



Matlab Algorithm Availability Simulation Tool

Version 0.1

User's Guide



Last Updated: 07 September, 2001

1 Installing and Running MAAST

To run MAAST, follow these simple steps:

- Download MAAST.ZIP from <http://waas.stanford.edu>.
- Unzip MAAST.ZIP in directory of your choice.
- Run Matlab.
- Change directory to MAAST directory.
- Type maast and enter.
- The MAAST Control Panel will appear.

2 The MAAST Control Panel

Here is a screen shot of the MAAST Control Panel.

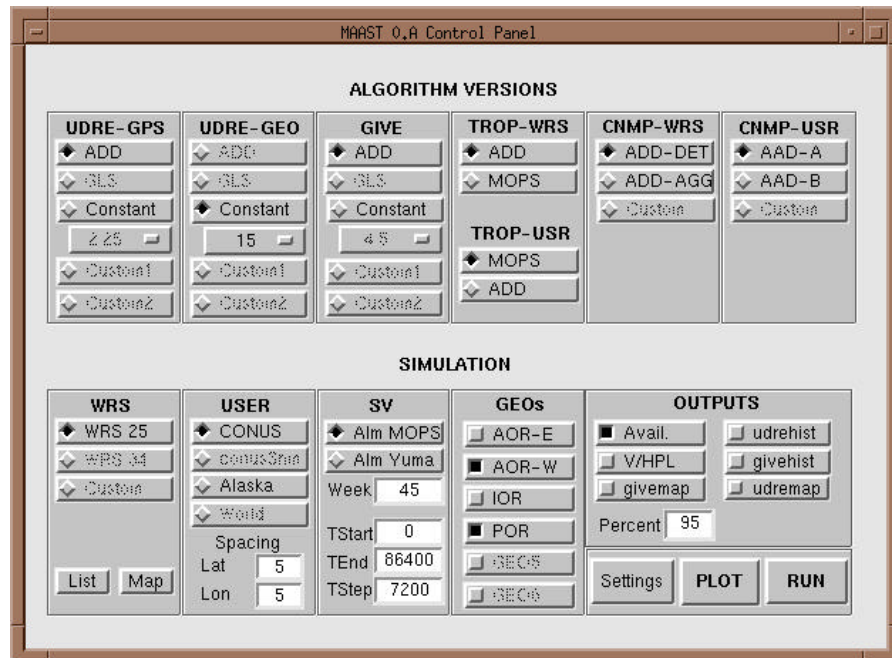


Figure 1

The top half section contains menus for algorithm selection. The bottom half contains menus for simulation configuration. Grayed out buttons and options are not available. Due to the proprietary nature of some algorithms, some options may not be available for general distribution. Custom algorithms in Matlab may instead be programmed by users following guidelines to be detailed in future references.

2.1 UDRE-GPS Menu

This menu specifies the algorithm for calculating UDRE for GPS satellites.

- CONSTANT option activates a list of indexed UDRE values from which to choose from. This sets all GPS satellite UDREs to the specified constant.

2.2 UDRE-GEO Menu

This menu specifies the algorithm for calculating UDRE for geostationary satellites.

- CONSTANT option activates a list of indexed UDRE values from which to choose from. This sets all GEO UDREs to the specified constant.

2.3 GIVE Menu

This menu specifies the algorithm for calculating GIVE for ionospheric grid points (IGPs).

- CONSTANT option activates a list of indexed GIVE values from which to choose from. This sets all IGP GIVES to the specified constant.

2.4 TROP-WRS / TROP-USR Menus

These menus specify the equation for calculating tropospheric error confidence bound for reference stations and for the users to be either the equation specified by:

- WAAS MOPS.

2.5 CNMP-WRS / CNMP-USR Menus

These menus are used to select the method of generating Code, Noise, and Multipath error confidence bounds (CNMP) at the reference stations and at the user locations. This menu is not needed for constant UDRE's and GIVE's, hence options are not available at the moment.

2.6 WRS Menu

This menu selects the ground reference station network to use.

- WRS 25 uses the 25 reference station used by the NSTB testbed.
- LIST / MAP buttons show a list / map of the selected WRS network.

