

Chamber Dressing Issues

CMS Week June 3rd 2003

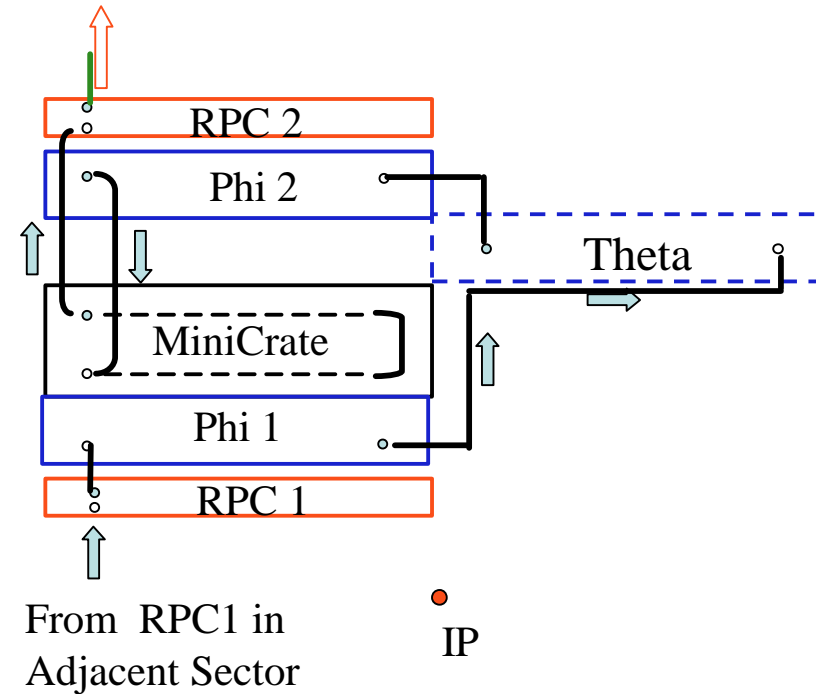
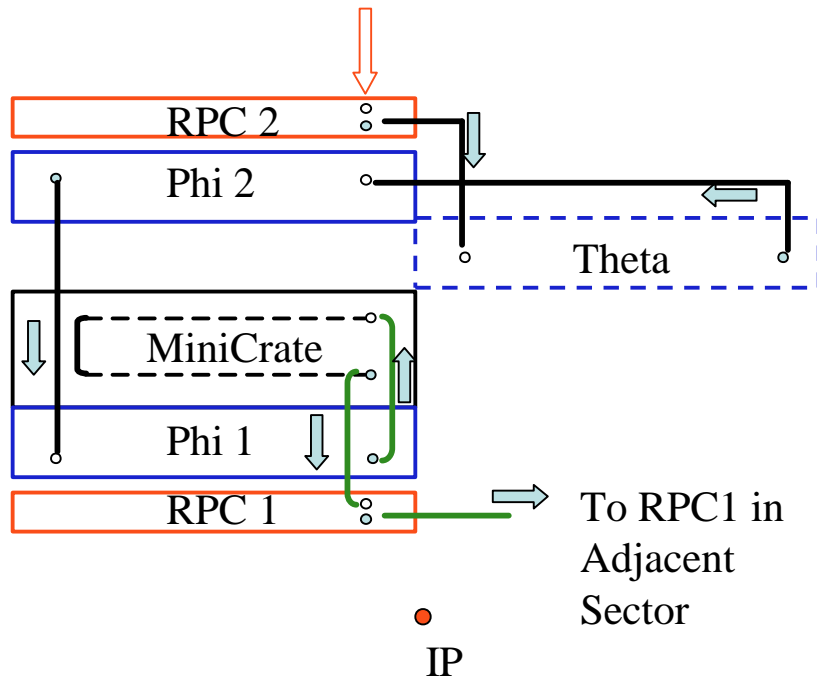
A. Benvenuti
INFN Bologna

Chamber Dressing Exercise (May 13th-16th)

- Finalize the cooling circuit: Done
loop modified but Minicrate still AFTER SL in each station;
Drawings for MB2, MB3 Left Right +, - done(Boki) apart for connections to RPC. Use of flexible connections to Minicrate
- Finalize on chamber gas pipes: Done
One drawing to modify, copper already ordered (Hans). Local firm identified for bending pieces
- Define cable lengths and layout for DCS and PADC LV: Done
LV cable length depends on position of Minicrate LV connector but not critical (within ~50 cm)
Alignment DCS cable needs pitch adaptor on MC pigtail, DCS cable length not critical (within ~50 cm)
- Check cables layout and protections: Done
Position Minicrate always at the same distance from Theta SL

- Define position and support of Low Voltage Splitter board: Done
- Define position and support of Gas manifold (front-end side): Done
Manifold support and fastening to the chamber to be designed ASAP (Barthel Philipps)
- Connection Minicrate to Theta SL: To be decided
pigtail option checked, looks OK but test needed on a fully equipped Minicrate
- Minicrate position and dimensions: To be frozen
- SL ground straps connections: Done

