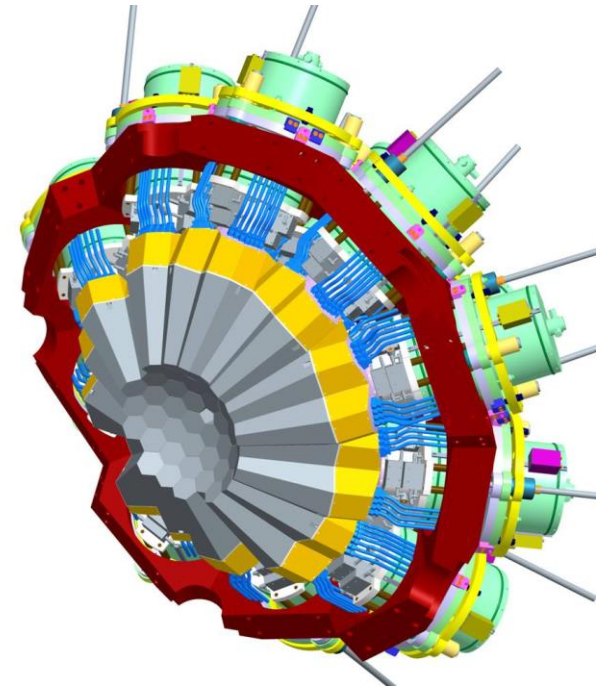


Maintenance and Production of Phase 1 Electronics

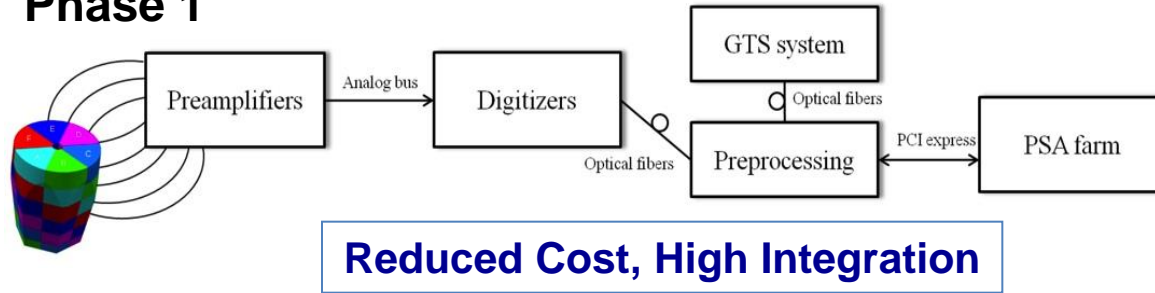
Andres Gadea (IFIC-CSIC, Spain)
on behalf the AMB



ASC Meeting KTH Stockholm 23rd-24th April 2018

Advanced Phase 1 Electronics

Phase 1

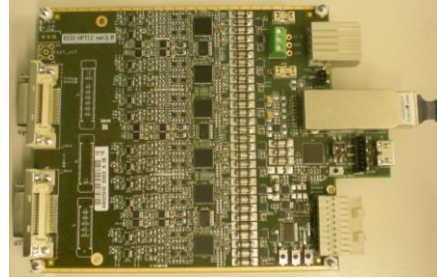


Reduced Cost, High Integration

PCI Pre-Processing Card GGP



ADC Card



- DIGIOPT12 Digitizers very stable, most of the problems found to be connected with power supply issues (DIGIOPT12 boards have no DC/DC regulator for the Transceiver. Stability issues with the power supply voltage).

Control Card



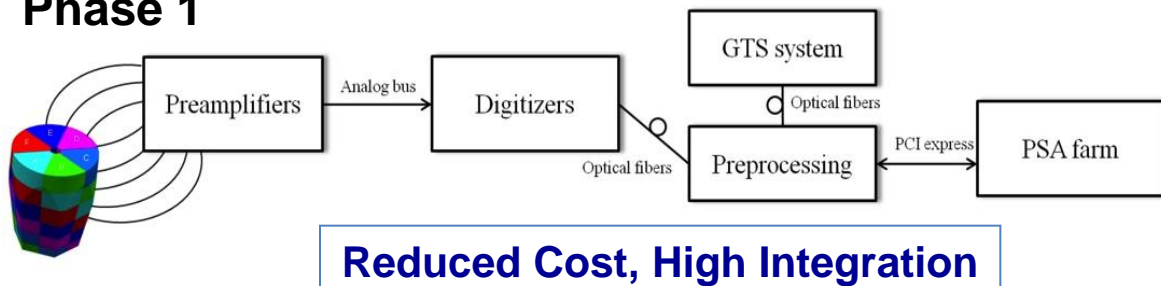
- Improved (cooling) Digitizer Power Supply boards have been produced and are being installed at GANIL when needed. All to be replaced within 2018.

D. Barrientos, et al., IEEE TRANS. NS

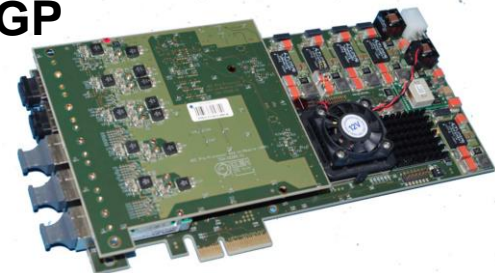
**INFN-Padova INFN-Milano INFN-LNL
IFIC-Valencia ETSE-Uni.Valencia**

Advanced Phase 1 Electronics

Phase 1



PCI Pre-Processing Card GGP



ADC Card



Control Card



- Presently 13 Digitizers + 12 GGP at GANIL (5 borrowed from GALILEO). 13 DIGITIZERS + 14 GGPs produced.
- 4 GGP to be repaired: first attempt failed, 1 GGP with irreversible damage.
- Observed Validation loses issue at high counting rate and readout issues when comparing with ATCA.
- New Crystal-Produced delivered by D.Bazzacco mid February and a corrected version mid march. Now performing as well as the ATCA in read-out.

