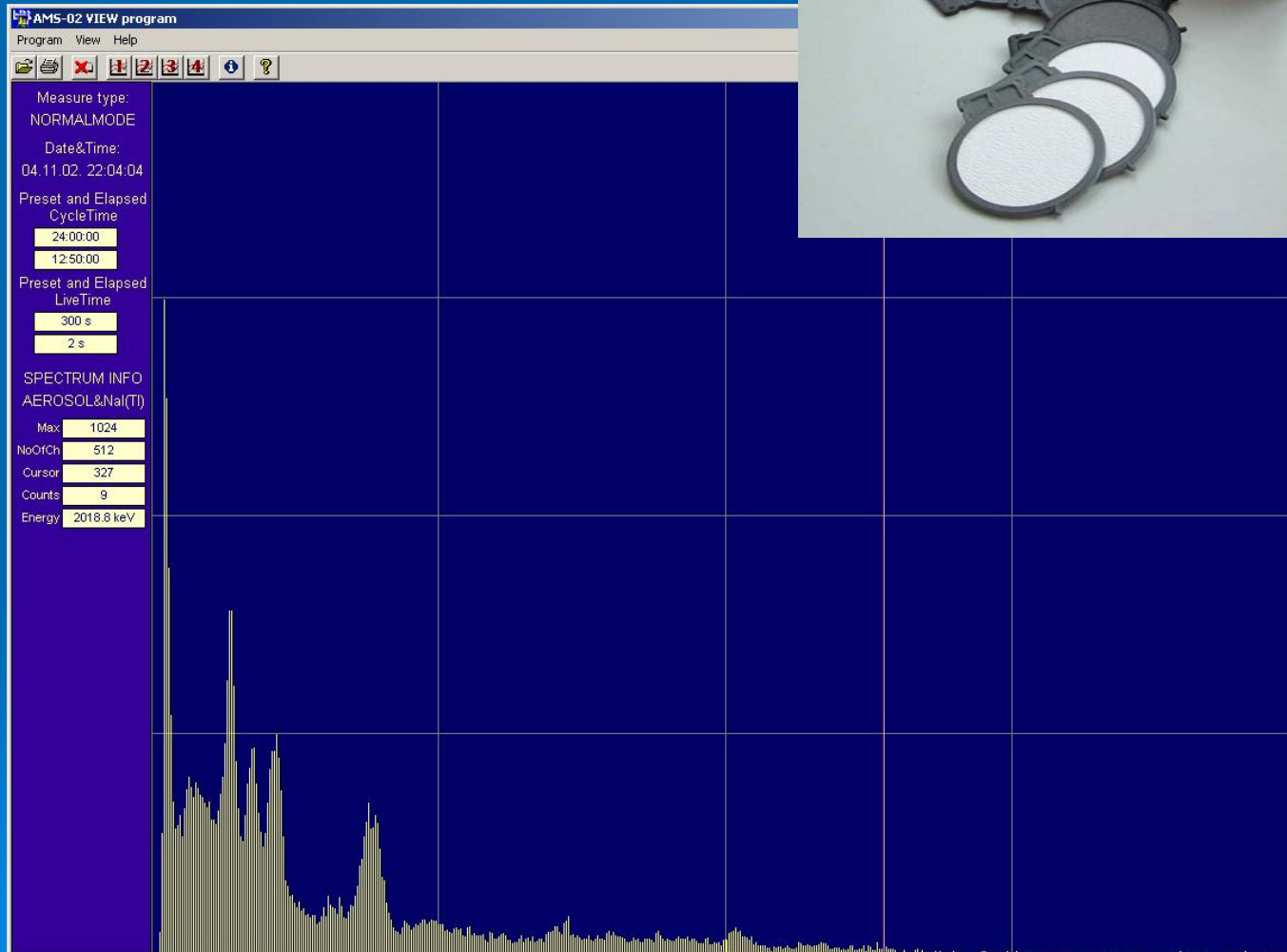
β 30 keV (continuous spectrum)



