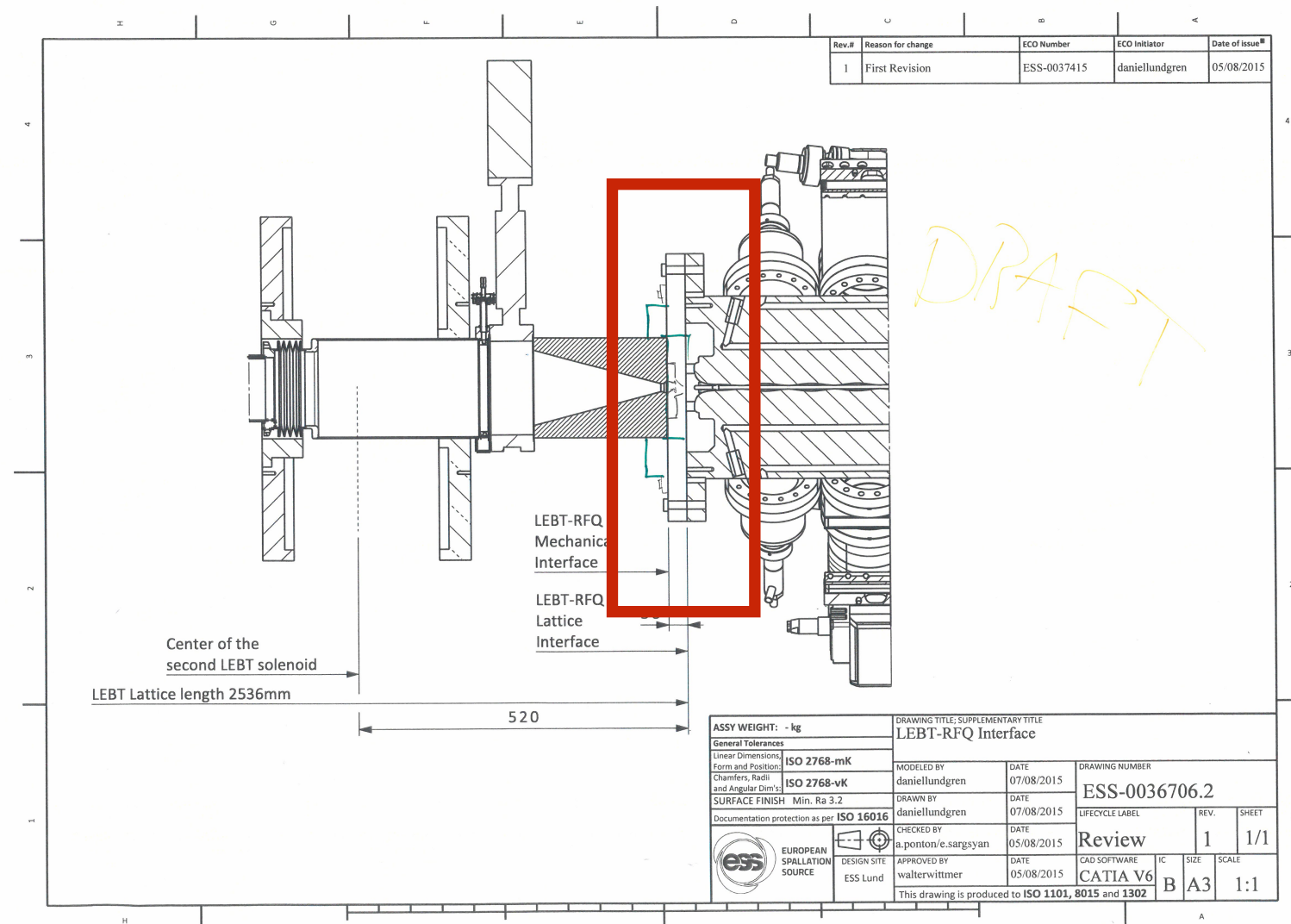# RECENT LATTICE CHANGES

