AGATA AMB Phone conference 30th May 2022

Sujet : AMB May 2022
Heure : 30 mai 2022 01:00 PM Paris

Participer à la réunion Zoom
https://cnrs.zoom.us/j/94755527887?pwd=c2ZTQ0JqekZxcDQ0WWxPZUUrSVhiUT09

ID de réunion : 947 5552 7887
Code secret : V1ALr5

Apologize: J.N, B.M, Ch. Th., K. W

AGATA Week Program

Final check of the AGATA week program
Updated version at :
https://agenda.infn.it/event/30320/attachments/90365/121709/AGATA%20Week_scientific%20program.pdf

LNL Status (J.J. Valiente-Dobon) → Report from the two commissioning, following ACTIONS

First and second commissioning went very well. PRISMA, DANTE and SPIDER.

- Currently we are doing the first experiment of AGATA@LNL 36S(d,p)37S to study the intruder configurations.
- Current experiment with plunger, it is working. We have so far commissioned PRISMA, SPIDER, DANTE and plunger. Some issues with DANTE and the event builder with SPIDER → raw data anyhow is written on disk.
- pre-PAC dates 5-7 of October → announced. Next PAC 5-7 of December 2022.
- Limit of 30 mA in the power was giving issues and PRISMA/AGATA switch of because there was a dispersion with the motor during the rotation → solved.
- Prices of LN2 will increase 40-50%. We have two systems AGATA itself + the detector laboratory.
- 11 ATC installed → 33 crystals. ATC-6B problems with baseline fluctuation (off). ATC-4C problem with the signal of the core, probably due to humidity (we are taking the data). ATC-7C bursts of counting rate however we are taking it. We had a trip on one detector, the current ATC-9C 100 nA for 5 seconds, probably due to humidity. So 31 crystals out of 33.
- E-log of Orsay is being used. We will do a local backup. The Orsay logbook is not always working in all the browsers (due to the TLS certificate). Hopefully it will be solved soon.
- JJVD asked Olivier to installed 6 additional machines DCOD for the 2 new ATCS that we got ready between the last commissioning and the experiment. Thanks Olivier and the team!
- We will have soon another 6 machines to install for the last 2 ATCs.
- DAQ is quite stable. Run Control upgrade on-going by Alain.
- The alignment of the tree is quite "straight forward" and robust. Once you start the procedure it ends good.
- Filling system very stable. No issues so far. Just we had an issue with a cable in the shut down → it broke and a detectors switched off. The net of the PLC LN2 is now in the AGATA network → now it is needed to connect via VPN.
- New isolation seems finally will arrive next week. Mechanics to hold better the bayonet and mechanics to hold the rigid tubes of the detectors has been mounted and tested.

- AGATA rotation, we are evaluating a small rotation of AGATA along its axis.
- Message for spokespersons: Two shifts tables (responsibility of the spokesperson):
  - Traditional table related to the shifts themselves
  - Second table exploitation → from 8,00 to 24,00 fully dedicated to do near online analysis.
- Important spokespersons send people well before the experiment to make sure they get fully trained.

ASC Report / ASC Matters

The next ASC meeting is scheduled on the 12-13th of October at Milano (face to face meeting)

ACC Report / ACC Matters

ACC meeting scheduled after the AGATA week on the 10th of June
https://agenda.infn.it/event/30927/
EPJA special issue : we need to move on !

GSI Status (K. Wimmer) no report

REPORTS FROM THE WORKING GROUPS

Detector Module (H. Hess)

Status of the detectors:

56 detectors available within the AGATA community

MIRION:

B012 and C015 were delivered in Dec. 21 for repair due to leakage current

- B012: leakage current at the factory was confirmed
  - Due to the experience with B008 the detector was annealed at 100 °C
  - After annealing measured in test cryostat, no leakage current observed
  - Two to three thermal cycles will be performed as a stress test to investigate the behaviour of the capsule
  - After two thermal cycles the detector is working well

- C015: Leakage current check at the factory -> capsule shows no leakage current at Mirion
  - Due to the experience with B008 the detector was annealed at 100 °C
  - Test in a test cryostat, everything is ok
  - Two to three thermal cycles will be performed as a stress test to investigate the behaviour of the capsule
  - After the second thermal cycle the detector had leakage current on several segments -> reprocess
  - Repair finished and is waiting for FAT