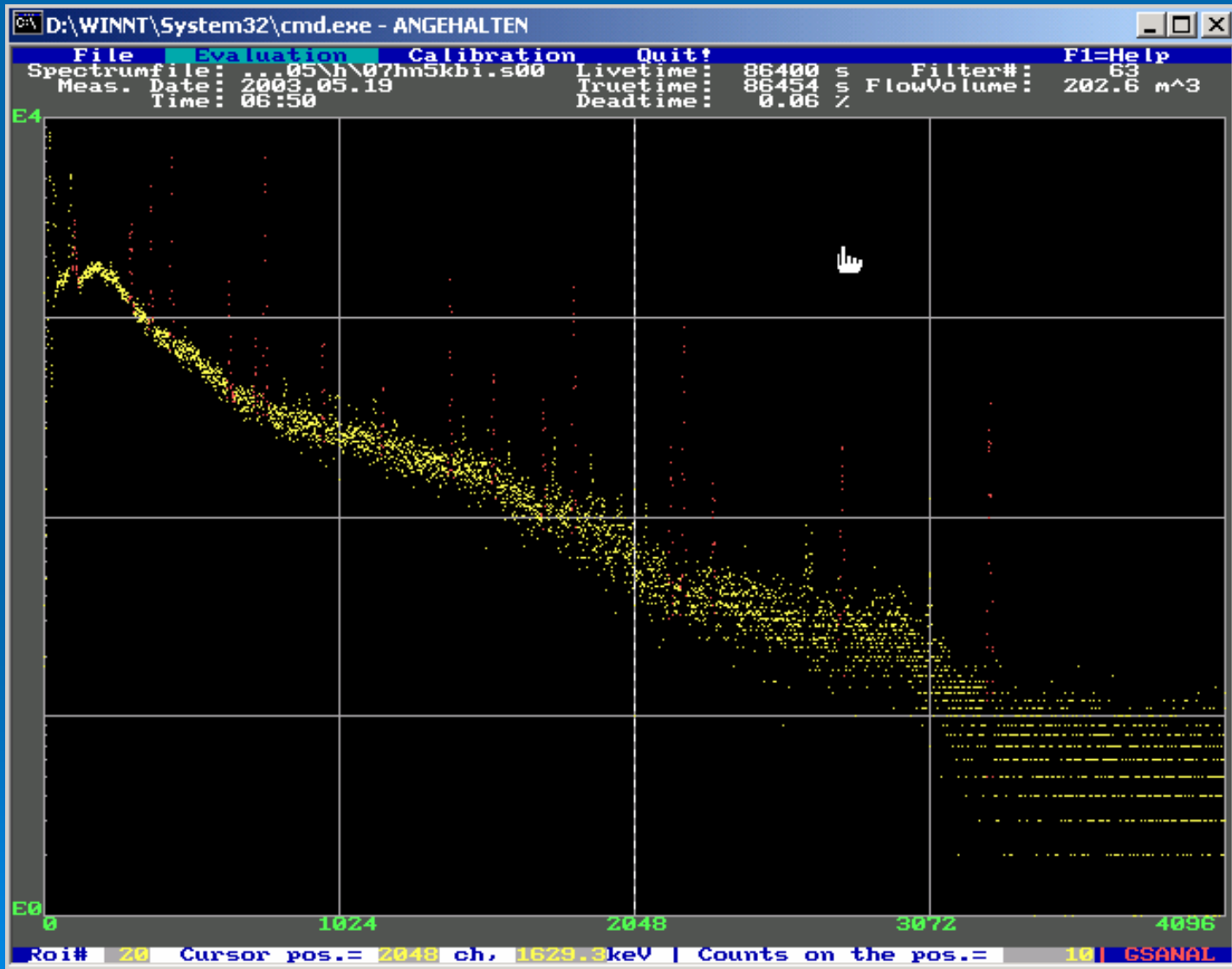
PIPS Spectra (^{222}Rn - and ^{220}Rn -descendants – alpha- and beta-regions)



