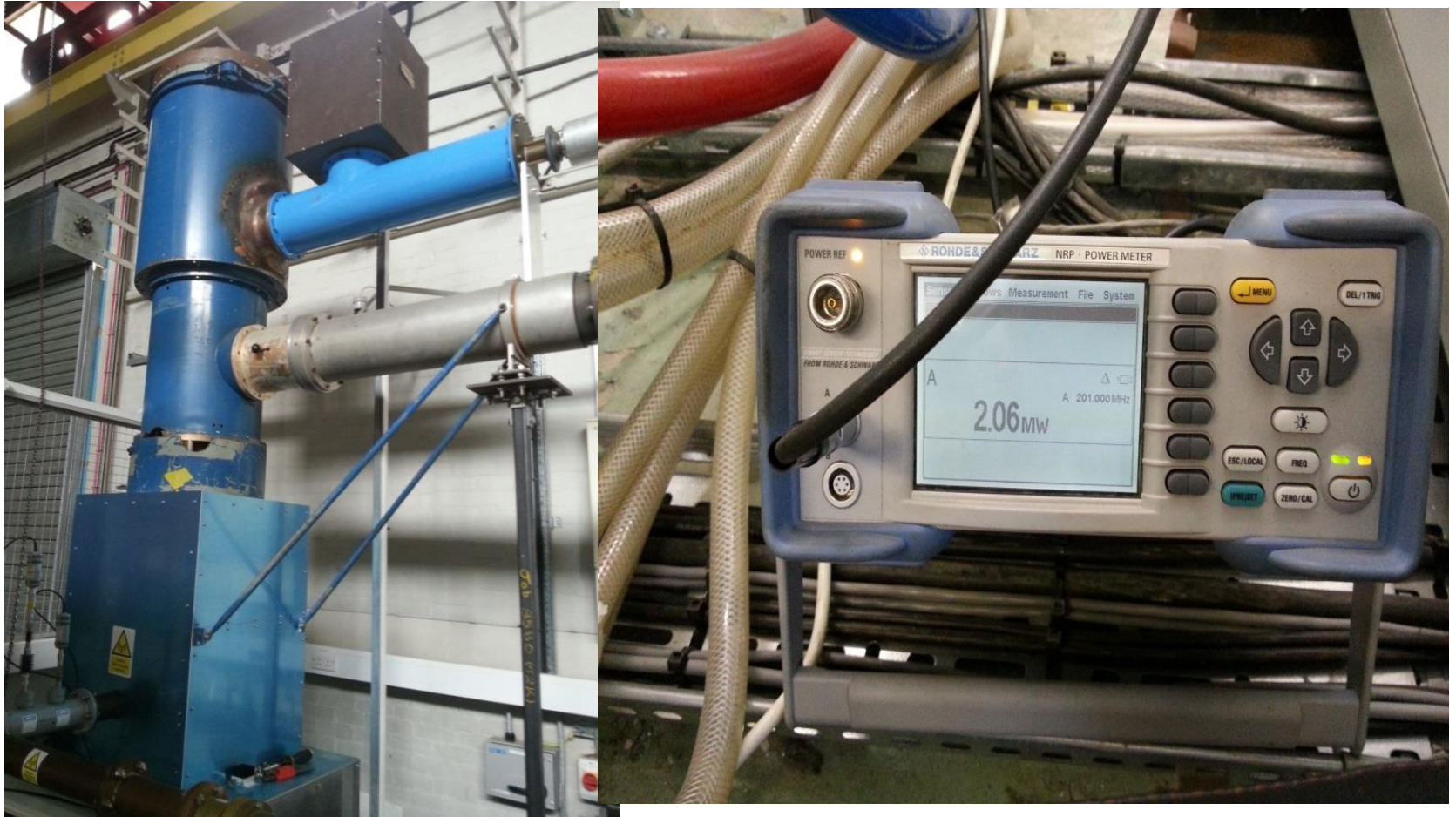


# MICE RF – Installation at RAL

Tim Stanley RAL

7 November 2013

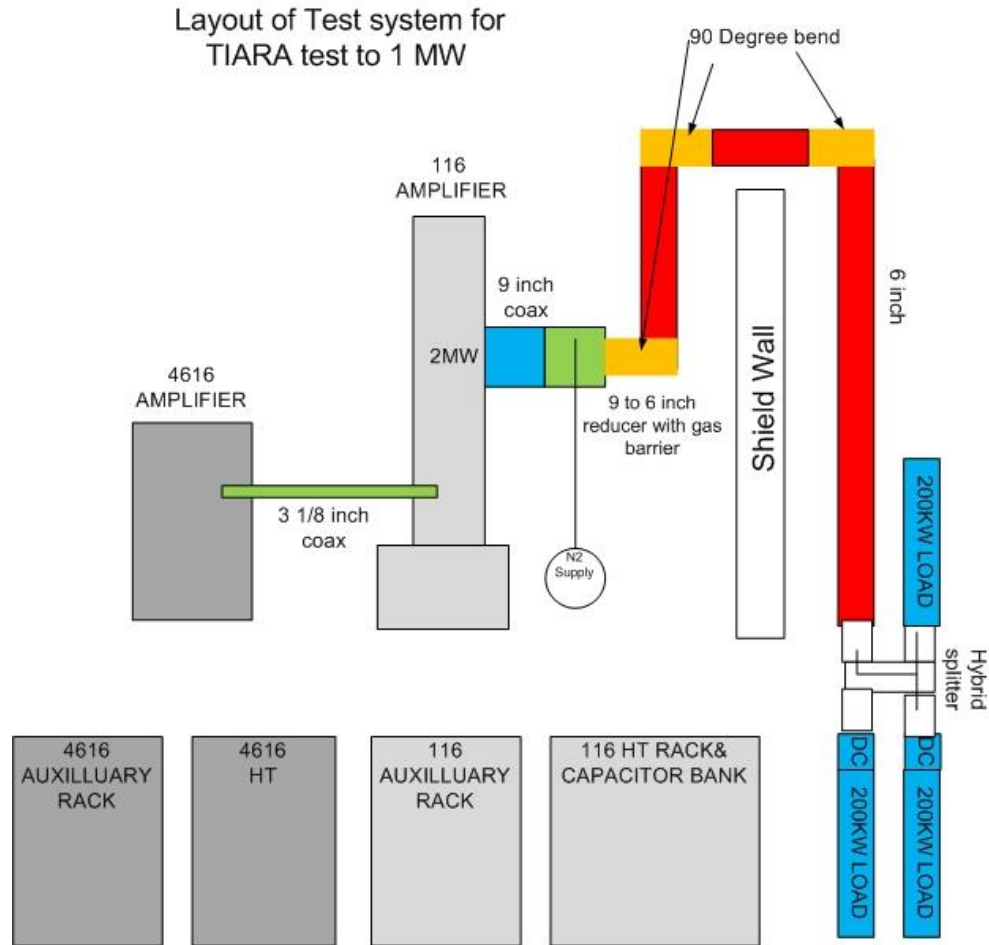
# RF Amplifiers - Performance



# RF Amplifiers - Performance

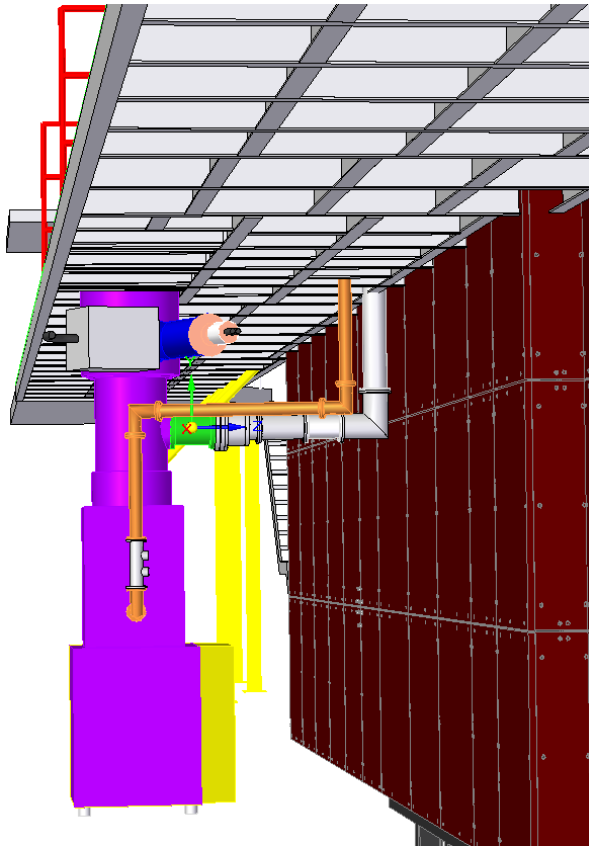
- 2 MW RF output was achieved at Daresbury, in July, on the TIARA amplifier chain.
- PSU trips were mitigated to allow high enough HT supply voltage (35 kV) to achieve the 2 MW RF
- Amplifiers and PSU racks were dismantled and arrived at RAL MICE Hall mid-August.

