







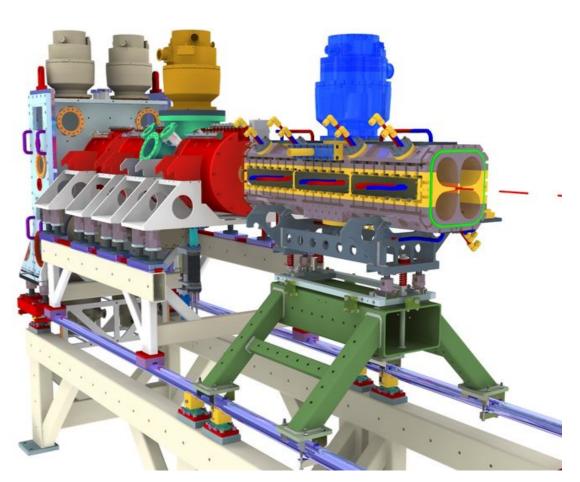
FETS Schedule Update

Thanks for major contributions from Pete Savage & Mike Dudman

FETS Meeting, RAL 12/11/2014

Outline

- Overview schedule
- R8 progress this month
- Imminent issues
- Avoiding schedule slippage



Overview Schedule

FETS Overview Schedule (October 2014)

Overview schedule developed for FETS extension proposal, with help of Mike and Pete:

Critical path highlighted in red:

Assumes all RFQ sections assembled and tested by end of March 2015.

- RFQ integration in R8 in April/May and bead pull tests until July.
- RFQ beam tests from August
- MEBT assembly from November 2015.
- Tight for diagnostics tests.

R8 Infrastructure Shielding walls erected
Internal infrastructure installed

Safety - check effectiveness of radiation protection Shielding roof procured and first section installed

Section 1 assemble and test

Section 2 assemble and test
Section 3 assemble and test
Section 4 assemble and test
Integration of four sections in in R8
4m bead pull and RFQ tuning
RFQ ready for beam

RF system Klystron full power test with dummy loads.

RF support frame assembly

Install roof section for RF waveguide / coax Connect RF waveguide / coax to RFQ

MeV beam tests Recommission ion source / LEBT

First beam test RFQ exit

Verify throughput with torroids /BPMs

Measure RFQ properties and comparison with simulations

MEBT

Procurement of MEBT components

Development of diagnostics sled (BPMs, large bore quads, dump)
MEBT installation stage 1: RFQ via BPM to diagnostics sled
MEBT installation stage 2: first quadrupole pair and BPM

MEBT installation stage 3: first rebunching cavitiy, next quadrupole pair, BPM $\,$

MEBT installation stage 4: chopper 1 chambe

MEBT installation stage 5: rebuncher 2, quad, BPM, chopper 1 beam dump and torroid MEBT installation stage 6: quadrupole, button+stripline BPMs and chopper 2 chamber MEBT installation stage 7: rebuncher 3, BPM, quad, chopper 2 beam dump and torroid

Chopper Handover of tasks / documentation

Fast chopper: electrical (fast pulse generator and timing generator)
Fast chopper: mechanical designs and helical / planar prototypes

Slow chopper: electrical (slow pulse generator) Slow chopper: mechanical (beamline structure)

Chopper installation and beam test

Diagnostics BPM production and calibration, electronic

MEBT diagnostic sled installation and commissioning Diagnostics readout during MEBT installation

Dipole design and procurement

Laserwire interaction chamber development and manufacture

Detector system developmen

Beam dump

Proof of principle laserwire tests at CERN Linac4 (12 MeV)

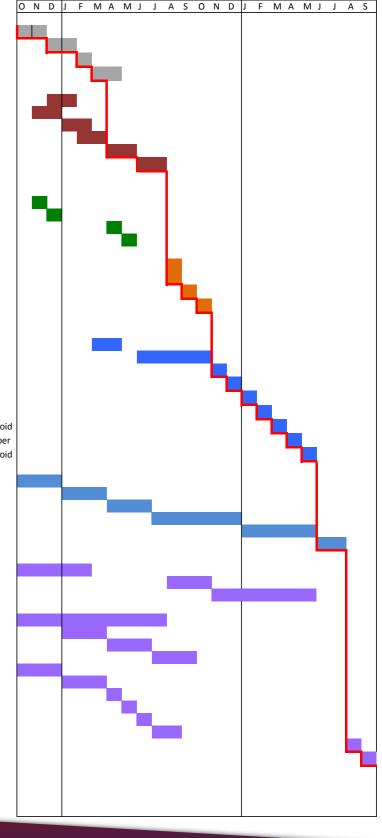
Laser room preparation at RAL Laser returned and installed at RAL Fibre beam delivery system installed

