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Configuring a Graphical User Interface for Managing Local HYSPLIT Model Runs through AWIPS

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PRIMARY OBJECTIVES:

Develop a Graphical User Interface (GUI) that allows forecasters to manage the local HYSPLIT for both routine and emergency use. The interface allows forecasters to quickly determine the current HYSPLIT configuration for a list of predefined sites (e.g., fixed sites and flying sites) and to make any necessary adjustments to key parameters such as Input Model, Number of Forecast Hours, etc. This will help NWS MLR forecasters improve efficiency and reduce human error when running HYSPLIT in support of an incident involving toxic substances dispersed into the atmosphere. During emergencies, forecasters also have the ability to invoke playbook options (e.g., low altitude rocket release, nuclear power plant mishap, etc.) to assist them in optimizing certain parameter settings such as Emission Duration, Emission Rate, Emission elevation, etc. The interface is written in Tool Command Language (TCL) / Toolkit (TK) making it AWIPS compatible and able to run within most LINUX and Windows operating systems.

BACKGROUND

- Responding to incidents involving the release of harmful airborne pollutants is a continual challenge for Weather Forecast Offices in the National Weather Service. HYSPLIT guidance is generated for the purpose of obtaining useful trajectory and concentration forecasts associated with the release of harmful chemical gases, radiation, wildfire smoke, etc., into local atmosphere.
- In previous work (Derber, 2009), the AMU obtained and installed the latest version of HYSPLIT on a Linux system that hosted routine NWP model products. The AMU also configured a utility program to convert WRF EMS output into HYSPLIT binary format for use in generating dispersion forecasts from a locally run mesoscale model. Several scripts were created to run a sequence of commands to generate HYSPLIT trajectory and concentration output on a routine schedule. The scripts reference parameter files for each product that contain the necessary trajectory and concentration HYSPLIT variables.
- Previously, forecasters had to manually change test configuration files before running a HYSPLIT trajectory forecast. Example of the NAM Parameter text file that a forecaster would manually edit.

GRAPHICAL USER INTERFACE

The HYSPLIT GUI allows the user to select site locations, models of preference, map output selection, emission control data, and an additional feature playbook option which automatically changes particle, vertical and horizontal parameters based on the source release. When a Submit button is pressed in the background the code process, apply function to data or parameters and then outputs the proper formatted-HYSPLIT configuration files.
- Programmed using Tool Command Language (TCL) / Toolkit (TK) programming language.
- Fixed Sites: The forecaster can enter or update information such as, Name, Latitude, Longitude, Forecast Time, Model choice, Emission Duration and Rate on the 10 daily updated sites. The HYSPLIT model runs daily for these 10 sites.
- Floating Sites: The forecaster can enter or update the same information as for Fixed Sites along with a playbook option on five additional daily sites. Once changed, these sites will be added to the 10 daily HYSPLIT model run.
- Emergency Site: The forecaster can enter or update the same information as for Fixed Sites along with a playbook option on a single site and then have the HYSPLIT model run with those parameters once the submit button is clicked.
- Playlist Option: The forecaster can select the category of the source release particulate.

CONCLUSIONS

- The forecaster has control over all the input and selectable fields.
- Up to 15 source sites can easily be configured.
- Playlist option allows the forecaster to quickly select the particulate of the source release which then changes the parameters.
- All site, fields, buttons and labels have mouse over "Help" describing their functionality.
- Once done the forecaster just has to click on the "Submit" button, which will then update all configuration files.
- An emergency single site selection menu has been configured which allows the forecaster to quickly configure and run a HYSPLIT Trajectory forecast and view its graphics output.

REFERENCES

### Configuring a Graphical User Interface for Managing Local HYSPLIT Model Runs through AWIPS

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**ABSTRACT:**
Responding to incidents involving the release of harmful airborne pollutants is a continual challenge for Weather Forecast Offices in the National Weather Service. When such incidents occur, current protocol recommends forecaster-initiated requests of NOAA’s Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model output through the National Centers of Environmental Prediction to obtain critical dispersion guidance. Individual requests are submitted manually through a secured web site, with desired multiple requests submitted in sequence, for the purpose of obtaining useful trajectory and concentration forecasts associated with the significant release of harmful chemical gases, radiation, wildfire smoke, etc., into the local atmosphere. To help manage the local HYSPLIT for both routine and emergency use, a graphical user interface was designed for operational efficiency. The interface allows forecasters to quickly determine the current HYSPLIT configuration for the list of predefined sites (e.g., fixed sites and floating sites), and to make any necessary adjustments to key parameters such as Input Model, Number of Forecast Hours, etc. When using the interface, forecasters will obtain desired output more confidently and without the danger of corrupting essential configuration files.

**SUBJECT TERMS:**
Meteorology, weather, Space Shuttle landings, operational, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT), forecasts, National Weather Service (NWS), Linux, trajectory, concentration, Graphical User Interface