

ISOTTA project

(ISOTope Trace Analysis)

**Advanced Techniques for the Production, Purification
and Radio-Purity Analysis of Isotopically Enriched Sources
for Double Beta Decay**

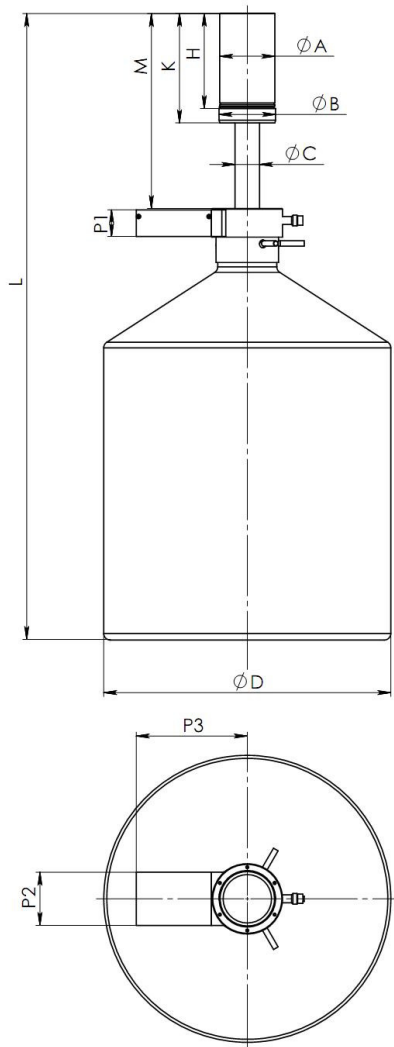
Jerzy W.Mietelski
The Henryk Niewodniczański Institute of Nuclear Physics
IFJ PAN, Kraków, Poland

ISOTTA: Task 2 – The low background detector for underground laboratory

1. Detector is constructed
2. Spectrometric modules (HV, amplifier, MCA) are bought
3. 20 k zł was to spent (about 4.5 k euro) – the purchase of mini NIM-BIN cage (Ortec or Canberra) is organised.
4. About 2 t of lead bricks (50 years old) ws gathered*
5. The design of shield is at final stage, it will be constructed in our workshop

*change regarding 24 June talk – the shield will be constructed for initial test instead of use shield of WBS