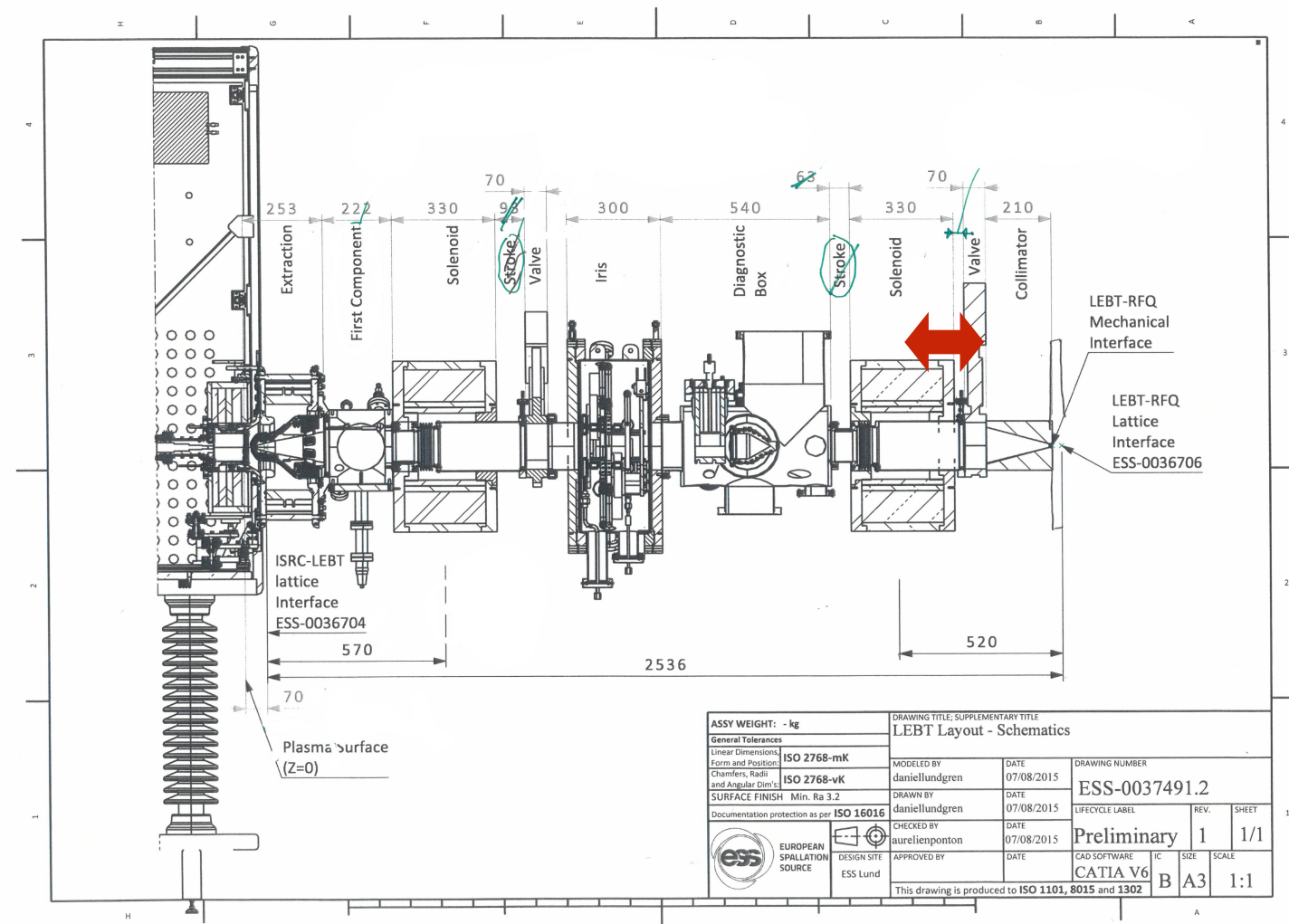Mamad Eshraqi on behalf of beam physics work package