Nal(Tl) gamma detector



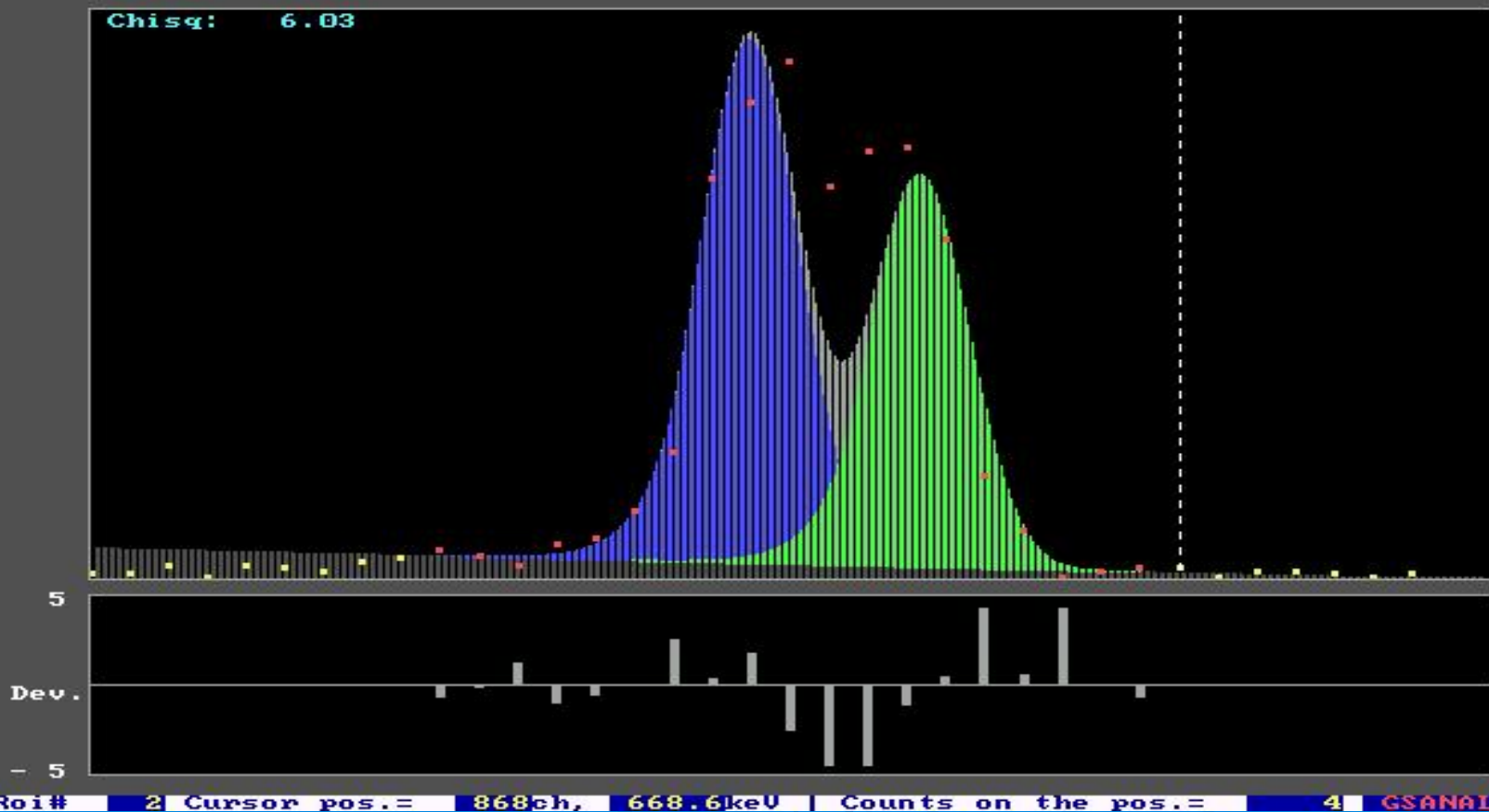
HP Ge gamma detector



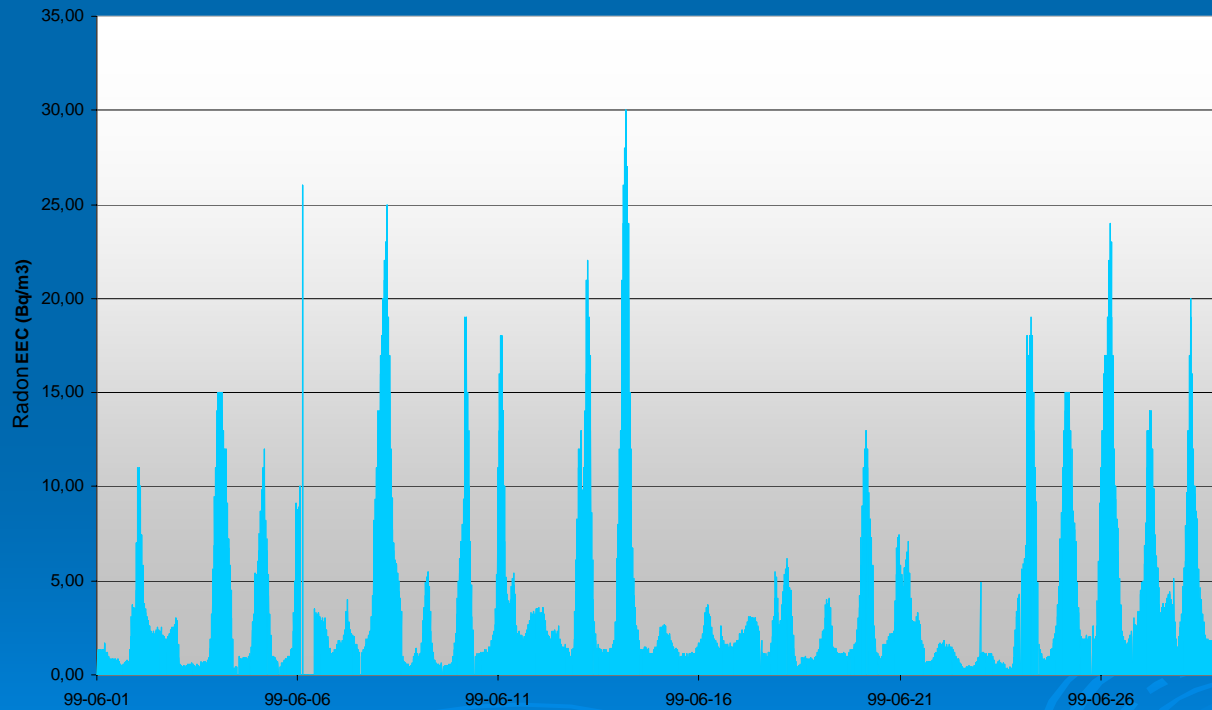
Evaluation of gamma spectrum [GSANAL]

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

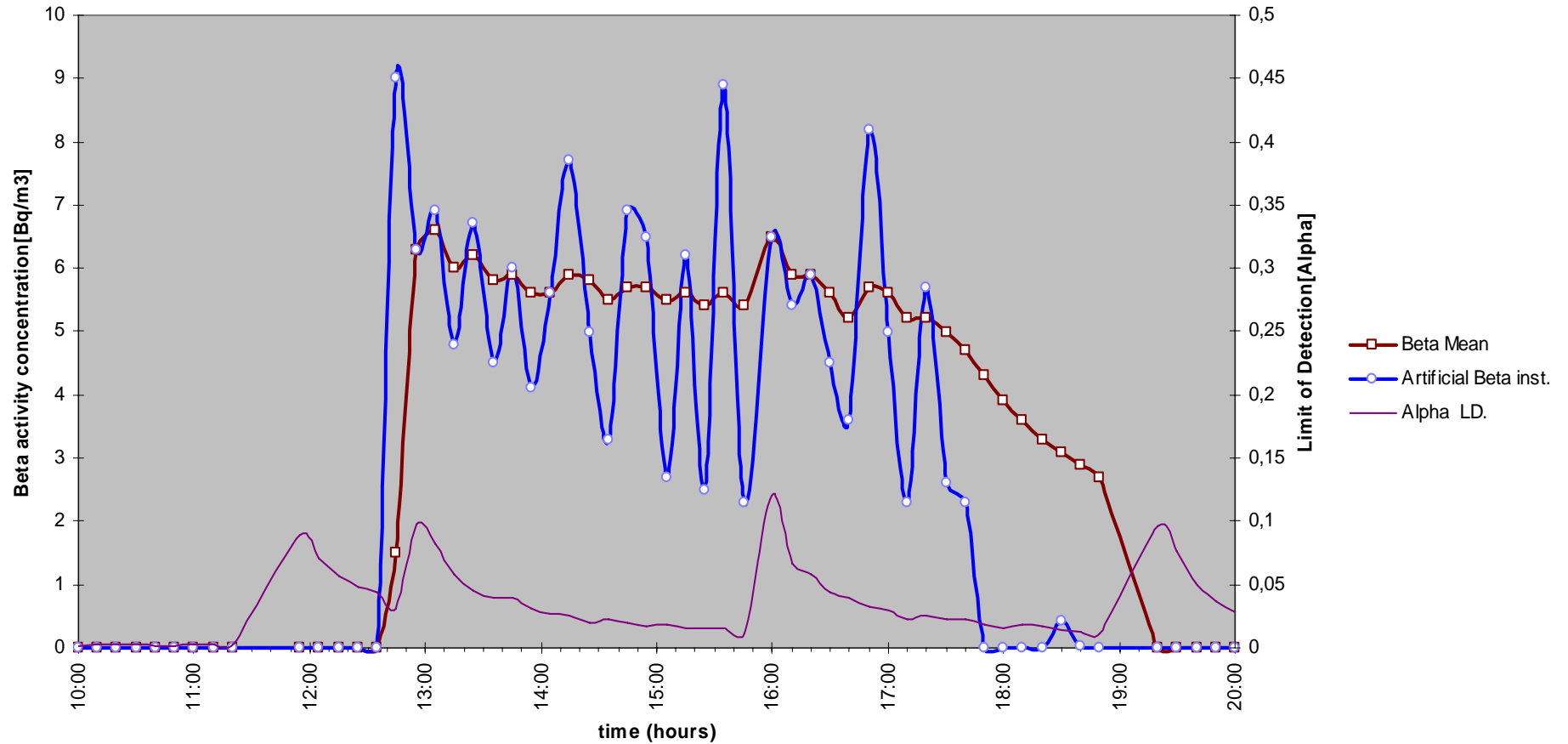
Roi#	Centrum	Energy(keU)	LM	RM	Intensity(cps)	Error(%)	Isotope
1.	857.0	660.3	849	*	1.86E+000	13.10	
2.	861.4	663.6	*	867	1.40E+000	13.85	



