Recent Progress:

1. MiniWECC step test results using different time steps (see reverse).
2. Matt approach of ggov1 model attempted.
3. Code flowchart being compiled to aid in further development (timing).
4. Shunts and Branches added to Mirror
5. custom `single2float` function added to reduce casting error during PSLF⟶LTD value exchange
6. `shelve`, instead of `pickle`, used for python data storage. Leads to more consistent read/write operations.
7. GitHub updated: `https://github.com/thadhaines/PSLTDSim/`

Current Tasks:

1. Add logging to Shunt and Branch Agents
2. Add perturbance Agents for Generator/Slack, Shunt, Branch, …
3. Formulate feasible plan of action for casting all WECC governors to LTD governors (tgov1). Something like:
   (a) Parse models of interest from dyd.
   (b) Automate one machine infinite bus test in PSDS.
   (c) Generate/Calculate LTD equivalent model parameters from results
   (d) Export custom dyd for LTD simulation. (PSDS would still use original the dyd, though *could* use modified dyd)
4. Create an agent for every object: SVD, Transformer, …
5. Define Agent actions for AGC/LFC (i.e. ACE calculations)

Future Tasks: (Little to No Progress since last time / Things coming down the pipe)

1. Formulate an experiment utilizing a multi-area model that can be validated with PSDS.
2. Revisit tgov1 model to account for `LoadRef` / `Pref`.
3. Investigate line current data and ULTC action in PSLF.
4. Think about Shunt Control / Generic Agent control based on system state(s)
5. Add import mirror / bypass mirror init sequence option. Will prevent repeated WECC mirror creations.
6. Identify System Slack bus programmatically (currently assumes first slack == global slack if > 1 slack found)
   AND/OR calculate system slack error differently → An average of slack errors?
7. Matt request: Enable multiple dyd files to overwrite / replace previously defined agents/parameters

Current Questions:

1. Overview of planned PSLF scenarios? → Similar to Heredia paper but on Wecc/MiniWecc Scale?
2. Is there more available/relevant event data that may help us to verify simulations of specific instances (wind ramps or other behavior) that novel research will focus on?
3. Any progress / continued interest in miniWecc Area definitions?

Goals:

1. Speed⟶ Order of Magnitude faster than PSDS (not met — only ≈2x faster)

Time step resolution: Changing the time step affects accuracy, size of data collected, and simulation run time. The following data was collected from a 90 second MiniWECC simulation. LTD is ran from the command line and uses rk45 integration and 0.5 MW slack tolerance.The PSDS system simulates exciters and PSS. (PSDS produces a .chf, LTD produced a .mir)

	Time step	Simulation Time [sec]	Data File Size [KB]	Real time Speed up	PSDS Speed up	Reduction of file size	Steady State f varience [Hz]
PSDS	4.167 ms	56.12	35,070	1.60	1	1	0
LTD	2 sec	13.79	238	6.53	4.07	147.35	NA
LTD	1 sec	27.22	479	3.31	2.06	73.21	9.50E-4
LTD	0.5 sec	53.56	871	1.68	1.05	40.26	9.71E-4
LTD	0.25 sec	104.76	1,655	0.86	0.54	21.19	9.77E-4

