

THALES TO RESIGNAL SSL?

by Piers Connor

FORGONE CONCLUSION

Those of us who have been following the Sub Surface Lines (SSL) resignalling debacle, where the first supplier Westinghouse (in 2008) and then Bombardier (last Christmas) were dumped by LU, will not have been surprised by the announcement by TfL on 25 April that Thales had been “invited to tender” for the Sub Surface Lines resignalling contract. Since there was no other contractor mentioned in the press release and, to my knowledge at least, two other major suppliers declined to bid, one may assume that Thales was the only company prepared to put their corporate neck on the SSL block. Bearing in mind the long and sad history of this project¹, it was, for most observers, a foregone conclusion.

Why a foregone conclusion? Simply because no other signalling system supplier, starting from scratch and complying with TfL’s requirement to finish by December 2018, could hope to resignal, on a fully operational railway, 310 kms of track in 4½ years. The only reason why Thales could attempt it is because they are already on site doing the last bit of the Northern Line from Chalk Farm to Edgware. When this is complete later this year, they would simply move over to the Met., or wherever LU agreed they should start, and carry on.

OK, it’s not as simple as that but at least they could start doing the simple bits like laying the transmission cables on the track and fitting wheel detector heads for the axle counters. They don’t have to go through the safety validation processes that a new supplier would have to and their set up costs will be minimal but they will need a big increase in manpower if they are to get the job completed anywhere close to the due date.

WORKLOAD

Leaving the site design issues out of the story, it is interesting to try to assess what else Thales has to do to get a finish date of December 2018. This is just about 54 months from now. Each month has an average of 30 days and each of those days has, after allowances for taking and giving up possessions, about 3 hours working time available each night. This is 90 hours a month or 4,950 hours for the 4½ years. With 310 kms of track to cover, this means they have to install roundly 63m metres of new signalling every hour from now until the end of 2018. Well, actually, not right up to the end of 2018 since they have to allow time for testing, so they will lose three months. They will lose another three months at the start while they order the cable and fixings from their suppliers, so the actual installation rate will have to be 72 metres an hour. This is a huge workload and, to get it done, there will have to be multiple worksites and multiple gangs distributed around the system. Quality control will be a big issue and a major risk is that there will be a drain on the skills resources of the signalling industry in Britain as a whole and this could delay other projects like fitting ETCS to the Great Western Main Line and ATC² on Thameslink.

MULTICON

Then there is the new SSL control centre at Hammersmith. If I was looking for a name for it, I’d call it Multicon – because of the multiplicity of contractors who have tried to get their kit in there. The building is already built and Thales need to get their kit into this building quickly – another parallel workstream they have to manage – because their SelTrac S40 system³ has a centralised architecture that relies on VCCs (Vehicle Control Computers) to control large sections of the line and all the trains working over it. The VCCs for the south end of the Northern Line (NMA5) will have to control up to 27 trains at once when they have a 33 trains per hour service in operation. The SSL routes will need at least 12 similarly sized VCC areas. They need to get the VCCs in place in order to test anything.

¹ For the full story see, “SSL Resignalling in Trouble”, *Underground News* No.625, January 2014 and “Round Again for SSL Resignalling”, *Underground News* No.626, February 2014.

² ATC = Automatic Train Control.

³ We are assuming here that they will use the same system as they have on the Jubilee and Northern lines.

TRAINS

There are 191 S Stock trains that need to be fitted with VOBCs (Vehicle On Board Computers). Someone has to work out how to install them at each end of the train and interface them with the traction and braking systems. There will be some space for the new kit already available as it was provided for the original Westinghouse equipment but it will need careful design to get everything in.

Trains will be kept out of service while being converted and there will have to be a test track somewhere. Neasden would be the logical place to do it but space in the Neasden complex is at a premium. The depot rebuilding isn't fully complete yet and setting up a modification road is not likely to be feasible. Upminster and Ealing Common depots were ruled out because conversion work to allow S Stock to be maintained there is on-going and late, so they won't want any interference at this stage.

In the end, the solution was Ruislip depot. The installation of the ATC equipment is planned to take place there in a special built shed. It's due to be ready by February 2015. Although it was planned for Bombardier's ATC equipment, we must assume that it will do just as well for Thales.

INTERFACES

The Bombardier-based SSL resignalling programme envisaged the introduction of their system on the Uxbridge line first with Metropolitan S Stock trains running in ATC mode and Piccadilly trains in traditional tripcock mode. This would mean that track circuits would be retained and linked to the operation of the new signalling, something the Thales system didn't do on the Jubilee and Northern Line conversions. This process will add another complication if the overlay mode is adopted on the Metropolitan Line and this will consume a lot of design and safety validation time.

Another part of the Bombardier plan was to convert the Piccadilly Line's 1973 Tube Stock so that it could run over the Uxbridge line and through to Acton Town under ATC. This was not going to be easy and retrofitting S40 to them will be just as difficult. If LU are seeking options to reduce risks and cost, dropping the 1973 Tube Stock conversion is definitely an option, especially since the stock is due to be replaced first under the New Tube for London programme.

Assuming the Thales system adopted is the same as that on the Jubilee Line, the interfaces at places like Neasden and Wembley Park will be simple. Could we ever see empty Circle Line trains running up the local line between Finchley Road and Neasden as used to happen before the PPP break-up? No, because the connections at Finchley Road have gone but at least the engineering is simplified.

At the other end of the difficulty scale, liaison with Network Rail over the Wimbledon and Richmond lines will be another issue entirely. If I was looking for ways to get the important bits of the job done by the due date, I'd take the installation of Thales system over these branches out of the critical path and leave them for after 2018. It'll probably take till then to get Network Rail to agree the engineering and installation processes anyway.

ASSUMPTIONS

Of course, much of this is speculation. I have made a number of assumptions, beginning with the one that says LU will agree a contract with Thales. I have used educated guesses to have a quick look at what has to be done, where and to what. I've left a lot out, not least the design work that has to be done for the really complex junctions at Harrow, Earl's Court, Baker Street and Aldgate. They will each be separate projects on their own. My own feeling on all this is still that December 2018 is not realistic and that, to get a proper job done, 2020 is more realistic. This may then suggest that the 1973 Tube Stock fleet should be left out as they will, if the New Tube for London programme is to work as planned, be delivering new Piccadilly Line trains the following year.

FINALLY

It now six years since the Westinghouse SSL resignalling contract was dropped by London Underground. In *Underground News* No.557 for May 2008, I wrote, in an article reporting the event, that "Thales must be the front runner technically and financially. They have a mature and well tested system...". Finally, I get to rest my case.