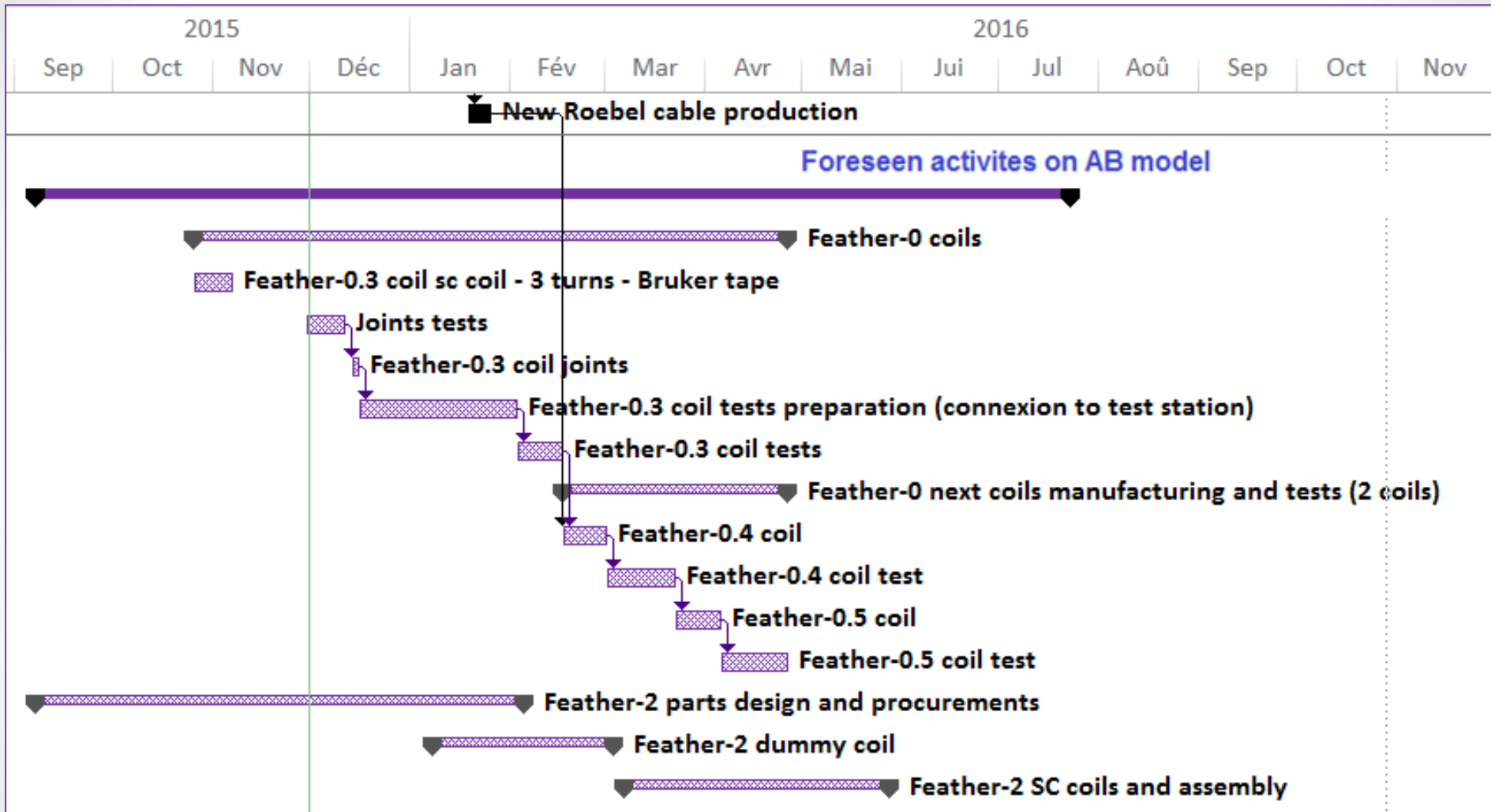


Magnet plan & issues

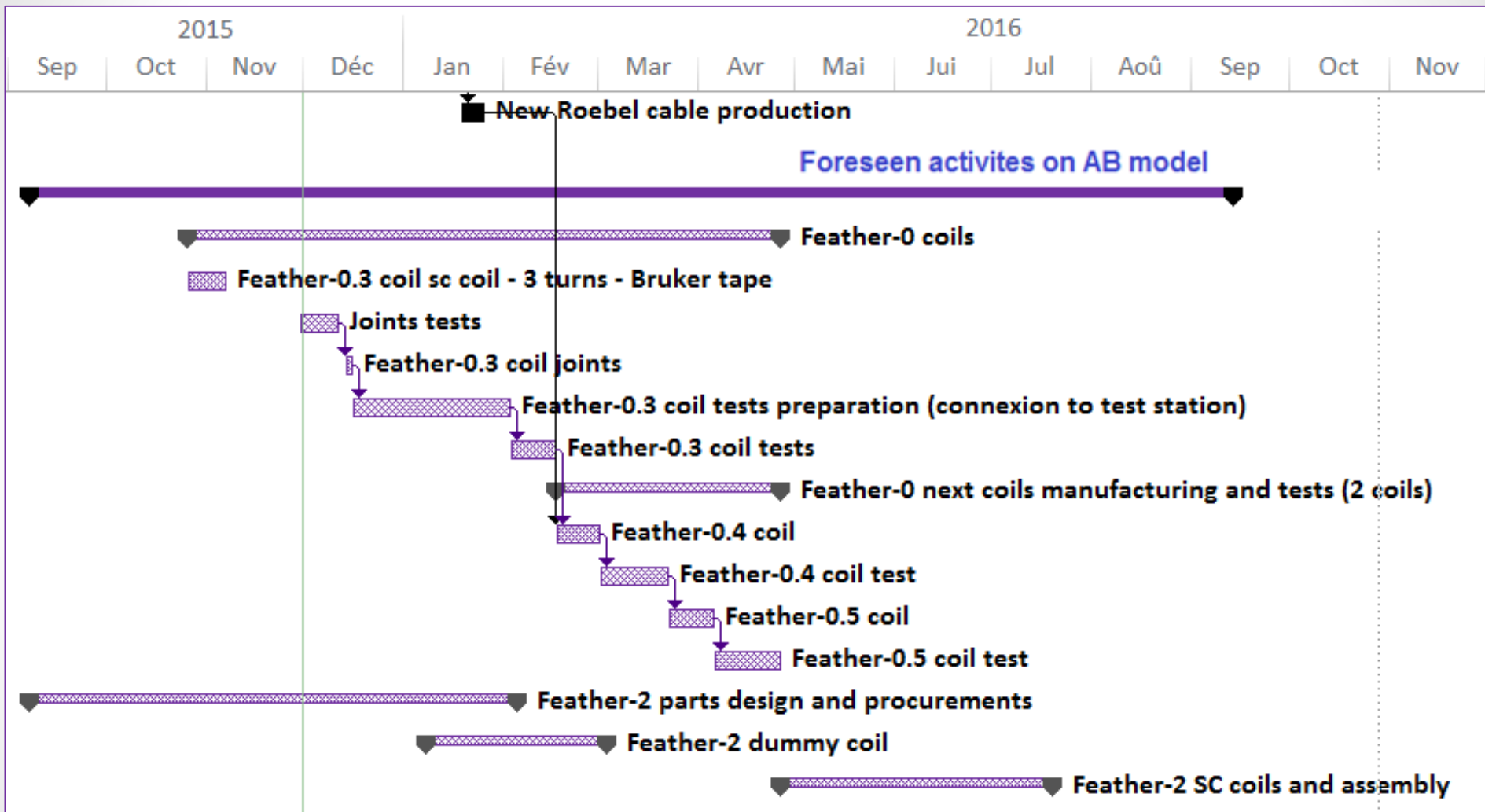
WP10 general meeting
01/12/2015

Maria DURANTE
On behalf of Task 10.3

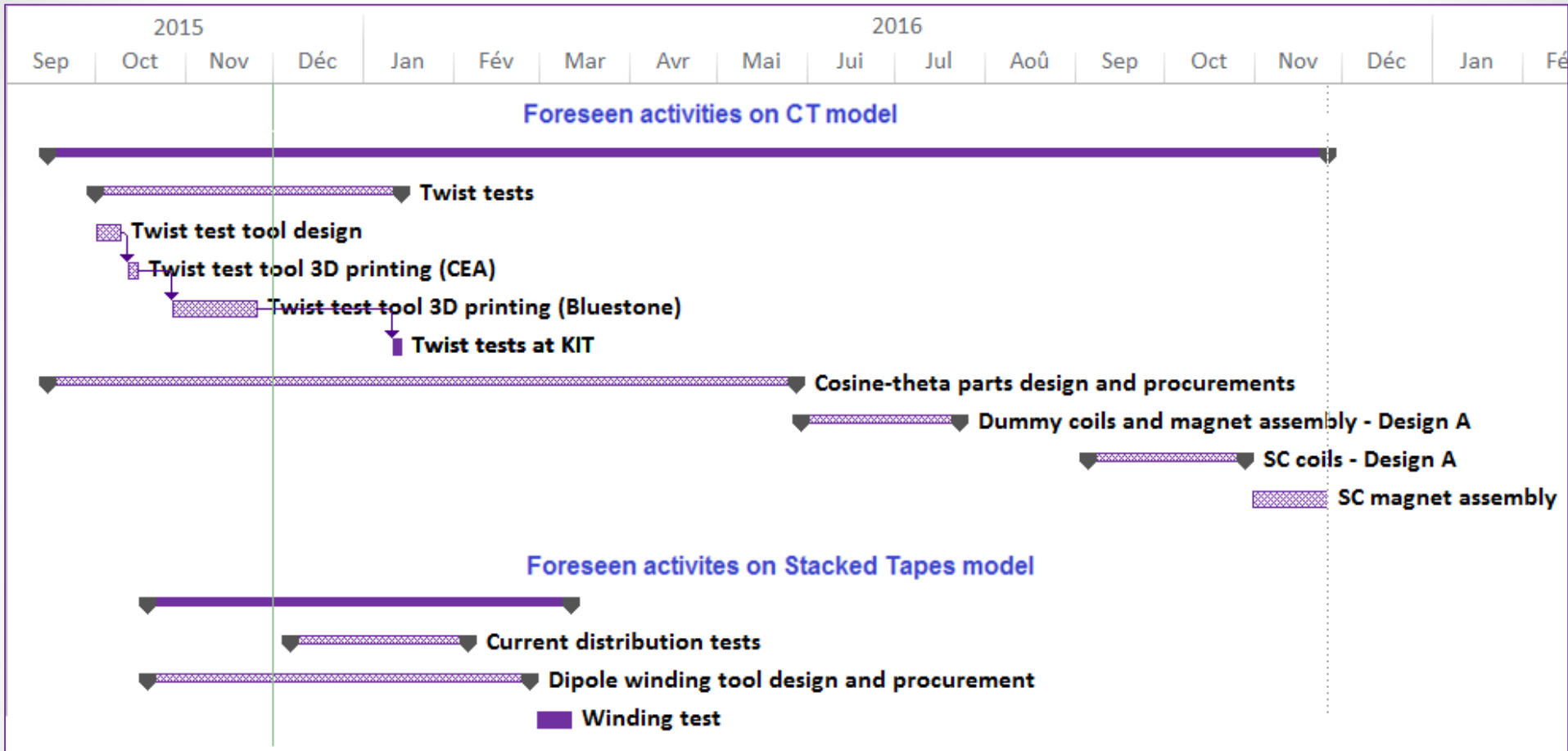
Magnet plan – AB model



Magnet plan – AB model



Magnet plan – CT and stacked tapes models



Tape and cable needs

- **ABdesign**

- Dummy **0.8 mm thick** :
 - 20 m (3 x 6 m UL) for Feather-0 → December 2015
 - 2 x 30 m UL from GCS for Feather-2 available
 - 2 x 30 m UL for Feather-2 → February 2016
- SC **0.8 mm thick** :
 - 20 m (3 x 6 m UL) for Feather-0 → December 2015
 - 3 x 30 m UL for Feather-2 → March 2016

- **CT design**

- For Design A :
 - Dummy 1.2 mm thick : 3 x 20 m UL → March 2016