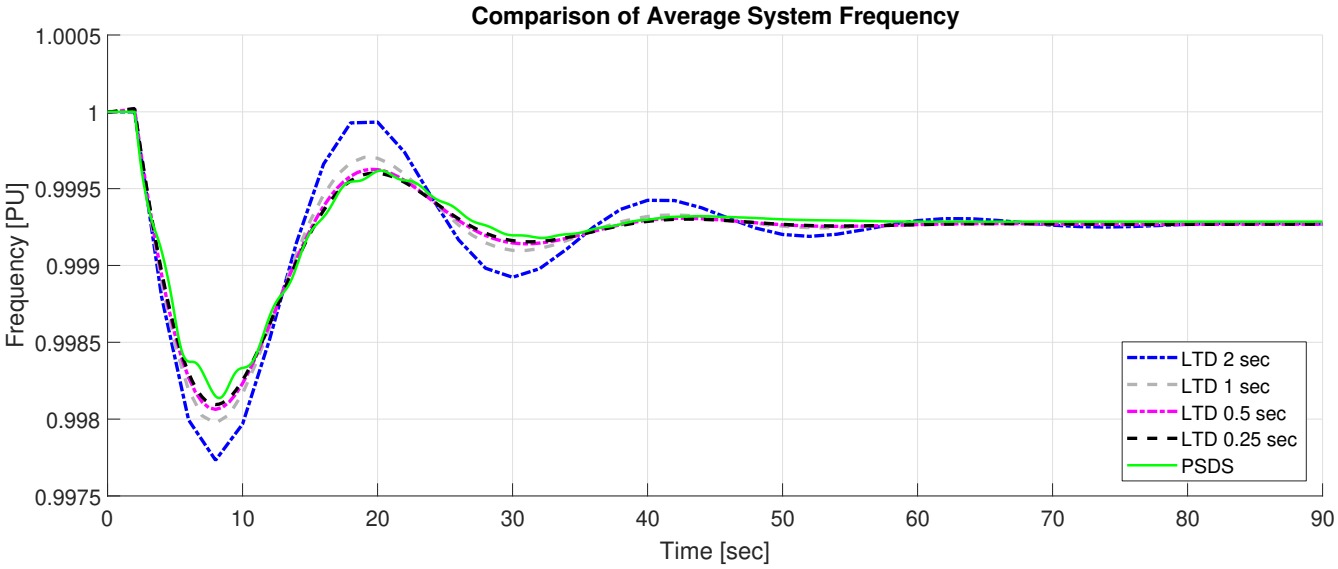

Figure 1: System frequency among different time steps during a 1,200 MW load step.

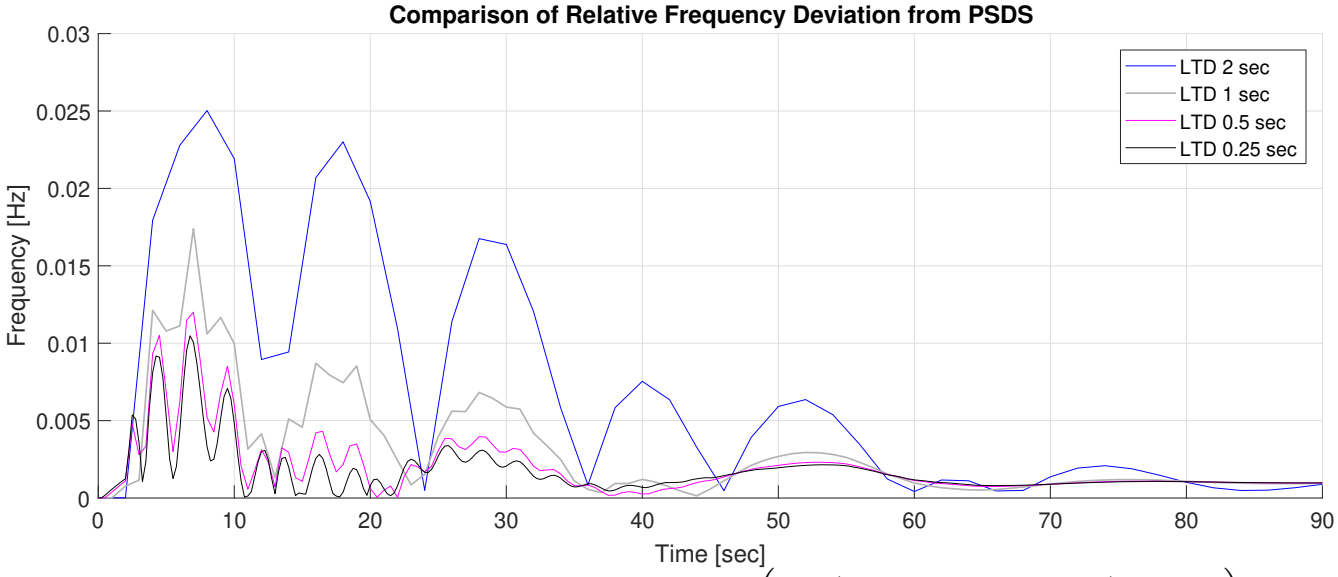

Figure 2: Relative Hz difference of PSDS - LTD $\left(\text{i.e. } \left|f_{PSDS}(t) - f_{LTD}(t)\right| \times 60\text{Hz}\right)$.