# TIARA System – Plan A

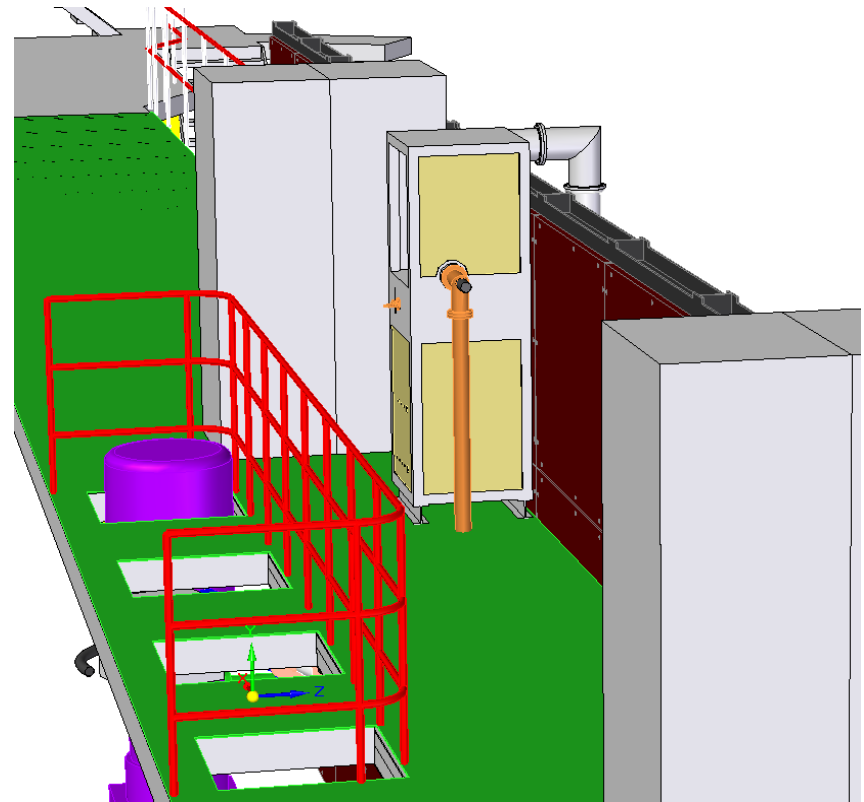


# TIARA System – Plan A

- End-stage, ground floor



- Driver stage and PSU racks



# Preparations for Installation

- CAD drawings are complete (DL); electrical drawings are complete (DL); detailed installation drawings generated by RAL. .
- Alternative layout, of o/p co-ax, will be implemented; avoids significant lead-time for floor mods.
- Safety Document generated by RF group and being ratified at RAL. TS appointed EMF Protection Advisor.

# Procurement of Co-ax RF TX lines

- MEGA, in the USA, have fulfilled full order of parts for entire MICE RF system. Importation, under MoU, via University of Mississippi, achieved late September.
- Many thanks to Don Summers, and UMISS, for supply of co-ax and other components of RF system

# Arrival of a batch of TX lines at RAL





6" co-ax



# 6" co-ax – assembly practice



# Mechanical Installation

- PSU and Control racks (5) craned into position during August.
- End-stage amplifier craned-in during September

# Mechanical Installation – End-stage



# Mechanical Inst: HT PSU and SSPA



# Mechanical Inst – HT PSU Rack 2



# Mechanical Installation

- Co-ax feed from Driver stage to Endstage fitted; co-ax is rigid piping.

