ADT Observation Box for Scrubbing in 2016

Scrubbing Preparation Meeting
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Acknowledgements: A. Butterworth, W. Hofle, G. Kotzian, T. Levens, M. Sandonis, D. Valuch,

Overview of ADT System

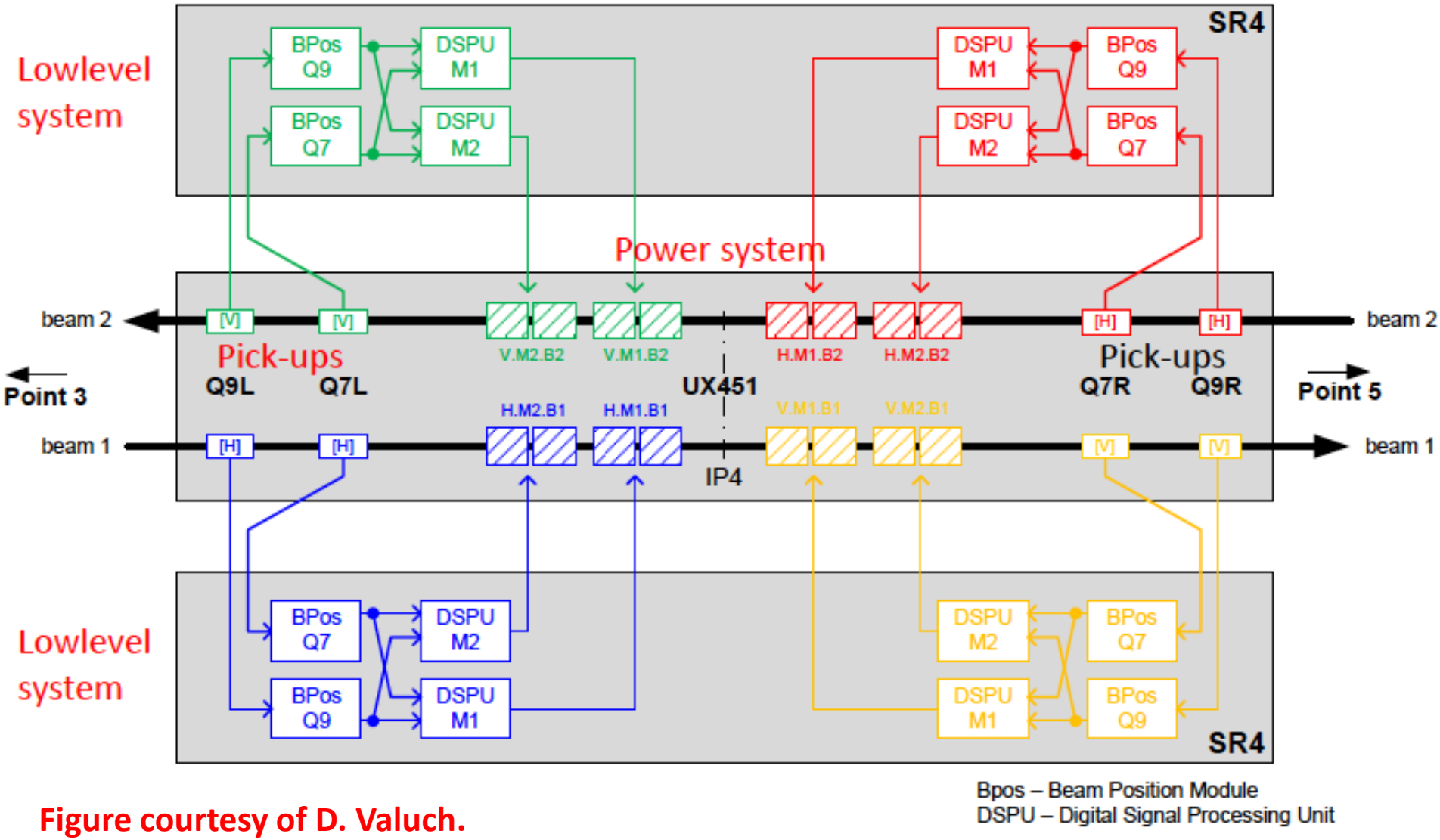
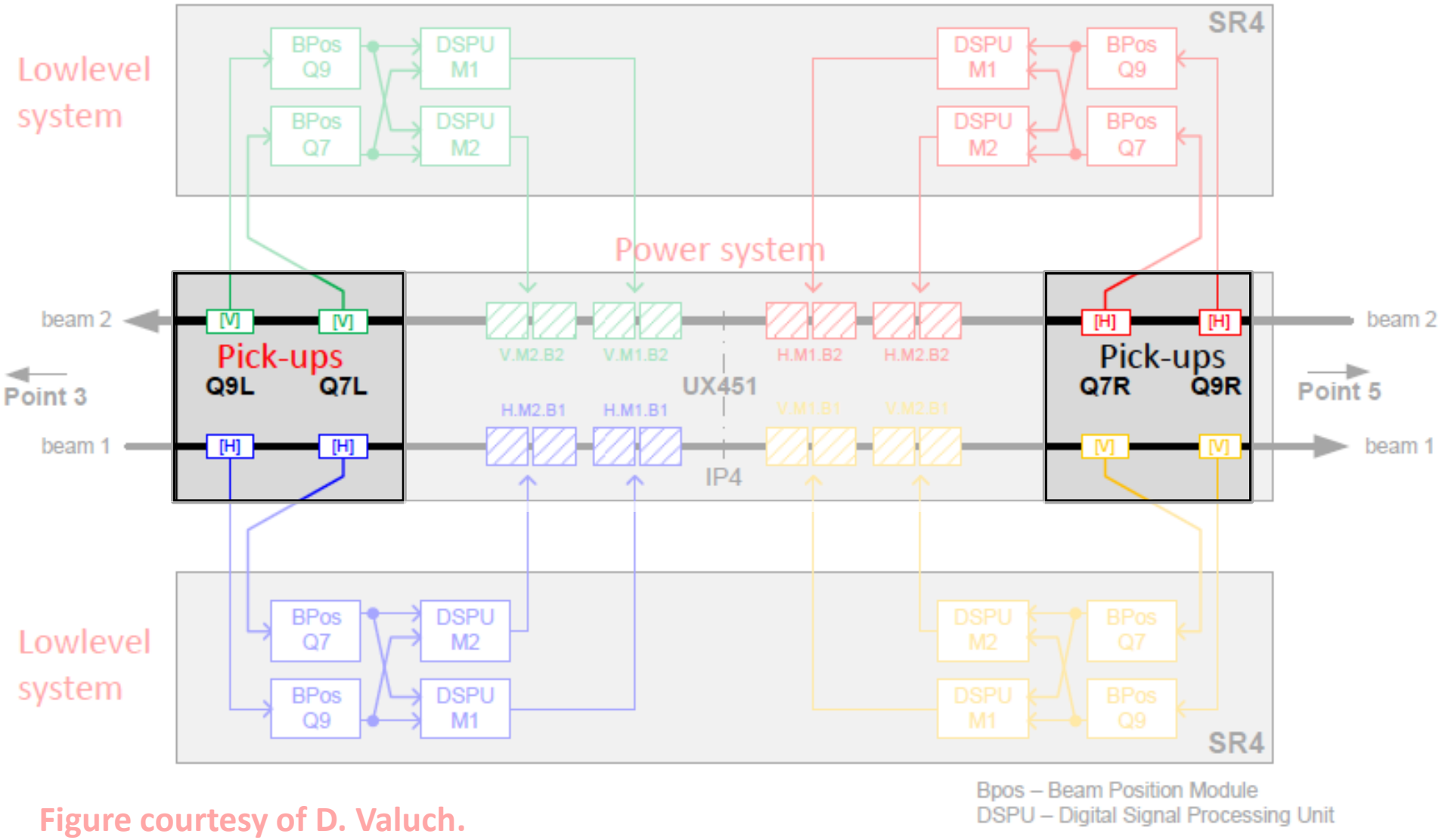