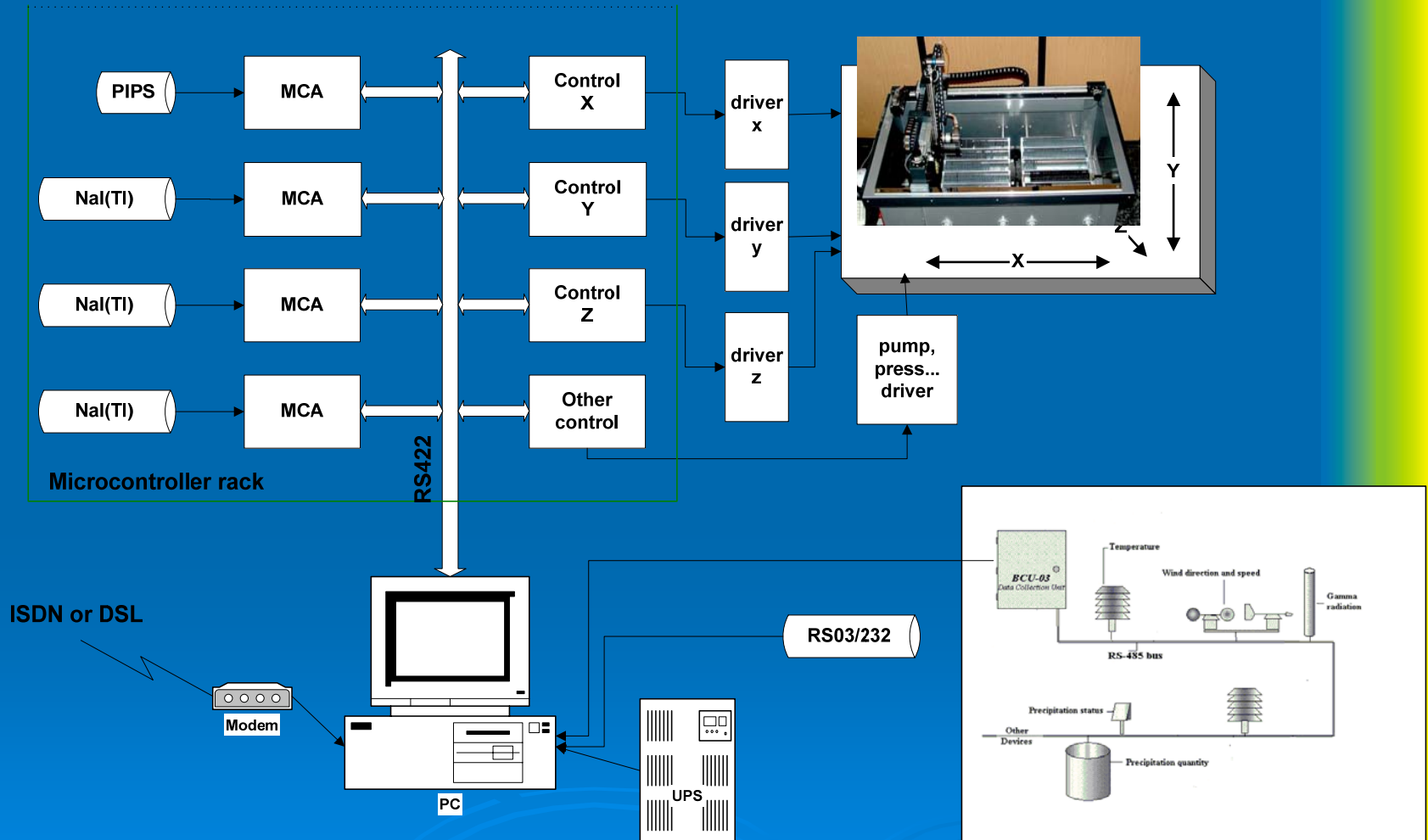
Radon EEC values recorded for a longer period