Proposed Cooling Circuit



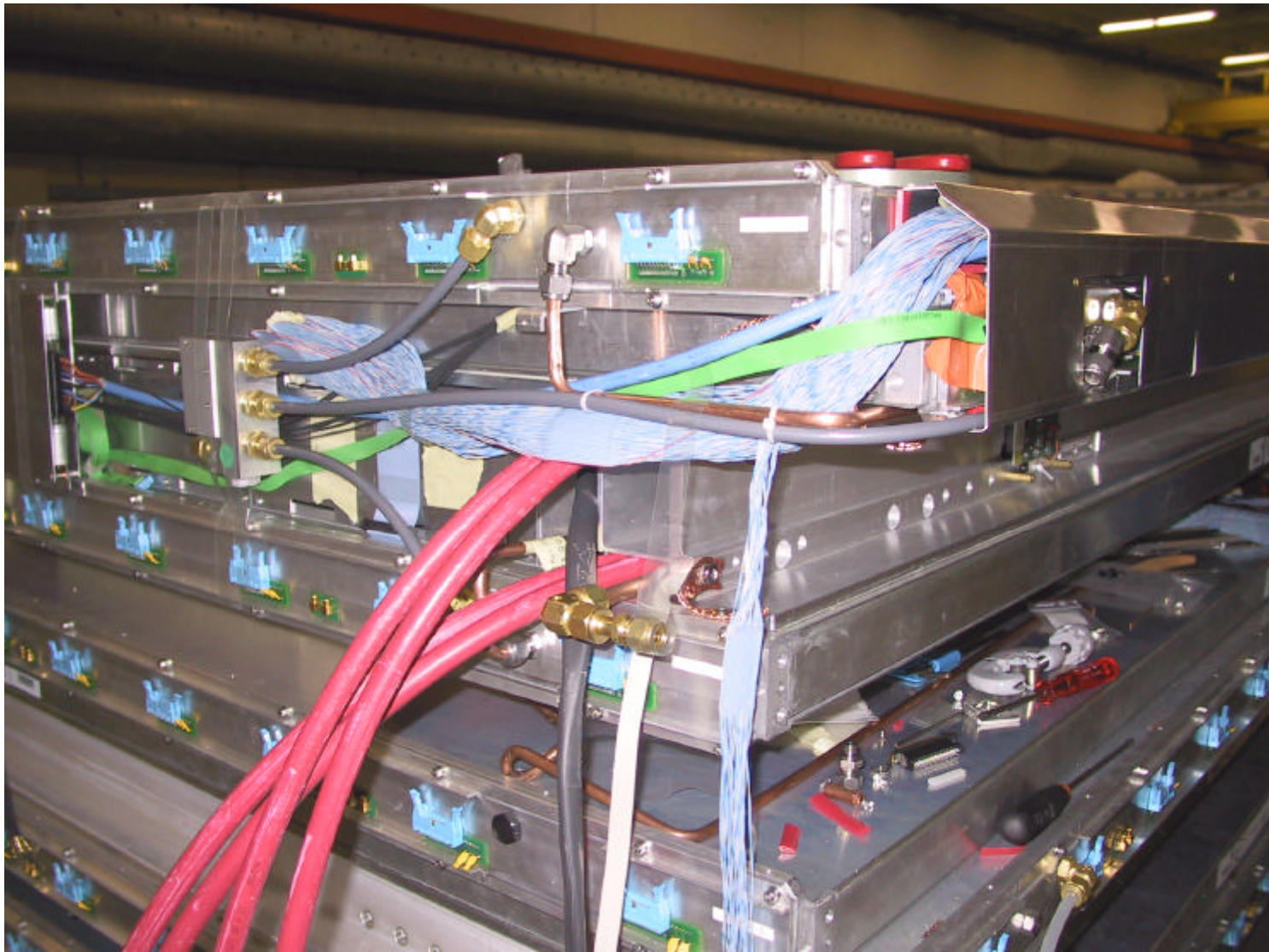
Right:

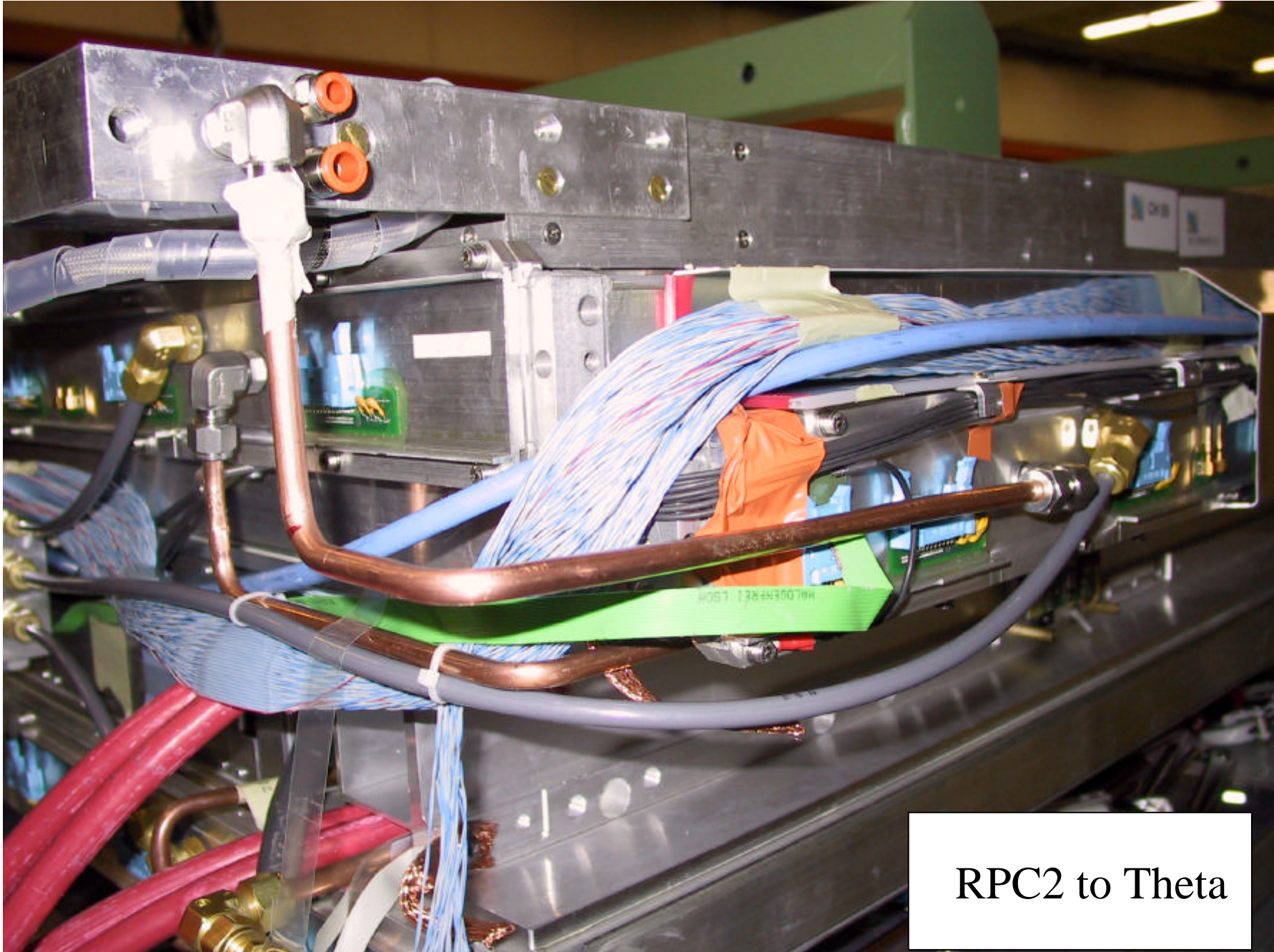
RPC2 => Theta =>
Phi2 => Phi1 => MiniCrate
=> RPC1

