This test assesses how easy it is to access and run a UFS SRW Application configuration, modify the configuration to run a getting started step and two experiments:

1. Different horizontal resolution, and
2. New physics suite definition file (SDF).

You will be rerunning the code each time, and then comparing the results.

The test case used here is a two-consecutive day period with significant severe weather across the Contiguous United States (CONUS) from 15-16 June 2019. After completing the technical exercise, participants submit feedback on their experience through a short questionnaire. You don't have to be a graduate student to take the test – all feedback is appreciated!

If you decide to take the test and have not yet registered, please register and submit your feedback here.

In order to perform the test, you will start by running the default SRW Application configuration using the GFSv15p2 suite definition file (SDF) for 48 hours starting at 00 UTC on 15 June 2019 on a 25-km predefined CONUS domain to establish a control experiment. Once that is successful, two additional experiments will be conducted.

First, you will change the configuration to run a 12-hour forecast starting at 18 UTC on 15 June 2019 on a 3-km predefined CONUS domain, still using the GFSv15p2 SDF. Next, you will run the same 12-hour forecast on the 2-km predefined domain, but this time you will use the RRFSv1alpha SDF. Working your way through these examples will assist you with learning how to change these settings and conduct new experiments. Python scripts are available to plot a variety of files from each run as well as difference those fields between two runs.

Important Note: If you are using a laptop for running the SRW App you will need a minimum of 4 Gb of memory and at least 40 Gb of disk space to run a 25 km resolution CONUS case. Running a 48 hour simulation will likely take several hours and thus you may wish to run 12 hour simulations instead. In addition, if you would like to run a 3 km resolution CONUS case you will need at least 24 Gb of memory and additional disk space depending on your forecast output frequency.

All information needed for running the SRW App GST is found in this document or through links provided below. In case you are interested in additional information, detailed documentation is provided in the SRW App User's Guide.

Configure Cloud Resources
Launch EC2 instance

ssh into instance

Install Docker (documentation)
```
ec2$ sudo yum update -y
```

```
ec2$ sudo amazon-linux-extras install docker
ec2$ sudo service docker start
ec2$ sudo usermod -a -G docker ec2-user
```

Download and Run Container

```
ec2$ docker pull samuelephraim/ufs-srw:v1.6
```

If you get a permissions error, run this (`$ sudo chmod 777 /var/run/docker.sock`)

```
ec2$ wget
https://ufs-data.s3.amazonaws.com/public_release/ufs-srweather-app-v1.0.0/docker/fix_files.tar.xz
```

```
ec2$ wget
https://ftp.emc.ncep.noaa.gov/EIB/UFS/SRW/v1p0/simple_test_case/gst_model_data.tar.gz
```

```
ec2$ mkdir tmp
ec2$ mkdir output
ec2$ export HOST_TEMP_DIR=/home/<username>/tmp
ec2$ export DOCKER_TEMP_DIR=/tmp/docker
```

```
ec2$ cd $HOST_TEMP_DIR
ec2$ tar -xzf ../gst_model_data.tar.gz
ec2$ unxz -c ../fix_files.tar.xz | tar -xf -
```

```
ec2$ docker run --mount
"type=bind,source=${HOST_TEMP_DIR},target=${DOCKER_TEMP_DIR}" -it
samuelephraim/ufs-srw:v1.6 bash --login
```

```
container$ export DOCKER_TEMP_DIR=/tmp/docker  (this must be
identical to the $DOCKER_TEMP_DIR on the ec2 instance)
```

```
container$ cd $DOCKER_TEMP_DIR
container$ wget
https://ftp.emc.ncep.noaa.gov/EIB/UFS/SRW/v1p0/natural_earth/natural_earth_ufs-srw-release-v1.0.0.tar.gz
```

```
container$ tar -xzf natural_earth_ufs-srw-release-v1.0.0.tar.gz
container$ cd /usr/local/src/ufs-srweather-app/regional_workflow/ush
```

Run Control Case

```
container$ ./generate_FV3LAM_wflow.sh
container$ export EXPTDIR=<new_expt_dir>
container$ cd wrappers
container$ chmod +x run_all.sh
```

```
./run_all.sh > run_all.log 2>&1 &
```
To check on progress of workflow:
```
container$ tail run_all.log
```

Detailed log files of each step are present in the directory stated at the beginning of the run_all.log file

Output files for the forecast go into the `$HOST_TEMP_DIR`

Run Experiment 1: 3km Resolution (NOT_DONE)

```
container$ cd /usr/local/src/ufs-srweather-app/regional_workflow/ush
container$ cp config.sh conrig_gst_CONUS_25km_GFSv15p2.sh
```

Modify config.sh to update the settings to the following values:
```
EXPT_SUBDIR="test_CONUS_3km_GFSv15p2" [new experiment output
directory name]
PREDEF_GRID_NAME="RRFS_CONUS_3km" [move to the 3-km CONUS domain]
FCST_LEN_HRS="12" [shorten the forecast length to 12 hours]
LBC_SPEC_INTVL_HRS="3" [provide lateral boundary condition (LBC)
files every 3 hours]
CYCL_HRS=( "18" ) [initialize case at 18 UTC]
WTIME_RUN_FCST="01:30:00" [increase the wall clock time]
EXTRN_MDL_FILES_LBCS=( "gfs.pgrb2.0p25.f003" "gfs.pgrb2.0p25.f006"
"gfs.pgrb2.0p25.f009" "gfs.pgrb2.0p25.f012" ) [point to the 3-hourly
LBC files]
```

```
container$ ./generate_FV3LAM_wflow.sh
container$ export EXPTDIR=<new_expt_dir>
```

```
container$ cd wrappers
```

```
((comment out forecast file check lines in run_all.sh)
container$ ./run_all.sh > run_all.log 2>&1 &
```
To check on progress of workflow:
```
container$ tail run_all.log
```

Detailed log files of each step are present in the directory stated at the beginning of the run_all.log file

Output files for the forecast go into the `$HOST_TEMP_DIR`