C005: repair finished waiting for FAT
A003: needs to be reprocessed (2nd time)
C020: (new capsule, close to be ordered by IPHC) is close to be finished
A019: (new capsule, close to be ordered by GANIL), work started

Saclay:
In the moment 4 detectors are at Saclay to confirm the diagnosed problems while mounted in different ATCs

- A007, A012, C003 leakage current
- C014 high voltage problems
- A007, A012 tests finished confirmation of the first diagnostics, they are in preparation for transport to Mirion for repair

Liverpool:
1 detector for scanning

- C017 scanning ongoing
- A009 transported to Cologne and will be mounted in ATC20 (owner UK)

Salamanca:
1 detector for scanning

- A005 comparison of the performance of the different scanning tables
-

Status of the AGATA Triple Cryostats at INFN, Legnaro:
Fully operational:

9 ATCs fully operational

- ATC01 Core: A010 = 2,28 keV; B011 = 2,37 keV; C009 = 2,44 keV
- ATC03 Core: A002 = 2,31 keV; B007 = 2,23 keV; C007 = 2,55 keV
- ATC07 Core: A015 = 2,52 keV; B014 = 2,30 keV; C008 = 2.53 keV
- ATC10 Core: A011 = 2,22 keV; B007 = 2,36 keV; C012 = 2,34 keV
- ATC12 Core: A006 = 2,48 keV; B005 = 2,61 keV; C001 = 2,55 keV
- ATC14 Core: A014 = 2,26 keV; B010 = 2,45 keV; C016 = 2,27 keV
- ATC15 Core: A013 = 2,31 keV; B015 = 2,28 keV; C011 = 2,14 keV
- ATC17 Core: A016 = 2,18 keV; B017 = 2,18 keV; C013 = 2.27 keV
- ATC18 Core: A017 = 2,28 keV; B018 = 2.48 keV; C018 = 2,24 keV

ATCs with problems:

- ATC06
  - Detectors mounted: A008, B009 and C002
  - Core on capsule B very microphonic
  - Debugging ongoing

- ATC09
  - Detectors mounted: A001, B001 and C004
  - Core on capsule C wrong gain
  - Core on capsule B failed due to a HV spark
  - Both cold core FETs replaced, tests ongoing

- ATC11
  - Detectors mounted: A004, B004 and C010
  - Oscillating, debugging ongoing

CTT:

The assembly of ATC19 has started

Infrastructure (B . Million)

New developments status (Saclay) on use in LNL: LVPS and Autofill
à Need for new Bayonets: see Javier LNL report.
Purchase:
- New bayonets: after summer
- New LVPS: in 2022 40 capsules (13 ATC) at max?
Project definition planned substitution of all LVPS for up to 75 capsules (25 ATC) within 2024. This means we will need to have 3 new (36k€/cad + 20% discount for volume production) + 1 additional (18k€, Staying in Saclay/AXIS) LVPS groups at that time.
When do we, as AGATA, prefer to buy them?

- **Mechanics:**
Last meeting: May 18th
Starting to interact with Kathrin W. and Richard S. to pass information on previous AGATA installation at GSI :
• checking necessity of tilting the array (about 60°) to consider 2 pentagons

facing each other for the beam tube going through the array,
• need of double clusters around beam tube,
• checking possibility to cut the honeycomb along the beam line (and not perpendicular to the array axis) to avoid clash with beam tube when opening the array.

- **DataBase activity:**

Last meeting: May, 24th

Preparing team meeting during the AGATA week to involve all DB referent in the each AGATA collaboration site.

Front End Electronics (A. Gadea)

Coordination

The last Electronics W.G. meeting was on May 12th 2022, the next meeting will be in the AGATA week during the plenary session on June 8th Morning and parallel session during the on June 9th Morning. The next videoconference meeting will take place on Thursday July 12th 2022 at 10:00 CET.