Left:

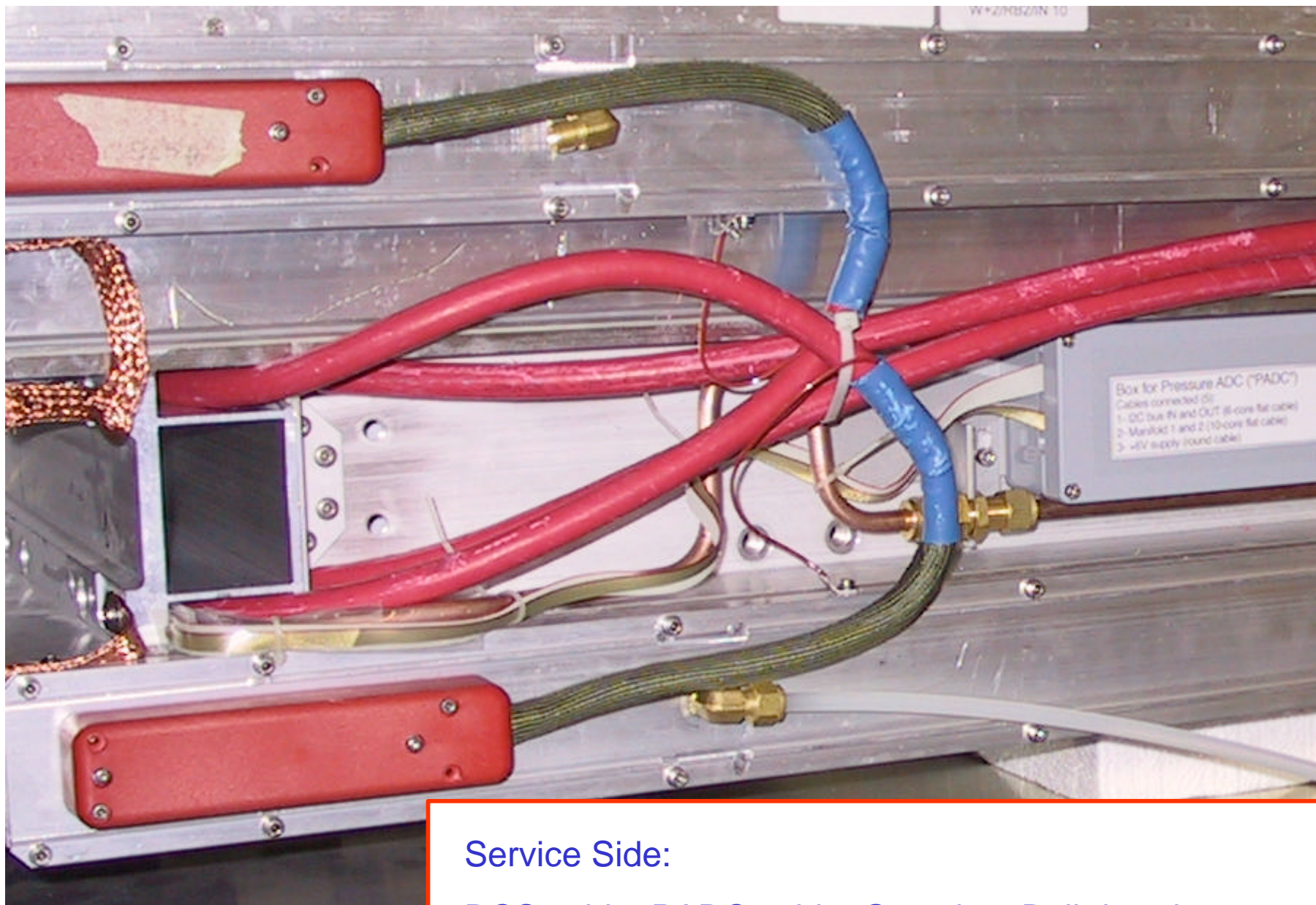
RPC1 => Phi1 =>
Theta => Phi2 =>
MiniCrate => RPC2