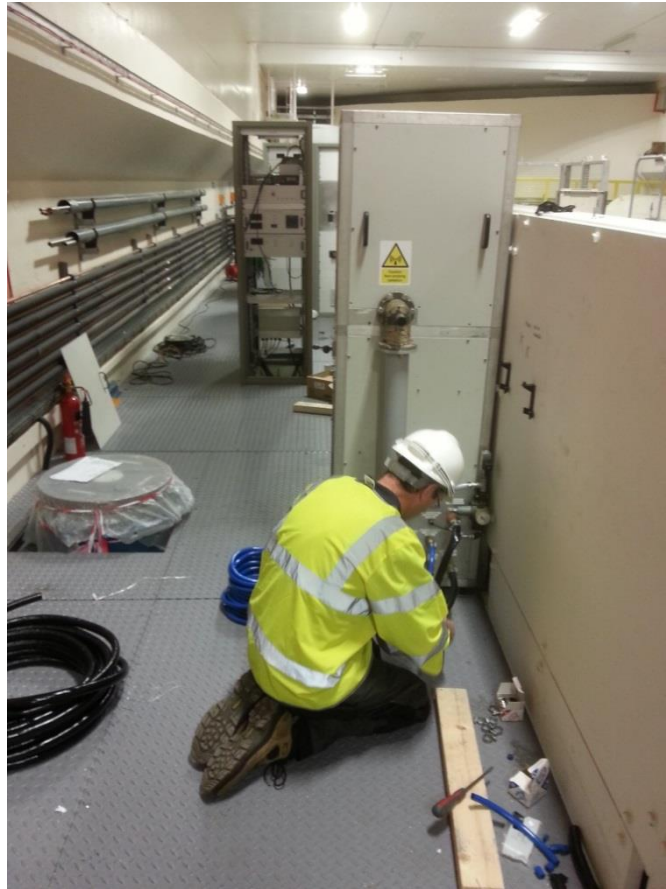
# Mechanical Installation – 3” co-ax





# Mechanical installation

- Driver stage accurately fixed in position

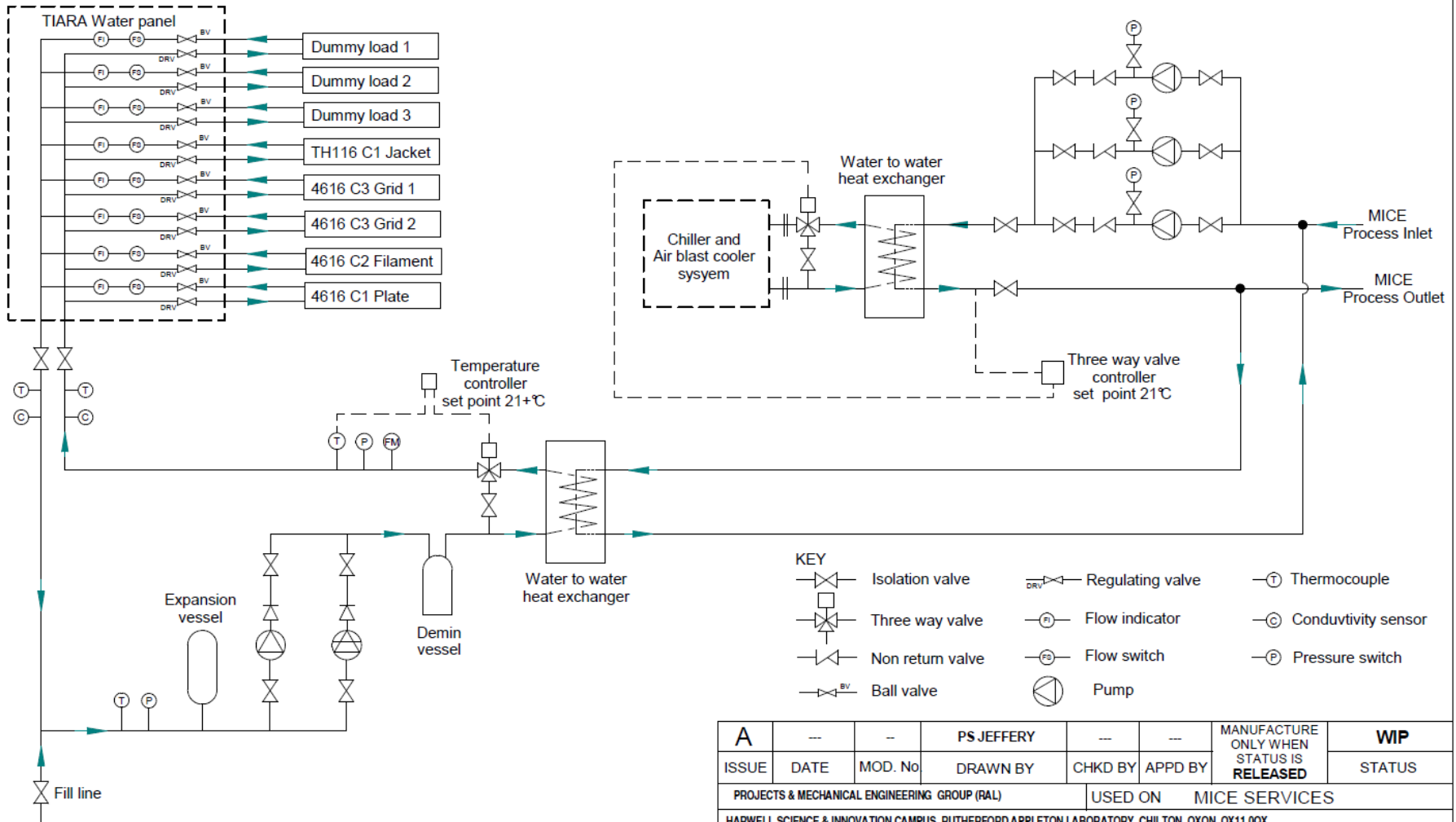


# Electrical Installation

- Wiring of PSU and Control racks has progressed.
- Some re-work required owing to config of End-stage HT port.

# Services - Water

- De-mineralised cooling water supply plumbed to MICE RF area. Dedicated closed-loop, but shares cooling with chilling system for magnets. Aiming for 21 to 24 degrees C at flow input.



- KEY**
- |—| Isolation valve
  - |—|—|—|—|—|—|—|—|—| Regulating valve
  - |—|—|—|—|—|—|—|—|—| Thermocouple
  - |—|—|—|—|—|—|—|—|—| Three way valve
  - |—|—|—|—|—|—|—|—|—| Flow indicator
  - |—|—|—|—|—|—|—|—|—| Conductivity sensor
  - |—|—|—|—|—|—|—|—|—| Non return valve
  - |—|—|—|—|—|—|—|—|—| Flow switch
  - |—|—|—|—|—|—|—|—|—| Pressure switch
  - |—|—|—|—|—|—|—|—|—| Ball valve
  - |—|—|—|—|—|—|—|—|—| Pump

A	---	---	PS JEFFERY	---	---	MANUFACTURE ONLY WHEN STATUS IS RELEASED	WIP
ISSUE	DATE	MOD. No	DRAWN BY	CHKD BY	APPD BY	USED ON MICE SERVICES	STATUS
PROJECTS & MECHANICAL ENGINEERING GROUP (RAL)							
HARWELL SCIENCE & INNOVATION CAMPUS, RUTHERFORD APPLETON LABORATORY, CHILTON, OXON, OX11 0QX							

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**PROJECTION**

TOLERANCES UNLESS STATED

LINEAR ± —

ANGULAR ± —

SURFACE TEXTURE

—|—|—|—|—|—|—|—|—|—| μm

DRAWING CONFORMS TO BS 8888 TOLERANCING ISO 8015

DIMENSIONS IN mm UNLESS STATED

MATERIAL & SPEC. **MASS** Error: No reference