Status at LNL

-27 complete channels GGP + DIGIOPT12 Digitizers mounted and working
-1 GGP not synchronizing
-25 DIGIOPT12 Digitizers+GGP used during the commissioning
-found several issues possibly due to the LVPS or DIGIOPT12 PSU.
-Now 2 additional ATC arriving and extra GGP´s will be required .
-Problems in the GANIL Trigger Processor with the clock provided by the VME carrier. The NEDA NIM carrier at Uni. Salamanca requested (presently not in use).
-One of the new LVPS units is to be tested with the new Phase 2 and old Phase 1 electronics.
Tests to be performed:

-Noise check on the new LVPS 48V output
-New PSU for the DIGIOPT12 + PACE-STARE

Phase 2 Electronics Status

DIGIOPT12 Digitizer Production

No news

PACE and PACE Firmware Status (J.Collado)

Most of the work of the last month was on the firmware:

-Now the receiver firmware is completed and fully tested including the buffers.
-The datapath is all tested and running on the SoM except the GTS interfacing
-The GTS firmware is all tested and ready to be included in the SoM.
-The Slow control firmware, including the IP bus Bridge/Slave, Register Map and SC FPGA translator is tested and running in the SoM.
-The Aurora quadruple link is all tested and running in the SoM

The Firmware has been uploaded to the GIT (New Firmware Base 9) with: Added Ipbus, Datapath ADF formater and buffer (New TOP VHDL – Clean and comments).
Work to be done in the coming weeks:

- Digitizer datapath test with high sampling frequency Oscilloscope (Valencia from May 24th -31st) Checking the quality of the clock transferred to the DIGIOPT12.
- Test with pulser/detector – problems to complete it on weeks 20 & 21. Next attempt after May 31st.
- Update top and add IP Bus (2 Weeks)
- Continue GTS tests (2 Weeks)
- Install linux + EPICS + Alignment (>2 Weeks)

	Apr	Apr	Apr	May	May	May	May	June	June
Week	15	16	17	18	19	20	21	22	23
Developement	Datapath	Global Firmware	Global Firmware	IP-Bus modules	TrMatch Package	TrMatch Package	Linux Server	Linux Server	Linux Server
	ADF format	Buffer adapter	Buffer adapter	Slow Control	GTS modules	GTS modules	Eth test	EPICS	EPICS
Test	Test PACE-STARE				Power Cable	Pulser/ detector test	Valencia Test Digi-Datapath		
Event							Run Prod.		

PACE Production: Ongoing procurement of the components for the 2022 (50) and 2023 (25) boards.
Revision of the Gerber files ongoing after discussion with the producing company to be sent after completion of test.

-Test of the Ethernet section ongoing
-GTS test completion
-Digitizer DIGIOPT12 test completion (Valencia)

2022 production will be divided into 5 pre-production boards and 45 production boards.

Mechanics and PSU (V.Gonzalez)

-1 complete unit being integrated in ETSE Valencia
-Modifications to the rear and front panels.
-Short cut in the 3.3V in the PSU during initialization, investigation concluded that are the PACE small FPGA now repaired.
-All connected and ready for water cooling test. If successful we will be ready for production of the mechanical parts.
-STARE prototype is compatible with the mechanics. Possible to realize up to 10 systems with the4 STARE prototypes and 10 systems with the STARE pre-production if available.

STARE Status (N.Karkour)

Nothing is blocking tests are ongoing and qualification of the STARE is longer than usual, but nothing to report.
Production Test bench development by Mathieu Cahoreau (my student) is ongoing ready by Q4/2022.
Integration tests with Javier are progressing in a good way. Still work to be done. Javier can explain.
X.Lafay perform a test with PACE as data generator, and data received on the server had no error and no data corrupted (15 hours @ 8Gb/s). I sent a mail to Javier so he is aware. To reach this result I've re-program several time the system until it works. So the problem with data corrupted we saw with PACE is more an initialisation problem than a PCB one.
Firmware status is progressing well with the UDP programs developped in IJCLAB.
A development plan is ongoing to integrate the RUDP with the DAQ group (Olivier Stezowski)
STARE Production is ongoing last component arrives MAY 2023!!!
Up to 25% of components price was spent (thanks to french labs who helped us also in administration issues), in addition to the total production components price, by IJCLAB to manufacture 10 STARE production boards.

IPHC PACE Firmware (G.Duchene)

IPHC firmware IPs delivered. Necessary to check if it works, but the present IPs will be validated before to be sure that we have an operational board.

Software/Data Format (O Stezowski)

Discussed the ADF format for long traces and agreed how to proceed.
RUDP developments on-going.
Fegarding slow control, all the IPbus registers have been implemented.