LEBT-RFQ

- The LEBT-RFQ interface is under study, since the two work units have different time priorities, it is proposed to create a mechanical interface where the involved parties could work independently.
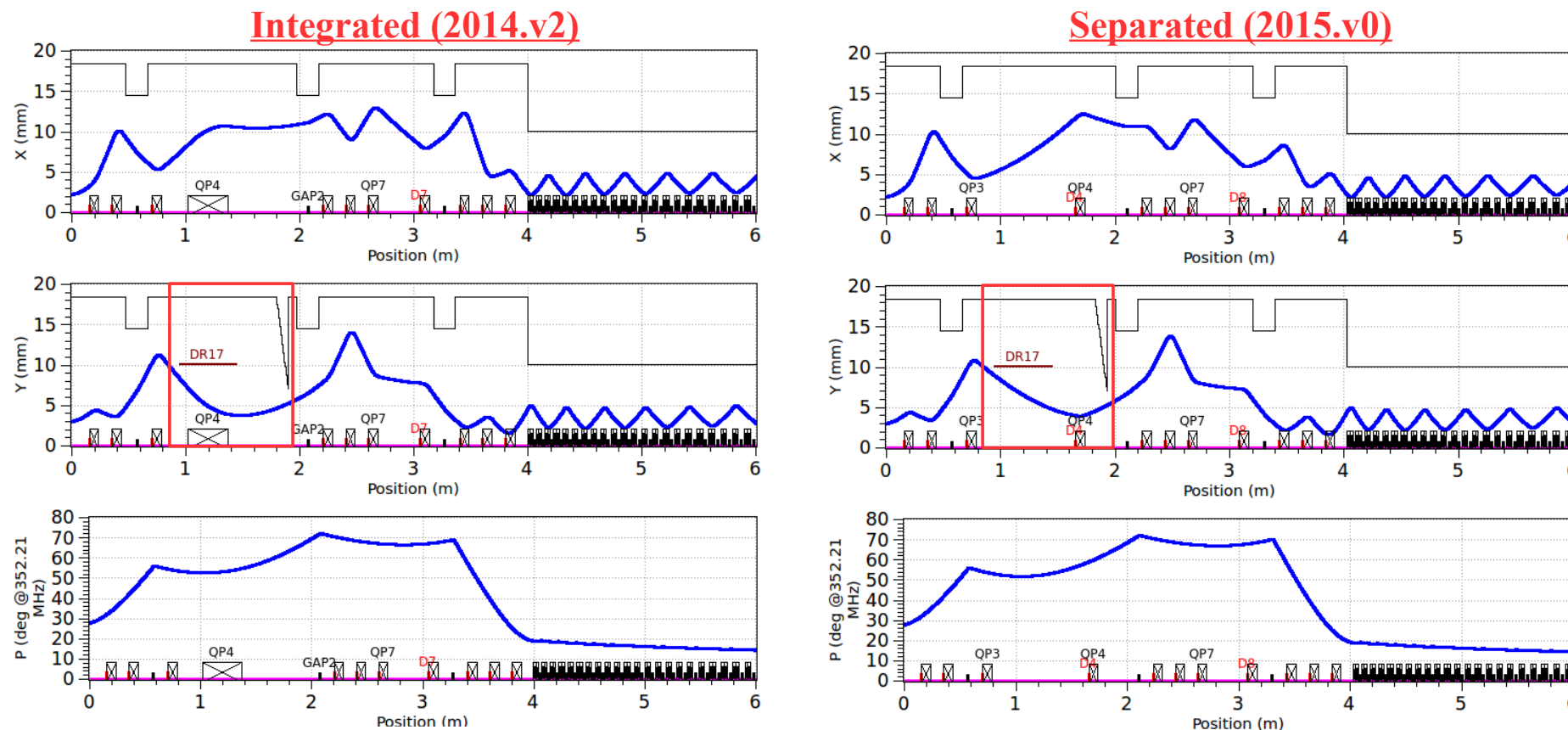
LEBT

- Moving one vacuum valve from downstream of the second solenoid to upstream of that solenoid.

MEBT I

2 layouts: chopper & quad integrated vs separated

Integrated (2014.v2)   Separated (2015.v0)

- ESS MEBT lattice structure:

  (Triplet) + (Chopper+Dump) + (Triplet) + (Diagnostics Box) + (Quadruplet)

- **The *chopper quad* was originally considered to surround the chopper (like LINAC4) but this has been questioned.**

- Two configurations are tried and the difference is minor from the point of view of beam physics, as seen in the following slides.

