ANALYZING CAN-BUS LIMITED BANDWIDTH PROBLEM WITH SIMEVENTS

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Modern control systems reduce wiring among elements of the control loop. More and more systems substitute cable wiring by industrial fielbuses. Industrial fieldbuses are easy for maintenance, they reduce costs, and even we can easily detect failure on the fieldbus or on the device.

In the project of plasma cutting machine we are substituting many cables by one Controller Area Network fieldbus (CAN-bus). We are using CANOpen protocol for communication between computer drives, control panel, I/Os and plasma handling. As mentioned, all of the devices were connected through one CAN-bus. Time for collecting data form all devices and sending all setpoints was set form one to two milliseconds. Meanwhile experiments we observed that some information about speed from drives was missing. Solution for this problem was to add another CAN-bus. Drives communicate through one CAN-bus and rest of the devices communicates through another CAN-bus.

SimEvents extends the Simulink product with a discrete-event simulation (DES) model of computation. With SimEvents software you can develop activity-based models of systems to evaluate system parameters such as congestion, resource contention, and processing delays. You can configure entities with user-defined attributes, and then aggregate entities and attributes to model data hierarchy and transport in applications such as packet-based networks, mission planning, supervisory control, real-time operating systems, and computer architecture.

We used Simevents to analyze our limited bandwidth problem. With blocks from SimEvents we could design a model for our communication. Our models show a situation when all devices were connected through one CAN-bus and a situation when we divided the drives form the rest of the devices and used another CAN-bus.

Figure 1: Plasma cutting machine