Milestones for Phase 1 - Proof of Concept

This project will be completed by a combined effort of Open VnmrJ Solutions, LLC (Principal: Dan Iverson) and Tabor Electronics (Principal: Mark Elo). This phase of the project will be to get the Proteus system functioning on a Varian spectrometer. At the end of this phase, one will be able to use OpenVnmrJ (OVJ) to acquire an ahX experiment and process the resulting data set in OVJ. This is a magic angle spinning experiment and the spinning might not be controlled directly from the Proteus system.

Milestone 1

Connect Proteus to a Varian spectrometer and acquire data using a Proteus pulse sequence. This is primarily a hardware integration effort, similar to Berkeley. A goal is to be able to switch a system between a Proteus acquisition and a Varian acquisition. This will serve as a baseline for correctly functioning hardware.

Milestone 2

Trigger a Proteus pulse sequence from OVJ and process the data in OVJ. This will involve establishing a communication pathway to the Proteus system. It is based on TCP/IP but we need to discover how the IP address is set (DHCP, hard-coded, etc). A procedure to import Proteus data in OVJ format has been written. At the end of this stage, a user will be able to click a button in OVJ to acquire data and display the results. The spectrometer will need to be tuned and configured properly prior to executing the pulse sequence from OVJ. OVJ will be unavailable for other tasks while it waits for the acquisition to complete. This will serve as a baseline for correctly functioning hardware and console software.

Milestone 3

OVJ's pulse sequence generation (PSG) language is a collection of pulse elements such as pulse, delay, loop, real-time decision elements, etc. The OVJ pulse sequence libraries have hundreds of pulse sequences constructed from these elements. By implementing these elements using the Proteus hardware control mechanisms, we should be able to enable the OVJ sequence library on the Proteus system. For this milestone, we will implement the pulse elements required to run an ahX solids pulse sequence. This will require several pulse elements to be implemented. These include delay, pulse, acquire, phase tables, shaped pulses, ramped waveforms for cross polarization, and phase-modulated decoupling. It will also require time averaging. Other pulse elements will just be stubbed out. PSG will be modified to export the pulse elements without hardware specific information, or with hardware configuration information appropriate for the Proteus system. At this time, an unknown is how the pulse sequence will be executed by the Proteus system. A Tabor engineer will help with this step. The OVJ communication programs ("the procs") are used to send instructions to the console (Sendproc) and receive data from the console (Recvproc). These will need to be modified for the Proteus system.