LBWG memo 13

Why does the survey data have worse signal than LBCS?

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The problem. Initial investigations show that the Surveys field data, when collapsed around individual LBCS sources and treated using the LBCS pipeline, give worse results than the LBCS data itself. In particular, many sources which were class 'P' in LBCS are classified by the LBCS pipeline as 'X'.

LOTSS-DATA	13:55:55.600	56:14:53.700	2015-10-15	11:00:01	XXXXXXXX-----	00	208.981667	56.248250
LBCS-DATA	13:55:55.620	56:14:53.700	2015-03-19	01:20:30	PPP-PPPPP----	100	208.981750	56.248250

Question: Is it simply due to a combination of integration time smearing (probably a factor 1.5-2 amplitude reduction at 2 degrees), bandwidth smearing (similar) and primary beam (probably also similar)? If so we should see a clear position dependence. (And this would imply a change in overall calibration/imaging strategy).

Analysis and result:

33 LoTSS sources were converted into 'LBCS-like' sources after appropriate averaging in time and frequency space and were treated using the LBCS pipeline. The figures below summarise the results found. The sources in red are the LOTSS sources that gave good signal on all/most of the stations after the LBCS pipeline run, with greater radius denoting higher proportion of 'P' classified signals. The yellow sources showed bad ('X' classification) signal on almost all the stations. The numbers right BELOW each yellow source signify the ratio: (SNR for 'LBCS-like' LOTSS data/SNR for actual LBCS sources). I have tested it for two stations so far. The first figure shows the SNR ratios for UK608 and the second one for DE605.

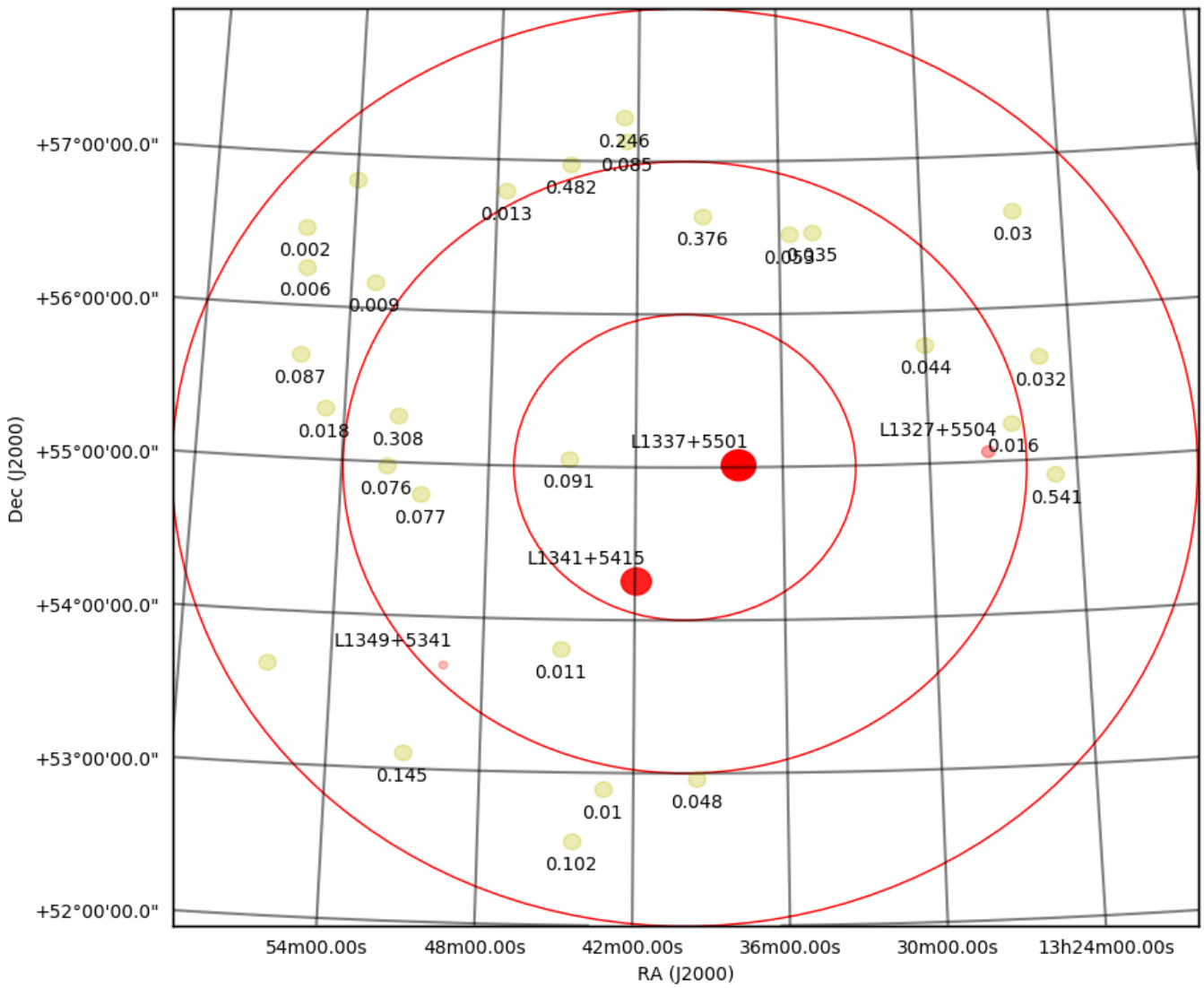

Figure 1: Result of LBCS pipeline run on LOTSS sources and comparison of the resultant SNR with that of actual LBCS sources for UK608

As expected, bright sources close to the centre of the field show good signal after the LBCS pipeline run.