Interlock saftey system installed and approved

Laser system commissioning

Laserwire 1D-transverse beam profile measurements at FETS

First laserwire emittance measurements at FETS



2015

2016

Overview Schedule

FETS Overview Schedule (October 2014)

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RFQ ready for beam

RF system Klystron full power test with dummy loads.

RF support frame assembly

Install roof section for RF waveguide / coax

Connect RF waveguide / coax to RFQ

Recommission ion source / LEBT 3 MeV beam tests

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Verify throughput with torroids /BPMs

Measure RFQ properties and comparison with simulations

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tacks / documentation

2014 2015 2016 N D M A M J A S O N D M A M J A S J

Front End Test Stand

Overview Schedule

MEBT

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Chopper Handover of tasks / documentation

Fast chopper: electrical (fast pulse generator and timing generator)
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Chopper installation and beam test

Diagnostics BPM production and calibration, electronic

MEBT diagnostic sled installation and commissioning

Diagnostics readout during MEBT installation

Dipole design and procurement

Laserwire interaction chamber development and manufacture

Detector system development

Beam dumps

Proof of principle laserwire tests at CERN Linac4 (12 MeV)

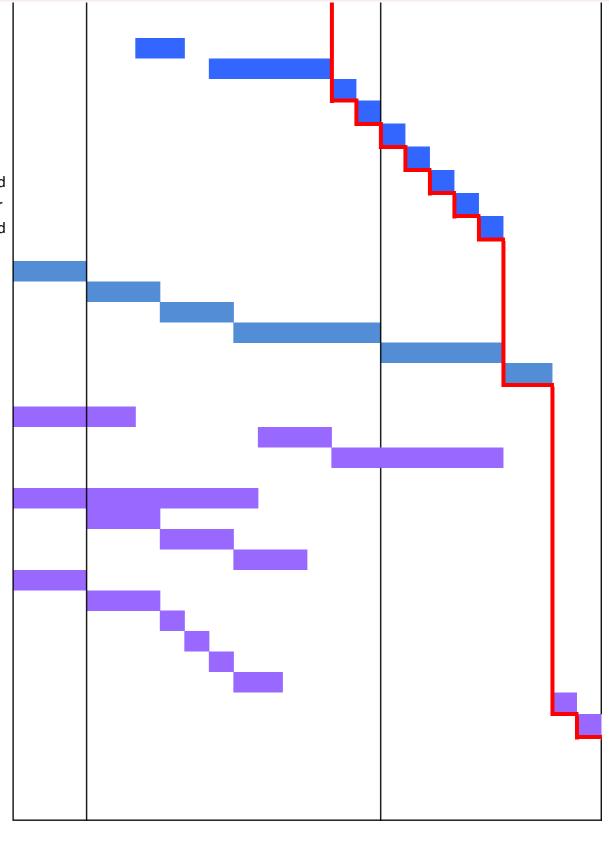
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First laserwire emittance measurements at FETS