I Connections with flexible hoses



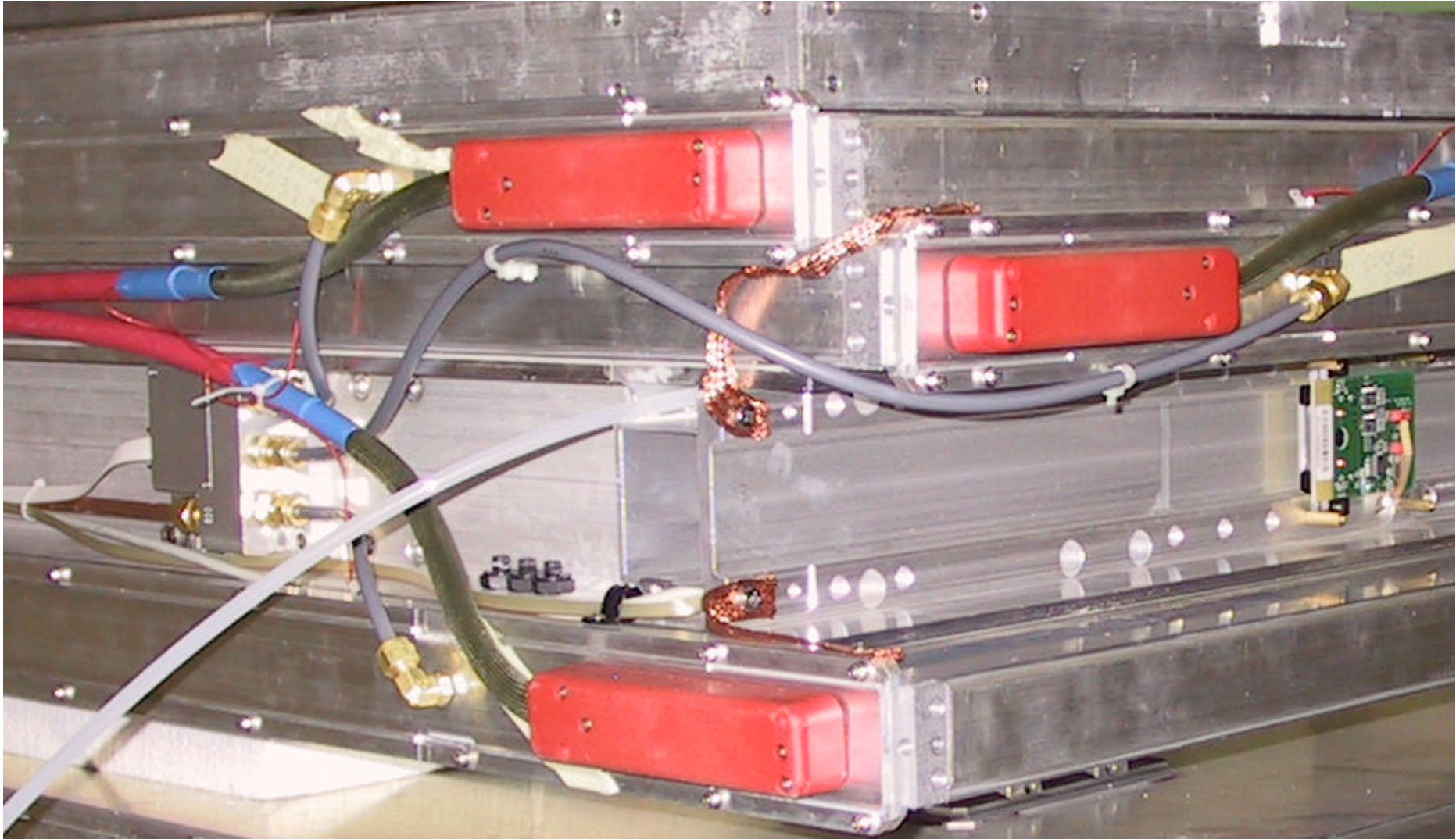


RPC2 to Theta



Service Side:

DCS cable, PADC cable, Gas pipe, Bulk-head+support
4 HV Cables



Sensor cable, DCS, LV cable inside honeycomb frame
Manifold and straight gas pipe + final gas connections to SL
Final ground straps from HC frame to HV covers

Alignment

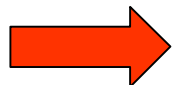
Items required for this task:

- 1) Chamber preparation: alignment pins, clean corner blocks and alignment passages
- 2) Targets that fit in corner blocks,
- 3) Chamber supports for alignment stand, 2 sets; **only one prototype set available**
- 4) Led forks, and control cards;
- 5) 5 DCS cables/chamber:
 - 2 are the same length for all chambers
 - 2 are chamber specific and depend on the PADDC position
 - 1 length defined by pigtail with pitch adaptor on Minicrate

Critical items:

DCS cables: from PADDC to forks, from fork to Control board

Chamber supports: drawing still to be frozen



Start MB1 Alignment procedure by June 16h

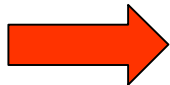
HV Cabling

Items required for this task:

- 1) PADC and DCS cables, protection, (PADC LV), Gas pipe
- 2) HV cables, 300 stored at ISR for 75 chambers (thanks to Marco and..)
- 3) HV soldering station, pin map control unit, assembled connectors, Ready
- 4) HV test station, expected mid June (Marco)
- 5) Mapping cables to Chambers, table with cable lengths outside chamber (Mimmo and Fabio),
- 6) Cable labels

Critical items:

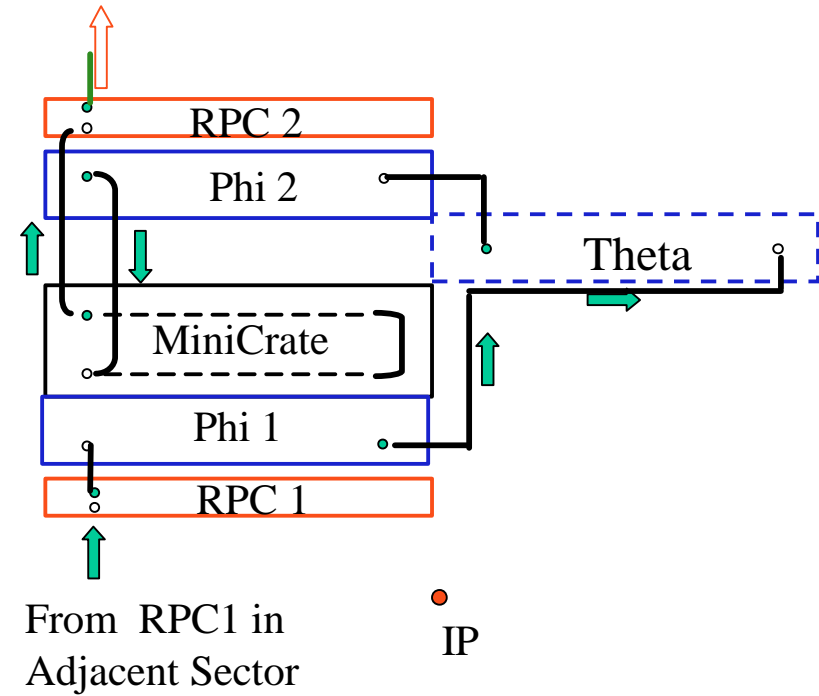
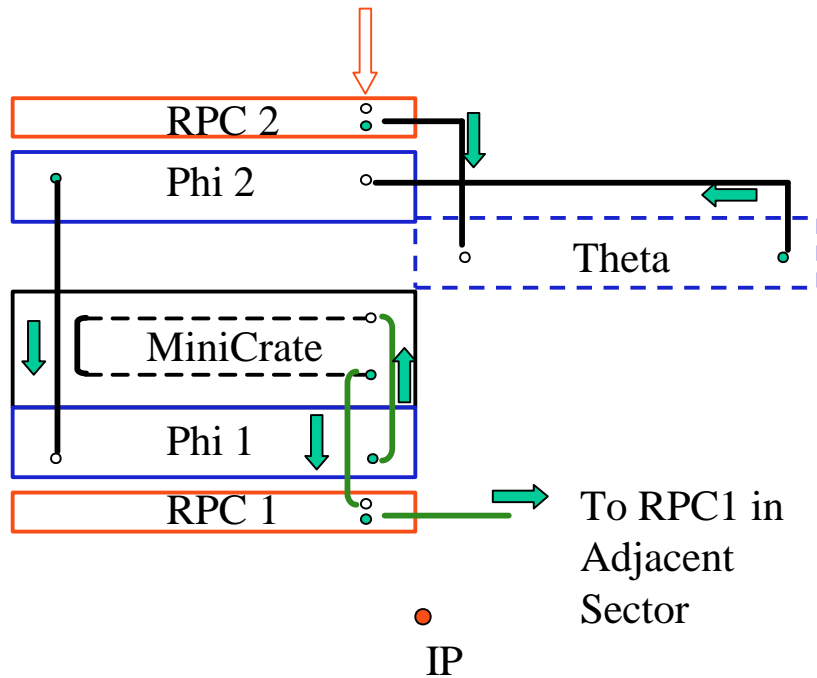
Gas pipe (Aachen): expected end of June (20 chambers) + manufacturing time. Final drawing for one configuration?