Data Processing (O. Stézowski)

Coordination:

No general meeting since last AMB (covid + many other difficulties)
Second FEEBE and DAQ meeting 16/05, pre discussion for meeting at the AGATA Week

Phase 1 :

- The DAQ box has been re installed
    - Re-start the CEPH disk array
        - It seems ok so far
        - Globicephala1 still down … out of warranty
            - **2 New machines ordered last week** !
            - BUT very long delays foreseen …
        - Anodeds6, two disks changed,
            - Should be operational soon for the disk backup part.
- GRID machine
    - Scripts updated
    - Machine sent to LNL, received and installed
        - On the AGATA network
        - 40 To available … could be used as backup in case CEPH off
    - We will start soon the transfer tests
- LNL machines configured to include the two additional clusters
    - Topology, dcod, run control coupling, replay and analysis facilities …
- Issues with the elog at Orsay, the local one has been re started
    - We should switch from to the local one at some decided time

Phase 2 developments :

- Electronic Phase 2 integration

PSA and Tracking R&D (A. Boston)

Characterisation

Last Team meeting 7th March 2022.

Liverpool update:

- A009 scans data under analysis by Chris Everett (presentation at AGATA week) and Jack Hackett.
- A009 capsule CT scanned at Clatterbridge Cancer Centre on 26/04/22
- A009 returned to IKP on 27/04/22
- C017 operational and under measurement – coincidence scan to commence soon. Work led by Adem Kus.

The new laboratory commissioning continues to be delayed due to issues with the security door and asbestos removal above the door. The new x-y positioning table is now fully tested and will be available for operational use. The detector holding structure is entering final commissioning.

Salamanca Update: Measurement in progress with A005. Presentation at AGATA week.
IPHC Update: Analysis of S001 data is in progress. Comprehensive scan data was collected to investigate the localised charged trapping, including temperature dependence of the trapping sites. Presentation on this at AGATA week. Available to receive A005.
GSI update: Available to receive A005 from August onwards.

Next Team meeting due at AGATA week.

PSA

Last Team meeting 18th March 2022. Update received from Fraser.

Fraser provided an update on his most recent results.
There are some promising results from some GPU-accelerated high-fold PSA he's been working on in conjunction with his MTree-accelerated work using the new rigs in the lab. In short GPU-accelerated exhaustive Fold-2 PSA seems to work in an acceptable timeframe for online PSA for AGATA, the algorithm runs at ~2kHz for Fold-2 across 2 segments and 3kHz for Fold-2 within a single segment (this is the type of fold that's impossible to deconvolve traditionally). Exhaustive Fold-1 PSA on the GPU seems to run at around 20kHz which is likely overkill for GRT considering that the approximate kNN methods I developed during my PhD seem sufficient anyways.

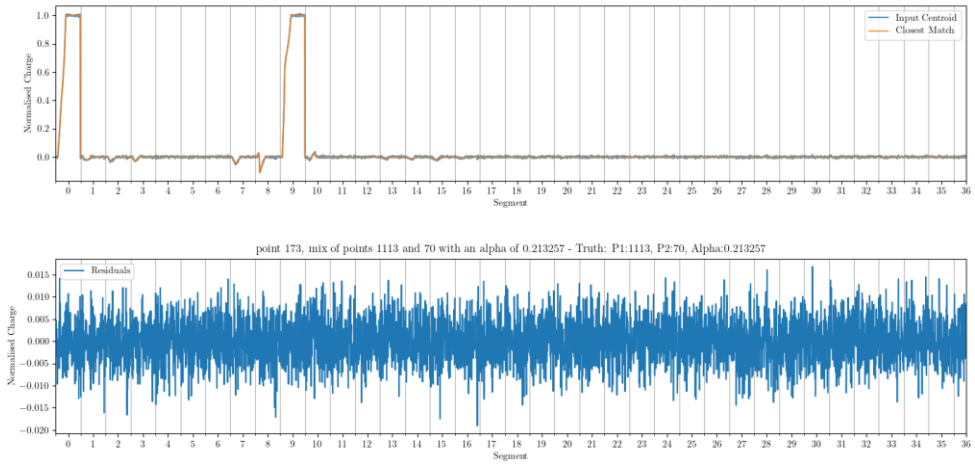

Figure 1: Fold 2 best match example - CUDA

As a final test he removed the hit segment pulses from the signals & basis (effectively removing the spectroscopic information from the signals), the PSA is still able to compute the correct indices and determine energy depositions within around 1 keV of the actual values for a 662 keV photon. The ramifications of this would suggest that this PSA would provide sufficient position and energy resolution even in a detector where the Fold-2 interactions occur solely within 2 broken segments. These results will be presented at AGATA week.