2.7 USR Menu

This menu selects the ground user locations to use in simulation. This will generate a rectangular grid of user locations within the specified boundary.

- CONUS selects users within the continental United States.
- ALASKA selects users in Alaska.
- LAT / LON fields specify user grid resolution in degrees.

2.8 SV Menu

This menu specifies the almanac file in Yuma format to be used for calculating GPS satellite positions and velocities.

- MOPS uses standard almanac given in WAAS MOPS.
- YUMA uses almanac file corresponding to the specified week. Weekly almanacs can be downloaded from the US Coast Guard website at <http://www.navcen.uscg.gov/ftp/GPS/almanacs/yuma/>.
- TSTART, TEND, and TSTEP specify the time steps for the simulation in seconds. The default setting runs through a day in 2-hour steps.

2.9 GEO Menu

This menu specifies the GEOs to be considered in the simulation.

- AOR-E
- AOR-W
- IOR
- POR

3 Outputs

The OUTPUTS menu allows the user to select which plots to show. Multiple selections may be made among the following:

- Availability contour (Figure 2)
- VPL contour (Figure 3)
- HPL contour (Figure 4)
- UDRE map (Figure 5)
- GIVE map (Figure 6)
- UDRE / σ_{flt} histogram (Figure 7)
- GIVE / UIVE histogram (Figure 8)

Other items on the menu:

- PERCENT field specifies the availability percentage on which the VPL and HPL plots are based.
- RUN button runs simulation and plots selected outputs.
- PLOT button plots selected outputs for latest simulation run.
- SETTINGS button opens new window for simulation settings. (Not available as of this writing.)