Identify firm and order tube bending NOW

Start Cabling procedure beginning of July

Proposed Cooling Circuit



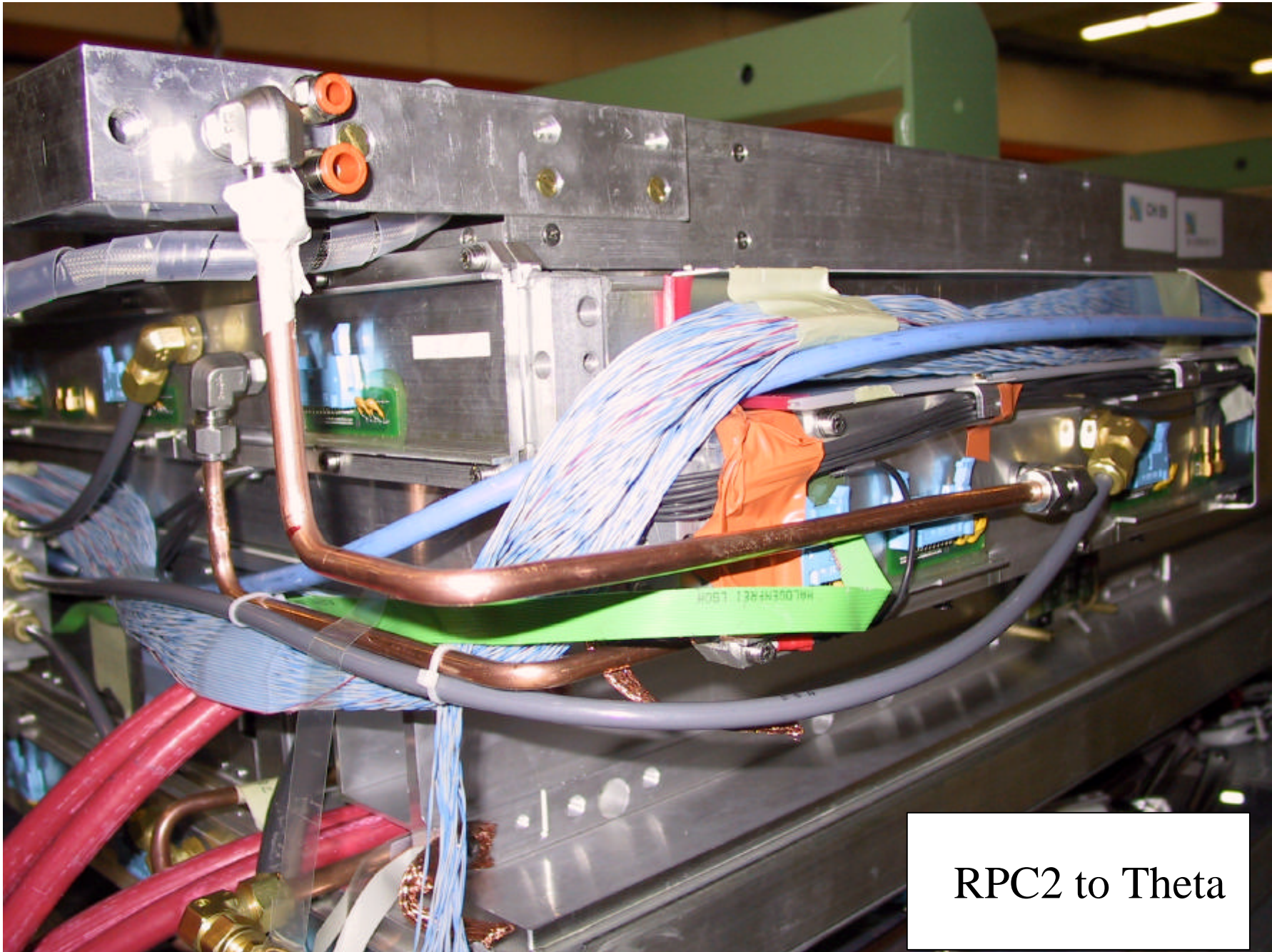
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Phi2 => Phi1 => MiniCrate
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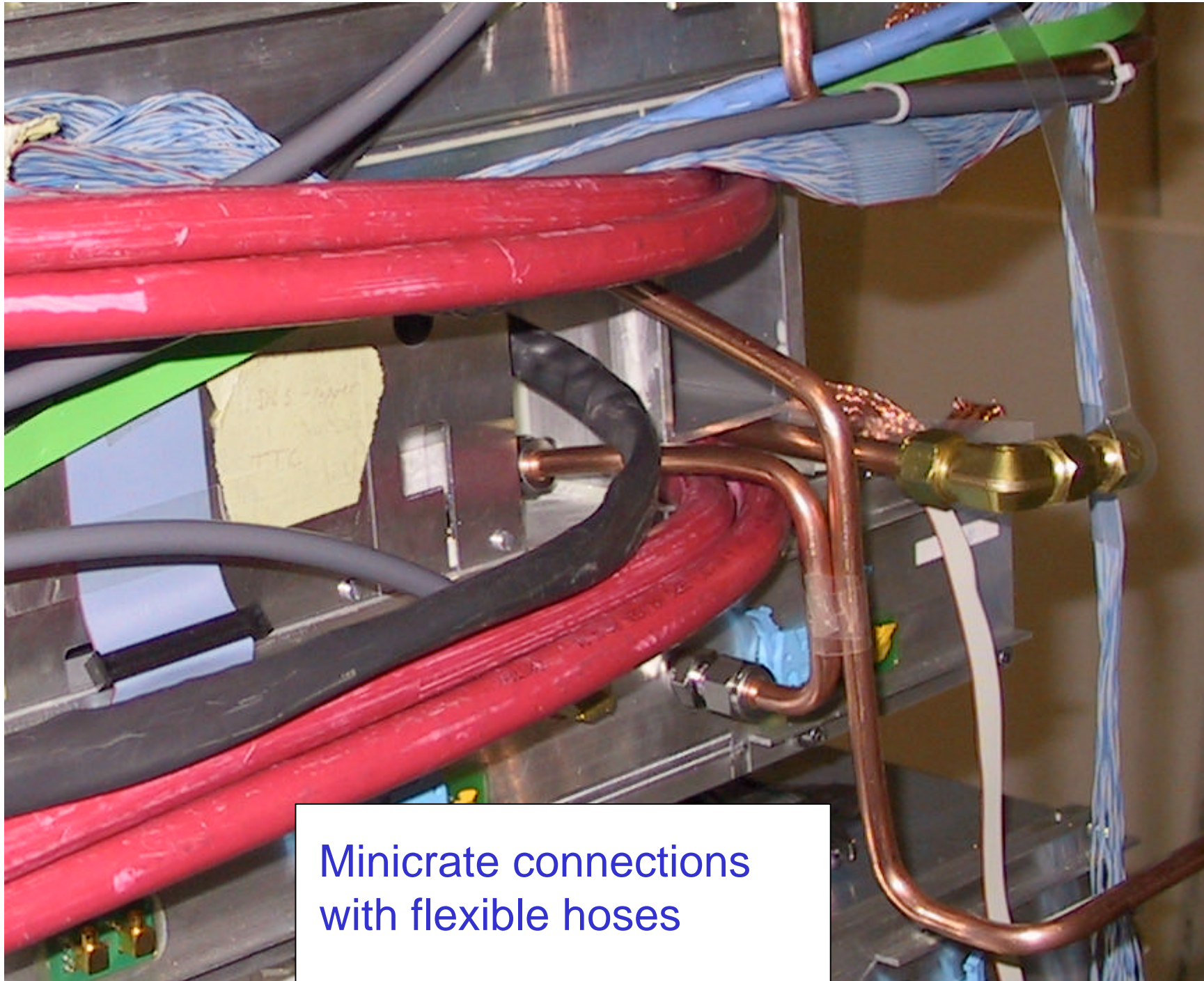
Left:

RPC1 => Phi1 =>
Theta => Phi2 =>
MiniCrate => RPC2

I Connections with flexible hoses



RPC2 to Theta



Minicrate connections
with flexible hoses

Cooling Circuit

Cooling Loop agreed,

Executive drawings ready (Boki) for MB2, MB3 apart for connections to RPC, pending on 3D model (Clemente),

Prototype pieces expected in July (Mimmo),

Full set of drawings available in July with ~week of Boki's time.