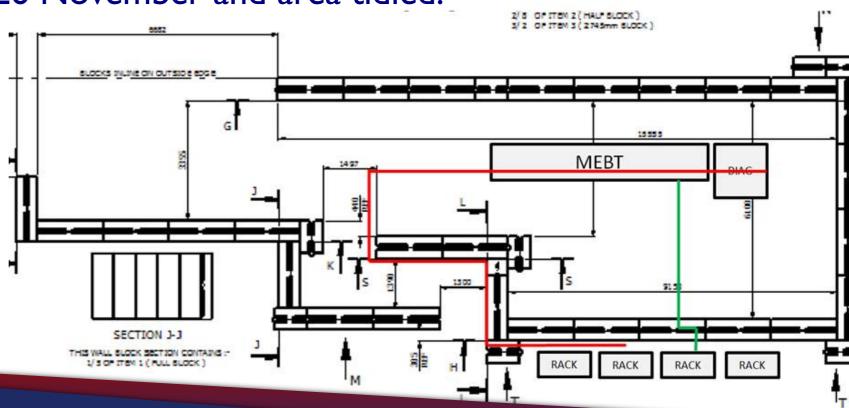




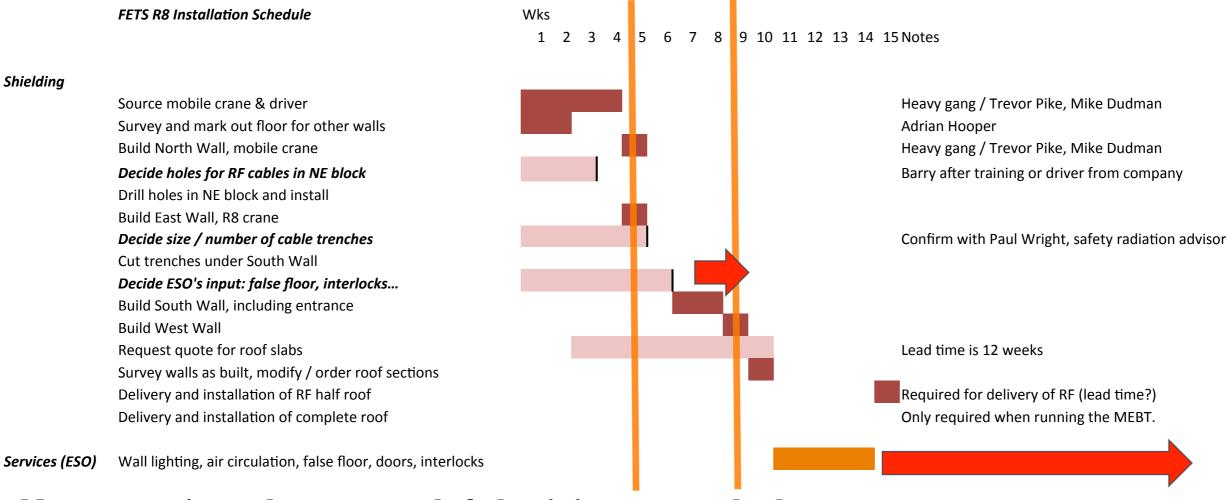
Progress & plans in R8

Shielding

- Good progress was made on North & East walls at last FETS meeting, 15 October.
- The South wall upto the labyrinth entrance was completed as of 20 October.
- Next phase requires cages modifications for escape route (Pete organizing):
- Work planned for 17-21 November:
 - Heavy gang to bring remaining blocks for next phase of the build.
 - Labyrinth: two ends with block tangs to be removed to progress.
- Build to be complete 24 26 November and area tidied:
- Oversight Committee tour on 27 November



Shielding and R8 status today



Key meetings last month/ decisions needed:

- Meeting with ESSO on 5 November: see report and actions from Mike. FETS to decide on exactly what is required from ESSO. Interlock standards (P. Barnes).
- Realistic manufacture to installation in 12-16 weeks: will miss gap in R8 schedule.
- Shielding / cable entry meeting with P. Wright on 7 November: approval pending drawings from FETS (Mike).



R8 Installation Schedule (Draft v0)

FETS R8 Installation Schedule

Shielding

Source mobile crane & driver Survey and mark out floor for other walls Build North Wall, mobile crane

Decide holes for RF cables in NE block

Drill holes in NE block and install Build East Wall, R8 crane

Decide size / number of cable trenches

Cut trenches under South Wall

Decide ESO's input: false floor, interlocks...

Build South Wall, including entrance

Build West Wall

Request quote for roof slabs

Survey walls as built, modify / order roof sections

Delivery and installation of RF half roof

Delivery and installation of complete roof

Services (ESO)

WallI lighting, air circulation, false floor, doors, interlocks

RFQ

Section 1

Section 2

Section 3

Section 4

Fit upstream flange and connect to upstream component On rails in R8, align to beam axis, offset in Z for bead pull Fit upstream flange and connect to upstream component On rails in R8, align to beam axis, offset in Z for bead pull Fit upstream flange and connect to upstream component

On rails in R8, align to beam axis, offset in Z for bead pull

Fit upstream flange and connect to upstream component On rails in R8, align to beam axis, offset in Z for bead pull

4m bead pull test

Tuning field flatness of 4 section RFQ



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32



Adrian Hooper

Heavy gang / Trevor Pike, Mike Dudman

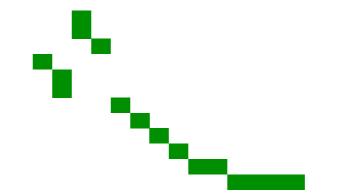
Heavy gang / Trevor Pike, Mike Dudman

Barry after training or driver from company

Confirm with Paul Wright, safety radiation advisor

Lead time is 12 weeks

Required for delivery of RF (lead time?) Only required when running the MEBT.



