Results from the Band Limited RMS Monitor

Edward Daw
Louisiana State University

edaw@lsuligo.phys.lsu.edu
http://lsuligo.phys.lsu.edu/edaw/homepage/homepage.html

August 13, 2001

Abstract

The band limited rms monitor has been running at both LIGO sites for over 7 months. I explain how the monitor works and the two different ways to access current data. I show some results from the past two months of running and their implications. I talk about new developments in band limited monitoring, particularly searching for peaks in filtered data.

LIGO-G010308-00-Z

How the Band Limited RMS Monitor Works

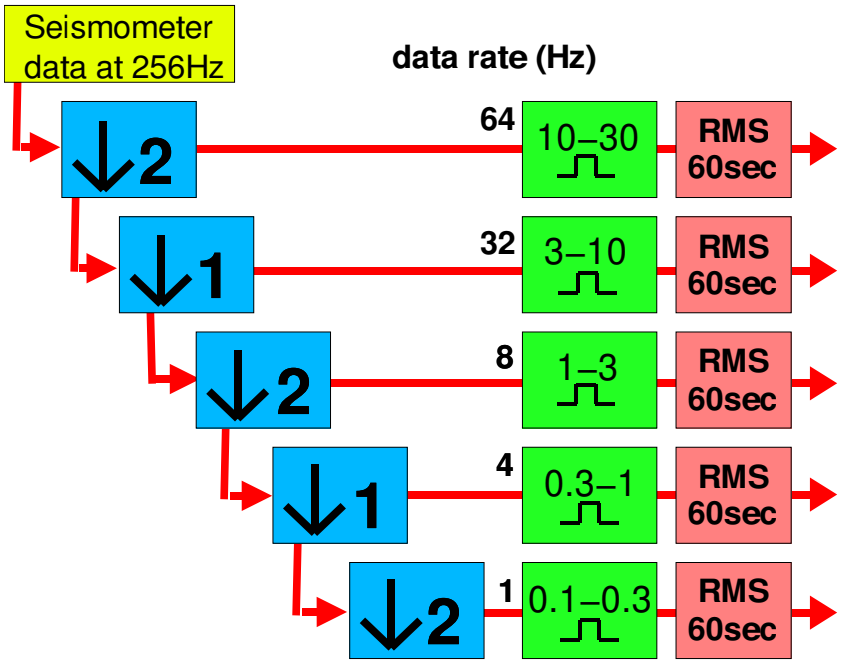


Figure 1: How the band limited RMS monitor processes data from a single seismometer channel. Many channels can be analyzed simultaneously by the same filter bank.