The work on self-calibration from York (has been observed to converge on noiseless test data (simulated), tests on simulated data with experimental noise were performed producing a reasonable observed deviation. This will be presented at the Team meeting during AGATA week.

Orsay is continuing with machine learning developments to accelerate PSCS. This work will be presented at AGATA week.

Next Team meeting at AGATA week.

Tracking

Two updates will be presented at AGATA week:

- M. Abushawish (IP2I, Lyon): Compton camera capabilities of AGATA
- Mikael Andersson or Torbjörn Bäck (KTH): Graph Neural Network for gamma ray tracking

ORTEC detector status update

The following update was received from ORTEC on 30th May 2022.

All tooling has been received. They have scheduled the process of the AGATA RED detector this week after from Monday 5/30/22. They expect the first data set the beginning of the week of 6/6/22.

The performance will be shared with us most likely this will be Wednesday 6/8/22 or Thursday 6/9/22. The plan with ORTEC is as follows prior to the FAT:

- Manufacture and demonstrate that the detector operates as a diode with a leakage current as expected when mounted in the capsule at the recommended operating voltage.
- Check the spectroscopic performance of the core with Co-60 (1332 keV) and measure the energy resolution – this verifies the bulk charge collection profile from the detector is okay

- Verify a response is observed from all of the segments
- Make a set of measurements of the low energy with Am-241 (60 keV) resolution of the segments to check performance

This means the earliest date for the FAT would be late June 2022.

Performance and Simulation (M. Labiche)

Missing reference measurements with sources due to the preparation of the beam time. To be done when possible.

Financial Reports (B. Million)

Reminder from LNL report : Prices of LN2 will increase 40-50%. We have two systems AGATA itself + the detector laboratory.

Operation Costs

Availability for 2022:

- **Germany OC:** 310k€ available for period July 2021- June 2024
- **France:** 110k€ planned
  - **GANIL:** 55k€ planned,
  - **IN2P3 OC:** 36.7k€ approved: 10k€ back to Orsay (Anticipated in 2021)
    15k€ detector lab IPHC
    11.7 transfer to GANIL ongoing
  - **IRFU-CEA:** 4,5k€ available from 2021
    + 19k€ planned,
- **Poland:** 20k€ planned, still to be requested
- **Hungary:** 30k€ planned, transfer to GANIL ongoing
- **UK:** 85k€ planned, approved in 69k£ - det lab + transfer to GANIL:
  1st transfer of 30k€ ongoing
- **INFN:** 110 k€ approved: 25 k€ + ?? for LN2 directly to LNL
  due to 30% increase in price,
  1 k€ for GRID at CNAF
- **Spain OC:** 28k€/2021 + 30k€/2022 + 31k/2023 approved and available
  As MoU Annex E was signed is transfer 2021+2022 to GANIL starting up ?
- **Sweden:** 38k€ planned, ok?
- **Finland:** 23k€ planned, ok?
- **Germany:** MoU still to be signed
- **Turkey:** MoU still to be signed

Spent/Needs since last AMB meeting:

- **IPHC common account:**
  - 9.2k€ for 14 stare boards for replacement
  - 21k€ for 14 PACE boards – when ??
  - 79,38k€ contribution for 14*3 digiopt12 segment boards –
    To Be Done after june2022 when EOS has clarified procurement of ADC
  - 2 Disk servers to be replaced: 17.4k€ in 2022 - done
  - x DAQ machines (for GGP?) to be replaced (out of warranty): ???k€ in 2022
- **KTH common account:**
  - 7.2k€ for 11 stare boards for replacement
  - 16.5k€ for 11 PACE boards – when ??