Detector in low background cryostat



Value	mm
A	70
B	72
C	39
D	450
H	144
K	165
M	293
P1	40
P2	80
P3	170
L	942



Carbon window



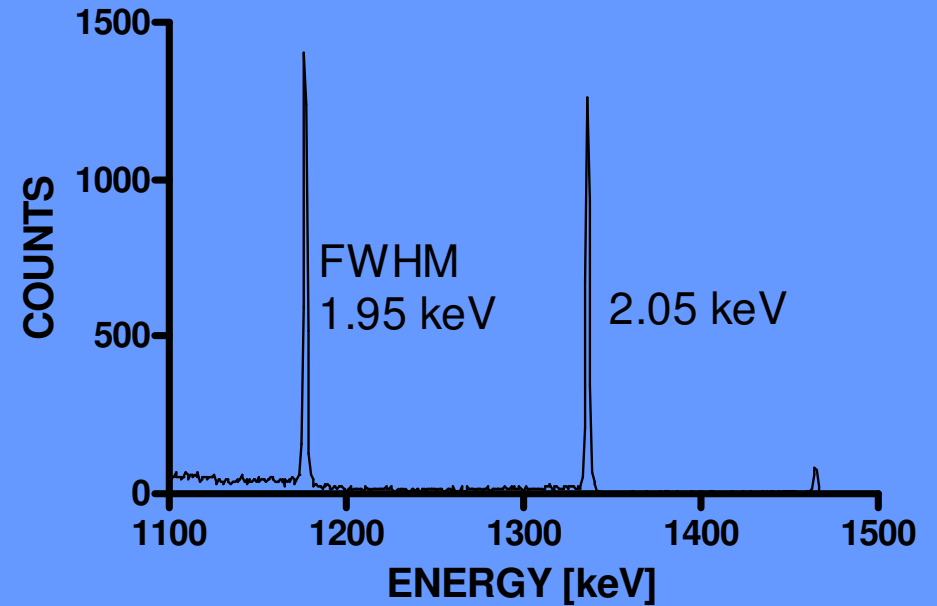
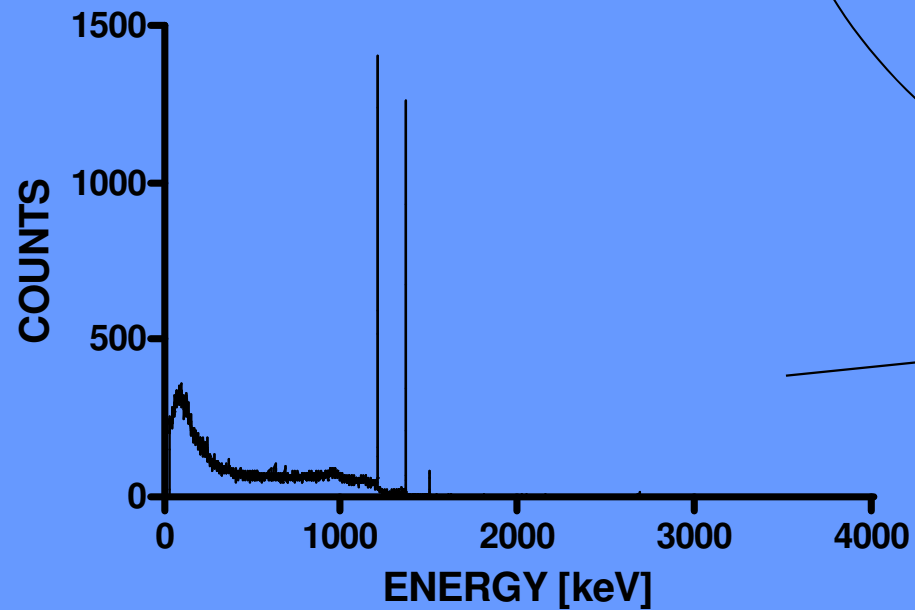
Spectrometer elements



**HV, amplifier by
Canberra
Polish MCA**

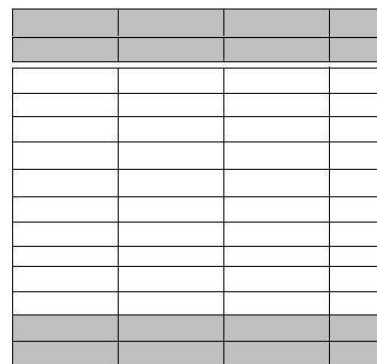


Spectrum of Co-60 (unshielded)