Results of test run with radioaerosol generator



Flow chart of AMS operation



AMS-02 equipment

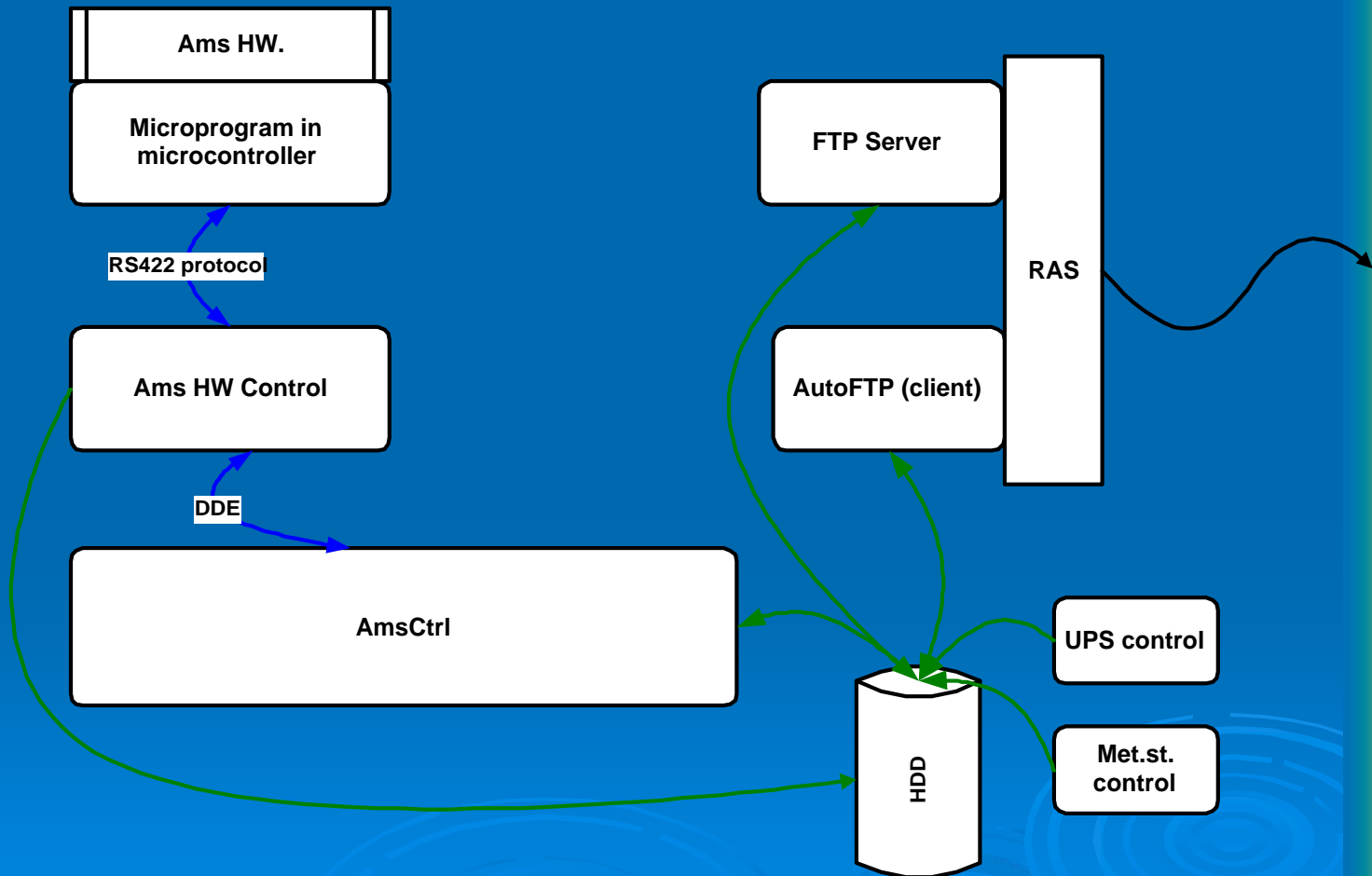
Driver rack

Microcontroller rack

Computer



Software structure



Ams02 control programs

AMS02 CONTROL

Exit! DDE_Comm Stepper MCA Settings Tools LOGIN! About!

PUMP

On_Off

Q [m3] P1 [mBar] 309 732.80
 6.91 P2 [mBar] 3525
 T1 [°C] 672.41
 49.89 P3 [mBar] 0
 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 0 Target Y Pos 0 Target Z Pos 0

Goto XYZ Refresh X,Y,Z ++ --

From 1 Change Filter
 To 601 Goto Pos
 Change pos. Calculate pos. Reset

FINGER On_Off

FILTER IN FINGER IN AEROSOL IN IODINE

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

File Start Goto Help

MEASURE MODE

NORMALMODE
 (Phase: MEAS_IF_MEAS_END)