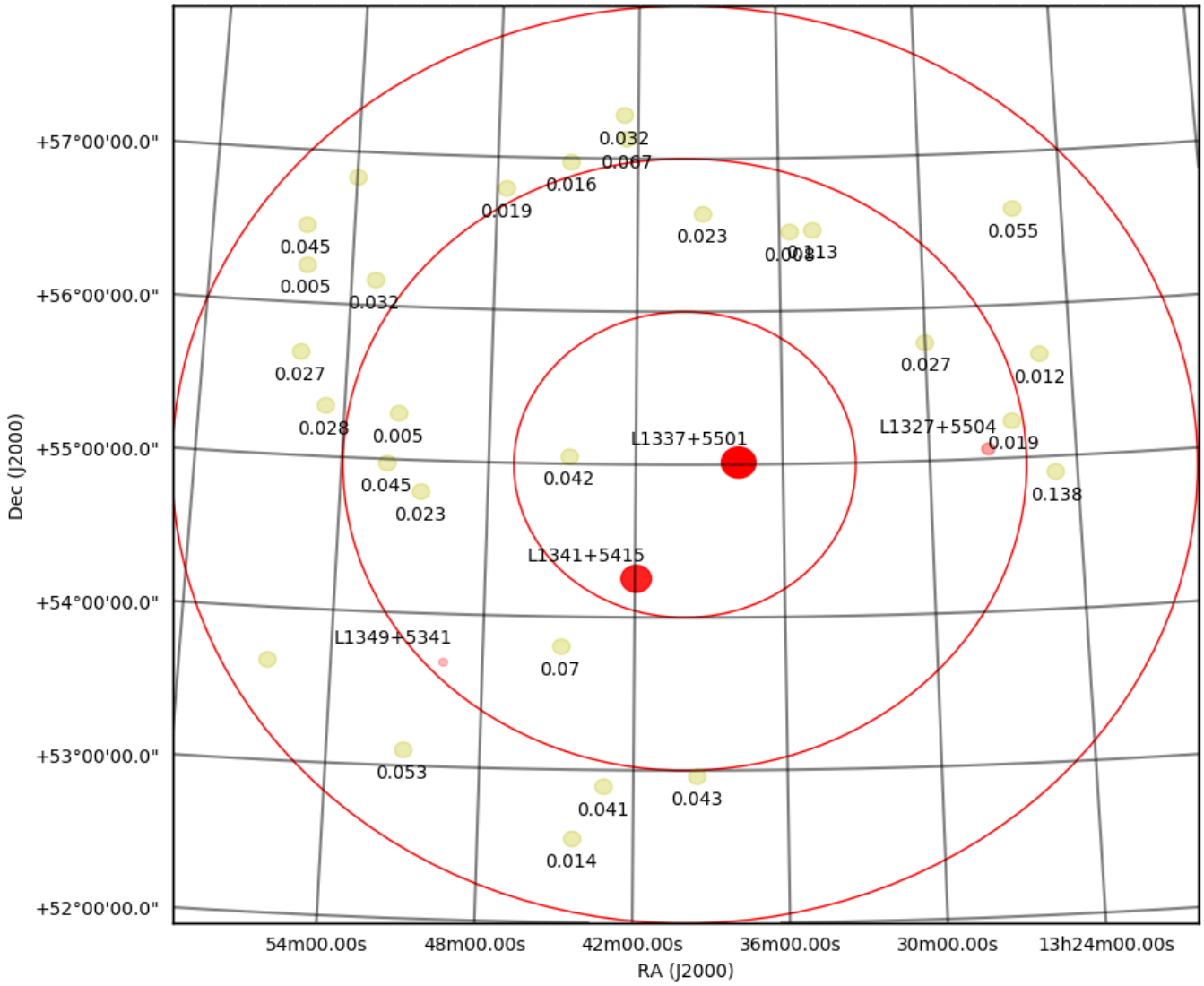

Figure 2: Result of LBCS pipeline run on LOTSS sources and comparison of the resultant SNR with that of actual LBCS sources for DE605

Table 1: The SNR ratios between LOTSS and LBCS sources for 3 of the 4 sources in red (LBCS data was not available for L1337+5501).

	UK608	DE605
L1349+5341	0.028	0.024
L1341+5415	0.098	0.083
L1327+5504	0.018	0.027