- output to simple text files
- output to DMT viewer

The IIR filter for the 1-3Hz band

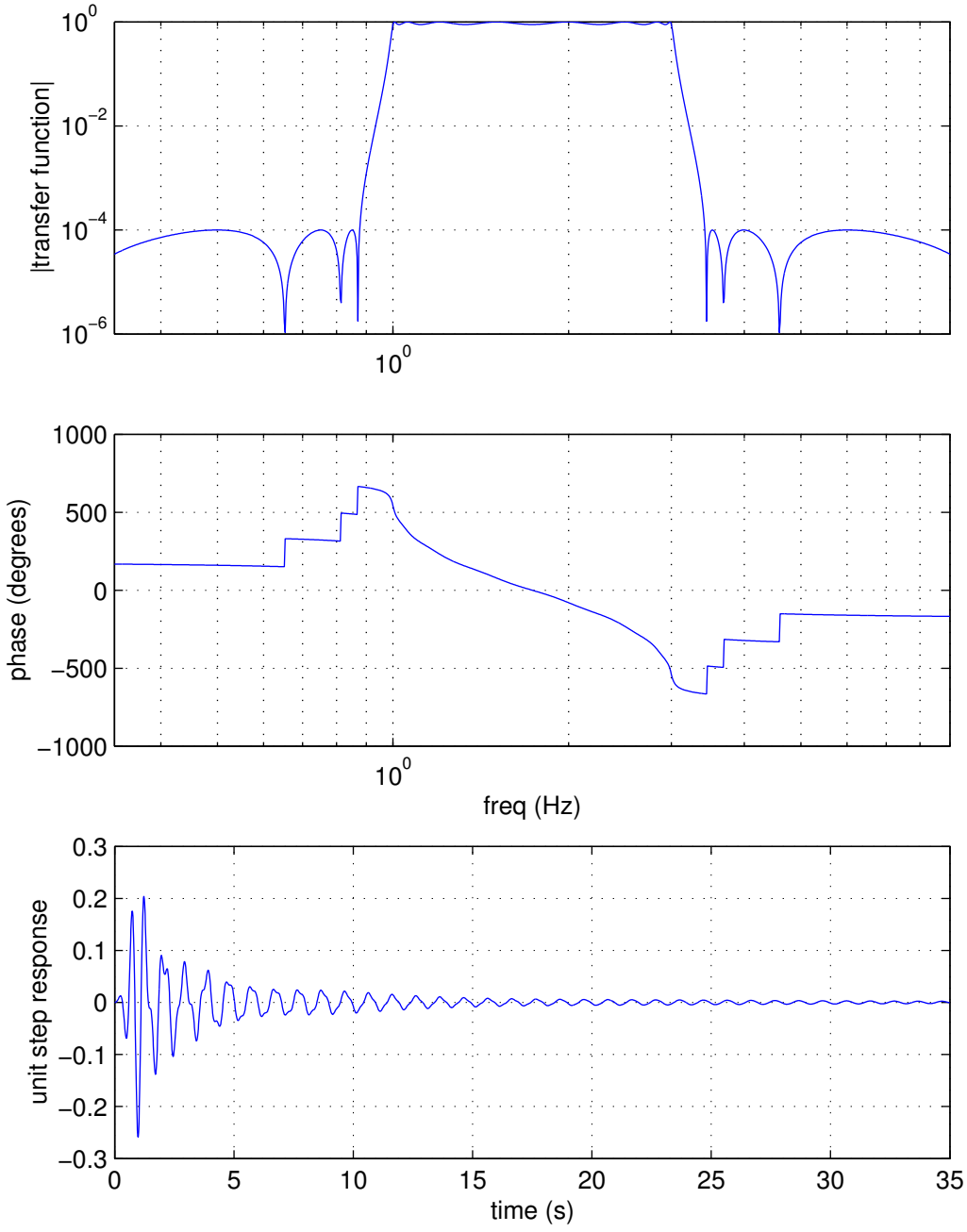
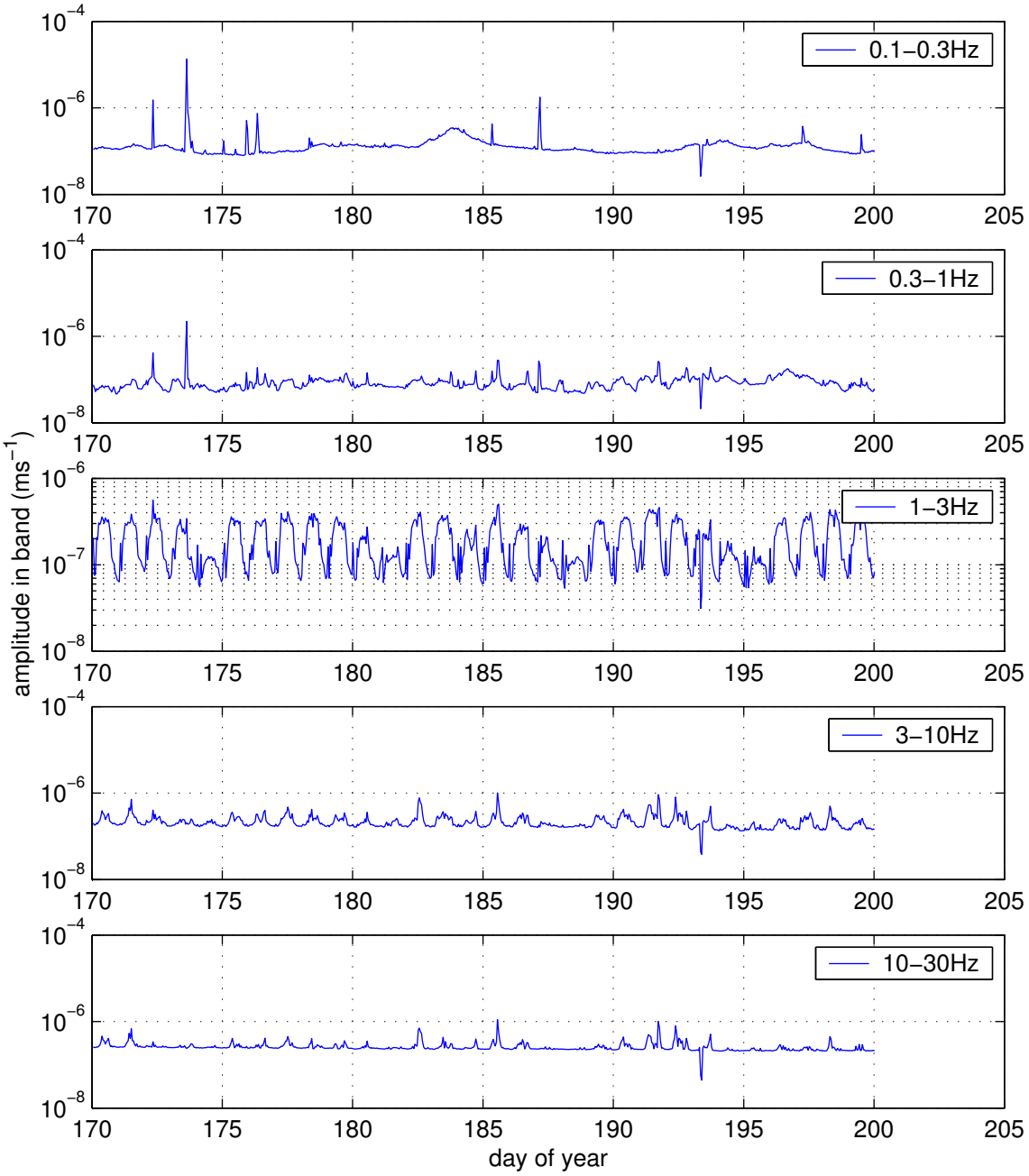