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

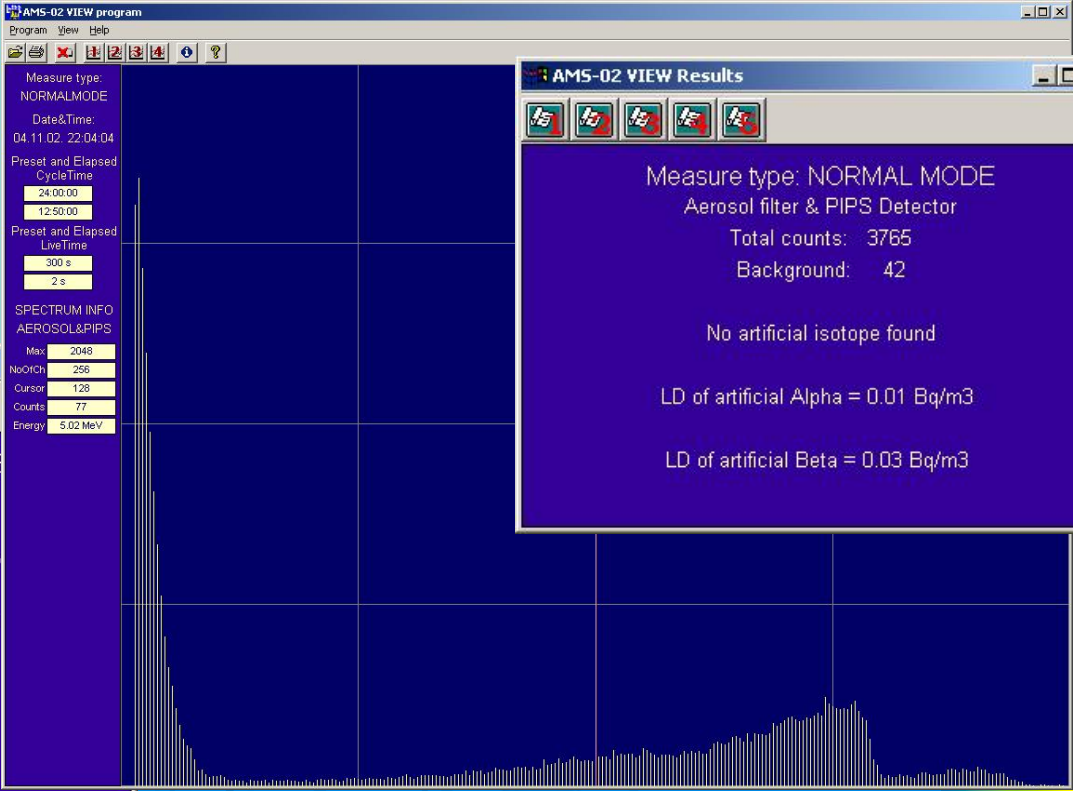
PresetLiveTime(s) 300
 ElapsedLiveTime(s) 257

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 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