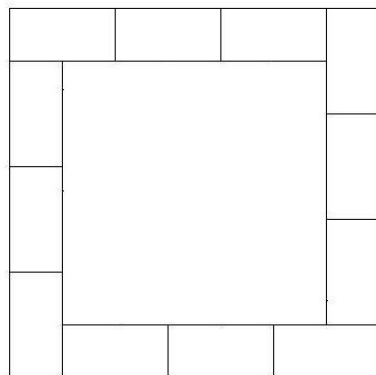


The shield

SIDES



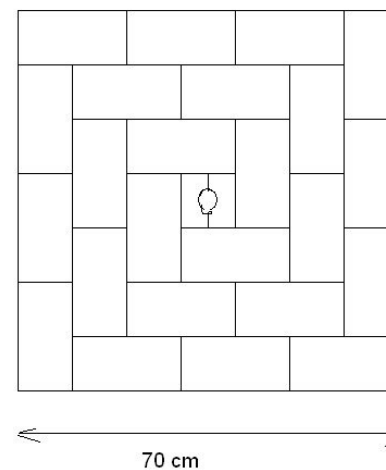
Wysokość- 50 cm



wieniec - 120 cegieł w 10 warstwach

Razem w bokach - 120 cegieł,
w górze i dole - 98
CAŁOŚĆ - 218 cegieł

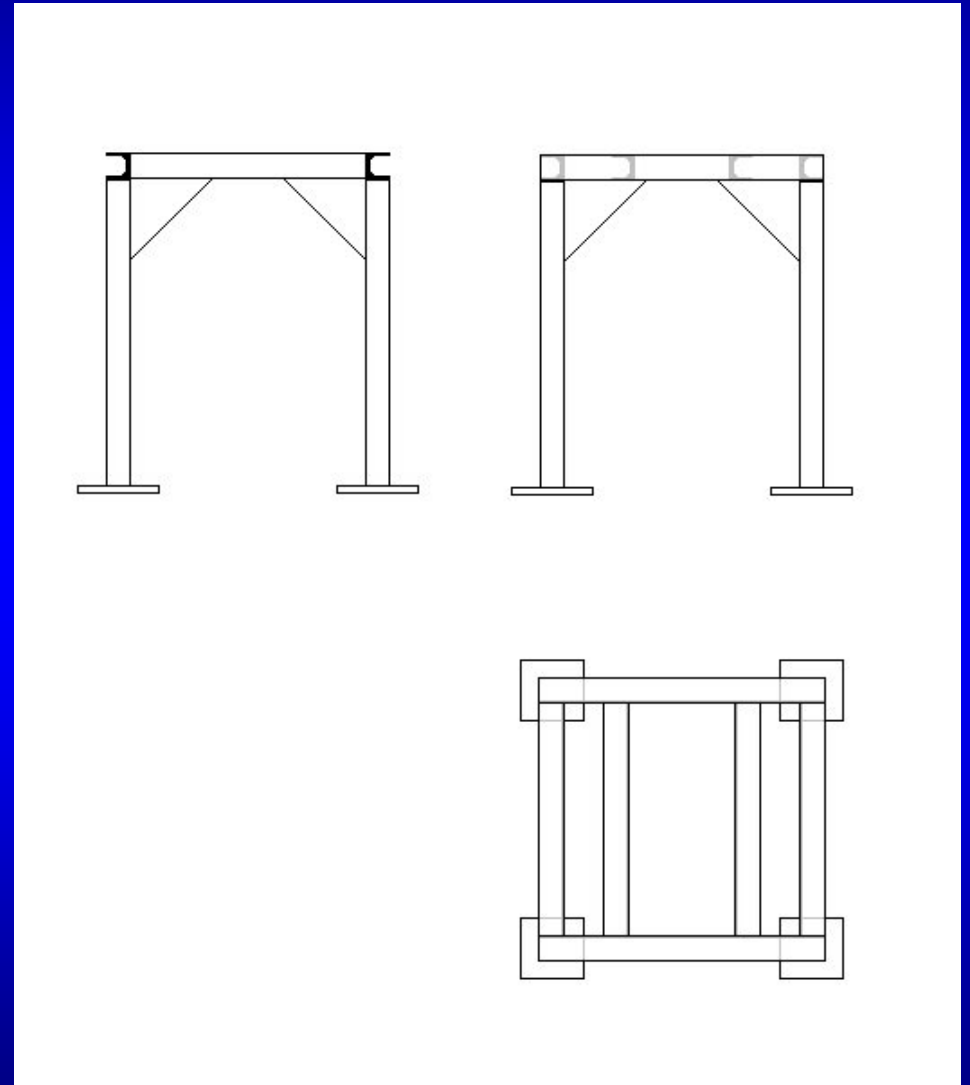
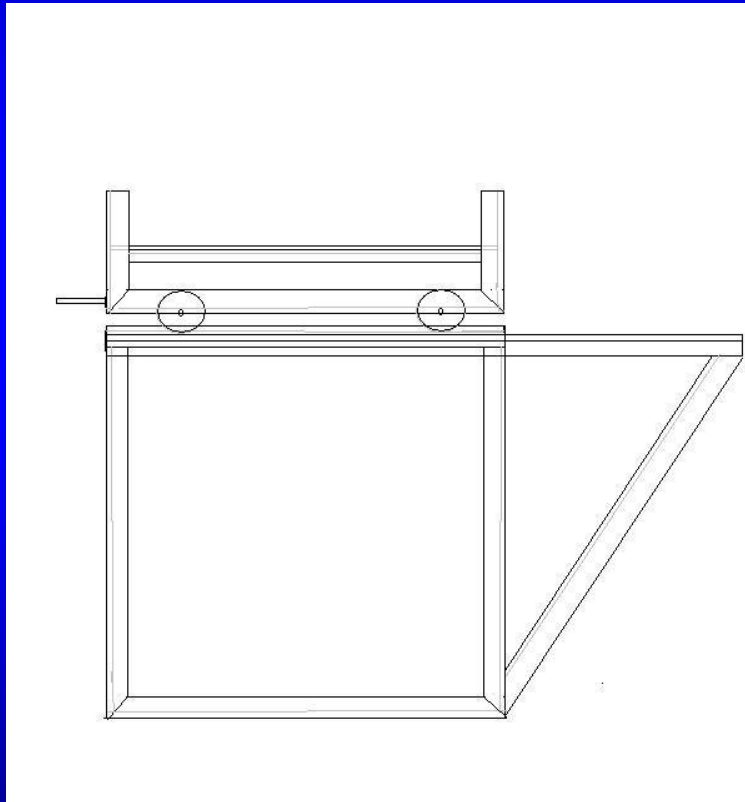
TOP & BOTTOM