Figure 2: IIR bandpass filter characteristics

Some typical results, from June 2001



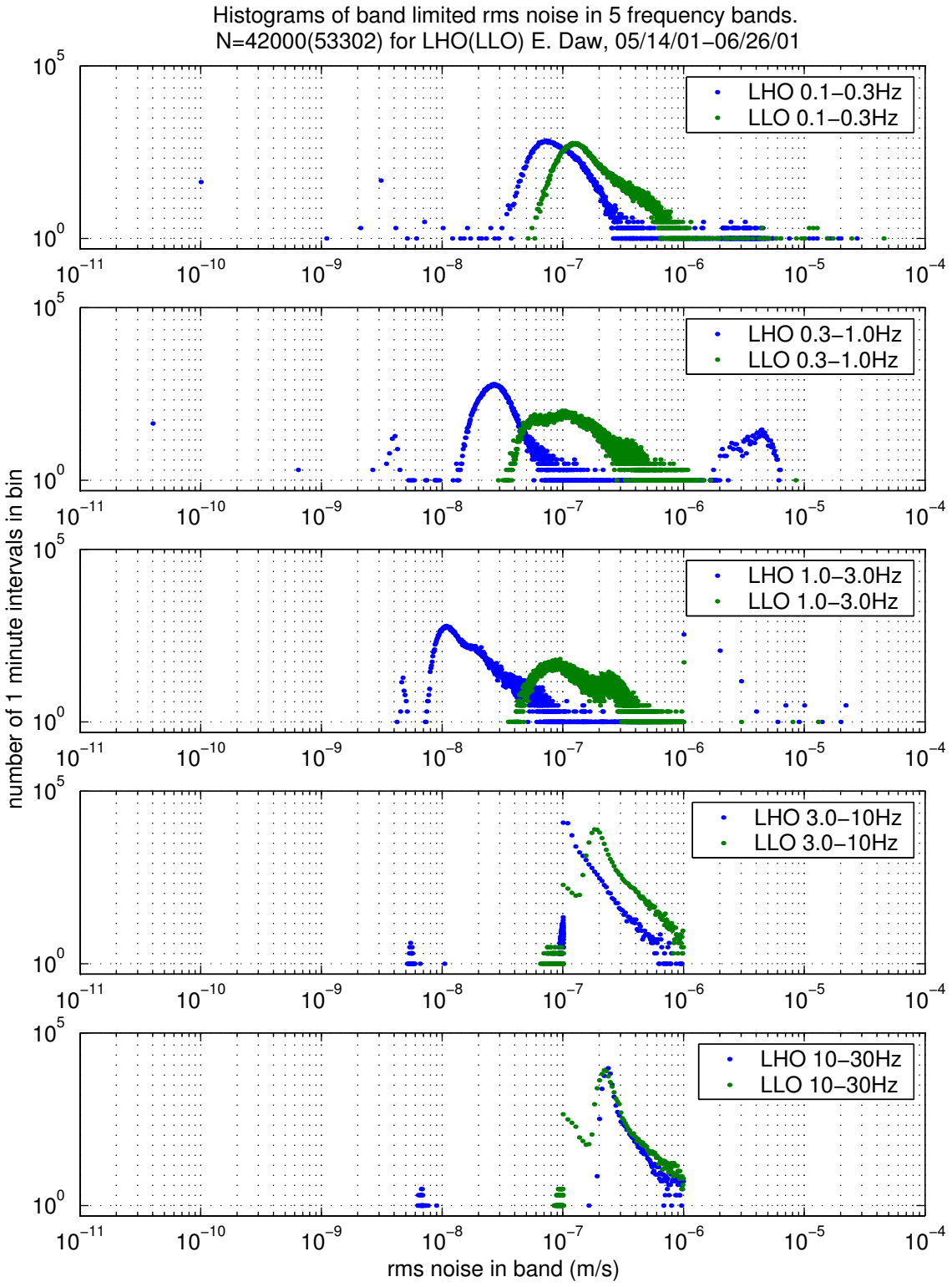


Figure 3: RMS Velocity in 5 frequency bands at Hanford and Livingston over a Month