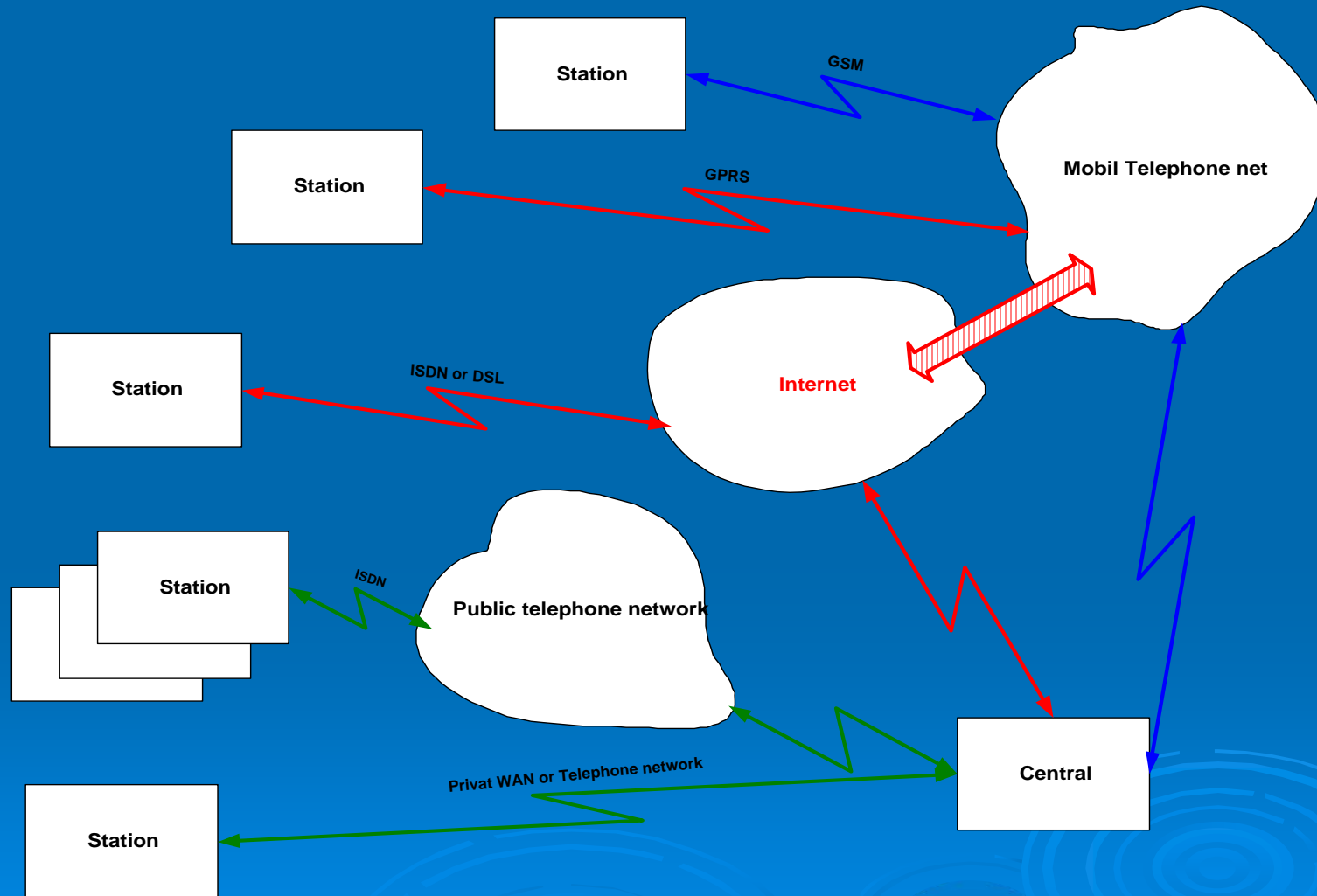
FTP Users | Emergency

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

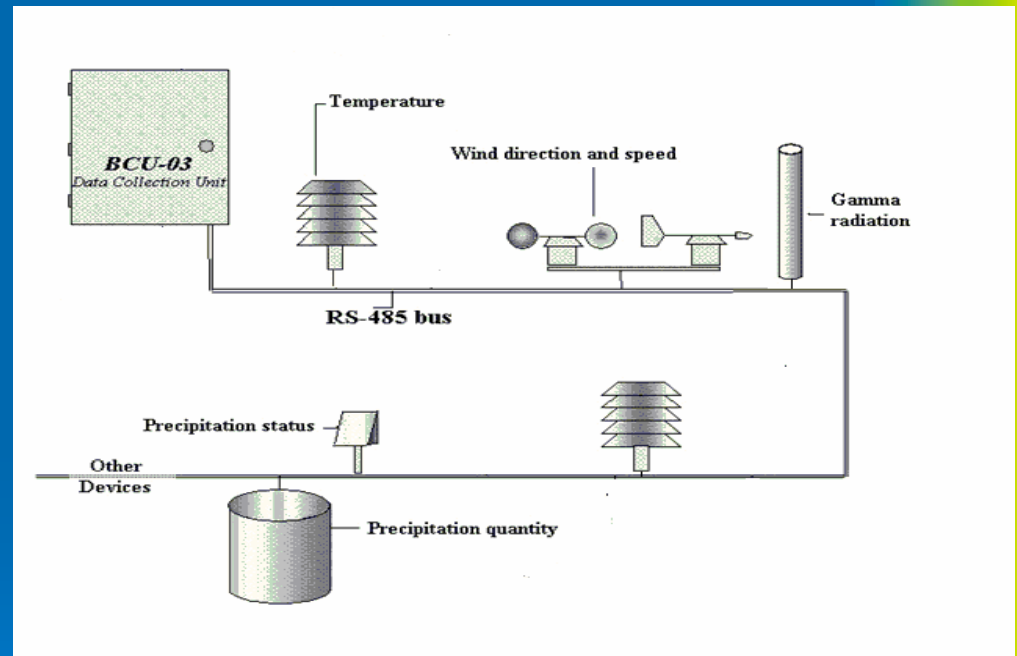
Temperature sensor element, temperature and moisture sensor, soil temperature sensors 0.2°C precision, *measure range from -50°C to $+70^{\circ}\text{C}$.*

Wind direction and -speed sensor

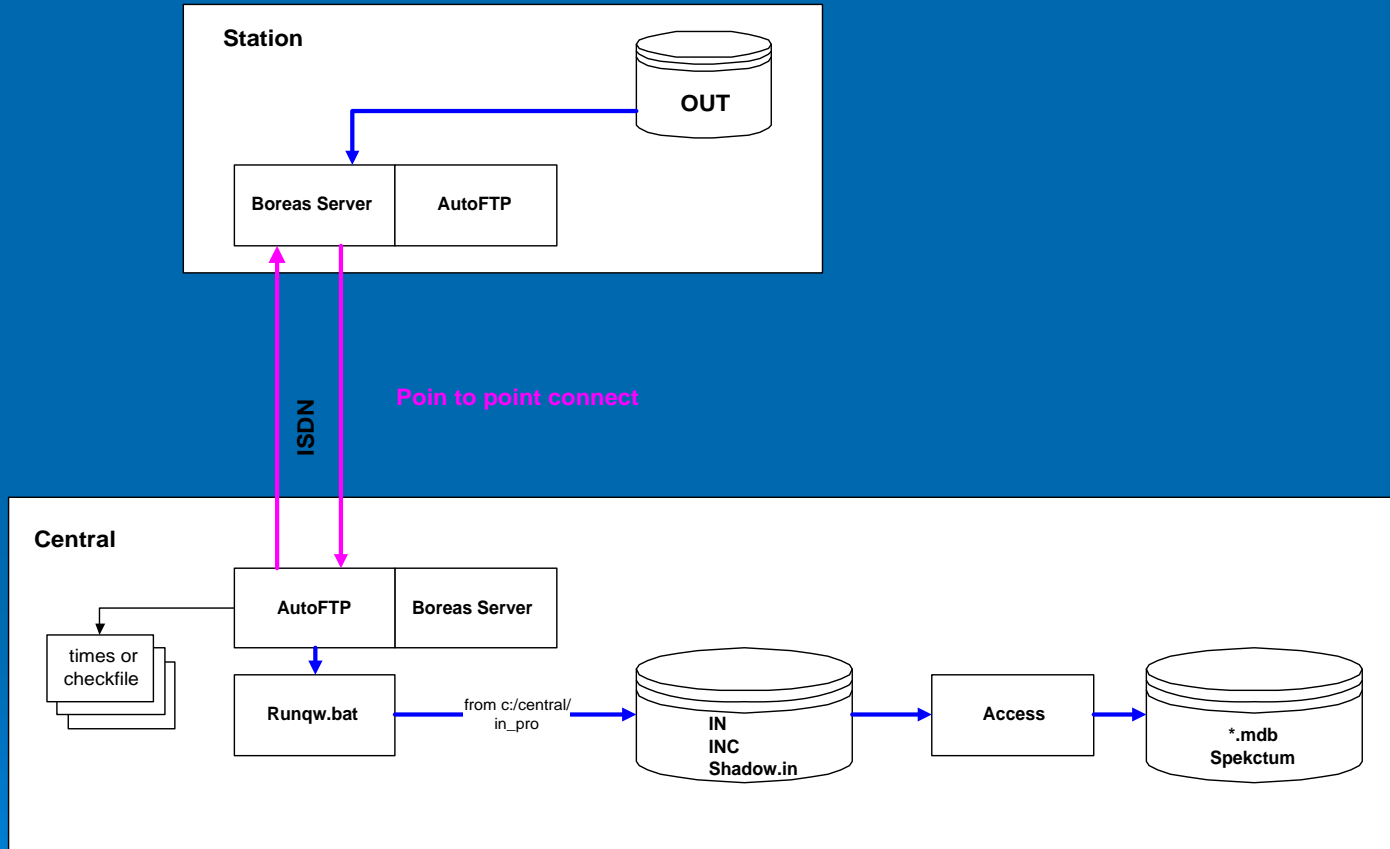
The classical build-up spoon anemometer and wind flag takes place in an individual container. Precision 3% over 5 m/s.

