Changes to code from AMOS 2017 (EnKF\_withDensity\_comb\_norm\_loc.ipynb) to full state implementation

Changes made due to Python Update:

* In calc\_lat\_lst\_indices() function, added conversion to integers before return, this is already implemented in filter\_functions.py, but this code does not yet call that function directly from that file, it still just has it included in its script

Changes to due to error in AMOS code:

* Generate Measurements script:
  + LST input to MSIS was given in radians instead of hours, needs to be hours, this is already correct in filter. Will regenerate measurements based on this error/update (3-7-18)
  + Account for if the simulation is over one day in miss density calculation by adding t = t - math.floor(t/86400) \* 86400 (3-7-18)
  + Saving true density (used in propagation) at each time step and added it to the output file
* Calc\_MSIS density using hour\_init in filter instead of hour\_init\_UT, was using correct hour\_init\_UT in measurement generation
* Inconsistency with using day of year and day of month, calc\_julian\_date accepts day of month as a parameter, not day of year!

Other Updates:

* Updated calc\_MSIS in meas gen to call calc\_lat\_lon\_from\_t\_R in order to be more consistent with filter
* When I normalized the density from 1e-13 to 1e-4 and the amount of noise/error I was adding to the initial estimate from 1e-4, is this the correct amount of error???
* Returning lst in hours instead of radians when creating the array of lat and lst to be used for comparison in filter (does not affect actual measurements, correct lst, in hours, was used for miss)
* Was saving density time array in gen\_meas, but saving all times even when only saving the truly observably times of the other arrays, such as lat, lst, true xyz, etc.