Capital funds

- **UK:** about 123k€ * 2 = **246 k€** Tax excluded
  (129k£ including taxes for Univ York + Univ W Scotland) with STFC official rates exchange extra taxes excluded for items – Phase 2.
  Grant till march 2024.
  For York University money should be **paid** within the last 6 months of grant so **before 2023, September 30th.**

  spent 79 k€ (electronics) + **46,2** (mechanics) now and the rest in 2022 (electronics)
  - 20 pairs of TRENZ Boards (York, MB): 50,6k€ + VAT
  - 16 DIGIOPT12 Core boards (UWS, JFS): 28,8k€+VAT
  - Mechanics (STFC, RS): 46,2 k€+VAT

  On-going/to be done
  - 13k€ for 20 STARE boards + spare
  - 30k€ for 20 PACE boards + spare
  - 4.2k€ for 15 mechanics crates/boxes??
  - 2k€ for cabling??
  - 5k€ for plug RJ45??
  - 5k€ for transceivers??
  - 61.6k€ still available for???????

- **Spain:** **On-going/to be done (67.5k€)**
  - 7.5k€ for 5 PACE boards??
  - 20k€ for cooling blocks??
  - 15k€ for backplane components??
  - 25k€ for PS construction and cabling

- **INFN:** 452k€ approved (Tax excluded): 2 capsules + few digiopt12s

- **France:** IN2P3 approved 300k€: tender for 1 capsule ongoing
  GANIL approved 400k€: tender for 2 capsules
  – offer received mid-April.

- **Germany:** request ???
- **Sweden:** request ???
- **Poland:** request ???

- **Finland:**
- **Hungary:**

Critical path: meeting in December to define price on approved funding
New Coordination for capsule purchases at MIRION: next week
Same for cryostats purchase at CTT
2022: 0 ATC planned

Next 5y planning of purchases: no news from Germany yet

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	Planned																
	Inflation +1.5%/year	2021	2022	2023	2024	2025	2021-2025	da MoU - Proj Def 2021-2025	2026	2027	2028	2029	2030	2026-2030	Total 2021-2030	da MoU - Proj Def 2021-2030	da MoU - Proj Def 2021-2030
		64/21	72/24	80/26	88/29	96/31			104/34	111/37	119/40	127/43	135/45				
DETECTORS	Bulgaria	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	
	Finland	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	
	France	0	3	2	1	2	8	8	3	0	2	2	1	8	16	16	
	Germany	0	0	0	0	0	0	8	0	0	0	0	0	0	0	16	
	Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
	Italy	0	2	2	2	1	7	8	2	2	2	1	2	9	16	16	
	Poland	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	
	Spain	0	1	0	0	0	1	2	0	0	0	0	0	0	1	3	
	Sweden	0	0	0	0	0	0	3	0	0	0	0	0	0	0	4	
	Turkey	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	
	UK	3	0	0	0	0	3	6	0	0	0	0	0	0	3	12	
	total number	3	6	4	3	3	19	39	5	2	4	3	3	17	36	77	78
	total price	595,9	1094,9	792,7	623,2	632,5	3739,2		1002,3	448,2	881,9	692,6	703,0	3728	7467,0		1 extra capsule to be distributed
	price / Unit	198,6	182,5	198,2	207,7	210,8			200,5	224,1	220,5	230,9	234,3	1110			
CRYOSTATS	Bulgaria	0	0	0	0	0	0		0	0	0	0	0	0	0		
	Finland	0	0	0	0	0	0		0	0	0	0	0	0	0		
	France	1	0	1	0	2	4	2	0	1	0	0	0	1	7	5	
	Germany	0	0	0	0	0	0	2	0	0	0	0	0	0	2	5	
	Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Italy	2	0	0	0	1	3	2	0	1	0	1	0	2	7	5	
	Poland	0	0	0	0	0	0		0	0	0	0	0	0	0		
	Spain	0	0	0	0	0	0		0	0	0	0	0	0	0	1	
	Sweden	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	
	Turkey	0	0	0	0	0	0		0	0	0	0	0	0	0		
	UK	1	0	0	0	0	1	2	0	0	0	0	0	0	3	4	
	total number	3	0	1	0	3	7	9	0	2	0	1	0	3	19	21	26
	total price	328,8	0,0	119,0	0,0	348,9	796,7		0,0	246,1	0,0	130,1	0,0	376	1173,0		5 extra cryostats to be distributed
	price / Unit	109,6	#DIV/0!	119,0	#DIV/0!	116,3	113,8		#DIV/0!	123,1	#DIV/0!	130,1	#DIV/0!	#DIV/0!			

Dissemination (J. Nyberg)

No publication to be discussed

NEXT AMB : Focus on the Budget