Overpressure test of cooling system (Bologna)

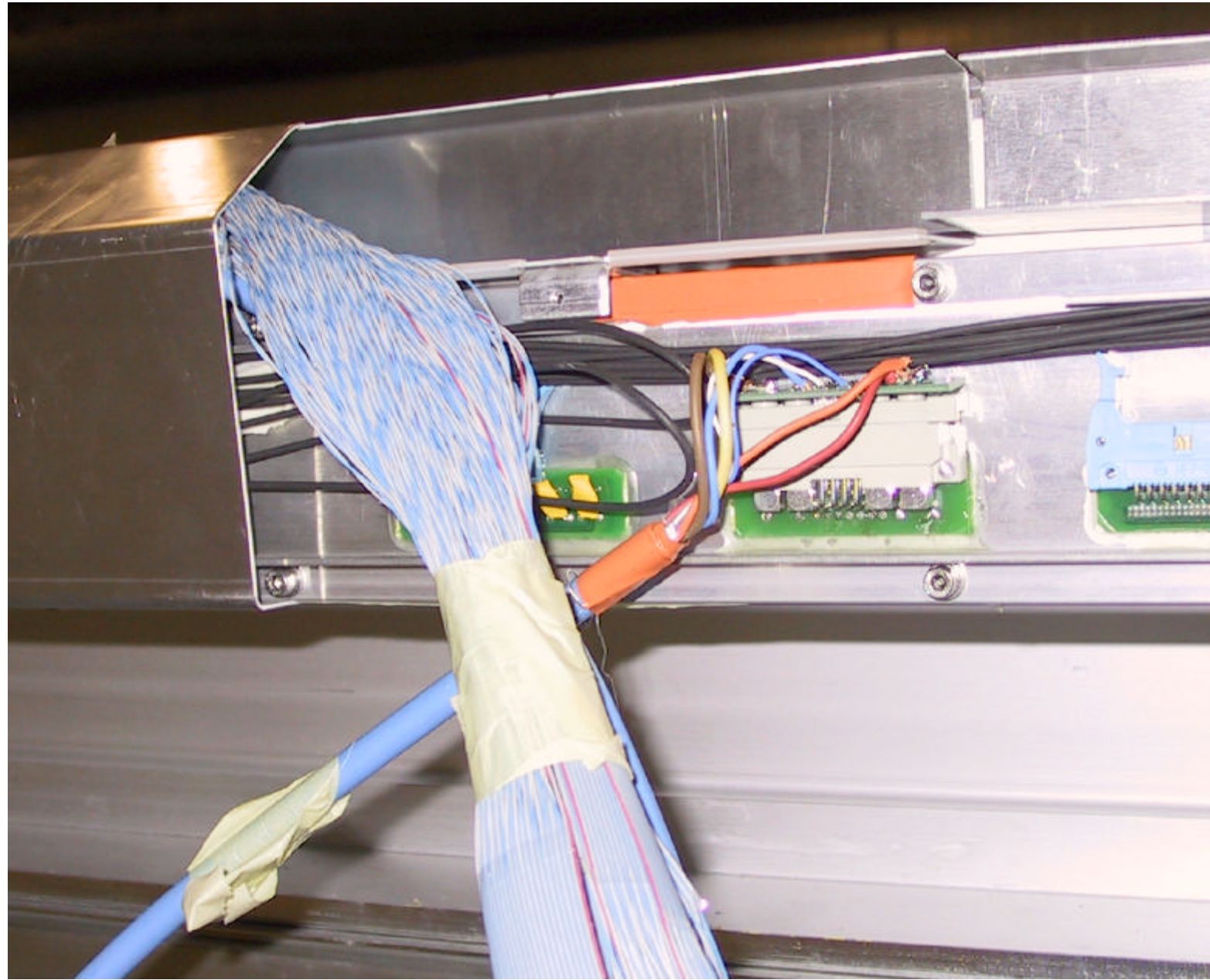
Action items:

Decide on usage of flexible hoses for minicrate connections at Theta SL side.

RPC 3D model

Request additional time for Boki





Cabling

Many items required for this task:

- 1) Cables: Front-end (Hans), LV, DCS, Pulser (Matteo)
- 2) Cable protections, covers, (Matteo,Massimo)
- 3) Grounding straps (Matteo),
- 4) Pigtails for Theta front-end cables ??
- 5) LV Splitter board (Matteo)

Critical items:

Cable protection and covers: design must be frozen by end of July

Theta Front-end cable: decide connection to minicrate

Gas System at ISR

On chamber gas connections should be changed to the final ones as part of the HV cabling procedure.

This requires:

- 1) Gas manifolds
- 2) Flexible gas pipe (**Approved?**)
- 3) Definition of gas manifold position at Front-end side
- 4) Support for gas manifold at Front-end side
- 5) Straight copper gas pipe at HV side

This would allow to gain experience with the manifolds and the parallel gas flow in the superlayers.

Final Tests on Dressed Chambers

- 1) Leak test,
- 2) Overpressure of cooling system with minicrate bypass,
- 3) Data taking with cosmic ray trigger and test pulse: at least one minicrate and related DAQ/Monitor system required for test of Theta SL. Phi SL can be readout with present system.

Action item:

Working minicrate and DAQ/Monitor system at ISR in September (also needed at SX5).

Cooling water for minicrate at ISR.