A monitor for peaks in filtered data

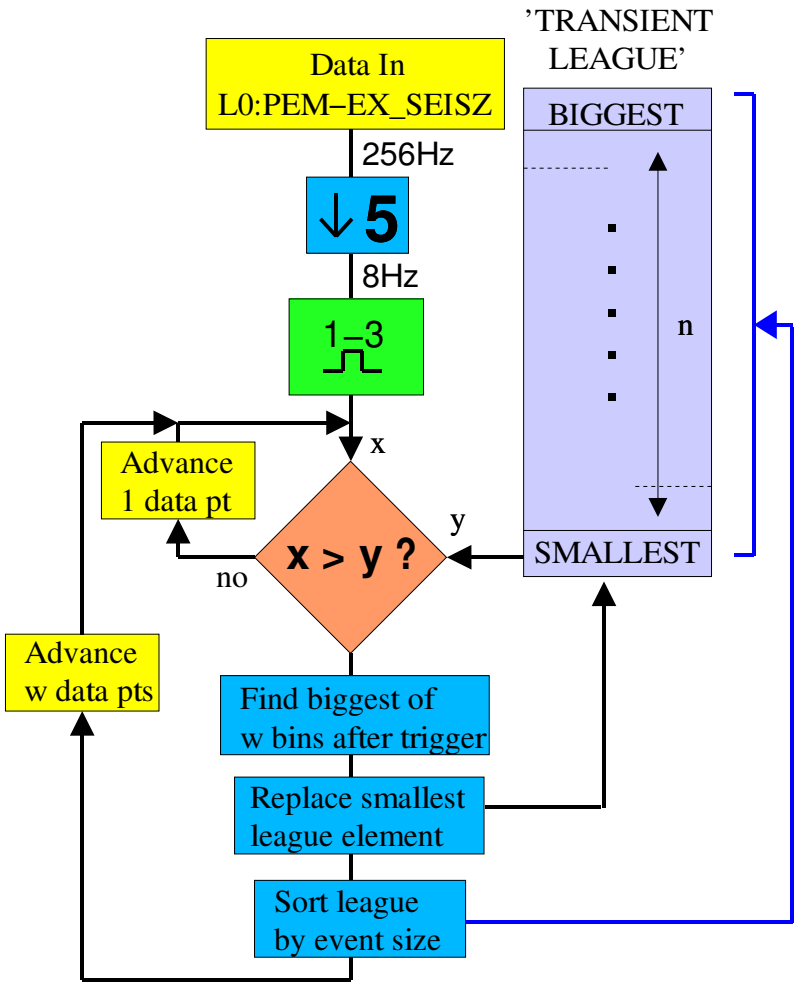


Figure 4: A schematic for a simple peak search monitor

Peak Seismic data from Livingston this week

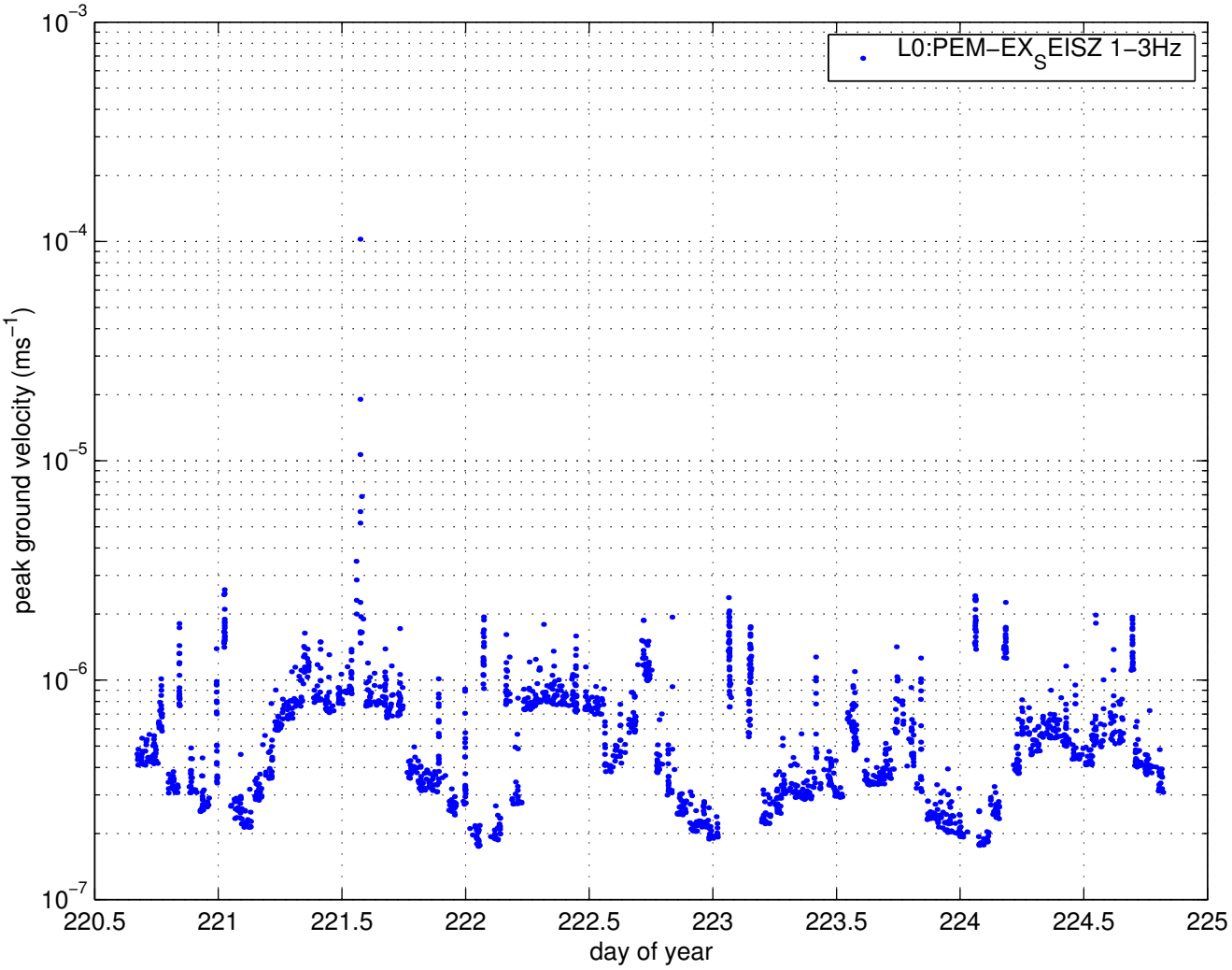


Figure 5: Some preliminary data from the monitor of biggest peaks

Conclusions / Future work

- IIR filter class released in DMT
- BLRMS results comparing Hanford and Livingston indicate that 1-3Hz excess seismic noise is a problem at LLO
- New generic peak search class works on filtered data
- Biggest peaks in a typical LLO day $\sim 3\mu\mathrm{m/s}$.
- TO DO
  - Make blrms class more flexible, user friendly
  - Release peak search class to DMT tree
  - Determine threshold peak velocity for locking
  - Gate peak search with lock loss monitor