Precipitation sensors

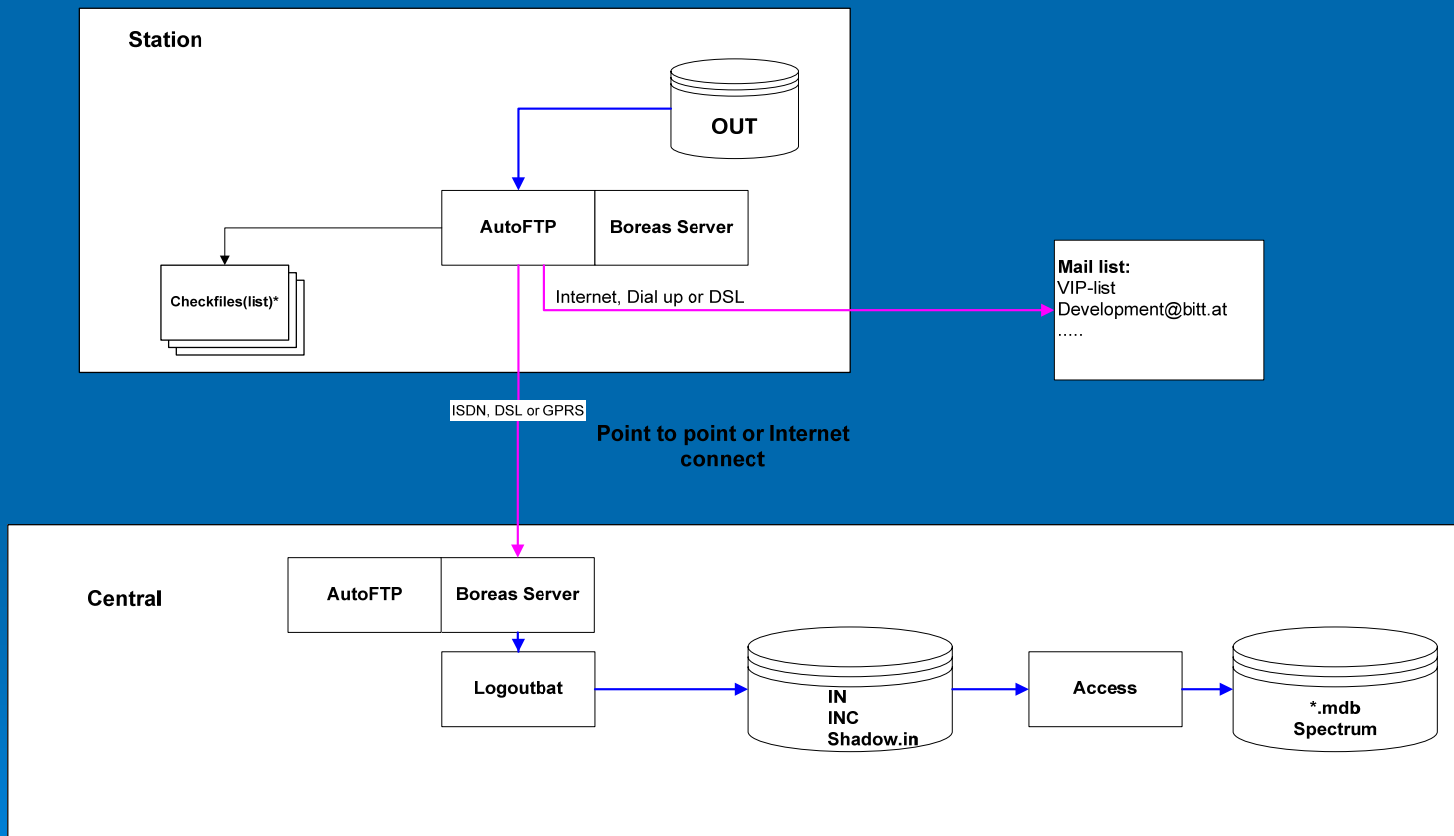
The precipitation quantity sensor measures the quantity of the fallen precipitation with precision 0.1 mm. The precipitation status detector and the leaf moisture sensors are used to



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



Alarm-Warning: communication is started by the Station



BITT Technology offers

Planning, construction and maintenance of systems for monitoring of external radioactive radiation, as well as training of the technical staff of our customers.

Headquarter:

BITT Technology

Wienerstrasse 70

A-2104 Spillern

AUSTRIA

EUROPE

Tel.: (+43)2266-80216-0

Fax.: (+43)2266-80216-12

E-mail: office@bitt.at

<http://www.bitt.at>

Subsidiaries:

Budapest, Hungary