Chamber Dressing Plan

Main tasks:

- 1) Chamber Certification (gas tight, DCS, cosmics)
- 2) Alignment with final cables (=> chamber type defined)
- 3) HV cabling, includes all items in the honeycomb frame
- 4) Gas manifolds and final gas connections (SL in parallel)
- 5) Equip with chamber supports
- 6) Connect and test cooling loop
- 7) Theta SL cabling
- 8) Final tests
- 9) Coupling with RPCs

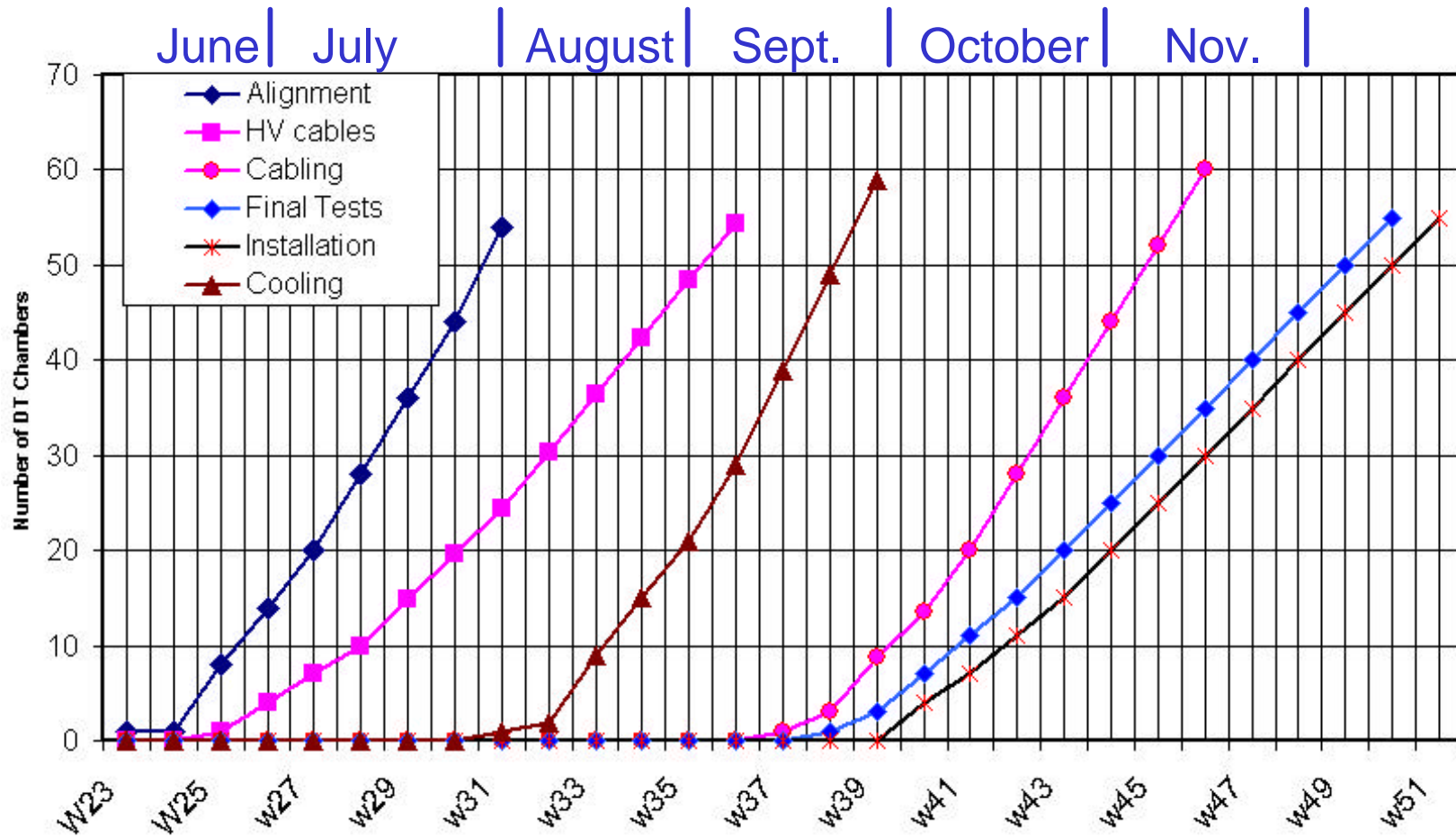
Some of these tasks can and should go in parallel. Preparatory work, not included above, will proceed interleaved with the main tasks.

Alignment should start ASAP since it is simpler to do on bare chambers and also to establish and validate the procedure

DT Chamber Dressing at ISR

- **Alignment**: 10DT/week with 2 Technicians + 2 experts
60% efficiency in June 80 to 100% in July
- **HV cables** (4 connectors + DCS, PADC cables, gas pipe) :
6 DT/week with 2 technicians + 1 for soldering , 50-80%
efficiency in June July to 100% in August
- **Cooling**: 10 DT/week with 2 technicians and all pieces ready
60% efficiency in July 80 to 100% in August -September
- **Cabling** (Theta + LV + grounding straps, protections...)
10 DT/week with 1 technician + one physicist
60% efficiency in September, 80 to 100% in October
- **Final checks** with cosmics : 5 DT/week 1 physicist
requires a workable minicrate with monitor...

Tasks for DT Installation



Manpower Requirements

Assuming that all parts are “off the shelf “

- 2 technicians for chamber handling, parts preparation...
- 1(+1) technicians for HV connector soldering
- 2 Physicists for chamber tests and analysis
- 2 Alignment Experts

These are full time dedicated people in residence beginning mid June at latest

In addition to the Installation Team

Chambers to be installed in 2003

	YB + 2				
Sectors	+8	+9	+10	+11	+12
Services	Left (ZpB)	Right (ZpA)	Left (ZpB)	Right (ZpA)	Left (ZpB)
	YB - 1				
Sectors	-8	-9			
Services	Left (ZmB)	Right(ZmA)			
	YB + 1				
Sectors	+8	+9	+10	+11	+12
Services	Right (ZpA)	Left (ZpB)	Right(ZpA)	Left (ZpB)	Right (ZpA)

	DT Type										Total
	Positive		Negative		Left		Right		Unisex		
	Need	ISR	Need	ISR	Need	ISR	Need	ISR	Need	ISR	
MB1	10	6	2	6							12
MB2	10	16	2	8							12
MB3	10	9	2	6							12
* MB4/9,11							URGENT		5		5
* MB4/10			URGENT		2		2				4
MB4/8,12					2		3		Torino		5
Total	30	31	6	20	4		5		5		50