Figure courtesy of D. Valuch.
See W. Hofle, LBOC, 30/06/15

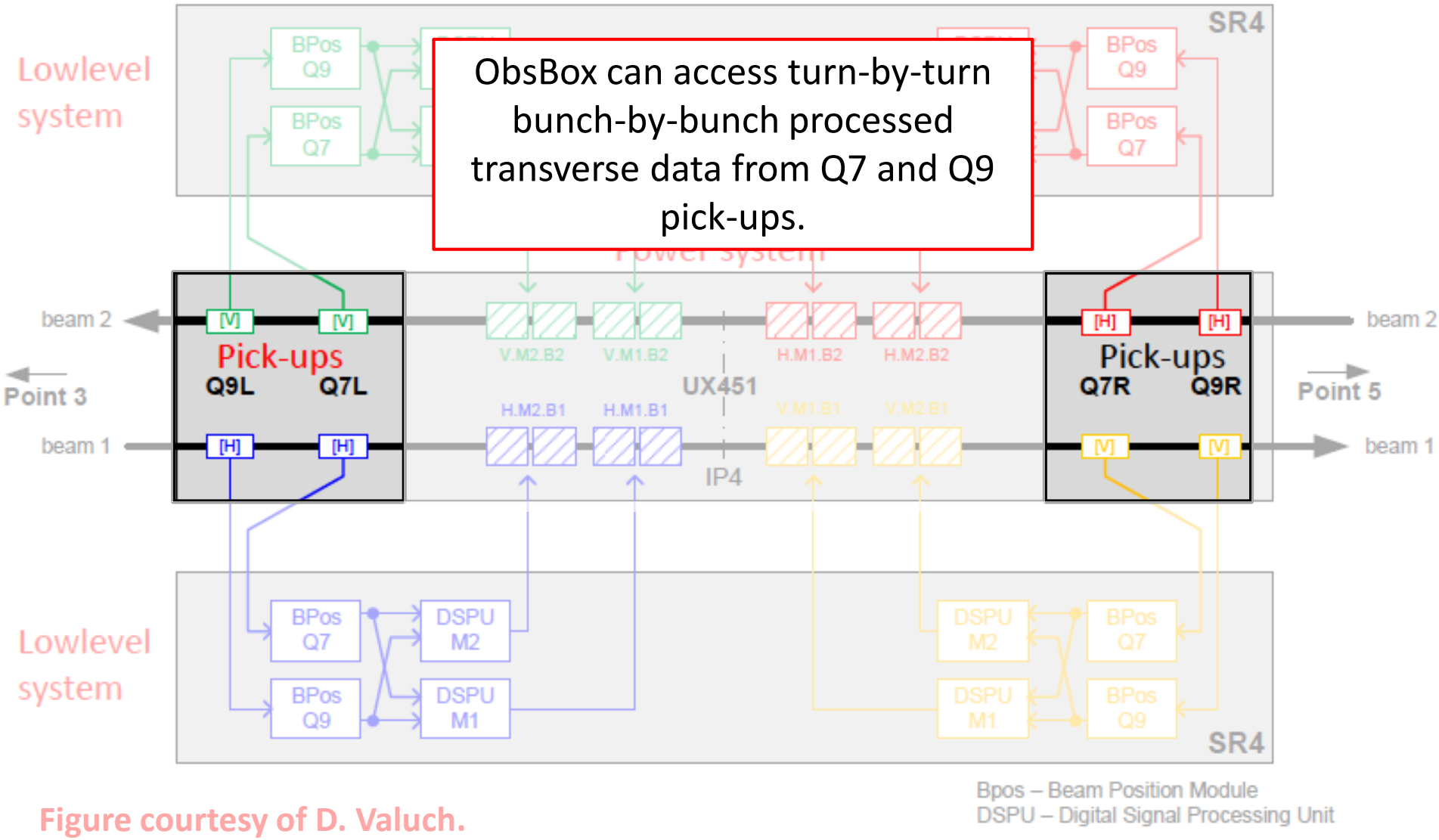
Overview of ADT System



Bpos – Beam Position Module
DSPU – Digital Signal Processing Unit

Figure courtesy of D. Valuch.
See W. Hofle, LBOC, 30/06/15

Overview of ADT System



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ObsBox in 2015

- Last year there was a 6 minute data buffer on one server for all Q7 pickups.
- Scripts were written that sent a signal directly to the ObsBox to trigger data acquisition. ObsBox would then send the data (Nx3640 array, where N = number of turns) over the network.
- For large numbers of turns, data retrieval was very slow. Limited to around 25000 turns (more turns took more than 6 minutes to acquire).
- The system worked well, but there were obvious improvements to be made.

ObsBox in 2016

- This year, 3 new servers have been installed. Each server will process Q7 and Q9 pickups for each plane.
- The buffer for each pickup is now 60000 turns (although this can be changed depending on requirements). When it is triggered, it copies the buffer locally, and sends the copied data. Meaning, you can take as long as you want to download the data, as well as having multiple scripts triggering in quick succession.
- The data is now accessed via a FESA class, which will automatically provide new data for a variety of beam stages (including injection synchronisation).
- The class has only recently been made available, but once there is beam it is very straightforward to subscribe to the class to retrieve the data. Scripts will be much simpler in 2016 than 2015
- There will also be an additional 5th server that will maintain the functionality of the ObsBox in 2015, i.e. manual trigger with different numbers of turns. This will be for use with the more miscellaneous measurements (e.g. Civil Engineering vibration measurements).
- There was a plan to be able to synchronise the ObsBox with a one turn kick on all bunches from the ADT kicker to then record injection oscillations. Don't think it got much traction during the YETS.
- Super fast ADT diagnostics should hopefully be in place by end of April. Will follow up with Gerd.

What we have and what we need to do

- The scripts to retrieve and save the data from injection needs to be written, but will be very straightforward.
- Scripts (developed by Nicolo) exist that use NAFF to calculate bunch by bunch tunes. These could be modified to work with the data from the injection oscillation to calculate tune shift along the injected batch.
- Would need to modify the injection oscillation script to work with the new data files.
- Other ideas I have forgotten?