Dół - 22 i pół cegły w warstwie
70x70 cm,
dwie warstwy (10 cm)
Łącznie na dole 45 cegieł

Góra tak samo za wyjątkiem wycięcia
w centralnej "połówce" (45 cegieł)
Razem góra i dół - 90 cegieł

The shield frame



Tests - planned

1. Ground level at IFJ PAN (winter, early spring)
2. Move to SUNLAB (late spring?)



TASK 3 - Large-Area Multi-Wire Screening Detector For Surface Alpha Contamination - Prototype

M. Wójcik, S. Mieszek, G. Zuzel

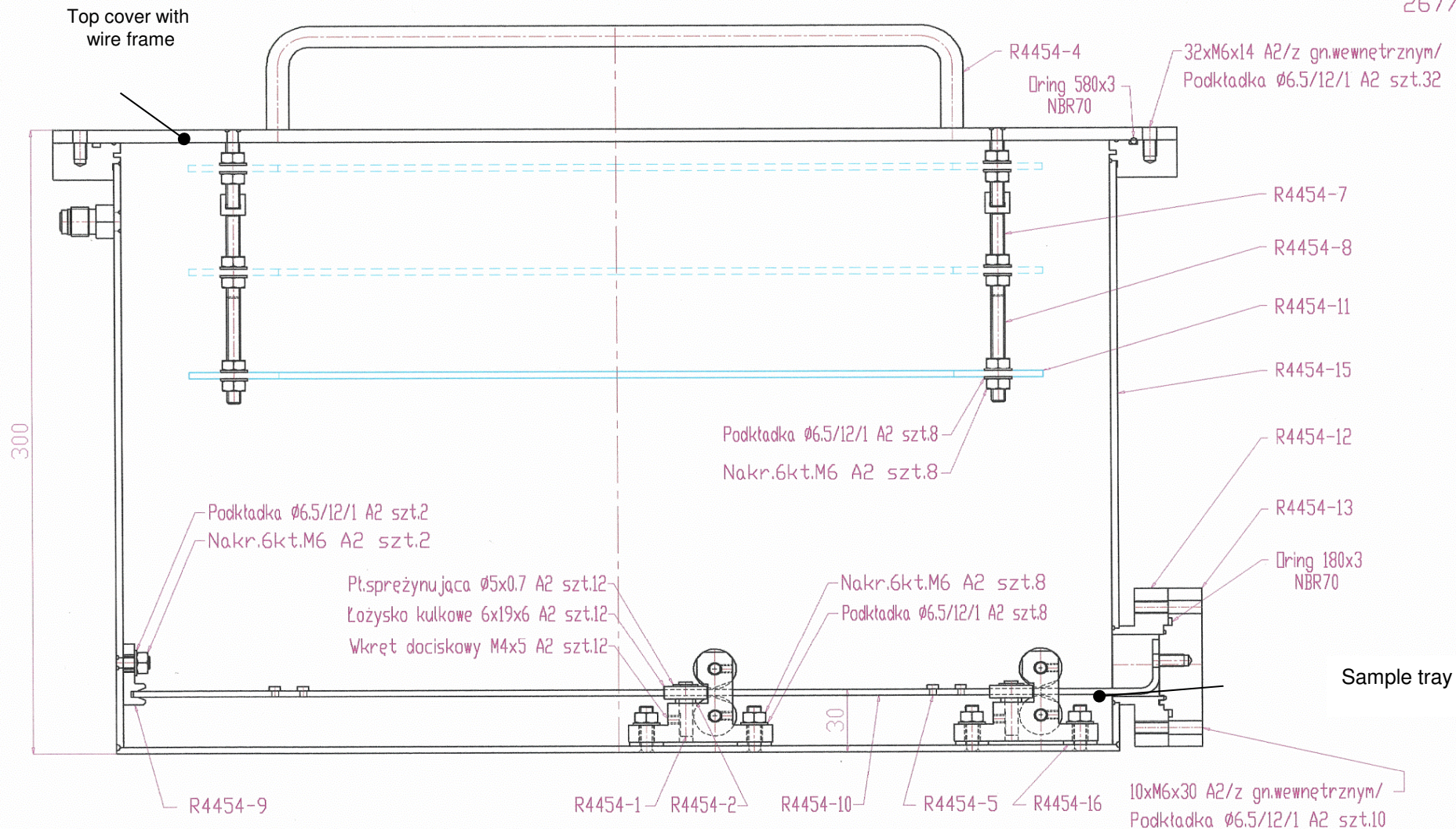
Institute of Physics Jagiellonian University