 - SC 1.2 mm thick : 3 x 20 m UL → June 2016
- For Design B :
 - Dummy 1.0 mm thick : 3 x 24 m UL → March 2016
 - SC 1.0 mm thick : 3 x 24 m UL → June 2016

- **Stacked tapes block design**

- Needs for 200 m, 4 mm wide, 0.14 mm thick tape
- For first single layer coil : 20 x 1.8 m UL = 36 m → March 2016

Cable geometry

- **Cable thickness**

- Baseline cables:

- Cable A, Bruker tapes, 13 x 140 μm thick tapes: 1.1 +/- 0.1 mm thick
- Cable B : 15 x 100 μm thick tapes : 0.9 +/- 0.1 mm thick
- Cable 0.8 mm : ?

- **Cable width**

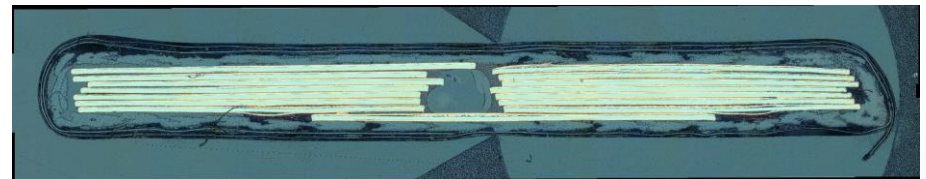
- 12 mm +/- ?

- **Strands distribution, longitudinally**

- 300 mm transposition pitch will help