FINISH **CLEAN**

REMOVE ALL BURRS

**WATER SERVICES SCHEMATIC**  
**TIARA**

TDR175
A3 TD-1152-4356
SHEET 1 of 1

A3
TD-1152-4356
A

# Services - Water

- Water distribution panel manufactured; delivered and fitted at RAL last week. (Design review required post-TIARA)

# Services - Water



# Services - Air

- Supply, of dry and clean compressed air, has been provided to RF area in MICE Hall; local distribution tubes and valves being fitted.

# Programme

- Concern that, owing to protracted test-programme at DL to mid-2013, to resolve technical issues, installation programme is very compressed.
- Avoiding the proposed mods., to mezzanine floor, won some time.
- EMR Runs during October reduced hall-time by ~50%



# Programme

- Target dates to completion of TIARA milestone:

Nov 16:

Mechanical installation complete, including both amplifiers, co-ax transmission lines and loads, and all services.

Nov 29:

Electrical commissioning of 4616 (driver) stage complete and RF tested into load

# Programme

Dec 9:

Electrical commissioning of 116 (End-stage) complete, ready for RF testing

Dec 20:

Amplifier chain functional; RF power delivered to load; TIARA milestone achieved

# Early 2014

- Installation of under-floor co-ax lines; needs to be completed by end of February(?) to avoid clashes with supports for return yoke and perhaps other components. All these co-ax lines are fixed-length and rigid!
- TS to familiarise with first RF cavity?
- New financial year: Build of RF amplifier system 2 commences at DL?