2

Courtesy of Ryoichi Miyamoto

MEBT 2

Lengths of elements and spaces in 2015.v0c

	2015.v0b	Bilbao's excel v3	2015.v0c
Quad	100 (10+80+10)	100 (6+88+6)	100 (6+4+80+4+6)
Buncher	190	180	180
Chopper	550 (50+450+50)	550 (50+450+50)	550 (50+450+50)
Dump	200 (150+0+50)	200	200 (150+0+50)
Initial drift	150	133 (30+103) ??	150 (72+35+43)
Final drift	100	113 (103+30) ??	100 (43+35+22)
Quad-quad drift	100	100 (102.6 for WS)	100
Quad-buncher drift	30	41	41
Chopper-Q4 drift	30	0	0
Q4-dump drift	120	102.6	150
Diag box drift	350	350	350 (400, 450)

- Practically, the only change from 2015.v0b to 2015.v0c is in the quad-buncher space so the difference should be very small.

- From beam dynamics point of view, the initial drift certainly has some margin (a few cm ??) but the final drift is tighter. More about the interfaces from Aurélien?

3

Courtesy of Ryoichi Miyamoto

PULSED MAGNETS

- After a recommendation on changing the quadrupoles downstream of the DTL (except A2T and Dipoles) to pulsed magnets, layout of the LWUs in Spoke, MBL, HBL, HEBT, Dogleg have changed
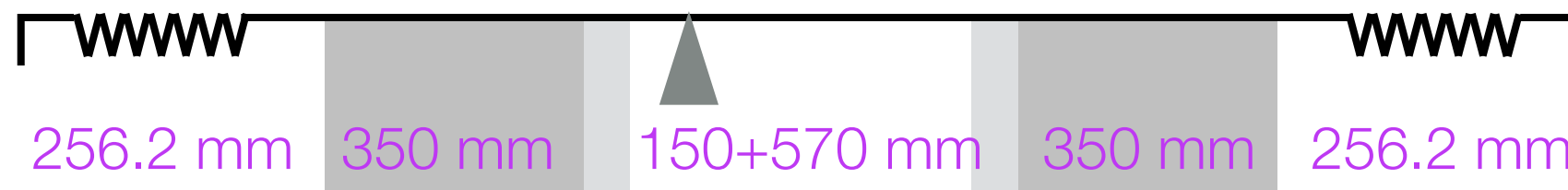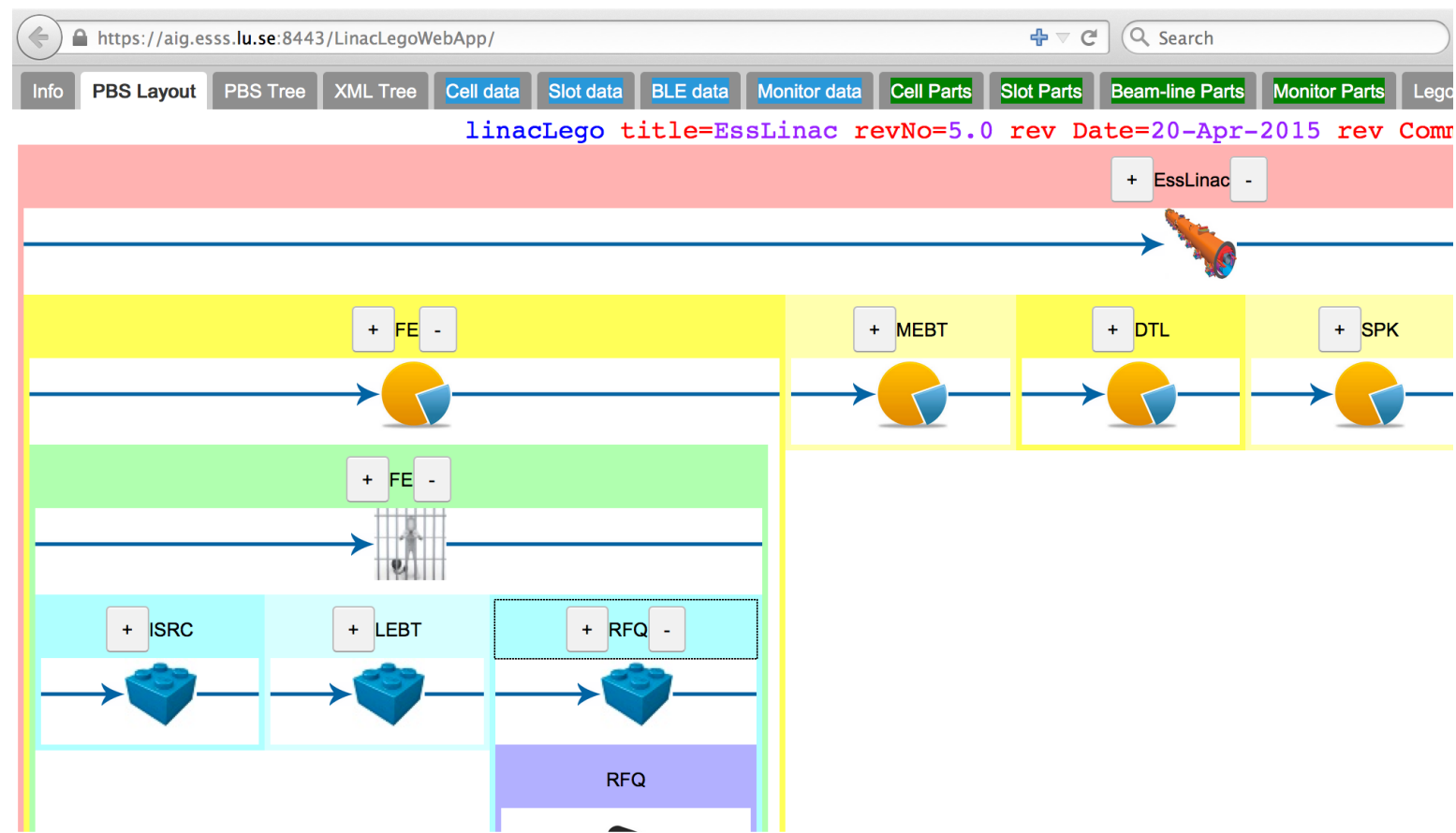
SWU
Spoke Warm Unit