- **Strands distribution, right/left side**

- Fiber rope, or insulated copper wire in the central hole \rightarrow also helping for stress
- Kapton maybaum



Insulation/Impregnation

- Insulation for Roebel cable : glass fiber sleeve, 0.1-0.125 mm thick completed by epoxy resin impregnation
- Need for charged resin (difficult with glass sleeve)?
 - Feather-0.3 resin impregnation without filler
 - On-going test at Twente University → see Marc's talk

Joints

- Joints at the end of the coils, between Roebel cable and stacks of tapes.
 - Solder choice
 - Soldering procedure avoiding temperature $> 250\text{ °C}$ for more than few seconds
- Joint configuration test campaigns carried out by Task 3 and Task 2
 - see Jérôme and Glyn talks
- Tests to be done on 12 mm wide splices, at 77K and 4K
 - joint for Feather-0.3

Protection

- For **AB model**, protection studies done for Roebel cable made up of 0.1 mm thick tapes
- To be done for Bruker cable, 0.14 mm thick tapes
- For **CT model**, protection studies for Bruker cable → see Tina talk
 - High copper current densities
 - 100 μm ss substrate → 50 μm ss substrate and more copper ?

Instrumentation

- **Voltage taps**
- **Temperature sensor**
- Pick up coil + (50 μ m/50 μ m 20+20 turns x 5)
- Optical fiber used in Feather-0.3 (seems too fragile)
- Acoustic recording (one put aside or two for redundancy)
- Copper wire in a glass sleeve in the Roebel center