

PELLETRON VOLTAGE REGULATION PROBLEMS

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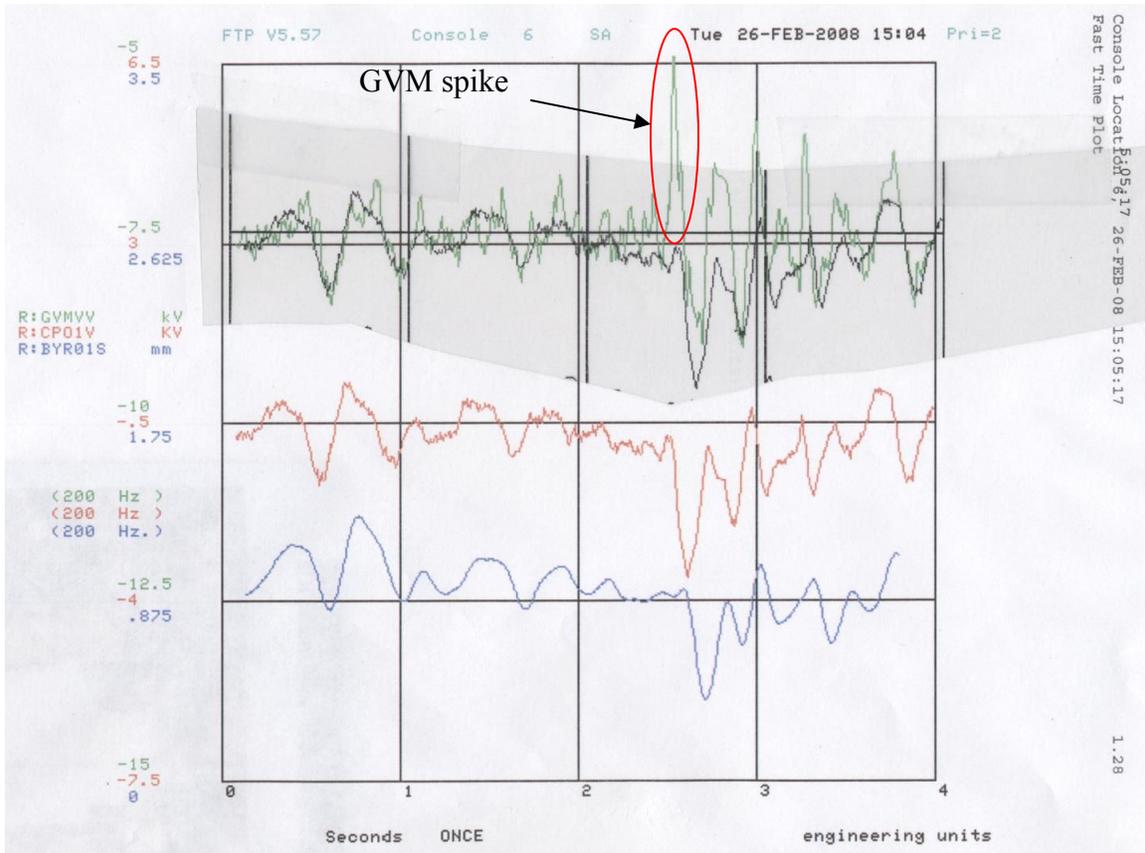
Since we fixed the corona-module in the dome on January 19, the Pelletron has still had intermittent voltage regulation problems. In good times, the terminal regulates within a range of 1.25 kV; in bad times the range is 2.5 kV.

The problems are no longer due to the corona-module, as its reference and monitored corona current now track at all times. This time we have traced the problem to intermittent errors in the output of the GVM signal that we use to regulate the terminal voltage.

To capture this misbehavior, we compared three signals:

1. GVMVV – a high-resolution monitor of the GVM signal.
2. CPO1V -- a broad-band amplification of the A/C coupled terminal voltage monitor.
3. BYR01S – a BPM readout whose position varies directly with terminal voltage.

Fig.1, below, shows the three signals, monitored at 200 Hz. The action of the different signal processing causes slight time-shifts between the three signals.



The upper trace is a superposition of the GVMV and CP01V signals, created by making a transparency of the latter and shifting it to match the timing of the former.

The superposition shows that the two signals track for part of the trace and then the GVMV jumps up as the CPO1V goes down. Note that the BYR01S signal tracks the CPO signal, confirming that the terminal voltage really does go down. Our interpretation is that the GVM has generated a false positive spike which, through feedback, caused the corona-module to drive the terminal voltage downward.

These signals are typical of the kinds of transients that you see often if you fast-time-plot these channels.

Responses to the Problem

1. We are creating composite GVM feedback signal by combining the GMV signal with the CPO signal in a way that uses the GVM output only below .016 Hz.

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2. We will examine and re-habilitate the GVM mechanism in the dome when we next have access to it.