| 160 mm | 250 mm | 120+460 mm | 250 mm | 160 mm |

EWU
Elliptical Warm Unit

| 256.2 mm | 350 mm | 150+570 mm | 350 mm | 256.2 mm |

INTERFACE MARKERS

```
; ------------------------------------------------
; ---            LEDP START             ---
; ------------------------------------------------
DRIFT 400 20 0
QUAD 250 6.27303 30 0 0 0 0 0 0
DRIFT 120 50 0
;DIAG_POSITION N-1 0 0 0.2
ADJUST 49001 1 0 -0.0013145001 0.0013145001 0
ADJUST 49001 2 0 -0.0013145001 0.0013145001 0
THIN_STEERING 0 0 50 0
DRIFT 460 50 0
QUAD 250 -5.65192 30 0 0 0 0 0 0
DRIFT 400 30 0
; ------------------------------------------------
; ---            LEDP END               ---
; ------------------------------------------------
; ------------------------------------------------
; ---            CRYO START             ---
; ------------------------------------------------
DRIFT 371.5 28 0
FIELD_MAP 100 988 0.671508 28 0 0.950174 0 0 Spoke_W_coupler
DRIFT 141 28 0
FIELD_MAP 100 988 17.4919 28 0 0.876163 0 0 Spoke_W_coupler
DRIFT 371.5 28 0
; ------------------------------------------------
; ---            CRYO END               ---
; ------------------------------------------------
; ------------------------------------------------
; ---            SWU START              ---
; ------------------------------------------------
DRIFT 160 30 0
QUAD 250 5.80773 30 0 0 0 0 0 0
DRIFT 120 30 0
DIAG_POSITION 49001 0 0 0.2
ADJUST 49002 1 0  -0.0013145001 0.0013145001 0
ADJUST 49002 2 0  -0.0013145001 0.0013145001 0
THIN_STEERING 0 0 30 0
```

WHAT IS NEXT

- After insertion of interface markers, beam physics and mechanical, the lattice will be handed over to be uploaded to the LinacLego as the single point of truth.