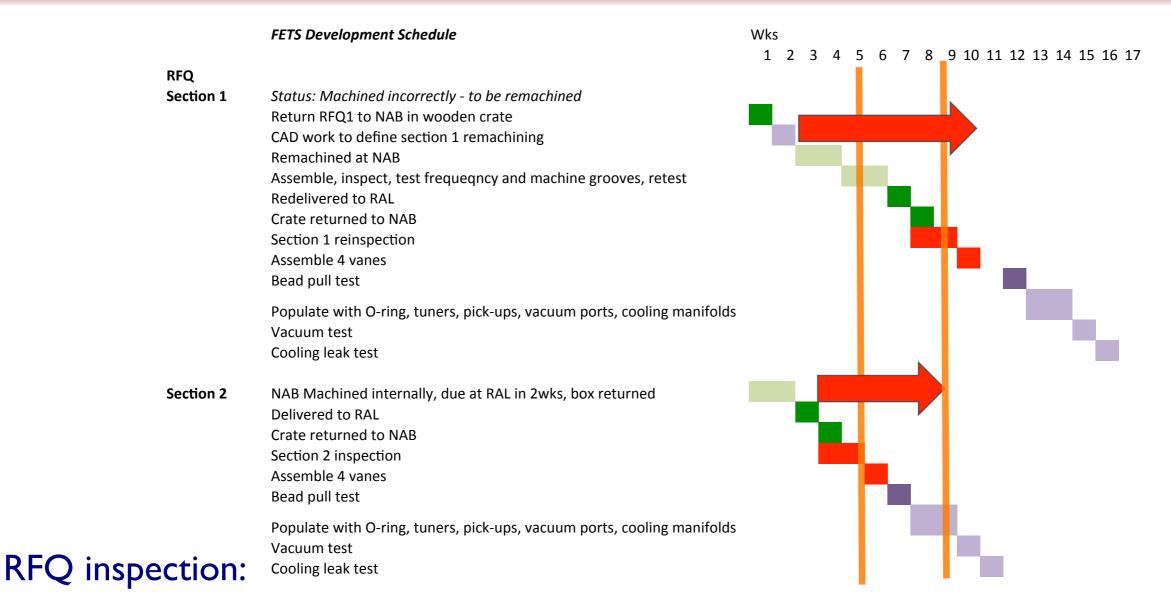
Align RFQ sections with telescope to perpex cross hair

4 metre bead pull and tuning plan needs defining.

Support needs to be designed.

To be defined...

Imminent issue: RFQ inspection



- Dave Wilsher started inspection RFQ section 2 this week on 3 November. (delays the schedule by 5 weeks). Pete to report on progress later today...
- Can we recover lost time for other sections? Is RAL's RFQ 2 inspection consistent with measurements at NAB. RFQ 1 awaiting results to proceed with machining.



Back up



RFQ Development Schedule (v0)

Pete Savage

Dave Wilsher

Dave Wilsher + Pete

Pete / Mike / technician??

Pete, Mike setup then Saad for tests

FETS Development Schedule

RFQ Section 1

Status: Machined incorrectly - to be remachined

Return RFQ1 to NAB in wooden crate

CAD work to define section 1 remachining

Remachined at NAB

Assemble, inspect, test frequequcy and machine grooves, retest

Redelivered to RAL
Crate returned to NAB
Section 1 reinspection
Assemble 4 yanes

Populate with O-ring, tuners, pick-ups, vacuum ports, cooling manifolds

Vacuum test Cooling leak test

Delivered to RAL

Bead pull test

Section 2 NAB Machined internally, due at RAL in 2wks, box returned

Crate returned to NAB Section 2 inspection Assemble 4 vanes

Populate with O-ring, tuners, pick-ups, vacuum ports, cooling manifolds

Vacuum test Cooling leak test

Bead pull test

need results of section 2 to NAB

Machine at NAB
Delivery to RAL?
Crate returned to NAB
Section 3 inspection
Assemble 4 vanes
Bead pull test