Basic parameters of the detector

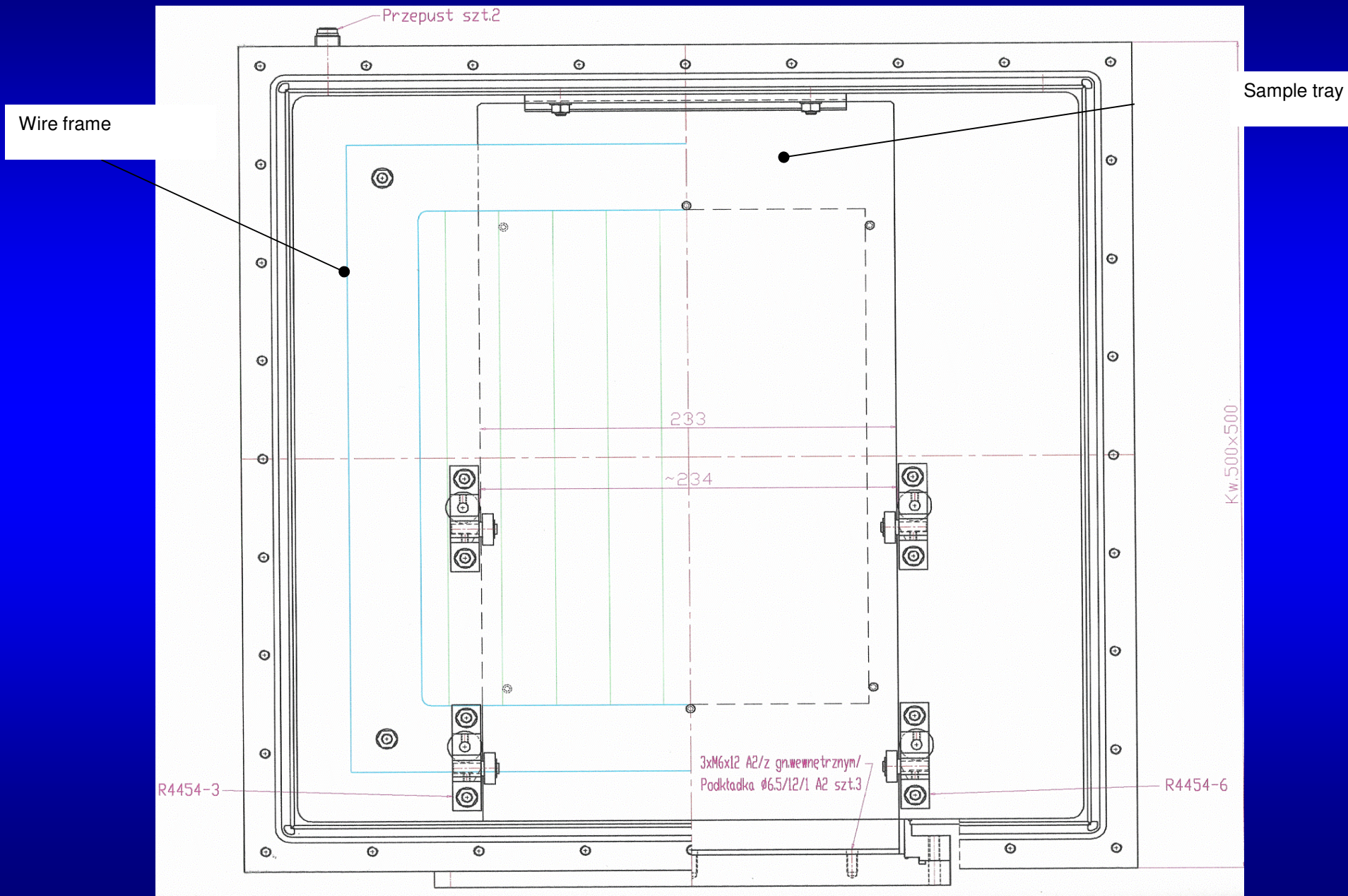
1. Surface area of the investigated sample: 20 cm x 20 cm
2. Counting gas: Radon free N_2 at STP, flow-rate: $\sim 0.1 - 1$ L/min (N_2 produced from purified $L_2N \rightarrow 0.3$ Rn dpd)
3. Sealing with viton O-rings and Indium O-rings (to avoid Rn diffusion)
4. Phase I: 10 common signal wires + 2 guard wires (15 μm W-Au wire)
5. Phase II: Additional guard wires and a veto detector may be added

Technical drawing - side view

267/I



Technical drawing - top view



Construction status

1. Technical drawings completed
2. All parts (HV feed-throughs, wire, gaskets) ordered, some already delivered (electronics, DAQ)
3. Construction will start at the beginning of January 2014
4. Working prototype should be available in February
5. Testing/commissioning till end of March
6. In April first physics results should be available

Task 1 - Analysis of the enriched samples with ICP-MS

1. Received 27 samples in summer (July-August)
2. Transferred to ICP-MS clean lab (Institute of Geological Studies PAS)
3. Unexpected problems with personnel crisis of this lab (3 out of 4 person quit job - 75% staff removed). Measurements postponed.
4. Crisis overtaken (new 2 technicians)
5. Measurements planned to start in January (isotopic composition, U and Th contamination)