VLBA Software Requirements for Update of VLBA Resources in Proposal Submission Tool (PST)

Description of new capability:

An update to the VLBA Resources in the PST is required.   The connections among the "Observing System" and the selected stations need to reflect reality as best we can (although it is and will continue to be, a moving target). This mainly affects HSA stations selected with the VLBA.

In addition, the calculation of Aggregate Bit Rates, for some reason, isn't always done correctly, and sometimes a "NULL" is found in the database table for the Aggregate Bit Rate. This shouldn't happen.

These updates are required "fixes" to the current VLBA resources.

Summary of software subsystems expected to be affected by new capability: Proposal Submission Tool

Operational implications: Hopefully this will allow proposals to have correct stations for a given "Observing System" and vice-versa. Also, the aggregate bit rate will be calculated correctly.

Detailed description of requirements for each software subsystem:

Software subsystem: Proposal Submission Tool
Subsystem scientist: Mark Claussen
Required date for deployment in production: 1 January 2013
Description of required functionality:

The Observing System that can be selected should depend upon the Stations that are selected and vice-versa. The connections between the Observing System and the HSA stations are shown in the following table, and explanatory footnotes:

	Legacy[1]	PFB[2]	DDC[3]	Legacy--[4]
Min – Max Bit Rate	? – 512 Mbps	2048 – 2048 Mbps	256 – 2048 Mbps	4 – 256 Mbps
VLBA	Yes	Yes	Yes	Yes
Gb	Yes	Yes	Yes	Yes
Y27[5]	4X16 MHz	4x 32 MHz	4x128, 4x64 MHz	4x16 MHz
Eb	Yes	Not operational (11/27)	Not operational (11/27)	Yes
Ar	Yes	Not operational (11/27)	Not operational (11/27)	Yes

[1]The Legacy system at the VLBA is the "old" system which uses the 8 BBCs and formatter, which can give up to 512 Mbps, using 8 baseband converters (or subbands) of 16 MHz bandwidth each. Narrow bandwidths for spectroscopy are available, and may be oversampled as discussed in "old" VLBA documentation.

[2]The PFB (Polyphase Filter Bank personality of the RDBE) allows 16 subbands of 32 MHz (frequency placement of subbands is rather limited).

[3]The DDC (Digital Down Converter personality of the RDBE) allows 1, 2, or 4 subbands of bandwidth 128 MHz or 64 MHz, and by the beginning of semester 13A observing (1 February 2013), we expect that the DDC will allow narrow bandwidths, all the way down to 1 MHz (in powers of 2), and reasonably flexible frequency placement of the subbands. (The minimum bit rate in the DDC column is calculated for 1 subband of 64 MHz bandwidth.)

[4]The Legacy system can (obviously) provide 1, 2, or 4 subbands of bandwidth 16 MHz down to 1 MHz (in powers of 2), so this can (likely) match the DDC (or Y27, see note 5) capability for these subband bandwidths. We label this column "Legacy--" as it is just a subset of the Legacy system.

[5]The phased VLA does not use the RDBE hardware/firmware to write data to the Mark5C, but forms the output signals directly from the WIDAR correlator. Therefore the possible available combinations for Y27 are somewhat different than from any of the other systems. Y27 can write 1, 2, or 4 subbands with subband bandwidths from 128 MHz to 1 MHz, reducing by powers of 2 (but for the July 9 CfP we are only offering down to 16 MHz channels). The 4 channels (maximum) are 2 subband pairs (RCP / LCP). The table lists "compatible" channelizations for the observing systems; but may not use all the channels.

The table shows which observing systems can match with which HSA station. Unfortunately the phased VLA (Y27) is a completely different system which is actively being worked upon by NRAO staff so that compatible observations can be made beginning in semester 13A. Error messages should be displayed to the user when the Observing System and Stations are not compatible. Also, if these are not compatible the proposal should not pass validation.

Proposed schedule (including testing and documentation):

Software subsystem: Proposal Submission Tool
Subsystem scientist: Mark Claussen
Required date for deployment in production: 1 January 2013
Description of required functionality:

The aggregate bit rate is calculated by (Number of Baseband Channels)*(Sample Rate)*(Bits/Sample). There is no combination for the VLBA or the VLBA/HSA that allows 1024 Mbps aggregate bit rate. If that rate is calculated (by perhaps a proposer changing the PST-calculated Sample Rate), then an error message should be displayed and the proposal should not pass validation.

Sometimes a NULL value for the aggregate bit rate is stored in the database; this shouldn't happen, and we don't understand how it is done. It would be useful if this could be tracked down and fixed.

Proposed schedule (including testing and documentation):