Populate with O-ring, tuners, pick-ups, vacuum ports, cooling manifolds

Vacuum test Cooling leak test

on 4 need results of section 2

Machine at NAB
Delivery to RAL?
Section 4 inspection
Assemble 4 vanes
Bead pull test

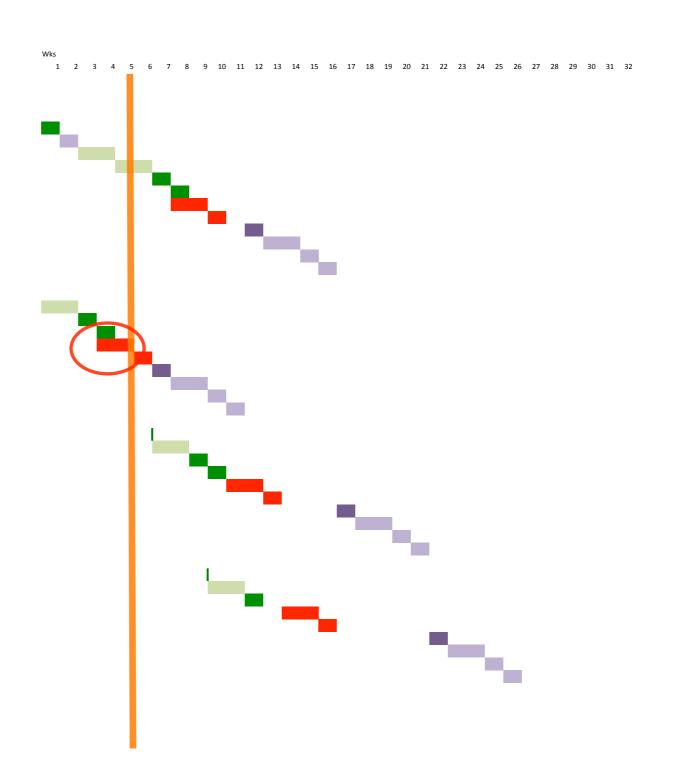
Populate with O-ring, tuners, pick-ups, vacuum ports, cooling manifolds

Vacuum test Cooling leak test

4m bead pull Decide on specification

Simulation of field tuning?

Development of hardware to make 4m+ / multiple beads?





MEBT development schedule (v0)

MEBT MEBT Vacuum Manifold:

Design

Details drawings

Request for quotes

Place order

Manufacture

Delivery

Inspection

MEBT Support Frames

Design

Details drawings

Request for quotes

Place order

Manufacture

Delivery

Inspection

MEBT Vacuum vessels

Design

Details drawings

Request for quotes

Place order

Manufacture

Delivery

Inspection

MEBT Alignment systems

Design

Details drawings

Request for quotes

Place order

Manufacture Delivery

Inspection

MEBT Rebuncher Cavities

Design

Details drawings

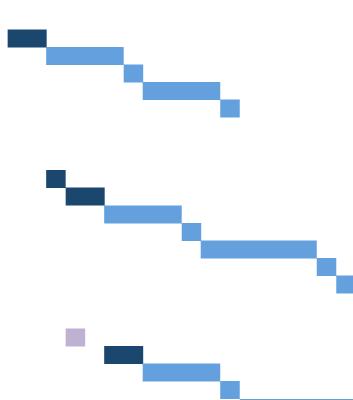
Request for quotes

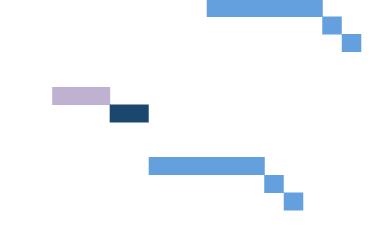
Place order

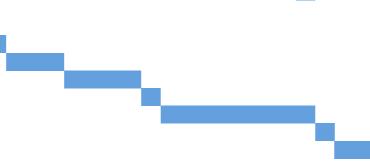
Manufacture

Delivery

Inspection







Dave Zakhar

Outside Manufacturer

?

TBA

Dave Zakhar

Dave Zakhar

Outside Manufacturer

TBA

Pete Savage

Dave Zakhar

TBA

Pete Savage

Dave Zakhar

Imperial College

Charles Evans

Charles Evans?

Outside Manufacturer

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TBA