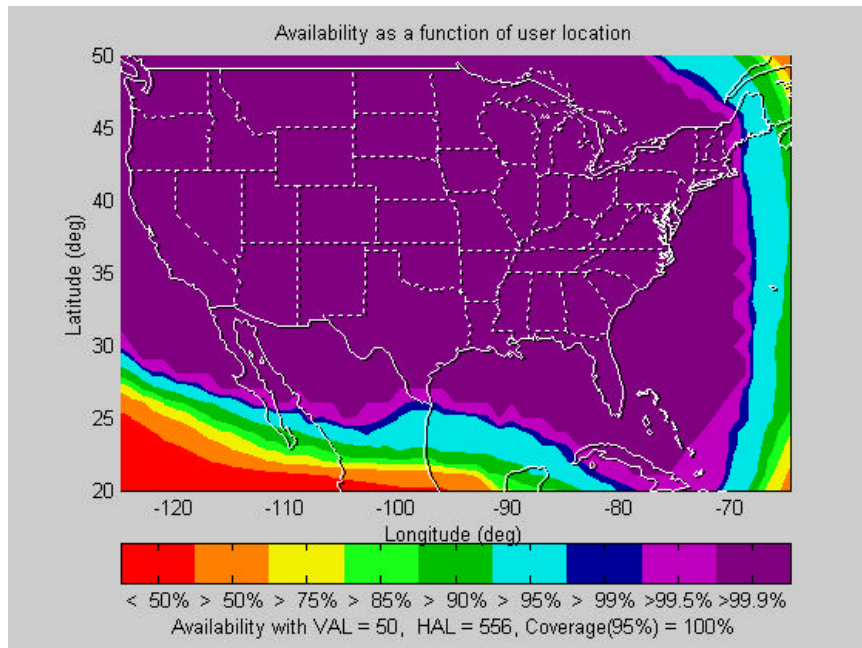


Figure 2: Availability contour*

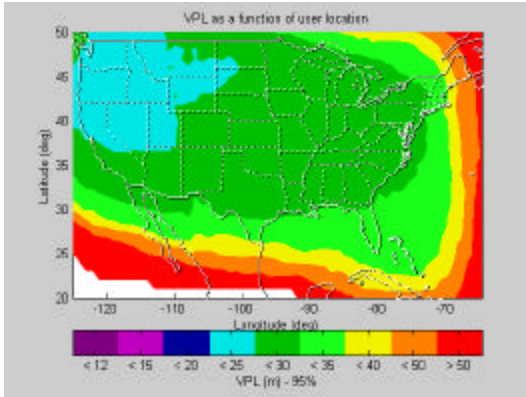


Figure 3: VPL contour*

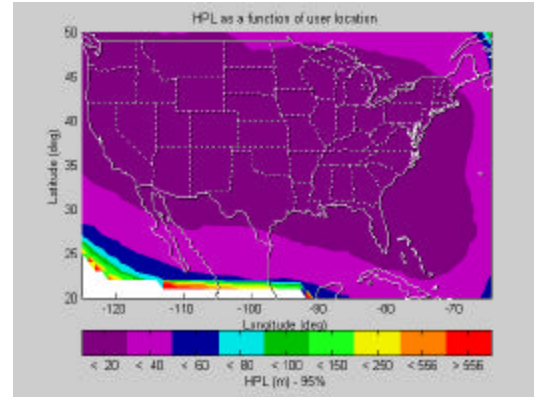


Figure 4: HPL contour*

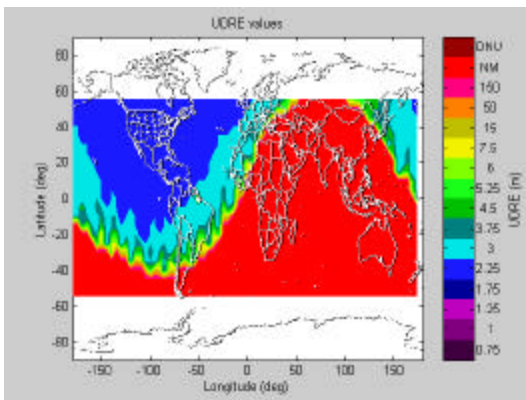


Figure 4: UDRE map*

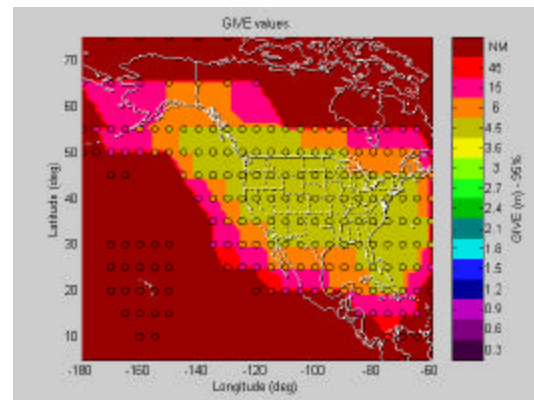


Figure 6: GIVE map*

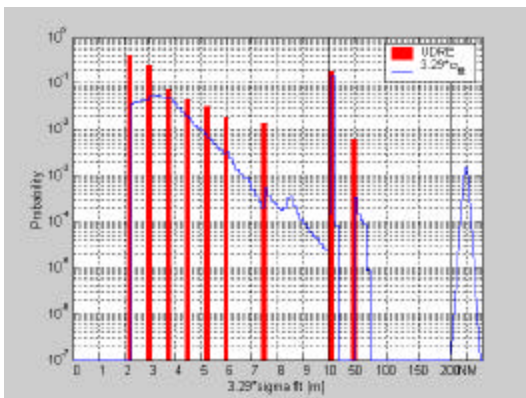


Figure 7: UDRE histogram*

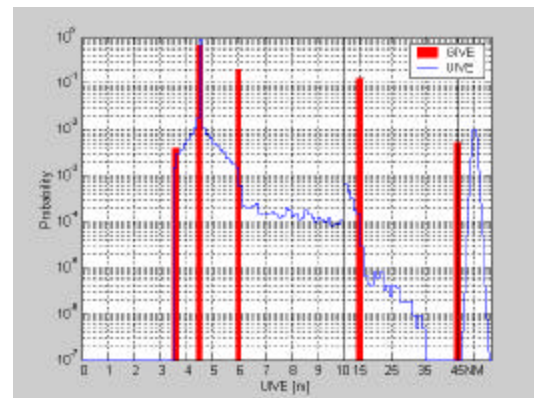


Figure 8: GIVE histogram*

* These plots were generated using proprietary algorithms. Outputs may vary considerably with different algorithm selections.