D. Barrientos, et al., IEEE TRANS. NS

INFN-Padova INFN-Milano INFN-LNL
IFIC-Valencia ETSE-Uni.Valencia

Summary of the First Production

GGP at GANIL:

ggp	25	anode61	
ggp	35	anode59	GALILEO
ggp	11	anode55	GALILEO
ggp	21	anode24	
ggp	15	anode29	
ggp	12	anode58	GALILEO
ggp	27	anode27	
ggp	19	anode62	
ggp	14	anode57	
ggp	7	anode60	GALILEO
ggp	18	anode28	reboot after ~1 week
ggp	10	anode56	GALILEO
ggp	17	anode63	reboot after ~24 hours

AGATA GGP's sent for repairing with AGATA O.C.: ggp 20, ggp 22, ggp 16

AGATA ggp 23 was sent to Padova -server reboot issues-

Summary of the First Production

From the 14 GGPs produced in total we have:

- 6 Working in the AGATA set-up
- 2 with reboot issues at the AGATA set-up
- 1 with reboot issues presently at INFN-Padova
- 3 on repairing at INFN-Padova one irrecoverable
- 2 never delivered

Electronics production: New batch

- Aiming to complete 45 channels for the GANIL setup + Spares + 3 for IKP-Cologne Det. Lab., in total 17 Channels.
- Schedule: end 2017 delayed to Summer 2018.
- DIGIOPT12-DIGITIZERS: All parts produced within last year. Provided to Valencia all parts to mount 10 Digitizers (Including the one from Finland). Process of mounting completed at ETSE. The rest of the DIGIOP12 cards expected in a short time. Upgraded power supply included. One Digitizer and 2 new power supply units already at GANIL.
- GGPs: 2 pre-production cards delivered mid-Feb and tested 15-21st Feb. The known synchronization problems when connected to the ADC appeared and an extra effort was done by D.Bazzacco to locate and solve the issue.
- Half of the GGP cards (12) from the production run were delivered in June. The cards are in Legnaro and initial power-up test were successful.
- The burn-in tests have been performed at Padova, 12 cards already tested for full functionality. 3 not fully functional.
- Delivery of 11 cards were expected within July.
- AGATA has ordered 14 in total and 3 are for IKP Cologne (the rest of the production till 24 is for Galileo).

Agata Advanced Phase 1 Electronics 2nd Batch costs:				Investment	AGATA O.C.	All AGATA channels	Cost/Channel	GALILEO parts	Total Spares	AGATA Spare	GALILEO Spares	
											(Sharing proposal 17/24 - 7/24)	
O.C.-INFN	FPGA purchasing	28.000	13,5	28.000	28.000	28.000	1647,06					
	Control Card Production	26.800	30	26.800	26.800	15186,67	893,33	6253,33	5.360,00	3796,67	1563,33	
	Total	54.800										
				Note: 3,5 + Spares FPGAs paid on INFN Investment funds								
O.C.-IPHC	GGP routing modification											
	EDA-02264	536,84			536,84	402,63	23,6842105	156,578947				
	EDA-02266	313,04			313,04	234,78	13,8107417	91,3043478				
Spain	Signal Backplane	3320,7	30	110,69	2545,87		1881,73	774,83				
	Power Backplane	1811,4	20	90,57	1811,4		1539,69					
	Power Supply	8090,2	24	337,09	8090,2		5730,56					
	Front pannels	768,5			768,5		522,58					
	Boxes	5585,87			5585,87		4747,99					
	Optical Fibres	6690	20		6690		5686,5					
	Control Card Routing	308,2			308,2		308,2					
								Unit Cost				
					25800,04		20417,25	1201,01		5382,79	5382,79	
O.C. IKP	QSFP	41103	80		41103	41103	26203,16	1541,36	10789,54	4110,3	2911,46	1198,84
	SNAP12R	USD 45 k€	39027	90	39027	39027	22115,30	1300,90	9106,30	7805,4	5528,83	2276,58
O.C. GANIL												
	GGP DC/DC	1345,9	40		1345,9	572,01	33,65	235,53	538,36	381,34	157,02	
Core INFN	digiopt12	122400	68		122400	122400	7200					
	snap12T	21032,36	17				1237,19782					
	FPGA	5633	3,5				331,352941					
	GGP-PCB	7204	17				423,764706					
	GGP-Components	1182	17				69,5294118					
	GGP-Mounting	15090	17				887,647059					
	Spare-PCB	4803										
	Spares-FPGA	11443	~7 FPGA									
	Spare-Components	629										
	Spare-Snap12R	561										
	Spare-Snap 12T	4962,69					Unit Total=	16804,30				
Electronics: Second Batch Production Cost Summary				Total AGATA O.C. =	137.125,79		GALILEO=	27407,4166		Spares=	5195,77	
				Spain AGATA Investment=	25800,04		AGATA Spares			40399,78		
				Total GANIL O.C. Overexp=	1345,9							
				INFN AGATA Investments=	194940,06		FPGA Average Cost=			1978,41		
				Cost/Channel=	16.835,81	€						
				AGATA	14 Channels		Total Galileo	32603,18	without Backplanes=	31828,35		
AGATA IKP	3 Channels											
	AGATA Spare parts	40399,78	€									